



Ararat Rural City

ROAD, DRAINAGE AND BRIDGE SPECIFICATION

JANUARY 2016



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1 GENERAL

The Contractor shall carry out all necessary work to complete the Contract described by the specifications and drawings of this Contract.

The following VicRoads Standard Specification for Roadworks and Bridgeworks - February 1995 (hereafter referred to as VicRoads Standard Specifications) form part of this Specification and are used as a technical reference where they apply to the works under this contract:

<i>Section 160</i>	<i>Construction - General</i>
<i>Section 165</i>	<i>Procurement of Roadmaking Materials</i>
<i>Section 166</i>	<i>Traffic Management</i>
<i>Section 173</i>	<i>Examination and Testing of Materials and Work (Roadworks)</i>
<i>Section 176</i>	<i>Environmental Management (Minor)</i>
<i>Section 201</i>	<i>Site Clearing</i>
<i>Section 204</i>	<i>Earthworks</i>
<i>Section 210</i>	<i>Geotextiles in Earthworks</i>
<i>Section 304</i>	<i>Flexible Pavement Construction</i>
<i>Section 307</i>	<i>In-Situ Stabilisation of Pavements with Cementitious Binders</i>
<i>Section 310</i>	<i>Preparation of Pavement for Sprayed Bituminous Surfacing</i>
<i>Section 407</i>	<i>Hot Mix Asphalt</i>
<i>Section 408</i>	<i>Priming, Primersealing and Sealing</i>
<i>Section 602</i>	<i>Excavations</i>
<i>Section 605</i>	<i>Driven Piles</i>
<i>Section 606</i>	<i>Bored Cast-In-Place Piles (without Permanent Casing)</i>
<i>Section 610</i>	<i>Structural Concrete</i>
<i>Section 611</i>	<i>Steel Reinforcement</i>
<i>Section 614</i>	<i>Formwork (Cast-In-Situ Concrete)</i>
<i>Section 619</i>	<i>Manufacture, Testing and Delivery of Precast Reinforced Box Culverts</i>
<i>Section 620</i>	<i>Precast Concrete Units</i>
<i>Section 626</i>	<i>Installation of Precast Concrete Crown Unit Culverts</i>
<i>Section 630</i>	<i>Fabrication of Steelwork</i>
<i>Section 631</i>	<i>Protective Treatment of Steelwork</i>
<i>Section 652</i>	<i>Supply of Elastomeric Bearing and Pads</i>
<i>Section 660</i>	<i>Bridge Expansion Joints</i>
<i>Section 670</i>	<i>Steel Bridge Barriers</i>
<i>Section 701</i>	<i>Underground Stormwater Drains</i>
<i>Section 702</i>	<i>Subsurface Drainage</i>
<i>Section 703</i>	<i>General Concrete Paving</i>
<i>Section 705</i>	<i>Drainage Pits</i>
<i>Section 706</i>	<i>Installation or Replacement of Utility Infrastructure within Road Reserves</i>
<i>Section 708</i>	<i>Steel Beam Guard Fence</i>
<i>Section 709</i>	<i>Guide Posts</i>
<i>Section 710</i>	<i>Fixing Raised Pavement Markers</i>
<i>Section 713</i>	<i>Beaching</i>
<i>Section 714</i>	<i>Sign Installation</i>
<i>Section 720</i>	<i>Landscape Works</i>
<i>Section 721</i>	<i>Pavement Markings</i>
<i>Section 801</i>	<i>Source Rock for the Production of Crushed Rock and Aggregates</i>
<i>Section 811</i>	<i>Gravel, Sand and Soft or Ripped Rock for Pavement Base and Subbase</i>
<i>Section 812</i>	<i>Crushed Rock for Pavement Base and Subbase</i>
<i>Section 815</i>	<i>Cementitious Treated Crushed Rock for Pavement Subbase</i>
<i>Section 831</i>	<i>Aggregate for Sprayed Bituminous Surfacing</i>

Unless otherwise specified in this specification, provisions of the VicRoads Specifications will apply.



This document has precedence over provisions of the VicRoads Standard Specifications.

Where this specification and the VicRoads Standard Specification is silent on any matter the latest version of the Infrastructure Design Manual shall apply.

INTERPRETATION

- (a) **Supply** means purchase and transport to site or nominated depot.
- (b) **Provide** means supply and install.
- (c) **Repair** means to make good.
- (d) **Retain** means take out, reinstall and repair or leave in place.
- (e) **Remove** means demolish and dispose of materials and repair.
- (f) **Replace** means to remove and then to provide equal material or material as nominated.
- (g) **Relocate** means move into a new location/position, reinstall and repair.
- (h) **N/A** means Not Applicable.
- (i) **Renew** means replace with new item.
- (j) **Perform** means to test and report.
- (k) **Superintendent** means Principal's Representative



2 PRELIMINARIES

GENERAL: Refer to schedules and drawings for the application of clauses from this section.

HOLD POINTS: Refer to schedules for applicable hold points.

2.1 Quality System

Provide a documented quality system to cover all work under this Contract. Quality system documents shall be submitted for consideration and acceptance by the Superintendent as follows:

- Contract Specific Quality Plan; and
- Specific Quality Procedures relating to specific work.

(Reference: VicRoads Standard Specifications 160.A4)

2.2 Insurances

Provide documentary evidence, to the Superintendent, of the existence of a Public Liability Insurance Policy indemnifying Council against any claim for damage which may be sustained by the public due to the works.

The Contractor shall also provide documentary evidence of other insurance's effected and maintained.

2.3 Health and Safety Coordination Plans

Provide a safety coordination plan detailing a management system covering Occupational Health and Safety before works commence.

(Reference: VicRoads Standard Specifications 168)

2.4 Construction Program

Provide a Construction Program to. The Program as a minimum shall show:

- The proposed order of works;
- The planned dates for starting and completion of the various parts of the work; and
- Allowance for all anticipated factors.

2.5 Cartage Routes

Provide specific cartage routes for the Superintendent's approval for the cartage of plant, equipment and materials to and from the job site.

2.6 General Information

Provide to the Superintendent before commencing any works:

- Written advice and acceptance of hours of work; and
- Names and telephone numbers of Contractor's representatives who can be contacted in an emergency including outside of hours under the Contract.

2.7 Notifications

Where scheduled the Contractor shall provide the following notifications.

2.7.1 Public Notification

The contractor shall notify the superintendent with at least four (4) weeks notice to place advertisement in the local newspaper. Council will place and pay for the advertisement.

Where specified in the schedules, the contractor is to supply variable message signs (VMS) to notify motorists of upcoming road closures and detours. Refer to Clause 2.2.14 for Traffic and Pedestrian Management.



2.7.2 Resident Notification

The contractor shall provide notification via mail/letterbox drop of the works to all adjoining residents and businesses advising the timing of the works and the traffic management processes to be implemented. At least two (2) weeks notice is required prior to works commencing.

2.7.3 Emergency Services and Authorities

The contractor shall provide notification to all emergency services and transport organisations including the following as a minimum:

- Ambulance: roadclosures@ambulance.vic.gov.au
- Police: ararat.erc@police.vic.gov.au
- State Emergency Service: ararat@ses.vic.gov.au, midwest@ses.vic.gov.au
- Country Fire Authority: admin.d16@cfa.vic.gov.au
- Vicroads tmc@roads.vic.gov.au
- Public Transport Victoria: jon.gunby@ptv.vic.gov.au
- Local Public Transport: ararat@christiansbus.com.au
bowles.kev.v@edumail.vic.gov.au

- Other:
councilrequests@wheeliewaste.com.au
cloder@ararat.vic.gov.au
ncleary@ararat.vic.gov.au
council@ararat.vic.gov.au

2.8 Site Management

The site shall be supervised on a daily basis by a competent and experienced person nominated by the Contractor, who shall take responsibility for the safety of the travelling public and works site personnel, the general conduct of Contract works on site and for addressing directions from the Superintendent.

The Contractor shall also nominate a Project Manager who will be available to and will liaise and confer with the Superintendent and who will ensure Contract requirements and responsibilities are addressed.

Throughout the contract period, the Contractor shall:

- Arrange for or provide adequate storage for materials, equipment and machinery on-site or elsewhere for the duration of the works in a manner that will prevent damage, deterioration, and loss including theft. Control delivery schedules to minimise long-term storage of products at sites.
- Be responsible for activities on the site including providing access for authorised persons and restricting access by unauthorised persons and shall take the necessary precautions to secure the assets of the Principal.
- Not store waste materials and flammable liquids at the site.
- Maintain the site in a clean, tidy and safe condition. Provide and erect barriers, bunting etc. as appropriate to protect and isolate persons and materials from injury and damage.
- During the handling and installation of work as the project proceeds, clean the site and protect work in progress and adjoining work on a basis of perpetual maintenance. Apply suitable protective covering on newly installed work where required to ensure freedom from damage or deterioration until Practical Completion; otherwise clean and perform maintenance on newly installed work as frequently as necessary throughout the remainder of the construction period.

2.9 Survey

The Contractor shall be responsible for all survey work necessary to accurately set out the works, to control alignment and measurement during progress of the Contract and to provide substantiation test levelling documentation.

Alignment shall be set out, controlled and, where required, certified by a competent surveyor.

Test levelling results and set out confirmation shall be certified and provided to the Superintendent.

The Contractor shall use the reference marks as shown on the Contract drawings and the survey co-ordinates of control stations and design centre line where provided, to set out and measure work.

All levels and co-ordinates shall be confirmed by the contractor for accuracy prior to the commencement of work. No claim resulting from errors in levels shall be considered resulting from the failure of the contractor to confirm the levels and co-ordinates prior to commencement. Any errors or discrepancies detected in the levels shall be reported immediately to the Superintendent for clarification.

2.10 Records

The Contractor shall make all records pertaining to the Contract available to the Superintendent upon request. The Contractor shall supply the Superintendent with copies of records as follows:

- All material characteristic testing required under the Contract to assure consistency and compliance of pavement, bedding and filling materials;
- All complying compaction testing results within five days of tests being undertaken;
- Changes made to any traffic management and environmental plan; and
- Other records requested by the superintendent.

2.11 Industrial

(Reference: VicRoads Standard Specifications 160.B1 and 160.B2)

2.12 Audits

The Superintendent may arrange surveillance and audits to ensure the Contractor is complying with the Quality System.

The Contractor shall make available all facilities, documentation, records and personnel reasonably required for audits to be undertaken.

2.13 Contractor's Plant

The Contractor shall not allow the use of tracked plant or vehicles on roads, streets, paved areas, paths or other improvements other than the actual sections of the works. Where movement of tracked plant or vehicles on roads or paved areas etc. cannot be avoided, the Contractor shall seek the approval of the Superintendent and shall provide suitable protection and undertake any reinstatement works required.

The Contractor shall comply with all relevant provisions of Acts, Laws and Regulations relating to the use of plant and vehicles.

2.14 Licences

The Contractor shall ensure that every operator used on site, for works under this Contract, holds the appropriate licence and/or certificate for the equipment being operated. A Register of Licences held shall be kept by the Contractor and shall be available to the Superintendent for inspection upon request.

2.15 Protection of Property and Services

The Contractor shall execute and maintain the whole of the works in such a manner that damage shall not be occasioned to any private or public property including all buildings, fencing, public utility services and structure and all roads used for the transfer of materials or plant. In the event of any damage the party controlling it must be informed immediately of the damage.

The contractor shall at its own expense arrange repair and restore any structure, service or property damaged in any way, to the like order and condition in which it was before the damage. The repairs may



be made by the party controlling the structure, service or property, and the cost of such repairs shall be at the expense of the contractor. The contractor shall also be liable for any loss which may result from such damage or interference to any structure, service or property, and for any claim arising from delay in repairing or restoring it.

The Contractor shall provide a written clearance from the owner of any property damaged during the execution of the Contract. This clearance must be forwarded to the Superintendent before a Certificate of Practical Completion is issued.

The Contractor shall in general maintain all public roads, which access the site, free from rubbish, dirt, mud and dust, which may result from Contract operations.

The contractor shall also undertake all necessary repairs of any damage caused by cartage or other operations.

Trafficable surfaces are maintained free of pot holes and in a condition suitable for travelling at 60 km per hour at all times, except where traffic control personnel are being used to control traffic.

Where the works require access into or through private property, as for example, the installation of drains through private property, the Contractor shall take all possible precautions to prevent the property or improvements thereon being damaged, and to avoid, as far as possible, any inconvenience to the residents and public. Under no circumstances shall soil or other materials be heaped or allowed to fall and remain against buildings or fences.

2.16 Stormwater Drains and Utility Services

Prior to commencing any of the work under this Contract, the Contractor shall:

- Obtain all relevant information from the appropriate authorities concerning the location of stormwater drains, water, sewerage, gas electricity, telecommunication or other services;
- Make arrangements for locating the position of services on site; and
- The Contractor shall be responsible for any damage by any work or operation under the Contractors control.

2.17 Traffic and Pedestrian Management

The Contractor shall make provision for all traffic and pedestrians.

The Contractor shall provide:

- All necessary signs, devices and fencing;
- Traffic control including flagman or traffic lights; and
- Safe passage through the work site at all times.

All signs and devices shall be erected in accordance with the Australian Standard AS1742.3 (2009) 'Manual of Uniform Traffic Control Devices'. The Contractor will provide and maintain on site a copy of AS1742.3 (2009) for use during the Contract.

The Contractor shall be responsible for the safe usage of the site by traffic and pedestrians. The Contractor shall conduct his operations so as to offer the least possible obstruction and inconvenience to traffic. Work shall not commence at any location until the appropriate signs and devices are in place.

2.17.1 Construction Under Traffic

Where construction operations are in progress the Contractor shall:

- Keep open a minimum of 7 metres width of carriageway; or
- Where less than 7 metres width is available, provide competent traffic control personnel at all times. The maximum length of carriageway with less than 7 metres available width shall not exceed 150 metres; or
- Provide an electronic traffic control system approved by the Superintendent;

- Provide a minimum of 3.5 metres where traffic control is employed; and
- Provide a minimum of 7 metres width of carriageway outside of working hours.

2.17.2 Detours

The Contractor shall obtain the approval of the superintendent before traffic is detoured on the designated route and will provide, erect and maintain all appropriate signs and devices required.

The Contractor shall be responsible for any maintenance works on the detour resulting from damage caused by additional traffic created under this contract. The extent of works shall be determined by the Superintendent.

2.17.3 Maintenance and Care of Areas used by Traffic

The Contractor shall maintain all work areas in a safe and trafficable condition.

Material falling on any carriageway shall be removed immediately by the Contractor.

2.17.4 Access to Adjacent Properties

Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners. Access to private entrances along the line of the work shall be maintained at all times and temporary approaches to intersecting roadways and property entrances shall be provided and kept in safe and trafficable condition.

2.17.5 Side Tracks

Traffic shall not be diverted on to any side track until permission to use such side track has been given by the Superintendent.

Written proposals and details for side tracks are to be submitted to the Superintendent at least 24 hours before use is required.

2.17.6 Worksites Speed Limits & Traffic Lights

Should the Contractor wish to erect major traffic control devices, i.e. road works speed limits, traffic lights, etc. consent shall be obtained from VicRoads, Ballarat.

Application is made by completing a 'Memorandum of Consent for Major Traffic Control Items at Road Worksites' form and submitting the form to VicRoads.

The approved copy is to be provided to the superintendent prior to works commencing.

2.18 Environmental Management

Where required in the schedules the Contractor shall prepare a project specific Site Environmental Management Plan (SEMP) for the management of activities that impact on the environment.

The Site Environmental Management Plan shall implement conditions mentioned within the projects Planning Permit and/or relevant CMA Permit where supplied

2.19 Site Environmental Management Plan (SEMP)

The Contractor must prepare a site environmental management plan for the proposed works. This plan must describe how an action might impact on the natural environment and set out clear commitments from the contractor taking the action on how those impacts will be avoided, minimised and managed so that they are environmentally acceptable.

The Contractor shall address the following as a minimum:

- Water Quality
- Air Quality (Dust Control and Plant Emissions);

- Erosion and Sediment control;
- Stockpiles
- Mud on Public Roads
- Contaminated Soils and Materials
- Waste and Resource Reuse
- Fuels and Chemicals
- Noise and lighting control standards
- Flora and Fauna
- Weed, Pest and Disease Management
- Vibration
- Archaeological, cultural and heritage protection (where applicable);
- Reinstatement standards
- Noise and lighting control standards;

2.19.1 Water Quality

The quality of water in waterways shall not be detrimentally impacted by runoff from the site.

Water quality and rainfall shall be monitored stages of construction to ensure that the water quality in the receiving waterways:

- does not vary between the upstream and downstream limits of the works site during the period (where upstream results become the background limits), although a variation between results of no more than twice the measurement uncertainty of the instrument will be allowable; or
- is as agreed between the Contractor, the Superintendent and EPA.

Monitoring shall be carried out in waterways and/or drainage infrastructure upstream and downstream of the limits of the site for each rain event as follows:

- within one hour of commencement of rain event during working hours
- every four hours for periods of continuous rain during working hours
- within 12 hours of a rain event, outside working hours.

2.19.2 Air Quality

The Contractor shall take measures necessary to keep airborne dust to a minimum.

Dust generated from road construction activities shall not create a hazard or nuisance to the public, disperse from the site or across roadways, nor interfere with crops and stock or commercial or residential properties or other dust-sensitive receptor.

If the Contractor fails to achieve adequate dust control, particularly where the safety and convenience of the public are affected, the Superintendent may take any action necessary and deduct the cost of such action from moneys due or becoming due to the Contractor.

The Superintendent may direct the suspension of work at any time where that work creates a dust hazard or nuisance to the public, personnel working on the site or property such as crops, stock and houses in the vicinity of the work. Where the Superintendent has directed a suspension of work and considers that the Contractor could not have been expected to have adequately controlled the dust, the Superintendent may consider an extension of time pursuant to the General Conditions of Contract. No claim for increased costs due to such suspension will be considered.

Emissions of visible smoke from construction plant and equipment shall be for periods no greater than ten consecutive seconds

Emissions of odorous substances or particulates shall not create or be likely to create objectionable conditions for the public

Materials of any type shall not be disposed of through burning

Materials that may create a hazard or nuisance dust shall be covered during transport.

2.19.3 Erosion and Sediment Control

The Contractor shall minimise the risk of soil erosion and sediment pollution of the site, adjacent land, and waterways, by defining and implementing erosion and sediment controls measures as part of its SEMP.

The control measures shall be developed with reference (but not limited) to the Environment Protection Authority's publications including EPA Publication No. 960 *'Doing it Right on Subdivisions'*, EPA Publication No. 275 *'Construction Techniques for Sediment Pollution Control'*, EPA Publication No. 480 *'Environmental Guidelines for Major Construction Sites'* and the International Erosion Control Association *'Best Practice Erosion and Sediment Control'* (IECA, 2008).

The Contractor shall inspect all erosion and sedimentation control works at least once per week with additional inspections during a rain event as follows:

- within one hour of commencement during working hours
- every four hours for periods of continuous rain during working hours
- within 12 hours of a rain event outside working hours
- when runoff is leaving the site.

Any defects and/or deficiencies in control measures identified by monitoring undertaken shall be rectified immediately and these control measures shall be cleaned, repaired and augmented as required to ensure effective control measures thereafter.

2.19.4 Stockpiles

Where soil is stockpiled on site it shall be located no less than 10 metres from waterways.

Where it is not possible to provide a clearance of 10 metres, the stockpile shall be above the normal high water level of the waterways and protection shall be provided to prevent stockpiled material entering the waterways.

2.19.5 Mud on Public Roads

The Contractor shall take all steps necessary to prevent vehicles from trafficking and depositing mud and other debris on the surface of adjacent roads when entering and leaving the site. The cleaning of plant and equipment shall not impact on any other element of the environment.

Any mud deposited on the road shall be removed immediately.

2.19.6 Contaminated Soils and Materials

All work under the Contract shall comply with the following requirements:

- soils or materials shall not be contaminated as a consequence of work under the Contract
- materials imported to the site shall be free from contaminants
- contaminated materials shall only be reused on site through agreement and approval from the Superintendent and EPA
- contaminated materials to be reused onsite shall be temporarily stored and managed to minimise any impact on the site or surrounding environment

- the transport and disposal of contaminated soils or materials offsite shall be undertaken in accordance with relevant legislation and State Environment Protection Policies, or by a method agreed with the EPA.

2.19.7 Waste and Resource Reuse

The generation of waste materials shall be managed in accordance with the hierarchy, of avoid, reuse, recycle or dispose of waste material. The Contractor shall be responsible for the management of any waste produced in performing the work under the Contract.

Solid inert wastes may be reused when approved by the Superintendent.

The Contractor shall also control the generation of wind blown litter, or litter spread by birds and animals, from disturbed material. This may include limiting the disturbed area or recovering material.

All vehicles transporting waste shall be covered and appropriately licensed.

Copies of all waste disposal records shall be provided to the Superintendent within five working days of their issue date.

Litter shall be placed in rubbish containers. Fuel oil and other pollutants shall not be discharged onto the ground or into drains. Spillage shall be contained and removed from site.

Unless otherwise agreed by the Superintendent and where recycling facilities are available, the materials shall be managed in accordance with the table below.

Material	Waste Management Option
Asbestos	EPA licensed landfill
Asphalt	Recycle or reuse - not to landfill
Concrete and concrete washings	Recycle or reuse - not to landfill
Contaminated soil	Recycle or reuse on site if opportunity exists If removed from site, transported by an EPA licensed contractor and disposed in accordance with EPA regulations
Felled woody vegetation (except fragments of noxious or environmental weeds capable of regeneration)	Mulched for re-use, or used for habitat logs
Woody weed fragments capable of regeneration	Burial on site (deeper than 500mm and not in fill, pavement or other critical areas), composting, or disposal to landfill
Formwork	Reuse or dispose to landfill
Plastics (Recycle Nos. 1,2,3,4,5,6,7)	Recycling facility - not to landfill
Metal	Recycle or reuse - not to landfill
Oils and containers and lead acid batteries	Recycling facility - not to landfill
Packaging materials	Recycle where possible or dispose to landfill
Empty paint tins	Recycling facility - not to landfill



Petroleum products from spills (absorbed in spill kit material or contaminated soil)	Recycle or reuse with rehabilitation of contaminated soils if opportunity exists Transported by an EPA licensed contractor and disposed in accordance with EPA regulations
Timber (untreated)	Recycle - not to landfill
Litter	Recycle or dispose to landfill
Office waste	Recycle where possible or dispose to landfill
Other waste excluding the above wastes	Recycle or reuse if opportunity exists

2.19.8 Fuels and Chemicals

Any leakage or spillage of any fuels or chemicals shall not have detrimental environmental impact.

The Contractor shall include specific procedures to mitigate the effect on the environment from fuels and chemicals, including herbicides and pesticides. Such procedures shall include but not be limited to:

- nominated fuel and chemical storage areas that comply with Dangerous Goods (Storage and Handling) Regulations 2012 and EPA Bunding Guidelines (EPA Publication No. 347) including the placarding of compounds and bulk storage containers
- nominated points for fuel and chemical storage, the refueling and fluid top up of vehicles and plant which shall be undertaken in a designated area at least 20 metres from any drainage point or waterways
- provision of readily accessible and maintained spill kits for the purpose of cleaning up chemical, oil and fuel spillages on the Site at all times
- ensuring that personnel trained in the efficient deployment of the spill kits are readily available in the event of spillages
- a contingency plan that shall address the containment, treatment and disposal of any spill.

Fuel and chemical storages and equipment fill areas shall be monitored for compliance at intervals of not more than 7 days.

2.19.9 Noise

All work under the Contract shall comply with the following requirements:

- hours of work shall be as agreed
- construction vehicles and equipment shall have appropriate measures fitted and be effectively maintained to minimise engine noise
- noisy equipment shall be enclosed where possible
- advise local residents in advance when unavoidable out-of-hours work will occur.

The contractor shall obtain the Superintendent’s approval prior to undertaking works outside of the above hours.

2.19.10 Flora and Fauna

All work under the Contract shall comply with the following requirements:

- avoid, minimise and offset (where appropriate) the removal of native vegetation during construction
- avoid injury to fauna or damage to protected vegetation or habitat
- protect significant flora and fauna sites, species or habitat not previously identified.

Permits from relevant authorities shall be obtained prior to disturbance of flora/fauna sites or relocation of native fauna affected by works under the Contract if not already cover by the permit supply. Works under the Contract shall comply with all permits and approvals and associated conditions.

Areas of existing vegetation and native fauna habitat identified to be retained, shall be identified as 'No-Go Zones' and protected by temporary fencing and signage.

Prior to removing any vegetation or habitat, the Contractor shall arrange an on-site inspection with the Superintendent and other relevant authorities to confirm and clearly identify and mark trees, vegetation or habitat to be removed. Any removal shall be consistent with the Contract drawings and any relevant permits and shall fence and sign all sites nominated as No-Go Zones.

Plant, equipment, material or debris shall not be placed or stored within the limit of the root zone of the tree or vegetation to be retained.

The Contractor shall avoid trafficking and compacting, or storing materials on soil in all areas that are currently vegetated and those areas to be re-vegetated.

The Contractor shall undertake monitoring of the condition of flora and fauna habitat sites and protective measures at the site every 7 days.

2.19.11 Weed, Pest and Disease Management

Declared weeds, pests and diseases (also referred to as pathogens) shall not be introduced to the Site, spread through the Site, or removed from the Site as a consequence of work under the Contract.

The Contractor shall prevent the spread of declared weeds, pests and diseases within the Site and off-site through the implementation of controls that as a minimum shall include:

- treatment of declared weeds prior to the commencement of any ground disturbing activities
- response to their identification through monitoring of the site
- management of weed and soil pathogen potential within imported materials
- provisions for cleaning plant and equipment at the following times –
 - prior to arrival on Site
 - prior to departure from Site
 - prior to movement within the Site from infested to non-infested areas.

2.20 Site Establishment

The Contractor may subject to the approval of the Superintendent, provide any temporary buildings, structures or compounds for the storage of plant, materials, equipment or staff amenities.

2.20.1 Sanitary Accommodation

Where required, the Contractor shall provide on-site sanitary accommodation as follows:

- Separate weather proof sanitary accommodation and washing facilities including paper towel, towels and dispenser;
- Servicing of sanitary accommodation at least once per week; and
- Arrangements for daily cleaning.

2.20.2 Site Office

Where required, the Contractor shall provide a suitable weather proof building, either on site or in close proximity of the site. This building shall be suitable for on-site meetings, storage of copies of the documentation and examination of contract documentation and plans.



2.20.3 High Visibility Jackets

All personnel involved in contract activities shall wear fluorescent high visibility jackets on site at all times.



3 SITE CLEARING

GENERAL: Refer to Schedules and drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall undertake clearing and grubbing within specified limits of:

- Vegetation such as trees, tree stumps, tree roots, logs, brush, noxious weeds and decayed vegetable matter; and
- Refuse such as pole stumps, rubbish dumps and sawdust piles resting on or protruding from the ground surface; and
- Obstructions such as concrete paving and sealed surfaces, concrete edgings, drainage pits, foundations, fences, guard rail, signs and disused structures, but not underground obstructions such as drainage pipes, service conduits and fuel tanks.

3.1 Definitions

‘Earthworks Width’

The width to the outside of table drains, toe of batters or edge of excavations.

3.2 Limit of Works

Unless otherwise specified, the limits of clearing and grubbing shall be:

- the whole length between the following chainages:
- the whole width between the outside edges of any batters, including any roundings, together with a further horizontal distance of 1 m beyond the outside edges of batters but not beyond the road reserve boundary or, where catch drains are required, to the outside edges of catch drains;
- not more than the width required for completion of the work under the Contract.

3.3 Clearing

Unless otherwise specified, the area within the specified limits shall be cleared of all vegetation, refuse and obstructions down to natural surface. The Contractor shall not undertake any clearing work or any type of disturbance outside of the specified limits of work unless approved by the Superintendent.

Only those trees identified on the contract documents for removal shall be permitted to be removed in accordance with the planning permit conditions.

Trees shall be brought down in such manner as to avoid danger to personnel and traffic or damage to other trees, shrubs, structures or property outside the area being cleared or designated to be retained within the area being cleared.

Tree branches extending over the carriageway shall be trimmed to provide a clearance of at least 6 m above the carriageway surface. Where whole branches are to be removed, the Contractor shall use the three cut method which requires:

- the under cut;
- the upper cut (further away from the trunk than (a) above) to remove the branch; and
- the final trim cut which is to be cut close to the main trunk but outside the branch collar.

3.4 Grubbing

In areas where excavation will be made, all vegetation, refuse and obstructions shall be totally grubbed or grubbed to a depth of not less than 0.3 m below the sub grade and batters, whichever is the lesser treatment.

Pits which are no longer required shall be removed or broken back to a depth not less than 0.3 m below the finished surface of the sub grade. Remaining pipe openings shall be sealed with concrete. Any



remnants of pits shall be backfilled with material and compacted to a density ratio of not less than 95%. The calculation of density ratio shall be based on Standard compactive effort.

Holes resulting from grubbing shall be backfilled with material similar to the surrounding material and compacted to the same degree as the surrounding material.

3.5 Salvageable Material

Materials identified for salvage shall be delivered to nominated location. If no location has been nominated, materials identified for salvage shall be protected from degradation and damage and stored on site.

Any surplus or demolition materials not required for salvage by Council shall become the property of the Contractor.

The Contractor shall remove all surplus or demolition materials from the site

Disposal and tip fees are the responsibility of the contractor.

3.6 Survey Marks

During clearing and grubbing operations, care shall be taken not to disturb any survey marks.

3.7 Damage to Fences

Any damage to fences shall be repaired immediately by the Contractor to a condition at least equal to that existing before damage and no additional payment will be made for this work.

3.8 Protection and Removal of Existing Vegetation

Prior to commencement of any work, the Contractor and the Superintendent shall conduct a joint inspection of the site to identify vegetation to be retained and protected.

Existing trees, shrubs, native grasses and groundcovers and other areas of existing vegetation marked as 'to be protected and/or retained' on the drawings or as directed by the Superintendent shall be protected by temporary fencing and incorporated into the works by the Contractor.

No earthworks, travel of equipment or storage compounds shall be established within 5 metres of the drip line of mature trees of trunk diameter greater than 200 mm.

Construction of table drains within the drip line of roadside trees shall be undertaken with no disturbance beyond the line of the table drain and no damage to the canopy of the trees.

Protective fencing shall consist of, as a minimum, star pickets with three strands of wire (top, middle and bottom) and construction webbing.



4 EARTHWORKS

GENERAL: Refer to Schedules for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall undertake all earthworks including the following:

- stripping of top soil from all disturbed areas and stockpiling;
- excavation to Subgrade profile;
- provision and compaction of fill to Subgrade profiles;
- treatment of existing surface;
- treatment of excavated profile;
- treatment of underlying unsuitable materials;
- construction/cleaning out of table /swale drains;
- rock removal;
- disposal of surplus material;
- top soiling;
- subgrade width testing;
- compaction testing;
- proof rolling; and
- level testing

4.1 Definitions

'Subgrade' - material below the Subgrade Profile.

'Pavement' - the pavement shall consist of sub-base, lower sub-base, base and bituminous surfacing courses.

'Subgrade Profile' - the surface on which the pavement is to be placed.

'Pavement Profile' - the upper surface of the base layer of the pavement including the seal and shoulder widths.

'Earthworks Width' - the width to the outside of table drains, toe of batters or edge of excavations.

'Pavement Width' - the width of the pavement including the seal and shoulder

'Subgrade Width' - the width of the Subgrade at Subgrade Profile level.

4.2 Horizontal Alignment

Set out information for the design centreline will generally be shown on the drawings or can be provided upon request either as hardcopy or digital file.

4.3 Transition at Existing Pavements

As shown on the contract drawings the new pavement construction is to match into the existing pavement to ensure a smooth profile.

The transition lengths are to be treated as follows;

- Tyne all sealed areas with underlying pavement materials;
- Existing material within the transition length is to be removed across the full Pavement Width, to a depth of 150 mm below finished surface profile;
- All disturbed areas are to be compacted and test rolled in accordance with the approved proof rolling procedure;
- Soft areas are to be treated in accordance with this specification;
- Base quality material shall be spread across full pavement width and compacted; and



- Where seal widths vary they shall be tapered from the existing seal to the design seal over the transition length.

4.4 Excavation to Subgrade Profile

Where the proposed works require excavation to the design subgrade profile, the subgrade profile shall be test rolled in the presence of the Superintendent.

4.5 Resheet Treatment

Where the proposed works require a resheet the treatment shall be as follows:

The existing seal shall be broken up into particle size not exceeding 25 mm.

A regulating course shall be placed. This shall be a layer of sub-base material and placed in uniform layers up to 150 mm maximum thickness.

The Sub-base layer shall be ripped and mixed thoroughly with additional material as required to achieve a maximum 150mm compacted depth layer.

4.6 Rock, Hard Ground and Rock 'Floaters'

DEFINITIONS:

Rock: natural or artificial material encountered in the excavation which cannot be removed with a 50 kw excavator of good working condition and operated by an experienced and competent operator until broken up by mechanical means such as rippers, jack-hammers or percussion drills.

Floaters: massive pieces of rock equal to or exceeding 0.5 cubic metres in volume with a smallest dimension that exceeds 500mm.

Hard Ground: ground that cannot be excavated at a rate exceeding 10 cubic metres per hour with a 50 kw excavator of good working condition and operated by an experienced and competent operator.

Where rock, artificial material or hard ground conditions have been identified in the schedules or drawings no additional claim shall apply to such conditions.

Rock, artificial material or hard ground conditions as defined above may qualify for additional payment claim subject to:

- prompt notification of the Superintendent; and
- material stockpiled until the Superintendent has assessed quantities; or
- the Superintendent or representative is on site and assesses quantities under excavation

Rock 'floaters' or loose boulders will be removed to a depth of at least 150 mm below Subgrade Profile level, within the Earthworks Width. Any resulting depression below Subgrade Profile level will be backfilled with suitable material and compacted (refer VicRoads Standard Specification 204).

Where the Superintendent considers that any rock encountered presents a solid even surface at Subgrade Profile level, he may direct that no further removal will be required.

4.7 Materials for Fill

Type B Filling

Type B filling shall be free of perishable material and have a maximum particle dimension after compaction of not greater than 75 mm.

4.8 Treatment of Unsuitable Materials

Where underlying unsuitable materials and soft spots are detected by observation and/or proof rolling, the Contractor shall propose a method of treatment to the Superintendent.



The Superintendent will confirm the proposed method and will measure the area jointly with the Contractor.

The following methods of treatment may be confirmed for areas less than 100 m².

No.	Treatment
1	Loosening, mixing and re-compaction in-situ to a depth of 150 mm
2	Excavate and dispose of unsuitable material 150 mm, replacement and compaction with Type B Filling or sub-base material.
3	Excavate to a depth of 200mm and backfill with 3% cement stabilised sub-base material

For areas greater than or equal to 100 m² the treatment shall be in accordance with Clause 4.3.2 Further Treatment of Subgrade.

Rates of payment for treatment of unsuitable materials shall be in accordance with the terms of the contract.

4.9 **Compaction Testing**

4.9.1 **Fill**

Each layer of fill shall be compacted and compaction tested and will be required to achieve a mean value of density ratio based on standard compactive effort:

Upper layer (0-150 mm below Subgrade Profile)	97 %
Second layer (150-300 mm below Subgrade Profile)	96 %
Lower layers (more than 300 mm below Subgrade Profile)	95 %

Each layer of fill greater than 2 m in width shall be tested for compaction.

A lot for compaction purposes shall be a layer of like work and the maximum length shall be 200m Urban and 500m Rural.

4.10 **Excavation and Unsuitable Materials**

The Subgrade Profile shall be compacted and compaction tested and will be required to achieve a mean value of standard density ratio based on standard compactive effort as follows:

Subgrade Profile layer	97 %
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A lot shall be a layer of like work and the maximum length of a lot for compaction purposes shall be 200m Urban and 500m Rural.

4.11 **Number of Tests Per Lot**

The number of test per lot shall be:

LOT SIZES	NUMBER OF DENSITY TESTS PER LOT
Equal or less than 2000 m ²	3
Over 2000 m ²	6

4.12 **Disposal of Unsuitable and Surplus Material**

Excavated and unsuitable material shall be disposed of as follows:



- Material conforming with the requirements of Type C Filling may be used on the site where specified or as landscape filling where approved by the Superintendent;
- Material unsuitable for immediate re-use, due to being over wet, may be stock piled at a location approved by the Superintendent, for later use; and
- Surplus excavated material shall be disposed of off-site.

The contractor is to confer with the Superintendent for possible locations for off-site disposal.

4.13 Level Testing

The contractor is to provide level measurements (based on reduced levels) at the;

- Subgrade Profile at the design centre line, and
- Subgrade Profile at the lip of kerb left and right.

Levels shall be taken at each design cross section for urban road construction and at 40 metre intervals for rural road construction works.

4.14 Subgrade Width Testing

The Contractor is required to record offsets of Subgrade Width at a frequency of 20 metres/each design cross section.

4.15 Top Soil

Top soil shall be stripped to a maximum depth of 75 mm, over all areas to be disturbed and stock piled in a location approved by the Superintendent.

Retrieved top soil shall be placed on disturbed areas outside of the paved area, excluding cut batters in rock. Disturbed areas shall be top soiled to the following requirements:

4.16 Conformity with Drawings

Earthworks shall be finished to conform to the schedules and drawings within the following limits:

- The design centre line shall not deviate from the designed offset co-ordinates by more than 50 mm;
- The minimum pavement width shall be provided;
- Subgrade width shall not be less than specified. The edge of Subgrade Width shall be within 50 mm of the design offset from centre line or design line;
- The actual subgrade profile shall not be higher than the design subgrade profile. The crossfall at any section shall not vary by more than 20 mm from the design crossfall;
- Finished surfaces outside of areas to be paved shall be free of depressions capable of holding water and the surface shall be self draining;
- Batters shall not be steeper than the specified slope;
- Batter lines shall not exceed defined offset limits detailed on plans by more than 300 mm unless otherwise approved by the Superintendent; and
- Drain inverts and side slopes shall be finished to within 50 mm of specified level. Drainage invert widths shall not vary more than 100 mm from specified width.

4.17 Further Treatment of Subgrade

If required by the Superintendent the further treatment of subgrade shall be:

4.17.1 Rip and Mix

Loosening of material to a depth of 150 mm, thorough mixing across the full width of formation and re-compaction.

Compaction testing requirements are 98% (mean value density ratio). Satisfactory proof rolling is required.



4.17.2 Excavation and Disposal

Excavate and dispose of unsuitable material to a depth of 150 mm, replace and compact with Type B Filling or sub-base material to match the design Subgrade Profile.

Payment will be based on agreed measurement at Contract Schedule rates.

4.17.3 Stabilisation

Loosening of material to a depth of 200 mm, spreading of specified additive at prescribed rates, pulverisation and mixing of material, water and additive by stabilisation equipment, compaction and trimming.

4.17.4 Geotextiles

Placement of approved geotextiles over the subgrade to the extent indicated on the construction drawings or as agreed.

4.18 Moisture Content of Filling Material and Treated Areas

Materials:

- Used for filling, and
- Further treated subgrade areas, and
- Treated areas of unsuitable materials

shall have a moisture ratio of not less than 70% as determined by test using standard compactive effort.

Should it be demonstrated by the Contractor that the material is not stable at this minimum moisture ratio, a lesser moisture ratio may be agreed upon by the Superintendent.

4.19 Compaction Testing of Material Layer

A lot for compaction purposes shall consist of a single layer of work. The calculation of density ratio shall be based on standard compactive effort.

4.20 Proof rolling

The Superintendent may direct proof rolling of any layer prior to covering with a successive layer, without additional payment

Plant used in proof rolling shall comply with the following

Static smooth steel wheeled rollers	12 tonne minimum mass
Pneumatic tyred plant	20 tonne minimum mass 450 kPa per tyre

The Superintendent may require verification of the mass of any item of plant or vehicle used for proof rolling by certified weigh bridge docketts or by other means acceptable to the Superintendent.

Compliance with proof rolling requirements shall be when an area or layer with stands proof rolling without visible deformation or springing.

Minor surface movement may be accepted by the Superintendent.

24 hour notice of requirement for proof rolling is to be given to the Superintendent.

Lower layers of fill more than 300 mm below the Subgrade Profile shall not be test rolled

To obtain the Superintendents approval, the Contractor will be required to:

- Provide evidence of complying compaction testing results
- Receive the Superintendents approval for satisfactory proof rolling of the Subgrade Profile
- Provide certified level measurements across the finished Subgrade Profile

The Contractor should allow a minimum of 24 hours for the consideration of the above, before approval by the Superintendent.

**5 DRAINAGE**

GENERAL: Refer to Schedules and drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall undertake works as required to conform with the approved plans, including:

- Supply and installation of underground stormwater pipes, lintels, lids, grates and surrounds
- Construction of drainage pits, endwalls, wingwalls and driveable endwalls
- Remove and dispose of existing pipes
- Material characteristic testing of bedding materials
- Material characteristic testing of backfilling material.

The following VicRoads Standard Specifications form part of this Specification:

- Section 173 Examination and Testing of Materials and Work (Roadwork)
- Section 701 Underground Stormwater Drains, and
- Section 702 Subsurface Drainage
- Section 705 Drainage Pits
- Section 713 Beaching

5.1 Install New Underground Drainage

Underground drainage shall be installed in accordance with the approved plans or in locations as approved by the Superintendent.

5.2 Construct New Drainage Pits & Structures

Drainage pits, endwalls etc. shall be constructed / installed in accordance with the approved plans, IDM standard drawings and VicRoads standard drawings.

The pit floor shall be shaped to provide a smooth flow to a height of one-third of the pipe diameter.

For pits greater than 1.0 m in depth step irons shall be provided. Steps shall not obstruct any opening, water shall not discharge onto them and they shall be placed on a wall that has unrestricted access.

5.3 Pavement Restoration

Where;

- pipes are installed through existing paved areas, or
- trenches are to be backfilled after removal of existing pipes in a paved area

The trench shall be backfilled up to subgrade level and the pavement restored using materials as shown below;

PAVEMENT LAYER	MATERIAL TYPE	MAXIMUM LAYER THICKNESS (mm)
Sub-base	Approved sub-base material	150
Base	Approved base material	150

5.4 Removal of existing pipes

Where identified in schedules or drawings that existing pipes are to be removed and disposed of by the contractor, pavement restoration shall be undertaken.

5.5 Conformity with Drawings

The Contractor shall set out the drainage work in accordance with the drawings to the following tolerances:

Level



The invert level at the entry and exit shall not vary from the design levels by +/- 20 mm.

Grade

A minimum gradient as shown on the drawings must be achieved.

The pipe grade must be true to line and grade.

Location

The location of the pits, endwalls etc. shall not vary from the specified location by +/- 0.1 m.

Dimensions

The dimensions of the pits, endwalls etc. shall not vary from that specified by +/- 20 mm.

Pit Cover

The line of the cover shall be within 10 mm of the design kerb line for Side Entry Pits.

Drainage pits shall conform with the IDM standard drawing.

5.6 Pipe Sections

Precast reinforced concrete pipe shall comply with Australian Standard AS4058.

Precast reinforced concrete box culverts shall comply with VicRoads Standard Specification Section 619.

Precast reinforced crown units shall comply with VicRoads Standard Specification Section 626.

5.7 Excavation

The Contractor shall excavate trenches to adequate dimensions to provide for the full specified depth of bedding and for compaction of backfilling material around the culvert.

The width of the trench will allow for proper jointing of the culvert and thorough compaction of backfill material around the culvert using hand held compaction equipment. A minimum clearance of 100 + D/6 mm and a maximum of 200 + D/6 mm from the outside the pipe to the wall of the trench, on either side shall be provided (D = nominal pipe diameter).

Excavation of trenches may be undertaken as follows:

- Over full width of roadway only while traffic is detoured on a route approved by the Superintendent; or
- Part width of roadway where traffic access through site is required. Traffic is to be provided with a minimum width of 3.5 metres for single vehicle access at all times. A flagman shall be provided.

5.8 Bedding

The Contractor shall provide and place bedding material for the full width of the trench. The compacted minimum thickness shall be 100 mm under the culvert, unless otherwise specified.

Materials used for bedding shall be free of perishable matter or lumps of clay and shall comply with the following:

Material passing 19 mm AS Sieve	= 100%
Material passing 0.075mm AS Sieve	= 10% maximum
Plasticity Index	= 20 maximum

5.9 Laying

Pipes shall be laid true to line, face upstream with invert levels and grades as shown on the Approved plans. Pipes shall be in contact with the bedding and bear evenly over the full length of each section.

The top of pipes as marked, shall be set as near to the top of the pipe as possible and lifting holes shall be infilled by approved plugs or concrete mortar.



5.10 Jointing

Jointing of pipes shall be in accordance with the manufacturer's recommendations.

5.11 Stormwater Drainage Connections

All connections shall be neat and all pipe ends trimmed off flush with the internal wall and finished with cement mortar.

5.12 Backfilling

5.12.1 Under Pavements

Material used for backfilling shall be 3% cement stabilised sub-base material. The backfill material shall be thoroughly mixed with a cement mixer or, with the approval of the Superintendent, mixed on the ground. Backfill shall be placed to at least subgrade level.

5.12.2 Not Under Pavements

Material used for backfilling shall be free of perishable matter or lumps of clay and shall comply with the following:

Material passing 37.5mm AS Sieve	= 100%
Material passing 0.075mm AS Sieve	= 5-20%
Plasticity Index	= 20 maximum

5.13 Compaction

Bedding shall be compacted by mechanical equipment to provide a firm foundation. Shaping of the bedding to accommodate the pipe, shall be undertaken after compaction.

Backfilling will be placed and compacted in layers not exceeding 150 mm thickness. Backfilling shall be assessed for compaction as follows:

- A lot shall consist of one layer of backfill for a pipe length between drainage pits,
- Tested layers shall be located at subgrade level and at least 150 mm above the top of culverts
- Backfill shall be compacted to a mean value of density ratio, based on Standard compactive effort, of 97% minimum. The number of tests per lot shall be three.

The frequency of testing of lots shall be:

- One 3 test lot for every pipe and backfilled trench located under a paved area

5.14 Beaching

Materials used for rock beaching shall be resistant to weathering action of air, wind and water and shall be free from staining, laminations, cracks and other structural defects which may reduce its mechanical strength.

This section covers the requirements for the supply and placement of rock, stone or manufactured block beaching for the protection of batter slopes, drainage channels and culvert endwalls as shown on the drawings. One of the four types of beaching are covered by this section:

Type 1: Un-grouted rock beaching.

5.14.1 Beaching Material

Type 1 Beaching

Rock for Type 1 beaching shall consist of field or quarry rock.

All rocks shall have a mass of between 20 and 70 kg and at least 60% by number shall be over 40 kg. Rocks shall be of such size that the layer of beaching is not less than 225 mm thick.



5.14.2 Bedding

Type 1 beaching shall not routinely require a granular bedding, however a very robust needle-punched non-woven geotextile (mass >250 g/m²) shall be laid over the trimmed surface where rock beaching is to be placed. Geotextiles used shall comply with and be placed in accordance with Section 210. The geotextile shall be buried to a depth of 300 mm at the edges of beaching and placed under and around the excavation for the toe wall and for any other perimeter walls provided. The geotextile shall be laid evenly with no kinks or folds, and joints shall be formed by overlapping the geotextile by not less than 300 mm and not more than 500 mm.

5.14.3 Preparation of Underlying Surface

Areas on which beaching is to be placed shall be trimmed as required to provide a finished surface level of beaching in accordance with the drawings. Any scours or hollows in the surface shall be filled with compacted Class 4 crushed rock.

Trimmed material shall be removed from the site.

5.14.4 Beaching Placement

Beaching materials shall be firmly bedded on the prepared embankment and/or bedding if required and laid in courses commencing from the bottom of any slope.

Un-grouted beaching when placed shall form a tight 'interlocking grid', which shall prevent the removal of individual rocks.

The general surface of the finished beaching shall not vary from a 3 metre straight edge laid across the surface of the beaching by more than:

100 mm for Type 1 Beaching

Finished surface levels of rock beaching placed in open drains shall be flush with adjacent soil levels to allow mowing and maintenance. Rock beaching shall not protrude more than 50 mm above the surrounding ground levels.

5.14.5 Cleaning

On completion of the work, the beaching shall be cleaned to remove all foreign materials and discolouration from the beaching surface. Any joint mortar adhering to the surrounding rock surfaces shall be removed.



6 UTILITY SERVICES

GENERAL: Refer to Schedules or drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall undertake works as required to conform with the contract drawings, including Installation of utility services and reinstatement of paved and nature strip areas.

6.1 *Conformity with Drawings*

The Contractor shall set out and lay the conduits or pipes in accordance with the service authority requirements and the contract drawings to the following tolerances;

6.2 *Conduit Sections*

Conduits and pipes shall comply with the relevant service authority requirements.

6.3 *Excavation*

The Contractor shall excavate trenches to the dimensions required by the servicing authority and provide for the full specified depth of bedding and for compaction of backfilling material around the conduit or pipe.

Excavation of trenches may be undertaken as follows:

- Over full width of roadway only while traffic is detoured on a route approved by the Superintendent; or
- Part width of roadway where traffic access through site is required. Traffic is to be provided with a minimum width of 3.5 metres for single vehicle access at all times. A flagman shall be provided.

6.4 *Bedding*

The Contractor shall provide and place bedding material for the full width of the trench. The compacted minimum thickness shall be in accordance with the service authority requirements or where this is not specified a minimum depth of 100 mm.

6.5 *Laying*

Pipes shall be laid true to line and level as shown on the Contract Drawings.

6.6 *Jointing*

Jointing of pipes and culverts shall be in accordance with manufacturer and service authority requirements.

6.7 *Backfilling*

6.7.1 *Under Pavements*

Material used for backfilling shall be 3% cement stabilised sub-base material. The backfill material shall be thoroughly mixed with a cement mixer or, with the approval of the Superintendent, mixed on the ground. Backfill shall be placed to at least subgrade level.

6.7.2 *Not Under Pavements*

Material used for backfilling shall be free of deleterious matter.

Backfilling will be placed and compacted in layers not exceeding 150 mm thickness.



7 KERB, CHANNEL AND FOOTPATHS

GENERAL: Refer to Schedules or drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall undertake works as required to conform with the contract drawings, including;

- Construction of new kerb and channel
- Construction of new footpaths and surfacings
- Installation of vehicle crossings and laybacks
- Installation of kerb ramps

Specific kerb and channel and footpath requirements are detailed on the Contract drawings and include the following;

7.1 *Construct New Kerb and Channel Crossings*

Crossings shall conform with the IDM standard drawings.

The Contractor shall liaise with property owners for new property entrance works.

7.2 *Construct New Footpath*

New footpaths including reinforcement and joints shall conform with the IDM standard drawings.

7.3 *Level Testing*

The contractor is to provide level measurements (based on reduced levels) at the:

- Top of Kerb
- Footpath

Levels shall be taken at the design cross-sections.

7.4 *Materials*

Concrete

Concrete shall be 20 Mpa strength (unless noted otherwise in schedules or on the drawings) complying with AS 3600 - Concrete Structures. Concrete used in kerb extrusion machines shall not be subject to compressive strength requirements but shall have a minimum concrete content of 280 kg/m³.

7.5 *Conformity with drawings, tolerances*

Around existing fixtures

Footpaths and surfacings shall match around fixtures, eg. pit covers, edgings, driveways to within +/- 5 mm and finished so as not to present a tripping hazard to pedestrians.

Line and level

At any point the finished work shall not differ from that specified by +/- 10 mm. The rate of change of the deviation shall not exceed 10 mm in 10 m.

Shape

Except on curves or in shaped areas the deviation of the finished work shall not exceed 5 mm over a 3 m straightedge.

Cross Section

The overall width of the section shall not exceed 15 mm from that specified.

Individual dimensions shall not differ from that specified by +/- 5 mm.

Extrusion machine finish



Surfaces shall be free of pitting larger than 5 mm in diameter.

7.6 Excavation

Existing sealed pavements to be excavated to allow construction shall be saw cut. Following completion of the work the excavated area shall be reinstated with compacted pavement material and bituminous surfaced to match the existing sealed surface. Any damage to the saw cut edge shall be recut to provide a uniform edge to which the bituminous surfacing is to be placed.

7.7 Bedding Preparation

Bedding of crushed rock, gravel or concrete shall be placed and compacted to provide a stable surface. Unsuitable materials to a depth of 75 mm below the underside of the bedding shall be removed and replaced with bedding material.

Kerb and channel

Where the kerb is over pavement material bedding shall be provided to the underside of the kerb or the kerb thickened.

Where the kerb is not over pavement layers a minimum compacted thickness of 75 mm of Class 3 FCR bedding shall be provided.

Footpaths

A minimum compacted thickness of 50 mm of Class 3 FCR shall be provided except under driveway access points where a minimum compacted thickness of 75mm shall be provided.

7.8 Household Drainage Connections

Unless otherwise specified, existing household drainage connections not connected to underground stormwater drains shall be altered as necessary and connected through the kerbing to the channel using approved kerb adaptors.

7.9 Profile Transitions

Where it is necessary to join to an existing section a profile that is different to that being constructed, the change in profile shall be of constant rate between 10 and 20 mm per metre.

7.10 Provision for permanent signs

Where specified sleeves for permanent signs shall be installed. Sleeves shall be approximately 70mm diameter, 500 mm long with the bottom end plugged and extend 15-20 mm above the finished surface level.

7.11 Surface Finish

Kerb and channel

Kerb and channel shall have a steel trowelled finish.

Footpaths and surfaces

The surface shall be worked until the mortar comes to the top and finished with a wooden float to produce a non-skid surface.

7.12 Joints

Kerbs

Transverse joints shall be constructed at regular intervals not exceeding 2.5m and adjacent to household drainage kerb adaptors and minimum depth of 75mm.

Footpaths and surfacings



Expansion joints of cork or bituminous materials shall be provided at intervals not exceeding 15 m and either side of vehicle crossings.

A tooled, grooved trowelled contraction joints shall be provided at a maximum of 1.5m spacing to a depth of 15mm.

Between kerb and footpath

Bonding between the kerb and footpath shall be prevented by painting the back edge of the kerb with bitumen or by installing bituminous felt.

7.13 Backfilling

Following curing of the concrete approved topsoil material shall be placed and firmly compacted either behind the kerb or beside the footpath. This topsoil shall be to a minimum compacted depth of 75mm and to a width of 300 mm or to a greater extent as required to achieve the design reinstatement levels.



8 BRIDGEWORK

GENERAL: Refer to Schedules or drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall provide and install all components for bridges and associated works in accordance with the contract drawings i.e. excavations, piles, structural concrete, structural steel, reinforcement, cast in-situ components, formwork, joints etc.

VicRoads Standard Specifications 600 Series form part of this Specification.



9 PAVEMENT

GENERAL: Refer to Schedules or drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall undertake the construction of pavement courses as follows:

- The supply, placing, compaction and shaping of a sub-base and base courses;
- Compaction testing;
- Proof rolling;
- Level testing; and
- Material testing.

9.1 Definitions

‘Pavement’ - the pavement shall consist of sub-base, lower sub-base, base and bituminous surfacing courses.

‘Subgrade Profile’ - the surface on which the pavement is to be placed.

‘Pavement Profile’ - the upper surface of the base layer of the pavement including the seal and shoulder widths.

‘Earthworks Width’ - the width to the outside of table drains, toe of batters or edge of excavations.

‘Pavement Width’ - the width of the pavement including the seal and shoulder

9.2 Materials

Prior to commencement of work, the contractor shall confirm the source from which the material will be obtained. The physical properties and gradings of material shall conform as detailed below.

9.3 Pavement Materials

All material supplied by the Contractor for pavement construction shall be free of deleterious matter and meet the relevant requirements of the Tables below

Table 9.1 Material Characteristics

All Passing Sieve Size AS(mm)	Liquid Limit	Plasticity Index	California Bearing Ratio
Granitic Sand			
13.2	25	0 min - 6 max.	80
Natural Gravel or Approved Equivalent			
37.5	15 to 25	2 min - 15 max.	80

Table 9.2 Grading

Sieve Size - AS Sieve (mm)									
75	37.5	26.5	19	13.2	9.5	4.75	2.36	0.425	0.075
Granitic Sand									
				100	97-100	55-99	45-90	25-50	6-25
Natural Gravel or approved equivalent									
100	95-100	90-100	84-100	78-97	70-93	46-80	36-70	20-42	6-20
Crushed Rock 20 mm nominal size									
		100	95-100	75-95	60-90	42-76	28-61	14-29	6-14
Crushed Rock 40 mm nominal size									
53mm sieve 100	95-100	75-95	64-90		42-78	27-64	20-51	10-24	6-13

**Table 9.3 Permitted Range of Grading**

Sieve Size AS (mm)	Permitted Range Of Grading +/- (% By Mass)
75, 37.5	20
26.5, 19.0, 13.2, 9.50, 4.75, 2.36	15
0.425	10
0.075	5

9.4 Frequency of Testing for Material Characteristics

The Contractor shall test material being supplied and delivered to the site for pavement use to ensure that all the material complies with the specified requirements and is consistent.

A lot shall be 200m Urban and 500m Rural maximum length of roadway.

The tests required for each lot are for Grading and Plasticity Index.

In addition, one soaked CBR test shall be required for each pavement material prior to the commencement of carting pavement material.

Tests are to be endorsed in accordance with the NATA registration of the testing laboratory.

9.5 Proof rolling

Proof rolling is required for both the sub-base and base layers.

Layers shall be test rolled in the presence of the Superintendent. The Superintendent may direct proof rolling of any layer prior to covering with a successive layer without additional payment.

Plant used in proof rolling shall comply with the following:

Static smooth steel wheeled rollers	12 tonne minimum mass
Pneumatic tyred plant	20 tonne minimum mass 450 kPa per tyre

The Superintendent may require verification of the mass of any item of plant or vehicle used for proof rolling by certified weighbridge dockets or by other means acceptable to the Superintendent.

Compliance with proof rolling requirements shall be when an area or layer with stands proof rolling without visible deformation or springing.

24 hour notice of requirement for proof rolling is to be given to the Superintendent.

9.6 Compaction Testing

Each layer of sub-base shall be tested for acceptance of compaction and the requirement for lot acceptance is a mean value of density ratio based on modified compactive effort of not less than 96% with no value being less than 94%.

Each layer of base shall be tested for acceptance of compaction and the requirement for lot acceptance is a mean value of density based on modified compactive effort ratio of not less than 97% with no value being less than 95%.

The maximum layer thickness for compaction purposes is 150mm.

A lot for compaction test purposes shall consist of a single layer of work and the maximum length of a lot shall be 200m Urban and 500m Rural

The number of tests per lot shall be:



Lot Sizes	Number of Density Tests per Lot
Less than & equal to 2000 m ²	3
Over 2000 m ²	6

All tests shall be endorsed in accordance with the NATA registration of the testing laboratory.

Copies of endorsed complying test results are to be provided to the Superintendent within 5 days of testing.

Where up to 2 tests in a 6 test lot do not achieve the minimum individual test value, reworking of part of the lot will be permitted over the length determined by the Superintendent. Each reworked location will require 2 tests both of which shall achieve the required minimum.

9.7 Level Testing

The Contractor is to provide level measurements (based on reduced levels), at the following points:

Finished base course profile at the following locations

- design centre line,
- edge of pavement, left and right

Levels shall be taken at each design cross section for urban road construction and at 40 metre intervals for rural road construction works.

9.8 Conformity with Drawings

The Contractor shall finish the pavement courses to smooth and uniform surfaces conforming to drawings.

9.9 Alignment and Width

The design centre line shall not deviate from the designed off-set co-ordinates by more than 50 mm.

The width shall not be less specified or shown on the drawings. The off-set width from the design centre line shall not be less than 50 mm or, without the Superintendents approval, greater than 300 mm.

9.10 Finished Levels

The surface level of the completed pavement shall not vary from the specified or design level by more than 20 mm.

9.11 Pavement Thickness'

9.11.1 The Total Pavement Thickness'

The 'average thickness' of the combined sub-base and base courses shall not be less than the specified thickness and the thickness at any point shall not be less than 10 mm of the specified thickness.

9.11.2 Base Course

The 'average thickness' of the base course shall not be less than the specified thickness and the thickness at any point shall not be less than 10 mm of the specified thickness.

9.11.3 Sub-base Course

The sub-base course shall be of adequate layer thickness to enable compaction to be achieved.



The 'average thickness' will be calculated over 5 successive cross sections.

9.12 Shape

The shape of all pavement layers shall be such that the cross fall does not vary from the specified cross fall by more than 20 mm.



10 SEALING

GENERAL: Refer to Schedules or drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall prepare and mark out the pavement surface in preparation for sealing.

It is the Contractors responsibility to prepare the pavement surface for sealing.

The Contractor shall undertake bituminous sealing works as required to conform with the Contract Drawings, including the following:

- Sweeping of the surface in preparation for sealing;
- Application of primerseal;
- Protection of in-situ concrete products;
- Design of Rate of Application;
- Rolling of the surface;
- Drag brooming of the surface; and
- Removal of excess aggregate.

10.1 *Extent of Seal Preparation*

Preparation for primer sealing is to take place for the full extent of works under this Contract, as shown on the drawings and includes transition sections and bellmouths outside the limits of new construction.

10.2 *Aggregate Supply*

Aggregate shall be supplied by the Contractor.

10.3 *Traffic Volumes*

Refer to schedules or drawings for any traffic volumes provided.

10.4 *Final Seal*

The final seal shall be undertaken by the other unless specifically nominated in the schedules.

10.5 *Approval of Pavement Areas before Preparation for Sealing*

Before preparation of pavement areas for sealing is commenced, the following approvals are required:

- Acceptance of the total pavement construction including verification of complying material characteristics and compaction testing results, compliance with proof rolling requirements and verification of complying pavement thickness' by level testing; and
- Acceptance of the final pavement surface profile.

10.6 *Spotting*

Prior to sealing work taking place and immediately following brooming, the Contractor is to mark out the centre line and the right and left edges of seal.

10.7 *Maintenance*

Following acceptance of the prepared surface, the Contractor shall maintain the pavement in the accepted condition until surfacing works are commenced.

10.8 *Bituminous Design*

The rates of application shall be determined by the Contractor. At least 2 days prior to the commencement of work, the Contractor shall submit the rates of application for review by the Superintendent.



10.9 Sweeping

Prior to spraying the surface to be sprayed shall be swept clean and be free of dust, clay and deleterious material.

10.10 Stacksites

Aggregate for sealing activities is only to be stockpiled at one of the nominated stacksites as indicated in the schedules or drawings. The contractor shall remove all surplus aggregate remaining at the stacksite within 5 days of the surface being sprayed.

10.11 Removal of Excess Aggregate

Excess aggregate shall be removed from the pavement within 5 days of being sealed or primer-sealed. Excess aggregate may be removed by either a suction sweeper or broom. Aggregate recovered by a suction sweeper shall be disposed of at a municipal tip or at a location approved by the Superintendent.

Tipping fees shall be paid by the Contractor.

10.12 Reporting

Within 2 days of the completion of the sealing work the contractor shall submit to the Superintendent a spray information sheet containing the following minimum information:

- Client Name
- Road name and location;
- Treatment type;
- Actual area sprayed per run;
- Bituminous materials used, quantities and rates;
- Average rate of application; and
- Aggregate size, quantity and rate.



11 GUARD RAIL AND WIRE ROPE SAFETY BARRIER

GENERAL: Refer to Schedules or drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall provide and install all components for guard rail and wire rope barrier and associated works in accordance with the contract drawings i.e. w-beams, posts, blocks, terminals, GREAT's, wire rope, tensioning, foundations, delineators, excavations, concrete, heights, offset, etc.

VicRoads Standard Specifications Sections 708, 711 form part of this Specification.



12 SIGNAGE

GENERAL: Refer to Schedules or drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall undertake the following in accordance with the approved plans, including:

- Supply and installation of new signs
- Relocating existing signs

VicRoads Standard Specifications Section 714 – Signs Installation

12.1 Sign Schedule

Specific sign requirements and locations are as detailed on the approved plans.

12.2 Materials

All materials are to be supplied by the Contractor.

All signs shall comply with Australian Standard AS 1742.2 and sign faces shall have Class 1 reflectorisation.

Posts, unless otherwise stated, shall be galvanised 50 mm nominal diameter by 3250 mm long. All posts shall have caps and vandal proof bolts are to be used.

12.3 Foundations

All posts are to be set in concrete foundations to a minimum depth of 450 mm and a minimum diameter of 225 mm in accordance with VicRoads Standard Specification 714.06.



13 LINEMARKING

GENERAL: Refer to Schedules or drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall undertake the installation of painted pavement markings and raised reflective pavement markers as specified.

13.1 Linemarking Schedule

The actual position of the linemarking shall be confirmed by on site measurement. Where the nominal requirements indicated on the contract drawings are altered the Contractors payments shall be varied in accordance with the rate nominated.

13.2 Layout of Markings

The set out for the pavement markings shall be carried out by the Contractor. Obtain acceptance from the Superintendent.

13.3 Standards

The position and dimensions of the linemarking shall conform to Australian Standard AS1742.

13.4 Materials

All materials are to be supplied by the Contractor.

The paint shall be white water borne paint unless nominated otherwise on the contract drawings or within this specification. Glass beads shall be used on the markings.

13.5 Application Rates

The application rates shall be 0.3 mm minimum dry thickness. One coat shall be applied.



14 GUIDE POSTS

GENERAL: Refer to Schedules or drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall provide and install guide posts at the designated locations to conform with the contract drawings.

VicRoads Standard Specifications Section 709 - Guide Posts form part of this Specification.

14.1 Offset Location

Guide posts are to be located 0.3 m outside the Pavement Width.

14.2 Type

The Contractor is to supply and install steel guide posts or an equivalent approved by the Superintendent for use in this Contract.

Posts with excessive flexibility will not be considered.

14.3 Reflectors

The Contractor shall fix retroreflective type delineators with the centre of the delineator 200 mm below the top of posts and shall attach delineators by vandal proof and weather proof means.

14.4 Installation

Guide posts are to be firmly set into the ground so that:

- Posts are vertical;
- Tops of posts present a uniform profile;
- Exposed length above ground is 1050 mm; and
- Minimum depth of embedment is 400 mm.



15 LANDSCAPING

GENERAL: Refer to Schedules or drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall undertake works as required to conform with the contract drawings, including;

- Top-soiling
- Seeding
- Planting
- Landscaping
- Maintenance of works, including weed spraying/removal.

Specific works are detailed in the Contract Drawings and include the following;

15.1 Top-soiling

Areas to be seeded shall contain a minimum of 75 mm of topsoil. On batters steeper than 4:1 the ground shall be roughened prior to the placement of any topsoil.

Site topsoil should be used where ever possible.

In the event that site topsoil is not available or is not appropriate, imported topsoil shall be supplied by the Contractor at the Contractor’s expense. Imported topsoil shall be free from pathogens, toxic levels of any element and any weeds and their roots.

If imported topsoil is used, the Contractor shall supply topsoil with the following characteristics:

- Texture:** Light to medium, i.e. capable of handling when moist but lacking cohesion so that it will spread easily.
- PH:** Slightly acid to neutral pH 6.0 - 7.0.
- Stone Content:** Less than 4% by dry weight with stone size not exceeding 10 mm.
- Organic Matter:** Decomposed matters shall not exceed 40% by volume, undecomposed matter shall be less than 4% by volume.
- Salinity:** Less than 600 ppm
- Extraneous Material:** The topsoil shall be free of weeds, sods of subsoil, rubbish, petrol and oil contaminants, lime etc.
- General Description:** Topsoil for mulch planting beds shall be a light to medium friable clay loam. Topsoil for grass areas shall be a light to medium friable sandy loam.

15.2 Seeding

An approved equivalent (see below) shall be spread at a rate of 35 – 45 gm/m² unless otherwise specific on the contract drawings

DURATURF KERBSIDE MIX:

Arena Ryegrass	25%
Joust Prima Ryegrass	25%
Tambour Ryegrass	25%
Chewings Fescue	20%
Highland Bentgrass	5%



15.3 Planting

Plant stock for the Works shall be of the size and type as specified. No substitution of species shall occur without the Superintendent's approval.

Plants shall show healthy growth, be undamaged, free of disease, have a size in proportion to their pot size and species, not be pot bound and shall generally have roots penetrating to the edge of the pot.

Advanced trees shall be straight-trunked and, when planted, be of minimum height and caliper as specified. Head growth shall be strong and well formed.

Planting shall be carried out so as to ensure healthy, vigorous growth of plants.

Planting holes shall be backfilled with friable topsoil free of debris, rocks and clods greater than 50 mm in diameter.

Advanced trees shall be planted with trunks vertical. A slotted flexible agricultural pipe shall be wrapped around the root ball and allowed to protrude to the surface in order to facilitate watering.

Stakes for advanced trees shall be 2400x50x50mm treated pine or hardwood.

Ties for advanced trees shall be flexible, soft strapping and of a type which shall not detrimentally abrade or bruise the bark of the tree. Plastic covered wire, string hessian and twine are not acceptable.

Tree guards for non-advanced trees shall be opaque plastic 400 mm in diameter and 450 mm high and be of sufficient gauge and UV inhibitor to ensure a minimum two year life.

Tree guard and marker stakes shall be 750x25x25mm.

15.4 Landscaping, Mulching

Shredded wood mulch shall be free of soil, weeds, vermin, deleterious material and toxins.

Mulch shall be placed to a minimum depth of 75mm and maximum depth of 100mm on planting bed areas. Mulch shall extend at least 500mm beyond plant centres at the outer edges of planting beds.

All trees in lawn areas are to be mulched with a 75mm deep x 500mm radius layer of mulch.

Mulch shall be kept clear of plant stems to avoid collar rot.

Landscaping shall generally be in accordance with the contract drawings.

15.5 Materials

All materials shall be supplied by the Contractor. Provide details of the materials to be used, including supplier, description, methods of application to the Superintendent for review and acceptance.

15.6 Setting Out

Landscaping beds and individual trees shall be set out in accordance with the drawings.

15.7 Maintenance

All works shall be maintained for the duration of the Defects Liability Period and shall include;

- replanting
- control of weeds
- watering
- mowing/slashing
- re-seeding
- pest and disease control
- mulching
- pruning
- repairs to erosion and sediment control areas



16 COMPLETION OF WORKS

GENERAL: Refer to Schedules or drawings for the application of clauses from this section.

HOLD POINTS: Refer to Schedules for applicable hold points.

The Contractor shall be responsible for leaving the site in a neat and tidy condition at the completion of works under this Contract.

16.1 *Tidying up of Site*

Activities to clean up and leave the site tidy at the completion of works shall include:

- Levelling out of windrows;
- Grading of any disturbed areas;
- Collecting and removal of any loose stone, miscellaneous construction products, pipe offcuts, rocks, rubble and deleterious matter from construction activities, to the Superintendents satisfaction;
- Removal of all buildings or temporary works;
- Removal of all contractors' equipment and surplus material; and
- Removal of all rock and miscellaneous products from the nature strip areas.

16.2 *As Constructed Information*

Prior to the date of Practical Completion, the Contractor shall provide as-constructed information in the forms of marked up plans and survey level information as detailed in the relevant sections of this specification. If construction is per the contract documents without change, the contractor shall submit those drawings.