

standard specification for civil maintenance

V9.0



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this document specifies the general standards of materials and workmanship required by the department for maintenance of the road network assets and other civil infrastructure assets

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ABOUT THIS SPECIFICATION

This document was prepared by the Department of Infrastructure, Planning and Logistics (DIPL) and specifies the general standards of materials and workmanship required by the Department for civil maintenance works. It brings together standard terminology and methods for civil maintenance work across all regions of the Northern Territory.

It is designed to be used as a reference document for civil maintenance projects, using a schedule of rates form of payment.

The text has been edited to specify only the types of civil maintenance work performed by the Department and is applicable to all regions of the Northern Territory. The text has been developed through consultation with Departmental Officers with extensive experience in civil works in the Northern Territory.

This Standard Specification will remain unchanged until an updated version is published.

This specification is also available electronically in PDF from the Department's Specification Services website: <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/technical-specifications/roads> .

INFORMATION

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V 9.0 February 2021

Thanks to Wicking for providing
the caricatures which help
enliven a rather mundane subject.



STANDARD SPECIFICATION FOR CIVIL MAINTENANCE V.9.0

REFERENCE TEXT

REFERENCE

Read this Standard Specification in conjunction with the Request For Tender/Quotation, the Project Specific Requirements, and with the Drawings, if any. Only those parts of the Standard Specification which refer to the works being carried out apply, in addition to those items listed in the Schedule of Rates which is attached to the Response Schedules for the particular Contract. This document may be used as a blanket reference specification referring generally to the standards of materials and workmanship required by the Department for civil maintenance works.

PROJECT SPECIFIC REQUIREMENTS

The selection of specific items or materials for the works being carried out are those items listed in the Schedule of Rates in the Response Schedules for the particular Contract. Any additional work or any changes to the reference specification will be specified in the Request for Tender/Quotation document, usually in the Project Specific Requirements section.

PRECEDENCE

Any provision in the project specification in the Request for Tender/Quotation document, including the Project Specific Requirements, or on the project drawings, shall override any conflicting provision in this Standard Specification.

HOLD AND WITNESS POINTS

These apply whether Project Control or Quality Assurance is included in the project or not. Refer to the definitions of Hold Points and Witness Points in the Miscellaneous Provisions section of this reference specification.

Tables of Hold Points and Witness Points are available via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/technical-specifications/roads> .

SITE COPY

Retain a copy of this document on site for the duration of the works.

COPYRIGHT

This reference specification is based on the Department's Roadworks Master Specification and modified to suit civil maintenance works.

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**STANDARD SPECIFICATION FOR CIVIL MAINTENANCE
V.9.0**

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1 MISCELLANEOUS PROVISIONS

1.1 GENERAL

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

1.2 CROSS REFERENCES

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS, AND CODES.

1.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards, Acts and Publications unless specified otherwise:

AS/NZS 1336	Eye and face protection - Guidelines
AS/NZS 1337(set)	Personal eye protection and Eye and face protection
AS/NZS 1338(set)	Filters for eye protectors
AS 1348	Road and traffic engineering - Glossary of terms
AS 1379	Specification and supply of concrete
AS 1742(set)	Manual of uniform traffic control devices
AS/NZS 1800	Occupational protective helmets - Selection, care and use
AS/NZS 1801	Occupational protective helmets
AS/NZS 1906(set)	Retroreflective materials and devices for road traffic control purposes
AS/NZS 1906.4	- High-visibility materials for safety garments
AS/NZS 2161(set)	Occupational protective gloves
AS 2187.1	Explosives - Storage, transport and use - Storage
AS 2187.2	Explosives - Storage, transport and use - Use of explosives
AS/NZS 2210(set)	Safety, protective and occupational footwear
AS/NZS 2299	Occupational diving operations
AS/NZS 2299.1	Standard operational practice
AS/NZS 2299.2	Scientific diving
AS 2815	Training and certification of occupational divers
AS 2815.1	Occupational SCUBA diver – Standard
AS/NZS 2815.2	Surface supplied diving to 30 m
AS 2815.3	Air diving to 50 m
AS 2815.4	Bell diving
AS/NZS 2815.5	Dive supervisor
AS/NZS 4399	Sun protective clothing - Evaluation and classification
AS/NZS 4501(set)	Occupational protective clothing
AS/NZS 4501.1	Guidelines on the selection, use, care and maintenance of protective clothing
AS/NZS 4501.2	General requirements
AS/NZS 4602.1	High visibility safety garments - Garments for high risk applications
AS 4742	Machine-mounted forward and reverse audible warning alarm
ISO 9533	Earth-moving machinery - Machine-mounted audible travel alarms and forward horns - Test methods and performance criteria

NTMTM NT Materials Testing Manual (Includes NTCPs and NTTMs) accessible via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/materials-testing-manual>

NTCP NT Code of Practice (Included in the NTMTM)

NTTM NT Test Method (Included in the NTMTM)

Aboriginal Land Rights (NT) Act 1976 (Cth)

Dangerous Goods Act 1998 and Regulations 1985

Energy Pipelines Act 1991

Mineral Titles Act 2010

Mining Management Act 2001

Water Act 1992

Work Health and Safety (National Uniform Legislation) Act 2011 and Regulations 2011

Railways of Australia (ROA) Code - Installation of Other Parties Services and Pipelines Within Railway Boundaries

ACMA Australian Communications Media Authority - any Standards, Acts, controls specifically required. Refer to ACMA directly.

Standard Specification for Environmental Management, current edition, DIPL publication.

1.3.1 Standards in Conflict

Where conflict arises between a referenced standard and particular clauses of this specification the specification prevails.

1.3.2 Overseas Standards

Where no Australian Standard exists standards published by the British Standards Institute (BSI) or the American Society for Testing Materials are referenced.

1.3.3 Currency of Standards

Use referenced Standards or other documents which are the editions, with amendments, current 3 months before the closing date for tenders, except where other editions or amendments are required by statutory authorities, including, but not limited to, NATA testing authorities and the National Construction Code/Building Code of Australia (NCC/BCA).

1.4 DEFINITIONS

The terms used in this specification are in accordance with the definitions laid down in AS 1348 unless specified otherwise in the Definitions clauses.

AAPA

Aboriginal Areas Protection Authority.

APPROVED

Means approved by the Superintendent except where applicable statutory requirements state otherwise or if a different approver is specified.

APVMA

Australian Pesticides and Veterinary Medicines Authority.

AS BUILT

Has the same meaning as "As Constructed"

AS CONSTRUCTED

A documented record, including drawings, of the details of a construction following its completion. Includes and is the same as "As Built", "As Installed", and "Works as Executed".

AS INSTALLED

Has the same meaning as "As Constructed".

ASTM

American Society for Testing and Materials.

AUTHORISED

Means authorised by the Superintendent except where applicable statutory requirements state otherwise or if a different authoriser is specified.

BASE

The layer of pavement immediately above the subgrade or sub-base and/or below the bituminous surfacing extending for the full width of the traffic lanes.

BOUND MATERIAL

Material, including, but not limited to, natural gravel, crushed material, and in-situ material, stabilised with an introduced binder which is added to enhance the structural stiffness of the material.

BUSINESS DAY

Means the same as "Day".

CALENDAR DAY

Means any day of the week, including weekends, and including Public Holidays.

CARRIAGEWAY

That portion of a road for the use of vehicles, that is between kerbs or barriers where these are provided, including shoulders and auxiliary lanes.

CATCH DRAIN

A surface channel constructed along the high side of a road or embankment, outside the batter, to intercept the water.

CLC

Central Land Council.

CSR

Contractor Service Request.

DAY

Means working day, Monday to Friday, excluding Northern Territory wide Public Holidays, and excluding weekends.

DIPL

Department of Infrastructure, Planning and Logistics

DEPARTMENT, THE

Department of Infrastructure, Planning and Logistics

DERN

Department of Environment and Natural Resources

DRY DENSITY RATIO (DDR)

The percentage ratio of the field dry density of a material to the modified maximum dry density of that material. This property is also termed Relative Compaction.

EMP

Environmental Management Plan.

EPA

Environmental Protection Authority.

EXCESS HAULAGE

Haulage for the distance in excess of 15 km one way.

EXTRACTION AREA

An excavation outside the formation limits for obtaining fill, gravel, rock and rubble. Also known as Borrow Pit.

FCR

Fine crushed rock.

FORMATION WIDTH

The width of cut or fill, including table drains, out to the points of any batters.

HIGH RISK CONSTRUCTION WORK

Has the meaning given to it in the *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011

HOLD POINT

Obtain the Superintendent's written approval for that particular part of the works.

IRI

International Roughness Index, stated as a numerical value.

KPIs

Key Performance Indicators. Measurable values that demonstrate how effectively the Contractor is achieving contract objectives.

MATERIAL EXTRACTION AREAS

(Formerly known as Borrow Pits)

An excavation outside the formation limits for obtaining fill, gravel, rock, rubble and other materials.

MAX.

Maximum.

MIN.

Minimum

MMDD

Maximum Modified Dry Density.

MODIFICATION

The improvement of the properties of a material by the addition of small quantities of a stabilising material.

NATA

National Association of Testing Authorities.

NLC

Northern Land Council.

NTCP / NTCOP

NT Code of Practice – located in NTMTM.

NTMTM

Northern Territory Materials Testing Manual. Available via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/materials-testing-manual> .

NTTM

Northern Territory Test Methods – located in NTMTM.

ON-CALL STAFF

Staff of the Department of Infrastructure, Planning and Logistics, unless the context clearly indicates otherwise.

OPTIMUM MOISTURE CONTENT

The amount of water by mass, expressed as a percentage of the dry mass of the material, at which maximum modified dry density is obtained with the stabiliser added.

PAVEMENT

The portion of a road constructed for the structural support of, and to form the running surface, for traffic.

PROVIDE

Provide and similar expressions mean supply, install, connect, test, commission, and leave ready for use. It includes development of the design beyond that documented.

PSRs

Project Specific Requirements:

- appear in RFT and refer to this document which is the Technical Specification for the project which is the subject of the RFT,
- detail what selections have been made where selections need to be made
- are amendments to specified requirements published in this Standard Specification to tailor the specification to suit the project which is the subject of the RFT

RECYCLED PLASTIC

Products from recycled and processed plastic wastes that have undergone processes in order to create new plastic products: proprietary products included.

REMOVE

Pick up and transport material to be removed to an approved disposal site. Use plant and equipment appropriate for the material to be removed and appropriate for the terrain.

RFT, RFQ

Request for Tender, Request For Quotation. Provisions applicable to one are equally applicable to the other.

ROCK

Hard naturally occurring elastic material which is not significantly affected by immersion in water and cannot be dug with construction equipment normally used for the particular operation.

ROUGHNESS

The roughness of the finished road surface in IRI as measured by a Roughness Meter approved by Superintendent.

RTO

Registered Training Organisation.

RURAL AREAS

Means areas not defined as "Urban Areas".

RWA

Restricted Work Area.

SDS

Safety Data Sheet – provides information about hazardous materials such as identity, ingredients, health and physical hazards, safe handling and storage, emergency procedures, and disposal considerations.

SHALL

Is indicative of a mandatory requirement unless the context clearly indicates otherwise.

SHOULDER

The layer of material immediately above the sub base or subgrade and adjacent of the pavement.

STABILISATION

The process used to enhance material properties for pavement design purposes to overcome deficiencies in available materials, by incorporation of a binder, or granular material, or both.

STOP BERM

An independent blockage of a table drain or a diversion of flow into a culvert.

SUB-BASE

One or more layers of material placed over the subgrade and below the basecourse and shoulders.

SUBGRADE

Top 150 mm of material below subgrade surface.

SUBGRADE SURFACE

The prepared surface immediately beneath the pavement and shoulder layers.

SURFACE FORMATION

The formation of a road from material generally cut from the table drains.

TABLE DRAIN BLOCK

A block constructed in a table drain to divert water into an offlet drain.

TGS

Traffic Guidance Scheme. Includes, but is not limited to, plans, drawings, sketches, diagrams, instructions, and after hours arrangements. Formerly referred to as Traffic Control Diagram.

TMP

Traffic Management Plan.

UNPAVED AREAS

Those areas within the road reserve boundary which are not part of the road pavement, including any medians not paved, batters and table drains and blocks, but excluding footpaths and vehicle access strips.

UNSUITABLE MATERIAL

Any material that does not conform to the properties specified for the materials to be used. If properties of the replacement materials are not specified, then UNSUITABLE MATERIALS are materials which do not conform to the specified properties of standard fill.

URBAN AREAS

Darwin - Urban area is defined as being north, east and west, of the Stuart Highway/Arnhem Highway intersection, essentially covers Darwin and suburbs, Palmerston and suburbs, and parts of Litchfield Shire, Gunn Point Regions, Channel Island Regions, Jenkins Road and the sections of:

- the Stuart Highway from Arnhem Highway to Jenkins Road and
- the Arnhem Highway from Stuart Highway to Edwin Road.

Alice Springs – The area within a 20 km radius from the Alice Springs Post Shop,

Katherine – The area within a 20 km radius from the Katherine post office,

Tennant Creek – The area within a 20 km radius from the Tennant Creek post office,

East Arnhem Region – The area within a 30 km radius from the Nhulunbuy post office.

URL

Uniform Resource Locator – an internet web address.

WASTE DISPOSAL (waste, rubbish, surplus items, surplus material).

Other material is to be removed and disposed of in compliance with the *Waste Management and Pollution Control Act 1998*. These other materials are to be disposed of in approved waste disposal sites or facilities.

WEEDS

Weeds include both declared and non-declared species.

Declared weeds are plant species declared under the *Weeds Management Act 2001*. Land managers have a legal obligation to manage these species.

Non-declared weeds are plant species which may represent a hazard to the public, impact road reserve assets or affect the aesthetics of a landscaped area. These plants can be exotic or native in origin. Non-declared weeds and their appropriate management methods will be identified by the Superintendent as part of the contract.

WHS

Work Health and Safety. Also can be a reference to the NT *Work Health and Safety (National Uniform Legislation) Act 2011* and its Regulations 2011 and their companion Codes of Practice (NT and Commonwealth).

WITNESS POINT

Give the Superintendent sufficient prior notice, in writing, of an action so that that part of the works may be inspected.

WORKING DAY:

Means the same as DAY.

WORKING HOURS:

Means the hours, on a working day, from 8am to 4.30pm.

WORKS AS EXECUTED:

Has the same meaning as “As Constructed”.

WMB

Weeds Management Branch, a division of DENR.

YOU and YOUR

Indicative of the Contractor, any Sub-Contractor engaged to provide services under this contract, and any personnel engaged by either to provide services under this contract.

1.5 THE CONDITIONS OF TENDER AND CONDITIONS OF CONTRACT

The Conditions of Tender and the Conditions of Contract contain additional requirements which apply to works carried out under any contract awarded by NT Government, including any works carried out using this specification.

1.6 ENVIRONMENTAL MANAGEMENT

The Standard Specification for Environmental Management applies for all construction and demolition work for building and civil works carried out by or on behalf of the Northern Territory Government. An electronic copy of this document is available via

<https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/technical-specifications/environmental-management> .

The Standard Specification for Environmental Management takes precedence over this specification.

1.6.1 Preservation of Sites and Artefacts Cultural and Heritage Significance

Refer to the Standard Specification for Environmental Management.

1.6.2 Contractor’s Environmental Management Plan – Hold Point

Refer to the Standard Specification for Environmental Management. Submission of the Contractor’s Environmental Management Plan is a **Hold Point**.

1.7 DISPOSAL OF WASTE

Dispose of waste of all types in a legal manner at a legal waste disposal site.

Obtain any permits required by the operator, and by the owner, of the waste disposal site.

Pay all fees associated with the permits and the disposal of the waste.

1.8 ESTABLISHMENT

1.8.1 General

Allow in the tender for establishment on site, including, but not necessarily limited to, the following:

1.8.1.1 Mobilisation

Transportation to and establishment on site, including all ongoing costs, of all the requirements to complete that stage of the work. Mobilisation will not be paid for work within an urban area. Refer

to the Mobilisation diagrams in MEASUREMENT AND PAYMENT or determined by regional requirements.

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

1.8.1.2 Demobilisation

Removal and transportation from site of all temporary and construction facilities and equipment. Restoration of the site, on Practical Completion of the works, compatible with environs.

1.9 VOLATILE SUBSTANCES MANAGEMENT – HOLD POINT

Contractors must become familiar with any Volatile Substance Abuse Management Plan(s) which is/are applicable in the areas where the Contractor needs access so that the works can be carried out. This includes, but is not limited to, the site(s) of the works, the site(s) of any accommodation used by the Contractor, and any access routes used by the Contractor.

The Contractor must comply with the requirements of any applicable Volatile Substance Abuse Management Plan(s). Failure to comply with an applicable Volatile Substance Abuse Management Plan is an offence. Prosecutions may be instigated. Offenders may be required to leave the area(s).

Aspects of Volatile Substance Abuse Management Plans of particular significance to the Contractor include, but are not limited to:

- The type of fuels used in fuelled vehicles, plant and equipment, and the secure storage of these,
- Products which use propellants, such as aerosol cans, and the secure storage of these,
- Paints, and the secure storage of these,
- Tools and equipment, which could be used to gain access to storage facilities where volatile substances may be stored, and the secure storage of these tools and items of equipment.

Copies of Volatile Substance Abuse Management Plans are available from the community which has a plan in place, community councils, land councils, or via

<https://health.nt.gov.au/professionals/alcohol-and-other-drugs-health-professionals/volatile-substances> .

Check with the community/communities to ensure you receive up to date information.

Hold Point – Provide details of the volatile substances proposed to be brought in to the area(s) subject to Volatile Substance Abuse Management Plan(s) and provide details of the proposed methods for complying with the requirements of any applicable Volatile Substance Abuse Management Plan(s).

This clause is applicable only in areas where Volatile Substance Abuse Management Plan(s) are in place.

1.10 PERMITS TO ACCESS LAND FOR WORKS ON ROADS – HOLD POINT

The Department will advise the Contractor about the entities and/or organisations with jurisdiction over the land by way of the Environmental Risk Assessment document applicable to the contract.

The Contractor must obtain permission, from the entities and/or organisations with jurisdiction over the site(s) of the works, to have access to the land where the works are to be carried out.

The Contractor must pay all fees and charges related to obtaining this permission.

Hold Point – The Contractor must provide documentary evidence of having been granted the required permission(s) to;

- enter the land which is the site(s) of the works, and
- enter any other lands for ancillary activities related to the works, and
- carry out the works and works related ancillary activities.

Do not enter the land until this evidence has been received by the Superintendent.

The Contractor must comply with all conditions imposed by the entities and/or organisations which have jurisdiction over the land.

All works and works related activities in these areas must be carried out within the limits of the existing roadway, existing shoulders, and existing cleared drainage areas immediately adjacent to the roadway.

Unless prior permission is given by the entities and/or organizations with jurisdiction over the area:

- Do not clear any additional land.
- Do not stockpile any materials beyond the pre-existing cleared areas.
- Do not leave any surplus materials windrowed or stockpiled at the worksite on completion of the works.
- Do not windrow surplus materials at the tree line.

Do not spread surplus materials on the batters without approval from the Superintendent.

Hold Point – Provide documented advice on sites to which surplus materials will be taken. Provide documentary evidence of permits, from the entities and/or organisations with jurisdiction over those sites, for the dumping of surplus materials at those sites.

1.11 CAMP SITE/COMPOUND/WORKSHOP – HOLD POINT

Hold Point - Provide a copy of written permission from the owner or lessee of the land permitting establishment and operation of a camp site, compound and/or workshop, before commencing works.

Pay all costs associated with the use of the site(s).

Refer to the Department of Health-Environmental Health Fact Sheet No.700 Requirements for Mining and Construction Projects for camp site requirements.

Maintain all facilities in good condition.

Remove all facilities, unless otherwise agreed in writing with owner or lessee of land, and restore the site to a clean and tidy condition upon completion of the works.

Assume all responsibility for any current and consequential damage caused to the site as a result of occupation. Rehabilitate site similar to site conditions prior to disturbance.

Refer to OTHER REFERENCED AUTHORITIES AND DOCUMENTS, and ACTS, REGULATIONS AND CODES.

1.11.1 Food Preparation Facilities – Hold Point

Hold Point - Provide a copy of proof of registration with DoH of any camp food preparation area in accordance with the *Food Act 2004*.

1.11.2 Waste

Comply with the requirements of the *Weeds Management and Pollution Control Act 1998*.

Remove from the site and dispose of all waste materials, including green waste, food scraps and other putrescible wastes, construction waste, chemicals and effluent in an appropriate manner, in approved legal waste disposal sites or facilities.

Failure to comply with these requirements may result in remedial action being taken at your cost and may result in legal action being taken.

1.11.3 Effluent – Hold Point

Hold Point - Provide a copy of written approval from Department of Health (DoH) for any proposed on-site effluent disposal system, before commencing works.

Ensure that all effluent from amenities is discharged into an approved facility or, if permitted by the controlling authority, the local sewerage system. Effluent disposal direct to ground or water is NOT permitted.

Septic tanks and portable self-contained toilets of suitable capacity may be used subject to suitable arrangements for the disposal of effluent.

Hold Point - Where the use of septic tanks or portable toilets is not reasonable or practical, pit toilets may be used, but this requires the prior written approval of the Superintendent.

Any pit toilets constructed must be at least 100 m from any bore, at least 200 m from any watercourse and sites must be appropriately rehabilitated on completion.

All septic tank installations or alternative septic systems servicing buildings both within and outside of declared building control areas, apart from installations subject to the *Building Act 1993*, must be approved by the Chief Health Officer (CHO) or the CHO's delegate for the area in which the works are to be carried out. Further information may be obtained from the relevant Environmental Health Officer in whose area the works are to be located. Regional contacts are contained within the Code of Practice for On-Site Waste Water Management accessible via <https://nt.gov.au/property/building/health-and-safety/wastewater-management/wastewater-management-codes-and-guidelines> .

1.11.4 Rehabilitation – Hold Point

Hold Point - Obtain approval from the Superintendent for the completed rehabilitation of the camp site/compound/workshop before final demobilisation.

On completion of the works remove all facilities, unless otherwise agreed in writing with the owner or lessee of the land and restore the site to a clean and tidy condition.

Rehabilitate the site to its condition prior to conducting site works for establishing the camp ground, compound and/or workshop unless another course of action is approved by the Superintendent.

Where the camp site/compound /workshop is located within an extraction area, rehabilitation is to be undertaken in accordance with the conditions applying to rehabilitation of extraction areas. Rehabilitation measures must be implemented to a standard approved by the Superintendent prior to final demobilisation. Refer to the Standard Specification for Environmental Management.

Assume all responsibility for any current and consequential damage caused to the site as a result of occupation and pay for all remedial action required.

Refer the Environmental Management clause in this work section and to ACTS, REGULATIONS, CODES, AND AUTHORITIES.

1.12 TIME LIMIT FOR ATTENDANCE

Unless otherwise specified, the works must be attended within the following time limits:

- Generally the work must be attended within 3 working days of notification.
- For urgent call outs within and outside of normal working hours the Contractor must be mobilised within 2 hours of notification.
- For priority works, which involve health, safety and security, the Contractor must be mobilised within 6 working hours of notification.

1.13 EXTRACTION AREAS AND WATER SOURCES

1.13.1 Extraction Areas Locations

Borrow pits will be allowed provided that all the clearances and approvals listed in the Approvals For Extraction Areas clause in the Standard Specification For Environmental Management are obtained. Extraction areas are not be permitted within 125 metres of the road centreline.

1.13.2 Administration

Take responsibility for locating, selecting, operating and rehabilitating all Material Extraction Areas and water sources.

Determine any constraints on the use of potential Material Extraction Areas and water sources, including sites of significance, environmental and salinity etc.

The Contractor must provide all fill and gravel material in the rural and remote areas.

All the cost activities in acquiring the material (locating, obtaining approvals, pushing up, screening, blending, stockpiling and rehabilitation) shall form part of the construction rate.

The Contractor, as an agent of the Principal, shall be responsible for locating new material extraction areas for execution of works in rural and remote areas.

The Superintendent will negotiate any compensation for extraction of material with the stakeholder if required.

1.13.3 Extraction Areas Locations – Hold Point

Existing borrow pits may be used for fill and gravel material.

Hold Point - Complete the Gravel Extraction Pit Management Plan and submit it to the Superintendent prior to any material removal.

Locations of existing approved gravel extraction areas will be provided to the successful Contractor on request.

New borrow pits will be allowed provided that all the clearances and approvals listed in the Approvals For Extraction Areas clause in the Standard Specification For Environmental Management are obtained.

Hold Point – Submit copies of all clearances and approvals to the Superintendent, except for those obtained by the Superintendent and provided to the Contractor.

Extraction areas are not be permitted within 125 metres of the road centreline.

Extraction areas are limited in extent to a distance into the lease of 500m from the road centre line.

Hold Point - Provide to the Superintendent documents detailing the proposed pit positions prior to the establishment of new pits.

Superintendent will establish if current AAPA certificates are in place and will confirm that proposed works/activities are covered in the conditions.

If an areas or activity is not covered in an AAPA certificate, the Principal will apply for the AAPA certificate.

Works must not commence until and unless a current valid AAPA certificate allows for the works to occur. In this context “works” means the works and any associated activities undertaken on or near the site of the works.

1.13.4 Approvals for Extraction Areas – Hold Point

Hold Point - Prior to commencing any work on or in extraction areas, either new or existing, provide documentary evidence to the Superintendent that the relevant approvals have been ascertained or obtained.

The types of approvals are listed below however not all the approvals would be required for every gravel extraction area. DIPL can assist with what approvals is required for each pit area.

- Aboriginal Areas Protection Authority (AAPA)
- NT Environment Protection Authority inclusive of Land clearing
- Heritage Branch (Department of Lands, Planning and the Environment)
- Relevant Land Councils.
- Land owner (freehold) or lease of any land affected.
- Service Authorities.
- Any other approvals required.

Hold Point - Creation or use of existing extraction areas for fill or gravel within the road reserve not supplied by DIPL require the written approval from the Superintendent before use.

1.13.5 Extraction Area Management Plan – Hold Point

New or existing extraction areas require a Pit Management Plan prior to the commencing of any extraction of gravel.

Hold Point - The completed Extraction Area Management Plan must be submitted to the Superintendent for approval before any works commence.

A template of the Extraction Area Management Plan for completion by the Contractor shall be provided by the Superintendent.

1.13.6 Crushing or Screening – Witness Point

The crushing or screening plant to be used on the project subject to this contract must be certified as fit for use by a competent person.

The certification of fitness for use must have been issued not more than one year prior to the date of the scheduled completion of the works plus one calendar month.

A competent person is defined in the NT WorkSafe Bulletin Competent Persons for Inspection and Maintenance of Plant.

Witness Point – Provide documentary evidence of the certification that the plant is fit for use issued by a competent person.

Provide documentary evidence of that person's skills and qualifications which indicate their competence as defined in the NT Work Safe Bulletin cited above.

This evidence is to be provided within 2 weeks of the award of the contract.

1.13.7 Process Control Testing of Extracted Materials

The Contractor is responsible for ensuring extracted material conforms to the specifications. The Contractor must pay all costs associated with replacement of nonconforming material and for correction of all nonconforming works.

1.13.8 Operation of Material Extraction Area

1.13.8.1 Access

Mark out with flags or other clear markings both proposed access route to Material Extraction Area and boundaries of Material Extraction Areas or proposed Material Extraction Areas.

Obtain approval from Superintendent before commencing extraction or track construction works.

Construct only one access road to each pit.

Confine all transport operations to the access road.

Provide and maintain adequate road drainage.

Provide and maintain erosion and sedimentation controls to the access track and the Material Extraction Areas.

1.13.8.2 Extraction

Strip 100 mm minimum depth top layer throughout the area of operation.

Stockpile stripped material clear of drainage to a maximum height of 1.5 m.

Side slopes of sand or gravel to be not steeper than one vertical to two horizontal at any time when the excavation is unattended.

By-products of the excavation operations to be removed or buried unless otherwise required.

Stabilise stockpiles to prevent erosion by using, for example, systems such as silt fences. For longer term stockpiles grassing and battering to 1:4 as well as silt fences are options.

1.13.8.3 Limit of Excavation

- Not within 6 m of any fence line or utility service.
- Not within sight of road traffic.
- Not within 125 m of any road or railway centre line.
- For waterways: Refer to the Department of Environment, Parks and Water Security web page titled Land Clearing for the procedures and processes to be followed. The URL is: <https://nt.gov.au/property/land-clearing> .
- Maximum area: 1 ha. Align the long side with the contour.
- Maximum width: 50 m.
- Maximum depth: 2 m.
- Leave natural vegetation buffer strips 25 m width between pits.
- Do not dump or stockpile any material in these 25 m buffer strips,
- Stockpile cleared vegetation and subsequently spread over the surface of the extraction area.

Existing pits within 125 m of a public road may be used provided:

- No significant revegetation exists,
- Extension proceeds away from the road,
- Site is rehabilitated after use.

1.13.9 Rehabilitation of Material Extraction Areas

Rehabilitate existing pits, or progressively rehabilitate new pits:

- Backfill all test pits.
- Respread unused material and rip 0.5 m deep at 3 m spacing along the contours.
- Remove and dispose of all rubbish and debris in approved disposal sites.
- Replace stockpiled topsoil and cleared vegetation uniformly over the extraction area.
- Batter walls at three horizontal to one vertical where excavation is less than 1 m depth, and six horizontal to one vertical where depth exceeds 1 m.
- Rehabilitate the access road.
- Repair any erosion damage to the site. Rehabilitate the site to prevent future erosion and sedimentation issues.
- Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

1.13.10 Stream Sites

Contact the EPA or Environmental Services prior to conducting any work in a stream site.

Excavation Limits

- Not within 200 m upstream or downstream of any road structure, pipeline or gauging station.
- Not in a manner liable to cause erosion or further disturbance to the watercourse.
- Not within 15 m of the trunk of a tree and not under the branches of any tree.

Conditions

- Leave sizeable islands to ensure groupings of trees that will withstand stream bed erosion.
- Maximum batter slope: Two horizontal to one vertical.

1.13.11 Inspection

Allow authorised personnel from the EPA to enter the site at any time.

1.13.12 Records

Provide the following details on completion:

- List of areas used.
- Chainages of area along the public road.
- Direction and length of haul road.
- Approximate volume of material removed from each site.

Provide suitable forms for such records to the Superintendent.

1.13.13 Water Extraction

Comply with DENR requirements for water extraction as they relate to road construction and maintenance.

On completion of the works advise the Superintendent the total volume of water extracted.

Take measures to minimise erosion, sedimentation, site disturbance and damage caused by the extraction and transportation of the water. Install appropriate temporary control devices or systems.

Rehabilitate disturbed or damaged areas.

1.14 EXPLOSIVES – HOLD POINT

Hold Point - Provide evidence of the following requirements of NT Worksafe:

- License to carry and store explosives.
- Vehicle license to carry explosives.
- Shot Firer's certificate.

Inspect and record the condition of all structures and services subject to possible effect by use of explosives before and after blasting operations.

1.15 PLANT AND EQUIPMENT

1.15.1 Geo-spatial data

If Geo-spatial data is provided by the Principal it is for information only. The data must not be relied on as being accurate. The data must not be uploaded to plant or equipment.

1.15.2 Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

1.15.3 Construction Plant, Equipment, and Vehicles

All construction plant, equipment, and vehicles must be in compliance with all relevant laws applicable in the areas where the works are to occur.

1.15.4 General

Do not clean spray bars or other contaminated equipment on the work site.

Clean plant and equipment in a location and in a manner which prevents pollution of the surrounding environment.

Clean plant and equipment before it is brought on to the site and immediately before it leaves the site to make it pest and weed free.

Plant and equipment is to be inspected and maintained as necessary during the course of the works. Emissions and fluid leaks are to be minimized by ensuring plant and equipment are well maintained, in good repair and in good working order.

1.15.5 Mobile Plant Machinery - Broadband Alarm

1.15.5.1 Standards

AS 4742: Machine-mounted forward and reverse audible warning alarm (withdrawn)

ISO 9533: Earth-moving machinery - Machine-mounted audible travel alarms and forward horns - Test methods and performance criteria

1.15.5.2 Definition

Broadband alarm: Pulsed acoustic signal that comprises a range of frequencies and sometimes referred to as quacker, woosher, non-tonal reversing beepers or white sound.

1.15.6 Broadband/White-Sound Alarm Requirement:

Broadband Alarms (White Sound) must be fitted to all construction vehicles and mobile plant before commencement of works.

Ensure that installation and operations of the alarm/warning systems are sufficient before commencement of works, including, but not limited to:

- All alarms clearly audible above the noise level of the machinery or vehicles.
- Alarms are automatically activated when reverse gear is selected in the vehicle to which it is fitted, or when the machine to which the alarm is fitted is switched on and is in use.
- Directional nature of the broadband alarm is appropriate for works.

1.15.7 Warning Beacons on Vehicles and Mobile Plant, Machinery, and Equipment

Provide beacons, or other vehicle, or plant, or equipment, or machinery, mounted visual illuminated warning devices on the highest point of the cabin roof or superstructure of all vehicles, mobile plant, mobile machinery, and mobile equipment in accordance with the Vehicle-Mounted Signs And Devices Clause in the Description And Use of Signs And Devices Section of AS 1742.3 where these are being used within the road reserve.

Fit beacons with globes rated at a minimum of 55 watts, or the LED equivalent.

Do not use strobe lights.

Ensure that the light is operational whenever the plant or equipment is working on or within 9 m of the roadway.

Ensure that the light is visible from all approaches and not obscured by exhaust stacks, back hoe arms etc, and that the beacons or warning devices are not covered in dust.

Non-compliance with this clause may result in the Contractor being directed to cease work, which will be at no cost to the Principal, and which will not be grounds for an extension of time claim.

1.16 SAFETY

Comply with the *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011 and any applicable Codes of Practice, and any applicable Australian Standards.

All workers on site are to have undertaken and completed **Prepare to work safely in the construction industry** (CPCCWHS1001), or superseding or preceding equivalent qualification recognised by training.gov.au.

Site specific and Task specific induction training is still required for all work sites and is to be provided by the employer.

1.16.1 Safety Officer – Witness Point

Witness Point - Appoint a Safety Officer and notify the Superintendent of the Safety Officer's name, and contact details, including an after-hours contact phone number.

Ensure the Safety Officer is capable and available at all times as required.

The Superintendent retains the right to revoke the appointment of the Safety Officer at any time, and direct that another person be appointed.

1.16.2 Work Health and Safety Management Plan - Hold Point

Hold Point - If the Act requires it, provide a Work Health and Safety Management Plan within 14 calendar days of award of the contract. Do not commence works until the Superintendent has advised that the Work Health and Safety Management Plan may be used.

Comply with the *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011 and any applicable Codes of Practice.

A person with control of a construction project, irrespective of monetary value of the contract, where five or more persons are working, or are likely to be working simultaneously on a construction site must ensure that:

- a site-specific Work Health and Safety Management Plan is prepared before the work commences; and
- the plan is monitored, maintained and kept up to date during the course of the work.

The person with control of the construction project must ensure that the Work Health and Safety Management Plan includes, but is not limited to:

- a statement of responsibilities, listing the names, positions and responsibilities of all persons who will have specific responsibilities on the site for Work Health and Safety;
- the detail of arrangements for ensuring compliance with the Work Health and Safety induction training requirements of this national standard;
- the detail of arrangements for the co-ordination of health and safety issues of persons engaged to undertake construction work;
- the detail of arrangements for managing Work Health and Safety incidents when they occur, including the identities of and contact details of all persons who will be available to prevent, prepare for, respond to and manage recovery from such incidents;
- any site safety rules, with the detail of arrangements for ensuring that all persons at the site, whether employees, Contractors, suppliers or visitors, are informed of the rules;
- the hazard identification, risk assessment and risk control information for all work activities assessed as having safety risks; and
- the safe work method statements for all high-risk construction work.

1.16.3 Safety Practice

Provide safety equipment, protective clothing and devices and first aid facilities.

Ensure that employees are instructed concerning hazards and how to avoid injury.

Observe good safety practices throughout the Contract.

1.16.4 Safety Equipment, Clothing, and Devices

Safety equipment, clothing, and devices used are to comply with the requirements of the Australian Standards listed in this work section.

1.16.5 Work Involving Chemicals

Comply with *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011.

SDS documentation for chemicals used during the works must be held on site at all times during the works.

Spill clean-up equipment and materials, appropriate for the type and quantities of chemicals used on site, must be kept on site at all times during the works. They must be kept in a readily accessible location. The equipment and materials must be maintained and replenished as needed. Staff trained in the use of the spill clean-up equipment and materials must be on site at all times during the works.

Report all chemical spills to the Superintendent.

Where appropriate, also report spills to the NT Pollution Hotline, phone 1800 064 567.

Chemicals include, but are not limited to, paints, fuels, oils, herbicides, pesticides, tars, lubricants, cleaning products (domestic and industrial types), inks, dyes, toners, fertilizers etc.

1.17 FENCING AND SHORING OF OPEN EXCAVATIONS

Comply with *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011.

Design, construct and maintain the excavation and shoring in a safe and satisfactory condition.

Support trenches in saturated or unstable ground with close timbered shoring or similar.

Ensure fencing and access / egress requirements are identified and implemented to comply with *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011.

1.18 UTILITIES AND OTHER SERVICES PASSING UNDER EXISTING PAVEMENTS – HOLD POINT

Utilities and other services which are to be routed under existing pavements located in a road reserve which would otherwise not be subjected to works must be routed through thrust bored channels.

Hold Point – If the pavement is to be subjected to works, and open trenching for the routing of utilities or services is proposed, and has not been approved as part of the works, obtain approval from the Road Authority and the Superintendent before undertaking any excavation works for trenching across the existing pavement.

The utilities and other services are to be housed in conduits.

The installations must comply with the requirements of the authorities with jurisdiction over the utilities or services.

Do not cut any trenches in existing pavements located in a road reserve for utilities and other services which are to cross the pavement.

Refer to THRUST BORING in the Standard Specification for Roadworks.

1.19 EVIDENCE OF UNSCHEDULED WORKS

When requested by the Superintendent the Contractor must provide evidence for any unscheduled works.

The requirement for evidence shall include the provision of certified copies of the following:

- Material invoices
- Specialist sub-Contractor invoices
- Time sheets, time records, vehicle log books and photos.

The provision of satisfactory evidence is a prerequisite to Payment for the work and percentage on-cost.

1.20 STOCKPILES

Specification Reference: Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

Refer to the clause **Permits to Access Land for Works on Roads** in this work section.

Stockpiles are to be located in previously cleared areas.

If no clear area is available within a reasonable distance from the work site obtain approval from the Superintendent prior to clearing a new area.

The stockpile is to be located within the boundaries of the site of the works.

Construct gravel foundation for stockpiles with 100 mm compacted thickness. Trim and compact to 95% relative compaction.

Do not create a stockpile within;

- An environmentally sensitive area.
- A vegetated area without prior approval for clearing as stated above.
- On a flood plain.
- Where it will affect a site with cultural or heritage significance.
- Within 5m of the boundary of the cleared area.

For waterways: Refer to the Department of Land Resource Management web page titled Land Clearing for the procedures and processes to be followed. The URL is:

<https://nt.gov.au/property/land-clearing> .

Cover stockpiles with plastic sheet or other appropriate materials to prevent pre-coat, fines and dust from being released in to the environment during rain or wind events.

Stockpiles in urban areas are not permitted.

Provide a separate site for each aggregate size. Allow 15 m between adjacent sites.

Ensure sites are well drained and on hard ground. Avoid contamination by dust.

Maintain access roads and stockpile sites.

Avoid sites under trees, telephone lines, overhead transmission lines or where overhead clearance is less than 6 m.

Remove from site any non-conforming aggregate.

For work in or close to regional centres, towns and urban areas, remove all unused aggregate from stockpile sites at conclusion of work. For rural work, prepare unused aggregate into one neat and tidy stockpile, per aggregate size.

Construct stockpiles at least 1 m high and batter sides 1V: 1.5H.

Trim neatly to facilitate measurement.

Neatly stockpile all waste materials from the screening process.

1.21 WORK ON RAILWAY SITES – HOLD POINT

Comply with *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011.

Carry out work within railway sites to the approval of the owner and operator of the railway.

The Contractor must comply with all requirements, conditions and directions of the owners and operators of the Railway pursuant to the *Rail Safety (National Uniform Legislation) Act 2012* when carrying out work under the Contract within 100 metres of the Railway.

Obtain any approvals or licences required for such work.

Comply with the terms of any current existing interface agreement for work within the railway sites.

Procure railway track possession, railway track isolation and access to railway land necessary for the construction of the works.

Provide documentation detailing all interfaces between the works under the Contract and the Railway or Railway land. The Contractor must fully comply with the terms of the plan.

The Contractor indemnifies in the Principal in respect of any claim made by or liability to any person arising out of:

- The performance of work on, over or near the Railway, and
- The procurement or utilisation of a Railway track possession or track isolation (including any postponement, improper use or delay in relinquishing them).

Give 14 days written notice to the owner and operator of intent to commence work and provide a work plan showing safe working conditions for the site.

Hold Point - Do not commence work until the work plan has been approved by the owner and operator of the rail system. Provide copies of the work plan and of the approval to carry out the works to the Superintendent.

If work is required to be carried out within 3 m of the actual rail line, this work must be co-ordinated through the Superintendent.

1.22 WORK NEAR TRAFFIC COUNTING STATIONS – HOLD POINT

Hold Point - Prior to commencing any excavation, boring of holes, blasting, rock breaking, soil compaction or similar activity in the vicinity of traffic counter station detector loops, obtain the location of the cables.

This information is available from the Department's Transport Infrastructure Planning Division, contact 8924 7531.

Follow all directions and instructions issued by the Transport Infrastructure Planning Division in relation to work in the vicinity of such cables.

1.23 DISTANCE MEASURING EQUIPMENT

Install distance measuring equipment with a digital display capable of measuring to one metre, in all relevant work and supervisory vehicles within 4 weeks of the Contract being awarded.

Ensure that the measurement of kilometres is consistent with the Permanent Reference Points (PRPs) taken from the Department's Road Information Management System (RIMS) data sheets.

Verify the accurate locations of all work performed under the Contract to enable the Government Asset Management Database to be updated.

1.23.1 Road Asset Information

The Superintendent will provide a current Road Information Management System (RIMS) data sheet listing when the Contract is awarded and provide regular updates, as required, throughout the Contract.

The data sheet listing will include the following;

- Each road under the Contract,
- The respective identification number,
- The respective Permanent Reference Points (PRPs) and chainages.

Work will be located by reference to the information contained on the data sheet listings.

1.24 CONSTRUCTION INDUSTRY WHITE CARD

All workers on site are to have completed "General Safety Induction Training for the Construction Industry" (CPCCOHS1001A).

Site specific and Task specific induction training is still required for all work sites and is to be provided by the employer.

1.25 AREAS FOR VEHICLE AND PLANT MOVEMENT AND PARKING

Restrict vehicle and plant movement, turning and parking to the area of the works or to previously sealed, cleared or disturbed areas not within the area of the works.

If no suitable previously sealed, cleared or disturbed area is available obtain Superintendent's approval prior to clearing or disturbing any area for these purposes.

Rehabilitate any area newly cleared or disturbed for these purposes at the completion of the works.

Protect the areas cleared or disturbed and adjacent areas against erosion and sedimentation.

1.26 PROJECT NOTICE BOARDS

Supply, erect and maintain Project Notice Boards.

Confirm if project notice board is required. If required allow to supply and install a notice board/project sign in accordance with the NTG standard drawings, wording and image to be supplied.

Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

1.27 ASBESTOS

Comply with the requirements of NT WorkSafe and the *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011. Refer to the Code of Practice – How to Safely Remove Asbestos and the Code of Practice - How to Manage and Control Asbestos in the Work Place.

1.28 CONTRACTOR'S RESPONSIBILITIES AND SUBMISSIONS

1.28.1 Warranties

1.28.1.1 Warranties – Witness Point

Witness Point - Name the Principal as warrantee. Provide the standard manufacturer's warranty certificates for manufactured plant, equipment, and other items. Provide installation warranties for the installation of plant, equipment, and other items, where specialized installation practices are a prerequisite for a manufacturer's warranty.

Provision of warranties does not affect the responsibilities of the Contractor under the contract.

Provide electronic copies of warranties at or before final completion.

The warranties must include the following information for each item or type of item as a minimum:

- Product Description
- Name of the manufacturer
- Name of the supplier and contact details
- Contract details under which the items are installed
- Location of items or location area with GPS coordinates (Latitude and Longitude in decimal degrees)
- Month and year of manufacture
- Batch number
- Product code or model/type identifier (to differentiate the supplied product from other similar products of different type or model)
- Serial number of item (if applicable)
- Warranty period and end of warranty date
- Warranty conditions, and
- A declaration that provided products comply with the Principal's project specifications.

1.28.1.2 Warranty Markings on Products – Hold Point

If warranty markings on products are used in lieu of warranty certificates the Principal still requires an electronic copy of general information including, but not limited to, supplier, contract details, and locations of individual items.

Hold Point - Obtain Superintendent approval prior to the use of product markings as warranty certificate.

1.28.1.3 Traceability

Mark each item legibly and indelibly with the following:

- Name of the manufacturer
- Name of the supplier (optional)
- Month and year of manufacture
- Batch number
- Product code or model/type identifier (to differentiate the supplied product from other similar products of different type or model)
- Serial number (if applicable)
- End of warranty date.

1.28.1.4 Warranties Schedule

Table - Warranties Schedule	
CLAUSE TITLE	SECTION
Tactile Ground Surface Indicators	ROAD FURNITURE AND TRAFFIC CONTROL DEVICES
Flexible Guide Posts	ROAD FURNITURE AND TRAFFIC CONTROL DEVICES
Raised Reflective Pavement Markers	PAVEMENT MARKING
Contractor's Responsibilities	PROTECTIVE COATINGS

1.28.2 Certificates of Compliance – Witness Point

Witness Point - Provide product Certificates of Compliance before Practical Completion. Provision of these will be required before the final payment can be processed.

Certificate of Compliance Schedule

Table - Certificate of Compliance Schedule	
CLAUSE TITLE	SECTION
Geofabric	SPRAY SEALING
Geotextile Fabrics - Delivery And Product Certification	PROTECTION WORKS
Pavement Marking Paint	PAVEMENT MARKING
Glass Beads	PAVEMENT MARKING

1.28.3 Compliance - Traceability of components

Ensure that components comply with material specifications.

Compliance - Traceability of components Schedule

Table - Compliance - Traceability of components Schedule	
CLAUSE TITLE	SECTION
Road Safety Barriers - Steel Beam Guardrail System - Compliance	ROAD FURNITURE AND TRAFFIC CONTROL DEVICES

1.28.4 List of Plant and Equipment Installed – Witness Point

Witness Point - On or before Practical Completion provide a list of plant and equipment installed as part of the project. Include the following details:

- Make
- Model
- Serial number (if applicable)
- Year of manufacture
- Capacity
- Location.

Provide details of the maintenance and servicing regime that will be undertaken during the defects liability period.

Provide a servicing schedule for each item of plant and equipment which will be serviced and maintained during the defects liability period.

Provide a copy of Operations and Maintenance Manuals for each different type and model of plant and equipment. Also provide a copy to Technical Records in PDF format.

Provision of these docs will be required before the final payment can be processed, and for the final certificate (if applicable) to be issued.

1.28.5 Contractor’s Environmental Management Plan (CEMP) – Hold Point

Hold Point - Submit details of procedures to protect the environment. Refer to the Standard Specification for Environmental Management. Submission of a Contractor’s Environmental Management Plan (CEMP) may be required.

1.28.6 Inspection Test Plans (ITPs) – Witness Point

Witness Point - Submit ITPs detailing all procedures and test plans to be undertaken.

1.28.7 Project Control Plan (PCP) – Witness Point

Witness Point - Submit a project control plan for the project which sets out in detail all control procedures for the project. A framework Project Control Plan Guidance document is available at the Department’s Specification Services webpage: <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/technical-specifications> .

This document is to be prepared by the Contractor and not a third party.

1.28.8 Submission of documents

Submit electronic copies of the following documents to the Superintendent, and to Technical Records at technicalrecords@nt.gov.au :

- Operations and Maintenance Manuals
- Building Permits
- Occupancy Permits/Certificates.

PDF format is preferred, Microsoft Word format will also be accepted.

If file sizes are large contact Technical Records for advice.

1.28.9 Time allowed for assessment of submitted documents

This clause is related to documents which are to be submitted by the Contractor to the Superintendent for assessment and/or acceptance and/or approval and/or appraisal.

The documents subject to this clause include, but are not limited to:

- Traffic Management Plan
- Inspection and Test Plans
- Project Control Plan
- Quality Assurance Plan
- Work Health and Safety Plan which includes, but is not limited to:
 - Risk assessment and mitigation measures proposed
 - Project targets and how they will be achieved
 - Induction training sessions for all site personnel, including sub-Contractors, suppliers, and the Principal's representatives
 - Cultural Heritage inductions by Cultural Monitors
- Indigenous Development Plan
- Contractor's Environmental Management Plan which includes, but is not limited to:
 - Erosion and Sediment Control Plan
 - Acid Sulphate Soils Management Plan
 - Weed Management Plan
 - Asbestos Management Plan
 - Cultural Heritage Management Plan

The Superintendent will provide a response in respect to the submitted documents to the Contractor within a reasonable time. The length of time considered reasonable will depend on the complexity of the documents, the amount of information in the documents and the workload of the Department's personnel who will assess the documents. The length of time considered reasonable can be negotiated between the Contractor and the Superintendent. Any such negotiated time must be fair to both parties.

If the documents are rejected, not accepted, not approved or returned for modification, the Superintendent will have an additional reasonable time period to assess the amended documents.

The time taken by the Superintendent to assess submitted documents or to assess re-submitted documents and to respond to the Contractor will not be accepted as a reason for the Contractor to claim an extension of time nor to claim a variation for costs related to the preparation of, or modification to, documents to be submitted or re-submitted.

These time frames do not apply in emergency situations where faster responses are appropriate.

Resubmitted documents must be sent with the changes made clearly marked. Changes should only be made to the plans to the extent required by the Superintendent. Any changes not explicitly requested by the Superintendent but made in the resubmitted plans must be clearly visible in the document and the reasons for making the changes must be explained in a separate document or the covering email. Changes not made obvious and not explained or made obvious but not explained will not be accepted under the contract whether this is advised to the Contractor or not. Changes which were not requested but are made obvious and which are explained will be assessed during the re-assessment process.

Plans required in respect to works in specialised facilities such as health care facilities and secure facilities will be subject to responses in time frames to be negotiated.

1.28.10 Contractor's Submissions – Hold Point

Find out the extents of the road reserve for the full length of the works. Widths of road reserve vary.

Obtain all required permits, and approvals, for works, and associated activities, proposed to be carried out in areas not in the road reserve. This is in addition to all other required permits and approvals.

Hold Point - Provide copies of permits, and approvals, for works, and associated activities, proposed to be carried out in areas not in the road reserve before commencing any proposed works, and activities.

1.29 CONTRACTOR'S PERSONNEL

To enable achievement of the required service delivery requirements more than one work crew of the same or similar nature may be required at any one time for the various Schedule of Rate items. Provide enough personnel to meet these requirements.

All personnel undertaking traffic control works as part of the work under this contract will be required to have a current Accreditation Certificate in Work-zone Traffic Control to the appropriate level. Refer to PROVISION FOR TRAFFIC.

Operation of the KONECT system

Where KONECT is specified as a management tool, personnel shall have the ability to operate electronic data collection devices to record repair data in the provided software platform.

A least one person on work sites when the repair works are being undertaken or logged must be trained and have the ability to operate the KONECT system.

1.30 MANAGEMENT SERVICE AND SUPPORT

Included in the Contractor's Management Service and ongoing support of the Contract are the following:

- Developing and maintaining the plans, programs and reports.
- Attendance to and supply of all requirements for the monthly meetings inclusive of minute keeping.
- Tracking completion and payment status of monthly and individual invoices & Contractor Service Requests (CSRs),
- Processing Daily Log Books
- Provide, implement and maintain electronic data collection hardware capable of running the supplied KONECT software and camera capabilities for the use and operation of all the electronic inspection recording, data collection and management associated with the Contract.
- Updating Regional staff on new products and relevant standards.
- Liaison with the Superintendent.
- Processing Daily Log Books and recording of defects and completed works in the electronic defect system
- Any other ancillary items and provision in servicing the contract.
- Live Service Program.

1.31 URGENT WORKS ATTENDANCE

The Contractor may be required to respond to urgent works, within and outside of normal working hours, which are outside the standard maintenance service level.

The Contractor must be mobilised within 2 hours of notification.

1.32 EMERGENCY ROAD HAZARD – URGENT ATTENDANCE

In the event of a tropical or severe storm or other emergency situation, immediately mobilise and supply sufficient staff and resources (include vehicle and machinery such as a frontend loader or backhoe) to locate and make safe storm damage which has occurred within the road reserves.

The Superintendent will assist in identifying immediate safety concerns where and whenever possible.

Remove from within the road reserve dead or fallen plants, trees, and shrubs, of all species and sizes, and stumps, which pose a danger or a hazard, within 24 hours of observation or notification.

1.33 OFFICER AND VEHICLE

The Contractor may be required to supply a suitably qualified and competent person acceptable to the Superintendent to perform other works associated with the contract, including road inspections, responses to reports and emergency requests.

The Contractor shall equip that person with a suitable vehicle, mobile communication, and all necessary equipment to attend the request.

1.34 NEGOTIATED RATE

Where a type of works is described but does not appear in the Schedule of Rates or is not defined in the Specification and not included in the Schedule Of Rates items, a rate shall be negotiated to cover the works required.

The item of works may then be included in the Schedule Of Rates at the Superintendent's discretion.

Generally approval from the Superintendent, or from an authorised representative of the Superintendent, must be given for the rate to be paid before the expense is incurred.

In emergency situations the Superintendent, or an authorised representative of the Superintendent, may approve the expense before the rate is negotiated.

1.35 AS CONSTRUCTED INFORMATION – HOLD POINT - WITNESS POINT

Hold Point – Provision of As Constructed information is a condition precedent to Practical Completion.

Witness Point - Provide As Constructed drawings for all of the works.

- Show in red, on the Contract Drawings, as constructed information relating to works constructed beyond the various construction tolerances. The information includes, but is not limited to:
 - o Setout co-ordinates, where applicable.
 - o Design levels.
 - o Detail dimensions.
- Pavement, seal, line marking and protection extents.
- Refer to the specific deliverables in the NTG Technical Drawings Part 1 - Requirements for Technical Records Management document, which is accessible via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/technical-records> .
- Drawings without changes shall be also be included and labelled as "As Constructed " in the amendment description column.

As Constructed includes and means the same as; works as executed, and as installed, and as built. Hard copies of documents are no longer required. Electronic copies in Microsoft Word, Microsoft Excel, pdf, .dwg or .dgn, or as specified, are required.

Where the scope of work has been varied beyond the content of the Contract Drawings, provide As Constructed drawings to reflect the work, to the same format and style as defined in:

- The NTG Technical Drawings Part 1 - Requirements for Technical Records Management document, which is accessible via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/technical-records> .
- The NTG Technical Drawings Part 2 – Civil CADD Manual document, which is accessible via https://dipl.nt.gov.au/data/assets/pdf_file/0017/430019/ntg-technical-drawings-part-2-civil-cadd-manual.pdf .

Document all changes to and variations of the design as the work proceeds.

Provide amended versions of the information and drawings which reflect the as built conditions.

Provide PDF copies of drawings in A3 size format and provide the drawings in CAD format in AutoCad or Microstation. Provide copies of text information in A4 portrait format in Microsoft Word,

and/or PDF format. Provide tables and schedules in Microsoft Excel and/or PDF. Standard: To AS 1100(set) Technical drawing.

Where the drawings are to be reduced, the annotation character heights shall be selected so that the annotation character heights as reproduced are not less than 1.8 mm. Resolution to be a minimum of 600 dpi.

Provide the amended information and drawings to the Superintendent progressively as the work proceeds, with or before the next progress payment claim, or with or before the claim for the variation which led to the need to amend the information and drawings to accurately reflect the as built condition.

Witness Point - Before the work commences provide a proposed procedure for recording and submitting the amended drawings.

Use an independent surveyor who is eligible for membership of the Institution of Surveyors Australia or the Institution of Engineering and Mining Surveyors Australia to record the changes and variations, and certify each of the drawings and/or documents labelled and provided as "As Constructed" information.

1.36 DIVING WORK

1.36.1 General

Comply with the *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011.

Comply with ADAS Operation Manual or DRDC (formerly DCIEM) Diving Manual or NOAA Diving Manual.

1.36.2 Standards

AS/NZS 2299(set) Occupational diving operations

AS/NZS 2299.1 Standard operational practice

AS/NZS 2299.2 Scientific diving

AS 2815(set) Training and certification of occupational divers

AS 2815.1 Occupational SCUBA diver – Standard

AS/NZS 2815.2 Surface supplied diving to 30 m

AS 2815.3 Air diving to 50 m

AS 2815.4 Bell diving

AS/NZS 2815.5 Dive supervisor

1.36.3 Definitions

ADAS Australian Diver Accreditation Scheme

DRDC Defence Research and Development Canada

NOAA National Oceanic and Atmospheric Administration (USA)

WHS (NUL) *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011 and applicable NT and Federal Codes of Practice

1.36.4 Diver Qualifications

Provide evidence of competency for all personnel undertaking diving work (general occupational diving or high risk diving as applicable). Minimum competencies required are the competencies required by ADAS deemed by ADAS to be appropriate for the works to be undertaken. Refer to AS 2815 (set).

1.36.5 Dive Safety Log

Maintain and provide Dive Safety Log (in accordance with Regulation 180, of the WHS (NUL) Regulations 2011). To be provided for review on request and at completion of works. Refer to AS/NZS 2299 (set).

1.36.6 Dive Plan

Submit a Dive Plan (in accordance with Regulation 178, of the WHS (NUL) Regulations 2011). To be submitted after contract award and at least 14 days prior to commencement of diving works. Refer to AS/NZS 2299 (set).

The Dive Plan is to include:

- the method of carrying out the diving work to which it relates;
- the tasks and duties of each person involved in the dive;
- the diving equipment, breathing gases and procedures to be used in the dive;
- as applicable, dive times, bottom times and decompression profiles;
- hazards relating to the dive and measures to be implemented in the control of risks associated with those hazards;
- emergency procedures.

1.36.7 Crocodile Hazard Management

Provide a Crocodile Hazard Management Plan where diving work is to occur in waters known to have, or suspected of having, crocodiles. The plan can include, but not be limited to;

- Having spotters at water level and on a bridge
- Minimizing movement of vessels once diving work commences to reduce risk of attracting crocodiles
- Establishing a communication plan and having a communications system or methodology in place so that all parties conducting the activity can communicate with each other

1.36.8 Dive Cage

Diving work in waters known to have, or suspected of having, crocodiles is to be carried out by divers who are protected by a dive cage. This dive cage should be engineered for the task and can be mounted to either a service barge or other watercraft or lowered from a bridge, depending on the task environment.

1.36.9 Crocodile Net

If a crocodile net is the only viable option provide details of the construction of the net and its support systems and provide details of the risk management plan which will be in place during use of the net.

1.36.10 Response if a crocodile is spotted

Ensure or personnel move to a safe place.

Contact the Crocodile Management Unit of the Parks and Wildlife Service

- Darwin All hours 0419 822 859 or 0401 118 776 or Office hours 8999 4691
- Katherine All hours 0407 958 405 or Office hours 8973 8849

If safe and practical to do so, monitor the movement of the crocodile(s) so that the personnel from the Crocodile Management Unit can be told of the crocodiles last known location.

1.37 WORK NEAR AREAS WHERE CROCODILES MAY BE PRESENT

For all work in or near areas where crocodiles may be present comply with the crocodile related sub-clauses in the Diving Work clause.

1.38 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

2 PROVISION FOR TRAFFIC

2.1 GENERAL

Minimise obstruction and inconvenience to the public.

Ensure public safety is accommodated at all work sites at all times.

A traffic escort vehicle is required for all resealing works.

Provide traffic control for conformance testing activities.

Assume responsibility for the safe conduct of traffic through, past or around the works, 24 hours a day, from possession of the site to completion of all works, defects liability period (if any) and handover.

Comply with the Acts, Regulations, Codes and Guidelines applicable to the works. Comply with the requirements of Authorities which have jurisdiction over the works or the sites of the works.

Comply with the *Work Health and Safety (NUL) Act 2011* and Regulations 2011.

2.1.1 Ownership markings on temporary traffic control signs and devices

Ownership markings on the backs of signs and in unobtrusive locations on devices are permitted. Advertising markings are not permitted.

The limitations for ownership markings are:

- The entirety of the markings are to fit within a square of 200mm x 200mm,
- The markings are to be in one colour only,
- The markings are to be located on the backs of signs,
- The markings are to be located in unobtrusive locations on devices and should not be visible to motorists, and
- Only one marking per sign or device is permitted.

These limitations on ownership markings apply to, but are not limited to, the following temporary traffic control devices:

- Signs,
- Bollards,
- Cones,
- Portable traffic signals,
- Temporary traffic signals,
- Vehicle mounted signs,
- Vehicle mounted flashing arrow signs,
- Variable message signs, and
- Any other temporary signs and devices not listed above.

Signs and devices with non-compliant ownership markings, or with advertising markings, must be removed from site and be replaced with compliant signage at no cost to the Principal.

2.1.2 Clean Up of Tracked Materials

Remove tracked materials such as dirt, mud, and other detritus, from the Workzone immediately.

Failure to comply with this requirement will render the Contractor liable to pay the costs incurred by the Department to procure any alternate means of having the tracked materials removed.

2.2 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

AS 1742.2	Manual of uniform traffic control devices - Traffic control devices for general use
AS 1742.3	Manual of uniform traffic control devices - Traffic control devices for works on roads
AS 1742.9	Manual of uniform traffic control devices - Bicycle facilities
AS 1742.10	Manual of uniform traffic control devices - Pedestrian control and protection
AS/NZS 1906.1	Retroreflective materials

AS/NZS 3845.1 Road safety barrier systems
 AS 4191 Portable traffic signals
 AS 4852.2 Variable message signs - Portable signs
 AS/NZS ISO 31000 Risk management
 NTTM NT Test Methods.
 NTMTM NT Materials Testing Manual, accessible via
<https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/materials-testing-manual>

AUSTROADS Guide to Road Design
 AUSTROADS Guide to Bridge Technology
 AUSTROADS Guide to Road Safety Part 6: Road Safety Audit (AGRS06-09)

NT WorkSafe All Relevant Bulletins, Guides, Guidelines, and Codes of Practice
 Safe Work Australia All Relevant Bulletins, Guide, Guidelines, and Codes of Practice

2.3 LEGISLATION

Northern Territory of Australia *Control of Roads Act 1953*, and its Regulations 2011
 Northern Territory of Australia *Traffic Act 1987*, and its Regulations 1999
 Northern Territory of Australia *Work Health and Safety (NUL) Act 2011*, and its Regulations 2011

2.4 DEFINITIONS

After Hours Rectification(s): Work required to repair, amend, reset, replace, and the like, any item which is damaged or malfunctioning, and which is part of the works, and which is work which is required to be done outside of working hours, and is done to protect the safety of the traveling public.

Appraised: Appraised by the Superintendent, or a Department staff member with authority to appraise the item being appraised.

Approved: Approved by the Superintendent, or a Department staff member with authority to approve the item being approved.

Authorised: Authorised by the Superintendent, or a Department staff member with authority to authorize the item being authorised.

Business day: Means the same as **Day**.

Calendar day: Means any day of the week including weekends and Public Holidays.

Day(s): Means working days, Monday to Friday, excluding Northern Territory wide Public Holidays, and excluding weekends.

DIPL / the Department: The Department of Infrastructure, Planning and Logistics.

Generic TGS A TGS which has been appraised by the department, and has been deemed as suitable for use, and may be suitable for use at sites in addition to the site for which it was created, and relates specifically to the works to be undertaken.

ITC: Instruction to Contractor. Issued by the Superintendent, or by a Department PTW approval officer.

Long term: Applies when traffic guidance is required to operate for more than one shift irrespective of whether it is day or night.

PTSA: Portable Traffic Signals Authorisation.

PTW: Permit to Work in a Road Reserve. A Permit to Work in a Road Reserve does not confer any rights to the entity to which the permit is issued beyond the right to carry out activities for which the permit was issued. Those activities must have been approved before the activities commence.

Shall: Is indicative of a mandatory requirement, unless the context clearly indicates otherwise.

Short term: Applies when work is started and completed in one shift and the road is returned to normal conditions by the end of that shift.

Superintendent: As defined in the Contract for NTG procured works. For works not procured by, or on behalf of, the NTG, the term Superintendent means an employee of the Department, including the nominated Departmental Contact Officer, who has authority to make decisions in respect to works in road reserves.

SWMS: Safe Work Method Statement.

TGS: Traffic Guidance Scheme. Includes, but is not limited to, plans, drawings, sketches, diagrams, instructions, and after hours arrangements. Formerly referred to as Traffic Control Diagram.

TMP: Traffic Management Plan.

Traffic Controller: Person responsible for the control of traffic on public roads utilising a stop-slow bat.

TSLA: Temporary Speed Limit Authorisation.

VMS: Variable Message Sign(s)

Working day: means the same as **Day**.

Working hours: Means the hours, on a working day, from 8am to 4.30pm.

2.5 WORKZONE TRAFFIC MANAGEMENT

2.5.1 Traffic Management Personnel

All personnel engaged in the works must have a current valid NT Construction Induction White Card.

Only persons qualified in nationally accredited units of competency in Workzone Traffic Management can be utilised for traffic management at worksites. The four levels of accreditation are:

- Workzone Traffic Management Plan Designer (WZ1)
- Workzone Traffic Controller (WZ2)
- Workzone Traffic Supervisor (WZ3)
- Escort mobile works(WZ 4)

2.5.2 Workzone Traffic Management Plan Designer (WZ1)

The following prerequisites must be met to enable NT accreditation as a Traffic Management Plan Designer (WZ1):

- hold a valid current Australian motor vehicle driver's licence, and either
- successful completion of RII09 Resources and Infrastructure Industry Training Package unit of competency RIICWD503D Prepare Workzone Traffic Management Plans (or the replacement unit of competency if and when applicable) training course through an Northern Territory Registered Training Organisation, or
- successful completion of the RII09 Resources and Infrastructure Industry Training Package unit of competency RIICWD503D Prepare Workzone Traffic Management Plans (or the replacement unit of competency if and when applicable) training course through a Registered Training Organisation from another State or Territory AND successfully completed a bridging course through a Northern Territory Registered Training Organisation in the above unit of competency.

2.5.3 Workzone Traffic Controller (WZ2)

The following prerequisites must be met to enable NT accreditation as a Traffic Controller (WZ2):

- hold a valid current Australian motor vehicle driver's licence, and either
- successful completion of the RII09 Resources and Infrastructure Industry Training Package unit of competency RIIWHS205D Control Traffic with a STOP/SLOW Bat (or

the replacement unit of competency if and when applicable) training course through an Northern Territory Registered Training Organisation, or

- successful completion of the RII09 Resources and Infrastructure Industry Training Package unit of competency RIIWHS205D Control Traffic with a STOP/SLOW Bat (or the replacement unit of competency if and when applicable) training course through a Registered Training Organisation from another State or Territory AND successfully completed a bridging course through a Northern Territory Registered Training Organisation in the above unit of competency.

2.5.4 Workzone Traffic Supervisor (WZ3)

The following prerequisites must be met to enable NT accreditation as a Traffic Supervisor (WZ3):

- hold a valid current Australian motor vehicle driver's licence, and either
- successful completion of the RII09 Resources and Infrastructure Industry Training Package unit of competency RIIWHS302D Implement Traffic Management Plan (or the replacement unit of competency if and when applicable) training course through an Northern Territory Registered Training Organisation, or
- successful completion of the RII09 Resources and Infrastructure Industry Training Package unit of competency RIIWHS302D Implement Traffic Management Plan (or the replacement unit of competency if and when applicable) training course through a Registered Training Organisation from another State or Territory AND successfully completed a bridging course through a Northern Territory Registered Training Organisation in the above unit of competency.

2.5.5 Escort Mobile Works (WZ 4)

The following pre requisites must be met to enable Northern Territory accreditation as an Escort mobile works (WZ 4):

- hold a valid current Australian motor vehicle driver's licence, and either
- successful completion of the RII09 Resources and Infrastructure Industry Training Package unit of competency RIICRM201E Escort mobile works (or the replacement unit of competency if and when applicable) training course through a Northern Territory Registered Training Organisation, or
- successful completion of the RII09 Resources and Infrastructure Industry Training Package unit of competency RIICRM201E Escort mobile works (or the replacement unit of competency if and when applicable) training course through a Registered Training Organisation from another State or Territory AND successfully completed a bridging course through a Northern Territory Registered Training Organisation in the above unit of competency.

2.5.6 Trainee Traffic Controller

The Superintendent may grant approval for the use of a Trainee Traffic Controller within the work site. Such approval will only be considered after submission of a written request. A Trainee Traffic Controller cannot commence work until such approval has been granted and received in writing.

A Trainee Traffic Controller must meet all of the following criteria:

- be an employee of the Traffic Control Provider,
- hold a valid current Australian motor vehicle driver's licence,
- be registered with a Northern Territory Registered Training Organisation (NT RTO) to undertake the RII09 Resources and Infrastructure Industry Training Package unit of competency RIIWHS205D Control Traffic with a STOP/SLOW Bat (or the replacement unit of competency if and when applicable),
- only work under the direct supervision of a Controller (WZ2), and
- have commenced training to become a qualified Controller (WZ2) and complete all assessments of competency within 8 weeks of registration.

The direct supervision of a Trainee Traffic Controller is defined as the constant personal oversight of the work by a Workzone Traffic Controller (WZ2).

2.5.7 Traffic Escort Vehicle - Resealing Works

Provide a traffic escort vehicle for all work sites where resealing works are undertaken under the contract.

The vehicle must have, as a minimum, one rotating beacon light or LED equivalent.

The escort vehicle is to be the lead vehicle for traffic permitted to pass through the work site at the direction of the traffic control personnel.

The escort vehicle is to control the speed of the traffic to ensure safety of road works personnel.

The driver of the escort vehicle is to have adequate skills and knowledge to be able to maintain safety of the public and of the roadworks personnel.

2.5.8 NT Accreditation in Workzone Traffic Management

NT accreditation is provided by the following process:

- Completion of training course (or courses) as outlined above, and
- Obtain Workzone Traffic Management ID Card from NT Motor Vehicle Registry.

A list of NT Workzone Traffic Management Registered Training Organizations is accessible via <https://nt.gov.au/driving/management/work-zone-traffic-management-qualifications> .

2.5.9 Signs and Devices Not In Use

Do not leave signs and devices in the Workzone if they are not in use.

Cover or remove signs and traffic control devices associated with reduced speed limits within one hour of completion of the shift if the works will continue in the next shift.

Remove signs and traffic control devices associated with reduced speed limits within one hour of completion of the work requiring the reduced limit.

Cover or remove unused signs and traffic control devices within two hours of completion of any revised traffic arrangement.

Remove unused signs and traffic control devices within two hours of completion of the works.

Keep the Workzone tidy and uncluttered.

Any failure to comply with this clause will render the Contractor liable to pay the costs incurred by the Department to procure any alternate means to have signs and devices not in use removed from site.

2.5.10 Reinstatement of Signs and Devices

After any severe weather event check all signs and devices and reinstate them in accordance with the applicable TMP and TGSs if they have moved, blown over, or disappeared.

Check, and reinstate signs and devices if required, after becoming aware of any other event which may have caused the signs and/or devices to have moved from the locations shown on the applicable TMP and TGSs.

2.6 TRAFFIC MANAGEMENT PLAN

Standard: To AS 1742.3 Traffic control for works on roads.

Provide a site and project specific Traffic Management Plan (TMP), and site and project specific Traffic Guidance Schemes (TGSs) of a complex and noncomplex nature per activity as required for the scheduled works.

The Traffic Management for this contract may be subject to audit. Refer to the PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

2.6.1 Document Control

Each TMP and TGS must have a unique identifying number and a revision number shown on it.

Each TMP must have a unique identifying number for each project.

Each revised/amended TGS is to have the revision number shown on it after the unique identifying number, and after the words "Revision number" or "Rev. No." or similar.

Provide and keep updated a register showing the TMP and a list of the TGSs to be used for each project managed by the department. Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

The register is to show the names/titles of the TMP and TGSs, the name of the project for which they are to be used, the unique identifying number for each TMP and TGS, the revision number for each revised TGS, and the date and time when each revised TGS was submitted.

The register is to show the status of the document. The status will be one of the following, or another term which the Superintendent allows:

- Submitted for appraisal,
- Appraised as suitable,
- Superseded, or
- Withdrawn.

A copy of each page of the register showing the entries for the TMP(s) and/or TGSs issued must be submitted to the Superintendent on request. Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

A revised TGS which has been appraised and found to be suitable for use replaces all earlier revisions of it. All earlier revisions of that TGS must be withdrawn from use at the time the new revision is implemented.

Any TMP which is amended must either have a revision number if the changes are minor, or a new unique identifying number if the changes are substantial. The Superintendent will advise which option is to be adopted.

2.6.2 Submission of Traffic Management Plan - Hold Point

Hold Point - Submit the Traffic Management Plan (TMP), with the Traffic Guidance Schemes.

For contracts where audits of traffic control measures are required:

- Do not commence implementing traffic control measures until the TMP has been audited by a Panel Period Audit Consultant and found to be suitable.
- Do not commence the works until the TMP has been audited by a Panel Period Audit Consultant and found to be suitable.

For contracts where audits of traffic control measures are not required;

- Do not commence implementing traffic control measures until the TMP has been appraised by DIPL Road Operations and found to be suitable for use.
- Do not commence the works until the TMP has been appraised by DIPL Road Operations and found to be suitable for use.

The TMP shall be designed by a Northern Territory accredited Traffic Management Plan Designer. The TMP Designer must have visited the site, with the Contractor, before documenting the TMP. Include the details of the TMP Designer's name, accreditation number, and date of expiry of accreditation on the TMP.

Design the TMP in conformance with the requirements of AS 1742 - Manual of uniform traffic control devices Part 3: Traffic control devices for works on roads. Submit the plan, the TGSs, and other supporting documents, to the Superintendent by electronic means.

Include sufficient details on the TMP to explain the potential hazards, the assessed risks and the proposed treatments for the proposed work activities and work site which may include some or all of the following:

2.6.2.1 Project Information

- Purpose and Scope
- Specific Project Location
- Site Constraints/Impacts
- Traffic Management Objectives and Strategies
- Principal for the Works; Principal Contractor/Design Consultant including contact details
- Responsibilities including role responsibility and authority of key personnel, management hierarchy including site representatives and contact details of the

- responsible personnel
- Prior approvals (if any) granted by the Road Authority with relevant reference number

2.6.2.2 Works on Roads

- Project scope inclusive of works to be undertaken, staging of works, duration of works (work hours)
- Existing Traffic and Speed environment
- Roles and Responsibilities
- Traffic Management Responsibility Hierarchy
- Project Representatives
- Traffic Management Administration

2.6.2.3 Traffic Hauling Impacts

For worksites where machinery or hauling is required, provide the following information:

- details of haul routes,
- details of vehicle types, and configurations,
- hauling movements frequencies,
- proposed days and times of day for haulage movements,
- specific TGS(s) showing site access and site egress points,
- proposed methods to be used to prevent tracking of dirt, mud, and other materials, such as shaker bars or rumble strips,
- proposed methods of maintaining tracking prevention systems, and
- proposed methods to be used for dust suppression.

2.6.2.4 Statutory Requirements

- *Work Health and Safety (NUL) Act 2011* and Regulations 2011
- Provide details, on the TMP, of responsibilities and authorities of all key personnel on the project including project manager, line managers (site engineers, supervisors etc), Contractors and workers, safety personnel, and traffic management personnel
- Requirements of personal protective equipment, plant and equipment
- Procedures for incidents or accidents

2.6.2.5 After hours contact details

Provide contact details of personnel who can be contacted outside of working hours. These people must be able to respond to situations which may arise, and must be able to rectify, or to have rectified, any problems which occur, outside of working hours.

Any failure to comply with this clause will render the Contractor liable to pay the costs incurred by the Department to procure any alternate means to have after hours rectifications made.

2.6.2.6 Monitoring and Measurement

- Site Inspections and Record Keeping
- TMP Auditing
- Public Feedback
- References

2.6.2.7 Management Review

- TMP Review and Improvement
- Variations to Standards and Plans
- Attention to hazards for non-motorised road users

2.6.2.8 Planning

Risk Identification and Assessment - Critical element to identify and assess foreseeable potential hazards associated with the work activities and work site.

Legal and Other Requirements - Confirmation of use of up-to-date information and legislation

Traffic Assessment (Vehicular Traffic)

- Volume and Composition
- Existing and Proposed Speed Zones
- Intersection Capacity
- Existing Parking Facilities
- High Wide Loads
- Public Transport
- Special Events and Other Works

Non-motorised Road Users

- Cyclists and Pedestrians
- People with Disabilities
- School Crossings

Site Assessment

- Access to Adjoining Properties
- Environmental Conditions
- Impact on Adjoining Road Network

Works Programming

- Work Sequence
- Night Works
- Emergency Planning

Consultation and Communication

- Approvals - Road, Utility and Service Authorities
- Public Notification
- Notification to Other Agencies

2.6.2.9 Implementation

- Hazard Identification, Risk Assessment and Control
- Traffic Guidance Schemes
- Traffic Control Devices
- Signs
- Pavement Markings, including temporary pavement markings and proposed removal processes, and permanent pavement markings
- Variable Message Signs
- Delineation
- Temporary Speed Zones
- Emergency Arrangements
- Site Access
- Communicating TMP Requirements

2.6.3 Submission of Traffic Guidance Schemes

Provide documented specific and/or generic Traffic Guidance Schemes (TGSs) per activity as required and/or as specified. These TGSs will be appraised on their merits.

Generic TGSs must be modified to suit the site of the works before being submitted. The modified TGSs are to be given a unique identifying number as per the Document Control clause in this worksection. Do not issue them as revisions of the generic TGSs.

Include, but do not be limited to, plans, drawings, sketches, diagrams, instructions, and after hours arrangements.

Submit the specific TGS to the Superintendent 5 working days prior to undertaking the required works.

Submitted TGSs will be appraised, or audited, for suitability for use. If the TGS(s) are considered suitable for use they may be appropriate to use for future works at that same location for the same scope of works.

Generic TGSs are only applicable in certain situations such as emergency, urgent, and/or maintenance road works, and where site conditions and identified hazards are of a similar nature. Generic TGSs must provide sufficient detailed information to enable traffic management personnel to implement site controls that comply with AS 1742.3 and which comply with this work section.

For Urgent Works, advise the Superintendent which generic TGS applies, or submit the specific TGS within 2 working days.

Provide amended TGSs, which incorporate changes which have been appraised by the Superintendent on site, or audited, within two working days of the appraisal, or completion of audit, of the change.

2.7 COMPLIANCE CHECKS OF WORKSITE TRAFFIC MANAGEMENT

Department Road Projects staff may perform random compliance checks of traffic management at work sites as part of their daily routine duties.

Checks undertaken will include verification of:

- The Traffic Management Plan (TMP) held on site,
- The Traffic Guidance Scheme(s) (TGSs) held on site,
- Traffic control devices established in accordance with the TGSs,
- The correctness and currency of accreditation of all personnel associated with traffic management at the work site.
- The Permit to Work in a Road Reserve (PTW) for the project if a PTW is required for the project (generally not required for Department procured works),
- Any applicable Safe Work Method Statement,
- Any Temporary Speed Limit Authorisation issued for the project,
- Any Portable Traffic Signal Authorisation issued for the project,
- Any other applicable documents,
- Implementation of the requirements outlined in any document applicable to the project and the effectiveness of the implemented requirements.

Where personnel associated with traffic management at work sites are found not to have current accreditation to an appropriate level in Workzone Traffic Management, the Superintendent may direct the Contractor to cease work, make the site safe, and withdraw plant, equipment and personnel from the road reserve.

Where the checking officer deems modifications to Traffic Management are required for reasons of public safety or safety on the work site, an Instruction to Contractor (ITC) will be issued requesting that the TMP Designer makes immediate amendments to the TMP to manage the identified hazards. If modifications are deemed necessary but not urgent, corrections are to be made at the earliest practicable opportunity.

Resubmit revised documents for appraisal. Do not recommence work until the submitted revised documents have been appraised and found to be suitable for use and the amended traffic control measures have been implemented on site. This is to be at no cost to the Principal.

The Superintendent may direct the Contractor to cease work, make the site safe, and withdraw plant, equipment, and personnel from the road reserve if the site is deemed unsafe, and/or if the traffic control measures are not compliant. This is to be at no cost to the Principal.

When revised documents have been appraised and found suitable for use, and rectification is complete, and the site is deemed to be acceptably safe, and/or the traffic control measures are deemed to be compliant, the Contractor may return the plant, equipment, and personnel to the site, also at no cost to the Principal.

2.8 TRAFFIC MANAGEMENT AUDIT REQUIREMENTS

The Traffic Management for this contract may be subject to audit. Refer to the PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ. If audits are not required under the contract this clause will not apply to the works.

2.8.1 Work Zone Traffic Management (WZTM) – Independent Third Party Audits

The Principal will engage Consultants with WZ1, WZ2 and WZ3 accreditation and Road Safety Auditor accreditations to be Panel Period Audit Consultants.

The Superintendent will provide the names of the Panel Period Audit Consultants to be used for independent third party Work Zone Traffic Management audits under this contract, when the contract is awarded.

The Contractor is to advise the Superintendent immediately if any conflict of interest exists or might be perceived to exist between the Contractor and any of the nominated Panel Period Audit Consultants.

The Superintendent will select the Panel Period Audit Consultant for each traffic management audit task and will authorise the selected Panel Period Audit Consultant by issuing to that auditor an Auditor Service Request.

The Superintendent reserves the right to use other independent third party auditors to carry out specific audits of Work Zone Traffic Management Plans (TMPs), implementation of those plans, traffic management and control installations, and traffic management and control operations on site.

Only suitably experienced, qualified, and independent auditors can be a member on an audit team.

Any Contractor Performance Report (CPR) conducted on long term works projects shall include an assessment of the traffic management performance, covering all aspects of traffic management, and including traffic flow/congestion associated with the works.

Audits will evaluate compliance with reference to AS 1742.3, AGRS Part 6, NT legislation, and specifications for the project.

Refer to the clause **Time Allowed for Assessment of Submitted Documents** in MISCELLANEOUS PROVISIONS.

2.8.2 Suitability Audit Requirements – Hold Point

All contracts, other than routine or specific maintenance on long term works projects, may require a suitability audit of all elements of the Traffic Management Plan to be carried out.

The Panel Period Audit Consultant will conduct a desktop audit of the Contractor's traffic management documentation.

The Panel Period Audit Consultant will provide a Draft Audit Report to the Superintendent and, concurrently, to the Contractor.

If the Draft Audit Report indicates corrective measures are required the Contractor is to amend the traffic management documentation and submit the amended documentation to the Superintendent at no cost to the Principal.

The amended documentation will be audited by the Panel Period Audit Consultant.

Any audit of amended traffic management documentation will be at the Contractor's expense.

Hold Point - The Traffic Management Plan must not be implemented before it is audited for suitability and found to be suitable.

Hold Point - Works must not commence before the Traffic Management Plan is audited for suitability and found to be suitable.

Refer to the clause **Time Allowed for Assessment of Submitted Documents** in MISCELLANEOUS PROVISIONS.

2.8.3 Compliance Audit Requirements

Compliance Audits must be undertaken within 24 hours of any Traffic Management Plan being implemented and shall reoccur at intervals no longer than 3 months.

The Panel Period Audit Consultant will conduct day time and night time on site compliance audits of the Contractor's traffic management measures.

The Panel Period Audit Consultant will provide a Draft Audit Report to the Superintendent and, concurrently, to the Contractor.

The Draft Audit Report will classify items using 3 classes – (1) No corrective measures required, (2) Minor corrective measures required, and/or (3) Substantial breach/breaches identified.

2.8.3.1 No corrective measures required

If the Draft Audit Report indicates no corrective measures are required it will be presented as an Audit Report.

2.8.3.2 Minor corrective measures required

If the Draft Audit Report indicates minor corrective measures are required the Contractor is to implement the corrections on site within 3 hours.

The Contractor is to advise the Superintendent immediately when the corrections are completed.

The Contractor is to amend the traffic management documentation to reflect the minor corrective measures implemented if they differ from what was documented, and submit the amended documentation to the Superintendent.

The Panel Period Audit Consultant will then complete the Audit Report.

2.8.3.3 Substantial breach/breaches identified

If the Draft Audit Report indicates substantial breaches the Superintendent will advise what action is required.

The Contractor is to advise the Superintendent immediately when the corrections are completed.

The Contractor is to amend the traffic management documentation to reflect the corrective measures implemented if they differ from what was documented, and submit the amended documentation to the Superintendent.

The amended traffic management documentation will be audited by the Panel Period Audit Consultant.

Any audit of amended traffic management documentation will be at the Contractor's expense.

2.8.4 Independent Third Party Audits

Give 5 working days notice for audits.

The Superintendent will order the audits.

Independent Third Party Audits of site Traffic Management Plans, implementation, and operations shall be required for all significant changes to existing traffic movements such as;

- All new detours and traffic switches, where traffic is switched from an existing alignment to a revised or temporary alignment,
- First time installations for all detours, channelization and/or road geometry changes,
- New or alternate alignments, or changes to any detours, lane shifts for all long term installations to be in place for more than one shift.

If any TMP, Traffic Guidance Scheme (TGS)(formerly referred to as Traffic Control Diagram (TCD)), or site set out traffic management fail to meet DIPL requirements, AS 1742.3, other relevant associated Australian Standards, and/or Legislative requirements, when audited, all post rectification re-auditing costs shall be a negative variation to the contract.

Pursuant to the relevant clauses of the contract, the Contractor shall make good all non-conformances at no cost to the Principal.

The Contractor shall record and manage rectification of all non-conformances pursuant to its ITP requirements, including issuing of Non-Conformance Reports (NCRs) and Corrective Action Reports (Car's) according to the Quality Assurance requirements of the contract.

2.8.5 Process Auditing

The Contractor is responsible for the ordering up of, and payment for, all process audits that are carried out for its own purposes to ensure its compliance with its own ITP.

2.8.6 Notice of Implementation – Hold Point

Hold Point – Provide the Superintendent with copies of all audit reports confirming conformance, or indicating non-conformance, with specifications, Standards, and requirements for each implemented TGS within 24 hours of implementation.

Hold Point – Provide the Superintendent with copies of all audit reports confirming conformance, or non-conformance, with specifications, Standards, and requirements for each significant change within 24 hours of implementation.

Hold Point –The Contractor shall rectify the significant/urgent non-conformance in the time instructed by the Superintendent. If the Contractor fails to rectify the non-conformance the Superintendent may engage others to rectify the non-conformance, and the associated costs shall become a debt due and payable to the Principal.

2.8.7 Notice of Independent Third Party Audits – Witness Point - Hold Point

Witness Point - Give the Superintendent 5 working days written notice in advance of each stage of the works requiring auditing.

All communication with the Panel Period Audit Consultant shall be forwarded through the Superintendent, except that on site communications are permitted for coordination of work and site safety.

Hold Point – Notify Superintendent and submit revised TGSs & TMPs to DIPL Road Operations for appraisal.

Witness point – Notify the Superintendent prior to rework arising due to failed audits.

2.9 CONFORMANCE AUDITING RESULTS

The Traffic Management for this contract may be subject to audit. Refer to the PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ. If audits are not required under the contract this clause will not apply to the works.

The Panel Period Audit Consultant will provide an accredited report to the Superintendent within the scheduled times allowed listed in **Table - Auditing and Reporting Completion Times** from the time of ordering the audit/s.

For work in remote areas the Superintendent will increase the auditing and reporting completion times by a minimum of 2 days.

Table - Auditing and Reporting Completion Times	
Attribute Being Tested	Time Allowed for Accredited Auditor Report in Working Days (Monday to Friday)
Work Zone Traffic Management	
Traffic Management Plan Audit	2
Revised Traffic Management Plan Audit	2
New Site Compliance Audit (new implementation or major change or switching of traffic)	5
Site re-audit generally (not related to a major change or new implementation)	3

2.9.1 Reporting Monthly

The Contractor shall ensure their Monthly report to the Superintendent clearly and accurately reports on all elements of work zone traffic management activities such as TMP/TGS status, implementations, staging (where applicable), audits, audit results, NCR’s and CAR’s.

2.9.2 Lot Auditing

Conformance of work zone traffic control will be based on lots (made up by stages where there are multiple stages on one site).

Give each lot a lot number.

Number the lots using a logical system.

Maintain a register of all lots and lot numbers.

Include the location of each lot on the lot register.

Provide a copy of the lot register to the Superintendent upon request.

Lots defined by the Contractor must be clearly marked out or clearly evident on the construction site.

Lots of work will be selected by the Contractor, based upon:

- A lot will represent differing traffic conditions and or traffic shift/s.
- A lot will be a continuous traffic guidance scheme, which either ends, or transitions in a clearly discernible way into a separate traffic guidance scheme.
- A lot will comprise of essentially a continuous traffic guidance scheme (identified on one or more Traffic Guidance Scheme documents) with no distinct changes in traffic channelling, geometry, speed environment, or risk rating.

Each lot will be subject to conformance auditing as individual lots (where applicable), and as an entire site. Where more than one traffic guidance scheme/lot is evident, these may be separated out if it is practicable to do so, however transitions between one or more traffic guidance schemes shall be assessed collectively for the site.

Non-conforming sections may be excluded from the lot to be audited if it is a distinctly different scheme and may be identified as a separate lot, and will also be subjected to lot auditing when ready.

Quality of the lot will be judged as conformance or non-conformance of each lot, however the audit report will be applicable to the entire site.

Conformance of traffic control devices will be based on the presented works when compared to the relevant Australian Standards.

When a lot, or a part of a lot, fails to satisfy the conformance requirements, either the entire lot shall be re-audited, or a sub lot may be generated. A sub-lot may be created if the non-conforming lot is an isolated traffic guidance scheme that does not affect adjacent areas. Non-conforming lots shall be submitted for reauditing.

Should the lot under consideration be subdivided then each subdivision will be classed as a lot and each subdivided lot will be subject to lot auditing.

Non-conforming lots which are subdivided after auditing will be treated as separate lots and each and every subdivided lot will be reaudited.

2.9.3 Examples of non-conformances that attract re-audit costs

Table – Non-conformances requiring re-audits		
Speed	Traffic Guidance Scheme (TGS)	Quality
Failure to install and maintain speed limit signs as detailed in a TGS.	Failure to maintain any other traffic control device detailed in a TGS.	Failure to maintain and update the TMP.

Table – Non-conformances requiring re-audits		
Speed	Traffic Guidance Scheme (TGS)	Quality
Reduced speed limits introduced more than one hour prior to the commencement of the works. (NOTE: Speed limit signs may be installed but should be covered until immediately prior to the need for their use applies.)	Failure to maintain minimum travelled path dimensions.	Failure of the TGS to comply with the principles outlined in this specification.
Failure to cover/remove signs and traffic control devices associated with reduced speed limits within one hour of completion of the shift or of completion of the work requiring the reduced limit.	Failure to cover/remove unused signs and traffic control devices within two hours of completion of any revised traffic arrangement.	Traffic delay periods exceeding any maximum period nominated in the Contract.
Speed limits and associated control measures not implemented in accordance with the Speed Management Plan.	Failure to use other than designated construction workplace entries or exits for the works.	Failure to provide the required information/notification to the community and/or local businesses of changes to traffic movement.
Other non-conformances		
Failure to maintain an obstruction free travelled path.		
Failure to assist with mitigating the impacts of traffic incidents as much as is reasonably practicable.		
Undertaking traffic rearrangements without an approved TGS except where required for incident management purposes.		
Any other issue raised by the Auditor deemed to be a non-conformance.		
NOTE; This table does not represent an exhaustive list of non-conformances requiring re-audits.		

2.10 AMENDMENTS TO TRAFFIC MANAGEMENT PLANS - HOLD POINT

This clause does not refer to amendments to TMPs arising as consequence of audits.

Modify the Traffic Management Plan during the works to suit site conditions if required or requested by the nominated Departmental Contact Officer. Modify the Risk Assessment to ensure it is relevant to the modified TMP.

Changes made to the TMP must be clearly marked in the amended TMP.

In situations where immediate hazard mitigation is necessary the changes may be implemented and the Superintendent advised of the changes as soon as practicable thereafter.

Hold Point – Modified TMPs must be audited for suitability by a Panel Period Audit Consultant, or appraised by DIPL Road Operations if Traffic Management audits are not required under the contract, before implementation of the modified TMP.

Hold Point – Modified traffic management control measures must be audited for compliance by a Panel Period Audit Consultant, or appraised by DIPL Road Operations if Traffic Management audits are not required under the contract, before works resume.

Refer to the **Traffic Management Audit Requirements** clause, and to the **Conformance Auditing Results** clause, in this work section.

Refer to the clause **Time Allowed for Assessment of Submitted Documents** in MISCELLANEOUS PROVISIONS.

2.11 WORK IN RURAL AREAS – HOLD POINT

Hold Point - Undertake work during daylight hours only unless approval is given by the Superintendent. Approval will only be granted in exceptional circumstances.

2.12 WORK IN BUILT UP AREAS

2.12.1 Working Times – Hold Point

Program work, provide and install traffic management devices/controllers, equipment, materials etc accordingly so that traffic flows are not impeded during the following hours, from Monday to Friday, excluding Territory wide Public Holidays:

Table - Restricted work hours in built up areas	
From	To
0700 hours	0900 hours.
1530 hours	1730 hours.

This table is only an example of peak traffic periods in urban areas.

Additional historical generic traffic data is available from the Department's annual Traffic Report, which can be accessed via <https://dipl.nt.gov.au/data/traffic-report> . This data does not provide accurate up-to-date information on traffic volumes or traffic flows.

Hold Point - Obtain Superintendent approval if proposing to work during the restricted work hours.

Remove or cover existing signs or devices as appropriate to stop confusion during these hours. Further restrictions may apply should the Department deem it appropriate to do so. Concessions to work within these hours may be approved by the Superintendent, should the need arise and the officer deems it necessary.

Do not operate construction vehicles used in conjunction with the proposed works, either SV plated or vehicles in excess of 19 metres on public roads during peak traffic times (see above, working times) or in any way impede peak traffic flow during these times. Vehicles in excess of 19 metres in length are only permitted to travel on roads designated for road trains unless an appropriate permit from the Motor Vehicle Registry has been obtained in advance of using such routes.

2.12.2 Traffic Lanes - Hold Point

Maintain at least 2 lanes (one in each direction) open to traffic at all times unless permitted otherwise on duplicated roads and maintain at least one lane open on two lane roads with appropriate traffic control in place accordingly. Obtain the written permission of the Superintendent if it is necessary to fully close a road.

Only permit single lane operation of two way traffic when traffic is directed by accredited WZTM controllers and signs or portable traffic signals etc. are employed, dependant on the site conditions and obtaining the appropriate approvals.

Program works so that the closure of turning lanes is minimised.

Obtain prior written approval from the relevant Local Government or Council if traffic is to be detoured onto their road network or the proposed works affects their network/assets accordingly.

Hold Point - Provide a copy of all relevant approvals with the Traffic Management Plan.

2.12.3 Lane closures - Hold Point

Hold point - Do not use bullnose or V type barriers unless no other option is available. Obtain permission from the Superintendent to use bullnose or V type barriers before placing them on site.

2.13 NIGHT ILLUMINATION – HOLD POINT

Hold Point – Sections of the roadway, including detours and side tracks, affected by Work Zone Traffic Management, must be illuminated at night to AS 1742.3, if

- night works are in progress, and/or
- if signage left on site overnight is not illuminated by the headlights of vehicles approaching the signs.

Illumination to be 10 lux minimum at ground level.

2.14 WARNING DEVICES

Take care when placing warning signs, work signs, traffic management devices, or plant and equipment within the road reserve to ensure that these do not interfere with or restrict sight lines, particularly at intersections and ensure that the devices are not obscured by trees or other objects.

Ensure that road work signs reflect the current conditions of the site. Remove or cover signs such as T1-5 (worker symbolic), temporary speed reductions and the like, when appropriate, such as when no persons are on site. Refer to AS 1742 for guidance on the appropriate use of these signs.

Any failure to comply with this clause will render the Contractor liable to pay the costs incurred by the Department staff to procure any alternate means to have the rectifications made.

2.14.1 Works in Progress Signs

For proposed works which are expected to be in progress for longer than 14 calendar days, display signs, sized 1200 x 900mm with 100mm high black Helvetica medium lettering on a white background displaying the following details:

- The nature of the works.
- The start and end date of the works.
- The Contractor's business name.
- The Contractor's business phone number.
- The Contractor's after hours phone number.
- The name of the Traffic Management Plan supervisor.

Display these signs prominently at the extremities of all works in progress and in addition to the work signs requirement. The signs remain the property of the Contractor.

2.14.2 Multi Panel Signs

The use of multi panel sign configuration for "Traffic Controller Symbolic" & "Prepare to Stop" being mounted on one multi sign frame shall conform to AS 1742.3.

The use of the "Prepare to Stop" sign is mandatory in conjunction with the symbolic traffic controller sign where traffic are required to stop at the controllers position, therefore the Department approves making this the exception to the "No multi sign rule".

These signs must be on the one frame either side by side or one above the other. The individual signs are to be 900 mm x 600 mm minimum each when used stand alone, but may be reduced in size on a multi panel sign frame provided that the legend and / or symbol size are not reduced.

The Department will allow a multi panel sign frame for this use only in accordance with the directions herein and those contained within AS 1742.3.

2.14.3 Multi message signs

Do not use multi message signs. Stand-alone signs must be used.

2.15 NT SPECIFIC DIRECTIONS FOR ROAD WORK SIGNS

2.15.1 Sign erection

Refer to the **Definitions** clause in this worksection.

Table - Sign erection requirements	
Long term rural areas:	Place all signs a minimum 1m lateral clearance from the travelled path and a minimum of 1.5m from the lower edge of the sign to the ground.
Long term urban areas:	Place all signs a minimum of 2.2m from the lower edge of the sign to the ground in locations where they could be obscured by parked vehicles, vegetation or trees or may interfere with pedestrian routes. On traffic islands or medians the heights for signs shall conform to the "short term all areas" where it is deemed appropriate and only if they are not obscured by parked vehicles and if they do not interfere with pedestrian routes.
Short term all areas:	Display all signs prominently and place a minimum of 200mm from the lower edge of the sign to the ground, except regulatory signs such as speed, no parking signs etc, which shall be mounted a minimum of 1.5m from the lower edge of the sign to the ground. Place all signs a minimum of 2.2m from the lower edge of the sign to the ground where they could be obscured by parked vehicles, vegetation or trees or may interfere with pedestrian routes.

Mount signs on Oz Spike posts or similar, or set in concrete in accordance with the requirement for permanent speed sign installations. Ensure signs remain secure, stable, and frangible. If an Oz Spike does not have a sign in it, and no sign is required to be mounted in it, that Oz Spike is to be removed from site.

Ensure that signs are clean, free of damage and comprise of a minimum of Class 1 retroreflective material in accordance with AS/NZS 1906.1.

Duplicate all temporary work signs (place on both sides of roads within the work site) on all multilane work sites, irrespective of the duration of the works, unless there is insufficient room available to do so, such as the median width being not sufficient to accommodate the signs. Where necessary, seek direction from the Superintendent where this condition cannot be complied with.

2.15.2 Advance warning signs

Use T1-1 (road work ahead) signs and T2-16/17 (end road work) signs at all long term works sites and at all rural works sites.

In urban areas T1-1 (road work ahead) signs and T2-16/17 (end road work) signs at short term work sites are not mandatory, however, they may be used if deemed appropriate.

2.15.3 Star pickets & fence droppers

Do not use star pickets for support of road work signs, bunting, flagging, fencing, etc within 9 metres of the trafficked path.

Do not use star pickets or any other non-frangible items such as steel drums, for delineation or any other purposes within 9 metres of the edge of the trafficked lanes. Bollards, cones and flagging are appropriate alternatives.

Fence droppers may be used as sign supports or legs and bunting or flagging supports on the condition that that the droppers are securely embedded into the ground and the sign, bunting or flagging is sufficiently secured to the droppers. Maintain a prudent use of end caps to ensure the minimisation of any hazards to workers and the public and the specified sign heights can be achieved.

Star pickets may be used for fencing support within the work site, provided appropriate action is taken to reduce any associated hazard for workers within the site and they are not within 9 metres of the travelled path of motorists.

2.15.4 Non-standard signs - Hold Point

Hold Point - Obtain specific approval from the Superintendent before using signs not included in AS 1742.3.

2.15.5 Portable Variable Message Signs (VMS) - Hold Point

Provide electronic variable message signs (VMSs) which comply with AS 1742.3 and with AS 4852.2 where major disruptions or delays to traffic or changes to the travelled path are likely to occur.

Provide the VMSs a minimum of 5 working days before any changes occur.

Provide the VMSs:

- at all approaches to intersections affected by, or likely to be affected by, the works,
- at approaches to detours associated with the works, and
- at approaches to major alterations to the existing travelled path.

Use electronic variable message signs capable of displaying a minimum text size as specified in AS 1742.3 and/or in AS 4852.2 and capable of displaying at least 3 lines, and capable of displaying at least 8 characters per line, and capable of displaying a maximum of 10 characters per line.

Colours for text, symbols, and backgrounds must conform to **Table - Permitted VMS colours**.

Table - Permitted VMS colours	
Application	Permitted colours
General message	White
Warning message	Yellow
Lane open (symbolic)	Yellow (Green only if approved)
Lane closed (symbolic)	Yellow (Red only if approved)
Regulatory	As required for static sign of same type
Other	As approved
Regulatory VMS displays must be a single screen, and permanently visible.	

Hold point: Provide details of the messages to be displayed and the locations of the variable message signs. Provide wording for advance warning message(s) and wording for message(s) to be displayed during the works. Do not use any VMS until the messages to be displayed have been approved. Do not use any VMS until the proposed location and orientation of the VMS has been approved. Provide this information not less than 5 working days before the VMSs are to be put in to service for the project.

Ensure the displayed messages are updated to reflect the actual on-site conditions and/or requirements.

VMSs are to be placed in position, and display an advance warning regarding the works, on all approaches, 5 working days before new traffic signals are put in to operation. The VMSs are to remain in situ, operating properly, displaying the approved during works message, for a minimum of 2 working days after the new traffic signals are put in to operation. These time frames may be varied by the Superintendent.

VMSs are to be placed in position, and display an advance warning regarding the works, on all approaches, 5 working days before any major disruptions or delays to traffic or changes to the travelled path are likely to occur. The VMSs are to remain in situ, operating properly, displaying the approved during works message, for a minimum of 2 working days after the works are complete. These time frames may be varied by the Superintendent.

Ensure any VMS used on site is oriented so that the message is clearly visible to motorists on the approach side.

Ensure any VMS used on site has adequate separation from the travelled path.

Ensure the VMS does not obstruct any path of travel of cyclists or pedestrians.

Ensure the VMS does not obstruct any crossover.

Ensure any VMS used on site has adequate separation from any other infrastructure, particularly overhead power lines.

Ensure any VMS used on site does not obstruct motorists' sight lines.

Ensure any VMS used on site is level, and that the screen and display elements are not damaged.

Do not have any on site VMS visible to motorists if it is not in use. Pre-positioning a VMS on site without a message being shown is only permitted if the VMS will be put in to use within a brief period of time.

Ensure the VMS does not cause any light pollution to nearby residences.

Take full responsibility for the VMSs used for the works, including prevention of theft and prevention of vandalism,

Do not, under any circumstances, use variable message signs for private advertising, within the NT Government road reserve, or visible from the NT Government road reserve, without the written approval of the Superintendent.

Any failure to comply with this clause will render the Contractor liable to pay the costs incurred by the Department to procure any alternate means to have any non-compliant VMSs removed from site.

2.15.6 Work Zone Speed Limits - Mandatory

Where work zone speed limits are being proposed to be changed, the proposed temporary speed limits must be approved by the Superintendent prior to implementation of the proposed speed limits.

Erect speed limit signs in accordance with sub-clause **Sign Erection** in this clause.

All Traffic Management Practitioners must record in their Daily Diaries time, date and location of each approach, of speed limit installations and removals for legal purposes. Retain these diaries for a minimum of 12 months from completion of the works if there were no reportable incidents at the site of the works. If there was an incident, retain the logs until informed that they can be destroyed. Provide copies of the diaries on request.

If an incident occurs within, adjacent to, on approach to or departure from the work site, make a photographic record of the traffic control devices, site conditions, placement of plant and equipment etc, as soon as practical after the event. Advise the Superintendent of the incident as soon as possible.

Provide, to the Superintendent, as soon as practicable, electronic copies of:

- the site photographs,
- the TGSs implemented at the site at the time of the incident,
- the signed incident report,
- the Daily Diaries,
- any TSLA applicable to the site at the time,
- any PTSA applicable to the site at the time, and
- any other information requested by the Superintendent.

2.15.7 Temporary Speed Limits - Hold Point

Hold point - Submit temporary speed limit authorisation applications to alter speed limits to the Superintendent, 5 working days prior to the implementation of temporary speed limits, for approval under the *Control of Roads Act 1953*.

Place repeater speed limit signs along the road, which has a temporary speed limit imposed, after all intersections with other roads within the speed limited area.

Design the Traffic Management Plans so that speed limits lower than the following absolute minimums are not required (refer to PROJECT SPECIFIC REQUIREMENTS);

Table - Target lowest speed limits	
Application	Target speed limit not lower than
Urban or built up areas.	40 km/h
Bridge works, when restricting traffic to one lane and only in conjunction with a stop-traffic situation. A safety barrier complying with the relevant Test Level in accordance with AS/NZS 3845 shall also be used.	40 km/h
All other rural works.	60 km/h unless site conditions warrant a lower speed limit.

Implement permitted controls and monitor the site for compliance.

Do not allow dangerous conditions to remain for any time before adjusting control measures to make travel through the section of road subject to the controls as safe as possible.

If there is non-compliance make adjustments to control measures and check for compliance.

Assess the options available to mitigate risk if there is non-compliance.

Assess the risks, and assess if compliance is unlikely to be achieved, before calling Police to assist.

Temporary speed limit signs may only be displayed within the times and dates stipulated in the approved TSLA, and only when they are necessary. Failure to comply with this clause will render the Contractor liable to pay for the costs incurred by the Department to have the installation made compliant.

2.15.8 Road Safety Barriers - Hold Point

Design, install and maintain all road safety barriers, including longitudinal channelizing devices, used within the NT Government's road reserve in accordance with AS 1742.3, AS/NZS 3845.1, AS/NZS 3845.2 and any other relevant and current Australian Standard associated with the works being proposed. Refer to the **Workzone temporary safety barriers** section at <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/road-safety-barriers> . Use only MASH tested barriers.

Failure to meet the requirements of this clause may result in the project being suspended by the Department or other relevant authorities, such as NT WorkSafe, without cost to the Department, and without cost to that authority, until the project meets the requirements of this clause.

Hold Point: Provide a statement, signed by your engineer, and signed by the author of the Traffic Management Plan, which states that the Road Safety Barriers proposal complies with AS 1742.3, and with AS/NZS 3845.1, and with AS/NZS 3845.2, and with the specifications and installation manuals from the manufacturers of the components proposed to be used in the Road Safety Barriers system. Provide the Traffic Management Plan with this statement.

The Traffic Management Plan must have information about the proposed Road Safety Barrier system(s), including, but not limited to:

- the barrier type(s),
- the end treatment type(s),
- the deflection zone(s),
- containment fence(s),
- offset(s) from traffic lane(s),
- width(s) and length(s) of work site(s),
- barrier(s) length(s) of need,
- barrier(s) requirements for night time,
- design layout drawing(s),
- installation methodologies, and
- a risk assessment of the use of the proposed Road Safety Barrier system(s).

2.15.9 Covering of Signs

Do not cause damage to signs by covering them with incompatible materials.

Do not use plastics to cover signs.

Do not use adhesive tapes on the faces of signs.

Remove covers immediately if directed to do so by the Superintendent or another officer of the Department.

Ensure moisture does not become trapped between a sign cover and the face of the sign.

Replace any signs which are damaged by incompatible coverings at no cost to the Principal.

Any failure to comply with this clause will render the Contractor liable to pay the costs incurred by the Principal to have rectifications made.

2.16 EXCAVATIONS, STOCKPILES, AND GRADIENTS WITHIN WORK ZONES AND CLEAR ZONES

2.16.1 NT WorkSafe Guideline in Relation to Excavations

Provide shoring to all trenching or excavations which are deeper than 1.5 metres and where a person is required to enter unless an engineer certifies that shoring is not required. Provide a copy of the Engineer's certification on request.

Comply with the provisions of the Code of Practice for Excavation Works available from Safe Work Australia. Comply with the NT Work Safe Codes of Practice and Safe Work Australia Codes of Practice applicable to the works.

2.16.2 Requirements for excavations, stockpiles or other gradients

Provide protection and delineation measures to excavations, stockpiles, or other gradients, to AS 1742.3, Protection and delineation at excavation works appendix, and to the **Road Safety Barriers** clause in this work section.

Measures to be implemented must take in to account the clearances between the hazards and traffic, and the posted traffic speed limits, and the nature of the hazard.

Where possible the site should be left without hazards outside working hours by backfilling, covering, or removing the hazards.

2.16.3 Containment fencing

Containment fencing must comply with AS 1742.3, **Containment fences and road safety barrier systems** clause, **Containment fences** sub-clause.

Containment fencing is not a substitute for safety barriers.

The clearance between containment fencing and the travelled path is to be determined by the Procedures for the installation and operation of traffic control devices section of AS 1742.3.

Fix retroreflective markers on the trafficked side of steel panels which are used as containment fencing, if they are within 9m of the travelled path, or adjacent to pedestrian or cyclist access, and if they are to be in place at night.

2.17 TEMPORARY PAVEMENT MARKING

Where new pavement surfacing or existing pavement resurfacing is being undertaken, install temporary raised reflective pavement markers at the end of each day and prior to the loss of daylight at 24 metres maximum spacing.

If so instructed by the Superintendent, temporary line marking at the end of each day may also be required until completion of the works when the permanent line marking is reinstated.

Only use temporary raised reflective pavement markers that comply with AS 1742.3, **Description and use of signs and devices** section, **Devices for delineating and indicating the travelled path** clause.

For long term road construction works where sealed detours merge into existing sealed pavements or where sealed side roads merge into sealed detours, line mark transition areas in

accordance with the standard drawing for Line Marking, CS 3400 and in accordance with AS 1742 including the setting out of arrows, letters, numerals and chevrons.

2.17.1 Removal of Temporary Pavement Marking

All line removal works must be carried out in such a manner as to not endanger the health, safety or amenity of employees, road users or the general public.

Do not paint over temporary line marking as a means of removing it.

Carry out removal of marking in such a manner as to minimise damage to pavement surfaces.

Obliterate markings so as they are no longer recognisable as marking. When arrows, letters or figures are to be removed, the removal pattern must be in the shape of a rectangle or square to minimise confusion to the motorist, particularly in wet weather and poor lighting conditions.

The removed marking and the material used to remove the marking must be contained, collected and disposed of in an environmentally acceptable manner.

Refer to the Department's Removal of Line Marking Policy at <https://dipl.nt.gov.au/policies>.

2.18 DETOURS, SIDE TRACKS, AND CROSSOVERS – HOLD POINT

Hold Point- Obtain written approval from the Superintendent before commencing any works.

Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

2.18.1 Construction - Witness Point

Witness Point - Obtain advice from the Superintendent that all requirements for the construction of the detours, side tracks, and/or crossovers have been met on completion.

Witness Point - Provide not less than 5 days notice before opening any side track, detour, or crossover, to traffic.

Provide side tracks for detours when it is impractical to provide for traffic on the existing road system.

Side Track Type; Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

Construct side tracks with a finished surface level crown height 250 mm above the natural surface. Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

Design and construct side tracks to comply with AUSTRROADS Guide to the Geometric Design of Rural Roads and the following minimum standards:

Table – Minimum Standards for Side Tracks - Part 1 of 2			
Side track characteristic	Roadway Type		
	National Highway	Secondary Highway	Local Road
Carriageway Width	10 m	8 m	6 m
Design Speed	80 km/h	60 km/h	40 km/h
Design Vehicle	Triple road train	Triple road train	Semi trailer
Horizontal Curve radius with 3% superelevation	250 m	150 m	50 m
Vertical Curve radius (crest)	2,500 m	1,000 m	400 m
Vertical Curve radius (sag)	1,000 m	600 m	400 m
Pavement Width	8 m	6 m	4 m
Trafficable Surface Type (over pavement width) ^a	Sealed	Gravelled	Gravelled
Gravel Pavement Thickness (when specified)	150 mm	100 mm	50 mm
Lateral Clearance to Obstruction (from edge of carriageway)	2.5 m	1.2 m	1.0 m

Table – Side Track Minimum Requirements - Part 2 of 2	
Item	Requirement
Signs/Warning devices:	As in Traffic Management Plan.
Guideposts:	At all fills, curves and crests.
Flood gauge posts:	At all floodways.
Total length at any one time:	5 km max.
Side track type:	Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

Compact top 150 mm to 95% relative compaction.

Match side tracks neatly to the existing road system.

Provide sufficient resources to direct and assist traffic, when side tracks become restricted.

Carry out immediate remedial works when traffic is delayed by poor side track conditions or surface condition is dangerous.

Provide and maintain adequate drainage. Ensure drainage measures do not cause or accelerate erosion.

2.18.2 Maintenance

Provide contact details of personnel who can be contacted outside of working hours. These people must be able to respond to situations which may arise, and must be able to rectify, or to have rectified, any problems which occur, outside of working hours.

Any failure to comply with this clause will render the Contractor liable to pay the costs incurred by Department staff to procure any alternate means to have after hours rectifications made.

Maintain the existing road network, and all side tracks, in use by the public.

Table – Side track maintenance requirements	
Surface type	Maintenance required
Sealed Surfaces:	Patch and repair all surfaces. Grade and roll shoulders.
Unsealed Surfaces:	Regrade and roll to maintain a comfortable riding quality at design speed.

Prevent dust nuisance by water spraying at regular intervals to keep surface moist.

Do not use waste oil as a dust suppressant.

Remove debris and rubbish.

Maintain road signs and guide posts in a clean state.

Inspect the site regularly, particularly when there is rainfall which will affect the site, whether directly or by run-off from rain fall in upstream areas. Inspect the site regularly at times when you and/or your employees, are not, or will not be, working on site for periods of time in excess of 2 weeks. Inspections are to be carried out at least once a week.

2.19 ACCESS TO ADJACENT PROPERTIES AND SIDE ROADS

Maintain access to adjacent properties and side roads at all times to a level appropriate for the type and frequency of traffic. Refer TO PROJECT SPECIFIC REQUIREMENTS.

Provide and erect proposed and approved signs detailing alternative access, only after approval from the Superintendent is obtained.

Ensure adequate access is maintained for pedestrians and cyclists as required, including delineated access if existing paths are being closed as part of the works.

2.20 TEMPORARY PEDESTRIAN ACCESS

Conform to: AS 1742.9, AS 1742.10. Refer TO PROJECT SPECIFIC REQUIREMENTS.

Maintain access for pedestrians, cyclists and persons with disabilities passing through and around the work site. Where existing paths have been, or are to be, demolished or are, or will be, inaccessible or modified due to construction works, provide temporary access to a standard not less than the pre-existing or preconstruction standard.

Temporary access must;

- be clearly delineated and have adequate width and height clearance,
- be smooth, free draining and free of obstructions and loose material,
- provide clear guidance where paths change direction,
- be illuminated by temporary lighting in urban areas to assist path users where existing street lighting has been removed or affected by the works,
- be arranged so that path users are clearly visible to vehicle drivers and plant operators at road crossing points.

2.21 TEMPORARY BRIDGING – HOLD POINT

Design and construct any temporary bridging in accordance with the AUSTRROADS Guide to Bridge Technology.

Hold Point - Obtain written approval from the Regional Manager, Road Projects prior to commencement of any such works.

Ensure all environmental approvals have been obtained prior to the commencement of the works.

Hold Point - Provide copies of approvals obtained by Contractor to the Superintendent prior to the commencement of the works.

Provide and erect signage, fencing, road safety barriers and or guard railing etc. to prevent accidental access to the feature being bridged.

2.22 CONTRACTOR'S PLANT AND EQUIPMENT – HOLD POINT

Provide public traffic right of way at all times unless traffic control is in use.

Keep parking and materials storage clear of trafficked areas and clear zones in accordance with applicable AUSTRROADS guides.

Do not park any vehicles, or mobile plant, machines, or equipment in the Road Reserve when it is not in use for the execution of the works without prior written approval, or explicit approval in the Request for Tender/Quotation.

Any request for approval must include, as a minimum, the reasons for the need to park in the Road Reserve, the locations affected, the durations anticipated, site conditions, lighting conditions, traffic paths of travel and anticipated volumes, access and egress points, site security measures, pedestrian and cyclist activity and safety, and effects on nearby residential properties, including the occupants of them.

Do not leave equipment or tools unattended. Do not leave any item in a location where it could be a hazard to the public.

Responsibility for maintaining the security of Contractor's plant, vehicles, machines, equipment and other items used for the execution of the works remains with the Contractor.

Hold Point - On roads carrying significant traffic, floodlight the road and area within 50 m of the site when working at night, if approved by the Superintendent, to a ground level luminance of 10 lux minimum.

2.22.1 Vehicles, plant, machines, and equipment

All vehicles, and mobile plant, machines, and equipment, used on the road must be legally registered, or otherwise permitted, to travel on Northern Territory roads, and must have compulsory third party insurance valid in the Northern Territory if that is required under Northern Territory legislation.

Comply with the Northern Territory *Traffic Act 1987*, and its Regulations 1999.

Do not permit tracked mobile plant, equipment, machines, or vehicles, to cross public roads.

Any failure to comply with this clause will render the Contractor liable to pay the costs incurred by the Department to procure any rectifications or repairs which become necessary.

2.22.2 Mobile Plant - Broadband Alarm

2.22.2.1 Standards

AS 4742: Machine-mounted forward and reverse audible warning alarm (withdrawn but available)

ISO 9533: Earth-moving machinery - Machine-mounted audible travel alarms and forward horns
- Test methods and performance criteria

2.22.2.2 Definition

Broadband alarm: Pulsed acoustic signal that comprises a range of frequencies and sometimes referred to as quacker, woosher, non-tonal reversing beepers or white sound.

2.22.2.3 Broadband/White-Sound Alarm Requirement

Provide Broadband Alarms (White Sound) fitted to all construction vehicles and mobile plant before commencement of works.

Ensure that installation and proper operations of the alarm/warning system is sufficient before commencement of works, including but not limited to:

- All alarms clearly audible above the noise level of the machinery or vehicle.
- Automatically activated when reverse gear is selected.
- Directional nature of the broadband alarm is appropriate for works.

2.22.3 Warning devices mounted on vehicles, plant, and equipment

Provide beacons, or other vehicle, or plant, or equipment, mounted visual illuminated warning devices on the highest point of the cabin roof or superstructure of all vehicles, mobile plant, mobile machinery, and mobile equipment in accordance with the **Vehicle-Mounted Signs And Devices** Clause in the **Description And Use of Signs And Devices** Section of AS 1742.3 where these are being used within the road reserve.

Fit beacons with globes rated at a minimum of 55 watts, or the LED equivalent.

Do not use strobe lights.

Ensure that the light is operational whenever the plant or equipment is working on or within 9 m of the roadway.

Ensure that the light is visible from all approaches and not obscured by exhaust stacks, back hoe arms etc, and that the beacons or warning devices are not covered in dust.

Non-compliance with this clause may result in the Contractor being directed to cease work, which will be at no cost to the Principal, and which will not be grounds for an extension of time claim.

2.23 ROAD WORK ZONE LENGTH

Comply with the requirements of AS 1742.3.

Comply with the requirements of the Portable Traffic Signals clause in this work section.

Maximum road work zone length when using portable traffic signals is 1050-1150m.

Refer to the **Table - Zone Lengths for Temporary Speed Limits** in the **Temporary Speed Limits** sub-clause in the **NT Specific Directions for Road Work Signs** clause in this work section for length limits for temporary speed zones.

2.24 TRAFFIC SIGNALS, INTELLIGENT TRANSPORT SYSTEMS (ITS), VARIABLE SPEED LIMIT ZONES, AND TRAFFIC COUNT STATIONS

2.24.1 Traffic Signals - Hold Point

Hold Point - Obtain clearances from the Department's Traffic Section, ph. 8999 4402, prior to commencement of the works. Co-ordinate your works activities with the Department's Traffic Section for the duration of the works.

This includes all works;

- 150 m prior to the stop line (within trafficked lanes),
- 50 m past the stop line (within trafficked lanes),
- that affect normal daily traffic flow at any signalised intersection,
- for road reserve or median excavations greater than 150 mm,
- within 10m of an area defined by the traffic signal or ITS pedestals and associated pits, including detector loops and pits, traffic signal controller cabinet, and UPS cabinet,
- within 10m of a Department CCTV camera,
- where a Red Light Speed Camera (RLSC) is, or will be, impacted by traffic management, and
- between the traffic signal poles and associated traffic signal control cabinet.

Approvals and clearances may be varied or withdrawn at any time in response to changing circumstances.

2.24.1.1 Works undertaken DURING working hours - Hold Point

Hold Point - Provide copies of the endorsed TGSs, and contact the Traffic Section, by phone on 8999 4402, not less than one working day prior to the commencement of work.

Hold Point - If the traffic signals need to be re-mapped, or other traffic controls implemented, advise the Traffic Section not less than one working day prior to the commencement of work.

Contact should be made by email to traffic.NTG@nt.gov.au or by phone.

Hold Point - Advise the Traffic Section about the planned lane closures by phone immediately before installing traffic control on the day the works are to be carried out.

Contact the Traffic Section immediately if unacceptable traffic congestion occurs during the works so that the Traffic Section can assist by adjusting traffic signal timings. If traffic congestion cannot be relieved by adjusting traffic signal timings it may be necessary to remove lane closures.

Hold Point - Advise the Traffic Section immediately before traffic control is removed.

Any failure to comply with this clause will render the Contractor liable to pay the costs incurred by the Department to procure any rectifications or repairs which become necessary.

2.24.1.2 Works undertaken OUTSIDE working hours - Hold Point

Hold Point - Provide copies of the endorsed TGSs, and contact the Traffic Section, not less than one working day prior to the commencement of work.

Hold Point - If the traffic signals need to be re-mapped, or other traffic controls implemented, co-ordinate directly with the Traffic Section not less than one working day prior to the commencement of work.

The name and phone number of an after-hours contact officer will be provided by the Traffic Section.

Hold Point - Advise the Traffic Section after-hours contact officer about the planned lane closures, using the after-hours phone number provided, immediately before installing traffic control, on the day the works are to be carried out.

Contact the Traffic Section after-hours contact officer, on the after-hours phone number provided, immediately if unacceptable traffic congestion occurs during the works so that the Traffic Section after-hours contact officer can assist by adjusting traffic signal timings. If traffic congestion cannot be relieved by adjusting traffic signal timings it may be necessary to remove lane closures.

Hold Point - Advise the Traffic Section after-hours contact officer, on the after-hours phone number provided, immediately before traffic control is removed.

Any failure to comply with this clause will render the Contractor liable to pay the costs incurred by the Department to procure any rectifications or repairs which become necessary.

2.24.2 Variable Speed Limit Zones – Hold Point

Hold point – Obtain clearances from the Department’s Traffic Section, ph. 8999 4402, not less than five working days prior to commencing works.

Co-ordinate the work activities with the Department’s Traffic Section for the duration of the works.

This includes all works:

- In the close proximity of the area defined by the VSL poles and associated pits.
- Within the VSL zone.
- On any immediate approach to the VSL zone that may require the installation of temporary speed reductions.

Provide copies of endorsed TGSs to traffic.NTG@nt.gov.au and/or contact the Traffic Section, by phone on 8999 4402, not less than five working days prior to commencement of work.

VSL control keys may be available from the Traffic Section for use.

2.24.3 Traffic Count Stations - Hold Point

The majority of the permanent count stations have in-pavement detection systems installed and cutting off or closing traffic lanes can have an impact on their operation.

In addition to the permanent count stations, there may be other count stations which are identified by the installed tubes laid across the surface of the pavement.

Hold Point - Prior to the commencement of work within the trafficked lanes and within 50 m of traffic counters or within 20 m, in any direction, of any component of the traffic count equipment, whether located in or on the trafficked lanes, shoulders, nature strips, and/or medians, or located in another type of area, obtain a clearance to commence the works from Department's Maintenance Section for the region in which the works are located, and with either the Superintendent or with the Maintenance Manager (phone 8999 4660).

Co-ordinate works activities, with the Department's Maintenance Section for the region in which the works are located, for the duration of the works.

Maps showing count station locations are available from Department's Transport Infrastructure Planning Division, contact: (08) 8924 7531, or from the Annual Traffic Reports at: <https://dipl.nt.gov.au/data/traffic-report> .

Any failure to comply with this clause, and any damage caused to Northern Territory Government infrastructure, will render the Contractor liable to rectify the breach, and / or repair any damage, and / or pay the costs incurred by the Department to procure any rectifications or repairs which become necessary.

2.25 PORTABLE TRAFFIC SIGNALS - HOLD POINT

Use portable traffic signals (PTS) complying with AS 4191. Use portable traffic signals in a manner complying with the requirements of AS 1742.3.

Portable traffic signals are for short-term traffic control applications only. Where traffic signal control is being proposed for periods greater than 2 months in a single location, consider the installation of temporary traffic signals.

Each portable traffic signal unit must be fitted with a sign which has on it the Contractor’s name and contact information, including phone numbers for contact during working hours and for contact outside of working hours.

Hold point - Complete and provide the Portable Traffic Signal Authorisation (PTSA) form, included in the application for a Permit to Work in the Road Reserve document, to seek formal approval from the Superintendent to use the proposed portable traffic signals and the proposed time settings, not less than 5 working days prior to the intended use of the portable traffic signals.

Do not use any PTSs on site until an authorised Departmental Officer has signed off the PTSA form.

Refer to **Table - General Time Settings**, and **Table - Yellow Times**, and **Table - Red and Green Times**.

Consider the reduction of Green Times to reduce delays to traffic.

Limit the spacing between PTSs controlling each section of road to the minimum practical distance. For the area under the control of portable traffic signals, limit the spacing between PTSs controlling each section of road to no more than 1150 m.

Use the time settings in the tables in the **Time Settings** sub-clause in this clause as a guide for red time clearance and maximum green times.

Monitor the prevailing traffic conditions and vehicle speeds and amend the times for the site to suit traffic conditions and to minimise delays to traffic. Submit details of the changes to the Superintendent as soon as practicable thereafter.

Preference should be given for the use of approved vehicle activated systems.

The use of PTSs at T intersections will be considered on a case by case basis. Overall delay times are critical at these types of locations.

Inaccurate or incorrect information provided with a PTSA submission may cause delays in processing the application, and therefore may delay the start of the project.

Provide contact details of personnel who can be contacted outside of working hours. These people must be able to respond to situations which may arise, and must be able to rectify, or to have rectified, any problems which occur, outside of working hours.

Any failure to comply with this clause will render the Contractor liable to pay the costs incurred by Department staff to procure any alternate means to have after hours rectifications made.

2.25.1 Temporary Speed Limits - Hold Point

Impose a controlled area speed limit not exceeding 60 km/h if the portable traffic signals would otherwise be in a higher speed limit zone.

Hold Point - Work zone speed limits require approval from the Superintendent prior to implementation.

Refer to the **Table - Zone Lengths for Temporary Speed Limits** in the **Temporary Speed Limits** sub-clause in the **NT Specific Directions for Road Work Signs** clause in this work section for length limits for temporary speed zones.

2.25.2 Sight Distance

Maintain a sight distance on the approach to portable traffic signals of not less than 150 m. If this cannot be achieved, use appropriate advance warning signage to advise road users in advance of the sight line obstruction of the impending traffic signals ahead.

In cases where queuing traffic is extending past the advance warning signage, install further advance warning signs and speed zone signs further in advance, to prevent collisions at the end of the queue awaiting a green light. Avoid excessive traffic queuing by use of and adjustment of, appropriate time settings on the portable traffic signals whenever possible.

2.25.3 Time Settings

Table – General Time Settings				
Mode	All red	Minimum Green	Maximum Green	Yellow
Manual	M	F	M	S
Fixed time	S	F	S	S
Vehicle Actuated	S	F	S	S
F Fixed at 15 seconds M Set the manual control switch each cycle S Needs to be selected and pre-set by operator for each site				

Table – Yellow Times	
Approach Speed	Yellow Time
60 km/h	4 seconds

Table - Red and Green Times			
Determine green period timings based on anticipated traffic conditions, and modify them to suit actual traffic conditions experienced when the works are undertaken, as green times indicated in this table are maximum times for green signals.			
All Red Period (Seconds)	Max Green Period (Seconds)	Distance Between Stop Lines at traffic Signals (m) – Clearance speed 20 km/h	Distance Between Stop Lines at traffic Signals (m) – Clearance speed 40 km/h
2	30	0-30	0-50
5	35	34-45	50-90
10	35	45-75	90-150
15	40	75-105	150-210
20	40	105-135	210-270
25	45	135-165	270-330
30	45	165-195	330-390
40	50	195-250	390-500
50	50	250-310	500-620
60	60	310-365	620-730
70	70	365-415	730-830
80	80	415-465	830-930
90	90	465-525	930-1050
100	100	525-575	1050-1150

2.26 RESTORATION

Upon completion of works:

- Remove all temporary warning signage and other traffic control devices.
- Remove all temporary works and reinstate the areas to their original state, including the removal and disposal of seal and dragging windrows and debris back across the side track carriageway.
- Stabilize all areas impacted by the works to prevent erosion.
- Where applicable reseed with local native grasses and trees and shrubs.
- Comply with the requirements of the Environmental Approvals and Clearances issued by the Department, and by DENR, Environment Heritage and the Arts Division, Environmental Assessment and Policy Section, for the project.
- Reinstate permanent traffic control devices temporarily removed during the works.

Refer TO PROJECT SPECIFIC REQUIREMENTS.

2.27 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

3 EARTHWORKS AND DRAINAGE MAINTENANCE



3.1 OUTLINE DESCRIPTION

This section specifies the maintenance requirements for drainage, and the maintenance requirements for formation and subgrade on periodic pavement maintenance projects.

Maintain pavement dimensions in accordance with drawings CS 3609, CS 3610, and CS 3611. Civil Standard Drawings are accessible via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/standard-drawings>.

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

3.2 CROSS REFERENCES

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

Refer to REFERENCED AUSTRALIAN STANDARDS, and to OTHER REFERENCED AUTHORITIES AND DOCUMENTS, and to ACTS, REGULATIONS AND CODES.

3.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

AS 1289(set)	Methods of testing soils for engineering purposes
CS 3609	Typical Cross-Section For Unsealed Rural Roads
CS 3610	Typical Cross-Section For Sealed Rural Roads
CS 3611	Typical Sealed Floodway Cross-Section For Unsealed Rural Roads

3.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

3.5 EARTHWORKS IN CUT

3.5.1 Description

Operations necessary for excavation, irrespective of the type of material and subsurface conditions, including:

- working cuttings so that material meeting standard fill requirements is used for the subgrade,
- disposal of excess excavated material, including haulage of materials, up to a distance of 15km to the spoil/dump area,
- trim and compact exposed surfaces – refer to the **Trim and Compact Unpaved Areas** clause in this work section,
- compaction of material below the subgrade surface, and
- shaping and trimming of formation within cuttings.

3.5.2 Rock – Hold Point

Hold point - Obtain agreement from the Superintendent to the extent of the excavation.

Excavate rock encountered in the subgrade, formation, or drain.

Avoid forming pockets of shattered material below the level of the excavation.

Remove all loose material.

Trim the excavation to shed water and minimise erosion.

In subgrade, replace excavated material with select fill compacted to 95% relative compaction.

3.5.3 Unsuitable Material and/or Weathered Rock – Hold Point

Hold point - Obtain directions from the Superintendent before works commence.

Excavate unsuitable material and/or weathered rock encountered in the subgrade, formation, or drain.

Avoid forming pockets of shattered material below the level of the excavation.

Remove all loose material.

Trim the excavation to shed water and minimise erosion.

In subgrade: Replace excavated material with select fills compacted to 95% relative compaction.

3.6 EARTHWORKS IN FILL

3.6.1 Description

Earthworks in fill includes:

- locating sites for extraction of suitable materials,
- obtaining approvals for extraction,
- pushing up, screening, blending, and stockpiling of extracted material,
- rehabilitation of extraction and stockpile sites,
- winning, hauling, placing, compacting, and trimming material on all prepared areas including holes, pits, other depressions, scours, and washouts, and
- haulage of materials, as part of the construction activity, for up to a distance of 15km from any extractive area.

General Filling includes filling holes, pits and other depressions.

3.6.2 Preparation Prior to Filling – Hold Point

Subsequent to stripping of top layer apply a minimum of three passes with maximum mass compaction equipment.

Hold Point - Once moisture conditioned and compacted, subject each lot to a proof roll, with the Superintendent in attendance, as specified in the Proof Rolling sub-clause of the Conformance clause in this work section.

3.6.3 Construction Methods

Fill by any of the "Compacted Layer", "Rocky Material" or "Rock Fill" method.

Mix to a homogeneous material before compacting.

Select appropriate method(s).

3.6.3.1 Compacted Layer Method

Use where material generally does not contain cobbles, boulders or broken rock.

- Deposit and spread the material in uniform level layers to a maximum thickness of 250 mm loose measurement for the full width of fill.
- Compact each layer to the specified compaction (refer **Table - Dry Density Ratios for Conformance** in CONFORMANCE) before placing the next layer.
- Use standard fill for the subgrade.

3.6.3.2 Rocky Material Method

Use where material contains some cobbles and boulders (maximum size 600 mm) with sufficient fines for the work to be free of voids.

- Break up rocks bridging between adjacent materials to prevent cavities being formed.
- Maximum rock dimension: 600 mm or one-half the height of fill at the section where the rock is placed.
- Spread material in layers approximately equal to the maximum rock size.
- Work the rocky material in each layer until it is firm and unyielding.
- Construct to the bottom of the subgrade layer.

3.6.3.3 Rock Fill Method

Use where material is predominantly cobbles or boulders with insufficient fines to fill voids.

- Place and work the material until interlock is achieved.
- Advance the fill by full width construction. Side dumping shall not be undertaken. The construction face will be concave, with the shoulder face well in advance of the centre, except when filling in swamps or soft material when the advancing face ends shall be convex.
- Rock Dimensions.
 - Maximum vertical dimension: one - third of the height of fill being placed.
 - Maximum horizontal dimension: one - half of the height of the fill being placed.
- Construct to 300 mm below the bottom of the subgrade layer. Within 300 mm of the bottom of the subgrade layer use the Compacted Layer Method or Rocky Material Method, with a maximum particle size of 150 mm.

3.7 FILL MATERIAL

Provision of fill includes:

- locating sites for extraction of suitable materials,
- obtaining approvals for extraction,
- pushing up, screening, blending, and stockpiling of extracted material,
- rehabilitation of extraction and stockpile sites,
- winning, hauling, placing, compacting, and trimming material on all prepared areas including holes, pits, other depressions, scours, and washouts, and
- haulage of materials, as part of the construction activity, for an average of 15km from any extractive area.

3.7.1 General Fill

Use the best locally available material.

Use fill material, whether cut or borrow, that is free of organic matter and has a minimum soaked CBR (California Bearing Ratio) of 20 at 95% MMDD (Maximum Modified Dry Density) (to AS 1289), and a plasticity index between 2 % and 15%.

3.7.2 Standard Fill

Must be free of organic matter and conform to the following properties:

Table - Standard fill properties		
Property		Default (if no differing values shown in PROJECT SPECIFIC REQUIREMENTS)
CBR 4 day soaked at 95% MMDD to AS 1289:		20 min.
Maximum Particle Size:	For subgrade layers	50 mm
	For other than subgrade layers	100 mm
Plasticity Index:		2% - 15%

3.7.3 Select Fill

Select fill will be comprised of gravel, decomposed rock or broken rock, free from organic matter and lumps of clay.

Conform to the following:

Table – Select fill grading	
AS Sieve (mm)	% Passing (dry weight)
75.00	100
9.50	30 - 100
2.36	15 - 65
0.075	5 - 25

Table – Select fill properties	
Property	Value
CBR 4 day soaked at 95% MMDD to AS 1289:	30 minimum
Plasticity Index:	2 - 15% maximum
Linear shrinkage	2 – 6%.

3.8 REMOVAL OF EXCESS MATERIAL- HOLD POINT

Generally this work applies to the removal of unsuitable material such as silt, rubble, and sand, debris dumped on windrows, floodways, pavements and drains.

Removal of excess material includes the haulage of materials for up to a distance of 15km from site to spoil area.

Work does not include new works in cut, or heavy excavation of rock.

Haul and dump and/or spread excess material at the site(s) specified in PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

The material is to be spread and sheeted with topsoil, or stockpiled as specified in PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

Haul and dump and spread excess material:

- Not less than 125 m from the new road centre line, or
- To spoil dump sites specified. Clear site of organic material/topsoil prior to stockpiling material.
- Spread excess material, level to less than 1.5 m high. Stabilize to prevent erosion. Sheet with topsoil.

Dumped material remains the property of the Principal.

Ensure dumps do not dam surface water or streams or damage the works or other property.

Ensure dumping is not in streams nor within 25 m of a stream. Dump and spread the material in legally acceptable location using legal methods.

Comply with AAPA clearances.

Comply with environmental management approvals, including within the road reserve.

Hold Point - Obtain approval from Superintendent prior to hauling and dumping and spreading excess material.

3.9 EARTHWORKS FOR DRAINAGE

Grades shown below are as ratios of rise: run.

3.9.1 Table Drains

Construct, or reinstate, and trim, to the dimensions shown on the drawings.

Remove all obstructions including dead trees, fallen branches and regrowth.

Grade to prevent ponding of water.

Trim and compact as specified in the **Trim and Compact Unpaved Areas** clause in this work section.

Shape to direct water discharge into culverts, offlet drains or watercourses.

3.9.2 Table Drain Offlets

Construct, or reinstate, and trim, to a trapezoidal shape drain, with a flat bottom not less than 2m wide, with maximum batter slope 1:3.

Divert table drains into offlet drains at intervals not exceeding 150 m, or as specified. Refer to PROJECT SPECIFIC REQUIREMENTS.

Remove all obstructions including dead trees, fallen branches and regrowth.

Extend drains as far as required to prevent water ponding in the table drains, with length to be minimum 50 m.

Ensure the capacity of the offlet is not less than the capacity of the table drain, and is of similar cross section and dimensions.

Align and grade the offlet so that the water drains away without scour and damage, and to disperse water as sheet flow or into natural watercourses, at a gradient not to exceed 1:40 (1.5%).

Divert the table drain offlets neatly around natural obstacles such as large rocks and trees.

3.9.3 Table Drain Blocks

Construct, or reinstate, and trim, table drain blocks at offlets.

Construct blocks from standard fill conforming to the following requirements:

- Plasticity Index: 6% minimum.
- Length: To extend from edge of shoulder to top of outer table drain batter.
- Width: 3 m minimum, at the top, measured parallel to the road centre line.
- Height: To edge of shoulders.
- Max. Slope: 1: 0.67 (1.5:1).
- Compaction: Layers not exceeding 150 mm compacted thickness.

3.9.4 Stop Berms/Levees

Construct, or reinstate, and trim, stop berms/levees at locations diverting the flow from table drains into a stream or culvert.

Construct stop berms/levees from standard fill conforming to the following requirements:

- Plasticity Index: 6 % minimum.
- Height: To edge of shoulders.
- Max. Slope: 1: 0.67 (1.5:1).
- Compaction: Layers not exceeding 150 mm compacted thickness.

3.9.5 Catch Drains

Construct, or reinstate, and trim, catch drains. Carry out prior to formation, subgrade, and other drainage works.

- Depth: 500 mm (minimum) into solid ground.
- Gradients: Ensure free flow, prevent ponding of water, prevent scour.
- Outlets: As terrain permits construct at frequent intervals to reduce scour. Construct a block on continuous grades to divert water into culverts or drains.
- Offset: 2 m (minimum) and 4 m (maximum) beyond the edge of the cutting.

Divert the drains neatly around large rocks and trees.

3.10 TRIM AND COMPACT UNPAVED AREAS

Shape, grade and compact verge and unpaved areas as specified.

Unpaved areas include, but are not limited to, areas beyond the shoulders, and table drains.

Refer to **Table - Test Frequencies For Soils - Part 3 of 3** in CONFORMANCE TESTING.

Refer to **Table – Dry Density Ratios for Conformance** in CONFORMANCE TESTING.

Refer to PROJECT SPECIFIC REQUIREMENTS.

3.11 COMPACTION

Mix to a homogeneous material and compact with no compaction planes and free of cracking to conform to the Dry Density Ratios specified in the **Table - Dry Density Ratios for Conformance** in CONFORMANCE TESTING and the conformance clauses in this section.

3.12 CONFORMANCE

3.12.1 Tolerances

Finish earthworks and drainage to a smooth compacted and uniform surface within the limits in **Table – Conformance Tolerances – Earthworks and drainage**.

Table – Conformance Tolerances – Earthworks and drainage	
Item	Requirement
Formation Width:	Not less than shown on the drawings.
Subgrade Surface:	As shown on the drawings.
Subgrade Width:	Not less than shown on the drawings.
Batter:	Not steeper than the specified slope.
Maximum variation:	At any point from specified plane of batter shall be 150 mm in earth and 300 mm in rock.
Table Drain Invert:	Maximum 75 mm above or below specified level, free of depressions capable of ponding water.

3.12.2 Proof Rolling – Hold Point – Witness Point

Proof roll all areas to the satisfaction of the Superintendent.

Hold point - Submit a proof rolling procedure to the Superintendent for approval including the proposed method of preparing the areas, the extent of proof rolling, and details of the plant and / or equipment proposed to be used.

Plant Requirements

Use plant in proof rolling procedures that comply with the following requirements:

- For urban areas only, fully loaded water cart, minimum size 12tonne, on standard pneumatic road tyres, fully inflated.
- Fully loaded, minimum single trailer articulated heavy vehicle, on standard pneumatic road tyres, fully inflated.
- Pneumatic tyred compaction plant with a mass of not less than 20 tonnes and with a ground contact pressure under either the front or rear wheels of not less than 450 kPa per tyre and a ground contact area of not less than .035 m² per tyre.
- Do not use flat drum rollers.

Witness point - Give the Superintendent not less than 24 hours notice of the location and commencement time for the proof rolling. Give 48hrs notice for remote work (greater than 5hrs travel one way from regional centre).

Check areas for level tolerance and layer thickness before proof rolling.

Proof roll each layer immediately following completion of compaction. If proof rolling is carried out at a later time, water the surface and roll with the test roller prior to commencement of proof rolling.

Compliance; the proof rolling requirements are deemed to comply when an area withstands proof rolling without visible deformation or springing.

Provide uniform and stable support for rear wheel loads when at walking pace.

Remedial work; remove and reconstruct areas that deform or break up.

3.12.3 Conformance Testing – Hold Point

All works are subjected to CONFORMANCE TESTING and testing frequency shall comply with ***Table - Test Frequencies for Soils – Parts 1, 2 and 3.***

Ordering procedures; refer to CONFORMANCE TESTING for testing requirements and test ordering procedures.

Subgrade surface will be tested only when it is within level tolerance and conforms to proof rolling.

Check subgrade surface levels prior to testing.

Hold Point – Obtain the Superintendent’s approval of subgrade conformance prior to placing further material.

3.13 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

4 CONFORMANCE TESTING



4.1 GENERAL

This section specifies the conformance testing criteria for use in road maintenance works.

The Contractor will be responsible for process control testing.

The Superintendent will carry out all conformance tests nominated to be the Superintendent's responsibility through Panel Period Contracts.

The Contractor will be responsible for ordering the conformance tests.

Provide traffic control for conformance testing activities.

4.2 STANDARDS, CODES, TEST METHODS, AND PUBLICATIONS

Northern Territory Test Methods (NTTM) and NT Codes of Practice (NTCP) for materials testing are given in the Northern Territory Road Projects Materials Testing Manual (NTMTM). The methods contained in the Materials Testing Manual shall take precedence over all other test methods and procedures, and are used in conjunction with relevant Australian Standards.

When testing cannot be performed to the test methods stated below, these methods may be substituted with State Road Authority test methods so testing can be performed.

Conform to the following Standards and Publications unless specified otherwise.

The following standards, codes and test methods are referred to in this section;

AUSTRALIAN STANDARDS

AS 1012(set) Methods of testing concrete

AS 1141(set) Methods for testing and sampling aggregates

AS 1141.11.1 - Particle size distribution – Sieving method.

AS 1141.14- Particle shape, by proportional calliper.

AS 1141.15- Flakiness index.

AS 1141.18- Crushed particles in coarse aggregate derived from gravel.

AS 1141.20.1 - Average least dimension - Direct measurement (nominal size 10 mm and greater).

AS 1141.20.2 - Average least dimension - Direct measurement (nom. sizes 5 mm and 7 mm).

AS 1141.23- Los Angeles value.

AS 1141.24- Aggregate soundness – Evaluation by exposure to sodium sulphate solution.

AS 1141.40- Polished aggregate friction value - Vertical road-wheel machine.

AS 1141.41- Polished aggregate friction value – Horizontal bed machine.

AS 1289(set) Methods of testing soils for engineering purposes

AS 1289.3.1.1 - Soil classification tests - Determination of the liquid limit of a soil – Four point Casagrande method.

AS 1289.3.2.1 - Soil classification tests – Determination of the plastic limit of a soil – Standard method.

AS 1289.3.3.1 - Soil classification tests – Calculation of the plasticity index of a soil.

CONFORMANCE TESTING

- AS 1289.3.4.1 - Soil classification tests – Determination of the linear shrinkage of a soil – Standard method.
- AS 1289.3.6.1 - Soil classification tests – Determination of the particle size distribution of a soil – Standard method of analysis by sieving.
- AS 1289.5.1.1 - Soil compaction and density tests - Determination of the dry density or moisture content relation of a soil using standard compactive effort.
- AS 1289.5.2.1 - Soil compaction and density tests - Determination of the dry density or moisture content relation of a soil using modified compactive effort.
- AS 1289.5.4.1 - Soil compaction and density tests – Compaction control test – Dry density ratio, moisture variation and moisture ratio
- AS 1289.5.8.1 - Soil compaction and density tests – Determination of field density and field moisture content of a soil using a nuclear surface moisture-density gauge – Direct transmission mode.
- AS 1289.6.1.1 - Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil – Standard laboratory method for a remoulded specimen.
- AS 2341(set) Methods of testing bitumen and related road making products.
- AS/NZS 2341.2 - Determination of dynamic (coefficient of shear) viscosity by flow through a capillary tube.
- AS 2341.3 - Determination of kinematic viscosity by flow through a capillary tube.
- AS/NZS 2341.4 - Determination of dynamic viscosity by rotational viscometer.
- AS 2341.12- Determination of penetration
- AS/NZS 2341.13 - Long-term exposure to heat and air.
- AS 2891(set) Methods of sampling and testing asphalt.
- AS/NZS 2891.3.1 - Binder content and aggregate grading – Reflux method.
- AS/NZS 2891.3.2 - Binder content and aggregate grading – Centrifugal extraction method.
- AS/NZS 2891.3.3 - Binder content and aggregate grading – Pressure filter method.
- AS/NZS 2891.5 - Determination of stability and flow – Marshall procedure
- AS/NZS 2891.7.1 - Determination of maximum density of asphalt – Water displacement method
- AS/NZS 2891.7.3 - Determination of maximum density of asphalt – Methylated spirits displacement
- AS/NZS 2891.8 - Voids and density relationships for compacted asphalt mixes.
- AS/NZS 2891.9.1 - Determination of bulk density of compacted asphalt – Waxing procedure.
- AS/NZS 2891.9.2 - Determination of bulk density of compacted asphalt – Presaturation method.
- AS/NZS 2891.9.3 - Determination of bulk density of compacted asphalt – Mensuration method.
- AS 4049.3 Paints and related materials – Pavement marking materials Part 3: Waterborne paint – for use with surface applied glass beads.

NT CODES OF PRACTICE

- NTCP 102.1 Testing field compaction for conformance
- NTCP 103.1 Site selection by the stratified random technique.
- NTCP 107.1A Surface Roughness

NT TEST METHODS

- NTTM 204.1 Cement content of stabilised materials – Heat of neutralisation
- NTTM 204.7 Rate of spread of lime or cement
- NTTM 204.8 Stabiliser distribution
- NTTM 215.1 Standard ball penetration test

CONFORMANCE TESTING

- NTTM 216.1 Measurement of layer thickness
- NTTM 304.1 Determination of skid resistance with the portable skid tester
- NTTM 305.1 Determination of pavement surface texture depth - sand patch method
- NTTM 404.1 Retroreflectivity testing of pavement marking
- NTTM 404.3 Retroreflectivity testing of pavement marking – wet condition

AUSTROADS TEST METHODS

- AGPT04H Austroads Guide to Pavement Technology Part 4H: Test Methods
- AGPT/T103 Pre-treatment and Loss on Heating of Bitumen Multigrade and polymer Binders (rolling thin film oven [RTFO] test)
- AGPT/T111 Handling Viscosity of Polymer Modified Binders (Brookfield Thermosel)
- AGPT/T112 Flash Point of Polymer Modified Binders
- AGPT/T121 Shear Properties of Polymer Modified Binders (ARRB ELASTOMETER)
- AGPT/T122 Torsional Recovery of Polymer Modified Binders
- AGPT/T124 Toughness of Polymer Modified Binders (ARRB Extensiometer)
- AGPT/T131 Softening Point of Polymer Modified Binders
- AGPT/T231 Deformation Resistance of Asphalt Mixtures by the Wheel Tracking Test.

MAIN ROADS WESTERN AUSTRALIA, TEST METHODS (MRWATM).

- WA 730.1 Bitumen Content and Aggregate Grading.

4.3 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

The following additional definitions apply.

CBR

California Bearing Ratio

CONFORMANCE TESTING

The testing to be carried out by the Superintendent to ensure that the work complies with the contract documents.

ITP

Inspection Test Plans

NATA

National Association of Testing Authorities

NTCP

NT Code of Practice – in NTMTM

NTMTM

NT Materials Testing Manual – available via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/materials-testing-manual>

NTTM

NT Test Methods – in NTMTM

PROCESS TESTING

Testing carried out by the Contractor to self-ensure that the work is in accordance with the contract documents.

4.4 ITP SUBMISSION – HOLD POINT

ITPs are required for all construction processes.

Hold Point - Submit: ITPs, detailing all procedures and test plans to be undertaken to complete the project, before commencing work.

4.5 SPECIFIC TESTS

Conduct field density testing using Nuclear Density Gauges in accordance with NTCP 102.1 and AS 1289.5.8.1.

Conduct CBR moulding using a compaction rammer / hammer conforming to the requirements of AS 1289.5.1.1 or AS 1289.5.2.1.

Where tests are required that are not included in the manual use the appropriate Australian Standard.

4.6 PANEL PERIOD CONTRACTORS

The Principal has in place Panel Period Contracts with NATA accredited testing companies. The Superintendent will provide a list of the Panel Period Contractors to be used for conformance testing on the contract when the contract is awarded. The Superintendent reserves the right to use other NATA accredited laboratories when panel Contractors are unable to carry out specific tests.

4.7 ORDERING TESTING

When required, in accordance with the contract documents, order the conformance testing in writing directly from the Panel Period Contractors. Order all testing using the Department's Test Request Form. Include on the order the following information:

- Lot boundaries including start and finish chainages, length and width,
- Type of layer,
- Type of tests required,
- Date and time when lot will be ready for testing.

Start with the first Contractor on the list and rotate in sequence for each set of tests. Do not bypass any Panel Period Contractor on the list unless that Panel Period Contractor provides a written explanation that he is unable to carry out the required testing to the time frames listed in the **Table - Testing and Reporting Completion Times** in this work section. In this instance, the written explanation must be provided to the Superintendent at the same time as the order for testing. Panel Period Contractors that are unable to carry out the required testing will be placed at the end of the rotation sequence.

4.7.1 Conformance Testing

The Superintendent will pay for all conformance testing directly to the Panel Period Contractor selected to perform the conformance tests required under the contract and nominated as the Superintendent's responsibility.

If any tests fail to meet specification, all retesting costs will be a negative variation to the contract. Failures in bitumen tests; refer to Superintendent.

When testing has been ordered and the site is not ready for testing at the time specified by the Contractor, the Contractor will bear the cost of time and travel incurred by both the Panel Period Contractor attending to conduct the conformance tests and the Superintendent, where applicable.

4.7.2 Process Testing

The Contractor is responsible for the ordering up of, and payment for, all process tests carried out.

4.8 NOTICE OF TESTING – WITNESS POINT

Give the Panel Period Contractor written notice in advance of each stage of the works requiring conformance testing, including re-testing.

Witness Point - Provide the Superintendent with a copy of the request for testing simultaneously with the request being sent to the Panel Period Contractor.

Any communication with the Panel Period Contractors, other than the ordering of testing or inquiring on the timing of test results, must be forwarded through the Superintendent.

Provide the Superintendent with the results of process control testing as identified in the relevant ITP with all requests for conformance testing.

Witness Point - Notify the Superintendent prior to any rework of failed lots.

4.9 TABLES - TEST FREQUENCIES, COMPLIANCE TESTING

Test frequencies as per tables:

Table – Test Frequencies for Bitumen Spray Sealing,

Table – Asphalt Testing Frequencies - During Works,

Table – Asphalt Testing Frequencies – After Works Completed,

Table – Number of Cores per Lot,

Table - Test Frequencies for Soils – Parts 1, 2 and 3,

Table - Test Frequencies for Aggregates and Pavement Surfaces,

Table - Sampling Frequencies for Fresh Concrete,

Table - Test Frequencies for Surface Roughness Testing, and

Table - MMDD Minimum Curing Times

Table – Test Frequencies for Bitumen Spray Sealing					
Test Method.	Property Tested	Cutback Bitumen/ Emulsions	Straight Run Binder -Initial Seal on New Works	Polymer Modified Bitumen -Initial Seals on New Works	Polymer Modified Bitumen - Reseal Works
AS/NZS 2341.2, AS 2341.3 or AS/NZS 2341.4	Dynamic Viscosity (60°C)	1 per 15,000L	1 per 15,000L	-	-
	Dynamic Viscosity (135°C)	-	1 per 15,000L	-	-
AS 2341.12	Penetration (25°C)	-	1 per 15,000L	-	-
AGPT/T121	Consistency (60°C)	-	-	1 per 15,000L	1 per 20,000L
AGPT/T121	Stiffness at 15°C (kPa)	-	-	1 per 15,000L	1 per 20,000L
AGPT/T111	Dynamic Viscosity (165°C)	-	-	1 per 15,000L	1 per 20,000L
AGPT/T122	Torsional Recovery at 25°C, 30s (%)	-	-	1 per 15,000L	1 per 20,000L
AGPT/T131	Softening Point (°C)	-	1 per 15,000L	1 per 15,000L	1 per 20,000L
AS/NZS 2341.13	Durability of base binder	1 per project	1 per project		
AGPT/T112	Flash Point (°C) min.	1 per project	1 per project	1 per project	1 per project
AGPT/T103	Loss on Heating (%mass) max.	1 per project	1 per project	1 per project	1 per project
AGPT/T124	Toughness at 4°C, 100mm(Nm) min.	1 per project	1 per project	1 per project	1 per project

CONFORMANCE TESTING

Table – Asphalt Testing Frequencies - During Works			
Test Method	Property Tested	Minimum Test Frequency	
		Daily Production <100 tonnes	Daily Production >100 tonnes
-	Mixing temperature	Every mix	Every mix
-	Laying temperature	Every 30 minutes	Every 30 minutes
-	Asphalt surface temperature at commencement of compaction	Every Mix	Every mix
AS/NZS 2891.3 or WA730.1	Bitumen content	1 No.	1 per 100 t *
AS/NZS 2891.3 or WA730.1	Particle size distribution	1 No.	1 per 100 t *
AS/NZS 2891.5	Stability	1 No.	1 per 100 t *
AS/NZS 2891.5	Flow	1 No.	1 per 100 t *
AS/NZS 2891.7.1 AS/NZS 2891.7.3	Maximum Density	1 No.	1 per 100 t *
AS 2341.3	Viscosity of Binder	1 per shift	1 per shift
* One test per nominated tonnage or part thereof.			

All sampling is to be performed at the plant from safe sampling platforms.

Binder sampling is to be conducted on the binder in actual use, either at transfer to the bitumen tank on the asphalt plant or from the tank itself.

Table – Asphalt Testing Frequencies - After Works Completed		
Test Method	Property Tested	Frequency
AS 2891	Thickness of layer	1 per core
AS/NZS 2891.8	Air Voids of compacted asphalt layer	1 per core
AS/NZS 2891.9	Insitu Density	1 per core
AGPT04H - AGPT/T231	Wheel track testing (composite sample)	1 per Type or 1 per 1000 t

Carry out density testing as soon as practicable after completion of works.

Do not test within 200mm of an edge or longitudinal joint, nor within 1 metre of a transverse joint.

Do not test odd shaped areas completed by hand placing of asphalt.

Conform to the following number of cores per lot:

Table – Asphalt Testing - Number of cores per lot			
Area (m²)	<100	100 – 1500	>1500
No. of Cores	1	Minimum 3	1 per 500m ² (minimum 3)

CONFORMANCE TESTING

Table - Test Frequencies For Soils – Part 1 of 3										
Type Of Test	General Fill	Standard Fill	Select Fill/Sand Clay Fill	Subgrade	Sub-Base	Basecourse	Bridge Backfill Using Std. Fill	Bridge Backfill Using Select Fill	Culvert Backfill Using Std. Fill	Culvert Backfill Using Select Fill
Field Density (FDD) by NTCP 102.1 & AS 1289.5.8.1	1 in 3,000 m ² (min. of 3 tests per lot)	1 in 3,000 m ² (min. of 3 tests per lot)	1 in 3,000m ² (min. of 3 tests per lot)	1 in 1,000 m ² (min. of 3 tests per lot)	1 in 1,000 m ² (min. of 3 tests per lot)	1 in 1,000 m ² (min. of 3 tests per lot)	3 tests per 100 m ³	3 tests per 100 m ³	3 tests per 10 m ³	3 tests per 10 m ³
Modified Compaction (MMDD) by AS 1289.5.2.1	1 per FDD	1 per FDD	1 per FDD	1 per FDD	1 per FDD	1 per FDD	1 per FDD	1 per FDD	1 per FDD	1 per FDD
Particle Size Distribution by AS 1289.3.6.1	-	-	1 per each 2,000 m ³	-	1 in 5000 m ² (min. of 1 test per lot)	1 in 5000 m ² (min. of 1 test per lot)	-	1 per 300 m ³	-	1 per 300 m ³
Plasticity Index AS 1289.3.1.1 AS 1289.3.2.1 AS 1289.3.3.1	1 per each 2,000 m ³	1 per each 2,000 m ³	1 per each 2,000 m ³	1 in 5,000 m ² (min. of 1 test per lot)	1 in 5000 m ² (min. of 1 test per lot)	1 in 5000 m ² (min. of 1 test per lot)	1 per each 300 m ³	1 per each 300 m ³	1 per each 300 m ³	1 per each 300 m ³
Linear Shrinkage by AS 1289.3.4.1	1 per each 2,000 m ³	1 per each 2,000 m ³	1 per each 2,000 m ³	1 in 5,000 m ² (min. of 1 test per lot)	1 in 5000 m ² (min. of 1 test per lot)	1 in 5000 m ² (min. of 1 test per lot)	1 per each 300 m ³	1 per each 300 m ³	1 per each 300 m ³	1 per each 300 m ³
California Bearing Ratio by AS 1289.6.1.1	1 per each 2,000 m ³	1 per each 2,000 m ³	1 per each 2,000 m ³	1 in 5 FDD (min.1 of test per lot)	1 in 5 FDD (min.1 of test per lot)	1 in 5 FDD (min.1 of test per lot)	1 per each 300 m ³	1 per each 300 m ³	1 per each 300 m ³	1 per each 300 m ³
* run = 1 pass of cement spreader. FDD = Field Dry Density MMDD = Maximum Modified Dry Density										

CONFORMANCE TESTING

Table - Test Frequencies For Soils - Part 2 of 3			
Type Of Test	Subgrade	Sub-Base	Basecourse
Pavement Layer Thickness by NTTM 216.1	-	1 per FDD	1 per FDD
Ball Embedment by NTTM 215.1	-	-	1 in 5,000 m ²
Dry Back – Moisture ratio as per AS 1289.5.4.1	-	-	1 per 1,000 m ²
Stabiliser Spread Rate by NTTM 204.7	1 per run *	1 per run *	1 per run *
Stabiliser Content by NTTM 204.1	1 per 1000 m ² with a min. of 3 tests	1 per 1000 m ² with a min. of 3 tests	1 per 1000 m ² with a min. of 3 tests
Stabiliser Distribution by NTTM 204.8	1 per 1000 m ² with a min. of 3 tests	1 per 1000 m ² with a min. of 3 tests	1 per 1000 m ² with a min. of 3 tests
Soluble Salt Content of Construction Water	-	1 per water source	-
* run = 1 pass of cement spreader. FDD = Field Dry Density MMDD = Maximum Modified Dry Density			

Table - Test Frequencies for Soils - Part 3 of 3	
Type of Test	Unpaved areas (including unpaved medians, batters, table drains and blocks)
Field Density (FDD) by NTCP 102.1 and AS 1289.5.8.1	1 for every 100 lineal metres or part thereof
Modified Compaction (MMDD) by AS 1289.5.2.1	1 per each 3 FDD tests
Plasticity Index by AS 1289.3.1.1, AS 1289.3.2.1, AS 1289.3.3.1	For Table Drain blocks only - 1 per each 3 blocks

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Table - Test Frequencies for Aggregates and Pavement Surfaces			
Type Of Test	Aggregate	Pavement Marking	Pavement Surface
Particle Size Distribution by AS 1141.11.1	1 in 250 t	-	-
Los Angeles Abrasion Value by AS 1141.23	1 in 250 t	-	-
Particle Shape by AS 1141.14 at 2:1 ratio	1 in 250 t	-	-
Flakiness Index by AS 1141.15	1 in 250 t	-	-
Average Least Dimension by AS 1141.20.1, AS 1141.20.2 *	1 in 250 t	-	-
Sulphate Soundness by AS 1141.24	1 in 1,000 t	-	-
Percentage of Crushed Faces by AS 1141.18	1 in 250 t	-	-
Polished Aggregate Friction Value by AS 1141.40 or AS 1141.41	-	-	1 in 20,000 m ²
Surface Texture Depth by NTTM 305.1	-	-	1 in 5,000 m ²
Skid Resistance by NTTM 304.1	-	-	As nominated by Superintendent
Roughness	-	-	As nominated by Superintendent
Retroreflectivity of Pavement Marking by NTTM 404.1 or NTTM 404.3	-	1 per 1,000 m	-
Wear Assessment of Road Marking Paints – Image Analysis to AS 4049.3 Appendix K, Method A Photographic Method	-	As nominated by Superintendent	-
* Take Average Least Dimension samples only from the stockpile on the project site.			

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Table - Sampling Frequencies for Fresh Concrete		
Structures – excluding kerbs and gutters, and excluding floodway margins		
Type of Test	Frequency	Number of samples
Slump - AS 1012.3.1	Per truck	Per truck as required
Making, curing and compressive strength of concrete - AS 1012.8 and AS 1012.9	1 truck pour	1 set of cylinders *
	2 truck pour	2 sets of cylinders *
	3 - 5 truck pour	3 sets of cylinders *
	6 - 10 truck pour	4 sets of cylinders *
	11 + truck pour	4 sets of cylinders plus 1 additional set of cylinders per every additional 1 to 5 trucks after the first 10 trucks *
Kerbs*** and gutters, and floodway margins		
Type of Test	Frequency	Number of samples
Slump - AS 1012.3.1	Per each set of cylinders **	Per each set of cylinders
Making, curing and compressive strength of concrete - AS 1012.8 and AS 1012.9	1 set of cylinders per 25m ³ , or each lot. **	1 set of cylinders *
* A set of cylinders consists of 3 cylinders unless directed otherwise.		
** Or as directed by the Superintendent.		
*** For urban projects include side entry pits and similar structures.		

Table – Test Frequencies for Surface Roughness Testing		
Type of test	Frequency	Required value (IRI)
Lane Roughness Value – Pavement and Shoulders – NTCP 107.1A	3 runs per constructed traffic lane	Maximum value
Lot Average Surface Roughness Value – Dense Graded Asphalt – NTCP 107.1A	3 runs per constructed traffic lane	Mean value

CONFORMANCE TESTING

Table – Maximum Dry Density (MDD) Minimum Curing Times (AS 1289.5.2.1:2017)		
Plasticity	Condition of Prepared Sample	
	Within 2% of OMC	Greater than 2% from OMC
Sands and Granular Material (NP)	2 hours	2 hours
Low Plasticity (LL ≤ 35%)	24 hours	48 hours
Medium Plasticity (LL > 35% to ≤ 50%)	48 hours	96 hours (4 days)
High Plasticity (LL > 50%)	96 hours (4 days)	168 hours (7 days)
NP – Non plastic LL – Liquid limit OMC – Optimum moisture content		

4.10 CONFORMANCE TESTING RESULTS

The Panel Period Contractor will provide NATA endorsed test results to the Contractor within the following scheduled times (in days – Monday to Saturday) from the time of ordering the tests.

For work in remote areas increase the testing and reporting completion times by a minimum of 2 days. Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

Refer to:

Table – Testing and Reporting Completion Times - Part 1 of 3 and

Table – Testing and Reporting Completion Times - Part 2 of 3 and

Table – Testing and Reporting Completion Times - Part 3 of 3.

Table – Testing and Reporting Completion Times - Part 1 of 3	
Attribute being tested	Time Allowed for NATA Endorsed Report in Days (Monday to Saturday)
For work in remote areas the testing and reporting completion times may be increased by a maximum of 2 days, subject to approval by the Superintendent.	
SOILS	
Field Density	5
Modified Compaction	** 5
Modified Compaction – Oversize	** 5
Pavement Layer Thickness	4
Particle Size Distribution	5
Plasticity Index (Liquid Limit, Plastic Limit)	** 5
Linear Shrinkage	5
Moisture Content	3
CBR – Soaked (Completion time includes Modified Compaction)	** 9
Cement Content of Stabilised Materials (Heat of Neutralisation)	5
Bitumen Content of Stabilised Materials	4
Stabiliser Spread Rate	3
Soluble Salt Content of Construction Water	4
Standard Ball Penetration Test	3
Unconfined Compressive Strength (7 Day result) excluding compaction	10
AGGREGATES	
Specific Gravity	4
Particle Size Distribution	4
Particle Shape, by Proportional Calliper	4
Flakiness Index	4
Average Least Dimension (Direct Measurement)	4
Clay and Fine Silt (Settling Method)	4
** Time for completion may be extended by each additional day required for the curing of materials and each additional overnight stay.	

CONFORMANCE TESTING

Table – Testing and Reporting Completion Times - Part 2 of 3	
Attribute being tested	Time Allowed for NATA Endorsed Report in Days (Monday to Saturday)
AGGREGATES (continued)	
Particle Density and Water Absorption of Fine Aggregate	5
Particle Density and Water Absorption of Coarse Aggregate	5
Los Angeles Value	4
Pavement Surface Texture Depth	4
Crushed Particles	4
Sulphate Soundness	10
CONCRETE	
Consistency of Concrete – Slump Test	3
Making, Curing and Compressive Strength (28 day result)	*** 31
Making, Curing and Compressive Strength (7 day result)	*** 10
ASPHALT	
Bitumen Content and Aggregate Grading	5
Stability and Flow of Mix	5
Air Voids and Density Relationship	6
Density of Thin Lift Asphalt by Nuclear Gauge	4
Bulk Density of Asphalt	6
Kinematic Viscosity of Bitumen	5
BITUMEN	
Dynamic Viscosity (60°C)	3
** Time for completion may be extended by each additional day required for the curing of materials and each additional overnight stay.	
*** From Date of Sampling.	

Table - Testing and Reporting Completion Times - Part 3 of 3	
Attribute being tested	Time Allowed for NATA Endorsed Report in Days (Monday to Saturday)
SURFACE ROUGHNESS	
IRI – Dense graded asphalt	3
IRI – Pavements and shoulders	3
Interim reports are to be issued immediately after testing	

4.11 LOT TESTING GENERALLY

Conformance of compaction for soils and asphalt will be based on lots.

Give each lot a lot number.

Number the lots using a logical system.

Maintain a register of all lots and lot numbers.

Include the location of each lot on the lot register.

Provide a copy of the lot register to the Superintendent upon request.

Lots defined by the Contractor must be clearly marked out on the construction site.

Lots of work will be selected by the Contractor, based upon:

- A lot will represent no more than one shift's production
- A lot will be continuous and will have been brought to completion at the same time,
- A lot will be composed of essentially homogeneous material with no distinct changes in attribute values.

Each lot will be subject to conformance testing in accordance with NTCP 102.1.

Defective sections will be excluded from the lot to be tested and identified as a separate lot, and will also be subjected to lot testing.

Quality of the lot will be judged as conformance or non-conformance of each lot. This will be based on all tests conducted on the lot in accordance with NTCP 102.1.

Conformance of materials is based on samples from the finished works.

When lots fail to satisfy the conformance criteria, reprocess the entire lot and resubmit for retesting.

Should the lot under consideration be subdivided then each subdivision will be classed as a lot and each subdivided lot will be subject to lot testing.

Non-conforming lots which are subdivided after testing will be treated as separate lots and each and every subdivided lot will be retested.

4.11.1 Conformance of Compaction for Soils

In situ density is expressed as a percentage of the Maximum Modified Dry Density. One Modified Dry Density test for each in situ density test will apply.

In situ density will be determined and reported in accordance with NTCP 102.1 and relevant Australian Standards.

A minimum of three tests will apply to each and every lot.

The Mean Dry Density Ratio (R) is calculated as follows:

$$R = \frac{\sum x_i}{n}$$

x_i = an individual test result

n = the number of results in the lot.

The Characteristic Mean Dry Density Ratio (R_c) is calculated as follows:

$$R_c = R - ks$$

where:

R = the mean dry density ratio for the lot

k = the multiplier in the below Table. – MULTIPLIER VALUES FOR SOILS.

s = the standard deviation.

The Standard Deviation (**s**) is calculated as follows:

$$s = \sqrt{\frac{\sum (x_i - R)^2}{(n-1)}}$$

where:

x_i = an individual test result

R = the mean of n results

n = the number of test results in the lot.

When less than 6 tests are used to determine conformance of a lot the Mean Dry Density Ratios in **Table - Dry Density Ratios for Conformance**, Column A apply.

When 6 or more tests are used to determine conformance of a lot the Characteristic Mean Dry Density Ratios in **Table - Dry Density Ratios for Conformance**, Column B, apply.

4.11.2 Conformance of Compaction for Asphalt

Air Voids Ratio is the difference between the maximum density of a mix and the bulk density of that compacted mix expressed as a percentage of the maximum density.

The Mean Air Voids Ratio is calculated as follows:

$$R = \frac{\sum x_i}{n}$$

x_i = an individual test result

n = the number of results in the lot.

CONFORMANCE TESTING

Table - Dry Density Ratios for Conformance			
Works Components	A Mean Dry Density Ratio (R) % ("n" is 3 to 5)	B Characteristic Mean Dry Density Ratio (Rc) % ("n" is 6 or greater)	
Natural surface to subgrade, fill, batters, table drains, table drain blocks, fill for water course, unpaved areas	95.0 or greater	94.0 or greater	Conformance
	94.9 or less	93.9 or less	Non-conformance
Subgrade, shoulder sub-base, unsealed pavement base, shoulder base, select fill, levees, structures and culverts in fill, bridge foundation backfill, bridge abutment fill	95.0 or greater	94.0 or greater	Conformance
	94.9 or less	93.9 or less	Non-conformance
Sealed pavement basecourse	100.0 or greater	99.0 or greater	Conformance
	99.9 or less	98.9 or less	Non-conformance
Sealed pavement sub-base, Stabilised and modified basecourse, Subgrade treatment for Reconstruction and Rehabilitation of Existing Pavements clause in PAVEMENTS AND SHOULDERS, or as directed by Superintendent.	98.0 or greater	97.0 or greater	Conformance
	97.9 or less	96.9 or less	Non-conformance
Contractor to backfill all pavement layer test excavations with the material and density ratio specified for that layer, treated as follows: <ul style="list-style-type: none"> - Base and sub-base layers stabilised with 3% cement. - Other layers may be unstabilised. 			

Table – Multiplier Values for Soils	
Values of the Multiplier k for Characteristic Mean Dry Density Ratio (Rc)	
Number of tests per lot (n)	k
6	0.50
7	0.54
8	0.56
9	0.59
10	0.61
15	0.68
20	0.72

4.12 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

5 GRADING AND GRAVEL SHEETING

5.1 OUTLINE DESCRIPTION

This section specifies the maintenance requirement for gravel sheeting on unsealed roads, the maintenance grading of unsealed roads, and the maintenance grading of shoulders and verges of sealed roads and shared paths, including the associated drainage.

Drainage is specified in EARTHWORKS AND DRAINAGE, and measured as per that section when not associated with road maintenance.

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

5.2 CROSS REFERENCES

MISCELLANEOUS PROVISIONS

EARTHWORKS AND DRAINAGE.

CONFORMANCE TESTING

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES.

Standard Specification for Environmental Management and the RFT/RFQ.

5.3 STANDARDS AND PUBLICATIONS

Conform to the following standards and publications unless specified otherwise:

Australian Standards

AS 1141(set) Methods for sampling and testing aggregates.

AS 1289(set) Methods of testing soils for engineering purposes

Civil Standard Drawings

CS 3609 Typical Cross-Section For Unsealed Rural Roads

CS 3610 Typical Cross-Section For Sealed Rural Roads

CS 3611 Typical Sealed Floodway Cross-Section For Unsealed Rural Roads

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

Other

NTMTM - NT Materials Testing Manual.

5.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

5.5 GRADING GENERALLY

Provide a finished graded surface free of ruts, corrugations, depressions, excess loose material and debris.

Maintain pavement dimensions in accordance with drawings CS 3609, CS 3610, and CS 3611.

Do not grade over the crown of the road. Maintain the profiles as per the standard drawings.

5.6 GRAVEL SHEETING GENERALLY

Provide a finished gravel surface trimmed and tightly compacted, conforming to standards in CONFORMANCE TESTING.

Maintain pavement dimensions in accordance with drawings CS 3609, CS 3610, and CS 3611.

The standard drawing showing the typical cross section shows the ideal carriageway width and actual widths may vary on individual roads. Maintain the existing carriageway width of individual roads in the contract. This may, in some cases, require extra passes of the grader or other equipment.

Do not grade over the crown of the road. Maintain the profile as per the standard drawing.

Allow for haulage of materials, as part of the construction activity, for up to 15km from any extractive area. Excess haulage will be paid separately.

In compaction include the use of a self-propelled Pneumatic Roller of 15 Tonnes for compaction to roll off the surface layer.

Extraction of gravel materials includes:

- locating sites for extraction of suitable materials,
- obtaining approvals for extraction,
- pushing up, screening, blending, and stockpiling of extracted material, and
- rehabilitation of extraction and stockpile sites,

in accordance with the Material Extraction Areas and Water Sources clause in MISCELLANEOUS PROVISIONS.

ADDITIONAL FOR DARWIN REGION

RURAL – include in the rate the extraction of material (locate, approvals, push up, screening, blending, stockpiling and rehabilitation), load, haul to site, place, mix, compact and trim.

URBAN - Source material commercially.

5.7 PERFORMANCE REQUIREMENTS

5.7.1 Maintenance grading of unsealed roads

For works associated with maintenance grading of unsealed roads and verges the following table indicates the expected average achievable daily production per grader under normal weather conditions.

Table – Maintenance Grading of Unsealed Roads		
Work Type	Distance	Number of passes
Opening Grade	30 km	Number of passes required to achieve specified outcomes.
Carriageway Grade	15 km	
Grade Between Inverts	10 km	
Full Maintenance Grade	5 km	
Grade, Water, and Roll - Carriageway	7 km	
Grade, Water and Roll – Grade between inverts	5 km	
Grade, Water and Roll – Full maintenance grade	3 km	
Rip and Re-compaction	1 km	

5.7.2 Maintenance grading of unsealed shoulders on sealed roads

For works associated with maintenance grading of unsealed shoulders and verges on sealed roads the following table indicates the expected average achievable daily production per grader under normal weather conditions.

Work Type	Distance One side of road	Number of passes
Dry Grade	8 km	Number of passes required to achieve specified outcomes.
Full Maintenance Grade	6 km	
Full Maintenance Grade with Water and Roll	4 km	
Grade, Water and Roll	6 km	
Rip and Re-compaction	3 km	

5.8 MATERIALS

5.8.1 Natural Gravel

Obtain material from sources of naturally occurring deposits. in accordance with the **Material Extraction Areas and Water Sources** clause in MISCELLANEOUS PROVISIONS.

Produce required properties by crushing, screening, mixing or other processes necessary.

Ensure particles are tough, durable and of a tightly binding nature free of organic or other deleterious matter.

Natural gravel to conform to **Table – Natural Gravel Particle Sizes** and to **Table – Natural Gravel Properties**.

AS Sieve (mm)	Percentage Passing			
	Type 1	Type 2 *	Type 3 *	Type 4
75.0	100			100
37.5	80-100	100		80-100
19.0	50-80	70 - 100	100	60-100
9.5	35-65	50 - 80	70 - 100	50-95
4.75	25-50	35 - 65	50 - 80	40-80
2.36	15-40	25 - 50	35 - 65	30-65
0.425	7-20	10 - 30	15 - 35	20-50
0.075	3-13	4 - 16	6 - 20	5-25

* Grading Types 2 and 3 are for Base and Shoulder.

Attribute	Application			
	Northern Area - Sealed base	Southern Area – Sealed Base*	Unsealed Base And Shoulder Material	Sub-Base
Liquid Limit (LL)	25% max	30%	35% max	30% max
Plasticity Index (PI)	1-6%	1 - 10%	4 – 12 %	1-10%
Linear Shrinkage (LS)	0-3%	0 - 6%	2 – 8 %	0-6%
PI x % passing 0.425 mm Sieve	180 max	300 max	400 max	400 max

Table – Natural Gravel Properties				
Attribute	Application			
	Northern Area - Sealed base	Southern Area – Sealed Base*	Unsealed Base And Shoulder Material	Sub-Base
California Bearing Ratio (CBR) 4 day soaked (AS 1289)	80 min	80 min	50 min	30 min
at a relative density of (Highest CBR value to be reported)	100% MMDD	100% MMDD	95% MMDD	95% MMDD
Los Angeles Abrasion (LAA) Loss	50 max	50 max	60 max	60 max

Note: Southern Area- Sealed Base* applies to south of a line connecting Birrindudu - Dunmarra - Wollogorang.

5.8.2 Fine Crushed Rock

Manufacture from clean, hard durable rock free from natural gravel, clay, loam or other deleterious substances. Fine crushed rock to conform to **Table – Fine Crushed Rock Sizes** and to **Table – Fine Crushed Rock Properties**.

Table – Fine Crushed Rock Sizes	
AS Sieve (mm)	Percentage Passing
37.5	100
19.0	90-100
13.2	75-90
9.5	60-80
4.75	38-60
2.36	25-45
0.425	12-26
0.075	6-14

Table – Fine Crushed Rock Properties	
Liquid limit (LL)	25% max
Plasticity Index (PI)	1-6%
Linear Shrinkage (LS)	1-3%
Dust Ratio (DR) (% passing 0.075mm)/(% passing 0.425mm) x 100	25-50
CBR, 4 day soaked at 100% MMDD	100 min (AS 1289)
Los Angeles Abrasion (LAA) loss: Coarse grained rock Fine grained rock	35max 25%max
PI x % passing 0.425mm sieve	180 max

5.8.3 Blends of Natural Gravel and Fine Crushed Rock

Not permitted in urban areas for sealed pavements.

Material to conform to the Natural Gravel tables.

5.8.4 Sand Clay

Obtain Sand Clay from sources of naturally occurring deposits.

Material to conform to the requirements in **Table – Sand Clay Grading** and in **Table – Sand Clay Properties**.

Table – Sand Clay Grading	
AS sieve (mm)	Percentage Passing
4.75	80 - 100
2.36	60 - 100
0.425	30 - 60
0.075	14 - 28

Table – Sand Clay Properties	
Property	Value Limits
Plasticity Index (PI) - Sealed roads	20% maximum
Plasticity Index (PI) - Unsealed roads	15 % maximum
Linear Shrinkage (LS)	1% - 8%.
CBR, 4 day soaked at 95 % MMDD to AS 1289	50 minimum

5.9 GRAVEL SHEETING

5.9.1 Terminology

The term gravel sheeting refers to the sheeting of pavement and shoulders with gravel, sand clay or other suitable approved materials.

5.9.2 Gravel Resheeting – Lots greater than 600m²

Gravel sheet pavement and shoulders in section lots greater than 600 m².

Use gravel material complying with the Materials clause in this section.

Load, haul to site, and dump gravel material.

Place, mix, compact and trim the material to the specified layer thickness in accordance with this section.

5.9.3 Gravel Repairs to Wash outs and Blow outs

Gravel sheet repair pavement and shoulder wash outs and blow outs in section lots less than 600m².

Locate and push up gravel material in accordance with the **Material Extraction Areas and Water Sources** clause in MISCELLANEOUS PROVISIONS.

Use gravel material complying with the Materials clause in this section.

Load, haul to site and dump gravel material.

Place, mix, compact and trim the material to the specified layer thickness in accordance with this work section.

5.9.4 On-Formation Placing and Mixing

Place material in uniform layers over subgrade surface or lower layers of the pavement.

Remove segregated and contaminated material from the site.

Manually remove materials such as timber, branches, roots and the like.

Do not place material on a previous layer that has:

- become waterlogged or cracked; and/or
- otherwise deteriorated.

Mix the material uniformly throughout with water to achieve the specified conforming Dry Density Ratio.

Ensure water is clean and free from oil, alkali, organic or any other deleterious substances, and that the total soluble salts content is less than 3,000 mg/litre, total dissolved salts. Provide evidence of construction water salt contents.

5.9.5 Compaction

Compact in uniform layers not less than 100 mm nor greater than 200 mm compacted thickness.

Achieve a homogeneous mass with no compaction planes.

Conform to the Dry Density Ratios specified in **Table - Dry Density Ratios for Conformance** in CONFORMANCE TESTING.

5.9.6 Trim Final Pavement Surface

Trim with a dense textured surface, free of laminations.

Remove sticks and any loose material.

Ensure surface is free of cracking.

Do not introduce new material to the surface after final compaction.

Where pavement thickness is 200 mm or greater, scarify to not less than 100 mm depth and recompact where finish not achieved.

Where pavement thickness is less than 200 mm scarify and recompact to full depth where finish not achieved.

5.10 MAINTENANCE GRADING OF UNSEALED PAVEMENTS

Refer to **Table – Maintenance Grading of Unsealed Roads** in **Performance Requirements** in this work section.

Maintain pavement dimensions in accordance with drawings CS 3609, CS 3610, and CS 3611.

Remove windrows from the carriageways, table drains, offset drains, creek crossings, floodways and culvert entrances and outlets.

Do not grade over the crown of the road. Maintain the profile as per the standard drawing.

If the specified Grading calls for the reinstatement of drainage the Contractor is to achieve a suitable degree of compliance, as per EARTHWORKS AND DRAINAGE, with the equipment used on site to complete the type of Grading specified.

5.10.1 Opening Grade

Open roads to conventional vehicles by grading after damage by rain.

Any undamaged pavement may be by-passed by the grader.

Where damaged pavement is encountered, grade the pavement running surface to remove corrugations and fill in ruts, holes, and depressions.

Repair scours. Recover material from the batters and drains at scours to restore shape to the formation.

Repair creek crossings and floodways leaving no windrow on either side.

In the case of saturated table drains, it may only be possible to open grade the centre of the pavement, removing sand and debris to the shoulder.

5.10.2 Maintenance Grade – Carriageway

Grade the carriageway pavement and shoulder surface.

With the first passes cut the full width of the pavement and shoulders to remove all corrugations, and fill in all ruts, holes, and depressions.

Spread the trimmed material evenly across the full width of the carriageway to a thickness of 25 to 40 mm to fill depressions and to obtain the typical cross section.

5.10.3 Maintenance Grade – Between inverts

Grade the area between the inverts of both table drains.

Remove all obstructions including dead trees, fallen branches and regrowth from area to be graded.

Win material from the area between the inverts of both table drains and the edges of the shoulder. Ensure that vegetation material is not included.

Cut the full width of the pavement and shoulders to remove all corrugations and fill in all ruts, holes, and depressions.

Spread the accumulated material uniformly over the pavement and shoulders to a thickness of 25 mm to 40 mm to fill depressions and to obtain the typical cross section.

Reinstate table drain blocks in accordance with EARTHWORKS AND DRAINAGE.

5.10.4 Full Maintenance Grade

Grade the road formation width between the tops of both outer batters.

Remove all obstructions including dead trees, fallen branches and regrowth from area to be graded.

Remove windrows which contain vegetation or other unsuitable materials by spreading them evenly outside of the outer batters.

Win material from windrows which contain suitable material and the area back to the edge of the shoulder. Ensure that vegetation material is not included.

Cut the full width of the pavement and shoulders to remove all corrugations and fill in all ruts, holes, and depressions.

Spread the accumulated material uniformly over the pavement and shoulders to a thickness of 25 mm to 40 mm to fill depressions and to obtain the typical cross section.

Reinstate table drains, offlet drains, table drain blocks, catch drains, and benches in cut, in accordance with EARTHWORKS AND DRAINAGE.

5.10.5 Grade, Water, and Roll

Grade, Water and Roll are applicable to three grading types as nominated by the Superintendent:

- Carriageway – Road pavement and shoulder surface.
- Between Inverts - The area between the inverts of both table drains. Include, reinstatement table drain blocks in accordance with EARTHWORKS AND DRAINAGE,
- Full Maintenance - The road formation width between the tops of both outer batters. Include, the reinstatement of table drains, offlet drains, table drain blocks, catch drains, and benches in cut, in accordance with EARTHWORKS AND DRAINAGE.

Grade the area as per nominated grading type.

Remove all obstructions including dead trees, fallen branches and regrowth from area to be graded.

Win material which contains suitable material from the graded areas. Ensure that vegetation material is not included.

Cut the full width of the pavement and shoulders to remove all corrugations and fill in all ruts, holes, and depressions.

Spread the accumulated material uniformly over the pavement and shoulders to fill depressions and to obtain the typical cross section.

Apply sufficient water to cut, mix and compact the surface material to produce a uniform and tightly bound surface free of corrugations, ruts, and depressions.

Compact with a minimum of 10 passes of a 15 tonne multi tyred roller. Passes to be distributed evenly over the carriageway, and to be between the outer edges of the shoulders.

5.10.6 Rip and Re-compaction

Grade the road formation width between the tops of both outer batters.

Remove vegetation from areas to be graded, and remove windrows which contain vegetation or other unsuitable materials by spreading them evenly outside of the outer batters.

Win material from windrows which contain suitable material, and from the areas back from the edges of the shoulders. Ensure that vegetation material is not included.

Spread the accumulated material uniformly over the pavement and shoulders to fill depressions and to obtain the typical cross section.

Scarify and/or rip the full width of the pavement and shoulders, mixing both won and in-situ materials to obtain a uniform homogenised blend of 150 mm compacted thickness. Ensure the cutting extends to below the rip marks.

Wet mix blended materials and compact to minimum 95% of maximum modified dry density (MMDD). Trim and finish to produce a uniform and tightly bound surface free of ridges, corrugations, ruts, and depressions.

Include the use of a self-propelled Pneumatic Roller of 15 Tonnes to roll off the surface layer.

Reinstate table drains, offlet drains, and table drain blocks, catch drains, and benches in cut, in accordance with EARTHWORKS AND DRAINAGE.

5.10.7 Reformation and Re-compaction

Grade the road formation width between the tops of both outer batters.

Remove vegetation from areas to be graded, and remove windrows which contain vegetation or other unsuitable materials by spreading them evenly outside of the outer batters.

Win material from windrows which contain suitable material and the area back to the edge of the shoulder. Ensure that vegetation material is not included.

Spread the accumulated material uniformly over the pavement and shoulders to fill depressions and to obtain the typical cross section.

Top up with 100mm compacted depth gravel material conforming to the **Materials** clauses of this work section.

Scarify and/or rip the full width of the pavement and shoulders, mixing both won and in-situ materials to obtain a uniform homogenised blend of 150 mm compacted thickness. Ensure the cutting extends to below the rip marks.

Wet mix blended materials and compact to minimum 95% of MMDD. Trim and finish to produce a uniform and tightly bound surface free of ridges, corrugations, ruts, and depressions.

Include the use of a self-propelled Pneumatic Roller of 15 Tonnes to roll off the surface layer.

Reinstate table drains, offlet drains, and table drain blocks, catch drains, and benches in cut, in accordance with EARTHWORKS AND DRAINAGE.

5.11 MAINTENANCE GRADING OF UNSEALED SHOULDERS, BATTERS AND DRAINAGE OF SEALED ROADS

Refer to **Table – Maintenance Grading of Unsealed Shoulders on Sealed Roads in Performance Requirements** in this work section.

Provide a finished surface free of ruts, corrugations, depressions, excess loose material, and debris, and level with the sealed surface.

Remove all surplus material, spoil, and debris, from the sealed surface after each day's work with a power broom, prior to removing work area signs.

Attain and maintain pavement dimensions with standard drawings CS 3609, CS 3610, and CS 3611.

Ensure that there is no shoulder material left on the seal.

Remove all vegetation from areas to be graded.

If this specification includes the reinstatement of drainage in the type of grading works specified, achieve a suitable degree of compliance as per EARTHWORKS AND DRAINAGE, with the equipment used to complete the specified type of grading.

5.11.1 Drainage Maintenance Grade

Grade the road formation width between the top of the outer batter and edge of shoulder.

Remove all obstructions, including dead trees, fallen branches and re-growth from areas to be graded and remove windrows which contain vegetation or other unsuitable materials by spreading them evenly outside of the outer batters.

Drainage Maintenance Grade can be used for sealed roads and for unsealed roads.

5.11.2 Invert Grade Water and Roll

Grade the area between the invert of the table drain and the edge of seal.

Remove all obstructions including dead trees, fallen branches and regrowth from area to be graded.

Win suitable material from the area between the invert of table drain and the edge of the shoulder and ensure that vegetation material is not included.

Spread the accumulated material uniformly over the shoulders and finish to the typical cross section, level with the top of the seal to provide a smooth transition between the shoulder and the seal.

Provide thorough mixing with water and rolling to produce a uniform and tightly bound surface free of corrugations, ruts and depressions.

Compact with a minimum of 4 passes of a 15 tonne multi tyred roller, evenly on each shoulder.

Take care not to damage the seal when cutting or spreading. If the seal is damaged repair the damage with cold mix.

5.11.3 Full Maintenance Grade with Water and Roll

Grade the road formation width between the top of the outer batter and edge of seal.

Remove all obstructions including dead trees, fallen branches and regrowth from area to be graded.

Remove windrows which contain vegetation or other unsuitable materials by spreading them evenly outside of the outer batters.

Win material from windrows which contain suitable material and the area back to the edge of the shoulder. Ensure that vegetation material is not included.

Spread the accumulated material uniformly over the shoulders and finish to the typical cross section, level with the top of the seal to provide a smooth transition between the shoulder and the seal.

Provide thorough mixing with water and rolling to produce a uniform and tightly bound surface free of corrugations, ruts, and depressions.

Compact with a minimum of 4 passes of a 15 tonne multi tyred roller

Trim and finish to produce a uniform and tightly bound surface free of ridges, corrugations, ruts, and depressions.

Take care not to damage the seal when cutting or spreading. If the seal is damaged repair the damage with cold mix.

Reinstate table drains, offlet drains and table drain blocks, catch drains, and benches in cut, in accordance with EARTHWORKS AND DRAINAGE.

5.11.4 Rip and Re-compaction

Grade the road formation width between the top of the outer batter and edge of seal.

Remove vegetation from areas to be graded, and remove windrows which contain vegetation or other unsuitable materials by spreading them evenly outside of the outer batters.

Win suitable material from windrows or batters and ensure that vegetation material is not included.

Spread the accumulated material uniformly over the shoulder and finish to the typical cross section, level with the top of the seal to provide a smooth transition between the shoulder and the seal.

Scarify and/or rip the full width of the shoulder, mixing both won and in-situ materials to obtain a uniform homogenised blend of 150 mm compacted thickness, ensuring the cutting is below depth of rip marks.

Wet mix blended materials and compact to minimum 95% of MMDD. Trim and finish to produce a uniform and tightly bound surface free of ridges, corrugations, ruts and depressions.

Include the use of a self-propelled Pneumatic Roller of 15 Tonnes to roll off the surface layer.

Take care not to damage the seal when cutting or spreading. If the seal is damaged repair the damage with cold mix.

Reinstate table drains, offlet drains and table drain blocks, catch drains, and benches in cut, in accordance with EARTHWORKS AND DRAINAGE.

5.11.5 Reformation and Re-compaction

Grade the road formation width between the tops of both outer batters and edge of seal.

Remove vegetation from areas to be graded, and remove windrows which contain vegetation or other unsuitable materials by spreading them evenly outside of the outer batters.

Win material from windrows which contain suitable material and the area back to the edge of the shoulder. Ensure that vegetation material is not included.

Spread the accumulated material uniformly over the pavement and shoulders to fill depressions and to obtain the typical cross section.

Top up with nominated compacted depth gravel material conforming to the **Materials** clause in this work section.

Scarify and/or rip the full width of the pavement and shoulders, mixing both won and in-situ materials to obtain a uniform homogenised blend of 150 mm compacted thickness, ensuring the cutting is below depth of rip marks.

Wet mix blended materials and compact to minimum 95% of MMDD. Trim and finish to produce a uniform and tightly bound surface free of ridges, corrugations, ruts, and depressions.

Include the use of a self-propelled Pneumatic Roller of 15 Tonnes to roll off the surface layer.

Take care not to damage the seal when cutting or spreading. If the seal is damaged repair the damage with cold mix.

Reinstate table drains, offlet drains and table drain blocks, catch drains, and benches in cut, in accordance with EARTHWORKS AND DRAINAGE.

5.11.6 Shoulder Maintenance – Cycle/Shared Path

Repair cycle path shoulders with a Quarry FCR (PI > 6 <15) or with Superintendent approval a natural gravel, stabilised product or alternative solution that will provide the same outcome.

Pre-wet and pre-mix material to OMC.

Lightly scarified base with tooth spacing of 120mm and wet base.

Place imported material uniformly 100mm thick on base over the width of the shoulder (max 500mm) to a minimum gradient of 1 in 20.

Compacted to minimum of 95% MMDD, trim and finish.

Include the grading of batters (maximum 2m wide) and compact to form a neat shoulder/batter.

Remove material from the sealed surface with a power broom, prior to opening of the path.

Additional material for batter repairs shall be negotiated.

5.12 PROTECTION OF RAILWAY LINES

Prevent damage to railway lines and other railway assets when maintenance equipment crosses at railway crossings.

Lift grader blade and rippers during crossing.

Remove any dirt and debris deposited onto tracks by maintenance equipment crossing.

Advise the appropriate rail authority immediately if railway line tracks are damaged.

5.13 REMOVAL OF ROAD MATERIALS FROM CATTLE GRIDS

Remove any gravel or fill material which enters cattle grids during maintenance operations.

5.14 PROTECTION OF ROAD FURNITURE

Remove, protect, store, replace any road furniture damaged during the work and reinstate all removed or damaged road furniture items within the work zone as the work proceeds.

5.15 CONFORMANCE

5.15.1 Tolerances

Final surfaces shall conform to the following:

Table – Final Surfaces Tolerances	
Longitudinal Section	A surface alignment that provides a good ride quality in accordance with Ride Quality sub-clause in this clause. Road width as per drawings.
Cross Section Gradient	As shown on the drawings plus or minus 0.25%
Compacted Thickness	Not less than shown on the drawings.
Width	Not less than shown on the drawings.

5.15.2 Proof rolling procedure - Hold Point

Proof rolling shall be limited to gravel works for lot sizes greater than 600 m².

Hold Point - Submit a proof rolling procedure to the Superintendent for approval including the method of preparing an area and the extent of proof rolling.

5.15.3 Proof rolling notice - Witness Point

Witness Point - Give the Superintendent not less than 24 hours' notice of the location and commencement time for the proof rolling.

Proof roll all areas and obtain satisfactory results before ordering conformance testing of those areas.

Plant Requirements; use plant in proof rolling procedures that comply with the following requirements:

- Static smooth wheeled rollers with a mass of not less than 12 tonnes and a load intensity under either the front or rear wheels of not less than 6 tonnes per metre width of wheel.
- Pneumatic tyred plant with a mass of not less than 20 tonnes and with a ground contact pressure under either the front or rear wheels of not less than 450 kPa per tyre and a ground contact area of not less than .035 m² per tyre.

Check areas for level tolerance and layer thickness before proof rolling.

Proof roll each layer immediately following completion of compaction. If proof rolling is carried out at a later time, water the surface and roll with the test roller prior to commencement of proof rolling.

Compliance; the proof rolling requirements are deemed to comply when an area withstands proof rolling without visible deformation or springing.

Remedial work; remove and reconstruct areas that deform or break up.

5.15.4 Conformance Testing – Hold Point

All works are subjected to CONFORMANCE TESTING. Testing frequencies to **Table – Test Frequencies for Soils – Parts 1, 2, and 3** in CONFORMANCE TESTING.

Ordering procedures; refer to CONFORMANCE TESTING for testing requirements and test ordering procedures.

Only the finished compacted base and shoulder conforming to proof rolling and layer thickness will be tested.

Hold Point – Obtain the Superintendent’s approval for pavement conformance prior to any surfacing work.

Backfill and compact all test holes with cement stabilised quality material which is the same as the layer being tested.

5.15.5 Ride Quality

Surface roughness (IRI) to be less than 2.4.

Ride quality requirements represents an absolute upper limit and all field values to be less than a value specified.

Lotting and averaging out of field values not permitted.

Rectify all areas where Surface Roughness exceeds specified level.

Exclusions are listed below in the **Exclusions to specified roughness limits** clause.

Surface roughness testing is to be carried out as directed by the Superintendent. When lots fail to meet the conformance criteria, rejection of the lot or payment adjustments will be applied. Refer to **Table - Rate of Payment Adjustments** in MEASUREMENT AND PAYMENT, **Payment Adjustments** clause.

5.15.6 Roughness testing sequence

Data must be collected in the sequence shown in the table within 5 days of completion of testing of the relevant pavement layer.

Ensure that; the pavement is free of loose material and debris when testing is done, for unbound granular bases, measurements must be undertaken prior to sweeping of the pavement, and free water is not present on the pavement when testing is undertaken.

Table – Roughness testing sequence for pavement type	
Pavement type	Testing sequence
Gravel	Completion of the final gravel wearing/base surface.
Spray seal on granular base	Before application of spray seal and after completion of the final wearing surface.
Asphalt Overlays and Thin Shape correcting Surfaces (thickness < 50 mm)	After all rehabilitation work is complete but before asphalt overlay has commenced. Also required on final wearing course.
Asphalt pavement (thickness 50 mm and over)	Prior to, and after, the application of the final wearing course.

5.15.7 Exclusions to specified roughness limits

Unless specified otherwise in the PROJECT SPECIFIC REQUIREMENTS (PSRs), the following areas are excluded from the requirement to achieve an IRI of less than 2.4:

- Roundabouts
- Railway lines (35 m after the event)
- Bridge joints (35 m after the event)
- Intersections (stop bar to stop bar)
- Inspection pit covers and related surface defects within the wheel paths (15 m including the event)

- Side streets specified in the PSRs deemed to affect pavement ride quality (the width of the side street plus 30 m after the event)
- Surface defects related to existing culverts which are not part of the works under the Contract (width of culvert plus 30 m after the event),
- Cattle grids, and
- Floodways on unsealed roads.

5.16 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

6 STABILISATION MAINTENANCE

6.1 OUTLINE DESCRIPTION

This section specifies the stabilisation requirements of materials for use in sealed and unsealed roads, shoulders, verges and inverts, and the in-situ wet mixing of existing pavement and shoulders by pulverisation.

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works. Comply with the requirements of Authorities with jurisdiction over the works. Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

6.2 CROSS REFERENCES

Refer to REFERENCED AUSTRALIAN STANDARDS, and to OTHER REFERENCED AUTHORITIES AND DOCUMENTS, and to ACTS, REGULATIONS AND CODES.

6.3 STANDARDS AND PUBLICATIONS

Conform to the following standards and publications unless specified otherwise:

AS 1672.1 Limes and limestones – Limes for building

AS 3972 General purpose and blended cements

6.4 DEFINITIONS

Refer **MISCELLANEOUS PROVISIONS** section, **Definitions** clause.

The following additional definitions apply.

OPTIMUM MOISTURE CONTENT

The amount of water by mass, expressed as a percentage of the dry mass of the material, at which maximum modified dry density (MMDD) is obtained with the stabiliser added.

6.5 MATERIALS

6.5.1 Stabiliser

Lime: Hydrated $\text{Ca}(\text{OH})_2$ or Quicklime CaO conforming with AS 1672.1.

Do not use agricultural lime (Calcium Carbonate).

Cement: To AS 3972 - type GP or GB.

Supply and store as specified in product Safety Data Sheet (SDS).

6.5.2 Additives – Hold Point

Hold Point - Use additives only with the approval of the Superintendent.

Follow manufacturer's recommendations when using retarders, water reducing or other additives.

6.5.3 Water

Ensure water is clean and free from oil, alkali, organic matter and other deleterious substances, and that the total soluble salts content is less than 3,000 mg/litre (total dissolved salts).

For Southern Regions amend the maximum salt content as instructed by the Superintendent.

6.5.4 Curing Agent

Surface applied curing membrane other than the use of water to be:

Bitumen emulsion ARS Grade 320, or

Cut-back bitumen Class AMC 2 or AMC 3.

6.5.5 Materials to be Stabilised

Stabilise the existing subgrade layer or the existing pavement and shoulder layer.

Refer to **EARTHWORKS AND DRAINAGE** and **GRADING AND GRAVEL SHEETING** for specification for top-up materials properties.

6.5.6 Materials to be Wet Mixed

Pulverise and wet mix the existing pavement and shoulder layer including seal.

6.6 IN-SITU STABILISATION

6.6.1 Preparation of Subgrade Layer

Remove the top 150 mm base course layer, or other nominated requirements, and stockpile to one side of formation for re-use. Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

Avoid contamination of base-course material.

Extend the base-course preparation 5 m each end of the required section.

Shape and trim the surface to alignment, levels and cross sections necessary to produce the final subgrade levels and compacted thickness.

6.6.2 Preparation of Pavement and Shoulder Layer

Scarify the existing pavement sections and new material, where necessary, full depth before spreading.

Tyne the surface lightly when quicklime is used.

Compact lightly to reveal irregularities in the spread material and to permit the stabilising equipment to traverse the area without excessive displacement of the surface.

Shape and trim the surface to the alignment, levels and cross-sections necessary to produce the final levels and compacted thickness.

6.6.3 Commencement & Continuity of Work

Complete full width stabilisation in one day.

Cease stabilising during the following conditions:

- Wet weather or if rain is likely to fall.
- Windy periods which could cause loss of stabiliser, or dust nuisance.

6.6.4 Spreading – Hold Point

Select the spread rate to achieve an unconfined compressive strength of 1.5 to 2.0 MPa.

Spread the cement using a computerised cement spreader.

Calibrate and check the spread rate prior to commencement.

Adopt the following rate for 150 mm thickness layers for tender purposes:

Cement: 6 kg/m²

Hydrated Lime: 8 kg/m²

Hold Point - Assess spread rate based upon test results of materials to be stabilised. Obtain the Superintendent's approval of the spread rate.

QUICKLIME

Water the spread material sufficiently to allow full slaking. Avoid over-watering.

LIME SLURRY

Mix the lime slurry initially in a separate paddle mixer or similar.

Use a mechanical sprayer with agitation to maintain a lime/water ratio within $\pm 10\%$ of the initial ratio.

Lime/water ratio: Generally between 1:2 (i.e. 1 tonne per 2,000 litres) and 1:0.8 (i.e. 1 tonne per 800 litres), measured by mass.

6.6.5 Mixing – Hold Point

Use plant capable of:

- mixing the stabiliser with the nominated material uniformly over the full depth to be stabilised; and
- adding water uniformly to the materials while mixing with application rate between 0 to 10% (by mass) of the material being mixed.

Use purpose designed pavement re-claimer with an undercut rotor stabiliser.

Hold Point – For small areas in remote locations obtain Superintendent's approval for use of alternative plant suitable for the particular situation, including rotary hoes and graders.

Mix until uniform in colour and free of lumps, pockets or clumps of stabiliser.

Pulverise clayey material until at least 90% passes 19 mm sieve.

Add water to the materials during mixing to achieve a moisture content suitable for compaction.

CEMENT STABILISATION

Commence compaction and finishing immediately following satisfactory mixing.

LIME STABILISATION

Shape the treated layer to the approximate section after satisfactory mixing and lightly compact.

Cure for a period of 24 to 72 hours.

Commence final mixing.

Add water during final mixing if necessary to achieve moisture content suitable for compaction.

Mix until uniform in colour and free of lumps, pockets or clumps of lime.

6.6.6 Compaction

Compact parallel to the centre line of the pavement and for the full depth of the stabilised layer.

Commence compaction at the lower edge of the pavement and work progressively towards the crown or the higher edge.

Allow for progressive and uniform overlap between passes.

Wet the surface lightly after compaction to reduce moisture loss and lay the dust when necessary.

CEMENT STABILISATION

Complete the compacting and finishing within two hours of adding water.

6.6.7 Finishing

Finish the final surface to a smooth, dense, closely knit surface, free from compaction planes and cracks and finished to the tolerances specified.

Do not fill or add material to the surface of the pavement to meet tolerance requirements.

Maintain the surface material at not less than its optimum moisture content during all finishing operations.

Reconstruct non-complying areas at no cost to the Principal.

6.6.8 Construction Joints

LONGITUDINAL JOINTS

Minimise longitudinal joints by stabilising the full width of traffic lanes or wider as one continuous operation.

Keep the joints straight or following the road curvature as appropriate.

TRANSVERSE JOINTS

Form joints following any break in excess of two hours in the continuity of the stabilisation operations.

Cut the end of the material to a plane face at an angle not exceeding 45 degrees from the vertical.

Check the surface adjacent to the joint with a straight edge prior to recommencement and further cut back the joint as necessary to achieve surface tolerance.

6.6.9 Curing

Keep the finished surface damp, without leaching, until further construction or curing operations are carried out.

Alternatively cure by applying a bitumen emulsion or a bitumen primer as specified.

Apply the bituminous curing membrane as soon as possible after mixing and compaction but no later than 24 hours after relative compaction results are available.

Application rate for bitumen emulsions: 0.3 to 0.45 litres/m².

Maintain clear of vehicular traffic for four days.

6.7 PULVERISATION AND WET MIXING

Prepare pavement and shoulder layer, mix, compact, and finish the layer all in accordance with the in-situ stabilisation clauses.

Break up and pulverise the existing pavement and shoulder layer including the existing sealed surface with a pavement re-claimer to a maximum particle size of 37.5 mm, incorporating the broken-up seal into the layer.

Use reclaimer plant capable of pulverising previous cement stabilised layers.

Make allowance for 2% cement added and mixed to the existing materials. Allow for transportation of the material in the rate for the works.

6.8 RECONSTRUCTION OF PAVEMENT

6.8.1 Stabilisation of Pavement

Insitu stabilisation of distressed pavement and resurfacing for areas up to 1000m².

Provide 50mm Top-up material (same material type as existing).

Stabilise existing pavement base course (200mm) materials with 3% cement (by volume) by placing, spreading, and compacting, in 100mm maximum layers at 98% MMDD. Incorporate surface treatment and 50mm top-up material into existing material and pulverise.

The finished level of the base course must allow for surface treatment, asphalt or seal, as specified in the CSR, to be finished, at its full design depth, at the same level as the adjoining retained surface treatments/layers.

Broom the surface of the patch and remove waste material from the site.

Apply nominated spray seal to the patch and overlap the existing surfacing by 100 mm.

Rectify any failure of the surfacing at no additional cost.

6.8.2 Reconstruction of Pavement Base course 200mm and Subgrade 150mm Depth

Reconstruction of pavement layers for areas up to 1000 m².

Excavate the distressed pavement to a depth of 200 mm.

Either stabilise or excavate 150mm subgrade. Remove excavated material from site.

Square up the surface shape of the patch to provide a neat appearance.

Clean the excavation of all loose material, dust and water.

Cut back the edges of the hole to sound material. Cut the sides vertically in order to provide shoulders against movement of the patch, and square the bottom.

If the subgrade is to be replaced, the excavated base course material may be used if suitable or new material should be used in accordance with EARTHWORKS AND DRAINAGE MAINTENANCE.

If subgrade is to be stabilised, then carry out work in accordance with EARTHWORKS AND DRAINAGE MAINTENANCE for either lime or cement, depending on soil properties.

Base course layer should be new gravel material (If base course is FCR the supply rate shall be negotiated) in accordance with EARTHWORKS AND DRAINAGE MAINTENANCE to 200mm depth compacted to 100% MMDD

The finished level of the base course must allow for surface treatment, asphalt or seal, as specified in the CSR, to be finished, at its full design depth, at the same level as the adjoining retained surface treatments/layers

Broom the surface of the patch and remove waste material from the site.

Apply nominated spray seal to the patch and overlap the existing surfacing by 100 mm.

Rectify any failure of the surfacing at no additional cost to the Principal.

6.9 CONFORMANCE

6.9.1 Tolerances

For stabilised and wet mix layers conform to the tolerances specified in GRADING AND GRAVEL SHEETING and with the following:

Table – Conformance of Stabilisation - Additional Tolerances	
Property	Required value
Dry Density Ratio:	Refer to <i>Table - Dry Density Ratios for Conformance</i> in CONFORMANCE TESTING
Stabiliser Application Rate/Content:	±10% of the designated value averaged for each lot
Stabiliser Distribution:	Do not vary the stabiliser content by more than 0.5% absolute between top and bottom half of a layer at any location as determined in accordance with NTTM 204.8.
Moisture Content during Compaction:	±1.5% of optimum moisture content.

Samples for Liquid Limit, Plastic Limit, Linear Shrinkage, CBR will be taken from the unstabilised pavements.

6.9.2 Testing – Hold Point

Average one test per 1000 m² for the layer under consideration with a minimum number of three tests.

STABILISER APPLICATION RATE

The Contractor is responsible for checking the application rate.

Determine the stabiliser application rate in accordance with NTTM 204.7.

Determine the stabiliser content in accordance with NTTM 204.1.

Refer to CONFORMANCE TESTING for test frequencies.

Correct application deficiencies by the application of additional stabiliser and remixing if mixing has already commenced.

STABILISER CONTENT

The Superintendent will carry out conformance testing.

COMPACTION

The Superintendent will carry out conformance testing.

Check areas for level tolerance and layer thickness before testing.

Sample only from the finished compacted pavement complying with level tolerance and layer thickness.

Proof roll all areas with maximum pneumatic tyre roller units.

Remove all areas that breach up or deform and reconstruct as specified.

Dry Density Ratios will be determined 24 hours after final compaction.

Backfill test holes within 24 hours of testing with new stabilised material.

Hold Point – Obtain the Superintendent's approval for conformance of the stabilised layer prior to priming.

6.9.3 Surface Roughness

Surface roughness testing will be carried out by the Superintendent at the discretion of the Superintendent.

6.10 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

7 SPRAY SEALING MAINTENANCE

7.1 OUTLINE DESCRIPTION

This section specifies the requirement for bituminous spray seal work for areas greater than 300m².

Refer to BITUMINOUS SURFACE MAINTENANCE for details of spray sealing work for areas less than 300m², patching work using hot mix and cold mix asphalts and crack sealing work.

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise

7.2 CROSS REFERENCES

BITUMINOUS SURFACE MAINTENANCE

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES.

7.3 STANDARDS AND PUBLICATIONS

Conform to the following standards and publications unless specified otherwise:

7.3.1 Australian Standards

AS 1141(set) Methods for sampling and testing aggregates

AS 1160 Bitumen emulsions for construction and maintenance of pavements

AS 1742(set) Manual of uniform traffic control devices

AS/NZS 1906.3 Retroreflective materials and devices for road traffic control purposes – Raised pavement markers (retroreflective and non-retroreflective)

AS 2008 Bitumen for pavements

AS 2106(set) Methods for the determination of the flash point of flammable liquids (closed cup)

AS 2157 Cutback bitumen

AS 2341(set) Methods of testing bitumen and related roadmaking products

AS 2341.6 Methods of testing bitumen and related roadmaking products - Determination of density using a hydrometer

AS 2341.9 Methods of testing bitumen and related roadmaking products - Determination of water content

AS/NZS 2341.13 Methods of testing bitumen and related roadmarking products – Long-term exposure to heat and air

AS 2758 (set) Aggregates and rock for engineering purposes

AS 3568 Oils for reducing the viscosity of residual bitumen for pavements

7.3.2 Austroads

AGPT04H-08 Austroads Guide to Pavement Technology – Part 4H: Test Methods.

AGPT04K-09 Guide to Pavement Technology – Part 4K: Seals.

AGPT-T190-14 Specification Framework for Polymer Modified Binders.

AP-G41-15 Bituminous Materials Sealing Safety Guide.

AP-T68/06 Update of the Austroads Sprayed Seal Design Method.

AP-T235-13 Guide to the Selection and Use of Polymer Modified Binders and Multigrade Bitumens.

AP-T236-13 Update of Double/Double Design for Austroads Sprayed Seal Design Methods.

AP-C87-15 Austroads Glossary of Terms.

ASTM D 1298-12b Standard Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method.

7.3.3 Other

NTMTM NT Materials Testing Manual.

ASTM American Society for Testing Materials.

NT Weeds Management Act 2001.

AUSTRALIAN ASPHALT PAVEMENT ASSOCIATION (AAPA)

Guide to the manufacture, storage and handling of polymer modified binders.

Advisory Note 7 Guide to the manufacture, storage and handling of binders for spray sealing (and hot mix asphalt)

(available via <http://www.aapa.asn.au/technology-and-publications/advisory-notes>)

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

7.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

Refer to **Definitions** in BITUMINOUS SURFACE MAINTENANCE.

7.5 SCOPE

Spray sealing treatments for routine maintenance include:

- Prime,
- Primerseal,
- Initial Seal or Reseal,
- With conventional bitumen, cutback bitumen or bitumen emulsion binder,
- With modified binder,
- Incorporating geotextile fabric reinforcement,

Spray sealing work consists of:

- Supply and delivery of materials,
- Storage and handling of raw materials,
- Precoating of aggregate,
- Preparation of pavement surfaces,
- Preparation of bituminous materials,
- Application of primer and/or primer binder and/or binder,
- Spreading and rolling of aggregate,
- Removal of loose aggregate.

7.5.1 Cycle and Pedestrian Shared Path Maintenance

All relevant design principles contained in Austroads Guide to Road Design Part 6A: Pedestrian and Cyclist Paths must be integrated in the design of cycle ways, pathways and associated infrastructure. Refer to Civil Standard drawing CS 3006, and to design drawings, and conform to local Council requirements. Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

Install Under Pavement Growth Inhibitor to CS 3006.

7.6 MATERIAL REQUIREMENTS

7.6.1 Aggregates

Aggregates must be clean, hard, durable, skid resistant, dry crushed stone, or gravel of uniform quality free from declared weeds and their seeds and other deleterious material, and conform to the properties specified. Minimum two crushed faces.

Nominate source of aggregate supply. Submit to the Superintendent current NATA endorsed test result certificates providing evidence that the nominated aggregate supply conforms to specified properties. Aggregate used for testing must be sampled from project site.

Conform to **Table - Aggregate Grading and Average Least Dimension**, and to **Table - Aggregate Properties**.

Table - Aggregate Grading and Average Least Dimension						
Sieve Size (mm)	% Passing (Dry Mass)					
	Nominal Size of Aggregate					
	20 mm	16 mm	14 mm	10 mm	7 mm	5 mm
26.5	100					
19.0	85 - 100	100				
16.0	-	80 - 100	100			
13.2	0 - 15	0 - 20	85 - 100	100		
9.5	0 - 5	0 - 2	0 - 15	85 - 100	100	
6.7	0 - 2		0 - 5	0 - 15	85 - 100	100
4.75			0 - 2	0 - 5	0 - 15	85 - 100
2.36				0 - 2	0 - 5	0 - 15
1.18					0 - 2	0 - 5
Min. ALD *	12.0mm	9.5mm	8.0mm	5.5mm	3.5mm	2.5mm

* Refer to Test Methods AS 1141.20.1, AS 1141.20.2. - Direct Measurement.

Table - Aggregate Properties			
Aggregate Property	Traffic Count (Annual Average Daily Traffic (AADT): Two Lanes)		
	Less than 300 VPD *	300 to 6,000 VPD	More Than 6,000 VPD
AS 1141.14 Misshapen Particles: Calliper Ratio 2:1	25 % max	15 % max	12 % max
AS 1141.15 Flakiness Index	35 max	30 max	25 max
AS 1141.23 Los Angeles Abrasion (LAA): Fine Grained Aggregate	30 % max	25 % max	20 % max
Coarse Grained Aggregate	40 % max	35 % max	30 % max
AS 1141.24 Sulphate Soundness	15 % max	12 % max	10 % max
AS 1141.40, AS 1141.41 Polished Aggregate Friction Value	40 min	40 min	45 min

* VPD (Vehicles per day).

Table - Aggregate Properties	
AS 1141.18:	Crushed particles in coarse aggregate derived from gravel. Ensure 80% minimum by mass is classified as crushed particles.
AS 1141.25.1	Degradation factor – Source rock (Washington Degradation Test). Igneous rocks shall have a minimum value of 50.
AS 1141.26	Secondary minerals content in igneous rocks shall not exceed 25 %.
AS 1141.29	Accelerated soundness index by reflux. Igneous rocks shall have a minimum value of 94.
AS 1141.50	Resistance to stripping of cover aggregates from binders. The maximum stripping value of precoated aggregate (precoat shall contain 1 % adhesion agent.) shall be 10 %.

7.6.2 Cutter and Flux

Cutter is to be Kerosene or Jet A1 Aviation Turbine Fuel – conform to **Table – Cutter Oil Properties**. Do not use diesel products.

Table – Cutter Oil Properties			
Property	Min.	Max.	Test Method
Density at 15 °C, km/m ³	775	830	ASTM D1298 or AS 2341.6
Distillation - Initial Boiling Point °C	140	-	ASTM D86
Distillation - Final Boiling Point °C	-	280	ASTM D86
Flash Point °C (Penksy-Martens closed cup)	38	-	AS 2106.2
Water content, % by volume	-	0.1	AS 2341.9
Viscosity, mPa.s at 40 °C	-	2.0	ASTM D445
Refer AS 3568 – 1999 Table 1 for complete table.			

7.6.3 Precoat and adhesion agents

Precoat and Adhesion Agents are to be in the concentrated form and not contain Diesel as part of the mixture.

Precoat all aggregates to conform to the following:

- Precoat mixture is to be 100/0/100/1 and not contain Diesel as part of the mixture.
- Bitumen residue (by mass): 50%.
- Kerosene (by Mass) 50%
- Adhesion agent (by mass): minimum 1%

7.6.4 Bitumen

Standard Classes of bitumen to conform to the requirements of AS 2008.

Manufacture all AS 2008 bitumens in a refinery and have NATA endorsed certificates of manufacture.

Durability Value, in accordance with AS/NZS 2341.13 – Long-term exposure of bitumen to heat and air, shall be a minimum of 7 days with no maximum value.

Multigrade bitumen to comply with AGPT-T190-14 Specification framework for polymer modified binders.

7.6.5 Cut Back Bitumen

Conform to the requirements of AS 2157 and **Table - Cut Back Bitumen Properties**.

Designation is by AMC class.

Class AS 2157	Viscosity (Dynamic) At 60°C Pa.sec	Approximate Parts Bitumen To Cutter	Spraying Temperature deg. C
AMC 00	0.008 - 0.016	100 - 100	Ambient
AMC 0	0.025 - 0.05	100 - 80	35 - 55
AMC 5	5.5 - 11.0	100 - 12	120 - 150
AMC 6	13.0 - 26.0	100 - 7	135 - 160

7.6.6 Bitumen Emulsion

A rapid setting bitumen emulsion made with bitumen Class 320.

Refer to PROJECT SPECIFIC REQUIREMENTS in the Request for Tender document for details of type of emulsion to be used.

Conform to the requirements of AS 1160.

Utilise within 90 days of manufacture.

Spraying temperature: 60% bitumen content 30 to 60° C.

Generally Bitumen emulsion to be;

Type; CRS

Binder Grade; 170

%Binder; 60

7.6.7 Polymer Modified Binder

A mixture of Standard Class bitumen and elastomeric polymer or crumb rubber additive.

All conformance testing to be carried out in accordance with Austroads and Australian Standard Test Methods.

Base binders for the production of PMB must meet the specification limits outlined in **Table – Base Binder for Polymer Modified Bitumen** from the refinery. All base binders must be process tested for conformance to ensure compliance before manufacture into PMB's.

Polymer Modified Binders must conform to the requirements outlined in **Table – Polymer Modified Binders for Sprayed Sealing Applications**.

Manufacture of Polymer Modified Binders must meet the requirements of the "Guide to Manufacture, Storage and Handling of Polymer Modified Binders, Australian Asphalt Pavement Association, 2013".

Property	Specification limit	
	Minimum	Maximum
Viscosity at 60°C, Pa.s	140	380
Viscosity at 135°C, Pa.s	0.25	0.65
Penetration at 25°C (100g, 5s), <i>pu</i> (<i>pu</i> unit is 0.1mm)	40	-
Flashpoint °C	250	N/A
Matter Insoluble in toluene, percent mass	N/A	1.0
Short Term effect of heat and air (Rolling Thin film Oven Test) Viscosity of residue at 60°C as a percentage of original	N/A	300
Long term effect of Heat and air, days	7	-
Density at 15°C, t/m ³	To be reported	To be reported

SPRAY SEALING MAINTENANCE

Table – Polymer Modified Binders for Sprayed Sealing Applications		PMB Class ⁽⁷⁾					
		S10E	S15E	S20E	S25E	S35E ⁽⁶⁾	S45R ⁽¹⁾
Test Method ⁽⁸⁾	Binder Property						
AS/NZS 2341.4 or AGPT/T111	Viscosity at 165 °C (Pa.sec) max. ⁽²⁾	0.55	0.55	0.6	0.9	0.55	4.5 ⁽²⁾
AGPT/T122	Torsional Recovery at 25 °C, 30s (%)	22-50	32-62	38-70	55-80	16-32	25-55
AGPT/T131	Softening Point (°C).	48-64	55-75	65-95	82-105	48-56	55-65
AGPT/T125	Stress ratio at 10 °C min.	TBR ⁽³⁾	TBR	TBR	TBR	TBR	TBR
AGPT/T121	Consistency 6% at 60 °C (Pa.s) min. ⁽⁴⁾	300	400	500	900	250	800
AGPT/T121	Stiffness at 15 °C (kPa) max.	140	140	NA ⁽⁵⁾	NA	180	180
AGPT/T121	Stiffness at 25 °C (kPa) max.	NA	NA	35	30	NA	NA
AGPT/T132	Compressive Limit at 70 °C, 2kg (mm) min.	NA	NA	NA	NA	NA	0.2
AGPT/T108	Segregation (%) max.	8	8	8	8	8	8
AGPT/T112	Flash Point (°C) min.	250	250	250	250	250	250
AGPT/T103	Loss on Heating (% mass) max.	0.6	0.6	0.6	0.6	0.6	0.6
Notes: (1) Class S45R binder must be manufactured by the incorporation of crumb rubber derived from used vehicle tyres.							
(2) L series Brookfield is recommended together with spindle SC4-31, except in the case of S45R where spindle SC4-29 is recommended. The shear rate involved in determining viscosity by AS/NZS 2341.4 and AGPT/T111 must be calculated and recorded. AGPT/T111 has been retained in Table 8.1 to allow laboratories sufficient time to adopt AS/NZS 2341.4.							
(3) TBR = To be reported							
(4) Consistency 6% at 60 °C of S10E and S35E must be determined using mould B (breakpoint of 5 mm and a test speed of 1.5 mm/s). Other grades must be tested using mould A (breakpoint of 10 mm and a test speed of 1 mm/s).							
(5) NA means not applicable for that PMB class.							
(6) S35E must be manufactured with Polybutadiene (PBD) polymers. To be used only if approved by the Superintendent as an alternative to S10E.							
(7) Class of PMB: S=Sealing, E=Elastomeric Polymer, R=Granulated Crumbed Rubber							
(8) AGPT Test Methods are available from Austroads Guide to Pavement Technology Part 4H: Test Methods							

7.7 SPRAYERS AND PERSONNEL

Sprayers must have current calibration accredited by a tester nominated on the Australian Asphalt Pavement Association website. All calibrated sprayers must be listed on the Australian Asphalt Pavement Association website. A copy of the calibration certificate must be with the vehicle at all times.

Calibrate sprayers yearly.

Ensure sprayer driver and operator are skilled and trained with an understanding of sprayer calibration and an appreciation of the requirements of the work.

Ensure relevant personnel understand the types and quantities of the various materials and mixtures to be used.

Bitumen Spraying plant and equipment must be in good working condition at all times.

7.8 PREPARATION OF PAVEMENT

Remove raised reflective pavement markers. Repair any damage to the pavement surface caused by the removal of raised reflective markers with an emulsion/sand mixture before sealing.

Sweep the entire pavement surface to remove loose stones, dust, dirt and foreign matter immediately before spraying.

Do not use steel brooms on fine crushed rock type or low plasticity type materials or on airstrips.

Maintain the prepared surface.

Extend sweeping clear of the area to be sealed.

Remove adherent patches of foreign material with a steel scraper.

Dampen the prepared surface lightly immediately before spraying (for priming and primersealing only).

Remove water from the surface of primed or sealed pavements before applying binder.

Do not allow traffic on the prepared surface.

7.9 SETTING OUT

Mark out by string line or paint.

Include pavement widening.

Reseal works follow existing seal.

7.10 BINDER COAT REQUIREMENTS

7.10.1 General

Rectify bleeding or flushing seals during the defined defects period at no cost to the Principal.

7.10.1.1 References

DIPL Technical Standard - Bituminous Surfacing Works Treatment and Selection, accessible via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/road-surfacing-standards>

Austrroads Guide to Pavement Technology Part 4K Selection and Design of Sprayed Seals
AS 2008 - Bitumen for Pavements

7.10.1.2 Definitions

S10E – A class of polymer modified bitumen, used for spray seal work, with an elastomeric modifier, conforming to specified binder properties in the Standard Specification for Roadworks It must be manufactured from bitumen that conforms to the classes in AS 2008.

SAMI – Strain Alleviating Membrane Interlayer. A layer of seal sprayed onto an existing cracked surface, prior to asphalt resurfacing.

7.10.1.3 Requirements

Selection of binder type other than those specified above can be considered in special circumstances and to the approval of the Executive Director Civil Services. For example, resealing a heavily cracked surface may require a S20E or S25E binder type or crumb rubber S45R.

Material properties for S10E binders and other binder types are contained in the Standard Specification for Roadworks, Spray Seal section.

For further guidance refer to Austroads - Guide to the Selection and Use of Polymer Modified Binders and Multigrades (TT1357 2012)

Heat to spraying temperature but do not exceed the maximum. Avoid heating bitumen in quantities excess to requirements

Prevent foaming.

Table - Binder Type Requirements	
PRIMING AND PRIMER SEALING	
Region	Binder Type
All	Class C240 / C320 Applied in cutback form.
TACK COAT AND ENRICHMENT	
Region	Binder Type
All	CRS170/60 Applied in emulsion form.
INITIAL SEAL WORK	
Region	Binder Type
Darwin, Katherine, East Arnhem, Tennant Creek, Alice Springs	S10E
RESEALING WORK	
Region	Binder Type
All	S10E
SAMI WORK (Using 14 mm aggregate)	
Region	Binder Type
All	S25E

7.10.2 Prime, primer seals and enrichment coats

Provide bitumen complying with **Table - Base Binder for Polymer Modified Bitumen** in the **Polymer Modified Binder** sub-clause in the **Material Requirements** clause in this work section.

Generally bitumen class 320 for cut back as follows:

Prime: AMC 0 to AMC 00

Primer Seal: AMC 5 to AMC 6

Enrichment Coat: CRS 170/60

Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT for cut back requirements.

Cut-back bitumen to be mixed on site.

Heat bitumen to a temperature appropriate for achieving final spraying temperature making allowance for incorporation of the unheated cutter.

Add unheated cutter to heated bitumen and circulate until a homogeneous mixture is achieved.

Spray immediately circulation is complete.

Allow at least three days to elapse after priming before applying the binder coat. Ensure primer soaks in and dries off before applying binder coat.

Keep traffic off the primed surface for 3 days after priming. Use a primer seal if traffic cannot be kept off surface for 3 days.

7.10.3 Straight Run Binder Coats

Do not use Straight Run Binder Coats unless you have prior approval from the Executive Director Civil Construction (Chief Engineer).

Provide bitumen Class 320 complying with AS 2008.

Ensure product meets the requirements of the specification at point of delivery.

7.10.4 Polymer Modified Binder Coats

Provide bitumen in conformance with **Table – Base Binder for Polymer Modified Bitumen** (in the Polymer Modified Bitumen sub-clause in the clause Material Requirements in this work section) blended with the required polymer as follows:

Prepare the product in a manufacturing or blending plant that complies with the “Guide to the Manufacture, Storage and Handling of Polymer Modified Binders, Australian Asphalt Pavement Association, 2013”.

- Initial seal coat: Class S10E
- Reseal coat: Class S10E

Store, mix, heat and spray the polymer modified binder as recommended by the polymer manufacturer.

Both coats of two coat seals shall contain polymer.

Allow for adhesion agent in Bitumen item.

7.10.5 Binder Coats, Tender Quantities

Spray Rates: Calculated using Austroads Design Method.

Refer to PROJECT SPECIFIC REQUIREMENTS for spray rates used as a basis for calculating tender quantities.

7.11 SAMPLING OF BINDER

7.11.1 Test Request

Darwin Urban areas – Test requests are to be sent to the panel period Contractor to witness sampling and arrange testing.

All other areas - the supplier is to sample and deliver the sample to Department staff within 48 hours.

7.11.2 Supply of Sampling Containers

Supply all sampling containers as required for sampling purposes.

- Sample containers are to be leak proof and having a capacity of not less than one litre.
- Sample containers must be clean, rust free and capable of receiving a product at high temperatures.

7.11.3 Definition of Sampling

A sample is three containers of product collected at the same time from the same supply source. One sample container is for the Contractors analysis.

Two sample containers are for the Department to analyse.

Note: Refer to the Superintendent for requirements if samples are non-conforming.

7.11.4 Frequency of Samples

Refer to CONFORMANCE TESTING.

7.11.5 Collection of Samples - Witness Point

Take samples prior to addition of adhesion agents.

Conformance test sampling is to be collected at point of delivery.

Ensure bulkers and road tankers have adequate sampling cocks installed so as samples can be taken on transfer from the bulker to the sprayer. Do not take samples from the spray wagon.

Witness Point – Take samples from the point of delivery on transfer from the bulker to the sprayer or as directed. Where transfer is for works in the urban area or for small works ensure that conformance testing is ordered and samples are taken at the point of transfer from bulker to sprayer.

All sampling must be in accordance with Australian or Austroads standards. The supplier is to perform the sampling. Ensure staff carrying out sampling are competent in sampling methods.

Ensure sampling techniques do not allow contamination of the samples.

Where samples are not collected, 10% reduction adjustments (**Table - Payment Adjustments** in MEASUREMENT AND PAYMENT, **Payment Adjustments** clause) will apply to the total materials represented.

Refer to in the clause Material Requirements in this work section.

7.11.6 Identification of Samples

Mark samples with the following information on the container at the time of collection.

- Container number.
- Sample number.
- Date and time of sample taken.
- Designation or Classification of Materials.
- Sample Temperature.
- Tanker/Sprayer Identification Number.
- Name of Supplier.
- Road Name and number.
- Site Identification.
- Location and Chainage.
- **Reseals** - Maintain an electronic register of all samples which includes the information listed above. Provide a copy of this register to the Superintendent on request.

7.11.7 Storage and Delivery of Samples

Store all samples taken to prevent accidental damage or contamination. Submit sample containers at the completion of each days spraying.

7.11.8 Stockpile Sites

Refer to Stockpiles clause in MISCELLANEOUS PROVISIONS.

7.12 SUPPLY OF AGGREGATE

Supply and deliver aggregate into stockpiles at the locations specified in the PROJECT SPECIFIC REQUIREMENTS section of the RFT.

The quantity of aggregate delivered is to be within 5 % or 20 m³ of the specified quantity, whichever is the lesser.

7.13 PRECOATING AGGREGATE

All aggregates used must be dry before precoating.

No precoat is required for SAMI and Emulsion seals, unless stated in the response schedules.

Apply a uniform film of precoating material to the aggregate.

Aggregate which has been excessively precoated will be rejected.

Precoating is to take place at preapproved site stockpile locations unless otherwise approved by the Superintendent.

All precoating must be performed with a powered shaking screen deck precoater which removes dust, dirt and oversize materials and evenly applies precoat to the aggregate.

7.14 ADHESION AGENT - MANDATORY

Use 1% adhesion agent in the binder. Written Superintendent approval must be obtained for variation of this rate.

Do not use diesel based adhesion agents.

Circulate in binder for 20 minutes before spraying.

Provide the Superintendent a copy of the Safety Data Sheet information of the adhesion agent prior to its intended use.

7.15 SPRAYING – WITNESS POINT

Witness Point - Give the Superintendent 48 hours' notice of intention to spray bitumen.

Store bitumen at lowest practical temperature and for the shortest possible duration.

Comply with the following temperature control requirements for polymer modified binders:

Table – Temperature Control Requirements for Polymer Modified Binders		
Property	Straight Run Binder	Polymer Modified Binder
Temperature at point of spraying	175 to 185 °C	180 to 200 °C
Holding time at spraying temperature	7 days maximum	2 days maximum
Temperature for medium term storage	130 to 150 °C	140 to 160 °C
Holding time for medium term storage	30 days	7 to 10 days

Seek approval to vary these requirements.

Remove bitumen from the site when temperature limits are exceeded.

7.15.1 Atmospheric Conditions

Commence spraying only when pavement temperature:

- is in excess of 20°C, or
- has been in excess of 15°C for at least one hour.

For cutback work, commence spraying when pavement temperature is in excess of 10 °C.

For emulsion work, commence spraying when pavement temperature is in excess of 5 °C.

Cease spraying if rain threatens, or in windy or dusty conditions.

Protect the work in the event of a sudden change in weather by closing the affected section of road or by rigidly controlling traffic speed.

7.15.2 Preparing the Sprayer

Circulate the mixture.

Check the horizontal and vertical alignment and the cleanliness of the spraybar and its extensions.

Determine the appropriate number of nozzles for the width to be sprayed. Ensure the end nozzles fitted are EAN18W.

Check that the nozzles in use are symmetrical about the sprayer.

Check the alignment and setting of the nozzle to ensure that the fans of material from intermediate nozzles are parallel and at an angle of 30° to the centre line of the spraybar. Ensure that the fans

from the end nozzles are parallel to each other and at an angle of 45 degrees to the centre line of the spraybar.

Set the height of the spraybar so that the lower faces of the nozzles are 250 mm (or that specified on the calibration certificate) above the pavement when the sprayer is full.

Fit an end shield to the spraybar when necessary to prevent spraying material on the kerb, or to counter any wind effects which would compromise uniform spraying.

Position the guide rod to conform to the setting out and edges of spray. Check by making a dummy run.

7.15.3 Application Spray Rates – Hold Point

Application spray rates shall be determined by the Superintendent. Refer to Austroads Guide to Pavement Technology, Part 4K, Selection and Design of Sprayed Seals, and to the Department's Technical Directive *Design of Sprayed Seals* accessible via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/road-surfacing-standards>.

For new seals and reseals, supply the following to the Superintendent, 3 working days prior to the planned commencement of sealing, to allow the spray rates to be calculated:

- Particle Size Distribution (1 per 250 tonne - minimum 3 tests)
- Average Least Dimension (ALD) (1 per 250 tonne - minimum 3 tests)
- Flakiness Index (FI) of the aggregate, (1 per 250 tonne - minimum 3 tests)
- Ball Penetration testing (for new seal work)
- Dryback results (for new seal work)
- Refer to Conformance Testing for sampling requirements of aggregates.

Hold Point – Do not commence spraying until the spray rates are advised by the Superintendent.

Spray rates to be at 15 °C adjusted in accordance with in **Calculation of Equivalent Volumes for Spray Rates** clause in this work section.

For primers, primer seals and polymer modified binders, the rate of application refers to the whole of the mixture, including all modifiers, cutback materials, combining oils and adhesion agents. For enrichments and emulsion seals, the rate of application refers to the whole of the mixture.

7.15.4 Preparation for Sprayer Run – Witness Point

Record the volume and temperature of the sprayer contents while it is on level ground.

Supply Sprayer Tank dips before and after each sprayer run.

Witness Point - Allow visual inspection when requested.

Determine the length of sprayer run from the available quantity in the sprayer and the application rate. Ensure the area to be sprayed is not greater than the area that can be covered by aggregate in the loaded trucks.

Start and finish each spray run on a protective strip of paper placed on the pavement. The paper to be wide enough to ensure the sprayed material is being discharged correctly over the full width of spray. Place sufficient protective paper to protect road fixtures.

Place paper on the pavement and masking around areas to be sprayed or wherever the sprayer is stationary on the road pavement.

Seal joints are only allowed where line marking is to be placed. No joints are allowed in wheel paths. Excess overspray and spills must be removed before sealing works proceed.

7.15.5 Installation of Temporary Pavement Markers

Temporary Pavement Markers to conform to AS/NZS 1906.3.

Spacings of temporary pavement markers to be in accordance with AS 1742 or as directed by the Superintendent.

7.15.6 Sprayer Run

Attain uniform spraying speed before spraying commences.

Avoid an excess or deficiency of material due to faulty overlap at longitudinal joints when spraying a road in half-widths.

Overlap to be 300 mm with an intermediate nozzle.

Do not use end nozzles on an overlap.

Make allowances for "Fog Spraying" when joining to existing seals.

Cease spraying before the level of material in the tank falls to a level which reduces the full discharge of the pump.

Remove and dispose of all paper as per the EMP.

Clean off any sprayed material from road fixtures.

7.15.7 Hand Spraying

Plan work to minimise the requirement for the use of a hand sprayer.

Any strips of pavement not adequately covered with sprayed material to be sprayed later with the hand attachment.

7.16 APPLICATION OF AGGREGATE – HOLD POINT

Supply current test results of materials to be used.

Load aggregate into tip trucks using an approved aggregate loader which removes dust, dirt and oversize stone while applying precoat.

Hold Point - Obtain approval from the Superintendent for use of the proposed aggregate loader before commencing aggregate loading operations.

Apply aggregate to sprayed binder within:

- 10 minutes where the pavement temperature is 20°C or greater.
- 5 minutes where the pavement temperature is between 15 and 20°C.

Polymer Modified Binders: Apply aggregate within 5 minutes irrespective of pavement temperature.

Apply aggregate to emulsion coat before the emulsion breaks.

Spread the aggregate evenly and uniformly over the sprayed surface at a rate of 900/ALD m²/m³. Seek approval for variations to this rate.

Use a mechanical spreader.

Rerun or hand cover bare or insufficiently covered places after the first spreading.

Aggregate spread in excess of the application rate designated in the procedure will be removed and stockpiled at full cost to the Contractor.

7.16.1 Aggregate Spread Rates

Spread the aggregate evenly and uniformly over the sprayed surface at a rate complying with **Table – Aggregate Spray Rates**.

Use a mechanical automated spreader, manual spreader boxes are not to be used.

Rerun or hand cover bare or insufficiently covered areas after the first spreading.

Remove all excess aggregate.

Table – Aggregate Spread Rates	
SINGLE / SINGLE SEALS	
Straight Run Binder Coats Multi Grade And Polymer Modified Binders	900/ALD m ² /m ³
Emulsions And Cut Back Binders	800/ALD m ² /m ³
SAMI	1000/ALD to 1100/ALD m ² /m ³
DOUBLE / DOUBLE SEALS – FIRST COAT APPLICATION	
Straight Run Binder Coats Multi Grade And Polymer Modified Binders	950/ALD m ² /m ³
Emulsions And Cut Back Binders	850/ALD m ² /m ³
DOUBLE / DOUBLE SEALS – SECOND COAT APPLICATION	
All Binders	900/ALD m ² /m ³

7.16.2 Rolling Rate

Roll the treated surface with self-propelled rubber tyred rollers with a minimum tyre pressure of 600 kPa and a minimum wheel load of 1 tonne.

Roller speed on the first pass to be between 5 and 10 km/h, with subsequent passes between 15 and 25 km/h.

Conform to the following:

- Entire area to receive one roller pass immediately after covering.
- 75% of rolling within 1 hour of covering.
- 100% of rolling within 2 hours of covering.

Minimum Rolling Rate: 1 roller hour per 2,000 litres of binder.

Ensure a uniform distribution of aggregate. Drag broom to distribute surplus aggregate but do not dislodge embedded aggregate. Drag broom before 50% of rolling is complete. Drag brooms are not to be rotary brooms.

For two coat treatments, double the specified rolling rate if the second coat is to be applied immediately or the surface is not to be trafficked.

Roll in daylight hours only.

Sweep all loose aggregate from the carriageway at completion of rolling.

Ensure aggregate on the final surface is uniformly distributed and firmly held by the binder.

Adjust drag broom to distribute surplus aggregate, but not to dislodge embedded aggregate.

Ensure aggregate on the final surface is uniformly distributed, and firmly held by binder.

Re-roll the surface after sweeping to ensure uniform bedding of aggregate in binder.

7.16.3 Rolling Rate Airstrips

Roll the treated surface with at least one self-propelled rubber tyred roller with a minimum weight of 20 tonnes.

Roll the treated surface with self-propelled rubber tyred rollers with a minimum tyre pressure of 600kPa and a minimum wheel load of 1 tonne.

Rubber Tyred Minimum Rolling Rate: One roller hour per 800 litres of binder.

Steel Drum Roller Minimum Rolling Rate: One pass on the second coat.

For 2 coat treatments, double the rolling rate on the final coat only.

Ensure a uniform distribution of aggregate. Drag broom to distribute surplus aggregate but do not dislodge embedded aggregate. Drag broom before 50% of rolling is complete. Drag brooms are not to be rotary brooms.

Ensure aggregate on the final surface is uniformly distributed and firmly held by the binder.

Roll in daylight hours only.

Using a suction type broom to sweep all loose aggregate from the carriageway at completion of rolling, remove from site.

Re-roll the surface after sweeping to ensure uniform bedding of aggregate in binder.

7.16.4 Self-Propelled Multi Rubber Tyred Vibrating Rollers – Hold Point

Hold Point – Obtain Superintendent’s approval for the use of self-propelled multi rubber tyred vibrating rollers before using them.

Do not use steel drum rollers fitted with rubber covers.

Self-propelled multi rubber tyred vibrating rollers must not be used on works other than resealing works.

All self-propelled multi rubber tyred vibrating rollers must meet the same requirements as are required for self-propelled multi rubber tyred non-vibrating rollers in respect to rolling speeds, tyre pressures, and wheel loadings.

If the self-propelled multi rubber tyred vibrating rollers meet all the above requirements, one self-propelled multi rubber tyred vibrating roller will be considered to be equivalent to 2 self-propelled multi rubber tyred non-vibrating rollers for calculations of rolling times.

A minimum of 2 self-propelled multi rubber tyred non-vibrating rollers must be on site at all times during execution of the works.

7.17 TRAFFIC ON RESEALS

Cross reference: PROVISION FOR TRAFFIC, Workzone Traffic Management, Traffic Escort Vehicle- Reseal Works.

Co-ordinate work to minimise traffic delays.

Prohibit traffic:

- until at least 3 passes of a roller has taken place or until sufficient rolling has taken place to prevent damage to the applied seal, whichever is greater; and
- from adjacent strip of roadway during spraying.

Sweep all loose aggregate from the carriageway at completion of rolling.

7.18 WASTE MATERIAL

Refer to *Disposal of Waste* clause in MISCELLANEOUS Provisions.

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

In urban areas, remove all excess aggregate by suction broom. Ensure no aggregates are distributed onto the verge.

Remove from the site and legally dispose of all waste material.

Clean and remove all aggregate from the shoulders and verges in urban areas.

Urban areas aggregate removal / sweeping regime:

- **Initial** sweep after rolling has concluded
- **Second** sweep after 24 hours
- **Third** sweep after 48 hours.

Sweep all aggregate from the extremities of the shoulders in rural areas.

7.19 REPORTING

7.19.1 Spraysheets

Supply to the Superintendent at the end of each day's production paper or electronic copies of spraysheets that record the following information for all spray runs conducted.

- Contractors Name
- Project Details
- Contract Number
- Specification schedule number
- Road Name
- Product Type Sprayed
- Precoat type used, Precoat litres / m³
- Aggregate supplier, Aggregate Type, Aggregate size
- Run number, Start Time of spray run
- Pavement Temperature, Ambient Temperature
- Start Chainage of spray run – actual km of road
- End chainage of spray run – actual km of road
- Total Length, Width of spray run
- Total area of spray run
- Temperature of product at spraying
- Start Dip, End Dip
- Total sprayed hot, Correction factor, Total sprayed cold
- Application rate cold
- Ordered application rate
- Percent of application rate ordered
- Number of rollers used
- Bitumen sample number
- Signature of Contractor representative
- Signature section for client representative

7.20 CONFORMANCE

7.20.1 Tolerances

Final surfaces shall conform to the following:

Aggregates are to conform to **Table – Aggregate Properties** in the **Material Requirements** clause in this work section.

Skid resistance determined by NTTM 304.1.

Skid resistance testing may be carried out by the Superintendent.

Final surfaces with non-conforming skid resistance will be rejected.

Rectify non-conforming work by methods approved by the Superintendent. Rectification work is at the Contractor's expense, including the cost of testing and re-testing.

Remove from the site binder which has been overheated or has deteriorated or become contaminated prior to its application to the road.

Spray rates applied at less than 95% or more than 105% of the rate indicated in the procedure will be rectified by resurfacing at the Contractor's expense inclusive of all materials.

7.21 CALCULATION OF EQUIVALENT VOLUMES FOR SPRAY RATES

This includes the prime coat, enrichment coat, emulsion coat, primerseal and seal coats. Refer to MEASUREMENT AND PAYMENT for schedules of adjustments.

7.21.1 Bitumen Equivalent Volumes

Equivalent volumes of bituminous material measured at higher temperature are to be converted to an equivalent volume at 15°C (15°C converted higher temperature).

Interpolate to determine equivalent volumes at temperatures other than those specified in the **Table – Bitumen Equivalent Volumes**.

Table - Bitumen Equivalent Volumes				
Temp. (°C)	Factor		Temp. (°C)	Factor
15	1.0000 (1.0000)		120	0.9356 (1.0688)
40	0.9844 (1.0158)		130	0.9296 (1.0757)
50	0.9782 (1.0223)		140	0.9237 (1.0826)
60	0.9720 (1.0288)		150	0.9178 (1.0896)
70	0.9659 (1.0353)		160	0.9119 (1.0966)
80	0.9597 (1.0420)		170	0.9060 (1.1038)
90	0.9537 (1.0486)		180	0.9002 (1.1109)
100	0.9476 (1.0553)		190	0.8944 (1.1181)
110	0.9416 (1.0620)		200	0.8886 (1.1253)
			210	0.8829 (1.1326)

7.22 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

8 BITUMINOUS SURFACE MAINTENANCE

Refer to SPRAY SEALING for bitumen requirements.

8.1 OUTLINE DESCRIPTION

This section specifies the repairs and minor rehabilitation to existing bituminous surfaces and pavements with asphalt, and includes the repair of potholes, edge defects, surface deformations and cracks.

This section specifies the requirement for sealing works of less than 300m² in area.

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

8.2 CROSS REFERENCES

PROVISION FOR TRAFFIC for WorkZone Traffic management, Traffic Escort Vehicle – Reseal works.

SPRAY SEALING for Standards and Publications

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES

8.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

Australian Standards

AS 1160	Bitumen emulsions for the construction and maintenance of pavements
AS 2008	Bitumen for pavements
AS 2150	Hot mix asphalt – A guide to good practice
AS 2157	Cutback bitumen
AS 2341	Methods of testing bitumen and related road making products
AS/NZS 2341.13	Long-term exposure (of bitumen) to heat and air
AS 2891(set)	Methods for sampling and testing asphalt.

Austrroads

Austrroads Guide to Pavement Technology Part 4 B Asphalt

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

8.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

Reference should be made to AUSTROADS – AP-C87-15 Austrroads Glossary of Terms to give definitions on all aspects of Bituminous Surfacing works where required.

The following additional definitions apply.

ADHESION AGENT

A substance used for the purpose of promoting the adhesion between binder and aggregate.

ALD

Average least dimension

ASTM

American Society for Testing and Materials.

COARSE AGGREGATE

Where the average grain size of the constituent minerals is greater than 5 mm. The average grain size is determined optically under a petrographic microscope or by calibrated hand lens.

COLD MIX ASPHALT

A premix, blended from bitumen, aggregate, sand, and mineral filler, and having a flux oil in the binder. It is workable at ambient temperatures.

CUTTER

A light petroleum distillate (kerosene) added to bitumen to temporarily reduce its viscosity.

THE DEPARTMENT, or DIPL

Department of Infrastructure, Planning and Logistics.

FINE AGGREGATE

Where the average grain size of the constituent minerals is less than 5 mm. The average grain size is determined optically under a petrographic microscope or by calibrated hand lens.

FLUX OIL

A petroleum distillate added to bitumen produce a long term reduction in its viscosity.

HOT MIX ASPHALT

A hot mixed homogeneous blend of bitumen, aggregates, sand, mineral fillers produced at an approved asphalt plant. It is delivered, placed and compacted hot.

Ensure that the asphalt has a current mix design to the requirements of AGPT Part 4B Asphalt.

JOB MIX

The mix utilised for asphalt surfacing which is determined from laboratory testing of proposed materials and complies with the specified properties.

NATA

National Association of Testing Authorities.

NTCP

Northern Territory Code of Practice.

NTMTM

Northern Territory Materials Testing Manual.

NTTM

Northern Territory Test Methods.

PAVEMENT PROFILING

The use of a pavement profiler to remove worn, oxidised, aged or out of shape pavements, and for correcting poor surface conditions to make the pavement suitable for re-sheeting or resealing.

PMB

Polymer Modified Binder.

PRECOATING MATERIAL

A material used for precoating aggregate to promote adhesion of bitumen. Do not use diesel.

PRIME

An application of a Primer to a prepared base without cover aggregate to provide penetration of the surface temporary waterproofing and to obtain a bond between the pavement and the subsequent seal or asphalt. It is a preliminary treatment to a more permanent bituminous surface. Do not use diesel products.

PRIMERSEAL

An application of primer binder with a fine cover aggregate to a prepared base to provide penetration of the surface and retain a light cover aggregate. Do not use diesel products.

RESEAL

A seal applied to an existing sealed, asphalt or concrete surface.

REGULATION PATCHING

Surface repairs and shape correction without dig-out and/or squaring up, will usually not be straight sided due to irregularities in the pavement and feathering repair techniques.

RECONSTRUCTION PATCHING

Repairs with profiling, dig-out and/or squaring up, may be confined to the surface course or extend through all courses.

SEAL

A sprayed application of bituminous binder into which aggregate is incorporated. May include more than one application of binder and aggregate, and may include geotextile fabric.

WEARING SURFACE

The section of pavement upon which the traffic travels. This includes the layer(s) of asphalt or spray seal in a flexible pavement above the base.

8.5 IDENTIFICATION AND TYPES OF FAILURES

The Superintendent will identify the defect and then order the appropriate method of repair by issue of a Contractor Service Request (CSR).

Defect types are grouped into one of the following modes of pavement distress;

8.5.1 Deformations

Includes: corrugations, depressions, rutting, and shoving.

8.5.2 Cracks

Cracks promote water entry and can be a primary cause of other defects including deformations and potholes.

8.5.3 Edge breaks

Occur along the interface of a sealed pavement and unsealed shoulder.

8.5.4 Potholes

Steep sided or bowl shaped cavities or delaminations extending into layers below the wearing course, usually due to failures associated with an aged, cracked or debonded bituminous surface.

8.5.5 Patch

An area of pavement surface where the original has been replaced or covered.

8.5.6 Surface texture deficiencies

Includes polishing, ravelling, bleeding. Generally rectified by reseal not specified in this section.

8.6 REPAIR OPERATIONS

Undertake repair operations to rectify identified distress modes.

8.6.1 Pothole Patching

Applies to potholes, delaminations, and edge break defects.

Hole must be meticulously cleaned before repair, all loose and unbounded material must be removed.

Trim edges to sound material, creating angle sides to the bottom.

Tack coat the sides, bottom and lip of pothole for a minimum width of 20 mm with bitumen emulsion. Remove excess tack coat. Place patching material in layers no greater than 3 times the nominal size, and thoroughly compact.

Finish the pothole slightly higher than adjacent pavement surface, between 3 mm and 5 mm.

Level the patch by hand raking, motor grader or pull type blade.

Remove all loose aggregate around the edges of the patch so patch can be raked and rolled to a smooth junction with the old surface.

Compact asphalt material with hand tamper for small holes and where possible, compact by using a rammer or vibrating plate.

Compact large patches with a vibrating smooth drum roller.

Hot mix can be topped with a light application of sand to prevent pick up. Remove all waste materials from the road reserves and dispose in an approved manner.

8.6.2 Temporary patching – Hold Point

Hold point - Temporary patching with aggregate and emulsion requires approval of the Superintendent. For such work, keep traffic off the patch until patch is stable.

8.6.3 Regulation Patching

Patch defect areas where only the surface needs repair. Applies to deformations.

The Superintendent will specify the suitable type of hot mix asphalt for the patch material in the CSR.

Remove all debris and any loose materials on the pavement.

Repair any potholes or cracks as required, refer other clauses.

Apply a tack coat to the area under repair at the application rate to suit surface conditions.

Supply, place, spread and compact the asphalt in layers until finished surface is flush with the existing surface.

Compact in layers approximately 3 times the size of the mix aggregate and bring up to surface in layers level with the intended surface profile.

Compact smaller holes with vibrating plate compactor and/or mechanical tampers.

Compact larger patches with a small vibrating roller.

Depending on the size of the patch, level by hand raking, a pull type drag, or paver.

Remove all aggregate larger than the feather edge so that the edges of the patch can be raked and rolled to a smooth junction with the old surface.

Brush off and remove all loose material from area.

8.6.4 Reconstruction Patching

Patch defect areas requiring squaring up and or the removal of distressed pavement.

The Superintendent will specify the suitable type and size hot mix asphalt for patch material in the CSR.

Excavate the area to the required depth with reclaimer/profiler plant, and clean excavation of all loose aggregate, dust and water.

Cut back the edges of the hole to sound material, cut the side vertically in order to provide shoulders against the movement of the patch, and square the bottom.

Square up the surface shape of the patch to provide a neat appearance. Refer to Pothole patching clause.

Apply a tack coat to the sides and bottom of the hole. Avoid applying too much tack coat so as not to induce a condition known as a fatty patch.

Supply, place, spread and compact the asphalt in layers in the hole until finished surface is flush with existing surface.

Compact in layers approximately 3 times the size of the mix aggregate and bring up to surface in layers level with the intended surface profile.

Depending on the size of the patch, level by hand raking, a pull type drag, or paver.

Remove all aggregate larger than the feather edge so that the edges of the patch can be raked and rolled to a smooth junction with the old surface.

Compact larger patches with a small vibrating roller.

Depending on the size of the patch, level by hand raking, a pull type drag, or paver.

Remove all waste materials from the road reserve. Waste stock piles are not permitted for any duration.

8.6.5 Reconstruction Patching – Alternative Method

Obtain the prior approval of the Superintendent to use this method of reconstruction patching where asphalt is not locally available.

Excavate the distressed pavement to sound material or to a depth of 300 mm.

Square up the surface shape of the patch to provide a neat appearance.

Clean the excavation of all loose material, dust and water.

Cut back the edges of the hole to sound material. Cut the sides vertically in order to provide shoulders against movement of the patch, and square the bottom.

If sound material is not reached at 300 mm depth, stabilise the subgrade 150 mm deep with 3% cement for granular materials or 3% lime for clay materials. (Allow 10 kg/ m² for 150 mm depth).

Supply, place, spread, mix and compact base course gravel in 100 mm maximum layers until flush with the existing surface.

Broom the surface of the patch and remove waste material from the site.

Apply spray seal or emulsion to the patch and overlap the existing surfacing by 100 mm.

Apply 10 mm size aggregate to the surface.

Rectify any failure of the surfacing at no additional cost.

8.6.6 Crack Sealing

For cracks wide enough to be treated, first clean the crack with air pressure, and then fill with a binder having viscosity low enough to enable it to be poured or worked into cracks.

Do not undertake crack sealing when wet.

Take care to ensure that the cutback bitumen, bitumen emulsion, rubberised bitumen or latex modified bitumen used does not bridge across the crack at the surface.

Assist the binder to penetrate cracks by using a squeegee.

Lightly sand the surface to prevent traffic picking up surplus binder if necessary.

For wide cracks, first clean the crack and fill with fine asphalt or bituminous slurry.

Large areas with fine cracks and minimal pavement distortion will be spray sealed, slurry sealed or resurfaced with plant mix, in accordance with other sections of the specification.

8.7 MATERIALS

8.7.1 Aggregates

The combined particle size distribution to be in accordance with **Table – Mix Proportions**.

Table – Mix Proportions				
Mix Type	1	2	3	4
AS Sieve (mm)	Dense Graded - % Passing (Dry Mass)			
	5 mm	10 mm	14 mm	20 mm
53.0	-	-	-	-
37.5	-	-	-	-
26.5	-	-	-	100
19.0	-	-	100	95 – 100
13.2	-	100	85 – 100	75 – 90
9.5	-	90 - 100	70 – 85	60 – 80
6.7	100	70 - 90	62 – 75	50 – 70
4.75	85 - 100	58 - 76	53 – 70	40 – 60

Table – Mix Proportions				
Mix Type	1	2	3	4
AS Sieve (mm)	Dense Graded - % Passing (Dry Mass)			
	5 mm	10 mm	14 mm	20 mm
2.36	55 - 75	40 - 58	35 – 52	25 – 43
1.18	38 - 57	27 - 44	24 – 40	18 - 35
0.60	26 - 43	17 - 35	15 – 30	14 - 27
0.30	15 - 28	11 - 24	10 – 24	9 - 21
0.15	8 - 18	7 - 16	7 - 16	6 – 15
0.075	4 - 11	4 - 7	4 – 7	3 – 7
Bitumen binder (% by mass)	5.0 - 7.0	4.5 - 6.5	4.6 - 6.5	4.0 – 6.0
Compacted thickness (mm)	10 - 25	25 - 40	35 – 55	50 – 80
Bitumen film thickness (min micron)	8.5	8.5	8.5	8.5
The grading curve shall be smooth and shall not vary from the outer one third of the range between the specified limits for one sieve size to the opposite outer one third of the range between the specified limits for an adjacent sieve size.				

COARSE AGGREGATES

Coarse aggregates must consist of crushed stone, with a minimum of 3 crushed faces, which is clean, hard, of high strength, angular, which has adequate skid resistance, which is durable and free from laminated particles, clay and other aggregations of fine material, soil, organic matter and any other deleterious material. Coarse aggregate must not fracture under compaction equipment or deteriorate rapidly

Conform to the following:

- Proportion of misshapen particles: 15 % maximum at 2:1 calliper ratio.
- Los Angeles Abrasion (LAA);
 - Fine grained aggregate: 30% maximum loss.
 - Coarse grained aggregate: 35% maximum loss.
 - Sulphate Soundness: 12% maximum loss.
 - Polished Aggregate Friction Value: 45 minimum.

FINE AGGREGATES

Fine aggregates must consist of clean, hard, sharp, washed, durable natural sand and/or material manufactured from crushed stone of uniform quality free from clay and other aggregations of fine material, soil, organic matter and any other deleterious material.

Where crushed fine materials are from sources other than the source of the coarse material used in the asphalt mix, the parent rock must meet all the requirements of Coarse Aggregates.

8.7.2 Mineral Filler

Filler must consist of mineral material consisting of natural or crushed mineral materials, hydrated lime or cement with a particle size less than 0.075 mm.

Filler must be dry, free from lumps, clay, organic material or any other deleterious material, and complies in all respects with the requirements of AS 2150.

8.7.3 Bituminous Binder

Standard Classes of bitumen to conform to the requirements of AS 2008.

Durability Value in accordance with AS/NZS 2341.13 shall be a minimum of 7 days with no maximum value.

8.7.4 Bitumen Emulsion

A rapid setting bitumen emulsion made with bitumen conforming to AS 1160.

8.7.5 Cut Back Bitumen/Prime

Conform to the requirements of AS 2157 and in SPRAY SEALING MAINTENANCE, **Material Requirements** clause, **Cut Back Bitumen** sub-clause.

Designation is by AMC class.

8.7.6 Cutter

Cutter to be Kerosene.

Do not use diesel products.

8.7.7 Precoat and Adhesion Agents

Precoat all aggregates to conform to the following:

- Adhesion agent (by volume): minimum 1 % precoat.
- Bitumen residue (by mass): minimum 50 % precoat.
- Kerosene (by mass): 50%.
- Viscosity (Dynamic) at 60°C: 0.003 to 0.020 Pa.

8.8 SAMPLING OF BINDER

8.8.1 Supply of Sampling Containers

Supply all sampling containers as required for sampling purposes.

- Sample containers are to be leak proof and having a capacity of not less than two litres.
- Sample containers must be clean, rust free and capable of receiving a product at high temperatures.

8.8.2 Definition of sampling

- Refer to NTMTM
- A sample is three containers of product collected at the same time from the same supply source.
- One sample container is for the Contractor's analysis.
- Two samples containers are for the Department to analyse.

8.8.3 Frequency of samples

Refer to CONFORMANCE TESTING and to Conformance clauses in this section.

8.8.4 Additive

An additive may be proposed provided that full details of the type of additive are provided and the mix design standards of the **Proportioning of Mixes** clauses in this section are attained.

8.9 PROPORTIONING OF MIXES FOR HOT MIX ASPHALT

8.9.1 Mix Type for Hot Mix Asphalt

The Superintendent will order Rural and/or Urban Mix Type Number with issue of CSR.

8.9.2 Manufacture of Hot Mix Asphalt

Mix in a plant capable of producing asphalt that complies with the approved design mix.

Bitumen temperature: 135°C to 160°C prior to mixing.

Heat aggregates to such a temperature that when filler and binder are added, the temperature of the mixed asphalt is between 135°C and 170°C.

8.9.3 Mix Assessment and Approval of Hot Mix Asphalt Types

Provide current mix design to Level 1.and Level 3 as per AGPT Part 4 B Asphalt.

Conform to the minimum mix requirements as shown in **Table - Properties of Hot Mix Asphalt**.

Table - Properties of Hot Mix Asphalt		
Marshall Characteristics	Rural	Urban
Compactive effort (number of blows each end of specimen):	50	75
Stability of mix (kN):	5 min.	10 min.
Flow (mm):	2 – 5	2 – 5
Air voids (%):	3 – 7	3 – 7
Voids in mineral aggregate (%):	14 min.	14 min.
Wheel tracking 10000 passes	5 + or - 1	5 + or - 1

Conform to **Table – Mix Proportions** in **Aggregates** sub-clause in **Materials** clause in this work section, and to **Table – Aggregate and Mineral Filler Mix Proportions**.

Table – Aggregate and Mineral Filler Mix Proportions				
Conform to the following mix proportions				
Mix Type	CM 1	CM 2	CM 3	CM 4
AS Sieve (mm)	Dense Graded - % Passing (Dry Mass)			
	7 mm	10 mm	14 mm	20 mm
53.0	-	-	-	-
37.5	-	-	-	-
26.5	-	-	-	100
19.0	-	-	100	95 – 100
13.2	-	100	85 - 100	-
9.5	100	90 - 100	70 - 85	58 – 74
6.7	90 - 100	-	-	45 – 60
4.75	70 - 90	58 - 70	46 - 65	37 – 50
2.36	45 - 60	35 - 50	28 - 45	22 – 36
1.18	-	22 - 38	15 - 30	12 – 26
0.60	15 - 30	12 - 27	10 - 23	6 – 20
0.30	10 - 20	6 - 16	5 - 17	4 – 15
0.15	4 - 14	4 - 14	3 - 11	2 – 10
0.075	3 - 8	2 - 6	2 - 5	1 – 5
Total %	100	100	100	100

The grading curve shall be smooth and shall not vary from the outer one third of the range between the specified limits for one sieve size to the opposite outer one third of the range between the specified limits for an adjacent sieve size.

8.10 PROPORTIONING OF MIXES FOR COLD MIX ASPHALT

8.10.1 Mix Type for Cold Mix Asphalt

The Superintendent will order the Mix Type Number with issue of a CSR.

8.10.2 Manufacture of Cold Mix Asphalt

Dry mix aggregate and mineral filter to provide a homogenous blend.

Add bituminous binder until the specified percentage is reached.

Carry out further mixing until a minimum of 90 % of the coarse aggregate particles are coated.

Add additional bitumen so that a satisfactory mix can be achieved, if so directed by the Superintendent.

Refer to **Table – Aggregate and Mineral Filler Mix Proportions** and **Table – Total Mix Proportions of Cold Mix Asphalt** and **Table – Specification Limits for the Binder Mix of Cold Mix Asphalt**.

Table – Total Mix Proportions of Cold Mix Asphalt				
Conform to the following mix proportions.				
Mix Type	CM 1	CM 2	CM 3	CM 4
Material	Dense Graded - % Of Total Mix			
	7 mm	10 mm	14 mm	20 mm
Aggregate and filler %	94.2 – 95.2	94.8 – 95.8	95.0 – 96.0	95.3 – 96.3
Residual binder %	4.8 - 5.8	4.2 - 5.2	4.0 - 5.0	3.7 - 4.7
Total Mix %	100	100	100	100

Table - Specification Limits for the Binder Mix of Cold Mix Asphalt	
Bitumen	100 parts
Flux	Between 5 and 15 parts, depending on location and climatic conditions. Will be specified on the CSR.
Cutter	10 parts

8.11 SURFACE PREPARATION

8.11.1 Resurfacing of Existing Bituminous and/or Concrete Surfaces

All vegetation and loose and extraneous matter must be removed prior to the application of bituminous resurfacing materials.

Depressions greater than 25 mm must be filled with an asphalt correction course layer. Minimum asphalt layer thicknesses must be observed during this procedure.

8.11.2 Tack Coat

Apply a fine spray of bitumen emulsion lightly and evenly over the whole of the area to be covered with asphalt.

The pavement must be dry and dust free before any application of tack coat.

Apply tack coat by spray bar fitted to mechanical sprayer. Hand spray only in areas where it is impractical to use the mechanical sprayer.

Protective splash boards or spray skirts must be used to eliminate over spray beyond the surface where tack coat is being applied.

Application rate of Residual Binder must be between 0.1 – 0.2 litres/square metre unless otherwise directed by the Superintendent.

Allow the tack coat to 'break' before laying the asphalt.

Clean and tack coat existing surfaces against which new work is to be laid.

Re-apply Tack coat where damaged by construction traffic or weather.

8.12 TRANSPORT AND SUPPLY

Insulate the bodies of trucks, block out corners with timber, and cover the body with a fitted tarpaulin when transporting distance is over 20 km or when temperatures are below 20°C.

8.13 SPREADING AND LAYING

Lay the final surface layer at a uniform thickness, and as one continuous operation.

Construct a transverse joint whenever the operation ceases.

Remove from site, prior to initial rolling, asphalt which has cooled below the required initial rolling temperature.

Hand spread in locations where mechanical spreading is not practical, and to correct localised depressions or irregularities.

Take the asphalt directly from the spreader hopper or dump asphalt onto metal sheets or existing hard clean surfaces. Do not dump asphalt directly onto the area where it is to be spread.

Complete the work as one continuous operation.

Remove from site all excess or spilt asphalt.

8.13.1 Minimum Temperatures of Hot Mix Asphalt

Conform to the minimum laying and initial rolling temperatures.

Cease laying asphalt during heavy or continuous rain, or in wet conditions where the material will not adhere or key to the surface.

Laying temperature: 135°C.

Initial rolling temperature: 105°C.

8.13.2 Joints Generally

Minimise the number of longitudinal and transverse joints.

Offset joints in multiple layer work by at least 100 mm so that joints in the surface course do not overlay joints in the previous course.

Overlap the finished asphalt by 25 to 75 mm when spreading.

Push the overlap asphalt back immediately to form a ridge along the joint.

Roll the ridge to form a smooth joint.

Remove excess asphalt prior to final rolling.

Prevent the accumulation of coarse particles along the joint by raking.

8.13.3 Transverse Joints

Form by cutting the end of the spread material to a vertical face and remove loose material.

Check the surface adjacent to the joint with a straight edge and correct any surface defects immediately.

Treat the face of the joint with bitumen emulsion tack coat prior to spreading adjacent section.

Provide ramps of compacted asphalt (maximum grade 5% relative to pavement grade) when joints are left overnight on trafficked pavements.

Offset transverse joints in adjacent runs by 1m minimum.

Transverse Match of Overlay to Existing Pavement:

- Saw cut existing asphalt pavement 20 mm depth along the match line of joint.
- Remove taper wedge of existing asphalt pavement along the overlay side of match joint.
- Feather the asphalt overlay down to the existing pavement to achieve a maximum slope of 1 in 40 and for the full width of the pavement.
- Ensure depth of overlay above existing pavement in taper wedge area is not less than 20 mm.

8.13.4 Longitudinal Joints

Do not leave longitudinal joints at any resurfacing or mill and fill works at the end of a shift. Only transverse joints may be left at the end of a shift. Design shift plans to conform to these requirements.

Keep joints straight or follow the line of curvature.

Minimise the unsupported length left overnight.

Rectify broken sections of unsupported edge by cutting a vertical face before resuming laying.

Treat the face of the joint with bitumen emulsion tack coat prior to spreading adjacent section.

Longitudinal joints shall not be left overnight on a pavement in use by traffic.

8.14 **COMPACTION**

8.14.1 **General**

For large patches, compact by using at least two rollers, one pneumatic tyred and one tandem steel wheeled.

Provide additional steel wheeled roller(s) for each additional 30 tonne (or part thereof) spread in excess of 30 tonne per hour.

Stand compaction plant clear of new asphalt surface.

Do not use plant or vehicles which have fuel or oil leaks.

Defer rolling if excessive displacement of the asphalt occurs but only until the asphalt has cooled sufficiently to permit rolling to continue.

The depth of each layer compacted must not exceed 5 times the nominated aggregate maximum size.

Do not use chemicals or detergents in rollers; use water only. Sanding of the asphalt area is required for rolling purposes.

Remove sand before opening to traffic.

8.14.2 **Initial Rolling**

Roll immediately behind the spreader using a steel wheeled roller having a minimum weight of 8 tonnes and a maximum unit load on the rear drum equivalent to 55 kN/m width of drum.

Provide steel wheeled rollers with adjustable scrapers and keep the drums moist with water.

Prevent the mix from sticking to the drums.

Avoid ponding of water on the pavement surface.

8.14.3 **Intermediate Rolling**

Roll with a self-propelled pneumatic tyred roller of at least 10 tonnes mass, a minimum tyre pressure of 550 kPa and a minimum total load of 1 tonne on each tyre. Increase the load to 2 tonnes per tyre where practicable.

Ensure tyre pressures are uniform and maintained within 5% of the specified figure.

Rolling surfaces to be smooth.

8.14.4 **Final Rolling**

Roll with a steel wheeled roller as used for initial rolling.

8.14.5 **Joint Compaction**

Compact all joints and edges.

Roll all joints.

Offset joints in adjoining roller runs by a minimum of 1m.

All joints and free edges must be constructed and compacted to obtain acceptable surface texture.

Rolling of unsupported edges must not result in shape loss and/or excessive lateral displacement.

8.14.6 **Rolling Speed**

Steel wheeled roller: 1.5 m/sec. maximum, steady and uniform.

Pneumatic tyred roller: 0.75 m/sec. maximum for the first pass. 4.5 m/sec. maximum for subsequent passes.

Avoid abrupt stops and starts.

8.14.7 Vibrating Plant

Table - Vibrating Plant Specifications	
Property	Requirement
Mass:	6 tonnes minimum.
Drum width:	1.5 m minimum.
Vibrating frequency:	2,000 – 3,000 cycles per minute.
Amplitude range:	0.4 – 8.0 mm.

Initial passes (not less than two) to be non-vibrating.

Provide steel wheeled rollers with adjustable scrapers and keep drums moist with water.

Disengage vibrator when accelerating, decelerating or standing.

8.14.8 Deep Lift Rolling Pattern

Applies to asphalt placed in layers exceeding 75 mm compacted thickness.

Asphalt to be placed and compacted in layers not exceeding 150 mm maximum.

Commence rolling not less than 300 mm clear of the edge of asphalt that is laterally unsupported.

Advance outwards towards the edge in 100 mm increments.

Delay rolling within 200 mm of an unsupported edge to allow mix cooling and minimise distortion.

Complete rolling in such time that specified densities are obtained.

8.14.9 Hand Tampers

Compact by vibratory plates or hand tampers in location inaccessible to rollers.

Side tamp before rolling the edge of all asphalt which is not laterally supported.

Finish hand tamped surfaces smoothly, conforming to machine finished areas.

8.15 CONFORMANCE

8.15.1 Conformance Testing

The Contractor will be responsible for process control testing.

The Superintendent will carry out all conformance testings through Panel Period Contracts.

The Contractor will be responsible for ordering the conformance tests.

8.15.2 Tolerances

Conform to the following:

- Surface to be smooth, dense and true to shape.
- Thickness: Not less than specified.
- Surface levels: 0 to + 10 mm maximum deviation from design level.
- Straight edge deviation: 5 mm maximum in 3 m.
- Surface roughness: IRI 2.4 maximum.
- Skid resistance: Not less than specified in NTTM 304.1.
- Bitumen content: Maximum variation 0.3% by mass.
- Job mix: Within the following variation limits.

Table - Job Mix Variation Limits	
AS Sieve (mm)	% Passing (By Mass)
4.75 or larger	+ or – 7
2.36	+ or – 5
1.18 to 0.30.150	+ or – 4
0.15	+ or – 3
0.075	+ or – 2

8.15.3 Conformance Sampling and Testing

Sample materials as directed by Superintendent

8.15.4 Asphalt Testing Frequencies

For large patching works, conform to the testing frequencies in **Table - Asphalt Testing Frequencies**.

Table - Asphalt Testing Frequencies		
Test Method No.	Test Method	Minimum Test Frequency
AS/NZS 2891.3.1 AS/NZS 2891.3.2 AS/NZS 2891.3.3	Bitumen content	1 per 50 t
-	Mixing temperature	Every mix
-	Laying temperature	Every 30 minutes
AS/NZS 2891.7.1 AS/NZS 2891.7.3	Density	1 per 50 t
AS/NZS 2891.1.1 AS 2891.1.2 AS 2891.1.3	Thickness	1 per density
AS/NZS 2891.3.1	Particle size distribution	1 per 50 t
AS/NZS 2891.3.2 AS/NZS 2891.3.3	Viscosity	1 per 10,000 L
AS/NZS 2891.5	Stability of mix	1 per 50 t
AS/NZS 2891.5	Flow	1 per 50 t
AS/NZS 2891.8	Air voids	1 per 50 t
AS/NZS 2891.8	Voids in mineral aggregate	1 per 50 t

8.15.5 Conformance of compaction (Lot Testing)

Base the conformance of compaction on lots, determined from cores.

- Subdivide all items of work into lots.
- Give each lot a lot number.
- Number the lots using a logical system.
- Maintain a register of all lots and lot numbers.
- Include the location of the lot on the lot register.

Lots of work will be selected by the Contractor, based upon:

- Lot will represent no more than one shift's production.
- Lots will be continuous and have been brought to completion at the same time.
- Lot will be composed of homogeneous material with no distinct changes in attribute values.

Each lot will be subject to conformance testing.

Lots will be checked for level tolerance.

Quality of the lot will be judged as conformance or non-conformance of each lot including all tests conducted on the lot.

When lots fail to satisfy the conformance criteria, payment adjustments or rejection of the lot shall be in accordance with the **Payment Adjustments** clause in MEASUREMENT AND PAYMENT.

Should the lot under consideration be subdivided then class each subdivision as a lot and subject each subdivided lot to lot testing.

Treat non-conforming lots which are subdivided after testing as separate lots and retest each and every subdivided lot.

Core sample locations will be selected by the laboratory on a stratified random basis in accordance with NTCP 103.1. Supply copies of the completed stratified random selection with each compaction report.

There shall be 6 cores per lot.

Refer to CONFORMANCE TESTING, Conformance Testing Results, Conformance of Compaction for Asphalt.

Conform to the following limits of mean Value of Air Voids:

Table - Limits of Mean Value of Air Voids			
	Light traffic	Medium traffic	Heavy traffic
Conformance	3.0 – 8.0	3.0 – 8.0	3.0 – 7.0

The **Conformance of Compaction** clause only applies to a specified asphalt thickness of 30 mm or greater.

Backfill all core holes with asphalt conforming to the specified properties for the subject mix, and compact to the required density.

Remove areas contaminated by chemicals, petroleums (including oils, petrol and diesel) or solvents and replace with uncontaminated asphalt.

8.15.6 Surface Roughness

Surface roughness testing will be carried out by the Superintendent at the discretion of the Superintendent.

Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

Table - Testing Sequence for Surface Roughness for Pavement Type	
Pavement type	Surface Roughness Testing sequence
Deeplift asphalt pavements	On final wearing surface
Asphalt Overlays and Thin Shape correcting Surfaces (thickness < 50 mm)	On final wearing surface.
Asphalt surface on new granular pavement (thickness 40 mm and over)	On finished base layer, to meet requirements of PAVEMENTS AND SHOULDERS. On final wearing surface.

8.16 SPRAY SEALING – AREAS LESS THAN 300m²

Comply with the SPRAY SEALING section with the following exceptions:

8.16.1 Binder Coat Requirements

PRIME AND PRIMER SEALS

Cut-back bitumen to be mixed on site.

Heat bitumen to a temperature appropriate for achieving final spraying temperature making allowance for incorporation of the unheated cutter.

Add unheated cutter to heated bitumen and circulate until a homogeneous mixture is achieved.

Spray immediately circulation is complete.

Allow at least three days to elapse after priming before applying the binder coat. Ensure primer soaks in and dries off before applying binder coat.

Provide Standard Class 320 bitumen, cut back as follows:

- Prime: AMC 00
- Primer Seal: AMC 6

STRAIGHT RUN BINDER COATS

Provide Standard Class 320 bitumen as follows:

- Primerseal coats
- Seal coat for geotextile seal or re-seal

Heat to spraying temperature but do not exceed the maximum. Avoid heating bitumen in quantities excess to requirements.

Prevent foaming.

POLYMER MODIFIED BINDER COATS

Provide conforming bitumen blended with the required polymer as follows:

Prepare the product in a manufacturing or blending plant that complies with the AGPT T190

- Initial seal coat: Class S10E
- Reseal coat: Class S10E

Provide test results from a NATA registered testing facility - when requested, of the properties of the binder modified with the nominated type and quantity of polymer.

Store, mix, heat and spray the polymer modified binder as recommended by the polymer manufacturer.

Both coats of two coat seals shall contain polymer.

8.16.2 Spraying – Hold Point

APPLICATION SPRAY RATES

Ensure current test results are supplied to the Superintendent before spraying begins.

Spray rates to be at 15°C adjusted in accordance with **Table – Bitumen Equivalent Volumes** at clause 7.21.1.

For primers, primer seals and polymer modified binders, the rate of application refers to the whole of the mixture, including all modifiers, cutback materials, combining oils and adhesion agents.

For enrichments and emulsion seals, the rate of application refers to the residual bitumen.

Determine the application spray rates using appropriate Austroads design methods.

Hold Point – Do not commence spraying until the Superintendent is advised and gives approval to the proposed application spray rates.

Supply the following to the Superintendent to enable the proposed spray rates to be approved.

- Average Least Dimension (ALD),
- Flakiness index (FI) of the aggregate

Ensure samples are taken from stockpiles of material that are to be used, generally from site stockpiles.

8.16.3 Preparation for Sprayer Run – Witness Point

Record the volume and temperature of the sprayer contents while it is on level ground.

Supply Sprayer Tank dips before and after each sprayer run.

Witness Point - Allow visual inspection when requested.

Determine the length of sprayer run from the available quantity in the sprayer and the application rate. Ensure the area to be sprayed is not greater than the area that can be covered by aggregate in the loaded trucks.

Start and finish each spray run on a protective strip of paper placed on the pavement. The paper to be wide enough to ensure the sprayed material is being discharged correctly over the full width of spray. Place sufficient protective paper to protect road fixtures.

Place paper on the pavement and masking around areas to be sprayed or wherever the sprayer is stationary on the road pavement.

Seal joints are only allowed where line marking is to be placed. No joints are allowed in wheel paths.

Excess overspray and spills must be removed before sealing works proceed.

8.16.4 Sprayer Run

Attain uniform spraying speed before spraying commences.

Avoid an excess or deficiency of material due to faulty overlap at longitudinal joints when spraying a road in half-widths.

Overlap to be 300 mm with an intermediate nozzle.

Do not use end nozzles on an overlap.

Make allowances for "Fog Spraying" when joining to existing seals.

Cease spraying before the level of material in the tank falls to a level which reduces the full discharge of the pump.

Remove and dispose of all paper as per the EMP.

Clean off any sprayed material from road fixtures.

8.16.5 Hand Spraying

Plan work to minimise the requirement for the use of a hand sprayer.

Any strips of pavement not adequately covered with sprayed material to be sprayed later with the hand attachment.

8.16.6 Application Of Aggregate – Hold Point

Supply current test results of materials to be used.

Load aggregate into tip trucks using an approved aggregate loader which removes dust, dirt and oversize stone while applying pre-coat.

Hold Point - Obtain approval from the Superintendent for use of the proposed aggregate loader before commencing aggregate loading operations.

Apply aggregate to sprayed binder within:

- 10 minutes where the pavement temperature is 20°C or greater.
- 5 minutes where the pavement temperature is between 15 and 20°C.

Polymer Modified Binders: Apply aggregate within 5 minutes irrespective of pavement temperature.

Apply aggregate to emulsion coat before the emulsion breaks.

Spread the aggregate evenly and uniformly over the sprayed surface at a rate of 900/ALD m²/m³. Seek approval for variations to this rate.

Use a mechanical spreader.

Rerun or hand cover bare or insufficiently covered places after the first spreading.

Aggregate spread in excess of the application rate designated in the procedure will be removed and stockpiled at full cost to the Contractor.

8.16.7 Rolling Rate

Roll the treated surface with self-propelled rubber tyred rollers with a minimum tyre pressure of 600 kPa and a minimum wheel load of 1 tonne.

Roller speed on the first pass to be between 5 and 10km/h, with subsequent passes between 15 and 25 km/h.

Conform to the following:

- Entire area to receive one roller pass immediately after covering.
- 75% of rolling within 1 hour of covering.
- 100% of rolling within 2 hours of covering.

Minimum Rolling Rate: 1 roller hour per 1,500 litres of binder.

For two coat treatments when the second coat is to be applied immediately, the total rolling on the first coat shall be double that specified.

Roll in daylight hours only. Sweep the surface after rolling. Ensure a uniform distribution of aggregate.

Adjust drag broom to distribute surplus aggregate, but not to dislodge embedded aggregate. Ensure aggregate on the final surface is uniformly distributed, and firmly held by binder.

Re-roll the surface after sweeping to ensure uniform bedding of aggregate in binder.

8.17 TRAFFIC ON RESEALS

Co-ordinate work to minimise traffic delays.

Prohibit traffic:

- until at least 3 passes of a roller has taken place or until sufficient rolling has taken place to prevent damage to the applied seal, whichever is greater; and
- from adjacent strip of roadway during spraying.

Sweep all loose aggregate from the carriageway at completion of rolling.

8.18 WASTE MATERIAL

Remove from the site and dispose of all waste material in legal waste disposal facility.

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

8.19 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

9 CONCRETE MAINTENANCE



9.1 OUTLINE DESCRIPTION

This section specifies miscellaneous minor repairs or replacement of concrete structures such as stormwater side entry pits, wing/head walls, kerbs and gutters, cycle/footpaths etc. and does not apply to buildings, bridges or concrete pavements.

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

9.2 CROSS REFERENCES

MISCELLANEOUS PROVISIONS for **Disposal of Waste**

CONFORMANCE TESTING for **Table – Sampling Frequencies for Fresh Concrete**

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES

9.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

Australian Standards

AS 1379	Specification and supply of concrete
AS 1478.1	Chemical admixtures for concrete, mortar and grout – Admixtures for concrete
AS 2870	Residential slabs and footings
AS 3600	Concrete structures
AS 3610.1	Formwork for concrete – Documentation and surface finish
AS 3972	General purpose and blended cements
AS/NZS 4671	Steel reinforcing materials

Civil Standard Drawings

CS 3300	Standard Kerb Profiles
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Austrroads

Austrroads Guide to Road Design Part 6A: Pedestrian and Cyclist Paths

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

9.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

9.5 MATERIALS – HOLD POINT

Hold point - Provide manufacturer's test certificates for quality of cement, aggregate and reinforcement.

9.5.1 Cement

Type GP or GB to AS 3972.

Store cement in watertight containers or shelters until used.

Do not mix or store special cement with normal Portland cement.

9.5.2 Fine Aggregate

Clean, hard, tough, durable, uncoated grains, homogeneous in quality, free from clay, dirt and organic material.

9.5.3 Coarse Aggregate

Clean, hard, durable, crushed stone or gravel, free from clay, dirt and organic material.

9.5.4 Water

Clean and free from oil, alkali, organic or other deleterious substances.

9.5.5 Chemical Admixtures – Hold Point

Hold point - Do not use admixtures without obtaining prior written approval from the Superintendent.

Admixtures and their use must conform to AS 1478.1.

Where two or more chemical admixtures are proposed for incorporation into a concrete mix, their compatibility must be certified by the manufacturers.

Store admixtures in accordance with the manufacturer's recommendations.

9.5.6 Reinforcement – Hold Point

Conform to AS/NZS 4671.

Supply, cut, bend and fix steel reinforcement as specified.

Secure reinforcement and bar supports to prevent displacement during construction and concrete placement.

Hold Point - Do not place concrete until the reinforcement has been inspected by the Superintendent.

9.5.7 Recycled Crushed Glass (RCG)

Clean, hard, durable RCG free from clay, dirt and organic material. Source the material from glass food and beverage containers, drinking glasses, and window (or flat) glass and plain ceramic. Do not use glass from hazardous waste containers, reinforced and laminated glass, light bulbs, fluorescent tubes and cathode ray tubes. The source glass must be free of debris and contaminants such as paper and cardboard, plastic, fabrics, residues from original contents and toxins.

Use RCG conforming to Specification for Recycled Crushed Glass as an Engineering Material Section 9 available at: <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/technical-specifications> .

9.6 EQUIPMENT

The Contractor will provide all general and specialised equipment, tools and materials, to carry out and test the Work. The Contractor must be fully equipped on each attendance call.

9.7 CONCRETE

Refer to CONFORMANCE TESTING for sampling frequencies for fresh concrete.

9.7.1 Ready-mix Concrete

Unless otherwise specified, Production Assessment in accordance with AS 3600 shall be used.

Register the project with the concrete supplier for submittal of Production Assessment data and nominate the Superintendent for receipt of this information.

Supply concrete with the following properties unless specified otherwise:

Table – Concrete Properties	
Property	Requirement
Compressive strength	N25
Aggregate size, generally	20 mm
Aggregate size, machine extruded kerbs and gutters	10 mm
Slump	80 mm, + or - 15 mm

The Superintendent reserves the right to carry out independent sampling and testing of concrete.

9.7.2 Job-mixed Concrete

Use Project Assessment in accordance with AS 3600.

The Contractor will be responsible for sampling and testing.

Provide concrete with properties as specified for ready-mix concrete.

Determine the quantities of materials to be used by mass or by equivalent dry loose volume.

Provide and maintain gauges for measurement of the materials.

The Superintendent reserves the right to carry out independent sampling and testing of concrete.

9.7.3 Addition of Admixtures

Refer to **Materials** clause, **Chemical Admixtures** sub-clause.

Chemical admixtures may only be added subsequent to slump test compliance confirmation. A further slump test post admixture addition may also be required.

Where Superintendent approval has been granted for the addition of superplasticiser at the plant prior to dispatch of concrete, a slump test of each batch must be performed and recorded by a NATA accredited testing laboratory prior to the addition of the superplasticiser. The slump test report must record the time of the addition of the superplasticiser, amount of superplasticiser added and product identification.

Do not add chemical admixtures unless the exact amount required is measured using a regularly maintained and calibrated device of the required accuracy.

Make allowance for the reversion time of superplasticisers.

Delay the addition of superplasticisers as long as practicable before the concrete is discharged from the mixer.

Agitate concrete for at least 5 minutes following the addition of superplasticiser before dispensing.

9.8 FOUNDATIONS

Provide a foundation compacted to 95 % relative density within 150 mm of the base of concrete.

9.9 CONSTRUCTION

9.9.1 General

Repair, reinstate or replace concrete structures to match existing dimensions, cross sections and grade or as otherwise directed by the Superintendent. Work to be all inclusive and include but not limited to; saw cutting, excavation and removal of broken sections, disposal of waste material, formwork, reinforcement, etc.

9.9.2 Kerbs and Gutters

Repair, reinstate or replace damaged kerb and gutter as integral units to match existing dimensions and grades, as per Standard Drawing CS 3300.

9.9.3 Cycle and Pedestrian shared Path Maintenance

For concrete shared use paths provide 100mm minimum thick concrete to AS 1379 N25 with reinforcing mesh SL62 placed centrally. Mesh material to AS/NZS 4671, installation to AS 2870.

Install Under Pavement Growth Inhibitor under the concrete or asphalt to CS 3006.

All relevant design principles contained in AUSTRROADS must be integrated in the design of cycle ways, pathways and associated infrastructure (Austroads Guide to Road Design Part 6A: Pedestrian and Cyclist Paths). Refer to Civil Standard drawing CS 3006, design drawings, and conform to local Council requirements.

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender

9.10 FORMWORK – WITNESS POINT

Formwork to be accordance with AS 3610.1. Design and construct forms so that they are mortar tight, have adequate strength and removable without damaging the concrete.

Formwork material to be suitable for the purpose and finish specified.

Build forms true to line and braced in a substantial and non-yielding manner.

Witness Point - Do not place concrete until the formwork has been inspected by the Superintendent.

9.11 HANDLING AND PLACING – WITNESS POINT – HOLD POINT

Witness Point - Give the Superintendent sufficient notice so that inspection may be made before and during pouring concrete.

Hold Point - Provide verification that all constituent materials, formwork, falsework, reinforcement, and environmental conditions comply with all requirements. Do not cast any concrete without that verification.

Do not place concrete if the temperature of the concrete exceeds 35°C, or if the ambient air temperature exceeds 40°C.

Place and compact concrete within the times shown in after the addition of the mixing water to the mix:

Table - Maximum Concrete Placing Time After Adding Mixing Water	
Concrete temperature at time of placing	Maximum Time (minutes)
25 to 28°C	75
28 to 32°C	60
32 to 35°C	45

Place concrete in a continuous operation between construction joints so that the face of the concrete is in a plastic state when succeeding concrete is placed against it.

Do not allow concrete to free-fall from a height greater than 1.5 m.

Place all concrete in dry weather unless otherwise approved.

Vibrate concrete to remove entrapped air, but avoid over-vibration that may cause segregation.

For each truck of premixed concrete provide an identification certificate on delivery listing the information required by AS 1379 and any other particular requirements for special class concrete.

9.12 JOINTING

9.12.1 Construction Joints

Roughen and clean the face of hardened concrete before placing fresh concrete against it. Remove soft material, foreign matter and laitance. Thoroughly moisten the joint surface.

9.12.2 Expansion / Contraction Joints

Joints to be 10 mm wide over full length and filled with a bitumen impregnated fibrous filler.

Provide vertical transverse expansion/contraction joints as follows:

- Footpaths: 6 m spacing maximum.
- At junctions with other concrete structures
- Inverts: 15 m spacing maximum.
- All other works: As shown on the drawings.

9.12.3 Tooled Joints

Provide tooled joints as follows:

- Transverse vertical grooves 20 mm depth minimum.
- Joints at right angles to outer edge of concrete works.
- Footpaths: 2 m spacing maximum.
- Kerbs/Inverts: 3 m spacing maximum.
- All other works: As shown on the drawings.

9.13 SURFACE FINISHES

Finish surfaces to a smooth and even colour.

Remove free surface water during final screeding of unformed surfaces.

Round off exposed edges and corners.

Protect exposed surfaces from rain until final set has occurred.

Conform to **Table – Concrete finishes**.

Table – Concrete finishes		
Type	Description	Application
S1	Left rough to give key but not honeycombed or porous	Surfaces to be rendered.
S2	Wood float	As specified.
S3	Steel trowel without polish	Internal surfaces subject to foot traffic. Kerb and gutter.
S4	Wood float and broomed finish - broom finish - broom across direction of traffic	Surfaces subject to vehicular traffic.
S6	Steel float followed by moist hair broom	Surfaces subject to foot traffic.
F1	Remove mortar fins, etc., repair minor blow holes by bagging where approved or rub down with Carborundum stone	Formed surfaces exposed to view.
F2	Off forms	-
F3	Exposed RCG	Details overleaf

Table – Concrete finishes (cont'd)		
Type	Description	Application
F3	Exposed RCG	Application of RCG to be hand spread once application of the exposed mix has been bull floated RCG to be measured 1000 grams per square meter, or as otherwise specified by the Superintendent. Colour and size of RCG to be specified by Superintendent

9.13.1 Curing

Protect and cure all exposed surfaces immediately after the concrete has taken its initial set.

Maintain all surfaces, including those within loosened formwork, in a moist condition by:

- flooding;
- continuous spraying with water; or
- other methods approved by the Superintendent.

Prevent staining during the curing process of all concrete surfaces that will be visible in the completed works.

Continuously maintain the protection and curing of each element for the minimum time specified by AS 3600 to provide the concrete with durability corresponding to the specified exposure classification.

Do not use curing compounds in lieu of moist curing unless approved.

9.13.2 Backfilling

Backfill areas around the concrete with specified material.

Compact the backfilling in layers not exceeding 150 mm compacted thickness.

Reinstate damaged grassed areas with topsoil and grass seed to match existing surrounds.

9.14 PATCH REPAIR OF CONCRETE STRUCTURES

Remove spalled and unsound concrete to expose a sound surface. Where necessary remove damaged steel reinforcement and replace as required.

Saw cut outer perimeter of the repair to a depth of at least 15 mm in order to prevent featheredging.

Scabble and wash down the surrounding sound concrete surface to ensure removal of all contamination.

Pre wet the prepared concrete substrate and steel reinforcement and apply a bonding agent to enhance the bond at the repair interface.

Erect formwork as per FORMWORK clause and cure as per CURING clause.

9.15 RAIN DAMAGE

Remove and replace rain damaged concrete.

9.16 EXISTING SERVICES – HOLD POINT

Hold Point - Obtain the Superintendent's approval before altering the line or level of existing services.

Place an expansion joint between concrete works and service.

9.17 CONFORMANCE

Refer to the DRAINAGE MAINTENANCE for culvert structures and pits.

Conform to **Table – Concrete Conformance - Tolerances**.

Table – Concrete Conformance - Tolerances	
Aspect Measured	Tolerance
Finished level:	+ or - 15 mm from the specified level.
Invert level:	+ or - 5 mm from the specified level.
Straight edge deviation of surface:	3 mm maximum in 3 m, or 6 mm maximum in 15 m.
Alignment:	+ or - 10 mm from the specified alignment.
Chainage at vehicle crossing	+ or - 150 mm
Width of vehicle crossing:	+ or - 25 mm.

9.18 DEFECTIVE CONCRETE AND MATERIALS

Concrete which is not placed, cured or finished as specified, does not have the specified strength or other specified properties, is not sound, dense, durable or crack-free will be considered defective.

Bear all cost and delays resulting from the rejection of concrete and subsequent rectification.

Remove the concrete to a point agreed with the Superintendent at which a visually and structurally acceptable construction joint can be made, and the defective element rebuilt.

Repair defective surface finishes if approved by the Superintendent. Approval will not be given if the defective area is too extensive or the techniques proposed are not adequate to ensure a visually acceptable and durable repair.

9.19 MAINTENANCE CLEANING

High pressure water may be used for cleaning of concrete paths and structures.

Clean surfaces at a pressure rating that will provide an even, streak free cleaned surface without causing damage.

Chemicals may be used to remove specific types of stains or to ease cleaning and must be used in accordance with the product SDS and environmental requirements.

Mask or protect adjacent surfaces.

9.20 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

10 DRAINAGE MAINTENANCE

10.1 OUTLINE DESCRIPTION

This section applies to the repair or replacement of precast concrete box culverts including inlet and outlet structures and precast concrete pipe culverts not exceeding 1950 mm nominal diameter.

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

10.2 CROSS REFERENCES

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES

10.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

AS 1597 (set)	Precast reinforced concrete box culverts
AS 1597.1	- Small culverts (not exceeding 1200 mm span and 1200 mm height)
AS 1597.2	- Large culverts (exceeding 1200 mm span or 1200 mm height and up to and including 4200 mm span and 4200 mm height)
AS 5100.5	Bridge design - Concrete

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

10.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

The following additional definitions apply.

CULVERT

An underground pipe, box or reinforced concrete box structure.

Typically located in a trench, embankment or road formation in a transverse crossing or in a longitudinal drainage line.

CULVERT SKEW ANGLE

The angle between a line drawn perpendicular or radial to the road centre line and the centre line of the culvert.

CULVERT CHAINAGE

The chainage measured along the road centre line at its intersection with the culvert centre line.

DIPL / DEPARTMENT, THE

The Department of Infrastructure, Planning and Logistics.

LARGE BOX CULVERTS

Precast box culverts and link slabs having spans greater than 1200 mm, heights greater than 1200 mm or fill heights exceeding 1600 mm.

RECYCLED CRUSHED GLASS (RCG)

RCG conforming to Specification for Recycled Crushed Glass as an Engineering Material Section 9, available via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/technical-specifications> .

STANDARD DRAWINGS

DIPL Civil Standard Drawings, accessible via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/standard-drawings> .

TOMS

- (1) Devices used to hold pipe culverts in place during backfilling of trenches.
- (2) Horizontal device(s), such as timbers, metal struts, hydraulic spreaders, etc, spanning across an excavation for holding soldiers (vertical timbers) or walings (horizontal timbers) in place against the sides of trenches before and during trench backfilling.

10.5 MATERIALS

10.5.1 Conformance

Conform to requirements specified in CONFORMANCE TESTING.

The Contractor will be responsible for process control testing.

The Superintendent will carry out all conformance testing nominated to be the Superintendent's responsibility through Panel Period Contracts.

The Contractor will be responsible for ordering the conformance tests.

Ensure that all pipes and box culverts are indelibly marked with a Standards Australia conformance stamp.

Pipes and box culverts not stamped shall be removed from site at the Contractor's expense.

10.5.2 Precast Reinforced Concrete Pipes

Use flush joint type pipes with external rubber bands.

Ensure that pipes are clearly marked as to their class.

10.5.3 Precast Reinforced Concrete Box Culverts – Hold Point - Witness Point

Use box culverts of the inverted U type suitable for installation on a cast-in-situ concrete slab.

Design and supply box culverts which have a span not greater than 1200 mm, height not more than 1200 mm and a fill height not more than 1600 mm in accordance with AS 1597.1.

Design all other box culverts in accordance with AS 1597.2.

Use Standard Vehicle Loadings including NT Standard Road Train, with addition of the HLP 400 Abnormal Vehicle Loading on all National Highways, and HLP 320 on all other routes.

Provide culverts designed for exposure classification in accordance with the Exposure Classification Table in AS 5100.5. Refer to NORTHERN TERRITORY CLIMATE ZONES TABLE.

Hold Point - Provide drawings showing complete reinforcement and dimensions with tolerances and obtain the Superintendent's approval prior to fabricating any units. Provide manufacturer's certification that the provided culverts comply with the applicable sections of AS 5100.5 and with AS 1597. Certify that the design is reflected accurately by the shop drawings and that the design is adequate to resist all specified loads and the soil loads pertaining to the site.

Provide a table of construction axle loads versus minimum required cover for each box culvert size.

Witness Point - Give the Superintendent notice prior to casting concrete.

10.5.4 Bedding

Use:

- A clean granular material free from sticks, stones and other deleterious material with a Plasticity Index less than 6, conforming to the **Table - Bedding Material Size**, or
- RCG conforming to Specification for Recycled Crushed Glass as an Engineering Material Section 9, *or*
- A blend of both materials shown above.

Table – Bedding Material Size	
AS Sieve (mm)	Percentage Passing by Dry Mass
19.0	100
2.36	50 – 100
0.60	20 – 90
0.30	10 – 60
0.15	0 – 25
0.075	0 – 10

10.5.5 Concrete

Conform to the requirements of CONCRETE MAINTENANCE.

10.5.6 Mortar

Use one part fresh cement and three parts clean sharp sand mixed with potable water to yield a stiff but workable mixture.

10.5.7 Select Fill

Conform to the requirements of EARTHWORKS AND DRAINAGE.

10.6 CONSTRUCTION OF CULVERTS AND STRUCTURES

10.6.1 Setting Out – Hold Point

Measure culvert length along the invert to the outside face of headwalls.

Measure pits and/or manholes to the inside face of the wall.

Finished surface levels for kerbside structures are measured at the top of the kerb.

Set out the culvert and/or structure with pegs before construction.

Hold Point - Obtain the Superintendent's approval for the setting out before construction.

10.6.2 Excavation – Witness point

Excavate in whatever material is encountered.

Use of explosives must be in accordance with MISCELLANEOUS PROVISIONS.

Pump, bail, sheet, shore and brace as necessary.

Divert water when necessary.

Rectify foundations which are affected by rain or surface water entering the excavation.

The total width of trench at and below the level of the top of the pipe shall be in accordance with the Department's civil standard drawings or the project drawings.

Backfill with select fill up to the specified level if the trench is excavated too deep. Any such backfilling will be at the Contractor's expense.

Witness Point - Excavate unsuitable material below specified level if directed by the Superintendent.

Replace with select fill, compacted as specified.

10.6.3 Culverts in Fill under Construction

Place and compact fill to Manufacturer's instructions and design specifications. Use select fill. Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ. Conform to Compacted Layer Method in Construction Methods in EARTHWORKS AND DRAINAGE.

Re-excavate the fill in accordance with the Excavation clause to permit the construction of the culvert.

10.6.4 Construction Loading on Culverts

Provide the minimum compacted thickness of cover specified in **Table - Minimum Required Cover Thickness in Metres** before allowing traffic to cross a culvert.

Table - Minimum Required Cover Thickness in Metres							
Maximum Construction Vehicle Axle Load (tonne)	Type, size and class of culvert						
	Concrete Pipes, By Pipe Class					Boxes	
	Less than 1200 mm Nominal Diameter			1200 mm Nominal Diameter or more		Less than 1200 mm Span, 1200 mm Height and 1600 mm Final Fill Height	
	Concrete Pipe Class						Min. cover (m)
	X(2)	Y(3)	Z(4)	X(2)	Y(3)	Z(4)	
9	0.4	0.4	0.4	0.4	0.4	0.4	0.1
20	0.8	0.6	0.4	0.5	0.4	0.4	0.6
35	1.3	0.8	0.6	1.3	0.4	0.4	0.9
50	1.0	0.8	-	1.0	0.4	-	1.2

Do not permit construction vehicles having axle loads greater than 10 tonnes to cross large box culverts (having spans greater than 1200 mm or heights greater than 1200 mm) under any depth of fill unless specific certification is provided by the culvert crown unit manufacturer that the culverts have been designed to cope with those loads.

10.6.5 Bedding

Place bedding 75 mm compacted thickness for the full width of the trench or 0.6 m greater than the width of the culvert for non-trench conditions.

Compact bedding to 90 % relative compaction.

Shape the bedding to hold pipes in position during compaction of additional fill.

Place and compact a further (haunching) layer of bedding in accordance with the Department's civil standard drawings or the project drawings.

10.6.6 Laying Generally

Lay culverts commencing from the downstream end.

End caps, when used, shall provide a tight waterproof seal.

10.6.7 Laying Pipe Culverts

Face rebates or sockets upstream.

Rest the full length of the pipe barrel on the bedding.

Position 'TOP' marking on pipes to within 5 degrees of the vertical axis.

Fill all joints with stiff mortar firmly rammed into openings. Remove excess mortar from barrel of culvert. Apply external rubber bands.

Brace pipes of 1200 mm diameter and greater with toms until the completion of the embankment and pavement.

The toms shall bear against a sill along the invert and a cap against the crown of the pipe. Provide toms opposite every pipe joint.

Cast collars and blocks in one operation. Restrain the culvert prior to constructing the collars or blocks by partially backfilling with bedding around the barrel of the culvert to one-half of the pipe diameter.

10.6.8 Laying Box Culverts

Lay precast box culverts on a cast-in-situ reinforced concrete base slab.

Ensure concrete base slab exceeds external width of box culverts as shown on the typical details.

Butt box culverts firmly together.

Cut away lifting hooks and seal over the affected area with an approved epoxy resin.

Fill all joints with a stiff mortar firmly rammed into the openings. Remove excess mortar from the barrel of the culvert and apply external joint seals, Densopol HT60 or equivalent, 150 mm wide.

10.6.9 Connection to Existing Systems – Witness Point

Repair all cut openings and make watertight.

Demolish existing headwalls to make way for the extension of the culvert.

Clean out new work and existing work affected by the new work.

Witness Point – Advise superintendent within two days when clean out is completed.

10.6.10 Backfill – Witness Point – Hold Point

Witness Point - Notify the Superintendent before backfilling where holes or fissures occur in rock trenches.

Hold Point - Do not place backfill against any in-situ concrete structure until the concrete has attained 80% characteristic strength and approval has been given.

Place backfill in layers not exceeding 150 mm compacted thickness.

Ensure the maximum difference in height of backfill on each side of a culvert is 300 mm.

Backfill around the culvert for the full width of the trench, and for a minimum 300 mm above the top of the culvert, or to subgrade surface if less, with select fill.

Backfill the remainder of the trench with standard fill.

Stabilise all backfill with 2% cement by mass and compact to 95% relative compaction where the trench or embankment is located, or will be located, beneath a road pavement.

Produce a uniform mix. Complete compaction within one hour of adding mixing water.

Use compaction equipment which will not damage the culvert and in-situ structures.

Carry out conformance testing using the Department's Panel Period Contractors for Testing.

Stabilise top 150 mm of backfill, for a distance of 1 m adjacent to culvert headwalls and wing walls, so as to be erosion resistant.

Remove surplus material from the site.

Reinstate to subgrade level trenches cut through pavements and other construction by backfilling the trench with stabilised select fill compacted to 95% relative compaction.

Construct base/sub-base layers of the pavement in accordance with PAVEMENTS AND SHOULDERS work section in the Standard Specification for Roadworks.

10.6.11 Reinstate Surface.

Reinstate trenches cut outside of pavements and other construction by backfilling with standard fill compacted to 90% relative compaction.

10.7 INLET AND OUTLET STRUCTURES AND MAINTENANCE HOLES

Construct in accordance with the **Construction Of Culverts And Structures** clause in this work section.

Compact foundations to 95% relative compaction to a depth of 150 mm minimum.

Replace unsuitable material as specified in the **Excavation** sub-clause in the **Construction Of Culverts And Structures** clause in this work section.

10.8 INLET AND OUTLET CHANNELS – WITNESS POINT

Excavate the inlet and outlet of all culverts to facilitate the flow of water.

Conform to the following:

- Bed width: Minimum 150 mm greater than overall width of culvert.
- Side batters: 45 degrees maximum to horizontal.
- Bed grade: 0.5% in the direction of flow for a minimum distance of 50 m.

Clean out new work and existing work affected by the new work.

Witness Point – Advise superintendent within two days when clean out is completed.

10.9 OPEN UNLINED DRAINS

Excavate and dispose of all excess material as specified in EARTHWORKS AND DRAINAGE.

Trim drains to form neat levees.

Compact levees to 95% relative compaction.

Allow natural surface runoff.

10.10 REMOVAL OF EXISTING CULVERTS AND DRAINAGE STRUCTURES

Demolish and remove from the site existing culverts and drainage structures identified for removal by the Superintendent.

Dispose of waste material in accordance with the **Disposal of Waste** clause in MISCELLANEOUS PROVISIONS, and in accordance with the Standard Specification for Environmental Management, and in accordance with the Request for Tender (RFT).

10.11 SUBSOIL DRAINS

10.11.1 Excavation

Impervious Material

Excavate below the top of the impervious zone to a minimum depth equal to the outside diameter of the pipe plus 75 mm.

Place a bedding layer of 50 mm of filter material in the trench and compact with a vibrating plate or similar.

Pervious Material

Excavate and backfill under the pipe with impervious material as specified.

10.11.2 Filter Material

Shall be a hard durable stone having a Los Angeles Abrasion Loss not greater than 35%.

Conform to the grading specified by the manufacturer of the subsoil pipe. If manufacturer's grading not supplied, conform to **Table – Filter material grading**.

Table – Filter material grading	
AS Sieve (mm)	Percentage Passing
37.50	100
19.00	90 – 100
9.50	65 – 85
4.75	45 – 65
0.60	0 – 5

10.11.3 Geotextile Fabric

Refer to Geotextile Grades clause in PROTECTION WORKS MAINTENANCE.

Supply and lay an approved non-woven polypropylene or polyester geotextile fabric having an equivalent opening size (EOS) of 120 micrometre and typical geotextile strength rating (G) of 1350 minimum.

Cut or fold the fabric to the required shape. Patch, repair, or replace damaged fabric.

Cover geotextiles in accordance with the following:

- Untreated UV susceptible geotextiles:
 - Within 5 days of placing.
- UV treated or low susceptibility geotextiles:
 - Within 30 days of placing.

Encase the length of the trench with the fabric placed in such a way as to fully encompass the pipe and filter.

Overlap the fabric 300 mm over the top of the filter material.

10.11.4 Subsoil Drain Pipe

Use 100 mm diameter Class 400.

Use compatible couplings and fittings.

Connect solid wall pipe to the subsoil drain pipe for the disposal of collected water.

10.11.5 Laying and Backfilling – Hold Point

Fit the upper end of pipelines with inspection openings and caps supported in a concrete collar.

Hold Point - Obtain Superintendent's approval of the pipe installation before backfilling.

Place filter material around the barrel of the pipe and to a height of 200 mm above the pipe.

Compact with a vibrating plate compactor or similar.

Place and compact remaining layers of the filter in layers not exceeding 300 mm.

Prevent contamination of the filter.

Place and compact basecourse gravel, as specified in PAVEMENTS AND SHOULDERS work section in the Standard Specification for Roadworks, in the top 300 mm of trench.

Place the material in two equal layers compacted to 95 % relative compaction.

Where trench excavated through pavement compact upper layer of basecourse gravel to 100% relative compaction and reinstate surface.

Backfill above solid wall pipes as specified for trench conditions in the **Backfill** sub-clause in the **Construction of Culverts and Structures** clause in this worksection.

10.11.6 End Walls – Witness Point

Construct end walls at the outlet of subsoil drains as specified.

Secure 19 mm galvanised wire mesh over the opening.

Mark end walls with guide posts.

Clean out new work and existing work affected by the new work.

Witness Point – Advise superintendent within two days when clean out is completed.

10.12 CONFORMANCE

Conform to *Table – Conformance – Drainage Maintenance*.

Table – Conformance – Drainage Maintenance	
Application	Requirement/Tolerance
Invert level and grade line:	No ponding of water.
Open unlined drains:	+ or - 50 mm.
Culverts or lined drains:	+ or - 20 mm.
Plan position:	+ or - 200 mm.
Culverts parallel to kerbs:	+ or - 50 mm.
Concrete structure dimension:	+ or - 5 mm.
Concrete thickness:	Not less than specified.
Subsoil drain slope:	25 mm maximum sag in 8 m.

10.13 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

11 PROTECTION WORKS MAINTENANCE



11.1 GENERAL

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

11.2 CROSS REFERENCES

MISCELLANEOUS PROVISIONS for **Disposal of Waste**

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS, AND CODES

11.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

AS 1012(set)	Methods of Testing Concrete.
AS 1141(set)	Methods of Sampling and Testing Aggregates.
AS 1141.25.1	- Degradation factor – Source rock (Washington Degradation Test).
AS 1141.26	- Secondary minerals content in basic igneous rocks
AS 1141.29	- Accelerated soundness index by reflux - Basic igneous rocks
AS 1289(set)	Methods of Testing Soils for Engineering Purposes
AS 1725(set)	Chain link fabric fencing
AS 2001.2.3.2	Methods of test for textiles - Physical tests - Determination of maximum force using the grab method (ISO 13934-2:1999, MOD)
AS 2423	Coated steel wire fencing products for terrestrial, aquatic and general use
AS 2758.1	Aggregates and rock for engineering purposes - Concrete aggregates
AS 3706(set)	Geotextiles - Methods of Test
AS 3972	General purpose and blended cements
AS 4133(set)	Methods of Testing Rocks for Engineering Purposes
AS/NZS 4671	Steel Reinforcing Materials
AS/NZS 4680	Hot Dip Galvanized (Zinc) on Coatings Fabricated Ferrous Articles

NTMTM NT Materials Testing Manual accessible via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/materials-testing-manual>

NTTM NT Test Methods

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

11.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

11.5 FOUNDATIONS

Excavate, fill and trim the site to the required shape prior to commencing the protection works.

Compact the top 150 mm of earthworks, on which protection works are to be laid to 90 % relative compaction.

11.6 GEOTEXTILE FABRICS

11.6.1 General

Supply and lay non-woven polypropylene or polyester geotextile fabric, consisting of long chain synthetic polymers composed of at least 95% by mass of polyolefins or polyesters. The geotextile filaments must be rot-proof, chemically stable and must have low water absorbency. Filaments must resist delamination and maintain their dimensional stability in the geotextile.

Non-woven geotextiles must have filaments bonded by needle punching, heat or chemical bonding processes.

Woven geotextiles must have filaments interlaced in two sets, mutually at right angles. One set must be parallel to the longitudinal direction of the geotextile.

Geotextiles must be free of any flaws which may have an adverse effect on the physical and mechanical properties of the geotextile.

Geotextiles must be stabilised against ultra-violet radiation such that, when tested in accordance with AS 3706.11, must have a retained strength of at least 50% after 500 hours of exposure.

11.6.2 Storage, Packaging and Handling

Geotextiles must be stored under protective cover or wrapped with a waterproof, opaque UV protective sheeting to avoid damage prior to installation.

Geotextiles must not be stored directly on the ground or in any manner in which they may be affected adversely by heat, water or soil. The method of storage must be in accordance with recommendations by the manufacturer.

The protected geotextile rolls must be clearly labelled showing manufacturer, type of geotextile, and batch identification number.

Handle rolls with forklifts or similar, using dedicated slings, free of sharp hooks or tongs. Rolls that are dropped, dragged or pushed around on the ground will be rejected.

11.6.3 Delivery and Product Certification

Geotextile must be delivered to site at least 5 days prior to commencement of installation.

Provide a Certificate of Compliance that the geotextile complies with all the requirements as specified, together with test results reported on NATA endorsed test documents. The certificate must not be more than 12 months old.

The Certificate of Compliance to include: quality control documentation for the relevant batch/lots, physical properties sheet, and manufacturer's letter of certification stating compliance.

11.6.4 Construction

Prepare smooth surfaces for placement of the geotextile, free of sharp objects, large rocks and protruding vegetation.

Place geotextiles just ahead of the advancing face of construction work, with a maximum of 48 hours of placement prior to covering.

Repair punctures and tears.

Where used in trenches or other drainage configurations, place the geotextile to the shape of the prepared surface, folding and overlapping where required. Fully envelope drainage materials in trenches.

Unless specified elsewhere in the contract, the overlap must be minimum 300 mm. Overlap to be minimum 500 mm where large ground deformations are expected. Sewing may be permitted provided the seam strength exceeds the parent material grab strength.

Direct travel of machinery over geotextile not permitted.

Where required, conform to the following initial layer of material thicknesses:

Nominal Maximum Particle Size D_{85} of Initial Fill Layer (mm)	Minimum Initial Layer Thickness (mm)
< 150	300
150 - 300	400
300 - 500	500

Rock armour placed directly on geotextiles must be placed with a drop height of less than 1.5 m, and placed in such a manner so as not to damage, puncture or tear the geotextile.

Obtain Superintendent approval for use of vibratory compaction methods on the initial layer.

11.6.5 Geotextile Grades

Unless specified elsewhere in the contract, use: non-woven, Strength Grade C.

All strength grades, where specified, based on a Characteristic Values (Q), to conform to **Table – Geotextile Strength Grade Properties**.

Filtration properties relevant to each grade to be certified as part of Product Certification clause requirements.

Geo textile Strength Grade	Elongation ⁽¹⁾	Grab Strength (N) ⁽²⁾⁽³⁾	Tear (N) ⁽²⁾⁽³⁾	G Rating ⁽²⁾
A	>30%	500	180	900
	<30%	800	300	1350
B	>30%	700	250	1350
	<30%	1100	400	2000
C	>30%	900	350	2000
	<30%	1400	500	3000
D	>30%	1200	450	3000
	<30%	1900	700	4500
E	>30%	1600	650	4500

(1) % Elongation corresponding to max CBR burst strength as per AS 3706.4. Generally <30% for wovens, >30% for non-wovens.
 (2) Property value is 80th percentile characteristic value (mean strength – 0.83 x standard deviation), as per relevant AS test.
 (3) N = Newtons

11.6.6 Conformance Testing

Where project requirement is less than 15,000m², sampling and testing is not required.

Provide samples to independent, NATA accredited testing laboratory when project exceeds 15,000m², to **Table – Test Frequencies**

Table – Test Frequencies			
Description	Units	Test Method	Test Frequency
Tensile Strength	kN/m	AS 3706.2	1 per 15,000 m ²
Tear Strength	N	AS 3706.3	1 per 15,000 m ²
CBR Burst Strength	N	AS 3706.4	1 per 15,000 m ²
Grade Tensile Strength	N	AS 2001.2.3.2	1 per 15,000 m ²
Flow Rate	l/m ² /s	AS 3706.9	1 per 90,000 m ²

Samples to be 15m² in size cut across full width of the roll, not within 2m of the end of a roll, to AS 2001.2.3.2.

11.7 ROCK PROPERTIES

The rock properties specified in this clause apply to the rock, stone, aggregate and boulders specified in the following clauses in this section;

- Stone Pitching
- Dumped Rock
- Quarter Tonne Dumped Rock
- Rubble
- Gabion Rock
- Reno Mattresses

REQUIREMENTS; Clean, dry, durable crushed stone of uniform quality, free from declared weeds and their seeds, vegetable matter and other deleterious materials.

Particles must have at least 2 crushed faces and conform to AS 1141.25.1, AS 1141.26 and AS 1141.29.

11.8 STONE PITCHING

11.8.1 Stone Pitching

The stone to be spalls of hard durable rock complying with the Rock Properties clause and with no dimension less than 200 mm.

Hand place the stones so that they are firmly bedded in layers.

The average plane of the exposed face to be within 100 mm of the specified plane and all exposed faces of stones to be within 50 mm of the average plane.

11.8.2 Grouted Stone Pitching – Hold Point

Place stones as specified in the Stone Pitching Clause.

Hold Point - Obtain Superintendent's approval before grouting.

Grout stone pitching with cement mortar.

Cement mortar to consist of one part cement to three parts of clean sand mixed with potable water to form a workable mixture.

Work the mortar into the interstices of the stone pitching to a depth of at least 100 mm from the surface. Work from the base upwards.

Cure the mortar for at least 48 hours.

Remove defective mortar and re-grout any loose stones.

Provide 75 mm diameter weep holes penetrating the full thickness of the grout at the rate of one every 5 square metres.

11.9 DUMPED ROCK PROTECTION

Large spalls or boulders complying with the Rock Properties clause and having a least dimension of that specified in the PROJECT SPECIFIC REQUIREMENTS section of the RFT.

Dump into the specified area.

Protect adjacent areas from damage due to dumping.

The average plane of the exposed rock face to be within 100 mm of the specified position.

11.10 QUARTER TONNE CLASS DUMPED ROCK PROTECTION

Large spalls or boulders complying with the Rock Properties clause and having the following grading.

Table – Rock grading	
Rock Size	Minimum % Larger Than
35 kg	90
250 kg	50
500 kg	0

Dump into the specified area.

Protect adjacent areas from damage due to dumping.

The average plane of the exposed rock face to be within 100 mm of the specified position.

11.11 RUBBLE

Broken rock complying with the Rock Properties clause.

Maximum size of rubble to be 200 mm.

At least 30 % by mass to have a nominal size of 100 mm or greater.

No more than 20 % by mass to pass the 2.36 mm sieve.

Dump rubble without segregation onto the prepared area.

Compact rubble to a tight finish.

The average plane of the exposed face to be within 100 mm of that specified.

The exposed face to be within 100 mm of the average plane.

11.12 GABIONS

11.12.1 General

A flexible, hexagonal woven steel wire mesh box, filled with packed stone conforming to the Rock Properties clause, and securely laced with steel wire.

11.12.2 Steel Wire Mesh for Gabions

Use galvanized steel wire, Grade W15Z380 to AS 2423.

Zinc coating; 250 g/m² Galvanization to be carried out prior to weaving of the mesh.

Minimum tensile strength of wire: 380 MPa.

Mesh openings to be 80 mm x 100 mm maximum, hexagonal in shape with flexible joints consisting of not less than two full turns.

All wire to be coated with average thickness of 0.55 mm extruded grey PVC firmly attached to the wire. The minimum thickness of coating to be 0.40 mm in accordance with AS 2423.

At the discretion of the Superintendent, the PVC wire coating may be omitted where abrasion of wire is not likely to be of concern or where deleterious effects on the wire of ground water, soil salinity, natural weather exposure and water emersion is not significant. Check PROJECT SPECIFIC REQUIREMENTS section of the RFT.

Conform to wire sizes and galvanizing weights in **Table – Wire properties - Gabions**.

Table – Wire properties - Gabions	
Wire Type	Minimum Diameter (mm)
Body wire	2.7
Binding and lacing wire	2.2
Selvedge wire	3.4

Selvedge wire shall be woven integrally along all edges of the mesh, in accordance with the manufacturer's instructions, and such that the mesh shall not unravel.

The steel wire mesh shall be sized so that it can be folded into regular boxes, complete with diaphragms, having dimensions specified. Diaphragms to be at 1,000 mm spacing.

11.12.3 Construction of Gabions

Assemble and erect in accordance with the manufacturer's instructions.

Pretension the wire framework against a firm anchor or adjacent units.

Retain the shape of the wire framework with spreaders.

Fill with hard durable stone, complying with the Rock Properties clause and placed in stages to achieve the tightest packing of stone.

Maximum stone dimension: 250 mm.

Minimum stone dimension: 100 mm.

Overfill the framework by 20 mm to 50 mm to allow for subsequent movement of the stone.

Perform lacing operations using specified lacing wire. Wire to pass round the edges being joined using alternative single and double loops through each mesh in turn. Tightness of the mesh and wiring is essential.

Ensure a tightly packed, neat and uniform construction.

11.13 RENO MATTRESSES

11.13.1 General

A flexible, hexagonal woven steel wire mesh box, filled with packed stone conforming to the Rock Properties clause, and securely laced with steel wire.

11.13.2 Steel Wire Mesh for Reno Mattresses

Use galvanized steel wire, Grade W15Z380 to AS 2423.

Zinc coating; 250 g/m². Galvanization to be carried out prior to the weaving of the mesh.

Minimum tensile strength of wire: 380 MPa.

Mesh openings to be 60 mm x 80 mm maximum, hexagonal in shape with flexible joints consisting of not less than two full turns.

All wire to be coated with average thickness of 0.55 mm extruded grey PVC firmly attached to the wire. The minimum thickness of coating to be 0.40 mm in accordance with AS 2423.

At the discretion of the Superintendent, the PVC wire coating may be omitted where abrasion of wire is not likely to be of concern or where deleterious effects on the wire of ground water, soil salinity, natural weather exposure and water emersion is not significant. Check PROJECT SPECIFIC REQUIREMENTS section of the RFT.

Conform to the wire sizes and galvanizing weights shown in **Table – Wire properties – Reno Mattresses**.

Table – Wire properties – Reno Mattresses	
Wire Type	Minimum Diameter (mm)
Body wire	2.0
Binding and lacing wire	2.2
Selvedge wire	2.4

Selvedge wire to be woven integrally along all edges of the mesh, in accordance with the manufacturer's instructions.

Cut to shape where necessary.

Mattress Panels

Bottom panel: Includes both sides and both end panels.

Top panel: Shall have the same dimension as the bottom, without the sides and ends, and be supplied separately.

Diaphragms: Extend over the full width of the mattress from top to bottom at maximum intervals of 1 m.

11.13.3 Construction of Reno Mattresses

Assemble and erect in accordance with the manufacturer's instructions.

Align diaphragms perpendicular to the direction of flow unless otherwise specified.

Pretension the wire framework against a firm anchor or adjacent units.

Retain the shape of the wire framework with spreaders.

Fill with hard durable stone complying with the Rock Properties clause in this section and placed in stages to achieve the tightest packing of stone.

Maximum stone dimension:

120 mm when mattress depth 170 mm.

150 mm when mattress depth 230 mm.

200 mm when mattress depth 300 mm or greater.

Minimum least stone dimension 80 mm.

Overfill the framework by 20 to 50 mm to allow for subsequent movement of the stone.

Perform lacing operations using specified lacing wire. Wire to pass round the edges being joined using alternative single and double loops through each mesh in turn. Tightness of the mesh and wiring is essential.

Last panel on downstream side, or at base of slope, shall be a whole unit (i.e. not cut).

Ensure a tightly packed, neat and uniform construction.

11.14 REVETMENT MATTRESSES

11.14.1 General

A nylon fabric material filled with mortar with filter points for the relief of hydrostatic uplift pressure.

Conform to the manufacturer's instructions.

11.14.2 Materials for Revetment Mattresses

Mortar mix proportions to **Table – Mortar mix proportions**.

Table – Mortar mix proportions			
Cement Type GP or GB	Fine Sand	Coarse Sand	Water
1 (500 kg)	1.2 (600 kg)	2.2 (1,100 kg)	450 L/m ³

Adjust fine sand/coarse sand proportions if required to provide workable mix.

11.14.3 Construction of Revetment Mattresses

Toe-in to provide cut-off walls minimum 300 mm deep and width not less than maximum thickness of mattress.

Lay, cut and stitch mattress on prepared surface. Make allowance for take up of fabric resulting from filling mattress with mortar.

All stitching and seams to be neat in appearance and strength to withstand filling pressure.

Ensure mattress is anchored prior to mortar pumping to prevent creep during placement of mortar.

Provide openings in fabric at a maximum of one every 50 m² for placement of mortar. Opening to match size of pumping hose.

Make good openings on completion of mortar pumping.

All areas of mattress to be hard filled with mortar with smooth surface.

Do not permit any loading on the mattress until one hour after mortar pumping has been completed.

Remove spilt mortar from surface of mattress by hand only. Do not use water to wash spilt mortar.

Make good any defective areas.

11.15 EMBANKMENT PROTECTION - CONCRETE

Construct embankment protection from concrete reinforced with a single layer of centrally located SL62 mesh.

Overlap the mesh by 200 mm at joints.

Make construction joints in the vertical plane, at 2 m maximum spacing.

Continue reinforcement mesh across construction joints.

Where margins are required, construct the embankment protection and the margins as an integral unit.

Where there are adjacent protection works, construct the toe of the embankment protection and the protection work as an integral unit.

Drainage holes to be 75 mm diameter penetrating the full thickness of the protection works. Install the drainage holes at 3 m intervals just above the toe.

Install additional rows of drainage holes parallel to the first, and at 3 m intervals and spacings, where the scope of work requires it.

The exposed surface to be within 50 mm of the specified position.

11.16 MARGINS

Construct margins with reinforced concrete. Conforming to the requirements of the CONCRETE MAINTENANCE Section.

Make construction joints at 3 m maximum spacing.

Form the top 75 mm of the vertical face nearer the pavement, and any exposed outer face, true to line and level.

Wood float and broom finish the upper surface of the margin. Finish flush with the top of the pavement.

Where adjacent pavement is sealed, overlap the bituminous seal on the margins by not less than 100 mm.

Tolerances

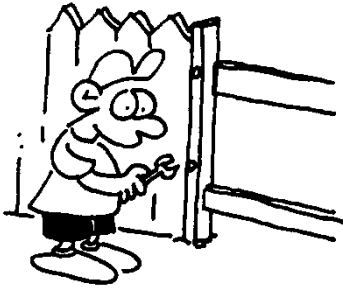
Width: Not less than specified.

Level: + or - 10 mm of top of adjacent pavement.

11.17 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

12 ROAD FURNITURE MAINTENANCE



12.1 OUTLINE DESCRIPTION

This section specifies the maintenance requirement for regular maintenance of road furniture.

Maintenance operations are specifically ordered as required by the Superintendent, and includes, but is not limited to, new installation (where missing), repairs to, removal and replacement of, any of the following:

- Tactile Ground Surface Indicators,
- Fencing
- Flexible Guideposts, and Steel Guideposts, including delineators,
- Work Zone Products and Accessories,
- Road Signs
- Raised Retroreflective Pavement Markers (RRPMs)
- Flood Gauge Posts
- Cattle Grids
- Road Safety Barriers - Steel Beam Guardrail
- Road Safety Barriers - Wire Rope Guardrail

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

12.2 CROSS REFERENCES

MISCELLANEOUS PROVISIONS for **Disposal of Waste**

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES

12.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

AS 1074	Steel tubes and tubulars for ordinary services
AS 1111.1	ISO metric hexagon commercial bolts and screws - Product grade C - Bolts
AS/NZS 1252	High strength steel bolts with associated nuts and washers for structural engineering
AS 1428.4.1	Design for access and mobility – Means to assist the orientation of people with vision impairment – Tactile ground surface indicators
AS/NZS 1594	Hot rolled steel flat products
AS 1604.1	Specification for preservative treatment – Sawn and round timber

AS 1742(set)	Manual of uniform traffic control devices
AS 1742.2	- Traffic control devices for general use
AS 1742.3	- Traffic control for works on roads
AS 1742.10	- Pedestrian control and protection
AS 1743	Road signs – Specifications
AS/NZS 1906	Retroreflective materials and devices for road traffic control purposes
AS/NZS 1906.1	- Retroreflective sheeting
AS/NZS 1906.2	- Retroreflective devices (non pavement application)
AS 2759	Steel wire rope – Use, operation and maintenance
AS/NZS 3750.9	Paints for steel structures - Organic zinc-rich primer
AS/NZS 3845.1	Road safety barrier systems and devices - Road safety barrier systems
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
EN 1317	Road restraint systems
NCHRP 350	Recommended Procedures for the Safety Performance Evaluation of Highway Features

Department of Infrastructure, Planning and Logistics accepted road safety barriers at <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/road-safety-barriers>

APAS

Specification 2916 Organic zinc rich coating for protection of steel

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

12.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

The following additional definitions apply.

CS

Civil Standard drawing. Use the most recent version.

GRAFFITI

The name for images or lettering scratched, scrawled, painted or marked in any manner on property.

LONGITUDINAL LINES

Any line which runs parallel to the road centre line, e.g. broken line, edge line, separation line, barrier line.

OTHER MARKINGS

All diagonal lines, chevron markings and messages on the pavement, including symbols, words, numerals, arrows, and kerb markings.

TACTILE GROUND SURFACE INDICATOR (TGS)

A device, or a number of devices, installed on a surface in a pedestrian path of travel, designed to provide pedestrians who are blind or vision-impaired with warning or directional orientation information.

TRAFFIC CONTROL DEVICE

Any sign, signal, pavement marking or other installation placed or erected for the purpose of regulating, warning, guiding or providing for the safety of road users. It does not include temporary warning devices and control measures erected only for the construction period.

TRANSVERSE MARKINGS

Any line which is at right angles to the centre line of the road, e.g. stop line, hold line, pedestrian cross walk.

12.5 CIVIL STANDARD DRAWINGS

The most recent issue of the following civil standard drawings form part of the contract as applicable.

Table – Civil Standard Drawings for Road Furniture Maintenance	
Drawing No.	Title
CS 3200	Steel Beam Guard Rail (With Flared Terminals)
CS 3302	Pram Ramps, With And Without Tactile Ground Surface Indicator (TGSI)
CS 3305	Vehicle Barrier Fencing, Wheelchair Crossing For Medians & Intersection Hold Rail Details
CS 3306	Cycle/Shared Path Culvert Crossing Fence Details
CS 3307	Pedestrian fence
CS 3308	1800mm Security Fence
CS 3310	Stock Fence Design and Details
CS 3313	Standard Cattle Grid Plan and Sections With Approach Slab
CS 3314	Standard Cattle Grid Plan and Sections Without Approach Slab
CS 3315	Standard Cattle Grid Details
CS 3500	Flexible Guide Posts
CS 3501	Flood Gauge Posts

12.6 EXTENT OF WORK

12.6.1 Scheduled Work

Undertake scheduled works ordered by Superintendent.

12.6.2 Unscheduled Work

Undertake unscheduled works when directed. Payment will be at scheduled rates if available, or be paid at a fair and reasonable rate negotiated between the Contractor and Superintendent.

Unscheduled works may include new installations or repairs, removal, replacement of items identified whilst undertaking scheduled works.

Be familiar with road furniture installations along the routes under the contract and be vigilant and attentive to any unscheduled works requirements.

Log all unscheduled work in a logbook detailing as a minimum:

- Start date, start time
- Road name, and location measured by distance
- Work performed, i.e.: sign type, guidepost, etc. removed, or replaced
- Completion date, completion time
- Provide electronic copies of before and after digital photos in jpeg format, clearly showing work undertaken.

Refer to each section for lists of materials to be carried on the service vehicle.

The Contractor will inform the Superintendent within 24 hours where unscheduled works cannot be carried out due to lack of particular materials.

12.7 TACTILE GROUND SURFACE INDICATORS (TGSIS) – WITNESS POINT

TGSI devices used must conform to AS 1428.4.1.

TGSI devices used must conform to AS 4586.

Use preformed plastic units.

Use integrated units. Do not use discrete units in outdoor applications.

Material is to be high density, fibre reinforced, UV stabilised, polymer containing Herculite, fabricated by a sheet moulding compression method.

Units must be fixed with tamper resistant screw fasteners.

Provide cast-in units which have lugs which are embedded in the concrete substrate and which enable replacement of the TGSI unit if it needs to be replaced.

Units must achieve, as a minimum, the performance criteria detailed in **Table – TGSI Minimum Performance Standards**.

Table – TGSI Minimum Performance Standards					
Slip Resistance					
Test	Method	Result		Class	
		Warning Type	Directional Type	Warning Type	Directional Type
AS 4586 Appendix A	Wet Pendulum Slider 96	71	54	P5	P4
	Wet Pendulum Slider 55	65	41	P5	P4
AS 4586 Appendix C	Wet Barefoot Inclining Platform	29°	16°	C	A
AS 4586 Appendix D	Oil - Wet Inclining Platform	24°	22°	R11	R11
Luminous Reflectance					
Test	Method	Dry Luminous Reflectance		Wet Luminous Reflectance	
		Warning Type	Directional Type	Warning Type	Directional Type
AS 1428.4.1 Appendix E Luminous Reflectance	Luminous Reflectance Material Colour - White	73.5	74.6	72.5	73.7
	Luminous Reflectance Material Colour - Black	3.1	5.2	2.5	3.5
	Luminous Reflectance Material Colour - Yellow	55.3	57.2	54.2	54.3
	Luminous Reflectance Material Colour - Blue	19.5	20.9	18.4	19.5
Minimum required luminance contrast between TGSI units and the surrounds/substrate is 30%.					
Dimensions: Must comply with AS 1428.4.1					
Colours: Refer to drawings, or to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.					

Witness Point – Provide a 5 year warranty for the materials used, and for the devices installed as tactile ground surface indicators. Provide a 5 year warranty for the workmanship for the installation of the tactile ground surface indicators. Both warranties to be in the name of the Principal.

Witness Point – Provide documentary evidence that the TGSIs meet the minimum performance criteria.

12.8 FENCING

12.8.1 General

Clearing fence lines includes the removal of trees, shrubs, vegetable matter and debris. Grub out all roots that interfere with the placement of posts. Refer to Clearing and Mulching clauses in Formation Width Clearing in EARTHWORKS AND DRAINAGE.

Erect fences so that the line of the tops of the posts is uniform.

Adjust the position of posts to compensate for the irregularities of the ground.

Provide gates where ordered and across existing access tracks or roads.

12.8.2 Existing Fences

Install a post at the intersection of any new fence with the existing fence and fix the wiring of both fences to that post.

Complete the necessary sections of new or replacement fencing before removing existing fencing.

Obtain the owner's agreement to the proposed fence removal and advise the owner or occupier in writing of the date that the fence will be removed.

Erect gates or grids at fence openings as ordered.

12.8.3 Materials

Barbed wire: 1.57 mm diameter minimum, high tensile.

Plain wire: 2.50 mm diameter minimum, high tensile.

Wire mesh: Galvanized 3.15 mm diameter x 50 mm chain mesh.

12.8.4 Stock Fence

Stock fencing to consist of tubular steel strainer assemblies with star pickets and galvanized wire. Construct as specified on standard drawing CS 3310.

Include the crossing of gullies, watercourses and hollows on the ground.

12.8.5 Security Fence

Security fencing to consist of tubular steel posts complete with post caps, cable straining wires, chainwire mesh and three barbed wires. Construct as specified on standard drawing CS 3308.

12.8.6 Pedestrian Fence

To civil standard drawing CS 3307.

Refer to AS 1742.10, **Pedestrian Fencing** clause.

12.8.7 Log Barrier Fence

Refer to Recycled Plastic Bollards sub-clause.

Provide log barrier fencing consisting of close spaced vertical bollards.

Use recycled plastic bollards or Stringybark, Woollybutt or Pine timber, pressure impregnated with ACQ preservative formulation, copper oxide (CuO) and quaternary ammonium compound (DDAC) to Category H4 of AS 1604.1.

Do not use preservative treatments that contain arsenic or chromium.

12.8.8 Vehicle Movement Barriers/Fences

As per Civil Standard Drawing CS 3305.

Supply stock & half stock length pipe barriers.

Erect fences as ordered, so that the line of the tops of the posts is uniform.

Make allowance for excavation and concreting of anchor/footings.

Adjust the position of posts to compensate for the irregularities of the ground.

Minor clearing fence lines may include the removal of trees, shrubs, vegetable matter and debris. Grub out all roots that interfere with the placement of posts.

12.8.9 Cyclist Holding Rails

Supply and erect new cyclist holding rails and delineators as per Civil Standard Drawings numbered CS 3302 and CS 3305,

Or

Remove damaged rail and replace with new rail as per drawing.

Make allowance for excavation and concreting of anchor/footings.

Make allowance for minor clearing of fence lines

12.8.10 Recycled Plastic Bollards

Supply round pre-moulded recycled plastic bollards, 1.5 m length x 150 mm dia with built in colours and UV stabilised, resistant to termites, microorganisms and moisture.

Install and ensure security of recycled plastic bollards as per manufacturer's recommendations.

Make allowance for excavation and concreting of anchor/footings.

Make allowance for minor clearing of fence lines.

12.8.11 Culvert Crossing Fences

Supply and erect Culvert Crossing Fences and delineators as per drawing.

Make allowance for Hot Dip galvanising and masonry chemical anchorage to headwalls.

Make allowance for excavation and concreting of anchor/footings. Refer to Civil Standard Drawing CS 3306.

Make allowance for minor clearing of fence lines.

Or

Remove damaged Culvert Crossing Fences and replace with new fences as per drawing.

Make allowance for excavation, removal and rehabilitation of anchor/footings.

12.9 FLEXIBLE GUIDE POSTS

See also STEEL GUIDE POSTS in this worksection.

12.9.1 Unscheduled Guide Post Materials

20 additional guide posts will be carried on the service vehicle when leaving the Contractor's premises to perform scheduled works, for the purpose of carrying out unscheduled works.

12.9.2 General

For the purposes of these Flexible Guide Posts clauses the following definitions apply:

- **Delineator:** Small retroreflectors or panels of retroreflective sheeting attached to guide posts to provide a coherent pattern of delineation of carriageway edges as an aid to night driving.
- **Flexible guide post:** A guide post that when impacted by a vehicle, deflects and returns to the vertical position without maintenance intervention.

Flexible guide posts shall be constructed so that they do not constitute a hazard if struck by a vehicle. Stubs of broken flexible guide posts which protrude from the ground are to be extracted from the ground and disposed of in a legal disposal site.

Flexible guide posts shall be constructed of plastic, rubber, steel, or similar proprietary product capable of recovering from an impact by returning to, or returning to within a margin of 5 degrees of, their original vertical state, post impact, without maintenance intervention, for the life of the guide post.

12.9.3 Product data – Witness Point

Witness Point - Submit details of the proposed flexible guide post including the following:

- Manufacturer’s details on the materials, and the properties of the materials, used in the manufacture of the guide posts.
- Manufacturer’s recommended installation procedures.
- Technical specifications.
- Test results per the test sub-clauses

12.9.4 Warranties – Witness Point

Witness Point – Submit the manufacturer’s published product warranties in the name of the Principal.

12.9.5 Samples – Hold Point

Hold Point - Provide a sample flexible guide post from each batch purchased for this contract for inspection and approval before installing any posts.

12.9.6 Materials

Flexible guide posts shall be composed of material which is:

- Heat resistant.
- Fire retardant.
- Capable of retaining 85% of its colour, appearance and physical properties for at least five years when exposed to weather conditions existing in the Northern Territory.
- Resistant to mould growth, and mildew.
- Not be affected by hydrocarbon solvents.
- Corrosion resistant or treated to resist corrosion.
- Resistant to ultraviolet light.
- Termite resistant.

12.9.6.1 Surface finish

Durable gloss or semi-gloss opaque white which is smooth and easy to clean. Free of sharp edges and burrs and discolouration or other defects that may affect its appearance and/or serviceability.

12.9.6.2 Colour

Whiter than Y35 Off White of AS 2700.

12.9.6.3 Dimensions

Minimum width: 100 ± 5 mm.

Minimum thickness: Plastic 4 mm – Steel 2mm. Refer to the **Steel Guide Posts** clause in this work section.

Minimum height above ground surface: 1000 ± 100 mm.

12.9.6.4 Markings

Traceability: Mark each post legibly and indelibly with the following:

- Name of the manufacturer
- Name of the supplier (optional)
- Month and year of manufacture
- Batch number
- Product code or model/type identifier (to differentiate the supplied product from other similar products of different type or model)
- End of warranty date

Letter size: 5 to 10 mm high.

Marking of ground level: Mark 1000 mm from the top of the post.

12.9.6.5 Anchorage

Resistance to impact: Resistant to overturning, twisting and displacement from wind and impact forces when installed in the ground to manufacturer's recommendations.

Resistance to removal: Installation must be resistant to vertical removal by persons other than authorised personnel using approved removal tools.

12.9.6.6 Delineators

Rectangular retroreflectors

Class 1A retroreflective material to AS/NZS 1906.1.

Size to be 200 mm x 50 mm for red delineators, white delineators, and for yellow delineators. Area minimum 100 cm² (10,000 mm²).

Discrete device type retroreflectors

Maximum projected face area for delineator devices to be 100 cm² (10,000 mm²). Minimum length of shortest projected dimension to be 60 mm.

Use only to denote special hazards. Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

Installation of delineators

Fix the delineators to the flexible guide post so that they are weatherproof and vandal resistant and so that they can be replaced if necessary without damaging the guide post.

Centrally locate delineators between the edges of the guide post and 50 mm from the top of the guide post.

The red delineator to be attached to the convex side of curved or shaped flexible guide posts where applicable.

On a two way single carriageway, attach one red delineator to the face of the road edge flexible guide post on the left hand side of the carriageway and one white delineator to the face of the road edge flexible guide post on the right hand side of carriageway. Note that these road edge flexible guide posts will have delineators on both sides.

On a single direction, single carriageway, attach red delineators to the face of the road edge flexible guide posts on the left hand side of the carriageway and yellow delineator to the face of the road edge flexible guide post on the right hand side of carriageway facing the traffic. Note that these road edge flexible guide posts will have delineators on one side only.

Attach any required discrete device type retroreflectors to manufacturer's recommendations.

12.9.7 Installation of guide posts

Installation of the guide posts is to be to AS 1742.2.

Installation of the guide posts is to be to CS 3500.

Installation of the guide posts is to be to the manufacturer's written installation guide or manual.

Curved or shaped guide posts installed on the left hand side of traffic lanes must be installed with the convex surface facing the traffic.

12.9.8 Tests – Hold Point

All testing specified in this clause shall be undertaken by a NATA accredited laboratory. The vehicle impact testing can be undertaken by a non NATA accredited laboratory.

Testing and associated reports must not be more than three years old as of the date of tenders, unless otherwise approved by the Principal.

The tests must be done on posts which are proposed to be provided under the contract.

Guide posts of each type or model from each batch must be tested.

Test reports must verify that the tested samples have been marked as required by the **Markings** sub-clause. The reports must include photos of the markings, which must be clearly legible in the reports. At least one photo of the markings of each type or model of guide post from each different batch must be included in the reports.

Hold Point - Submit test results to the Superintendent in respect to the following characteristics before ordering the guide posts:

- Heat resistance.
- Cold resistance.
- Rigidity
- Vehicle impact.

12.9.8.1 Heat resistance testing

Heating: Condition posts at $60 \pm 2^\circ\text{C}$ for 2 hours in an oven.

Test procedure: Conform to the following:

- After conditioning, remove the post from the oven and clamp the base so that the post is vertical and protruding 1000 mm from the post top.
- Bend the conditioned post adjacent to the clamp in the direction of the adjacent traffic flow to form a 90° angle.
- Subject the post to 3 cycles of bending through 180° within 2 minutes of its removal from the oven so that the post is bent in a right angle. Release the post after the third cycle.
- Record the physical condition and horizontal deflection at the top of the post from a vertical line 30 seconds after release from the bent position. The deflection must not exceed 50 mm.

12.9.8.2 Cold resistance testing

Cooling: Condition post at $0 \pm 2^\circ\text{C}$ for 2 hours in an ice bath.

Test procedures: Conform to the following:

- After conditioning, remove post from the ice bath and clamp in a vertical position with the top of the post protruding 1000 mm.
- Bend the conditioned post adjacent to the clamp in the direction of the adjacent traffic flow to form a 90° angle within 30 seconds of its removal from the ice bath.
- Release the post from the clamp 60 seconds after removing it from the ice bath and place in the ice bath for an additional 60 seconds.
- Repeat the bending and ice bath procedure a further three times and release post from the bent position and record the horizontal deflection at the top of the post from a vertical line 60 seconds after release. The deflection must not exceed 50 mm.
- Return the post to ice bath for 60 seconds minimum.
- Remove the post from ice bath and place in a horizontal position, securely clamped so that the minimum clear length between supports is 1000 mm.
- Drop a 1 kg steel ball for a distance of 1500 mm vertically through a low friction guide so that it impacts the centre face of the post displayed towards the traffic.
- Recondition post in ice bath for 60 seconds.

Repeat ball dropping and reconditioning procedures. After the fifth ball drop, record the condition of the post. The flexible guide post must show no signs of fractures, cracks or splits.

12.9.8.3 Rigidity testing

Testing conditions: Conduct tests under the following conditions:

- Temperature: At $35^\circ\text{C} \pm 2^\circ\text{C}$.
- Clamps: Shape jaws of clamps to suit post profile so that the post cannot rotate in the clamp.

Test procedures: Conform to the following:

- Securely clamp post to a bench in a horizontal position with the top of post unsupported and protruding 1000 mm.

- Bend the post adjacent to the clamp in the direction of adjacent traffic flow to 90° and straighten. Repeat this procedure 10 times with maximum 3 minute intervals between procedures.
- Apply a 0.9 kg mass to a point 50 mm from the top of the post, in the direction of adjacent traffic flow. Record the vertical deflection of post top from its original position. The deflection must not exceed 130 mm
- Remove the mass and record the final deflection. The top of the flexible guide post must return unassisted to no more than 10 mm from its initial position within 10 minutes of the removal of the mass. Record the final deflection.

Alternative testing procedures: Conduct testing as for standard testing procedures. Instead of applying a mass, conduct testing in a wind tunnel with a wind speed of 12.5 m/s applied in the direction of the adjacent traffic flow with a maximum horizontal deflection at the top of 130 mm. After the wind is removed, the top of the flexible guide post must return unassisted to no more than 10 mm from the vertical position.

12.9.8.4 Maximum rigidity of flexible guide posts

Test procedures: Conform to the following:

- Securely clamp post to a bench in a horizontal position with the top of post unsupported and protruding 1000 mm.
- Apply a 10 kg mass to a point 50 mm from the top of the post, in the direction of adjacent traffic flow.
- Record the vertical deflection of post top from its original position. The deflection must exceed 500 mm.

12.9.8.5 Vehicle impact testing

Flexible guide post shall be capable of self-erecting and remaining serviceable after being subjected to a series of direct impacts by a typical passenger vehicle at temperatures between 15°C and 30°C. Flexible guide posts to be tested shall be installed in accordance with manufacturer's recommendations, and shall be furnished complete with delineators.

The guide post shall be capable of withstanding a series of 10 bumper bar impacts at a speed of 60 km/h and five bumper bar impacts at a speed of 100 km/h directed at 90 degrees to the face of the guide post which has the red delineator attached to it.

The impacting vehicle shall suffer little or no damage during the impact tests. The guide post shall return to within five degrees of vertical within ½ hour of impact.

Test results which show the flexible guide posts are capable of withstanding the above vehicle impacts are to be provided to the Superintendent upon request. Test results to include video or photographic evidence. A minimum sample of three flexible guide posts must be tested.

12.10 STEEL GUIDE POSTS

Steel guide posts must conform to AS 1742.

Delineators fitted to them must conform to AS/NZS 1906.

Provide steel guide posts which are galvanized, and which are made from are 2mm thick steel or made from spring steel.

12.10.1 Unscheduled Guide Post Materials

20 additional steel guide posts will be carried on the service vehicle when leaving the Contractor's premises to perform scheduled works, for the purpose of carrying out unscheduled works.

12.10.2 General

For the purposes of these Steel Guide Posts clauses the following definition applies:

Delineator: Small retroreflectors or panels of retroreflective sheeting attached to guide posts to provide a coherent pattern of delineation of carriageway edges as an aid to night driving.

Steel guide posts shall be constructed so that they do not constitute a hazard if struck by a vehicle. Stubs of broken steel guide posts which protrude from the ground are to be extracted from the ground and disposed of in a legal disposal site.

12.10.3 Product data – Witness Point

Witness Point - Submit details of the proposed steel guide post including the following:

- Manufacturer’s details on the materials used in the manufacture of the guide posts.
- Manufacturer’s recommended installation procedures.
- Technical specifications.

12.10.4 Warranties – Witness Point

Witness Point – Submit the manufacturer’s published product warranties in the name of the Principal.

12.10.5 Samples – Hold Point

Hold Point - Provide a sample flexible steel guide post from each batch purchased for this contract for inspection and approval before installing any posts.

12.10.6 Materials

Steel guide posts shall be composed of materials which are:

- Heat resistant.
- Fire retardant.
- Capable of retaining 85% of its colour, appearance and physical properties for at least five years when exposed to weather conditions existing in the Northern Territory.
- Resistant to mould growth, and mildew.
- Not be affected by hydrocarbon solvents.
- Corrosion resistant or treated to resist corrosion.
- Resistant to ultraviolet light.

12.10.6.1 Surface finish

Durable gloss or semi-gloss opaque white which is smooth and easy to clean. Free of sharp edges and burrs and discolouration or other defects that may affect its appearance and/or serviceability.

12.10.6.2 Colour

Whiter than Y35 Off White of AS 2700.

12.10.6.3 Dimensions

Minimum width: 100 ± 5 mm.

Minimum thickness: 4 mm.

Minimum height above ground surface: 1000 ± 100 mm.

12.10.6.4 Markings

Traceability: Mark each post legibly and indelibly with the following:

- Name of the manufacturer
- Name of the supplier (optional)
- Month and year of manufacture
- Batch number
- Product code or model/type identifier (to differentiate the supplied product from other similar products of different type or model)
- End of warranty date

Letter size: 5 to 10 mm high.

Marking of ground level: Mark 1000 mm from the top of the post.

12.10.6.5 Anchorage

Resistance to impact: Resistant to overturning, twisting and displacement from wind and impact forces when installed in the ground to manufacturer’s recommendations.

Resistance to removal: Installation must be resistant to vertical removal by persons other than authorised personnel using approved removal tools.

12.10.6.6 Delineators

Rectangular retroreflectors

Class 1A retroreflective material to AS/NZS 1906.1.

Size to be 200 mm x 50 mm for red delineators, white delineators, and for yellow delineators. Area minimum 100 cm² (10,000 mm²).

Discrete device type retroreflectors

Maximum projected face area for delineator devices to be 100 cm² (10,000 mm²). Minimum length of shortest projected dimension to be 60 mm.

Use only to denote special hazards. Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

Installation of delineators

Fix the delineators to the steel guide post so that they are weatherproof and vandal resistant and so that they can be replaced if necessary without damaging the guide post.

Centrally locate delineators between the edges of the guide post and 50 mm from the top of the guide post.

The red delineator to be attached to the convex side of curved or shaped steel guide posts where applicable.

On a two way single carriageway, attach one red delineator to the face of the road edge steel guide post on the left hand side of the carriageway and one white delineator to the face of the road edge steel guide post on the right hand side of carriageway. Note that these road edge steel guide posts will have delineators on both sides.

On a single direction, single carriageway, attach red delineators to the face of the road edge steel guide posts on the left hand side of the carriageway and yellow delineator to the face of the road edge steel guide post on the right hand side of carriageway facing the traffic. Note that these road edge steel guide posts will have delineators on one side only.

Attach any required discrete device type retroreflectors to manufacturer's recommendations.

12.10.7 Installation of guide posts

Installation of the steel guide posts is to be to AS 1742.2.

Installation of the steel guide posts is to be to CS 3500.

Installation of the steel guide posts is to be to the manufacturer's written installation guide or manual.

Curved or shaped steel guide posts installed on the left hand side of traffic lanes must be installed with the convex surface facing the traffic.

12.10.8 Tests – Hold Point

Hold Point - Test results are to be provided as for Flexible Guide Posts detailed in this work section.

12.11 WORK ZONE PRODUCTS AND ACCESSORIES

12.11.1 General

Conform to AS 1742.3 unless otherwise specified.

Items required under this section will include, but not limited to the following.

- Traffic Cones 450, 700mm high. reflective
- Traffic Cones (Reflectorised) 700mm high.
- Plastic Barrier Boards (CL1) and Stands.
- Amber Flashing Lights.
- Delineators (CL1), Red/Yellow 200mm x 50mm, White 200mm x 50mm.
- Class 1 Overlays and Sheeting Material in all colours. Colour and sizes will be as ordered.

Various associated items as per the schedule of rates.

12.12 ROAD SIGNS – MANUFACTURE, SUPPLY, AND DELIVERY

This subsection specifies the manufacture, supply and delivery of road signs.

12.12.1 Anti-spear fixings for hazard markers (sight boards)

Anti-spear fixings and stiffener rails must be installed for hazard markers (D4-1-1A), and other signs at similar heights and with similar dimensions, which are installed parallel to the path of travel of traffic.

Hazard marker signs are to comprise two unidirectional D4-1-1A signs, mounted end to end.

The stiffener rails are to be aluminium extrusions, each made up of two equal length sections, spliced at the centre line. The aluminium extrusions are to be of alloy and temper as shown on the drawings.

Refer to Civil Standard Drawings CS-3516, CS-3517, and CS-3518, accessible via

<https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/standard-drawings>.

12.12.2 Remotely activated road condition information signs

These are fixed signs with some permanent messaging/text, and some variable messaging/text, with messaging varied via remote connection to electronic displays built in to the sign board.

Maintain the signs including, but not limited to:

- the permanent messaging on the sign,
- the sign board and its posts, footings, and fixings,
- the solar panels, their support structures, the footings if any, and any ancillary cabling, conduits, fixtures and fittings,
- the cabinets, their footings if any, and any ancillary cabling, conduits, fixtures and fittings,
- all the components housed in the cabinets,
- the batteries,
- the electronic message display units,
- any slide in message plates (back up for when there is a failure of the electronic message display units which cannot be repaired in a short time frame),
- the communications devices and associated cabling, conduits, aerials, and connectors at the sign,
- any power supply devices and connections at the sign,
- the communications devices and ancillary items at the base station, including portable computers, and
- all software required for the system to function properly.

12.12.3 Materials – Hold Point

NON-REFLECTIVE MATERIALS

In accordance with AS 1743.

REFLECTIVE MATERIAL

Use high intensity Class 400 to AS/NZS 1906.1 for all signs and hazard markers with the exception that all black legends are to be non-reflective.

BLANKS

Use aluminium marine grade alloy designation 5052 - H38. Thickness 1.6 mm.

Steel sheets may only be used for temporary signs.

MANUFACTURE

Chemically clean aluminium blanks before painting or bonding of reflective material.

Stamp the month and year of manufacture and the symbol DIPL on the backs of all signs.

POSTS

Post sizes to conform to the **Table - Roadside Signs - Mounting Selection** unless specified otherwise.

Road signs mounting pole sizes other than the sizes shown in the **Table - Roadside Signs - Mounting Selection** are shown in the **Table - Roadside Signs – Non Standard Mounting Poles Selection** in PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

Posts to be medium grade galvanized pipe with plain ends and constructed from a single length of pipe. Cap each post with a galvanized cap. Do not use “Ingal” posts.

Standard; to AS 1074.

ANTI-GRAFFITI COATING

Hold Point - Obtain Superintendent’s approval for the use of the anti-graffiti films or coating products. Apply anti-graffiti products only to the new road signs specified by the Superintendent.

12.12.4 Delivery

Supply sign including all brackets, bolts, nuts and bracings. Fix bracings to the signs prior to delivery.

Package and handle all items to ensure delivery in an undamaged condition.

Protect signs with an approved slip sheeting and if required by the retroreflective sheeting manufacturer be padded with microfoam sheeting between the faces. The sheeting is to cover the entire sign.

Store signs on their edge at all times and do not allow to become wet at any stage. Signs are deemed delivered on being received into Sign Stores at Regional Centres.

Signs received in a damaged condition will not be accepted. The Sign Supply Period Contractor is responsible for unloading.

Contact DIPL Regional Office to confirm the delivery location and make allowance. Regional Centre Sign Stores are located at the following locations:

DARWIN

DIPL Road Projects Depot, Yarrowonga Road, Palmerston, and/or Period Contractor for Signage Installation, Darwin.

Note: make allowance for delivery to a single location within a 40-kilometre radius of the Darwin General Post Office.

TENNANT CREEK

DIPL Road Projects Depot, Leichhardt Street, Tennant Creek.

ALICE SPRINGS

Period Contractor for Signage Installation, Alice Springs.

EAST ARNHEM

DIPL Road Projects Depot, John Flynn Drive, Nhulunbuy.

12.13 DELIVERY TIMES – NORMAL REQUIREMENTS

Delivery times are measured from the time of ordering. Requirements are;

Table – Sign delivery times		
Sign Type	Quantity	Delivery Time
Regulatory Signs ('R'-series)	Up to 20 each	1 Week
Warning Signs ('W'-series)	Up to 20 each	1 Week
Guide Signs ('G'-series)	Up to 10 signs	2 Weeks
Temporary Signs ('T'-series)	Up to 10 each	1 Week
Associated Hardware	Any Quantity	1 Week

Where delivery is not achieved within the times listed a penalty of 15% of the value of the order per week or part thereof will be applied at the discretion of the Superintendent.

For orders in excess of the quantities listed, delivery time will be as agreed between the Superintendent and the Contractor.

12.14 ROAD SIGNS – INSTALLATION AND MAINTENANCE

12.14.1 General

This subsection specifies the erection or replacement of road signs and posts including supply of posts.

12.14.2 Anti-spear fixings for hazard markers (sight boards)

Refer to **Road signs – Manufacture, supply, and delivery** clause in this worksection.

12.14.3 Posts

Post sizes to conform to unless specified otherwise.

Posts to be medium grade galvanized pipe with plain ends and constructed from a single length of pipe. Cap each post with a galvanized cap.

Do not use “Ingal” posts.

Conform to AS 1074.

12.14.4 Location

Signs to be located clear of vegetation and be clearly visible under headlight illumination.

12.14.5 Lateral Placement

Lateral placement to be measured to the edge of the sign nearest the road.

Lateral placement to be as follows:

Unkerbed roads: 2 to 4 m clear from the edge of the traffic lane, and 600 mm minimum clear from the outer edge of the road shoulder.

Kerbed roads: 500 mm to 1000 mm from the front face of the kerb.

12.14.6 Height

Height to be measured as the clearance to the lowest edge of the lowest sign in an assembly.

Heights for signs to be as follows:

Table – Heights for signs	
Unkerbed Roads:	
Fingerboard (G3) and street name signs (G5):	2 m above the near edge of the pavement.
Other signs:	1 to 1.5 m above the near edge of the pavement.
Kerbed Roads:	
Signs overhanging a footway:	2.5 m minimum above footway.
Signs not overhanging a footway:	1 to 1.5 m clearance except for those specific signs on medians and islands given below.

Heights for specific signs on medians and islands:

The following signs, when used on medians and islands, to have a clearance 150 mm above the kerb:

- D4-1-2 Hazard Marker
- D4-2-2 Hazard Marker
- D4-3 Hazard Marker
- R2-3 (Keep Left) (Keep Right)
- R2-5 (No U Turn)
- R2-6 (No Right Turn) (No Left Turn)
- R2-15 (U Turn Permitted).

12.14.7 Installation of Posts and Signs

Conform to **Table - Roadside Signs - Mounting Selection**.

Posts to be vertical.

For signs with post sizes less than or equal to 48.3mm, provide and install a galvanised steel sleeve when installing sign posts in concreted or paved medians.

Sleeves, when specified, to be 50 mm longer than the specified ground anchor depth and extend 50 mm above the finished surface level.

Secure the post to the sleeve with a galvanised locking wedge.

Encase the post, or sleeve when used, in a footing of 25 MPa concrete.

Conform to **Table - Orientation of signs**.

Table - Orientation of signs	
Face:	Vertical, and turned 3 degrees to 5 degrees horizontally from oncoming traffic on straight sections. On curves, at right angles to centre line of road.
Exception:	Parking signs to be oriented 5 degrees from parallel to the kerb to face oncoming traffic.

12.14.8 Remove and Replace Existing Posts and Signs

Dismantle damaged posts and signs.

Backfill the hole left by the post and its footing and compact the fill to the same density as the surrounding area.

Erect replacement posts and signs in newly augered holes in accordance with Installation of Posts and Signs section above.

12.14.9 Reinstatement and Relocation of Existing Signs

Dismantle existing post and signs carefully.

Store in a manner to prevent damage.

Backfill the hole left by the post and its footing and compact the fill to the same density as the surrounding area.

Erect posts and signs in newly augered holes in accordance with Installation of Posts and Signs clause above.

Adopt the post requirements for the nearest sign size in the list for intermediate sizes.

Use posts of the same size as the posts being replaced. If there is no exact match in the table, use the nearest larger size shown in the table.

Refer to **Table - Roadside Signs - Mounting Selection**.

12.14.10 Roadside signs – Mounting selection table

Table – Roadside Signs – Mounting Selection							
Sign Size		Number of post	Sign Attachment Bracket (Or M8 Bolts) per Post	Min. Galvanised Post size		Min. Bored Pier footing size	
Width (mm)	Depth (mm)			OD (mm)	Thickness (mm)	Diameter (mm)	Depth (mm)
300	300	1	2	33.7	3.2	300	600
300	450	1	2	33.7	4.0	300	700
450	450	1	2	42.4	4.0	300	800
450	300	1	2	42.4	3.2	300	700
450	600	1	2	42.4	4.9	300	900

Table – Roadside Signs – Mounting Selection							
Sign Size		Number of post	Sign Attachment Bracket (Or M8 Bolts) per Post	Min. Galvanised Post size		Min. Bored Pier footing size	
Width (mm)	Depth (mm)			OD (mm)	Thickness (mm)	Diameter (mm)	Depth (mm)
450	750	1	2	48.3	5.4	300	900
450	900	1	2	48.3	5.4	300	900
600	450	1	2	48.3	4.0	300	900
600	600	1	2	48.3	5.4	300	900
600	750	1	2	60.3	3.6	300	1000
600	900	1	3	60.3	4.5	300	1000
600	1050	1	3	60.3	5.4	450	900
750	450	1	2	48.3	5.4	300	900
750	600	1	2	60.3	4.5	300	1000
750	750	1	2	60.3	4.5	450	900
750	900	1	2	60.3	5.4	300	1100
750	1200	1	3	76.1	4.5	450	1000
900	300	1	2	48.3	5.4	300	900
900	600	1	2	60.3	5.4	450	900
900	900	1	3	76.1	4.5	450	1000
900	1200	1	4	76.1	5.9	450	1100
900	1350	1	4	76.1	5.9	450	1100
1050	600	1	2	76.1	3.6	300	1100
1050	900	1	3	76.1	4.5	450	1100
1200	600	2	3	48.3	5.4	300	900
1200	900	2	5	60.3	4.5	300	1000
1500	800	2	4	60.3	5.4	300	1100
1800	600	2	3	60.3	5.4	300	1100
1800	1200	2	6	76.1	5.9	450	1100
2400	1200	2	6	88.9	5.0	600	1000
2400	1800	2	9	101.6	5.0	600	1200
3000	600	2	3	76.1	5.9	600	1000
3000	1200	2	6	101.6	5.0	600	1200
3000	1500	2	8	114.3	4.5	600	1300
3000	1800	2	9	114.3	4.5	600	1300

Table – Roadside Signs – Mounting Selection							
Sign Size		Number of post	Sign Attachment Bracket (Or M8 Bolts) per Post	Min. Galvanised Post size		Min. Bored Pier footing size	
Width (mm)	Depth (mm)			OD (mm)	Thickness (mm)	Diameter (mm)	Depth (mm)
3700	600	2	3	88.9	5.0	600	1000
3700	1200	3	6	101.6	4.0	600	1000
3700	1800	3	9	101.6	5.0	600	1200
3700	2400	4	12	101.6	4.0	450	1300
4300	600	2	3	101.6	5.0	600	1200
4300	1200	3	6	101.6	5.0	600	1200
4300	1800	3	9	114.3	4.5	600	1300
4900	600	3	3	76.1	5.9	600	1100
4900	1200	3	6	114.3	4.5	600	1300
4900	1800	3	9	114.3	5.4	600	1300
5500	600	3	3	88.9	5.0	600	1100
5500	1200	4.0	6	101.6	5	600	1200
5500	1800	3.0	9	139.7	5	600	1400
6100	600	3.0	4	101.6	4	600	1200
6100	1200	3.0	6	114.3	5.4	600	1400
6100	1800	4.0	9	114.3	5.4	600	1300

Notes:

1. Sign posts and footings designs are based on allowable wind loads, not traffic impact forces. If traffic impact forces are to be considered in the design the signs affected require specific individual design.
2. All posts must not be less than Grade 250.
3. All post must be capped for corrosion protection.
4. Dimensions are **NOT APPLICABLE** for structures with overall heights **exceeding 3m above ground**. These require specific individual design.
5. Dimensions are **NOT APPLICABLE** for sites having a soil bearing capacity **less than 100kPa**. These require specific individual design.
6. Bored pier footing sizes above are calculated without covering concrete slab.
7. Posts for signs **highlighted** above must be installed with **slip bases** as per NTG standard drawing CS3508.

12.14.11 General Requirements

Spacing between posts to be:

- 2 post signs - 0.6 times sign width.
- 3 post signs - 0.4 times sign width.
- 4 post signs - 0.3 times sign width.
- Brace spacing to be 380 mm maximum.

- Adopt the nearest size in the list for intermediate sizes.
- Post sizes for galvanized pipe posts are for sign clearance of less than 2 m above the pavement. For sign clearances greater than 2 m, increase the nominal diameter of the pipe size by a percentage equal to the percentage increase in height above 2 m.

Where signs are erected in groups treat the overall dimensions of the group as one sign size to determine the post requirement from the **Table - Roadside Signs - Mounting Selection**.

12.14.12 Unscheduled Sign Materials

Carry additional sign materials on the service vehicle for the purpose of carrying out unscheduled repair and replacement works at various sites.

These items are additional to those required for scheduled works.

- 3 x 60 km/h
- 3 x 80 km/h
- 3 x 100 km/h
- 3 x Give Way
- 3 x Stop Signs
- 3 x Keep Left
- 3 x D4-2-2 Hazard Signs
- Ample spare sign posts, caps, brackets, bolts, nuts and bracings
- Concrete materials including cement, sand, and aggregate

12.14.13 Receipt, Storage, Inventory and Control of Signs

Make provision for the receipt, storage, inventory and control of existing and replacement stock of Departmental signs, fittings and other associated items for use in the contract works.

Provide a secure and weatherproof storage facility at the Contractors premises. The facility is to be approximately 150 m² to accommodate an existing stock of signs, posts and fixtures made available to the Contractor by the Superintendent for use in the contract works. Three large sign racks will also be provided with the signs.

Keep stock records up to date and regularly advise the Superintendent of item usage. The Superintendent will supply replacement items as required. Such replacement items will be at no cost to the Contractor, however costs associated with receipt, storage, inventory and control will be paid at the rate for Establishment as defined in the Schedule of Rates.

12.14.14 Transportation

Transport all items with care to ensure installation in an undamaged condition. Signs are to be secured, supported and braced vertically to prevent damage due to scuffing, abrasion or load shifting. Adequately brace large signs to prevent buckling or rivet popping. Signs installed in a damaged condition will not be accepted.

12.14.15 Daily Log – Hold Point

Keep a daily log of works which at a minimum identifies road name, chainage, work performed, completion date, equipment down time and unusual happenings. Submit daily log book sheets with each completed Contractor Service Request (CSR).

Hold Point - Submit for Superintendent approval a suitably designed format for daily log books prior to commencing works under the Contract.

12.15 REMOVAL OF GRAFFITI

Remove the Graffiti using the nominated graffiti remover in accordance with the manufacturer's instructions. Rinse panel free of remover/graffiti residues with water, wipe dry and assess for clean ability/removal it shall exhibit complete removal of the graffiti and show no discernible effect on the graffiti barrier or retro-reflective or non-reflective sheeting of the sign or other painted surfaces

12.16 CLEANING OF SIGNS

When cleaning a sign a non-abrasive cleaner free of damaging solvents should be applied with a sponge or soft bristle brush. Pressure sprayers may be used if not sprayed so close to the sign that it would damage the sheeting face. Whatever procedure is followed, it is best to first check with the product supplier and test out any chemical cleaner on a sign in the maintenance yard before use in the field.

12.17 CLEANING OF TOURIST INTERPRETIVE SIGNAGE

Tourist Interpretive signs in various locations are required to be kept clean at all times and especially during the "tourist season." The signs are to be cleaned in such a manner as to remove all graffiti, dirt and other deleterious material, leaving the signs fit for purpose, clean and readable.

12.18 ROAD ASSET INFORMATION

The Superintendent will provide a current Road Information Management System (RIMS) data sheet listing when the Contract is awarded and provide regular updates, as required, throughout the Contract.

The data sheet listing will include the following;

- Each road under the Contract
- The respective identification number
- The respective Permanent Reference Points (PRPs) and chainages.

Work will be located by reference to the information contained on the data sheet listings.

12.19 MATERIAL SUPPLIED BY THE PRINCIPAL

On termination of the Contract, undertake a stock inventory of all signs, posts and fixtures and provide the inventory to the Superintendent. All discrepancies deficient from the stock at the onset of the Contract will be charged to the Contractor. Give access to the Superintendent or his Representative in order to remove or relocate the signs at the termination of the contract. The cost of removal or relocation of the signs, posts and fittings will be borne by the Superintendent.

12.20 FLOOD GAUGE POSTS

Posts and Gauges

Use a standard flood gauge refer to standard drawing CS 3501.

Use galvanized posts, single length, 150 x 50 x 3mm RHS with a 3mm end cap welded to the top.

Paint welds with a zinc rich organic paint to APAS specification 2916.

Installation

Erect the post vertically at the outer edge of the road shoulder or margin, on the left hand side when viewed in the direction of travel.

Install a concrete anchor, of 20 MPa concrete, with a depth of 600 mm and a diameter of 300 mm.

Cast a suitable galvanized sleeve, 650 mm in length, in the anchor so that the sleeve extends 50 mm above the finished surface level.

Attach post to sleeve with a galvanized M10 bolt 25 mm from the top of the sleeve.

Secure gauge to post with galvanized bolts and nuts, and galvanized brackets as appropriate.

Position gauge zero to comply with lowest spot on floodway along the centre line.

12.21 CATTLE GRIDS

Repair and maintain each required section of the cattle grid or assembly as shown on the Standard Drawings and details below:

- Grid centre line are placed on the centre line of the road pavement.
- Grid grade and levels are to conform to the grade and levels of the adjacent road pavement.

- Place and compact select fill behind the abutments of the grid, up to the base of the pavement.
- Reinstate pavement layers with base material.
- Reinstate surface.
- Tighten all hold down bolts as specified.
- Paint the portion of guardrails above ground with one coat zinc phosphate primer and two coats of white alkyd paint.
- Fix width markers with epoxy adhesive to each guardrail.
- Construct strainer post assemblies.
- Fix the stock fence to the strainer assembly.
- Supply and install a gate in the fencing adjacent to the grid as specified.

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

12.21.1 Grid Maintenance

Refer to Standard Drawings CS 3305, CS 3313, CS 3314, and CS 3315.

This section of work for the repairs and maintenance of grids, include the welding to damage members of a grid, remove and replacement of damaged parts of a grid and cleaning and painting of parts of a grid

All repairs to grid steel welding will be carried out by a certified tradesman or a person with demonstrated ability to perform the works within the limits of the specification

Carry sufficient spare bolts, nuts, plates and tradesman equipment when carrying out routine maintenance for repairs that were not obvious at the time of original inspection.

12.22 ROAD SAFETY BARRIERS - STEEL BEAM GUARDRAIL SYSTEM

Repair and maintain each section of the steel beam guardrails requiring repair and/or maintenance to reinstate them to an as new condition as shown on CS 3200 and as detailed below. Refer to CIVIL STANDARD DRAWINGS.

12.22.1 Steel Beam Guardrail System Maintenance

Repairs to, and maintenance of, damaged sections of steel beam guardrail include removal and replacement of damaged sections of rail, posts and terminal sections in a manner that produces a smooth, continuous, taut rail closely conforming to the line and grade of the roadway.

Attach reflective delineators to the guardrail in accordance with the manufacturer's specification.

12.22.2 Materials

Refer to Civil Standard Drawing CS 3200 and <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/road-safety-barriers> for the installation of accepted MASH tested road safety barrier systems.

RAILS

Use accepted MASH tested steel beam rail to AS/NZS 3845.1 and per the Department's Safety Barrier Technical Conditions of Use, which are accessible via the link shown above, and the related Manufacturer's product manual.

TERMINAL SECTIONS

Use accepted MASH tested terminals as per the Department's Safety Barrier Technical Conditions of Use and the related Manufacturer's product manual.

POSTS

Use posts and block outs as detailed in the Manufacturer's product manual of accepted MASH tested safety barriers as per the Department's Safety Barrier Technical Conditions of Use.

GALVANIZING

All accepted MASH tested steel rail product components as per the Department's Safety Barrier Technical Conditions of Use and the related Manufacturer's product manual shall have been hot dip galvanized, after fabrication, to AS 4680.

Where the galvanising on guard rail or associated fittings has been damaged, the coating shall be repaired by regalvanising or by painting with a minimum of two coats of a zinc-rich inorganic paint in accordance with AS/NZS 3750.9 and one coat of aluminium paint.

Provide certificate(s) of compliance from the galvanizer making the repairs that the repaired galvanizing complies with AS 4680.

12.22.3 Compliance

Traceability of components - To AS/NZS 3845 Part 1.

(a) All steel rails, posts and other critical components shall be permanently marked in lettering at least 10 mm high with the name of System Manufacturer, the date and month of manufacture the grade of steel and base metal thickness (BMT) to allow the product to be traced.

(b) Where plastic components make up a key element of the system, they shall be permanently marked clearly indicating the month and year of manufacture in a location that can be easily inspected.

(c) Bolts shall be marked in accordance with AS 1111.1 or AS/NZS 1252.

12.22.4 Installation

Erect the rail in a manner that produces a smooth, continuous, taut rail closely conforming to the line and grade of the roadway.

Lap rails so that the exposed ends of the rails do not face oncoming traffic from the adjacent lane.

Attach retroreflective delineators to the guardrail in accordance with the manufacturer's specification.

Delineator heights to match heights of delineators on guide posts.

Delineator dimensions shown in **Guide Posts** clause, **Delineators** sub-clause in this work section.

12.23 ROAD SAFETY BARRIERS – STEEL WIRE ROPE SYSTEM – HOLD POINT

Materials and installation to AS/NZS 3845.1, to AS 2759, to the Department's Safety Barrier Technical Conditions of Use, and to the manufacturers' product manuals.

Use only accepted MASH tested steel wire safety systems.

Hold Point – Obtain Superintendent's approval for any proposed Steel Wire Rope Road Safety Barrier System before ordering any components.

12.24 ADVERSE CONDITION REPORT

Submit to the Superintendent a Road Furniture Adverse Condition Report when condition of road furniture is adverse due to factors not covered by this specification.

Carry out the works in accordance with ordered Contractor Service Request (CSR) and as per unscheduled work conditions of this specification, however, submit this report if works are to be interrupted due to external or unforeseen circumstances.

12.25 LIAISON WITH THE SUPERINTENDENT

Refer all matters relating to difficulties or problems experienced in carrying out the requirements of the Contract to the Superintendent.

12.26 CONTRACTOR'S PERSONNEL

Provide one service vehicle with a minimum of two personnel to undertake the works under the contract.

The Superintendent may at times require the services of additional vehicles and labour to perform Unscheduled Works. Additional vehicles and labour will be paid at the tendered rates defined in the Schedule of Rates.

12.26.1 Personnel in Crews

Personnel undertaking contractual works as defined in this specification will be required to work with minimum supervision. Nominate one of the personnel familiar with the requirements of contract to attend all operations in each area of work to ensure full compliance. Nominate an

individual or provide a roster of individuals that are contactable and available at all times, 24 hrs a day 7 days a week including Public Holidays.

Refer to **Table - Personnel in Crews**.

Table - Personnel in Crews	
At least one person shall have the following:	
Qualifications:	A current Accreditation Certificate in Work-zone Traffic Control, and prior experience in traffic management. An ability to understand and apply the requirements of AS 1742.3. Possess a current NT driver's licence appropriate for the Contractors service vehicle.
Experience:	Relevant experience in the construction industry including safe operation of equipment for welding, cutting, grinding, concreting, and other hand tools.
Attributes:	Good oral and written communication skills, and able to liaise well with Departmental staff.
Knowledge:	Knowledge of the road network.

12.26.2 Plant and Equipment

Supply a service vehicle readily available and equipped with all the necessary tools and equipment to perform the works.

Refer to **Table - Plant and Equipment**.

Table - Plant and Equipment	
The service vehicle will provide effective and efficient service response, and will contain but not be limited to the following items:	
Communication:	Hands free mobile phone. Access to a satellite phone for remote locations would be advantageous, however not essential.
Fittings:	Post and sign racks, concrete pre-mix material bins, water tank with potable water supply sufficient to mix concrete as required, and storage boxes for brackets, fitting, bolts and nuts etc.
Equipment:	Mechanical and hand augers, oxy-acetylene set, portable welder/generator set, small electric breaker, ladders, wheelbarrow, lifting equipment, dumpy level and staff.
Hand Tools:	Hand tools for fencing, concreting, digging, shovelling, compacting, fixing, screwing, dismantling, riveting, driving, breaking, and levelling. Electric hand tools and accessories for the grinding, cutting and drilling of steel, aluminium and wood, banding tools.
Camera:	Digital camera to record evidence of damage for unscheduled works and other occurrences.

12.27 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

13 PAVEMENT MARKING MAINTENANCE

13.1 GENERAL

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

13.2 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

AS 1580(set) Paints and related materials - Methods of test

AS/NZS 1580.205.4 - Application properties - Airless spraying

AS 1742(set) Manual of uniform traffic control devices

AS 1742.3 - Traffic control for works on roads

AS 1744 Standard alphabets for road signs

AS/NZS 1906(set) Retroreflective materials and devices for road traffic control purposes

AS/NZS 1906.1 - Retroreflective sheeting

AS/NZS 1906.3 - Raised pavement markers (retroreflective and non-retroreflective)

AS/NZS 2009 Glass beads for road marking materials

AS/NZS 2310 Glossary of paint and painting terms

AS/NZS 2433 Plastics - Method for exposure to ultraviolet lamps

AS 2700(set) Colour standards for general purposes

AS 2700S(N14) - White

AS 2700S(N61) - Black

AS 2700S(Y14) - Golden yellow

AS 2700S(Y35) - Off-white

AS 2890(set) Parking facilities

AS/NZS 2890.1 - Off-street car parking

AS 2890.2 - Off-street commercial vehicles facilities

AS 2890.3 - Bicycle parking

AS 2890.5 - On-street parking

AS/NZS 2890.6 - Off-street parking for people with disabilities

AS 4049(set) Paints and related materials – Pavement marking materials

AS 4049.1 - Solvent-borne paint – For use with surface applied glass beads

AS 4049.2 - Thermoplastic road marking materials - For use with surface applied glass beads

AS 4049.3 - Waterborne paint - For use with surface applied glass beads

AS 4049.4 - High performance pavement marking systems.

AS 4049.5 - Performance assessment of pavement markings

13.2.1 APAS Specifications

APAS AP-S0041/2 Pavement marking paint, solvent-borne

APAS AP-S0041/3 Pavement marking paint, cold applied plastic

APAS AP-S0041/4 Pavement marking paint, thermoplastic

APAS AP-S0041/5 Pavement marking paint, water borne

APAS AP-S0041/6 Airport runway markings

APAS AP-S0042 Glass beads for pavement marking paint

13.2.2 Test Methods

NTTM 401.1 Operation of wet film thickness comb

NTTM 402.1 Field procedure for measurement of the rate of application of spherical glass beads

NTTM 405.1 Certification of pavement line marking apparatus

13.2.3 Civil Standard Drawings

CS 3400 Line marking

CS 3401 Pavement markings – Chevrons and raised retroreflective pavement markers – Sheet 1

CS 3402 Pavement markings – Chevrons and raised retroreflective pavement markers – Sheet 2

CS 3403 Edge line with audio-tactile ribs

13.3 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

The following additional definitions apply.

AADT

Annual Average Daily Traffic

ATLM

Audio Tactile Line Marking.

APAS

Australian Paint Approvals Scheme.

APPROVED

Approved by the Superintendent

CS and C(S)

Civil Standard drawings. Use the most recent version. These are accessible via

<https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/standard-drawings>

CSR

Contractor Service Report

GPS

Global Positioning System

LONGLIFE MATERIALS

Generally thermoplastic, cold applied plastic or pliant polymer materials, with lifespans between 2 to 5 times that of waterborne paint.

LONGITUDINAL LINES

Any line which runs parallel to the road centre line, e.g. broken line, edge line, separation line, barrier line.

NTMTM

NT Materials Testing Manual accessible via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/materials-testing-manual> .

NTTM

NT Test Methods, found in NT Materials Testing Manual.

OTHER MARKINGS

All diagonal lines, chevron markings and messages on the pavement, including symbols, words, numerals, arrows and kerb markings.

PCCP

Painting Contractors Certification Program.

PRP

Permanent Reference Point

RETROREFLECTIVITY

The reflectivity provided by glass beads expressed as minicandela per lux per square metre (mcd/lux/m²) as measured by a reflectometer approved by the Superintendent.

RRPM

Raised retroreflective pavement marker.

TRAFFIC CONTROL DEVICE

Any sign, signal, pavement marking or other installation placed or erected for the purpose of regulating, warning, guiding or providing for the safety of road users. It does not include temporary warning devices and control measures erected only for the construction period.

TRANSVERSE MARKINGS

Any line which is at right angles to the centre line of the road, e.g. stop line, hold line, pedestrian cross walk.

TYPE B-HR

Highly retroreflective spherical glass beads of Type B to AS/NZS 2009

TYPE D-HR

Highly retroreflective spherical glass beads of Type D to AS/NZS 2009

URBAN

Urban area for Darwin region is nominated as – North of Cox Peninsula Road (Stuart Highway), West of Trippe Road (Arnhem Highway) and the end of seal on Gunn Point Road. Other urban areas are nominated as being within, and extending to, town boundaries.

13.4 SCOPE

This section specifies the materials, testing and standards of workmanship for marking of pavements.

Pavement Marking treatments include, but are not limited to:

- Supply of estimate of works to be undertaken (not for new works)
- Traffic control
- Set out of pavement markings to Australian and Northern Territory Standards
- Painting of Markings with waterborne, thermoplastic and cold applied paints
- Installation and removal of raised reflective pavement markers
- Removal and disposal of temporary pavement markers
- Removal and storage of temporary road signs after resealing works
- Coordination of works with resealing Contractor (for new works only)
- Reporting of works performed
- Remarkings of aerodromes (if applicable)

13.5 CONTRACTOR ACCREDITATION

All pavement marking work shall be carried out by a Contractor accredited to the “Painting Contractor Certification Program” (PCCP) in a class or category applicable to the work. The PCCP is administered by the CSIRO. Information regarding the PCCP can be obtained via <http://www.apas.gov.au/>.

The Superintendent may give an exemption for this clause for airstrip reseals, small quantity work, or unusual circumstances.

13.6 PAVEMENT MARKING PAINT – HOLD POINT

Use approved water based white pavement marking paint which:

- Conforms to APAS AP-S0041/5, and
- Is suitable for application by spray equipment, in accordance with Test Method AS/NZS 1580.205.4, to asphalt and bituminous seal road surfaces, and

- Is suitable for use with Type B HR and/or Type D HR drop-on spherical glass beads.

Hold Point - Submit Certificates of Compliance, issued by an accredited testing authority, stating that all paints being used comply with the relevant Australian Standards and/or APAS specifications.

Pavement marking paint colours:

The standards for pavement marking paint colours are:

- White pavement marking paint must have a white colour to AS 2700S(N14),
- Yellow pavement marking paint must have a golden yellow colour to AS 2700S(Y14),
- Black pavement marking paint must have a black colour to AS 2700S(N61).

White pavement marking paint with an off-white colour to AS 2700S(Y35) may be accepted by the Superintendent.

Pavement marking paint is acceptable for remarking aerodromes.

13.7 GLASS BEADS – HOLD POINT

Use glass beads conforming to AS/NZS 2009 and APAS specification AP-S0042

Hold Point - Submit Certificates of Compliance, issued by an accredited testing authority, stating that the glass beads being used comply with, the relevant Australian Standards and APAS specifications.

In urban areas use: Type B-HR for initial new works application

Type D-HR beads for subsequent remark and all remarking works

In rural areas use: Type B-HR beads for initial new works application

Type B-HR beads for subsequent remark and all remarking works.

Refer to **Table – Application Times – All Longitudinal and Transverse Pavement Markings.**

13.8 PAVEMENT MARKING SETTING OUT

The location of all pavement markings on new surfaces, including reflective raised pavement markers, shall be set out by spotting with paint or other approved method prior to application of the markings.

Ensure the distance between the centre line of the marking and the centre line of the set out mark is less than 30 mm. The apparent line of the markings is a smooth continuous alignment when viewed in the direction of the line.

Roads New work: Set out line marking to the line pattern specified in accordance with AS 1742 and the Standard Drawings for Line Marking CS 3400, CS 3401, CS 3402, and CS 3403, including the setting out of arrows, letters, numerals and chevrons and RRPMS.

Aerodromes New work: Set out pavement marking to the line pattern specified in accordance with the specification drawing for Aerodrome Pavement Marking, and in accordance with the Manual of Standards Part 139— Aerodromes, Chapter titled “Visual Aids Provided by Aerodrome Markings, Markers, Signals, Signs, Wind Direction Indicators ETC”

The Superintendent will supply the design drawings for aerodromes when the work order is issued.

Existing Pavement Markings (including aerodromes)

Remark along the line of the existing line marking as per **Table – Tolerances of Pavement Markings.**

13.9 PAVEMENT MARKING APPLICATION – WITNESS POINT

Apply the marking materials using a self-propelled mobile sprayer, hand sprayer, hand painting or hand screeding as directed by the Superintendent

Witness Point - Obtain approval from the Superintendent for the type of equipment to be used for applying pavement marking materials.

Witness Point - Produce documented evidence to show that the spraying equipment has been calibrated in accordance with PCCP requirements and is certified by PCCP as being suitable for the works to be carried out under this contract.

Witness Point: Obtain Superintendent's approval for variation to the any of the above requirements.

Substrate: Ensure that the pavement surface is free from dirt, loose detritus, mud and other extraneous matter, and is dry before and after painting operations

Protect all applications from traffic until the binder has hardened sufficiently to retain the glass beads.

Produce markings so that they are straight, with smooth even curves where necessary. Remove any marking material beyond the defined marking leaving a neat and smooth marking on the pavement.

Produce markings free from ghosting and raggedness on the sides and ends and parallel with the general alignment of the carriageway with the lines level, uniform and free from streaks.

Reinstate pavement markings that are damaged by traffic during paint drying time and remove all tyre pickup marks.

13.9.1 Longitudinal Application

Apply the marking materials using a self-propelled mobile sprayer having a minimum capacity of 200 litres of paint.

Apply paint evenly to the pavement surface at the specified film thicknesses and immediately after apply an even application of glass beads at the specified rates.

On all new work, apply one coat of paint and glass beads to the pavement in the direction of traffic flow.

For remarking, apply one coat of paint and glass beads to the pavement surface in the direction of traffic flow.

13.9.2 Transverse and Other Marking Applications

Apply the marking materials using a self-propelled or hand sprayer with a capacity of 20 litres of paint or a different capacity as directed by the Superintendent.

Apply paint evenly to the pavement surface to the specified film thickness and immediately after apply an even application of glass beads at the specified rates.

13.9.3 Markings on Concrete Pavement

Prime the concrete pavement surface with an approved primer before applying markings. Allow sufficient time for primer to cure to manufacturer's recommendations before applying markings.

13.9.4 Glass Beads

Apply glass beads by low pressure or delivered by gravity dispenser, D-HR beads may require application by static drop method in conjunction with air pressures to retain beads.

Maximum application speed for glass beads shall be as per manufacturer's recommendations.

The application rates specified for glass beads are the amounts that are retained in the painted surface after three weeks of trafficking.

Ensure that the loss in glass beads after three weeks traffic does not exceed ten per cent of total applied.

13.10 PAVEMENT MARKING CONFORMANCE TOLERANCES – HOLD POINT

Hold Point – Provide evidence that the pavement marking complies with the requirements of this specification.

Pavement marking for road and aerodrome work shall conform to the following tables:

- **Table – Dimensional Tolerances for Pavement Markings**
- **Table – Application Rates – All Longitudinal and Transverse Pavement Markings**
- **Table – Application Times – All Longitudinal and Transverse Pavement Markings**

Table – Dimensional Tolerances for Pavement Markings		
Properties	Tolerances	
	New work	Remarking work
Locations of centrelines of markings	< 20 mm from locations as shown on drawings	+/- 5 mm
Widths of lines	+/- 5 mm	+/- 10 mm
Lengths of lines	+/- 50 mm	+/- 100 mm
Locations of arrows, chevrons, letters, numerals	+/- 50 mm	+/- 50 mm
Deviation and/or trueness of lines	< 15mm in 2 metres	< 15mm in 2 metres

Table – Application Rates – All Longitudinal and Transverse Pavement Markings					
Location	Works	Wet film paint thickness	Dry film paint thickness	Glass beads type	Rate of glass beads to be retained
URBAN	Initial marking	> 0.360 mm	> 0.230 mm	B-HR	> 300g/m ²
	Remarking	> 0.515 mm	> 0.330 mm	D-HR	> 400g/m ²
RURAL	Initial marking	> 0.360 mm	> 0.230 mm	B-HR	> 300g/m ²
	Remarking	> 0.360 mm	> 0.230 mm	B-HR	> 300g/m ²
AERODROMES	Initial marking	> 0.360 mm	> 0.230 mm	Not required	> 300g/m ²
	Remarking	> 0.360 mm	> 0.230 mm	Not required	> 300g/m ²

Note: Paint film thickness tolerances exclude surface applied glass beads.

Table – Application Times – All Longitudinal and Transverse Pavement Markings				
Location		Works	Longitudinal markings	Transverse markings
URBAN	New Pavement Marking	Initial marking	Before opening of works to traffic	Before opening of works to traffic
		Resurfacing and/or resealing	Within 2 days	Hold lines – 1 day. Other lines within 2 days
		Remarking	9 months maximum	9 months maximum
	Existing Pavement Marking	Remarking	Within 7 days of issue of a CSR or as extended by the Superintendent	Within 7 days of issue of a CSR or as extended by the Superintendent
RURAL	New Pavement Marking	Initial marking	Before opening of works to traffic	Before opening of works to traffic
		Resurfacing and/or resealing	Within 21 days	Within 21 days
		Resurfacing and/or resealing – Stuart Highway, including overtaking lanes	Within 5 days	Within 5 days
		Remarking	3 to 6 months of issue of a CSR or as extended by the Superintendent	3 to 6 months
	Existing Pavement Marking	Remarking	Within 7 days of issue of a CSR or as extended by the Superintendent	Within 7 days of issue of a CSR or as extended by the Superintendent
AERODROMES	Resurfacing and/or resealing	As directed by the Superintendent. To comply with CASA safety requirements	As directed by the Superintendent. To comply with CASA safety requirements	
	Remarking	As directed by the Superintendent.	As directed by the Superintendent.	

13.11 FIELD TESTING

The Department, at the Superintendent’s discretion, will perform on site conformance testing using the panel period Contractors. The Contractor shall assist the testing laboratory with sampling and other requirements of the testing in the field.

The Superintendent will perform random reflectivity testing in all regions to measure performance of the pavement marking on different surfaces and bead types.

Wet film thickness: Check the thickness of the wet film applied to the pavement by the method NTTM 401.1 - Operation of Wet Film Thickness Comb.

Glass bead application: Check the application rate of glass beads to the surface of the marked line by the method NTTM 402.1 - Field Procedure for Measurement of the Rate of Application of Spherical Glass Beads.

Wear assessment limits: The degree of wear is defined as the area of pavement marking remaining after a period of time, relative to the initial area of the pavement marking.

Degree of wear: At the Superintendent’s discretion determine the degree of wear using Image Analysis in accordance with AS 4049.3:2005 Appendix K, Method A, Photographic Method.

Wear limits for pavement marking: 95% intact area after six months.

Remark pavement marking that does not conform to the specified limits, including the costs of all testing, at no cost to the Principal.

13.12 THERMOPLASTIC MATERIALS – HOLD POINT

Hold Point: Approval from the Department's Executive Director Civil Delivery is required before thermoplastic materials are used.

Thermoplastic pavement marking materials must comply with AS 4049.2 and with APAS specification AP-S0041/4.

Thermoplastic road marking material must consist of aggregate, pigment, binder, glass beads and extenders, capable of being softened by heating and hardened by cooling.

For continuous thermoplastic pavement marking, 100 mm drainage gaps shall be provided, at a maximum spacing of 3m, to allow adequate drainage of the pavement surface. Nominate the method of identifying the location and spacing for these gaps.

13.13 COLD APPLIED PLASTIC MATERIALS – HOLD POINT – WITNESS POINT

Use approved plastic pavement marking materials to APAS AP-S0041/3 Cold applied plastic.

Hold Point: Approval from the Department's Executive Director Civil Delivery is required before cold applied plastic materials are used.

Witness Point - Provide evidence that all proprietary products such as epoxy or plastic products have demonstrated satisfactory field performance for a period of at least three years.

Material - Generally: A two part Poly Methyl Methacrylate resin based pavement marking material that complies with the requirements for colour, luminance and bead content of AS 4049.2, and which complies with AS 4049.4, sprayed or screeded onto the pavement, containing pre-mixed glass beads, with additional drop-on beads being added during application, conforming with the following requirements of AS 4049.2: Clause 5.1 – Colour, Clause 5.2 - Luminance and Clause 7 - Field Testing. The material shall have a maximum no-pick-up time of 60 minutes.

Do not use cold applied plastic materials on new asphalt works.

13.14 AUDIO TACTILE LINE MARKING (ATLM) – HOLD POINT

Hold Point: Approval from the Department's Executive Director Civil Delivery is required before audio tactile line marking materials are used.

Use approved plastic pavement marking materials.

13.14.1 Site Preparation

The area to be marked is to be dry and free of dirt, gravel, oil and other loose or foreign material to ensure the best possible adhesion of new material. Remove existing paint or other material which is flaking or chipped. Cleaning may be carried out by brooming, blowing or washing.

Use a tack coat or primer material for surface or other conditions requiring it in accordance with the Manufacturer's Specification to ensure satisfactory adhesion of the material.

13.14.2 Application

Apply by extrusion methods, including application of glass beads and anti-skid material, in a single uniform layer.

For longitudinal lines and transverse markings, apply material at a rate to achieve a minimum final tolerances and dimensions as stated in drawing CS 3403.

Glass beads that are to be mixed in are to be Class C (intermix 20 to 30 % by mass).

Additional Type B-HR beads shall be uniformly applied to the surface of thermoplastic at the rate of > 300g/m² (retained) as part of the application process and before the material has commenced to set.

The marking produced shall be uniform in texture, width and thickness and the surface substantially free from blisters, streaks, lumps and other defects.

Remove any occurrence of overspray, gun dribble and defective ribs.

Audio tactile line marking tolerances must conform to **Table - Audio Tactile Line Marking Tolerances** and to civil standard drawing CS 3403.

Table - Audio Tactile Line Marking Tolerances		
Aspect	Dimension	Tolerance (mm)
Length of raised rib	150 mm	+/- 10 mm
Width of raised rib	50 mm	+/- 10 mm
Height of raised rib	12 mm	+ 1 mm
Spacing of raised rib	250 mm	+/- 20 mm

13.14.3 Retro-reflectivity

When tested in accordance with AS 4049.2:2005 Appendix K marking must achieve a minimum level of reflectivity of 350 mcd/lux/m² at time of application

13.15 RAISED RETROREFLECTIVE PAVEMENT MARKERS (RRPMS)

13.15.1 Raised Reflective Pavement Markers – Hold Point

Use raised reflective pavement markers conforming to AS/NZS 1906 Retroreflective materials and devices for road traffic control purposes

Hold Point: Submit details in relation the manufacturer’s warranties, performance, durability and maintenance of the raised retroreflective pavement markers.

Provide raised retroreflective pavement markers with the following attributes:

Table – Raised Retroreflective Pavement Markers Dimensions	
Aspect	Dimension
Height (above pavement level when installed)	18 – 25 mm
Width at right angles to the direction of the traffic	110 – 130 mm
Length parallel to the direction of the traffic	80 – 110 mm

13.15.2 Materials

Use markers fixed to the pavement surface as recommended by the manufacturer of the marker.

Use adhesives as recommended by the manufacturer.

Use adhesives within the time recommended by the adhesive manufacturer.

13.15.3 Pavement Preparation

Clean the pavement.

Ensure each RRPM site is free of dirt, oil, grease, paint and any other material that would affect the bond of adhesive to the pavement.

Abrasive blast, chip, or burn pavements that cannot be cleaned by sweeping.

Do not place markers if moisture is present. Ensure pavement is dry before applying markers.

13.15.4 Placing Markers

Place markers in accordance with AS 1742.3 and Standard Drawings CS 3401, CS 3402.

Place the reflectors to face the oncoming traffic.

Do not obscure the reflective faces by adhesive.

Ensure that the surface finish is smooth.

Discard markers which are not positioned correctly within the time recommended by the manufacturer for use of the adhesive. Remove stale adhesive from the pavement surface.

Do not place markers over joints in concrete pavement.

Wear limits for pavement markers: 95% intact area after six months.

Replace markers that have dislodged within 12 months of installation.

13.16 REMOVAL OF PAVEMENT MARKINGS – HOLD POINT

Hold Point – Obtain approval from the Superintendent on the proposed method used for pavement marking removal before commencing removal operations.

Removal of pavement marking must not adversely affect the integrity of the pavement surface.

When longitudinal and transverse lines are removed, the marks left on the pavement surface must not confuse the motorist with ghosting or incorrect directions. Where removal is outside of 100 mm of the existing lines then the entire width of the lane is to be consistent with the line removal texture.

When arrows, letters or figures are to be removed or temporarily blacked out, the removal pattern must be in the shape of a rectangle or square to minimise confusion to the motorists.

Remove all materials and debris from removal operations and dispose at an authorised legal disposal site. Repair any surface defect caused by the removal process at no additional cost to the Principal.

The following methods may be considered and will be dependent on the type of surface, extent and application.

13.16.1 Resealing and asphaltting

Spray sealing and or Asphalt replacement is the preferred method for replacement. Determination of materials shall be in accordance with existing materials.

Where this method is used the reworking needs to be for the full width of the pavement.

13.16.2 Sandblasting or water blasting

This methodology is the preferred method for marking removal on asphalt and concrete surfaces.

Use a skirt or guard around the blaster to minimise the spraying of material away from the immediate work area.

Remove waste material before it can be transported by rain, wind or traffic. This will generally require the use of a vacuum attachment operating concurrently with the blasting operation or alternative method approved by the Superintendent.

13.16.3 Machine Grinding

This method may be considered for use on smaller removal jobs where surface finish is not a concern. It can be used on most asphalt and concrete surfaces.

13.16.4 Paint Blackout – Hold Point

Paint blackout may be considered as a temporary measure only and must be removed upon completion of the works.

Hold Point – Obtain Superintendent's approval before using this methodology.

13.16.5 Other Methods

Other methods such as heat lance or paint stripping may also be considered by the Superintendent.

13.16.6 Raised Retroreflective Pavement Marker Removal

Where required, remove raised retroreflective pavement markers by breaking the bond between the adhesive, the pavement surface and the base of the raised retroreflective pavement marker.

Repair all divots caused by the removal of raised retroreflective pavement markers with hot melt adhesive or epoxy adhesive to the level of the surrounding pavement.

13.17 RESURFACING CONTRACTS

13.17.1 New Pavement Marking on Asphalt Resurfacing and Resealing Works Contracts

Where works are ordered under a period contract, conform to, and comply with, the requirements of the Period Contract documents.

The Principal will pay the Pavement Marking Period Contractor direct for the pavement marking work associated with resurfacing contract works.

13.17.2 Co-ordination of Pavement Marking Work

The Pavement Marking Period Contractor is responsible for co-ordination of the pavement marking work with the Resurfacing Contractor.

The Superintendent will advise of the name and contact details of the Resurfacing Contractor to the Pavement Marking Period Contractor

The Superintendent will issue a direction to work.

The works shall require co-ordination with the resealing Contractor to ensure all new asphalt and or resealing scheduled works have pavement marking reinstated within the allocated timeframes. Refer to **Table – Application Times – All Longitudinal and Transverse Pavement Markings**

13.17.3 Removal of Temporary Pavement Markers

The Pavement Marking Period Contractor shall remove all temporary pavement markers that have been placed on the new pavements for delineation and safety reasons, and dispose of them at an authorised legal disposal site.

Use a removal method which does not cause damage to the pavement surface. For temporary pavement markers which are securely bonded to the pavement it is acceptable to cut off the vertical flange and leave the horizontal flange bonded to the pavement. Ensure there are no sharp edges or protrusions on the portion left on the pavement.

13.17.4 Removal of Temporary Traffic Control Signage

The Pavement Marking Period Contractor shall remove all temporary traffic control warning devices and posts that have been left at new works site for safety reasons, and return signage and posts to the following locations:

- Darwin – Government storage yard
- Katherine – Government storage yard
- Tennant Creek – Government storage yard
- Alice Springs – Government storage yard

The Pavement Marking Period Contractor Contractor will be responsible for the safe keeping of the signage and must ensure no damage occurs to the signage during transport.

13.18 REPORTING – HOLD POINT

Hold Point – Submit to the Superintendent the following information, in Microsoft Excel spreadsheet format, every quarter for panel contract works, for all works carried out under this contract:

- CSR number (for panel contract works)
- Contract number (for new works)
- Date
- Road number
- Chainages – start point and finish point of each section of works
- PRP numbers - start point and finish point of each section of works
- GPS coordinates in Decimal Degrees - start point and finish point of each section of works
- Type of carriageway – inbound outbound (for duel carriageways) and full width (for two way carriageway) and
- Bead size used and Paint application rate.

13.19 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

14 LANDSCAPE MAINTENANCE



14.1 OUTLINE DESCRIPTION

This section specifies the maintenance requirement for control of vegetation and litter by use of mechanical means and/or chemicals, and the maintenance requirement for irrigation systems, in an urban road verge environment.

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

Comply with conditions included in any AAPA clearances or approvals applying to the site of the works.

Comply with the restrictions imposed by any Restricted Works Areas conditions applying to the site of the works.

14.2 CROSS REFERENCES

MISCELLANEOUS PROVISIONS for **Disposal of Waste**

MISCELLANEOUS PROVISIONS for **Work Involving Chemicals**

SLASHING AND WEED CONTROL for **Vegetation Control** and for spraying

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES

14.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

Australian Standards

AS 1742.3	Manual of uniform traffic control devices - Traffic control for works on roads
AS 2303	Tree stock for landscape use
AS 4373	Pruning of amenity trees
AS 4419	Soils for landscaping and garden use
AS 4454	Composts, soil conditioners and mulches

Austrroads

AGRD04A-10 Austrroads Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

14.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

The following additional definitions apply.

CERTIFIED SEED

Seed by record of origin, purity, and strain and conforming in character to the parent stock.

EXOTIC PLANTS

Any plants not native to Australia.

FINE TILTH

The friable soil resulting from cultivation.

GERMINATION PERCENTAGE

The proportion of pure seed germinating in a fixed time under standard laboratory conditions.

GRASS

Grass includes clumps or tufts of grass growing on scalded areas, grass species that grow faster than other species and includes the whole of the plant, including leaves, seeds, stems and seed heads.

MULCH

Material spread as a surface treatment to reduce soil erosion, water loss, and weed invasion.

NATIVE PLANTS

Plants which are natural to Australia.

NPK RATIO

The ratio of Nitrogen (N), Phosphorus (P), and Potassium (K) in a fertiliser compound.

ROOT BALL

The finely bound fibrous root and soil removed intact from the container with the plant.

RWA

Restricted Work Area

SOIL BINDING AGENT

Material which stabilises and conditions soil and aids moisture retention.

WEEDING

The removal of unwanted plant or grass species by mechanical, manual or chemical means.

14.5 EXTENT OF WORK

Maintain the full extent of the road reserve for each road and length identified in the RFT and/or in the PROJECT SPECIFIC REQUIREMENTS section and the Schedule of Rates.

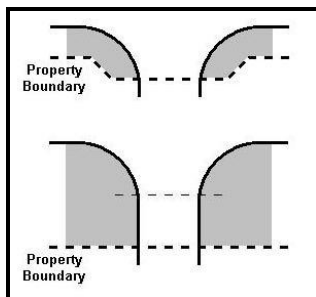
Identify and undertake the works required to maintain each road within the specified service levels. Service levels are clearly defined outcomes specified for all the landscape maintenance works specified herein.

Failure to adhere to the response times for attendance and completion of work, including after hour call-outs, may result in the Superintendent engaging a third party to attend to and complete the work at the Contractor's expense.

At intersections with Local Council Roads, maintain to the end of the curve at the truncation.

Where there is a discernible property boundary or fence line, maintain beyond the end of the curve at the truncation to the extended property boundary line. The relevant Local Councils are responsible for maintenance beyond that point.

Refer to **Figure – Extent of Work Area at Intersections with Local Council Roads.**

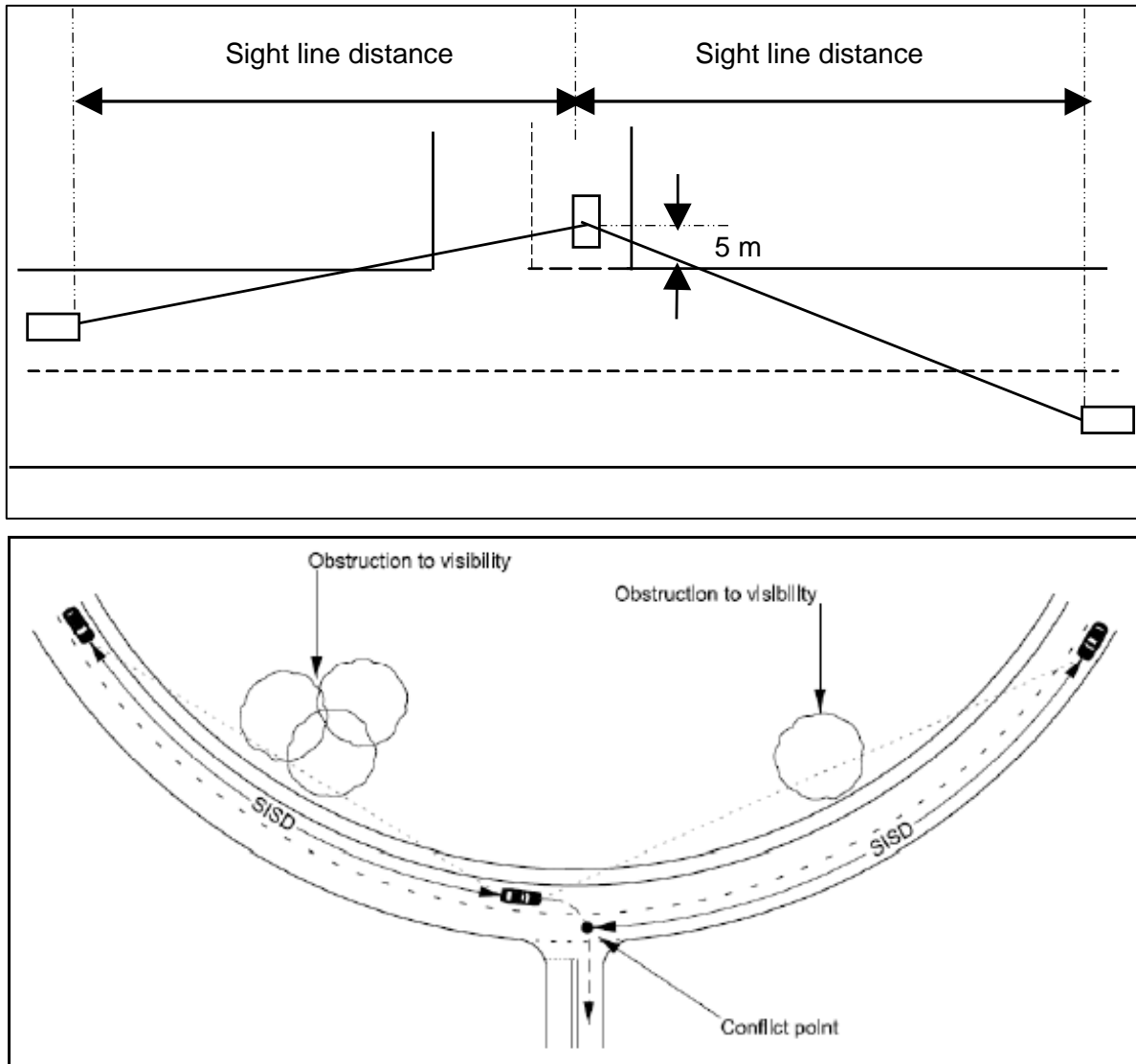


Road verges within the road reserve may on occasion be maintained by other land holders or residents, however they are not exempt from the specified service levels.

Figure - Extent of Work Area at Intersections with Local Council Roads

14.6 INTERSECTION SIGHT LINES

Maintain intersection sight lines to minimum safe intersection sight distances (SISD) corresponding to the relevant vehicle speed as per **Figures - Intersection Sight Lines (SISD)** and **Table – Safe Intersection Sight Distances (SISD) (Sight Lines)**.



Figures - Intersection Sight Lines (SISD)

Table – Safe Intersection Sight Distances (SISD) (Sight Lines)	
Posted Speed Limit (km/h)	Sight Line Distance (m)
40	73
50	97
60	123
70	151
80	181
90	226
100	262
110	300
120	341
130	383

Sight line distances are based on Safe Intersection Sight Distance parameters defined by AGRD04A-17 Austroads Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections, 2017.

14.7 CONTRACTOR'S PERSONNEL

14.7.1 Horticulturist

Employ or have access to a qualified Horticulturist for the total period of the Contract. The Horticulturist shall have attained a minimum qualification of Certificate III in Horticulture (Floriculture) or equivalent accredited training course.

The Horticulturist is to continually monitor and advise the Contractor daily on appropriate horticultural requirements with a view to best practices and will play a major part in maintaining the health of all vegetation over the period of the contract.

A Horticulturist's report is to accompany the monthly claim for payment and is to include mention of all observations or occurrences of note related to vegetative issues observed over the period.

Make available the time and expertise of the Horticulturist at no additional cost to the Superintendent in relation to any plant health related query that may arise within the road reserve associated with the contract on an "as and when required" basis.

14.7.2 Certified Irrigation Specialist

Employ or otherwise engage a certified irrigation designer and tradesperson with appropriate qualifications to undertake design, installation and maintenance of irrigation systems. Certification to be recognised by the Irrigation Association of Australia.

Make available the time and expertise of the certified irrigation specialist at no additional cost to the Superintendent in relation to any irrigation related query that may arise regarding issues associated with the contract on an "as and when required" basis.

The certified irrigation specialist is to continually monitor works and advise the Contractor on appropriate irrigation requirements with a view to best practices and will play a major part in maintaining the irrigation systems over the period of the contract.

14.7.3 Arborist

Include at least one qualified arborist in the tree pruning team.

The Arborist shall be a person with a minimum qualification of Certificate III in Horticulture (Arboriculture) RTF30203, from the Amenity Horticulture Training Package RTF03 or equivalent accredited training course.

14.7.4 Supervisors

Employ sufficient supervisors familiar with the requirements of the contract to attend all operations in each area of work to ensure full compliance with specified service levels.

Nominate an individual or provide a roster of individuals including their contact phone numbers who will be available at all times, including nights, weekends and Public Holidays during the period of the Contract.

14.7.5 Personnel Handling Chemicals

Be registered for business as weed control operators, or engage sub-Contractors registered for business as weed control operators. The Contractor and Sub-Contractors must have a Ground Spraying Business Licence and operators must have a Ground Spraying Applicators Licence. Provide copies of these licences.

Nominate one of the personnel familiar with the requirements of contract to supervise all operations to ensure full compliance with statutory requirements.

Do not allow spray drift. Operators must be competent in their understanding of how to prevent spray drift.

Keep a copy of the Safety Data Sheet on site for each type of chemical used

Handle all chemicals as specified in product SDS.

Wear as a minimum the protective clothing as specified in product SDS.

Refer to the Spraying clause in SLASHING AND WEED CONTROL.

14.8 PROGRAM OF WORKS

Submit a 12 month Landscape Maintenance Program within 2 weeks of award of contract in the first year, and 2 weeks prior to the commencement of a subsequent 12 month period.

Identify the type, frequency and timing for each service associated with the contract. However, achieve the specified service levels regardless of frequency of treatment.

The Superintendent will use the 12 month landscape maintenance program to measure progress of the works.

There may occasionally be a reduction in the area of service under the contract due to new works being carried out within the road reserve. Negotiate with the Superintendent any variation to the contract should these works result in a changed maintenance requirement both during construction and after completion.

Any reduction in the area of service under the contract as a result of asset transfer to another owner will be varied out of the contract.

14.9 PROGRESS REPORTS

14.9.1 Weekly Report

Submit to the Superintendent via email no later than close of business each Thursday a detailed Weekly Report advising the location and nature of works programmed to be carried out over the following week.

Include information about any chemical spills and the remedial action taken.

Carry out the works in accordance with the Weekly Report, however submit a modified version if works are to be interrupted due to external or unforeseen circumstances.

Irrespective of external or unforeseen circumstances continue to maintain the asset within the service levels specified.

Number each Weekly Report from 1 to 52, and identify as a Revision if that is the case.

14.9.2 Monthly Report

Submit a Monthly Maintenance Report attached to the monthly claim for payment. The report shall provide the following information:

- a summary of the activities carried out during the month of the report
- a Horticulturist's report mentioning all observations or occurrences of note related to vegetative issues observed over the period
- a schedule of trees, plants and shrubs that have died, are dying, or are approaching the end of their expected life in the road reserve during the month of the report.
- a schedule of any vegetation that for any reason is unstable or represents a safety hazard to pedestrians, cyclists, motorists or any other user of the road reserve.
- summary of observations or occurrences of note related to irrigation issues.
- summary of spraying operations for herbicides and pesticides undertaken in the period of the report. Copies of daily log book sheets for spray treatments shall accompany the monthly report.
- summary of fertilising undertaken in accordance with the Annual Maintenance Plan.
- estimate of quantity, including location, of mulch held in stockpile that is the property of the Principal.
- details of complaints received from members of the public, and actions taken.
- information about any chemical spills and the remedial action taken.
- details on how compliance with any AAPA conditions or RWAs was achieved.
- a record of details of all dead domestic animals that are disposed of under the contract.

14.10 LIAISON WITH THE SUPERINTENDENT

Refer all matters relating to difficulties or problems experienced in carrying out the requirements of the Contract to the Superintendent.

14.11 SAFETY MATERIALS EQUIPMENT AND SIGNAGE

Carry out all work within the road reserve in accordance with the PROVISION FOR TRAFFIC section and the approved traffic management plan.

Include in the traffic management plan requirements specified herein.

Supply all materials and equipment used under the Contract.

Ensure the safe and proper use and maintenance of all tools, plant, equipment and materials.

Fit appropriate guards on cutting equipment and high mounted orange coloured hazard lights on all plant, equipment and vehicles being utilized under the contract.

Fit all plant, equipment and vehicles with signs or signwriting which identifies the primary Contractor and advises users of the road reserve the primary Contractor's contact phone number.

Erect chemical spraying advice signs within 200 m of the work zone when spraying chemicals, and relocate as works progresses. Spray only between the signs.

Erect signs and park plant equipment and vehicles within the road reserve so that they do not interfere with or restrict sight lines, particularly at intersections.

14.12 MATERIALS

14.12.1 Trees

Refer to AS 2303 for tree stock requirements.

Provide trees, shrubs and ground covers with the following characteristics:

- Trunks and stems to be sturdy and well hardened.
- A well-developed vigorous root system.
- A minimum of three months in their container.
- Be sound, healthy, vigorous, and free from insect pests, plant diseases, sun scalds, fresh abrasions of the bark, or other disfigurements.

14.12.2 Fertilisers

Store fertilisers in waterproof sealed bags under shelter away from water and direct sunlight.

Supply fertilisers conforming to **Table - Fertilisers**.

Table - Fertilisers			
Use	General Plant Category	Where Used	Component Requirements
Planting	Native	Surface	Native Plant Feed Mix
	Exotic	Surface	Exotic Planting and Feeding Mix
	Native and/or Exotic	Hole	Granular or Tablet Slow Release (6 month minimum) 20:10:10 NPK ratio
Feeding	All existing plants	Surface	As for Planting - Surface
Grassing	All seeding, both new and existing	Surface	Fast Release 15:7:7 NPK ratio Trace Elements
Do not apply fertiliser to Grevillia and Banksia plant varieties.			

14.12.3 Imported Soils - Hold Point - Witness Point

Provide imported topsoil conforming to AS 4419 and the following requirements:

- Be free draining.
- Be red-brown or black sandy loam.
- Contains no grass or declared weeds and their seeds.
- Maximum stone size of 6 mm.

Hold Point - Advise the name of the proposed supplier. Do not order soils without Superintendent’s approval of the supplier.

Witness Point - Provide a 5kg sample of topsoil proposed for the works. Do not order soils without Superintendent’s approval of the sample. Provide copies of delivery dockets for the topsoil delivered to site for the works.

14.12.4 Mulch - Hold Point - Witness Point

Organic Mulch

- Material free from impurity and sufficiently heavy to prevent dispersal by wind.
- Shredded bark, wood chips, hay or similar.
- Wood chips of a maximum size of 50 mm, inert, and free of resinous toxins and termites.
- Shall conform generally to AS 4454.

Hold Point - Advise the name of the proposed supplier. Do not order mulch without Superintendent’s approval of the supplier.

Witness Point - Provide a 5kg sample of mulch proposed for the works. Do not order mulch without Superintendent’s approval of the sample. Provide copies of delivery dockets for the mulch delivered to site for the works.

Inorganic Mulch

- Washed and screened lateritic gravel, crushed aggregate or brick chips with particle sizes in the range 6 mm minimum to 25 mm maximum.

14.13 GRASS CUTTING

14.13.1 Service Levels

Cut grass on medians, verges and islands within the road reserve to **Table – Grass Cutting Service Levels**.

Table – Grass Cutting Service Levels	
Maximum cut:	50 mm from the ground.
Height not to exceed:	As specified for the particular road in the PROJECT SPECIFIC REQUIREMENTS section, Or Refer to Table – Grass Height Specification in Grass Cutting clause in ROAD AND MARINE AMENITY MAINTENANCE

14.13.2 Grass cutting operations

Collect litter as part of and prior to grass cutting operations.

Cut grass to between 50 mm and 150 mm of ground level at time of service.

Cut grass from the edge of seal to the extent of the road reserve or to the cleared tree line within the road reserve, including cuttings, batters, inlets and outlets of culverts, protection works, and around road furniture.

Cut grass to clean cut, not broken or ripped, using equipment capable of maintaining the health and appearance of the grass and ground cover.

Do not cut shrubs and trees with a calliper size at base greater than 50 mm diameter, planted vegetation, or vegetation regardless of size that has been pegged and directed by the Superintendent to be retained.

Remove cut material or other detritus from the grass cutting process from gutters, cycle paths, walk tracks and road pavements as the work proceeds. Use this material for mulching if suitable, or remove from site.

Make adjustments to cutting methods and frequency as required to maintain the specified service levels during the wet season.

14.13.3 Plant and Equipment

Anticipated plant requirements are push, front deck and batter mowers and slashers.

Suitable guards are to be in place on all machinery to prevent material being sprayed onto the road surface and endanger vehicles, persons or property.

14.14 GRASS TRIMMING

14.14.1 Service Levels

Trim grass using hand held equipment on medians, verges and islands within the road reserve that cannot be addressed by cutting grass by mowing or slashing.

Trim grass at joints on concrete, seal and paving and any other hard surfaces occurring within the road reserve before it reaches 50 mm in height and/or 10 mm in diameter.

Trim grass at top of kerbing before it overhangs the roadside edge.

14.14.2 Grass Trimming Operations

Trim grass in conjunction with grass cutting service.

Use mechanical or manually operated hand held equipment that has no detrimental effect to the landscape or road asset.

Trim grass for the purposes of aesthetics, integrity of asset, functionality, public safety, including vegetation protruding from adjoining properties that interferes with footpath traffic.

Trim grass at back of kerbs, around drainage inlets and outlets, drainage lines and culverts, edges and surfaces of footpaths and cycle paths, access ramps, drive ways, any form of infrastructure, utility, furniture, signs, on in or around road medians and splitter islands, traffic control devices, fence lines, barriers, trees, concrete or paving.

Trim grass on concrete, paved or bituminous surfaces to ground or surface level. Use of super-heated steam for longer term treatment is permitted here, as is herbicide in accordance with the Herbicide clause.

Fit vehicular trimmer and edge machines with arrow boards and crash attenuators (cushions) to AS 1742.3 Vehicle-mounted signs and devices sub-clause, Truck-mounted crash attenuators sub-sub-clause.

Do not trim grass with vehicular trimmer and edge machines on the carriageways between 6 am and 6 pm Monday to Friday excluding Public Holidays.

14.15 WEEDING

14.15.1 Service Levels

Remove unwanted plant and grass species in accordance with the *Weeds Management Act 2001*.

Do not allow weeds to exceed the allowable grass height on medians, verges and islands within the road reserve.

Remove weeds from joints on concrete, seal and paving and any other hard surfaces occurring within the road reserve before it reaches 50 mm in height and/or 10 mm in diameter.

Remove or treat with herbicide all weeds prior to them seeding.

14.15.2 Weeding Operations

Weed any areas and at road pavement and kerb junctions, within garden beds and within or around any other structure or feature occurring within the road reserve which cannot be controlled by slashing, mowing or trimming.

Carry out weeding for the purposes of addressing issues related to aesthetics, integrity of asset, functionality or public safety.

Carry out weeding by mechanical, manual or chemical means. Refer to Treatment Of Pest And Weed Species section for clauses regarding the latter.

Do not re-use removed weed matter as mulch within the road reserve.

Dispose of all removed weed matter at a Community or Council Waste Disposal Site. Dispose of declared weeds and their seeds in a manner consistent with the requirements of the *Weeds Management Act 2001*.

Do not allow weed control activities to impinge on the health of other desirable plant species, or result in damage to any part of the road reserve asset.

14.16 PRUNING

14.16.1 Service Levels

Prune trees, shrubs, and other plants so that no part of any plant extends over paved or sealed surfaces up to a height of 3 m over cycle and walk paths or 5.5 m over road pavements.

Prune so that vegetation does not obscure sun light to solar collectors.

Prune so that vegetation does not obscure road signs and sight lines for motorists or other road users.

14.16.2 Pruning Operations – Hold Point

Carry out tree pruning operations in accordance with AS 4373.

Include at least one qualified arborist in each tree pruning team.

Qualified Arborist: A person with a minimum qualification of Level 3 Horticulture, specialising in Arboriculture, from the National Horticulture Training Package or equivalent accredited course.

Do not carry out tree lopping or heavy pruning practices, except on the written recommendation of the qualified arborist.

Prune plants for the purposes of addressing issues related to plant health, aesthetics, integrity of asset, functionality or public safety.

Prune plants in response to a need arising from vandalism, vehicle accident, age of plant, unwanted growth, damage or death by fire, insect, fungal or other attack, and any form of weather occurrence excluding cyclones. Effects due to cyclones are referred to in the Cyclone Event Damage clause in this work section.

Hold Point – Do not prune branches exceeding a calliper size of 75 mm at trunk which overhang the road pavement without the approval of the Superintendent.

Mulch and re-use pruned matter as mulch on previously mulched garden beds within the road reserve. Do not apply freshly mulched material directly onto bare or grassed soils, but allow to age for a minimum of 6 weeks prior to application, stored at an approved location.

Dispose of all removed pruned matter not used as mulch at a Community or Council Waste Disposal Site. Do not leave on site overnight.

14.17 REMOVAL OF VEGETATION

14.17.1 Service Levels

Remove dead, fallen or dangerous plants, trees and stumps from within the road reserve within 24 hours of observation or notification.

Remove vegetation as necessary for safety reasons within 1 hour of observation or notice to do so.

14.17.2 Horticulturist Identification of Dead Plants

Engage the Horticulturist to identify any plants that die within the road reserve, including all desirable flora regardless of species or size.

The Horticulturist is to identify dead or sickly vegetation and authorise the removal of any vegetation that is dead or is approaching the end of its expected life.

The Horticulturist may also authorise removal of any vegetation that for any reason is unstable or represents a safety hazard to pedestrians, cyclists, motorists or any other user of the road reserve.

Submit details of the Horticulturists findings and recommendations in the Monthly Report.

14.17.3 Vegetation Removal Operations

Remove trees and shrubs of all species and size that have died or fallen, or may represent a hazard to any person within the road reserve as identified by the horticulturist for whatever reason except in the case of a cyclone.

Grind stumps and roots to a depth of not less than 150 mm below ground level or in the case of smaller species grub, pull and remove roots and stem base.

Do not elevate or reduce ground levels within the immediate area because of vegetation removal.

Refer to Cyclone Event Damage clause in this work section for the removal of vegetation debris necessary as a result of a cyclone event.

14.18 REPLACEMENT OF PLANTS

Refer to AS 2303 for tree stock requirements.

14.18.1 Service Levels

Replace plants which have died within irrigated areas of the road reserve within 7 days of observation.

Replace plants which have died within non-irrigated areas of the road reserve with native species during the month of December each year of the contract.

14.18.2 Horticulturist - Replacement of Plants – Hold Point

The Horticulturist is to identify all dead plants and note the loss in the monthly Horticulturist Report, including all trees, shrubs and ornamental species of flora that occur within the road reserve.

The Horticulturist is to select replacement plants which are healthy and well formed.

Hold Point - If the same species of plant is not available the Horticulturist shall recommend a suitable replacement species with similar characteristics that is available, and submit to the Superintendent for approval.

14.18.3 Plant Replacement Operations

Use a water retentive medium such as “Hortex Rain Saver” or similar product with equivalent or better water absorption and release characteristics in the planting process. Apply according to the manufacturer’s recommended rates.

Replace dead plants in irrigated areas with plants of a similar size up to a 45 litre bag size.

Exceptions are Eucalyptus, Acacia, Melaleuca, Calytrix, Grevillea or other savanna species.

Replace these with tube stock.

Stake all replacement plants within non irrigated areas.

Do not plant vegetation likely to exceed a mature height of 4 m below or within 4 m of power lines.

14.18.4 Planting

Plant trees, shrubs and ground cover only when temperature is below 32 °C.

Maintain the integrity of the plant root zone and the surrounding earth mould.

Place fertiliser in the hole adjacent to, but not in contact with, the root zone of the plant. Use fertiliser in accordance with **Fertilizers** sub-clause, in **Materials** clause in this work section, with application rates in accordance with **Table – Fertilisers Application Rates**.

Table – Fertilisers Application Rates		
Plant category (Native/exotic)– Use (Planting/feeding) – Where used (Surface/hole)	Variable aspect	Application Rate
Native - Planting - Surface	Tube stock	10 g
	150 mm container	30 g
	200 mm container	80 g
	250 mm container	100 g
	300 mm container	150 g
	20 litre bag	300 g
Exotic - Planting - Surface	Plant height: 0.5 m	100 g
	Plant height: 1.0 m	200 g
	Plant height: 2.0 m	300 g
Native/Exotic - Planting - Hole	Ground covers and shrubs 10 cm tall	10 g
	Ground covers and shrubs 20 cm tall	20 g
	Plants to 1 m	40 g
	Plants to 2 m	80 g
	Plants to 3 - 4 m	120 g
	Advanced trees and palms 2 m – 3m	200 g
	Advanced trees and palms 3 m – 4m	300 g
	Advanced trees and palms 4 m +	400 g
	These rates apply to both granular compound and equivalent tables.	
Native - Feeding	Ground covers up to 300 mm wide	30 g
	Ground covers 300 - 600 mm wide	50 g
	Ground covers 600 - 900 mm wide	75 g
	Ground covers 900 - 1000 mm wide	100 g
	Ground covers over 1000 mm wide	100 g/metre
	Shrubs up to 300 mm high/wide	50 g
	Shrubs 300 - 600 mm high/wide	75 g
	Shrubs 600 - 900 mm high/wide	100 g
	Shrubs 900 - 1000 mm high/wide	150 g
	Shrubs over 1000 mm high/wide	200 g/m of height or width
	Trees	200 g/m of height
Exotic - Feeding		250 g/m of plant height

14.19 LITTER COLLECTION

14.19.1 Service Levels

Maintain the area so that there is no more than ten items of litter within any 100 m section of the full width of the road reserve at any time, and that no litter remains within the road reserve for a period exceeding 72 hours.

14.19.2 Litter Collection Operations

Collect litter and remove from the road reserve to comply with the service level requirements, and prior to grass cutting operations.

Dispose of at a Community or Council Waste Disposal Site, or by acceptable re-cycling methods.

Do not store litter for later retrieval anywhere within the road reserve or adjoining properties.

Litter is defined as any loose unattached inanimate item or any other object that does not form part of the road reserve asset occurring within the road reserve, generally deposited illegally.

Litter includes but is not limited to any forms of:

- goods packaging,
- paper product,
- plastic product,
- rubberised product,
- glass product,
- metal / alloy product,
- stone or masonry product or item including spilt concrete.

Litter also includes but is not limited to:

- any material excluding liquids resultant from a vehicle accident,
- any vegetative item,
- any mechanical item or part that is not related to intact mechanical, electrical or service-related infrastructure occurring within the road reserve,
- any loose, unattached inanimate item that the Superintendent deems is not required, wanted or expected to occur within the road reserve.

Report to the Superintendent any occurrences of concrete, gravel, sand or soil on any trafficable surface. These are not litter under the terms and conditions of the contract and will be removed by other means at the Principal's cost.

Litter does not include illegal signage or abandoned vehicles or equipment

Litter resulting from a significant spill event that cannot reasonably be removed within thirty minutes of commencement of work will be paid at a fair and reasonable rate negotiated between the Contractor and Superintendent.

Any single item of litter with a weight greater than 50 kg will be paid at a fair and reasonable rate negotiated between the Contractor and Superintendent.

14.20 REMOVAL OF DEAD ANIMALS

Keep a record of details of all dead domestic animals that are disposed of under the contract, noting the following:

- Animal type,
- Breed of animal, if possible,
- Description of size and colour,
- Registration or identification numbers,
- Special identifying features, such as brands, ear tags, collars etc.,
- Submit details to the Superintendent as part of the Monthly Report,
- Collars are to be removed and retained for 30 days before disposal.

14.20.1 Service Levels

Remove any carcass from within the road reserve within two hours of observation or notice.

Remove any carcass from the road pavement and shoulders within one hour of observation or notice.

14.20.2 Carcass Removal Operations

Remove and dispose of dead animals from within the road reserve irrespective of reason or event resulting in the demise of the animal.

Dead animals include native and exotic species of vertebrate including but not limited to dogs, cats, kangaroos, wallabies, turtles, fish, birds, lizards, pigs and any other form of mammal, reptile, macropod, marsupial, amphibian, or aquatic species.

Remove and dispose of multiple or singular carcasses occurring anywhere within the road reserve with a weight per carcass not greater than 50 kg. Removing a carcass with a weight greater than 50 kg will be paid at a fair and reasonable rate negotiated between the Contractor and Superintendent.

The time period for removal of carcasses will commence from time of observation by the Superintendent or the Contractor, whichever is earlier. The Superintendent is under no obligation to advise the Contractor of this observation.

Quantities of carcasses resulting from a significant spillage or killing event that cannot reasonably be removed within 1 hour of commencement of work will be paid at a fair and reasonable rate negotiated between the Contractor and Superintendent. This payment will be for time expended in excess of 1 hour.

14.21 CONTROL OF PESTS AND WEED SPECIES

14.21.1 Service Levels

Treat any pest species, including weed, fungal, insect and animal occurring within the road reserve within 7 days of observation or notice.

14.21.2 Operations for Control of Weeds

Control declared weeds in accordance with the requirements of the NT *Weeds Management Act 2001*. Control other weeds in accordance with this specification. Control methods include mowing, trimming, hand weeding, or by spraying herbicide or other suitable chemicals, or by other manual means.

Treat all declared weeds listed in the NT *Weeds Management Act 2001* and all other weeds perceived to represent a hazard or impediment to the public, plant growth, the road reserve asset, or which effect the aesthetics of the area.

The chosen methods must not impinge on the health of all desirable species of plants.

Control weeds in the following areas as a minimum:

- along road reserve boundaries,
- along fence lines,
- around the base of trees,
- along pipelines,
- in mulch beds,
- at joints contained within concrete slabs,
- at junctions of road pavement and concrete kerb.

14.21.3 Operations for Treatment of Fungal or other Organic Pests

Control or eradicate any form of fungal or other organic pest that may be, or is, affecting the health or integrity of any plant or any other aspect of the road reserve asset, by spraying pest specific fungicides, or by manual means.

14.21.4 Operations for the Treatment of Insect and Animal Pests

Control or eradicate insects including termites, ants, aphids, mealybug or arachnids (invertebrate) and any other form of animal pests (vertebrates) that could be, or are, affecting the health or integrity of any plant or any other aspect of the road reserve asset, by spraying pest specific pesticides, or by manual means.

Relocate protected vertebrate species.

14.21.5 Insecticide

Use insecticide strictly as specified in product SDS.

Use only Fipronil as an insecticide for termite control.

14.21.6 Log Books

Comply with the requirements of the *Agricultural and Veterinary Chemicals (Control of Use) Act 2004*. Further to any other reporting and log book requirements under the contract, maintain daily log books for spray treatment works undertaken. The following information must be collected and recorded:

- Detailed location of work (place name and GPS coordinates),
- Date and time of spray application,
- Product used (generic label name, active ingredient name and % or proportion of active ingredient),
- Expiry date of product and withholding period (if applicable),
- Chemical mixture (e.g. % or litres per 100 litres of water),
- Rate of application (e.g. litres per ha, or kg per km sprayed),
- Type of spray equipment used (e.g. hand spray, vehicle mounted spray),
- Type of transport equipment used (Mounted spray Ute, Truck, quad, by hand),
- Names of target pest species,
- Weather conditions (e.g. rainfall, temp, wind speed and direction),
- Name of applicator,
- Any unusual happenings on the site,
- Results of application: Include date this information is added.
- Add additional items.

Submit daily log book sheets with monthly invoice for payment. Retain copies as per statutory requirements.

Include a digital copy in MS Excel spread sheet format.

14.21.7 Herbicide - Hold Point

Hold Point - Submit a Weeds Management Plan for assessment and approval.

Herbicide treatment of weeds in the urban environment must be controlled and proposed in the Weeds Management Plan for approval by the Superintendent.

Apply herbicide in accordance with manufacturer's specification.

Do not use dyes in the application of herbicides.

For chemical weed control in urban areas use only Glyphosate. Use according to manufacturer's directions for use.

Do not use Glyphosate in the following areas:

- At drainage lines,
- On top of kerbs not associated with concrete slabs or paving,
- Around signage, utilities, roadside furniture, culverts, irrigation systems or any other road related infrastructure,
- Beyond 500mm from the vertical trunk at the base of any tree.

14.21.8 Chemicals

For weed control in areas outside of urban areas submit to the Superintendent the list of chemicals intended for use during the contract. Include information in the Weeds Management Plan.

Use chemicals that are approved by the Australian Pesticides and Veterinary Medicines Authority (APVMA). Find all information pertaining to the use requirements of chemicals on the Authority's web site. Only use the chemicals on plant species listed in the product information.

Use herbicides, fungicides, pesticides that are biodegradable and do not contain lead arsenates or other substance or salts dangerous to humans or animals.

Handle, transport, spray, store and dispose of chemicals and their containers in accordance with the product SDS.

Ensure that personal protective equipment (PPE) including protective clothing is worn by all personnel handling or applying chemicals. Use PPE in accordance with the product SDS.

14.21.9 Spraying

Do not spray on days where wind velocity exceeds 15km/hr or if it poses a risk of spray drift.

Prevent misting in breeze conditions by spraying at a lower pressure or adjusting spray nozzles to increase droplet size.

Do not spray near schools during school hours, or during outdoor activities at the school at any time. Spray only when wind is blowing away from the school.

Refer to Spraying in SLASHING AND WEED CONTROL.

14.22 FERTILISING

14.22.1 Service Levels

Apply fertiliser to promote the development and ongoing health of all vegetation within the road reserve in accordance with the Fertiliser Proposal Document submitted with the tender and approved by the Superintendent.

14.22.2 Fertilizing Operations

Apply fertiliser as specified in the approved Fertiliser Proposal Document including:

- proposed method to confirm proof of each treatment,
- description of proposed fertilisers, product name, N:P:K Ratio, and application rate if such rate is not to be applied at manufacturers specifications,
- description of fertiliser locations such as grassed areas, trees, under mulch, under ground covers etc.,
- what is to be fertilised,
- time of fertilising as shown in the Program Of Works, indicating week and month.

14.23 DRAINAGE LINES

14.23.1 Service Levels

Maintain all drainage lines including inlets and outlets to Side Entry Pits (SEPs) and Letterbox Pits in a debris free state.

Re-fit dislodged lids to stormwater pits within 48 hours of observation.

Make safe stormwater pits with missing or broken lids immediately upon observation or within one hour of notification. Notify the Superintendent of any observation.

14.23.2 Re-fitting Dislodged Stormwater Pits

Re-fit dislodged SEP and Letterbox Pit lids. Advise the Superintendent of any damaged lids which cannot simply be re-fitted.

14.23.3 Drainage Line Maintenance Operations

De-silting drainage lines, and the internal cleaning and clearing of SEPs, drainage culverts and Letterbox Pits is not included in the contract.

Remove all litter and/or debris from open drainage lines including inlets and outlets to SEPs and Letterbox Pits to ensure free drainage.

Do not force litter or debris into inlets of SEPs or Letterbox Pits but collect and remove from site.

14.24 REPLENISHMENT OF MULCH

14.24.1 Service Levels

Maintain 75 mm thick consolidated layer of mulch within all mulched areas including garden beds, other plantings or medians within the road reserve.

14.24.2 Mulch Replenishment Operations

The Horticulturist will advise the Contractor on the status of organic mulch.

Replace or replenish mulch with material of similar characteristics to the existing mulch.

Replenish mulch sufficient for the purposes of aesthetics, retaining moisture, insulating the soil and ongoing soil improvement resultant from the decaying matter.

Supply mulch that is free from weeds, seeds, sticks, stones, insects, diseases and other deleterious matter.

Provide organic mulch for a 500 mm radius from the main stem, but ensure a gap of 50 mm is retained between the main stem and the mulch.

14.25 DISPOSAL OF CUT MATERIALS

14.25.1 Service Levels

Remove and dispose of all non-mulched cut or waste materials daily at a Community or Council Waste Disposal Site, do not leave on site overnight.

14.25.2 Disposal Operations

Dispose of any materials in accordance with relevant environmental protection legislation.

Apply mulched material from cuttings suitable for use only on previously mulched areas, not on bare or previously non-mulched areas. Do not use weeds as mulch.

14.26 IRRIGATION OPERATION AND MAINTENANCE

This section outlines the requirements for the repair, operation and maintenance of existing irrigation systems.

14.26.1 Service Levels

Maximise efficiency of landscape irrigation systems.

Manage and maintain irrigation systems to maintain a functional and healthy landscape with the minimum required amount of water for the designated purpose.

Do not allow irrigation water, other than that carried by wind, to flow onto the road pavement.

Repair broken or vandalised sprinkler or spray heads within 12 hours of observation or notification by the Superintendent.

14.26.2 Monthly Irrigation Report

Provide an Irrigation Report attached to the monthly claim for payment. Report all observations or occurrences of note related to irrigation issues over the period being claimed.

14.26.3 Telemetric Control (Darwin Region)

The superintendent will arrange for supply and installation of the telemetry irrigation control base station at the Contractors premises.

This supply will not include basic office requirements such as power sockets, office furniture etc.

Irrigation systems will be periodically upgraded to Telemetric Control. Do not maintain newly upgraded systems until the completion of the defects liability period for that upgrade contract, with the date as advised by the Superintendent.

14.26.4 Irrigation Systems Maintenance Operations

Maintain and adjust in sound and serviceable condition all controllers, control cables, housings, meters, meter protection, valves, back flow prevention, drippers, sprays or conduits used in the delivery of water to all plant species including grass.

Engage and disengage manually controlled irrigation systems.

Maintain all irrigation supply and main lines in a water tight condition.

Maintain all adjustable sprinkler heads within their adjustment requirements at all times.

Repair or adjust daily as required to prevent over watering of vegetation and grass, and to prevent wastage through overflow of irrigation water onto the road surface.

14.26.5 System Shutdown – Witness Point

NORTHERN REGIONS

Shut down irrigation systems at the start of the wet season each year for the duration of the wetter months. Re-activate the irrigation systems towards the end of the wet season.

Time the start of shut down and re-activation operations according to the weather conditions apparent at the time.

Witness Point - Advise the Superintendent of the full shut down and re-activation of irrigation systems.

14.26.6 Irrigation Day and Night Cycle Late in Dry Season – Witness Point

NORTHERN REGIONS

Ensure areas receive sufficient quantities of water during the hotter part of the dry season, i.e. September to early October. This may be achieved by running selected systems twice a day.

Witness Point - Advise the Superintendent of altered irrigation cycle times.

14.26.7 Reset Irrigation Timers During School Holidays – Witness Point

Reset pop up irrigation systems for day light watering the week preceding school holidays on road reserves that pass through high density residential areas.

Reset back to night watering within seven days of the new school term commencing.

Witness Point - Advise the Superintendent of such action taken.

14.27 ENVIRONMENTAL PROTECTION

14.27.1 Duty of Care

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT. Comply with the following additional requirements included under the contract and allow for any associated costs.

14.27.2 Litter

Prevent any form of littering by all Contractor's personnel, including sub-contract personnel, during the course of the work.

Remove all debris, surplus material, waste material or any form of spoil related to works from the site.

Prevent materials from falling or being blown from vehicles.

Leave the work site clean and tidy at the completion of each day's work. Do not allow refuse of any type to remain on site overnight.

14.27.3 Noise

Comply with the relevant sections of the *Local Government Act 2008*, *Waste Management and Pollution Control Act 1998* and the *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011 with regard to noise pollution.

Ensure all plant and equipment complies with statutory regulations, and is designed, installed, operated and maintained to minimise noise disturbance to residents and the general public.

14.27.4 Protection of Waterways

Comply with all regulatory guidelines and legislation including the *Water Act 1992*.

Ensure no materials enter any waterways, including stormwater and sewerage systems.

14.27.5 Protection of Flora and Fauna

Ensure best practice protection to any flora and fauna that may be affected by the works, particularly those which:

- have particular botanical, historical or cultural significance,
- have outstanding aesthetic or ecological significance,
- provide habitat for rare or endangered species,
- have cultural and archaeological heritage.

Refer to Acts, Regulations And Codes Applicable To The Works And Authorities With Jurisdiction Over The Works in REFERENCED DOCUMENTS.

14.28 DAMAGE TO PROPERTY

Ensure that the works proceed with all due care in order to avoid damage to property, utility installations, vehicles, or the environment.

Without limiting the Contractor's obligations under the General Conditions of Contract, promptly repair or have repaired any damage to property, utility installations or environment resulting from the implementation of the works associated with the contract.

Immediately notify the Superintendent of any such damage advising proposal for repairs at no cost to the Principal.

Ascertain the owner's wishes as to the timing of the repairs. Engage appropriately qualified tradespersons to carry out repairs to the satisfaction of the property owner and the Superintendent.

After providing seven days notice to the Contractor, the Superintendent reserves the right to settle any claims arising from the damage.

Settlement of damages by the Superintendent will not relieve the Contractor of any responsibility under this clause. The Superintendent will deduct any costs incurred in settling these claims from the Contractor's monthly progress invoice.

14.29 STORM DAMAGE

In the event of a tropical or severe storm, immediately mobilise and supply sufficient staff and resources to locate and make safe storm damage which has occurred within the site of works. The Superintendent will assist in identifying immediate safety concerns where and whenever possible.

Make trafficable surfaces i.e. roads, cycle and footpaths, safe as quickly as possible.

Clean up storm damage as part of the contract to the specified service levels within 24 hours of the observation of damage, and where this is not possible, within a time line acceptable to the Superintendent.

Give priority to roadways, cycle and footpaths to make safely trafficable as soon as possible.

Access real time storm and weather information on the Internet at the Weather Bureau website at <http://www.bom.gov.au/australia/radar/> .

14.30 CYCLONE EVENT DAMAGE

A cyclone event does not include severe storms.

A cyclone event will be recognised as commencing when a cyclone has been declared and named and is effecting any location within the contract area. The cyclone will be recognised as remaining current until such time as all warnings associated with the event have been cancelled for the area of the contract.

Immediately following the passing of a cyclone;

- Attend the site of works and identify all works required to clean up and reinstate, that which is attributable to cyclone damage,
- quote a fair and reasonable price for such works in negotiation with the Superintendent,
- quote a time line for implementation and completion of the works,
- Removal of tree or vegetative debris as additional works as a result of a cyclone event will relate to green plant growth only, since removal of dead wood is a requirement of maintaining to specified service levels under the contract prior to the tropical cyclone,
- Increase resources as necessary to ensure a rapid rectification and clean-up of site.

The Superintendent reserves the right to employ the services of additional Contractors when the need to expedite these works becomes necessary due to public health or safety concerns.

In the interests of safety, it is not a requirement under the contract to supply staff or resources beyond stage three of a cyclone. The requirement resumes when cyclone danger has passed and the cyclone alert for the area of the contract has been cancelled.

14.31 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

15 SLASHING AND WEED CONTROL

15.1 OUTLINE DESCRIPTION

This section specifies the maintenance requirement for control of vegetation and litter on road verges, batters and medians, by use of mechanical or manual means and/or chemicals, and for the control of noxious weeds in the road reserve by use of herbicides.

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

15.2 CROSS REFERENCES

MISCELLANEOUS PROVISIONS for **Disposal of Waste**

MISCELLANEOUS PROVISIONS for **Preservation of Sites and Artefacts Cultural and Heritage Significance** sub-clause

MISCELLANEOUS PROVISIONS for **Plant and Equipment**

MISCELLANEOUS PROVISIONS for **Work Involving Chemicals** sub-clause

LANDSCAPE MAINTENANCE

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES

15.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

Acts and Regulations

Comply with the following Acts and Regulations:

- *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011
- *Weeds Management Act 2001*
- *Dangerous Goods Act 1998* and Regulations 1985
- *Medicines, Poisons and Therapeutic Goods Act 2012* and Regulations 2014
- *Agricultural and Veterinary Chemicals (Control of Use) Act 2004*

15.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

The following additional definitions apply.

APVMA

Australian Pesticides and Veterinary Medicines Authority.

HERBICIDE

A chemical formulation for control and eradication of vegetation and weeds.

KPIs

Key Performance Indicators. Measurable values that demonstrate how effectively the Contractor is achieving contract objectives.

VEGETATION

Refers to any grasses, shrubs or trees to be controlled.

WEEDS

Refers to undesirable vegetation in the area to be controlled, including declared and non- declared species.

15.5 WORKS RESTRICTED TO ROAD RESERVE

Restrict slashing and weed control activities to within the road reserve unless explicitly specified otherwise.

The **Table - Road Classifications and Indicative Minimum Road Reserve Widths** shows indicative road reserve widths for various classes of roads.

Dimensions of road reserves vary. Determine the actual locations of the boundaries of the road reserves in the areas of the works.

Table - Road Classifications and Indicative Minimum Road Reserve Widths	
Road Classification	Indicative Minimum Road Reserve Width
National Highway	200m
Arterial - Urban	80m
Arterial - Rural	150m
Sub-arterial/Distributor - Urban Industrial	22m
Sub-arterial/Distributor - Urban Residential	(See Note)
Sub-arterial/Distributor - Rural Industrial	100m
Rural Secondary Road	100m
Pastoral 3	100m
Collector - Urban Industrial	20m
Collector - Urban Residential	(See Note)
Collector - Rural Industrial	40m
Collector - Rural	40m
Local - Urban Industrial	20m
Local - Urban Residential	(See Note)
Local - Rural Industrial	30m
Local - Rural	30m
Pastoral 1 and 2	100m
Do not take dimensions as being correct for all road types and classifications.	
Note: For road reserves for roads with these classifications, and any other roads not in this list, refer to the relevant local authority.	
Excerpt from; Department of Transport Policy, Performance And Design Standards For Northern Territory Government Roads, April 2017 Version 2.0. https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/road-design-standards	

15.6 WEED SPREAD PREVENTION

Comply with the requirements of the *Weeds Management Act 2001*.

Do not spread declared weeds by slashing.

For prevention of weed spread by machinery see the Standard Specification for Environmental Management.

While slashing does not kill weeds, if done at the right time it can be an effective measure to reduce seed production especially in infested areas.

Slashing must be planned in conjunction with chemical control.

Requirements include, but are not limited to:

- Slash at end of rain season as stems are starting to elongate prior to seed maturity to reduce flowering of grassy weeds.
- Slash from clean area to infested area.
- Clean down slasher after working in infested area with leaf blower, compressed air, or high pressure water.
- Control isolated individual plants or clumps in otherwise clean areas with herbicide.
- Allow previously slashed weeds which have no visible green leaves time to grow green leaves if spraying with herbicides which are designed to be absorbed through their leaves.
- Follow the machinery hygiene practices as detailed in the Department of Land Resource Management Weed Spread Prevention Strategy <https://nt.gov.au/environment/weeds/how-to-manage-weeds/prevent-weed-spread-industry-and-recreation/corridor-maintenance> .

15.7 REFERENCE STANDARD DRAWINGS

Refer to Standard Drawings listed in **Table - Civil Standard Drawings for Reference for Terminology** for typical cross section profiles and terminology used throughout this section.

Table - Civil Standard Drawings for Reference for Terminology	
CS 3609	Typical Cross-Section For Unsealed Rural Roads
CS 3610	Typical Cross-Section For Sealed Rural Roads
CS 3611	Typical Sealed Floodway Cross-Section For Unsealed Rural Roads

These drawings are accessible via <https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/standard-drawings> .

15.8 SLASHING

15.8.1 Slashing Operations

Slash all grass and vegetation including shrubs and trees with a butt size up to 100 mm diameter.

During slashing operations poison slashed Suckers and Self Seeders over 50mm in diameter.

Trim vegetation to a height of 100 mm or less above the ground.

Collect litter prior to slashing.

Slash steep batters or areas inaccessible to conventional slashers with hydraulically operated boom mounted slashing equipment.

Trim growth that cannot be slashed with tractor mounted slashers with hand held equipment. Include around road furniture, culvert headwalls, bridges, grids, floodways, drains and drainage structures.

Trim overhead vegetation to minimum clearance height of 5.5 m above the carriageway.

At bridges trim vegetation to a minimum of 2 m behind bridge rails.

Re-slash any area which is not slashed to the specified height above the ground.

Remove stones, grass or other debris from the sealed pavement following slashing operations.

15.8.2 Plant

Provide sufficient plant to achieve the minimum specified rate of progress, using the following plant configurations to complete all slashing operations simultaneously:

- Tractors and Slashers,

- Tractor and Batter / Reach Mower,
- Hand held equipment including chainsaws and brushcutters.

Suitable guards are to be in place on all machinery to prevent material being “sprayed” onto the road surface and endanger vehicles, persons or property.

15.8.3 Opening Slash

Slash each side of roadway from edge of seal for a minimum width of 4.5 m.

Opening Slash is to be used on roadside batters when table drains are too wet and boggy or an interim slash is required.

At floodways cut both sides as a minimum 4.5m wide past the edge of the floodway or any protection.

To manage and control declared weed spreading allow for daily cleaning of vehicles, plant, and equipment, and cleaning prior to entering national parks, and cleaning prior to exiting infested areas.

Provide sufficient plant, labour and resources in order for two separate crews to each complete 35 km per day, both sides of the road. Plant to include a reach mowers, batter slashers, or alternative slashing means to treat areas unable to be done by conventional slashers.

15.8.4 Full Slash

DARWIN

Normally undertake between November and March depending on the severity of the wet season.

Slash from the edge of pavement, sealed or unsealed, one cut width past the top of the outer batter. If outer batter has a cut-off drain, slash the drain and one cut width past it. In fill batters slash to one cut past the toe of the bottom of the batter (if no drain is in existence).

For dual carriageways, the slash shall be the full width of the Road Reserve or from fence to fence.

The areas to be slashed include cuttings, tops of batters at cuttings, fill batters, inlets and outlets of culverts, protection works, around road furniture, and offlet drains as per the sub-clause **Slash Table Drain Offlets** in this clause.

In floodways slash both sides as a minimum 4.5m or in line with slashing operation width, whichever width is the greatest. Slashing must extent past any floodway protection.

At intersections and approved property accesses slash triangular areas joining points of sight distance lines, given in **Figures - Safe Intersection Sight Distances (SISD)** and **Table – Safe Intersection Sight Line Distances (SISD) (Sight Lines)**, in the clause **Intersection Sight Lines**, in LANDSCAPE MAINTENANCE.

At curves slash to provide clear sight distances to the specified sight line distances on the inside of the curve at the seal edge.

To manage and control declared weed spreading allow for cleaning of vehicles, plant, and equipment daily or prior to entering national parks or exiting infested areas.

Slash other areas as directed.

Provide sufficient plant, labour and resources in order for two separate crews to each complete 20 km per day, both sides of the road. Plant to include reach mowers, batter slashers, or alternative slashing means to treat areas unable to be done by conventional slashers.

EAST ARNHAM AND KATHERINE REGIONS

Normally undertake between November and March depending on the severity of the wet season.

Slash both sides of roadway from the edge of pavement, sealed or unsealed, to the cleared tree line including cuttings, tops of batters at cuttings, fill batters, inlets and outlets of culverts, protection works, and around road furniture.

At intersections slash triangular areas joining points of sight distance lines given in **Figures - Safe Intersection Sight Distances (SISD)** and **Table – Safe Intersection Sight Line Distances (SISD) (Sight Lines)**, in the clause **Intersection Sight Lines**, in LANDSCAPE MAINTENANCE.

Slash other areas as directed.

Provide sufficient plant, labour and resources in order for two separate crews to each complete 20 km per day, both sides of the road.

ALICE SPRINGS AND TENNANT CREEK REGIONS:

Slash both sides of roadway from the edge of pavement to the outer edge of formation including cuttings, fill batters, inlets and outlets of culverts, protection works, and around road furniture.

Slash other areas as directed.

Provide sufficient plant, labour and resources in order for two separate crews to each complete 15 km per day, both sides of the road.

15.8.5 Slash Table Drain Offlets

Specification Reference: Refer to the Northern Territory Government Standard Specification for Environmental Management, and to the RFT.

Slash each side of invert of trapezoidal shaped table drain offlet for 1.8 m width, i.e. total width of cut 3.6 m, nominally two cuts.

Slash each side and invert base of trapezoidal shaped table drain, i.e. total width of cut 5.4 m, nominally three cuts.

Table drain offlets are generally at intervals not exceeding 150 m and have a minimum length of 50 m.

15.8.6 Slash Additional Areas in the Road Reserve, Aerodromes, Park areas

Slash additional areas in the Road Reserve or Corridor not covered in Opening or Full Slash, and in or at other NTG owned assets and at aerodromes as directed by the Superintendent.

Manage and control declared weed spreading. Allow for cleaning of vehicles, plant, and equipment daily, and prior to entering national parks, and prior to exiting infested areas.

Where slashing for an area is ordered by the Superintendent as part of Opening/Full slash for the same area, mobilisation will not be applicable.

15.8.7 Slash for Weed Control

Slash areas for Weed Control in the Road Reserve/Corridor or NTG owned assets as directed by the Superintendent.

Manage and control declared weed spreading. Allow for cleaning of vehicles, plant, and equipment daily, and prior to entering national parks, and prior to exiting infested areas.

Where slashing for an area is ordered by the Superintendent as part of Opening/Full slash for the same area, mobilisation will not be applicable.

15.8.8 Slash Firebreaks

Slash firebreaks to a minimum width of 4 m as directed in the Road Reserve/Corridor or NTG owned assets.

Manage and control declared weed spreading. Allow for cleaning of vehicles, plant, and equipment daily, and prior to entering national parks, and prior to exiting infested areas.

15.8.9 Slash and Rake Firebreaks

Slash firebreaks within the road reserve.

Rake slashed material and windrow to one side.

15.8.10 Litter Collection and Disposal

Include litter collection and disposal as a part of slashing operations. Undertake collection of litter on area to be slashed prior to slashing.

Litter collection and disposal may also be ordered separately, and shall include full road reserve width.

Collect litter including but not limited to:

- Tyres & tubes,
- Drink or food packages,
- Rocks larger than 100mm,
- Fallen trees, branches or timber,
- Ant beds,
- Any other materials or rubbish which is 100 mm or more higher than natural surface.

Litter collection does not include abandoned vehicles or car bodies, or dead animals. Advise the Superintendent of the location of such items and they shall be collected and disposed of separately.

Dispose of all litter legally, at Community or Council Waste Disposal Site.

15.8.11 Replacement of Damaged Roadside Furniture and Structures

Repair or replace guide posts, signs, culverts or any roadside furniture or structure damaged by slashing operations at no cost to the Principal.

The Principal reserves the right to affect repairs by any means and recover the costs from the Contractor.

15.9 BUSHFIRE PREVENTION

15.9.1 Requirement

Advise Bushfires NT for the region and adjacent property owners of slashing program prior to commencement of slashing in the area.

Adhere to bushfire prevention requirements during slashing operations when there is a fire warning rating of moderate or higher.

15.9.2 Plant

Provide plant and equipment for fire-fighting. The following are minimum requirements:

- 1 x 500 litre water tank with an attached pump,
- 2 x 9 litre air expelled water fire extinguishers, or 1 x 20 litre knapsack spray, as appropriate to the slashing equipment being used.
- Carry the equipment in a 4 wheel drive back up utility travelling behind the tractor slasher operations at all times. Maintain two-way radio communication between the utility and the tractor slasher.

15.9.3 Conditions Preventing Slashing

Avoid roadside slashing when it is dry and windy, or when the bushfire warning is extremely high.

Cease slashing operations if weather conditions indicate an extreme fire danger. If such a day is predicted, then start early and cease operations when the conditions reach a point that would indicate that if a fire started then it would be difficult to contain.

15.9.4 Response Procedures to Fire Starting

Cease slashing operations immediately a slasher starts a fire, and assist with combating the fire. To achieve this, the crew must be working in close proximity to each other at all times and be in radio contact.

Contain any fire which occurs due to slashing operations immediately to avoid the fire spreading. If the crews are unable to contain and extinguish the fire, immediately notify the adjacent station/property owners/managers and Bushfires NT, Department of Land Resource Management.

Remain and provide assistance to the property owners/managers until the fire is contained, or until the owners/managers or Bushfires NT Officers no longer require your assistance.

Do not recommence slashing until the fire is contained and all crew are back on site with all equipment fully operational again, i.e. water tanks refilled, pump motors refuelled, etc. Do not undertake roadside slashing without the support backup.

15.9.5 Contractor Responsibility

Accept responsibility for any damages, loss of pasture or stock that is a result of a fire started by slashing operations.

Exercise care in areas where the possibility of ignition is high. An example is rocky outcrops where it may be necessary to raise the blades marginally higher to avoid sparks.

15.9.6 Fire Fighter Training – Hold Point

At least one member of each slashing crew is to hold a current qualification of Fire Fighter 1 NT. Training in this course is available from Bushfires NT, DENR, phone 8922 0844.

Hold Point – Provide evidence of qualifications before commencing slashing operations.

15.10 VEGETATION CONTROL

15.10.1 Vegetation Control Operations

Control or eradicate vegetation around road structures and furniture to ensure they are visible to motorists and to prevent damage by fire, by spraying herbicides and/or other suitable chemicals.

15.10.2 Additional Requirements for the Darwin Region

The Contractor must performance manage this item and is required to control or eradicate vegetation around road structures and furniture by spraying herbicide and/or other chemicals.

The vegetation in treated areas must not exceed more than 3 plants per square metre, nor more than 200mm in height, at any time.

Any treated vegetation that died back in the sprayed area must be controlled to prevent damage to the infrastructure by fire and if necessary must be removed by mechanical means.

The Superintendent or a representative of the Superintendent may evaluate the sites to determine compliance with Key Performance Indicators.

Note: This KPI will apply after the first treatment from the commencement of the contract.

Manage and control declared weed spreading. Allow for cleaning of vehicles, plant, and equipment daily, and prior to entering national parks, and prior to exiting infested areas.

15.10.3 Log Books

Maintain daily log books for works undertaken under the contract. Include the following information:

- Description, i.e. category of work for measurement and payment,
- Start/finish spray locations by PRP chainage and as GPS position,
- Time of spray application,
- Product used,
- Chemical mixture (e.g. kg or litres per 100 litres of water),
- Rate of application (e.g. kg per hectare, or Kg per kilometres sprayed),
- Type of spray equipment used (e.g. hand spray, vehicle mounted spray).
- Type of transport equipment used (Mounted spray Ute, Truck, quad, by hand),
- Target weeds,
- Weather conditions (e.g. rainfall, temperature, wind velocity and direction),
- Name of applicator,
- Any unusual happenings on the site,
- Results of application: Include date this information is added.

Submit daily log book sheets with invoice for payment.

Include a digital copy in MS Excel spread sheet format.

15.10.4 Chemicals – Witness Point

Witness Point - Submit to the Superintendent the list of herbicides and other chemicals intended for use during the contract, details of vegetation controlled by the herbicide, and duration of control per treatment.

Use chemicals that are approved by the APVMA. Obtain copies of SDS pertaining to the use requirements of chemicals listed on the manufacturers' labels. The APVMA web site <http://services.apvma.gov.au> has information about SDS.

Use herbicides that are biodegradable and do not contain lead arsenates or other substance or salts dangerous to humans or animals.

Use spreading agents if and as recommended on the labels.

Obtain a permit from Parks Australia North for the use of any chemicals within Kakadu and Uluru – Kata Tjuta National Parks and up to 30 km from their boundaries, and from Parks and Wildlife Commission of the Northern Territory for the use of any chemicals within NT National Parks and Reserves and up to 30 km from their boundaries.

Witness Point - Provide copies of the permits.

15.10.5 Personnel Handling of Chemicals

Be registered for business as weed control operators, or engage Sub-Contractors registered for business as weed control operators.

Personnel carrying out spraying operations must have undertaken and passed a National Farm Chemical User Training Program.

Do not allow spray drift. Operators must be competent in their understanding of how to prevent spray drift.

Keep a copy of the Safety Data Sheet on site for each type of chemical used

Handle all chemicals as specified in product SDS.

Wear as a minimum the protective clothing as specified in product SDS.

15.10.6 Spraying

Handle, transport, spray, store and dispose of chemicals and their containers in accordance with the manufacturer's specifications and/or directions as written on the labels which appear on the APVMA web site, to avoid environmental and health risks.

Do not spray on days of wind velocity greater than 15 km/h mean value and gusts do not exceed 19 km/h because of risk of spray drift causing a hazard on adjoining properties.

Do not cause spray drift. Prevent misting in breeze conditions by spraying at a lower pressure or adjusting spray nozzles to increase droplet particles, or other suitable means.

Do not spray near schools during school hours or during outdoor activities at the school at any time. Spray only when wind is blowing away from the school.

Do not spray during rain or when vegetation is saturated.

15.10.7 Spray Equipment

Use equipment calibrated to measure volume sprayed.

15.10.8 Around Guide Posts

Spray a minimum triangular area around guide posts having as its base the sealed edge of the road. The length of the base to be a minimum 8 m centred on the guide post. The apex of the triangle to be 1 m beside the guide post on an imaginary line perpendicular to the road centreline and through the guide post.

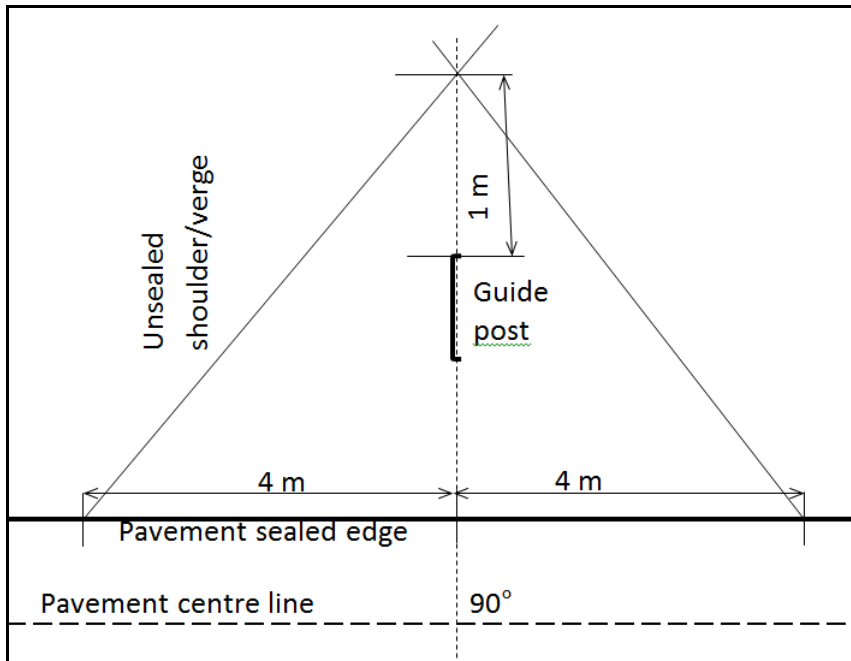


Figure - Guide Posts Spray Area

15.10.9 Around Sign Posts

Spray a minimum triangular area around sign posts having as its base the sealed edge of the road. The length of the base to be a minimum 5m long and positioned to extend 4 m into the direction of the oncoming traffic and 1 m past the line of the sign post. The apex of the triangle to be 1 m beside the sign post on an imaginary line perpendicular to the road centreline and through the sign post.

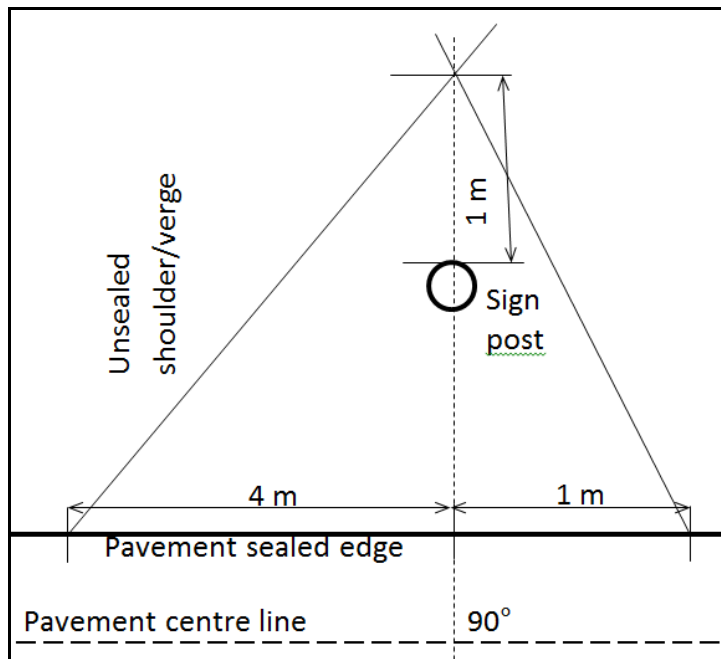


Figure - Sign Posts Spray Area

15.10.10 At Bridges and Guard Rails

Spray area within 1 m of any part of the structure.

Spray area between the edge of the seal and a line 1 m behind any guard rail and extending 10 m beyond the guard rail at both ends.

15.10.11 At Flood-ways and Culverts

Spray incorporated rock protection works.

Slash area within 1 m of the structure and protection works.

15.10.12 Rest Areas and Truck-bays

Spray areas within 1 m of any part of furniture or structure.

Slash all other areas within the perimeter.

15.10.13 Aerodromes

In accordance with the relevant requirements referred to in AERODROME MAINTENANCE, spray areas as shown in the **Table – Minimum areas to be sprayed for vegetation control at aerodromes**.

Table – Minimum areas to be sprayed for vegetation control at aerodromes	
Feature	Minimum dimensions of areas to be sprayed
Fencelines	1 m either side of fence around aerodrome.
Signal Area	Total signal area including 1 m outside of signal area perimeter.
Gable Markers	An area 8 m by 3 m at each gable marker, centred on, and oriented the same way as, the marker.
Cones, Runway Flares, and Lights	The area to 2 m out from each structure and device on all sides.
Buildings and Other Structures	An area 1 m wide around the entire perimeter of each building and structure.

15.11 WEED CONTROL**15.11.1 Operation**

Treat all weeds listed as Declared Weeds under the NT *Weeds Management Act 2001*, and other nominated weeds and vegetation in the road reserve, by spraying herbicides and/or other suitable chemicals.

Refer to vegetation control clauses for specification requirements for Log Books, Chemicals, Personnel Handling Chemicals and Spraying.

There is a legal obligation to control all declared weeds under the *Weeds Management Act 2001* (see <https://nt.gov.au/environment/weeds/weeds-in-the-nt/A-Z-list-of-weeds-in-the-NT> for list). For Class A declared weeds it is necessary to eradicate them; for Class B it is necessary to prevent them from growing and spreading.

15.11.2 Additional Requirements for the Darwin Region

The Contractor must performance manage this item and is required to treat all weeds in the road reserve that are Declared Weeds under the NT *Weeds Management Act 2001*, by spraying herbicide and/or other chemicals. This requirement also applies to other nominated vegetation.

The Superintendent or a representative of the Superintendent may evaluate the sites to determine compliance with Key Performance Indicators.

The Contractor shall as part of the proposed treatment program detail clearly how they will control weed spread.

At the commencement of the contract and annually thereafter the Superintendent will supply weed mapping in PDF and GIS format showing location, species and densities of weed infestation on the road network.

Manage and control declared weed spreading. Allow for cleaning of vehicles, plant, and equipment daily, and prior to entering national parks, and prior to exiting infested areas.

15.11.3 Treatment Program – Hold Point

Prepare a Weed Management Plan within 4 weeks of commencement of the contract (outlined in the Standard Specification for Environmental Management).

The Weed Management Plan must be signed off by both the Superintendent and Contractor and must refer directly to the Response Schedule and the Request for Tender and this specification.

Hold Point - Submit a Weeds Management Plan for assessment and approval.

A Weed Management Plan is to set practical objectives for each road identified in the Response Schedule and/or the RFT and be based on detailed maps of declared weeds present, the scope of their infestations and the likelihood of seeds being spread (e.g. proximity to turn off areas). For example, in a road section with isolated individuals the objective might be that all plants are chemically controlled, whereas in a core infestation slashing alone may be adequate to prevent weed spread and satisfy obligations under the *Weeds Management Act 2001*.

Objectives need to be measurable so that effectiveness of control measures and spread prevention can be assessed. Objectives should be discussed with the Superintendent in conjunction with DENR.

Address seasonal restrictions to weed reproductive cycles to prevent weed seeding.

DARWIN, EAST ARNHEM AND KATHERINE REGIONS

Time the operations to follow the first storms of the wet season and/or before seeds are produced by the target plants.

Timing of seed production is variable depending on rainfall, however some wood species (eg. Neem) flower and produce seed in the dry season.

ALICE SPRINGS AND TENNANT CREEK REGION

Rain can fall in both winter and summer in arid Australia. Operations should be timed about 3 weeks after a 25 mm rainfall event for broad leaf or grassy weeds. Woody weeds can be controlled all year round but the herbicide works better after rain.

15.11.4 Herbicide Selection - Hold Point

Hold Point - Provide a list of herbicides and chemicals intended for use during the contract to the Superintendent as part of the Weed Management Plan.

Control declared weeds in the road reserve by spraying herbicides and additives as prescribed such as diesel or wetting agents (surfactants). Different herbicides have different modes of action, which needs to be considered in selecting suitable herbicides and their application (e.g. foliar vs. basal bark). Some disrupt the weed's metabolic processes killing the plants, whereas others are residual in the soil and interfere with germinating seeds. See the Department of Land Resource Management Weed Management Handbook <https://nt.gov.au/environment/weeds/how-to-manage-weeds/weed-management-handbook> for appropriate herbicides and application methods for most declared weeds.

For each declared weed species controlled, log book records of chemical use should be kept. Refer to Additional Requirements for the Darwin Region

The Contractor must performance manage this item and is required to control or eradicate vegetation around road structures and furniture by spraying herbicide and/or other chemicals.

The vegetation in treated areas must not exceed more than 3 plants per square metre, nor more than 200mm in height, at any time.

Any treated vegetation that died back in the sprayed area must be controlled to prevent damage to the infrastructure by fire and if necessary must be removed by mechanical means.

The Superintendent or a representative of the Superintendent may evaluate the sites to determine compliance with Key Performance Indicators.

Note: This KPI will apply after the first treatment from the commencement of the contract.

Manage and control declared weed spreading. Allow for cleaning of vehicles, plant, and equipment daily, and prior to entering national parks, and prior to exiting infested areas.

Log Books sub-clauses in LANDSCAPE MAINTENANCE, **Control of Pest and Weed Species** clause, and in **Vegetation Control** clause in this work section.

Chemical control should be planned in co-ordination with slashing and burning requirements.

Provide an alternative suitable herbicide if during the course of the contract a chemical is withdrawn from the APVMA approved list.

15.11.5 Effectiveness of Control and Spread Prevention

Effectiveness of control and spread prevention is assessed by:

- a) Permanent Monitoring Sites; these are established by the Superintendent (or his agent) in strategic locations known to contain weeds (point data) and those known to be free of weeds (transects) at the commencement of the contract.

These will:

- identify changes in weed infestations annually and over the entire period of the contract
 - allow for verification against log books
 - evaluate efficacy of the treatment (slashing and chemical control)
 - help inform weed control priorities for the next season (in conjunction with post-season review)
 - include areas of known high density weed infestation and also areas known to be free from weeds at the commencement of the contract period.
 - Provide incentive for the Contractor as a result of improved control over the duration of the contract.
- b) Overall visual assessment of road verge for monitoring according to submission of the log books.
 - c) Specific monitoring for gamba grass control and spread management may be conducted in strategic areas.

15.11.6 Determination for Key Performance Indicators

Evaluation of the monitoring points will occur at the conclusion of the treatment period (wet season) annually. Assessment will be consistent with the WMB data collection requirements (<https://nt.gov.au/environment/weeds/how-to-manage-weeds/weed-mapping-and-data-sharing>), and will allow determination of a Key Performance Indicator (KPI) based on criteria listed below. The KPI is linked to final payment schedule.

The KPI is calculated as the percentage of sites where values of 1, or 100% alive adult seeding gamba grass were recorded, indicating that weeds were not managed.

Refer to **Table - KPI Criteria and KPI Value Codes**, and to **Table – SAMPLE – Field data log - Assessment of sites by KPIs**.

Table - KPI Criteria and KPI Value Codes		
Point data codes (KPI value)	Transect data codes (KPI value)	Gamba Age & Status Codes
1 = No evidence of effective treatment 2 = treated (slashed or sprayed) but not adequately effective 3 = effective treatment (>90% total brown-out) or slashed such that plants dead and did not produce seed	1 = weed present and not controlled 2 = weed present and evidence of effective control 3 = no weed present	Age >1yr Perennial plants <1yr Germinated that season Status AS Alive and seeding (post-feathering) + % alive DS Dead but seeded + % dead but seeded D Dead + % dead

Table – SAMPLE – Field data log - Assessment of sites by KPIs					
Name of assessor -					
Date of assessment -					
Site No.	Road Name or Description	Site Type (Point or Transect)	Monitoring Site ID	KPI value	Gamba Age & Status
Total number of sites assessed:				#	
Total number of sites where value = 1				# sites (# points, # transects)	
Average KPI% across ALL sites (average of all KPIs, divided by total number of sites assessed, expressed as a percentage)				#%	

15.11.7 Induction for Declared Weed Management

The contactor and personel shall attend a ½ day induction course prior to the commencement of the Contract to confirm knowledge and understanding of;

- Correct weed identification and any new species declarations,
- Appropriate herbicides for specific weed situations, and old/new formulations,
- Appropriate methods of application, and application techniques,
- Required data collection and logbook guidelines, and
- The *Weeds Mangement Act 2001* and requirements of statutory weed mangement plans.

15.11.8 Post Season Review

The contactor and/or his agent shall attend an annual post season review to conduct desk-top analysis of weed data and associated road maps.and to conduct site visits if necessary.

The primary purpose of the annual post-control review is to determine if Contractor has maintained road reserve as per the contract and met objectives in the Weed Management Plan. The focus of the review will be a dialogue between the Superintendent and the Contractor to plan for better control in the following year.

Inspections will be undertaken jointly between the Superintendent (or a representative of the Superintendent) and the Contractor (or his nominated sub Contractor) not longer than 4 weeks after the end of annual control operations.

At the conclusion of the post-season review meeting, final payment as a percentage of the scheduled rate will be determined.

15.12 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

16 TRAFFIC SIGNALS AND INTELLIGENT TRANSPORT SYSTEMS MAINTENANCE

16.1 DESCRIPTION OF THE WORKS

16.1.1 General Outline

A general outline of the work to be carried out under the Contract comprises:

The Contractor is required to ensure that all infrastructure listed, including their components, remain in good condition and operate as designed.

Provide a twenty four hours a day, seven days a week service to safely and efficiently meet the requirements of the contract within specified timeframes for all ITS & related equipment within the area stipulated in the RFT/RFQ, associated with inspection, servicing, repairs, and maintenance for:

- Traffic Signal Controller (TSC) assets & associated hardware;
- Advanced Warning Signs (AWS or Wig Wags);
- Variable Speed Limit Signs (VSLs);
- Closed Circuit Television (CCTV);
- Uninterruptible Power Supply (UPS) systems;
- Other Intelligent Transport Systems (ITS); and,
- Associated communication equipment relating to the above items.

The majority of the equipment to be maintained includes, but is not limited to:

- traffic signal controllers,
- cabinets,
- detectors,
- detector loops,
- signal hardware including:
 - o conduits,
 - o cables,
 - o footings,
 - o conduit junction pits,
 - o detector pits,
 - o signal posts, pedestals, masts, and arms,
 - o supports,
 - o wiring assemblies,
 - o aspects,
 - o pedestrian buttons, and
 - o traffic signal / pedestrian lanterns,
- AWS,
- VSLs,
- CCTV,
- UPS, and
- other ITS equipment including:
 - o all IT and communication equipment, and
 - o equipment linking each asset to the Sydney Coordinated Adaptive Traffic System (SCATS) regional computer,
- other equipment which integrates into the traffic signal controller, such as:
 - o Red Light Camera equipment which is housed within the TSC,
 - o Emergency Services 'hurry call' equipment, and
 - o other equipment which uses the controller for information, power supply, or communications.

16.1.2 Work Types

The maintenance of traffic signals and ITS are specified as three work types, which are;

- Fault Maintenance,
- Routine Maintenance, and
- Specific Maintenance

The Contractor shall endeavour to coordinate all maintenance tasks at one asset, at the same time within the time limits for attendance if possible, to reduce the impact on the road network, and offer synergies with traffic management. If this is not possible due to time limit for attendance, seek approval for an extension from the Superintendent.

The Contractor shall have a minimum of two technicians on site for all works other than site attendance after hours

16.1.2.1 Fault Maintenance

Fault Maintenance is the response to unscheduled maintenance and will be paid at the rate for a Site Attendance, or the rate for an Accident Attendance.

Fault Maintenance can be identified by either the Contractor, or the Superintendent. Attendance on site, and works, must be authorised by the Superintendent, except where the fault is of a nature that poses a significant risk to the public or the Contractor's workers. Attendance must occur within specified response times provided in **Table - Response Times** in the **Response Times** clause in this work section.

Fault Maintenance includes, but is not limited to, rectification of the following faults:

- damage caused by impacts by vehicles and/or trailers,
- damage caused by weather or seismic events,
- traffic signals flashing amber,
- controller related faults,
- traffic signals blacked out,
- traffic signals non-operational,
- communications outages,
- aspects out of alignment,
- pedestrian hardware related faults, and
- all ITS related faults.

16.1.2.2 Routine Maintenance

Routine Maintenance is carried out to a specified level and within a broad timeframe. Work is scheduled by the Contractor but must be completed within an allocated time as shown in **Table - Response Times**. Routine maintenance is generally follow up work to Fault Maintenance i.e. reinstate pedestal and hardware, replace detectors, replace faulty signal component, replace UPS batteries or testing, CCTV repairs, cleaning or inspections.

16.1.2.3 Specific Maintenance

Specific Maintenance consists primarily of an audit of an individual traffic signal site, inclusive of all ITS related to that traffic signal asset. A report is generated by the Contractor identifying the condition and performance of the traffic signals and related ITS, if applicable. The report, inclusive of any recommended repairs identified from the audit are scheduled by the Contractor and submitted to the Superintendent's Representative in a program of works within 5 working days of the audit being completed as a basis for approval. If any recommended repairs are considered as

urgent at the time of the audit being undertaken, the Contractor shall contact the Superintendent's Representative immediately for further direction regarding works to be undertaken. Nominated repairs such as pole top replacements are undertaken in conjunction with the Audit.

16.2 CROSS REFERENCES

MISCELLANEOUS PROVISIONS

PROVISION FOR TRAFFIC

CONCRETE MAINTENANCE

16.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

AS/NZS 1163	Cold-formed structural steel hollow sections
AS 1231	Aluminium and aluminium alloys - Anodic oxidation coatings
AS/NZS 1477	PVC pipes and fittings for pressure applications
AS/NZS 1554(set)	Structural steel welding
AS/NZS 1594	Hot-rolled steel flat products
AS 1742.3	Manual of uniform traffic control devices - Traffic control for works on roads
AS 1743	Road signs - Specifications
AS/NZS 2053(set)	Conduits and fittings for electrical installations
AS 2144	Traffic Signal Lanterns
AS/NZS 2276(set)	Cables for traffic signal installations
AS 2339	Traffic signal posts, mast arms and attachments
AS 2353	Pedestrian push-button assemblies
AS 2700	Colour standards for general purposes
AS 2703	Vehicle loop detector sensors
AS/NZS 3000	Electrical Installations
AS/NZS 3100	Approval and Test Specification – General Requirements for Electrical Equipment
AS/NZS 3108	Approval and test specification - Particular requirements for isolating transformers and safety isolating transformers
AS/NZS 3191	Electric flexible cords
AS/NZS 3678	Structural steel - Hot-rolled plates, floorplates and slabs
AS/NZS 3679.1	Structural steel - Hot-rolled bars and sections
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 5000.1	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV

16.4 DEFINITIONS

In this contract, unless otherwise specified, the following words and expressions will have the following meanings;

Table – Definitions – Traffic Signals and ITS Maintenance	
Accident Attendance	Attendance to carry out repairs to severe damage caused by vehicle accident or similar.
Advanced Warning Signs (AWS):	Large yellow and black signs approximately 150m advanced of some signalised intersections displaying alternating flashing yellow lights when the approaching signal group is in either yellow or red. Also known as “Wig wags”.
After Hours:	Any hours not between 0700hrs and 1700hrs Monday to Friday and all weekends and public holidays.
Audio Tactile Driver:	An electronic device to activate the transducer within the associated push button assembly mounted on a traffic signal post.
Auxiliary Cabinet:	An approved housing for ITS components which is often fitted to the top of a controller cabinet. It may house Red Light Camera (RLC) equipment, CCTV equipment, and other ITS equipment and related components including routers, UPS, modems, fibre optic connections etc.
Business Hours:	Between 0700hrs and 1700hrs Monday to Friday, excluding NT wide public holidays and local show days.
Closed Circuit Television (CCTV):	CCTV is the use of video cameras to transmit a signal to a specific place, on a set of monitors. The cameras may be fixed, or PTZ (pan, tilt, zoom) and capable of being remotely controlled. The CCTV for use in this contract may monitor traffic flow / congestion, incidents, or to observe events or works.
Control Relay:	An electro-mechanical or solid state assembly within a controller cabinet for the purpose of switching signal lamps.
Controller:	A complete electronic mechanism for controlling the operation of traffic signals and other ITS.
Controller Cabinet:	An approved housing for a controller, control relays, auxiliary equipment, terminal blocks, sockets, flasher units, wiring, and other ITS components etc. which may or may not include vehicle detectors and linking equipment.
CSR:	Contractor Service Request/Report
Day:	Calendar business day unless otherwise stated.
Deficiency:	<p>The visible or measurable evidence of failure or other undesirable condition that is at or exceeding its intervention level or that is likely to become a Hazard (as reasonably determined by the Contractor or Superintendent’s Rep) before the next scheduled or required inspection.</p> <p>The deficiency may affect the safety, serviceability, structural capacity or appearance of the asset.</p>

Table – Definitions – Traffic Signals and ITS Maintenance	
Department, the / DIPL	The Department of Infrastructure, Planning and Logistics.
Detector Loop:	An in-pavement wiring configuration (including lead-in wires) to detect or count vehicle movements, or both.
Detector Sensor:	An electronic device, which may be post or controller mounted, used to count, classify, or detect vehicles or pedestrians, or both.
Fault:	Any malfunction of equipment to be rectified within specified response time.
Fault Maintenance:	<p>The repair and/or replacement of equipment damaged or defective through any cause and shall require:</p> <p>(a) A 24 hour, 7 days/week fault attendance service for the purpose of inspection, identification and repair of reported site malfunctions, with a fully equipped service vehicle and experienced technicians.</p> <p>(b) An adequate back-up service to enable permanent repairs and rectification of all site deficiencies.</p> <p>(c) A fully equipped workshop facility for the purpose of testing and repairing equipment removed from the maintenance site.</p>
Footing and Post / Pedestal:	A concrete base, including all conduit bends, ragbolt assemblies and reinforcement cages, and a post used primarily for the support of traffic signal lantern/s (including mast arms and joint use poles). Footings and posts maintained by other authorities are not included in this definition.
HHT	Hand Held Terminal
Intelligent Transportation Systems (ITS)	Intelligent Transportation Systems (ITS) can be defined as the application of advanced information and communications technology to surface transportation in order to achieve enhanced safety and mobility while reducing the environmental impact of transportation. ITS in the NT may include CCTV, Red Light Cameras, UPS, VLSL, Radar or video detection, VMS (mobile or fixed). It may include vehicle to roadside, vehicle to vehicle, or vehicle to infrastructure technology.
IIPC	Instruction to Period Contractor
KDU	Keyboard Display Unit
Minor Repairs	The regular adjustment and minor servicing required to keep traffic signals in good, serviceable operating condition.
Normal Hours	See Business Hours .

Table – Definitions – Traffic Signals and ITS Maintenance	
Pedestrian Detector	A push button device used to actuate the pedestrian walk phases which may or may not include audio-tactile devices and 'Wait' indicators.
PSTN	Public Switched Telephone Network
RCTI	Recipient Created Tax Invoice
Red Light Speed Camera (RLSC)	Red light cameras and speed cameras are not included in the maintenance contracts for Traffic Signals and ITS. The cameras are connected to the ITS. Contractors are to ensure operation of the cameras is not disrupted when working on the ITS.
RFT/RFQ	Request for Tender / Request for Quotation. Provisions in this specification applicable to one are equally applicable to the other.
Routine Maintenance	Repairs identified during fault maintenance or otherwise directed by the Superintendent's Representative or Traffic Section staff. Work to be completed within a specified timeframe.
Sydney Coordinated Adaptive Traffic Management System (SCATS)	SCATS® is an adaptive urban traffic management system that synchronises traffic signals to optimise traffic flow across a whole city, region or corridor. It's highly configurable, dynamically responding to the demands of the network in real time. SCATS is used throughout the NT to control the traffic signals.
Scheduled Work	Work for which a specific rate item is provided in the Schedule of Rates
Shall	Is indicative of a mandatory requirement unless the context clearly indicates otherwise.
Site Attendance	Site attendance is the response to an unknown fault or the requirement to attend a site as instructed by the Superintendent and includes maintenance works that can be carried out within the two hour minimum period.
Supports	All structural components, brackets, post top assemblies, clamps, straps and parts thereof, used to support traffic signal equipment.
Specific Maintenance	Scheduled inspection of all asset based on-site equipment compiled in report form to identify condition and performance of traffic signal hardware and related ITS. Recommended repairs scheduled in program as provided by Contractor and agreed to by Superintendent's Representative.
TGS	Traffic Guidance Scheme – TGSs are part of TMP
TMP	Traffic Management Plan – includes TGSs

Table – Definitions – Traffic Signals and ITS Maintenance	
Traffic Signal Aspect	A single optical system (circular, arrow or symbolic) on a single face capable of been illuminated at a given time. 2 or more aspects in a common mount and operation are called a Lantern (see Traffic signal lantern)
TSC	Traffic Signal Controller
Traffic Signal Lantern	A vehicular traffic control signal, pedestrian control signal, flashing signal or internally illuminated sign including all housings, visors, doors, lamp holders, reflectors, gaskets, target boards, lenses, wiring and cables and other related items. The lantern may consist of Incandescent, Halogen, or Light Emitting Diode (LED) lamps to illuminate the traffic signal display.
Uninterruptable Power Supply (UPS)	An uninterruptible power supply, or battery backup, is an electrical apparatus that provides emergency power to a load when the input power source, typically mains power, fails. The UPS continues to power the traffic signals and ITS until mains power can be restored. Also may be termed as ICUPS (Internal Controller UPS), or ECUPS (External Controller UPS).
Unscheduled Work	Work for which no specific rate item is provided in the Schedule of Rates.
Variable Message Signs (VMS)	A VMS, is an electronic traffic sign often used on roadways to give travellers information about events related to the road reserve. They warn motorists of road conditions, traffic management, accidents or incidents and may warn of traffic congestion. They may direct vehicles to take alternative routes, limit travel speed, warn of duration and location of the incidents or just inform of the traffic conditions.
Variable Speed Limit Signs (VSLS)	A VSLS is an electronic sign that can display alternate speed/s by time of day remotely either automatically, or manually, for reasons such as school zones, busy areas, areas of high pedestrian numbers etc, where the lower speed limit is not warranted permanently.
Wig wags	See Advanced Warning Signs
WO	Works Order
Working Day	See Business Hours .

16.5 SITE OF WORKS

There are various sites for these works. Refer to the RFT. The sites will include all traffic signalised intersections, pedestrian crossings AWS, CCTV, UPS, VSLS, and ITS applications within the areas stipulated in the RFT.

All traffic signals in the stipulated areas are included in this contract. Maintenance for any newly constructed assets will be included within the maintenance list once a handover has been undertaken with the constructing Contractor and the Project Manager for the governing agency and accepted by the Department's Traffic Section.

All Closed Circuit Television (CCTV) cameras under the control of the Department are included in this contract. Other selected NTG CCTV assets or future council CCTV may also be included.

The locations of these traffic signals and of signalised intersections are shown in the tables:

- **Table – NT Government Owned Traffic Signals – Darwin Region,**
- **Table – Darwin City Council Owned Traffic Signals,**
- **Table – Palmerston City Council Owned Traffic Signals,**
- **Table – NT Government Owned Traffic Signals – Alice Springs, and**
- **Table – Alice Springs Council Owned Traffic Signals**

The tables appear in clauses 16.30 and 16.31.

Where work is required to be carried out in easements or on land adjacent to the site for the purpose of connecting services or joining up of roads etc. ensure that the appropriate licences and approvals are obtained for work in those particular areas.

Permits – City or Town Council permits are required to be obtained to undertake works for all non-fault maintenance activities. As per Council direction, fees will be waived for all works within Darwin and Palmerston Council jurisdictions for works directly relating to traffic signal or ITS maintenance purposes executed under this contract. Approved permits shall be forwarded on to the Traffic Section prior to proceeding with the works.

16.6 RESTRICTED WORKING HOURS

The work to be performed under the Contract shall be subject to execution within certain restricted working hours.

For the purpose of this contract working hours are:

- Planned Works, Scheduled Works:
Monday to Friday between 0700 and 1700 hours (normal/business hours), excluding NT wide public holidays and local show days,
- Emergency / Call outs / Unplanned Works:
Monday to Friday excluding NT wide public holidays and local show days, outside the above normal/business hours, and on weekends, and on NT wide Public Holidays, and on local show days.

Note: Planned or scheduled works may not always be able to be carried out within normal work hours due to the unacceptable risk of some environments, for example; where traffic volumes are too high to allow works to be undertaken in accordance with PROVISION FOR TRAFFIC or Australian Standards for traffic management.

The Superintendent will issue an instruction when planned or scheduled works shall be undertaken outside of normal hours.

If the Contractor wishes to undertake works outside of normal working hours for their own benefit, the Superintendent may approve the works, but payment shall be made at normal working hour rates.

See also PROVISION FOR TRAFFIC.

See also the clause titled 'Working Hours' in the Conditions of Contract.

16.7 ACCESS TO SITE

Prior to entering the site of the Works, the Contractor shall contact the officer-in-charge of the site to explain the nature of the work to be carried out and ask for permission to enter the site to carry out the Works.

In the event of either, being unable to contact the officer-in-charge, or being refused permission to enter the premises the Contractor shall notify the Superintendent’s Representative.

Work shall not proceed in such areas until further advised by the Superintendent’s Representative.

Note: This clause applies where the Contractor is required to access a site to undertake traffic signal, or ITS maintenance, that at the time, is under contractual possession of a third party i.e. other Contractor.

16.8 SCHEDULE OF DRAWINGS INCLUDED IN CONTRACT

The following drawings shall form part of the Contract:

Table – Schedule of Drawings Included in Contract		
DRAWING NO.	AMEND NO.	TITLE
CS 1500	4	Signal Details – Ducting
CS 1501	3	Signal Details – Pole Foundation
CS 1502	2	Signal Details – Mast Arm Foundation
CS 1503	3	Signal Details – Controller Foundation
CS 1504	3	Signal Details – Communication Isolation Pillar
CS 1505	2	Signal Details – Lantern Mounting Details
CS 1506	1	Signal Details – Pedestrian Push Button
CS 1507	5	Signal Details – Detector Installation
CS-1510	3	Philips PSC MK3 QC12 – ID Controller
CS-1511	-	Traffic Cabinet Details Drawings
CS-1512	-	Cabinet Base Plate Mounting Details Drawings
CS 1557	2	Traffic Signal Advanced Warning Sign

16.9 AVAILABILITY OF CONTRACTOR

The Contractor shall provide twenty-four hours a day, seven days a week telephone contact and availability of labour to deploy to the Works should the Superintendent’s Representative, Traffic Section or Departmental On-Call staff so direct. The Principal shall have first call on the services of the Contractor.

The Contractor shall ensure that there is always an appropriately delegated ‘Contractor Representative’ available to provide quotes, information on quotes, to make operational decisions and provide technical advice, escalation of works, to be available to resolve disputed invoices, and for other operational purposes. If the nominated Contractor Representative is on leave, prior notice shall be given of the staff member who will be available for these duties in the Contractor Representative’s absence. Alternately, a 2nd in charge may be appointed to make the same decisions and provide the same services with equivalent authority.

16.10 CONTRACTOR'S ESTABLISHMENT

The Contractor shall provide and maintain an established office workshop facility. The facility shall include the following:

- An approved workshop with equipment and capabilities sufficient to carry out work as requested under the Contract.
- An approved office space with sufficient personnel necessary to take, record or pass on any emergency message that may be received, provide day to day information with regard to prices availability and delivery. Be sufficiently qualified to process and forward invoices for work carried out.
- An approved storage facility that is secure and provides a weatherproof location for the storage of Department owned assets or hardware that are stored by the Contractor under the requirements of this contract.

16.11 CONTRACTOR'S EQUIPMENT AND MATERIALS

The Contractor shall provide all general and specialised equipment, tools and materials to carry out and test the Work (except for equipment, tools and materials supplied by the Principal). It shall be the responsibility of the Contractor to be fully equipped on each attendance call.

16.12 CO-ORDINATION OF WORK

The Contractor shall confer with any sub-Contractors and persons engaged on separate orders in connection with the Works and with the Superintendent's Representative, Traffic Section or Departmental On-Call staff for the purpose of co-ordination and execution for the various phases of the Works. The Contractor shall be responsible for arranging that each shall attend upon and assist the other trades.

The Contractor shall ascertain from the sub-Contractor and persons engaged on separate contracts the extent of all chasing, cutting and forming of all openings, holes, grooves and the like.

The Contractor shall ascertain the routes of all services and the position of all pits, conduits and the like in connection with the installation of plant and services and arrange for the construction of work accordingly. The breaking and cutting of complete work must be avoided wherever possible.

16.13 MATERIAL AND SOFTWARE TO BE SUPPLIED BY THE PRINCIPAL - DARWIN

The following material and software will be supplied free by the Principal to the Contractor for use only in execution of the Works:

Table – Items Supplied by Principal – Darwin	
ITEM	QUANTITY
CONTROLLERS	
PSC MK3 Cabinet & Test Controller (with lamp load bank)	1
Keyboard Display Units (KDU)	8
Eclipse Cabinet & Test Controller (with lamp load bank)	1
Eclipse Hand Held Terminal (HHT)	7
PSC Manuals and Eclipse Manuals	1

Table – Items Supplied by Principal – Darwin	
ITEM	QUANTITY
CCTV Cleaning Pole	1
SOFTWARE / SCATS / USER MANUALS	
Scats Access Program	1
SCATS Log	1
Loop Detector Analyser	1
Tyco Log Viewer	1
EUpdate	1
ATSUI	1
Microconnect LCM Management Tool	1
UPS Manuals	1
SIGNAGE	
'Changed Traffic Conditions Ahead' Signs	4
'Traffic Signals Under Repair' Signs	8

16.13.1 Collection of Hardware – Hold Point

Hold Point - Within 7 days of award of the Contract, the Contractor shall collect such materials and take delivery of the materials at the Department's Yarrowonga shed / storage yard.

Before taking delivery of any material, the Contractor shall check that is in a satisfactory condition and in the quantity described. No claim will be admitted for replacement of material alleged to be found defective or deficient in quantity after delivery.

The quantities stated are not necessarily adequate for the execution of the Works and supply of any additional quantities shall be arranged by the Contractor and at his own expense.

The maintenance and serviceability of all equipment provided by the Department and used for testing by the Contractor, such as the KDUs, HHTs, test controller cabinets and associated load banks are the responsibility of the Contractor to arrange and shall be at the Contractor's expense. The equipment shall always be in a serviceable condition.

On completion of the contract, the Contractor shall deliver the Principal supplied material back to the Traffic Section storage yard in serviceable condition.

16.14 MATERIAL TO BE SUPPLIED BY THE PRINCIPAL – ALICE SPRINGS

The following material will be supplied free by the Principal to the Contractor for use only in execution of the Works:

Table – Items Supplied by Principal – Alice Springs	
MATERIALS	QUANTITY
CONTROLLER:	
Keyboard Display Units (KDU)	3
PSC MK3 Cabinet Test Controller	1
Mother Board	1
PSC Processor Plus card	1
PSC Power Supply card	1
PSC Power Interface card	1
PSC PD212 Detector card	1
PSC PD216 Detector card	1
PSC Lamp Control Board cards (low power)	3
Memory Test Program (from old L0101)	1
PSC Motherboard complete with: PSC Processor Plus Card, PSC Power Supply Card, PSC Power Interface Card, 2 x PSC PD216 Detector cards, 3 x PSC Lamp Control Board cards.	1
PSC Motherboard	1
PSC Processor Plus card	2
PSC Power Supply card	3
PSC Power Interface card	1
PSC PD212 Detector cards	1
PSC PD216 Detector cards	1
PSC Lamp Control Board cards (low power)	6
PSC Flasher Units	1
PSC Manuals	2
Eclipse Controller EC1-69-16	3
Eclipse Controller EC1-69-08	1
Eclipse Hand Held Terminal (HHT)	3
Eclipse Manuals (electronic copy)	1
Eclipse Motherboard LM40-16-16 complete with cards	2
Eclipse Motherboard LM40-08-16 complete with cards	3
Eclipse CPM 1a card	2
Eclipse LDM 416 card	2
Eclipse LCM 8 card	4

Table – Items Supplied by Principal – Alice Springs	
MATERIALS	QUANTITY
Eclipse PSM card	1
Eclipse Flasher Unit	2
Eclipse Mains Filter Unit	2
Eclipse Assembly Site ID	1
PSTN Micro Connect Linking Control Modules for SCATS communication	1
SCATS	
Scats Access Program	1
SCATS Log	1

On award of the Contract, the Contractor shall submit a written request for such materials, and on receiving the Superintendent's written authority, he shall take delivery of the materials at the Traffic Section storage location wherever it may be in Alice Springs (Currently second floor of Greenwell Building)

Before taking delivery of any material, the Contractor shall check that is in a satisfactory condition and in the quantity described. No claim will be admitted for replacement of material alleged to be found defective or deficient in quantity after delivery.

The quantities stated are not necessarily adequate for the execution of the Works and supply of any additional quantities shall be arranged by the Contractor and at his own expense.

16.14.1 Documents / items to be submitted for this contract after award

Table – Documents / Items Contractor to Provide	
ITEM	TIMEFRAME
Project Control Plan	14 Days
Document / Hardware Control	14 Days
Contact numbers - during and after hours	24 Hours
Site Log Template	7 Days
Traffic Management Plan & TGSs	14 Days
Test Controllers Installed	14 Days
Test Traffic Signal Loop Installed	14 Days
Contractors Nominated PIN Numbers	7 Days
Contractor's Personnel Accreditations / Qualifications	7 Days
Company Workplace Health & Safety Plan	14 Days

Table – Documents / Items DIPL to Provide	
ITEM	TIMEFRAME
Material to be supplied to Contractor	Upon Request (within 7 days)
Callout Request Form	24 Hours
Contact numbers - during and after hours	24 Hours
Excel Spreadsheet Quote Sheet	7 days

Note: The items listed above are required to be provided or undertaken within the nominated timeframes following commencement of the contract, however is not an exhaustive list.

Documents shall be updated and provided to the Superintendent’s Representative as soon as possible of any contents within the documents changing.

16.15 PROCEDURES, CALLS AND PAYMENTS

16.15.1 General

This section specifies the requirements for attending the work and the procedures for reporting and payment of work carried out.

NOTE: The Department’s Traffic Section are investigating the feasibility of implementing a maintenance management system for traffic signals and ITS in the NT. It is anticipated that this system be capable of creating and forwarding works order directions, and allow responses for all maintenance tasks, tracking work orders and invoices, recording works completion times, and providing full reports. It may also be able to attach photos to work orders, control stock and location.

If this system is implemented during the term of this contract, the Contractor will be required to adopt the use of the system for the purpose of this contract. Licenses, software and equipment (mobile devices) will be provided by the Department if required.

16.15.2 Abbreviations and Definitions

The following abbreviations and definitions are used in this specification section:

- SCHEDULED WORK – Work for which a specific rate item is provided in the Schedule of Rates.
- UNSCHEDULED WORK – Work for which no specific rate item is provided in the Schedule of Rates.
- CSR – Contractor Service Report/Request.
- ITPC – Instruction to Period Contractor
- WO – Works Order.
- RCTI – Recipient Created Tax Invoice

16.15.3 Direction to work

A direction to work may be issued in the following forms:

- Telephone call or facsimile.

A CSR will subsequently be issued by the Superintendent.

- Instruction to Period Contractor. (ITPC)

A CSR will subsequently be issued by the Superintendent.

- Contractors Service Request/Report (CSR)

Issued in its own right or subsequent to a telephone call or facsimile, an ITPC or an urgent call out.

- Service Order

Issued in respect to a quotation for specific works not included in the Schedule of Rates.

- Urgent call out work outside of normal working hours.
- Urgent call out work outside of normal working hours may be communicated to the Contractor by the Department's answering service Contractor or the Superintendent's Representative, Traffic Section or Departmental On-Call staff.

In the event of an urgent call out outside of normal working hours the Contractor shall on the first working day thereafter, complete a "Call Out Request Form" and email the same to Traffic Section as a prerequisite to the issue of a CSR or email work order.

If the Superintendent's Representative, Traffic Section or Departmental On-Call staff considers any particular work requirement is urgent he shall so advise the Contractor and shall cause the CSR subsequently issued to be stamped "URGENT".

The Contractor shall visit the office of the Superintendent as required to collect any hard copy directions to work.

For traffic signal maintenance works, an automatically generated CSR is issued monthly to the Contractor for each traffic signal asset. Traffic Section staff send email work orders to the Contractor as a direction to work to initiate maintenance works to be completed at required assets. The Contractor then compiles the email work orders and evidence, and then invoices the Department monthly for each CSR. Where works have not been undertaken at any particular asset for that month, the Contractor will enter the words 'nil charges' on the relevant CSR and return with the other monthly invoices for that CSR to be cancelled.

For works where there is a recovery of costs initiated by the Department i.e. where a traffic signal has been knocked over by a motorist, a separate CSR will be forwarded to the Contractor to undertake the works in relation to the reinstatement of that asset.

Specific maintenance and other works may be initiated on a separate CSR.

16.15.4 Advance Direction

Notwithstanding the provisions of the Direction To Work clause the Contractor will receive an advance direction to carry out any required Scheduled Work up to a maximum of the monthly pro rata frequency of the respective Schedule of Rate Items.

Any advance direction issued may be revoked at the sole discretion of the Superintendent.

16.15.5 Authority to Undertake Work

The Contractor will not undertake any work unless specifically directed to do so by the Superintendent's Representative, Traffic Section or Departmental On-Call staff, with the exception of:

- Hazardous situations. If there is obvious works required due to a hazardous situation that could endanger a worker or member of the public, the Contractor shall attempt to contact the Superintendent's Representative for permission to proceed with the work. If the Superintendent's Representative or other Traffic Section staff are not available, the Contractor may proceed with the works if the works is of a nature that poses a risk to the public or workers.

In the above situations the Contractor shall notify the Superintendent's Representative as soon as practicable during or after the works, and provide supporting evidence (photographic or other) of the works that occurred.

16.15.6 Instruction To Period Contractor - CSR

One copy of an ITPC or CSR will be issued to the Contractor. The document will describe in brief detail, the location and a brief description of the work required.

When the works required by the CSR have been completed the Contractor shall insert, in the appropriate place on the CSR, brief work descriptions, item numbers, quantities, rates, extensions, additions, the total value and any other information required by the Superintendent to approve payment.

The CSR shall have the completion date of the works entered thereon and be signed off by the Contractor.

16.15.7 Time Limit for Attendance

The works must be attended within the time limits specified in **Table - Response Times**.

Any inability to undertake the works during the allowable time limit shall be coordinated with the Superintendent's Representative or Traffic Section staff, prior to the time or date due for completion with sufficient time to arrange a suitable alternative.

16.15.8 Variation Approval

Any variation from the extent of work ordered must be approved by the prior to the varied work being carried out.

Where an item of work is ordered pursuant to a Schedule of Rates item for Scheduled Work and the Contractor considers the item to be outside the scope of the Schedule of Rates item the Contractor shall obtain the approval of the Superintendent prior to carrying out the varied works unless the works is of a nature that poses a risk to the public or workers.

The Contractor shall in the case of any authorised variation insert on the CSR the approving officer's name and the date of such approval.

16.15.9 COMMUNICATIONS

Provide field and after hours communication with the Department by mobile telephones connected either to a cell net system or a satellite system.

Provide the Department with a list of current contact numbers (including mobile phones) for all staff involved in the delivery and works within this contract, including the single after hours contact number within 24 hours of award of the contract.

Ensure that the telephones are switched on every day between the hours of 0700 and 1700 or at any other time when work is being carried out under the Contract.

Ensure that the after hours phone is manned at all times, twenty-four hours a day, seven days a week.

The use of answering machines or message banks as the primary form of communication is not appropriate and should only be used if the phone is engaged (in use) or if the user is unable to get to the phone in time to answer it. The Contractor shall ensure that if a call is not answered for any reason, a return phone call will be made within ten minutes from the original missed call.

Replace faulty telephones within 3 working days of the occurrence of the fault, and advise the Superintendent's Representative in writing of any temporary arrangements.

All email work orders that are sent to the Contractor with instruction to undertake works, shall be replied to (reply to all) by 1000 hrs (10am) the following work day with details of the works that were undertaken, the fault/s that were fixed, scheduled and unscheduled items used, and any works outstanding or other non-urgent maintenance observed while on site. Any work order written responses required due to urgent reasons on the day that works occurred will be marked as such on the work order, and shall be received by 1000 hrs that day or earlier, as otherwise directed.

Works will be checked against the time limit for repairs of the fault and SCATS Log.

16.15.10 DAILY LOG BOOKS – APPROVAL – Witness Point

Maintain daily log books for works undertaken under the contract.

Witness Point - Approval - Submit to the Superintendent's Representative for approval, a suitably designed format for an individual Site Log template prior to commencing works under the Contract – to be provided within 7 days of award of contract.

A Site Log job sheet shall be filled in for each attendance regardless of the type of works being undertaken, and shall have all details completed including if a field is n/a.

Include in each individual site job sheet the following fields as a minimum:

- The site asset number and location, i.e. road name / intersection,
- Date and time of each attendance - arrival, returns, and departure from site,
- Confirmation that attendance was as per contract time limit for attendance – Yes/No,
- Names of personnel who attended site,
- Details of other site attendees (Police, Power & Water, Worksafe, Sub-Contractors etc),
- Name of Department officer that ordered the works (business hours and after hours),
- The type of work and details of the works undertaken, including controller faults and codes, test readings and results,
- Scheduled and non-scheduled items, and the quantities used or completed,
- Stock used (whether or not the item used was from Department stock or provided as new from the Contractor),
- Details of significant changes in the operational state of the traffic signals such as disconnection of communications or power to the site, Flashing Amber, Blackout or similar. Shall include approximate time of the change to operation,
- Evidence of works, including date and time stamped photographic images of any damaged / replaced items, additional or outstanding works.
- Equipment or works down time,
- Work Health & Safety incidents, near misses, or any unusual happenings, and any other requirements specified in the relevant Technical Section,
- Any outstanding maintenance requirements or faults observed onsite but not corrected at the time of attendance, or adverse traffic signal operational observations.

So that the Superintendent's Representative and Traffic Section staff can record the job as completed, all email work orders that are sent to the Contractor with instruction to undertake works, shall be replied to (reply to all) by Close of Business the following work day with details of the works that were undertaken, the fault/s that were fixed, scheduled and unscheduled items used, and any works outstanding or other non-urgent maintenance observed while on site. Works will be checked against the time limit for repairs of the fault.

Submit daily log book sheets with each completed CSR with the monthly or separate invoices.

16.15.11 Payments Generally

On completion of all work described on the CSR, endorse the CSR as required and return to the Superintendent no later than 14 days after completion of work.

When the Superintendent is satisfied the work has been completed in a satisfactory manner, and that the charges are in accordance with the Schedule of Rates, payment will be certified.

All orders for work not invoiced within 14 days of completion may be subject to valuation by the Superintendent and paid accordingly.

Fully detailed particulars, evidence of cost and acceptable reasons as to why the work was not invoiced within the 14 day period may be required as prerequisites to payment.

16.15.12 Tax Invoices

A GST compliant tax invoice which includes the order number of the work must be attached to the CSR when forwarding to the Superintendent for payment unless the Contractor has entered an agreement with the Principal to receive Recipient Created Tax Invoices (RCTI).

Where the Contractor has a written agreement with the Principal to receive Recipient Created Tax Invoices the Department, after receiving a completed CSR, will create a tax invoice on the Contractors behalf and issue it in parallel with the contract payment.

The Contractor will still be responsible for collecting the GST and remitting it to the Tax Office.

16.16 MEASUREMENT AND PAYMENT

Refer to MEASUREMENT AND PAYMENT

16.16.1 Payment Generally

Payment for Scheduled Work will be made at the tendered rate.

16.16.2 Rates Generally

The rates tendered are deemed to represent the full value of the work inclusive of plant, labour, messing, clearances, transportation, fuel, oil, maintenance, tools, material procurement and delivery, all incidentals to complete the work, attendance, supervision and for overheads and profit.

Where a Schedule of Rate item for Scheduled Works is defined as "Labour Only" the rate tendered shall be inclusive of all of the above relating to the labour component.

16.17 CLAIMS UNDER THE INDIGENOUS EMPLOYMENT PROVISIONAL SUM

Claims under the Indigenous Employment Provisional Sum are to be submitted to the Principal within 14 days of the end of each calendar month and must be accompanied by an Indigenous Employment Report as required by the Conditions of Contract.

16.18 REVIEW MEETINGS

The nominated appropriately delegated Contractor Representative shall be available to attend fortnightly meetings at locations to be directed by the Superintendent's Representative and at recurring times that are convenient to both the Contractor and the Superintendent's Representative.

The meetings will be held for the following purposes:

- For the Contractor to update the Superintendent's Representative of the progress of ongoing and pre-programmed works,
- For the Superintendent's Representative to provide the Contractor with future planned works, prioritise works and provide feedback,
- For the Superintendent's Representative and the Contractor to confirm previous works have been completed adequately, discuss and resolve disputed invoices, non-conformances and general Contractor co-ordination,
- Discuss integration and / or impact of other traffic signal works or contracts on traffic signals not included within this maintenance contract but impacting on traffic signals under NTG control (including other Traffic Section contracts, Departmental projects and external clients including councils),

- Current Work Health & Safety concerns by the Contractor, Traffic Section, Worksafe or any other stakeholder, and;
- Any other relevant issues or queries that relate to, or impact upon this maintenance contract.

16.19 QUOTING FOR UNSCHEDULED WORKS

The Contractor Representative is required to utilise the Quoting Form which will be supplied to the successful Contractor within 7 days of the contract being awarded. The Quoting Form is in an Excel Spreadsheet format. The Quoting Form is required to be completed by the Contractor for all unscheduled materials, negotiated rate items and to advise the Superintendent's Representative of what quantities are required for works such as full pole replacements as a result of an accident, or other routine maintenance activities. Quotes may be required for supply only items, labour items, or both.

Completed quote forms should be emailed to the Department's Traffic Section so a CSR or email work order can be raised if the quote is accepted. The email shall be accompanied by a description of what the quote includes, excludes, a breakdown of the negotiated rate items (including personnel and materials), expected duration of works, and the date proposed to commence.

Quotes requested verbally or in writing by the Department shall be provided in detail with all of the required information within the following time limits:

Standard Quote. A standard quote shall be provided within 5 business days of the request for quote being issued. A standard quote would include traffic signal and ITS works, repairs or reinstatement which is of a non-urgent nature as described by the Department's Traffic Section, and other non-urgent requirements.

Urgent Quote. An urgent quote shall be provided within 24 hours of the request for quote being issued. An urgent quote would include traffic signal and ITS works, repairs or reinstatement which is of an urgent nature or any other urgent requirements as described by the Department's Traffic Section.

Also refer to clause 'Availability of Contractor'.

16.20 FAULT MAINTENANCE

Provide a fault attendance service by appropriately qualified technicians on twenty-four hours per day, seven days per week basis for all traffic signal or ITS failures arising from any cause. Typical causes of traffic signal faults include:

- Signal controller or hardware malfunction including power outages,
- Communications outage or malfunction,
- Accident, vandalism or environmental damage. E.g. lightning, moisture, UV exposure, to any traffic signals or ITS hardware.
- Any other issue resulting in a signal controller, or other ITS equipment, to not operate as it is normally intended.

16.20.1 Service Vehicle/s, Equipment and Materials

The vehicle/s used for all works under this contract shall at all times be equipped with sufficient materials to make a site safe, perform fault maintenance activities, and be fully equipped for all after hours call out duties on site.

As an absolute minimum the traffic equipped vehicle shall at all times, be equipped with:

- Manuals, either electronic or hard copy, for:
 - Each type of Traffic Signal Controller (TSC) in use within the region of this contract,

- Uninterruptible Power Supply (UPS) units currently in use within the region of this contract,
- Microconnect communication equipment,
- Variable Speed Limit Sign (VSLS) equipment,
- Manuals for any other equipment worked on within the scope of this contract.
- Necessary fault finding tools, electrical testing equipment including
 - a multi-meter (Low impedance solenoid meter, test lamp, "Wiggy" or similar meters capable of testing and displaying 240V over period of 0.5 sec (flashing amber output cycle)) and
 - a KDU (Keyboard Display Unit),
 - a HHT (Hand Held Terminal) and
 - ladder/s appropriate for accessing a standard traffic signal pole safely,
- Telecommunications / PSTN testing equipment including but not limited to a butt phone, surge protection equipment, data cable / cat 5 cable tester, and a spare microconnect unit,
- A generator, fully fuelled, and serviceable, which is suitable for an immediate connection to a TSC or UPS as required,
- A gatic / pit lid lifter, other common tools including screwdrivers, pliers, side cutters, crimping tools etc.
- Basic replacement and repair hardware such as vehicle and pedestrian cowls, lenses, replacement lamps, pedestrian buttons, fuses, transformers, spare TSC modules and cards, and a green yellow and red roundels and arrows in both 200mm and 300mm.
- The minimum traffic management signage and TMP to carry out fault maintenance tasks in accordance with AS 1742.3 and PROVISION FOR TRAFFIC,
- Flashing beacons or other vehicle mounted warning devices on the highest point of the cabin roof or superstructure of all plant and equipment and in accordance with AS/NZS 1742.3 where these are being used within the road reserve. Fit beacons with a minimum of 55 watt globes. Do not use strobe lights. Ensure that the lights are operational whenever the plant or equipment is working within 9 metres of the road reserve and ensure that the light is visible from all approaches and not obscured by exhaust stacks, ladders, roof racks or are covered in dust.

16.20.2 Fault Maintenance Procedures

Fault Maintenance is unscheduled maintenance identified by the Contractor, the Superintendent's Representative, Departmental Traffic staff, or Departmental On-Call staff. Work must be carried out within a specified time. Refer to **Table - Response Times** in **Clause 16.32 Response Times Tables**.

Attendance on site is to be communicated to and / or approved by the Superintendent's Representative, Departmental Traffic staff, or Departmental On-Call staff (except where the fault is of a nature that poses a significant risk to the public or the worker). On receiving confirmation of a fault, the Contractor shall dispatch appropriately qualified technician/s as required to attend the site within the times specified. Upon initial attendance, the Contractor will identify the fault, ascertain the cause and rectify the fault as soon as practical. The cost of the authorised repairs will be paid in accordance with the Contractors tendered schedule of routine maintenance rates.

Where full repairs cannot be implemented immediately, the Contractor shall ensure that the site is made safe and report to the Superintendent's Representative any further works required prior to departure from site. In the event that a site cannot be left with all lanterns functioning (for example

where a pedestal has been destroyed) the Contractor shall seek advice from the Superintendent's Representative as to an acceptable temporary arrangement.

For all attendances, prior to leaving the site the Contractor shall ensure that the traffic signals are intact, all functions and displays are as per normal operation, there are communications established from the TSC to SCATS, and that all pits and the controller door are safely secured.

The Superintendent's Representative or Traffic Section staff member's specific authorisation is required for all situations where rectification works will require:

- A site being left in an operational mode other than its normal operational mode,
- Additional scheduled items varied to the original CSR or email work order,
- Any additional equipment other than that specified.

Upon satisfactory completion of repair works the Contractor will advise the Superintendent's Representative or Traffic Section staff member of the site status and action taken prior to departing the site.

So that the Superintendent's Representative and Traffic Section staff can record the job as completed, all email work orders that are sent to the Contractor with instruction to undertake works, shall be replied to traffic.ntg@nt.gov.au and all other nominated recipients by 1000hrs (10am) the following work day with details of the works that were undertaken, the fault/s that were fixed, scheduled and unscheduled items used, and any works outstanding or other non-urgent maintenance observed while on site. Works will be checked against the time limit for repairs of the fault and SCATS Log.

Submit daily log book sheets with each completed CSR with the monthly or separate invoices.

Initial attendance to any reported faults shall be performed in accordance with the prescribed attendance time criteria on a twenty-four (24) hour 7 day basis. The Contractor shall apply the following priorities for actioning all site faults:

1. Make the site safe
2. Return the traffic signals to operational state
3. Establish communications to all equipment
4. Return any ITS to operational state
5. Optimise the operation and complete remedial works

The Contractor shall ensure that all fault attendance work is performed with the deliberate intention of minimising inconvenience to road users including pedestrians and cyclists, while ensuring the safety of the workers and the public.

In accordance with the 'Provision for Traffic' clause in the standard specification, remedial works shall be performed so as not to interfere with traffic flows during the periods of 07.00 hours to 09.00 hours and from 15.30 hours to 17.30 hours Monday to Friday, excluding public holidays. This exclusion period may be over-ridden by the Superintendent's Representative, Traffic Section staff or the Department's On-Call Officer in relation to emergency or critical works which require immediate attendance in the interest of public safety.

16.20.3 Response Times

Respond to all service calls during normal business hours, and call outs after business hours as per **Table - Response Times** in **Clause 16.32 Response Times Tables**.

Maintain a 24 hour / seven (7) days a week service to attend works covered by this contract.

Respond only to service calls or call outs initiated or confirmed by the Superintendent's Representative, Departmental Traffic staff, or Departmental On-Call staff.

Confirmation of service calls and call outs will be issued to the Contractor by CSR (Contractor Service Report) or Traffic Section email work order as soon as practicable following the work requested by Superintendent's Representative, or the Department's Traffic Section staff.

Maximum response times have been applied to various faults or maintenance activities based on their urgency and risk. Considerations such as danger to the public, impact to the road network operation due to a traffic signal or ITS fault, realistic achievability, and other influences have been used to determine these response times. Other variables such as time of day, or critical site/s affected may result in the maximum response times being reduced at the discretion of the Superintendent's Representative, or the Department's Traffic Section staff.

Failure to meet the maximum response times listed in **Table - Response Times**, in **Clause 16.32 Response Times Tables**, may expose the Contractor to external liabilities. If the Contractor fails to attend a site fully equipped to rectify a fault within the given time limit for attendance, and this failure is considered to have caused or contributed to an accident or injury, investigating authorities may consider further action regarding any negligence proven.

Any inability for the Contractor to complete the works in accordance with the required maximum response time or other nominated time, shall be coordinated as soon as possible with the Superintendent's Rep or Traffic Section staff, to agree to a suitable alternative time or time extension to complete the works, and shall be followed up in writing.

16.20.4 Temporary Repairs

Where it is not practical to immediately repair traffic signal equipment on site, the Contractor shall without delay provide a temporary arrangement as agreed to in consultation with the Superintendent and will maintain the asset including temporary repairs until permanent repairs are authorised and implemented.

In order to allow the installation to operate until permanent repairs can be undertaken, the Contractor may be required, when deemed necessary by the Superintendent's Representative, or the Department, to modify the site, or install or relocate equipment to temporary locations.

Where there is provision for switching the signals from normal to flashing operation, the Contractor may do so while effecting repairs on the controller however the Contractor is advised that flashing operation is an emergency action only and will not be considered as a temporary repair. Also refer to 'switching of traffic signal conditions'.

16.20.5 Switching State of Traffic Signal Conditions or Communications

Where it is necessary to change the state of the traffic signal operation or the status of controller communications, the Department's Traffic Section shall be consulted and provide approval prior to changing the state of the signals. If its required to occur in the case of urgent works, or it has occurred unintentionally during maintenance activities, The Department's Traffic Section shall be informed as soon as practically possible of this need or event.

Change of State is defined as:

- Traffic Signals on to off or flashing amber,
- Traffic Signals off to on or flashing amber,
- Traffic Signals flashing amber to off or on, or;
- Turning communications on or off.

When signals are in flashing yellow mode or switched off during maintenance activities, ensure the attending works vehicle is parked in a prominent position with its high intensity flashing yellow hazard warning lights operating.

Ensure that the location of the works vehicle does not interfere with sight lines for motorists at intersections, and also pedestrian access is to be considered.

Works shall be scheduled so as to minimise disruption to motorists/pedestrians where the planned switching states of traffic signals is considered.

16.20.6 Temporary Shut Down to UPS, CCTV, or Other ITS

Where it is necessary to shut down a UPS, CCTV, or other ITS, or if this equipment is unintentionally shut down, the Department's Traffic Section shall be informed as soon as practically possible prior to this need or as soon as possible after the event.

16.20.7 Connection / Disconnection of a Generator

Where there is any requirement for the connection of a generator to any traffic signal controller or UPS, Traffic Section staff shall be consulted and provide approval prior to the connection or disconnection of the generator. If the connection is required to occur in the case of urgent works, or a fault has occurred unintentionally during maintenance activities, the Department's Traffic Section shall be informed as soon as practically possible after the connection. If the reason for the generator connection is a power outage, it may be requested that the Contractor liaise with the power provider to ascertain when power is restored.

Any third party requests for generator connection to traffic signals or UPS through the maintenance Contractor shall be forwarded to Traffic Section for consideration and approvals. Full details including proposed date and timings, the reason for the request, the contact person and business name of the third party shall be provided.

16.21 ROUTINE MAINTENANCE

Routine maintenance repairs are identified by either the Superintendent's Representative, Traffic Section staff or the Contractor. Attendance on site is to be communicated to and approved by the Superintendent's Representative or Traffic Section staff. Routine Maintenance repairs are to be completed within a specified timeframe - Refer **Table - Response Times** in **Clause 16.32 Response Times Tables**.

Routine maintenance includes follow up works such as replacing full detector loops, cables and pole tops, conduit junction and detector pit replacements, traffic signal pole and accident repairs, scheduled controller changeovers, and scheduled inspections and works.

Some Routine Maintenance activities may need to be rescheduled due to the high risk nature of the environment (identified by the Contractors written and documented Risk Assessment) so as to reduce risk to the Contractors personnel and so as not to affect the traffic flows in the area. Some examples of situations such as this would be lamp changes or aspect repairs on narrow medians or high speed / high risk areas, or the recutting of traffic signal loops in dense trafficked areas.

The Contractor shall endeavour to coordinate all routine maintenance tasks at one asset, at the same time within the time limits for attendance if possible, to reduce the impact on the road network, and reduce traffic management costs. If this is not possible due to time limit for attendance, seek approval for an extension from the Superintendent's Representative who may extend the time limit for attendance subject to the type of routine maintenance required.

These works identified as high risk shall be rescheduled to a time when risk can be better managed i.e. after hours or on weekends at no additional cost to the Principal, unless specific direction to work outside of work hours has been given by Traffic Section staff for other reasons, otherwise whereby works could have been undertaken during normal work hours within the relevant standards and Provision for Traffic section. Where direction to work outside of normal working hours has been made by Traffic Section, additional charges shall be by negotiated rate or hourly rate, as applicable according to the type of works undertaken, and with consideration of the labour component of the item of works involved if it were completed during normal work hours.

When a Routine Maintenance activity is considered 'High Risk' by the Contractor, the Superintendent's Representative or Traffic Section staff shall be informed as soon as possible in writing so that the Superintendent's Representative can make an allowance for the Contractor's

time to complete the works (**Table - Response Times** in **Clause 16.32 Response Times Tables**) to a more appropriate time to alleviate the high risk.

Traffic volumes may be available for the Contractor to assist to ascertain a more suitable time to undertake the works.

This maintenance will be programmed in accordance with identified performance levels of the traffic signal equipment covered in this contract.

16.21.1 Time Lines for Follow up Works

This requirement of the contract refers to works previously authorised by the Superintendent's Representative and performed after initial reinstatement or repair works have been implemented and the site made safe or other maintenance tasks identified while on site. To support the follow up works, a photo may be required to provide evidence and also to assist with the description of the maintenance works or follow up works identified.

Upon receipt of the Superintendent's Representative or Traffic section staff approval to proceed with additional works the Contractor shall initiate the required works and ensure completion within the timelines identified in **Clause 16.32 Response Times Tables** , **Table - Response Times**.

Advise the Superintendent's Representative or Traffic section staff of any items temporarily repaired within the prescribed times and provide the Superintendent's Representative or Traffic section staff with an estimate of the time required to complete the works. This information must be forwarded to the Superintendent's Representative or Traffic section staff as soon as a time line has been determined.

16.22 SPECIFIC MAINTENANCE – TRAFFIC SIGNALS & ITS – HOLD POINT - WITNESS POINT

Specific maintenance includes the inspection and testing of all on-site equipment to identify its physical condition, operational performance and configuration of hardware. Included in the audit is all components of the traffic signals and any associated ITS situated at the traffic signal intersection, or attached to the traffic signal controller. Details of the inspection are to be recorded in report form.

The following functions are to be undertaken during specific maintenance of traffic signals:

- Site / asset audit
- minor repairs
- Corresponding report & photos

Site audit reports have been categorised to suit the expected work required to be undertaken for each type of audit. Contractors shall appoint appropriate amount of resources in order to be able to complete the audit in one shift. The categorised Site Audits are:

- Site Audit & Report – Vehicle Signalised Intersection.
- Site Audit & Report – Pedestrian Signalised Intersection.
- UPS Maintenance and Report

NT Government traffic signals are to be inspected on an 'as required' basis as directed by the Superintendent's Representative. It is desired that up to eight traffic signalised intersections are audited each year and all UPS in accordance with their maintenance schedule. The Superintendent's Representative reserves the right to include additional sites or assets, or exclude sites at any time if deemed necessary.

City of Darwin Council, City of Palmerston Council and Town of Alice Springs Council traffic signals may be included in the specific maintenance program as required and directed by the Superintendent's Representative.

Witness Point - Audit Supervision. Following Traffic Section's direction to undertake a specific maintenance audit, the Contractor shall coordinate with Traffic Section to arrange a suitable time

to undertake the audit to allow supervision of the works to be scheduled if required by the Superintendent's Representative.

Notify the Superintendent's Representative of any variation to the program at least 5 working days prior to any scheduled audit, the commencement of any altered programmed work, or original work program.

Hold Point - Audit Report Review. Within 5 days following the physical completion of a specific maintenance audit, the Contractor's representative shall arrange a time with a Traffic Section staff member to review the quality and content of the completed report prior to formal submission, and review any recommended follow up works that may be required on site. The meeting may include a site visit and time in the office.

Any changes required to the document shall be undertaken and submitted with the required timeframe.

16.22.1 Site Audit – Traffic Signals & ITS

Inspect, audit and report on each traffic signalised intersection site as directed by the Superintendent's Representative. The Contractor should be prepared to undertake approximately eight (8) site audits annually.

A site audit consists of completing all items listed in clause **16.36 Figures and Tables**

Figure - Sample Template Traffic Signal and ITS Audit Report Template, and marking up all details undertaken on the audit, outstanding works, and discrepancies between the site drawing and the site on a copy of the most current site drawing. Each item in the checklist must be considered a specific maintenance function and all cleaning, adjustment, repair or replacement of such items shall be completed within seven (7) days of the CSR being issued. If issues are considered complicated, by both parties, the completion date can be negotiated.

The Contractor shall identify what traffic management is required to undertake the audit completely. The traffic management scheduled items shall be nominated prior to the works commencing; the Superintendent's Representative will subsequently issue a CSR for the audit and traffic management items.

Details of minor repairs carried out during specific maintenance must be recorded in the site audit report.

Refer to clause **16.36 Figures and Tables**

Figure - Sample Template Traffic Signal and ITS Audit Report Template. The template shall be modified by the Contractor to suit each site requirements.

Where any fault, damage or deficiency is detected during the site audit and cannot be immediately rectified by the Contractor, or where items not required to be carried out during specific maintenance as a minor repair, the details must be included on the site audit report and site drawing. The Superintendent's Representative shall be provided the completed report and corresponding site drawing within 5 working days of completion of the physical audit, inclusive of any quotes for follow up works.

If the Superintendent's Representative issues a direction to work covering authorisation, the works arising from such reports will be considered routine maintenance and itemised as per the schedule of rates.

16.22.2 Minor Repairs – Traffic Signals & ITS

Minor repairs are to be carried out in conjunction with the site audit, and shall be approved by the Departmental representative if on site.

Refer to clause 16.36.1 **Figures and Tables, Figure – Sample Template Traffic Signal and ITS Audit Report Template.**

All service vehicles engaged in specific maintenance must carry, in addition to standard service equipment, a quantity of materials sufficient to undertake minor repairs suited to the particular site being audited, including but not limited to:

- Replacement Lamps / LED arrays,
- Transformers
- Replacement Lenses,
- Cowls for Vehicle Lanterns,
- Pedestrian Cowls,
- Pedestrian Buttons,
- Complete Pole Top Assemblies,
- Controller module and cards,
- Spare fuses,
- Spare flasher unit,
- Cleaning equipment.

Due to traffic management being implemented for all audits and the site usually being shut down, priorities for minor repairs shall be pole top assembly replacements, followed by other tasks as directed by the Department's site supervisor.

16.22.3 Site Audit Report – Traffic Signals & ITS

Throughout the term of the Contract, keep and maintain accurate records of all replacements, alterations and repairs made to any equipment within the requirements of the Contract. Keep all completed audit reports and make them available to the Superintendent's Representative when requested.

Provide the Superintendent's Representative with a Site Audit Report and corresponding marked up site drawing, no later than 5 working days following an audit being completed. Refer to **Figure - Sample Template Traffic Signal and ITS Audit Report Template** in **Clause 16.36 Figures and Tables**.

A site audit report will detail all minor repairs and routine maintenance carried out at that site. It will also include specific maintenance required at the site as follow up works. The purpose of this report is to build a record of maintenance carried out at the site.

16.23 SPECIFIC MAINTENANCE – UNINTERRUPTABLE POWER SUPPLY (UPS) SYSTEMS

Specific maintenance for UPS systems includes the inspection and testing of all on-site equipment to identify its physical condition, operational performance and configuration of hardware.

The UPS Maintenance and Battery Condition Report are completed at regular intervals for all UPS installed in the NTG road Network and any future council jurisdiction installations. The intervals required, and brief description of tasks undertaken is:

- At Installation. Requires items 1, 2, 4, 5 & 6 below to be undertaken and recorded.
- Quarterly. Requires items 1 & 2 below to be undertaken and recorded.
- Half Yearly. Requires items 2, 3 & 4 below to be undertaken and recorded.
- Annually. Requires items 2, 3, 4, 5, & 6 below to be undertaken and recorded.

Inspections and tests required to be carried out as a part of the UPS Maintenance and Battery Condition Report are:

- 1) 15 minute discharge test.
- 2) Check battery terminal condition.

- 3) 2 hour discharge test (to be undertaken by Traffic Section).
- 4) Apply battery terminal grease over terminals to prevent corrosion.
- 5) Re-torque battery terminals connections to 12.4 N.m (110 inch/pounds).
- 6) Test internal resistance disconnect - $<2\Omega$.

Included in the UPS Maintenance and Battery Condition Report shall be a general inspection of all components of the UPS including the housing and connection/s to the traffic signal controller. Details of the inspection shall be recorded in the provided manufacturers report form Refer to **Figure – Sample Template UPS Maintenance and Battery Condition Report** in **Clause 16.36 Figures and Tables**.

The following shall be provided upon completion of each UPS maintenance inspection interval, for each UPS (by close of business the following work day):

- Site where UPS maintenance was undertaken,
- Copy of completed UPS Maintenance and Battery Condition Report (see *Figure*) (photocopy, or clear and legible photograph), in electronic format,
- Any additional information, photos, or follow up works.

Notify the Superintendent's Representative of any variation to the program at least 5 working days prior to any scheduled maintenance inspection, the commencement of any altered programmed work, or original work program.

16.24 TRAFFIC SIGNAL & OTHER ITS SPECIFIED EQUIPMENT

The Department of Infrastructure specifies that the Contractor shall use equipment provided by the following suppliers:

- Aldridge Traffic Systems – for all asset furniture equipment,
- TYCO Traffic and Transportation – for all traffic controller equipment (unless otherwise specified),
- Aldridge Traffic Controllers (ATC) – for all UPS installations, parts and components.
- Microconnect Linking Control Modules (LCM) for TSC communication equipment,
- IndigoVision CCTV cameras and associated equipment and communications equipment.

Note 1: The Department's Traffic Section is currently preparing for testing of ATC traffic signal controllers and may be incorporated in the above specified equipment. If accepted for use in the NT Government road reserve, the Contractor will be required to utilise and maintain this equipment.

Note 2: The Superintendent's Representative reserves the right to add or remove use of specified suppliers or equipment within the traffic signals and ITS maintenance contract subject to testing, type approval (local or interstate), or for other reasons at the Superintendent's Representative's discretion.

Whilst the Department of Infrastructure requires that all equipment used in this contract shall be provided by the nominated suppliers, the Department will consider alternate suppliers as proposed by prospective tenderers and / or maintenance Contractor. The proposed supplier's equipment shall be provided to the Department of Infrastructure for inspection and testing, any type approvals shall be provided, and evidence that it meets the relevant standards.

On completion of the Department of Infrastructure inspections, testing and assessments of the equipment, the Superintendent's Representative may give approval for the Contractor to use the nominated supplier/s equipment throughout the contract subject to any conditions that may be applied. Conditions may include the Contractor to maintain minimum stock levels at their cost, and provide full warranty details and conditions.

16.25 MAINTENANCE AT LOCATION UNDER POSSESSION OF OTHER CONTRACTORS

Where there is traffic signal or ITS maintenance required at an asset which is under the possession of another Contractor, Department staff will coordinate the maintenance between the project Contractor and the maintenance Contractor regarding timings, access and site contact. When the traffic signal maintenance Contractor arrives on site they shall liaise with the site project Contractor prior to proceeding with the work.

If there is a fault that occurs on the site of an asset which is under the possession of another Contractor, whether directly related to the works that the project Contractor are undertaking or not, and the Superintendent's Representative, Traffic Section staff, or the Department's On-Call staff direct the traffic signal maintenance Contractor to site, the maintenance Contractor shall attend and carry out works as directed in the interest of public safety by returning the site to operational condition as soon as possible. Departmental staff shall undertake the coordination role for urgent maintenance between the project Contractor and the maintenance Contractor regarding timings, access and site contact.

16.26 MAINTENANCE HANDOVER & INSPECTIONS

Traffic signals and ITS owned by the Department and Councils that are newly constructed, rebuilt or modified, and have not been done so within this traffic signals and ITS maintenance contract, are required to be handed over to Traffic Section in order to identify any defects or faults, and / or accept the completed condition as acceptable for ongoing maintenance purposes.

The Traffic Signals Maintenance Contractor will be invited to assist Traffic Section staff to attend the maintenance handover with the Project Contractor, and the Department or City Council Project Manager.

The Traffic Signal Maintenance Contractor will be given the opportunity to identify any concerns of their own, and to familiarise themselves with the asset, and / or modified asset. No payment will be made for the attendance of the Contractor Representative to inspect the site at the handover inspection to the Department.

Ultimate acceptance of the site or asset for maintenance purposes under this contract shall be the Superintendent.

16.27 SUPPLY & MANAGEMENT OF MATERIALS & EQUIPMENT

16.27.1 Materials

Materials to be supplied by the Contractor will be paid at the tendered amount, wholly inclusive of mark up and/or freight charges.

16.27.2 Non Specified Materials / Unscheduled Items

Non specified materials, or unscheduled items are materials or items which may be required on one or more occasions over the contract period but which the Superintendent's Representative has been unable to predict the requirement for, or quantity of.

Any use of non-specified materials, or unscheduled items shall be approved by the Superintendent's Representative or Traffic Section staff member prior to use of any item.

Non specified materials, or unscheduled items will be new materials or items, hired equipment which is not included in another labour item, or sub-Contractor services supplied for use in the performance of this contract and be priced at invoiced cost to Contractor inclusive of freight and 10% mark up. Invoices from the supplier or sub-Contractor showing cost of the material or service and all freight charges shall be attached to the CSR, before payment will be processed. In the case of a single invoice and multiple assets or CSR's, the invoice shall be copied and marked as a 'copy' and the proportion of the item/s highlighted and allocated to the specific CSR.

16.27.3 Minimum Stock to be Held by Traffic Signal Maintenance Contractor

The Contractor is to obtain and maintain the following quantities of stock as a minimum and is to store it at the location approved by the Superintendent. The stock listed below shall be recorded on the Stock Database (see 'Stock Control').

The stock to be held is;

- 5 traffic signal poles complete with base plates,
- 10 complete pole top assemblies,
- 4 complete units of 3 x 200mm LED Aspects including target boards & cowls,
- 4 complete units of 3 x 200mm LED Turn Arrow Aspects including target boards & cowls,
- 4 complete units of 3 x 300mm LED Aspects including target boards & cowls,
- 4 complete units of 3 x 300mm LED Turn Arrow Aspects including target boards & cowls,
- 6 LED pedestrian aspects & cowls complete,
- 5 sets of LED arrays (5 x 300mm & 5 x 200mm)*,
- 3 sets LED Turn Arrow arrays (3 x 300mm & 3 x 200mm)*,
- 8 pedestrian buttons complete,
- 6 audio tactile units, including audio tactile cards and housing,
- 5 full brackets and 5 half brackets for mounting aspects,
- 500m Detector Feeder Cable,
- 500m Multicore Traffic Signal Cable,

*One set consisting of 1 green, 1 yellow and 1 red.

Upon completion of the contract, and if a different Contractor has been awarded the contract, the minimum stock to be held by the Contractor may be purchased by the Principal from the Contractor. Items may be purchased off the Contractor in accordance with the 'Negotiated Rate' clause, providing that the item/s or materials are of relevant use to the Department and a reasonable price is offered in consideration to their age and condition.

16.27.4 Repairs to Electrical Components

Traffic signal circuit boards that become faulty or require upgrade shall be forwarded to a Superintendent approved service agent for repair. Items shall be clearly marked with 'unserviceable' and details of the specific fault or upgrade required and the asset number from which the component came from and the date removed. The labelling of the circuit boards shall be done immediately when removed from site to ensure it is not mixed with serviceable equipment.

The site / asset number of the controller that the component was removed from, shall be identified for each component repair claimed.

The cost of the repair shall be charged at invoiced cost to Contractor inclusive of freight and 10% mark up. Invoices from the repair agent showing cost and details of the material / repairs and all freight charges shall be attached to the CSR before payment will be processed. In the case of a single invoice and multiple CSR's, the invoice shall be copied and marked as a 'copy' and the proportion of the item/s highlighted and allocated to the specific CSR.

Repaired circuit boards returned in full working order from the authorised service agent shall be returned to the stock of specified materials and tracking of the item shall be maintained within the stock list.

Generally, equipment will require forwarding interstate for component repairs. The Contractor will be required to isolate faulty boards by use of the Test Controller provided and will forward on advice of any failure identified to the repairing agent.

If a component is assessed by the Contractor or approved repair agent as unrepairable, the Superintendent's Representative shall be contacted and approval be obtained to purchase a replacement component and/or deletion of the component from the stock control database. Any item confirmed unrepairable and approved by the Superintendent's Representative, shall be disposed of following the item being completely destroyed.

16.27.5 Stock & Equipment Control & Disposal (Stock List)

The Contractor shall maintain a database list of all Department owned items, and also stock that the Contractor has available for use under the maintenance contract. The Stock Database will be recorded on monthly tabs on an Excel Spreadsheet, which will be available to the Contractor on award of the contract. See **Figure- Sample Stock List - Darwin** in **Clause 16.36** for template current Sample Stock List for the Darwin Region. The Stock List may have line items added or removed as required.

The Stock List shall include as a minimum:

- Items that have been recovered from accidents, or removal of other equipment that is to be held in stock for use or re-use under this contract, and marked as 'second hand',
- All Department owned traffic signal controller cards,
- Items that have been purchased by the Department's Traffic Section (whether through the maintenance Contractor or otherwise) but stored by the Contractor such as any controllers, UPS, auxiliary cabinets, cable, aspects, comms pillars, Microconnect units, signage etc.
- Principal owned items handed over to the Contractor as a condition of this contract as stated in 'Material & Software to be Supplied by the Principal', and;
- All available Contractors stock for use within the contract, including the items required as a condition of contract in 'Minimum Stock to be Held by Traffic Signal Maintenance Contractor'.
- Any hardware that has been removed from site in a damaged or inoperable state, or that has been approved or directed by Traffic Section to be disposed of shall be recorded with detail of reasons for disposal.

The Stock List shall be maintained and kept up to date at all times, and shall be available to Traffic Section staff electronically and completely updated within 5 business days of request. The Contractor shall supply the Superintendent's Representative with an updated electronic copy of the list in conjunction with the monthly CSR's and will have all previous month's details on other tabs within the spreadsheet. The list shall contain, but not be limited to:

- Type of Item, listed as individual components, both new or second hand,
- Scheduled item number (if applicable),
- Quantity of the item held,
- Serial No of Item (if applicable).
- Date removed from site, and the asset and location of origin,
- Status / Serviceability of Item, and the date tested,
- Date Received / Sent (i.e. to Traffic Section shed, or to nominated repairers),
- Current location (eg: in stock, out for repair)
- Any hardware that has been removed from site in a damaged or inoperable state, or that has been approved or directed by Traffic Section to be disposed of shall be recorded with detail of reasons for disposal.

The Contractor shall use the Department owned stock listed in this stock control list in the first instance unless directed otherwise by the Superintendent's Representative. Any Department stock used shall also be reported on site logs / job sheets and submitted with any CSR invoices.

16.27.6 Stock List Quarterly Audit

A Stock List audit will be undertaken on a quarterly basis at the Contractor's nominated establishment. The Contractor's nominated Contractor Representative shall ensure that they are available to attend and coordinate each audit, and will identify in the workshop all items for inspection that are listed on the most current stock list.

16.27.7 Salvaged Items – Witness Point

All items or parts thereof that are re-usable shall be salvaged for re-use within the traffic signal maintenance contract, other NTG contract, or as otherwise directed by the Superintendent's Representative or other Traffic Section staff member. Items to be salvaged may be obtained due to any upgrade works, damage to hardware and equipment, or any other maintenance activity.

Within the appropriate scheduled item rates, make allowance for salvage and testing of the equipment and entry into the stock database.

Witness Point - Following an incident where traffic signal equipment or ITS such as a signal pole and hardware, signal controller or CCTV camera has been severely damaged, provide adequate notice to allow for Superintendent's Representative to arrange inspection of the equipment prior to dismantling. If this is not possible due to the urgent nature of the situation, take photos of the equipment in its existing location, then relocate back to the Contractor's storage yard without causing further damage, for inspection.

16.27.8 Test Controller – Witness Point

As per clause 'Material and Software to be supplied by the Principal', The Superintendent will provide the Contractor with 2 test controllers for the purpose of testing control modules and other equipment. It is entirely the Contractor's responsibility to ensure that these devices are maintained in a functional and serviceable condition suitable for their purpose at all times. The devices shall be available for use in conjunction with this contract twenty four (24) hours per day.

Witness Point. Test Controllers to be displayed in working operation to the Superintendent's Representative within 14 days of the contract being awarded.

Both traffic signal controllers require a suitable load bank for testing purposes. The load banks shall be provided by the Contractor and may be purchased by the Department off the Contractor at the completion of the contract at a negotiated rate if the Contractor wishes for this to occur.

The Test Controllers will not be used for any purpose other than that identified in this document.

16.27.9 Test Traffic Signal Loop – Witness Point

Witness Point. The Contractor shall provide and install a testing loop at the approved workshop within 14 days of this contract being awarded, for the purpose of testing detector cards. The test loop shall be installed in accordance with the most current relevant standard drawing for detector installation and connected to the test controller and be used for testing the operation of controller detector cards (it is recommended that a switching device be installed to aid in testing detector channels). It is entirely the Contractor's responsibility to ensure that this device is maintained in a functional and serviceable condition suitable for its purpose at all times. The device shall be available for use in conjunction with this contract twenty four (24) hours per day.

16.28 TECHNICAL DIRECTIONS

16.28.1 SCATS Access

The Superintendent's Representative will provide the Contractor with a copy of the SCATS Access and SCATS Log programs to monitor this system for lamp failures to repair and to advise the Superintendent's Representative of other faults that may require attention if so directed.

This aspect of the contract will require permanently connected internet connection for continuous day time observation (0700hrs to 1700hrs).

The Contractor will assign an individual Personal Identification Number (PIN) that is between numbers 20 and 40, to each Traffic Signal Technician. These assigned numbers shall then to be provided to the Superintendent's Representative within 7 days of the contract being awarded.

At each site visit, regardless of the type of fault or reason for attendance, the technician shall log in and then at the completion of the job shall log out. This shall be undertaken at every controller where the facility allows. For controllers where there is no log in / log out function such as an Eclipse type controller, the Contractor shall open and close the door of the controller at arrival and departure of site, so the opening of the door switch registers attendance on SCATS.

The Superintendent's Representative and Traffic section staff will use the Pin Numbers 1-19 to assist with Identification of personnel working on site.

All fault logs shall be cleared by the Contractor following the full completion of works (rather than after initial attendance or if fault is ongoing) with the exception of when the site is not communicating with SCATS. In this instance the Contractor is to leave the controller log as it is.

16.28.1.1 Fault / Item Identification Procedures

To assist with the identification of asset furniture and lamp faults the Contractor will use in their reporting, verbal or written, 1 of 2 methods along with the display colours of Red, Yellow, Green (or R, Y, G).

Method 1

Use the pole identification as used on newly released Department plans.



Eg. For a lamp fault on Signal Group 3 red lamp on pole 6 the ID would read SG3, red, pole 6, or SG3 R 6

Method 2

Here the pole numbers are not shown on the Department's plan or no plan is available for viewing (ie fault viewed in passing) Use the notation, Right, Left, Centre, Primary, Tertiary, Secondary to identify the position of the furniture.

eg. Signal Group 1 red left secondary or SG 3 R L/S

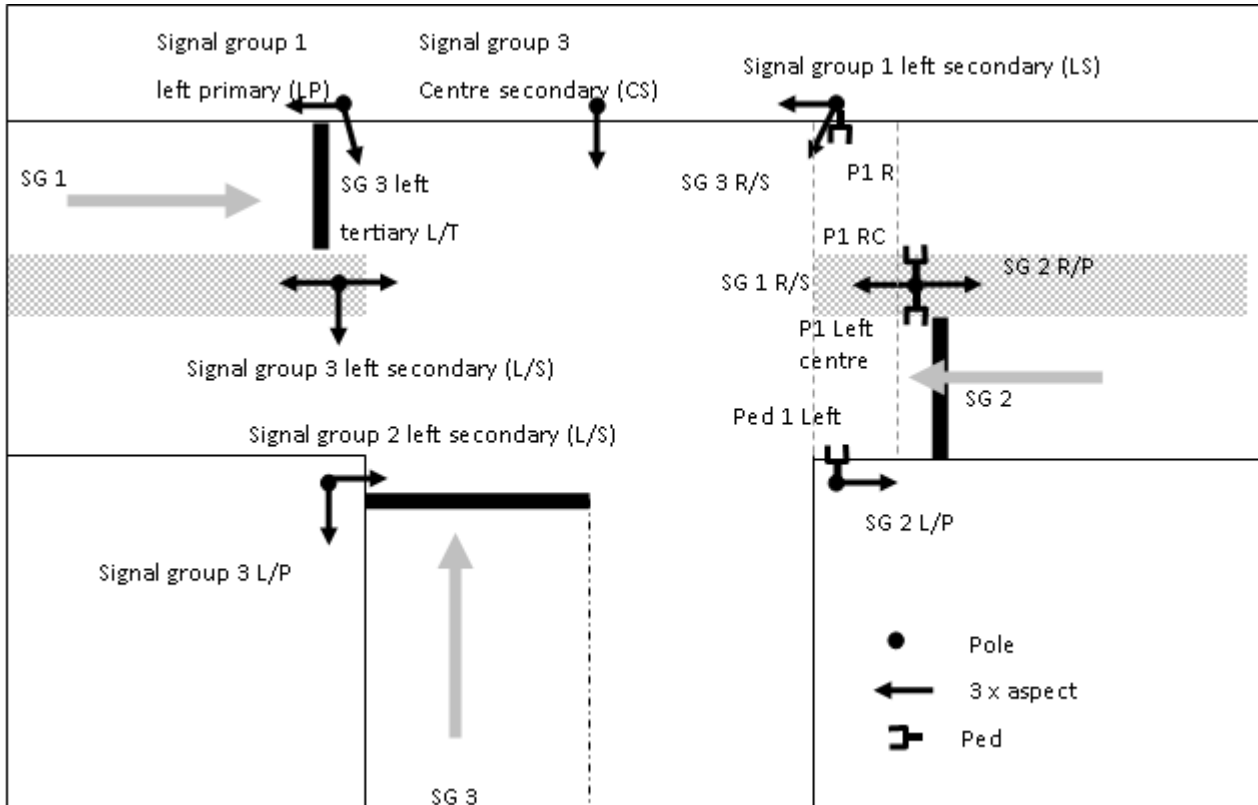


Figure - Item Identification Procedures for Fault Reporting

16.28.2 Lamp Fault Monitoring and Repairs

The Contractor will acknowledge Lamp Faults through the SCATS Access Alarm Management System and will service all non-functional lamps at its own volition, within the relevant time for attendance and at the rates tendered. Lamp faults noted on SCATS will be actioned as per time lines identified in **Table - Response Times**, in **Clause 16.32 Response Times Tables**, at the rates tendered.

All lamp fault times for attendance are measured against the time that the lamp fault has appeared on SCATS, however where the fault has occurred after hours, weekends or public holidays, the time where the time limit for repairs commences shall be 0900hrs (9am) the following work day.

All faults (including lamp faults) noted by means other than identification by SCATS shall require an authority to proceed from the Superintendent's Representative or Traffic section staff and any such incidence will be noted in the site report.

The Contractor shall advise the Superintendent's Representative or Traffic section staff of recurring lamp faults and recommended remedial action with details of the recurring fault. A recurring lamp fault is considered one that occurs more frequently than others on that site and / or would be considered as the fault occurring once every 2 to 3 weeks.

NOTE: Where a lamp fault is shown on SCATS lamp faults but turns out to be a 'false positive' lamp fault on site (shown on SCATS but not faulty in the field), the Contractor shall only attend to repair the fault twice and reset the wattages. The Contractor shall advise the Superintendent's Representative or Traffic Section staff of the false positive fault and suggest remedial measures. The Contractor will not be paid for attending site to repair a lamp fault which is a false positive beyond the second occurrence.

All other Faults observed are to be reported to Traffic Section for authority to proceed with appropriate remedial action.

16.28.3 Pole Top Connections

When performing works associated with pole top installation or repairs, identify:

- Pole tops with an open link, creating an open link in the ring main.

Pole tops with an open link in the ring main shall have the top half of their pole top cover painted BLACK, or a ring (minimum 100mm) painted around the pole top cover in BLACK.

- Pole tops with a junction box or join in an associated pit, creating a join in the ring main.

The pole tops with a junction in an associated pit shall have the bottom half of the pole top cover painted WHITE, or a ring (minimum 100 mm) painted around the pole top cover in WHITE.

16.28.4 Detector Loops and Feeder Cables

When performing works associated with suspected failure or partial failure or intermittent problems associated with detector loops and associated feeder cables the following procedures will be implemented:

- Perform normal electrical tests (Continuity, Insulation, and Inductance will be required).

Provide to the Superintendent's Representative or Traffic Section staff separate insulation resistance / resistance and Inductance measurements of:

- Detector loop and feeder cable,
- Loop feeder cable only (disconnected from detector loop),
- Detector loop only (both loops separately).

Detector cables must be disconnected from controller terminal strip before measurements are taken.

Advise the Superintendent's Representative or Traffic Section staff of test findings associated with Detector Loops verbally prior to leaving site and ensure these are written on the site job sheet to be provided to the Department.

Installation of additional or replacement Detector Loops will be performed as indicated in the standard drawing at the rates tendered.

Ensure that Pre-fabricated detector loops are installed where practical, or otherwise instructed by the Superintendent's Representative or Traffic Section staff for all resealing works of asphalt. Coordinate with the pavement Contractor in order for the pre-fabricated loops to be installed and to ensure loops are placed in the correct sequence.

Newly installed detector loops shall have their resistance and insulation resistance measured and recorded prior to sealing in the road.

16.28.5 Traffic Signal Cabling

Multicore Connecting Cable

Cable used shall be 51 core multicore as per AS/NZS 2276.1 and shall have a polyamide jacket termite sheath installed.

Terminate the cabling of signal lanterns and multicore cable in each associated terminal assembly.

Loop Detector Feeder Cables

Cable used shall be as per AS/NZS 2276.2 and shall have a polyamide jacket termite sheath installed.

Install and connect feeder cables from detector loops to detector sensors units located in the controller housing.

Feeder cables to be indelibly marked with the loop detector number at each end.

Loop Cable for Vehicle Detectors

Cable used shall be as per AS/NZS 2276.3

Cable will be V90 HT, 30/0.25.

Detectors Cut Into Pavement: Supply and install the cable for the loop in a saw cut in the pavement surface.

Clean the saw cut of debris and sharp edges before installing the cable.

Twist loop feeder cable one turn every 200 mm between each loop and junction in the detector pit.

Backfill around the loop cables with polymer modified bituminous emulsion filler.

House cables in conduits where they pass under kerbs.

Fully test loop following installation, and test operation on SCATS.

Detectors Pre-fabricated: Supply and install the pre-fabricated detector loop allowing for 50mm of asphalt cover over the prepared pavement surface.

Clean the surface of loose debris and position the pre-fabricated loop in the correct location, ensuring that the tail of the loop is appropriately placed and protected.

Hand place and compact asphalt over the pre-fabricated loop to ensure the asphalt paving machine does not pick the loop up as it passes over.

Fully test loop following installation, and test operation on SCATS.

16.28.6 Workzone Safety

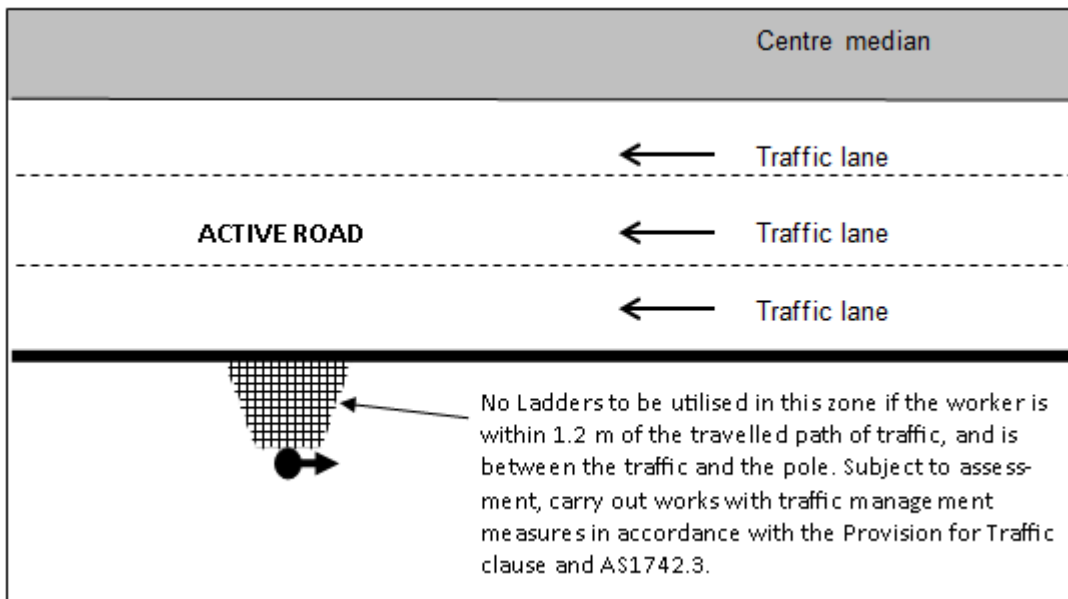


Figure – Work Zone Safety – Ladder Exclusion Zone

16.28.7 Contractor's Personnel

The Contractor shall ensure that they utilise qualified trades persons only for technical/electrical works. Australian/New Zealand Wiring Rules apply.

Submit with the tender a list detailing the following for all nominated staff intended for use within the requirements of this contract:

1. Names of all personnel intended for use in the carrying out of works required under the Contract, (mobile phone numbers also to be submitted as soon as the contract is awarded).
2. Detailed work experience and electrical qualifications of all personnel as provided above, including comprehensive details of:
 - Traffic Signal Controller maintenance and fault finding experience, and /or official training,
 - Communications equipment fault finding experience and official training which may include PSTN phone lines, 3G / 4G equipment, data cable testing, modems, routers and surge protection devices,
 - Uninterruptible Power Supply maintenance and fault finding experience, and / or official training,
 - Any other ITS experience, or other relevant training that may be of use in the traffic signal, communications, or information technology fields,
3. Workplace Health and Safety experience, accreditation and qualifications including the National Occupational Health and Safety Construction Induction card for construction training,
4. Northern Territory accredited Work Zone Traffic Management Qualifications required to undertake any traffic management duties on an NTG road reserve.
5. Northern Territory accredited Construction White Card 'Work Safely in the Construction Industry', required to undertake any construction works / duties in the NT.

Expiration, Withdrawal or Cancellation of Qualification or Accreditations - The Contractor shall keep the Superintendent's Representative advised in writing, at least 48 hours in advance of any expiry, or as soon as practical following any cancellation of any qualification or accreditation.

Additionally Nominated Contractor's personnel - Any additions of personnel to be utilised for the purpose of works within this contract shall be requested in writing to the Superintendent's Representative for consideration, at least 48 hours prior to use, and may be accepted for use in the contract at the Superintendent's Representative's discretion.

The Superintendent's Representative reserves the right to remove or suspend any person listed on the nominated staff list at any time, based on any expiration of accreditation, non-conformance or poor work practice, poor WZTM practices, actual or perceived lack of experience in relation to the technical requirements of this specification, or other reason as determined by the Superintendent's Representative.

Any information not available at the time of tender submission shall be provided to Superintendent's Representative within 7 days of the contract commencing.

Traffic Control at Work Sites shall only be performed by accredited Traffic Controller/s. Training associated with this requirement of contract is available through Registered Training Providers at the Contractors expense.

16.28.8 Workplace Health and Safety (WH&S) Action Plan

A complete company WH&S action plan and accompanying policies and procedures shall be submitted within 2 weeks of the contract being awarded.

The company WH&S action plan that is traffic signal specific shall be finalised and provided to the Superintendent's Representative within 1 week following initial submission. The WH&S plan is additional to the Traffic Management Plan (TMP) however these documents should reference each other. It shall include, but is not limited to the following traffic signal and ITS maintenance tasks:

- Fault Maintenance activities,
- Routine Maintenance activities,
- Specific Maintenance activities,
- Traffic Accident Situations,
- Working in the road reserve safety procedures,
- Working at heights and appropriate ladder usage and procedures,
- Electrical activities and procedures,
- Heavy Lifting activities and;
- Any other relevant activity for the execution of works in this contract which may also include power tools usage, chemical handling procedures, and heat and exhaustion management.

Worksafe may be consulted in order to create an action plan that is acceptable for use. The plan shall contain references to specific legislation and standards where appropriate.

16.29 TRAFFIC MANAGEMENT PLAN

Refer to PROVISION FOR TRAFFIC.

16.29.1 Submission of Traffic Management Plans

Within 2 weeks of the commencement of the contract the Contractor shall provide the Superintendent's Representative with a comprehensive Traffic Management Plan (TMP) and full risk assessment to be used as a template throughout this contract for all traffic signals and ITS maintenance works.

The TMP and risk assessment shall be used as a template document which shall be continuously updated throughout the contract. Where site specific issues or concerns have been identified to apply to a particular worksite or location, the TMP should be supplemented with additional or expanded information which shall be provided with the site Specific TGS/s and risk assessment, referencing the TMP in order to address those specific issues or concerns.

The TMP original submission shall as a minimum include the following generic Traffic Guidance Schemes (TGS's);

Type A (Speed Reduction) Traffic Management setups for implementation including:

- speed reductions for an approach on a divided and undivided road, allowing for various speed zones and reductions, and various clearances to the work site.

Type B (Lane Closures) Traffic Management setups for implementation including:

- Lane closure for a left hand and right hand through lane, allowing for various speed zones and reductions,
- A right hand through lane in accordance with the above, allowing access for a right hand turn pocket,
- Management of any side roads affected by the lane closure/s.

Type D (Short Term Mobile Works) Traffic Management setup for various implementation including:

- Kerbside works
- Median works
- Right Turn Pocket works

Provide site specific Traffic Guidance Schemes (TGSs) per activity as required and/or as specified.

Where a generic TGS is selected for use, an appropriate risk assessment shall be undertaken by staff prior to arrival at site to ensure that the generic TGS is suitable for that specific location. If the site does not allow for the generic TGS to be utilised, subject to consideration by qualified staff at the Department, a separate TGS and associated risk assessment shall be undertaken in order to complete the works.

Where a traffic management situation is not covered by a generic TGS within the TMP, submit the specific TGS and risk assessment to the Superintendent's Representative or Traffic Section staff at least 2 working days prior to undertaking the required works.

For Urgent Works, advise of the generic TGS or submit the specific TGS within the required timeframes in accordance with **Table - Response Times** in **Clause 16.32 Response Times Tables**.

The Traffic Management Plan (TMP) is required to be designed by a Northern Territory accredited Traffic Management Plan Designer. Include the details of the TMP Designer's name, accreditation number and date of expiry of accreditation on the TMP. Produce the plan by electronic means and submit electronically to the Superintendent's Representative.

16.29.2 Implementation of Traffic Management - Hold Point

Hold Point - Do not proceed with implementation of traffic management, or the commencement any works within the relevant road reserve without the TGS and TMP amendments (if necessary) being endorsed by Traffic Section staff or Road Operations staff, and any associated Temporary Speed Limit Authorisations (TSLA) being signed by the delegated person in the Department.

In addition to this; if works are on a Council road, do not proceed without the relevant permits being issued, and a copy provided to Traffic Section staff.

16.30 TRAFFIC SIGNAL & ITS LOCATIONS & OWNERSHIP - DARWIN

16.30.1 NT GOVERNMENT (DEPARTMENT OF INFRASTRUCTURE)

Note 1: The below list is an indication of traffic signal and ITS assets as at September 2020, and is subject to change.

Note 2: Red Light Speed Cameras (RLSC) have been noted in the tables as ITS onsite so that the Maintenance Contractor is aware of the equipment within the controller and / or auxiliary cabinet. Some ITS equipment utilised for RLSCs is also used for other ITS (such as routers, fibre media converter, UPS etc.) which will be worked on within the contract. Red light cameras and speed cameras are not included in the maintenance contracts for Traffic Signals and ITS. Contractors are to ensure operation of the cameras is not disrupted when working on the ITS.

Table - NT Government Owned Traffic Signals – Darwin Region					
Intersection Number	Location	No. of Vehicle Lantern Arrays	No. of Pedestrian Lantern Arrays	No. of Pedestrian Push Buttons	ITS on site
L0002	Stuart Hwy / Daly St / McMinn St	75	4	2	CCTV / UPS
L0003	Stuart Hwy / Westralia St	54	20	10	RLSC / CCTV / UPS
L0004	Stuart Hwy / Parap Rd	48	8	3	-
L0005	Stuart Hwy / Ross Smith / Woolner Rd	102	24	11	CCTV / UPS / RLSC x 2
L0006	Stuart Hwy / Bagot Rd / Snell St	77	16	6	CCTV / UPS
L0007	Stuart Hwy / Hook Rd	48	-	-	-
L0008	Stuart Hwy / Amy Johnson Ave	100	8	2	CCTV
L0009	Stuart Hwy / Berrimah Rd / Vanderlin Dve	88	8	3	CCTV / UPS / RLSC x 2
L0010	Tiger Brennan Dve / Woolner Rd	93	24	6	CCTV
L0011	Bagot Rd / McMillians Rd	60	8	4	RLSC x 2 CCTV / UPS
L0012	Bagot Rd / Trower Rd / Nightcliff Dve	48	12	4	CCTV / UPS
L0013	Trower Pelican Xing (Francis St)	24	8	4	-
L0014	Trower Rd / Lakeside Dve	45	12	5	-
L0015	Trower Rd / Parer Dve	51	12	5	-
L0016	Trower Rd / Dripstone Rd	66	20	8	-
L0017	Trower Rd / Vanderlin Dve	76	36	14	CCTV
L0018	McMillans Rd / Rothdale Rd	74	24	10	CCTV
L0019	McMillans Rd / Lee Point Rd	86	28	12	CCTV / RLSC
L0020	McMillans Rd / K.O.A Ped Xing	24	8	4	-
L0021	McMillans Rd / Amy Johnson Ave	45	8	4	-
L0022	Vanderlin Ped Xing (Hibiscus)	24	8	6	-
L0023	Bagot Rd / Fitzgerald St	52	12	6	-
L0024	McMillans Rd / Matthews Rd / Links	70	32	16	-
L0025	Tiger Brennan / Dinah Beach / Francis	74	12	7	UPS
L0026	Tiger Brennan / Bennett / McMinn St	84	16	6	CCTV

Table - NT Government Owned Traffic Signals – Darwin Region					
Intersection Number	Location	No. of Vehicle Lantern Arrays	No. of Pedestrian Lantern Arrays	No. of Pedestrian Push Buttons	ITS on site
L0029	Bagot Rd / Totem Rd / Osgood Dve	48	-	-	Lane Lights / UPS
L0033	Stuart Hwy / Amaroo St / Post Office	51	8	3	-
L0034	Vanderlin Dve / Leanyer Dve	45	8	3	CCTV / UPS
L0035	Casuarina Bus Exchange / Bradshaw	45	16	8	-
L0036	Trower Rd / Rapid Ck Rd	74	32	11	RLSC / CCTV
L0037	Tiger Brennan Dve / Amy Johnson Av	80	-	-	CCTV / UPS
L0038	Tiger Brennan Dve / Berrimah Rd	114	20	9	CCTV / UPS / RLSC x 3
L0039	Berrimah Rd / Wishart Rd	51	-	-	UPS
L0040	Vanderlin / Leanyer Waterpark Ent	45	12	6	-
L0056	Tiger Brennan Dve / Gonzales St	66	8	4	Lane Lights
L0058	Stuart Hwy / Mountbatten Rd	74	24	10	
L0059	Tiger Brennan / Bowen St / CDPN	88	16	4	UPS
L0060	Tiger Brennan / Benison Rd	51	2	-	CCTV / UPS
L0061	Vanderlin Dve / Kalymnos Dve	57	8	4	CCTV / UPS
L0062	Tiger Brennan Dve / Garamilla Blvd	63	16	8	CCTV / UPS
L0063	Garamilla Blvd / McMinn St	105	32	12	CCTV / UPS
L0064	Garamilla Blvd / Cavenagh St	57	20	5	CCTV / UPS
L2002	Stuart Hwy / Tulagi Rd	37	-	-	CCTV / UPS
L2003	Stuart Hwy / Temple Tce / Glyde Pt	115	16	8	CCTV / UPS
L2004	Stuart Hwy / McMillans Rd	43	-	-	-
L2005	Roystonea Ave / University Ave	60	20	10	CCTV / UPS
L2006	Roystonea Ave / Temple Tce	108	36	11	CCTV / UPS
L2008	Stuart Hwy / Howard Springs Rd / Lambrick Ave	112	16	6	CCTV / UPS / RLSC x 2
L2009	University Avenue Ped Xing	18	8	4	-

Intersection Number	Location	No. of Vehicle Lantern Arrays	No. of Pedestrian Lantern Arrays	No. of Pedestrian Push Buttons	ITS on site
L2010	Stuart Hwy / Henning Rd / Girraween	96	12	6	CCTV / RLSC x 2
L2011	Stuart Hwy / Arnhem Hwy	71	-	-	UPS
L2012	Elrundie Ped Xing	24	4	4	-
L2013	Temple Tce / Maluka Ave	74	32	14	-
L2014	Stuart Hwy / Deviney Rd / Palms	109	8	4	CCTV / RLSC
L2015	Chung Wah Ped Xing	18	4	2	-
L2016	Wishart Rd / Kirkland Rd	60	-	-	CCTV / UPS
L2017	Tiger Brennan Dve / Tivendale Rd	104	-	-	CCTV / UPS
L2018	Roystonea Ave / Yarrowonga Rd / Packard St	99	24	12	CCTV / UPS
L2019	Chung Wah Tce / University Ave	60	20	10	-
L2020	Stuart Hwy / Jenkins Rd	91	-	-	RLSC x 2
L2021	Roystonea Ave / Lambrick Ave	96	16	6	-
L2024	Temple Tce Ped Crossing	24	8	4	-
L2026	Lambrick Ave / Farrar Bld / Zuccoli	74	24	13	-
L2027	Roystonea Ave / Gateway Entrance	78	12	6	CCTV / UPS
L2028	Roystonea Ave / The Boulevard	86	12	5	UPS
L2029	Temple Tce / Farrar Dve / Toupein Rd	96	8	5	
L2030	Stuart / Lagoon Rd / Spine Rd	94	20	10	
VSL	Rapid Ck Variable Speed Limit Signs	-	-	-	VSL x 2
VSL	Arnhem Hwy Variable Speed Limit Signs	-	-	-	VSL x 4

16.30.2 DARWIN CITY COUNCIL

Table – Darwin City Council Owned Traffic Signals					
Intersection Number	Location	No. of Main Aspect Lamps	No. of Pedestrian Aspect Lamps	No. of Pedestrian Push Buttons	ITS on site
L0027	Cavenagh St / Bennett St	63	16	8	UPS
L0030	Mitchell St / Daly St	64	24	10	-
L0031	Daly St / Cavenagh St	56	32	12	-
L0032	Cavenagh St / Knuckey St	36	24	8	UPS
L0041	Trower Rd / Casuarina Car Park	51	24	12	-
L0042	Trower Ped Xing (Casuarina)	24	8	4	-
L0043	Trower Rd / Bradshaw Tce	45	24	12	-
L0044	Mitchell St / Knuckey St	36	24	8	UPS
L0046	Gilruth Ave / Gardens Rd	57	8	4	-
L0047	Gilruth Ave / East Point Rd / Goyder Rd	74	32	14	-
L0048	East Point Rd Ped Xing (Parap)	18	4	2	-
L0049	Dick ward Dve Ped Xing (near Tang St)	18	4	2	-
L0050	Ross Smith Ave / Dick Ward Dve	45	16	6	-
L0051	Lee Point Rd / Parer Dve	57	12	6	-
L0052	Knuckey St / Smith St	31	20	6	UPS
L0053	Lee Point Rd / VRD Drive	45	8	4	-
L0054	Lee Point Rd / Tambling Tce	54	8	4	-

16.30.3 PALMERSTON CITY COUNCIL

Table – Palmerston City Council Owned Traffic Signals					
Intersection Number	Location	No. of Main Aspect Lamps	No. of Pedestrian Aspect Lamps	No. of Pedestrian Push Buttons	ITS on site
L2007	Temple Terrace Ped Xing	24	8	4	-
L2025	Chung Wah Tce / The Boulevard	57	12	6	-

16.31 TRAFFIC SIGNAL LOCATIONS AND OWNERSHIP – ALICE SPRINGS

NT GOVERNMENT

(MANAGED BY DEPARTMENT OF INFRASTRUCTURE PLANNING AND LOGISTICS – ROAD PROJECTS)

Intersection Number	Location	No. of Main Aspect Lamps	No. of Pedestrian Aspect Lamps	No. of Pedestrian Push Buttons	Type of Site Audit
L0105	Stuart / Wills	45	16	8	Vehicle
L0107	Stuart / Parsons	60	20	12	Vehicle
L0101	Stuart / Larapinta	84	24	14	Vehicle
L0106	Telegraph - Pedestrian Crossing	24	8	4	Pedestrian
L0110	Telegraph - Warning Wig Wags	12	0	0	Fire Truck
L0102	Stott / Bath	48	16	8	Vehicle
L0103	Stott / Hartley	36	16	8	Vehicle
L0104	Stott / Todd	48	16	8	Vehicle
L0111	Larapinta - Pedestrian Crossing	24	8	4	Pedestrian

ALICE SPRINGS TOWN COUNCIL

(MANAGED BY DEPARTMENT OF INFRASTRUCTURE PLANNING AND LOGISTICS – ROAD PROJECTS)

Intersection Number	Location	No. of Main Aspect Lamps	No. of Pedestrian Aspect Lamps	No. of Pedestrian Push Buttons	Type of Site Audit
L0108	Wills / Leichhardt	48	14	6	Vehicle

Where work is required to be carried out in easements or on land adjacent to the site for the purpose of connecting services or joining up of roads etc. Ensure that the appropriate licences and approvals are obtained for work in those particular areas.

16.32 RESPONSE TIMES TABLES

Table - Response Times			
MAINTENANCE OR ACTIVITY	ALARM TYPE	TIME FOR ATTENDANCE / RESPONSE	BRIEF REQUIREMENTS - refer to Maintenance Section & Measurement & Payment for further details
Legend for SCATS related alarms: BO: Black Out DA: Detector Alarm		FY: Flashing Yellow LF: Lamp Fault	NC/DZ/ST: SCATS Communications fault related PB: Pedestrian Button Detector Alarm WD: Watchdog
<p>NOTE: All response times listed are inclusive of after hours, weekends and public holidays – all response times apply</p> <p>NOTE: Maintenance & timeframes identified as 'urgent' are entirely at the discretion of the Superintendent. Maintenance identified as 'urgent' may be based on high risk consideration (danger to the public or workers), maintenance required prior to peak hours, or other urgent requirements.</p>			
Fault Maintenance			
Controller, UPS or Hardware Malfunction	FY / BO / WD	1 Hour	The provision of time for the Contractor's technician to be onsite, appropriately equipped to rectify a controller, UPS or hardware malfunction. This may include internal faults, minor accidents, vandalism, storm damage, cable faults, or exposed cables.
Accident Attendance	FY / BO / WD	1 Hour	The provision of time for the Contractor's 2 technicians to be onsite, appropriately equipped for an accident attendance which may include the controller, traffic signals pedestals, or any other ITS.
Other Urgent Fault, Malfunction or Maintenance as Directed	-	1 Hour	The provision of time for the Contractor's technician to be onsite, appropriately equipped to attend to an urgent issue relating to traffic signals or ITS, as directed by the Department's Traffic staff or the Department's On-Call staff.
Supply & Install Generator to Traffic Signal Controller or UPS	BO	1 Hour	The provision of time for the Contractor's technician to be onsite, appropriately equipped to connect a generator unit to a traffic signal controller or UPS, for an unscheduled outage, as directed by the Department's Traffic staff or the Department's On-Call staff. Where a generator connection can be scheduled, as much notice as possible will be provided.

TRAFFIC SIGNALS AND INTELLIGENT TRANSPORT SYSTEMS MAINTENANCE

Table - Response Times			
MAINTENANCE OR ACTIVITY	ALARM TYPE	TIME FOR ATTENDANCE / RESPONSE	BRIEF REQUIREMENTS – refer to Maintenance Section & Measurement & Payment for further details
Legend for SCATS related alarms: BO: Black Out DA: Detector Alarm		FY: Flashing Yellow LF: Lamp Fault	NC/DZ/ST: SCATS Communications fault related PB: Pedestrian Button Detector Alarm WD: Watchdog
<p>NOTE: All response times listed are inclusive of after hours, weekends and public holidays – all response times apply</p> <p>NOTE: Maintenance & timeframes identified as 'urgent' are entirely at the discretion of the Superintendent.</p> <p>Maintenance identified as 'urgent' may be based on high risk consideration (danger to the public or workers), maintenance required prior to peak hours, or other urgent requirements.</p>			
Communications – Test & Restore Traffic Signals or ITS	NC / ST / DZ	TSC - 2 Hours ITS – 24 Hours	The provision of time for the Contractor's technician to be onsite, appropriately equipped to test, repair or replace all components of faulty communication equipment for traffic signals or ITS equipment.
Routine Maintenance			
Lamp Fault - Critical (Replacement or Reset)	LF	4 Hours (from 09:00hrs if occurring a/hrs)	The provision of time for the Contractor's technician to be onsite to replace or reset a traffic signal aspect array or lamp which is considered urgent by the Department's Traffic Section, or is a right turn arrow, or if the lamp fault is the second one for that signal group.
Lamp Fault – Standard (Replacement or Reset)	LF	5 Days	The provision of time for the Contractor's technician to be onsite to replace or reset a traffic signal aspect array or lamp which has been identified by the Contractor on SCATS or by the Department's Traffic Section.
Lamp Fault – High Mast (Replacement or Reset)	LF	10 Days (or as negotiated)	The provision of time for the Contractor's technician to be onsite to replace or reset a highmast traffic signal aspect array or lamp which has been identified by the Contractor on SCATS or by the Department's Traffic Section. This maintenance may be negotiated by the Contractor or Traffic Section to combine works, or if urgent.

TRAFFIC SIGNALS AND INTELLIGENT TRANSPORT SYSTEMS MAINTENANCE

Table - Response Times			
MAINTENANCE OR ACTIVITY	ALARM TYPE	TIME FOR ATTENDANCE / RESPONSE	BRIEF REQUIREMENTS – refer to Maintenance Section & Measurement & Payment for further details
Legend for SCATS related alarms: BO: Black Out DA: Detector Alarm		FY: Flashing Yellow LF: Lamp Fault	NC/DZ/ST: SCATS Communications fault related PB: Pedestrian Button Detector Alarm WD: Watchdog
NOTE: All response times listed are inclusive of after hours, weekends and public holidays – all response times apply NOTE: Maintenance & timeframes identified as 'urgent' are entirely at the discretion of the Superintendent. Maintenance identified as 'urgent' may be based on high risk consideration (danger to the public or workers), maintenance required prior to peak hours, or other urgent requirements.			
Traffic Signal Aspect – Damaged or Conflicting Display (Aspect out of Alignment)	-	1 Hour (or as negotiated)	The provision of time for the Contractor's technician to be onsite, appropriately equipped to rectify a traffic signal aspect out of alignment or damaged.
Traffic Signal Pedestal Reinstallation	-	10 Days (or as negotiated)	The provision of time for the Contractor to arrange & complete the reinstallation of a complete traffic signal pedestal, cabling, & associated hardware identified as of standard urgency by Traffic Section.
Traffic Signal Pedestal Reinstallation – Urgent	-	2 Days	The provision of time for the Contractor to arrange & complete the reinstallation of a complete traffic signal pedestal, cabling, & associated hardware identified as urgent by Traffic Section.
Detector Fault	DA	4 Hours	The provision of time for the Contractor's technician to be onsite, appropriately equipped to test & repair all components of a faulty traffic signal vehicle detector.
Detector Recut / Installation	DA	7 Days (or as negotiated)	The provision of time for the Contractor's technicians to be onsite, appropriately equipped to arrange & install or recut a traffic signal vehicle detector.

TRAFFIC SIGNALS AND INTELLIGENT TRANSPORT SYSTEMS MAINTENANCE

Table - Response Times			
MAINTENANCE OR ACTIVITY	ALARM TYPE	TIME FOR ATTENDANCE / RESPONSE	BRIEF REQUIREMENTS – refer to Maintenance Section & Measurement & Payment for further details
Legend for SCATS related alarms: BO: Black Out DA: Detector Alarm		FY: Flashing Yellow LF: Lamp Fault	NC/DZ/ST: SCATS Communications fault related PB: Pedestrian Button Detector Alarm WD: Watchdog
NOTE: All response times listed are inclusive of after hours, weekends and public holidays – all response times apply NOTE: Maintenance & timeframes identified as 'urgent' are entirely at the discretion of the Superintendent. Maintenance identified as 'urgent' may be based on high risk consideration (danger to the public or workers), maintenance required prior to peak hours, or other urgent requirements.			
Pedestrian Push Button Repair or Replacement (including audio)	DA / PB	4 Hours	The provision of time for the Contractor's technician to be onsite, appropriately equipped to test, repair or replace all components of a faulty traffic signal pedestrian push button, including all audio tactile components.
ITS Fault Repair	-	2 Days	The provision of time for the Contractor's technician to be onsite, appropriately equipped to test & repair all components of faulty ITS equipment.
Specific Maintenance			
Site Audit – Vehicle Signalised Intersection	-	14 Days	The required time for a physical audit to be fully arranged, completed & recorded.
Site Audit Completed Report	-	5 days (or as scheduled)	The required time for the final audit report, drawing/s & quotes to be submitted & accepted by the Department's Traffic Section.
UPS Maintenance & Report	-	7 days (or as negotiated or as scheduled)	The required time for the physical inspection & testing to be completed, & the corresponding report to be completed & submitted to the Department's Traffic Section.

TRAFFIC SIGNALS AND INTELLIGENT TRANSPORT SYSTEMS MAINTENANCE

Table - Response Times			
MAINTENANCE OR ACTIVITY	ALARM TYPE	TIME FOR ATTENDANCE / RESPONSE	BRIEF REQUIREMENTS – refer to Maintenance Section & Measurement & Payment for further details
Legend for SCATS related alarms: BO: Black Out DA: Detector Alarm		FY: Flashing Yellow LF: Lamp Fault	NC/DZ/ST: SCATS Communications fault related PB: Pedestrian Button Detector Alarm WD: Watchdog
<p>NOTE: All response times listed are inclusive of after hours, weekends and public holidays – all response times apply</p> <p>NOTE: Maintenance & timeframes identified as 'urgent' are entirely at the discretion of the Superintendent.</p> <p>Maintenance identified as 'urgent' may be based on high risk consideration (danger to the public or workers), maintenance required prior to peak hours, or other urgent requirements.</p>			
Miscellaneous / Administrative Timeframes			
Provide Lifting Equipment	-	2 Days (or as negotiated)	The provision of time for the Contractor's technicians to be onsite, appropriately equipped with suitable hydraulic lifting equipment to access highmasts, CCTV or as otherwise required by the Department's Traffic Section.
Provide Detailed Quote – Standard	-	7 Days	The provision of time for the Contractor's Representative to provide a comprehensive quote inclusive of all labour & materials, following a verbal or written request for traffic signal or ITS works or repairs of a standard nature.
Provide Detailed Quote - Urgent	-	24 Hours (or as negotiated)	The provision of time for the Contractor's Representative to provide a comprehensive quote inclusive of all labour & materials, following a verbal or written request for traffic signal or ITS works or repairs of an urgent nature.
Work Order Responses	-	Close of business - next business day	Provision of time for all Work Order Responses, due fully completed with details of the works undertaken and other particulars as specified.

TRAFFIC SIGNALS AND INTELLIGENT TRANSPORT SYSTEMS MAINTENANCE

Table - Response Times			
MAINTENANCE OR ACTIVITY	ALARM TYPE	TIME FOR ATTENDANCE / RESPONSE	BRIEF REQUIREMENTS – refer to Maintenance Section & Measurement & Payment for further details
Legend for SCATS related alarms: BO: Black Out DA: Detector Alarm		FY: Flashing Yellow LF: Lamp Fault	NC/DZ/ST: SCATS Communications fault related PB: Pedestrian Button Detector Alarm WD: Watchdog
<p>NOTE: All response times listed are inclusive of after hours, weekends and public holidays – all response times apply</p> <p>NOTE: Maintenance & timeframes identified as 'urgent' are entirely at the discretion of the Superintendent.</p> <p>Maintenance identified as 'urgent' may be based on high risk consideration (danger to the public or workers), maintenance required prior to peak hours, or other urgent requirements.</p>			
Salvaged Item Inspection	-	Close of business - Next business day	Provision of time for the Contractor to have damaged items ready for inspection, to agree on salvaged / unrepairable items.
Provide Site Specific TGS/s including Risk Management Plan - Standard	-	2 Days	Provision of time to supply Traffic Guidance Scheme/s & associated risk management plan in order to undertake works within the road reserve, including the preparation of any permits or authorisations that may be required in order to carry out the works.
Provide Site Specific TGS/s including Risk Management Plan - Urgent	-	24 Hours Or as required by other maintenance activity timeline	Provision of time to supply Traffic Guidance Scheme/s & associated risk management plan in order to undertake works within the road reserve, including the preparation of any permits or authorisations that may be required in order to carry out the works of an urgent nature – i.e. Traffic Signal Pedestal Reinstallation – Urgent

16.33 SPECIFIC MAINTENANCE – TRAFFIC SIGNALS AND ITS AUDIT

16.33.1 Site Audit – Report Template

Refer to clause 16.36 Figures and Tables

Figure - Sample Template Traffic Signal and ITS Audit Report Template.

The Traffic Signals and ITS Audit Template is a required to be comprehensively completed. The current condition of all items shall be described, with any remedial works required to be listed in red.

Diagrams or drawings of the site shall also be submitted with the report, along with photographs to support descriptions of condition of hardware – contact Traffic Section for the most current drawings.

The reports provided shall be typed, with accompanying site drawing provided in a neat, clear format, within 5 working days from completion of the audit.

16.34 SPECIFIC MAINTENANCE – UNINTERRUPTABLE POWER SUPPLY (UPS) SYSTEMS

16.34.1 UPS Maintenance and Battery Condition – Report Sheet

Refer to **Figure – Sample Template UPS Maintenance and Battery Condition Report** in **Clause 16.36**.

The UPS Maintenance and Condition report sheet shall be completed for each scheduled UPS maintenance inspection, and left in the door of the UPS housing. A photo of the completed report shall be forwarded to Traffic Section following each specific maintenance activity for recording.

A copy should already be in each UPS unit for completion, however contact Traffic Section if there are any issues relating to this report document.

16.35 STOCK LIST & QUANTITIES

16.35.1 Stock List - Example of Excel Spreadsheet with Current Quantities

Refer to **Figure – Sample Stock List – Darwin** in **Clause 16.36**.

The Stock List is a current snapshot prior to advertising of this tender, of the items of stock owned by the Department.

The stock list will require updating upon award of this contract.

The stock on the updated list will be supplied by the Principal to the Contractor for the use only in execution of the Works.

16.36 FIGURES AND TABLES

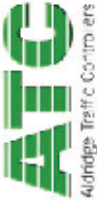
16.36.1 Figure - Sample Template Traffic Signal and ITS Audit Report Template

Dept of Infrastructure, Planning & Logistics TRAFFIC SIGNAL & ITS AUDIT SITE: (example) L0018 – McMillans Road / Rothdale Road DATE: Time Commenced: Time Completed: Person Responsible for Audit Completion by Contractor (name & sign): *Remedial Action in RED		
ITEM / ASSET	DESCRIPTION / CONDITION (condition of assets, hardware replaced, works undertaken, remedial works required, general notes, and other recommendations or comments)	
1	POLES	Check pole condition & base type (direct buried), any rust, pole top cover (painted for open links or junction box), aspect alignment/type/condition. Lenses, cowls, target boards, louvres, seals, connector rack, cable lengths. Pests. Any other infrastructure on the pole?
	Pole 1	Eg Pole 1 >New pole top replaced due to existing connector rack being brittle >Pole 2, SG6 secondary right aspect slightly realigned >Pole and all other hardware in good condition >Has open link – painted pole top with black ring on top half
	Pole 2	Eg Pole 2 >Highmast pole. Checked aspect and hardware – all in good condition.
	Pole 3	Eg Pole 3 >Pole top fully rewired due to cables exposed >Replaced cowl on SG2 right primary due to being missing >Pole and all other hardware in good condition See attached photo
ITEM / ASSET	DESCRIPTION / CONDITION (condition of assets, hardware replaced, works undertaken, remedial works required, general notes, and other recommendations or comments)	
2	DETECTORS	Check detector condition (exposed or sealant missing), direction of loop cut, surrounding pavement condition, operation of loop and testing of cables if required. Also check for half or full loop & advise which half is active.
	NOTE:	List detectors as per SCATS image
	Detector 1	Eg Det 1 >Detector 1 cut to the left kerb >Loop and sealant in good condition. Loop operational
	Detector 2	Det 2 >Detector 2 cut to the left kerb >Loop undamaged, however some sealant in poor condition and missing. *Recommend sealant top up in existing cut.
3	DETECTOR PITS	Note type of pit, condition of pit & lid (pit sinking, or full of dirt), at surface level, feeder cable connections. Also CCTV &/or other ITS pits, advanced warning sign pits.
	NOTE:	List which detectors that each pit feeds to.
	Detector Pit 1	Eg >Pit 1 - pit & lid in good condition, however is sitting 40mm above surface level. *Recommend reinstalling new enclosed polycarbonate pit > Feeder cable and connections in good order
ITEM / ASSET	DESCRIPTION / CONDITION (condition of assets, hardware replaced, works undertaken, remedial works required, general notes, and other recommendations or comments)	
4	CONDUIT JUNCTION PITS	Type of pit & approximate size (brick, asbestos, corrugated plastic), type of lid (steel, concrete), condition of pit, any issues with conduits. Also CCTV &/or RLC pits, advanced warning sign pits.
	Pit A	Eg Pit A >Old brick style pit, however is in good condition and has an accessible removable gatic lid.
	Pit B	Pit B >New standard pit. Pit and conduits in good condition.
	Pit C	Pit C >Old brick style pit. Has a very heavy & cracked concrete pit lid which is hard to access. *recommend upgrading to new standard conduit junction pit.
5	PEDESTRIAN GROUPS	Operation of all buttons, arrow facing correct way, audio tactile & speaker, appropriate height of ped aspects (3.0m from ground), line-marking condition, any other issues with crossing. Condition of pedestrian fencing if installed (or missing).
	Walk 1 Across:	Poles 6,7,8,9. Eg Ped Walk 1 >Button on walk 1, pole 3 replaced due to being damaged & not repairable. >Other equip all in good cond.
	Walk 2 Across:	Poles 12,13,14,1 Ped walk 2 >Slightly raised ped aspect on pole 6 due to being too low >All ped equip in good condition


TRAFFIC SIGNALS AND INTELLIGENT TRANSPORT SYSTEMS MAINTENANCE

	ITEM / ASSET	DESCRIPTION / CONDITION (condition of assets, hardware replaced, works undertaken, remedial works required, general notes, and other recommendations or comments)
6	TRAFFIC SIGNAL CONTROLLER	Type of controller, site ID sticker, graffiti or damage, site drawings present, footing & fixings, door & locks, internal components wiring, switches & fuses, operation of flasher unit, general cleanliness & cables tidy, signs of pest activity, any safety issues. Excessive heat.
	Controller Type / Model	Eg >Eclipse controller
	TSC Cabinet Housing Condition	Eg >controller fixings slightly loose. Tightened. >Applied ant rid due to ants >Paint in good condition
	Auxiliary Cabinet Housing	
	On/Off/Flash Switch Operation	
	All Wiring Neat & Safe	
	TSC Interior Lighting	
	Paperwork	Eg > *Site ID sticker missing *Controller only has old site diagram
	Other	
7	AUXILIARY CABINET ITS COMPONENTS	Check all cabling tidy, any wireless transmitters/receivers, excessive heat, graffiti or damage, door & locks, internal components wiring, switches & fuses, general cleanliness & cables tidy, signs of pest activity, any safety issues. Excessive heat.
	Router / modem	
	Fibre Media converter (including in field)	
	UPS in Auxiliary Cabinet	
	Surge Protection	
	Fans Installed if Required	
	Cabling tidy	
8	INTELLIGENT TRANSPORT SYSTEMS (ITS)	CCTV – Check pole & footing condition, clean dome. UPS – Check cabinet condition, general inspection, and documentation. VLSL – Check poles and footing conditions, any LEDs not operational. Lane Lights – Check operation of lights, pits.
	CCTV	
	UPS	
	VLSL	
	Lane Lights	
8	COMMUNICATIONS & PILLAR	Check comms pillar internal cleanliness & wiring, comms pillar cover condition & type (fibre glass/steel), any pest activity, associated pit/s, Linking Control Module (LCM) operation
	Pillar Type and Condition	
	Cabling	
	LCM	
	Pit/s	
9	ADVANCED WARNING SIGNS	Check condition of sign & sign fixings, operation of lights, condition of poles & footings, conduits, associated pits, & cabling to signs.
	Inbound	
	Outbound	
10	NOTES	ADDITIONAL NOTES, COMMENTS &/OR RECOMMENDATIONS

16.36.2 Figure – Sample Template UPS Maintenance and Battery Condition Report



UPS MAINTENANCE AND BATTERY CONDITION REPORT SHEET



Site No.: _____ Cabinet S/N: _____ Date Installed: ____/____/____

Battery Manufacturer: _____ Battery Type: _____

INSPECTIONS AND TESTS TO BE CARRIED OUT													
Quarterly Checks				½ Yearly Checks				Install and Annual Checks					
1. 15 minute discharge test.				3. 2 Hour discharge test.				5. Re-torque battery terminals connections to 12.4 N.m (110 inch/pounds).					
2. Check battery terminal condition.				4. Apply battery terminal grease over terminal to prevent corrosion.				6. Test internal resistance disconnect - <2W.					

Year 1/4 ¹ Install	Date	Initial	Charger ²		Cell 1 ³		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6		Cell 7		Cell 8		Inspection and test item ⁴				
			Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	1	2	3	4	5
Q1																									
Q2																									
Q3																									
Q4																									
Q1																									
Q2																									
Q3																									
Q4																									

¹ This is the quarter that the inspections and tests are required. Q1 starts three months from installation.

² The actual measured volt age and amperes are to be recorded in appropriate columns. This is applicable to both the Charger and Cell Columns.

³ Cells (batteries) are numbered from left to right and from top shelf to bottom shelf, i.e. top left cell is number 1 and bottom right cell is number 8.

⁴ The inspection and test columns only need to be ticked to indicate that the process has been performed. The blacked out areas do not need to be checked.

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UPS MAINTENANCE AND BATTERY CONDITION REPORT SHEET

Year 1/4 ¹	Date	Initial	Charger ¹		Cell 1 ¹		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6		Cell 7		Cell 8		Inspection and test item ¹							
			Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	Volt	Amp	1	2	3	4	5	6
Q1																												
Q2																												
Q3																												
Q4																												
Q1																												
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16.36.3 Figure – Sample Stock List – Darwin

Available as Excel Spreadsheet to Contractor.

DIPL CRITICAL STOCK LIST & TEST EQUIPMENT						
PRODUCT CODE	MAKE / MANUFACTURER	DESCRIPTION	DIPL CRITICAL STOCK QTY (ALL NEW)	DIPL CRITICAL STOCK INTERVENTION LEVEL	Item	Comments
200mm ARRAYS						
RA553-1	ALDRIDGE	200mm ARRAY VEHICLE - RED	15	8	Units	
RA553-2	ALDRIDGE	200mm ARRAY VEHICLE - YELLOW	15	8	Units	
RA553-3	ALDRIDGE	200mm ARRAY VEHICLE - GREEN	15	8	Units	
RA553A-1	ALDRIDGE	200mm ARRAY ARROW - RED	15	8	Units	
RA553A-2	ALDRIDGE	200mm ARRAY ARROW - YELLOW	15	8	Units	
RA553A-3	ALDRIDGE	200mm ARRAY ARROW - GREEN	15	8	Units	
300mm ARRAYS						
RA863-1	ALDRIDGE	300mm ARRAY VEHICLE - RED	15	8	Units	
RA863-2	ALDRIDGE	300mm ARRAY VEHICLE - YELLOW	15	8	Units	
RA863-3	ALDRIDGE	300mm ARRAY VEHICLE - GREEN	15	8	Units	
RA863A-1	ALDRIDGE	300mm ARRAY ARROW - RED	15	8	Units	
RA863A-2	ALDRIDGE	300mm ARRAY ARROW - YELLOW	15	8	Units	
RA863A-3	ALDRIDGE	300mm ARRAY ARROW - GREEN	15	8	Units	
PEDESTRIAN ARRAYS						
RL020	ALDRIDGE	200mm ARRAY PEDMAN RED	12	5	Units	
RL021	ALDRIDGE	200mm ARRAY PEDMAN WALK	12	5	Units	
RL592-B	ALDRIDGE	200mm ARRAY PEDMAN WITH COUNTDOWN TIMER	6	3	Units	
200mm LANTERNS						
RA1553	ALDRIDGE	200mm SASP VEHICLE LANTERN R/Y/G	10	6	Complete Assembly	excl target board
RA1553A	ALDRIDGE	200mm SASP ARROW LANTERN R/Y/G	10	6	Complete Assembly	excl target board
RA553A-GBB	ALDRIDGE	200mm SASP LANTERN GREEN ARROW/ BLANK/ BLANK	9	6	Complete Assembly	excl target board

DIPL CRITICAL STOCK LIST & TEST EQUIPMENT											
PRODUCT CODE	MAKE / MANUFACTURER	DESCRIPTION	DIPL CRITICAL STOCK QTY (ALL NEW)	DIPL CRITICAL STOCK INTERVENTION LEVEL	Item	Monthly Comments	ENTER PREVIOUS MONTH		STOCK MOVEMENT		ENTER CURRENT MONTH
							START OF MONTH QUANTITY	QUANTITY OUT (to site)	LOCATION / SITE	QUANTITY IN (from site)	LOCATION / SITE
200mm ARRAYS											
RA553-1	ALDRIDGE	200mm ARRAY VEHICLE - RED	15	8	Units						
RA553-2	ALDRIDGE	200mm ARRAY VEHICLE - YELLOW	15	8	Units						
RA553-3	ALDRIDGE	200mm ARRAY VEHICLE - GREEN	15	8	Units						
RA553A-1	ALDRIDGE	200mm ARRAY ARROW - RED	15	8	Units						
RA553A-2	ALDRIDGE	200mm ARRAY ARROW - YELLOW	15	8	Units						
RA553A-3	ALDRIDGE	200mm ARRAY ARROW - GREEN	15	8	Units						
300mm ARRAYS											
RA863-1	ALDRIDGE	300mm ARRAY VEHICLE - RED	15	8	Units						
RA863-2	ALDRIDGE	300mm ARRAY VEHICLE - YELLOW	15	8	Units						
RA863-3	ALDRIDGE	300mm ARRAY VEHICLE - GREEN	15	8	Units						
RA863A-1	ALDRIDGE	300mm ARRAY ARROW - RED	15	8	Units						
RA863A-2	ALDRIDGE	300mm ARRAY ARROW - YELLOW	15	8	Units						
RA863A-3	ALDRIDGE	300mm ARRAY ARROW - GREEN	15	8	Units						
PEDESTRIAN ARRAYS											
RL020	ALDRIDGE	200mm ARRAY PEDMAN RED	12	5	Units						
RL021	ALDRIDGE	200mm ARRAY PEDMAN WALK	12	5	Units						
RL592-B	ALDRIDGE	200mm ARRAY PEDMAN WITH COUNTDOWN TIMER	6	3	Units						
200mm LANTERNS											
RA1553	ALDRIDGE	200mm SASP VEHICLE LANTERN R/Y/G	10	6	Complete Assembly						
RA1553A	ALDRIDGE	200mm SASP ARROW LANTERN R/Y/G	10	6	Complete Assembly						
RA553A-GBB	ALDRIDGE	200mm SASP LANTERN GREEN ARROW/ BLANK/ BLANK	9	6	Complete Assembly						
RA1554	ALDRIDGE	200mm SASP VEHICLE LANTERN R/Y/G + G ARROW	8	3	Complete Assembly						
RA1554T	ALDRIDGE	200mm SASP ADVANCE WARNING SIGNAL - YELLOW	8	3	Units						
300mm LANTERNS											
RA863	ALDRIDGE	300mm SASP VEHICLE LANTERN R/Y/G	10	6	Complete Assembly						
RA863A	ALDRIDGE	300mm SASP ARROW LANTERN R/Y/G	10	6	Complete Assembly						
RA863AG	ALDRIDGE	300mm SASP GREEN ARROW/ BLANK/ BLANK	9	6	Complete Assembly						
RA863	ALDRIDGE	300mm SASP LED VEH R/Y-GA PCA	8	2	Complete Assembly						
PEDESTRIAN LANTERNS											
RL412	ALDRIDGE	200mm SASP PEDESTRIAN LANTERN	8	4	Complete Assembly						
RL592	ALDRIDGE	200mm SASP COMBINED PEDESTRIAN LANTERN COUNTDOWN	-	-	Complete						

ALL DIPL (NON-CRITICAL) STOCK LIST (add additional items / components as required)										
PRODUCT CODE (codes to be confirmed & amended accordingly)	MAKE / MANUFACTURER	DESCRIPTION	Item	Monthly Comments	ENTER PREVIOUS MONTH Indicative qty's for Contract Commencement	STOCK MOVEMENT				ENTER CURRENT MONTH
						START OF MONTH QUANTITY	QUANTITY OUT (to site)	LOCATION / SITE	QUANTITY IN (from site)	LOCATION / SITE
200mm ARRAYS										
RA553-1	ALDRIDGE	200mm ARRAY VEHICLE - RED	Units		4					
RA553-2	ALDRIDGE	200mm ARRAY VEHICLE - YELLOW	Units		3					
RA553-3	ALDRIDGE	200mm ARRAY VEHICLE - GREEN	Units		8					
RA553A-1	ALDRIDGE	200mm ARRAY ARROW - RED	Units		1					
RA553A-2	ALDRIDGE	200mm ARRAY ARROW - YELLOW	Units		2					
RA553A-3	ALDRIDGE	200mm ARRAY ARROW - GREEN	Units		4					
300mm ARRAYS										
RA863-1	ALDRIDGE	300mm ARRAY VEHICLE - RED	Units		15					
RA863-2	ALDRIDGE	300mm ARRAY VEHICLE - YELLOW	Units		17					
RA863-3	ALDRIDGE	300mm ARRAY VEHICLE - GREEN	Units		9					
RA863A-1	ALDRIDGE	300mm ARRAY ARROW - RED	Units		21					
RA863A-2	ALDRIDGE	300mm ARRAY ARROW - YELLOW	Units		22					
RA863A-3	ALDRIDGE	300mm ARRAY ARROW - GREEN	Units		21					
RL066	ALDRIDGE	300mm ARRAY U-TURN - GREEN	Units		3					
PEDESTRIAN ARRAYS										
RL020	ALDRIDGE	200mm ARRAY PEDMAN RED	Units		8					
RL021	ALDRIDGE	200mm ARRAY PEDMAN WALK	Units		9					
RL592-B	ALDRIDGE	200mm ARRAY PEDMAN WITH COUNTDOWN TIMER	Units		0					
200mm LANTERNS										
RA1553	ALDRIDGE	200mm SASP VEHICLE LANTERN R/Y/G	Complete Assembly		7					
RA1553A	ALDRIDGE	200mm SASP ARROW LANTERN R/Y/G	Complete Assembly		1					
RA553A-GBB	ALDRIDGE	200mm SASP LANTERN GREEN ARROW/ BLANK/ BLANK	Complete Assembly		0					

17 STREET LIGHT MAINTENANCE

17.1 GENERAL

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

17.2 CROSS REFERENCES

MISCELLANEOUS PROVISIONS

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES

17.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

AS/NZS 1158(set) Lighting for roads and public places.

AS/NZS 1158.1.1 -Vehicular traffic (Category V) lighting – Performance and design requirements

AS/NZS 1158.1.2 - Vehicular traffic (Category V) lighting – Guide to design, installation, operation and maintenance

AS 1742(set) Manual of uniform traffic control devices.

AS/NZS 3000 Electrical installations (Australian/New Zealand Wiring Rules).

Power and Water Corporation - Power Networks Design and Construction Guidelines.

Power and Water Corporation - Power Supply Volumes, Volume 3, Street Lighting Manual.

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

17.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

17.5 SCOPE OF WORKS

Refer to the Request for Tender/Request for Quotation and to the contract documentation.

17.6 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

18 STREET SWEEPING

18.1 OUTLINE DESCRIPTION

This section specifies the sweeping of sealed, concrete and paved surfaces of roads, car parks, kerbs, traffic islands, cycleways and footpaths.

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

18.2 CROSS REFERENCES

MISCELLANEOUS PROVISIONS for **Disposal of Waste**

MISCELLANEOUS PROVISIONS for **Plant and Equipment**

MISCELLANEOUS PROVISIONS for **Work Involving Chemicals** sub-clause

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES

18.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

AS 1742.3 Manual of uniform traffic control devices - Traffic control for works on roads

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

Acts and Regulations

Comply with the following Acts and Regulations:

- *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011
- *Traffic Act 1987* and Regulations 1999 and Traffic Regulations, Schedule 3 – Australian Road Rules 1999
- *Control of Roads Act 1953* and Control of Roads (Infringement Notice) Regulations 2011
- *Environmental Offences and Penalties Act 1996*
- *Environment Protection Act 2019*
- *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*

18.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

The following additional definitions apply.

CALENDAR DAY

Means any day of the week, including weekends, and including Public Holidays.

CALENDAR MONTH

Means all the days occurring during the month from the first day of the month to the last day of the month inclusive, irrespective of the number of days occurring in that month.

CYCLEWAYS/FOOTPATHS/SHARED PATH

Sealed or concreted carriageways provided for the shared use of pedestrians and cyclists, but exclude motorised vehicles.

DAY/WORKING DAY/BUSINESS DAY

Means working day, Monday to Friday, excluding Northern Territory wide Public Holidays, and excluding weekends.

INTERSECTIONS

Junction points of at least two roads, and may include roundabouts, splitter islands and medians.

KERB

Concrete edging to a sealed carriageway, which may include a concrete gutter. Kerbs are generally associated with verges, medians, roundabouts or splitter islands.

MEDIAN BREAKS

Trafficable gaps in a road centre median which allow vehicles to gain access to the opposite side of the road. Median breaks are not located at intersections.

MEDIANS

Areas between divided portions of the carriageway, bounded by traffic lanes carrying traffic in opposite directions. Medians may or may not be kerbed.

ROAD

Sealed carriageways utilised by motor vehicles, which consist of one or more traffic lanes in each direction, and may be edged by a concrete kerb.

ROUNDBABOUTS

Circular centre islands at an intersection, usually having a kerbed perimeter.

SPLITTER ISLANDS

Kerbed islands in varying shapes and sizes used to control the route vehicles take at intersections and other locations.

VERGES

Areas of the road reserve between the carriageway and the property boundary. Cycleways and footpaths are constructed on the road verges. Verges may or may not be kerbed.

18.5 FREQUENCY OF WORKS

The frequency of sweeping is determined by the number of cycles to be performed during the period of the contract, i.e.: 12 cycles per year equates to monthly sweeping, 26 cycles per year equates to fortnightly sweeping, 52 cycles per year equates to weekly sweeping.

Nominated major intersections, median breaks, kerbed sections of roads, cycleways and footpaths will be swept at the frequency nominated in the Response Schedules.

Other areas will be called up for sweeping at the discretion of the Superintendent.

18.6 SCHEDULED SWEEPING PROGRAM

Submit to the Superintendent at least 7 calendar days in advance of the works, the scheduled sweeping program for the following calendar month. The program is to include the scheduled sweeping of all roadways, intersections, median breaks, cycleways and footpaths.

18.7 REQUIREMENTS

18.7.1 General

Ensure that all loose or foreign material such as stone, sand, gravel, and vegetative waste deposited against kerbs and on roadways cycleways and footpaths is picked up by the sweeping plant and removed at the time of service.

Where objects such as palm fronds or any other form of obstruction with a weight of less than 40 kg is encountered and found to be obstructing progress of the street sweeping machine, relocate the object out of the path of the machine in order to permit works to proceed. Any such material may be deposited a safe distance back from kerb for later retrieval by others.

18.7.2 Contractor to inform themselves

The Contractor shall be deemed to have to have examined all sites as nominated in the Response Schedule, and to have satisfied themselves as to the correctness of all areas of the individual roads and cycle/footpaths under the Contract irrespective of lengths and widths.

18.7.3 Manual sweeping

The hand sweeping of surfaces of medians and splitter islands may be required on occasion, and this will be undertaken by the Contractor on a tendered hourly rate. Traffic management associated with the hand sweeping work will be supplied by Contractor.

18.7.4 Sweeping of Intersections

The sweeping of intersections includes the sweeping of all road surfaces and all kerbs associated with medians, splitter islands and roundabouts. Sweeping includes all turning, stopping, crossing, and acceleration or deceleration areas including line marked areas across the whole of the road pavement within the area of the intersection.

Sweeping must be undertaken in the direction of the normal traffic flow.

An intersection will commence from the diversion point of any associated slip lane, or from the start of any painted chevron associated with line marking for diverging traffic, whichever is the most distant from the intersection. Where no slip lanes or painted chevrons exist, works will commence at a point fifty metres from the centre point of the intersecting roads.

The manual sweeping of surfaces of medians and splitter islands may be required on occasion, and this will be undertaken by the Contractor on a tendered hourly rate. Traffic management associated with the hand sweeping work is to be supplied by the Contractor.

18.7.5 Sweeping of Median Breaks

The sweeping of median breaks includes the sweeping of all road surfaces and all associated kerbs. Sweeping will include all turning, stopping, crossing, and acceleration or deceleration areas including line marked areas across the whole of the road pavement within the area of the median break.

Sweeping must be undertaken in the direction of the normal traffic flow.

A median break will commence from the diversion point of any associated slip lane, or from the start of any painted chevron associated with line marking for diverging traffic, whichever is the most distant from the median break. Where no slip lanes or painted chevrons exist, works will commence at a point twenty metres from the centre point of the median break.

18.7.6 Sweeping of Cycleways and Footpaths

The sweeping of cycleways and footpaths includes the sweeping of all associated surfaces. Loose or foreign material deposited as a result of heavy rain or flooding is also to be removed.

18.7.7 Sweeping of Kerbs, Roads and Car Parks

Sweeping of kerbed areas of nominated roads includes all kerbs associated with medians and verges and must be undertaken in the direction of the normal traffic flow.

Sweeping of other roads and car parks will be as directed by the Superintendent. Sweeping of car parks includes all car park surfaces and associated kerbs.

Cleaning and sweeping of road surfaces associated with spillages of concrete, oil, paint and other liquids will be required on occasion as directed by the Superintendent.

18.8 ROAD SWEEPING EQUIPMENT

The Contractor will possess sufficient plant to ensure continuity of service and conformance with contract requirements. This will include the provision for continuity of service when machinery is unavailable through service or mechanical breakdown.

The following characteristics are required as a minimum on road sweeping equipment:

- “suction” or “regenerated air” type.
- dual cab controls, enabling the sweeper to be operated from either the right or left side.
- fitted with dual gutter brushes and suction nozzles, enabling sweeping to be carried out on either side of the carriageway while maintaining the direction of traffic flow.
- minimum useable hopper capacity of 5 m³.

- fitted with noise and dust suppression features in accordance with manufacturers and regulatory requirements.
- fitted with a suction litter hose for the removal of lightweight litter.
- fitted with street washers for the cleaning of road surfaces. The machine must be capable of injecting detergent into the street washer facility. Refer to **Detergent** clause in this work section.
- fitted with a high pressure hand washer, with reel hose and lance for remote cleaning. The machine must be capable of injecting detergent into the hand washer facility. Refer to **Detergent** clause in this work section.
- minimum water tank capacity of 1200 litres.
- fitted with a dual rotating beacon, or LED equivalent, positioned on the cabin of the vehicle, and two single yellow rotating beacons, or LED equivalents, positioned at the rear of the vehicle. Refer to **Vehicle-Mounted Warning Device** sub-clause in **Traffic Control** clause in this work section.
- fitted with an illuminated flashing arrow sign, or an approved flashing bar light. Refer to **Illuminated Flashing Arrow Sign** sub-clause in **Traffic Control** clause in this work section.
- fitted with audio-visual reversing equipment.
- maintained in good order and condition throughout the Contract.

18.9 CYCLEWAY AND FOOTPATH SWEEPING EQUIPMENT

The following characteristics are required as a minimum on cyclepath and footpath sweeping equipment:

- “suction” or “regenerated air” type.
- minimum hopper capacity of 375 litres.
- capable of removal of all material up to half a kilo (500 g) in weight.
- fitted with noise and dust suppression features in accordance with manufacturers and regulatory requirements.
- fitted with a vehicle-mounted warning device. Refer to **Vehicle-Mounted Warning Device** sub-clause in **Traffic Control** clause in this work section.
- fitted with audio-visual reversing equipment.
- maintained in good order and condition throughout the Contract.

18.10 DETERGENT – HOLD POINT

Detergent utilised for either street washing or remote high pressure washing with the lance is to be supplied by the Contractor.

Detergent is to meet the following requirements:

- heavy duty general purpose cleaner/degreaser concentrate
- diluted in accordance with manufacturer’s recommendation
- water soluble and biodegradable
- low foam, quick break product
- be non-toxic,
- not contain; caustic material, phosphate builders or glycol ether solvents
- temperature stable to a minimum temperature of 42°C.

Hold Point - Provide product information details and SDS to Superintendent for approval of the detergent intended for use in the performance of the Contract prior to the commencement of the works.

18.11 DISPOSAL OF RECOVERED WASTE

All recovered waste associated with the sweeping operation will be disposed of at an appropriate waste management facility. Waste is not to be abandoned on site, deposited on adjoining properties, or hidden on areas of vacant land.

18.12 PERSONNEL

Ensure that all works are identified and undertaken in conformance with the requirements of the Contract.

Adequately train machinery operators in the correct operation of all equipment used in the performance of the contract. All operators will hold current licences as required under law.

All supervisors and operators will wear reflective fluorescent safety vests whenever working off machinery or out of vehicles during the performance of the Contract.

18.13 TRAFFIC CONTROL

Provide traffic control associated with the works in accordance with AS 1742.3.

The following requirements are intended to supplement or clarify the requirements of AS 1742.3.

18.13.1 Vehicle-Mounted Warning Device

Fit road sweeping equipment with one amber rotating dual beacon (Britax Aerobar 420-00 or similar), or LED equivalent, mounted over the cabin and fitted with minimum 55 watt globes, or LED equivalent. The beacon is to be visible from the front and both sides. Fit cycleway and footpath sweeping equipment with a single beacon device, or LED equivalent, visible from all directions.

For road sweeping equipment, additionally provide two single rotating beacons, or LED equivalents, mounted one on each side at the upper rear of the vehicle, and visible to traffic approaching from the rear.

Ensure that all lights are operational and maintained in a clean state whenever the plant or equipment is working on roadways, cycleways or footpaths.

18.13.2 Illuminated Flashing Arrow Sign

Road sweeping equipment will be fitted with either an illuminated flashing arrow sign, or an approved flashing bar light mounted horizontally and centrally on the upper portion of the rear of the equipment.

The flashing pattern required for an illuminated flashing arrow sign while sweeping roadside kerbs is for the central bar only to be flashing.

18.13.3 Very Short-Term and Low Impact Works

Scheduled work will be undertaken as "Work Taking 5 Minutes Maximum". As there will not be any workers on foot associated with the undertaking of these Contract works, a lookout person will not be required.

Works undertaken under the Contract will not be considered as "Mobile Works".

18.13.4 Urgent Works Request

An Urgent Works Request may be made by the Superintendent for reasons of safety, and may be the result of a motor vehicle accident, material or debris spillage, or other incident. Such requests are to be attended to on site within one hour of the request.

In such circumstances, the Superintendent will make alternative arrangements for the management of traffic.

18.14 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

19 AERODROME MAINTENANCE

19.1 OUTLINE DESCRIPTION

19.1.1 Precedence

Where conflict arises between this specification and CASA requirements, the CASA requirements prevail.

19.1.2 General outline

This section specifies the requirements for the provision of Aerodrome Reporting Officers (AROs) and of the general maintenance of sealed and unsealed, aerodromes and/or aerodrome landing areas (ALAs). Works must comply with the requirements of the Civil Aviation Safety Authority (CASA).

Comply with the Acts, Regulations, Guidelines, and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

The Principal will provide plant, equipment, furniture, lights, luminaires, poles, and the like, which are to be installed at aerodromes in fulfilment of the terms of the contract. Minor items and consumables required to carry out the works are to be provided by the Contractor.

19.1.3 Description of the Works

A general outline of the work to be carried out under the Contract comprises of:

- The provision of Aerodrome Reporting Officers whose primary function is to inspect the aerodrome on a regular basis,
- The provision of Works Safety Officers whose primary function is to ensure aerodrome safety while works are being carried out at the aerodrome,
- Responding to emergency callouts,
- The inspection, monitoring and reporting on the condition of the aerodrome,
- Ensuring the aerodromes' continual compliance with the requirements of the MOS Part 139, and
- General maintenance to the aerodrome landscape and furniture inclusive of, but not limited to:
 - Slashing grass, weeds and suckers,
 - Removal of litter of all types,
 - Spraying vegetation at markers, fence lines, signal areas, gable makers, cones, runway flares, lights, wind indicators, and other areas which must be kept clear of vegetation,
 - Removing trees, anthills/termite mounds/termite nests, and other obstacles, penetrating the obstacle limitation surfaces,
 - Inspecting and maintaining gates, fences, and firebreaks,
 - Inspecting and removal of any Foreign Object Debris (FOD) from the Runway and Runway Strip as it occurs,
 - Inspecting and maintaining lighting, including emergency lights stored outside the perimeter fence.
 - Inspecting and maintaining markers, wind indicators, and signal areas, and the clear areas required at them.

The use of electronic data collection for inspections, maintenance, defects, repairs, and routine works recording as proof of compliance shall be part of the contract.

Information contained in documents attached to the RFT/RFQ provide information about the data collection, roles and responsibilities, asset maintenance and inspection rules, the intervention levels and KONECT software operation instructions for performance of the works.

19.1.4 Provision of Ongoing Support

Provide the following ongoing support:

- Developing and maintaining the plans, programs and reports.
- Attendance to and supply of all requirements for the scheduled meetings inclusive of minute keeping.
- Tracking completion and payment status of monthly and individual invoices & Contractor Service Requests (CSRs),
- Provide, implement, and maintain electronic data collection hardware capable of running the supplied KONECT software and camera capabilities for the use and operation of all the electronic inspection recording, data collection and management associated with the Contract.
 - The time needed on the work sites to record the necessary information.
 - The supply and maintenance of all electronic equipment, backup and ancillary equipment for use in this contract.
 - For internet and associated data costs.
 - For alternative GPS recording devices and cameras to record repairs manually in the Spreadsheet in case of electronic equipment/software failure.
 - For all associated training needs in operation of the KONECT system software.
- Updating staff on new products and relevant standards.
- Liaison with the Superintendent.
- Liaison with Regular Public Transport services (RPT) providers to confirm flight schedules as it is subject to change from time to time. Inform the Superintendent of changes.

19.2 CROSS REFERENCES

MISCELLANEOUS PROVISIONS for **Disposal of Waste**

MISCELLANEOUS PROVISIONS for **Volatile Substances Management**

MISCELLANEOUS PROVISIONS for **Plant and Equipment**

MISCELLANEOUS PROVISIONS for **Work Involving Chemicals** sub-clause

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES

19.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

19.3.1 Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

19.3.2 CASA Documents

Carry out inspections and maintenance works in accordance with:

- Civil Aviation advisory publications CAAP 92 – 1 (1), and CAAP 92A-1(0), available via <https://www.casa.gov.au/rules-and-regulations/standard-page/civil-aviation-advisory-publications>.
- Civil Aviation Orders, Part 82, Section 82.3, Issue 3, Appendix 3, available via <https://www.casa.gov.au/rules-and-regulations/current-rules>,
- other applicable CASA Directives, and
- CASA publication Manual of Standards (MOS) Part 139, available via <https://www.legislation.gov.au/Details/F2020C00797>, ensure the version accessed is “In Force”.

Use the documents applicable to the types of aerodromes which are the subject of the works. Works will be carried out at registered aerodromes, and at unregistered Aeroplane Landing Areas (ALAs). Requirements may differ for each type of facility. Refer to the RFT.

19.3.3 Site Rules – Aerodromes – Witness Point – Hold Point

The Contractor shall comply with the provisions of Part 139 - Aerodromes of the Civil Aviation Safety Authority document Manual of Standards (MoS Part 139). The Contractor is only required to comply with the provisions directly related to the execution of this contract. The MoS document can be accessed via the web link shown above.

The Contractor must check that the information is current at the time the works are undertaken.

Carry out the works to include all works to meet the specified performance criteria.

This includes inspection, monitoring and reporting on the condition of the aerodrome to ensure its continual compliance with the requirements of the MOS Part 139.

Ensure the aerodrome is in a condition that complies with the requirements of the Civil Aviation Regulations (CAR) and all applicable CASA Directives.

The Contractor must comply with the requirements of:

- *Civil Aviation Act 1988* (Cth)
- Civil Aviation Regulations 1988 (Cth)
- Civil Aviation Safety Regulations (CASR) 1998 (Cth),
- [Aviation Transport Security Act 2004 \(ATSA\)](#) (Cth),
- [Aviation Transport Security Regulations 2005 \(ATSR\)](#) (Cth)
- Civil Aviation Advisory Publications
- Civil Aviation Orders, and
- other aviation regulations as required to undertake the works.

If it is a security controlled airport, ARO's must obtain an ASIC card (Aviation Security Identification Cards) to work on the airside and familiarise themselves with the requirements.

Witness Point - Contractors should also have a Drug and Alcohol Management Plan (DAMP) in place under Part 99 of the CASR and have completed a DAMP Certificate on the AviationWorx portal of the CASA Website. Provide a copy of the submitted DAMP and a copy of the DAMP Certificate to the Superintendent.

Note: This requires the Contractor to apply for an Aviation Reference Number (ARN).

Hold Point - Communications Plans are to be issued for all works being carried out and are to be approved by the Superintendent before works commence.

Hold Point - If required a NOTAMS is to be issued for all works being carried out at an aerodrome which requires NOTAMS to be issued. The NOTAMS are to be approved by the Superintendent before works commence.

Hold Point – Method of Working Plans (MOWPs) must be prepared for works to be carried out at an aerodrome which requires MOWPs to be issued. The MOWPs must be approved by the Superintendent before works commence.

19.4 SITE RULES – WORK ON COMMUNITIES

Contractors are advised that restrictions may apply to entering and working in an Aboriginal Community.

It is the Contractor's responsibility to ascertain from the relevant Community Council or Land Council details of any permits conditions, restrictions, requirements, fees etc applicable to working in that Community.

All permissions, permits and charges are the responsibility of the Contractor.

A Volatile Substance Abuse Management Plan may apply in and/or near the area of the works.

Information can be found at <https://health.nt.gov.au/professionals/alcohol-and-other-drugs-health-professionals/volatile-substances>.

19.5 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause. The following additional definitions apply.

AIP

Aeronautical Information Publication

APVMA

Australian Pesticides and Veterinary Medicines Authority

ARFF Unit

Aviation Rescue and Firefighting Unit

ARO

Aerodrome Reporting Officer

For Registered Aerodromes AROs are to hold a recognised training certificate issued after a minimum of 5 days of training.

For Aeroplane Landing Areas AROs are to hold an approved training certificate issued after a minimum of 1 day of training.

ASIC

Aviation Security Identification Card

ATC

Air Traffic Controller

ATSA

Aviation Transport Security Act 2004 (Cth)

ATSR

Aviation Transport Security Regulations 2005 (Cth)

CAAP

Civil Aviation Advisory Publication, published by CASA

CAO

Civil Aviation Orders

CAR

Civil Aviation Regulations 1988 (Cth)

CASA

Civil Aviation Safety Authority Australia

CASR

Civil Aviation Safety Regulations 1998 (Cth)

CSR

Contractor Service Request/Requisition

ERSA

En Route Supplement Australia

KONNECT

An interactive live database for recording asset management activities and assets.

MoS/MOS

Manual of Standards, published by CASA.

MOWP

Method of Working Plan

NEW ARO

An ARO appointed to the position of Primary ARO or Temporary ARO at the commencement of the contract, or during the period of the contract, and has not received the mandated ARO training.

NOTAM

Notice to Airmen

PRIMARY ARO

Nominal incumbent of the ARO position, who will fulfil the requirements of the position on an ongoing, permanent basis for the duration of the contract, apart from absences for leave or due to unexpected events.

TEMPORARY ARO

An ARO engaged to fulfil the functions of the Primary ARO when the Primary ARO is unable to fulfil those functions.

WSO

Works Safety Officer

19.6 RELATIONSHIPS AND RESPONSIBILITIES

The Northern Territory Government does not own or operate the aerodromes covered under the provisions of this Contract.

This Contract does not cover or include, nor does it relieve any of the responsibilities, duties or liabilities, of an Aerodrome Operator, which exist under Civil Aviation Safety Regulations 1998 (Cth).

The acceptance of this Contract does not make the Contractor responsible, duty bound or liable for any responsibility, duty, or liability of an Aerodrome Operator, other than those contained in this Contract.

This Contract includes the requirement for qualified Aerodrome Reporting Officers who are required to make regular inspections of the facilities and to advise pilots through the NOTAM system of changes which may affect aircraft operations.

Where Aerodrome Reporting Officers (AROs) have been appointed they shall undertake the specified inspection works required of this Contract, and as required in the statutory responsibilities of the Reporting Officer under CASR Part 139 (Civil Aviation Safety Regulations 1998 (Cth)).

Where there is no requirement for Aerodrome Reporting Officers (AROs) appoint a suitably trained Aerodrome Reporting Officers (ARO) to undertake the inspection, reporting and request for maintenance works at the respective aerodrome. Adopt the equivalent Registered Aerodrome standard for inspection at ALAs.

19.7 AERODROME REPORTING OFFICERS (ARO) – WITNESS POINT

Witness Point – Provide the names, contact details, and qualifications/training details of the AROs who will provide the ARO functions under the contract.

The term Aerodrome Reporting Officer (ARO) shall be adopted for all aerodromes nominated.

For the Aerodrome Reporting Officer work includes the aerodrome operations for the inspection, reporting, and recording requirements of MOS Part 139, any of the emergency and security operations and any operations relating to aircraft movements. Where a change in the aerodrome conditions requires a NOTAM to be issued this must be done in accordance with MOS Part 139.

For the Aerodrome Landing Areas (ALAs) the Aerodrome Reporting Officer work includes the adoption of the equivalent Registered Aerodrome standard for aerodrome operations for the inspection, reporting, and recording requirements of MOS Part 139, any of the emergency and security operations and any necessary operations relating to aircraft movements.

Note: Some of the following functions may not be applicable to AROs working at ALAs. Check the RFT to determine the classifications of the aerodromes subject to the contract. Check the CASA documents to determine which ARO functions are applicable to the aerodromes subject to the contract.

19.7.1 Primary ARO skills and attributes

The primary ARO is to be trained as per MOS Part 139 and have the attributes listed in MOS Part 139.

19.7.2 ARO resources

Aerodrome Reporting Officers shall provide appropriate vehicles and radios to comply with Manual of Standards Part 139—Aerodromes, and provide all miscellaneous items and stationery to undertake the inspections.

19.7.3 ARO functions

The Aerodrome Reporting Officer ARO shall undertake four functions as per MOS Part 139:

1. Undertake serviceability inspections for safety, service ability and standards compliance with MOS Part 139 CASA regulations of the airstrip specifically noting and reporting on any conditional change at the aerodrome that may impede the ability of an aircraft to safely land at the airstrip.
2. Write and issue NOTAMs (Notice to Airmen) as required when hazards are noted during serviceability inspections (refer MOS Part 139). This is only applicable to Registered Aerodromes.
3. Be registered as the Aeronautical Data Originator/NOTAMs authorized person with the Air Services Office for the duration of their tenure as the nominated primary ARO for the airstrip as per MOS Part 139.
4. Securing the aviation sectors from acts of terrorism and unlawful interference. If the nominated aerodrome is security controlled, the nominated ARO must have an ASIC card for the duration of their contract

19.7.4 New or Temporary AROs – Witness Point

Witness Point - Where there is a requirement for New or Temporary AROs, advise the Superintendent of the name, contact details, and qualifications details for the New ARO, or Temporary ARO, and the period for which they will be in that role.

19.8 AERODROME REPORTING OFFICER TRAINING – HOLD POINT

Provide a suitably trained/qualified ARO for each aerodrome under this contract.

Provide a secondary suitably trained/qualified ARO who shall be retained and available at each aerodrome to cover periods of leave or unexpected absences of the primary ARO.

Hold Point - Provide a Statement of Attainment of the nationally recognised qualification awarded to the ARO before that person commences any ARO duties.

19.9 AERODROMES AND FREQUENCY OF SERVICEABILITY INSPECTION

19.9.1 Inspection

There are four instances that a serviceability inspection shall be undertaken by the ARO:

1. (a) For Registered Aerodromes with RPT - A serviceability inspection prior to the first Regular Passenger Transport (RPT) flight of the day. The number of days per week required for this inspection to occur is given in the RFT/RFQ, Or
(b) For ALAs – Frequency – 2 per month, equally spread in time.
2. Two serviceability inspections two weeks apart each month are to be undertaken prior to sunrise, but after 4am to inspect lighting operation and determine any non-functioning lights. It is not acceptable to inspect the lights prior to 4am as this does not confirm the last battery power of the aerodrome lighting systems for medivacs.
3. A serviceability inspection prior to any emergency and or medical evacuation. The frequency of such inspections is variable. Provide general assistance to medical staff on the ground opening access gates, activating wind indicator and/or airstrip lighting, provide advice to the aircraft operator on any safety aspect, and be available for the duration of the medical evacuation if required. Note that this serviceability inspection is not required by CASA, it is an additional requirement that the NT Government requires under this contract.
4. A serviceability inspection post a storm event, such as a cyclone event, prior to any regular passenger transport flights occurring.

The inspection is to include, but not be necessarily limited to, the items detailed in MOS Part 139.

19.9.2 Inspection Logbook and Reports – Witness Point

The ARO must maintain an inspection logbook to demonstrate that inspections have been carried out.

Enter the logbook information into the electronic system.

The ARO shall develop and use an inspection checklist which aligns with the requirements of MOS Part 139.

Besides recording the inspections, the inspection checklist should also record maintenance, remedial, or upgrading works requirements.

Provide a report to Air Services Australia NOTAMS, with any issues observed that may impede the safe landing of aircraft.

Witness Point - Simultaneously notify the Superintendent immediately those deficiencies are noted at the aerodrome.

Witness Point - Submit to the Superintendent the ARO inspection and maintenance checklist reports on a monthly basis as part of the claims for payment verification.

Witness Point – Submit to the Superintendent copies of medivac logs, verified by the nurse-in-charge, or by a police officer, with the claim for payment which includes the medivacs.

Witness Point - Provide substantiated evidence of the ARO activities, as well as the regular monthly inspections and maintenance checklist reports, as part of any claims for payment.

19.10 WORKS SAFETY OFFICERS

Provide Works Safety Officers (WSO) for all works which require a WSO.

An ARO may also carry out the functions of a WSO.

Ensure that each Works Safety Officer has been suitably trained and is able to undertake the functions as listed in MOS Part 139.

19.11 METHOD OF WORKING PLANS

Method of Working Plans (MOWPs) will be required for works to be undertaken under this contract.

19.11.1 Requirements

A MOWP must:

- accurately set out the arrangements for carrying out the works; and
- be prepared in accordance with MOS Part 139.

19.11.2 Consultation

When preparing a MOWP, an aerodrome operator must consult with stakeholders as detailed in MOS Part 139.

19.11.3 Distribution of MOWP – Hold Point

Hold Point - Not less than 14 days before works commence, the Contractor must supply a copy of the MOWP to the entities listed in MOS Part 139 and the Superintendent.

19.11.4 Unforeseen Urgent Works

A MOWP may only be supplied less than 14 days before works commence if:

- the works are unforeseen urgent works; and
- the MOWP states that the works are unforeseen urgent works.

19.11.5 Amendments – Witness Point

Witness Point - If a MOWP is amended after it is supplied to the persons mentioned above in sub-clause 19.10.3, the amended MOWP must:

- be supplied to those persons as soon as possible but not later than 48 hours before the works commence; and
- clearly show the amendment that has been made.

19.11.6 Compliance with MOWP

Aerodrome works for which a MOWP is required must be carried out in accordance with the MOWP, including the MOWP as amended.

19.12 AVAILABILITY OF CONTRACTOR

The Contractor shall provide twenty-four (24) hours a day, seven (7) days a week telephone contact and availability of labour to deploy to the Works should the Superintendent so direct. The Principal shall have first call on the services of the Contractor.

19.13 SCHEDULED MEETINGS

The Contractor shall attend scheduled meetings, in person or over telephone.

Items for discussion or reports to be delivered include:

- Previous scheduled meeting minutes
- Project Control Plan review
- Contractor Performance Scorecard
- Key Performance Indicator report
- Service Program report
- completion dates for all CSR's completed in the last month inclusive of repairs logged in KONECT.
- discuss and update on the progress of ongoing and pre-programmed works,
- discuss follow up works,
- discuss works and corrective actions that require immediate or planned responses,
- discuss and help prioritise and co-ordinate works,
- discuss any other relevant issues or queries that require actions to be undertaken.
- Site Audit Report Review
- Outstanding works report (Contractor)
- Complaints register report (Contractor/Superintendent)
- Asset update report (Contractor)
- Software improvement suggestions (Contractor)
- Non-conformance/Corrective actions
- Invoice/payments
- Other issues
- General Business

19.14 CONTRACTOR'S ESTABLISHMENT

The Contractor shall provide and maintain an established office workshop facility. The facility shall include the following:

- An approved workshop with equipment and capabilities sufficient to carry out work as specified in the Contract.
- An approved office space with sufficient personnel necessary to take, record or pass on any emergency message that may be received, provide day to day information with regard to prices, availability, and delivery. Be sufficiently qualified to process and forward invoices for work carried out.

19.15 CONTRACTOR'S EQUIPMENT AND MATERIALS

The Contractor shall provide all general and specialised equipment, tools and materials to carry out and test the Work. It shall be the responsibility of the Contractor to be fully equipped on each attendance call.

19.16 COST LIMITS FOR REPAIR WORK

Where it becomes evident during the course of an item of work that the cost will exceed the amount specified in the RFT/RFQ (labour and materials), the Contractor shall not proceed without the

approval of the Superintendent. Refer to Cost Limits clauses in PROCEDURES CALLS AND PAYMENTS in the RFT/RFQ.

19.17 COMMUNICATIONS

Provide field communication with the Department by mobile telephones connected either to a cellnet system or a satellite system. Install a mobile telephone in the cabin of a vehicle located at the work site. If cabin mounting is not possible position the telephone at the Contractor's base camp.

Ensure that the telephones are switched on every day between the hours of 07.30 and 16.30 or at any other time when work is being carried out under the Contract.

Replace faulty telephones within 3 working days of the occurrence of the fault.

19.18 DAILY LOG BOOKS – APPROVAL – WITNESS POINT

Maintain daily log books for works undertaken under the contract.

Witness Point - Approval - Submit to the Superintendent for approval a suitably designed format for daily log books prior to commencing works under the Contract.

Include in the log book the location, type of work, quantity completed, equipment down time, unusual happenings, and any other requirements specified in the relevant Technical Section.

Submit daily log book sheets with each completed CSR.

19.19 AUDITS

Audits of any aspect of the project may be carried out by the Superintendent, the Superintendent's Representative or by another person nominated by the Superintendent. Audits may be conducted with or without notice.

Audits of Key Performance Indicators (KPI's) will be undertaken to measure compliance with contract requirements. Audits will take the form of a report giving details and locations of the non-compliances, together with supporting evidence.

The audit of the KPI's will be measured against a total of 5 audit categories. Deductions to scheduled rates claim for payments will be made based on the specified compliance of the key performance indicators. Refer to **Table - Key Performance Indicators and Audit Categories**.

There will be five types of Audits applicable to this contract.

1. Attendance at scheduled meetings.
2. Electronic Data Recording of inspections, maintenance, defects, repairs and routine works.
3. Aerodrome Reporting Officer Inspections.
4. Time for Attendance.
5. Quality of Works Undertaken and Compliance with Electronic Data Recording Audits.

19.19.1 Attendance at Scheduled Meetings

Attend scheduled meetings. The meeting schedule will be negotiated after award of the Contract. Meetings should be held each month unless there are circumstances which makes that frequency too onerous.

19.19.2 Electronic recording of inspections, defects, repairs and routine works

Regular updating of electronic system, KONECT, to display progress/status of works.

19.19.3 Aerodrome Reporting Officer Inspections

Mandatory serviceability inspection as set in the PROJECT SPECIFIC REQUIREMENTS.

19.19.4 Time for Attendance

Time for Attendance performance measured from the approved Service Program/CSR.

19.19.5 Quality Audits of Works Undertaken

The Superintendent will conduct random audits to verify that when defects have been repaired the standard of works undertaken is in accordance with the specification requirements and of acceptable Industry Standards. Payment will be withheld for works completed but not actioned in the electronic system (KONECT) (where applicable) until the system is updated.

19.19.6 Key Performance Indicators

Table - Key Performance Indicators and Audit Categories Services Performance Plan – Part 1 of 2 parts			
Monthly Key Performance Indicator:	Audit Category:	Compliance	Price Adjustment withheld as a % of Scheduled Rate
Meeting the required frequency of Attendance to Scheduled meetings	Attendance to Scheduled Meetings	Attendance to Scheduled meeting within two weeks of each agreed date	No adjustment
		Non-attendance to Scheduled meeting	25% deduction of monthly management fees
Electronic recording of defects, repairs and routine works	Electronic recording	90% to 100%	No adjustment
		<90%	10% deduction of cost of works under the applicable CSR immediate update of the system to rectify difference.
Attendance to Inspections	Aerodrome Reporting Officer Inspections	ARO Inspections according to Project Specific Requirements	
		Attendance to Inspections	No adjustment
		Non-attendance to any Inspections	Contractual consequence
Work performance	Time for Attendance/ Completion (as per approved CSR)	≥90% to 100%	No adjustment
		≥80% to <90%	10% deduction of CSR's that contribute to non-compliance
		≥70% to <80%	25% deduction of CSR's that contribute to non-compliance
		<70%	50% deduction of CSR's that contribute to non-compliance

Table - Key Performance Indicators and Audit Categories Services Performance Plan – Part 2 of 2 parts			
Monthly Key Performance Indicator:	Audit Category:	Compliance	Price Adjustment withheld as a % of Scheduled Rate
Quality of Works	Vegetation Control around structures and furniture	Non-compliance of any Vegetation Control around structures and furniture on monthly performance	
		≥10% to < 20%	10% deduction of the monthly fee of non-conforming and immediate rectification
		≥20% to < 50%	25% deduction of the monthly fee of non-conforming and immediate rectification
		≥50%	75% deduction of the monthly fee of non-conforming and immediate rectification

Continual non-compliance with Key Performance Indicators will result in action being taken under the Conditions of Contract.

19.20 PROCEDURES, CALLS, AND PAYMENTS

19.20.1 General

This section specifies the requirements for attending the work and the procedures for reporting and payment of work carried out.

19.20.2 Abbreviations and Definitions

The following abbreviations and definitions are used in this specification section:

- SCHEDULED WORK – Work for which a specific rate item is provided in the Schedule of Rates.
- UNSCHEDULED WORK – Work for which no specific rate item is provided in the Schedule of Rates.
- CSR – Contractor Service Report.
- ITPC – Instruction to Period Contractor
- WO – Works Order.
- RCTI – Recipient Created Tax Invoice

19.20.3 Direction to work

A direction to work may be issued in the following forms:

- **Telephone call or email.**

A CSR will subsequently be issued by the Superintendent.

- **Instruction to Period Contractor. (ITPC)**

A CSR will subsequently be issued by the Superintendent.

- **Contractors Service Report (CSR)**

Issued in its own right or subsequent to a telephone call or email, an ITPC or an urgent call out.

- **Service Order.**

Issued in respect to a quotation for specific works not included in the Schedule of Rates.

– **Urgent call out work outside of normal working hours.**

Urgent call out work outside of normal working hours may be communicated to the Contractor by the Department's answering service Contractor or the Superintendent.

In the event of an urgent call out outside of normal working hours the Contractor shall on the first working day thereafter, complete a "Call Out Request Form" and send it to the Superintendent as a prerequisite to the issue of a CSR.

If the Superintendent considers any particular work requirement is urgent he shall so advise the Contractor and shall cause the CSR subsequently issued to be stamped "URGENT".

The Contractor shall visit the office of the Superintendent as required to collect any hard copy directions to work.

19.20.4 Advance Direction

Notwithstanding the provisions of the DIRECTION TO WORK clause the Contractor will receive an advance direction to carry out any required SCHEDULED WORK up to a maximum of the monthly pro rata frequency of the respective Schedule of Rate Items.

Any advance direction issued may be revoked at the sole discretion of the Superintendent.

19.20.5 Authority to Undertake Work

Where a situation arises and urgent work as identified by the ARO because of a safety concern or hazard, then the Contractor has the authority to undertake repairs to a maximum value of \$880.00 (GST inclusive). If the works exceeds the maximum value then the Contractor shall contact the Superintendent for approval to proceed.

The Contractor will not undertake any other work unless specifically directed to do so by the Superintendent.

19.20.6 ITPC - CSR

One copy of an ITPC or CSR will be issued to the Contractor. The document will describe in brief detail, the location and a brief description of the work required.

When the works required by the CSR have been completed the Contractor shall insert, in the appropriate place on the CSR, brief work descriptions, item numbers, quantities, rates, extensions, additions, the total value and any other information required by the Superintendent to approve payment.

The CSR shall have the completion date of the works entered thereon and be signed off by the Contractor.

19.20.7 Time Limit for Attendance

The works must be attended within the following time limits:

- To comply with the requirements for Aerodromes with or without Regular Public Transport limits.
- For urgent call outs within and outside of normal working hours the Contractor must be mobilised as required for emergency responses within 1 hours.
- Generally the work must be attended within 3 working days of notification for routine maintenance works.

19.20.8 Variation Approval

Any variation from the extent of work ordered must be approved by the Superintendent prior to the varied work being carried out.

Where an item of work is ordered pursuant to a Schedule of Rates item for Scheduled Work and the Contractor considers the item to be outside the scope of the Schedule of Rates item the Contractor shall obtain the approval of the Superintendent prior to carrying out the varied works.

The Contractor shall in the case of any authorised variation insert on the CSR the approving officer's name and the date of such approval.

19.20.9 REPAIR DATA MANAGEMENT SYSTEM (KONECT) – Witness Point

The ARO shall become familiar with the operation and use of the software and the Superintendent shall provide initial training in its use.

Personnel shall have the ability to operate electronic data collection devices to record repair data on the management system.

At least one person on work sites when the repair works are being undertaken or logged must be trained and have the ability to operate the KONECT system.

Software and license for the KONECT application for repairing and recording of defects and logging routine maintenance associated with the Period Contract will be supplied to the Contractor.

The software will have the ability to record the date, time, locality and the identity of the licensed person conducting the repairs. It is a requirement of this contract that the GPS tracking component of the software is turned on whilst undertaking works under this contract.

The Contractor shall supply electronic hardware with camera access capable of running the supplied KONECT software, (smart phone / tablets etc.) and ancillary equipment for use in this contract, and they will remain the property of the Contractor. The Contractor shall be responsible for all backup equipment, maintenance, replacement costs and internet and associated data costs. All data collected and recorded is the property of the Principal. The software is the property of the Principal and is licenced for use by the Contractor during the term of the contract.

When the devices are within the range of a mobile phone cell network, the software has the ability to upload data live to the servers, resulting in immediate backup of the data. If the devices are outside of a cell network, they will need to be operated offline and synchronised as soon as they are back within a network. During the period they are offline, it will be the Contractor's responsibility to manage any backup or loss of data from equipment or software failure

Witness Point - If the situation arises that the system software program is not operational during programmed works the Contractor must immediately notify the Superintendent of the failure.

Witness Point - The supplied spreadsheet shall be used as a manual alternative reporting format that shall provide all details that would normally be captured with the KONECT system. Provide copies of the spreadsheets with the CSR.

GPS co-ordinates and photos must also be added to the record and the Contractor must supply a suitable digital camera and GPS locating device. The Contractor must provide a reference from the photo to the locality for data management purposes.

Photographic Images to be supplied in .jpg format with geotag aligned to GDA 94 (GPS coordinates in the image metadata), size to be not greater than 0.6Mb per image.

19.21 MEASUREMENT AND PAYMENT

19.21.1 Payment Generally

Payment for Scheduled Work will be made at the tendered rate.

On completion of all work described on the CSR, endorse the CSR as required and return to the Superintendent no later than 14 days after completion of work.

When the Superintendent is satisfied the work has been completed in a satisfactory manner, and that the charges are in accordance with the Schedule of Rates, payment will be certified.

All orders for work not invoiced within 14 days of completion may be subject to valuation by the Superintendent and paid accordingly.

Fully detailed particulars, evidence of cost and acceptable reasons as to why the work was not invoiced within the 14 day period may be required as prerequisites to payment.

19.21.2 Rates Generally

The rates tendered are deemed to represent the full value of the work inclusive of plant, labour, messing, clearances, transportation, fuel, oil, maintenance, tools, material procurement and delivery, all incidentals to complete the work, attendance, supervision, and for overheads and profit.

Where a Schedule of Rates item for Scheduled Works is defined as "Labour Only" the rate tendered shall be inclusive of all of the above relating to the labour component.

19.21.3 Negotiated Rate

A Negotiated rate has been provided within the Schedule of Rates with a provisional amount.

This item is applicable where/when a type of works is described but does not appear in the Schedule of Rates or is not defined in the specification and is not included in the Schedule of Rates items. A rate shall be negotiated to cover the works required.

The item of works may then be included in the Schedule of Rates at the Superintendent's discretion.

19.21.4 Tax Invoices

A GST compliant tax invoice which includes the order number of the work must be attached to the CSR when forwarding to the Superintendent for payment unless the Contractor has entered an agreement with the Principal to receive Recipient Created Tax Invoices (RCTI).

Where the Contractor has a written agreement with the Principal to receive Recipient Created Tax Invoices the Department, after receiving a completed CSR, will create a tax invoice on the Contractors behalf and issue it in parallel with the contract payment.

The Contractor will still be responsible for collecting the GST and remitting it to the Tax Office.

19.22 INSPECTIONS

19.22.1 Aerodrome Reporting Officer Inspections

The object of undertaking the inspections is to identify hazards and defects that adversely affect safety, asset preservation, user comfort or aesthetics. Scheduled inspections shall be carried out at the frequencies specified and in accordance with the requirements in the PROJECT SPECIFIC REQUIREMENTS.

The ARO shall record the inspection on the system on the preloaded form and upload the completed form once the inspection is done.

Inspections will generally be carried from the vehicle, however it will be necessary to stop and measure, photograph or inspect on foot from time to time. Should it be necessary for the vehicle to stop, the vehicle shall be parked in a safe location in accordance with CASA regulations

19.22.2 Maintenance Inspections

As part of the infrastructure inspection the ARO must identify items that require maintenance to improve the infrastructure so it is fully functional and safe for the usage.

19.22.3 Hazardous or Potentially Hazardous Defects – Hold Point

Some defects may be hazardous or potentially hazardous and pose a safety risk to aerodrome users and all reasonable steps must be taken to rectify or manage the hazard. If it is not possible to rectify or remove the hazard immediately upon identification, all measures that are reasonably necessary to safeguard users and others must be undertaken until such time as repair or removal can be effected or the Principal directs otherwise.

In determining whether a defect is a hazard consider the:

- (a) Severity and consequence of the defect.
- (b) Extent and nature of the defect (combined effect of multiple occurrences of the defect within localised area).
- (c) Potential impact of the defect on the user (likelihood and consequence).
- (d) Location of the defect.

Regardless of any specific intervention standard or guideline nominated in this Specification, all actions necessary to maintain user safety must be carried out.

Hold Point - The ARO shall immediately implement measures to safe guard the users and notify the Superintendent of the issues affecting performance and/or public safety that require urgent intervention. In certain circumstances (high risk, short response times) the software program will indicate the need for the Contractor to report the defect urgently.

19.22.4 Defect Repair – Witness Point

The ARO shall use the KONECT system that displays the location, and the extent of works and to verify that the works have been undertaken as outlined in KONECT or the CSR.

The ARO will have access to the Maintenance Project which is specific to their period contract within the KONECT system.

Defects that have been logged into the KONECT system will be either allocated to the Contractor to repair, placed on hold for a particular reason, or deleted as not needing action.

Once the defect has been allocated to the Contractor it will become visible in the Maintenance Project that the Contractor will be using.

Note: The Contractor will also be able to see defects that have been placed on hold so that they are not repaired by mistake.

Witness Point - When the repair is done the ARO shall use the system to record when the repair was done and provide evidence in the form of photographs confirming the process/method of repair and the satisfactory completion of the works. This evidence may be used to allow the Project Officers to make payment.

The ARO will also have the ability to log new defects in the system. These defects may have been noticed in the close vicinity of the allocated defects. The Contractor is encouraged to repair them at the same time to offer more productive use of time and travel and provide a proactive response to defect management.

WITNESS POINT - EVIDENCE IN THE SAME FORMAT AS ALL OTHER DEFECTS WILL BE REQUIRED. THIS IS PARTICULARLY RELEVANT WHEN WORKS ORDERS ARE SUBMITTED TO UNDERTAKE REPAIRS BETWEEN SPECIFIC LOCATIONS, WHERE THE ARO WILL BE REQUIRED TO LOG AND MARK AS REPAIRED ANY DEFECTS THAT EXCEED THE DEPARTMENT'S INTERVENTION LEVEL AS PART OF THE REPAIR PROCESS.

19.23 MAINTENANCE WORKS – WITNESS POINT

Carry out the maintenance works. Include all works required to be undertaken to meet the specified performance criteria.

This includes inspection, monitoring and reporting on the condition of the aerodrome to ensure its continual compliance with the requirements of the MOS Part 139.

Maintain the aerodrome in a condition that complies with the requirements of CASA, and of this specification.

Witness Point - Where work is required to be carried out in easements or on land adjacent to the site for the purpose of connecting services or joining up of roads etc. obtain the appropriate licences, approvals, and/or permits for access to, and to undertake the works in, those particular areas. Provide copies to the Superintendent.

19.24 PROGRAMMING OF ROUTINE MAINTENANCE WORKS – WITNESS POINT

Program routine maintenance works throughout the year to prevent deterioration and therefore limit the number of treatments to that specified in the Schedule of Rates.

Notwithstanding this, ensure that the works are undertaken at a frequency adequate to maintain the aerodrome in a condition that complies with the requirements of the Civil Aviation regulations.

Witness Point - Within two weeks of the Contract being awarded provide a draft Service Program of the proposed inspections and staging of the routine scheduled maintenance work throughout the year. Submit a copy to the Superintendent for approval.

19.25 MATERIALS TO BE SUPPLIED BY THE PRINCIPAL

The following materials will be supplied free by the Principal to the Contractor for use only in execution of the Works.

The supply of replacement airstrip lighting (including parts), safety equipment, furniture and materials deemed necessary by the Superintendent will be provided by the Principal.

The Contractor must submit written requests for such materials as and when required. Before taking delivery of any material, the Contractor must check that it is in a satisfactory condition and in the quantity described. No claim will be admitted for replacement of material alleged to be found defective or deficient in quantity after delivery.

The Principal will not replace components damaged by any act of negligence, including negligent slashing, or the negligent spread of fire. Failure to keep lights and markers clear of combustible vegetation is considered to be negligent in the case of fire.

19.26 SECURITY CONTROLLED AERODROMES – HOLD POINT

Some workers at some aerodromes are required to hold a current valid Aviation Security Identification Card (ASIC). If the nominated aerodrome is security controlled, the nominated AROs must each have a current valid ASIC card for the duration of their Contract. Guidance on how to obtain one is given through the Office of Transport Security <https://www.homeaffairs.gov.au/about-us/our-portfolios/transport-security/identity/applicants-and-cardholders> .

Hold Point - Provide copies of the ASIC cards to the Superintendent.

19.27 UNFORSEEN MAINTENANCE

Work may be initiated by the Superintendent or by the Aerodrome Reporting Officer in accordance with the **Procedures Calls and Payments** clause in this work section, and/or PROCEDURES CALLS AND PAYMENTS section of the RFT/RFQ. The extent of these works, and the payment for the works, if not included in the Schedule of Rates, will be negotiated with the Superintendent as required.

Unforeseen maintenance works includes all works other than routine maintenance works required to the aerodrome to maintain it in a condition that complies with the CAR.

Contractor to advise Superintendent of any deficiencies.

19.28 SLASHING

Slash the grassed areas within the perimeter fence, including drains, and firebreaks outside the perimeter fence, to maintain grass and other vegetation below the following maximum heights;

- 15 mm on the runway, taxiways and apron
- 150 mm in all other areas within the aerodrome fence line
- 500mm around the approaches and side transitions including drains, and the outside perimeter of the fence line
- As part of the slashing operations remove any litter, termite nests/ant hills, rubbish, and debris from these areas.

19.29 VEGETATION AND WEED CONTROL

For weed control by the chemical spraying method refer to the **Aerodromes** sub-clause in the **Vegetation Control** clause in SLASHING AND WEED CONTROL.

The Contractor shall performance manage this item and is required to control or eradicate vegetation on the Airstrip and furniture by spraying herbicide and/or other chemicals.

The vegetation in treated areas must not exceed more than 3 plants per square metre and more than 100mm in height at any time. Any treated vegetation that died back in the sprayed area must be controlled to prevent damage to the infrastructure by fire and if nessesary must be removed by mechanical means.

The Superintendent or agent may evaluate the sites to determine compliance with Key Performance Indicators. Note: This KPI will apply from the commencement of the contract.

19.29.1 Aerodromes

In accordance with the relevant requirements, spray areas as shown in the **Table – Minimum areas to be sprayed for vegetation control at aerodromes**.

Table – Minimum areas to be sprayed for vegetation control at aerodromes	
Feature	Minimum dimensions of areas to be sprayed
Fencelines	1 m either side of fence around aerodrome.
Signal Area	Total signal area including 1 m outside of signal area perimeter.
Gable Markers	An area 8 m by 3 m at each gable marker, centred on, and oriented the same way as, the marker.
Cones, Runway Flares, and Lights	The area to 2 m out from each structure and device on all sides.
Buildings and Other Structures	An area 1 m wide around the entire perimeter of each building and structure.

19.29.2 Chemicals – Witness Point

Refer to **Vegetation Control** clauses in SLASHING AND WEED CONTROL section.

Witness Point - Submit to the Superintendent the list of herbicides and other chemicals intended for use during the contract, details of vegetation controlled by the herbicide, and duration of control per treatment.

Use chemicals that are approved by the Australian Pesticides and Veterinary Medicines Authority (APVMA). Find all information pertaining to the use requirements of chemicals on the manufacturers' labels on the Authority's web site <http://services.apvma.gov.au/>.

Use herbicides that are biodegradable and do not contain lead arsenates or other substance or salts dangerous to humans or animals.

Use spreading agents if and as recommended on the labels.

19.29.3 Personnel Handling Chemicals – Witness Point

Refer to **Vegetation Control** clauses in SLASHING AND WEED CONTROL.

Witness Point - Personnel carrying out spraying operations shall have undertaken and passed a National Farm Chemical User Training Program. Provide a list of the names of personnel who will be using chemicals in spraying operations. Provide documentary evidence that those people have successfully completed the required training.

Do not allow spray drift. Operators shall be competent in their understanding of how to prevent spray drift.

Wear as a minimum protective clothing in accordance with the chemical manufacturer's recommendations and/or directions as written on the labels which appear on the APVMA web site.

19.30 CUTTING OF RE-GROWTH

Cut the re-growth on the approaches and side transitions to maintain the longitudinal and traverse clearway and slope requirements, as detailed in the CASA Guidelines.

Remove the cut re-growth from the site to an approved legal disposal site.

19.31 DRAGGING OF AERODROME

Drag the aerodrome with a sufficiently heavy metal beam to fill minor depressions, cracks and wheel ruts and to spread any build up of loose material.

Break up and dispose of ant hills and backfill, if necessary with suitable material. Compact backfilled areas where ant hills were removed.

Maintain the surfaces to limit cracks to the following dimensions;

Runways, taxiways and aprons; 40 mm.

Runway strips adjacent to the runway; 70 mm

19.32 ROLLING OF RUNWAYS

UNSEALED RUNWAYS

Roll gravel runways and taxiways when there is moisture in the pavement, but it is not saturated, to incorporate loose material and to compact the surface.

Roll with a rubber multi tyred roller with a minimum mass of 15 tonnes and a minimum of 3 passes at approximately 10 km/h.

SEALED RUNWAYS

Roll bitumen sealed runways and taxiways to invigorate the bitumen and rebind loose aggregate.

Carry out the rolling work during dry weather and at the hottest part of the day.

Roll with a rubber multi tyred roller with a minimum mass of 15 tonnes and a minimum of 3 passes at approximately 10 km/h.

19.33 MAINTENANCE GRADE – RUNWAY

Grade the full width of the runway surface to remove corrugations and fill in ruts, holes and depressions.

Win and recover material from the edge of the runway.

Spread the trimmed and windrow material evenly across the full width of the runway to fill depressions and to obtain the required cross section.

19.34 GRAVEL SHEETING

Where gravel sheeting is required refer to the Gravel Sheeting clauses of MAINTENANCE GRADING AND GRAVEL SHEETING.

19.35 FENCE AND GATE MAINTENANCE

Maintain aerodrome fences and gates to ensure the fence provides a continuous and taut barrier that prohibits the entry of livestock and similarly sized feral animals to the same level as when originally constructed.

Maintenance is inclusive of all plant, tools, and minor items and materials, to reinstate posts, repair, reattach, and restrain, fences, and gates.

When replacing fencing components conform to the standards of materials and workmanship on the appropriate standard fencing drawings.

19.36 AERODROME FURNITURE

19.36.1 Wind Indicator (Windsock)

Repair or replace the wind indicator when it is not working effectively or when it has reduced visibility such that it is not clearly visible.

Maintain the ground areas around wind indicators and at signal areas in a blackened state to provide sufficient contrast so that the wind indicators and signals are visible to pilots.

Maintain white markers to clearly define the boundaries of these areas.

19.36.2 Markers And Cones

Repair or replace the markers and/or cones when they are not working effectively or when they have defective visibility such that they are not clearly visible.

Eradicate grass around markers and cones such that no grass or vegetation reduces the visibility of the complete markers and/or cones.

19.36.3 Safety Equipment

Maintain flares in working order to the number required by CASA.

Ensure that the following safety equipment is available, is stored safely and is repaired, painted or replaced as necessary;

- un-serviceability cross
- orange safety cones
- threshold markers
- red and white un-serviceability cones.

19.36.4 Aerodrome Lighting

Inspect and maintain the aerodrome lighting, including runway lighting, including the supply and installation of batteries and globes as required.

19.36.5 Replacement Furniture

The supply of replacement aerodrome lighting, including parts, safety equipment, and furniture as necessary will be provided by the Principal.

19.36.6 Aerodrome Products

19.36.6.1 General

Comply with Civil Aviation Safety Authority (CASA) legislation and regulations unless otherwise specified.

Items required under this section will include:

- Gable Boundary Markers
- Cone Markers
- Unserviceability Marker Cones
- Wind indicators
- Threshold markers/lights with battery operated lights
- Battery Powered Solar Charged Photo Cell (LED) Lights

Colours and sizes will be as ordered.

19.36.6.2 Gable Boundary Markers

Manufactured of fibreglass, with provision for securing to the ground with steel pegs.

Size: Length 3000mm, Width 1000mm, Height 500mm.

Colour: White.

19.36.6.3 Cone Markers

Manufactured either of rubber or lightweight frangible materials such as fibreglass, with provision for securing to the ground with steel pegs.

Size: Either:

- Base diameter 750mm, Height 500mm, or
- Base diameter 500mm, Height 260mm.

Colour: White or yellow, as ordered:

- White for 750x500, or
- White or yellow for 500x260.

19.36.6.4 Unserviceability Marker Cones

Manufactured either of rubber or lightweight frangible materials such as fibreglass, with provision for securing to the ground with steel pegs.

Size: Base diameter 750mm, Height 500mm.

Colour: White, with a midway horizontal red band 230mm high.

19.36.6.5 Wind Indicators

Manufactured using unlaminated poly fabric complete with a 19mm rod support around the 900mm opening together with eyelets for attachment.

Size: Length 3650mm, Diameter: 900mm tapering evenly to 230mm.

19.36.6.6 Threshold Markers/Lights

Manufactured using high-impact plastic.

- Battery Powered Solar Charged Photo Cell (LED) Lights

Lens Colour: Either red blue green or half and half, as ordered.

Battery Powered Solar Charged Photo Cell Lights must meet the requirements of the CASA.

19.37 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

20 BUS STOP MAINTENANCE

20.1 GENERAL

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

20.2 CROSS REFERENCES

MISCELLANEOUS PROVISIONS for **Disposal of Waste**

MISCELLANEOUS PROVISIONS for **Work Health and Safety**

MISCELLANEOUS PROVISIONS for **Time Allowed for Assessment of Submitted Documents**

PROVISION FOR TRAFFIC

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES

20.3 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

20.3.1 Australian Standards

AS 1348 Road and traffic engineering - Glossary of terms

AS 1742(set) Manual of uniform traffic control devices

AS 2187.1 Explosives - Storage, transport and use - Storage

AS 2187.2 Explosives - Storage, transport and use - Use of explosives

AS/NZS 2311

20.3.1.1 Standards in Conflict

Where conflict arises between a referenced standard and particular clauses of this specification the specification prevails.

20.3.1.2 Overseas Standards

Where no Australian Standard exists standards published by the British Standards Institute (BSI) or the American Society for Testing Materials are referenced.

20.3.1.3 Currency of Standards

Use Standards, and their amendments, current 3 months before the date for the close of tenders except where different editions and/or amendments are required by statutory authorities, including, but not limited to, NATA and the National Construction Code including the Building Code of Australia.

20.3.2 Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

20.3.3 DIPL Publications

NTCP NT Codes of Practice (in NTMTM)

NTMTM NT Materials Testing Manual

NTTM NT Test Methods (in NTMTM)

20.3.4 Legislation

Aboriginal Land Rights (NT) Act 1976 (Cth)

Dangerous Goods Act 1998 and Regulations 1985

Energy Pipelines Act 1991 (NT Gas)

Mineral Titles Act 2010

Mining Management Act 2001

Workplace Health and Safety (National Uniform Legislation) Act 2011 and Regulations 2011

Water Act 1992

20.3.5 Other Publications

ACMA Australian Communications Media Authority - any Standards, Acts, and controls specifically required. Refer to ACMA directly.

Railways of Australia (ROA) Code - Installation of Other Parties Services and Pipelines Within Railway Boundaries

20.3.6 Site Rules - NT Schools

The Site Rules for Contractors Entering School Premises may apply to some of the Works.

The Contractor and all persons required to enter a school site in connection with the Works must comply with the NT Schools Site Rules.

All persons required to enter the site in connection with the Works must hold a valid current Working with Children Clearance Notice (Ochre Card) issued by Safe NT. The Ochre Cards must be shown to the Superintendent or a nominated representative at the Site Induction. A copy of each Ochre Card must be provided to the Superintendent.

The Sites Rules are administered by the relevant School Principal, or their appointed representative. Prior to entering the site and/or commencing work the Contractor must complete the undertaking to comply page, sign it, and return it to the relevant School Principal.

20.4 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

KPIs: Key Performance Indicators. Measurable values that demonstrate how effectively the Contractor is achieving contract objectives.

20.5 DESCRIPTION OF THE WORK

A general outline of the work to be carried out under this contract is for the inspection, reporting, maintenance and monitoring of Northern Territory Government Bus Stops and Shelters, to maintain facilities to a high standard for the users of public transport.

Each week the Contractor must inspect each bus stop and bus shelter. Each month the Contractor must inspect each yellow pole bus stop and each blue pole bus stop.

The use of electronic data collection and defect recording will be an essential part of the contract.

20.6 SITE OF WORKS

The sites of the Bus Stop maintenance works are within the urban arterial and local rural road network areas as listed in the RFT/RFQ.

Where work is required to be carried out in easements or on land adjacent to the site for the purpose of connecting services or joining up of roads etc. Ensure that the appropriate licences, permits, and approvals are obtained for work in those particular areas.

Provide copies of these licences, permits, and approvals to the Superintendent.

20.7 COMMENCING CONTRACT

The contract shall commence from the date of notification acceptance. The successful tenderer shall commence the physical works four (4) weeks from award in order to familiarise themselves of the locations, provide all plant and equipment.

The Contractor and Superintendent shall undertake a complete audit of the assets as listed in the RFT/RFQ.

20.8 QUANTITY OF WORKS

Routine works may increase or decrease dependent on the number of assets being maintained but are not expected to change substantially over the term of the contract.

Other authorized works will be carried out as required to maintain the level of service and safety. These items may change from month to month and are often dependent on such things as vandalism and littering which are outside of normal control measures. No guarantees can be given of the quantities of work.

The Superintendent reserves the right to append the scope of services provided in the light of future developments and changing technological and/or other service enhancements.

20.9 DETERMINATION OF WORKS

The use of electronic data collection and defect recording will be an essential part of the contract.

The Contractor shall be required to use an electronic recording system to undertake the Bus Stop condition inspections, recording and reporting of all defects using electronic means and the software (KONECT) system, to allow such defects to be repaired in accordance with pre-determined Intervention parameters.

The Bus Stop Maintenance Period Contractor shall be required to use the KONECT system in association with the inspection and authorised repair works as instructed in the Principals Contractor Service Requests (CSR).

The opportunity will exist for the Contractor to also log and repair works that exceed intervention levels in the vicinity of the ordered works at the time of repairs.

20.10 SCHEDULE OF DOCUMENTS

The following documents shall form part of the Contract:

TITLE
Bus Stop Bins Register
Bus Stop Asset Register
Bus Stop Locations Mapping
Bus Stops Types
Project Control Plan Framework

20.11 AVAILABILITY OF CONTRACTOR

The Contractor shall provide twenty-four (24) hours a day; seven (7) days a week telephone contact and availability of labour to deploy to the Works should the Superintendent so direct. The Principal shall have first call on the services of the Contractor.

20.12 CONTRACTOR'S ESTABLISHMENT

The Contractor shall provide and maintain an established office workshop facility. The facility shall include the following:

- (a) An approved workshop with equipment and capabilities sufficient to carry out work as requested under the Contract.
- (b) An approved office space with sufficient personnel necessary to take, record or pass on any emergency message that may be received, provide day to day information with regard to prices availability and delivery. Be sufficiently qualified to process and forward invoices for work carried out.

20.13 CONTRACTOR'S EQUIPMENT AND MATERIALS

The Contractor shall provide all general and specialised equipment, tools and materials to carry out and test the Work. It shall be the responsibility of the Contractor to be fully equipped on each attendance call.

20.14 COST LIMITS FOR REPAIR WORK

Where it becomes evident during the course of an item of work that the cost will exceed the amount specified in the RFT/RFQ (labour and materials), the Contractor shall not proceed without the approval of the Superintendent. Refer to **Authority to Undertake Work** sub-clause in **Procedures Calls And Payments** clause in this worksection.

20.15 LIGHT AND POWER

Where a suitable electric light and power supply is available, the Contractor shall be permitted to use this supply subject to any restrictions imposed by the officer-in-charge or occupier of the site. Where the work is carried out in an occupied residence, the Contractor shall reach agreement, in relation to reimbursement of costs and conditions under which the power may be used, with the tenant of the residence prior to connecting any electrical appliance to the residence's power supply. The Contractor shall promptly pay the tenant all costs agreed relating to the consumption of electric power by the Contractor and sub-Contractors.

Where no suitable supply is available, the Contractor shall arrange for the supply of all electric light and power required and pay all charges and costs incurred.

20.16 WATER

Where a suitable water supply is available, the Contractor shall be permitted to use this supply subject to any restrictions imposed by the officer-in-charge or occupier of the site.

Where no suitable supply is available, the Contractor shall arrange for the provision of water required and pay all charges and costs incurred.

20.17 SANITARY ACCOMMODATION

The Contractor will be permitted to use the existing sanitary accommodation provided that the facilities are properly used in accordance with the requirements of the officer-in-charge or occupier of the site.

Where no suitable supply is available, the Contractor shall arrange for the provision of sanitary accommodation and pay all charges and costs incurred.

20.18 PROTECTION OF UNDERGROUND SERVICES

Determine the actual locations of any underground services of all types before undertaking any excavation or directional boring work.

Any underground services damaged, and any consequential damage caused, must be rectified at no cost to the Principal.

20.18.1 Dial Before You Dig

Dial Before You Dig (DBYD) is a community service that provides information on underground pipes and cables from all underground service providers in the area. There is no cost to the user for this service; however, some asset owners reserve the right to make a modest charge for some plans.

Contact DBYD at least 2 working days before you plan to excavate and obtain the plans of the underground services before commencing excavation.

Provide a written notice to the Superintendent stating that the plans have been received and include the DBYD sequence number.

DBYD can be contacted at the following numbers:

Telephone: 1100 8am to 5pm weekdays, excluding public holidays

Internet: www.1100.com.au

20.18.2 Protection Of Telecommunication Underground Cables

In addition to the requirements of the clause titled "Dial Before You Dig", and prior to commencing any excavation, boring of holes, blasting, rock breaking, soil compaction or similar activity in the vicinity of telecommunication underground cables, whether fibre optic or copper, the Contractor shall obtain the location of the cables from the accredited plant locator, and pay all fees.

The Contractor shall follow all directions and instructions issued by the owner of such telecommunication underground cables in relation to work in the vicinity of such cables.

20.19 CO-ORDINATION OF WORK

The Contractor shall confer with any sub-Contractors and persons engaged on separate orders in connection with the Works and with the Superintendent for the purpose of co-ordination and execution for the various phases of the Works. The Contractor shall be responsible for arranging that each shall attend upon and assist the other trades.

20.20 EXISTING STRUCTURES AND SERVICES

Any connection, disconnection or interference with existing services shall be carried out under the supervision of the Superintendent to whom reasonable notice shall be given by the Contractor of his intention.

20.21 WORK IN EASEMENTS

During the construction for work in an easement, drainage reserve or the like, the Contractor shall confine his operations to within the boundaries of such easement or reserve. Any concessions the Contractor may desire outside the above-mentioned boundaries to obtain access to the easement or for any other purpose shall be obtained by him at his own expense from the property owner or other party concerned. Any agreement reached shall be confirmed in writing and copies forwarded to the Superintendent and the landowner concerned.

On completion of the Contract the easement or reserve and everything appertaining thereto shall be restored as near as possible to the condition prevailing immediately prior to commencement of the Works and to the satisfaction of the owner.

Before final payment is made, the Contractor shall, if so requested, produce a written certificate from the landowner stating that all claims for compensation and damages have been paid in full.

20.22 ACCESS TO SITE

Prior to entering the site of the Works, the Contractor shall contact the officer-in-charge of the site to explain the nature of the work to be carried out and for permission to enter to carry out the Works.

In the event of either, being unable to contact the officer-in-charge, or being refused permission to enter the premises the Contractor shall notify the Superintendent.

Work shall not proceed in such areas until further advised by the Superintendent.

20.23 RESTRICTED WORKING HOURS

The work to be performed under the Contract shall be subject to execution within certain restricted working hours and the Contractor shall observe the following requirements:

- Establish time frames that minimise disruption of the buses access to bus stops as and when works are to be undertaken.
- Program work so that traffic flows are not impeded during the following hours, from Monday to Friday, excluding Public Holidays:

Table – Restricted Working Hours	
Start of restriction period	End of restriction period
0700 hours	0900 hours.
1530 hours	1730 hours.

See also clause titled "Working Hours" in the Conditions of Contract.

20.24 PROJECT CONTROL PLAN

Provide a project specific Project Control Plan and submit two copies to the Superintendent within 14 days of the Contract being awarded. A framework Project Control Plan document in Microsoft Word format is provided as an attachment to the specification. This document should be prepared by the Contractor and not a third party.

The Project Control Plan is to include a description of the organisational structure for the management of the project and the procedures to be employed in complying with this section of the specification.

20.24.1 Document Control

Provide details on the procedures for the control of all documents and data relating to the contract and in particular the changes to documents.

20.24.2 Services Performance Plan

Provide a Services Performance Plan as part of the Project Control Plan and submit two copies to the Superintendent within 14 days of the Contract being awarded.

20.24.2.1 Services Performance Plan

A "Services Performance Plan" and associated "Procedures" shall be used in the execution of the Services under the Contract. The information should be brief, concise, and written in a format that can be understood by all parties.

The requirement comprises:

- (a) The Contractor will establish, document, implement and maintain a Services Performance Plan and associated Procedures throughout the course of the Contract to ensure that the Services comply with the requirements of the specification.
- (b) The Superintendent shall within a reasonable time from receipt either approve the Services Performance Plan and Procedures, or reject it, giving reasons for the rejections.
- (c) The Contractor shall rectify the deficiencies and resubmit the Services Performance Plan and Procedures for approval.

20.24.2.2 The Plan

The Plan to include:

- (a) *Overview*: An overview of how the Services under the contract will be performed and managed.
- (b) *Organisation*: Details of the Contractors management organisation, delegations and contact numbers. Details are to include business hours contacts and after-hours contacts.
- (c) *Representative*: Nomination of a representative responsible for the implementation and maintenance of the Performance Plan and Procedures.
- (d) *Plant and Equipment*: A list of Plant and Equipment to be utilised under the Contract.
- (e) *Updating*: Provision for the Superintendent to be notified of any updates and revisions.
- (f) Quality and Resource Management
- (g) Work Health and Safety, including staff training;
- (h) Traffic Management
- (i) Environmental Management, and Waste Disposal
- (j) Emergency, Complaints and Claims management
- (k) Data Management and operation of the Principal agreed inspection and maintenance program
- (l) Program and scheduling of routine services,
- (m) Program and scheduling of Superintendent authorised repairs and maintenance services
- (n) Provision for weekly and monthly reports of the inspections and summarising, completed routine works completed extra works, works in progress, works deferred, responses to emergencies
- (o) The Principal and Contractor shall develop and maintain a format suitable to both parties for the provision of weekly and monthly maintenance reports on award of the Tender, and continually refine the services over the course of the Contract to maintain appropriate performance standards

20.24.2.3 The Procedures

The Procedures will include:

- (a) *Urgent Call Out activities*: Procedures for the performance of *urgent call out* activities
- (b) *Complaints and Claims*: Procedures for the performance of Complaints and Claims activities

- (c) *Inspection and Corrective procedures*: A description of all inspection activities designed to ensure compliance with the specification, for identifying and correcting defective work, and for solving recurring problems.
- (d) *Litter Collection*: Procedures for the performance of all litter collection and garbage removal activities.
- (e) *Offensive and Hazardous Waste*: Procedures for the performance of all offensive and hazardous waste removal activities.
- (f) *Cleaning activities*: Procedures for the performance of all cleaning activities.
- (g) *Structure and Furniture maintenance*: Procedures for the performance of all structure and furniture maintenance activities.
- (h) *Horticulture activities*: Procedures for the performance of Horticulture activities
- (i) *Task allocation*: Procedures for the allocation of specific tasks to individuals and the issue of written task schedules.
- (j) *Training*: Procedures and methods for training staff to perform the various activities.

Screening and Employee Identification: Procedures for the screening of employees and ensuring site personnel are clearly identifiable as representatives of the Contractor while performing the Services. Procedures to record the issue of uniforms and ID badges.

20.24.3 Traceability

Provide details of the procedures for identifying work and materials as numbered lots. Identify samples and test results with the precise location in the works to which they relate.

20.24.4 Checklists

A Services Control Plan Check List proforma, based on the Contract technical requirements in the specification, will be used as a means of verifying that work has been completed and complies with the Contract documents.

Complete and maintain records of these Check Lists for all construction activities. Use separate Check Lists for each lot or part of the works.

Provide copies of the completed Check Lists to the Superintendent on request.

20.24.5 Control of Defects

Provide details of procedures employed to ensure that defective material or work is not used on the project.

Develop a project specific proforma for use in recording details of defects and the remedial action taken. Provide a copy of this proforma as an Appendix to the project specific Project Control Plan.

20.24.6 Preventative Action

Describe in the project specific Project Control Plan the procedures to be put into place to prevent any ongoing defects.

20.24.7 Records

Provide details of procedures describing how Project Control records are controlled, maintained and stored.

Make all Project Control records available to the Superintendent at all times during working hours.

Provide details of procedures that allows records to be kept efficiently and safely so that retrieval of records can be made at any time.

Ensure that all files are identified with the project number and that items within each file are recorded.

Provide security for all records in the files. Ensure that electronic records are protected with anti-virus programs and establish, where necessary, a structured filing system similar to that for the hard copy records.

If e-mails contain administrative information, print hard copies of these and place on the appropriate file. Ensure that the electronic system is backed up regularly.

Maintain an efficient system for archived records. Ensure that records are to be stored safely for the mandatory period of 7 years.

20.24.8 Audits

Audits of any aspect of the project may be carried out by the Superintendent, the Superintendent's Representative or by another person nominated by the Superintendent. Audits may be conducted with or without notice.

There will be five types of Audits applicable to this contract.

6. Initial Audit
7. Project Control System Audit;
8. Quality Audits of Weekly Inspections and Defect Reports,
9. Quality Audits of Works Undertaken,
10. Work Site Traffic Management audits.

20.24.8.1 Initial Audit

The Contractor and Superintendent shall undertake a complete audit of the assets as listed in the RFT/RFQ in order to familiarise themselves of the locations of the bus stops.

The Contractor has four (4) weeks from the award of the contract to prepare preliminary documentation for approvals and undertake the initial audit of the Public Bus Asset Register and Mapping locations in conjunction with the Superintendent.

The audit shall be completed within the 4 weeks and prior to any physical works being commenced.

The purpose of the audit will be to:

- Confirm Asset Register/Location.
- Confirm Bin Register Numbers
- Establish the condition of the assets at commencement of the contract
- Develop initial weekly Maintenance Program

20.24.8.2 Project Control System Audit

Conduct regular internal audits, at least once every month, to verify compliance with the Project Control Plan and take action to rectify items that do not comply. The Superintendent will also monitor and audit the Contractor's Project Control system.

Audits to measure compliance with the requirements of the Contract and Services Performance Plan are to be undertaken monthly at the Monthly Progress and Reporting Meetings.

The monthly audit of Key Performance Indicators (KPI's) will be undertaken to measure compliance with contract requirements. Audits will take the form of a report giving details and locations of the non-compliances, together with supporting evidence.

The audits of data are to identify the accuracy of information supplied by the Contractor.

The audit of the KPI's will be measured against a total of 3 audit categories on a monthly basis. Deductions to scheduled rates claim for payments will be made based on the specified compliance of the key performance indicators. Refer to **Table - Key Performance Indicators and Audit Categories Services Performance Plan**.

Table - Key Performance Indicators and Audit Categories Services Performance Plan			
Monthly Key Performance Indicator:	Audit Category:	Compliance	Price Adjustment
Inspections carried out at the specified frequencies and in accordance with the adopted and approved Inspection Program.	Bus Stops and Poles Inspections	>90% to 100%	No adjustment
		>80% to <90%	10% deduction of inspection monthly fee
		>70% to <80%	25% deduction of inspection monthly fee
		<70%	Nil payment of inspection monthly fee
Meeting the required frequency of Attendance Meeting attendance, report provision, invoicing and KPI reporting	Project Control, Management Services, Report Submission	Attendance to Monthly meeting within the first two weeks of each months	No adjustment
		Non-attendance to Monthly meeting	25% deduction of Contract Services monthly fee
		Report not submitted	25% deduction of Contract Services monthly fee
Schedule of Works Undertaken	Repaired Work	<2 non-conformance notices	No adjustment
		>2 to 5 non-conformance notices	25% deduction plus rectification at Contractors cost for items in dispute
		>5 non-conformance notices	Nil payment plus rectification at Contractors cost for items in dispute

20.24.8.3 Quality Audits of Weekly Inspection and Defect Collection

The Superintendent will conduct random audits to verify that the Inspection data collection is accurate.

The Contractor is welcome to accompany the auditing officer, during an audit process, at any time and will be advised of all inconsistencies identified. The cost of the Contractor attending the audit will be borne by the Contractor.

The audits of data are to identify the accuracy of information supplied by the Contractor. Records will be considered accurate if over 90% of the recorded entries in a 20 record sample of the bus stop asset audited are consistent with the auditor’s measures.

If the data recorded falls below the 90% accuracy, the Contractor must address the issues as part of the non-conformance procedures. If the issue occurs in three consecutive audits or in five audits across the period of the contract, the Contractor must address the issue as a matter of urgency by retraining or replacing staff.

20.24.8.4 Quality Audits of Works Undertaken

The Superintendent will conduct random audits to verify that when defects have been repaired the standard of works undertaken is in accordance with the specification requirements and of acceptable Industry Standards.

Continual non-compliance with Key Performance Indicators will result in action being taken under the Conditions of Contract.

20.24.8.5 Audits of Work Site Traffic Management

The Superintendent will monitor and audit the Contractors work site traffic management in accordance with Clause **Audits Of Work Site Traffic Management** in PROVISION FOR TRAFFIC.

Audits to measure compliance with the requirements of the Contractors work site traffic management are to be undertaken randomly at the Superintendents discretion for the duration of the contract.

Audits will take the form of a report giving details and locations of the non-compliances, together with supporting evidence.

The audit of the KPI’s will be measured against one audit category. Deductions to scheduled rates claim for payments will be made based on the specified compliance of the key performance indicators. Refer to **Table - Key Performance Indicators and Audit Categories Work Site Traffic Management System**.

Audits to measure compliance with the requirements of the Contract are to be undertaken monthly at the Monthly Progress and Reporting Meetings

Table - Key Performance Indicators and Audit Categories Work Site Traffic Management system			
Monthly KPI	Audit Category:	Non-Compliances During the Month (ITCs issued)	Monthly Deduction Price Adjustment withheld as a % of Scheduled Rate
Random Audits	Work Site Traffic Management	< 2	No adjustment
		>2 to <4	30% deduction
		>4 to <6	50% deduction
		> 6	100% deduction

Continual non-compliance with Key Performance Indicators will result in action being taken under the Conditions of Contract.

20.25 TRAFFIC MANAGEMENT PLAN

Provide a Traffic Management Plan and Generic Traffic Control Diagrams of a complex and noncomplex nature per each activity as required for all works under this contract. Where a traffic management situation is not covered by the generic Traffic Control Diagrams, submit the specific Traffic Control Diagrams to the Superintendent 4 working days prior to undertaking the required works. Submitted specific Traffic Control Diagrams shall in turn then become generic Traffic Control Diagrams.

Produce the plan by electronic means and submit electronically to the Superintendent prior to commencing works for the contract (It is anticipated that only one Traffic Management Plan will be required for the contract period)

The submission of the generic traffic control diagrams along with temporary speed limit authorisation requests nominating locations and timing of when the works are to be undertaken is sufficient notice for compliance and coordination with the Departmental requirements for Works within Road Reserves and *Control of Roads Act 1953*.

20.26 BUS STOP MAINTENANCE

20.26.1 The Conditions of Tender and Conditions of Contract

The Conditions of Tender and the Conditions of Contract contain additional requirements which apply to works carried out under any contract awarded by NT Government, including any works carried out using this specification.

20.26.2 General

The Contractor shall develop a proactive approach to maintaining the bus stop infrastructure.

In order to assist with the achievement of this goal, it is expected that the Contract shall include but shall not be limited to the following

- Comply with the various Acts, Regulations and other legislative and advisory requirements pertaining to the Contract work activities.
- Conduct patrols and inspections to identify maintenance requirements.
- Conduct audits of the bus stop asset list to ensure all stops are visited and current list updated.
- Provide the Principal/Superintendent with weekly work schedules.
- Provide the Principal/Superintendent with specific reports and audits.
- Program maintenance activities to undertake works.
- Collection, removal and disposal of litter, garbage, dead animals, and any dumped items.
- Removal of offensive and hazardous materials.
- Pest and weed control.
- Cleaning of Bus Stops and Shelters, including paving and bins for scheduled and urgent requests.
- Structure and Furniture maintenance including repairs and painting.
- Minimise exposure to public complaints.
- Conduct various activities at night to minimize disruption to the public.
- Provide and maintain a safe worksite, and conduct work activities to avoid injury to people, and to avoid creating hazards, and to avoid damage to property.
- Liaise with adjoining property owners prior to undertaking works which may become contentious.
- Maintaining grass height within the specified service levels.
- Removal and disposal of debris due to storm and natural disaster events.
- Provide and maintain effect traffic management.

This contract does not include works on Solar or Mains electrical and lighting systems at bus stop infrastructure.

20.26.3 Management and Service

The following shall form part of the Management and Service and implementation and maintenance of the Service Performance Plan provisions:

- Maintaining Project Control Plan.
- Implement and maintain the Services Performance Plan.
- Implement and maintain the use and operation of all the electronic inspection recording, data collection and management associated with the Contract.
- Maintain the Principal's/Superintendent's contract specific Bus Stop Asset Register.
- Developing and maintaining the weekly, general inspections programs and monthly reporting of the nominated Bus Stop Assets including and costing recommended general maintenance works.
- Processing Daily Log Books and recording of defects and completed works in the electronic defect system.
- General and emergency liaison with the Superintendent.
- Maintain a complaint Register detailing dates, complainant, actions and resolutions.
- Establish, and operate communications system.
- Attend meetings associated with administration of the Contract as requested by the Principal.
 - Monthly attendance at Contractor Performance Scorecard Meetings.
 - Monthly contract and performance KPI and claim for payments review meetings.
 - Monthly Inspection Program review.
- Any other ancillary items and provision in servicing the contract.

20.26.4 Conduct of Contractor's Employees and Sub-Contractors

The Contractor shall employ, and ensure that his sub-Contractors employed in connection with the Services, are only such persons as are of good character, careful, and suitably qualified and skilled and experienced in their respective trades and callings. The Contractor shall be responsible for the good and proper conduct of the persons engaged by him in the performance of the Services.

20.26.4.1 Identification

The Contractor shall ensure that all plant and persons engaged in the provision of the Services are clearly identified as a representative of the Contractor when performing the works. Person's identification shall be demonstrated by the wearing of a company uniform and personal protective equipment and or/an identification badge. If specifically requested by the Superintendent a combination of both may be required. Identification badges shall have an expiry date of not more than twelve (12) months from the date of issue, show the Company name and the employee's name and include a photograph of the employee

20.26.5 Servicing

Planning for any services at any site to be undertaken during low intensity use of public transport to minimise risk to the public and limit nuisances caused by the work.

The Contractor will maintain a communication notification system between the Contractor and the Superintendent, and between the Contractor and the Bus Companies, to establish time frames that minimise disruption of the buses' access to bus stops as and when works are to be undertaken.

The Contractor to be fully operational before commencement of the Services including, transportation and establishment on sites, and be able to fulfil all the requirements to complete the work. The Contractor is responsible for removal and transportation from site of all temporary and construction facilities and equipment at the completion of the works, and all indirect costs associated with the contract.

20.26.6 Emergency Complaints and Claims Service

The Contractor must implement and maintain a communication notification system for emergency communications, complaints, and claims management. Emergency contact phone numbers must be answered in-person (no recordings) twenty-four hours a day and seven days a week.

The Contractor must visit the site and determine the exact nature of a requirement or assessment.

The Contractor shall substantiate and report the most cost effective method(s), and the schedule item(s) to be applied to rectify the problem, subject to the cost limits threshold value as specified in the RFT/RFQ. Dangerous hazards may require immediate attention.

20.26.7 Inspections, Programs and Reports

During the term of the Period Contract the Contractor shall provide/undertake the following inspections, programs and reports:

1. Weekly Inspection Programming
2. Inspection of Bus stops
3. Maintenance Programming
4. Monthly meeting attendance
5. Bus Stop Asset Register Report/Updates

The contract specific Bus Stop Asset Register shall form the basis of the inspection programs and reports once the initial audit has been undertaken with the Superintendent and variations to the register are confirmed.

The Inspection Programs and report for each inspection shall detail date and time of the inspection and if no defects are recorded the report shall indicate Nil defects.

20.26.7.1 Maintenance Program

The maintenance program shall be developed by the Contractor, and submitted on a weekly basis to the Superintendent.

Timeframes for actions are as follows:

Table - Timeframes for actions			
Activity	Responsibility:	Commencement	Completion
Inspection of Bus Stops – defects logged electronically	Contractor	Monday. - am	Wednesday – 1600hrs
Works Approved – list provided to Contractor	Superintendent	Thursday - am	Thursday – 1600 hrs
Maintenance Program – developed and submitted	Contractor	Friday - am	Friday – 1600hrs
Maintenance Program Approval – reviewed and works allocated in software and CSR issued	Superintendent	Monday. - am	Monday. – 1600 hrs
Works Commence	Contractor	Tuesday - am	Next Monday or as designated in approved program

The approved works list provided by the Superintendent to the Contractor for development of the maintenance program will be in a spreadsheet format extracted from the electronic defect collection system. It may include other works not logged by the Contractor but added as the Superintendent requires them to be undertaken. The list provided will include estimated costs based on quantities logged where rates under the contract are applicable. Works that do not have associated costs will require the Contractor to provide a rate to undertake the works for negotiation with the Superintendent.

The Contractor shall develop a maintenance program from the approved works list and populate the spreadsheet with proposed maintenance dates.

Works previously approved and issued but not completed must also be listed on a separate spreadsheet and provided weekly to the Superintendent. Works not completed by the agreed planned date may result in the Superintendent procuring the works by other means.

Once the Contractor has submitted the maintenance program and the spreadsheet, and the Superintendent has agreed with or negotiated planned dates and costs, a CSR for the work will be issued, and the works will be allocated for repair using the electronic software system. The Contractor can then proceed to undertake the work.

Each weekly maintenance program shall be numbered consecutively starting from number 1 as the first program.

20.26.7.2 Weekly Inspection Programs – Hold Point

Hold Point - Do not commence works until an Inspection Program is received and approved.

The Inspection Programs will form a critical element of the contract. Meeting the targets as detailed in the Inspection Programs will be the basis for the Key Performance Indicators and subsequent payment deductions for unsatisfactory performance.

The Contractor shall develop and maintain the Inspection Programs. They must be in a format approved by the Principal (in both hard copy and electronic), and be suitable to upload into the electronic defect recording software provided by the Superintendent.

20.26.7.3 Inspection of Bus Stops

Inspect each urban bus shelter once per week as detailed in the Inspections program. Inspections shall commence in the am hours of each Monday and be completed prior to 1600 hours each Wednesday inclusive of Public Holidays.

Incorporate the inspection of and report on each yellow pole bus stop, and each blue pole bus stop, and each totem, once per month in the weekly inspection routine.

Inspect each bus stop in the rural area (Litchfield Shire Council) once per three months.

At all times while performing the inspection services the Contractor's inspector shall remove unauthorised notices, signs, and posters/fliers, and advertising signs, including adhesives.

At all times while performing the inspection services the Contractor shall inspect for any damaged/broken fixtures or safety hazards and shall immediately report them to the Principal. Provide photographic evidence as part of the report. Also provide information about costs to make good any safety hazards as part of the report.

At all times while performing the inspection services the Contractor shall identify and record the type, quantity, and location of any defects, and provide photographic evidence of the defects. The Contractor shall be required to record this information electronically in the software provided by the Superintendent.

Defects shall include, but not be limited to, cleaning and washing requirements, painting requirements, graffiti removal, signs and posts, timetables, electrical services malfunctions, landscaping requirements, vandalism, potential health and safety hazards, and anything that could be deemed to be an inconvenience to the general public.

The Contractor shall provide a detailed cost breakdown for rectification of the defects identified, and prioritise the rectification on approval of the Superintendent

The costs will be in accordance with the schedule of rates. Where a schedule rate is not identified, provide a rate for the additional works.

20.26.7.4 Weekly Maintenance Program

The Weekly Maintenance Program shall provide accurate advice of the location and nature of works programmed to be carried out over the following week. The Contractor shall submit to the Superintendent via email within four weeks of the award of the contract the first Weekly Maintenance Program.

The second and subsequent Weekly Maintenance Programs shall be submitted via email no later than close of business on each and every Friday 1600hours prior to the programmed works. The Weekly Maintenance Program shall identify the applicable date for the programmed works, if for any reason the programmed works change this should be amended and resubmitted to the Department to ensure accurate recording of works carried out.

Each Weekly Maintenance Program shall be numbered consecutively starting from number 1 as the first Program.

20.26.7.5 Monthly Meeting

The Contractor shall attend a monthly meeting on the first Monday of each month.

Items for discussion or report to be delivered include:

- Complaints register report (Contractor/Superintendent)
- Outstanding works report (Contractor)
- Asset update report (Contractor)
- Software improvement suggestions (Contractor)
- Non-conformance/Corrective actions
- Key performance indicator report
- Project Control Plan review
- Invoice/payments
- Contractor Performance Scorecard
- Other issues
- General Business

20.26.8 Types of Bus Stops

Table – Bus Stop Types	
Public Transport Stop type	Description
1	In Ground Yellow Pole
2	In Ground Blue Pole
3	Totem Pole
4	Single Steel Construction
4A	Double Older Steel Construction
5	J Style Steel Construction
5x2	Double J Style Steel Construction
6	J2 Style Steel Construction
7	Single Culvert Construction
7A	Double Culvert Construction
7B	Triple Culvert Construction
8	Steel Construction with wheel chair access
9	Small Steel Construction

10	Enclosed Steel Construction
11	Open Slatted Seat
12	T Shaped Steel Clad Construction
13	A Frame Steel Clad Construction
14	New Type No 1
14 A	New 3 Bay New Type No 2 – solid back wall
14B	New 4 Bay Type No 2 - with wheel chair access
14C	New 4 Bay Closed back
15	Cantilever Steel Construction
17	Single Galvanized Steel Construction
17	Double Galvanized Steel Construction

20.26.9 Bus Stop Inspection Hierarchy

Table – Bus Stop Inspection Hierarchy		
Priority Index	Type	Inspection Frequency
1	Urban Shelter	Weekly
2	Totem	Monthly
3	Rural Shelter	3 Monthly
4	YP, BP or no infrastructure	Not required

20.26.10 Litter Collection and Garbage removal

Do not light fires or burn any material or vegetation either on or off the site.

Refer to the Environmental clauses in the Environmental Management section of the RFT/RFQ.

Refer to the Standard Specification for Environmental Management.

20.26.10.1 Bins and Litter Collection

Collect litter (vegetable & foreign matter eg. food, paper, glass, plastic, dumped furniture, leaves, sticks, stones etc.) within and for four meters clear of the structure and paved extremity of shelters and stops.

Remove unauthorised posters/fliers, and advertising signs, including adhesives.

Empty garbage bins, remove litter from within the bin housing (under inner plastic bin), replace disposable bin liners, clean and disinfect/ deodorise all parts of bins, as required in accordance with the number of clearances/days of clearances as specified.

Replace bin or reinstate disturbed and/or damaged bins and concrete surrounds to the ground ensuring bins are secure. Make allowance for securing concrete surrounds to concrete base with application of one kilogram of epoxy grout.

Attend to urgent removal of litter and bin contents as and when required over and above regular service. Attend to urgent removal of broken glass, dead animals, offensive materials, or any other dangerous hazards.

20.26.10.2 Frequency of Litter Collection

Carry out daily services for litter and rubbish collection and disposal from locations identified by number of bins nominated at each location and number of days.

The Superintendent has identified the approximate number of bins and the service requirements in the contract specific Bus Stop Bins Register. Refer to the RFT/RFQ.

The Schedule shows estimated quantities only and these quantities are not to be taken as actual or correct quantities of work to be carried out. The lower and upper limits of accuracy for each quantity are ninety per cent (90%) and one hundred per cent (100%) respectively of the stated quantity. The numbers are to be confirmed as part of the initial audit. When the actual quantity is greater than the upper limit or less than the lower limit, an adjustment may be made to the rate applicable to the quantity outside the limits of accuracy. Any adjustment to the rate shall be as agreed between the Contractor and the Superintendent.

20.26.10.3 Disposal of Refuse and Litter

All waste and refuse is to be removed from the sites and disposed of by legal means at a registered waste facility appropriate for the waste classification.

20.26.11 General Maintenance and Cleaning of Bus Stops

GENERALLY: Use equipment, tools, disinfectants and cleaning agents of suitable quality for such purpose and follow the written instructions of the manufacturer. The Contractor shall supply all equipment, tools and cleaning mediums for all types of cleaning.

ABRASIVES: Use only abrasives suitable for cleaning the surfaces without damaging the finish.

STEEL WOOL: Use only stainless steel wool.

CLOTHS: Use suitable lint free cloths for wiping and polishing.

SOLVENTS: Follow safety precautions as advised by the manufacturer and do not use solvents that are detrimental to the finishes.

EQUIPMENT: Use only equipment suited for the particular task and in sound condition. Do not use worn equipment that may cause damage to the surfaces being cleaned.

CLEANING STANDARDS: Carry out the specified cleaning services so that:

- the premises will show an absence of visible soil on completion of the works to a condition that is acceptable in sanitation and appearance.
- no litter, trash or foliage in, around buildings, or along pathways.
- no dust, soil, streaks, spots, scuff marks or encrustations on concrete floors or pavements, particularly at corners, edges and adjacent to furniture.
- no dust, soil, streaks, spots, marks or stains on furniture and equipment, walls, partitions' panels and ledges.

20.26.11.1 Offensive Matter

Attend to, and clean away from within the structure, and for four meters clear of the structure and paved extremities of shelters and stops, and dispose of, all wet garbage, blood, faeces, vomit, excretions, syringes, and any other offensive matter. Wash down or pressure clean with an approved industrial strength disinfectant.

20.26.11.2 Minor Cleaning

Minor cleaning by appropriate means, to keep seats, furniture, signage and display case free from excessive staining, mould, dirt, leaf and foliage build up, at the Bus Stops, including removing chewing gum and cigarette residues.

20.26.11.3 Major Cleaning

Clean the entire bus stop/shelter to a condition that is acceptable in sanitation and appearance.

Care shall be taken not to damage any of the surface finishes, including lighting fixtures, during the cleaning process.

Clean all interior and exterior visible surfaces, including, but not limited to, metal, wood, and concrete surfaces, and external paving associated with the shelter location, including all glass and plexiglass surfaces, solar panels, timetable facings, and map cases for the bus stop/shelter. Include the removal of pests as part of the procedure.

Cleaning methods may include use of high pressure water spray, water hosing and washing, sweeping, vacuuming, air blowing, mopping, brooming, and use of detergent and rags.

Polish off glazing, time table facing and map case free of water marks and smudges.

All excess water because of cleaning shall be removed from all surfaces and pedestrian areas.

All debris that is accumulated due to this operation shall be cleaned up and disposed of at the time such operation takes place.

20.26.11.4 Removal of Graffiti and Gum

Removal of graffiti and gum shall be attempted using suitable solvents with the least aggressive removal method possible used. If lesser aggressive removal methods are ineffective, the Contractor shall use a progressive approach with the next slightly more aggressive removal method until the method used is effective and the graffiti or gum is removed. Supply a Material Safety Data Sheet (MSDS) for all chemicals used in cleaning, and graffiti and gum removal.

Remove graffiti, and gum, from all surfaces at bus shelters using suitable solvents.

Inspect for any graffiti etched or carved on bus stop furniture or fixtures and report any such occurrence.

20.26.11.5 Pest Control

Control or eradicate insects including termites, ants, and arachnids (invertebrate), and any other form of animal pests (vertebrates) that could be, or are, affecting public health in, or integrity of, any aspect of the Bus Stop asset, by spraying pest specific pesticides, or by manual means.

Use insecticide strictly in accordance with the manufacturer's instructions. Crew leaders carrying out spraying operations shall have undertaken and passed a National Farm Chemical User Training Program.

Use only chemicals that are approved by the Australian Pesticides and Veterinary Medicines Authority (APVMA).

Information relevant to the safe use of chemicals is available from the Australian Pesticides and Veterinary Medicines Authority (APVMA) website at <http://www.apvma.gov.au>

Erect signs advising of the spraying of chemicals within the work zone when chemical spraying operations are carried out. Spray shall only be applied between the signs.

Adhere to 'best practice' WHS spraying regimes. Refer to NT Sustainable Land Use Guidelines 'Current Recommended Practices' – Chemical section.

20.26.11.6 Landscape at Bus Stops and Shelters

Keep the site weed free, neat and tidy at all times.

Cut grass and remove weeds within, and for four meters clear of, the structure and paved extremity of shelters and stops as frequently as necessary to maintain a grass height in the range 35 mm - 100 mm. Trim edges to fixtures/paving and the like. Sweep paved surfaces and remove all cuttings from site.

20.26.11.7 Frequency of Cleaning Services

Urgent and Offensive Matter - required as and when identified by the Contractor or Superintendent.

Minor Cleaning - required periodically as and when identified by the Contractor or Superintendent.

Major Cleaning - required periodically as and when identified by the Contractor or Superintendent.

Removal of graffiti - required as and when identified by the Contractor or Superintendent.

Pest Control - required periodically as and when identified by the Contractor or Superintendent.

Landscape at Bus Stops and Shelters - required periodically as and when identified by the Contractor or Superintendent.

20.26.11.8 Cleaning Services Classification

For the purpose of measurement and payment for cleaning of the bus stops, they have been classified as Urban Shelters, Totems, Rural Shelters, or Yellow Pole, Blue Pole or no infrastructure, as detailed below:

Table – Bus Stop Inspection Hierarchy		
Priority Index	Type	Inspection Frequency
1	Urban Shelter	Weekly
2	Totem	Monthly
3	Rural Shelter	3 Monthly
4	Yellow Pole, Blue Pole, or no infrastructure	Not required

See sub-clause 20.26.9

Table – Priorities For Cleaning Works	
Description	Priority Index
Removal of Offensive Matter (All)	All
Minor Cleaning (Urban Shelter)	1
Minor Cleaning (Rural Shelter)	3
Minor Cleaning (Totem)	2
Major Cleaning (Urban Shelter)	1
Major Cleaning (Rural Shelter)	3
Wash & Clean Glazing (Urban Shelter)	1
Wash & Clean Glazing (Rural Shelter)	3
Clean Graffiti (All Surfaces)	All
Yellow Pole, Blue Pole, or no infrastructure	4

20.26.12 Miscellaneous Services

Miscellaneous service to the bus stops are for the various public notices, including, but not limited to, decals, timetables, maps, timetable holders, timetable holder faces, and totem panels, as nominated in the schedule of rates to be undertaken as and when required by the Superintendent.

20.26.13 Structure and Furniture Maintenance

20.26.13.1 General

From the Inspection services, notify the Superintendent of any maintenance defects which have been detected at Bus Stops inspected and which require approval for repairs and maintenance works. If the costs of the works are under the approval threshold, make the repairs and/or carry out the required maintenance.

Make the repairs and/or carry out the required maintenance without referring to the Superintendent if the costs are under the approval threshold.

The amount of the approval threshold is specified in the RFT/RFQ.

The Contractor shall provide all tools, equipment and ancillary items for the maintenance works other than any items supplied by the Superintendent.

20.26.13.2 Bus Stop Structure

Check complete structure for any damage or deterioration, especially that which compromises safety to the public.

Check for loose screws, nuts, bolts and other fixings.

Check for sharp or loose cladding and rough edges that may be, or may create, a hazard.

Check for missing parts.

Check lighting and fixtures for operation.

Check timetables holders, timetables, and decals or other official print media, for legibility and any vandalism.

Check for corrosion or other signs of wear such as sun damage, water damage, or vandalism, for painting or replacement purposes.

Check floor finishes, thresholds and external ground surfaces, for maintenance issues that may lead to trip hazards.

20.26.13.3 Bus Stop Seating

Check and maintain seating at all stops in a safe and secure condition.

Undertake the requirements to repaint seating as and when required, or replace old wooden seating as and when required with new aluminium seating.

New seating to be supplied by the Contractor but design/type must be approved by the Superintendent.

20.26.14 Painting at Bus Stops and Shelters

20.26.14.1 Standards

Prepare and paint to AS/NZS 2311 and relevant manufacturers printed recommendations/data.

20.26.14.2 Materials

Use Australian Paint Approval Scheme (APAS) approved premium quality products from approved manufacturers.

20.26.14.3 Preparation

To include thorough sanding of substrate producing a smooth even dust free surface, remove all surface contamination, remove mould and mildew using a chlorine solution (3%) scrub as required, fill cracks and irregularities, apply preparatory coats.

20.26.14.4 Preparatory Coats

Prime/Seal bare or damaged substrates using the following:

Timber	0181
Black Steel	0032
Galvanised Steel	0134
Concrete	0171
Colorbond	0134.

20.26.14.5 Paint Systems

Following the application of preparatory coats apply the following:

Timber	2 Coats 0280/1 Exterior Gloss Acrylic
Steel	2 Coats 0280/1 Exterior Gloss Acrylic
Colorbond	2 Coats 0280/1 Exterior Gloss Acrylic
Concrete	2 Coats 0280/1 Exterior Gloss Acrylic.

20.26.14.6 Spray Application

Is only acceptable to Colorbond surfaces.

20.26.14.7 Colours

Match existing. A reasonably close match is required cutting in to the nearest joint line, panel, corner, rail or the like.

Where part painting a mural cut into adjacent feature/colour change.

Where painting external Colorbond (where no physical break lines for cutting in are available), cut in to a termination line using masking tape. Paint from ground or finished surface level up to (approximately 25 mm below) the first line of fixings above the defacement or damage to (across) the full length of the elevation.

The Superintendent to supply exact paint colours as and when required.

20.26.14.8 Wet Paint Signs

Prominently display from commencement through and until the paint film is dry.

20.26.14.9 Anti-Graffiti Treatments

Apply sealer to graffiti areas to prevent stain bleed through if necessary.

Painting to murals to include one coat of anti-graffiti coating.

Obtain Superintendent's approval for the use of anti-graffiti film or coating products. Apply anti-graffiti products as per the manufactures specification and recommendations.

20.26.15 Contractor's Plant and Equipment in general

Contractor shall allow for all plant of the type and range that an established Contractor would provide to execute the maintenance work.

These include, but are not limited to, purpose built rubbish removal trucks, cars, utilities, water carts, medium sized flat top trucks, tip trucks, and the like, of up to 4 tonnes load capacity, and ride on and push mowers. These are defined as plant for the purpose of the contract.

Contractor shall allow for all equipment including, but not limited to, vacuum cleaners, air blowers, pumps, pressure cleaners, hoses mops brooms, shovels, hand tools, painting tools, generators and electrical tools, appropriate signage, temporary fencing, and scaffolding as required.

20.26.15.1 General

Clean plant and equipment in a location, and in a manner, which prevents pollution of the surrounding environment.

Plant and equipment is to be inspected and maintained as necessary during the course of the works. Emissions and fluid leaks are to be minimized by ensuring plant and equipment are well maintained, in good repair, and in good working order at all times for the duration of the contract.

20.27 PROCEDURES, CALLS AND PAYMENTS

20.27.1 General

This section specifies the requirements for attending the work and the procedures for reporting and payment of work carried out.

20.27.2 Abbreviations and Definitions

The following abbreviations and definitions are used in this specification section:

- SCHEDULED WORK – Work for which a specific rate item is provided in the Schedule of Rates.
- UNSCHEDULED WORK – Work for which no specific rate item is provided in the Schedule of Rates.
- CSR – Contractor Service Report/Request.
- ITPC – Instruction to Period Contractor
- WO – Works Order.
- RCTI – Recipient Created Tax Invoice

20.27.3 Direction to work

A direction to work may be issued in the following forms:

- Telephone call or facsimile.

A CSR will subsequently be issued by the Superintendent.

- Instruction to Period Contractor (ITPC).

A CSR will subsequently be issued by the Superintendent.

- Contractors Service Report/Request (CSR).

Issued in its own right or subsequent to a telephone call or facsimile, an ITPC or an urgent call out.

- Service Order

Issued in respect to a quotation for specific works not included in the Schedule of Rates.

- Urgent call out work outside of normal working hours.

Urgent call out work outside of normal working hours may be communicated to the Contractor by the Department's answering service Contractor or the Superintendent.

In the event of an urgent call out outside of normal working hours the Contractor shall on the first working day thereafter, complete a "Call Out Request Form" and fax same to the Superintendent, as a prerequisite to the issue of a CSR.

If the Superintendent considers any particular work requirement is urgent he shall so advise the Contractor and shall cause the CSR subsequently issued to be stamped "URGENT".

The Contractor shall visit the office of the Superintendent as required to collect any hard copy directions to work.

20.27.4 Advance Direction

Notwithstanding the provisions of the DIRECTION TO WORK clause, the Contractor will receive an advance direction to carry out any required SCHEDULED WORK up to a maximum of the monthly pro rata frequency of the respective Schedule of Rate Items.

Any advance direction issued may be revoked at the sole discretion of the Superintendent.

20.27.5 Authority to Undertake Work

Works of an urgent nature to a maximum of the amount specified in the RFT/RFQ (GST inclusive) per site shall be undertaken by the Contractor at the time of inspection.

This work is limited to works to repair issues of immediate safety concern or actions needed to make safe and/or:

- Urgent removal of litter and bin contents above regular service
- Urgent removal of offensive matter
- Urgent removal of offensive graffiti

The Contractor will not undertake any work unless specifically directed to do so by the Superintendent.

20.27.6 ITPC - CSR

One copy of an ITPC or CSR will be issued to the Contractor. The document will describe in brief detail, the location and a brief description of the work required.

When the works required by the CSR have been completed the Contractor shall insert, in the appropriate place on the CSR, brief work descriptions, item numbers, quantities, rates, extensions, additions, the total value and any other information required by the Superintendent to approve payment.

The CSR shall have the completion date of the works entered thereon and be signed off by the Contractor.

20.27.7 Time Limit for Attendance

The works must be attended within the following time limits:

- Generally, the work must be attended within 3 working days of notification.
- For urgent call outs within and outside of normal working hours, the Contractor shall be mobilised within 2 hours of notification.
- Urgent Works noted at time of inspection (refer to **Authority to Undertake Work** clause) to be addressed immediately.

Note: If costs are above limits then the Superintendent shall be contacted for a decision immediately

- For priority works, which involve health, safety and security, the Contractor must be mobilised within 6 working hours of notification.

20.27.8 Variation Approval

Any variation from the extent of work ordered must be approved by the Superintendent prior to the varied work being carried out.

Where an item of work is ordered pursuant to a Schedule of Rates item for Scheduled Work and the Contractor considers the item to be outside the scope of the Schedule of Rates item the Contractor shall obtain the approval of the Superintendent prior to carrying out the varied works.

The Contractor shall in the case of any authorised variation insert on the CSR the approving officer's name and the date of such approval.

20.27.9 Communications

Provide field communication with the Department by mobile telephones connected either to a cellnet system or a satellite system. Install the telephone in the cabin of a vehicle which will be located at the work site during the execution of the works. If cabin mounting is not possible position the telephone at the Contractor's base camp.

Ensure that the telephones are switched on every day between the hours of 07.30 and 16.30 or at any other time when work is being carried out under the Contract.

Replace faulty telephones within 3 working days of the occurrence of the fault.

20.27.10 Daily Log Books – Approval – Witness Point

Maintain daily log books for works undertaken under the contract.

Witness Point - Approval - Submit to the Superintendent for approval a suitably designed format for daily log books prior to commencing works under the Contract.

Include in the log book the location, ie road name and chainage, type of work, quantity completed, and equipment down time, unusual happenings, and any other requirements specified in the relevant Technical Section.

Submit daily log book sheets with each completed CSR.

20.27.11 Inspection Data Management System (KONECT)

The Inspection Data Management System is a software program developed by the Principal and others to record and organise data related to the NT Government controlled bus stop assets and an appropriate number of licences will be provided to the Contractor for use under this contract at no cost. The software is in the form of an application that can be downloaded to tablets, smartphones or similar. The Contractor shall not make any modifications to the supplied software, nor use the software for any other purpose than the requirements of this contract.

The software will record three types of data.

- The first is the collection and recording of defects and their status (including photographs).
- The second is recording the inspections that have been undertaken.
- The third is to record the repair of the defect (including photographs).

The Contractor shall supply all electronic inspection Data Collection and Management Devices (computer devices / tablets etc.) and ancillary equipment for use in this contract, and they will remain

the property of the Contractor. The Contractor shall be responsible for all backup equipment, maintenance, replacement costs, internet connections and costs, and associated data costs.

When the data collection devices are within the range of a mobile phone cell network, the software has the ability to upload data live to the servers, resulting in immediate backup of the data. If the devices are outside of a cell network, they will need to be operated offline and synchronised as soon as they are back within a network. During the period they are offline, it will be the Contractor's responsibility to manage any backup or loss of data from equipment or software failure.

The Contractor's Inspectors will be required to become familiar with the operation and use of the software. The Superintendent shall provide initial training in its use.

The software will have the ability to record the date, time, locality and the identity of the person conducting the inspection.

The Contractor acknowledges that the KONECT system incorporates a GPS tracking feature, which enables the Principal and/or Superintendent to validate the locations attended by the Contractor. For the purposes of claiming payment under the Contract, the Contractor will be required to provide evidence to the Principal and/or the Superintendent of the sites visited by reference to the data collection devices when submitting their Tax Invoice in accordance with the Conditions of Contract.

20.27.11.1 Failure of Inspection Data Management System (KONECT)

If the situation arises that the Inspection Data Management System software program is not operational during programmed inspections, the Inspectors must immediately notify the Superintendent of the failure.

The Inspectors will be required to use a manual alternative reporting format that shall provide all details that would normally be captured with KONECT.

GPS co-ordinates and photos must also be referenced to, and/or stored in, the record so that the Department's staff can input the information and images into the database.

The Contractors Inspectors shall provide evidence related to the activities of the failure of the system software program.

20.27.12 Payments Generally

On completion of all work described on the CSR, endorse the CSR as required and return to the Superintendent no later than 14 days after completion of the work.

When the Superintendent is satisfied the work has been completed in a satisfactory manner, and that the charges are in accordance with the Schedule of Rates, payment will be certified.

All orders for work not invoiced within 14 days of completion may be subject to valuation by the Superintendent and paid accordingly.

Fully detailed particulars, evidence of cost and acceptable reasons as to why the work was not invoiced within the 14 day period may be required as prerequisites to payment.

20.27.13 Tax Invoices

A GST compliant tax invoice which includes the order number of the work must be attached to the CSR when forwarding to the Superintendent for payment unless the Contractor has entered an agreement with the Principal to receive Recipient Created Tax Invoices (RCTI).

Where the Contractor has a written agreement with the Principal to receive Recipient Created Tax Invoices the Department, after receiving a completed CSR, will create a tax invoice on the Contractor's behalf and issue it in parallel with the contract payment.

The Contractor will still be responsible for collecting the GST and remitting it to the Tax Office.

20.27.14 Measurement and Payment Generally

Refer to MEASUREMENT AND PAYMENT for items to be listed in the Schedule of Rates.

20.27.14.1 Payment Generally

Payment for Scheduled Work will be made at the tendered rate.

20.27.14.2 Rates Generally

The rates tendered are deemed to represent the full value of the work inclusive of plant, labour, messing, clearances, transportation, fuel, oil, maintenance, tools, material procurement and delivery, all incidentals to complete the work, attendance, and supervision and for overheads and profit.

Where a Schedule of Rate item for Scheduled Works is defined as "Labour Only" the rate tendered shall be inclusive of all of the above relating to the labour component.

20.27.14.3 Materials Rate

A sum for Materials has been provided within the Schedule of Rates with a provisional amount.

This item is applicable where/when there are materials to be used in the performance of the works, which are not itemised in the Schedule of Rates.

The material items for works may then be included in the Schedule of Rates at the Superintendents discretion.

20.27.14.4 Negotiated Rate

A Negotiated rate has been provided within the Schedule of Rates with a provisional amount.

This item is found applicable where/when a type of works is described but does not appear in the schedule of rates or is not defined in the specification and not included in the Schedule of Rates items, a rate shall be negotiated to cover the works required.

The item of works may then be included in the Schedule of Rates at the Superintendents discretion.

20.28 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

21 ROAD AND MARINE AMENITY MAINTENANCE

21.1 GENERAL

This work section covers repairs, maintenance, and cleaning road and marine amenities, inclusive of boat ramps, barge landings, jetties, wharfs, pontoons, ramps, fishing platforms, boat ramp amenity areas, and other in or on water facilities, and ancillary facilities associated with these, and rest areas, tourist features, roadside stopping places, information bays and car, boat and truck parking bays.

General descriptions of these areas are provided in the Definitions clause of AS 1742.6.

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

21.2 OUTLINE DESCRIPTION

This section specifies the maintenance requirements for routine, periodic and specific maintenance of road and marine amenity areas identified in the PROJECT SPECIFIC REQUIREMENTS section of the RFT.

The maintenance operations in this section are performance based to specified service levels.

Some operations are specifically ordered as required by the Superintendent.

Maintenance operations generally include:

- Rubbish removal
- Maintenance of toilets, shelters and furniture
- Grass cutting, trimming, weeding
- Supplying water and maintaining irrigation systems
- Maintenance of water tanks and water quality
- Maintenance of barbecues and provision of firewood
- Roadside rubbish collection
- Removal of dead animals and abandoned vehicles.

21.3 CROSS REFERENCES

MISCELLANEOUS PROVISIONS for **Disposal of Waste**

MISCELLANEOUS PROVISIONS for **Plant and Equipment**

MISCELLANEOUS PROVISIONS for **Work Involving Chemicals** sub-clause

MISCELLANEOUS PROVISIONS for **Diving Work**

PROVISION FOR TRAFFIC

LANDSCAPE MAINTENANCE for **Cyclone Event Damage** and for **Storm Damage**

MARINE FACILITIES MAINTENANCE

PROTECTIVE COATINGS for marine locations and steel protection

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES

21.4 STANDARDS AND PUBLICATIONS

Conform to the following Standards and Publications unless specified otherwise:

Australian Standards

AS 1742.6	Manual of uniform traffic control devices - Tourist and services signs
AS/NZS 2311	Guide to the painting of buildings

AS 2700(set)	Colour Standards for general purposes
AS 2700S(G11)	Bottle Green
AS 2700S(G54)	Mist Green
AS 2700S(Y35)	Off White
AS 2865	Confined Spaces

APAS

0280/3 Exterior water based paint for buildings – Low gloss or matt finish

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT/RFQ.

21.5 DEFINITIONS

Refer MISCELLANEOUS PROVISIONS section, **Definitions** clause.

The following additional definitions apply.

AMENITY AREA

Any amenity area provided for use by the public whether associated with a road or with a body of water. Includes, but is not limited to, road amenity areas, and marine amenity areas. A reference to one type includes a reference to the other.

ROUTINE MAINTENANCE

Ongoing maintenance carried out in accordance with the program of works to achieve the service levels required.

PERIODIC MAINTENANCE

Items of maintenance to be carried out at a particular time in accordance with the program of works.

SPECIFIC MAINTENANCE

Items of maintenance to be carried out as and when required and ordered with the issue of a works order by the Superintendent.

VEGETATION

Refers to any plant growth, grasses, shrubs and trees in the area to be treated.

WEEDS

Refers to undesirable vegetation in the area to be treated.

HERBICIDE

A chemical formulation for control and eradication of vegetation and weeds.

21.6 REFERENCE STANDARD DRAWINGS

Refer to PROJECT SPECIFIC REQUIREMENTS section of the RFT/RFQ for locality map and list of Road and Marine Amenity areas included in the contract.

21.7 PROGRAM OF WORKS

Submit a 12 month Maintenance Program for routine and periodic maintenance of all Road and Marine Amenity areas within 2 weeks of award of contract in the first year, and 2 weeks prior to the commencement of a subsequent 12 month period.

Identify the type, frequency and timing for each service associated with the contract, however, achieve the specified service levels regardless of frequency of treatment.

The Superintendent will measure the progress of the work against the Contractor's submitted Maintenance Program.

21.8 EXTENT OF WORK

Maintain the full extent of all Road and Marine Amenity areas identified in the PROJECT SPECIFIC REQUIREMENTS section of the RFT/RFQ.

Identify and undertake the works required to maintain all amenity areas to comply with the specified service levels, which are clearly defined outcomes specified for all the maintenance works specified herein.

Undertake specific scheduled works issued by the Superintendent.

Undertake specific unscheduled works requested by the Superintendent, to be paid at a fair and reasonable rate negotiated between the Contractor and Superintendent.

Replacement items of a major nature and not covered under routine or periodic maintenance will be paid for at the invoiced price plus the Contractor's scheduled mark-up percentage.

Comply with the specified response times for attendance and completion of work to be carried out for safety or other reasons, including after hours call-outs. The Superintendent will engage a third party to attend to and complete the work at the Contractor's expense if specified response times are not met.

21.9 INFORMATION SIGN

Erect an information sign at each rest area with details of the name and telephone number of the Period Contractor for Maintenance of Road and Marine Amenity Areas.

Erect the sign to be clearly visible and securely attached to the shelter shed, and where there is no shelter shed, at a location approved by the Superintendent.

Ensure that the information on the sign is kept current for the duration of the contract.

Fabricate the sign from 0.6 mm off white pre-painted sheet steel, size 600 mm x 400 mm, with 50 mm high Helvetica medium black lettering. Fix to the metal framework of the shelter with 4 mm pop rivets at 200 mm centres.

21.10 RUBBISH COLLECTION

21.10.1 Service Levels for Rubbish Collection

Maintain Road and Marine Amenity areas;

- Clear the site of all rubbish that is visible from the site and ensure that,
- There are no more than ten items of rubbish within the site or visible from within the site at any time.

21.10.2 Rubbish Collection Operations - Witness Point

Collect rubbish and remove from Road and Marine Amenity areas to comply with the service level requirements, and prior to grass cutting operations.

Dispose of all rubbish at a Community or Council Waste Disposal Site and pay all dump fees where applicable.

Do not store rubbish for later retrieval anywhere within the amenity areas.

Rubbish is defined as any loose unattached inanimate item or any other object that does not form part of the Road Amenity areas.

Rubbish includes, but is not limited to:

- food scraps
- goods packaging,
- paper products,
- plastic products,
- rubberized products, including tyres and batteries.
- glass products,
- metal / alloy products,
- stone or masonry products or items including concrete chunks,
- any material excluding liquids resultant from a vehicle accident,
- any vegetative item,
- any mechanical item or part that is not related to intact mechanical, electrical or service-related infrastructure occurring within the amenity areas,
- any loose, unattached inanimate item that the Superintendent deems is not required, wanted or expected to occur within the amenity areas.

Witness Point - Normal rubbish collection does not include illegal signage or abandoned vehicles or equipment, however, report these items to the Superintendent.

Witness Point - Report to the Superintendent any occurrences of concrete spills, gravel, sand or soil on any trafficable surface. These materials are not rubbish under the terms and conditions of the contract and may be removed by others. If not removed by others, remove upon issue of direction to work from the Superintendent at a fair and reasonable negotiated rate.

Remove rubbish resulting from a significant spill event that cannot reasonably be removed within one hour of commencement of work at a fair and reasonable negotiated rate for time expended in excess of one hour.

Remove any single item of rubbish with a weight greater than 50 kg at a fair and reasonable rate negotiated with the Superintendent.

21.10.3 Roadside Rubbish Collection

Roadside rubbish collection is a specific maintenance item and is only to be carried out after a works order is issued by the Superintendent.

Collect all rubbish and remove from the roadside verge, within 10 km of towns, communities, commercial areas, and roadhouses.

Collect rubbish and remove from the roadside between the outside of the outer batters on each side of the road formation, and in fill areas 4 m from the toe of the batter, only upon issue of a direction to work from the Superintendent.

21.11 RUBBISH REMOVAL

21.11.1 Service Levels for Rubbish Removal and Bin Placement and Replacement

Maintain amenity areas so that;

- bins do not overflow, and
- bins do not have a build-up of rubbish on the ground around the base of the bin, and
- bins are not unpleasant for users to deposit rubbish into, due to decomposing rubbish.

21.11.2 Rubbish Removal Operations

Empty bins and remove rubbish from the amenity areas to comply with the service level requirements.

Install new plastic rubbish bin liners in all rubbish bins when rubbish is removed. Fold the plastic bin liners over the lip of the bins and secure with packaging tape.

Respond to any direction given by the Superintendent to empty bins and/or remove rubbish within 48 hours.

Dispose of rubbish at a community or council waste disposal site and pay all fees and charges.

Do not store rubbish for later retrieval anywhere within the amenity areas.

Modify the frequency of rubbish removal as necessary to allow for seasonal variances.

21.11.3 Deodorizing Rubbish Bins – Witness Point

After emptying rubbish bins wash out as necessary and place deodorising granules in the bottom of the bins to comply with the service level requirements.

Witness Point - Use Nilodew granules as manufactured by Nilodor Inc. or equivalent as approved by the Superintendent.

Spread approximately 30 grams of the deodorant granules across the bottom of each rubbish bin.

21.11.4 Bin Placement and Replacement Operations

Provide rubbish bins, replace or repair missing, damaged or rusted rubbish bins, at amenity areas to comply with the service level requirements.

Provide suitable metal or plastic 200 litre capacity rubbish bins, painted off white. These become the property of the Principal once on site.

Provide sufficient drain holes to prevent bins holding water.

Provide new plastic bin liners in all rubbish bins.

Modify the number of bins as necessary to allow for seasonal variances.

21.11.5 Rubbish Bin Lids

At the commencement of the contract ensure that all rubbish bins have lids to prevent animals and birds removing the contents.

Where necessary fabricate new lids from 25 mm x 25 mm welded mesh with a wire diameter of 3.15 mm (Smorgon WG311) and welded to a 10 mm diameter rod frame hinged to a mild steel frame on the top of the bin, fabricated from 50 mm x 3 mm mild steel flat.

Refer to Standard Drawing RU3A (B95-2284).

Ensure that lids are maintained at all times. If a bin loses its lid replace it within 7 days.

21.11.6 Illegal Rubbish Collection – Witness Point

Normal rubbish collection does not include illegal dumping of household refuse, signage or abandoned vehicles or equipment; however, report these items to the Superintendent.

Witness Point - Report to the Superintendent any occurrences of illegal rubbish dumping, vegetation dumping, concrete spills, gravel, sand or soil on any trafficable surface. These materials are not rubbish under the terms and conditions of the contract and may be removed by others. If not removed by others, remove upon issue of direction to work from the Superintendent, to be paid for at unit rates nominated in scheduled rates, or at negotiated rate.

21.12 CLEANING OF ROAD AND MARINE AMENITY AREA FURNITURE

21.12.1 Service Levels for Cleaning of Road and Marine Amenity Area Furniture

Maintain tables and seating at rest areas so that they are clean, free of rubbish and suitable to use at all times.

21.12.2 Cleaning of Road and Marine Amenity Area Furniture Operations

Clean tables and seating at rest areas to comply with the service level requirements.

Respond to any direction given by the Superintendent to clean tables and seating within 48 hours.

Remove rubbish from the surface of tables and seating, scrub clean with a scrubbing brush, water and detergent, rinse off with water.

Leave in a clean hygienic condition and suitable for use.

Modify the frequency of cleaning tables and seating as necessary to allow for seasonal variances.

21.13 CLEANING OF AMENITY AREA TOILET BLOCKS

21.13.1 Service Levels for Cleaning of Amenity Area Toilet Blocks

Maintain toilet blocks at amenity areas so that;

- they are clean, free of rubbish and suitable to use at all times.
- the 500 litre water tanks are not less than 30 % full at all times.
- the jumbo toilet rolls have sufficient paper to last to the next service by the Contractor.
- the liquid soap dispensers are filled at each service by the Contractor with liquid soap as recommended by the dispenser manufacturer.
- the solar powered exhaust fans, where fitted, are in working order.

21.13.2 Cleaning of Amenity Area Toilet Block Operations

Clean the toilet block at amenity areas where installed to comply with the service level requirements.

Respond to any direction given by the Superintendent to clean the toilet block within 48 hours.

Keep all surfaces free from dirt, grime and cobwebs.

Mop the floors with a disinfecting agent and disinfect all handled surfaces, i.e. hand rails, door knobs taps, etc.

Take care when cleaning the toilet bowl not to allow disinfectant to be added to the storage chamber.

Ensure that the toilet roll holders and soap dispensers are clean and work efficiently.

Leave in condition that is suitable for use.

Modify the frequency of cleaning toilet block as necessary to allow for seasonal variances.

21.14 MAINTENANCE OF ROAD AND MARINE AMENITY AREA TOILETS

Maintain toilet blocks by repairing or replacing fixtures and fittings to keep the toilet blocks in a good working condition and suitable for use at all times.

21.14.1 Toilet Systems

The particular toilet system at a road amenity area is identified in the PROJECT SPECIFIC REQUIREMENTS section of the RFT.

21.14.2 Composter Type Systems

Inspect the composting chamber at monthly intervals and rake over the compost using the special compost rake.

After raking, cover the compost with a layer of wood shavings to the manufacturer's specifications.

Ensure that the drain is free flowing and unobstructed.

Advise the Superintendent when the composting chamber is to the level requiring the compost to be removed and the chamber to be re-started.

21.14.3 Clean Out of Toilet Compost systems

When instructed by the Superintendent, clean out and re-start the toilet compost chambers as follows;

Clean out the compost chamber and dispose of the compost by burying at a community or council waste disposal site and pay all fees and charges.

Cover the floor of the compost chamber with wood shavings and treat with chemical composting bacteria in accordance with the manufacturer's instructions.

Spray the area lightly with a water mist.

Ensure that the drain is free flowing and unobstructed.

21.14.4 Collection Well Type Toilet Systems

Treat the collection wells with a deodorising organic based chemical at weekly intervals.

Only use chemicals recommended by the toilet manufacturer and in accordance with the application instructions.

21.14.5 Emptying Collection Wells

When the collection well is at a maximum of 75 % capacity arrange for the well to be pumped out and the system restarted with seed water in accordance with the manufacturer's instructions.

For liquid waste removal only use operators that are accredited in waste management and approved to dispose of waste at a Power Water sewerage treatment site.

Ensure that all health requirements are met when pumping out collection wells and transporting waste.

21.15 GRAFFITI

21.15.1 Graffiti Removal

Clean off or paint over any graffiti at road and marine amenity sites so that;

- the contained area of graffiti on signs, furniture or other surfaces does exceed 10 % of the total readily visible surface area for the particular item.

- offensive graffiti is removed as soon as it is observed and before leaving the particular site.
- Clean graffiti off signs with an approved graffiti cleaning agent.
Respond to any direction given by the Superintendent to remove graffiti within 48 hours.

21.16 GRASS CUTTING

21.16.1 Service Levels for Grass Cutting

Maintain verges within the established confines of road amenity areas so that;

- Grass maximum cut from the ground is as per **Table – Grass Height Specification**.
- Grass height for more than 10% of any one area at any time does not exceed the heights in the table below.
- Grassed verges are neat and tidy.

Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

Amenity	Maximum grass cut	Grass height does not exceed
Special Areas as nominated in the Project Specific Req.	100 mm	200 mm
Rest Areas within townships	100 mm	200 mm
Rest Areas on National Highways	100 mm	200 mm
Rest Areas on other roads within 10 km of a township	100 mm	300 mm
Rest Areas - Other	100 mm	300 mm
Truck Parking Bays within townships	100 mm	200 mm
Truck Parking Bays – Other roads within 10 km of township	100 mm	300 mm
Truck Parking Bays – Others	100 mm	300 mm
Aerodromes	100 mm	200 mm
Irrigated verges within townships	50 mm	200 mm
Non-irrigated verges within townships	100 mm	200 mm
Parks	50 mm	200 mm

21.16.2 Grass Cutting Operations

Cut grass at road and marine amenity areas to comply with the service level requirements.

Respond to any direction given by the Superintendent for grass cutting within 7 days.

Collect rubbish prior to grass cutting operations.

Definition: grass includes clumps or tufts of grass growing on scalded areas, grass species that grow at faster rates than other species, and includes the whole of the plant including leaves, seed stems and seed heads.

Cut grass from the edge of pavement and seal to the extent of the rest areas, truck parking bays and boat ramp areas or to the cleared tree line.

Cut grass to clean cut, not broken or ripped, using equipment capable of maintaining the health and appearance of the grass and ground cover.

Cut grass around established trees and shrubs, and around road furniture.

Do not cut shrubs and trees with a calliper size at base greater than 50 mm diameter, planted vegetation, or vegetation regardless of size that has been pegged and directed by the Superintendent to be retained.

Remove cut material or other detritus matter from the grass cutting, trimming or weeding processes from the site and dispose of at a community or council waste disposal site and pay all fees and charges.

Modify cutting methods and frequency as necessary to allow for seasonal variances.

Immediately replace and/or repair furniture damaged by grass cutting operations.

21.16.3 Grass Cutting Plant and Equipment

Anticipated plant requirements are ride on mowers or push motor mowers.

Use suitable guards on all machinery to prevent material being sprayed onto the road surface and endangering vehicles, persons or property.

Keep 2 x 9 kg water fire extinguishers on site to extinguish fires that may be started by mowing operations.

21.17 GRASS TRIMMING

21.17.1 Service Levels for Grass Trimming

Maintain verges within the established confines of road and marine amenity areas to service levels for grass cutting using trimmers where they cannot be addressed by grass cutting operations.

Maintain joints on concrete, seal and paving and any other hard surfaces occurring within the road amenity areas so that;

- Grass does not reach 50 mm in height and/or patches of grass do not reach 100 mm in diameter.

21.17.2 Grass Trimming Operations

Trim grass at road and marine amenity areas to comply with the service level requirements, in conjunction with grass cutting service.

Respond to any direction given by the Superintendent for grass trimming within 7 days.

Trim grass for the purposes of aesthetics, integrity of asset, functionality, public safety, including vegetation protruding from adjoining properties.

Trim grass at back of kerbs, around drainage inlets and outlets, drainage lines and culverts, edges and surfaces of footpaths and cycle paths, access ramps, drive ways, any form of infrastructure, utility, furniture, signs, on in or around verges, traffic control devices, fence lines, barriers, trees, concrete or paving.

Trim grass on concrete, paved or bituminous surfaces to ground or surface level. Use of super-heated steam for longer term treatment is permitted here, as is herbicide in accordance with the Herbicide clause.

21.17.3 Grass Trimming Plant and Equipment

Use mechanical or manually operated hand held equipment that has no detrimental effect to the landscape or road asset.

Fit suitable guards on all machinery to prevent material being sprayed onto the road surface and endangering vehicles, persons or property.

21.18 WEEDING

21.18.1 Service Levels for Weeding

Maintain verges within the established confines of road amenity areas to service levels for grass cutting and trimming, but where they cannot be addressed by grass cutting or trimming operations.

Remove unwanted plant and grass species.

21.18.2 Weeding Operations

Weed any areas and at road pavement and kerb junctions, within garden beds and within or around any other structure or feature occurring within the road amenity areas which cannot be controlled by grass cutting or trimming, to comply with the service level requirements.

Respond to any direction given by the Superintendent for weeding within 7 days.

Carry out weeding for the purposes of addressing issues related to aesthetics, integrity of asset, functionality or public safety.

Dispose of all removed weed matter at a community or council waste disposal site and pay all fees and charges.

Do not allow weeding treatment to impinge on the health of other desirable species, or result in damage to any part of the road amenity area asset.

Carry out weeding by mechanical, manual or chemical means.

Remove or treat with herbicide all weeds prior to them seeding.

21.18.3 Chemicals – Witness Point

Witness Point - Submit to the Superintendent the list of chemicals intended for use during the contract, if herbicide is intended for use, details of pest species controlled by the chemicals, and life expectancy of control.

Use chemicals that are approved by the APVMA. Find all information pertaining to the use requirements of chemicals on the Authority's web site <http://services.apvma.gov.au/>.

Use herbicides that are biodegradable and do not contain lead arsenates or other substance or salts dangerous to humans or animals.

Use spreading agents if and as recommended on the labels.

21.18.4 Herbicide

Glyphosate is the only herbicide permitted for use for weed control. Use according to manufacturer's directions for use.

Do not use herbicide for the treatment of weeds at the following areas:

- at drainage lines,
- beyond 500 mm of road amenity area or roadside furniture,
- beyond 500 mm from the vertical trunk at the base of any tree.

Minimise the use of herbicide.

Apply herbicide at killing strength and not to retard growth.

Do not use dyes in the application of herbicides.

21.18.5 Chemical Spraying

Handle, transport, spray, store and dispose of chemicals and their containers as specified in product SDS.

Do not spray on days of wind velocity greater than 15 km/h mean value and gusts exceeding 19 km/h because of the risk of spray drift causing a hazard on adjoining properties.

Do not cause or allow spray drift. Prevent misting in breeze conditions by spraying at a lower pressure or adjusting spray nozzles to increase droplet particles size, or other suitable means.

Do not spray near schools during school hours or during outdoor activities at the school at any time. Spray only when wind is blowing away from the school.

Do not spray during rain or when vegetation is saturated.

21.18.6 Personnel Handling of Chemicals

Be registered for business as weed control operators, or engage sub-Contractors registered for business as weed control operators.

Personnel carrying out spraying operations must have undertaken and passed a National Farm Chemical User Training Program.

Do not allow spray drift. Operators must be competent in their understanding of how to prevent spray drift.

Keep a copy of the Safety Data Sheet on site for each type of chemical used

Handle all chemicals as specified in product SDS.

Wear as a minimum the protective clothing as specified in product SDS.

21.19 IRRIGATION SYSTEMS

Maintain irrigation systems by repairing or replacing components to keep the systems in a good working condition.

21.19.1 Top Up Systems

Where irrigation water storage systems are installed, top up the system with water at each visit to the particular site.

Check the system for correct operation and maintain as required.

21.20 AMENITY TREES

21.20.1 Replacement Trees

Replace any amenity trees in the particular road amenity site that have died or have been badly damaged.

Replace with healthy trees of the same species and of a minimum height of 2 m.

Dispose of dead trees and waste at a community or council waste disposal site and pay all fees and charges.

21.21 WATER TANKS AND WATER MAINTENANCE

21.21.1 Service Levels for Water Tank and Water Maintenance

Maintain water tanks and water in water tanks at road and marine amenity areas so that;

- tanks are never less than 30% capacity,
- water in tanks is at all times uncontaminated and potable,
- taps cannot be left on, are well maintained and are simple to use.

21.21.2 Water Tank and Water Maintenance Operations

Maintain water tanks and water in water tanks at road amenity areas to comply with the service level requirements.

Respond to any direction given by the Superintendent for water tank and water maintenance within 48 hours.

Refill water tanks with potable water from a town water supply.

Monitor quality of water in tanks as follows:

- Supply and maintain chlorine level testing equipment.
- Test free chlorine levels after filling of tank with a Hach 46700-00 or equivalent Digital Chlorimeter.
- Ensure chlorine levels are within 1 to 1.25 ppm (or mg/L) prior to leaving rest area.
- Record free chlorine levels on report form Road Amenity Adverse Condition Report, and submit with monthly CSR / tax invoice.

Empty, clean out, disinfect and refill water tanks when water becomes contaminated in accordance with the Water Tank De-Contamination clause.

Replace taps that are damaged or missing.

Repair leaks in water tanks as required.

Modify frequency of service as necessary to allow for seasonal variances in use.

21.21.3 Water Tank Inspection

Inspect the water tank at each visit for damage or vandalism.

Fit locks to tank lids and keep locked at all times.

If the tank lid has been forced open or the tank is damaged to allow the importation of foreign material the water contained in the tank is deemed to be contaminated.

21.21.4 Water Tank De-contamination

Where a water tank is deemed to be contaminated, carry out the following procedure;

- Drain the tank,
- Repair the damage, if applicable, by a suitable method to ensure the integrity of the tank,
- Thoroughly clean the insides of the tank using a high pressure water jet and super chlorinated water containing 40 ppm of free chlorine.
- In some cases the contamination may need to be removed by scrubbing the internal surfaces. Ensure worker safety by complying with *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011 and with Codes of Practice applicable to work in confined spaces and with AS 2865. Finally flush the tank out as per the preceding paragraph.
- Refill the tank with fresh potable water and add chlorine to the correct level and test.

21.21.5 Prevent Cross Contamination

Protect the potable water supply from cross contamination from equipment used in the maintenance of the toilet systems or other areas.

Do not use tanks, pumps, hoses or other equipment associated with the maintenance of toilet systems in the servicing of potable water tanks.

21.22 MAINTENANCE OF BARBECUES

21.22.1 Service Levels for maintenance of Barbecues

Maintain the barbecues at road and marine amenity areas so that they are clean and suitable for use at all times.

Respond to any direction given by the Superintendent for barbecue maintenance within 72 hours.

21.22.2 Disposal of Ash

Remove the ash and burnt wood fragments from the barbecues and dispose of at a community or council waste disposal site and pay all dump fees and charges.

The removed ash may be used as mulch on garden beds provided it is not visually distracting.

21.23 PROVISION OF FIREWOOD

21.23.1 Firewood Bins

Provide firewood bins at each roadside and marine amenity site where barbeques are provided.

Use upturned concrete culverts at least 1.2 m wide, 2.4 m long and 0.9 m deep. Place the firewood bins a minimum of 4 m from the barbeques and bed them solidly to prevent rocking.

21.23.2 Service Levels for Provision of Firewood

Provide firewood at road and marine amenity areas so that;

- firewood log diameter does not exceed 150 mm,
- firewood should be of reasonable burning quality suitable for use in public barbecues and with a minimum density of 1000 kg/m³,

Do not provide any treated timber as firewood.

Fill the firewood bins at the following frequencies;

Location	Frequency
Special areas as nominated in the Project Specific Req.	Stockpiles never fall below 200 kg
Rest Areas on National Highways	Once a week
Other areas	Once a week

21.23.3 Provision of Firewood Operations

Provide adequate stockpiles of firewood at road and marine amenity areas where there are barbecues to comply with the service level requirements.

Store the firewood in the firewood bins.

Respond to any direction given by the Superintendent for provision of firewood within 72 hours.

Modify frequency of service as necessary to allow for seasonal variances in use.

21.24 PAINTING OF FURNITURE AND EQUIPMENT

Carry out all painting in accordance with AS/NZS 2311.

Prepare new surfaces for painting in accordance with Section 3 of AS/NZS 2311.

For repainting of existing surfaces conform to Sections 7 and 8 of AS/NZS 2311. This includes cleaning down with sugar soap, treatment of mould growth, rubbing back existing painted surfaces with abrasive paper and patching and priming of damaged surfaces.

Refer to PROTECTIVE COATINGS for marine locations and steel protection.

21.24.1 Paint Materials

Use only 100% acrylic low-gloss paint complying with the APAS specification 0280/3

Use only premium paints from approved manufacturers which include the following;

- Dulux Weathershield
- Taubmans Sunproof / Endure
- Wattyl Solagard.

The colours for painting of furniture and equipment are standard colours from the AS 2700 colour range and are as follows;

- Water tanks, tables and seating, shelter sheds;
 - Northern Region – Darwin to Dunmarra. G 11 Bottle Green. Similar to Mid Brunswick Green on Manufacturer's colour charts.
 - Southern Region – Dunmarra to the South Australian border. G 54 Mist Green. Similar to Mist Green on Manufacturer's colour charts.
- Rubbish bins, water tank protection rails - Y 35 off White.

Ensure that the manufacturer's tinting is suitable for external use.

Use paint from the same manufacturer to ensure consistency of finish, particularly when touching up existing paintwork.

For painting of small areas of items for repair work use a colour which matches the existing colour on the item.

21.24.2 Initial Painting

Repaint all existing furniture at road amenity areas at commencement of the contract.

Paint new rubbish bins prior to placing on site.

21.24.3 Touch Up Painting

Carry out touch up painting on all existing furniture at road amenity areas once every 12 months.

21.24.4 Service Levels for Subsequent Painting

Maintain the appearance on all existing furniture at road amenity areas so that graffiti is removed or painted over and other blemishes are painted over to leave the furniture in pristine condition and suitable for use.

21.24.5 Painting Existing Furniture

Carry out painting on existing furniture at road amenity areas to comply with the service level requirements.

Respond to any direction given by the Superintendent for painting existing furniture within 14 days.

Paint the following items of existing furniture:

- Water Tanks: External walls of tanks only.
- Tank protection rails.

- Table and Seating: Tops of seating and tables and associated edges only.
- Shelter Shed: All exposed surfaces except the upper surface of the roof.
- Rubbish Bins: External surfaces.

Modify frequency of service as necessary to allow for seasonal variances in use.

21.24.6 Painting new furniture and equipment

When installing replacement furniture or equipment initially paint the new surfaces in accordance with the Painting Existing Furniture clause. For new work apply a minimum of 2 coats of paint.

21.25 REPAIR AND REPLACEMENT OF ROAD AND MARINE AMENITY AREA FURNITURE

21.25.1 Service Levels for Repair and Replacement of Road and Marine Amenity Area Furniture

Maintain barbecues, tables and seating at road amenity areas so that they are in good condition and suitable for use at all times.

21.25.2 Repair and Replacement of Road And Marine Amenity Area Furniture Operations

Repair or replace barbecues, tables and seating at road and marine amenity areas to comply with the service level requirements.

Respond to any direction given by the Superintendent to repair or replace damaged or missing barbecues, tables and seating within 14 days.

Repair barbecues, tables and seating where necessary, including repainting if required, to a standard of suitable functionality, appearance and safety. Obtain the advice of the Superintendent on the extent of repairs.

Provide replacement barbecues, tables and seating of equivalent standard to existing. Obtain Superintendent’s approval of suitable replacement prior to purchase. These items become the property of the Principal, once installed on site.

Remove and dispose of existing barbecues, tables and seating damaged beyond reasonable repair to a community or council waste disposal site.

Secure barbecues, barbecue plates, tables and seating to deter theft.

Modify frequency of service as necessary to allow for seasonal variances.

21.26 REMOVAL OF DEAD ANIMALS

21.26.1 Service Levels for Carcass Removal

Remove any carcass as per the following table;

Table - Carcass Removal Service Levels	
Area	Response time from observation or notification
Within 50 km of the contract base	1 hour
Within 150 km of the contract base	2 hours
All other areas	24 hours

Ensure that vehicles, while working on the roadway, comply with the Rotating Beacons On Plant clause in the PROVISION FOR TRAFFIC section.

21.26.2 Carcass Removal Operations

Remove multiple or singular carcasses of dead animals from within the road reserve irrespective of reason or event resulting in the demise of the animal.

Dispose of animal carcasses located within 10 km of towns, communities, commercial areas and roadhouses by taking to a dedicated council or community “dead on arrival” pit and pay all fees

and charges. In other areas move the carcass to the outside of the outer batter and out of motorists' vision.

There are 2 categories of animal carcasses;

- Carcass weight greater than 50 kg. These include:
 - o Larger animals including but not limited to cattle, buffalo, camels, horses and donkeys.
- Carcass weight not greater than 50 kg. These include:
 - o All other native and exotic species, including but not limited to dogs, cats, kangaroos, wallabies, birds, lizards and pigs.

Remove any carcass that is attracting scavengers, no matter how small the remains of the carcass may be.

The time period for removal of carcasses will commence from time of notification by the Superintendent or observation by the Contractor, whichever is earlier.

Quantities of carcasses resulting from a significant spillage or killing event that cannot reasonably be removed within 2 hours of commencement of work will be paid at a fair and reasonable rate negotiated between the Contractor and Superintendent. This payment will be for time expended in excess of 2 hours.

21.27 REMOVAL OF ABANDONED VEHICLES

21.27.1 Service Levels for Vehicle Removal – Witness Point

Witness Point - Report any vehicle suspected of being abandoned to the Superintendent within 24 hours of observation.

When instructed by the Superintendent remove any vehicle that has been abandoned in compliance with NT Traffic Regulations 1999 Part 5 - Abandoned Vehicles.

21.27.2 Vehicle Removal Operations

Remove abandoned vehicle only upon issue of a direction to work from the Superintendent.

Remove and transport vehicle to a community or council waste disposal site and pay all fees and charges.

21.28 ADVERSE CONDITION REPORT

Submit to the Superintendent a Road Amenity Adverse Condition Report when condition of rest areas, truck parking bays and boat ramp areas is adverse due to factors not covered by this specification.

Carry out the works in accordance with the program or issued CSRs, however, submit a modified version of the work program if works are to be interrupted due to external or unforeseen circumstances.

Irrespective of external or unforeseen circumstances continue to maintain the assets within the service levels specified.

21.29 LIAISON WITH THE SUPERINTENDENT

Refer all matters relating to difficulties or problems experienced in carrying out the requirements of the Contract to the Superintendent.

21.30 CONTRACTOR'S PERSONNEL

21.30.1 Supervisors

Employ sufficient supervisors familiar with the requirements of contract to attend all operations in each area of work to ensure full compliance with specified service levels.

Nominate an individual or provide a roster of individuals including their contact phone numbers who will be available at all times, including nights, weekends and Public Holidays during the Contract.

21.30.2 Personnel in Crews

Provide appropriate crew size and numbers for the operations to achieve the specified service levels.

Provide adequate training in the correct operation of all powered equipment, hand tools, trimming techniques, use of chemicals, and first aid.

Where applicable ensure that staff holds current licences as required under law.

All personnel, supervisors, staff and operators on or off the machines are required to wear reflective safety vests to day or night in compliance with *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011 when working within the road reserve.

21.30.3 Personnel Working in Water Tanks

Be suitably trained for working in confined spaces in compliance with AS 2865 and *Work Health and Safety (National Uniform Legislation) Act 2011* and Regulations 2011. Comply with NT WorkSafe Code of Practice Confined Spaces.

21.31 CLEANING AND MAINTENANCE OF BOAT RAMPS

21.31.1 Service levels for maintenance cleaning of Boat Ramps

Boat ramp clear of algae growth and debris that compromises user safety.

No loose rocks or hazards at base of ramp.

21.31.2 Maintenance Cleaning of Boat Ramps

Maintain the boat ramp concrete deck and surrounds, so that they are clean and free from algae, sand/mud build up and any other detritus materials. Use high-pressure water blasting methods and a nozzle pressure sufficient to remove all marine growth, algae and slippery surfaces that become a hazard to the public use of boat ramps.

Maintain the surface at the base of the boat ramp to enable the launching of boats at low tide. Reposition loose rocks or hazard, to enable and assist with a smooth path for boats and trailers into or out of the water.

This operation is to be undertaken on a receding tide for boat ramps, the Contractor to program works for the most effective tide, in order to maximise the extent of the cleaning of the ramps' lengths. Ensure that ramps are available to users at all times. If necessary, the Contractor may have to demobilise from the ramp to enable users to launch or retrieve boats.

High-pressure water blasting operations are not to pose a danger to or any inconvenience to the public and nor damage their vehicles or boats or trailers.

21.32 CLEANING AND MAINTENANCE FOR JETTY, PONTOON, FISHING PLATFORMS AND FILLETING TABLES

21.32.1 Service levels for Jetty, Pontoon, Fishing Platforms and Filleting Tables Maintenance

Maintain the Jetty, pontoon structure, platforms and tables so that they are clean, free of all undesirable substances, algae and hazardous surfaces that compromise user safety.

21.32.2 Maintenance for Jetty, Pontoon, Fishing Platforms and Filleting Tables

Maintain the Jetty, pontoon structure, platforms and tables so that it is clean, free of all undesirable substances, algae and hazardous surfaces.

Use high-pressure water blasting methods using a nozzle pressure sufficient to remove all fish carcasses, offal, blood stains, scales and or any undesirable substances that may produce an offending sight or odours on the jetty and pontoon deck, its railings, the jetty shelter and surrounds.

Areas which still produce obnoxious odours following water blasting and or scraping, are to be further treated by the use of an approved environmentally friendly disinfectant to neutralise the possibility for flies, maggots to breed, and to reduce obnoxious odours.

Use high-pressure water blasting methods and a nozzle pressure sufficient to remove all marine growth, algae and slippery surfaces that become a hazard to the public use.

Care is to be taken to avoid causing any damage to concrete, steel coating, and other surfaces during high-pressure water blasting operations.

Program works for the most effective time frames in order to maximise the extent of the high-pressure water blasting operation. Ensure that the amenities are available to public use at all times. If necessary, cease the works to enable the immediate use of the amenity by the public at any time.

21.33 MAINTENANCE FOR MARINE GROWTH/ SHELLFISH ENCRUSTATIONS ON STRUCTURES

21.33.1 Service levels for Marine Growth/ Shellfish Encrustations on Structures Maintenance

Maintain the jetty structure piles landing decks, walkways, and the associated steel grating railings and posts so that they are clean, free of hazardous surfaces, and suitable to use at all times.

21.33.2 Maintenance for Marine Growth/ Shellfish Encrustations on Structures

Remove, or make smooth, all sharp edges of shellfish encrustations from the structure. Use a small tomahawk and a hammer or other approved tools to scrape and knock the shellfish encrustations off without damage to the underlying protective coatings. Run a curved sharpened blade over all cleaned areas to remove any remaining shellfish encrustations.

Remove or smooth all sharp edges of shellfish encrustations projecting above the top surface of the landing deck grating.

Where ever shellfish encrustation is threatening to fill the gaps between any grating bars by more than 30%, carefully rod through the gap with an approved object to open up the gap and knock off the growth. It is important to maintain the openings in the decking so that wave action is free to move through the openings. If this is not done then the decking will act like a solid plank. The force of the waves can then exert pressure and dislodge the decking units which are only fixed by clips to the structure.

Otherwise use high-pressure water blasting methods and a nozzle pressure sufficient to remove all marine growth, algae and slippery surfaces that are hazardous to the public users.

Touch-up any paint damaged during the cleaning process with an approved protective coating. Take particular care to not damage the paint coating of grating since "touch-up" painting of the grid is not feasible.

Clean any damaged protective coating back to bare metal or clean sound paint work.

Feather edges and lightly abrade areas of existing paintwork that are to be touched up.

Prime the area to be painted as soon as possible after surface preparation and prior to any deterioration or submergence of the surface.

Use WattyI Sigma EP Universal Primer and WattyI Sigmacover TCP Coating Glassflak or other approved system that is impact resistant, extremely tolerant of surface moisture, is high build, and will reliably adhere to the existing paint system.

Mix, handle and apply the paint strictly in accordance with the manufacturer's instructions.

Refer to PROTECTIVE COATINGS.

21.34 OTHER REQUIREMENTS

(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

22 PROTECTIVE COATINGS

22.1 GENERAL

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works.

Comply with the requirements of Authorities with jurisdiction over the works.

Conform to the Standards and Publications quoted throughout this document unless specified otherwise.

22.2 CROSS REFERENCES

MISCELLANEOUS PROVISIONS for **Disposal of Waste**

MISCELLANEOUS PROVISIONS for **Diving Work**

MISCELLANEOUS PROVISIONS for **Work Near Waters Where Crocodiles May Be Present**

PROVISION FOR TRAFFIC

REFERENCED AUSTRALIAN STANDARDS

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

ACTS, REGULATIONS AND CODES

22.3 STANDARDS, LEGISLATION, CODES, AND PUBLICATIONS

All materials and work shall comply with the latest issue of the relevant codes and standards. Some standards and codes are listed below.

When conflict arises between the requirements in the manufacturer's data sheets or recommendations and the specification, the highest standard shall be adopted as directed by the Superintendent.

22.3.1 Standards

AS 1580(set) Paints and related materials - Methods of test.

AS/NZS 1580.108.1 - Determination of dry film thickness on metallic substrates - Non-destructive methods.

AS 1627 Metal finishing - Preparation and pretreatment of surfaces. (Code of Practice for Preparation and Pretreatment of Metal Surfaces prior to Protective Coating).

AS 1627.0 - Method selection guide

AS 1627.1 - Removal of oil, grease and related contamination.

AS 1627.2 - Power tool cleaning.

AS 1627.4 - Abrasive blast cleaning of steel.

AS 1627.9 - Pictorial surface preparation standards for painting steel surfaces.

AS 1678 Emergency Procedures Guide – Transport.

AS 1678.3A1 - Group Text EPGs for Class 3 substances – Flammable Liquids.

AS 1940 The Storage and Handling of Flammable and Combustible Liquids.

AS/NZS 2311 Guide to the Painting of Buildings.

AS 2312 Guide to the Protection of Structural Steel against atmospheric corrosion by the use of protective coatings.

AS 2312.1 - Paint coatings.

AS 2700 Colours for General Purposes.

AS 2865 Confined Spaces.

AS 3894 Site Testing of Protective Coatings.

AS 3894.3 - Determination of dry film thickness.

AS 3894.5 - Determination of surface profile.

AS 3894.10 - Inspection Report – Daily surface and ambient conditions.

- AS 3894.11 - Equipment Report.
- AS 3894.12 - Inspection Report – Coating.
- AS 3894.13 - Inspection Report – Daily blast and paint.
- AS 3894.14 - Inspection Report – Daily painting

AS/NZS ISO 9000 Quality management systems - Fundamentals and vocabulary.

22.3.2 APAS

APAS Specification 2908 Inorganic zinc coating for protection of steel

APAS Specification 2971 Epoxy two-pack durable primer for protection of steel in atmosphere

22.3.3 ASTM

ASTM D5064 Standard Practice for Conducting a Patch Test to Assess Coating Compatibility.

22.3.4 Legislation

Work Health and Safety (NUL) Act 2011.

Work Health and Safety (NUL) Regulations 2011.

22.3.5 Codes

Code of Practice, Abrasive Blasting, Safe Work Australia.

Code of Practice, Managing the Risk of Falls at Workplaces, NT WorkSafe.

22.3.6 Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

22.4 ABBREVIATIONS

ACA	Australasian Corrosion Association
DFT	Dry Film Thickness
EPA	Environment Protection Authority
EPG	Emergency Procedure Guide to AS 1678
ICorr	Institute of Corrosion, UK
ITPs	Inspection and Testing Plans
JSA	Job Safety Analysis
NACE	National Association of Corrosion Engineers, USA
NCR	Non-Conformance Report
NTCZ	See NORTHERN TERRITORY CLIMATE ZONES TABLE
PCCP	Painting Contractors Certification Program
ppm	Parts per million
QA	Quality Assurance
SDS	Safety Data Sheets – formerly known as Material Safety Data Sheets
SWMS	Safe Work Method Statement
TDS	Total Dissolved Solids

22.5 PROTECTIVE COATINGS - HOLD POINT

Hold Point: Surface Preparation: To AS 1627. Provide a copy of the proposed specification for surface preparation as detailed in AS 1627.0 before commencing surface preparation works.

Remove loose millscale, rust, oil, grease, dirt, globules of weld metal, weld slag and other foreign matter.

Priming: Apply the primer coat to the structural steel before delivery to the site and protect from damage during handling and transport.

Hold Point: Complete and submit Site testing of protective coatings: To AS 3894.10 and AS 3894.11 and AS 3894.12.

Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

22.5.1 Single pack zinc phosphate

Thoroughly wire brush steelwork to AS 1627.2 and prime with one coat of single pack zinc phosphate to APAS specification 0162/1 with a dry film thickness of 40 microns.

22.5.2 Epoxy zinc phosphate

Blast clean to the recommendations of AS 1627.4 to grade Sa of AS 1627.9 and prime with one coat of epoxy zinc phosphate to APAS specification 2971 with a dry film thickness of 45 microns.

22.5.3 Inorganic zinc silicate

Blast clean to recommendations of AS 1627.4 to grade Sa of AS 1627.9 and prime with one coat of inorganic zinc silicate to APAS specification 2908 with a dry film thickness of 75 microns.

Site work: After erection, repair any damage to the shop coating and apply the coating, if any, omitted at site connections.

Time delay: Prime the steel surface as soon as possible after surface preparation and prior to any deterioration of the surface. If the surface is contaminated or rust bloomed, repeat the surface preparation before applying the primer.

22.6 PROTECTIVE COATING SPECIFICATIONS - SYSTEMS AND APPROVED PRODUCTS

Refer to PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

22.7 CONTRACTOR'S RESPONSIBILITIES - WITNESS POINT

Applicators must be PCCP accredited in the category appropriate to the works.

Witness point: Provide documentary evidence of PCCP accreditation before commencing protective coatings work.

Provide all protective coating materials, abrasives, labour, supervision, equipment and materials required to complete all work as specified.

Submit:

- Written details of plant and equipment to be used for the work,
- Written details of experience in similar projects,
- ITPs (Inspection & Test Plans) detailing all procedures and test plans to be undertaken to complete the project.
- Details of Environmental Policy. Contractor must present details of procedures to protect the environment.
- Details of warranties outlining the responsibilities of the Coating Manufacturer and the Contractors period of warranty.

22.7.1 Pre Job Meeting

Attend a pre job meeting with the Superintendent and the coating applicator, to review this specification and the coating Contractors ITPs. Any variation proposed shall be discussed at this meeting. No variation shall be allowed unless agreed at this meeting and formally signed off.

22.7.2 Standard Of Workmanship

Follow the protective coating manufacturer's instructions pertaining to mixing, application, drying time etc. Produce a satisfactory end result acceptable to the superintendent.

Compliance with the protective coating manufacturer's instructions shall not absolve the Contractor of responsibility to rectify unacceptable work. Perform all work in a safe and workmanlike manner.

All phases of the work shall be available for observation by a representative of the coatings manufacturer as well as by the Superintendent or their appointed Inspector.

Use personnel experienced in their particular field to carry out all work on surface preparation, protective coatings application and inspection.

The Superintendent may require the Contractor to produce proof of the tradesmen's qualifications.

22.8 SAFETY

Comply with *Work Health and Safety (NUL) Act 2011*, Work Health and Safety (NUL) Regulations 2011, and relevant Codes of Practice, Policies and Procedures applicable to the works at all times during the execution of the works.

Abrasive blasting and protective coatings application must include safety precautions necessitated by the presence of air-hydrocarbon mixtures or other flammable materials.

22.8.1 Thinners, Solvents and Coating Material Safety

All thinners, solvents, primers and coating materials shall be regarded as hazardous materials and their use and storage shall comply with AS 1940, the coating manufacturer's recommendations and Dangerous Goods Regulations 1985. All caution notices on the product containers and material labels shall be strictly observed.

The SDS for all chemicals, including paints and solvents, used and stored on site must be registered with the site manager prior to the product arriving on site.

A copy of the SDS and the applicable Emergency Procedure Guide (EPG) as per AS 1678 must accompany all chemicals during transport.

Keep SDS for all paints as reference.

22.9 TRAFFIC MANAGEMENT

Comply with the Traffic Management requirements in PROVISION FOR TRAFFIC.

Obtain a Permit to Work in a Road Reserve and comply with any conditions imposed in the Permit.

Provide a Traffic Management Plan that caters for vehicular traffic. Include provisions in the Traffic Management Plan for pedestrians, cyclists and water transport if pedestrians, cyclists or water craft might be affected by the works.

22.10 BARRIERS

Install barriers and warning signs for fire hazards, dust, abrasive blasting operations, dangerous fumes and the like, during blasting and coating activities.

Protect adjacent areas and equipment from abrasive blasting grit, water, and detritus and overspray by the erection of screens, hoardings, or drop sheets.

Remove all materials used to mask areas requiring protection during blasting and painting operations upon completion.

22.11 EQUIPMENT

Use equipment including, but not necessarily limited to, ladders, scaffold, compressors and electrical and pneumatic equipment conforming to the requirements in force by the appropriate statutory Acts, regulations and by-laws. Maintain and use this equipment in strict accordance with any safety regulations or requirements pertaining to them.

Do not use ladders as work platforms.

All equipment including dust collectors, air compressors, lifting devices etc. shall conform to the relevant Standards for safety and performance.

Use air supply hoses and couplings of the anti-static type which are safety wired.

Note: Compliance to site safety instructions will be in addition to regulatory requirements.

22.11.1 Personal Air Supply

Where personal breathing equipment is used, the operator's hood or headgear shall be ventilated by clean, cool, oil free air served through a regulator filter. Air supply must be of respiratory quality.

22.11.2 Equipment – Witness Point

Use compressors used for blasting, cleaning and spray painting which have oil and moisture separators with properly maintained filters in the airlines. Perform oil carry-over tests prior to the start of blasting and coating application and on a weekly basis thereafter. Record the results.

Witness Point – Give notice so that the oil carry-over test may be witnessed by the Superintendent or their nominated representative.

22.12 ENVIRONMENTAL CONDITIONS

Comply with coating manufacturers' specifications, particularly with reference to ambient environmental conditions, such as temperature, relative humidity and substrate temperature, prevailing at the location where surface preparation and coating system application is to take place.

Provide copies of Environmental Test Reports to AS 3894, Parts 10, 11, and 12.

In addition provide Reports to AS 3894 Parts 13 and 14 for structural steel.

22.13 WORK IN OR NEAR BODIES OF WATER

Consider the movements of the tide for work to be conducted on components located in tidal waters.

Consider variations to water depth for all work in or near bodies of water.

Refer to **Diving Work** and **Work Near Waters Where Crocodiles May Be Present** clauses in MISCELLANEOUS PROVISIONS.

22.14 SURFACE PREPARATION

Remove all substrate surface defects including weld spatter, slag, burrs, fins, sharp edges and corrosion product.

Remove all surface contaminants such as oil, grease and dirt in accordance with AS 1627.1 using a suitable solvent, oil emulsifier, alkaline degreaser or other approved product.

Assess compatibility and substrate and inter-coat adhesion between the original and new coating systems during maintenance activities by coating a test patch and assessing compatibility and adhesion by ASTM D5064.

Plan and execute all works so as to minimize the possibility of pollution of the Site and adjoining areas from chemicals, dangerous goods and potential contaminants such as dust from abrasive blasting.

22.14.1 Preparation of Surfaces Prior to Blast Cleaning

Permanent welds shall be smooth and shall merge evenly with joining surfaces.

All edges, including drilled or punched holes shall be de-burred and rounded where practical to a minimum of 2mm radius.

22.14.2 Abrasive Blasting – Hold Point

Abrasives shall conform to AS 1627.4 and shall be free from oil, grease, and moisture. The abrasive shall contain no more than 50 ppm soluble salts (TDS) and free from greater than 100 ppm lead.

Do not use silica sand and other potentially silica containing materials. Do not use zinc or copper slag.

Abrasive shall be capable of providing the specified profile.

Do not carry out abrasive blasting if:

- The relative humidity is above 85%.
- The metal temperature is less than 3°C above the dew point.

Blow down blasted surfaces with clean, dry compressed air, or vacuum, or wipe free of dust and spent abrasive media, before any coatings are applied.

Hold Point - At the completion of the final blast and prior to coating application, the surface profile of each item shall be measured according to Method A, Profile Replicating Tape, of AS 3894.5.

Provide documentary confirmation that the surface is suitable for the application of the specified coatings. This shall be identified as a Hold Point in the Contractor's ITP.

22.14.3 Spot and Whip Abrasive Blasting

Use spot blasting of localised corrosion or coating breakdown to provide a profile suitable for the coating system being applied during maintenance coating activities.

Feather the perimeter of the spot blasted area over a 50mm width from where the original coating system is sound.

Whip blast the generally sound coating surface after spot blasting to provide an adequate key for the coating system being applied.

Where whip blasting is not possible, gloss on sound coating may be removed by power tool or hand sanding.

22.14.4 Alternate Surface Preparation – Hold Point

Hold Point - Do not use forms of surface preparation other than abrasive blasting, such as bristle blaster, needle guns, power tool cleaning and hand tool cleaning, without written permission from the Superintendent. Alternate methods of surface preparation must be included in the Contractor's ITP.

22.14.5 Water Washing and Jetting

22.14.5.1 Low pressure water washing

Low pressure water washing operates at pressures up to 35 MPa (up to 5000 psi).

Used to remove loose millscale, rust, paint chalking and soluble salts.

22.14.5.2 High pressure water washing

For effective high pressure water washing 35 MPa to 70 MPa (5000 to 10,000 psi).

Used to remove light to moderate rust scale, concrete splashes, severe marine fouling and loose coatings.

22.14.5.3 High pressure water jetting

High pressure water jetting operates at 70 MPa to 210 MPa (10 000 to 30 000 psi).

Used to remove some rust, intact paints and contaminants.

22.14.5.4 Ultra high pressure water jetting

Ultra high pressure water jetting, equipment needs to operate above 210 MPa (30 000 psi).

Used to remove rust and coatings and to prepare steel to a cleanliness level close to near white metal.

22.14.5.5 Alternate methods

Alternate methods of surface preparation must be included in the Contractor's ITP.

22.14.5.6 Final rinse

To avoid flash rusting use only demineralised water for the final rinse.

22.15 APPLICATION OF PROTECTIVE COATINGS

22.15.1 Atmospheric Conditions

The atmospheric conditions which prevail during the application of coatings shall be such that the surface being coated is completely free of moisture.

Do not apply coatings if:

- The ambient temperature is below 5°C, unless otherwise permitted by the material supplier's data sheet or
- The relative humidity is above 85% or
- The metal temperature is less than 3°C above the dew point or
- The ambient temperature is above 35°C, unless otherwise permitted by the material

- supplier's data sheet or
- Any combination of the above.

Record the ambient conditions both before and at the completion of each day's coating and at three hourly intervals during coating. Submit this information with other daily records specified. Refer to Contractor Records in Inspection And Testing.

22.15.2 Coating – Witness Point – Hold Point

Witness Point – Provide copies of specifications for application of protective coatings from the manufacturers of the products used. Provide copies of manufacturers' product technical data sheets for all products used.

Have all coating materials delivered to the factory, workshop or site in the manufacturers' original containers with the labels intact and seals unbroken.

All materials which have been stored for longer than the specified shelf life or exposed to conditions outside the permissible storage conditions shall be discarded and replaced.

Stored, mix, thin, apply and use all paints strictly in accordance with the coating manufacturers' recommendations.

Hold Point - Provide coating manufacturers' written approval for use before using any other additives (eg promoters, accelerators etc).

Do not mix or use coating materials which have livered, gelled or otherwise deteriorated.

Do not exceed the pot life of catalysed materials corresponding to the working temperature. When the pot life limit is reached, the spray pot shall be emptied, remaining material discarded, the equipment cleaned, material line shall be emptied and flushed out with nominated solvent/cleaner, and new material mixed and catalysed.

22.15.3 Thinners

Use only thinners and dilutents from the same manufacturer as the specified coating for that coating. Use these only at the rate recommended by the coating manufacturer for the specific application.

22.15.4 Stripe Coating

Stripe coat all metal with edges (100mm either side of the weld or edge), where practical, prior to applying the remainder of the protective coating.

Apply the stripe coating by brush or spray. Use the specified coating materials. Ensure the correct DFT for each coat is achieved.

22.15.5 Multiple Coats

Where multiple coats of paint of the same type are specified, each successive coat of paint shall show, where possible, a distinguishable difference in colour to the one over which it is applied.

Comply with coating manufacturer's recommended recoating times for the ambient conditions and temperatures prevailing at the time of coating. If this cannot be achieved and the recoat period is exceeded submit a Non Conformance Report and Corrective Action Report.

22.15.6 Alternate Coating – Hold Point

Hold Point - Do not use coating materials other than specified, without written permission from the Superintendent. Alternate coating materials must be included in the Contractor's ITP.

22.15.7 Coating Defects – Hold Point – Witness Point

Adhesion of coatings shall be sound throughout. All coatings shall be free of sagging, pinholes, dry overspray and other defects.

Hold Point – Provide details of repairs required and procedures and processes proposed for making the repairs to the Superintendent prior to making any repairs. Any requirements for the repair of protective coatings shall be identified as a Hold Point in the Contractor's ITP.

Marking of defective areas shall be made using a marker compatible with the coating over which it is applied. Crayons and paint pens shall not be used.

Witness Point - This compatibility between marker and coating is to be confirmed by the coating manufacturer. Provide written evidence of this compatibility if requested by the Superintendent.

Sand, or whip blast, and recoat surfaces contaminated by embedded dust to the specified DFT using the full system selected. If the defects cannot be rectified through the above means, then the Contractor is required to submit a Non Conformance Report and a Corrective Action Report.

22.15.8 Transit And Erection Damage And Field Weld Margins

Spot abrasive blast all coating damaged during transit and erection, including field weld margins, such that it is thoroughly cleaned. Restore the area according to the coating manufacturer's recommendations with a material compatible with, and providing at least the same performance as, the parent coating.

22.15.9 Surfaces Not To Be Coated

Do not blast or coat the following surfaces and materials unless specifically directed by the Superintendent:

- Stainless Steel
- Other surfaces nominated by the Superintendent.

22.15.10 Inspection And Testing

All work performed may be subject to inspection by the Superintendent or a nominated representative.

Ensure all necessary inspections are carried out.

22.16 QUALITY ASSURANCE AND TRACEABILITY

The Superintendent will give preference to Protective Coating System manufacturers and applicators certified to AS/NZS ISO 9000 Series or equivalent, or holding approval from the Paint Contractors' Certification Program (Class 4).

22.17 ITP, JSA AND SWMS – HOLD POINT

Hold Point – Provide ITPs, JSAs, a SWMS and other quality control procedures and documents to be used during protective coating systems application. These must be approved prior to commencement of work.

22.18 CONTRACTOR RECORDS – WITNESS POINT – HOLD POINT

Maintain written records of the work so that complete traceability of all work and materials provided under this Specification is maintained. Use the relevant sections of AS 3894.10, AS 3894.11 & AS 3894.12 QA report forms as a basis of this record keeping format for all protective coating work under this contract. Use AS 3894.13 and AS 3894.14, in addition to the preceding Australian Standards, for structural steel work coated under this contract.

Witness Point - Maintain these reports on a daily basis. Submit them to the Superintendent when requested, or, if not specifically requested, at least weekly.

Hold Point - Provide copies of all NCRs (Non Conformance Reports) immediately they are completed or received. The NCRs must detail the non-conformance and be accompanied by a Corrective Action Report (CAR) which is to detail the action proposed to be undertaken to rectify the non-conformance.

22.18.1 Film Thickness – Hold Point – Witness Point

The film thickness is the minimum average dry film thickness, with an exception criteria as defined in AS 3894.3, including primer coats specified in the painting system.

Hold Point - Final acceptance of each increment of work will not be made until the dry film thickness meets or exceeds the specified thickness. Regardless of the number of coats specified, additional coats shall be applied as may be necessary to achieve the specified thickness, at the Contractor's expense.

Witness Point - Provide and operate wet film and dry film thickness gauges of approved types to ensure the correct thickness of each coat and the full system is achieved. Provide details of the gauges proposed for use.

Use an electronic thickness gauge to determine the total dry film thickness on metallic substrates.

Calibrate the gauges in accordance with AS 3894.3 (dry film thickness) or AS/NZS 1580.108.1 (wet film thickness).

22.18.2 Inspector – Hold Point

Appoint an inspector of coatings, qualified or certified under ACA, NACE, or ICorr, for inspection and testing of substrate preparation and protective coating systems applied under this contract.

Hold Point – Provide the name and qualifications of the inspector prior to commencement of work.

All work may be subject to inspection by the Superintendent. This shall not relieve the Contractor of their own Quality Assurance/Quality Control responsibilities.

22.19 HANDLING OF FINISH COATED ITEMS

Handle with care all metalwork that has been coated to preserve the coating in the best practicable condition.

Do not handle coated metalwork until the coating has dried hard.

Use web slings or slings covered with a rubber hose or similar soft material for the handling of finish coated items.

Protect finish coated items with soft material such as cloth, carpet or rubber sheeting on areas of contact (eg. wooden supports and holding down chains or slings) during transport and storage.

Repair and make good any damage to finish coated items.

Items with any damage caused by insufficient care are to have the entire coating removed and be recoated in accordance with this specification at the Contractor's expense.

22.20 NOTES

Coating systems are to be compatible with level of surface preparation available or proposed.

Refer to NT CLIMATE ZONES TABLE.

22.21 TABLES - PROTECTIVE COATING SPECIFICATIONS - SYSTEMS AND APPROVED PRODUCTS

Table - Corrosivity Categories of Areas of the NT	
ARID REGIONS: Corrosivity Category C2 Low	Areas south of, and including, Tennant Creek. (NTCZ01)
INLAND REGIONS: Corrosivity Category C3 Medium	Areas north of Tennant Creek and south of, and including, Katherine and areas more than 50 km from the coast or tidal estuaries. (NTCZ02)
COASTAL / TROPICAL: Corrosivity Category C5-M Very High and T (Inland Tropical)	Areas north of Katherine and areas up to 50 km from the coast or tidal estuaries. (NTCZ03 & NTCZ04)

PROTECTIVE COATINGS

Table - Protective Coating Specification # PS1							
General							
Coating Specification for Steel – Arid Regions Corrosivity Category C2 Low							
Areas							
Coating system for Steel where Abrasive Blasting cannot be undertaken. Typical Exposure: Atmospheric exposure for arid regions including areas of Alice Springs, Tennant Creek and all central Australian locations. Areas south of, and including, Tennant Creek. (NTCZ01)							
Surface Preparation							
Surfaces to be clean, free of oil and grease and all contaminants and salts. All loose and flaking coating to be removed. All edges to be feathered back to a sound tightly adhered surface. All corrosion to be removed by power or hand tool cleaning to AS 1627.2 and AS 1627.9 Class St 3 standard.							
Protective Coating System as per AS 2312							
	DFT in μm	Int'l Paints	Dulux	Jotun	PPG Industries	Hempel	Wattyl
1st Coat							
Epoxy Mastic	100-150	Interplus 1180	Durebild STE	Jotamastic 90	Amerlock 400	Hempadur Quattro 17634	Epiname! DTM 985
Optional 2nd Coat							
Finish Coat Polyurethane	75	Interthane 990	Weathermax HBR	Hardtop Flexi	Amershield	Hempathane HS 55610	Poly U750
Total DFT in μm	175-225						
Notes: Apply all coatings in strict accordance with the manufacturers' technical data sheets. Provide coatings manufacturers' recommendations prior to commencing work. The coating systems in these tables form part of, and should be read in conjunction with, the other clauses in this work section.							

PROTECTIVE COATINGS

Table - Protective Coating Specification # PS2							
General							
Coating Specification for Steel – Arid Regions Corrosivity Category C2 Low							
Areas							
Coating system for Steel where Abrasive Blasting can be undertaken. Typical Exposure: Atmospheric exposure for arid regions including areas of Alice Springs, Tennant Creek and all central Australian locations. Areas south of, and including, Tennant Creek. (NTCZ01)							
Surface Preparation							
Surfaces to be clean, free of oil and grease and all contaminants and salts Abrasive blast to AS 1627.4 & AS 1627.9 Sa 2½, near white metal with angular surface profile 40 – 75 microns.							
Protective Coating System as per AS 2312							
	DFT in µm	Int'l Paints	Dulux	Jotun	PPG Industries	Hempel	Wattyl
1st Coat							
Zinc Rich Epoxy Primer	75	Interzinc 52	Zincanode 402	Barrier Plus	Sigmazinc 471	Hempadur Zinc 17360	Galvit EP100
2nd Coat							
Finish Coat Polyurethane	75	Interthane 990	Weathermax HBR	Hardtop Flexi	Amershield	Hempathane HS 55610	Poly U750
Total DFT in µm	150						
Notes:							
Apply all coatings in strict accordance with the manufacturers' technical data sheets.							
Provide coatings manufacturers' recommendations prior to commencing work.							
The coating systems in these tables form part of, and should be read in conjunction with, the other clauses in this work section.							

PROTECTIVE COATINGS

Table - Protective Coating Specification # PS3							
General							
Coating Specification for Steel – Inland Regions Corrosivity Category C3 Medium							
Areas							
Coating system for Steel where Abrasive Blasting cannot be undertaken. Typical Exposure: Atmospheric exposure for inland regions including Katherine and other inland regions. Areas north of Tennant Creek and south of, and including, Katherine and areas more than 50 km from the coast or tidal estuaries. (NTCZ02)							
Surface Preparation							
Surfaces to be clean, free of oil and grease and all contaminants and salts. All loose and flaking coating to be removed. All edges to be feathered back to a sound tightly adhered surface. All corrosion to be removed by power or hand tool cleaning to AS 1627.2 and AS 1627.9 Class St 3 standard.							
Protective Coating System as per AS 2312							
	DFT in μm	Int'l Paints	Dulux	Jotun	PPG Industries	Hempel	Wattyl
1st Coat							
Epoxy Mastic	75-100	Interplus 356	Durebild STE	Jotamastic 90	Amerlock 400	Hempadur Quattro 17364	Epiname! DTS 680
2nd Coat							
Intermediate Epoxy Mastic	75-100	Interplus 356	Durebild STE	Jotamastic 90	Amerlock 400	Hempadur Quattro 17364	Epiname! DTS 680
Optional Top Coat							
Finish Coat Polyurethane	75	Interthane 990	Weathermax HBR	Hardtop Flexi	Amershield	Hempathane HS 55610	Poly U 750
Total DFT in μm	225-275						
Notes:							
Apply all coatings in strict accordance with the manufacturers' technical data sheets. Provide coatings manufacturers' recommendations prior to commencing work. The coating systems in these tables form part of, and should be read in conjunction with, the other clauses in this work section.							

PROTECTIVE COATINGS

Table - Protective Coating Specification # PS4							
General							
Coating Specification for Steel – Inland Regions Corrosivity Category C3 Medium							
Areas							
Coating system for Steel where Abrasive Blasting can be undertaken. Typical Exposure: Atmospheric exposure for inland regions including Katherine and other inland regions. Areas north of Tennant Creek and south of, and including, Katherine and areas more than 50 km from the coast or tidal estuaries. (NTCZ02)							
Surface Preparation							
Surfaces to be clean, free of oil and grease and all contaminants and salts. Abrasive blast to AS 1627.4 & AS 1627.9 Sa 2½ , near white metal with angular surface profile 40 – 75 microns.							
Protective Coating System as per AS 2312							
	DFT in µm	Int'l Paints	Dulux	Jotun	PPG Industries	Hempel	Wattyl
1st Coat							
PRIMER Zinc Rich Epoxy	50-75	Interzinc 52	Zincanode 402	Barrier Plus	Sigmazinc 471	Hempadur Zinc 17360	Epiname PR360ZPS
2nd Coat							
Intermediate High Build Epoxy	100-150	Interplus 1180	Duremax GPE	Jotacote Universal	Amerlock 400	Hempadur Quattro 17364	Epiname DTM 985
Optional Top Coat							
Finish Coat Polyurethane	75	Interthane 990	Weathermax HBR	Hardtop Flexi	Amershield	Hempathane HS 55610	Poly U750
Total DFT in µm	225-300						
Notes:							
Apply all coatings in strict accordance with the manufacturers' technical data sheets. Provide coatings manufacturers' recommendations prior to commencing work. The coating systems in these tables form part of, and should be read in conjunction with, the other clauses in this work section.							

PROTECTIVE COATINGS

Table - Protective Coating Specification # PS5							
General							
Coating Specification for Steel – Coastal Regions Corrosivity Category C5M Very High and T (Inland Tropical)							
Areas							
Coating system for Steel where Abrasive Blasting cannot be undertaken. Typical Exposure: Atmospheric exposure for coastal regions including Darwin and other coastal establishments. Areas north of Katherine and areas up to 50 km from the coast or tidal estuaries. (NTCZ03 & NTCZ04)							
Surface Preparation							
Surfaces to be clean, free of oil and grease and all contaminants and salts. All loose and flaking coating to be removed. All edges to be feathered back to a sound tightly adhered surface. All corrosion to be removed by power or hand tool cleaning to AS 1627.2 and AS 1627.9 Class St 3 standard.							
Protective Coating System as per AS 2312							
	DFT in μm	Int'l Paints	Dulux	Jotun	PPG Industries	Hempel	Wattyl
1st Coat							
Epoxy Mastic MIO	125-150	Interplus 356	Durebild STE MIO	Jotacote 605 MIO	Amerlock 400 MIO	Hempadur Mastic 45881	Epinamel DTM 985 MIO
2nd Coat							
Intermediate High Build Epoxy	100-150	Interplus 1180	Duremax GPE	Jotacote Universal	Amerlock 400	Hempadur Quattro 17364	Epinamel DTM 985
Optional Top Coat							
Finish Coat Polyurethane	75	Interthane 990	Weathermax HBR	Hardtop Flexi	Amershield	Hempathane HS 55610	Poly U750
Total DFT in μm	325-375						
Notes:							
Apply all coatings in strict accordance with the manufacturers' technical data sheets. Provide coatings manufacturers' recommendations prior to commencing work. The coating systems in these tables form part of, and should be read in conjunction with, the other clauses in this work section.							

PROTECTIVE COATINGS

Table - Protective Coating Specification # PS6							
General							
Coating Specification for Steel – Coastal Regions Corrosivity Category C5M Very High and T (Inland Tropical)							
Areas							
Coating system for Steel where Abrasive Blasting can be undertaken. Typical Exposure: Atmospheric exposure for coastal regions including Darwin and other coastal establishments. Areas north of Katherine and areas up to 50 km from the coast or tidal estuaries. (NTCZ03 & NTCZ04)							
Surface Preparation							
Surfaces to be clean, free of oil and grease and all contaminants and salts. Abrasive blast to AS 1627.4 & AS 1627.9 Sa 2½ , near white metal with angular surface profile 40 – 75 microns.							
Protective Coating System as per AS 2312							
	DFT in µm	Int'l Paints	Dulux	Jotun	PPG Industries	Hempel	Wattyl
1st Coat							
PRIMER Zinc Rich Epoxy	50-75	Interzinc 52	Zincanode 402	Barrier Plus	Sigmazinc 471	Hempadur Zinc 17360	Galvit EP100
2nd Coat							
Intermediate High Build MIO Epoxy	150-200	Interplus 1180	Duremax GPE MIO	Penguard Express MIO	Amerlock 400 MIO	Hempadur Mastic 45881	EpinameI DTM 985 MIO
Optional Top Coat							
Finish Coat Polyurethane	75	Interthane 990	Weathermax HBR	Hardtop Flexi	Amershield	Hempathane HS 55610	Poly U 750
Total DFT in µm	275-350						
Notes:							
Apply all coatings in strict accordance with the manufacturers' technical data sheets. Provide coatings manufacturers' recommendations prior to commencing work. The coating systems in these tables form part of, and should be read in conjunction with, the other clauses in this work section.							

PROTECTIVE COATINGS

Table - Protective Coating Specification # PS7							
General							
Existing Hot Dipped Galvanised Steel Subject to Severe - Atmospheric Exposure – New and Maintenance							
Areas							
Coating system for galvanized steel.							
Surface Preparation							
Surfaces to be clean, free of oil and grease, salts and all other contaminants. Abrasive Sweep (brush) blast to AS 1627.4 Appendix 'D' to achieve an angular surface profile using garnet to 25-40 microns. Rust affected areas to be spot blasted to AS 1627.4 & AS 1627.9 Sa 2½ with an angular surface profile of 40-75 microns.							
Protective Coating System as per AS 2312							
	DFT in µm	Int'l Paints	Dulux	Jotun	PPG Industries	Hempel	Wattyl
1st Coat							
Primer Zinc Phosphate Epoxy Primer	50 - 75	Intergard 251	Durepon P14	Pengard Special Grey	Sigmacover 280LT	Hempadur 15590	Epinamel PR 250
2nd Coat							
Finish Coat High Build Epoxy	300 - 350	Interzone 505GF	Durebild STE GF	Jotamastic 87 GF	Sigmashield 825 LT (Amerlock 2K Glass Flake)	Hempadur Multi- Strength 45540	Epinamel DTM 985
Total DFT In µm	350 - 475						
Allowance should be made for the galvanizing approximately 85 microns.							
Notes:							
Apply all coatings in strict accordance with the manufacturers' technical data sheets. Provide coatings manufacturers' recommendations prior to commencing work. The coating systems in these tables form part of, and should be read in conjunction with, the other clauses in this work section.							

PROTECTIVE COATINGS

Table - Protective Coating Specification # PS8								
General								
Repair specification for wharf structures, steel piling, ship loading facilities, oil spill clean up equipment and plant piping operating at <40°C.								
Areas								
Marine environment : onshore and offshore								
Surface Preparation								
Abrasive blast clean to remove all previous coatings and corrosion products. Bevel all edges. Surface shall be high pressure water blasted at a minimum pressure of 3,000 psi then tested to ensure free from soluble salts (see Clause 6). Abrasive blast clean to AS 1627.4 Class 2½ Surface profile 30-60µm								
Protective Coating System as per AS 2312								
Protective Coating – PS8.1 Steel with light to minimal pitting								
	DFT in µ	Int'l Paints	Dulux	Jotun	PPG	Hempel	Wattyl	
1st Coat								
High epoxy build	200-250	Interzone 954	Durebild STE Glass Flake	Marathon 500	Sigmashield 880	Hempadur Quattro 17634	Epinamel DTM 985	
2nd Coat								
High epoxy build	200-250	Interzone 954	Durebild STE Glass Flake	Marathon 500	Sigmashield 880	Hempadur Quattro 17634	Epinamel DTM 985	
Total DFT	400-500							
Protective Coating System as per AS 2312								
Protective Coating – PS8.2 Heavily pitted steel								
	DFT in µ	Int'l Paints	Dulux	Jotun	PPG	Hempel	Wattyl	
1st Coat								
High epoxy build	450-500	Interzone 954	Durebild STE Glass Flake	Marathon 500	Sigmashield 880	Hempadur Quattro 17634	Epinamel DTM 985	
2nd Coat								
High epoxy build	450-5000	Interzone 954	Durebild STE Glass Flake	Marathon 500	Sigmashield 880	Hempadur Quattro 17634	Epinamel DTM 985	
Total DFT	900-1000							
Notes:								
Apply all coatings in strict accordance with the manufacturers' technical data sheets. Provide coatings manufacturers' recommendations prior to commencing work. The coating systems in these tables form part of, and should be read in conjunction with, the other clauses in this work section.								

PROTECTIVE COATINGS

Table - Protective Coating Specification # PS9							
General							
Ultra high build epoxy for coating new piles, and other surfaces in underwater or splash zone environment.							
Areas							
Underwater & splash zone							
Surface Preparation							
Abrasive blast clean to remove all corrosion products and/or previous coatings. Bevel all edges. Surface shall be high pressure water blasted at a minimum pressure of 3,000 psi then tested to ensure free from soluble salts (see Clause 6). Abrasive blast clean to AS 1627.4 Class 2½ 75-100µm (angular profile)							
Protective Coating System as per AS 2312							
	DFT in µ	Int'l Paints	Dulux	Jotun	PPG	Hempel	Wattyl
1st Coat							
Primer Holding Primer (if required)	30-50	Interline 982	Luxepoxy 66	N/A	Sigmacover 280LT	Hempadur 15590	Epinamel PR 250 (thinned)
2nd Coat							
Ultra High Build Epoxy	1000-1500	Interzone 485	Luxepoxy UHB	Jotacote UHB	Sigmashield 880	Hempadur Multi Strength 45540 (2 coats of 500 um)	Epinamel UHB 1000
Total DFT	1030 - 1550						
Notes:							
Apply all coatings in strict accordance with the manufacturers' technical data sheets. Provide coatings manufacturers' recommendations prior to commencing work. The coating systems in these tables form part of, and should be read in conjunction with, the other clauses in this work section.							

PROTECTIVE COATINGS

Table - Protective Coating Specification # PS10	
General	
Repair coating for cylindrical piling using petrolatum tape system, for use in very exposed sites and harsh environments.	
Areas	
Very exposed sites and harsh environments.	
Surface Preparation	
Remove all loose rust, original coating, marine growth etc, by scraping, chipping, water blast cleaning or ship's hull scrubber. Close examination, after preparation, to ensure thoroughly clean surface without growth, sharp or protruding edges.	
System	
Primer	Denso Seashield Primer (or equal approved)
Tape	Denso Seashield Tape (or equal approved) Overlap of 55%
Outer Cover	Denso Seashield 2000 FD Outer Cover (or equal approved) Fixed with 316 stainless bolts
Note: Inspection points as per Denso Seashield published instructions.	
Notes: Apply all coatings in strict accordance with the manufacturers' technical data sheets. Provide coatings manufacturers' recommendations prior to commencing work. The coating systems in these tables form part of, and should be read in conjunction with, the other clauses in this work section.	

22.22 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

23 MEASUREMENT AND PAYMENT

The following Measurement and Payment clauses refer to the specification sections of the same name, however, the clause numbers do not match the section numbers of the same title.

The selection of specific items or materials for the works being carried out are those items listed in the Schedule of Rates in the Response Schedules for the particular contract and any items or materials specified in the PROJECT SPECIFIC REQUIREMENTS section of the Request for Tender/Quotation document. Any additional work or any changes to this Reference Specification will be specified in the PROJECT SPECIFIC REQUIREMENTS section.

Material used for the works which is extracted from areas within pastoral leases is to be provided at no cost to the Principal.

23.1 MISCELLANEOUS PROVISIONS

23.1.1 Environmental Management

Generally

Not measured separately.

Include the cost of environmental management in the rates for the applicable items.

23.1.2 Environmental Management Plan

Measured as an item.

23.1.3 Cleaning of Vehicles and Plant

Measured by number cleaned.

Vehicles and plant items are priced separately.

23.1.4 Establishment

Refer to Mobilisation Diagrams at Clause 23.24.

Note: Nominated distance from Post Office shown in the diagrams is equivalent to the nominated boundary of the Darwin Region area.

23.1.4.1 Mobilisation

Mobilisation may not be measured separately and may be included in rates for applicable items. *(If applicable) Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.*

Mobilisation will not be paid for work in the nominal urban areas of each region, and defined for this clause as the following:

Alice Springs Region:	Any work within 20 Km of the Alice Springs Post Office
Darwin Region:	Any work in Darwin, Palmerston and Litchfield Council geographical areas prior to the Stuart Highway (PRP20/0.00km) and the Arnhem Highway (PRP1/ 0.00km) Intersection. The area shall include Gunn Point Region, Channel Island Regions, the section of the Stuart Highway from Arnhem Highway intersection to Jenkins Road and the full length of Jenkins Road, and the section of the Arnhem Highway from Stuart Highway to Edwin Road Intersection.
East Arnhem Region:	Any work within 30 Km of the Gove Post Office
Katherine Region:	Any work within 20 Km of the Katherine Post Office
Tennant Creek Region:	Any work within 20 Km of the Tennant Creek Post Office

If Mobilisation is measured separately, it will be measured per kilometre, one way, beyond the urban boundary to the furthest location or end point of the works order along the shortest practical route.

When side roads are included in the work order, mobilisation will be paid for the one way distance from the beginning of the side road to the furthestmost point of the work.

In the case of the works issued on the same order but requiring the contractor to return to a site, example 3 will apply as in the diagram below. In essence this situation is treated as if it was a subsequent work order.

In the case of emergency works, and the contractor is busy with a current work order, relevant mobilisation shall apply to the furthest location of the emergency work order, however the contractor shall be paid a demobilisation fee from the furthest location of the emergency work order back to the work position on the work order prior to the emergency. The demobilisation rate shall be the same as the mobilisation rate.

Where subsequent work orders are issued and work is continuous, mobilisation will be measured from the end location of the original work site in the same manner as above. Work orders will be deemed to be continuous if they are issued before the previous work is complete..

23.1.4.2 Demobilisation

Not measured separately. Include all costs associated with demobilisation in with the costs of mobilisation.

23.1.5 Officer and Vehicle

Officer and vehicle to be paid for on hourly rate inclusive of vehicle and reports.

23.1.6 Urgent Works Attendance

Measured by number for urgent call outs within and outside of normal working hours. Contractor must be mobilised within 2 hours of notification.

23.1.7 Urgent Works Attendance - EMERGENCY Road Hazard

Measured in hours – paid at scheduled hourly Rate.

Make allowance for 2 personnel with appropriate qualifications, vehicle, with tools and equipment.

Make allowance for appropriate Plant for the works (i.e Backhoe or Loader)

Mobilisation of Plant will be paid separately.

23.1.8 Gravel Pit Management Plans

Measured by number.

23.1.9 Rehabilitation of Existing Material Extraction Areas

Measured by hectare rehabilitated.

23.1.10 Progressive Rehabilitation of New Material Extraction Areas

Not measured separately. Include the cost of progressively rehabilitating new Material Extraction Areas in the cost of gravel supply etc.

23.1.11 Negotiated Rate

Where a type of works is described but does not appear in the schedule of rates or is not defined in the specification and not included in the Schedule of Rates items, a rate shall be negotiated to cover the works required.

The item of works may then be included in the contract Schedule of Rates at the Superintendents discretion.

23.2 PROVISION FOR TRAFFIC

23.2.1 Traffic Management Plan

Measured as an item. Includes Traffic Guidance Schemes.

23.2.2 Provision For Traffic

Not measured separately. Included in rates for applicable items.

23.2.3 Specific Traffic Guidance Schemes

Measured by number.

Payment will be made progressively in proportion to the value of work carried out.

23.2.4 Variable message boards

Measured as an item.

23.2.5 Provision for Traffic – Rural Areas

Not measured as a separate item for work in rural areas. Allow for in other items.

23.2.6 Provision for Traffic – Urban Areas

To be at a negotiated rate per work site, or as nominated in the Schedule of Rates

23.2.7 Gravelling of Side Tracks for Detours

Measured in square metres for the specified gravel thickness and width.

Make allowance for supply, delivery, and compaction of material.

23.2.8 TRAFFIC MANAGEMENT

Complex Traffic Management items are inclusive of minor traffic management requirements for the entire site of works.

The following item/s shall be submitted to Superintendent for approval prior to use;

23.2.9 Site Specific Traffic Management Plan and Traffic Guidance Schemes

Measured by number.

Payment will include the labour, equipment and materials required to compile and submit a site specific Traffic Management Plan and associated TGSs, in accordance with the Provision for Traffic, to the Superintendent.

Note; the Template TMPs and Generic and TGSs required under PROVISION FOR TRAFFIC are not to be classed as chargeable items.

23.3 EARTHWORKS AND DRAINAGE

23.3.1 Earthworks in Cut – General Material

Measured in in-situ cubic metres.

23.3.2 Earthworks in Cut - Rock

Measured in in-situ cubic metres.

Payment only for works directed by the Superintendent.

Payment for excavation only and payment for filling is at the rate for Select Fill.

23.3.3 Earthworks in Cut – Unsuitable Material and/or Weathered Rock

Measured in in-situ cubic metres.

Payment only for works directed by the Superintendent.

Payment for excavation only, and payment for filling is at the rate for Select Fill.

23.3.4 Earthworks in Fill – Scour and Washout Repair

Measured in compacted cubic metres.

Include the compaction of the subgrade before filling operation.

23.3.5 Earthworks in Fill – Standard Fill

Measured in compacted cubic metres.

Include the compaction of the subgrade before filling operation.

23.3.6 Select Fill

Measured in compacted cubic metres.

Include the compaction of the subgrade before filling operation.

23.3.7 Excess Haulage

Measured in compacted cubic metres per kilometre over and above importing distance of 15 km.

23.3.8 Removal of Excess Material

Measured in in-situ cubic metres.

23.3.9 Table Drains

Measured by kilometre for 1 side of road for new works only. Reinstatement included in other rates.

23.3.10 Table Drain Offlets

Measured by number for new works only. Reinstatement included in other rates.

23.3.11 Table Drain Blocks

Measured by number for new works only. Reinstatement included in other rates.

A table drain block has approximate volume of 20 compacted cubic metres.

Allow for material sourced and imported from a location up to a distance of 15 km from the site.

Payment for excess haulage shall be at the rate for Excess Haulage.

23.3.12 Stop Berms/Levees

Measured by number for new works only. Reinstatement included in other rates.

A stop berm/levee has approximate volume of 15 compacted cubic metres.

Allow for material sourced and imported from a location up to a distance of 15 km from the site.

Payment for excess haulage shall be at the rate for Excess Haulage.

23.3.13 Catch Drains

Measured in linear metres for new works only. Reinstatement included in other rates.

23.3.14 Trim and Compact Unpaved Areas

Measured in square metres.

23.4 CONFORMANCE TESTING

The Superintendent will pay for all conformance testing directly to the Panel Period Contractor selected to perform the conformance tests required under the contract and nominated as the Superintendent's responsibility.

If any tests fail to meet specification, all retesting costs will be a negative variation to the contract.

When testing has been ordered and the site is not ready for testing at the time specified by the Contractor, the Contractor will bear the cost of time and travel incurred by the Panel Period Contractor and the Superintendent, where applicable.

23.4.1 Process Testing

The Contractor is responsible for the ordering up and payment for all process tests carried out.

This is not measured separately.

Include the cost of process testing under the relevant items in the Schedule of Rates.

23.5 GRADING AND GRAVEL SHEETING

Generally; include all costs within the rates, including the supply, and delivery to site, of materials. Allow for haulage of materials, as part of the construction activity, for up to 15km from any extractive area. Excess haulage will be paid separately.

23.5.1 Gravel Resheeting

Measured in square metres for 200 mm compacted thickness of gravel material in pavement and shoulder, where material is sourced and imported from a location up to a distance of 15 km from the site.

This item applies to lot section sizes greater than 600 m².

Include in the rate, the pavement or shoulder materials outside the carriageway width not included in measurement.

23.5.2 Gravel Repairs to Wash outs and Blow outs

Measured in square metres for 200 mm compacted thickness of gravel material in pavement and shoulder, where material is sourced and imported from a location up to a distance of 15 km from the site.

This item applies to lot section sizes less than, or equal to, 600 m².

23.5.3 Gravel Excess Haulage

Measured in compacted cubic metres per kilometre over and above importing distance of 15 km.

23.5.4 Opening Grade - Unsealed Pavements

Measured in kilometres for the total road length ordered, inclusive of the graded and the by-passed surface.

23.5.5 Maintenance Grade - Carriageway - Unsealed Pavements

Measured in kilometres.

23.5.6 Maintenance Grade – Between Inverts - Unsealed Pavements

Measured in kilometres.

Include in the rate, the reinstatement of table drain blocks in accordance with EARTHWORKS AND DRAINAGE.

23.5.7 Full Maintenance Grade - Unsealed Pavements

Measured in kilometres.

Include in the rate, the reinstatement of table drains, offlet drains, table drain blocks, catch drains, and benches in cut, in accordance with EARTHWORKS AND DRAINAGE.

23.5.8 Grade, Water, and Roll – Carriageway - Unsealed Pavements

Measured in kilometres.

23.5.9 Grade, Water and Roll – Between Inverts - Unsealed Pavements

Measured in kilometres.

Include in the rate, the reinstatement of table drain blocks in accordance with EARTHWORKS AND DRAINAGE.

23.5.10 Grade, Water and Roll – Full Maintenance - Unsealed Pavements

Measured in kilometres.

Include in the rate, the reinstatement of table drains, offlet drains, table drain blocks, catch drains, and benches in cut, in accordance with EARTHWORKS AND DRAINAGE.

23.5.11 Rip and Re-compaction - Unsealed Pavements

Measured in kilometres.

Include in the rate, the reinstatement of table drains, offlet drains, table drain blocks, catch drains, and benches in cut, in accordance with EARTHWORKS AND DRAINAGE.

23.5.12 Reformation and Re-compaction - Unsealed Pavements

Measured in square metres for 100 mm top up compacted thickness of gravel material.

Include in the rate, the reinstatement of table drains, offlet drains, table drain blocks, catch drains, and benches in cut, in accordance with EARTHWORKS AND DRAINAGE.

23.5.13 Drainage Maintenance Grade

Measured in kilometres for 1 side of road.

Include in the rate, the reinstatement of table drains, offlet drains, table drain blocks, catch drains, and benches in cut, in accordance with EARTHWORKS AND DRAINAGE.

23.5.14 Invert Grade Water and Roll – Sealed Road Shoulder Maintenance

Measured in kilometres for 1 side of road.

Include in the rate, the reinstatement of table drain blocks in accordance with EARTHWORKS AND DRAINAGE.

23.5.15 Full Maintenance Grade with Water and Roll – Sealed Road Shoulder Maintenance

Measured in kilometres for 1 side of road.

Include in the rate, the reinstatement of table drains, offlet drains and table drain blocks in accordance with EARTHWORKS AND DRAINAGE.

23.5.16 Rip And Re-compaction – Sealed Road Shoulder Maintenance

Measured in kilometres for 1 side of road.

Include in the rate, the reinstatement of table drains, offlet drains and table drain blocks in accordance with EARTHWORKS AND DRAINAGE.

23.5.17 Reformation and Re-compaction - Sealed Road Shoulder Maintenance

Measured in square metres for 100 mm top up compacted thickness of gravel material.

Include in the rate, the reinstatement of table drains, offlet drains and table drain blocks in accordance with EARTHWORKS AND DRAINAGE.

23.5.18 Reformation and Re-compaction - Sealed Road Shoulder Maintenance – Urban Areas

Measured in square metres for 100 mm top up compacted thickness of gravel material.

Include in the rate, the reinstatement of table drains, offlet drains and table drain blocks in accordance with EARTHWORKS AND DRAINAGE

Rate include sourcing of Gravel Type 2/3 commercially and haulage of material.

Mobilisation not measured separately, included in the rate.

23.5.19 Shoulder Maintenance Cycle/Shared Path

Measured in square metres for nominated top up compacted thickness of 100 mm.

Include the material that is commercially sourced and the haulage of material.

Mobilisation not measured separately, included in the rate.

23.5.20 Protection of Road Furniture

Not measured separately.

Include in the rates of other items for the removal, protection, storage, replacement of any road furniture damaged during the work, and the reinstatement of all removed road furniture items within the work zone.

23.6 STABILISATION MAINTENANCE

23.6.1 Supply and Spread Stabilising Agent

For in-situ methods.

Measured in tonnes.

Determined by multiplying the application rate of cement and lime indicated in the procedure by the area to be treated.

23.6.2 Supply Top-up Materials

Measured in square metres for nominated top up compacted thickness layer material of 50 mm in subgrade, pavement and shoulder, where material is sourced and imported from a location up to a distance of 15 km from the site.

23.6.3 Mixing, Compacting, Trimming and Curing Stabilised Layer

Measured in square metres for 150 mm compacted thickness for each specified layer:

23.6.4 Mixing, Compacting and Trimming Pulverized Wet Mix Layer

Measured in square metres for 150 mm compacted thickness for each specified layer.

23.6.5 Reconstruction Stabilise Pavement

Measured in square metres for 200 mm compacted the thickness for areas up to 1000m².

Inclusive of cement stabilisation of pavement materials (mixing, compacting, trimming and curing stabilised layer).

Allow for stabilisation and top-up material.

Surface treatment (spray sealing) shall be paid under a separate item.

23.6.6 Reconstruction of Pavement Base course 200mm and Subgrade 150mm Depth

Measured in square metres for the thickness specified for areas up to 1000m².

Include new gravel base course material. If the base course is FCR the supply rate shall be negotiated.

Allow for stabilisation material.

Surface treatment (spray sealing) shall be paid under a separate item.

23.7 SPRAY SEALING MAINTENANCE

23.7.1 AREAS LESS THAN 300m²

23.7.1.1 General

Measured in square metres for specified aggregate size

Allow for surface preparation, precoat, binder, aggregate and all activities to achieve the final sealed surface.

23.7.1.2 Primer Seal

Measured in square metres for the size nominated.

Allow for preparation, precoat, binder and aggregate and all activities to achieve the final sealed surface.

23.7.1.3 Reseal work

Measured in square metres for the size nominated and binder type nominated.

Allow for preparation, precoat, binder and aggregate and all activities to achieve the final sealed surface.

Make allowance for existing texture.

23.7.1.4 Geofabric

Measured in square metres of completed area.

Make allowance for supply and placement.

Make allowance for overlapping at joins.

23.7.2 AREAS GREATER THAN 300m²

23.7.2.1 Preparation of Pavement

Measured in square metres of the prepared area.

Allow for Under Pavement Growth Inhibitor for pedestrian paths, cycle paths, and shared paths.

23.7.2.2 Prime Coat, Enrichment Coat, Emulsion Coat, Primer Seal and Seal Coats

Measured in litres at 15 °C. Adjust volumes using **Table – Bitumen Equivalent Volumes** in SPRAY SEALING MAINTENANCE, **Calculation of Equivalent Volumes for Spray Rates** clause.

Payment calculated for each spray run. Quantity sprayed is determined by dipping the sprayer tank for each spray run.

Allow for the temperature of the mixture in determining the actual application rate.

The designated volume is determined from the area sprayed and the rate of application indicated in the procedure for such area at 15 °C. Multipliers for reducing the volume of hot bitumen to the equivalent volume at 15 °C are contained in **Table – Bitumen Equivalent Volumes** in SPRAY SEALING MAINTENANCE, **Calculation of Equivalent Volumes for Spray Rates** clause.

For primers, enrichment coats, primer seals, polymer modified binder or emulsion seals the rate of application refers to the whole of the mixture.

Allow for adhesion agent in the rate for polymer modified binder.

Adjustment to payment for the sprayed volume when the spray application rates equal or exceed 0.8 L/m²:

- Application 90% to 95% of the designated volume:
- Payment for the sprayed volume less one-half the difference between the sprayed volume and 95% of the designated volume.

(Example: Application = 92% of designated volume. Pay for $(92\% - 0.5 \times (95\% - 92\%)) = 90.5\%$ of designated volume.)

- Application 95% to 105% of the designated volume:
- Payment for the sprayed volume.
- Application 105% to 115% of the designated volume:
- Payment for 105% of the designated volume.
- Application less than 90% or more than 115% of the designated volume will be rejected. Rectify by methods approved by the Superintendent, at the Contractor's expense.
- Adjustment to payment for the sprayed volume when spray application rates below 0.8 L/m²:
- Application plus 0.05 L/m² and minus 0.05 L/m² of the designated spray rate:
- Payment for the sprayed volume.
- Application more or less than 0.05 L/m² of the designated spray rate will be rejected. Rectify by methods approved by the Superintendent, at the Contractor's expense.

Payment will be made for the designated volume upon satisfactory reseal of the rejected area at no extra expense to the Principal.

Adjustment to payment for seal coat items (binder, additive, precoat, aggregate) is in accordance with **Table - Payment Adjustments** in **Payment Adjustments** clause in this section.

23.7.2.3 Additives

Measured in litres at 15 °C.

Polymer additives in polymer modified binders not measured separately.

Make allowance in the rates for seal coats.

23.7.2.4 Precoat Applied to Aggregate

Measured in litres.

Make allowance for adhesion agent.

23.7.2.5 Stockpile Sites

Make allowance for in the relevant rates for sealing aggregate.

23.7.2.6 Sealing Aggregate

SUPPLY AND DELIVERY

Measured in cubic metres in the stockpile; or in loaded vehicles at the work site.

SUPPLY AND APPLICATION

Measured in square metres of finished aggregate work for each size of aggregate.

Measured in square metres of completed area.

Make allowance for supply and placement.

Make allowance for overlapping at joins.

23.8 BITUMINOUS SURFACE MAINTENANCE

23.8.1 Pothole Patching, Edge Patching and Regulation Patching

Measured in tonnes placed for the type specified.

Regulation patching will be measured as evidenced by weigh bridge docketts.

23.8.2 Reconstruction Patching

Measured in square metres for the thickness specified and asphalt type specified.

23.8.3 Crack Sealing

Measured in litres for the sealant specified.

Include all preparation, application, and blinding materials.

23.8.4 Profiling Work

Measured in square metres for depth specified.

Includes profiling and material disposal.

23.9 CONCRETE MAINTENANCE

23.9.1 General

Make allowance for saw cutting, excavation, bedding, reinforcement, installation of expansion joints and backfilling in the following items.

23.9.2 Cycle/Footpaths

Measured in square metres. Dependent on the number of square meters ordered. Allow for a minimum 100 mm depth of concrete and the requirements of reinforcement. Refer to the PROJECT SPECIFIC REQUIREMENTS in the RFT/RFQ.

Allow for Under Pavement Growth Inhibitor.

23.9.3 Vehicle Crossings and Access Strips

Measured in square metres.

23.9.4 Kerbs and Gutters

Measured in linear metres for each type

Drainage structures or crossings are excluded from the measured lengths.

23.9.5 Side Entry/Letter Box Pit Lids

Measured in square metres.

23.9.6 Side Entry Pit Lintels

Measured by the number of bays to be repaired.

23.9.7 Wing/Head Walls, Aprons and Cut Off Walls

Measured in square metres

23.9.8 Miscellaneous Concrete Works

Including but not limited to: Vehicle Accesses, Pram Crossings, Wheel Chair Accesses and Traffic Island Median Infill. Measured in square metres. (For tender purposes, make allowance for 100 mm thick concrete.)

23.10 DRAINAGE MAINTENANCE

23.10.1 Excavation in Trenching

Measured in in-situ cubic metres for the specified range of depths to invert.

The length of the trench shall be measured between the outside face of headwalls or between the centre of pits.

The width of the trench shall be the outside width of the culvert plus 300 mm on each side.

The depth of the trench is the average of the depths to invert measured at the structure at each end of the section.

The depth to invert is the lesser of the depth below natural surface and the depth below finished surface level. In the case of kerbside structures, the finished surface level is measured at the top of kerb.

Make allowance for shoring, bedding, inlet and outlet structures and irregularities in the natural surface where applicable.

23.10.2 Embankment Protection - Concrete

Measured in square metres of the face area.

Make allowance for weep holes.

23.10.3 Margins

Measured in linear metres.

Make allowance for reinforcement.

23.10.4 Supply, Load, Transport, Bed, Lay and Backfill Culverts

Measured in linear metres along the invert of the culvert as the distance between the outside face of headwalls or other structures for the type and size scheduled.

Multiple barrel culverts are measured as the single distance between the outside face of headwalls or other structures.

Excavation is measured separately.

23.10.5 Excavate, Supply, Load, Transport, Bed, Lay and Backfill Culverts

Measured in linear metres along the invert of the culvert between the outside face of headwalls/inside face of pits or other structures for the type and size scheduled.

Multiple barrel culverts are measured as the single distance between the outside face of headwalls or other structures.

Make allowance for RC floor slabs for precast box culverts.

23.10.6 Concrete Headwalls, Maintenance Holes and Other Structures

Measured in cubic metres of concrete for repairs.

Measured by number for replacements.

23.10.7 Collar Joints, Bandage Joints, Anchor Blocks and End Caps

Measured by number.

Make allowance for splay ends.

23.10.8 Inlet and Outlet Channels

Measured in in-situ cubic metres.

Not measured separately for culvert waterways less than 2 square metres in cross-sectional area and channels less than 50 metres long.

23.10.9 Open Unlined Drains

Measured in in-situ cubic metres.

23.10.10 Subsoil Drains

Measured in linear metres.

Make allowance for blocks, headwalls, filter material, geotextiles, and connection to existing drainage system.

23.10.11 Demolish and Remove Existing Drainage Structures

Measured as an item.

Make allowance for backfilling

23.11 PROTECTION WORKS MAINTENANCE

23.11.1 Geotextile Fabric

Measured in square metres of completed area.

Make allowance for supply and placement.

Make allowance for laps and folds.

23.11.2 Stone Pitching

Measured in square metres of the face area.

23.11.3 Grouted Stone Pitching

Measured in square metres of the face area.

Make allowance for weep holes.

23.11.4 Dumped Rock Protection

Measured in cubic metres.

23.11.5 Rubble

Measured in cubic metres.

23.11.6 Gabions

Measured in cubic metres.

Includes the excavation, steel wire mesh box and the stone filling.

23.11.7 Reno Mattresses

Measured in square metres.

Includes the excavation, steel wire mesh box and the stone filling.

23.11.8 Revetment Mattresses

Measured in square metres.

23.11.9 Embankment Protection – Concrete – Maintenance

Measured in square metres of the face area.

Make allowance for weep holes.

Make allowance for toes (nib walls) and reinforcement.

23.11.10 Margins

Measured in linear metres.

Make allowance for reinforcement.

23.12 ROAD FURNITURE MAINTENANCE**23.12.1 Tactile Ground Surface Indicators**

Measured by number for each type, and for each size.

23.12.2 Fencing

Measured in linear metres for each type of fencing.

Make allowance for gates which are not measured separately.

Make allowance for clearing of fence lines which is not measured separately.

(Types include, but are not limited to, stock fences, security fences, pedestrian fences, and log barrier fences.)

23.12.3 Supply and Install Vehicle Movement Barriers/Fences

Measured by number of stock or half stock sections.

23.12.4 Supply Install Cyclist Holding Rail

Measured by number.

23.12.5 Remove Cyclist Holding Rail

Measured by number.

23.12.6 Supply and Install 150 mm Round Recycled Plastic Bollard

Measured by number irrespective of colour.

23.12.7 Supply and Install Culvert Crossing Fence

Measured by number of stock or half stock sections including delineators.

23.12.8 Remove Culvert Crossing Fence

Measured by number of stock or half stock sections including delineators.

23.12.9 Flexible Guide Posts

Measured by number.

Make allowance for delineators.

23.12.10 Steel Guide Posts

Measured by number.

Make allowance for delineators

23.12.11 Work Zone Products and Accessories

Not measured separately – include in other items/Traffic Management/Provision for Traffic.

23.12.12 Road Signs, Manufacture, Supply and Delivery

Measured by number of each sign type or classification.

Freight: to be paid on receipt of invoice.

Include anti-spear fixings in pricing of applicable signs.

23.12.13 Road Signs: Remove existing signs. Install new sign on existing post

Measured by number of each sign type or classification within the sign surface area ranges.

($\leq 2\text{m}^2$; $2\text{m}^2 \rightarrow 6\text{m}^2$; $6\text{m}^2 \rightarrow 12\text{m}^2$)

23.12.14 Road Signs and post: remove existing sign posts. Supply, deliver and install new road signs and posts.

Measured by number of each sign type or classification.

23.12.15 Road Signs: Relocate existing signs and posts

Measured by number of each sign type or classification, and/or each post type.

23.12.16 Road Signs, Supply and Install new Posts and remove and re-install existing sign

Measured by number of each sign type or classification

Make allowance for new brackets, bolts, nuts and bracings for each sign, and new caps for each post.

23.12.17 Removal of Graffiti

Measured by hours inclusive of the solvents and procedure required to remove the graffiti.

23.12.18 Cleaning of Signs

Measured by number

23.12.19 Road Asset Information

Measured by number

23.12.20 Flood Gauge Posts, supply deliver and install

Measured by number.

Make allowance for gauge.

23.12.21 Cattle Grids

Payment will be made at the tendered rates as defined in the Schedule of Rates as nominated for the type of repair and maintenance to cattle grids.

Grid Maintenance Service Crew travel measured by kilometres for rural regions only.

Make allowance for all plant and materials irrespective of the type of repair.

23.12.22 Road Safety Barriers

Supply, remove and replace road safety barriers measured in linear metres by type.

Supply, remove and replace posts measured by number.

Supply, remove and replace terminals, end posts, and cable, measured by number.

Make allowance for delineators, nuts, bolts and fittings in all works.

Road Safety Barriers Maintenance Service Crew travel measured by kilometres for rural regions only.

23.13 PAVEMENT MARKING MAINTENANCE

23.13.1 Establishment – Period Contracts for Maintenance

Urban Area

Mobilisation - not measured separately.

Demobilisation - not measured separately.

Include the cost in the rates for the applicable items.

Rural Area

Mobilisation - The Contractor will be paid for all vehicles, plant, men, materials, and equipment, inclusive of all traffic control requirements, as a single item for each work request, one way for each kilometre travelled beyond the Stuart Highway (PRP20/0.00km) and the Arnhem Highway (PRP1/0.00km) Intersection.

Demobilisation - not measured separately

Aerodromes

Not measured separately for access by road, apply rural mobilisation.

Measured by negotiated rates for access by sea.

Make allowance for mobilisation, demobilisation and all associated ongoing cost.

Provide details substantiating the amounts shown in the negotiated rate.

23.13.2 Co-ordination and Setting Out

Payment for the co-ordination and setting out for new works only will be at an additional 15% of the total amount at the scheduled rates for the pavement marking items only ordered for the work site.

This is inclusive of the attendance, and recording of the extent of the works, and submission of a report detailing these to the Superintendent.

This is inclusive of the removal of all temporary markers and removal, and delivery to the designated delivery point, of temporary traffic control signage and posts left on site by resealing Contractors or others.

23.13.3 Pavement Marking

Refer to the **Table – Application Rates – All Longitudinal and Transverse Pavement Markings** in the **Pavement Marking Conformance Tolerances** clause in PAVEMENT MARKING.

Lengths of line being painted are based on the total length for the work item. For example, 2,500m of broken line will be paid as a single rate item within the ordered lengths 'Broken Line'.

The following are measured in linear metres for type of painted line, inclusive of unpainted gaps:

- Continuity line - (single broken).
- Continuity line special (single broken).
- Unbroken lane line - (single continuous).
- Broken lane line or separation line - (single).
- Barrier lines both directions - (double continuous longitudinal lines).
- Barrier lines one direction - (double longitudinal lines broken on one side, continuous on the other).
- Edge line - (single continuous).
- Single Yellow Line - (yellow single continuous).
- Outline (around medians)
- Stop Lines (single continuous)
- Hold Lines (single continuous)
- Turn Lines (single broken)
- Special Purpose Broken Lane Line (Alberta Line)
- Signalized Pedestrian Crossings (single broken)
- Car / Bus / Truck Parking Bays

The following are measured by number:

- Arrow Heads (single, double, triple, merge)
- Numbers and Letters
- Disabled Symbols

Chevrons and Speed Humps are measured by square metre (within the outline/perimeter bounding the area(s) in which the chevrons and/or speed humps are located, including painted and unpainted sections).

Make allowance for the supply and application of specified glass beads with all markings.

The following are measured as nominated for Aerodrome Marking:

- Runway centreline measured in linear metres inclusive of unpainted gaps (white 0.300m wide) (MoS 8.3.3)
- Runway designation markings. measured by number of digits (white 9.0 m length) (MoS 8.3.4)
- Runway end markings measured in linear metres of painted line (white 1.2 m wide) (MoS 8.3.5)
- Runway Threshold Markings measured by number (white 30 m x 1.5 m wide) (MoS 8.3.8)
- Taxi Guideline Markings. measured in linear metres of painted line (yellow 0.150m wide) (MoS 8.4.2)
- Runway holding positions Pattern "A" measured in linear metres include all painted lines required to meet detail in MoS 8.4.3 (yellow 0.150m wide).
- Taxiway edge markings and Apron markings (measured in linear metres of double painted line (yellow 0.150m wide spaced 0.150m apart) (MoS 8.4.5 and 8.5.3)
- Lead Out Line measured in linear metres of painted line (yellow 0.150m wide) (MoS 8.5.22)
- Alignment Line measured by number for a 17.0 m length of painted line (yellow 0.150m wide) (MoS 8.15.18)
- Parking Clearance Line measured in linear metres of painted line to detail in MoS 8.4.5 (yellow and red lines)

23.13.4 Raised Reflective Pavement Markers

Supply and install, or removal.

Measured by number of each type as nominated in the schedule of rates.

23.13.5 Removal of Line Marking

Measured by square metre of painted area for the various methods as nominated in the schedule of rates.

23.13.6 Glass Beads

Payment for Type B-HR beads for initial new works application shall be made at the tendered Schedule of Rates for all pavement marking

Payment for Type B-HR beads for subsequent remark and all remarking works shall be made at the tendered Schedule of Rates for all rural pavement marking

Payment for Type D-HR beads for subsequent remark and all remarking works shall be made at the tendered Schedule of Rates for all urban pavement markings

23.13.7 Compliance with the requirements for Project Control and Procedures, Calls and Payments

Not measured separately.

Include all costs associated with the Project Control, and Procedures Calls and Payments clauses, in the rates for the applicable items.

23.13.8 Distance Measuring Equipment and Communication Equipment

Not measured separately.

Include the cost of Distance measuring Equipment and Communication Equipment in the rates for applicable items

23.13.9 Payment Generally

Payment for Scheduled Work shall be made at the tendered Schedule of Rates.

Payment for Priority Work shall be made at the tendered Schedule of Rates and an additional payment for Priority attendance.

Payment for Urgent Works shall be made at the tendered Schedule of Rates, and an additional payment for urgent attendance.

23.13.10 Co-ordination of Pavement Marking Work

Measured by number of requests to undertake the works.

Make allowance for attendance and recording the extent of works and submission of report the Superintendent

23.13.11 Pavement Marking - Resealing Contracts

The Superintendent will pay for all pavement marking work directly to the Panel Contractor selected to perform the pavement marking work under this contract.

Measurement of completed pavement marking will be done jointly with the reseal Contractor, the panel contract linemarker and the Superintendent.

Recording of localities and extent of pavement marking work, including set out prior to line marking activities are measured as an item. Include recording existing pavement marking in works area.

Include all activities required to co-ordinate the pavement marking work.

23.13.12 Raised Retroreflective Pavement Markers

Measured by number for each type. Includes preparation of pavement.

Provide numbers of each type separately.

23.13.13 Removal and disposal of temporary pavement markings

Included in other items.

23.13.14 Removal of resealing works temporary signage

Included in other items.

23.13.15 Audio tactile line marking

Measured in lineal metres, including unpainted gaps.

23.14 LANDSCAPE MAINTENANCE

The following landscape maintenance operations are measured in kilometres for all areas between road reserve boundaries for each specified road for 12 months to specified service levels.

- 23.14.1 Grass Cutting**
- 23.14.2 Grass Trimming**
- 23.14.3 Weeding**
- 23.14.4 Pruning**
- 23.14.5 Removal of Vegetation**
- 23.14.6 Replacement of Plants**
- 23.14.7 Litter Collection**
- 23.14.8 Removal of Dead Animals**
- 23.14.9 Treatment of Pest Species**
- 23.14.10 Fertilising**
- 23.14.11 Clearing of Drainage Lines**
- 23.14.12 Replenishment of Mulch**
- 23.14.13 Disposal of Cut Materials**
- 23.14.14 Irrigation Systems Maintenance**

23.15 SLASHING AND WEED CONTROL

23.15.1 Weed Management Plan

Measured as an Item.

Allow to update the Plan annually at the anniversary of the inception date.

Make allowance for the development and implementation of a weed management plan including species prioritisation, area prioritisation, combining slashing and herbicide application, monitoring, and mapping.

23.15.2 Opening Slash

Slashing measured in kilometres including both sides of road for each specified road.

Note: each carriageway of a dual carriageway will be measured separately.

Make allowance for additional slashing on curves and at intersections to provide specified sight distance.

Make allowance for litter collection and disposal as part of the operation.

Include daily cleaning down of vehicles, plant, and equipment.

23.15.3 Full Slash

Slashing measured in kilometres including both sides of road for each specified road.

Dual carriageway slashing measured in kilometres for the full width of the road reserve for the road classification and nominated road.

Include for additional slashing on curves and at intersections to provide specified sight distance.

Make allowance for litter collection and disposal as part of the operations.

Include daily cleaning down of vehicles, plant, and equipment.

Allow for slashing of Table Drain Offlets.

23.15.4 Cleaning of Plant and Equipment

Not measured separately included in rates for applicable items.

23.15.5 Slash Specific Areas

Slashing of areas other than road reserves measured in square metres.

23.15.6 Slash Table Drain Offlets

Not measured separately included in rates for applicable items.

23.15.7 Slash Firebreaks

Measured in kilometres for nominated width.

Make allowance for litter collection and disposal as part of the operation.

Include cleaning down of plant.

23.15.8 Slash and Rake Firebreaks

Slash and rake firebreaks measured in square metres.

23.15.9 Slash Additional areas in the Road Reserve, Aerodromes, Park areas

Slashing of additional areas measured in hectares.

Make allowance for litter collection and disposal as part of the operation.

23.15.10 Slash for Weed Control

Slashing of areas measured in hectares.

Make allowance for litter collection and disposal as part of the operation.

23.15.11 Litter Collection & Disposal

Not measured separately when included in slashing items.

Measured in kilometres including full width of road reserve both sides of road for each specified road.

23.15.12 Replacement of Damaged Roadside Furniture and Structures

Not measured separately, include in slashing items.

23.15.13 Bushfire prevention

Not measured separately, include in slashing items.

23.15.14 Vegetation Control around Guideposts, Signs, and at Bridges, Guardrails, Flood-ways, Culverts

REGIONS OTHER THAN DARWIN

Spraying measured in kilometres including both sides of road for each specified road.

DARWIN REGION ONLY

Paid as a monthly fee to conform to the requirements of the specification.

Include cleaning down of plant and equipment.

23.15.15 Vegetation Control at Aerodromes, Rest Areas, Truck-bays, and Fire Breaks.

Spraying measured in hectares.

23.15.16 Vegetation Control at Aerodromes

Slashing measured in square metres.

Spraying measured in square metres.

23.15.17 Weed Control

Measured in kilometres including both sides of road for each specified road for 12 months treatment.

Progress payments will be paid for each treatment of the weed control program as a direct proportion of 90% of the scheduled rate.

Final payment will be paid for effective eradication of noxious weeds as a scaled proportion of the remaining 10% of the scheduled rate, based on **Table – Calculation of final payment as a percentage of scheduled rate**.

Table – Calculation of final payment as a percentage of scheduled rate	
Effective Eradication Percentage Value:	Final payment as a percentage of scheduled rate:
81-100%	30%
51-80%	15%

DARWIN

Payment will be paid monthly at 70% of the scheduled fee. The remaining 30% of the fee will be held as contingency and proportionally paid based on key performance indicator assessment as a result of annual post seasonal audits of monitoring sites.

Failure to meet compliance may result in the Superintendent using the remaining fee to engage alternative rectification and take further action under the contract.

Include cleaning down of plant and equipment.

23.16 TRAFFIC SIGNAL & ITS MAINTENANCE

The following Measurement and Payment clauses refer to the specification sections of the same name, however, the clause numbers do not match the section numbers of the same title.

23.16.1 Payment Generally

Payment for Scheduled Work will be made at the tendered rate.

23.16.2 Rates Generally

The rates tendered are deemed to represent the full value of the work inclusive of plant, labour, messing, clearances, permits, transportation, fuel, oil, maintenance, tools, material procurement and delivery, all incidentals to complete the work, attendance in accordance with Appendix B ‘Response Times’, supervision, and for overheads and profit. All works shall be in accordance with any standard drawings if applicable. If no standard drawing is appropriate for the works required, seek direction from the Superintendent’s Representative prior to completing any works.

Where a Schedule of Rate item for Scheduled Works is defined as “Labour Only” the rate tendered shall be inclusive of all of the above relating to the labour component.

Payment will be made for all activities associated with completing the work detailed in this Specification in accordance with the following Pay Items. A lump sum price for any of these items will not be accepted.

Payment for the various pay items for all work carried out under this Specification shall include the costs for the following:

- Installation and maintenance of ‘minor traffic management’ setups (see below),
- Submission of generic Traffic Management Plan & associated TGS’s & risk assessments,
- Photographs provided digitally of any works completed, such as damaged and replaced items (before and after) to justify any completed works, or to assist with any additional works identified or outstanding,
- Salvage of any usable parts and testing for reuse in this contract,
- Maintaining the Department stock database so that it is always current, and;
- Travel from Contractor’s base to the asset requiring works to be undertaken as instructed, and return to base.

Minor (Non Complex) Traffic Management

Minor Traffic Management is defined as consisting of all warning signs, work signs and traffic management devices required to carry out work within the road reserve on all approaches to the work site, including safe management of pedestrian movements and in accordance with AS1742.3 and the 2014 / 15 Standard Specification for Road Maintenance titled "Provision for Traffic".

Advising pedestrians of works, hazards, or giving directions around the works is considered minor traffic management and will not be paid separately.

Minor Non Complex traffic management setups would be generally acceptable for lamp changing, pedestrian button replacements, and other Routine Maintenance Repairs, as appropriately addressed in the Contractors risk assessment.

Complex Traffic Management

Complex Traffic Management is defined as consisting of any works requiring traffic management that is considered complex due to high risk or high speed environments. Complex situational requirements such as speed reductions, lane closures and manual controlling of traffic with WZ2 qualified personnel (control traffic with a stop / slow bat) are considered complex. These complex situations have been itemised and will be charged per approach as scheduled items.

If any item for which a quantity of work is listed in the Schedule of Rates has not been priced by you, it shall be understood that due allowance has been made in the prices of other items for the cost of the activity which has not been priced.

23.16.3 Fault Maintenance

Payment will be for labour, plant, equipment and minor non-complex traffic management required to attend and rectify the fault in accordance with Appendix B "Response Times". Payment for materials required to repair the fault will be itemised and paid separately at the tendered rate for Routine Maintenance or the Supply of Materials.

23.16.4 Fault Attendance – Business Hours

Measured by number.

Payment will generally be a one off fee for each traffic signal or ITS fault occurring between 0700hrs and 1700hrs Monday to Friday exclusive of public holidays.

The 'Fault Attendance – Business Hours' requires the Contractor to attend site with a traffic maintenance equipped vehicle within the nominated response time (Refer Appendix B), undertaking the works as directed or identifying the fault, and returning traffic signals, and / or UPS, CCTV and / or other ITS equipment to normal operating condition.

'Fault Attendance – Business Hours' will be payable once only for each time the Contractor leaves and returns to base, however if the same fault occurs at the same location within twenty four (24) hours* following the initial fault i.e. a controller fault, or if faults have been added to the system through works undertaken i.e. installing a controller module with a fault, the Contractor shall attend at their own expense as soon as possible within the nominated time limit for repair. A separate fault attendance shall be paid if work can be proven to be unrelated to the previous work undertaken, based on detailed records of work undertaken on the site job sheet and recorded fault log codes.

Payment for this item includes checking, testing and cleaning of equipment being worked on including communications, router, test and replace surge diverters, modem, uninterruptable power supply (UPS), wireless receivers and encoder, and reporting and documenting the fault/s.

Cost of materials supply is not included. Refer to 'Supply of Materials' items, or Unspecified Materials items.

Cost of installation of scheduled items is not included. Refer to 'Labour' items.

Note: If a Fault Attendance has exceeded two (2) hours and has become complex with the fault being a suspected cable fault in the field, the 'Hourly Rate – Business Hours' may be requested for use for additional staff member/s to attend to check pole tops and pits to assist rectify the fault.

Subject to approval by Superintendent's Representative, Traffic Section staff member or the Department's On-Call Officer.

*Does not override warranty or defects.

23.16.5 Fault Attendance - After Hours

Measured by number.

Payment will generally be a one off fee for each traffic signal or ITS fault occurring not between 0700hrs and 1700hrs Monday to Friday exclusive of weekends and public holidays.

The 'Fault Attendance – After Hours' requires the Contractor to attend site with a traffic maintenance equipped vehicle within the nominated response time (Refer Appendix B), undertaking the works as directed or identifying the fault, and returning traffic signals, and / or UPS, and / or other ITS equipment to normal operating condition.

'Fault Attendance – After Hours' will be payable once only for each time the Contractor leaves and returns to base, however if the same fault occurs at the same location within twenty four (24) hours* following the initial fault i.e. a controller fault, or if faults have been added to the system through works undertaken i.e. installing a controller module with a fault, the Contractor shall attend at their own expense within the nominated time limit for repair. A separate Fault Attendance – After Hours shall be paid if work can be proven to be unrelated to the previous work undertaken.

If the Contractor is required to attend an additional site after being called to the first site, and has not returned to base, or is required to return to a previously worked on site, only one 'Fault Attendance – After Hours' will be paid. If the work is at an additional site a 'Fault Attendance – Business Hours' will be paid.

If the callout is initiated during business hours but extends beyond normal working hours, the 'Fault Attendance – After Hours' shall not be paid unless the callout extends beyond two hours after business hours.

Payment for this item includes checking, testing and cleaning of equipment being worked on including communications, router, test and replace surge diverters, modem, uninterruptable power supply (UPS), wireless receivers and encoder, and reporting and documenting the fault/s.

Cost of materials supply is not included. Refer to 'Supply of Materials' items, or Unspecified Materials items.

Cost of installation of scheduled items is not included. Refer to 'Labour' items.

Note: If a Fault Attendance has exceeded two (2) hours and has become complex with the fault being a suspected cable fault in the field, the 'Hourly Rate – After Hours' may be requested for use for additional staff member/s to attend to check pole tops and pits to assist rectify the fault. Subject to approval by Superintendent's Representative, Traffic Section staff member or the Department's On-Call Officer.

*Does not override warranty or defects.

23.16.6 Accident Attendance – Business Hours

Measured by number.

Payment will be a one off fee for traffic signal faults that has resulted from severe damage to traffic signals, CCTV, and / or UPS, and / or other ITS equipment by a vehicle accident or similar, occurring during business hours 0700hrs to 1700hrs Monday to Friday. The 'Accident Attendance' item requires a minimum of two of the Contractor's appropriately qualified staff to attend site with a traffic maintenance equipped vehicle to allow them to make the site safe, photograph, and remove all damaged items from site, and return the site to fully operational conditions.

The 'Accident Attendance – Business Hours' item will be payable once only for each site requiring an accident attendance, however if there is a fault at the same location within four (4) hours following the accident attendance, the Contractor shall attend at their own expense within the nominated time limit for repair.

If the 'Accident Attendance – Business Hours' type callout is initiated during business hours but extends beyond, the 'Accident Attendance - After Hours' type fee shall not be paid unless the callout extends beyond two hours after business hours - the 'Accident Attendance - After Hours' type fee will be paid in lieu of the business hours type in this instance.

Maintenance resulting from an accident is not to be included in the monthly CSR's. A separate CSR shall be raised by the Superintendent's Representative or Traffic Section staff for works

resulting from an accident. The CSR will include all fault attendances, after hour's fees and associated labour, plant and materials required to carry out the work.

Cost of materials supply is not included. Refer to 'Supply of Materials' items.

Cost of installation of scheduled items is not included. Refer to 'Labour' items.

23.16.7 Accident Attendance – After Hours

Measured by number.

Payment will be a one off fee for traffic signal faults that has resulted from severe damage to traffic signals, CCTV and / or UPS, and / or other ITS equipment by a vehicle accident or similar, occurring not between 0700hrs and 1700hrs Monday to Friday exclusive of weekends and public holidays. The 'Accident Attendance – After Hours' requires a minimum of two of the Contractor's appropriately qualified staff to attend site with a traffic maintenance equipped vehicle to allow them to make the site safe, photograph, and remove all damaged items from site, and return the site to fully operational conditions..

The 'Accident Attendance – After Hours' will be payable once only for each site requiring an accident attendance, however if there is a fault at the same location within four (4) hours following the accident attendance, the Contractor shall attend at their own expense within the nominated time limit for repair.

Maintenance resulting from an accident is not to be included in the monthly CSR's. A separate CSR shall be raised by the Superintendent's Representative or Traffic Section staff for works resulting from an accident. The CSR will include all fault attendances, after hour's fees and associated labour, plant and materials required to carry out the work.

Cost of materials supply is not included. Refer to 'Supply of Materials' items.

Cost of installation of scheduled items is not included. Refer to 'Labour' items.

23.16.8 Site Inspection / Routine Maintenance Inspection

Measured by number.

Note: This item is intended to require less involvement by the Contractor than a Fault Attendance as the only requirement is to visually check an asset, photograph and report to Traffic Section. The reason may be to confirm a fault reported by a member of the public, or to provide other visual confirmation required.

Payment will include the establishment of plant and labour to visually inspect a site or asset and identify any Routine Maintenance required to be scheduled for another time, or to visually provide other advice. A photograph may be required to be forwarded.

If the technician attends site on a Site Inspection, however deems the fault to be of an urgent nature, Traffic Section is to be notified immediately to permit works to be carried out without delay. A Fault Attendance or other applicable item/s will then be paid in lieu of the Site Inspection / Routine Maintenance Inspection item.

Labour item only.

ROUTINE MAINTENANCE (LABOUR ITEMS)

Payment will be for all labour, plant, equipment, and minor non-complex traffic management items required to carry out the work in accordance with **Table - Response Times** in Clause 16.32. Material will be paid separately if included in the Schedule of Rates for Supply of Material.

23.16.9 Lamp Replacement / Reset

Measured by number.

Payment will include the establishment of plant, labour, equipment and sundries, required to change a traffic signal lamp regardless of its type i.e. incandescent, halogen or LED. If the lamp is situated on the mast of a highmast, 'Supply Lifting Equipment' item shall be used.

If it is found a transformer is required to be replaced, a 'Fault Attendance – Business Hours' shall be paid in lieu of the lamp replacement.

Cost of lamp is not included. Refer to Supply of Materials items.

23.16.10 Install Traffic Signal Lantern

Measured by number.

Payment will include the establishment of plant, labour, equipment and sundries required to install, relocate or change a traffic signal vehicle lantern (200mm or 300mm), for all single/ vertical aspect configurations.

Items included in installing the lantern are attaching target boards, louvres, cowls, cable and accessories to connect the aspect and test.

If the lantern required to be installed or replaced is situated on the mast of a highmast, 'Supply Lifting Equipment' item shall be used.

Cost of aspect, target board, brackets, louvres, cowls etc. are not included. Refer to Supply of Materials items.

23.16.11 Install Double Traffic Signal Lantern

Measured by number.

Payment will include the establishment of plant, labour, equipment and sundries required to install, relocate or change a double traffic signal vehicle lantern (200mm or 300mm), for all double aspect configurations.

Items included in installing the aspect are attaching target boards, louvres, cowls, cable and accessories to connect the lantern and test.

If the lantern required to be installed or replaced is situated on the mast of a highmast, 'Supply Lifting Equipment' item shall be used.

Cost of aspect, target board, brackets, louvres, cowls etc. are not included. Refer to Supply of Materials items.

23.16.12 Install Pedestrian Lantern

Measured by number.

Payment will include the establishment of plant, labour and equipment and sundries required to install, relocate or change a pedestrian lantern and test.

Items included in installing the aspect are attaching cowls, cable and accessories to connect the lantern.

Cost of pedestrian aspect, cowls, brackets etc. are not included. Refer to Supply of Materials items.

23.16.13 Install / Replace Pole Top Assembly

Measured by number.

Payment will include the establishment of plant, labour and equipment and sundries required to install or change a complete pole top assembly including brackets, mounting points, cover and connector rack, and the removal and reinstatement of traffic signal aspects as required. Items shall include cable connections. Payment will also include the painting of the pole top in the appropriate colour when that pole top being worked on has been identified as having a junction or open link.

If only the connector rack requires replacing (with Traffic Section staff approval), it will be paid as a rewire pole top item.

Cost of pole top is not included. Refer to Supply of Materials items.

23.16.14 Rewire Pole Top Assembly

Measured by number.

Payment will include the establishment of plant, labour and equipment required to completely rewire a pole top assembly. The item shall include disconnecting, re-terminating each active core, reconnecting and relabelling cable at the pole top assembly and additional cable connections if required. Payment will also include the painting of the pole top in the appropriate colour when that pole top being worked on has been identified as having a junction or open link.

Partial rewire will not be paid under this item.

If the connector rack requires replacing (with Traffic Section staff approval), it will be paid as a rewire pole top item, however the connector rack will be paid for under the negotiated rate item.

23.16.15 Install Traffic Signal Pedestal

Measured by number.

Payment will include the establishment of plant, labour and equipment required to install or change a traffic signal pedestal, connect cables, fixing the pedestal to functional footings, and mortaring the base of the pole. The pedestal shall be straight & level.

Cost of pedestal is not included. Refer to Supply of Materials items.

If required Multi Core cable will be available from the Superintendent unless directed otherwise.

23.16.16 Install Traffic Signal Base Plate

Measured by number.

Payment will include the establishment of plant, labour, equipment and sundries required to install or change a base plate on a traffic signal footing.

Cost of the base plate is not included. Refer to Supply of Materials items.

23.16.17 Install Traffic Signal Pedestal Footing

Measured by number.

Payment will include the establishment of plant, labour and equipment required to install or replace a traffic signal footing in accordance with the standard drawing, inclusive of all items and sundries to excavate material and damaged footing, backfill and compact, in situ concrete, formwork, bedding, grouting, reinstatement of surfaces and disposal of material.

Cost of footing rag bolt assembly is not included. Refer to Supply of Materials items.

If the footing is in a new position and the connecting conduit junction pit is more than 5 meters from the footing location or crosses a sealed surface i.e. concrete, or a rock base, the Contractor shall provide quote for negotiated rate in addition to this item to allow for the additional works.

23.16.18 Repair Traffic Signal Footing

Measured by number.

Payment will include the establishment of plant, labour and equipment required to repair a traffic signal footing where only the thread on the existing footing has been damaged. Payment is inclusive of all items and sundries to excavate any materials, cut off damaged threaded rods, drill holes for new threaded rods, install with chemset or similar, in situ concrete, formwork, bedding, grouting, reinstatement of surfaces and disposal of material.

23.16.19 Detector Test and Repair

Measured by number.

Payment will include the establishment of plant, labour, equipment and sundries required to test and repair a faulty traffic signal detector, including to reduce the detector to a half loop where instructed to by Traffic Section. Payment will also include the technician providing the readings verbally to Traffic Section from site, then written on the job sheet and response.

23.16.20 Install Detector (Saw cut)

Measured by number.

Payment will include the establishment of plant, labour, material and equipment required to install a vehicle detector in accordance with the Standard Drawing, connect to the controller, testing, and provide readings.

If required detector feeder cable will be available from the Superintendent's Representative unless directed otherwise.

23.16.21 Install Detector (Pre-fabricated)

Measured by number.

Payment will include the establishment of plant, labour, material and equipment required to install a pre-fabricated vehicle detector, connect to the controller, testing, and provide readings. Liaise with sealing or asphalt Contractors to coordinate the works program accordingly.

If required detector feeder cable will be available from the Superintendent's Representative unless directed otherwise.

23.16.22 Install Detector Pit

Measured by number.

Payment will include the establishment of plant, labour, materials, sundries and equipment required to install a detector pit. The pit shall have 75mm of 20mm aggregate installed underneath the pit to allow for drainage, separated by a membrane to stop ingress of material into the pit. The pit shall have a tooled concrete surround supporting the pit, minimum of 100mm wide x 100mm deep.

NOTE: The current standard drawing does not reflect this requirement and is soon to be updated. Different types of pits may be considered subject to Superintendent's Representative's approval for use.

Cost of detector pit is not included. Refer to Supply of Materials items.

23.16.23 Pedestrian Button Test and Repair / Replace

Measured by number.

Payment will include the establishment of plant, labour, sundries and equipment required to test and repair, and / or replace, a faulty or damaged pedestrian button.

If the pedestrian button is deemed unrepairable by the Contractor when sent to test and repair, and a new pedestrian button is required to be installed, this item will only be paid once for replacement. Items shall include disconnecting, reconnecting cables and testing the operation.

Cost of Audio tactile driver card and pedestrian push button in not included. Refer to Supply of Materials items.

23.16.24 Audio Tactile Test and Repair / Replace

Measured by number.

Payment will include the establishment of plant, labour, sundries and equipment required to test and repair, and / or replace, a faulty or damaged audio tactile unit, including speaker.

If the audio tactile component or speaker is deemed unrepairable by the Contractor when sent to test and repair, and a new audio tactile component is required to be installed, this item will only be paid once for replacement of the item. Items shall include disconnecting, reconnecting cables and testing the operation. Cost of audio tactile unit, components or speaker is not included. Refer to Supply of Materials items.

23.16.25 Test and Restore Communications / SCATS Communications

Measured by number.

Payment will include the establishment of plant, labour, sundries and equipment required to test and repair communication links to SCATS or other ITS equipment.

Cost of hardware material is not included. Superintendent's Representative to advise of authorised suppliers.

23.16.26 Supply and Connection of Generator

Measured by hours (Rounded up and payable in 30 minute blocks).

Payment will include the establishment of plant, labour, sundries and equipment required to connect, secure and maintain the operation of a 15amp / 240 volt generator to a traffic signal controller box, or UPS to power and maintain the operation of traffic signalised sites and associated ITS as specified by the Superintendent's Representative or Traffic Section staff.

Payment includes attendance for disconnection at completion of use, and the first tank of fuel.

Generators shall be tested on a site to prove suitability for use.

Subsequent tanks of fuel will be paid as per 'Unscheduled Items'.

23.16.27 Install Multi Core Cable – including and below 21 cores

Measured by Lineal Meter.

Payment will include the establishment of plant, labour, sundries and equipment required to install multi core cable (including and below 16 core) and other cable such as data cable (fibre / cat 5/6) into an existing conduit/s, pits, and posts, and to remove any existing damaged cable from conduit if necessary.

Note. Any fibre termination is not included within this rate.

23.16.28 Install Multi Core Cable – including and below 51 cores

Measured by Lineal Meter.

Payment will include the establishment of plant, labour, sundries and equipment required to install multi core cable (between 21 and 51 cores) into an existing conduit/s, pits, and posts, and to remove any existing damaged cable from conduit if necessary.

Multi Core cable (51 core) may be available from the Superintendent and will be utilised unless directed otherwise.

23.16.29 Install Detector Feeder Cable

Measured by Lineal Meter of conduit that the cable is drawn through.

Payment will include the establishment of plant, labour, sundries and equipment required to install Detector Feeder cable into an existing conduit/s and to remove existing damaged cable from conduit if necessary.

Detector Feeder cable will be available from the Superintendent unless directed otherwise.

The Lineal Meter rate for 'Install Detector Feeder Cables' is not to be measured as per Lm of cable installed in the ground as this cable is often installed as multiple layers in the one conduit. The rate shall be measured as per Lineal Meter of conduit drawn through for this cable to be installed.

23.16.30 Replace or Upgrade Traffic Signal Controller, or Integrated UPS & Controller

Measured by number.

Payment will include the establishment of plant, labour and equipment required to collect from the storage yard, install or upgrade a traffic signal controller, inclusive of all items and sundries, reinstatement of surfaces and disposal of material if previous controller had been damaged. This item includes some modification of existing footing/plinth in relation to new tie-down rods to secure the controller to the existing footing regardless of the controller type.

Any modifications regarding significant concrete works required, new or replacement plinth, or extension of plinth, shall be undertaken under a negotiated rate.

The cost of the Traffic Signal Controller unit is not included. Traffic Signal Controller unit will be available from the Superintendent unless directed otherwise.

23.16.31 Install Auxiliary Cabinet

Measured by number.

Payment will include the establishment of plant, labour, all sundries, cables (power / Cat 5 data / fibre) and equipment required to prepare, install and connect an auxiliary cabinet to a traffic signal controller including all the electrical components within.

Payment includes installation of the equipment required within the cabinet, including connection and establishment of communications with all items, tidy installation of all cables and equipment including to racks where possible, and use of appropriate length data cables.

Note: A standard drawing was not finalised at the time of advertising this contract. A standard drawing may be provided during the contract term.

23.16.32 Provide Lifting Equipment

Measured per day.

Payment will include the establishment of plant, labour, safety devices and equipment required to provide and operate lifting equipment in order to carry out other works.

The 'Provide Lifting Equipment' item will be used to provide access for highmast aspect installations, realignments, and lamp replacements, also CCTV maintenance and installation, or any other requirements for lifting equipment as directed by Traffic Section.

Payment will include all lifting equipment required to reach a high mast or CCTV pole.

Cost of Traffic Management is not included. Refer to 'Traffic Management' items.

Cost of traffic signal/CCTV hardware is not included. Refer to Supply of Materials items.

Cost of installation of hardware not included – refer to Routine Maintenance items.

23.16.33 Pest Eradication

Measured by number.

Payment will include eradication of ants, cockroaches, spiders and other insects from the asset for a period of at least 3 months. If the pest returns to the same location within 3 months, a further treatment will be required at the Contractor's expense.

Payment includes the treatment of a controller and associated communications pillar. If the pest issue is in a pit, payment includes that pit and nearest two pits.

Payment does not include termites, this will be a negotiated rate if needed.

23.16.34 Hourly Rate – Business Hours

Measured by hours (Rounded up and payable in 30 minute blocks).

Minimum payment of one hour applies.

Payment will include labour for an appropriately qualified technician to be available during business hours, for the services required by the Department where other scheduled items are not separately addressed. Use of this item may be utilised where a Fault Attendance has exceeded two hours and has become complex, or where the services of a technician are required for a known or unknown duration such as post cyclone refuelling of generators, or other duties as directed by Traffic Section.

This item shall only be approved for use with prior approval from the Superintendent's Representative, Traffic Section staff member, or the Department's On-Call Officer. If all of these personnel are unavailable, leave voice messages and proceed with works, however make contact as soon as possible thereafter.

This item is reliant on the Contractor providing evidence of attendance and duration on site via logon / logoff, door event or communication with Traffic Section / the On-Call Officer at commencement and completion for substantiation. Be advised that lack of evidence may result in item not been authorised.

Labour and tools item only.

23.16.35 Hourly Rate – After Hours

Measured by hours (Rounded up and payable in 30 minute blocks).

Minimum payment of three hours applies.

Payment will include labour for an appropriately qualified technician to be available after hours, for the services required by the Department where other scheduled items are not separately addressed. Use of this item may be utilised where a Fault Attendance has exceeded two hours and has become complex, or where the services of a technician are required for a known or unknown duration such as post cyclone refuelling of generators, or other duties as directed by Traffic Section.

This item shall only be approved for use with prior approval from the Superintendent's Representative, Traffic Section staff member, or the On-Call Officer. If all of these personnel are

unavailable, leave voice messages and proceed with works, however make contact as soon as possible thereafter.

This item is reliant on the Contractor providing evidence of attendance and duration on site via logon / logoff, door event or communication with Traffic Section / the On-Call Officer at commencement and completion for substantiation. Be advised that lack of evidence may result in item not been authorised.

Labour and tools item only.

23.16.36 Negotiated Rate

Measured by number.

To be determined as negotiated between the Superintendent's Representative or Traffic Section staff and the Contractor for labour, equipment and services are requested to be provided by the Contractor. All Negotiated Rate items are to be submitted and itemised on the Quote Sheet.

All Negotiated Rate items shall be agreed upon based on the Quote provided in writing prior to the execution of the works or ordering of the items, unless deemed an emergency by Superintendent's Representative, Traffic Section staff, or the Department's On-Call Officer and agreed to verbally. In an emergency instance the item shall be followed up in writing no later than the next working day thereafter.

This item is not to be priced in the Response Schedule – a Provisional Sum has been allowed for in the Schedule of Rates.

SPECIFIC MAINTENANCE

23.16.37 Site Audit and Report- Vehicle Signalised Intersection & ITS

Measured by number.

Vehicle sites are defined in clauses 16.30 and 16.31.

Payment will include the establishment of plant, labour and equipment, and collection of lighting plant if required, to audit and submit a corresponding report to the Superintendent's Representative for a vehicle site in accordance with the site audit template shown in **Figure - Sample Template Traffic Signal and ITS Audit Report Template in Clause 16.36**. The Site Audit will also include carrying out minor repairs such as replacing lamps or arrays, damaged or missing cowls, and all other similar activities that can be undertaken within activities associated with the audit. Any pole top assemblies identified at or prior to the audit shall be replaced as a priority while traffic management is on site.

This item shall also include written quotes for any works identified from the audit or other recommended maintenance.

The report shall also include fully detailed diagrams or drawings of the intersection.

The report shall be submitted to Traffic Section within 5 working days of the audit being completed.

Cost of hardware material is not included. See Unspecified Materials items.

Cost of traffic management is not included. See traffic management items.

23.16.38 Site Audit and Report – Pedestrian Signalised Intersection & ITS

Measured by number.

Pedestrian sites are defined in clauses 16.30 and 16.31.

Payment will include the establishment of plant, labour and equipment, and collection of lighting plant if required, to audit and submit a corresponding report to the Superintendent's Representative for a pedestrian site in accordance with the site audit template shown in **Figure - Sample Template Traffic Signal and ITS Audit Report Template in Clause 16.36**. The Site Audit will also include carrying out minor repairs such as replacing burnt out lenses or lamps, damaged or missing, cowls, visors and louvers and all other similar activities that can be undertaken within activities associated with the audit. Any pole top assemblies identified at or prior to the audit shall be replaced as a priority while traffic management is on site.

This item shall also include written quotes for any works identified from the audit or other recommended maintenance.

The report shall also include fully detailed diagrams or drawings of the intersection.

The report shall be submitted to Traffic Section within 5 working days of the audit being completed.

Cost of hardware material is not included. See Unspecified Materials items.

Cost of traffic management is not included. See traffic management items.

23.16.39 UPS Maintenance & Condition Report

Measured by number

Payment for the Specific maintenance for UPS systems includes the establishment of plant, labour sundries and equipment including terminal grease, inspection and testing of all on-site equipment to identify its physical condition, operational performance and configuration of hardware in accordance with the scheduled tasks in **Figure – Sample Template UPS Maintenance and Battery Condition Report** in **Clause 16.36**.

The required two hour discharge test will be undertaken remotely by Traffic Section.

The report shall be submitted to Traffic Section within 5 working days of the audit being completed.

SUPPLY OF MATERIALS

23.16.40 Specified Materials

Measured by number.

Payment will be wholly inclusive of all mark up and freight charges.

All materials will be sourced from suppliers approved by the Superintendent.

Refer to Response Schedule for list of specified materials.

23.16.41 Traffic Signal Component Repairs

Measured by number.

Payment will include 10% mark up and freight. Invoices from supplier / repairer and freight handlers shall accompany CSR for payment authorisation.

This item is not to be priced in the Response Schedule – a Provisional Sum has been allowed for in the Schedule of Rates.

23.16.42 Non Specified / Unscheduled Materials or Items

Measured by number.

Payment will include 10% mark up and freight. Invoices from supplier and freight handlers must accompany CSR for payment authorisation.

This item is not to be priced in the Response Schedule – a Provisional Sum has been allowed for in the Schedule of Rates.

23.16.43 Supply LED Traffic Signal Lantern or Aspect – Various sizes

Measured by number. Lantern sizes are priced separately in schedule of rates.

Payment will include the supply of a new LED traffic signal aspect or lanterns (regardless of size), complete with all cowls, louvres, target board, LED arrays, transformers, brackets and fittings required to form a complete lantern.

Payment includes manufacturer's warranty, and handling.

Cost of installation not included – refer to Routine Maintenance.

23.16.44 LED Array – Various Sizes and Colours

Measured by number. LED array sizes, colours, roundels and arrows priced separately in the schedule of rates.

Payment will include the supply of a new traffic signal LED array required for an existing LED aspect.

Payment includes manufacturer's warranty, and handling.

Cost of installation not included – refer to Routine Maintenance.

23.16.45 Supply LED Pedestrian Lantern

Measured by number.

Payment will include the supply of a new LED pedestrian lantern, complete with all cowls, LED arrays, transformers, brackets and fittings required to form a complete pedestrian lantern.

Payment includes manufacturer's warranty, and handling.

Cost of installation not included – refer to Routine Maintenance.

23.16.46 Supply Target Board – Various sizes

Measured by number. Target Board sizes priced separately in schedule of rates.

Payment will include the supply of a new traffic signal target board as a complete item for the corresponding size required for the aspect to be fitted, including any blank panels required for 4 or 5 way aspect configurations.

Cost of installation not included – refer to Routine Maintenance.

23.16.47 Miscellaneous Traffic Signal Aspect Items

Measured by number. Various sizes, types of items listed below all priced separately in the schedule of rates.

Cowls - Payment will include the supply of new open or closed cowls of various sizes, complete with all fittings required to install on a traffic signal aspect.

Aspect Doors - Payment will include the supply of new aspect doors, for traffic signal aspects and for pedestrian aspects, complete with all fittings required to install on a traffic signal aspect.

Aspect Seals – Payment will include the supply of new aspect seals, for traffic signal aspects and for pedestrian aspects, complete to install within a traffic signal aspect.

Cost of installation of above not included – refer to Routine Maintenance.

23.16.48 Lamps – Various Types

Measured by number. Lamp types priced separately in schedule of rates.

Payment will include the supply of new traffic signal aspect lamps for older style Halogen and Incandescent lamps.

Cost of installation not included – refer to Routine Maintenance.

23.16.49 Supply LED Transformer

Measured by number.

Payment will include the supply of a new traffic signal transformer required for an LED array / Halogen, regardless of the type or size required for 200mm or 300mm green, yellow or red.

Cost of installation not included – refer to Routine Maintenance.

23.16.50 Supply 50 Way Finial Pole Top Complete

Measured by number.

Payment will include the supply of a new 50 way finial pole top assembly complete.

Cost of installation not included – refer to Routine Maintenance.

23.16.51 Supply Pole Top Cover

Measured by number.

Payment will include the supply of a new pole top cover only and will also include the painting of the pole top in the appropriate colour if that pole top being worked on has been identified as having a junction or open link.

Cost of installation not included – refer to Routine Maintenance.

23.16.52 Brackets – Full and Half

Measured by number.

Payment will include the supply of new full or half brackets complete with all fittings required to install an aspect on a traffic signal pedestal.

Cost of installation not included – refer to Routine Maintenance.

23.16.53 Standard Traffic Signal Pedestal

Measured by number.

Payment will include the supply of a new hot dipped galvanised traffic signal pedestal in one continuous length without joints, threaded suitably for connection to the base plate, for use to mount traffic signal hardware.

Cost of installation not included – refer to Routine Maintenance.

23.16.54 Traffic Signal Pedestal Base Plate

Measured by number.

Payment will include the supply of a new hot dipped galvanised traffic signal pedestal base plate, threaded suitably for connection to mount traffic signal pedestal.

Cost of installation not included – refer to Routine Maintenance.

23.16.55 Traffic Signal Pedestal Footing

Measured by number.

Payment will include the supply of a new traffic signal pedestal footing for use to mount traffic signal pedestal base plate.

Cost of installation not included – refer to Routine Maintenance.

23.16.56 Pedestrian Push Button

Measured by number.

Payment will include the supply of a new pedestrian push button complete with button, housing, audio tactile speaker and fixings.

Cost of installation not included – refer to Routine Maintenance.

23.16.57 Audio Tactile Speaker

Measured by number.

Payment will include the supply of a new audio tactile speaker and wiring required for installation, for use within a pedestrian push button.

Cost of installation not included – refer to Routine Maintenance.

23.16.58 Audio Tactile Driver Card

Measured by number.

Payment will include the supply of a new audio tactile driver card to be fitted within the housing unit, for use with pedestrian push button.

Cost of installation not included – refer to Routine Maintenance.

23.16.59 Detector Pit (Polycrrete Type)

Measured by number.

Payment will include the supply of a new traffic signal detector pit complete, of Polycrrete construction similar to pit ACO Type 33 (L 340 mm x W 340 mm x D 440 mm). Two drain holes to be installed in the base of the pit.

Payment includes supply of pit and class B galvanised steel lid with a chain connection to the pit.

NOTE: The current standard drawing does not reflect this requirement and is soon to be updated. Different types of pits may be considered subject to Superintendent's Representative's approval for use.

Cost of installation not included – refer to Routine Maintenance.

23.16.60 Handheld Terminal (HHT)

Measured by number.

Payment will include the supply of a new traffic signal Hand Held Terminal (HHT), inclusive of freight.

23.16.61 Telephone Line Surge Diverter

Measured by number.

Payment includes the supply of Surge Protection equipment for traffic signal communications lines. Protection equipment should be the same as that supplied by Microconnect for use with their equipment, Novaris #MPP-RJ12-001.

23.16.62 Krone Rack

Measured by number. Payment includes the supply of a Krone Rack for installation within a traffic signal communications pillar for traffic signal communications lines.

Cost of installation not included – refer to Routine Maintenance.

23.16.63 Fuses

Measured by number.

Payment includes the supply of 5mm x 20mm fuses required for use within a traffic signal controller.

Fuse types nominated for supply include all amperages for 5mm x 20mm fuses including:

- 5mm by 20mm Quick acting 5 A fuse
- 5mm by 20mm medium acting 6.3 A fuse
- 5mm by 20mm medium acting 1 A fuse
- 5mm by 20mm medium fast acting 1 A fuse
- 5mm by 20mm medium fast acting 0.5 A fuse
- 5mm by 20mm medium slow blow 3.15 A fuse

Different sized fuses, Circuit Breakers and Miniature Circuit Breakers (MCBs) if required shall be paid utilising the unscheduled items / materials item.

Cost of installation not included.

23.16.64 Sea Wasp

Measured by number.

Payment includes the supply of a sea wasp surge diverter and sundries required for use within a traffic signal communications pillar.

Cost of installation not included.

23.16.65 Prefabricated Communication Box

Measured by number.

Payment includes the supply of a traffic signal communications pillar cover (communications box), constructed of aluminium, powder-coated in a bright orange colour similar to others previously installed. Four 'hex' bolts shall be supplied to fit the cover to the footing when installed, and remove any previously installed 'D' bolts.

Payment includes supply of communications box to suit various types of footings currently installed.

Cost of installation not included.

23.16.66 Supply Underground Junction Box

Measured by number.

Payment includes the supply of a permanently installed junction box to join multi core cable within a conduit junction pit. The junction box shall be entirely waterproof.

Connector should be isolation tag type like in pole tops and should be numbered / identified as per pole top.

Payment includes all sundries required for use in installation.

Cost of installation not included - Payment does not include painting the associated pole top nearest to the pit when installed, however when installed the bottom half of the pole top shall be painted white.

23.16.67 Supply Auxiliary Cabinet

Measured by number.

Payment includes the supply of an auxiliary cabinet (top hat) to suit the nominated controller/s listed within this specification. The auxiliary cabinet shall be constructed with the same materials as the traffic signal controller and be painted the same colour. It shall be ventilated, waterproof and keyed in accordance with the Superintendent's nominated key type, with 2 keys provided.

Payment will include a small suitable exhaust fan (IP rated to suit the environment) pre-installed, a sub-switchboard, and computer equipment racking to neatly store and secure items such as routers.

Cost of installation not included.

23.16.68 TRAFFIC MANAGEMENT

Complex Traffic Management

Complex Traffic Management is defined as consisting of any works requiring traffic management that is considered complex due to high risk or high speed environments. Complex situational requirements such as speed reductions, lane closures and manual controlling of traffic with WZ2 qualified personnel (control traffic with a stop / slow bat) are considered complex. These complex situations have been itemised and will be charged per approach.

Complex Traffic Management items are inclusive of Minor Non Complex traffic management requirements for the entire site of works, including all pedestrian management.

All Traffic Management Plans (TMPs) and Traffic Guidance Schemes (TGSs) submitted for use in this contract (specific or generic) shall be reused within this contract for the same or similar works where possible, or as advised by the Superintendent's Representative.

Payment for all traffic management items includes the submission of a Temporary Speed Limit Authorisation (TSLA) along with the TGSs to be utilised, and any permits required for the works. Daily Diaries from the traffic management company shall also be provided following the works, for any traffic management items utilised.

NOTE: SCATS can be utilised to assist with controlling traffic in some instances where it may otherwise not be possible due to speed or volume. For example, requesting Traffic Section staff to dwell an approach in order to hold another approach for a short duration to enable a technician to access a pit or an aspect safely. The Contractor shall consider this as an option to assist with works.

The following item/s shall be submitted to Superintendent's Representative or Traffic Section staff for approval prior to use:

23.16.69 Traffic Management Type A (Speed Reduction - Non Lane Closure)

Measured per approach.

Payment will include the establishment of all plant, equipment, signage and labour to install appropriate traffic management for speed reductions and to maintain the setup with accredited staff and modify the existing traffic management setup for as long as required for a period of one working day.

This item will be paid per approach that speed reductions are required to complete the works and shall include other minor traffic management requirements for the site including safe pedestrian management.

This item may be paid in accordance with Traffic Management Type C for the period that type C is required but is not to be used in accordance with Traffic Management Type B for that approach.

23.16.70 Traffic Management Type B (Lane Closure/s)

Measured per approach.

Payment will include the establishment of all plant, equipment, signage and labour to install appropriate traffic management for lane closures and to maintain the setup with accredited staff and modify the existing traffic management setup for as long as required for a period of one working day.

This item will be paid per approach that lane closure/s are required to complete the works and are inclusive of any requirement of a closure change to an adjacent lane. This item shall include other minor traffic management requirements for the site including safe pedestrian management.

This item may be paid in accordance with Traffic Management Type C for the period that type C is required but is not to be used in accordance with Traffic Management Type A for that approach.

23.16.71 Traffic Management Type C (Traffic Controller/s)

Measured by hours (Rounded up and payable in 30 minute blocks).

Payment will include the establishment of all plant, equipment and labour to install appropriate traffic management for manual traffic control and to maintain the setup with accredited staff and modify the existing traffic management setup for as long as required.

This item will be paid per lane of traffic under control / per hour that WZ2 qualified controllers are required for the Contractor to complete the works and shall include other minor traffic management requirements for the site including safe pedestrian management.

This item may be used in accordance with Traffic Management Type A or B for the period required.

23.16.72 Traffic Management Type D (Frequently Changing Work Area)

Measured by number / per site.

Payment will include the establishment of all plant, equipment and labour to install appropriate traffic management for a frequently changing work area and maintain the setup with accredited staff and modify the existing traffic management setup, regardless of how many approaches are required. This item may require a speed reduction in accordance with these standards which is included in this item.

Appropriate shadow vehicles and / or attenuator shall be utilised.

This item will be paid per site that this item is utilised for.

23.16.73 Site Specific Traffic Guidance Schemes (TGSs)

Measured by number / per site.

Payment will include the labour, equipment and materials required to compile and submit site specific Traffic Guidance Scheme/s (TGS), associated specific Risk Assessment, to the Superintendent's Representative or Traffic Section staff in order to undertake the required maintenance works task. If the works require two (2) or more TGSs in order to document the works required, or for after-hours care, this shall be included in the rate.

The TGSs and Risk Assessment shall reference the specific TMP for traffic signals maintenance, and ensure that it complies with this document. Alternately, provide a separate summarised TMP where details contradict the primary maintenance TMP.

Site Specific TGSs shall join the suite of TGSs, including generic TGSs, under the Traffic Signals Maintenance contract TMP, and shall be reused for other works associated with this contract where possible.

Note: the Template TMP's and Generic and TGSs required are not to be classed as chargeable items.

23.17 STREET LIGHTING MAINTENANCE

Refer to the RFT/RFQ.

23.18 STREET SWEEPING

23.18.1 Scheduled Works – Sweeping of Intersections, Median Breaks and Kerbed Sections of Roads

Measured by the number of monthly sweeping cycles for each nominated road. Sweeping will include intersections, median breaks and kerbed sections of roads.

23.18.2 Scheduled Works – Sweeping of Cycleways and Footpaths

Measured by the number of monthly sweeping cycles for each nominated cycleway or footpath.

23.18.3 Priority Works

Road Sweeping Equipment: Measured as an hourly rate for on-site hours worked.

Cycleway and Footpath Sweeping Equipment: Measured as an hourly rate for on-site hours worked.

23.18.4 Urgent Works

Road Sweeping Equipment: Measured as an hourly rate for on-site hours worked.

Cycleway and Footpath Sweeping Equipment: Measured as an hourly rate for on-site hours worked.

Water not measured separately

23.18.5 Supply and Use of Detergent

Measured by litres of detergent used.

23.18.6 Manual Sweeping of Medians, Splitter Islands, etc.

Measured as an hourly rate per person for on-site hours worked.

23.18.7 Travel Allowance past Stuart Highway/Arnhem Highway Intersection

- Road Sweeping Equipment: Measured per kilometre from the Stuart Highway / Arnhem Highway intersection to the most distant point of the works, by the most direct route.
- Cycleway and Footpath Sweeping Equipment: Measured per kilometre from the Stuart Highway / Arnhem Highway intersection to the most distant point of the works, by the most direct route.

23.18.8 Disposal of Recovered Waste

Not measured separately. Make allowance for these items within other rates.

23.18.9 Traffic Control/ Provision for Traffic

Not measured separately. Make allowance for compliance with the contract requirements within other rates.

Provision for Traffic not measured separately.

23.19 AERODROME MAINTENANCE

Refer to the specification text for the full extent of work required under each scheduled item.

The Principal will provide replacement and new equipment, parts, and materials for aerodrome furniture and lighting.

23.19.1 General maintenance

Not measured separately. Allow for in other items.

Includes, but is not limited to, all items listed and shown in the **Description of the Works** clause in the specification.

23.19.2 Provision of on-going support

Not measured separately. Allow for in other items.

Includes, but is not limited to, all items listed and shown in the **Provision of Ongoing Support** clause in the specification.

23.19.3 Aerodrome Reporting Officers (AROs) for Aerodromes receiving Regular Passenger Transport (RPT) services

Measured on a monthly basis.

Make allowance for the submission of reports.

Make allowance in the rate for vehicle, equipment and all other on-costs.

Make allowance for two lighting inspections per month.

Make allowance for emergency on call requirements for the ARO to be available on an on-call basis 7 days per week.

Make allowance for the nominated AROs of security controlled aerodromes to have an ASIC card for the duration of the contract.

Allow for the removal of litter.

Allow for providing ongoing support for the contract including, but not limited to:

- Using the Electronic Recording Management System;
 - the time needed on the work sites to record the necessary information.
 - the supply and maintenance of all electronic equipment, backup and ancillary equipment for use in this contract.
 - for internet and associated data costs.
 - for alternative GPS recording devices and cameras to record repairs manually in the Spreadsheet in case of electronic equipment/software failure.
 - for all associated training needs in operation of the KONECT system software.

Call out payments are only payable for out of hours emergency call outs. Call out payments are not payable for out of hours routine inspections. Call out payments are not payable for any works undertaken during normal working hours. Call out payments are not payable for attending any emergency call out undertaken during normal working hours.

Includes, but is not limited to, all items listed and shown in the **Aerodrome Reporting Officers (ARO)** clause in the specification.

23.19.4 Aerodrome Reporting Officers (AROs) for Aerodrome Landing Areas (ALAs)

Measured on a monthly basis.

Make allowance for the submission of reports.

Make allowance in the rate for vehicle, equipment and all other on-costs.

Make allowance for two lighting inspections per month.

Make allowance for emergency on call requirements for the ARO to be available on an on-call basis 7 days per week.

Allow for the removal of litter.

Allow for the compliance to ongoing support for the contract including

- Electronic Recording Management System
 - the time needed on the work sites to record the necessary information.
 - the supply and maintenance of all electronic equipment, backup and ancillary equipment for use in this contract.

- for internet and associated data costs.
- for alternative GPS recording devices and cameras to record repairs manually in the Spreadsheet in case of electronic equipment/software failure.
- for all associated training needs in operation of the KONECT system software.

Call out payments are only payable for out of hours emergency call outs. Call out payments are not payable for out of hours routine inspections. Call out payments are not payable for any works undertaken during normal working hours. Call out payments are not payable for attending any emergency call out undertaken during normal working hours.

Includes, but is not limited to, all items listed and shown in the **Aerodrome Reporting Officers (ARO)** clause in the specification.

23.19.5 After Hours Emergency Flights Response

Measured by number of responses to emergency flights after hours.

Make allowance for up to two hours attendance by the ARO at emergency responses.

23.19.6 ARO Additional Works

Responses to emergency flights during working hours, and to write and issue NOTAMS for planned works, and to write and distribute MOWPs (Method of Working Plans) for planned works.

Measured per hour for a maximum of two hours in half hour increments.

23.19.7 Aerodrome Reporting Officers (AROs) Training

Measured by number.

Maximum of two persons per aerodrome for the period of the contract.

Claim once the training is successfully completed and the ARO assessed to be qualified for the role.

Include course fees, travel, accommodation and meals.

23.19.8 Aerodromes and frequency of serviceability inspection

Not measured separately. Allow for in other items.

Includes, but is not limited to, all items listed and shown in the **Aerodromes and Frequency of Serviceability Inspection** clause in the specification

23.19.9 Works Safety Officers

Not measured separately. Allow for in other items.

Includes, but is not limited to, all items listed and shown in the **Works Safety Officers** clause in the specification

23.19.10 Method of Working Plans

Not measured separately. Allow for in other items.

Includes, but is not limited to, all items listed and shown in the **Method of Working Plans** clause in the specification

23.19.11 Monthly Meeting

Not measured separately. Allow for in other items.

23.19.12 Procedures, calls and payments

Not measured separately. Allow for in other items.

23.19.13 Inspections

Not measured separately. Allow for in other items.

23.19.14 Maintenance Works

Not measured separately. Allow for in other items.

23.19.15 Unforeseen Maintenance

Not measured separately for scheduled items. Include in other items.

For works items not scheduled: measured as an item at a negotiated rate.

23.19.16 Slashing of grassed area within perimeter fence

Measured by number of complete slashings for the period of the contract.

Make allowance for the removal and disposal of anthills and litter from areas within the perimeter fence.

Record slashing on the electronic system.

23.19.17 Cutting of Regrowth and Slashing of Grassed Areas outside the Perimeter Fence Line including Approaches and Side Transitions

Measured by number of complete slashings for the period of the contract.

Make allowance for the removal and disposal of anthills, litter, and cuttings.

Record slashing on the electronic system.

23.19.18 Chemical Spraying and Weed Control

REGIONS OTHER THAN DARWIN

Measured by number of complete Chemical Spraying of aerodrome sites for the period of the contract.

Make allowance for chemical spraying and weed control to meet the specified performance criteria at all locations.

DARWIN REGION

Paid as a monthly fee to conform to the requirements of the specification.

Record vegetation control on controlled areas on predetermined intervals on the electronic system to demonstrate compliance.

23.19.19 Dragging of Aerodrome

Measured as an item for the particular aerodrome.

23.19.20 Rolling of sealed runways

Measured in square metres.

23.19.21 Rolling of gravel runways

Measured in square metres.

23.19.22 Maintenance grade – Runways

Measured in square metres.

23.19.23 Gravel Sheetting

Not measured separately. Include in other items.

23.19.24 Maintain Fences and Gates – regions other than Darwin

Measured as an item for each 12 month period.

Make allowance to a maximum of 40 hours for minor repairs to fences and gates per 12 month period. Inclusive in the rate allow for all plant, tools, and minor items of materials, to reinstate posts, repair, reattach and restrain, fences, and gates.

23.19.25 Maintain Aerodrome Furniture – regions other than Darwin

Inclusive of wind indicators, marker cones, and safety equipment.

Measured as an item for each 12 month period.

Make allowance of up to a maximum of 40 hours for repairs to Aerodrome Furniture per 12 month period.

Make allowance for the handling storage replacement and disposal of all items to maintain aerodrome furniture.

23.19.26 Maintain Aerodrome Lighting – regions other than Darwin

Measured as an item for each 12 month period.

Make allowance of up to a maximum of 80 hours for repairs to Aerodrome Lighting per 12 month period.

Make allowance for the handling, storage, replacement, and disposal of all items to maintain aerodrome lighting.

23.19.27 Maintain Fences and Gates, and Furniture, and Lighting – DARWIN REGION ONLY

Measured per hour, in half-hour blocks to repair the item.

Inclusive in the rate allow for all plant and tools.

For fences and gates allow for minor repairs inclusive of minor items of materials, to reinstate posts, repair, reattach and restrain, fences, and gates.

The supply of replacement airstrip lighting (including parts), safety equipment, furniture and materials deemed necessary by the Superintendent will be provided by the Principal

Make allowance for the handling storage replacement and disposal of all items.

23.20 BUS STOP MAINTENANCE

The following Measurement and Payment clauses refer to the specification sections of the same name, however, the clause numbers do not match the section numbers of the same title.

23.20.1 Provision For Traffic

23.20.1.1 Traffic Management Plan

Measured as an item: Paid only once for the period of the Contract

Payment for further traffic control diagrams needed after the submission of the initial Traffic Control Plan will not be paid separately but included in the other rate.

23.20.1.2 Provision for Traffic Routine Works

Measured and paid as a monthly rate for nominated routine works.

Make allowance for hazard identification, risk assessment and traffic control at any site, including allowance for all traffic management personnel, traffic guidance, traffic control devices, electronic warning devices, temporary bridging, maintenance, installation, removal, restoration, record keeping and documentation

Routine Works involve:

- Inspection of Bus stops
- Daily services of litter and rubbish collection
- Weekly Bin Services
- Complaints and Claims

23.20.1.3 Provision for Traffic General Requested Works

Not measured separately: Include all cost within the rates for the specific item of work. See **Table – Guide – Tasks – Quantity of each type of task – Approximate number of task occurrences over a 3 year period** below for an aid in calculating tender rates.

Make allowance for hazard identification, risk assessment and traffic control at any site, including allowance for all traffic management personnel, traffic guidance, traffic control devices, electronic warning devices, temporary bridging, maintenance, installation, removal, restoration, record keeping and documentation.

Items below provide a summary of usage over a 3-year period of the occurrence of the scheduled items to enable tenderers to ascertain traffic control requirements. This summary does not include routine scheduled works, which can be determined from the schedule of rates. These quantities are given as a guide only in good faith and do not provide any guarantee of the actual use or intended usage.

Table – Guide – Tasks - Quantity of each type of task - Approximate number of task occurrences over a 3 year period – Part 1 of 2 parts

DARWIN REGION	
Litter Collection	Qty (= No of times)
Additional bins per day on any day and location	60
Call out to Litter Collection up to 1.0m ³	440
Remove & Replace Bins	25
Reinstate and Anchor Bins	15
Install New bins at new locations	1
Cleaning to Bus Stops and Shelters	Qty
Removal and Cleaning of offensive matter	1680
Minor Cleaning	1240
Major Cleaning to Bus Shelter	200
Wash Clean and removal of graffiti from all surfaces	1600
Manual Removal of Pests	90
Spraying Pesticides	60
Miscellaneous Services	Qty
Replace Decals	950
Removal and or replacement of timetable holders and faces.	1000
Remove and replace totems print panels	25
Structure and Furniture Maintenance	Qty
Remove and replace broken or damaged glazing	30
Replace Seat Timbers	3
Remove and replace old seats with aluminium seats	3
Installation and Removal of Temporary Bus Stop Poles	25
Paint to Structures	Qty
Preparation and Painting of Existing Surface	2700
Paint and Part Paint to Murals	1
Application of Graffiti Barrier	3
Paint Bus Stop Seats	600
Paint Bus Stop Posts	150
Landscaping	Qty
Mowing, Trimming, and removal of Cuttings Treatment and/or Removal of Weeds	30

Table – Guide – Tasks - Quantity of each type of task - Approximate number of task occurrences over a 3 year period – Part 2 of 2 parts

ALICE SPRINGS REGION	
Litter Collection	Qty (= No of times)
Call out to Litter Collection up to 0.5m ³	120
Cleaning to Bus Stops and Shelters	Qty
Removal and Cleaning of offensive matter	600
Minor Cleaning	1095
Major Cleaning to Bus Shelter	200
Wash Clean and removal of graffiti from all surfaces	1500
Manual Removal of Pests	3
Spraying Pesticides	50
Miscellaneous Services	Qty
Replace Decals	130
Removal and or replacement of timetable holders and faces.	150
Remove and replace totems print panels	35
Removal and or replacement No Smoking Sign.	20
Removal and Re-painted Disability Sign on slab	9
Removal and or replacement of Tactiles	10
Structure and Furniture Maintenance	Qty
Remove and replace broken or damaged glazing	50
Remove and replace aluminium seats	6
Installation and Removal of Temporary Bus Stop Poles	3
Paint to Structures	Qty
Preparation and Painting of Existing Surface	1800
Application of Graffiti Barrier	10
Landscaping	Qty
Mowing, Trimming, and removal of Cuttings Treatment and/or Removal of Weeds	1100

23.20.2 Management and Services**23.20.2.1 Management Service**

Measured and paid as a monthly rate.

Make allowance for all the requirements of the nominated Management services including programs and reports

Make allowance for initial audit of bus stops, and all future audits

Make allowance for all costs associated with electronic recording of defects and repairs.

23.20.2.2 Inspection of Bus Stops

Measured and paid as a monthly rate.

Make allowance for undertaking the weekly inspections and reporting of the nominated Bus Stop Assets including reporting and costing recommended general maintenance works.

Make allowance for removal unauthorised posters/fliers and advertising signs including adhesives during inspections

No variation to the rate of payment will be applicable unless the quantities varies below 90% or greater than 110% of the starting quantity

23.20.2.3 Call Outs for Unforeseen Incidents, Complaints and Claims

Measured by hours, (minimum payment two hours for callout within and out of normal working hours)

Make allowance for the report, all plant, equipment and dedicated officer.

23.20.2.4 Urgent Response for Call Outs Outside normal Working Hours

Measured by Number.

Where the Superintendent notifies the Contractor outside normal hours of Urgent Works to be performed, the After Hours Callout Fee will apply, as additional costs incurred in attending the work outside the normal working hours.

23.20.3 Payment For Materials

23.20.3.1 Payment

Measured as 10% mark-up fee on GST inclusive rate

All materials used in the performance of the works, which are not itemised in the Schedule of Rates, will be paid for at trade price, plus 10% mark-up fee. Evidence shall include the provision of certified copies of the material invoices. The provision of satisfactory evidence is a prerequisite to payment for the work materials.

23.20.3.2 Materials for payments

Shall include but not limited to, all Paints and Anti-Graffiti coating, Bins, Bin surrounds, Bin Liners, timetable holders, timetables and maps, glazing (Perspex), seat timbers, aluminium seats, totems panels, Blue or Yellow pole stops as authorised by the Superintendent.

23.20.4 Litter collection bin service

23.20.4.1 Disposal of Refuse and Litter

The Contractor shall make allowance and pay all fees for waste disposal associated with the contract in the rates for the applicable items.

23.20.4.2 Regular Services

Measured and paid as a monthly rate.

Make allowance for the regular services to 260 bins per week on any day and at any of the locations of the nominated Bus Stop Assets. (final numbers to be confirmed as part of the initial audit)

No variation to the rate of payment will be applicable unless the quantities varies below 90% or greater than 110% of the starting quantity

23.20.4.3 Additional Bins Service

Measured by Number of bins per day on any day and at any location

23.20.4.4 Call out to litter collection

Measured by Number of incidents for up to 1.0m³ of litter

23.20.4.5 Remove and Replace bins

Measured by Number of bins

23.20.4.6 Reinstate Repair and anchor bin and surrounds

Measured by Number of bins

23.20.4.7 Install new bins and surrounds at existing and new locations

Measured by Number of bins

23.20.5 General Maintenance And Cleaning Of Bus Stops

23.20.5.1 Removal of Offensive Matter

Measured by number of services on any day and at any location

23.20.5.2 Minor Cleaning

Measured by number of services, to any bus shelter or totem, (not applicable to yellow or blue pole stop)

23.20.5.3 Major Cleaning to Bus Shelters

Measured by number of services to any bus shelter (not applicable to totems, yellow or blue pole stop)

23.20.5.4 Wash and Clean Glazing

Measured by square meters for glazing only. (minimum one square meter).

23.20.5.5 Clean graffiti from all surfaces

Measured by square meters (minimum one square meter).

23.20.5.6 Pest Control of Bus Shelters by manual means

Measured in Number of Services (in other than cleaning service)

23.20.5.7 Pest Control of Bus Shelters by Spraying Pesticides

Measured in Litres

23.20.5.8 Grass Cutting and Weed Removal

Measured in square meters at any location.

23.20.6 Miscellaneous Services

23.20.6.1 Remove and replace decals.

Measured by Number of decals (supplied by Superintendent).

23.20.6.2 Removal and or replacement of timetable holders and faces, timetables and maps

Measured by Number irrespective of item (supplied by Superintendent)

23.20.6.3 Remove and replace totems panels to update timetables and maps

Measured by number (supplied by Superintendent)

23.20.7 Structure and Furniture at bus stops

23.20.7.1 Remove and replace broken or damaged glazing (Perspex)

Measured in square meters.

23.20.7.2 Remove and replace broken and damaged seat timbers

Measured by metre of timber used.

Remove and replace old seats with aluminium seats.

Measured by number for removal and installation. (Supply as per payment of Materials)

23.20.7.3 Installation and removal temporary stops as and when necessary,(i.e. yellow/blue pole)

Measured by number. Make allowance for the excavation, concreting and/or backfilling of the foundation for 0.3m diameter and 0.5m depth hole

23.20.8 Painting

23.20.8.1 Painting to Bus Stops and Shelters (except murals)

Measured in square meters.

Make allowance for all preparation works and application of preparatory coats.

23.20.8.2 Painting to Murals

Measured in square meters

Make allowance for all preparation of surfaces and cutting in to existing.

23.20.8.3 Application of Graffiti Barrier

Measured in square meters

Make allowance for all preparation of surfaces.

23.20.8.4 Painting to Bus Stops Seats

Measured in square meters.

Make allowance for all preparation works and application of preparatory coats.

23.20.8.5 Painting to Bus Stops Posts

Measured by Number.

Make allowance for all preparation works and application of preparatory coats.

23.21 ROAD AND MARINE AMENITY MAINTENANCE

The following routine maintenance operations for the maintenance of the nominated amenities are measured by month to the specified service levels.

Adjustments to payment for these items will be subject to independent auditor's report.

23.21.1 Rubbish Collection

23.21.2 Rubbish Removal

23.21.3 Bin Placement and Replacement

23.21.4 Cleaning of Road Amenity Area Furniture

23.21.5 Cleaning of Road Amenity Area Toilet Block

23.21.6 Cleaning of Amenity Area Structures and Furniture

23.21.7 Cleaning of Amenity Area Toilets and Toilet Block

23.21.8 Maintenance of Toilet Systems

23.21.9 Water Tanks and Water Maintenance

23.21.10 Cleaning of Barbecues and Provision of Firewood

23.21.11 Cleaning and Pressure Cleaning Jetty Decks

23.21.12 Cleaning and Pressure Cleaning of Boat Ramp and Pontoons

23.21.13 Maintenance of Toilet Systems

23.21.14 Graffiti Removal

23.21.15 Grass Cutting

23.21.16 Grass Trimming

23.21.17 Weeding

23.21.18 Irrigation Systems maintenance

23.21.19 Tree replacement

23.21.20 Water Tanks and Water Maintenance

23.21.21 Cleaning and maintenance of Barbecues Provision of Firewood

23.21.22 Painting Existing Furniture

23.21.23 Repair and Replacement of Road Amenity Area Furniture

The following specific maintenance operations are measured as specified and directed by the Superintendent (travel allowance to be paid where not mentioned separately for works in rural areas only)

23.21.24 Information Sign

Measured by number.

23.21.25 Initial Painting of Furniture

Measured as an item for all road amenity area furniture.

23.21.26 Touch Up Painting of Furniture

Measured as an item for all road amenity area furniture.

The following specific maintenance items are measured as specified.

23.21.27 Bin Placement and Replacement

Measured by number including NTG decals

23.21.28 Pumping of Septic tanks

Measured by number of operations for each Amenity site.

Clean Out Toilet Compost Chambers

Measured by number.

23.21.29 Roadside Rubbish Collection

Measured per kilometre including both sides of road.

23.21.30 Provision of Firewood Storage Bins

Measured by number.

23.21.31 Removal of Dead Animals

Measured by number.

Include in the rate for the specified rapid response time and removal of both large and small carcasses.

23.21.32 Removal of Graffiti

Measured by hours inclusive of the solvents and procedure required to remove the graffiti.

23.21.33 Removal of Abandoned Vehicles

Measured by number.

23.21.34 Illegal Rubbish Collection

Measured by lots of up to 250 kilo maximum weight

Provide weighbridge dockets to verification for payments.

Provide photographic evidence to verification of payments

23.21.35 Repair and Replacement of Road Amenity Area Furniture

To be paid at negotiated rate between the Contractor and Superintendent.

23.21.36 Painting Existing Furniture

To be paid at negotiated rate between the Contractor and Superintendent.

23.21.37 Tree and Plant Removal and or Replacement

To be paid at negotiated rate between the Contractor and Superintendent.

23.21.38 Maintenance for Marine Growth/ Shellfish Encrustations on Structures

To be paid at negotiated rate between the Contractor and Superintendent

23.21.39 Unscheduled items/materials and Negotiated Rate

Items not categorised in the Schedule Of Rates will be paid for by the following items.

Unscheduled items: Instances where the Contractor has been requested to engage the sub-Contractor (such as cross-hire of equipment), or provided unscheduled materials (freight to another region), the unscheduled item/material rate shall be utilised. This item is where the Contractor would be required to pay a third party.

Negotiated rate: Instances where the Contractor has been requested to provide labour items, or provide other.

23.21.39.1 Unscheduled Items /material

Measured by number and / or items.

Payment shall include 10% mark-up on evidence of cost of Unscheduled items.

Evidence of cost in the form of an invoice from the supplier, or freight handler must accompany the CSR for payment authorisation. Other evidence such as timesheets, log books or photos may be requested as evidence.

23.21.39.2 Negotiated Rate

Measured by number and/ or items.

To be determined as negotiated between the Superintendent and the Contractor for unscheduled labour, service or hire provided by the Contractor under existing conditions and contract.

Where a type of works is described but does not appear in the schedule of rates or is not defined in the specification and not included in the Schedule of Rates items, a rate shall be negotiated to cover the works required.

The item of works may then be included in the contract Schedule of Rates at the Superintendents discretion.

23.22 PROTECTIVE COATINGS

Measured as an item for each coating system required.

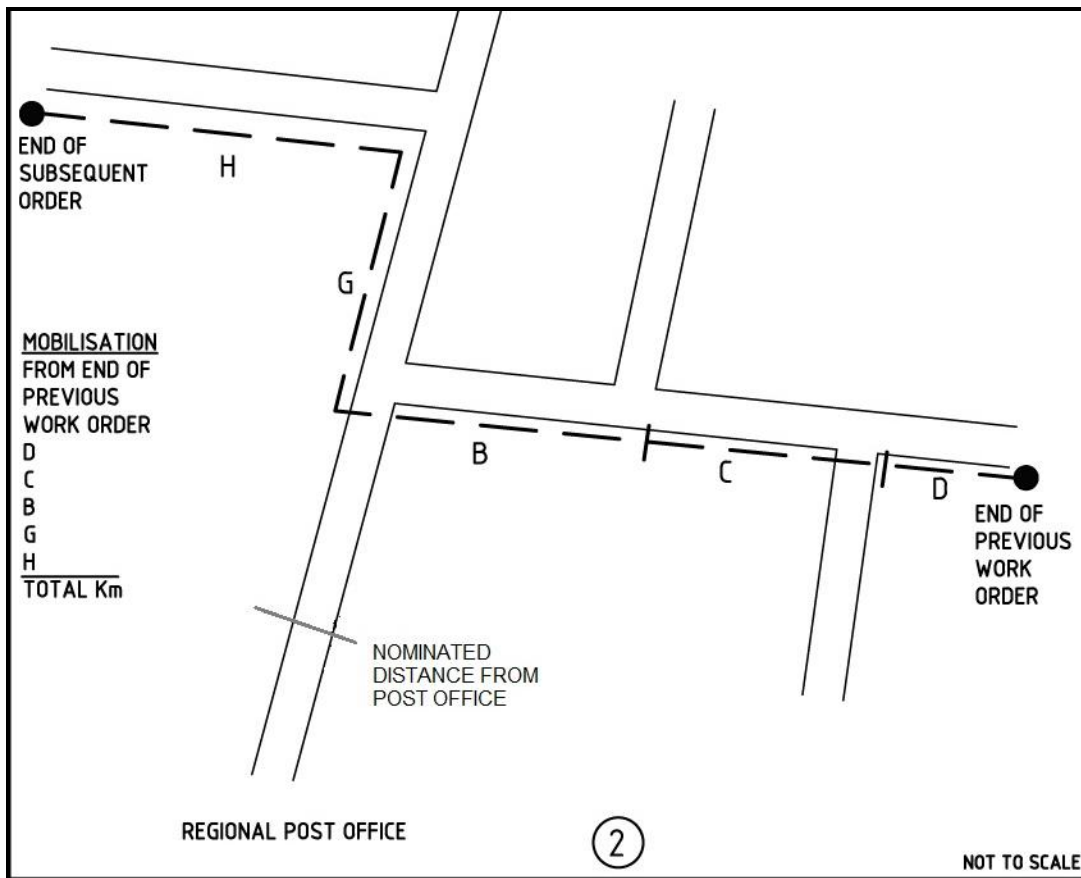
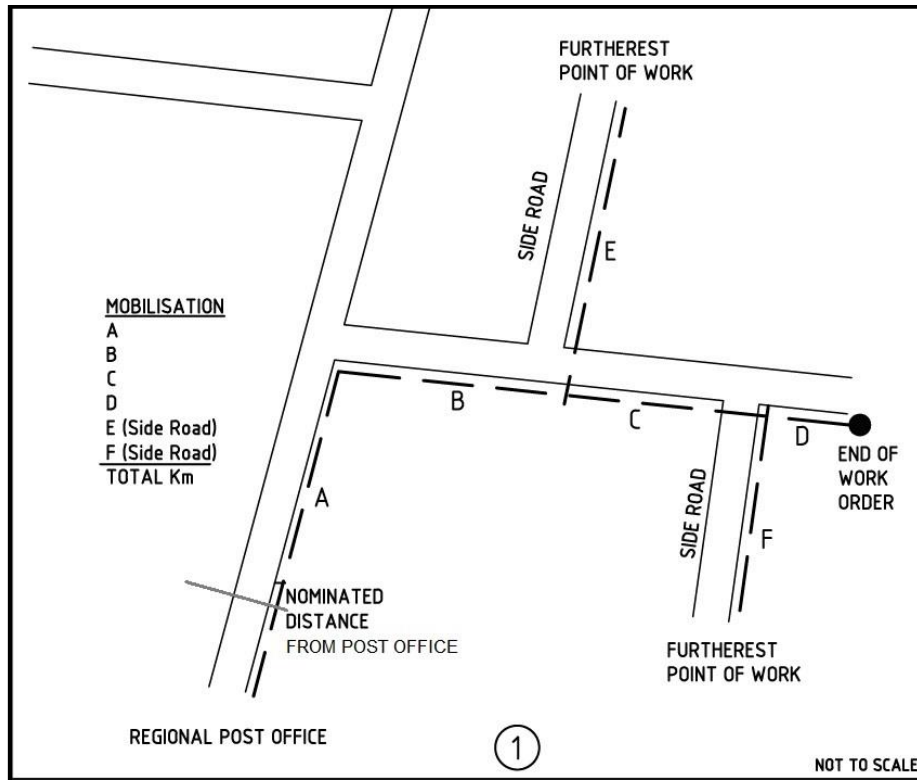
23.23 PAYMENT ADJUSTMENTS

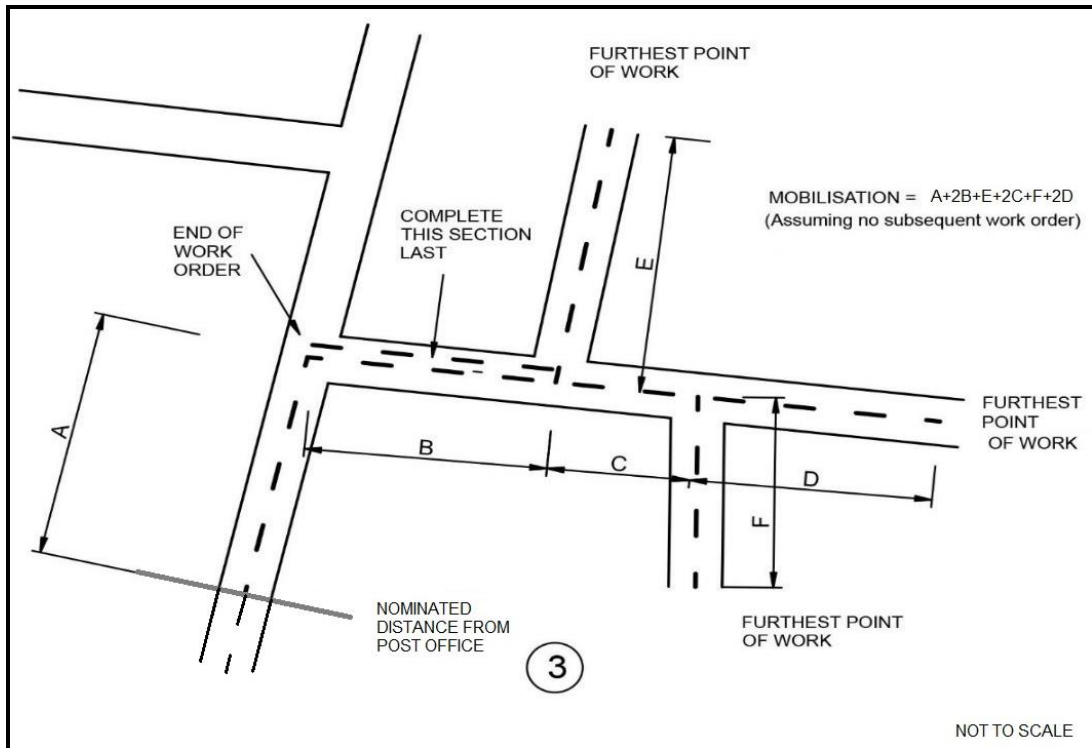
Table - Payment Adjustments	
Viscosity (At 60 °C Pa.Sec) Of Class 320 Bitumen Component Of The Binder	Reduction In Payment Of Seal Coat Items
Under 260	10% reduction for each 10 Pa.sec (or part thereof) below 260.
260 – 380	Nil.
Over 380	10% reduction for each 10 Pa.sec (or part thereof) over 380.

23.24 MOBILISATION DIAGRAMS

Note: Nominated distance from Post Office shown in the diagrams is equivalent to the nominated boundary of the Darwin Region area.

MEASUREMENT AND PAYMENT





23.25 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender.

24 REFERENCED AUSTRALIAN STANDARDS

Table – Referenced Australian Standards		
Use Standards, and their amendments, and applicable supplements, current 3 months before the date for the close of tenders except where different editions and/or amendments and/or supplements are required by statutory authorities, including, but not limited to, NATA and the National Construction Code including the Building Code of Australia.		
Dates entered like this (R2013) indicate that a Standard was reviewed and re-issued unaltered in the year cited in the parentheses.		
AS 1012 (set)	-	Methods of testing concrete
AS 1012.3.1	2014	- Determination of properties related to the consistency of concrete - Slump Test
AS 1012.8.1	2014	- Method for making and curing concrete - Compression and indirect tensile test specimens
AS 1012.9	2014	- Compressive strength tests - Concrete, grout and mortar specimens
AS 1074	1989	Steel tubes and tubulars for ordinary services
AS 1100 (set)	-	Technical drawing
AS 1111 (set)	-	ISO metric hexagon commercial bolts and screws - Product grade C
AS 1111.1	2015	- Bolts
AS 1112 (set)	-	ISO metric hexagon nuts
AS 1141 (set)	-	Methods for sampling and testing aggregates
AS 1141.0	1999	- List of Methods
AS 1141.1	2015	- Definitions
AS 1141.2	2015	- Basic testing equipment
AS 1141.3.1	2012	- Sampling - Aggregates
AS 1141.11.1	2009	- Particle size distribution – Sieving method
AS 1141.14	2007 (R2018)	- Particle shape, by proportional calliper
AS 1141.15	1999 (R2018)	- Flakiness index
AS 1141.18	1996	- Crushed particles in coarse aggregate derived from gravel
AS 1141.20.1	2000 (R2013)	- Average least dimension - Direct measurement (nominal size 10mm and greater)
AS 1141.20.2	2000 (R2013)	- Average least dimension – Direct measurement (nominal size 7mm and 5mm)
AS 1141.20.3	2000 (R2013)	- Average least dimension – Calculation (nomograph)
AS 1141.23	2009	- Los Angeles value
AS 1141.24	2013	- Aggregate soundness – Evaluation by exposure to sodium sulphate solution
AS 1141.25.1	2003 (R2013)	- Degradation factor – Source rock
AS 1141.26	2008	- Secondary minerals content in igneous rocks
AS 1141.29	2014	- Accelerated soundness index by reflux
AS 1141.40	2017	- Polished aggregate friction value - Vertical road-wheel machine
AS 1141.41	2017	- Polished aggregate friction value – Horizontal bed machine
AS 1141.50	1998 (R2016)	- Resistance to stripping of cover aggregates from binders
AS 1160	1996	Bitumen emulsions for the construction and maintenance of pavements
AS/NZS 1163	2016	Cold formed structural steel hollow sections
AS 1231	2000 (R2017)	Aluminium and aluminium alloys – Anodic oxidation coatings
AS/NZS 1252 (set)	-	High strength steel fastener assemblies for structural engineering - Bolts, nuts and washers for structural engineering
AS 1273	1991 (R2018)	Unplasticised PVC (UPVC) downpipe and fittings for rainwater
AS 1289 (set)	-	Methods of testing soils for engineering purposes
AS 1289.0	2014	- Definitions and general requirements
AS 1289.1.1	2001	- Sampling and preparation of soils – Preparation of disturbed soil samples for testing
AS 1289.2.1.1	2005 (R2016)	- Soil moisture content tests – Determination of the moisture content of a soil - Oven drying method (standard method)

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Dates entered like this (R2013) indicate that a Standard was reviewed and re-issued unaltered in the year cited in the parentheses.		
AS 1289.3.1.1	2009 (R2017)	- Soil classification tests - Determination of the liquid limit of a soil – Four point Casagrande method
AS 1289.3.2.1	2009	- Soil classification tests - Determination of the plastic limit of a soil - Standard method
AS 1289.3.3.1	2009	- Soil classification tests - Calculation of the plasticity index of a soil
AS 1289.3.4.1	2008 (R2016)	- Soil classification tests - Determination of the linear shrinkage of a soil – Standard method
AS 1289.3.6.1	2009	Soil classification tests - Determination of the particle size distribution of a soil – Standard method of analysis by sieving
AS 1289.3.7.1	2002 (R2013)	- Soil classification tests - Determination of the sand equivalent of a soil using a power-operated shaker
AS 1289.5.1.1	2017	- Soil compaction and density tests - Determination of the dry density/moisture content relation of a soil using standard compactive effort
AS 1289.5.2.1	2017	- Soil compaction and density tests - Determination of the dry density/moisture content relation of a soil using modified compactive effort
AS 1289.5.4.1	2007 (R2016)	- Soil compaction and density tests - Compaction control test - Dry density ratio, moisture variation and moisture ratio
AS 1289.5.8.1	2007	- Soil compaction and density tests - Determination of field density and field moisture content of a soil using a nuclear surface moisture density gauge – Direct transmission mode
AS 1289.6.1.1	2014	- Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil – Standard laboratory methods for a remoulded specimen
AS 1289.7 (set)	-	- Soil reactivity tests - Determination of the shrinkage index of a soil
AS/NZS 1336	2014	Eye and face protection - Guidelines
AS/NZS 1337(set)	-	Personal eye protection and eye and face protection
AS/NZS 1338(set)	-	Filters for eye protectors
AS 1345	1995	Identification of the contents of pipes, conduits and ducts
AS 1348	2002	Road and traffic engineering - Glossary of terms (available withdrawn)
AS 1379	2007 (R2017)	Specification and supply of concrete
AS 1397	2011	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 1428.4.1	2009	Design for access and mobility – Means to assist the orientation of people with vision impairment – Tactile surface ground indicators
AS/NZS 1477	2017	PVC pipes and fittings for pressure applications
AS 1478.1	2000	Chemical admixtures for concrete, mortar and grout – Admixtures for concrete
AS/NZS 1554 (set)	-	Structural steel welding
AS/NZS 1554.1	2014	- Welding of steel structures
AS 1579	2001	Arc-welded steel pipes and fittings for water and waste-water
AS 1580 (set)	-	Paints and related materials - Methods of test
AS/NZS 1580.108.1	1994 (R2013)	- Determination of dry film thickness on metallic substrates – Non-destructive methods
AS/NZS 1580.205.4	1998 (R2013)	- Application properties – Airless spraying
AS/NZS 1594	2002 (R2016)	Hot rolled steel flat products
AS 1597 (set)	-	Precast reinforced concrete box culverts
AS 1597.1	2010	- Small culverts (not exceeding 1200 mm span and 1200 mm height)

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Dates entered like this (R2013) indicate that a Standard was reviewed and re-issued unaltered in the year cited in the parentheses.		
AS 1597.2	2013	- Large culverts (exceeding 1200 mm span or 1200 mm height and up to and including 4200 mm span and 4200 mm height)
AS 1604.1	2012	Specification for preservative treatment – Sawn and round timber
AS 1627 (set)	-	Metal finishing—Preparation and pre-treatment of surfaces (Code of Practice for Preparation and Pre-treatment of Metal Surfaces prior to Protective Coating)
AS 1627.0	1997 (R2017)	- Method selection guide
AS 1627.1	2003 (R2017)	- Removal of oil, grease and related contamination
AS 1627.2	2002 (R2017)	- Power tool cleaning
AS 1627.4	2005 (R2017)	- Abrasive blast cleaning of steel
AS 1627.9	2002 (R2017)	- Pictorial surface preparation standards for painting steel surfaces
AS 1672.1	1997 (R2016)	Limes and limestones – Limes for building
AS 1678 (set)	-	Emergency procedure guide – Transport
AS 1678.3A1	2004 (R2016)	- Group text EPGs for Class 3 substances – Flammable liquids
AS 1722	1992 (R2017)	Pipe threads of Whitworth form - Fastening pipe threads
AS 1725 (set)	-	Chain link fabric fencing
AS/NZS 1734	1997	Aluminium and aluminium alloys - Flat sheet, coiled sheet and plate
AS 1742 (set)	-	Manual of uniform traffic control devices
AS 1742.2	2009	- Traffic control devices for general use
AS 1742.3	2009	- Traffic control for works on roads
AS 1742.6	2014	- Tourist and services signs
AS 1742.9	2018	- Bicycle facilities
AS 1742.10	2009	- Pedestrian control and protection
AS 1743	2018	Road signs – Specifications
AS 1744	2015	Standard alphabets for road signs
AS/NZS 1800	1998	Occupational protective helmets – Selection, care and use
AS/NZS 1801	1997	Occupational protective helmets
AS/NZS 1906 (set)	-	Retroreflective materials and devices for road traffic control purposes
AS/NZS 1906.1	2017	- Retroreflective sheeting
AS/NZS 1906.3	2017	- Raised pavement markers (retroreflective and non-retroreflective)
AS/NZS 1906.4	2010	- High visibility materials for safety garments
AS 1940	2017	The storage and handling of flammable and combustible liquids
AS 2001.2.3.2	2001 (R2016)	Methods of test for textiles - Physical tests - Determination of maximum force using the grab method (ISO 13934-2:1999, MOD)
AS 2008	2013	Bitumen for pavements
AS/NZS 2009	2006 (R2016)	Glass beads for pavement-marking materials
AS/NZS 2053(set)	-	Conduits and fittings for electrical Installations
AS 2106.2	2005 (R2016)	Methods for the determination of the flash point of flammable liquids (closed cup) - Determination of flash point - Pensky-Martens closed cup method
AS 2144	2014	Traffic signal lanterns
AS 2150	2005	Hot mix asphalt – A guide to good practice
AS 2157	1997	Cutback bitumen
AS/NZS 2161(set)	-	Occupational protective gloves
AS 2187.1	1998	Explosives – Storage, transport and use - Storage
AS 2187.2	2006	Explosives – Storage, transport and use – Use of explosives
AS/NZS 2210(set)	-	Safety protective and occupational footwear

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AS/NZS 2276 (set)	-	Cables for traffic signal installations
AS/NZS 2276.1	2004 (R2017)	- Multicore power cables
AS/NZS 2276.2	1998 (R2017)	- Feeder cable for vehicle detectors
AS/NZS 2276.3	2002 (R2017)	- Loop cables for vehicle detectors
AS/NZS 2299 (set)	-	Occupational diving operations
AS/NZS 2299.1	2015	- Standard operational practice (Includes Supp 1:2015)
AS/NZS 2299.2	2002	- Scientific diving
AS/NZS 2299.3	2003	- Recreational industry diving and snorkelling operations
AS/NZS 2299.4	2005	- Film and photographic diving
AS 2303	2018	Tree stock for landscape use
AS/NZS 2310	2002 (R2016)	Glossary of paint and painting terms
AS/NZS 2311	2017	Guide to the painting of buildings
AS 2312 (set)	-	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS 2312.1	2014	- Paint coatings
AS 2339	2017	Traffic signal posts, mast arms and attachments (Replaces AS 2979))
AS 2341 (set)	-	Methods of testing bitumen and related roadmaking products
AS/NZS 2341.2	2015	- Determination of dynamic viscosity by vacuum capillary viscometer
AS 2341.3	1993	- Determination of kinematic viscosity by flow through a capillary tube
AS/NZS 2341.4	2015	- Determination of dynamic viscosity by rotational viscometer
AS 2341.6	1992	- Determination of density using a hydrometer
AS 2341.9	1992	- Determination of water content (Dean and Stark)
AS 2341.12	1993	- Determination of penetration (available obsolescent - approximately equivalent to ASTM D5)
AS/NZS 2341.13	1997 (R2013)	- Long-term exposure to heat and air
AS 2341.18	1992	- Determination of softening point (ring and ball method)
AS/NZS 2350.0	1999 (R2016)	Methods of testing portland and blended cements - General introduction and list of methods
AS/NZS 2350.1	2006 (R2016)	Methods of testing portland, blended and masonry cements – Sampling
AS 2353	2018	Pedestrian push button assemblies
AS 2423	2002	Coated steel wire fencing products for terrestrial, aquatic and general use
AS/NZS 2433	1994	Plastics - Method for exposure to ultraviolet lamps
AS 2439.1	2007	Perforated plastics drainage and effluent pipe and fittings - Perforated drainage pipe and associated fittings
AS 2698.2	2000 (R2017)	Plastics pipes and fittings for irrigation and rural applications - Polyethylene rural pipe
AS 2698.3	1990 (R2017)	Plastics pipes and fittings for irrigation and rural applications - Mechanical joint fittings for use with polyethylene micro-irrigation pipes
AS 2700 (set)	2011	Colour Standards for general purposes
AS 2700S(G11)	2011	- Bottle green
AS 2700S(G54)	2011	- Mist green
AS 2700S(N14)	2011	- White
AS 2700S(N61)	2011	- Black
AS 2700S(Y14)	2011	- Golden yellow
AS 2700S(Y35)	2011	- Off white
AS 2703	2008	Vehicle loop detector sensors

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Dates entered like this (R2013) indicate that a Standard was reviewed and re-issued unaltered in the year cited in the parentheses.		
AS 2758	-	Aggregates and rock for engineering purposes
AS 2758.1	2014	- Concrete aggregates
AS 2758.2	2009	- Aggregate for sprayed bituminous surfacing
AS 2758.5	2009	- Coarse asphalt aggregates
AS 2759	2004	Steel wire rope – Use, operation and maintenance
AS 2809.5	2001	Road tank vehicles for dangerous goods - Tankers for bitumen based products
AS 2815 (set)	-	Training and certification of occupational divers
AS 2815.1	2008	- Occupational SCUBA diver - Standard
AS/NZS 2815.2	2013	- Surface supplied diving to 30 m
AS 2815.3	1992	- Air diving to 50 m
AS 2815.4	1992	- Bell diving
AS/NZS 2815.5	2013	- Dive supervisor
AS 2865	2009	Confined Spaces
AS 2870	2011	Residential slabs and footings
AS 2876	2000	Concrete kerbs and channels (gutters) - Manually or machine placed (available withdrawn)
AS 2890(set)	-	Parking facilities
AS/NZS 2890.1	2004	- Off-street car parking
AS 2890.2	2018	- Off-street commercial vehicles facilities
AS 2890.3	2015	- Bicycle parking
AS 2890.5	1993	- On-street parking
AS/NZS 2890.6	2009	- Off-street parking for people with disabilities
AS 2891 (set)	-	Methods of sampling and testing asphalt
AS/NZS 2891.1.1	2013	- Sampling – Loose asphalt
AS 2891.1.2	2008	- Sampling – Coring method
AS 2891.1.3	2008	- Sampling – Asphalt from slabs
AS/NZS 2891.3.1	2013	- Bitumen content and aggregate grading - Reflux method
AS/NZS 2891.3.2	2013	- Bitumen content and aggregate grading - Centrifugal extraction method
AS/NZS 2891.3.3	2013	- Bitumen content and aggregate grading - Pressure filter method
AS/NZS 2891.5	2015	- Compaction of asphalt by Marshall method and determination of stability and flow – Marshall procedure
AS/NZS 2891.7.1	2015	- Determination of maximum density of asphalt – Water displacement method
AS/NZS 2891.7.3	2014	- Determination of maximum density of asphalt – Methylated spirits displacement
AS/NZS 2891.8	2014	- Voids and volumetric properties of compacted asphalt mixes
AS/NZS 2891.9.1	2014	- Determination of bulk density of compacted asphalt – Waxing procedure
AS/NZS 2891.9.2	2014	- Determination of bulk density of compacted asphalt – Presaturation method
AS/NZS 2891.9.3	2014	- Determination of bulk density of compacted asphalt – Mensuration method
AS 2979	-	(Superseded by AS 2339:2017)
AS/NZS 3000	2018	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3100	2017	Approval and test specification - General requirements for electrical equipment
AS/NZS 3108	1994	Approval and test specification - Particular requirements for isolating transformers and safety isolating transformers

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AS/NZS 3191	2008	Electric flexible cords
AS/NZS 3500.1	2018	Plumbing and drainage – Water services
AS 3568	1999	Oils for reducing the viscosity of residual bitumen for pavements
AS 3600	2018	Concrete structures
AS 3610.1	2018	Formwork for concrete – Documentation and surface finish
AS/NZS 3661.1	-	(Superseded by AS/NZS 4586:2013 and AS/NZS 4663:2013)
AS/NZS 3661.2	1994	Slip resistance of pedestrian surfaces – Guide to the reduction of slip hazards
AS/NZS 3678	2016	Structural steel - Hot-rolled plates, floor plates and slabs
AS/NZS 3679.1	2016	Structural steel - Hot rolled bars and sections
AS 3706 (set)	-	Geotextiles – Methods of test
AS 3706.1	2012	- General requirements, sampling, conditioning, basic physical properties and statistical analysis
AS 3706.2	2012	- Determination of tensile properties – Wide strip and grab method
AS 3706.3	2012	- Determination of tearing strength – Trapezoidal method
AS 3706.4	2012	- Determination of bursting strength – California bearing ratio (CBR) – Plunger method
AS 3706.9	2012	- Determination of permittivity, permeability and flow rate
AS 3706.11	2012	- Determination of durability - Resistance to degradation by light, heat and moisture
AS/NZS 3725	2007	Design for installation of buried concrete pipes (Includes Supp 1:2007)
AS 3727	1993	Guide to residential pavements
AS 3730.14	2006 (R2016)	Guide to properties of paints for buildings - Undercoat - Solvent borne - Exterior/interior
AS/NZS 3750.9	2009	Paints for steel structure - Organic zinc-rich primer
AS/NZS 3750.22	2008	Paints for steel structures – Full gloss enamel – Solvent-borne
AS/NZS 3845 (set)	-	Road safety barrier systems and devices
AS/NZS 3845.1	2015	- Road safety barrier systems
AS/NZS 3845.2	2017	- Road safety devices
AS 3894 (set)	-	Site testing of protective coatings
AS 3894.3	2002 (R2013)	- Determination of dry film thickness
AS 3894.5	2002 (R2013)	- Determination of surface profile
AS 3894.10	2002	- Inspection report- daily surface and ambient conditions
AS 3894.11	2002	- Equipment report
AS 3894.12	2002	- Inspection report – coating
AS 3894.13	2002	- Inspection Report – Daily blast and paint
AS 3894.14	2002	- Inspection Report – Daily painting
AS 3972	2010	General purpose and blended cements
AS 4049 (set)	-	Paints and related materials - Pavement marking materials
AS 4049.1	2005 (R2016)	- Solvent borne paint - For use with surface applied glass beads
AS 4049.2	2005 (R2016)	- Thermoplastic pavement marking materials - For use with surface applied glass beads
AS 4049.3	2005 (R2016)	- Waterborne paint - For use with surface applied glass beads
AS 4049.4	2006 (R2016)	- High performance pavement marking systems
AS 4049.5	2007	- Performance assessment of pavement markings
AS/NZS 4058	2007	Precast concrete pipes (pressure and non-pressure)
AS 4133 (set)	-	Methods of testing rocks for engineering purposes
AS 4191	2015	Portable traffic signal systems
AS 4373	2007	Pruning of amenity trees

REFERENCED AUSTRALIAN STANDARDS

Table – Referenced Australian Standards		
Use Standards, and their amendments, and applicable supplements, current 3 months before the date for the close of tenders except where different editions and/or amendments and/or supplements are required by statutory authorities, including, but not limited to, NATA and the National Construction Code including the Building Code of Australia.		
Dates entered like this (R2013) indicate that a Standard was reviewed and re-issued unaltered in the year cited in the parentheses.		
AS/NZS 4399	2017	Sun protective clothing – Evaluation and classification
AS 4419	2003	Soils for landscaping and garden use
AS 4454	2012	Composts, soil conditioners and mulches
AS/NZS 4501(set)	-	Occupational protective clothing
AS/NZS 4501.1	2008	- Guidelines on the selection, use, care and maintenance of protective clothing
AS/NZS 4501.2	2006	- General requirements
AS/NZS 4586	2013	Slip resistance classification of new pedestrian surface materials (Partially replaces AS/NZS 3661.1:1993)
AS/NZS 4602.1	2011	High visibility safety garments – Garments for high risk applications
AS/NZS 4663	2013	Slip resistance measurement of existing pedestrian surfaces (Partially replaces AS/NZS 3661.1:1993)
AS/NZS 4671	2001	Steel reinforcing materials
AS/NZS 4680	2006 (R2017)	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS 4742	2003	Earth-moving machinery - Machine-mounted forward and reverse audible warning alarm - Sound test method (withdrawn) (See ISO 9533)
AS 4852.2	2009	Variable message signs – Portable signs
AS/NZS 5000.1	2005 (R2017)	Electric cables – Polymeric insulated – For working voltages up to and including 0.6/1 (1.2) kV
AS 5100.5	2017	Bridge design - Concrete
AS/NZS ISO 9000	2016	Quality management systems - Fundamentals and vocabulary
AS/NZS ISO 31000	2009	Risk Management – Principles and guidelines
AS/NZS 61558 (set)	-	Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1 100 V
AS/NZS 61558.2.4	2009	- Particular requirements for isolating transformers for general use (IEC 61558-2-4: Ed 2, SDT)
AS/NZS 61558.2.6	2009	- Particular requirements for safety isolating transformers for general use (IEC 61558-2-6: Ed 2, MOD)
ISO 9533	2010	Earth-moving machinery - Machine-mounted audible travel alarms and forward horns - Test methods and performance criteria

25 OTHER REFERENCED AUTHORITIES AND DOCUMENTS

AAPA	Aboriginal Areas Protection Authority
AAPA	Australian Asphalt Pavement Association - Guide to the manufacture, storage and handling of polymer modified binders
APAS	Australian Paint Approval Scheme
APAS AP-S0041/3	Pavement marking materials – cold applied plastic
APAS AP-S0042	Glass beads for use in pavement marking paints
APVMA	Australian Pesticides and Veterinary Medicines Authority
AGBT	Austrroads Guide to Bridge Technology
AGPT	Austrroads Guide to Pavement Technology
AGPT04B-14	- Part 4B Asphalt
AGPT04H-08	- Part 4H: Test Methods
AGPT04K-09	- Part 4K: Seals
AGPT-T	Austrroads Guide to Pavement Technology - Test methods
AGPT-T103-06	- Pre-treatment and Loss on Heating of Bitumen Multigrade and polymer Binders (rolling thin film oven [RTFO] test)
AGPT-T1111-06	- Handling Viscosity of Polymer Modified Binders (Brookfield Thermosel)
AGPT-T1112-06	- Flash Point of Polymer Modified Binders
AGPT-T121-14	- Shear Properties of Polymer Modified Binders (ARRB ELASTOMETER)
AGPT-T122-06	- Torsional Recovery of Polymer Modified Binders
AGPT-T124-16	- Toughness of Polymer Modified Binders (ARRB Extensometer)
AGPT-T131-06	- Softening Point of Polymer Modified Binders
AGPT-T132-06	- Compressive Limit of Polymer Modified Binders
AGPT-T141-06	- Laboratory protocol for the preparation of crumb rubber modified binders
AGPT-T190-14	- Specification Framework for Polymer Modified Binders and Multigrade Bitumens
AGPT-T231-06	- Deformation Resistance of Asphalt Mixtures by the Wheel Tracking Test.
AGRD	Austrroads Guide to Road Design
AP-C87-15	Austrroads Glossary of Terms
AP-G41-15	Bituminous Material Sealing Safety Guide
AP-T68-06	Update of Austrroads Sprayed Seal Design Method

OTHER REFERENCED AUTHORITIES AND DOCUMENTS

AP-T235-13	Guide to the Selection and use of Polymer Modified Binders and Multigrade Bitumens
AP-T236-13	Update of Double/Double Design for Austroads Sprayed Seal Design Methods
ARRB	Specification for Recycled Crushed Glass as an Engineering Material
ASTM	American Society for Testing and Materials
ASTM D86	Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure
ASTM D445	Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
ASTM D1298	Standard Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products
ASTM D5064	Standard Practice for Conducting a Patch Test to Assess Coating Compatibility
CASA	Civil Aviation Safety Authority
ISSA	International Slurry Surfacing Association
NATA	National Association of Testing Authorities
NTCP	Northern Territory Code of Practice
NTMTM	Northern Territory Materials Testing Manual https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/materials-testing-manual
NTTM	Northern Territory Testing Methods – found in NTMTM
WA 730.1	Main Roads Western Australia, Bitumen Content and Particle Size Distribution of Asphalt and Stabilised Soil: Centrifuge Methods
-	NTEPA Fact Sheet “Guidelines for Water Extraction as they relate to Road Construction and Maintenance.”
SPECIFICATIONS	Electronically available: https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/technical-specifications
	Standard Specification for Environmental Management
	Standard Specification for Small Building Works
	Standard Specification for Road Works

26 ACTS, REGULATIONS, AND CODES

Acts, Regulations and Codes applicable to the works and authorities with jurisdiction over the works include, but are not limited to;

26.1 ACTS & REGULATIONS

Aboriginal Land Rights (NT) Act 1976 (Cth)

Agricultural and Veterinary Chemicals (Control of Use) Act 2004

Aviation Transport Security Act 2004 (Cth)

Aviation Transport Security Regulations 2005 (Cth)

Building Act 1993 and Regulations 1993

Bushfires Management Act 2016

Civil Aviation Act 1988 (Cth)

Civil Aviation Regulations 1988 (Cth)

Civil Aviation Safety Regulations 1998 (Cth)

Control of Roads Act 1953 and Control of Roads (Infringement Notice) Regulations 2011

Dangerous Goods Act 1998 and Regulations 1985

Energy Pipelines Act 1991

Environmental Offences and Penalties Act 1996

Environment Protection Act 2019

Environment Protection and Biodiversity Conservation Act 1999 (Cth)

Fair Work Act 2009 (Cth)

Fire and Emergency Act 1996

Food Act 2004

Heritage Act 2011

Local Government Act 2008

Manual of Standards (MoS Part 139) (part of Civil Aviation Regulations)

Medicines, Poisons and Therapeutic Goods Act 2012 and Regulations 2014

Mineral Titles Act 2010

Mining Management Act 2001

Northern Territory Aboriginal Sacred Sites Act 1989

Planning Act 1999 and Regulations 2000

Public and Environmental Health Act 2011 and Regulations 2014

Rail Safety (National Uniform Legislation) Act 2012

Soil Conservation and Land Utilisation Act 1969

Territory Parks and Wildlife Conservation Act 1976

Traffic Act 1987 and Regulations 1999 and Traffic Regulations, Schedule 3 – Australian Road Rules 1999

Volatile Substance Abuse Prevention Act 2005

Waste Management and Pollution Control Act 1998

Water Act 1992

Weeds Management Act 2001

Work Health and Safety (National Uniform Legislation) Act 2011 and Regulations 2011

26.2 CODES AND GUIDELINES

Building Code of Australia (BCA)

CASA Directives

CASA Manual of Standards Part 139

Civil Aviation Advisory Publications

Civil Aviation Orders Code of Practice, Abrasive Blasting, Safe Work Australia

Code of Practice, Managing the Risk of Falls at Workplaces, NT WorkSafe

NT Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal or Re-use of Sewage Effluent.

NT Deemed to Comply Manual

NT Health and Safety Guidelines for Commercial Kitchens

26.3 AUTHORITIES

Aboriginal Areas Protection Authority (AAPA)

Development Consent Authority of the NT (DCA)

NT Department of Health

NT Department of Environment and Natural Resources (DENR)

NT Environment Protection Authority (NTEPA)

NT Fire and Rescue Service (NTFRS)

NT WorkSafe

Power and Water Corporation of the NT (PWC)

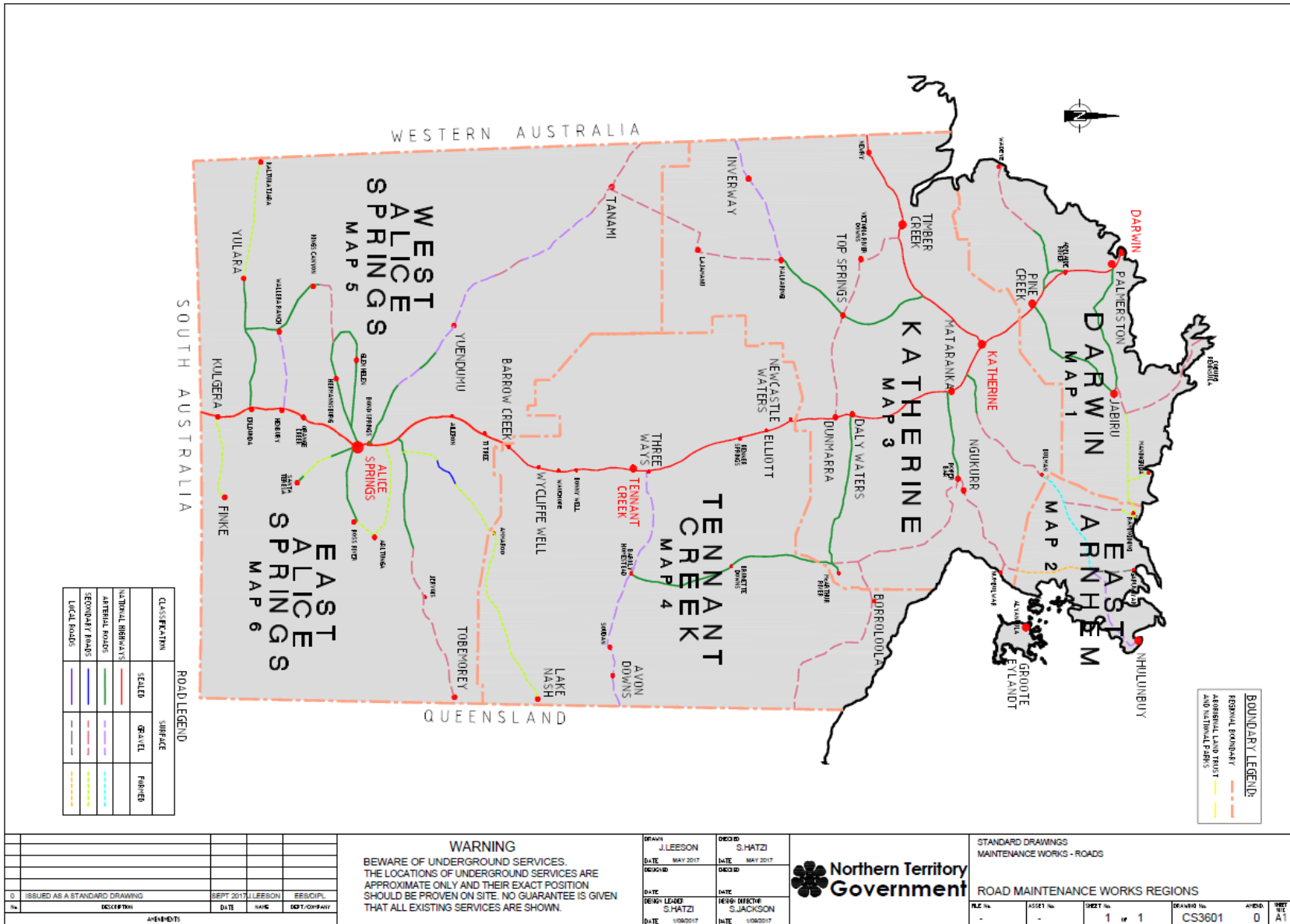
Requirements of the engaged Building Certifier (if applicable)

Requirements of the Local Municipal or Shire Councils

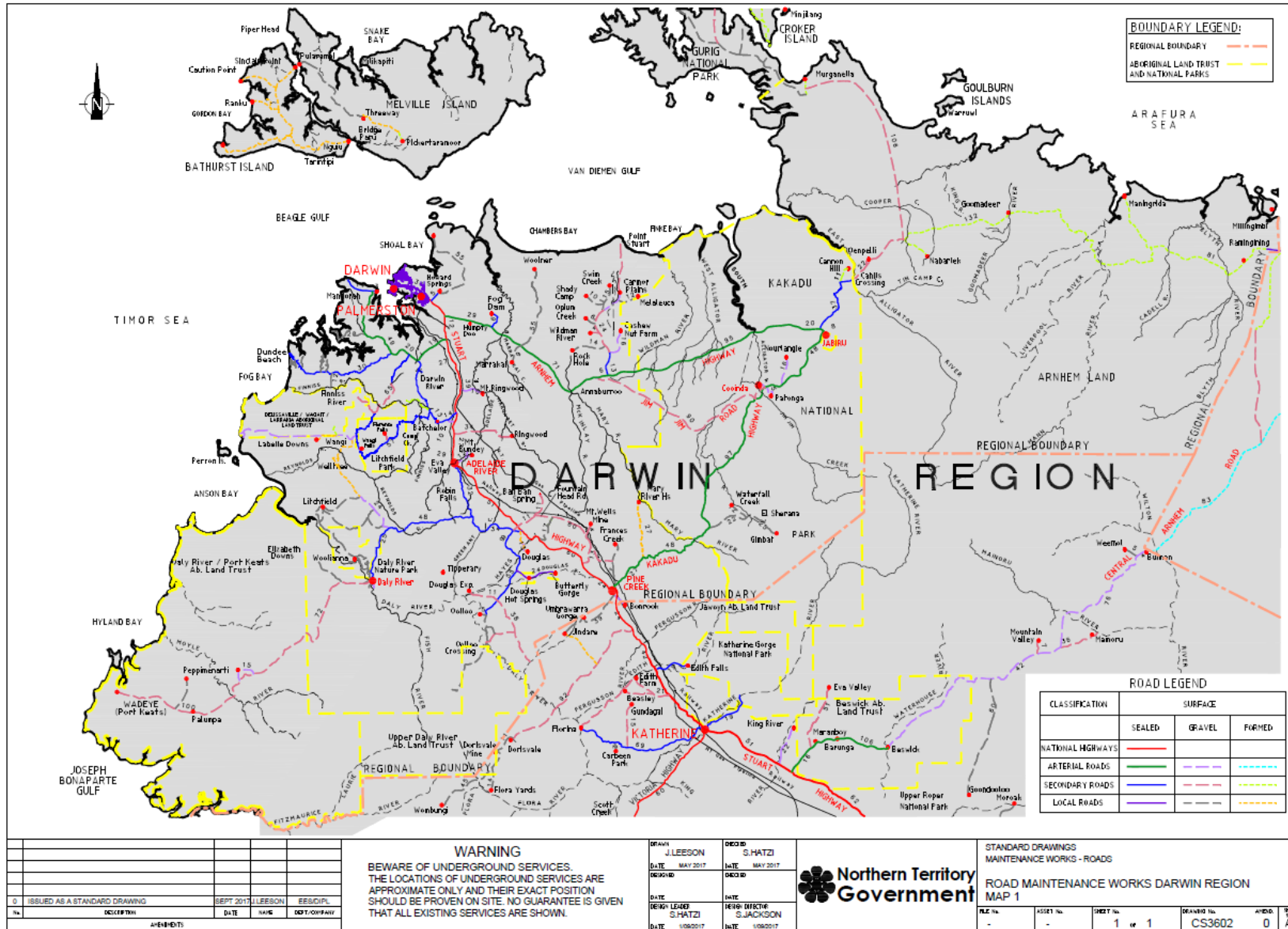
27 CIVIL STANDARD DRAWINGS FOR CIVIL MAINTENANCE

Table – Civil Standard Drawings for Civil Maintenance	
Note: Use the most recently issued versions of drawings. Civil Standard Drawings Available: https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/standard-drawings	
Number	Title
CS-3200	Steel Beam Guardrail (With Flared Terminals)
CS-3201	Typical Approach Guardrails With Flared Terminals (For Bridges Concrete Barrier Connections)
CS-3202	Typical Bridge Rail Details
CS-3203	Approach Guardrails With Flared Terminals (Replacement For Bridges With Steel Ski Jump Rails And Posts)
CS-3300	Standard Kerb Profiles
CS-3302	Pram Ramps, With And Without Tactile Ground Surface Indicator (TGSI)
CS-3303	Tactile Ground Surface Indicator (TGSI) Installation Details For Bus Stops, Island Crossings, Stairs, Ramps And Direction Change
CS-3305	Vehicle Barrier Fencing, Wheelchair Crossing For Medians & Intersection Hold Rail Details
CS-3306	Cycle/Shared Path Culvert Crossing Fence Details
CS-3307	Pedestrian fence
CS-3308	1800mm Security Fence
CS-3310	Stock Fence Design And Details
CS-3312	Stock Fence Swinging Floodgate For Stream Crossings
CS-3313	Standard Cattle Grid Plan And Sections With Approach Slab
CS-3314	Standard Cattle Grid Plan And Sections Without Approach Slab
CS-3315	Standard Cattle Grid Details
CS-3400	Line Marking
CS-3401	Pavement Markings - Chevrons And RRPM's Sheet 1
CS-3402	Pavement Markings - Chevrons And RRPM's Sheet 2
CS-3403	Edge Line With Audio-Tactile Ribs
CS-3500	Flexible Guide Posts
CS-3501	Flood Gauge Posts
CS-3600	Typical Maintenance Responsibility – Darwin Region – Urban Demarcation Plans
CS-3601	Road Maintenance Works Regions
CS-3602	Road Maintenance Works Darwin Region Map 1
CS-3603	Road Maintenance Works East Arnhem Region Map 2
CS-3604	Road Maintenance Works Katherine Region Map 3

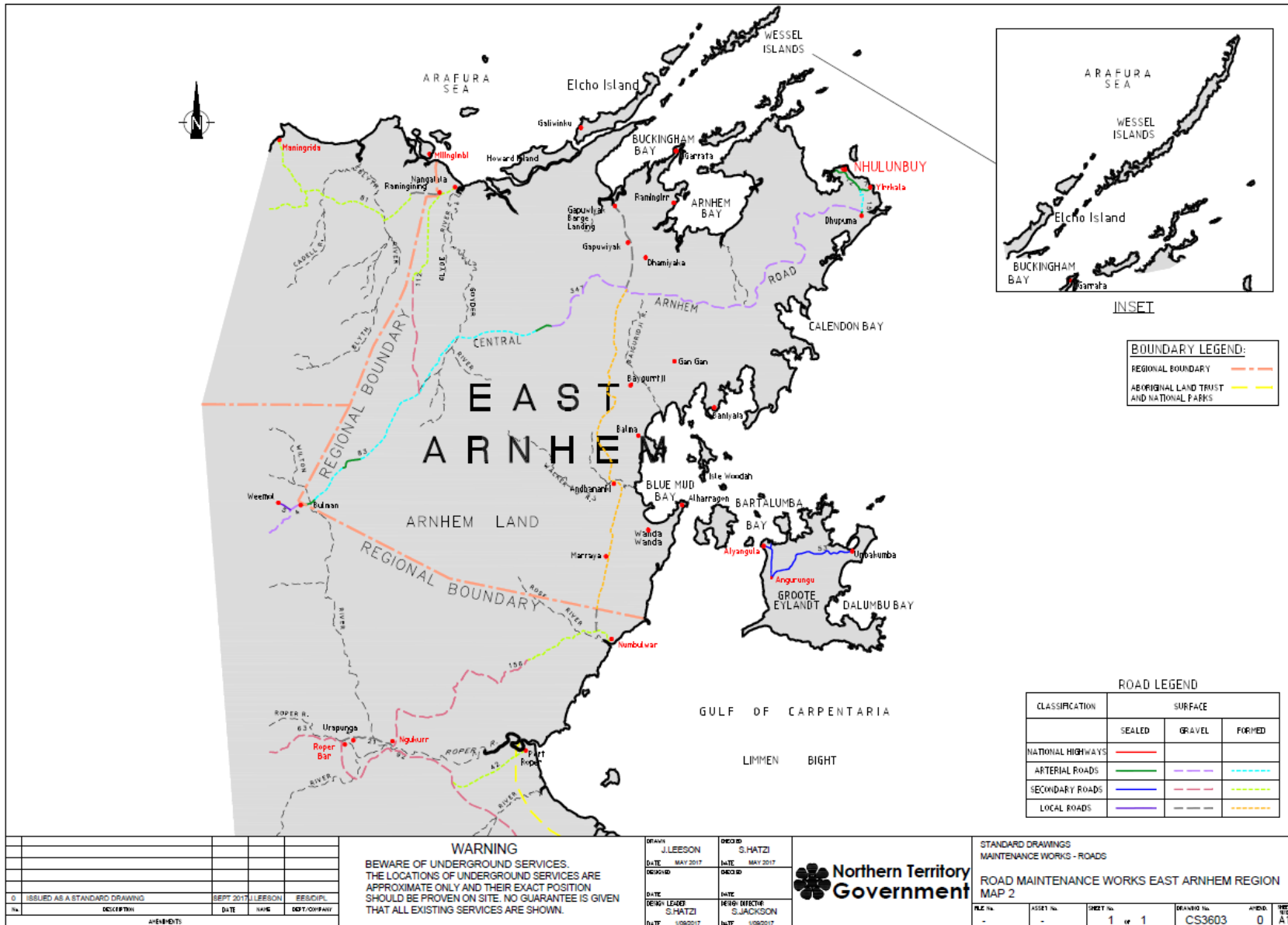
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Note: Use the most recently issued versions of drawings. Civil Standard Drawings Available: https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/standard-drawings	
Number	Title
CS-3605	Road Maintenance Works Tennant Creek Region Map 4
CS-3606	Road Maint. Works West Alice Springs Region Map 5
CS-3607	Road Maint. Works East Alice Springs Region Map 6
CS-3608	Urban And Rural Indicative Maintenance Activities
CS-3609	Typical Cross-Section For Unsealed Rural Roads
CS-3610	Typical Cross-Section For Sealed Rural Roads
CS-3611	Typical Sealed Floodway Cross-Section For Unsealed Rural Roads
CS-3612	Trench and Excavation Reinstatement for Urgent Unprogrammed Utility Repairs
CS Drawings using old series numbering	
CS 1500	Signal Details – Ducting
CS 1501	Signal Details – Pole Foundation
CS 1502	Signal Details – Mast Arm Foundation
CS 1503	Signal Details – Controller Foundation
CS 1504	Signal Details – Communication Isolation Pillar
CS 1505	Signal Details – Lantern Mounting Details
CS 1506	Signal Details – Pedestrian Push Button
CS 1507	Signal Details – Detector Installation
CS 1557	Traffic Signal Advanced Warning Sign
Additional drawings	
RU3A (B95-2284)	Crow Guard Lid for 200L Drum



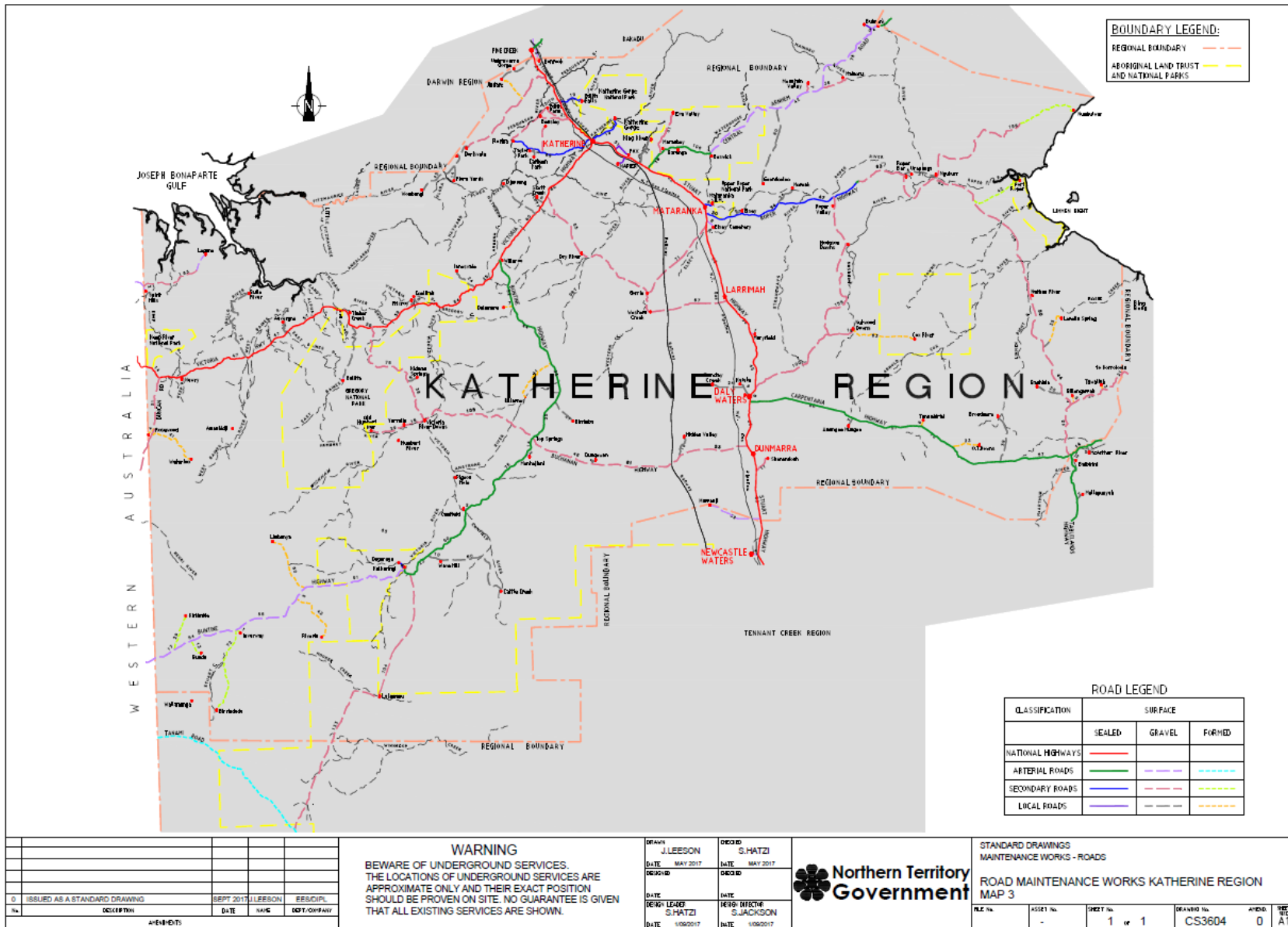
CIVIL STANDARD DRAWINGS FOR CIVIL MAINTENANCE



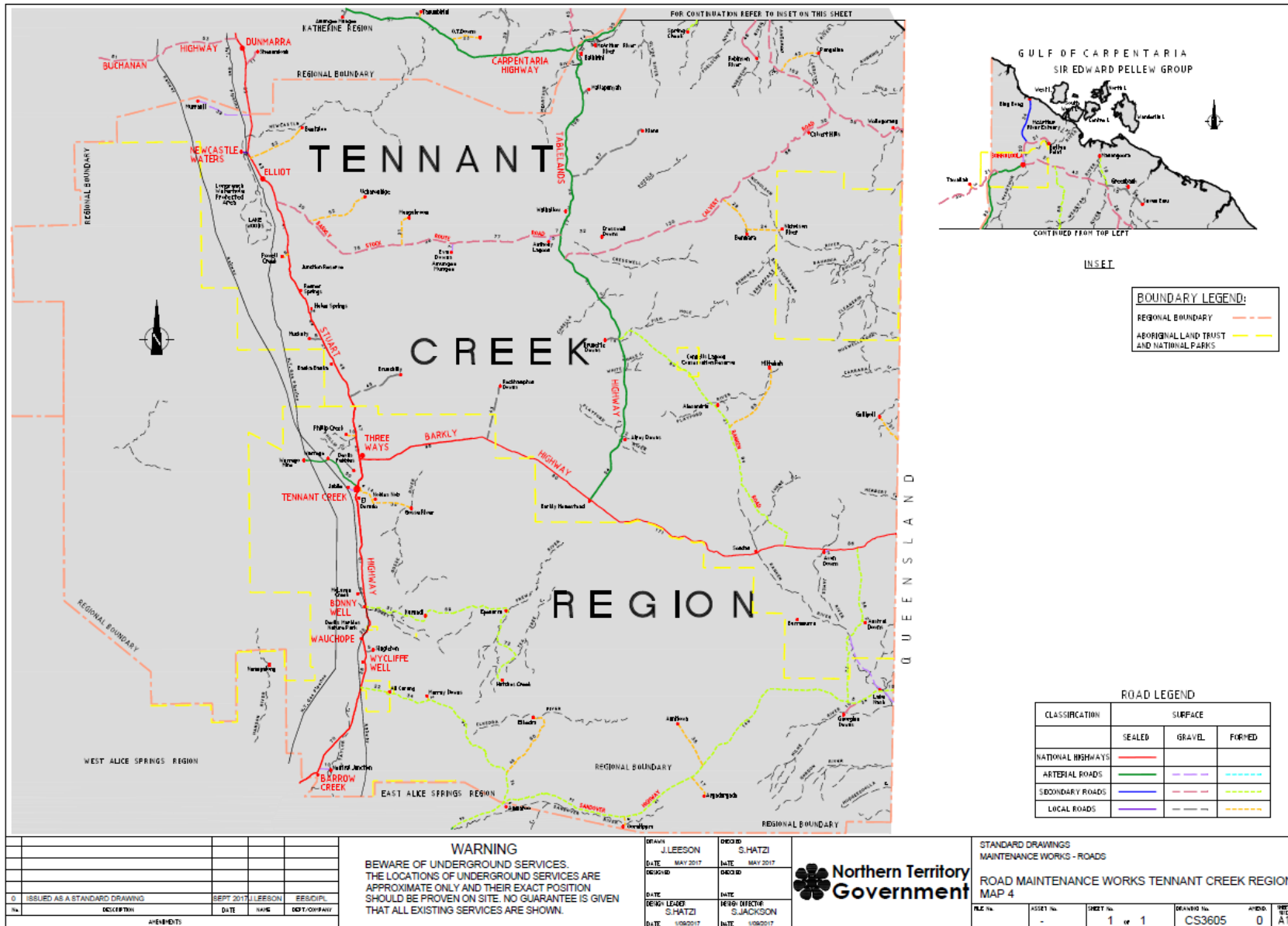
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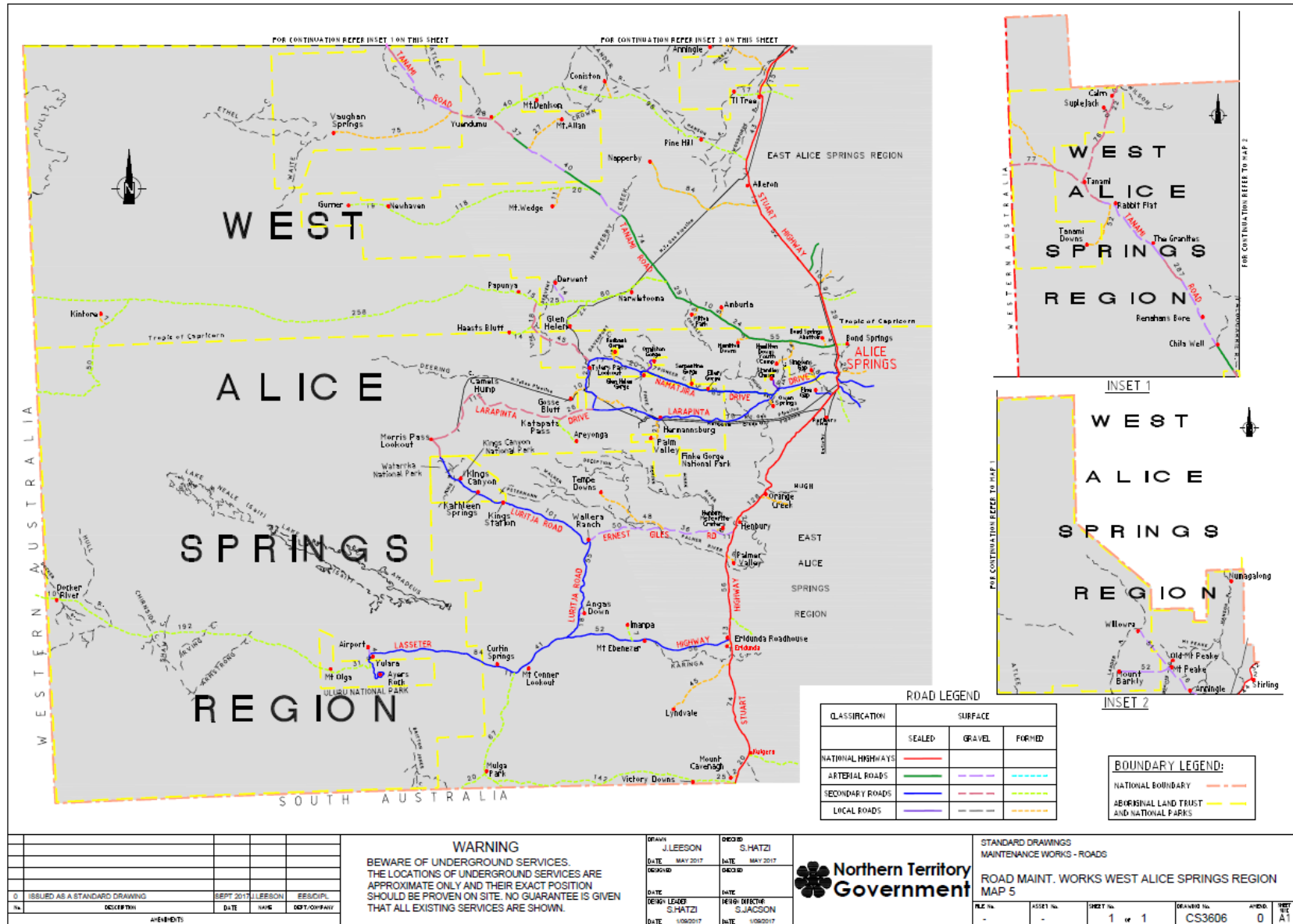
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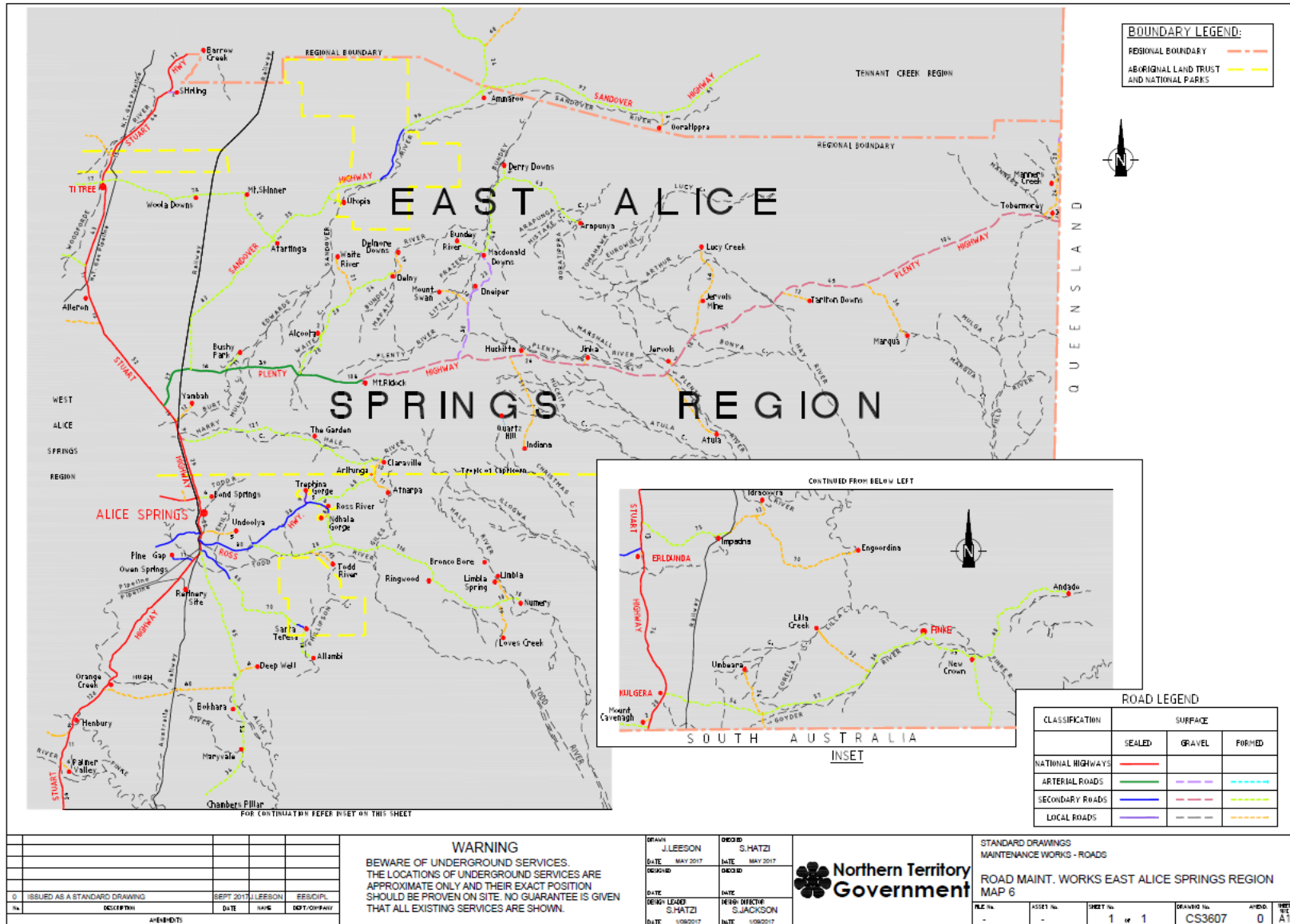
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CIVIL STANDARD DRAWINGS FOR CIVIL MAINTENANCE



CIVIL STANDARD DRAWINGS FOR CIVIL MAINTENANCE



28 NORTHERN TERRITORY CLIMATE ZONES TABLE

NORTHERN TERRITORY CLIMATE ZONES TABLE – Updated 12June2020						
The categorisations below do not take in to account aggressive environments. Special design considerations need to be put in place for aggressive environments. ACC – Atmospheric Corrosivity Classification						
		NTCZ 01 Areas south of, and including, Tennant Creek	NTCZ 02 Areas north of Tennant Creek and south of and including Katherine, and areas more than 50 km from the coast or tidal estuaries	NTCZ 03 Areas north of Katherine and areas between 10 km and 50 km from the coast or tidal estuaries	NTCZ 04 Areas less than 10 km from the coast or tidal estuaries	NTCZ 05 Areas inside buildings
AS 1170	Wind Region	A4	B	B & C	C	n/a
AS 1192	Service Condition Category	2	3	4	5	n/a
	Corrosion Category	B	C & F	D	E	C
AS 1231	Thickness Grade	AA15	AA25	AA25	AA25	AA10 Low airborne moisture
						AA15 High airborne moisture
AS/NZS 2312	ACC	C3	C4	C5, CX & CT	C5, CX & CT	C2
AS 2423	Climatic Category	B	C & F	D	E	A
AS 2699	Durability Classification	R1 (Green mark)	R2 (Yellow mark)	R3 (Red mark)	R4 (White or blue mk)	R1 (Green mark)
AS 3566.2	Corrosion Resistance Class	3	4	4	4	2
AS 3600	Exposure Classification	A	A	B1	B2 or C	A
AS 3715	Service Condition Category	3	4	5	5	n/a
	ACC	3	4	5	5	n/a
AS 4145	Corrosion Resistance Category	C6	C6	C7	C7	C6
AS 4312	ACC	C3	C4	C5	C5	C2
AS/NZS 4534	ACC	C (=C3)	D (=C4)	E (=C5)	E or F (=C5orCT)	B (=C2)
BCA Vol.2 Table 3.5.1.1	Environment category	Low	Low	Medium	High - Very High	n/a

29 HOLD POINTS AND WITNESS POINTS SCHEDULES

29.1 SCHEDULE 1 – HOLD POINTS

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
1 MISCELLANEOUS PROVISIONS				
<p>CONTRACTOR'S ENVIRONMENTAL MANAGEMENT PLAN</p> <p>Refer to the Standard Specification for Environmental Management. Submission of the Contractor's Environmental Management Plan is a Hold Point.</p>	1.6.2	13		
<p>VOLATILE SUBSTANCES MANAGEMENT</p> <p>Provide details of the volatile substances proposed to be brought in to the area(s) subject to Volatile Substance Abuse Management Plan(s) and provide details of the proposed methods for complying with the requirements of any applicable Volatile Substance Abuse Management Plan(s).</p> <p>This clause is applicable only in areas where Volatile Substance Abuse Management Plan(s) are in place.</p>	1.9	14		
<p>PERMITS TO ACCESS LAND FOR WORKS ON ROADS</p> <p>The Contractor must provide documentary evidence of having been granted the required permission(s) to;</p> <ul style="list-style-type: none"> – enter the land which is the site(s) of the works, and – enter any other lands for ancillary activities related to the works, and – carry out the works and works related ancillary activities. <p>Do not enter the land until this evidence has been received by the Superintendent.</p>	1.10	14		
<p>PERMITS TO ACCESS LAND FOR WORKS ON ROADS</p> <p>Provide documented advice on sites to which surplus materials will be taken. Provide documentary evidence of permits, from the entities and/or organisations with jurisdiction over those sites, for the dumping of surplus materials at those sites.</p>	1.10	14 & 15		
<p>CAMP SITE/COMPOUND/WORKSHOP</p> <p>Provide a copy of written permission from the owner or lessee of the land permitting establishment and operation of a camp site, compound and/or workshop, before commencing works.</p>	1.11	15		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
FOOD PREPARATION FACILITIES Provide a copy of proof of registration with DoH of any camp food preparation area in accordance with the <i>Food Act 2004</i> .	1.11.1	15		
EFFLUENT Provide a copy of written approval from Department of Health (DoH) for any proposed on-site effluent disposal system, before commencing works.	1.11.3	15		
EFFLUENT Where the use of septic tanks or portable toilets is not reasonable or practical, pit toilets may be used, but this requires the prior written approval of the Superintendent	1.11.3	15		
REHABILITATION Obtain approval from the Superintendent for the completed rehabilitation of the camp site/compound/workshop before final demobilisation.	1.11.4	16		
EXTRACTION AREAS AND WATER SOURCES – EXTRACTION AREAS LOCATIONS Complete the Gravel Extraction Pit Management Plan and submit it to the Superintendent prior to any material removal.	1.13.3	17		
EXTRACTION AREAS AND WATER SOURCES – EXTRACTION AREAS LOCATIONS Submit copies of all clearances and approvals to the Superintendent, except for those obtained by the Superintendent and provided to the Contractor.	1.13.3	17		
EXTRACTION AREAS AND WATER SOURCES – EXTRACTION AREAS LOCATIONS Provide to the Superintendent documents detailing the proposed pit positions prior to the establishment of new pits.	1.13.3	17		
EXTRACTION AREAS AND WATER SOURCES – APPROVALS FOR EXTRACTION AREAS Prior to commencing any work on or in extraction areas, either new or existing, provide documentary evidence to the Superintendent that the relevant approvals have been ascertained or obtained.	1.13.4	17		

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
<p>EXTRACTION AREAS AND WATER SOURCES – APPROVALS FOR EXTRACTION AREAS</p> <p>Creation or use of existing extraction areas for fill or gravel within the road reserve not supplied by DIPL require the written approval from the Superintendent before use.</p>	1.13.4	17		
<p>EXTRACTION AREAS AND WATER SOURCES – EXTRACTION AREA MANAGEMENT PLAN</p> <p>The completed Extraction Area Management Plan must be submitted to the Superintendent for approval before any works commence.</p>	1.13.5	17		
<p>EXPLOSIVES</p> <p>Provide evidence of the following requirements of NT Worksafe:</p> <ul style="list-style-type: none"> – License to carry and store explosives. – Vehicle license to carry explosives. – Shot Firer’s certificate. 	1.14	19		
<p>WORK HEALTH AND SAFETY MANAGEMENT PLAN</p> <p>If the Act requires it, provide a Work Health and Safety Management Plan within 14 calendar days of award of the contract. Do not commence works until the Superintendent has advised that the Work Health and Safety Management Plan may be used.</p>	1.16.2	21		
<p>UTILITIES AND OTHER SERVICES PASSING UNDER EXISTING PAVEMENTS</p> <p>If the pavement is to be subjected to works, and open trenching for the routing of utilities or services is proposed, and has not been approved as part of the works, obtain approval from the Road Authority and the Superintendent before undertaking any excavation works for trenching across the existing pavement.</p>	1.18	22		
<p>WORK ON RAILWAY SITES</p> <p>Do not commence work until the work plan has been approved by the owner and operator of the rail system. Provide copies of the work plan and of the approval to carry out the works to the Superintendent.</p>	1.21	23 & 24		
<p>WORK NEAR TRAFFIC COUNTING STATIONS</p> <p>Prior to commencing any excavation, boring of holes, blasting, rock breaking, soil compaction or similar activity in the vicinity of traffic counter station detector loops, obtain the location of the cables.</p>	1.22	24		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
WARRANTY MARKINGS ON PRODUCTS Obtain Superintendent approval prior to the use of product markings as warranty certificate.	1.28.1.2	25		
CONTRACTOR’S ENVIRONMENTAL MANAGEMENT PLAN (CEMP) Submit details of procedures to protect the environment. Refer to the Standard Specification for Environmental Management. Submission of a Contractor’s Environmental Management Plan (CEMP) may be required.	1.28.5	27		
CONTRACTOR’S SUBMISSIONS Provide copies of permits, and approvals, for works, and associated activities, proposed to be carried out in areas not in the road reserve before commencing any proposed works, and activities.	1.28.10	28 & 29		
AS CONSTRUCTED INFORMATION Provision of As Constructed information is a condition precedent to Practical Completion.	1.35	30		
2 PROVISION FOR TRAFFIC				
TRAFFIC MANAGEMENT PLAN - SUBMISSION OF TRAFFIC MANAGEMENT PLAN Submit the Traffic Management Plan (TMP), with the Traffic Guidance Schemes.	2.6.2	38		
TRAFFIC MANAGEMENT AUDIT REQUIREMENTS - SUITABILITY AUDIT REQUIREMENTS The Traffic Management Plan must not be implemented before it is audited for suitability and found to be suitable.	2.8.2	42		
TRAFFIC MANAGEMENT AUDIT REQUIREMENTS - SUITABILITY AUDIT REQUIREMENTS Works must not commence before the Traffic Management Plan is audited for suitability and found to be suitable.	2.8.2	42		
TRAFFIC MANAGEMENT AUDIT REQUIREMENTS - NOTICE OF IMPLEMENTATION Provide the Superintendent with copies of all audit reports confirming conformance, or indicating non-conformance, with specifications, Standards, and requirements for each implemented TGS within 24 hours of implementation.	2.8.6	44		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
<p>TRAFFIC MANAGEMENT AUDIT REQUIREMENTS - NOTICE OF IMPLEMENTATION</p> <p>Provide the Superintendent with copies of all audit reports confirming conformance, or non-conformance, with specifications, Standards, and requirements for each significant change within 24 hours of implementation.</p>	2.8.6	44		
<p>TRAFFIC MANAGEMENT AUDIT REQUIREMENTS - NOTICE OF IMPLEMENTATION</p> <p>The Contractor shall rectify the significant/urgent non-conformance in the time instructed by the Superintendent. If the Contractor fails to rectify the non-conformance the Superintendent may engage others to rectify the non-conformance, and the associated costs shall become a debt due and payable to the Principal.</p>	2.8.6	44		
<p>TRAFFIC MANAGEMENT AUDIT REQUIREMENTS - NOTICE OF INDEPENDENT THIRD PARTY AUDITS</p> <p>Notify Superintendent and submit revised TGSs & TMPs to DIPL Road Operations for appraisal.</p>	2.8.7	44		
<p>AMENDMENTS TO TRAFFIC MANAGEMENT PLANS</p> <p>Modified TMPs must be audited for suitability by a Panel Period Audit Consultant, or appraised by DIPL Road Operations if Traffic Management audits are not required under the contract, before implementation of the modified TMP.</p>	2.10	46		
<p>AMENDMENTS TO TRAFFIC MANAGEMENT PLANS</p> <p>Modified traffic management control measures must be audited for compliance by a Panel Period Audit Consultant, or appraised by DIPL Road Operations if Traffic Management audits are not required under the contract, before works resume.</p>	2.10	46		
<p>WORK IN RURAL AREAS</p> <p>Undertake work during daylight hours only unless approval is given by the Superintendent. Approval will only be granted in exceptional circumstances.</p>	2.11	47		
<p>WORK IN BUILT UP AREAS - WORKING TIMES</p> <p>Obtain Superintendent approval if proposing to work during the restricted work hours.</p>	2.12.1	47		

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
<p>WORK IN BUILT UP AREAS - TRAFFIC LANES Provide a copy of all relevant approvals with the Traffic Management Plan.</p>	2.12.2	47		
<p>WORK IN BUILT UP AREAS - LANE CLOSURES Do not use bullnose or V type barriers unless no other option is available. Obtain permission from the Superintendent to use bullnose or V type barriers before placing them on site.</p>	2.12.3	47		
<p>NIGHT ILLUMINATION Sections of the roadway, including detours and side tracks, affected by Work Zone Traffic Management, must be illuminated at night to AS 1742.3, if</p> <ul style="list-style-type: none"> – night works are in progress, and/or – if signage left on site overnight is not illuminated by the headlights of vehicles approaching the signs. <p>Illumination to be 10 lux minimum at ground level.</p>	2.13	48		
<p>NT SPECIFIC DIRECTIONS FOR ROAD WORK SIGNS - NON-STANDARD SIGNS Obtain specific approval from the Superintendent before using signs not included in AS 1742.3.</p>	2.15.4	50		
<p>NT SPECIFIC DIRECTIONS FOR ROAD WORK SIGNS - PORTABLE VARIABLE MESSAGE SIGNS (VMS) Provide details of the messages to be displayed and the locations of the variable message signs. Provide wording for advance warning message(s) and wording for message(s) to be displayed during the works. Do not use any VMS until the messages to be displayed have been approved. Do not use any VMS until the proposed location and orientation of the VMS has been approved. Provide this information not less than 5 working days before the VMSs are to be put in to service for the project.</p>	2.15.5	50		
<p>NT SPECIFIC DIRECTIONS FOR ROAD WORK SIGNS - TEMPORARY SPEED LIMITS Submit temporary speed limit authorisation applications to alter speed limits to the Superintendent, 5 working days prior to the implementation of temporary speed limits, for approval under the <i>Control of Roads Act 1953</i>.</p>	2.15.7	51		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
NT SPECIFIC DIRECTIONS FOR ROAD WORK SIGNS - ROAD SAFETY BARRIERS Provide a statement, signed by your engineer, and signed by the author of the Traffic Management Plan, which states that the Road Safety Barriers proposal complies with AS 1742.3, and with AS/NZS 3845.1, and with AS/NZS 3845.2, and with the specifications and installation manuals from the manufacturers of the components proposed to be used in the Road Safety Barriers system. Provide the Traffic Management Plan with this statement.	2.15.8	52		
DETOURS, SIDE TRACKS, AND CROSSOVERS Obtain written approval from the Superintendent before commencing any works.	2.18	54		
TEMPORARY BRIDGING Obtain written approval from the Regional Manager, Road Projects prior to commencement of any such works.	2.21	56		
TEMPORARY BRIDGING Provide copies of approvals obtained by Contractor to the Superintendent prior to the commencement of the works.	2.21	56		
CONTRACTOR'S PLANT AND EQUIPMENT On roads carrying significant traffic, floodlight the road and area within 50 m of the site when working at night, if approved by the Superintendent, to a ground level luminance of 10 lux minimum.	2.22	56		
TRAFFIC SIGNALS, INTELLIGENT TRANSPORT SYSTEMS (ITS), VARIABLE SPEED LIMIT ZONES, AND TRAFFIC COUNT STATIONS - TRAFFIC SIGNALS Obtain clearances from the Department's Traffic Section, ph. 8999 4402, prior to commencement of the works. Co-ordinate your works activities with the Department's Traffic Section for the duration of the works.	2.24.1	58		
TRAFFIC SIGNALS, INTELLIGENT TRANSPORT SYSTEMS (ITS), VARIABLE SPEED LIMIT ZONES, AND TRAFFIC COUNT STATIONS - TRAFFIC SIGNALS - WORKS UNDERTAKEN DURING WORKING HOURS Provide copies of the endorsed TGSs, and contact the Traffic Section, by phone on 8999 4402, not less than one working day prior to the commencement of work.	2.24.1.1	58		

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
<p>TRAFFIC SIGNALS, INTELLIGENT TRANSPORT SYSTEMS (ITS), VARIABLE SPEED LIMIT ZONES, AND TRAFFIC COUNT STATIONS - TRAFFIC SIGNALS - WORKS UNDERTAKEN DURING WORKING HOURS</p> <p>If the traffic signals need to be re-mapped, or other traffic controls implemented, advise the Traffic Section not less than one working day prior to the commencement of work.</p>	2.24.1.1	58		
<p>TRAFFIC SIGNALS, INTELLIGENT TRANSPORT SYSTEMS (ITS), VARIABLE SPEED LIMIT ZONES, AND TRAFFIC COUNT STATIONS - TRAFFIC SIGNALS - WORKS UNDERTAKEN DURING WORKING HOURS</p> <p>Advise the Traffic Section about the planned lane closures by phone immediately before installing traffic control on the day the works are to be carried out.</p>	2.24.1.1	58		
<p>TRAFFIC SIGNALS, INTELLIGENT TRANSPORT SYSTEMS (ITS), VARIABLE SPEED LIMIT ZONES, AND TRAFFIC COUNT STATIONS - TRAFFIC SIGNALS - WORKS UNDERTAKEN DURING WORKING HOURS</p> <p>Advise the Traffic Section immediately before traffic control is removed.</p>	2.24.1.1	58		
<p>TRAFFIC SIGNALS, INTELLIGENT TRANSPORT SYSTEMS (ITS), VARIABLE SPEED LIMIT ZONES, AND TRAFFIC COUNT STATIONS - TRAFFIC SIGNALS - WORKS UNDERTAKEN OUTSIDE WORKING HOURS</p> <p>Provide copies of the endorsed TGSs, and contact the Traffic Section, not less than one working day prior to the commencement of work.</p>	2.24.1.2	58		
<p>TRAFFIC SIGNALS, INTELLIGENT TRANSPORT SYSTEMS (ITS), VARIABLE SPEED LIMIT ZONES, AND TRAFFIC COUNT STATIONS - TRAFFIC SIGNALS - WORKS UNDERTAKEN OUTSIDE WORKING HOURS</p> <p>If the traffic signals need to be re-mapped, or other traffic controls implemented, co-ordinate directly with the Traffic Section not less than one working day prior to the commencement of work.</p>	2.24.1.2	58		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
<p>TRAFFIC SIGNALS, INTELLIGENT TRANSPORT SYSTEMS (ITS), VARIABLE SPEED LIMIT ZONES, AND TRAFFIC COUNT STATIONS - TRAFFIC SIGNALS - WORKS UNDERTAKEN OUTSIDE WORKING HOURS</p> <p>Advise the Traffic Section after-hours contact officer about the planned lane closures, using the after-hours phone number provided, immediately before installing traffic control, on the day the works are to be carried out</p>	2.24.1.2	58		
<p>TRAFFIC SIGNALS, INTELLIGENT TRANSPORT SYSTEMS (ITS), VARIABLE SPEED LIMIT ZONES, AND TRAFFIC COUNT STATIONS - TRAFFIC SIGNALS - WORKS UNDERTAKEN OUTSIDE WORKING HOURS</p> <p>Advise the Traffic Section after-hours contact officer, on the after-hours phone number provided, immediately before traffic control is removed.</p>	2.24.1.2	58 & 59		
<p>TRAFFIC SIGNALS, INTELLIGENT TRANSPORT SYSTEMS (ITS), VARIABLE SPEED LIMIT ZONES, AND TRAFFIC COUNT STATIONS - VARIABLE SPEED LIMIT ZONES</p> <p>Obtain clearances from the Department's Traffic Section, ph. 8999 4402, not less than five working days prior to commencing works.</p>	2.24.2	59		
<p>TRAFFIC SIGNALS, INTELLIGENT TRANSPORT SYSTEMS (ITS), VARIABLE SPEED LIMIT ZONES, AND TRAFFIC COUNT STATIONS - TRAFFIC COUNT STATIONS</p> <p>Prior to the commencement of work within the trafficked lanes and within 50 m of traffic counters or within 20 m, in any direction, of any component of the traffic count equipment, whether located in or on the trafficked lanes, shoulders, nature strips, and/or medians, or located in another type of area, obtain a clearance to commence the works from Department's Maintenance Section for the region in which the works are located, and with either the Superintendent or with the Maintenance Manager (phone 8999 4660).</p>	2.24.3	59		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
PORTABLE TRAFFIC SIGNALS Complete and provide the Portable Traffic Signal Authorisation (PTSA) form, included in the application for a Permit to Work in the Road Reserve document, to seek formal approval from the Superintendent to use the proposed portable traffic signals and the proposed time settings, not less than 5 working days prior to the intended use of the portable traffic signals. Do not use any PTSs on site until an authorised Departmental Officer has signed off the PTSA form.	2.25	59		
PORTABLE TRAFFIC SIGNALS - TEMPORARY SPEED LIMITS Work zone speed limits require approval from the Superintendent prior to implementation.	2.25.1	60		
3 EARTHWORKS AND DRAINAGE MAINTENANCE				
EARTHWORKS IN CUT – ROCK Obtain agreement from the Superintendent to the extent of the excavation.	3.5.2	62		
EARTHWORKS IN CUT – UNSUITABLE MATERIAL AND/OR WEATHERED ROCK Obtain directions from the Superintendent before works commence.	3.5.3	63		
EARTHWORKS IN FILL – PREPARATION PRIOR TO FILLING Once moisture conditioned and compacted, subject each lot to a proof roll, with the Superintendent in attendance, as specified in the Proof Rolling sub-clause of the Conformance clause in this work section.	3.6.2	63		
REMOVAL OF EXCESS MATERIAL Obtain approval from Superintendent prior to hauling and dumping and spreading excess material.	3.8	65		
CONFORMANCE - PROOF ROLLING Submit a proof rolling procedure to the Superintendent for approval including the proposed method of preparing the areas, the extent of proof rolling, and details of the plant and / or equipment proposed to be used.	3.12.2	67		
CONFORMANCE - CONFORMANCE TESTING Obtain the Superintendent’s approval of subgrade conformance prior to placing further material.	3.12.3	68		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
4 CONFORMANCE TESTING				
CONFORMANCE TESTING – ITP SUBMISSION Submit: ITPs, detailing all procedures and test plans to be undertaken to complete the project, before commencing work.	4.4	72		
5 GRADING AND GRAVEL SHEETING				
CONFORMANCE OF GRAVEL SHEETING - PROOF ROLLING PROCEDURE Submit a proof rolling procedure to the Superintendent for approval including the method of preparing an area and the extent of proof rolling.	5.15.2	95		
CONFORMANCE OF GRAVEL SHEETING - CONFORMANCE TESTING Obtain the Superintendent's approval for pavement conformance prior to any surfacing work.	5.15.4	96		
6 STABILISATION MAINTENANCE				
MATERIALS – ADDITIVES Use additives only with the approval of the Superintendent.	6.5.2	98		
IN-SITU STABILISATION – SPREADING Assess spread rate based upon test results of materials to be stabilised. Obtain the Superintendent's approval of the spread rate.	6.6.4	99		
IN-SITU STABILISATION – MIXING For small areas in remote locations obtain Superintendent's approval for use of alternative plant suitable for the particular situation, including rotary hoes and graders.	6.6.5	99		
CONFORMANCE – TESTING Obtain the Superintendent's approval for conformance of the stabilised layer prior to priming.	6.9.2	102		
7 SPRAY SEALING MAINTENANCE				
SPRAYING - APPLICATION SPRAY RATES Do not commence spraying until the spray rates are advised by the Superintendent.	7.15.3	114		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
APPLICATION OF AGGREGATE Obtain approval from the Superintendent for use of the proposed aggregate loader before commencing aggregate loading operations.	7.16	115		
APPLICATION OF AGGREGATE - SELF-PROPELLED MULTI RUBBER TYRED VIBRATING ROLLERS Obtain Superintendent's approval for the use of self-propelled multi rubber tyred vibrating rollers before using them.	7.16.4	117		
8 BITUMINOUS SURFACE MAINTENANCE				
REPAIR OPERATIONS - TEMPORARY PATCHING Temporary patching with aggregate and emulsion requires approval of the Superintendent. For such work, keep traffic off the patch until patch is stable.	8.6.2	123		
SPRAY SEALING – AREAS LESS THAN 300m² - SPRAYING Do not commence spraying until the Superintendent is advised and gives approval to the proposed application spray rates.	8.16.2	134		
SPRAY SEALING – AREAS LESS THAN 300m² - APPLICATION OF AGGREGATE Obtain approval from the Superintendent for use of the proposed aggregate loader before commencing aggregate loading operations.	8.16.6	135		
9 CONCRETE MAINTENANCE				
MATERIALS Provide manufacturer's test certificates for quality of cement, aggregate and reinforcement.	9.5	138		
MATERIALS - CHEMICAL ADMIXTURES Do not use admixtures without obtaining prior written approval from the Superintendent.	9.5.5	138		
MATERIALS - REINFORCEMENT Do not place concrete until the reinforcement has been inspected by the Superintendent.	9.5.6	138		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
HANDLING AND PLACING Provide verification that all constituent materials, formwork, falsework, reinforcement, and environmental conditions comply with all requirements. Do not cast any concrete without that verification.	9.11	140		
EXISTING SERVICES Obtain the Superintendent's approval before altering the line or level of existing services.	9.16	142		
10 DRAINAGE MAINTENANCE				
MATERIALS - PRECAST REINFORCED CONCRETE BOX CULVERTS Provide drawings showing complete reinforcement and dimensions with tolerances and obtain the Superintendent's approval prior to fabricating any units. Provide manufacturer's certification that the provided culverts comply with the applicable sections of AS 5100.5 and with AS 1597. Certify that the design is reflected accurately by the shop drawings and that the design is adequate to resist all specified loads and the soil loads pertaining to the site.	10.5.3	145		
CONSTRUCTION OF CULVERTS AND STRUCTURES - SETTING OUT Obtain the Superintendent's approval for the setting out before construction.	10.6.1	146		
CONSTRUCTION OF CULVERTS AND STRUCTURES – BACKFILL Do not place backfill against any in-situ concrete structure until the concrete has attained 80% characteristic strength and approval has been given.	10.6.10	148		
SUBSOIL DRAINS - LAYING AND BACKFILLING Obtain Superintendent's approval of the pipe installation before backfilling.	10.11.5	150		
11 PROTECTION WORKS MAINTENANCE				
STONE PITCHING - GROUTED STONE PITCHING Obtain Superintendent's approval before grouting.	11.8.2	154		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
12 ROAD FURNITURE MAINTENANCE				
FLEXIBLE GUIDE POSTS – SAMPLES Provide a sample flexible guide post from each batch purchased for this contract for inspection and approval before installing any posts.	12.9.5	165		
FLEXIBLE GUIDE POSTS – TESTS Submit test results to the Superintendent in respect to the following characteristics before ordering the guide posts: <ul style="list-style-type: none"> – Heat resistance. – Cold resistance. – Rigidity – Vehicle impact. 	12.9.8	166 & 167		
STEEL GUIDE POSTS – SAMPLES Provide a sample flexible steel guide post from each batch purchased for this contract for inspection and approval before installing any posts.	12.10.5	169		
STEEL GUIDE POSTS – TESTS Test results are to be provided as for Flexible Guide Posts detailed in this work section. (Submit test results to the Superintendent in respect to the following characteristics before ordering the guide posts: <ul style="list-style-type: none"> – Heat resistance. – Cold resistance. – Rigidity – Vehicle impact.) 	12.10.8	170		
ROAD SIGNS – MANUFACTURE, SUPPLY, AND DELIVERY – MATERIALS – Anti-graffiti coating Obtain Superintendent’s approval for the use of the anti-graffiti films or coating products. Apply anti-graffiti products only to the new road signs specified by the Superintendent.	12.12.3	171 & 172		
ROAD SIGNS – INSTALLATION AND MAINTENANCE - DAILY LOG Submit for Superintendent approval a suitably designed format for daily log books prior to commencing works under the Contract	12.14.15	177		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
ROAD SAFETY BARRIERS – STEEL WIRE ROPE SYSTEM Obtain Superintendent’s approval for any proposed Steel Wire Rope Road Safety Barrier System before ordering any components.	12.23	180		
13 PAVEMENT MARKING MAINTENANCE				
PAVEMENT MARKING PAINT Submit Certificates of Compliance, issued by an accredited testing authority, stating that all paints being used comply with the relevant Australian Standards and/or APAS specifications.	13.6	184 & 185		
GLASS BEADS Submit Certificates of Compliance, issued by an accredited testing authority, stating that the glass beads being used comply with, the relevant Australian Standards and APAS specifications	13.7	185		
PAVEMENT MARKING CONFORMANCE TOLERANCES Provide evidence that the pavement marking complies with the requirements of this specification.	13.10	186		
THERMOPLASTIC MATERIALS Approval from the Department’s Executive Director Civil Delivery is required before thermoplastic materials are used.	13.12	189		
COLD APPLIED PLASTIC MATERIALS Approval from Department’s Executive Director Civil Delivery is required before cold applied plastic materials are used.	13.13	189		
AUDIO TACTILE LINE MARKING (ATLM) Approval from the Department’s Executive Director Civil Delivery is required before audio tactile line marking materials are used.	13.14	189		
RAISED REFLECTIVE PAVEMENT MARKERS Submit details in relation the manufacturer’s warranties, performance, durability and maintenance of the raised retroreflective pavement markers.	13.15.1	190		

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
REMOVAL OF PAVEMENT MARKINGS Obtain approval from the Superintendent on the proposed method used for pavement marking removal before commencing removal operations.	13.16	191		
REMOVAL OF PAVEMENT MARKINGS - PAINT BLACKOUT Obtain Superintendent’s approval before using this methodology.	13.16.4	191		
REPORTING Submit to the Superintendent the following information, in Microsoft Excel spreadsheet format, every quarter for panel contract works, for all works carried out under this contract: <ul style="list-style-type: none"> – CSR number (for panel contract works) – Contract number (for new works) – Date – Road number – Chainages – start point and finish point of each section of works – PRP numbers - start point and finish point of each section of works – GPS coordinates in Decimal Degrees - start point and finish point of each section of works – Type of carriageway – inbound outbound (for duel carriageways) and full width (for two way carriageway) and – Bead size used and Paint application rate. 	13.18	192		
14 LANDSCAPE MAINTENANCE				
IMPORTED SOILS Advise the name of the proposed supplier. Do not order soils without Superintendent’s approval of the supplier	14.12.3	199		
MULCH Advise the name of the proposed supplier. Do not order mulch without Superintendent’s approval of the supplier.	14.12.4	199		
PRUNING OPERATIONS Do not prune branches exceeding a calliper size of 75 mm at trunk which overhang the road pavement without the approval of the Superintendent.	14.16.2	201		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
REPLACEMENT OF PLANTS – HORTICULTURIST If the same species of plant is not available the Horticulturist shall recommend a suitable replacement species with similar characteristics that is available, and submit to the Superintendent for approval.	14.18.2	202		
CONTROL OF PESTS AND WEED SPECIES - HERBICIDE Submit a Weeds Management Plan for assessment and approval.	14.21.7	206		
15 SLASHING AND WEED CONTROL				
BUSHFIRE PREVENTION - FIRE FIGHTER TRAINING Provide evidence of qualifications before commencing slashing operations.	15.9.6	217		
WEED CONTROL - TREATMENT PROGRAM Submit a Weeds Management Plan for assessment and approval.	15.11.3	221		
WEED CONTROL - HERBICIDE SELECTION Provide a list of herbicides and chemicals intended for use during the contract to the Superintendent as part of the Weed Management Plan.	15.11.4	221		
16 TRAFFIC SIGNALS AND INTELLIGENT TRANSPORT SYSTEMS MAINTENANCE				
MATERIAL AND SOFTWARE TO BE SUPPLIED BY THE PRINCIPAL - DARWIN - COLLECTION OF HARDWARE Within 7 days of award of the Contract, the Contractor shall collect such materials and take delivery of the materials at the Department's Yarrowonga shed / storage yard.	16.13.1	234		
SPECIFIC MAINTENANCE – TRAFFIC SIGNALS & ITS Audit Report Review. Within 5 days following the physical completion of a specific maintenance audit, the Contractor's representative shall arrange a time with a Traffic Section staff member to review the quality and content of the completed report prior to formal submission, and review any recommended follow up works that may be required on site. The meeting may include a site visit and time in the office.	16.22	247 & 248		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
TRAFFIC MANAGEMENT PLAN - IMPLEMENTATION OF TRAFFIC MANAGEMENT Do not proceed with implementation of traffic management, or the commencement any works within the relevant road reserve without the TGS and TMP amendments (if necessary) being endorsed by Traffic Section staff or Road Operations staff, and any associated Temporary Speed Limit Authorisations (TSLA) being signed by the delegated person in the Department.	16.29.2	261		
18 STREET SWEEPING				
DETERGENT Provide product information details and SDS to Superintendent for approval of the detergent intended for use in the performance of the Contract prior to the commencement of the works.	18.10	284		
19 AERODROME MAINTENANCE				
SITE RULES – AERODROMES Communications Plans are to be issued for all works being carried out and are to be approved by the Superintendent before works commence.	19.3.3	288		
SITE RULES – AERODROMES If required a NOTAMS is be issued for all works being carried out at an aerodrome which requires NOTAMS to be issued. The NOTAMS are to be approved by the Superintendent before works commence.	19.3.3	288		
SITE RULES – AERODROMES Method of Working Plans (MOWPs) must be prepared for works to be carried out at an aerodrome which requires MOWPs to be issued. The MOWPs must be approved by the Superintendent before works commence.	19.3.3	288		
AERODROME REPORTING OFFICER TRAINING Provide a Statement of Attainment of the nationally recognised qualification awarded to the ARO before that person commences any ARO duties.	19.8	291		
DISTRIBUTION OF MOWP Not less than 14 days before works commence, the Contractor must supply a copy of the MOWP to the entities listed in MOS Part 139 and the Superintendent.	19.11.3	292		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
HAZARDOUS OR POTENTIALLY HAZARDOUS DEFECTS The ARO shall immediately implement measures to safe guard the users and notify the Superintendent of the issues affecting performance and/or public safety that require urgent intervention. In certain circumstances (high risk, short response times) the software program will indicate the need for the Contractor to report the defect urgently.	19.22.3	299		
SECURITY CONTROLLED AERODROMES Provide copies of the ASIC cards to the Superintendent.	19.26	301		
20 BUS STOP MAINTENANCE				
BUS STOP MAINTENANCE - INSPECTIONS, PROGRAMS AND REPORTS - WEEKLY INSPECTION PROGRAMS Do not commence works until an Inspection Program is received and approved.	20.26.7.2	319		
22 PROTECTIVE COATINGS				
PROTECTIVE COATINGS Surface Preparation: To AS 1627. Provide a copy of the proposed specification for surface preparation as detailed in AS 1627.0 before commencing surface preparation works.	22.5	348		
PROTECTIVE COATINGS Complete and submit Site testing of protective coatings: To AS 3894.10 and AS 3894.11 and AS 3894.12	22.5	348 & 349		
SURFACE PREPARATION - ABRASIVE BLASTING At the completion of the final blast and prior to coating application, the surface profile of each item shall be measured according to Method A, Profile Replicating Tape, of AS 3894.5. Provide documentary confirmation that the surface is suitable for the application of the specified coatings. This shall be identified as a Hold Point in the contractor's ITP.	22.14.2	351 & 352		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
SURFACE PREPARATION - ALTERNATE SURFACE PREPARATION Do not use forms of surface preparation other than abrasive blasting, such as bristle blaster, needle guns, power tool cleaning and hand tool cleaning, without written permission from the Superintendent. Alternate methods of surface preparation must be included in the Contractor's ITP.	22.14.4	352		
APPLICATION OF PROTECTIVE COATINGS – COATING Provide coating manufacturers' written approval for use before using any other additives (eg promoters, accelerators etc).	22.15.2	353		
APPLICATION OF PROTECTIVE COATINGS – ALTERNATE COATING Do not use coating materials other than specified, without written permission from the Superintendent. Alternate coating materials must be included in the Contractor's ITP.	22.15.6	353		
APPLICATION OF PROTECTIVE COATINGS – COATING DEFECTS Provide details of repairs required and procedures and processes proposed for making the repairs to the Superintendent prior to making any repairs. Any requirements for the repair of protective coatings shall be identified as a Hold Point in the contractor's ITP.	22.15.7	353		
ITP, JSA AND SWMS Provide ITPs, JSAs, a SWMS and other quality control procedures and documents to be used during protective coating systems application. These must be approved prior to commencement of work	22.17	354		
CONTRACTOR RECORDS Provide copies of all NCRs (Non Conformance Reports) immediately they are completed or received. The NCRs must detail the non-conformance and be accompanied by a Corrective Action Report (CAR) which is to detail the action proposed to be undertaken to rectify the non-conformance.	22.18	354		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 1 – HOLD POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
CONTRACTOR RECORDS - FILM THICKNESS Final acceptance of each increment of work will not be made until the dry film thickness meets or exceeds the specified thickness. Regardless of the number of coats specified, additional coats shall be applied as may be necessary to achieve the specified thickness, at the Contractor's expense.	22.18.1	354		
CONTRACTOR RECORDS – INSPECTOR Provide the name and qualifications of the inspector prior to commencement of work.	22.18.2	355		

29.2 SCHEDULE 2 – WITNESS POINTS

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE NO	INITIALS	DATE
1 MISCELLANEOUS PROVISIONS				
EXTRACTION AREAS AND WATER SOURCES - CRUSHING OR SCREENING Provide documentary evidence of the certification that the plant is fit for use issued by a competent person.	1.13.6	17 & 18		
SAFETY - SAFETY OFFICER Appoint a Safety Officer and notify the Superintendent of the Safety Officer's name, and contact details, including an after-hours contact phone number.	1.16.1	21		
CONTRACTOR'S RESPONSIBILITIES AND SUBMISSIONS – WARRANTIES Name the Principal as warrantee. Provide the standard manufacturer's warranty certificates for manufactured plant, equipment, and other items. Provide installation warranties for the installation of plant, equipment, and other items, where specialized installation practices are a prerequisite for a manufacturer's warranty.	1.28.1.1	25		
CONTRACTOR'S RESPONSIBILITIES AND SUBMISSIONS – CERTIFICATES OF COMPLIANCE Provide product Certificates of Compliance before Practical Completion. Schedule <ul style="list-style-type: none"> – Geofabric – SPRAY SEALING – Geotextile Fabrics – Delivery and product certification – PROTECTION WORKS – Pavement Marking Paint – PAVEMENT MARKING – Glass Beads – PAVEMENT MARKING Provision of these will be required before the final payment can be processed	1.28.2	26		

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
<p>CONTRACTOR’S RESPONSIBILITIES AND SUBMISSIONS – LIST OF PLANT AND EQUIPMENT INSTALLED</p> <p>On or before Practical Completion provide a list of plant and equipment installed as part of the project. Include the following details:</p> <ul style="list-style-type: none"> – Make – Model – Serial number (if applicable) – Year of manufacture – Capacity – Location 	1.28.4	27		
<p>CONTRACTOR’S RESPONSIBILITIES AND SUBMISSIONS – INSPECTION TEST PLANS (ITPs)</p> <p>Submit ITPs detailing all procedures and test plans to be undertaken.</p>	1.28.6	27		
<p>CONTRACTOR’S RESPONSIBILITIES AND SUBMISSIONS – PROJECT CONTROL PLAN (PCP)</p> <p>Submit a project control plan for the project which sets out in detail all control procedures for the project. A framework Project Control Plan Guidance document is available at the Department’s Specification Services webpage: https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/technical-specifications .</p> <p>This document is to be prepared by the Contractor and not a third party.</p>	1.28.7	27		

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
<p>AS CONSTRUCTED INFORMATION Provide As Constructed drawings for all of the works.</p> <ul style="list-style-type: none"> - Show in red, on the Contract Drawings, as constructed information relating to works constructed beyond the various construction tolerances. The information includes, but is not limited to: <ul style="list-style-type: none"> o Setout co-ordinates, where applicable. o Design levels. o Detail dimensions. - Pavement, seal, line marking and protection extents. - Refer to the specific deliverables in the NTG Technical Drawings Part 1 - Requirements for Technical Records Management document, which is accessible via https://dipl.nt.gov.au/industry/technical-standards-guidelines-and-specifications/technical-records . - Drawings without changes shall be also be included and labelled as "As Constructed " in the amendment description column. 	1.35	30		
<p>AS CONSTRUCTED INFORMATION – Amended drawings Before the work commences provide a proposed procedure for recording and submitting the amended drawings.</p>	1.35	30 & 31		
2 PROVISION FOR TRAFFIC				
<p>TRAFFIC MANAGEMENT AUDIT REQUIREMENTS - NOTICE OF INDEPENDENT THIRD PARTY AUDITS Give the Superintendent 5 working days written notice in advance of each stage of the works requiring auditing.</p>	2.8.7	44		
<p>TRAFFIC MANAGEMENT AUDIT REQUIREMENTS - NOTICE OF INDEPENDENT THIRD PARTY AUDITS Notify the Superintendent prior to rework arising due to failed audits.</p>	2.8.7	44		
<p>DETOURS, SIDE TRACKS, AND CROSSOVERS – CONSTRUCTION Obtain advice from the Superintendent that all requirements for the construction of the detours, side tracks, and/or crossovers have been met on completion.</p>	2.18.1	54		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
DETOURS, SIDE TRACKS, AND CROSSOVERS – CONSTRUCTION Provide not less than 5 days notice before opening any side track, detour, or crossover, to traffic.	2.18.1	54		
3 EARTHWORKS AND DRAINAGE MAINTENANCE				
CONFORMANCE - PROOF ROLLING Give the Superintendent not less than 24 hours notice of the location and commencement time for the proof rolling. Give 48hrs notice for remote work (greater than 5hrs travel one way from regional centre).	3.12.2	67		
4 CONFORMANCE TESTING				
NOTICE OF TESTING Provide the Superintendent with a copy of the request for testing simultaneously with the request being sent to the Panel Period Contractor.	4.8	73		
NOTICE OF TESTING Notify the Superintendent prior to any rework of failed lots.	4.8	73		
5 GRADING AND GRAVEL SHEETING				
CONFORMANCE - PROOF ROLLING NOTICE Give the Superintendent not less than 24 hours' notice of the location and commencement time for the proof rolling.	5.15.3	95		
7 SPRAY SEALING MAINTENANCE				
SAMPLING OF BINDER - COLLECTION OF SAMPLES Take samples from the point of delivery on transfer from the bulker to the sprayer or as directed. Where transfer is for works in the urban area or for small works ensure that conformance testing is ordered and samples are taken at the point of transfer from bulker to sprayer.	7.11.5	112		
SPRAYING Give the Superintendent 48 hours' notice of intention to spray bitumen.	7.15	113		
SPRAYING - PREPARATION FOR SPRAYER RUN Allow visual inspection when requested.	7.15.4	114		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
8 BITUMINOUS SURFACE MAINTENANCE				
SPRAY SEALING – AREAS LESS THAN 300m ² - PREPARATION FOR SPRAYER RUN Allow visual inspection when requested.	8.16.3	134		
9 CONCRETE MAINTENANCE				
FORMWORK Do not place concrete until the formwork has been inspected by the Superintendent.	9.10	140		
HANDLING AND PLACING Give the Superintendent sufficient notice so that inspection may be made before and during pouring concrete.	9.11	140		
10 DRAINAGE MAINTENANCE				
MATERIALS - PRECAST REINFORCED CONCRETE BOX CULVERTS Give the Superintendent notice prior to casting concrete.	10.5.3	145		
CONSTRUCTION OF CULVERTS AND STRUCTURES – EXCAVATION Excavate unsuitable material below specified level if directed by the Superintendent.	10.6.2	146		
CONSTRUCTION OF CULVERTS AND STRUCTURES - CONNECTION TO EXISTING SYSTEMS Advise superintendent within two days when clean out is completed.	10.6.9	148		
CONSTRUCTION OF CULVERTS AND STRUCTURES – BACKFILL Notify the Superintendent before backfilling where holes or fissures occur in rock trenches.	10.6.10	148		
INLET AND OUTLET STRUCTURES AND MAINTENANCE HOLES - INLET AND OUTLET CHANNELS Advise superintendent within two days when clean out is completed.	10.8	148		
SUBSOIL DRAINS - END WALLS Advise superintendent within two days when clean out is completed.	10.11.6	150		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
12 ROAD FURNITURE MAINTENANCE				
TACTILE GROUND SURFACE INDICATORS Provide a 5 year warranty for the materials used, and for the devices installed as tactile ground surface indicators. Provide a 5 year warranty for the workmanship for the installation of the tactile ground surface indicators. Both warranties to be in the name of the Principal.	12.7	162 & 163		
TACTILE GROUND SURFACE INDICATORS Provide documentary evidence that the TGSIs meet the minimum performance criteria.	12.7	162 & 163		
FLEXIBLE GUIDE POSTS - PRODUCT DATA Submit details of the proposed flexible guide post including the following: <ul style="list-style-type: none"> – Manufacturer’s details on the materials, and the properties of the materials, used in the manufacture of the guide posts. – Manufacturer’s recommended installation procedures. – Technical specifications. – Test results per the test sub-clauses 	12.9.3	165		
FLEXIBLE GUIDE POSTS – WARRANTIES Submit the manufacturer’s published product warranties in the name of the Principal.	12.9.4	165		
STEEL GUIDE POSTS – PRODUCT DATA Submit details of the proposed steel guide post including the following: <ul style="list-style-type: none"> – Manufacturer’s details on the materials used in the manufacture of the guide posts. – Manufacturer’s recommended installation procedures. – Technical specifications. 	12.10.3	169		
STEEL GUIDE POSTS – WARRANTIES Submit the manufacturer’s published product warranties in the name of the Principal.	12.10.4	169		
13 PAVEMENT MARKING MAINTENANCE				
PAVEMENT MARKING APPLICATION Obtain approval from the Superintendent for the type of equipment to be used for applying pavement marking materials.	13.9	185		

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
PAVEMENT MARKING APPLICATION Produce documented evidence to show that the spraying equipment has been calibrated in accordance with PCCP requirements and is certified by PCCP as being suitable for the works to be carried out under this contract.	13.9	185		
PAVEMENT MARKING APPLICATION Obtain Superintendent's approval for variation to the any of the above requirements.	13.9	185 & 186		
COLD APPLIED PLASTIC MATERIALS Provide evidence that all proprietary products such as epoxy or plastic products have demonstrated satisfactory field performance for a period of at least three years.	13.13	189		
14 LANDSCAPE MAINTENANCE				
MATERIALS - IMPORTED SOILS Provide a 5kg sample of topsoil proposed for the works. Do not order soils without Superintendent's approval of the sample. Provide copies of delivery dockets for the topsoil delivered to site for the works.	14.12.3	199		
MATERIALS - MULCH Provide a 5kg sample of mulch proposed for the works. Do not order mulch without Superintendent's approval of the sample. Provide copies of delivery dockets for the mulch delivered to site for the works.	14.12.4	199		
IRRIGATION OPERATION AND MAINTENANCE - SYSTEM SHUTDOWN Advise the Superintendent of the full shut down and re-activation of irrigation systems.	14.26.5	208 & 209		
IRRIGATION OPERATION AND MAINTENANCE - IRRIGATION DAY AND NIGHT CYCLE LATE IN DRY SEASON Advise the Superintendent of altered irrigation cycle times.	14.26.6	209		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
IRRIGATION OPERATION AND MAINTENANCE - RESET IRRIGATION TIMERS DURING SCHOOL HOLIDAYS Reset pop up irrigation systems for day light watering the week preceding school holidays on road reserves that pass through high density residential areas. Reset back to night watering within seven days of the new school term commencing. Advise the Superintendent of such action taken.	14.26.7	209		
15 SLASHING AND WEED CONTROL				
VEGETATION CONTROL – CHEMICALS Submit to the Superintendent the list of herbicides and other chemicals intended for use during the contract, details of vegetation controlled by the herbicide, and duration of control per treatment.	15.10.4	217		
VEGETATION CONTROL – CHEMICALS Obtain a permit from Parks Australia North for the use of any chemicals within Kakadu and Uluru – Kata Tjuta National Parks and up to 30 km from their boundaries, and from Parks and Wildlife Commission of the Northern Territory for the use of any chemicals within NT National Parks and Reserves and up to 30 km from their boundaries. Provide copies of the permits.	15.10.4	217 & 218		
16 TRAFFIC SIGNALS AND INTELLIGENT TRANSPORT SYSTEMS MAINTENANCE				
PROCEDURES, CALLS AND PAYMENTS - DAILY LOG BOOKS – APPROVAL Submit to the Superintendent’s Representative for approval, a suitably designed format for an individual Site Log template prior to commencing works under the Contract – to be provided within 7 days of award of contract.	16.15.10	240		

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE NO	INITIALS	DATE
<p>SPECIFIC MAINTENANCE – TRAFFIC SIGNALS & ITS Audit Supervision. Following Traffic Section’s direction to undertake a specific maintenance audit, the contractor shall coordinate with Traffic Section to arrange a suitable time to undertake the audit to allow supervision of the works to be scheduled if required by the Superintendent’s Representative.</p> <p>Notify the Superintendent’s Representative of any variation to the program at least 5 working days prior to any scheduled audit, the commencement of any altered programmed work, or original work program.</p>	16.22	247 & 248		
<p>SUPPLY & MANAGEMENT OF MATERIALS & EQUIPMENT - SALVAGED ITEMS Following an incident where traffic signal equipment or ITS such as a signal pole and hardware, signal controller or CCTV camera has been severely damaged, provide adequate notice to allow for Superintendent’s Representative to arrange inspection of the equipment prior to dismantling. If this is not possible due to the urgent nature of the situation, take photos of the equipment in its existing location, then relocate back to the contractor’s storage yard without causing further damage, for inspection.</p>	16.27.7	254		
<p>SUPPLY & MANAGEMENT OF MATERIALS & EQUIPMENT - TEST CONTROLLER Test Controllers to be displayed in working operation to the Superintendent’s Representative within 14 days of the contract being awarded.</p>	16.27.8	254		

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE NO	INITIALS	DATE
<p>SUPPLY & MANAGEMENT OF MATERIALS & EQUIPMENT - TEST TRAFFIC SIGNAL LOOP</p> <p>The Contractor shall provide and install a testing loop at the approved workshop within 14 days of this contract being awarded, for the purpose of testing detector cards. The test loop shall be installed in accordance with the most current relevant standard drawing for detector installation and connected to the test controller and be used for testing the operation of controller detector cards (it is recommended that a switching device be installed to aid in testing detector channels). It is entirely the Contractors responsibility to ensure that this device is maintained in a functional and serviceable condition suitable for its purpose at all times. The device shall be available for use in conjunction with this contract twenty four (24) hours per day.</p>	16.27.9	254		
19 AERODROME MAINTENANCE				
<p>STANDARDS AND PUBLICATIONS – SITE RULES – AERODROMES</p> <p>Contractors should also have a Drug and Alcohol Management Plan (DAMP) in place under Part 99 of the CASR and have completed a DAMP Certificate on the AviationWorx portal of the CASA Website. Provide a copy of the submitted DAMP and a copy of the DAMP Certificate to the Superintendent.</p>	19.3.3	288		
<p>AERODROME REPORTING OFFICERS (AROs)</p> <p>Provide the names, contact details, and qualifications/training details of the AROs who will provide the ARO functions under the contract.</p>	19.7	290		
<p>AERODROME REPORTING OFFICERS (AROs) – NEW OR TEMPORARY AROs</p> <p>Where there is a requirement for New or Temporary AROs, advise the Superintendent of the name, contact details, and qualifications details for the New ARO, or Temporary ARO, and the period for which they will be in that role.</p>	19.7.4	291		
<p>AERODROMES AND FREQUENCY OF SERVICEABILITY INSPECTION – INSPECTION LOG BOOK AND REPORTS</p> <p>Simultaneously notify the Superintendent immediately those deficiencies are noted at the aerodrome.</p>	19.9.2	292		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
<p>AERODROMES AND FREQUENCY OF SERVICEABILITY INSPECTION – INSPECTION LOG BOOK AND REPORTS</p> <p>Submit to the Superintendent the ARO inspection and maintenance checklist reports on a monthly basis as part of the claims for payment verification.</p>	19.9.2	292		
<p>AERODROMES AND FREQUENCY OF SERVICEABILITY INSPECTION – INSPECTION LOG BOOK AND REPORTS</p> <p>Submit to the Superintendent copies of medivac logs, verified by the nurse-in-charge, or by a police officer, with the claim for payment which includes the medivacs.</p>	19.9.2	292		
<p>AERODROMES AND FREQUENCY OF SERVICEABILITY INSPECTION – INSPECTION LOG BOOK AND REPORTS</p> <p>Provide substantiated evidence of the ARO activities, as well as the regular monthly inspections and maintenance checklist reports, as part of any claims for payment.</p>	19.9.2	292		
<p>METHOD OF WORKING PLANS – AMENDMENTS</p> <p>If a MOWP is amended after it is supplied to the persons mentioned above in sub-clause 19.10.3, the amended MOWP must:</p> <ul style="list-style-type: none"> – be supplied to those persons as soon as possible but not later than 48 hours before the works commence; and – clearly show the amendment that has been made. 	19.11.5	292		
<p>DAILY LOG BOOKS – APPROVAL</p> <p>Submit to the Superintendent for approval a suitably designed format for daily log books prior to commencing works under the Contract.</p>	19.18	294		
<p>PROCEDURES, CALLS, AND PAYMENTS - REPAIR DATA MANAGEMENT SYSTEM (KONECT)</p> <p>If the situation arises that the system software program is not operational during programmed works the Contractor must immediately notify the Superintendent of the failure.</p>	19.20.9	298		
<p>PROCEDURES, CALLS, AND PAYMENTS - REPAIR DATA MANAGEMENT SYSTEM (KONECT)</p> <p>The supplied spreadsheet shall be used as a manual alternative reporting format that shall provide all details that would normally be captured with the KONECT system. Provide copies of the spreadsheets with the CSR.</p>	19.20.9	298		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
INSPECTIONS - DEFECT REPAIR When the repair is done the ARO shall use the system to record when the repair was done and provide evidence in the form of photographs confirming the process/method of repair and the satisfactory completion of the works. This evidence may be used to allow the Project Officers to make payment.	19.22.4	300		
INSPECTIONS - DEFECT REPAIR Evidence in the same format as all other defects will be required. This is particularly relevant when works orders are submitted to undertake repairs between specific locations, where the ARO will be required to log and mark as repaired any defects that exceed the Department's intervention level as part of the repair process.	19.22.4	300		
MAINTENANCE WORKS Where work is required to be carried out in easements or on land adjacent to the site for the purpose of connecting services or joining up of roads etc. obtain the appropriate licences, approvals, and/or permits for access to, and to undertake the works in, those particular areas. Provide copies to the Superintendent.	19.23	300		
PROGRAMMING OF ROUTINE MAINTENANCE WORKS Within two weeks of the Contract being awarded provide a draft Service Program of the proposed inspections and staging of the routine scheduled maintenance work throughout the year. Submit a copy to the Superintendent for approval.	19.24	300		
VEGETATION AND WEED CONTROL - CHEMICALS Submit to the Superintendent the list of herbicides and other chemicals intended for use during the contract, details of vegetation controlled by the herbicide, and duration of control per treatment.	19.29.2	302		
VEGETATION AND WEED CONTROL – PERSONNEL HANDLING CHEMICALS Personnel carrying out spraying operations shall have undertaken and passed a National Farm Chemical User Training Program. Provide a list of the names of personnel who will be using chemicals in spraying operations. Provide documentary evidence that those people have successfully completed the required training.	19.29.3	302		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
20 BUS STOP MAINTENANCE				
PROCEDURES, CALLS AND PAYMENTS - DAILY LOG BOOKS – APPROVAL Submit to the Superintendent for approval a suitably designed format for daily log books prior to commencing works under the Contract.	20.27.10	328		
21 ROAD AND MARINE AMENITY MAINTENANCE				
RUBBISH COLLECTION OPERATIONS Normal rubbish collection does not include illegal signage or abandoned vehicles or equipment, however, report these items to the Superintendent.	21.10.2	333 & 334		
RUBBISH COLLECTION OPERATIONS Report to the Superintendent any occurrences of concrete spills, gravel, sand or soil on any trafficable surface. These materials are not rubbish under the terms and conditions of the contract and may be removed by others. If not removed by others, remove upon issue of direction to work from the Superintendent at a fair and reasonable negotiated rate.	21.10.2	333 & 334		
RUBBISH REMOVAL - DEODORIZING RUBBISH BINS Use Nilodew granules as manufactured by Nilodor Inc. or equivalent as approved by the Superintendent.	21.11.3	334		
RUBBISH REMOVAL - ILLEGAL RUBBISH COLLECTION Report to the Superintendent any occurrences of illegal rubbish dumping, vegetation dumping, concrete spills, gravel, sand or soil on any trafficable surface. These materials are not rubbish under the terms and conditions of the contract and may be removed by others. If not removed by others, remove upon issue of direction to work from the Superintendent, to be paid for at unit rates nominated in scheduled rates, or at negotiated rate.	21.11.6	335		
WEEDING – CHEMICALS Submit to the Superintendent the list of chemicals intended for use during the contract, if herbicide is intended for use, details of pest species controlled by the chemicals, and life expectancy of control.	21.18.3	339		

HOLD POINTS AND WITNESS POINTS SCHEDULES

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
REMOVAL OF ABANDONED VEHICLES - SERVICE LEVELS FOR VEHICLE REMOVAL Report any vehicle suspected of being abandoned to the Superintendent within 24 hours of observation. When instructed by the Superintendent remove any vehicle that has been abandoned in compliance with NT Traffic Regulations 1999 Part 5 - Abandoned Vehicles.	21.27.1	334		
22 PROTECTIVE COATINGS				
CONTRACTOR'S RESPONSIBILITIES Provide documentary evidence of PCCP accreditation before commencing protective coatings work.	22.7	349		
EQUIPMENT Give notice so that the oil carry-over test may be witnessed by the Superintendent or their nominated representative.	22.11.2	351		
APPLICATION OF PROTECTIVE COATINGS - COATING Provide copies of specifications for application of protective coatings from the manufacturers of the products used. Provide copies of manufacturers' product technical data sheets for all products used.	22.15.2	353		
APPLICATION OF PROTECTIVE COATINGS - COATING DEFECTS Marking of defective areas shall be made using a marker compatible with the coating over which it is applied. Crayons and paint pens shall not be used. This compatibility between marker and coating is to be confirmed by the coating manufacturer. Provide written evidence of this compatibility if requested by the Superintendent.	22.15.7	353 & 354		

SCHEDULE 2 – WITNESS POINTS				
CLAUSE TITLE	CLAUSE	PAGE No	INITIALS	DATE
<p>CONTRACTOR RECORDS</p> <p>Maintain written records of the work so that complete traceability of all work and materials provided under this Specification is maintained. Use the relevant sections of AS 3894.10, AS 3894.11 & AS 3894.12 QA report forms as a basis of this record keeping format for all protective coating work under this contract. Use AS 3894.13 and AS 3894.14, in addition to the preceding Australian Standards, for structural steel work coated under this contract.</p> <p>Maintain these reports on a daily basis. Submit them to the Superintendent when requested, or, if not specifically requested, at least weekly.</p>	22.18	354		
<p>CONTRACTOR RECORDS - FILM THICKNESS</p> <p>Provide and operate wet film and dry film thickness gauges of approved types to ensure the correct thickness of each coat and the full system is achieved. Provide details of the gauges proposed for use.</p>	22.18.1	354 & 355		

30 UPDATES OVERVIEW

CLAUSE		CHANGE
<p>Renaming of document to Standard Specification for Civil Maintenance to reflect broad scope of its content.</p> <p>Reorganization of order of information at beginning of work sections [General, Cross References, (Australian) Standards and Publications, Definitions].</p> <p>Tables moved from ends of sections to be close to related text in work section.</p> <p>Table numbering deleted.</p> <p>Minor editorial changes, updates to web page URLs, updates to Australian Standards and other cited documents and organizations.</p> <p>Updated Civil Standard Drawings numbers.</p> <p>Some clause renumbering due to addition of new clauses.</p> <p>New work sections – Street Lighting Maintenance, Bus Stop Maintenance, Hold Points and Witness Points Schedules, and Updates Overview.</p>		
01 MISCELLANEOUS PROVISIONS		
1.3	Standards	Personal Protective Equipment standards added
1.4	Definitions	Several new definitions added. URBAN AREAS definition changed
1.6	Environmental Management	References to Standard Specification for Environmental Management added, referring to submission of CEMP, and preservation of cultural and heritage sites and artefacts.
1.9	Volatile substance management	New clause.
1.10	Permits to access land for works on roads	New clause.
1.11	Camp site	Requirements made explicit
1.13.3	Extraction areas locations	New clause
1.13.4	Approvals for extraction areas	New clause
1.13.5	Extraction area management plan	New clause
1.13.7	Process control testing of extracted materials	New clause
1.14	Explosives	New clause
1.15.3	Plant and equipment – Construction plant, equipment, and vehicles	Construction plant, equipment, and vehicles to be in compliance with applicable laws
1.15.7	Plant and equipment - Warning beacons on plant	Requirements made explicit
1.16	Safety	Requirements made explicit
1.18	Utilities and other services passing under existing pavements	New clause – Directional boring required
1.28.1	Warranties	New clause – Requirements detailed
1.28.2	Certificates of compliance	New clause – Requirements detailed

UPDATES OVERVIEW

CLAUSE		CHANGE
1.28.3	Compliance – Traceability of components	New clause – Requirements detailed
1.28.4	List of plant and equipment installed	New clause – Requirements detailed
1.28.8	Submission of documents	New clause – documents to be submitted – formats of the documents specified
1.28.9	Time allowed for assessment of documents	Additions to lists of documents
1.29	Contractor’s personnel	New clause – Traffic control - KONECT
1.30	Management service and support	New clause
1.32	Emergency road hazard – Urgent attendance	New clause
1.34	Negotiated rate	Additional information
1.35	As constructed information	Provision of As Cons condition precedent to Practical Completion Show design levels and as constructed levels
1.37	Work near areas where crocodiles may be present	New clause
02 PROVISION FOR TRAFFIC		
		Comprehensive update to entire work section
03 EARTHWORKS AND DRAINAGE		
		Minor changes/clarifications, new CS drawing numbers Clauses renumbered
	Formation Width Clearing	Clause deleted
3.5	Earthworks in cut	Inclusion of haulage Requirement to trim and compact added
3.6.1	Earthworks in fill - Description	Expanded description Benching sub-clause deleted
3.7	Fill material	Inclusions added
3.7.2	Standard fill properties	Default values for properties provided
3.8	Removal of excess material	Requirements made explicit
	Preparation and maintenance of subgrade surface	Clause deleted
3.9.1	Earthworks for drainage – Table drains	Trim and compact requirement added
3.9.2	Earthworks for drainage – Table drain offlets	Requirements made explicit
3.9.3	Earthworks for drainage – Table drain blocks	Fill Plasticity Index now the same for all regions.
3.9.4	Earthworks for drainage – Stop berms/levees	Stop berms and levees consolidated. Fill Plasticity Index now the same for all regions.
	Repair existing Formation Width	Clause deleted

UPDATES OVERVIEW

CLAUSE		CHANGE
3.10	Trim and compact unpaved areas	Requirements made explicit
	Surface formation	Clause deleted
3.12.2	Conformance – Proof rolling	Plant requirements made explicit
04 CONFORMANCE TESTING		
4.4	ITPs	Requirements made explicit
4.5	Specific tests	Minor amendments
4.9	Tables - Test frequencies, compliance testing	Minor amendments to tables. Changes to Table – Asphalt Testing – Number of cores per lot. Minor changes to sampling frequencies for fresh concrete. New table for surface roughness testing. Table for MDD curing times amended.
4.10	Test results	Interim results no longer required Surface roughness testing added
4.11	Lot testing - Compaction	Soils and asphalt separated Minor changes to dry density ratios table Conformance of compaction for asphalt amended
4.11.2	Conformance of compaction of asphalt	Now based on Air Voids Ratio
4.11.2	Table – Dry density ratios for conformance	Values in column B altered
05 GRADING AND GRAVEL SHEETING		
		Significant changes to entire work section
06 STABILISATION MAINTENANCE		
		Significant changes
6.8	Reconstruction of pavement	New clause
07 SPRAY SEALING MAINTENANCE		
		Minor changes to content, including minor changes to tables
7.5.1	Cycle and pedestrian shared path maintenance	Requirement for under pavement growth inhibitor added
7.6.1	Material requirements - Aggregates	Table – Aggregate Properties – required values changed Aggregate source rock properties requirements made explicit
7.6.5	Cut back bitumen	Table – Cut Back Bitumen Properties modified
7.6.7	Polymer Modified Binder	Requirements modified in Table – PMBs for Sprayed Sealing Applications
7.10	Binder coat requirements	Significant changes
7.15.3	Application spray rates	Explicit reference to AGPT 4K
7.16.1	Aggregate spread rates	New table
7.16.4	Application of aggregate – Self-propelled multi rubber tyred vibrating rollers	New clause

UPDATES OVERVIEW

CLAUSE		CHANGE
7.21	Bitumen equivalent volumes	New clause. Table moved from Measurement and Payment
08 BITUMINOUS SURFACE MAINTENANCE		
8.13.3	Spreading and laying - Transverse joints	Additional requirements
8.13.4	Spreading and laying - Longitudinal joints	Additional requirements
8.14.1	Compaction - General	Layer depth requirements made explicit
8.15.5	Conformance - Conformance of compaction (Lot testing)	Requirements for cleaning up of contaminated material made explicit
8.15.6	Conformance – Surface roughness	New Table – Testing sequence for surface roughness for pavement type
09 CONCRETE MAINTENANCE		
		CS drawings updated Tables relocated
9.9.3	Cycle and pedestrian shared path maintenance	Requirement for under pavement growth inhibitor added
10 DRAINAGE MAINTENANCE		
		Corrugated metal structures deleted Detail added to some cross references
10.6.2	Construction of culverts and structures – Excavation	Trench widths – dimension deleted, reference to drawings added
10.6.5	Construction of culverts and structures – Bedding	Bedding depth – dimension deleted, reference to drawings added
10.6.10	Construction of culverts and structures – Backfill	Cement stabilization required for backfill if it is or will be beneath a road pavement
10.11.5	Sub-soil drains – Laying and backfilling	Requirements for backfill above solid wall pipes made explicit
11 PROTECTION WORKS MAINTENANCE		
		Minor editorial changes to terminology to clarify intent
11.6	Geotextile fabrics	Major revision
12 ROAD FURNITURE MAINTENANCE		
		New CS drawing numbers
12.7	Tactile ground surface indicators	New clause
12.8	Fencing	Information re-organized – consolidation of fence related clauses
12.8.6	Fencing – Pedestrian fence	Requirements for pedestrian fences made explicit
12.9	Flexible guide posts	Major revision Submission of test results required
12.10	Steel guide posts	New clause
12.12.1	Road signs – Anti-spear fixings for hazard markers (sight boards)	New clause. New requirements for anti-spear fixings to hazard marker boards

UPDATES OVERVIEW

CLAUSE		CHANGE
12.12.2	Road signs – Remotely activated road condition information signs	New clause
12.12.3	Road signs - Materials	Manufacture and Posts – additional information
12.14.10	Road signs – Table – Roadside signs – Mounting selection	Term “anchor” changed to “footing” in tables
12.14.10	Road signs – Table – Roadside signs – Mounting selection	Two new sign sizes added to table (750x900 and 1500x800)
12.22	Road safety barriers – Steel beam guardrail	Significant changes – MASH testing required – lists of MASH tested products accessible via a web page
12.23	Road safety barriers – Steel wire rope system	New clause
13 PAVEMENT MARKING MAINTENANCE		
		Comprehensive update to entire work section
14 LANDSCAPE MAINTENANCE		
		Minor updates
14.6	Intersection sight lines	Additional information provided
15 SLASHING AND WEED CONTROL		
		Minor updates
15.5	Works restricted to road reserve	Requirements made explicit
15.8.3	Opening slash	Requirements made explicit
15.8.4	Full slash	Requirements made explicit
15.8.6	Slash additional areas in the road reserve, aerodromes, park areas	New clause
15.8.7	Slash for weed control	New clause
15.8.8	Slash firebreaks	Requirements made explicit
15.10.2	Vegetation control – Additional requirements for the Darwin region	Requirements made explicit
15.10.13	Vegetation control - Aerodromes	Requirements made explicit
15.11.2	Weed control – Additional requirements for the Darwin region	Requirements made explicit
15.11.4	Weed control – Herbicide selection	KPIs made explicit
16 TRAFFIC CONTROL SIGNALS AND INTELLIGENT TRANSPORT SYSTEMS MAINTENANCE		
		Minor updates
17 STREET LIGHTING MAINTENANCE		
		New work section
18 STREET SWEEPING		
		Minor updates Warning beacons – LED equivalents acceptable
19 AERODROME MAINTENANCE		
		Comprehensive update to entire work section

UPDATES OVERVIEW

CLAUSE		CHANGE
20 BUS STOP MAINTENANCE		
		New work section
21 ROAD AND MARINE AMENITY MAINTENANCE		
		Minor updates
22 PROTECTIVE COATINGS		
		Minor updates – Re-arranged to match Roadworks
23 MEASUREMENT AND PAYMENT		
		Gravel from pastoral leases at no cost to Principal. Changes to align with altered content in EARTHWORKS AND DRAINAGE and in GRADING AND GRAVEL SHEETING
23.1.6	Miscellaneous provisions – Urgent works attendance	Requirements made explicit
23.1.7	Miscellaneous provisions – Urgent works attendance – EMERGENCY road hazard	Requirements made explicit
23.1.8	Miscellaneous provisions – Gravel pit management plans	New item
23.2	Provision for traffic	Minor changes to terminology
23.6.5	Stabilisation maintenance – Reconstruction stabilise pavement	New item
23.6	Stabilisation maintenance – Reconstruction of pavement base course 200mm and subgrade 150mm depth	New item
23.7	Spray sealing maintenance	Clause relocated to align with work section order
23.8	Bituminous surface maintenance	Clause relocated to align with work section order
23.9.2	Concrete maintenance – Cycle/footpaths	Additional item – allow for under pavement growth inhibitor
23.11.9	Protection works maintenance – Embankment protection – Concrete - Maintenance	Requirements made explicit
23.11.10	Protection works maintenance – Margins	Requirements made explicit
23.12.1	Road furniture maintenance – Tactile ground surface indicators	New item
23.12.2	Road furniture maintenance – Fencing	Inclusions made explicit
23.12.3	Road furniture maintenance – Supply and Install Vehicle Movement Barriers/Fences	New item
23.12.4	Road furniture maintenance – Supply Install Cyclist Holding Rail	New item

UPDATES OVERVIEW

CLAUSE		CHANGE
23.12.5	Road furniture maintenance – Remove Cyclist Holding Rail	New item
23.12.6	Road furniture maintenance – Supply and Install 150 mm Round Recycled Plastic Bollard	New item
23.12.7	Road furniture maintenance – Supply and Install Culvert Crossing Fence	New item
23.12.8	Road furniture maintenance – Remove Culvert Crossing Fence	New item
23.12.9	Road furniture maintenance – Flexible Guide Posts	New item
23.12.10	Road furniture maintenance – Steel Guide Posts	New item
23.12.11	Road furniture maintenance – Work Zone Products and Accessories	Made explicit – not measured separately
23.12.12	Road furniture maintenance – Road signs, manufacture, supply and delivery	Anti-spear fixings included
23.12.18	Road furniture maintenance – Cleaning of signs	New item
23.12.19	Road furniture maintenance – Road asset information	New item
23.12.22	Road furniture maintenance – Road safety barriers	Terminology updated
23.13	Pavement marking maintenance	Comprehensive update
23.15	Slashing and weed control	Comprehensive update
23.17	Street lighting maintenance	New items
23.19	Aerodrome maintenance	Comprehensive update
23.20	Bus stop maintenance	New items
24 REFERENCED AUSTRALIAN STANDARDS		
		Minor updates
25 OTHER REFERENCED AUTHORITIES AND DOCUMENTS		
		Minor updates
26 ACTS, REGULATIONS, AND CODES		
		Minor updates
27 CIVIL STANDARD DRAWINGS FOR CIVIL MAINTENANCE		
		Updated drawing numbers
28 NORTHERN TERRITORY CLIMATE ZONES TABLE		
		Updated table
29 HOLD POINTS AND WITNESS POINTS SCHEDULES		
		New section
30 UPDATES OVERVIEW		
		New section

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