

23-343.4

04 December 2023

Darcy Lade
HUB
Unit 2, 276 Newcastle Street
Perth, WA 6000

Dear Darcy,

Lot 1 & 2 Frenchman Bay – Civil Design Certification

We confirm that we have carried out the preliminary civil design for the above project for the roads and car parks in accordance with the requirements of Austroads and relevant Australian Standards.

The stormwater drainage design for the civil development has been undertaken in accordance with City of Albany requirements to store the pre-to-post development flow for a 1:5 ARI of 6 minutes duration storm event and the relevant Australian Standards.

With a development area of 32,681m², the City of Albany will require that the development contain a minimum of 37.5m³. It is proposed that a volume of 11m³ from the roof of buildings be stored in water tanks for reuse and 26.5m³ of stormwater from roads and paths be detained via drainage swales.

The pre-development flow will be released towards the beach to the North at a pre-development throttled discharge rate.

We note that stormwater in excess of the 1:5 ARI of the 6 minutes durations will overflow into the City of Albany drainage network, being Frenchman Bay Road and Frenchman Bay Beach Reserve adjacent to the site.

A pavement will be designed in accordance with recommendations made by the Geotechnical Consultant.

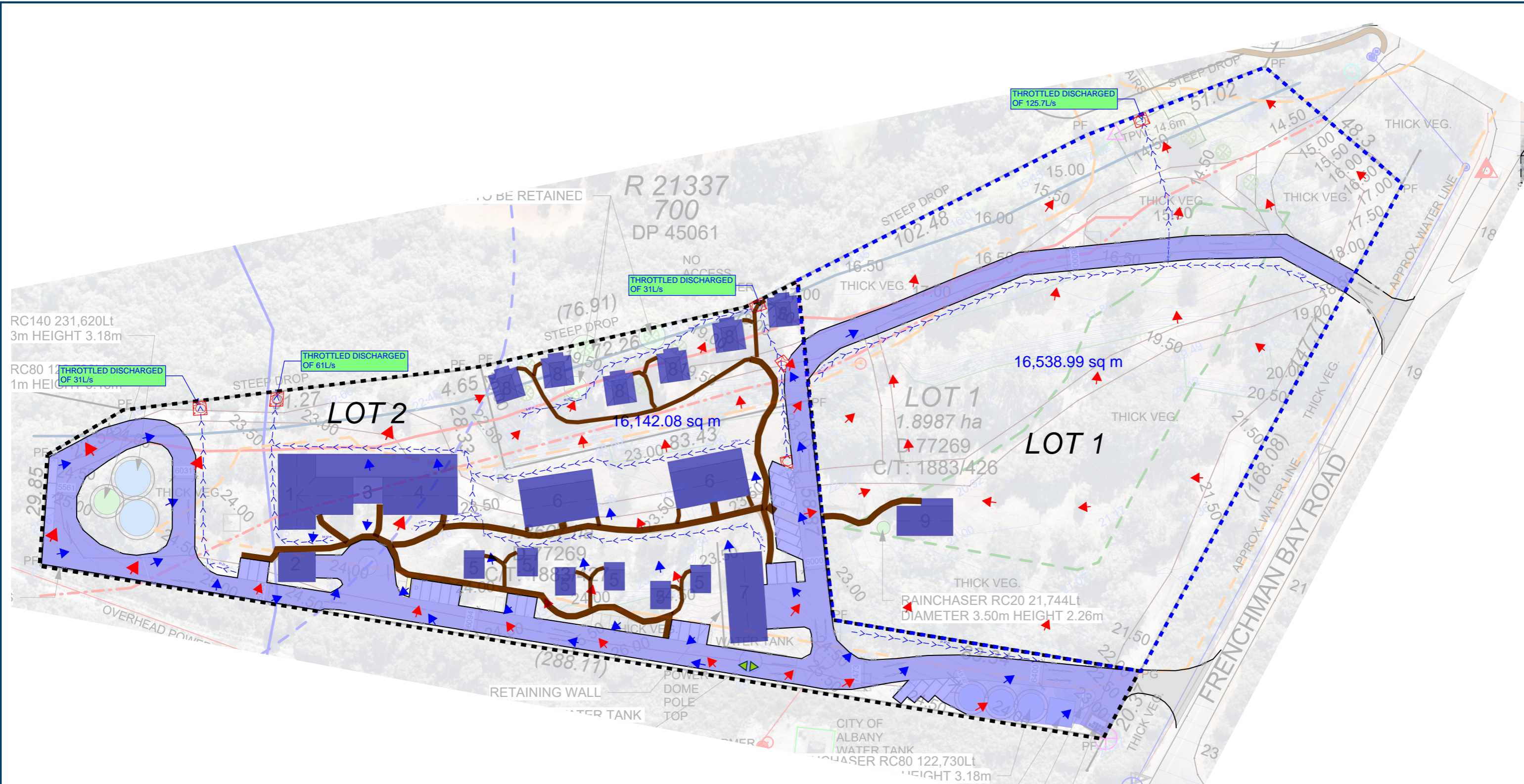
The civil drawings adequately convey the intent of the civil design and are numbered as follows:

| Drawing No. | Drawing Title | Rev |
|----------------|----------------------------|-----|
| 23343-C8-DG-01 | Stormwater Management Plan | B |
| 23343-C8-DG-02 | Civil Concept Plan | B |
| 23343-C8-DG-03 | Civil Details | A |
| 23343-C8-DG-04 | Civil Details | A |

Please contact our office should you require further information.

Yours sincerely

PASCAL HEEKENG
Project Leader - Civil
Perth



LOT 1 - IMPERVIOUS AREAS

TOTAL BUILDING : 138m²
 TOTAL ROADS : 957m²
 TOTAL PATH : 29m²
STORMWATER CALCULATIONS
 SITE AREA = 16,539m²
 POST DEVELOPMENT IMPERVIOUS AREA (ROADS+PATHS)= 986m²
 RUNOFF COEFFICIENT = 0.9
 EQUIVALENT IMPERVIOUS AREA = 887m²
REQUIRED STORAGE
 CITY OF ALBANY REQUIREMENT TO CONTAIN 1 IN 5 YR STORM

DETENTION VOLUME PROVIDED = 3.5m³ WITHIN DRAINAGE SWALES AND THROTTLED DISCHARGED AT 125.7L/s TOWARDS THE NORTH.
 DETENTION VOLUME SWALE CAPACITY PROVIDED 49.3m³.

STORMWATER FROM 1 IN 5 TR STORM FROM ROOFS WILL BE CAPTURED AND STORED IN TANKS FOR RE-USE. MIN ROOF STORAGE TO BE PROVIDED 1m³.

LOT 2 - IMPERVIOUS AREAS

TOTAL BUILDING : 2,324m²
 TOTAL ROADS : 4,364m²
 TOTAL PATH : 507m²
STORMWATER CALCULATIONS
 SITE AREA = 16,142m²
 POST DEVELOPMENT IMPERVIOUS AREA (ROADS+PATHS)= 4,871m²
 RUNOFF COEFFICIENT = 0.9
 EQUIVALENT IMPERVIOUS AREA = 4,384m²
REQUIRED STORAGE
 CITY OF ALBANY REQUIREMENT TO CONTAIN 1 IN 5 YR STORM

DETENTION VOLUME PROVIDED = 23m³ WITHIN DRAINAGE SWALES AND THROTTLED DISCHARGED AT 122.7L/s TOWARDS THE NORTH.
 DETENTION VOLUME SWALE CAPACITY PROVIDED 148.4m³.

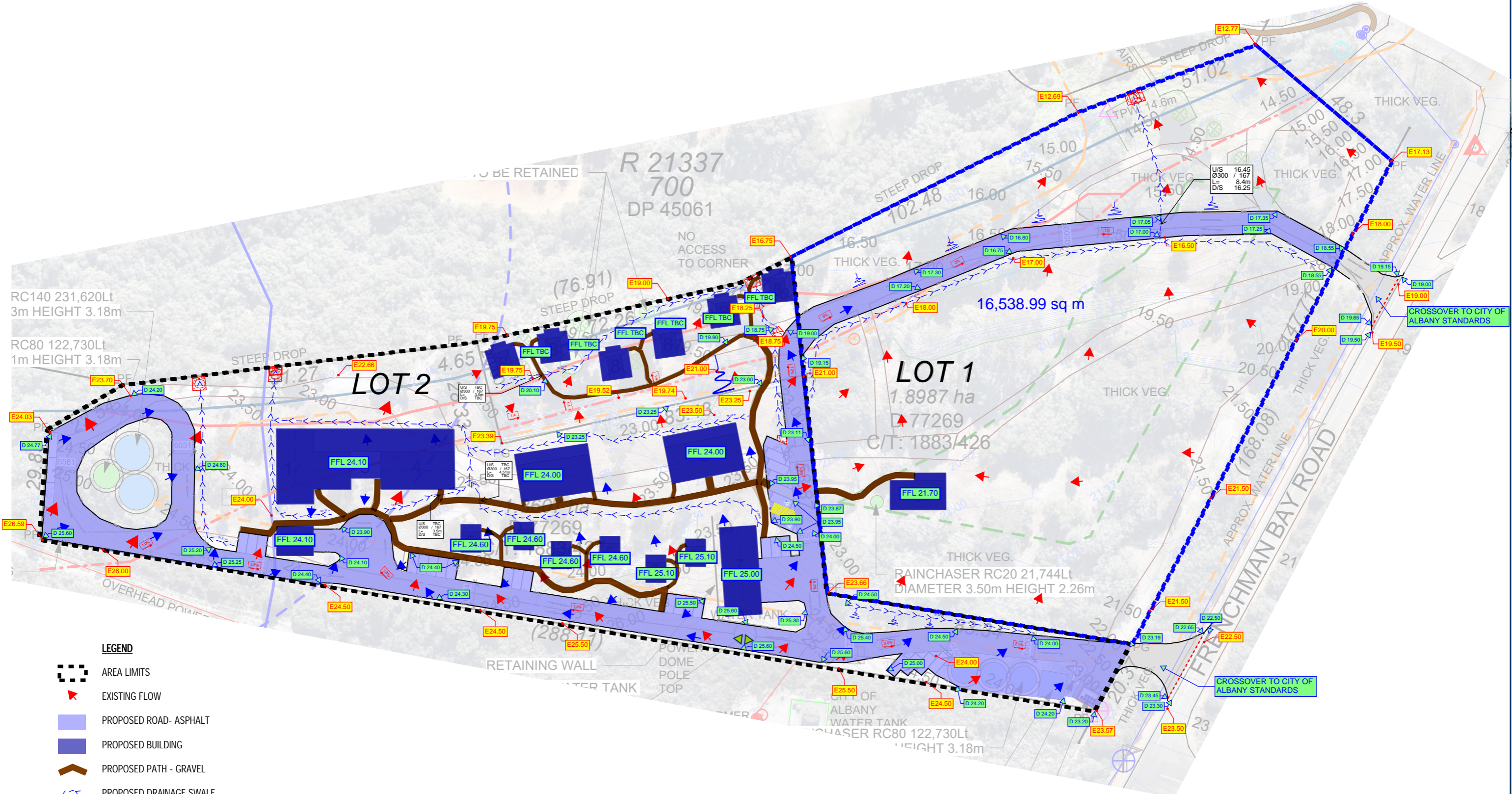
STORMWATER FROM 1 IN 5 TR STORM FROM ROOFS WILL BE CAPTURED AND STORED IN TANKS FOR RE-USE. MIN ROOF STORAGE TO BE PROVIDED 10m³.

LEGEND















- AREA LIMITS
- IMPERMEABLE AREA - PROPOSED ROAD
- IMPERMEABLE AREA - PROPOSED BUILDING
- IMPERMEABLE AREA - PROPOSED PATH
- EXISTING FLOW
- PROPOSED OVERLAND FLOW
- PROPOSED DRAINAGE CHANNEL
- PROPOSED DRAINAGE CULVERT UNDER ROAD/PATH WITH HEADWALLS
- SEMI MOUNTABLE KERB WITH KERB BREAKS AS REQUIRED FOR STORMWATER
- PROPOSED ROCK PROTECTION



| | | |
|-------------------------------------|---------------------|----------------|
| CLIENT HUB | | |
| PROJECT LOT 1 & 2 FRENCHMAN BAY | | |
| TITLE STORMWATER MANAGEMENT PLAN | | |
| SCALE 1:1000 @ A3 | DATE 04/12/2023 | DESIGNED PH |
| JOB No. 23-343 | DRG No. C8-DG-01 | REV B |



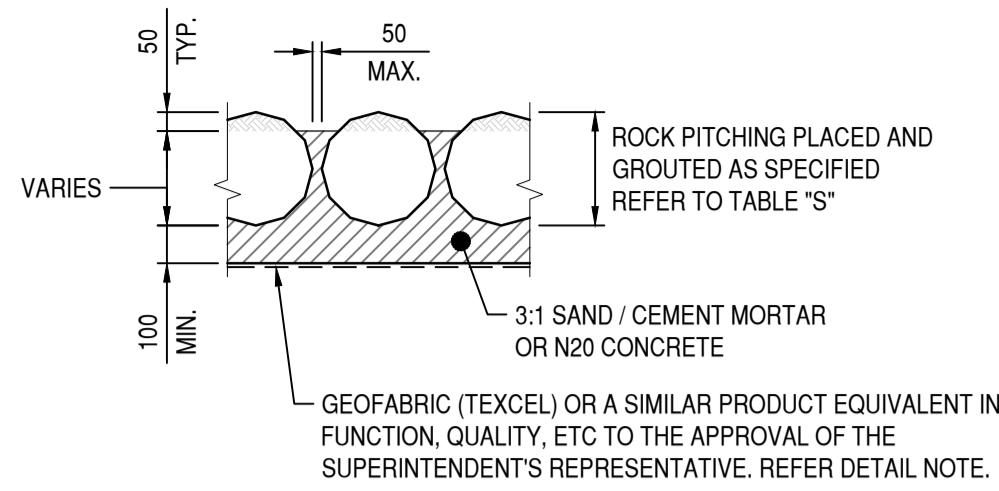
LEGEND

-  AREA LIMITS
-  EXISTING FLOW
-  PROPOSED ROAD- ASPHALT
-  PROPOSED BUILDING
-  PROPOSED PATH - GRAVEL
-  PROPOSED DRAINAGE SWALE
-  PROPOSED DRAINAGE CULVERT UNDER ROAD/PATH WITH ASSOCIATED HEADWALLS
-  PROPOSED OVERLAND FLOW
-  EXISTING LEVELS
-  DESIGN LEVELS
-  FINISHED FLOOR LEVELS
-  SEMI MOUNTABLE KERB WITH KERB BREAKS AS REQUIRED FOR STORMWATER
-  FLUSH KERB
-  PROPOSED ROCK PROTECTION

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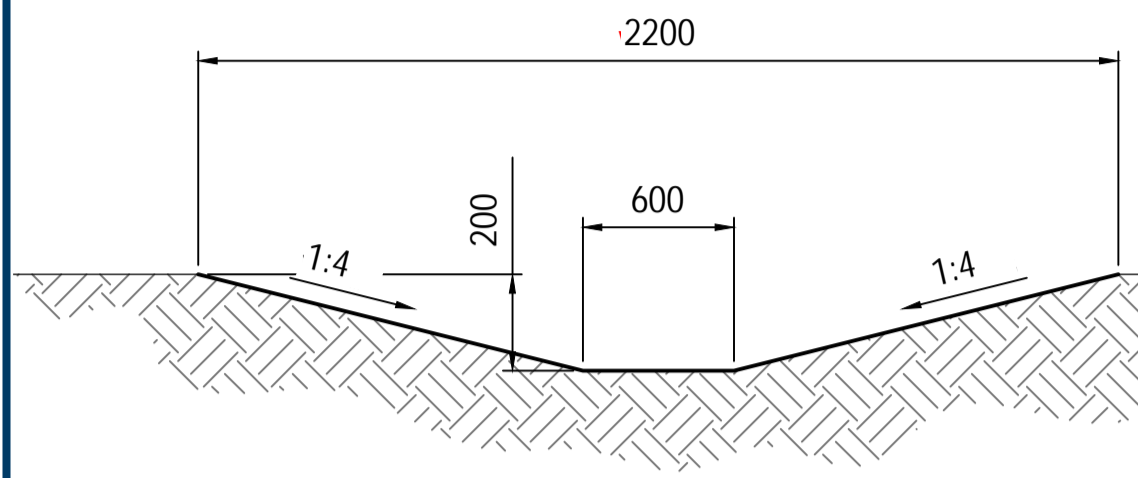
| | | |
|------------------------------------|---------------------|----------------|
| CLIENT HUB | | |
| PROJECT LOT 1 & 2 FRENCHMAN BAY | | |
| TITLE CIVIL CONCEPT PLAN | | |
| SCALE 1:1000 @ A3 | DATE 04/12/2023 | DESIGNED PH |
| JOB No. 23-343 | DRG No. C8-DG-02 | REV B |

| TABLE "S" | |
|--|--------------|
| ROCK PITCHING SPALL GRADING | |
| MINIMUM DIMENSIONS OF INDIVIDUAL SPALLS (mm) | SIZING RATIO |
| >200 to <300 | 45 - 60% |
| 100 to 200 | 25 - 40% |
| >50 to <100 | 10 - 20% |



DETAIL 3

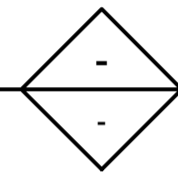
SCALE 1:20 0m 200mm 400mm



TYPICAL DRAINAGE SWALE

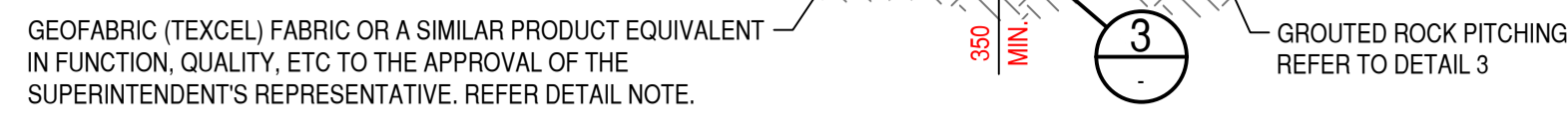
SCALE 1:50 0m 1m 2m

C3-M-03 AS SHOWN



TYPICAL DRAINAGE SWALE - SCOUR PROTECTION

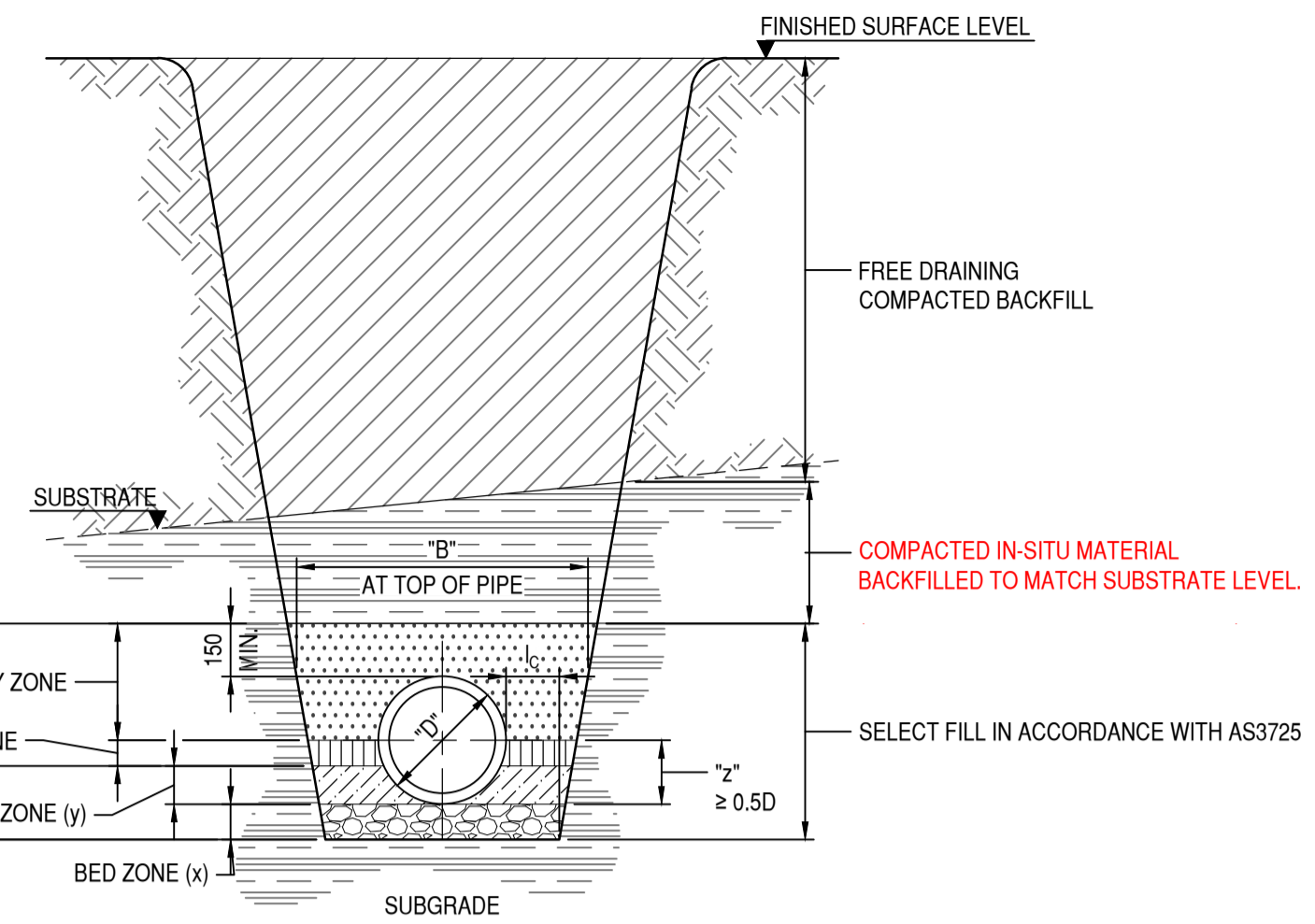
SCALE 1:50 0m 1m 2m



NOTE
GEOFABRIC (TEXCEL) FABRIC OR A SIMILAR PRODUCT EQUIVALENT IN FUNCTION, QUALITY, ETC TO THE APPROVAL OF THE SUPERINTENDENT'S REPRESENTATIVE TO EXTEND UP EDGE OF ROCK PITCHING WORK AND FINISH 20mm BELOW SURFACE LEVEL (TYP.).

TRENCH DETAIL NOTES

- ALL PIPE TRENCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AS3725 - DESIGN FOR INSTALLATION OF BURIED CONCRETE PIPES. SHOULD DISCREPANCIES EXIST, AS3725 TAKES PRECEDENCE.
- BEDDING CONDITION SHALL BE CARRIED PAST ALL MANHOLES, GULLIES & OTHER DRAINAGE STRUCTURES DOWNSTREAM.
- WHERE PIPES HAVE PROTRUDING SOCKETS, SUITABLE RECESSES SHALL BE PROVIDED IN THE SUPPORTING MATERIALS TO ENSURE THAT THE PIPES DO NOT BEAR ON THE SOCKETS (TYP.)



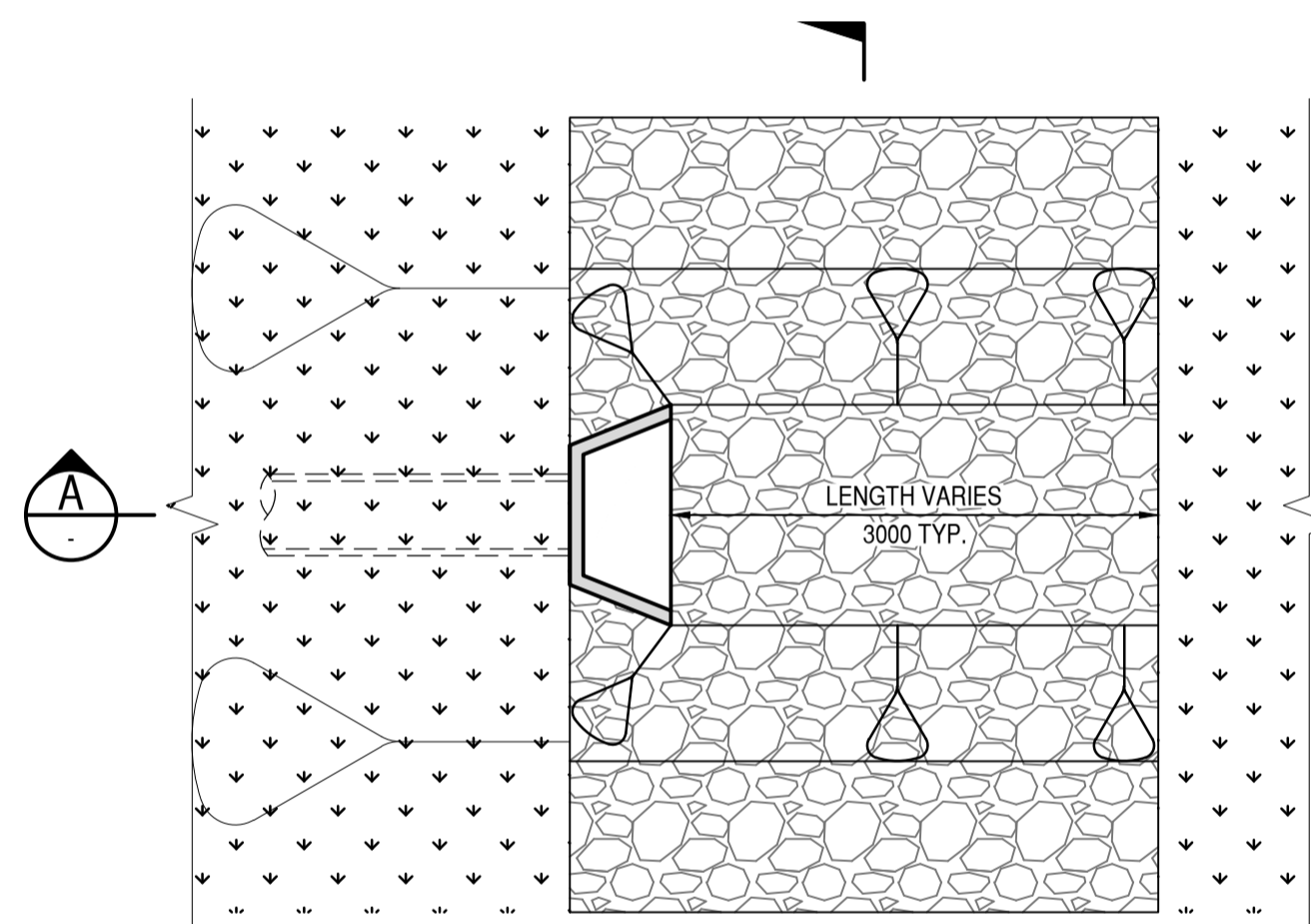
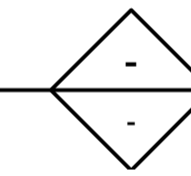
| "H" AND "HS" PIPE TRENCH DETAILS | | | | | | | | | |
|----------------------------------|--------------------|-------------------------------|-----------------------------|------------|------------------------|------------------------|--------------------|----------------------------|-----|
| PIPE I.D. (mm) | PIPE O.D. (mm) "D" | MINIMUM TRENCH WIDTH "B" (mm) | MINIMUM BED ZONE DEPTHS "x" | | | mm | | MINIMUM SIDE CLEARANCE "c" | |
| | | | SUPPORT TYPE | DEPTH (mm) | HAUNCH ZONE "y" = 0.1D | HAUNCH ZONE "y" = 0.3D | BEDDING "z" ≥ 0.5D | PIPE DIAMETER | lc |
| 300 | 362 | 650 | H / HS ≤ 0.1500 | 100 | 37 | 109 | 185 | ≤600 | 150 |
| 375 | 445 | 750 | | | 45 | 134 | 225 | | |
| 450 | 534 | 850 | | | 54 | 161 | 270 | | |
| 525 | 616 | 900 | | | 62 | 185 | 310 | | |
| 600 | 698 | 1000 | | | 70 | 210 | 350 | >600 - ≤1200 | 200 |

NOTE: THE MINIMUM VALUES SHALL ONLY BE USED WHERE NECESSARY COMPACTION VALUES CAN BE ASSURED.

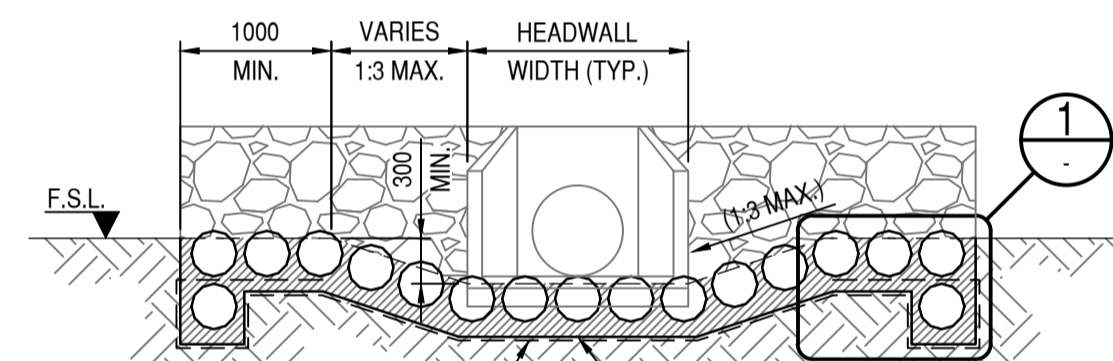
TYPICAL CONCRETE PIPE TRENCH DETAILS (SUPPORT TYPE "H" AND "HS")

SCALE 1:20 0m 400mm 800mm

C3-A-02 AS SHOWN



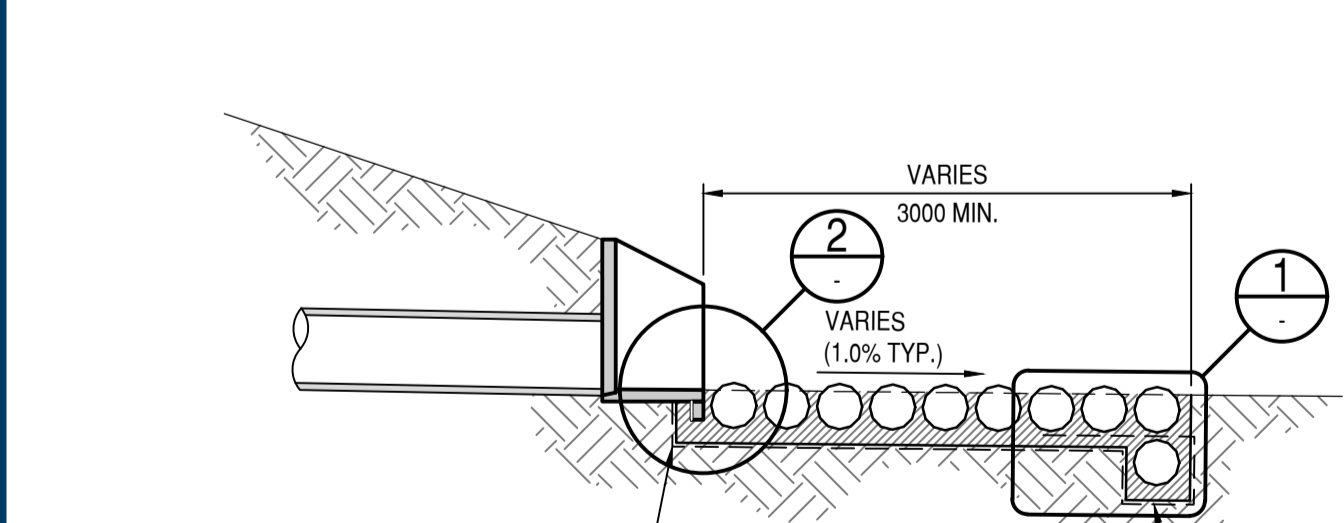
HEADWALL DISCHARGING TO SWALE DRAIN



GEOFABRIC (TEXCEL) FABRIC OR A SIMILAR PRODUCT EQUIVALENT IN FUNCTION, QUALITY, ETC TO THE APPROVAL OF THE SUPERINTENDENT'S REPRESENTATIVE. SHALL BE INSTALLED UNDER ROCK PITCHING, WRAPPED AROUND THE DOWN AND OVERLAPPED. REFER TO DETAIL 1.

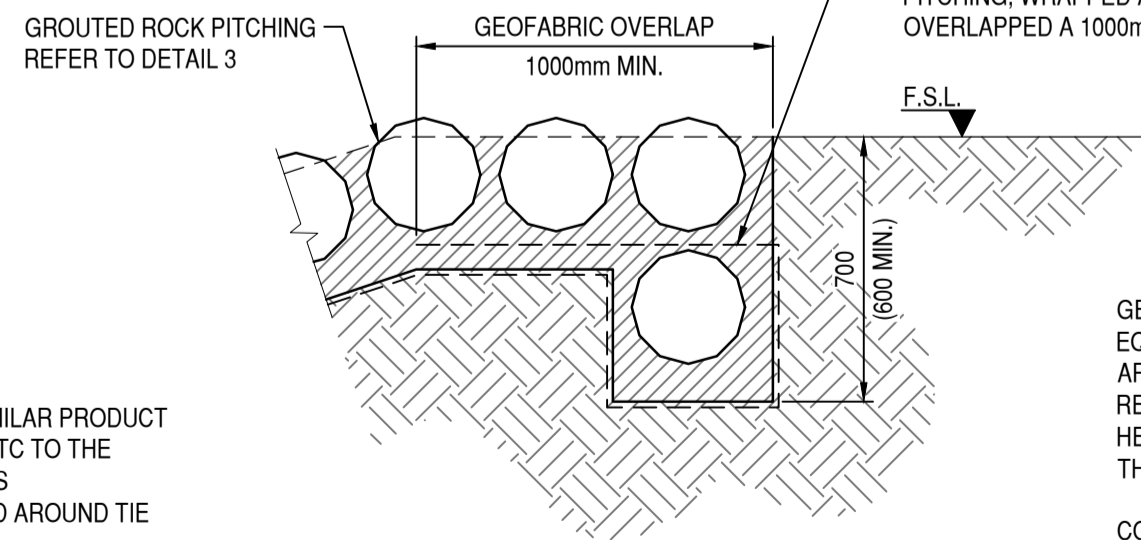
SECTION B

SCALE 1:50 0m 0.5m 1m



SECTION A

SCALE 1:50 0m 0.5m 1m

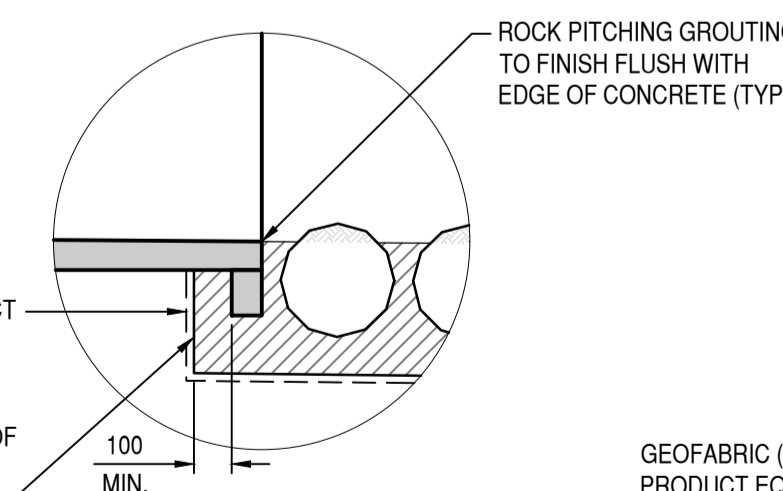


DETAIL 1

SCALE 1:20 0m 200mm 400mm

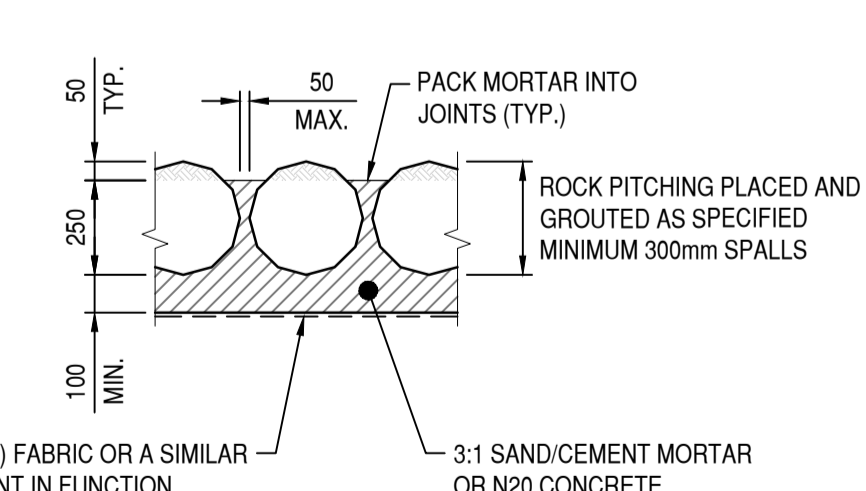
GEOFABRIC (TEXCEL) FABRIC OR A SIMILAR PRODUCT EQUIVALENT IN FUNCTION, QUALITY, ETC TO THE APPROVAL OF THE SUPERINTENDENT'S REPRESENTATIVE. SHALL BE INSTALLED UNDER HEADWALL AS SHOWN, PRIOR TO THE PLACEMENT OF THE MORTARED ROCK PITCHING (TYP.).

CONTRACTOR TO EXTEND ROCK PITCHING MORTAR UNDER HEADWALL 100mm (MIN.) BEHIND HEADWALL TURNDOWN (TYP.). WHERE THE HEADWALL DOES NOT HAVE A TURNDOWN, THE CONTRACTOR SHALL EXTEND THE MORTAR 200mm UNDER THE HEADWALL.



DETAIL 2

SCALE 1:20 0m 200mm 400mm

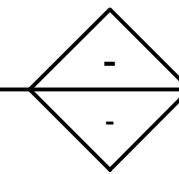


DETAIL 3

SCALE 1:20 0m 200mm 400mm

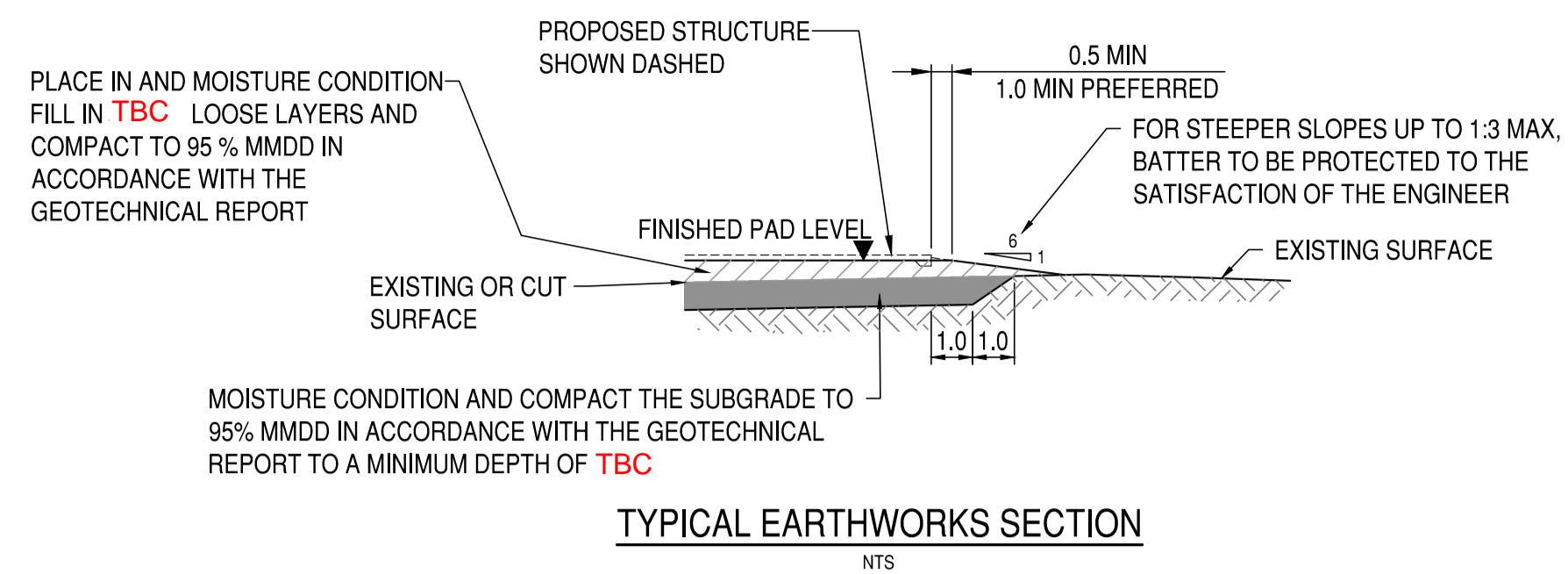
TYPICAL HEADWALL ROCK PITCHING DETAILS

C3-C-03 AS SHOWN



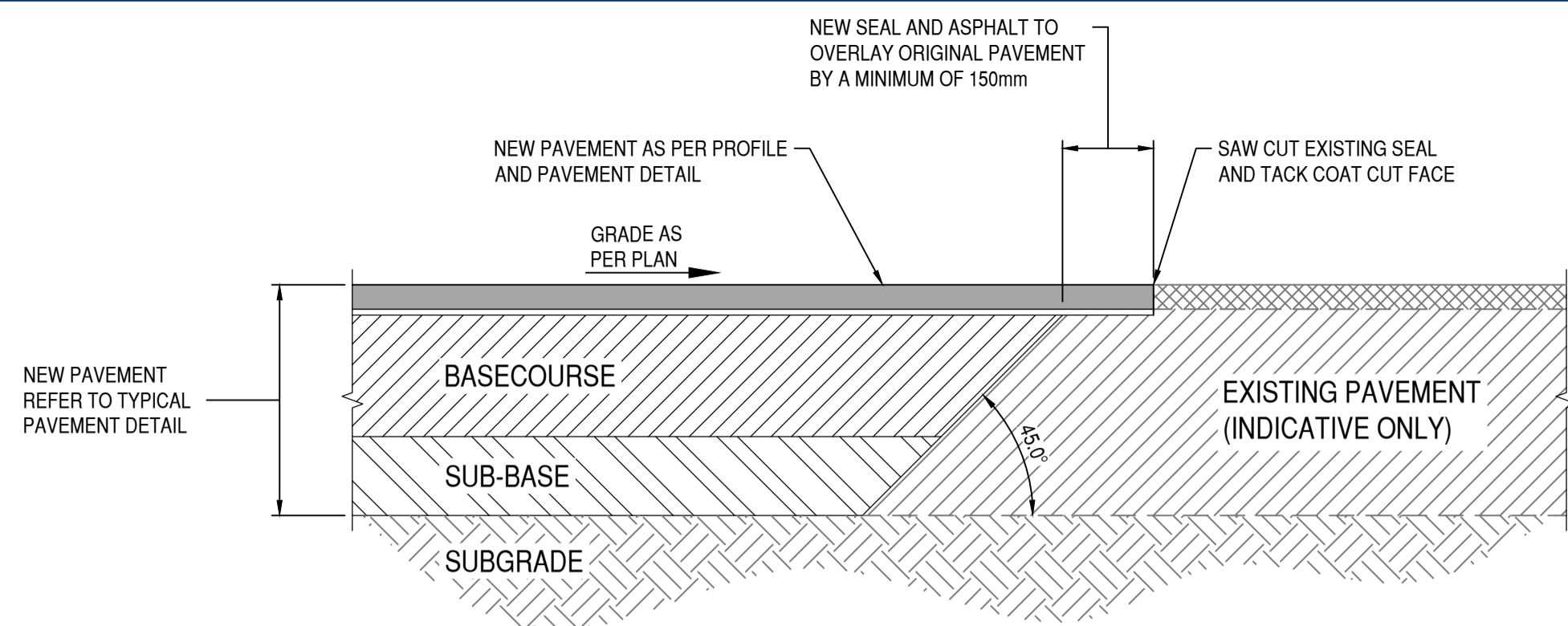
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| | | |
|----------|-------------------------|----------|
| CLIENT | HUB | |
| PROJECT | LOT 1 & 2 FRENCHMAN BAY | |
| TITLE | CIVIL DETAILS | |
| SCALE | DATE | DESIGNED |
| NTS @ A1 | 04/12/2023 | PH |
| JOB No. | DRG No. | REV |
| 22-343 | C8-DG-03 | A |

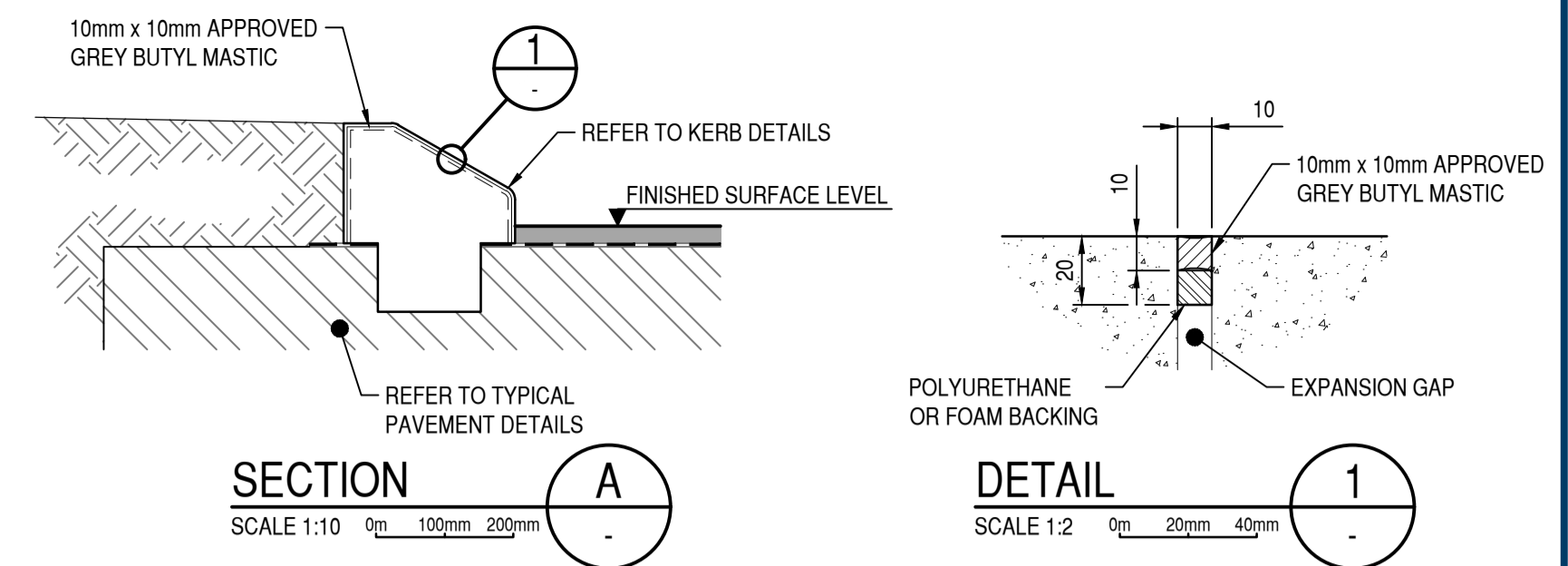


TYPICAL EARTHWORKS SECTION

NOTE:
THE CONTRACTOR SHALL EXCAVATE THE EXISTING SURFACE OR CUT LEVEL AND MOISTURE CONDITION AND COMPACT THE SUBGRADE AND BACKFILL AS SHOWN IN ACCORDANCE WITH THE GEOTECHNICAL REPORT. THE CONTRACTOR SHALL CONFIRM THE SUBGRADE PREPARATION WITH THE SUPERINTENDENT.



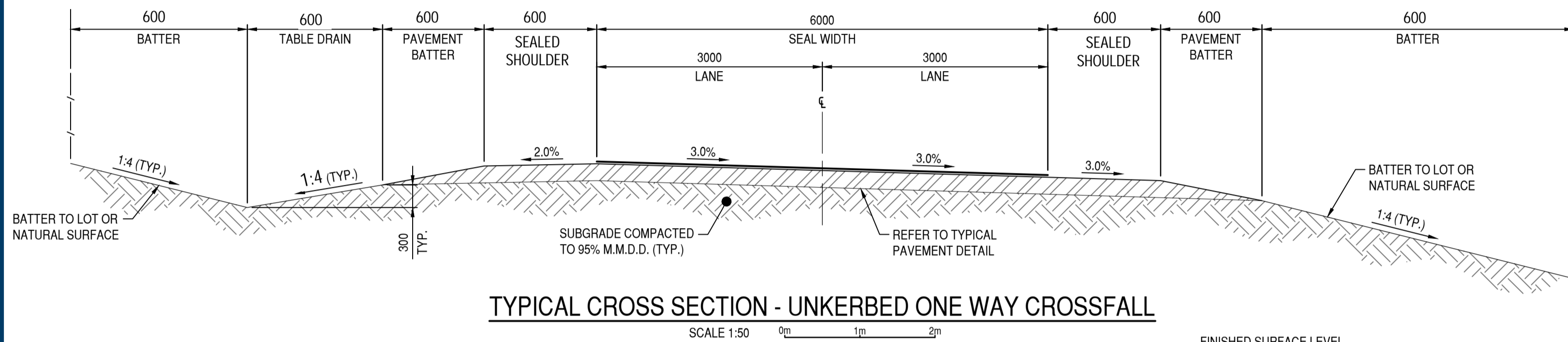
TYPICAL SAW CUT DETAIL



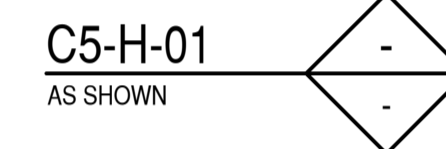
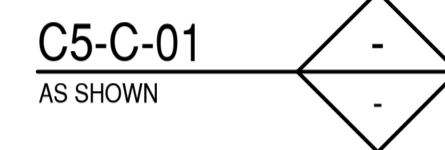
KERB EXPANSION JOINT NOTES

- EXPANSION AND CONTRACTION JOINTS SHALL BE IN ACCORDANCE WITH THE SPECIFICATION.
- KEYS SHALL BE INSTALLED FOR ALL RADII LESS THAN OR EQUAL TO 40m
- KERBING ALONG WITH EXPANSION AND CONTRACTION JOINTS SHALL BE CONSTRUCTED PRIOR TO LAYING OF ANY BRICK PAVING.
- BACKFILL BEHIND KERB SHALL BE COMPACTED TO 90% M.M.D.D. IN ACCORDANCE WITH THE SPECIFICATION
- WHERE PATHS ARE CONSTRUCTED DIRECTLY BEHIND THE KERB, EXPANSION AND CONTRACTION JOINTS IN THE PATH AND KERB SHALL BE ALIGNED

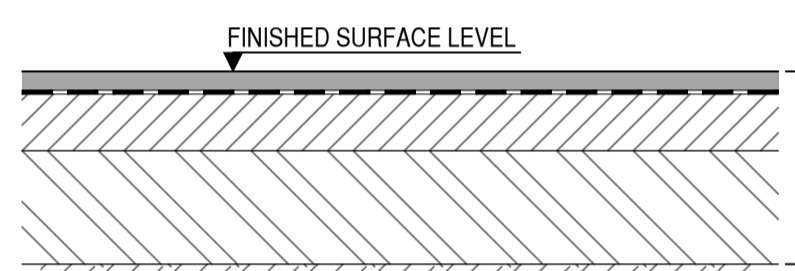
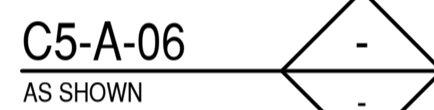
KERB EXPANSION JOINT AND CRACK CONTROL DETAILS



TYPICAL CROSS SECTION - UNKERBED ONE WAY CROSSFALL

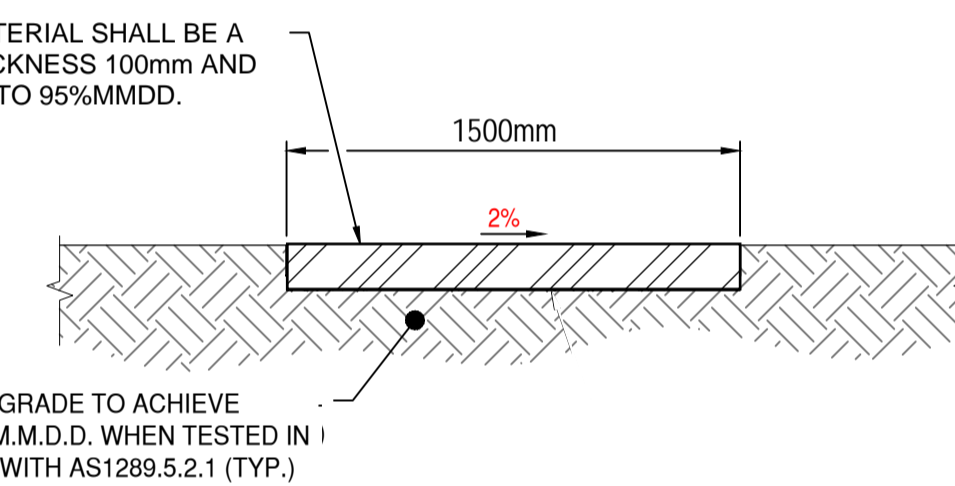
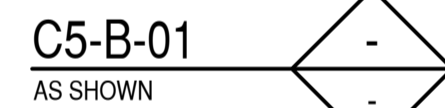


SHARED AREA DIAGONAL LINE MARKING TO BE IMPLEMENTED IF SHOWN ON ROADWORK DRAWINGS. CONTRACTOR SHALL NOT APPLY DIAGONAL LINE MARKING WHEN SHARED AREA IS UTILISED AS A PEDESTRIAN FOOTPATH.

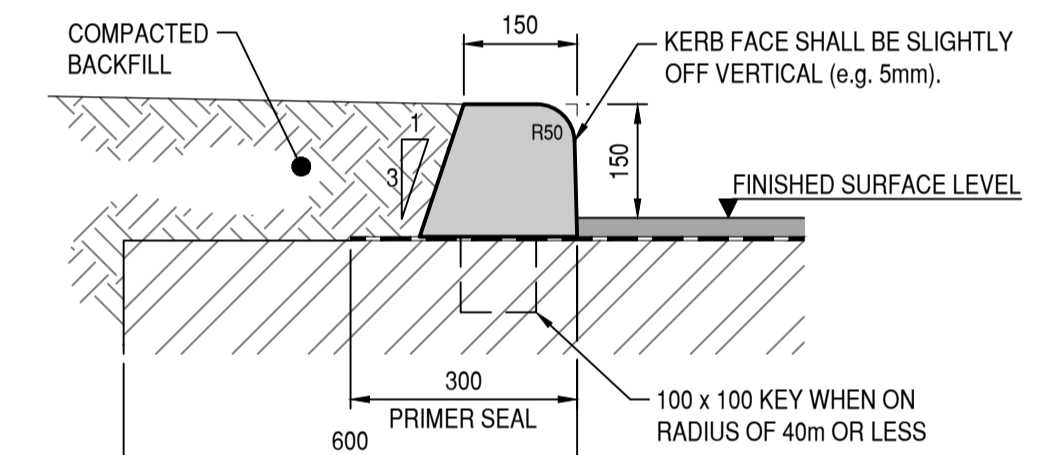


TYPICAL ROAD PAVEMENT DETAIL

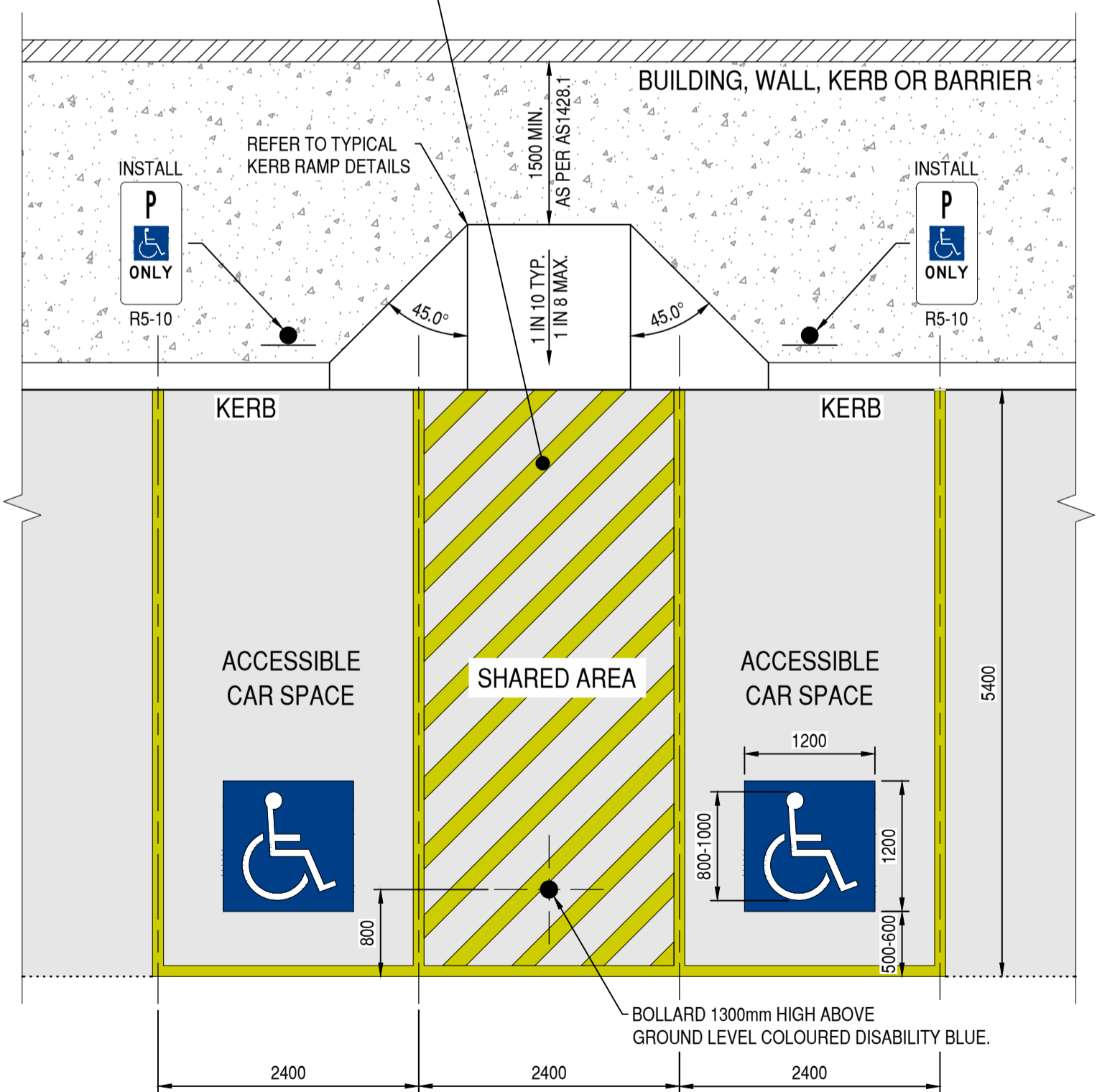
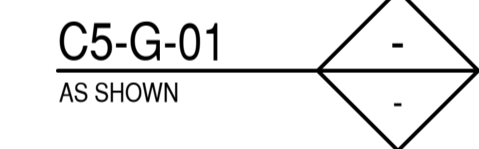
NOTE:
THE CONTRACTOR SHALL CONSTRUCT PAVEMENT IN ACCORDANCE WITH AS2150 AND CIVIL SPECIFICATIONS AND DETAILS



GRAVEL PATH SECTION



TYPICAL KERB DETAIL - BARRIER



PERPENDICULAR ACCESSIBLE CAR PARKING SPACES

ACCESSIBLE PARKING SPACE NOTES

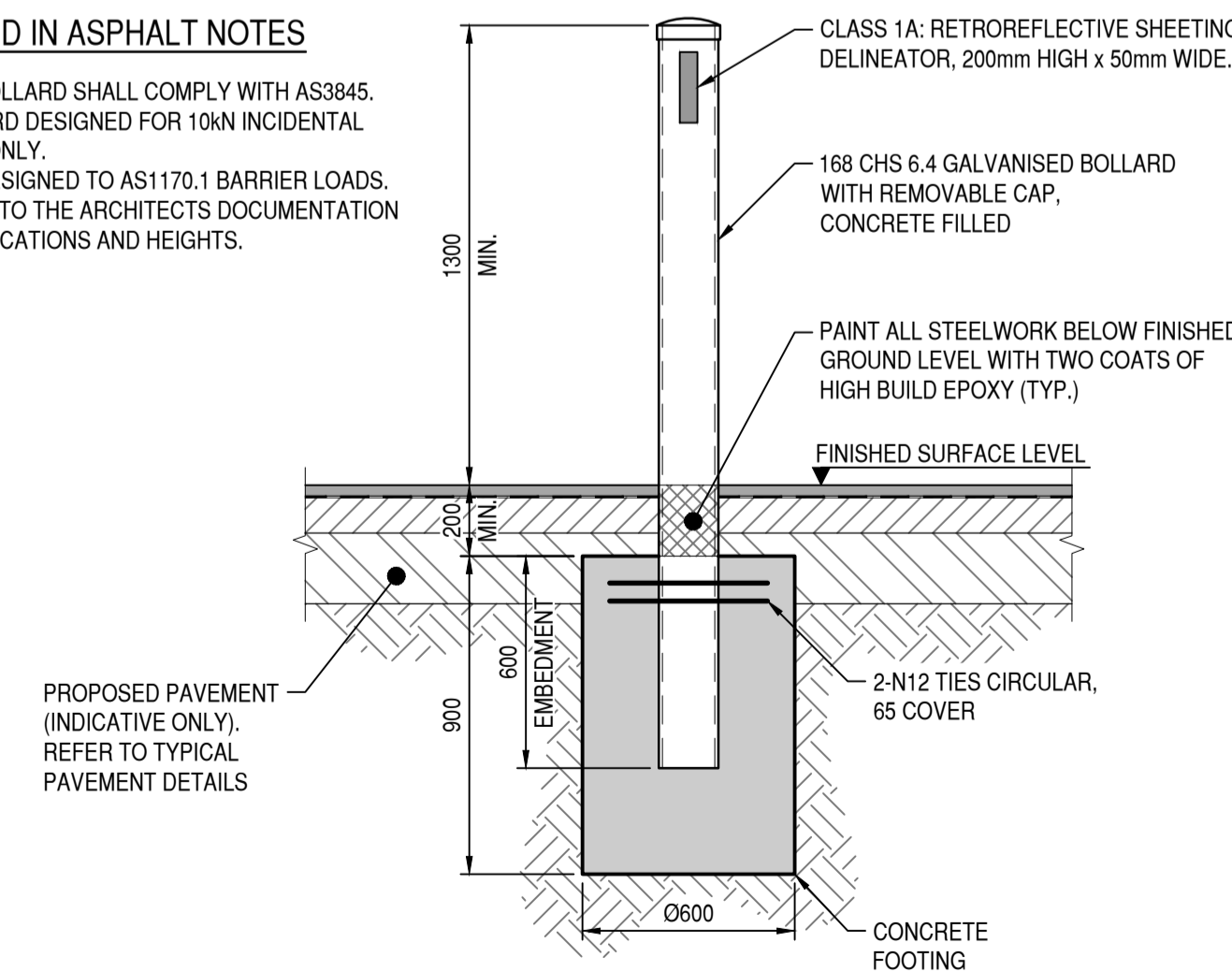
SPACE IDENTIFICATION
EACH DEDICATED SPACE SHALL BE IDENTIFIED BY MEANS OF A WHITE SYMBOL OF ACCESS IN ACCORDANCE WITH AS1428.1 BETWEEN 800mm AND 1000mm HIGH PLACED ON A BLUE RECTANGLE WITH NO SIDE MORE THAN 1200mm, PLACED AS A PAVEMENT MARKING IN THE CENTRE OF THE SPACE BETWEEN 500mm AND 600mm FROM ITS ENTRY POINT AS ILLUSTRATED.

SPACE DELINEATION
PAVEMENT MARKINGS SPECIFIED IN ITEMS (A) AND (B) OF THIS CLAUSE SHALL BE YELLOW AND SHALL HAVE A SLIP RESISTANT SURFACE. RAISED PAVEMENT MARKERS SHALL NOT BE USED FOR SPACE DELINEATION.

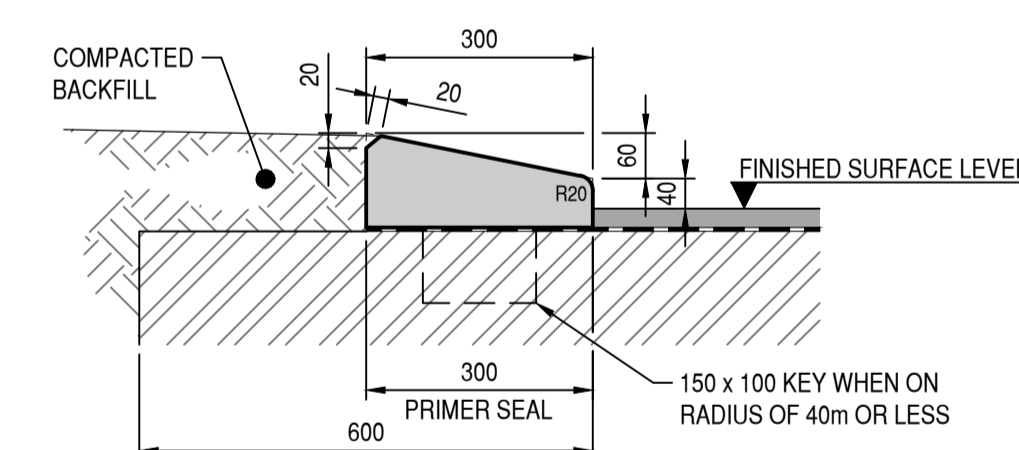
- PAVEMENT MARKINGS SHALL BE PROVIDED AS FOLLOWS:
- LINEMARKING:
 - DEDICATED PARKING SPACES SHALL BE OUTLINED WITH UNBROKEN LINES 80 TO 100mm WIDE ON ALL SIDES EXCEPTING ANY SIDE DELINEATED BY A KERB, BARRIER OR WALL.
 - SHARED AREAS SHALL BE MARKED AS FOLLOWS:
 - WALKWAYS WITHIN OR PARTLY WITHIN A SHARED AREA SHALL BE MARKED WITH UNBROKEN LONGITUDINAL LINES ON BOTH SIDES OF THE WALKWAY EXCEPTING ANY SIDE DELINEATED BY A KERB, BARRIER OR WALL.
 - OTHER VACANT NON-TRAFFICKED AREAS, WHICH MAY BE INTENTIONALLY OR UNINTENTIONALLY OBSTRUCTED (E.G. BY UNINTENDED PARKING), SHALL BE OUTLINED WITH UNBROKEN LINES 80mm TO 100mm WIDE ON ALL SIDES EXCEPTING ANY SIDE DELINEATED BY A KERB, BARRIER OR WALL, AND MARKED WITH DIAGONAL STRIPES 150mm WIDE WITH SPACES 300mm BETWEEN STRIPES. THE STRIPES SHALL BE AT AN ANGLE OF 45° TO THE SIDE OF THE SPACE.
 - NO SHARED AREA MARKINGS SHALL BE PLACED IN TRAFFICKED AREAS.
 - ALL LINEMARKING MUST BE NON SLIP.
 - BOLLARDS:
 - MINIMUM HEIGHT 1300mm.
 - RECOMMENDED COLOUR BLUE TO CONTRAST AGAINST YELLOW LINE MARKING.

BOLLARD IN ASPHALT NOTES

- THE BOLLARD SHALL COMPLY WITH AS3845.
- BOLLARD DESIGNED FOR 10kN INCIDENTAL LOAD ONLY.
- NOT DESIGNED TO AS1170.1 BARRIER LOADS.
- REFER TO THE ARCHITECTS DOCUMENTATION FOR LOCATIONS AND HEIGHTS.

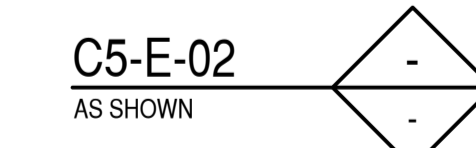


TYPICAL BOLLARD IN ASPHALT PAVEMENT DETAIL

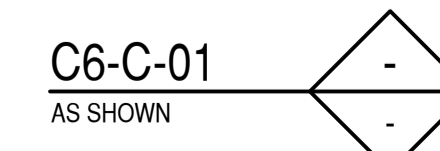
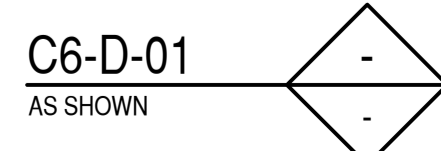


TYPICAL KERB DETAIL - MOUNTABLE

NOTE: ALL RADII ARE 20mm U.S.O.

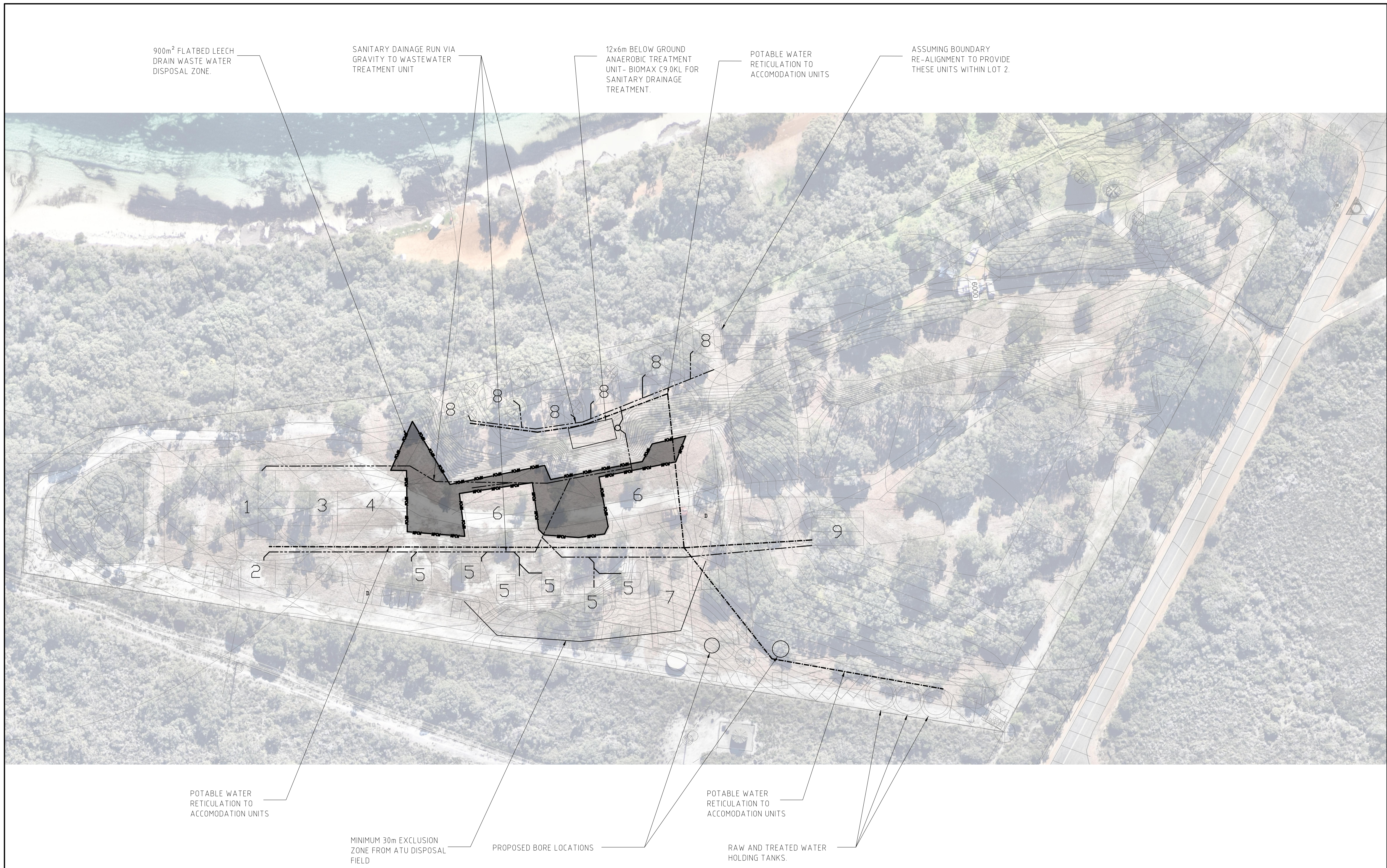


ACCESSIBLE CAR PARKING SPACES IN ACCORDANCE WITH AS2890.6



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|--|-------------------------|--------------------|
| CLIENT HUB | | |
| PROJECT LOT 1 & 2 FRENCHMAN BAY | | |
| TITLE CIVIL DETAILS | | |
| SCALE NTS @ A1 | DATE 04/12/2023 | DESIGNED PH |
| JOB No. 22-343 | DRG No. C8-DG-04 | REV A |



| REV | DATE | DESCRIPTION | TM | DCP | DCP |
|-----|----------|-------------------|-----|-----|-----|
| REV | DATE | DESCRIPTION | DRN | CHD | APP |
| A | 30/11/23 | PRELIMINARY ISSUE | | | |

FORTH

A: 1064 Hay St. WEST PERTH WA 6000
 E: admin@forth.com.au
 P: 9485 2921 F: 9485 2921
 W: forth.com.au

GENERAL NOTES: CONTRACTOR TO CHECK ALL DIMENSION ON-SITE REFER ANY DISCREPANCIES TO ARCHITECT FOR A DECISION, PRIOR TO COMMENCING ANY WORK OR PREPARING SHOP DRAWINGS

CLIENT: **Hub.**
 Property Group

ARCHITECT:

PROJECT:
 1823 FRENCHMAN BAY ROAD
 FRENCHMANS BAY

DRAWING TITLE:
 HYDRAULIC SERVICES
 SITE PLAN

| PRELIMINARY ISSUE | | | |
|-------------------|--------|-------------|----------|
| DRAWN: | TM | DATE: | 30/11/23 |
| DESIGN: | DCP | SHEET SIZE: | A1 |
| CHECKED: | DCP | SCALE: | 1:500 |
| PROJECT NUMBER: | 23-212 | | REV: |
| DRAWING NUMBER: | H001 | | A |