CIVIL ENGINEERING WORKS

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LEND LEASE

CLIENT

LEND LEASE, KINCUMBER

PROJECT

WOOD & GRIEVE ENGINEERS

30916-5	KI-CD-000-01	A
PROJECT No	DRAWING No	REV

1 EARTHWORKS

1.1 GENERAL

1.1.1 Extent of Contract

This specification is for the carrying out of all earthworks indicated on the drawings. It is the Contractor's responsibility to assess the nature of the soil being cut or filled and to select plant which will achieve the specified results. The Contractor shall also make his own assessment of the quantities of earthworks to be carried out, including the accuracy of existing contours and any effect on the levels of the in-situ material due to the operations selected by the Contractor.

1.1.2 Standards

Earthworks shall be completed in accordance with:

- Local Authority Standards and Specifications
- AS 3798-1996 Guidelines on Earthworks for Commercial and Residential Developments
- AS 1289 Methods of Testing Soils for Engineering Purposes
- AS 2870-1996 Residential Slabs and Footings – Construction
- AS 1726-1993 Geotechnical Site Investigations.

1.1.3 Existing Services

The Contractor shall familiarise himself and all personnel on Site, under his direction, with the location of all existing services on and adjacent to the Site and he shall be responsible for the cost of repairing any damage caused to existing services. This repair work shall be carried out by the relevant Authority and shall be arranged by the Contractor.

1.1.4 Disturbance to Private Properties

The Contractor shall not cause any damage to, and shall take reasonable precautions to avoid excessive disturbance to any private property due to dust, vibration, noise, etc., resulting from these works. The Contractor shall not enter onto private property without the written consent of the land owner.

1.1.5 Natural or Existing Vegetation

In areas not requiring earthworks, access for machines shall not be permitted. Any unauthorised disturbance shall be remediated to the full satisfaction of the Local Authority or relevant government department and all costs borne by the Contractor.

1.2 EARTHWORKS GEOTECHNICAL CERTIFICATION

Where applicable, all cut and fill operations are to be undertaken in accordance with the recommendations of the Geotechnical Report supplied with this tender as amended throughout the Contract under the instruction and supervision of the Geotechnical Consultant to achieve Level One Certification. The Geotechnical Consultant is to be engaged to provide a full time inspection and testing service on all earthworks and is to establish the location and frequency of sampling and testing of the earthworks operations to allow certification.
Where no Geotechnical Consultant or report has been established prior to Tender, the Contractor is to engage his own Geotechnical Consultant to supervise and certify all earthworks operations as directed by the drawings and the Local Authority requirements.

1.3 QUALITY ASSURANCE – EARTHWORKS

The Contractor shall produce, and submit to the Superintendent, verified records to confirm that the specification requirements have been achieved as follows:

	Item	Test/Record	Frequency
a)	Topsoil stripping	Contractor's Certificate	1 per project
b)	Finished Earthworks levels	Surveyed as-constructed drawing showing finished contours	1 per project
c)	Compaction - bulk fill	Compaction Certificate	As directed by the Local Authority and/or Geotechnical Testing Authority
d)	Compaction - method specification	Contractor's Certificate confirming roller, passes, water used etc	As directed by the Local Authority and/or Geotechnical Testing Authority
NB.	Compaction tests should be adequately distributed so as to give a good representation of the whole area, including additional testing within 2 metres of corners and edges of earthworked area.		
e)	Retaining Walls:		
	Independent Certification (Design)	Independent Structural Certification of Retaining Wall Design to suit in-situ soils	1 per mix
	Foundation Compaction	Compaction Certificate	1 per project
f)	Backfill Compaction	Compaction Certificate	
	Finished Walls	As-constructed profiles with tolerances and locations	1 per wall type per location

1.4 CLEARING

Clearing must be approved by the Superintendent, the Arborist and the Specialist Fauna Consultant (where applicable) prior to clearing works commencing. The Contractor is to confirm whether all permits and requirements are in place prior to commencing clearing.
Clearing and grubbing shall be carried out in accordance with the appropriate Local Authority Specification for Clearing and Grubbing and Earthworks. The extent of clearing and grubbing shall be as shown on the approved earthworks plan, VMP or Landscaping drawings (where applicable). Written confirmation from the Local Authority is required confirming any variation from these documents before commencement of any works. Clearing works shall not commence until all approved landscaping plans and vegetation management plans are available on site. If there are any discrepancies between these plans, any trees in question shall be retained until advised in writing by the Local Authority, via the Superintendent.
As a minimum the clearing shall consist of removal from the area designated in the drawings of all trees, standing or fallen, and other vegetation, boulders and rubbish and shall include the grubbing out of all stumps and tree roots to a depth of 600mm below the natural surface or 400mm below the finished cut surface, whichever is the lower, and disposing of all spoils resulting from the clearing and grubbing. Any holes left after grubbing shall be filled and compacted to the same density as that of the surrounding undisturbed soil.
As little as possible of the surface soil shall be removed during clearing operations.
The Contractor shall take precautions to minimise damage to growing trees and shrubs, fences and other improvements outside the designated areas, and any damage shall be made good. Trees that are shown as being retained on the approved drawings, Vegetation Management Plan or identified on site shall not be damaged in any way during construction. Any costs required for any remedial works to damaged trees will be the responsibility of the Contractor.
The spoils of all clearing and grubbing operations shall be removed from the Site. No spoils of clearing and grubbing shall be pushed beyond the limits of the site, or burnt.
The tender shall include the provision of temporary fencing as shown on tender drawings.

1.5 RUBBISH MATERIAL

Rubbish material such as concrete, bricks, any other building waste or material which is deemed unsuitable for use as fill shall be considered "Unsuitable Material" for the duration of the contract. Removal of any rubbish material which is visible from a site inspection at the time of tendering shall form part of the contract works. The Contractor shall allow for the removal and dumping of this material off site within their tender.
In cases where rubbish material is left by others after the close of tenders, or is discovered during excavations and could not reasonably have been expected at the time of tendering, the material shall be removed from site as directed by the Superintendent and shall form a variation to the Contract.

1.6 MULCHING / CHIPPING

All tree trunks, branches and stumps smaller than or equal to 400mm in diameter, including leafy material, shall be mulched (unless noted otherwise) and neatly stockpiled in a site to be determined by the Superintendent.
Mulched material shall be generally 75mm maximum length and 15mm maximum diameter and shall be that material passing a 100mm maximum screen.
Chipping of logs between 200mm and 400mm diameter is acceptable (subject to Superintendent approval) however the chipped and mulched material shall be stockpiled in separate heaps.
All mulch and chippings are the property of the Principal and processed mulch/chippings shall not be used for any other purpose, nor removed from the site without specific approval from the Superintendent.
The intent of these works and this specification is to maximise the volume of mulch/chippings for use on stabilising fill batters and the contractor shall undertake all works accordingly.
Due to the risk of self-combustion, stockpiles are to be placed in areas away from bushland and assets, preferably on cleared land. Where this cannot be achieved, sufficient firebreaks should be created such that stockpiles are accessible to water carts from all sides of the stockpile.
Where practical, stockpiles shall be positioned where they will be in passing view of workers to assist in monitoring.
The tops of stockpiles shall be struck flat and are to be thinned out to a height not exceeding 2m.
Water carts are not to be driven over stockpiles as they may cause burnt material to collapse under the weight of the machine.
In the event of a small fire or smoke arising from a stockpile, the heap shall be smothered with sand or water. Where the fire or smoke persists, the stockpile shall be thinned out and sand or water shall be reapplied until under control.
Where a stockpile is in close proximity to water access, a pipe with sprinkler shall be attached to the top of the heap.

1.7 STRIPPING OF TOPSOIL

The existing topsoil shall be stripped from all areas to be earthworked, prior to the commencement of the earthworks, and stockpiled on site.
Topsoil is defined as the layer of surface material containing humus, roots, plants and organic material exceeding one percent by weight.
The Contractor shall allow in his Tender the cost to remove and dispose of excess topsoil offsite.

1.8 CUTTING TO DESIGN LEVELS

Following the removal of topsoil and proof rolling (if specified by the Geotechnical Certifier), areas shown to be cut shall be cut to achieve the levels shown on the drawings.
Any areas which are over excavated shall be refilled to the design levels shown on the drawings. Any refilling shall be placed as specified in "Filling to Design Levels" section below.
Where no fill is to be applied, cut surfaces shall be finished by further proof rolling as directed by the Geotechnical Certifier.

1.9 FILLING TO DESIGN LEVELS

Fill material shall be placed as directed by the Geotechnical Certifier, which shall be varied to suit the material being placed, and the method of compaction.
The Contractor shall assess the fill quantities required within the earthworks area and allow to import any shortfall of fill. All associated costs shall be included in the tender.
Each layer of fill material shall be compacted in accordance with the Local Authority standards and specifications, and as directed by the Geotechnical Certifier. As a minimum, compaction shall achieve a minimum density ratio of 95% as obtained in test AS 1289.5.4.1 with maximum dry density determined in accordance with AS 1289.5.2.1 (modified compactive effort).
The Contractor is to have any material, which is proposed to be re-utilised in trenches or earthworked areas, tested to determine characteristics to allow suitable compaction to be achieved.
The Contractor is to ensure that all materials are placed in layers and at a moisture content as directed by the Geotechnical Certifier to achieve the desired compaction.

1.10 EXCESS SPOIL

Where after the completion of earthworks there is excess spoil it shall be placed on site as shown on the drawings. Where no direction is given on the drawings, all excess spoil shall be removed from the site at the Contractor's expense.

1.11 TESTING BY AN INDEPENDENT GEOTECHNICAL CERTIFIER

Earthworks shall be progressively tested in accordance with the Local Authority standards and specifications to an independent Level One Geotechnical Certification (unless specified otherwise) as defined in Appendix B of AS3798-1996, to demonstrate that the specified relative compaction has been achieved.
Field density testing shall be completed and certified by an independent NATA registered laboratory. The laboratory shall calibrate field density testing apparatus against laboratory tests. Field density tests may consist of sand replacement to AS 1289.5.3.1 or nuclear density tests to AS 1289.5.8.4 to 5.8.6.
The Contractor shall allow for the independent Geotechnical Certifier to provide a testing and inspection supervision service on all earthworks suitable to the level of geotechnical certification required. The Geotechnical Certifier shall establish the type, number and frequency of the testing regime appropriate for the works involved.
General fill shall be tested by means of sand replacement or nuclear density tests.
The frequency of testing shall be as listed in the clause "Quality Assurance - Earthworks" of this specification.
All costs for this testing shall be incorporated in the tender.
Additional tests may be directed by the Superintendent and the Contractor shall arrange for the performance of such tests. Where the results of such tests indicate that the specified densities have been achieved, the cost of the tests will be paid by the Principal through a Provisional Sum for testing.
The results of all tests shall be recorded on the appropriate forms as included in this specification.

2 PAVEMENT

2.1 GENERAL

All Pavement shall be constructed in accordance with the tender drawings and the relevant Local Authority Specification and standard drawings, and will be subject to inspections and approval of the Superintendent. Any discrepancy between the Local Authority standards and those shown on the tender drawings shall be referred to the Superintendent prior to construction.
The Contractor shall provide a minimum of 48 hours notice, to the Superintendent so an audit inspection of each stage of construction can be arranged. The Contractor shall also attend. Each stage shall be inspected prior to commencing the next or following stage. The Contractor shall rectify any areas considered unacceptable due to poor workmanship or materials and this shall be reinspected prior to continuing with the next stage of work.
Joint audit inspections with the Contractor and the Superintendent shall be actioned on the following basis:

- When the road has been boxed out and the sub-grade shaped and compacted;
- When overexcavation of the subgrade has been deemed required and the new subgrade level prepared;
- When the sub-base (or lower sub-base) has been placed, graded, water bound and compacted to shape and level;
- Establishment of line and level for kerb placement;
- When the base-course has been placed, graded, water bound and compacted to shape and level before priming;
- Before the placement of primer seal, asphalt or sprayed surface wearing course; and
- Prior to the commencement of laying a footpath or dual use path.

2.2 QUALITY ASSURANCE- PAVEMENT

Prior to commencing on the next stage of road works, the Contractor shall produce and submit to the Superintendent certified records to confirm that the Local Authority specifications and requirements have been achieved for each layer of the works. Where the Local Authority specifications are silent, the following minimum testing regime shall be applied:

	Item as Specified	Test/Record	Frequency
1.	**Subgrade**		
	- Removal of unsuitable material	Marked-up plan	Each occurrence
	- Finished level, alignment, width	Marked-up road plan	20m intervals
	- Compaction	Compaction Certificate	1 test per 400m^2 of road
2.	**Sub-base**		
	- Finished level, depth of layer, alignment, width	Marked-up road plan	20m intervals
	- Compaction	Compaction Certificate	1 test per 400m^2 of road
	- Material Specification	Supplier's Certificate	1 test per project
3.	**Basecourse**		
	- Finished level, depth of layer, alignment, width	Marked-up road plan	20m intervals
	- Compaction	Compaction Certificate	1 test per 400m^2 of road
	- Material Specification	Supplier's Certificate	1 test per project

All compaction tests shall be adequately distributed so as to give a good representation of the whole area. The Geotechnical Certifier shall amend the type, number and frequency of the testing regime appropriate for the works and materials involved to meet the Local Authority requirements.
The Contractor shall note on the record where any item fails to meet the specified requirement and the planned remedial action to be taken.

2.3 TOLERANCES

The Local Authority Standards are to be used to establish the allowable tolerances in relation to Pavement. Where the Local Authority standards are silent, the following construction tolerances shall be achieved by the Contractor:

1.	Road centreline alignment	+ or - 100mm of centreline of road reserve
2.	Finished subgrade level	+ 5mm or - 30mm
3.	Sub-base width	+ 300mm and - 0mm
4.	Finished sub-base level	+ 10mm or - 20mm
5.	Basecourse width	+ 300mm and - 0mm
6.	Basecourse thickness	- 0mm
7.	Finished basecourse level	+ 10mm or - 10mm
8.	Basecourse surface shape: (a) Crossfall (b) Surface (c) Longitudinal grades	 + or - 0.5% of design + or - 15mm when tested with a 3m straight edge, laid in any direction. The gutter grade shall be + or - 20% of the design grade.
9.	Width of prime for AC	+ 150mm or - 0mm
10.	Width of primer seal	+ 150mm or - 0mm
11.	Thickness of AC	+ 5mm or - 0mm
12.	Finished AC or brickpaving level	+ 10mm or - 10mm
13.	Kerbing: - Surface - Level - Line	 + or - 5mm when tested with a 3m straight edge + or - 5mm + or - 10mm

2.4 QUALITY ASSURANCE AUDITING

No work shall be commenced on the next stage until the existing work has been tested and approved by the Superintendent. It is the Contractor's responsibility to advise the Superintendent when each stage of the work is ready for testing. The Contractor shall give the Superintendent four (4) days notice of when the work will be ready for compaction tests so that the Local Authority may be co-ordinated where required.
All tests shall be arranged for by the Contractor at locations directed by the independent testing authority registered with the National Association of Testing Authorities Australia for the tests required. The results of all tests shall be issued to the Superintendent by the Testing Authority. All tests shall be paid by the Contractor directly to the Testing Authority concerned.
In order to audit the Contractor's testing programme, routine testing of materials and workmanship over and above the Quality Assurance schedule above may be called for from time to time by the Superintendent at each stage of the Pavement.
Where the results of such tests indicate that the specified Quality Assurance requirements have been achieved, the cost of the tests will be paid by the Principal through a Provisional Sum for testing.
Where tests indicate that the work or material is not in accordance with the Contract, the cost shall be borne by the Contractor.

2.5 PLANT & MATERIALS

All plant and materials used in the works shall conform to the relevant Local Authority's standard where such standard exists. Where the Authority standard refers to another industry standard or specification, these shall also form part of the Standard Specifications. Where such standard does not exist, the current Australian Standard shall apply. Any discrepancy or lack of information is to be brought to the attention of the Superintendent immediately, and works shall not proceed until clear direction has been given.
The Contractor shall supply to the Superintendent all Material Supply Certificates demonstrating compliance with these standards prior to materials being delivered to site.

2.6 SURVEY INFORMATION

Prior to the Contractor starting on site, all road centre lines will be staked at 20 metre intervals and at all tangent and intersection points.

2.7 PAVEMENT PREPARATION

2.7.1 Clearing

The road alignment shall be cleared for the width of the road reserve and shall extend 10m beyond the start and end of the road to be constructed (except at cul-de-sacs) and 20m along each cross street measured from the centreline of the road being cleared.
Clearing shall be carried out in accordance with the "Clearing" clause in the Earthworks section.

2.8 SUB-GRADE

2.8.1 General

The entire width of the road reserve shall be cut or filled as necessary to conform with the levels given on the drawings.
After excavation or filling, compacting, trimming and boxing out, the finished surface of the road sub-grade shall conform to the lines, grades, shape and dimensions shown on the drawings.
Any surplus material shall be disposed of as directed by the Superintendent. Additional filling, where a deficiency occurs, shall be carted to or sourced from the site.
The subgrade shall consist of a uniform type material. Where the in-situ material varies then the Superintendent shall direct any over excavation and replacement with approved material, either from site or off site to achieve a stable subgrade. The Contractor shall remain responsible to reasonably assess the site conditions and shall allow for the costs of any additional work in his tender.
For schedule of rates contracts, excavation of nominal pavement has been allowed for within bulk earthworks quantities.

2.8.2 Compaction

Sub-grade shall be compacted to not less than 100% of the standard dry density obtained in modified maximum dry density compaction tests (AS 1289.5.2.1-2003) to a minimum depth below the surface of 300mm. Sub-grade to be formed to grade, crossfall etc. to ensure that an even thickness of pavement can be finally achieved.
Sub-grade replacement material shall conform to Main Roads Class 2.5, or be of a minimum CBR 15, unless otherwise approved by the relevant Local Authority. Compaction is to conform to Local Authority standards, but where these are silent, the subgrade shall be compacted at its optimum moisture content to a density of not less than 100% of the standard dry density in accordance with modified maximum dry density tests (AS 1289.5.2.1-2003).

2.8.3 Testing

After the subgrade has been prepared and compacted, no work is to be commenced on the sub base until the Superintendent and the Local Authority are satisfied that the specified shape and compaction has been achieved.

2.9 SUB-BASE

2.9.1 General

Sub Base gravels are to be laid in one thickness, care being taken to ensure that the sub-grade is not disturbed.
Sub base gravels shall conform to Main Roads Class 2.3, or be of a minimum CBR 45, unless otherwise approved by the relevant Authority.

2.9.2 Compaction

Compaction is to conform to relevant Local Authority standards but where these are silent, the sub base shall be compacted at its optimum moisture content to a density of not less than 95% of the maximum modified dry density in accordance with modified maximum dry density tests (AS 1289.5.2.1-2003).
The sub-base shall be cut to grade, cross-fall, etc. free from local hollows and high spots.

2.9.3 Testing

After the sub-base has been prepared and compacted, no work is to be commenced on the base until the Superintendent and the Local Authority are satisfied that the specified shape, compaction and course thickness has been achieved.

2.10 BASE COURSE

2.10.1 General

The base material shall be placed so that the sub-grade or the sub-base (when a sub-base has been specified), is not disturbed and broken up and that an even thickness is obtained.
Base Course gravels shall conform to Main Roads Class 2.1, or be of a minimum CBR 80, unless otherwise approved by the relevant Authority.

2.10.2 Compaction

The base shall be watered, compacted and cut to grade and crossfall as noted on the drawings.
Compaction is to conform to Authority Standards but where these are silent, the base course shall be compacted at its optimum moisture content to a density of not less than 98% of the maximum modified dry density in accordance with modified maximum dry density tests (AS 1289.5.2.1-2003).
The surface of the base course after trimming and compaction shall be even and true to the required shape, grade and surface condition ready for priming. If subsequent testing reveals an uneven surface or a lesser depth of material than specified above, the top of the base course shall be scarified, further material added as required, shaped and compacted to the requirements of the specification.
After preliminary consolidation, the placed base course material shall be lightly scarified and further material added as necessary to give the required compacted depth. The loose layer shall be thoroughly blade-mixed to its full depth by means of an approved grader.

2.10.3 Surface Shape

During final shaping and compacting, the shape shall be checked frequently and corrected as necessary by grading under the direction of an experienced foreman. The cross-fall, super-elevation and smoothness of grade shall be checked with a straight edge and built-in level. The finished level shall allow for the thickness of the seal coats.
The Contractor shall provide a 3m straight edge, spirit level and string line as required for checking purposes and shall make these, together with the necessary labour, available to the Superintendent when required.
The longitudinal profile at the kerblines of the completed road shall conform to the design levels within the tolerance given in the sub-clause "Tolerances".
Where the shape of the compacted road or the thickness of the base courses do not comply with the requirements of this specification, the Contractor shall correct the same, at his cost, by scarifying, adding or removing materials as required, re-compacting and trimming as necessary to comply with the requirements of this specification.

2.10.4 Testing

After the base has been prepared and compacted, no priming shall be commenced until the Superintendent and the Local Authority are satisfied that the specified shape, compaction and course thickness of the base has been achieved.

2.11 PAVEMENT CONCRETE SLAB

The concrete pavement shall be as designated on the tender drawings constructed in accordance with the relevant Local Authority's specification and requirements.

2.12 PAVEMENT JOINTING

Pavement jointing shall be in accordance with the tender drawings.

2.13 PAVEMENT CROSSINGS – SERVICES

2.13.1 General

The Contractor shall supply and install ducts for service crossings (eg electrical, communications, signalisation, landscaping etc) at the locations, depths, sizes and length as shown on the relevant drawings in accordance with the relevant Authority specifications and standards.
The length of the ducts are to extend to the relevant Authority's reticulation corridor. The tender shall include all testing, plugs, draw wires, markers etc as deemed required by the Authority.

2.13.2 Backfill to Ducts

Backfilling over all ducts shall be in accordance with the relevant Authority standards, or where silent, be made up of sand compacted in maximum 300mm thick layers to not less than 95% of the maximum dry density obtained in modified maximum dry density compaction tests (AS 1289.5.2.1-2003).

2.13.3 Supervision of Installation of Underground Electrical Power Ducts

The Contractor shall notify the Superintendent or Electrical Consultant at the time of installation and again after kerb and conduit markers have been placed so that inspections can be undertaken with the relevant Authority as required.
The Civil Contractor can:

g) Employ the holder of an electrical work licence to supervise conduit installation, or
h) Have a qualified Electrical Sub Contractor install conduits in trenches, which the Civil Contractor excavates and back-fills.

The Contractor remains fully responsible for the installation of all electrical ducts and any rectification costs will be borne by the Contractor.

2.14 JOINING TO EXISTING WORK

Notwithstanding any levels or grades shown on the plans, the Superintendent reserves the right to vary these to make a smooth and neat junction with existing works. Prior to the commencement of works, the Contractor shall check the proposed design to confirm that its grade, height and alignment ties in smoothly with existing works.
Where joining to existing pavements, the existing construction shall be trimmed back neatly to expose the full depth of sound existing pavement and any existing asphaltic concrete surfacing shall be cut square and new AC joined neatly to it.

2.15 EXTRUDED CONCRETE KERBING

2.15.1 General

Kerbs to pavements shall be constructed of extruded concrete kerbing. Kerbing to smaller radii than can be placed with the extrusion machine used shall be cast in-situ to the same cross section as that of the extruded kerbing, except that the cast in-situ kerb shall be 100mm deeper than the extruded kerbing and shall be embedded firmly in the pavement surface to the extra depth. The outward appearance of the extruded and cast in-situ kerbing shall be identical.

2.15.2 Kerb Construction

All kerbing shall be constructed in accordance with the relevant Authority.
The final shape and dimensions of the extruded kerb shall be as detailed on the drawings. The top surface of the kerb shall always be parallel to the ruling grade of the pavement, with gentle transitions at changes in grade.
The kerb shall be placed in straight lines and in circular curves as shown on the drawings. The width of the pavement shall be the distance between the nominal face of kerb along straight sections of the pavement measured at right angles to the kerbs as detailed on the drawings. The kerbs shall be equidistant from the pavement centre line unless otherwise noted. At pavement junctions and intersections the radius of kerbing shall be measured from the designated set out point as shown on the drawings.
The kerb shall be placed using an appropriate extrusion machine, approved by the Superintendent and the Local Authority and the work shall be carried out by an experienced and competent crew. The first 150mm of any new pour shall be cut away and removed. The gap between the old and new work shall be filled by hand placing and shaping of the concrete until a satisfactory shape and finish has been obtained. Extruded kerb shall be joined to existing kerbing by using the same method.

2.15.3 Contraction and Expansion Joints

Construction and Expansion joints shall be constructed within the kerbing in accordance with the relevant Local Authority specifications. Where the relevant Authority standard is silent then the following shall apply:

- Contraction joints are to be placed at 2m intervals and at tangent points of sweeps.
- Expansion joints are to be placed at every third contraction joint and at sides of drainage gullies. The expansion joint shall be formed by the sawing of a 10mm gap that completely severs the adjoining sections of the kerb for the full depth. The gap shall be filled with approved joint filler after the Superintendent and the Local Authority have inspected and approved the cut joints.

2.15.4 Protection

Kerbs shall be protected from bitumen overspray at all times by adequately covering the kerbs with polythene sheeting or similar approved material. Any kerbing marked by bitumen spray shall be made good by the Contractor at his own expense.

2.15.5 Backfilling

The backfilling to kerbing shall be placed as shown on the drawings after the curing and acceptance of the kerbing. The backfill material is to be a similar material to the locally occurring topsoil, free from debris and compacted adequately to accommodate the driving of rubber tyred domestic vehicles.

2.15.6 Subsoil Drainage

The Contractor shall construct and install subsoil drainage in conjunction with all kerbs in accordance with the relevant Authority or IPWEAQ standards. All subsoil drainage is to grade at a minimum of 1:200 (or as per relevant standard) to the closest stormwater inlet pit and connect at approximately 200mm above the invert level of the pit's outlet pipe (where possible). Subsoil access (flush) points are to be installed in accordance with the relevant standard or where silent, as a minimum of 60m spacings, at high points of pavements and at high points of cul-de-sacs.

2.15.7 Cleaning Up

The Contractor shall remove any excess mortar or concrete spillages from the pavement surface prior to completing the pavement construction.
During completion of the pavement, the Contractor shall take every care to avoid damage and bitumen spillage onto the kerbs. Where damage or spillage has occurred, the Contractor shall make good this damage and remove bitumen spillages at his own expense.

REV	DESCRIPTION	DRAWN	APP'D	DATE
A	ISSUED FOR DA APPROVAL	CPO	IAH	06.02.18

DRAWN:
DESIGNED:
VERIFIED:
APPROVED FOR TENDER:
APPROVED FOR CONSTRUCTION:
ARCHITECT/CLIENT

KINCUMBER AGED CARE
CIVIL SPECIFICATION NOTES - SHEET 1
PROJECT | TITLE

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WOOD & GRIEVE ENGINEERS

FOR APPROVAL
NOT FOR CONSTRUCTION

AS SHOWN	253824	KI-CD-007-01	A
SCALE @ A1	PROJECT No	DRAWING No	REV

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1 FOOTPATHS

1.1 GENERAL

All footpath works shall be constructed in accordance with the drawings and the relevant Local Authority specification and will be subject to inspection and the approval of the relevant Local Authority and the Superintendent.
In relation to the footpaths portion of the specification, the term Local Authority will be taken to mean the Local Shire Council or the Local Main Roads Department where applicable to the works being undertaken. The term footpath in this specification will be deemed to cover all pathways, cycleways or the like designated on the tender drawings.
Any instructions from the Local Authority pertaining to the works shall be issued by that Authority to the Superintendent.
The extent of footpaths to be constructed is as shown on the drawings.
Footpaths may not be constructed until after all utility services, drainage, sewerage, major verge clearing and kerbing have been completed.

1.2 CLEARING

The footpath alignment shall be cleared for the full width of the footway reserve or as noted on the drawings.
Clearing shall be carried out in accordance with the "Clearing" clause in the Earthworks section.

1.3 SUB-GRADE

The entire width of the proposed footpath shall be cut or filled as necessary.
After excavation or filling, compacting, trimming and boxing out, the finished surface of the footpath sub-grade shall conform to the shape and dimensions shown in the drawings.
Sub-grade is to be compacted to not less than 95% of the maximum dry density obtained in modified maximum dry density compaction tests (AS 1289.5.2.1-2003) to a minimum depth below the surface of 300mm.
All filling shall be placed in generally horizontal layers not exceeding 250mm and compacted prior to the placing of further material.
Where required by the Local Authority a sand bed of clean sand, free from roots, clay or any deleterious matter shall be placed and compacted to the designed footpath width. The bedding shall be compacted in accordance with the relevant Local Authority standard or to not less than 90% of the maximum dry density obtained in the modified maximum dry density compaction tests (AS 1289.5.2.1-2003).

1.4 CAST IN-SITU CONCRETE PATHS

1.4.1 Dimensions

The footpath shall be constructed with a cross-fall as allocated by the relevant Local Authority towards the kerb unless otherwise noted on the drawings. The finished thickness of the slab to be a minimum of 100mm or as specified by the Local Authority. The width of the path shall be as shown on the drawings.

1.4.2 Construction

Where the path is constructed in the road reserve, the longitudinal profile of the path shall be the same as the longitudinal profile of the adjacent kerbing. Elsewhere, the path longitudinal profile will be such as to achieve a uniform smooth grading and alignment, and generally conform to the surrounding finished ground or as shown on the drawings.
No concrete shall be poured until the sand bedding and or subgrade has been approved by the Superintendent.

1.4.3 Concrete

The concrete used in this construction shall conform to AS 3600 and be provided by an approved pre-mixed concrete supplier, conforming with AS 1379. Each batch provided shall be supported with evidence of strength slump, aggregate size, etc.
The concrete strength aggregate size and slump should be as specified by the Local Authority.
The concrete, when placed, must be well tamped to remove all voids and to work fines to the surface for trowelling.

1.4.4 Contraction and Expansion Joints

Contraction and expansion joints in footpaths shall be constructed in accordance with the Local Authority specifications, or when silent, the following shall apply:

- Contraction joints are to be placed at 2m intervals.
- Expansion joints are to be placed at every third contraction joint and to the surround of all utility manholes or covers and against the back of kerb (where applicable).

All joints shall be aligned with joints in the kerbing where the path is against the back of kerb.

1.4.5 Finish

A brushed finish shall be provided to the surface of the slab with joints and edges polished in accordance with the Local Authority specifications.
The alignment of the edge of the path is to be straight and true to line. Deviations from alignment or from specified width will not be accepted. The path shall be parallel with the kerbing in vertical and horizontal alignment.

1.4.6 Protection

Barricade, warning signs and lights shall be erected to prevent damage of the footpath from vehicles and pedestrians for not less than 24 hours after completion or if rainfall during the curing period is apparent.
The Contractor is responsible for protection of the path against damage of any kind during the period of setting and curing of the concrete.

1.4.7 Clean Up and Backfilling

All cement droppings, slurry, etc. and surplus materials to be removed from site.
All formwork, pegs, stakes, etc. shall be removed after the curing of the path has been completed.
After removal of the formwork, and acceptance of the path by the Superintendent and the Local Authority, the path shall be backfilled with topsoil. Backfilling shall be compacted to not less than 90% of the maximum dry density obtained in modified maximum dry density compaction tests (AS 1289.5.2.1-2003) and shaped level with the top of path.

2 STORMWATER DRAINAGE

2.1 GENERAL

All stormwater works shall be constructed in accordance with the tender drawings and the relevant Local Authority Specification and standard drawings, and will be subject to inspections and approval of the relevant Local Authority and the Superintendent. Any discrepancy between the Local Authority standards and those shown on the tender drawings shall be referred to the Superintendent prior to construction.
In relation to the stormwater portion of the specification, the term Local Authority will be taken to mean the Local Shire Council or the Local Main Roads Department where applicable to the works being undertaken.
Where works are not municipal works, all works shall be constructed in accordance with the tender drawings and AS 3500.3.
Any instructions from the Authority pertaining to the works shall be issued by that Authority to the Superintendent.
The Contractor shall provide a minimum of 48 hours notice, to the Superintendent so a joint audit inspection of each stage of construction can be arranged with the Local Authority. The Contractor shall also attend. Each stage shall be inspected prior to commencing the next or following stage. The Contractor shall rectify any areas considered unacceptable due to poor workmanship or materials and this shall be reinspected prior to continuing with the next stage of work.
Joint audit inspections with the Contractor, the Superintendent and a Local Authority Representative shall be actioned on the following basis:

- When the stormwater pipes and other structures have been laid to final line and level and prior to backfilling of the trenches; and
- After junction pits, gullies and other structures have been constructed and the backfilling of trenches completed.

Quality Assurance – Drainage
Prior to commencing on the next stage of the works, the Contractor shall produce and submit to the Superintendent certified records to confirm that the Local Authority specifications and requirements have been achieved. Where the Local Authority specifications are silent, the following minimum testing regime shall be applied:

Item as Specified	Test/Record	Frequency
Materials Specification	Supplier's Certificate	1 per delivery
Drain set-out	Contractor's Survey record	1 per drain line
Drain Construction	Survey as-constructed details (as per standard form - see Appendix 2)	
Invert levels		
Access chamber locations		
Access chamber cover levels		
Bedding details		
Gully locations		
Gully type/level		
Pipe size/type	1 per drain line	
Drain Testing	CCTV Testing	1 per drain line
Backfill	Contractor's Certificate	1 per drain line
Compaction	Compaction Certificate (as per standard form – See Appendix 2)	
	3 tests per drain line per layer (incl trench base) and adjacent to chambers.	

The contractor shall note on the record where any item fails to meet the specified requirements, including the planned remedial action to be taken.

2.2 TOLERANCES

The Local Authority standards are to be used to establish the allowable tolerance in relation to Stormwater Drainage works. Where the Local Authority standards are silent, the following construction tolerances shall be achieved by the Contractor:

Grades steeper than 1:500	+ 10% of design grade and + 20mm of design invert level
Grades flatter than 1:500	up to 10% steeper, but not less than 5% flatter than design grade and + 10mm of design invert levels

The horizontal deviation of any piped or box culverted drain shall not exceed 25mm from the true alignment. There shall be no obvious sharp changes of direction.

2.3 MATERIALS

2.3.1 Australian Standards

All workmanship and materials used in the works shall conform to the current Local Authority standards where such standard exists. Where such standard does not exist, the current Australian Standard shall apply.

2.4 SETTING OUT

2.4.1 General

The drawings show centre lines, grades, lengths, diameters, invert levels at entry and exit of drains and the location of access chambers.
The distances shown between access chambers are mostly scaled measurements and are for the Contractor's guidance only. In all instances access chambers are to be constructed in the locations shown. Centre lines and invert levels are to be strictly adhered to and no alterations shall be made except on the written authority of the Superintendent.

2.4.2 Setting out of Drainage Lines and Structures

All set out shall be undertaken by an Engineering Surveyor, arranged for by the Contractor at his expense.
The centre of each access chamber shall be pegged and at least two reference stakes placed offset from the access chamber centreline.
The Contractor's Engineering Surveyor shall provide the Contractor's Foreman with a copy of his survey record for each drain. The record shall indicate all reference pegs, offset pegs, RLs of dumpy pegs, access chamber to access chamber distance, and the distance to house connections (where applicable). Records shall be retained by the Foreman on Site and shall be available for inspection by the Superintendent.

2.5 EXCAVATION

2.5.1 General

Tenderers must form their own opinion, and take what tests on site they consider necessary to ascertain what the nature of the ground is, sub-surface strata and ground water levels.
Clearing, topsoil and stabilisation shall be carried out in accordance with the Earthworks section of this specification.

2.5.2 Rock Excavation

The Contractor is to allow in his tender for all excavation works including the removal of all rock.
Rock for the purpose of variations is as defined in the Preliminaries section of this specification.
Blasting shall be undertaken as specified below.

2.5.3 Dewatering

The Contractor shall allow within his Tender the cost of all dewatering and any additional construction costs due to wet ground conditions.
In the event of water being encountered, the Contractor shall make adequate provision to ensure that the excavation is kept free from water during the process of concrete pouring and for a period of at least 24 hours after the concrete pour. No bedding or pipes shall be laid in water and trenches are to be kept free from water until refill is commenced.

2.5.4 Trench Excavation

Trenches are to be cut to line and gradient. The line of cut for each side of the trench shall be marked out on the surface before excavation commences.
The trench widths shall be kept to a minimum consistent with the bed width requirements and the requirements of adequate working space and timbering.
Tunnelling shall be only carried out where directed by the Superintendent, and the Contractor shall submit details of tunnelling method prior to commencement for the approval of the Superintendent.
Should the bed of the trench be over excavated, then the over-excavated volume shall be replaced in accordance with the Earthworks section of this specification.
All trench excavation shall be made in a safe manner with all trenches either being shored or battered back to achieve this. The Contractor shall comply with the Construction Safety section of this specification.
Trenches shall be kept free from water, debris and falling earth.
The final trimming of the bottom 150mm of trench excavation should not be carried out until immediately prior to concreting or placement of pipe bedding. Excavation must be completed for a minimum of 10 metres length ahead of pipe laying.

2.5.5 Drainage Structure Excavation

Excavation for all drainage structures must be made to the correct depth and of sufficient dimension to allow the base and walls to be constructed as needed.

The Contractor shall be responsible for safety at all times.

2.5.6 Blasting

Blasting shall be only carried out with the approval of the Superintendent and prior to any blasting, the Superintendent and the Contractor shall inspect all necessary safety precautions. Handling, safety precautions and storage of explosives shall be in accordance with the requirements of the Mines Regulation Act 1946, the Explosives and Dangerous Goods Act 1961, AS 2187 Part 1 1984 and AS 2187 Part 2, Rules for the Storage and Handling of Explosives, AS 2188, Magazines for Handling of Explosives and such other precautions as the Superintendent may require.
Blasting shall only be carried out by a person holding a current permit.

2.5.7 Excavation in Existing Roadways, Footpaths etc.

Excavation is to be kept to a minimum in existing roadways, footpaths and other paved areas, ensuring that damage to such structures is kept to a minimum. The Local Authority shall be notified and that Authority's approval received prior to commencing work in roadways and footpaths.

2.5.8 Measurement of Excavation

Measurement of excavation for the purpose of costing variations shall be in accordance with the minimum trench dimensions shown on the drawings, and measurement shall comply with AS 1181 "Method of Measurement of Civil Engineering Works."

2.5.9 Obstruction to Traffic

Excavation material shall be deposited in an area causing the least interference to vehicular and pedestrian traffic.
At all times when the works are left unattended, all excavation in public areas shall be fenced off with warning signs and lighting and the Contractor shall ensure that they remain in a safe condition.
These safety precautions shall be subject to the approval of the Superintendent.

2.6 DRAIN CONSTRUCTION

2.6.1 Pipe Setting

All pipes shall be set in a straight line between access chambers or between access chambers and headwalls. On inspection by the Superintendent, any pipe not placed in a straight line shall be replaced at the cost of the Contractor.
Pipes shall be set in an upstream direction unless otherwise approved by the Superintendent.
All pipes are to be jointed in accordance with the relevant Australian Standards and manufacturer's specification.

2.6.2 RC Concrete Pipe Jointing

Spigot and socket pipes shall be jointed with the spigot fully home in the socket and rubber ring joint. Pipes shall be laid such that the sockets face upstream.

2.6.3 PVC Pipe Jointing

PVC pipes shall be jointed with the spigot fully home in the socket and the joint solvent cemented. The solvent cement used shall be the product recommended by the pipe manufacturer. The solvent cement shall be applied using a clean brush to both surfaces of the joint after these surfaces have been cleaned.

2.6.4 Pipe Bedding

All pipes shall be bedded in accordance with the relevant Local Authority specifications. Pipes constructed in dry sand conditions shall be bedded on a shaped trench base. Pipes constructed in wet ground conditions shall be bedded in accordance with the Local Authority standards, or where silent, on a minimum 100mm crushed rock bedding.

2.7 DRAINAGE STRUCTURES

All drainage structures shall be constructed in accordance with the relevant Local Authority standards.

2.8 STEP IRONS

Step irons shall be placed in all drainage structures in accordance with the relevant Local Authority specifications.

2.9 ROCK PITCHING

Rocks shall generally weigh in excess of 10 Kg each and the greatest dimension of any rock shall not exceed 1.5 times its least dimension.
Rock shall be hard, sound and durable, shall be set on a sand bed in a close fitting pattern and watered and rammed into position. Where no mortar is specified, all rock pitching should be placed on geofabric for the full extent.
Where specified as mortared rock pitching, the joints between stones shall be raked clean for their full depth and filled with a 3 parts sand to 1 part Portland Cement mortar. All rocks are to be securely positioned with adequate mortar to ensure that will not loosen or break away. Thickness of mortar between rocks to be a minimum as listed below:

- Half the depth of the proposed rocks for rocks between 150mm and 300mm in diameter;
- One third the depth of the proposed rocks for rocks larger than 300mm up to 600mm in diameter;
- Absolute minimum of 75mm for smaller rocks.

Mortared rock pitching is to be placed around all headwalls (to front and sides) regardless of whether they are upstream or downstream structures. Where no extent is shown, rock pitching in front of outlet headwall structures is to extend a minimum distance as determined by the applicable Main Roads specifications. Where no key is shown on headwall structures, mortared rock pitching is to be placed below the headwall for a minimum of 400mm length.

2.10 BACKFILLING

2.10.1 General

Backfilling of pipe trenches shall not be carried out until mains have been measured by the Superintendent.
The fact of any such work being backfilled does not relieve the Contractor in any way of his responsibilities and he may be called upon to uncover and repair such work, at his own cost, any pipeline declared by the Superintendent as unsatisfactory at any time until the end of the defects period. Any such repair work shall be subject to retesting at the Contractor's cost.
Backfilling of all pipes shall be in accordance with Local Authority standards. Where these standards are silent, then the following sections shall apply.

2.10.2 Plain Pipes

Structural fill shall be used for backfilling to a height of 300mm above the top of pipes and shall be compacted by means of an approved mechanical or a pneumatic tamper to not less than a density ratio of 90% as obtained in AS 1289.5.4.1 (modified compactive effort).
Care shall be taken so as not to disturb the pipe. Backfilling of the remainder of the trench shall be in accordance with the Earthworks section of this specification.

2.10.3 Perforated Pipes

Selected 10mm filter aggregate shall be used for bedding and backfilling to the pipe and shall be not less than 150mm thickness below and above the pipe and for the full width of the trench which shall be not less than 150mm either side of the pipe. The remainder of the trench shall be backfilled in accordance with the Earthworks section of this specification.

2.10.4 Restoration of Existing Streets and Laneways

After refilling, trenches in existing road reserves or laneways are to be maintained in a safe condition for traffic and pedestrians.
The final surface treatment shall be to the standard of the Local Authority and the Contractor shall obtain a letter from the Local Authority, indicating its approval of the final surface treatment, and submit a copy of this letter to the Superintendent.

2.11 TESTING OF TRENCH BACKFILL DENSITY

The trench backfill density shall be tested in accordance with the Earthworks and Quality Assurance – Drainage sections of this specification.
Trench compaction tests are to be taken on each layer of backfill as specified in the relevant Local Authority guidelines, and all certification forwarded to the Superintendent. Compaction is to conform to the relevant Authority Standards but where these are silent, shall be compacted at its optimum moisture content to a density of not less than 95% of the maximum modified dry density in accordance with modified maximum dry density tests (AS 1289.5.2.1-2003).

2.12 TESTING REGIME

All testing of drainage works is to be undertaken in accordance with the Local Authority specifications including any required CCTV testing.
The Contractor shall supply all equipment, labour and materials necessary for testing of the drainage in accordance with the Local Authority specifications.

2.13.3 Acceptance

Acceptance of the works will follow the satisfactory completion of the works, authority inspection and acceptance of As-Constructed documentation.

2.14 CLEANING UP

Any damage done by the Contractor or his employees to buildings, fences, services, driveways etc. shall be immediately made good to the approval of the Superintendent.
During the period of the Contract, the Contractor shall clean up the construction site and remove all surplus construction material and debris from the site. At the completion of the Contract the Site shall be clean and tidy, all excavations filled flush with the natural ground level, and all excess material removed.
The Contractor shall immediately reinstate any subsidence over trenches occurring at any time during the defects liability period.

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APPROVED FOR TENDER:	
APPROVED FOR CONSTRUCTION:	

ARCHITECT/CLIENT

KINCUMBER AGED CARE

PROJECT

CIVIL SPECIFICATION NOTES - SHEET 2

TITLE

253824-KI-CD-007-02.dwg

WOOD & GRIEVE ENGINEERS

FOR APPROVAL
NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
AS SHOWN	253824	KI-CD-007-02	A

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AVOCA DRIVE

RL 42.55

PROPOSED RETAINING WALL

450x450 GRATED PIT
SL: 42.550
IL: 42.100

450x450 GRATED PIT
SL: 43.000
IL: 42.650

450x450 GRATED PIT
SL: 43.500
IL: 43.050

Ø225

RW

DP

RL 41.02

PROPOSED RETAINING WALL

RAINWATER TANK OVERFLOW

IO

450x450 JUNCTION PIT
SL: 38.500
IL: 37.900

4 x 2.4m DIA. 2.3m DEEP
UNDERGROUND
RAINWATER TANKS

450x450 JUNCTION PIT
SL: 41.000
IL: 40.640

450x450 JUNCTION PIT
SL: 41.500
IL: 41.050

Ø375

RL 40.32

RL 39.50

900x900 GRATED PIT
SL: 36.500
IL: 35.600

5 x 2.4m DIA. 2.4m HIGH
RAINWATER TANKS IN
UNDERCROFT

RL 39.00

RL 42.22

RL 42.20

RL 42.19

RL 42.59

RL 41.88

6 x 2.4m DIA. 2.3m DEEP
UNDERGROUND
RAINWATER TANKS

RAINWATER TANK OVERFLOW

KERB INLET PIT
1.2m LINTEL
SL: 41.500
IL: 40.225

PROPOSED RETAINING WALL

1:49

RL 44.80

RL 44.95

RL 44.55

RL 44.30

RL 43.97

RL 43.74

RL 43.32

RL 42.98

JOINS CD-520-02

REV	DESCRIPTION	DRAWN	APP'D	DATE
C	ISSUED FOR DA APPROVAL	CPO	IAH	28.03.19
B	FOR INFORMATION	IAH	IAH	27.02.18
A	ISSUED FOR DA APPROVAL	CPO	IAH	06.02.18

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ARCHITECT/CLIENT

KINCUMBER AGED CARE

PROJECT

GENERAL ARRANGEMENT PLAN - SHEET 1

TITLE

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WOOD & GRIEVE ENGINEERS

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NOT FOR CONSTRUCTION

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SCALE @ A1	PROJECT No	DRAWING No	REV

JOINS CD-520-01

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SL: 36.500
IL: 35.405

KERB INLET PIT
1.2m LINTEL
SL: 39.60
IL: 38.325

900x900 GRATED PIT
SL: 38.60
IL: 37.325

KERB INLET PIT
1.2m LINTEL
SL: 38.700
IL: 37.223

170m² BIO-RETENTION BASIN.

Ø150 WIDE GRATED DRAIN

KERB INLET PIT
1.2m LINTEL
SL: 38.580
IL: 37.305

SCAYSBROOK DRIVE

PAVED DRIVEWAY

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ARCHITECT/CLIENT

KINCUMBER AGED CARE

PROJECT

GENERAL ARRANGEMENT PLAN - SHEET 2

TITLE

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WOOD & GRIEVE ENGINEERS

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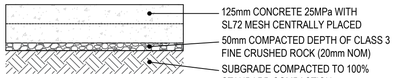

CONCRETE FOOTPATH DETAIL

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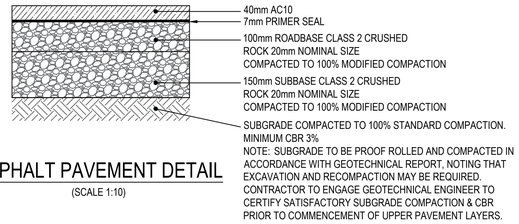

ASPHALT PAVEMENT DETAIL

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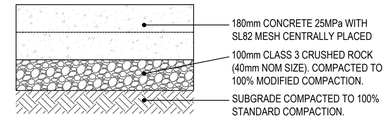

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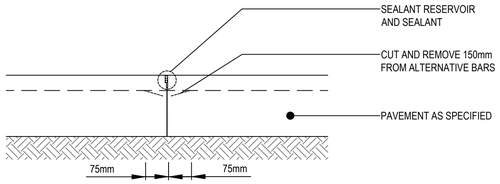

DOWELED SAWN JOINT (DSJ) DETAIL

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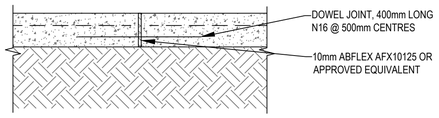

EXPANSION JOINT (EJ) DETAIL

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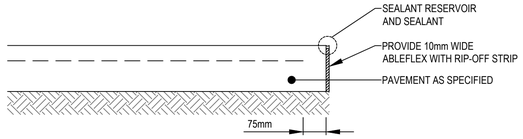

ISOLATION JOINT (IJ) DETAIL

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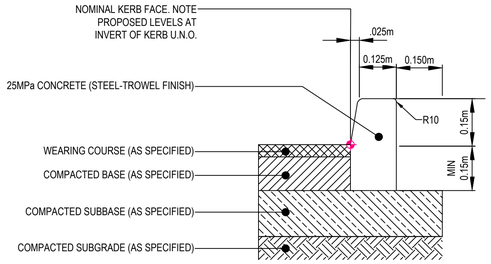
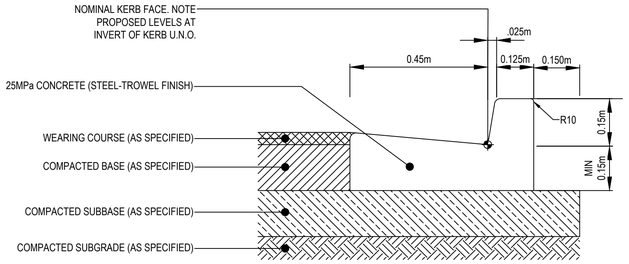


KERB ONLY 'KO' DETAIL

(SCALE 1:10)



KERB AND GUTTER DETAIL

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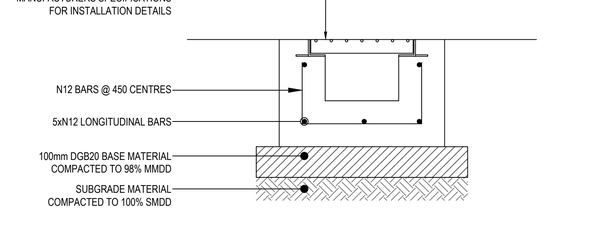
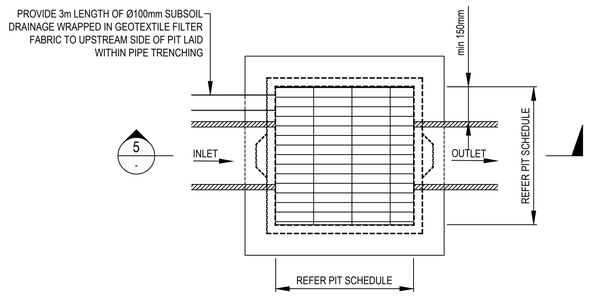


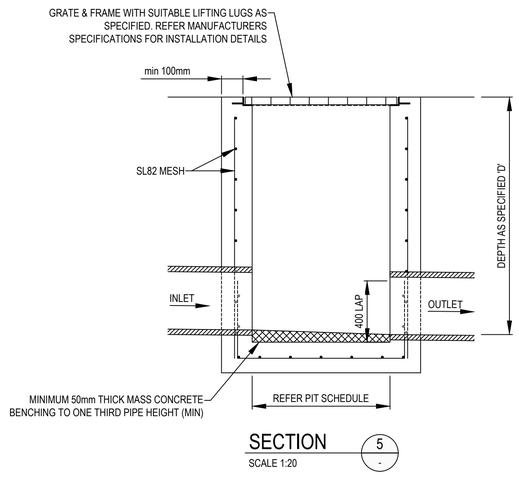
GRATED TRENCH DRAIN

(SCALE 1:10)



GRATED PIT PLAN

SCALE 1:20



SECTION

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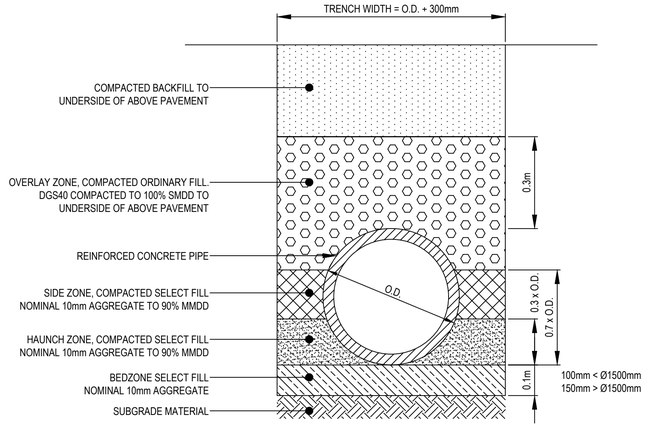

TYPICAL PIPE TRENCH DETAIL

SCALE 1:10

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1:20 A3

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APPROVED FOR CONSTRUCTION:	

ARCHITECT/CLIENT

KINCUMBER AGED CARE — DETAILS - SHEET 1

PROJECT — TITLE

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WOOD & GRIEVE ENGINEERS

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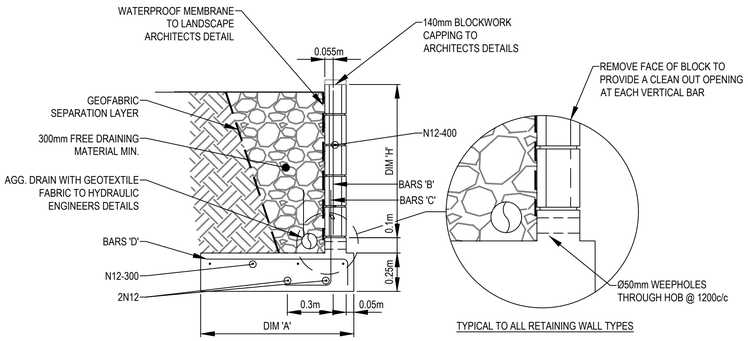
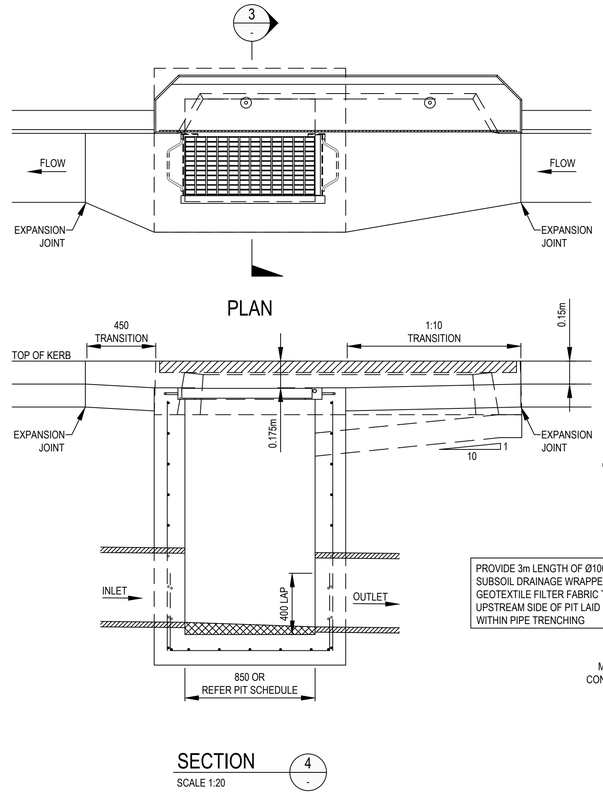


TYPICAL RETAINING WALL (RW) DETAIL

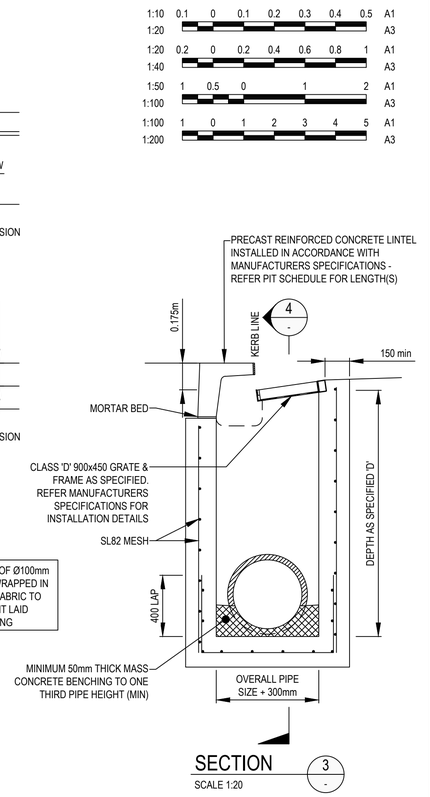
SCALE 1:20

DIM 'H'	DIM 'A'	BARS 'B'	BARS 'C'	BARS 'D'
600	600	N12-400	N16-400	N12-400
800	800	N12-400	N16-400	N12-400
1000	1000	N12-400	N16-400	N12-400
1200	1200	N12-400	N16-400	N12-400

TEMPORARY SHORING TO CONTRACTORS DESIGN AND DETAIL

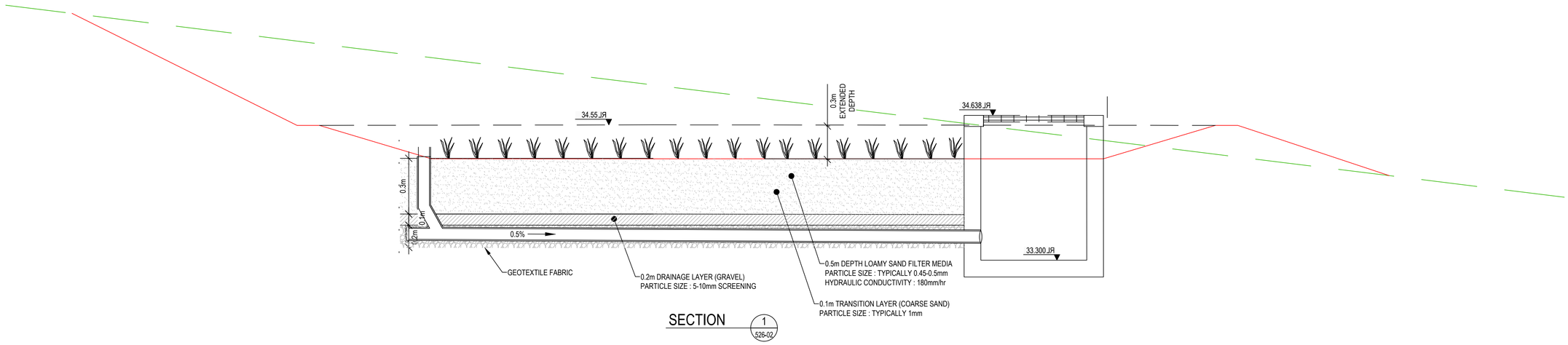


PROVIDE 3m LENGTH OF Ø100mm SUBSOIL DRAINAGE WRAPPED IN GEOTEXTILE FILTER FABRIC TO UPSTREAM SIDE OF PIT LAID WITHIN PIPE TRENCHING



KERB INLET PIT

SCALE 1:20



BIO-RETENTION BASIN CROSS SECTION

SCALE 1:20

REV	DESCRIPTION	DRAWN	APP'D	DATE
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B	FOR INFORMATION	IAH	IAH	27.02.18
A	ISSUED FOR DA APPROVAL	CPO	IAH	06.02.18

DRAWN:	
DESIGNED:	
VERIFIED:	
APPROVED FOR TENDER:	
APPROVED FOR CONSTRUCTION:	

ARCHITECT/CLIENT

KINCUMBER AGED CARE — DETAILS - SHEET 2

PROJECT — TITLE

253824-KI-CD-066-02.dwg

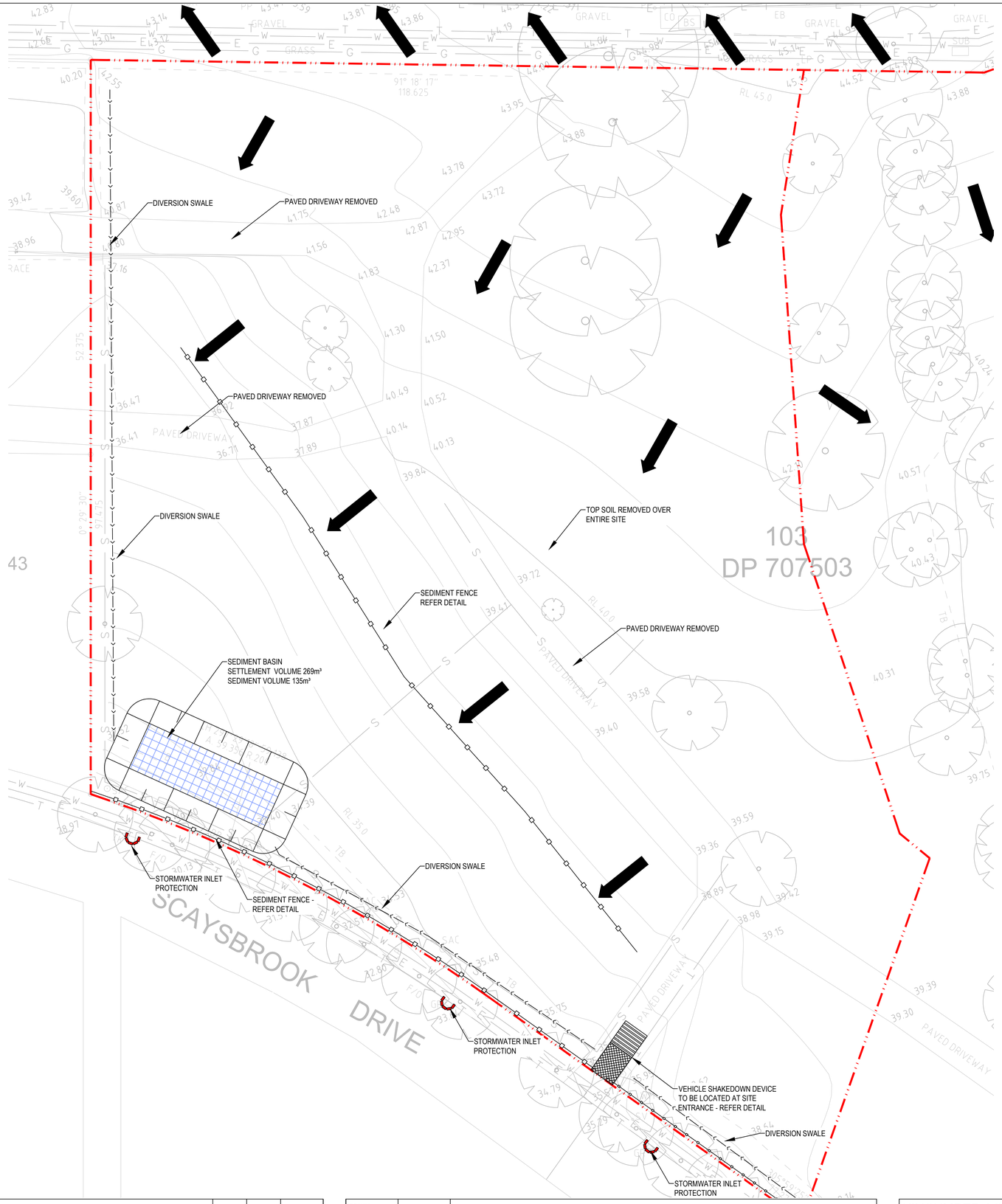
WOOD & GRIEVE ENGINEERS

FOR APPROVAL

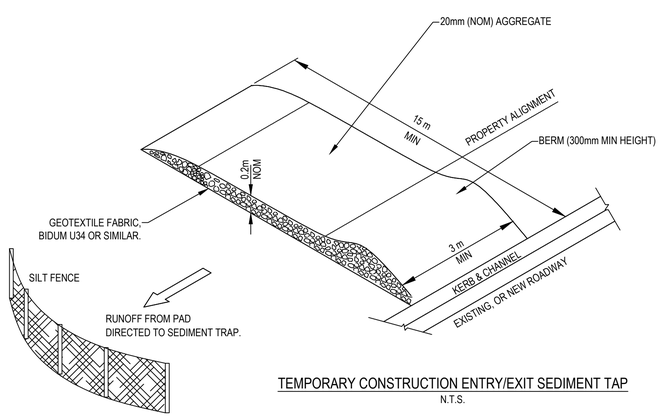
NOT FOR CONSTRUCTION

AS SHOWN	253824	KI-CD-066-02	B
SCALE @ A1	PROJECT No	DRAWING No	REV

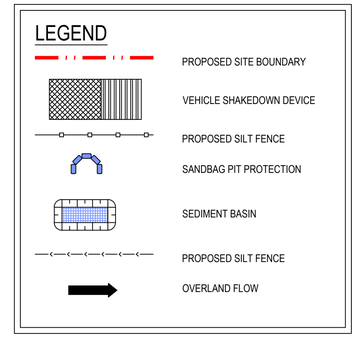
27/02/2018 1:16:17 PM

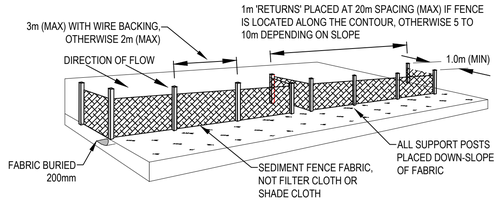


103
DP 707503

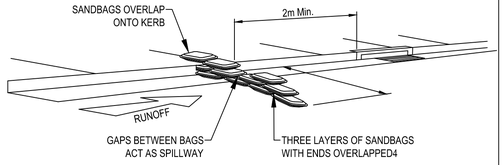


TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TAP
N.T.S.

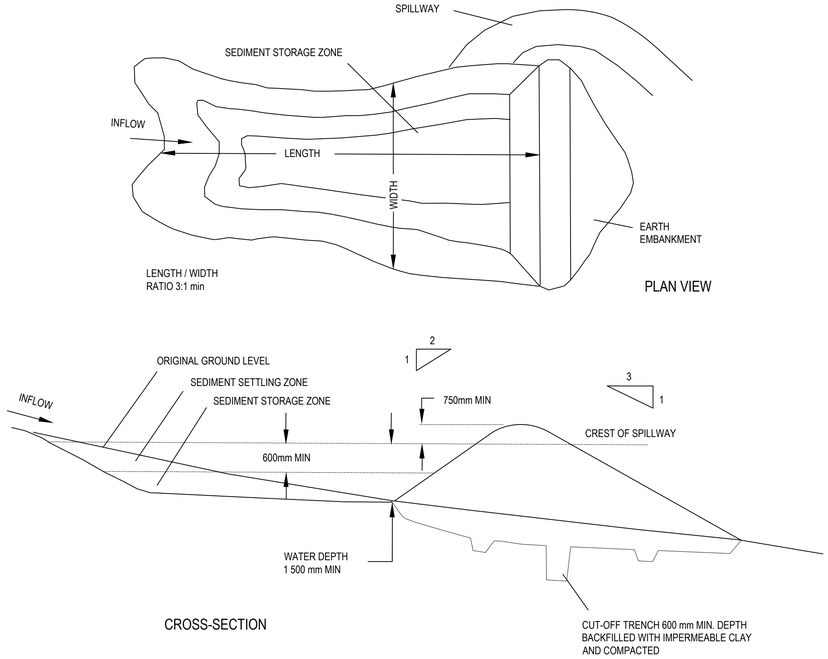




INSTALLATION OF SEDIMENT FENCE
N.T.S



SANDBAG KERB INLET SEDIMENT TRAP
N.T.S.



SEDIMENT BASIN DETAIL
NTS

1:300 6 4 2 0 6 12 A1
1:600 A3

REV	DESCRIPTION	DRAWN	APP'D	DATE
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C	ISSUED FOR DA APPROVAL	CPO	IAH	20.03.19
B	ISSUED FOR DA APPROVAL	CPO	IAH	31.01.19
A	ISSUED FOR DA APPROVAL	CPO	IAH	06.02.18

DRAWN:	
DESIGNED:	
VERIFIED:	
APPROVED FOR TENDER:	
APPROVED FOR CONSTRUCTION:	

ARCHITECT/CLIENT

KINCUMBER AGED CARE — PROJECT

EROSION AND SEDIMENT CONTROL PLAN — TITLE

253824-KI-CD-070-01.dwg

WOOD & GRIEVE ENGINEERS

FOR APPROVAL
NOT FOR CONSTRUCTION

AS SHOWN	253824	KI-CD-070-01	C
SCALE @ A1	PROJECT No	DRAWING No	REV

20/03/2019 3:03:56 PM

Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation (m)	Maximum Elevation (m)
1		-3.500	-3.000
2		-3.000	-2.500
3		-2.500	-2.000
4		-2.000	-1.500
5		-1.500	-1.000
6		-1.000	-0.500
7		-0.500	0.000
8		0.000	0.500
9		0.500	1.000
10		1.000	1.500
11		1.500	2.000
12		2.000	2.500
13		2.500	3.000
14		3.000	3.500
15		3.500	4.000
16		4.000	4.500

1:200 2 0 2 4 6 8 10 A1
1:400 A3

REV	DESCRIPTION	DRAWN	APP'D	DATE
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E	ISSUED FOR DA APPROVAL	CPO	IAH	28.03.19
D	EXISTING SED BASIN ADDED	IAH	IAH	21.01.19
C	UPDATED FOR NEW LAYOUT	IAH	IAH	18.01.19
B	UPDATED FOR MOUNDS	IAH	IAH	14.01.19
A	ISSUED FOR DA APPROVAL	CPO	IAH	06.02.18

DRAWN:	
DESIGNED:	
VERIFIED:	
APPROVED FOR TENDER:	
APPROVED FOR CONSTRUCTION:	

ARCHITECT/CLIENT

PROJECT: KINCUMBER AGED CARE

TITLE: BULK EARTHWORKS PLAN - SHEET 1

30916-5_BE_190121Model.dwg

WOOD & GRIEVE ENGINEERS

FOR APPROVAL

NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
AS SHOWN	253824	KI-CD-100-01	E

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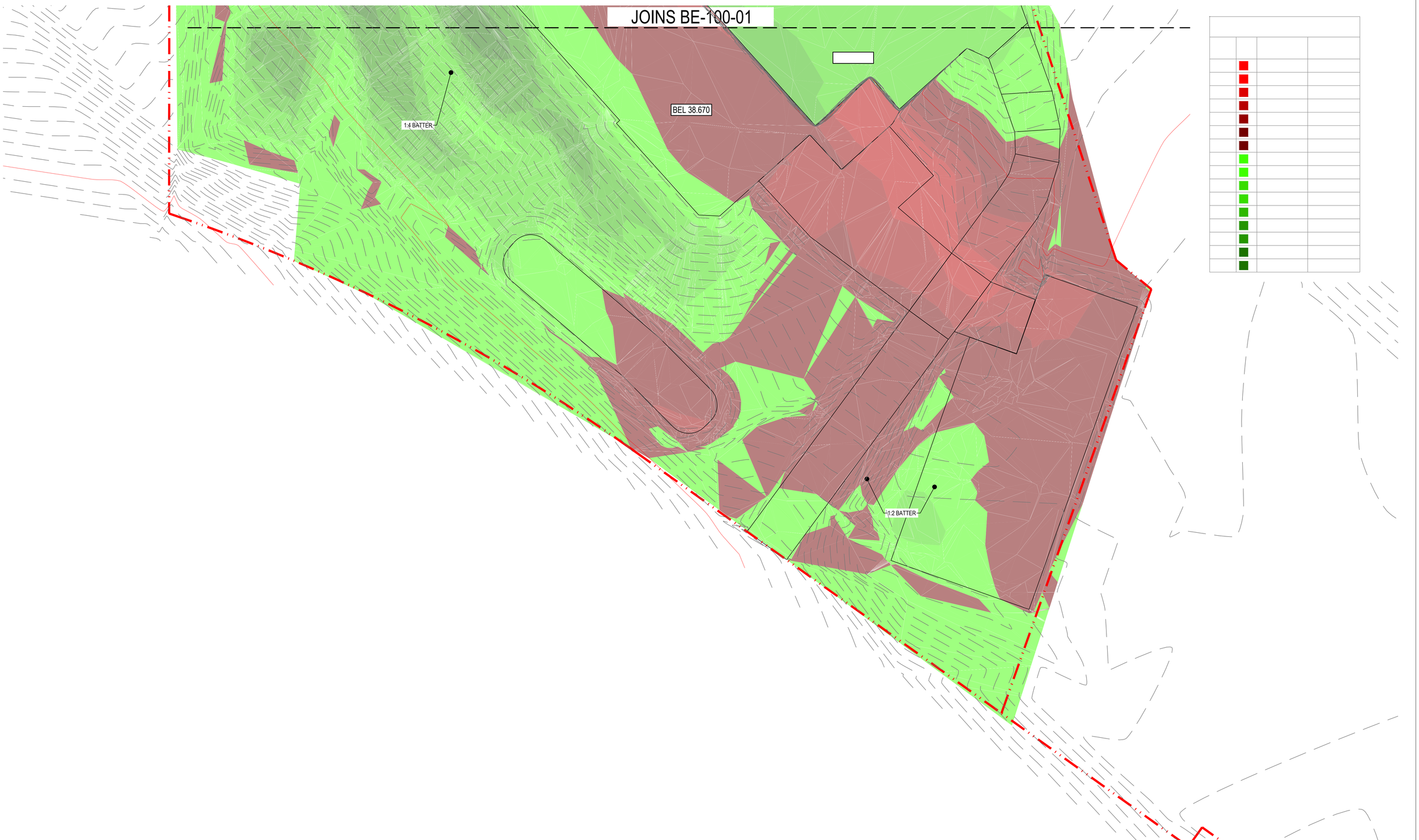

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E	ISSUED FOR DA APPROVAL	CPO	IAH	28.03.19
D	EXISTING SED BASIN ADDED	IAH	IAH	21.01.19
C	UPDATED FOR NEW LAYOUT	IAH	IAH	18.01.19
B	UPDATED FOR MOUNDS	IAH	IAH	14.01.19
A	ISSUED FOR DA APPROVAL	CPO	IAH	06.02.18

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VERIFIED:	
APPROVED FOR TENDER:	
APPROVED FOR CONSTRUCTION:	

ARCHITECT/CLIENT

KINCUMBER AGED CARE

PROJECT

BULK EARTHWORKS PLAN - SHEET 2

TITLE

WOOD & GRIEVE ENGINEERS

FOR APPROVAL

NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
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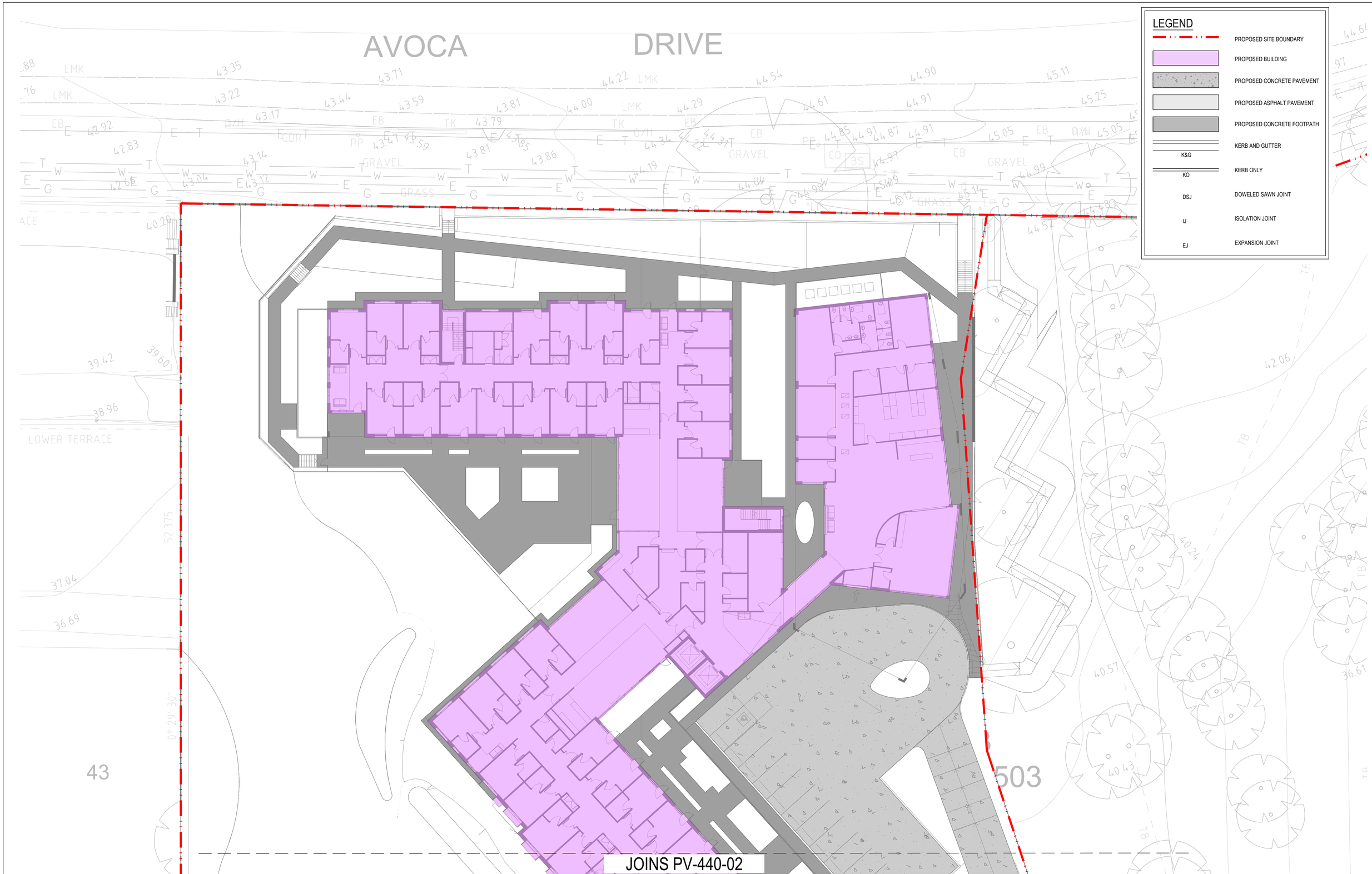

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B	ISSUED FOR DA APPROVAL	CPO	IAH	28.03.19
A	ISSUED FOR DA APPROVAL	CPO	IAH	06.02.18

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APPROVED FOR TENDER:	
APPROVED FOR CONSTRUCTION:	

ARCHITECT/CLIENT

KINCUMBER AGED CARE

PROJECT

PAVEMENTS PLAN - SHEET 1

TITLE

253824-KI-CD-440-01.dwg

WOOD & GRIEVE ENGINEERS

FOR APPROVAL

NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
AS SHOWN	253824	KI-CD-440-01	B

28/03/2019 11:09:49 AM

JOINS PV-440-01

SCAYSBROOK DRIVE

PAVED DRIVEWAY

LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED BUILDING
- PROPOSED CONCRETE PAVEMENT
- PROPOSED ASPHALT PAVEMENT
- PROPOSED CONCRETE FOOTPATH
- K&G — KERB AND GUTTER
- KO — KERB ONLY
- DSJ — DOWELED SAWN JOINT
- IJ — ISOLATION JOINT
- EJ — EXPANSION JOINT

REV	DESCRIPTION	DRAWN	APP'D	DATE
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B	ISSUED FOR DA APPROVAL	CPO	IAH	28.03.19
A	ISSUED FOR DA APPROVAL	CPO	IAH	06.02.18

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DESIGNED:	
VERIFIED:	
APPROVED FOR TENDER:	
APPROVED FOR CONSTRUCTION:	

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ARCHITECT/CLIENT

KINCUMBER AGED CARE

PROJECT

PAVEMENTS PLAN - SHEET 2

TITLE

253824-KI-CD-440-02.dwg

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WOOD & GRIEVE ENGINEERS

FOR APPROVAL

NOT FOR CONSTRUCTION

AS SHOWN	253824	KI-CD-440-02	B
SCALE @ A1	PROJECT No	DRAWING No	REV