

|                               | DRAWING NR      | DRAWING TITLE                                                       |
|-------------------------------|-----------------|---------------------------------------------------------------------|
| Plan and Notes                | 3235084-GE-5000 | Retaining Wall Drawing List and Locality Plan                       |
|                               | 3235084-GE-5001 | Retaining walls general notes                                       |
| Brigham Creek Retaining Walls | 3235084-GE-5002 | Retaining Wall Plan and Elevation Brigham Creek SW Sheet 1          |
|                               | 3235084-GE-5003 | Retaining Wall Plan and Elevation Brigham Creek SE Sheet 1          |
|                               | 3235084-GE-5004 | Retaining Wall Plan and Elevation Brigham Creek NW Sheet 1          |
|                               | 3235084-GE-5005 | Retaining Wall Plan and Elevation Brigham Creek NE Sheet 1          |
|                               | 3235084-GE-5006 | Retaining Wall Plan and Elevation GRW1 Sheet 1                      |
| Generic Retaining Walls       | 3235084-GE-5007 | Retaining Wall Plan and Elevation GRW1 Sheet 2                      |
|                               | 3235084-GE-5008 | Retaining Wall Plan and Elevation GRW2 Sheet 1 (NOT IN THIS ISSUE)  |
|                               | 3235084-GE-5009 | Retaining Wall Plan and Elevation GRW2 Sheet 2 (NOT IN THIS ISSUE)  |
|                               | 3235084-GE-5010 | Retaining Wall Plan and Elevation GRW2A Sheet 1 (NOT IN THIS ISSUE) |
|                               | 3235084-GE-5011 | Retaining Wall Plan and Elevation GRW2A Sheet 2 (NOT IN THIS ISSUE) |
|                               | 3235084-GE-5012 | Retaining Wall Plan and Elevation GRW2A Sheet 3 (NOT IN THIS ISSUE) |
|                               | 3235084-GE-5013 | Retaining Wall Plan and Elevation GRW3 Sheet 1                      |
|                               | 3235084-GE-5014 | Retaining Wall Plan and Elevation GRW3 Sheet 2                      |
|                               | 3235084-GE-5017 | Retaining Wall Plan and Elevation GRW5 Sheet 1                      |
|                               | 3235084-GE-5018 | Retaining Wall Plan and Elevation GRW6 Sheet 1                      |
|                               | 3235084-GE-5019 | Retaining Wall Plan and Elevation GRW6 Sheet 2                      |
|                               | 3235084-GE-5020 | Retaining Wall Plan and Elevation GRW6 Sheet 3                      |
|                               | 3235084-GE-5021 | Retaining Wall Plan and Elevation GRW6 Sheet 4                      |
|                               | 3235084-GE-5022 | Retaining Wall Plan and Elevation GRW7 Sheet 1                      |
|                               | 3235084-GE-5023 | Retaining Wall Plan and Elevation GRW7 Sheet 2                      |
|                               | 3235084-GE-5024 | Retaining Wall Plan and Elevation GRW7 Sheet 3                      |
|                               | 3235084-GE-5025 | Retaining Wall Plan and Elevation GRW7 Sheet 4                      |
|                               | 3235084-GE-5026 | Retaining Wall Plan and Elevation GRW8 Sheet 1                      |
|                               | 3235084-GE-5027 | Retaining Wall Plan and Elevation GRW8 Sheet 2                      |
|                               | 3235084-GE-5028 | Retaining Wall Plan and Elevation GRW9 Sheet 1                      |
| Significant Retaining Walls   | 3235084-GE-5029 | Retaining Wall Plan and Elevation GRW9 Sheet 2                      |
|                               | 3235084-GE-5030 | Retaining Wall Plan and Elevation SRW1 Sheet 1* (NOT IN THIS ISSUE) |
|                               | 3235084-GE-5031 | Retaining Wall Plan and Elevation SRW1 Sheet 2* (NOT IN THIS ISSUE) |
|                               | 3235084-GE-5032 | Retaining Wall Plan and Elevation SRW2 Sheet 1                      |
|                               | 3235084-GE-5033 | Retaining Wall Plan and Elevation SRW2 Sheet 2                      |

|                        |                 |                                                    |
|------------------------|-----------------|----------------------------------------------------|
| Retaining Wall Details | 3235084-GE-5034 | retaining wall typical detail steel H Pile Sheet 1 |
|                        | 3235084-GE-5035 | retaining wall typical detail steel H Pile Sheet 2 |
|                        | 3235084-GE-5036 | retaining wall typical detail Timber Pile Sheet 1  |
|                        | 3235084-GE-5037 | retaining wall typical detail Timber Pile Sheet 2  |
|                        | 3235084-GE-5038 | retaining wall typical detail Timber Pile Sheet 3  |
| Earthworks Details     | 3235084-GE-5039 | Earthworks typical section detail sheet 1          |

- NOTES:
- GRW - GENERIC RETAINING WALL
  - SRW - SIGNIFICANT RETAINING WALL

| LEGEND |                                           |
|--------|-------------------------------------------|
|        | RETAINING WALL ALIGNMENT                  |
|        | PROPOSED STORMWATER PIPES                 |
|        | EXISTING STORMWATER PIPES TO BE RELOCATED |
|        | EXISTING STORMWATER PIPES TO REMAIN       |
|        | EXISTING WATERCARE WATERMAIN              |
|        | SPARK INTERNATIONAL CABLE                 |
|        | NEW WORKS IN CUT                          |
|        | NEW WORKS IN FILL                         |

|     |                    |    |     |      |          |
|-----|--------------------|----|-----|------|----------|
| C   | FOR CONSENTING     | AV | HM  | GC   | 10.10.22 |
| B   | DETAILED DESIGN    | ES | HM  | GC   | 19.01.22 |
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|                     |     |                                              |    |          |                            |
|---------------------|-----|----------------------------------------------|----|----------|----------------------------|
| Original Scale (A1) | NTS | Design                                       | HM | 26.03.21 | Approved For Construction* |
| Reduced Scale (A3)  | NTS | Drawn                                        | ES | 26.03.21 | Date                       |
|                     |     | Dwg Verifier                                 | DA | 19.10.22 |                            |
|                     |     | Dwg Check                                    |    |          |                            |
|                     |     | * Refer to Revision 1 for Original Signature |    |          |                            |



Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 2  
BRIGHAM CREEK TO KUMEU

Title: RETAINING WALLS  
DRAWING LIST AND  
LOCALITY PLAN

|             |                 |
|-------------|-----------------|
| Discipline  | GEOTECHNICAL    |
| Drawing No. | 3235084-GE-5000 |
| Rev.        | C               |

SURVEY DATUM

CO-ORDINATES ARE IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016  
WITHIN THE RETAINING WALL MODEL AND THE LEVELS ARE IN TERMS  
OF NEW ZEALAND VERTICAL DATUM 2016

GENERAL NOTES

1. DESIGN OF BARRIERS / EDGE OF SEAL AS DETAILED IN DRAWINGS 3235084-CB-2900 TO 2913 AND 3235084-CP-3100 TO 3114

2. CONTRACTOR TO SET OUT AND CONFIRM RETAINED HEIGHTS AND WALL LENGTHS ON SITE WITH THE RETAINING WALL ENGINEER PRIOR TO CONSTRUCTION. SET OUT FOR FILL WALLS TO BE DONE FROM BACK OF PILE (FACE CLOSEST TO THE CARRIAGEWAY) AT TOP OF WALL. SET OUT FOR CUT WALL TO BE DONE FROM FRONT OF PILE AT TOE OF WALL (FACE CLOSEST TO THE CARRIAGEWAY).

3. SUBSOIL DRAINAGE SYSTEM:

3.1. POSITION OF THE SUBSOIL DRAIN PIPE OUTLETS TO BE ADJUSTED ON SITE TO SUIT, AS AGREED WITH THE RETAINING WALL ENGINEER. OUTLET TO BE SERIES 200 HEADWALL ENCASED IN CONCRETE. MAXIMUM 30M SPACING OF SUBSOIL OUTLETS.

3.2. FLUSHING BOXES TO ENCAPSULATE OPEN ENDS AND THEIR POSITION TO BE ADJUSTED ON SITE TO SUIT, AS AGREED WITH THE RETAINING WALL ENGINEER. FLUSHING BOXES SHALL BE PROVIDED AT 30m MAXIMUM SPACING.

4. DRAINAGE COIL TO BE 110mm DIAMETER NEXUS HIWAY SMOOTH BORE. PIPING TO BE LAID IN A GRANULAR BED OF F/2 TO A NOMINAL FALL ALONG THE WALL. THE HIGH END OF THE PIPE SHALL EXTEND TO THE SURFACE AND BE CAPPED TO ALLOW FOR FUTURE FLUSHING OUT.

5. REFER TO DRAWING GE-5034 AND 5035 FOR STEEL H-PILE FILL WALL TYPICAL SECTIONS & DETAILS (WALL TYPES K, K1, L).

6. REFER TO DRAWING GE-5036 AND 5037 FOR TIMBER POLE FILL WALL AND CUT WALL TYPICAL SECTIONS & DETAILS (WALL TYPES A TO J).

7. REFER TO EACH RETAINING WALL DRAWING SET FOR DESIGN UNDRAINED SHEAR STRENGTH. THE RETAINING WALL ENGINEER SHALL BE ADVISED WHERE OBSERVED STRENGTH IS LOWER THAN THE DESIGNERS ASSUMED.

8. ONLY MECHANICAL HAND COMPACTION EQUIPMENT (PLATE COMPACTORS) IS ALLOWED WITHIN 2M OF BACK OF WALL.

9. ALL EXISTING SERVICES ARE TO BE PHYSICALLY LOCATED AND PROTECTED PRIOR TO STARTING WORK ON THE RETAINING WALL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING, TEMPORARY SUPPORT, RELOCATION, PROTECTION AND REINSTATEMENT OF SERVICES.

10. DURING ALL PHASES OF WORK THE ENGINEER SHALL BE INFORMED ON A DAILY BASIS AS TO THE WORK ANTICIPATED TO BE CARRIED OUT TO ENABLE INSPECTIONS TO BE UNDERTAKEN.

11. ALL TIMBER SHALL BE TREATED IN ACCORDANCE WITH NZS 3605 HAZARD CLASS H5. TIMBER RAILS SHALL BE RADIATA PINE OR CORSICAN PINE. THE RAILS SHALL BE STRAIGHT & FREE OF DECAY. KNOTS, SPLITS, CHECK OR ANY OTHER DEFECT THAT MAY AFFECT THE STRENGTH OF THE RAIL.

12. ALL SITE CUT TIMBER TO BE TREATED VIA SITE APPLICATION OF A SUITABLE PRODUCT TO THE SUPPLIER'S SPECIFICATION TO ACHIEVE A LEVEL OF TREATMENT EQUAL TO OR GREATER THAN THE MEMBERS ORIGINAL LEVEL OF TREATMENT.
13. BORED HOLES ARE TO BE UNDERTAKEN AS HIT AND MISS AND NOT REMAIN OPEN OVERNIGHT. HOLES MUST BE THOROUGHLY CLEAN OUT OF DEBRIS AND WATER BEFORE PLACING CONCRETE. POLES SHALL BE CONCRETED THE SAME DAY AS BORING.

14. THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY STABILITY

15. POLES SHALL BE INSTALLED LARGE END DOWN.

16. POLES/UC ARE TO BE BRACED DURING & AFTER CONCRETING SUCH THAT THE REQUIRED ALIGNMENT IS MAINTAINED.

17. ALL BOLTED STEEL FIXING COMPONENTS SHALL BE GRADE 304 STAINLESS STEEL. ALL OTHER STEEL FIXINGS COMPONENTS SHALL BE HOT DIP GALVANISED IN ACCORDANCE WITH AS/NZS:4680

18. MINIMUM CONCRETE STRENGTH TO BE 20 MPa.

19. CROSS SECTIONS ARE BASED ON INTERPOLATION OF DISCRETE INFORMATION. IF CONDITIONS AT THESE SECTIONS DIFFER FROM THAT NOTED THIS SHOULD BE ADDRESSED WITH THE RETAINING WALL ENGINEER.

20. THE SIZE AND LOCATION OF THE COMBINED SERVICES TRENCH SHOWN IN THIS DRAWING SET IS INDICATIVE. REFER TO CIVIL DRAWING SET FOR DETAILS.

21. THE LOCATION OF SAFETY BARRIER SHOWN IN THIS DRAWING SET IS INDICATIVE BUT MUST BE OFFSET 1.0m FROM THE RETAINING WALL. REFER TO CIVIL DRAWINGS SET FOR DETAILS.

22. RAIL JOINTS TO OCCUR AT POSTS ONLY. RAIL JOINTS ARE TO BE STAGGERED. RAILS TO BE SECURED TO POSTS WITH 6mm, 150mm LONG GALVANISED NAILS. TOP RAIL TO BE SECURED WITH COACH SCREWS. REFER SHEET 5004.

23. THE FOUNDATION CONDITIONS SHALL BE INSPECTED ON SITE BY THE RETAINING WALL ENGINEER.

24. RETAINING WALLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION.

25. SAFETY FENCE SHALL BE MINIMUM 1.1m HIGH PROPRIETARY WELDED PANEL FENCE WITH MAXIMUM 100mm GAP BETWEEN RAILING AS AN ALTERNATIVE SOLUTION TO NZ BUILDING CODE CLAUSE F4.3.4B.

26. TOP OF WALL DRAINAGE TYPICALLY CONSISTS OF GRASS LINED SWALES OR CONCRETE DISH CHANNELS. REFER TO STORMWATER DRAWINGS FOR TOP OF WALL DRAINAGE DETAILS.

27. WHERE STORMWATER PIPES PASS THROUGH THE RETAINING WALL, INCREASED SPACING AND SPECIFIC POLE DESIGN IS REQUIRED. REFER TO PILE TO PILE SPACING DETAIL ON EACH DRAWING SET. CONTRACTOR AND ENGINEER TO AGREE ON SITE THE STORMWATER PIPE CROSSING LOCATIONS.

28. REFER TO LONG SECTIONS FOR BRIDGING DESIGN DETAILS OF RETAINING WALL PILES EITHER SIDE OF UNDERGROUND UTILITY PIPES THAT PROTRUDE THROUGH RETAINING WALL.

| WALL ID                                                                                                                       | CHAINAGE (m)        | LENGTH (m) |
|-------------------------------------------------------------------------------------------------------------------------------|---------------------|------------|
| BCCC NE                                                                                                                       | CH190600 - CH190616 | 16         |
| BCCC NW                                                                                                                       | CH190638 - CH190699 | 61         |
| BCCC SE                                                                                                                       | CH190580 - CH190610 | 30         |
| BCCC SW                                                                                                                       | CH190642 - CH190675 | 33         |
| SRW-01                                                                                                                        | CH190836 - CH190970 | 134        |
| SRW-02                                                                                                                        | CH192518 - CH192620 | 102        |
| GRW1                                                                                                                          | CH190749 - CH190829 | 80         |
| GRW2                                                                                                                          | CH190776 - CH190859 | 83         |
| GRW2A                                                                                                                         | CH190848 - CH191008 | 160        |
| GRW3                                                                                                                          | CH191580 - CH191638 | 58         |
| GRW5                                                                                                                          | CH192550 - CH192572 | 22         |
| GRW6                                                                                                                          | CH192730 - CH192954 | 224        |
| GRW7                                                                                                                          | CH192735 - CH192907 | 172        |
| GRW8                                                                                                                          | CH193417 - CH193508 | 91         |
| GRW9                                                                                                                          | CH194045 - CH194129 | 84         |
| TOTAL WALL LENGTHS MAY DIFFER FROM CHAINAGES SHOWN TO ACCOMMODATE BRIDGE ABUTMENT TIE-IN AND DRIVEWAY RETAINING WALL RETURNS. |                     |            |

|     |                    |    |     |      |          |
|-----|--------------------|----|-----|------|----------|
| C   | FOR CONSENTING     | AV | HM  | GC   | 10.10.22 |
| B   | DETAILED DESIGN    | ES | HM  | GC   | 19.01.22 |
| A   | PRELIMINARY DESIGN | ES | AC  | NL   | 26.03.21 |
| No. | Revision           | By | Chk | Appd | Date     |

Drawing Originator:



|                                              |              |    |          |                            |
|----------------------------------------------|--------------|----|----------|----------------------------|
| Original Scale (A1) NTS                      | Design       | HM | 26.03.21 | Approved For Construction* |
| Reduced Scale (A3) NTS                       | Drawn        | ES | 26.03.21 |                            |
|                                              | Dwg Verifier | DA | 19.10.22 |                            |
|                                              | Dwg Check    |    |          | Date                       |
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Client: SH16 - SAFETY IMPROVEMENTS  
STAGE 2  
BRIGHAM CREEK TO KUMEU

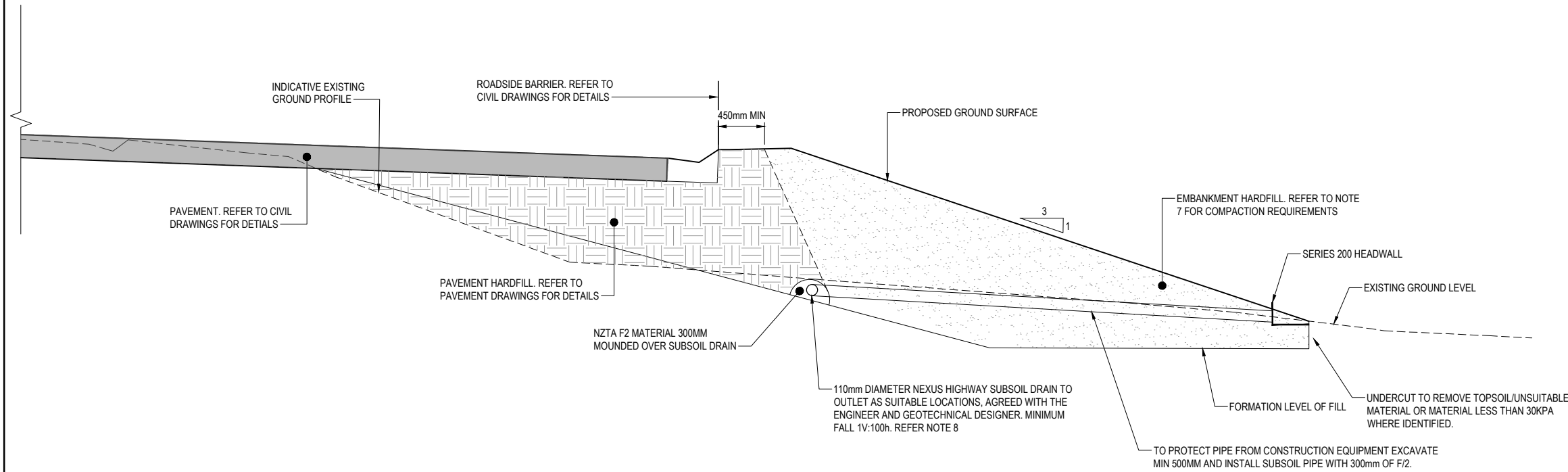
Title: RETAINING WALLS  
GENERAL NOTES

|             |                 |
|-------------|-----------------|
| Discipline  | GEOTECHNICAL    |
| Drawing No. | 3235084-GE-5001 |
| Rev.        | C               |



NOTES:

1. ALL DIMENSIONS IN METERS UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL LOCATE AND PROTECT ALL SERVICES / UTILITIES PRIOR TO COMMENCING THE WORK AND SHALL INFORM THE ENGINEER SHOULD ANY CONFLICTS ARISE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO SERVICES / UTILITIES CAUSED BY THEIR ACTIVITIES.
3. THE DESIGN DIMENSIONS LONGITUDINALLY AND LATERALLY ARE BASED ON INTERPRETATION OF GROUND CONDITIONS AT EACH SITE. THE GROUND CONDITIONS ARE INFERRED BASED ON LIMITED GEOTECHNICAL AND SURVEY INFORMATION. AS SUCH, THESE DIMENSIONS ARE INDICATIVE.
4. THE FORMATION LEVEL OF FILL IS ASSUMED TO COMPRISE FIRM FINE GRAINED (SILT/CLAY) SOILS. IF GROUND CONDITIONS ENCOUNTERED DURING CONSTRUCTION VARY FROM THIS ASSUMPTION OR 'UNSUITABLE MATERIAL' IS ENCOUNTERED, THE ENGINEER AND GEOTECHNICAL DESIGNER SHALL BE NOTIFIED IMMEDIATELY. 'UNSUITABLE MATERIAL' IS DEFINED AS ANY SOIL OR MATERIAL WHICH, BECAUSE OF ITS PHYSICAL OR CHEMICAL COMPOSITION IS UNSUITABLE TO HAVE FILL PLACED ON IT. 'UNSUITABLE MATERIAL' SHALL INCLUDE ANY: NON-ENGINEERED FILL, HIGHLY ORGANIC SOILS, TOXIC MATERIALS FROM SWAMPS, MARSHES OR BOGS, RUNNING SILT, PEAT, LOGS, STUMPS, PERISHABLE OR ORGANIC MATERIALS, SLURRY OR MUD, ASHES OR ANY MATERIALS CONTAINING COMPOUNDS HARMFUL TO OTHER ELEMENTS OF CONSTRUCTION OR THE ENVIRONMENT.
5. THE FORMATION LEVEL OF THE FILL IS REQUIRED TO HAVE A MINIMUM UNDRAINED SHEAR STRENGTH OF 30 KPa, MEASURED BY SCALA PENETROMETER, WITH MINIMUM 1BLOW/100MM FOR 1.0M DEPTH AT 5M INTERVALS. IF <1BLOW/100MM MEASURED, HAND HELD SHEAR VANE TESTS TO BE CARRIED OUT IN ACCORDANCE WITH THE NZGS 2001 GUIDELINE FOR HAND HELD SHEAR VANE TESTING. THIS TEST SHALL BE AT 5m INTERVALS AND 0.3m VERTICAL SPACINGS, WITH THE FIRST TEST AT A DEPTH OF 0.15m UNDERTAKEN TO A DEPTH OF 1.0m BELOW FORMATION LEVEL. TESTS ARE TO BE UNDERTAKEN BY THE CONTRACTOR.
6. THE ENGINEER SHALL OBSERVE THE FORMATION LEVEL AND THE TEST RESULTS PRIOR TO THE FILLING. NO FILLING TO COMMENCE WITHOUT THE ENGINEER'S ACCEPTANCE OF FOUNDING CONDITIONS.
7. THE FILL MATERIAL SHALL MEET THE GRADING, COMPACTION AND TESTING REQUIREMENTS SPECIFIED IN THE EARTHWORKS SPECIFICATION.
8. 110mm Ø HDPE SMOOTH BORE, CORRUGATED, TOP HALF PERFORATED SUBSOIL DRAIN PIPE IN 300mm x 300mm NZTA F2 DRAINAGE MATERIAL SHALL BE USED FOR THE SUBSOIL DRAINAGE SYSTEM.
9.
  - 9.1 POSITION OF THE SUBSOIL DRAIN OUTLETS TO BE ADJUSTED ON SITE TO SUIT, AS AGREED WITH THE ENGINEER. OUTLET TO BE SERIES 200 HEADWALL OR AS AGREED WITH ENGINEER. MAXIMUM 30M SPACING OF SUBSOIL OUTLETS.
  - 9.2 FLUSHING BOXES TO ENCAPSULATE OPEN ENDS AND THEIR POSITION TO BE ADJUSTED ON SITE TO SUIT, AS AGREED WITH THE ENGINEER. FLUSHING BOXES SHALL BE PROVIDED AT MAXIMUM 30M INTERVALS.
10. THE CONTRACTOR SHALL CONSTRUCT BENCHING TO KEY IN HARDFILL INTO EXISTING SLOPE WITH MAXIMUM BENCH HEIGHT NO GREATER THAN 1.0m. TEMPORARY BATTER ANGLE DURING CONSTRUCTION SHALL BE EVALUATED BY THE CONTRACTOR FOR STABILITY AND SAFETY OF THE GROUND WORKS.
11. THE FOLLOWING POINTS SHALL BE INCLUDED AS HOLD POINTS REQUIRING RELEASE FROM THE ENGINEER AND PRIOR TO COMMENCING ANY WORK.
  - a. CONTRACTOR'S SUBMISSION OF METHOD STATEMENT FOR REVIEW AT LEAST TWO WEEKS PRIOR TO COMMENCING WORKS.
  - b. ENGINEER TO INSPECT FORMATION LEVEL MATERIAL AND REVIEW THE CONTRACTOR'S TEST RESULTS PRIOR TO THE COMMENCEMENT OF FILLING



1 TYPICAL FILL SLOPE CROSS SECTION  
SCALE 1:25 (A1)

| No. | Revision              | By    | Chk. | Appd. | Date     |
|-----|-----------------------|-------|------|-------|----------|
| C   | FOR CONSENTING        | ES/AV | HM   | DA    | 10.10.22 |
| B   | DETAILED DESIGN       | ES/AV | HM   | DA    | 25.08.22 |
| A   | DRAFT DETAILED DESIGN |       |      |       |          |

Drawing Originator:



|                     |                 |    |          |                            |
|---------------------|-----------------|----|----------|----------------------------|
| Original Scale (A1) | Design          | HM | 26.03.21 | Approved For Construction* |
| NTS                 | Drawn           | ES | 26.03.21 |                            |
| Reduced Scale (A3)  | Design Verifier | DA | 26.08.22 |                            |
| NTS                 | Design Check    |    |          | Date                       |

\* Refer to Revision 1 for Original Signature

Client:



Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 2  
BRIGHAM CREEK TO KUMEU

Title:

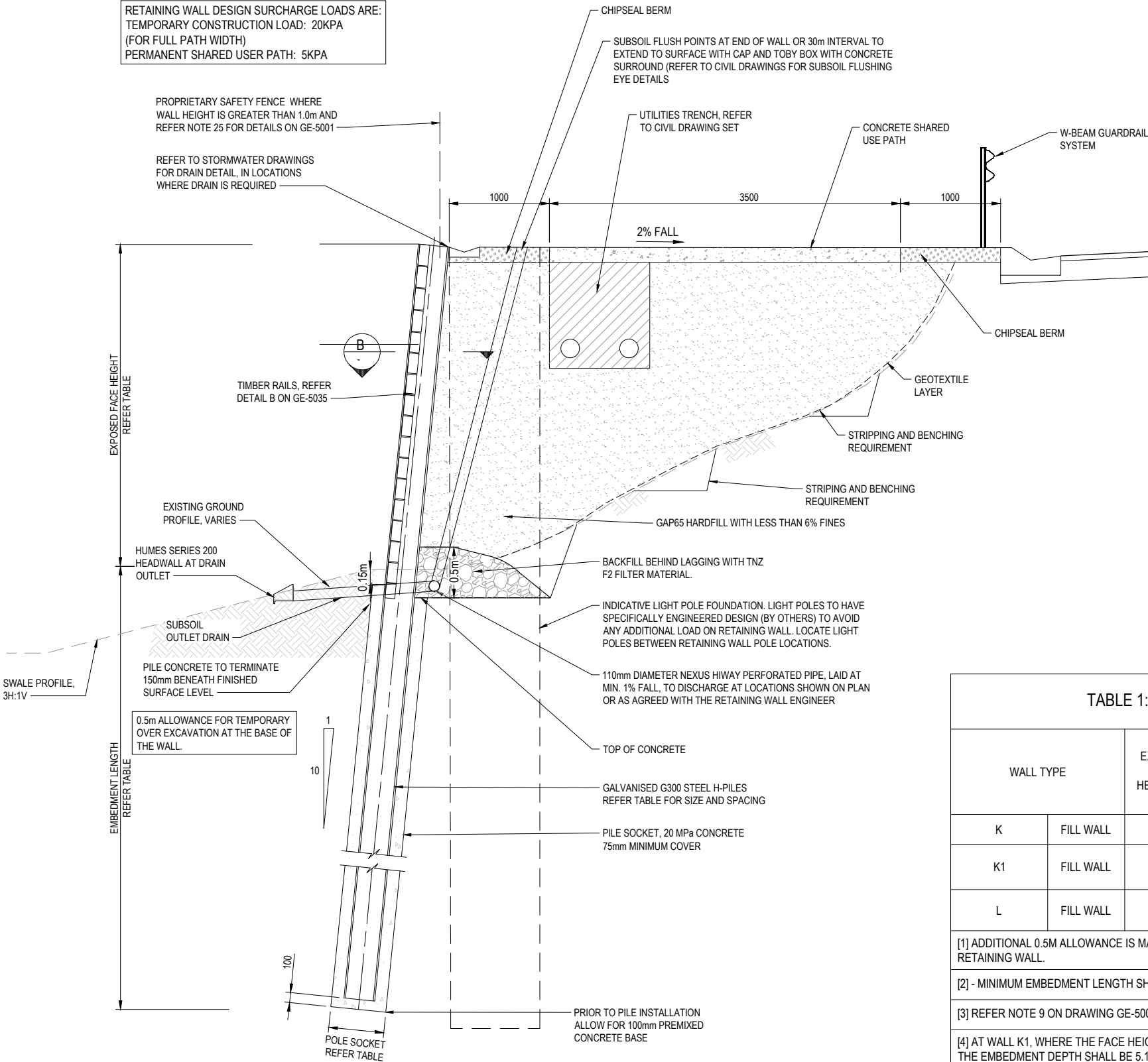
TYPICAL FILL SLOPE

|             |                 |
|-------------|-----------------|
| Discipline  | GEOTECHNICAL    |
| Drawing No. | 3235084-GE-5201 |
| Rev.        | C               |

CONSTRUCTION SEQUENCE CONSTRAINTS

1. BORED HOLES ARE TO BE UNDERTAKEN AS HIT AND MISS AND NOT TO REMAIN OPEN OVERNIGHT. HOLES MUST BE THOROUGHLY CLEANED OUT BEFORE PLACING CONCRETE. PILES SHALL BE INSTALLED THE SAME DAY AS BORING.
2. THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY STABILITY.

RETAINING WALL DESIGN SURCHARGE LOADS ARE:  
TEMPORARY CONSTRUCTION LOAD: 20KPA  
(FOR FULL PATH WIDTH)  
PERMANENT SHARED USER PATH: 5KPA



NOTE: FOR CRITICAL DESIGN, THE EMBEDMENT DEPTH IS CONTROLLED BY THE FOLLOWING FACTORS:  
-SWALE SLOPE IN FRONT OF THE WALL  
-SH16 SURCHARGE LOADING  
-HIGH GROUNDWATER LEVEL DESIGN CASE

TABLE 1: RETAINING WALL (STEEL H-PILE) DESIGN SUMMARY

| WALL TYPE |           | MAX. EXPOSED FACE HEIGHT (M) [1] | MIN. EMBEDMENT LENGTH (M) [2] [3] [4] | STEEL H-PILE SPACING (M) | CONCRETED BORED SOCKET DIA. (MM) | STEEL H-PILE SECTION SIZE [3] | TIMBER LAGGING           |
|-----------|-----------|----------------------------------|---------------------------------------|--------------------------|----------------------------------|-------------------------------|--------------------------|
| K         | FILL WALL | 2.2                              | 7.1                                   | 1.25                     | 600                              | 310UC158                      | 75mm x 150mm             |
| K1        | FILL WALL | 2.0 (3.0)                        | 6.1 (5.1)                             | 1.25                     | 600                              | 310UC158                      | 75mmX150mm<br>75mmX150mm |
| L         | FILL WALL | 1.5                              | 3.9                                   | 1.25                     | 600                              | 250UC72.9                     | 75mm x 150mm             |

- [1] ADDITIONAL 0.5M ALLOWANCE IS MADE FOR TEMPORARY EXCAVATION BENEATH FINISHED GROUND LEVEL IN FRONT OF THE RETAINING WALL.
- [2] - MINIMUM EMBEDMENT LENGTH SHALL BE MEASURED FROM LOWEST FINISHED GROUND LEVEL.
- [3] REFER NOTE 9 ON DRAWING GE-5001. CONTRACTOR TO CONFIRM GROUND CONDITIONS PRIOR TO WALL CONSTRUCTION.
- [4] AT WALL K1, WHERE THE FACE HEIGHT IS 2M THE EMBEDMENT DEPTH SHALL BE 6.1M AND WHERE THE WALL FACE IS EXTENDED TO 3M THE EMBEDMENT DEPTH SHALL BE 5.1M. I.E. THE PILE FOUNDING LEVEL REMAINS THE SAME FOR BOTH OPTIONS.

1 FILL WALL ADJACENT TO SHARED USE PATH - TYPICAL WALL CROSS SECTION  
SCALE 1:50 (A3)

| No. | Revision           | By | Chk | Appd | Date     |
|-----|--------------------|----|-----|------|----------|
| C   | FOR CONSENTING     | AV | HM  | GC   | 10.10.22 |
| B   | DETAILED DESIGN    | ES | HM  | GC   | 19.01.22 |
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Drawing Originator:



|                                              |                 |    |          |                            |
|----------------------------------------------|-----------------|----|----------|----------------------------|
| Original Scale (A1) NTS                      | Design Drawn ES | HM | 26.03.21 | Approved For Construction* |
| Reduced Scale (A3) NTS                       | Dwg Verifier DA |    | 19.10.22 | Date                       |
| * Refer to Revision 1 for Original Signature |                 |    |          |                            |

Client:

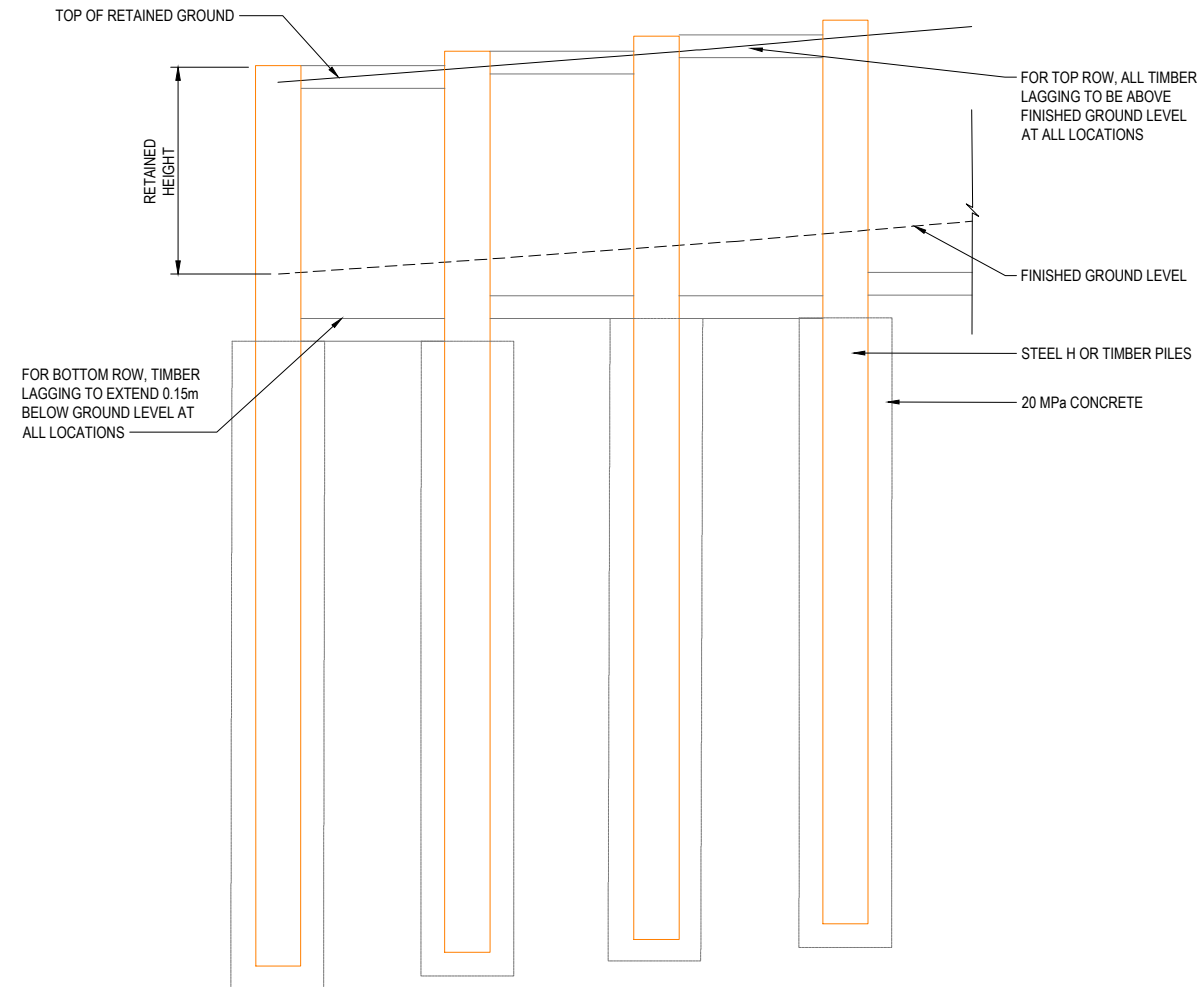


Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 2  
BRIGHAM CREEK TO KUMEU

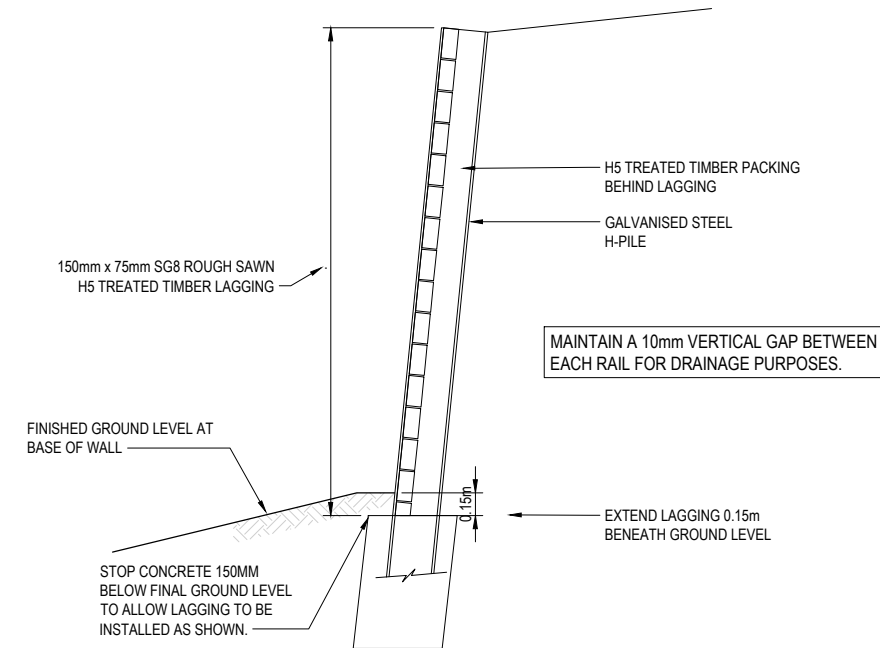
Title: RETAINING WALL TYPICAL DETAIL  
STEEL FILL RETAINING WALL  
SHEET 1

|             |                 |
|-------------|-----------------|
| Discipline  | GEOTECHNICAL    |
| Drawing No. | 3235084-GE-5034 |
| Rev.        | C               |

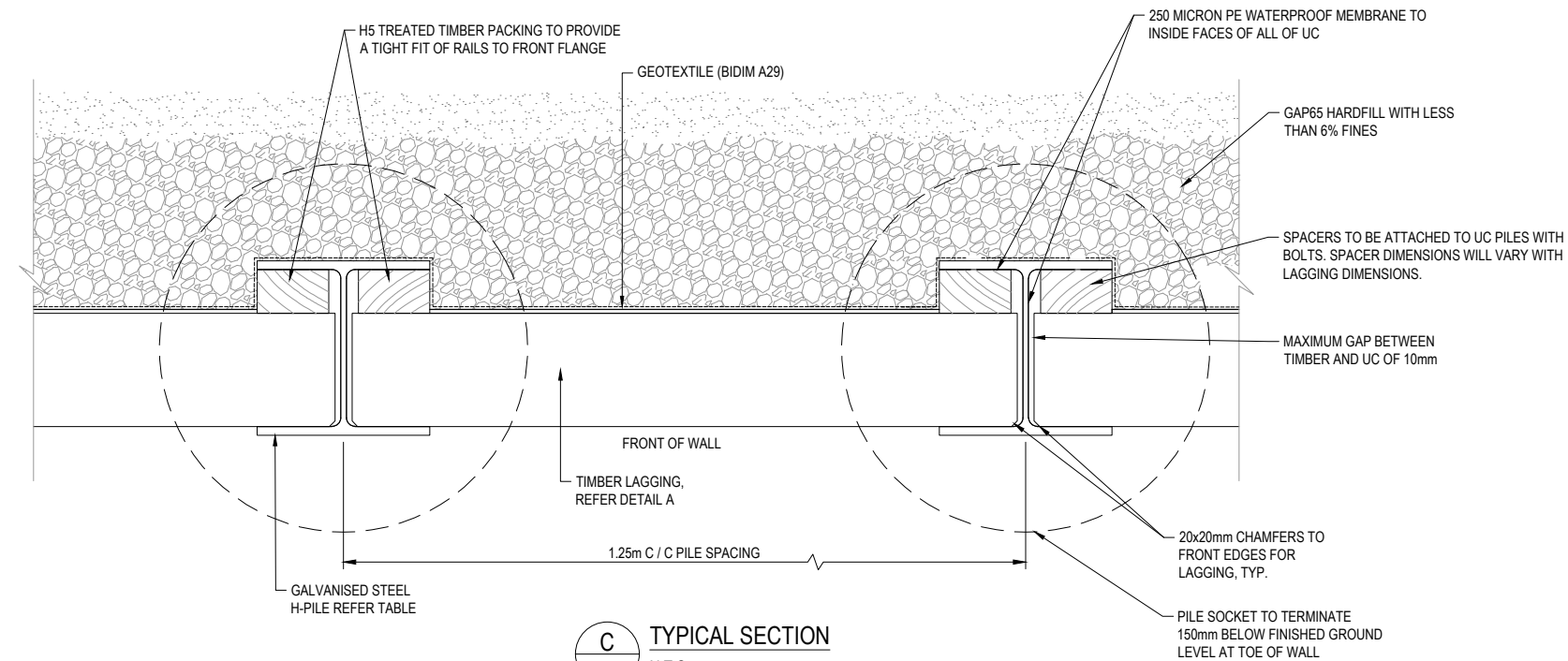




**A** DETAIL - TYPICAL LAGGING ARRANGEMENT  
SCALE 1:50 (A3)



**B** DETAIL - TYPICAL TIMBER LAGGING ARRANGEMENT  
SCALE 1:50 (A3)



**C** TYPICAL SECTION  
N.T.S.

**CONSTRUCTION SEQUENCE CONSTRAINTS**

1. BORED HOLES ARE TO BE UNDERTAKEN AS HIT AND MISS AND NOT TO REMAIN OPEN OVERNIGHT. HOLES MUST BE THOROUGHLY CLEANED OUT BEFORE PLACING CONCRETE. PILES SHALL BE INSTALLED THE SAME DAY AS BORING.
2. THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY STABILITY.

|     |                    |    |     |      |          |
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|                     |               |    |          |                            |
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| NTS                 | Drawn         | ES | 26.03.21 |                            |
| Reduced Scale (A3)  | Disg Verifier | DA | 19.10.22 | Date                       |
| NTS                 | Dwg Check     |    |          |                            |

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Client:



Project:

SH16 - SAFETY IMPROVEMENTS  
STAGE 2  
BRIGHAM CREEK TO KUMEU

Title:

RETAINING WALL TYPICAL DETAIL  
STEEL FILL RETAINING WALL  
SHEET2

|             |                 |
|-------------|-----------------|
| Discipline  | GEOTECHNICAL    |
| Drawing No. | 3235084-GE-5035 |
| Rev.        | C               |

CONSTRUCTION SEQUENCE CONSTRAINTS

1. BORED HOLES ARE TO BE UNDERTAKEN AS HIT AND MISS AND NOT TO REMAIN OPEN OVERNIGHT. HOLES MUST BE THOROUGHLY CLEANED OUT BEFORE PLACING CONCRETE. PILES SHALL BE INSTALLED THE SAME DAY AS BORING.
2. THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY STABILITY.

NOTE: FOR CRITICAL DESIGN WALL LOCATIONS, THE EMBEDMENT DEPTH IS CONTROLLED BY THE FOLLOWING FACTORS:  
-SWALE SLOPE IN FRONT OF THE WALL  
-SH16 SURCHARGE LOADING  
-HIGH GROUNDWATER LEVEL DESIGN CASE

TABLE 3: GRW1 RETAINING WALL DESIGN HEIGHTS

| WALL TYPE   | MAX. RETAINED FACE HEIGHT (m) [1] | MIN. EMBEDMENT LENGTH (m) [2] | MAXIMUM TIMBER POLE SPACING (m) | MINIMUM CONCRETED BORED SOCKET DIA (mm) | SED TIMBER POLE DIAMETER (mm) | TIMBER LAGGING [3]                          |
|-------------|-----------------------------------|-------------------------------|---------------------------------|-----------------------------------------|-------------------------------|---------------------------------------------|
| GRW1-TYPE 1 | 1.0                               | 2.2                           | 1.25                            | 500                                     | 250                           | 50mm X 150mm for top 1.1m then 75mm x 150mm |
| GRW1-TYPE 2 | 1.5                               | 3.4                           | 1.25                            | 500                                     | 250                           | 50mm X 150mm for top 1.1m then 75mm x 150mm |
| GRW1-TYPE 3 | 2.0                               | 4.3                           | 1.25                            | 600                                     | 400                           | 50mm X 150mm for top 1.1m then 75mm x 150mm |

TABLE 2: RETAINING WALL (TIMBER POLE) DESIGN SUMMARY

| WALL TYPE |           | WALL SUPPORTS | MAX. EXPOSED FACE HEIGHT (m) [1] | MIN. EMBEDMENT DEPTH (m) [2] | MAXIMUM TIMBER POLE SPACING (m) | MINIMUM CONCRETED BORED SOCKET DIA. (mm) | SED TIMBER POLE DIA. (mm) | TIMBER LAGGING [3] SG8                      |
|-----------|-----------|---------------|----------------------------------|------------------------------|---------------------------------|------------------------------------------|---------------------------|---------------------------------------------|
| A         | FILL WALL | -             | 0.9                              | 1.0                          | 1.25                            | 400                                      | 200                       | 50mm X 150mm for top 0.3m then 75mm x 150mm |
| B         | FILL WALL | SH16          | 1.2                              | 4.3                          | 1.25                            | 600                                      | 275                       | 50mm X 150mm for top 0.3m then 75mm x 150mm |
| C         | FILL WALL | SH16          | 0.6 *                            | 2.1                          | 1.25                            | 400                                      | 200                       | 50mm X 150mm for top 0.4m then 75mm x 150mm |
| D         | FILL WALL | SUP           | 1.8                              | 3.5                          | 1.25                            | 600                                      | 325                       | 50mm X 150mm for top 1.1m then 75mm x 150mm |
| E         | FILL WALL | SUP           | 1.3**                            | 2.2                          | 1.25                            | 400                                      | 250                       | 50mm X 150mm for top 1.1m then 75mm x 150mm |
| F         | FILL WALL | SUP/SH16      | 1.5                              | 3.0                          | 1.25                            | 400                                      | 250                       | 50mm X 150mm for top 0.8m then 75mm x 150mm |
| G         | FILL WALL | SUP           | 2.2                              | 5.1                          | 1.25                            | 600                                      | 400                       | 50mm X 150mm for top 0.4m then 75mm x 150mm |

\*1.0m maximum for BC SE only

\*\*1.8m maximum for GRW9 only

|   |          |  |     |     |      |     |     |                                             |
|---|----------|--|-----|-----|------|-----|-----|---------------------------------------------|
| H | CUT WALL |  | 1.4 | 6.0 | 1.25 | 600 | 350 | 50mm X 150mm for top 0.6m then 75mm x 150mm |
| I | CUT WALL |  | 2.0 | 4.6 | 1.25 | 600 | 350 | 75mm x 150mm                                |
| J | CUT WALL |  | 2.9 | 5.1 | 1.25 | 600 | 400 | 75mm x 150mm FOR TOP 2m. THEN 100mm x 150mm |

[1] ADDITIONAL 0.5M ALLOWANCE IS MADE FOR TEMPORARY EXCAVATION BENEATH FINISHED GROUND LEVEL IN FRONT OF THE RETAINING WALL.

[2] MINIMUM EMBEDMENT LENGTH SHALL BE MEASURED FROM LOWEST FINISHED GROUND LEVEL.

[3] SPECIFIC TIMBER LAGGING DETAILS AT STORMWATER BRIDGING LOCATIONS AND TRANSFORMER LOCATIONS.

ORIGINAL DRAWING  
IN COLOUR

DETAILED DESIGN  
NOT FOR CONSTRUCTION

|     |                    |    |     |      |          |
|-----|--------------------|----|-----|------|----------|
| C   | FOR CONSENTING     | AV | HM  | GC   | 10.10.22 |
| B   | DETAILED DESIGN    | ES | HM  | GC   | 19.01.22 |
| A   | PRELIMINARY DESIGN | ES | AC  | NL   | 26.03.21 |
| No. | Revision           | By | Chk | Appd | Date     |

Drawing Originator:



|                     |                                              |    |          |                            |
|---------------------|----------------------------------------------|----|----------|----------------------------|
| Original Scale (A1) | Design                                       | HM | 26.03.21 | Approved For Construction* |
| NTS                 | Drawn                                        | ES | 26.03.21 | Date                       |
| Reduced Scale (A3)  | Dwg Verifier                                 | DA | 19.10.22 |                            |
| NTS                 | Dwg Check                                    |    |          |                            |
|                     | * Refer to Revision 1 for Original Signature |    |          |                            |

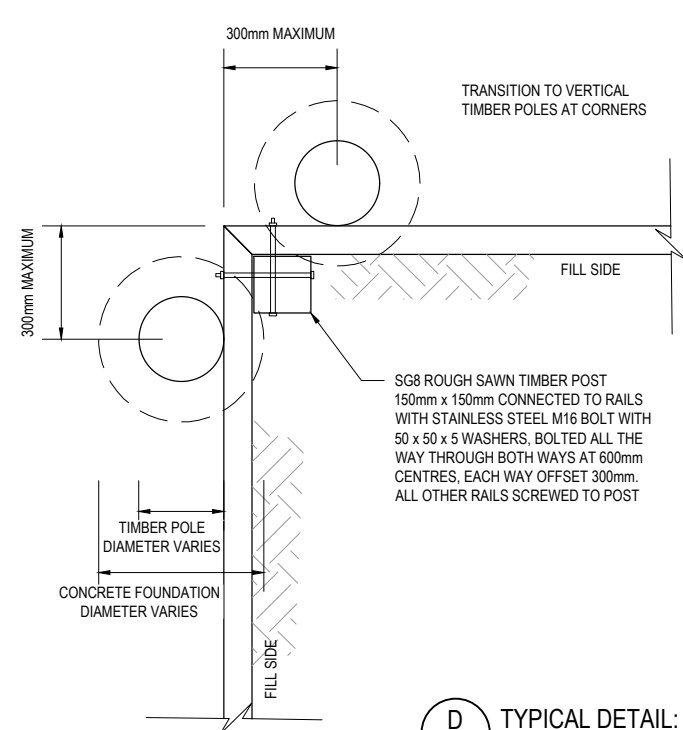
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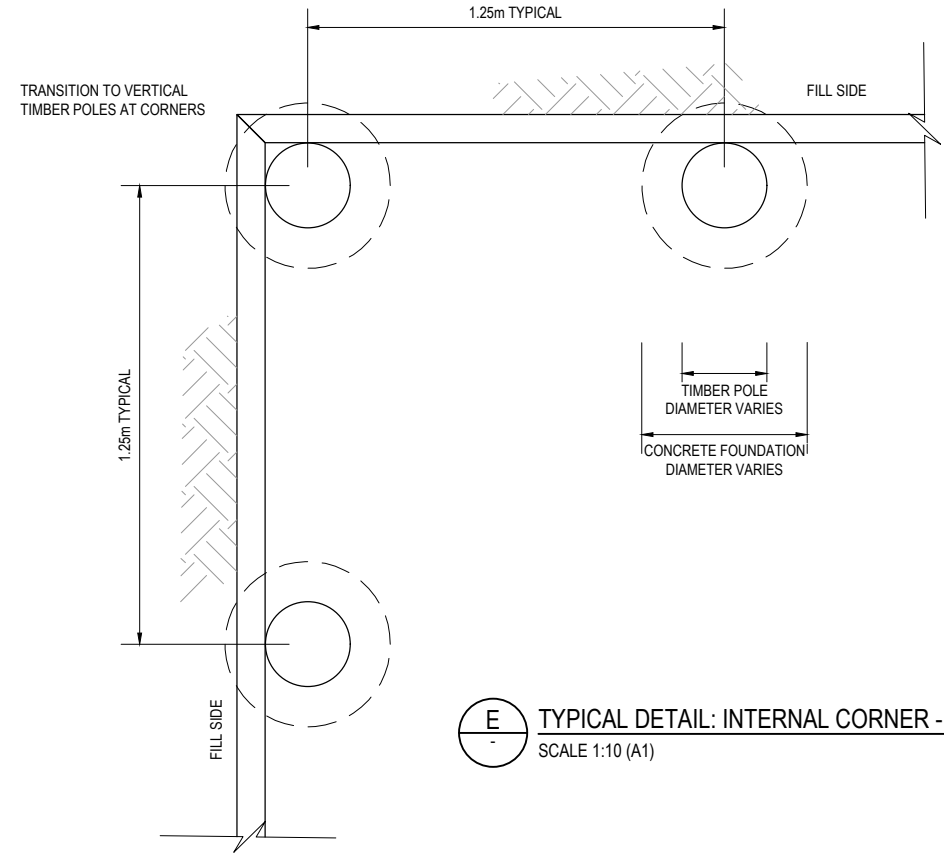
Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 2  
BRIGHAM CREEK TO KUMEU

Title: TYPICAL DETAIL  
TIMBER FILL RETAINING WALL  
SUPPORTING SHARED USE PATH

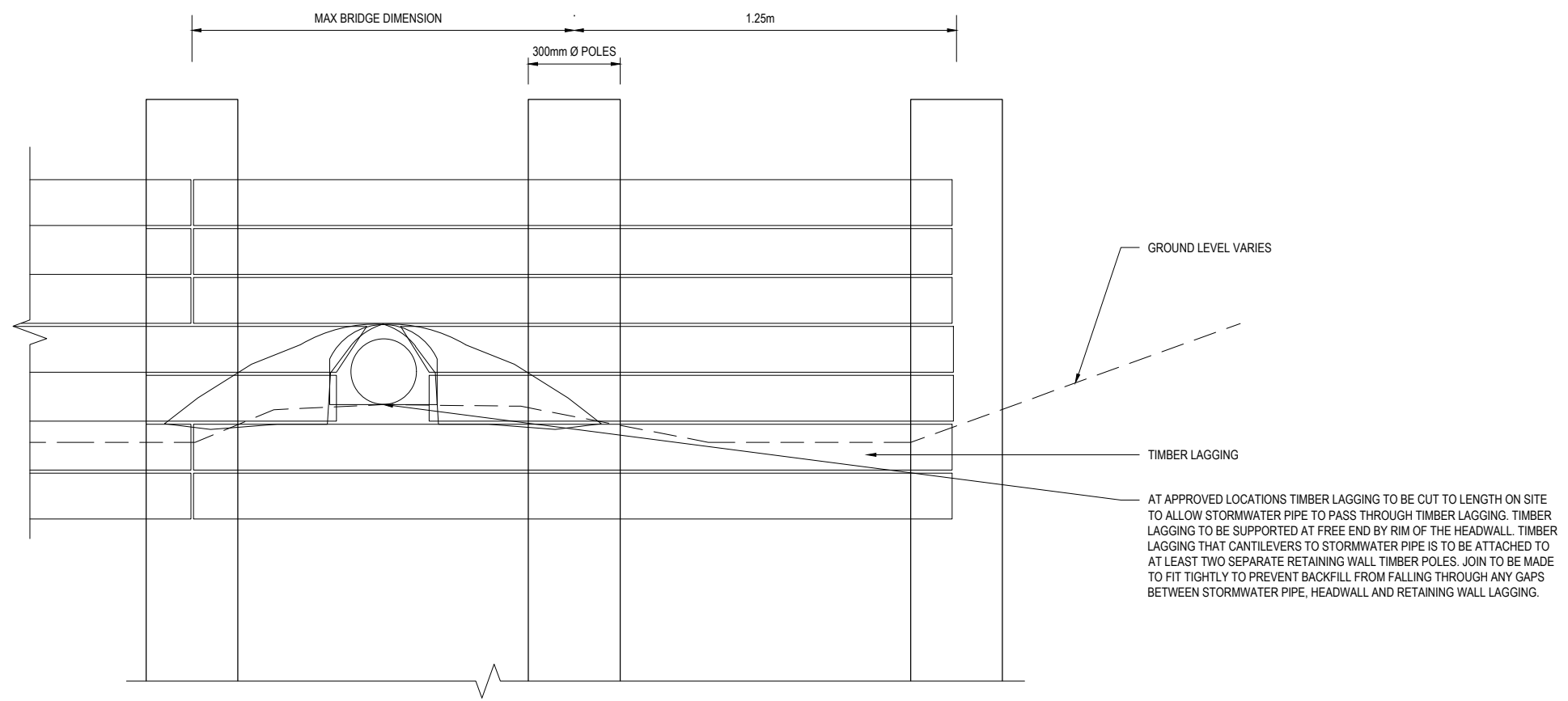
|             |                 |
|-------------|-----------------|
| Discipline  | GEOTECHNICAL    |
| Drawing No. | 3235084-GE-5036 |
| Rev.        | C               |



**D** TYPICAL DETAIL: EXTERNAL CORNER - PLAN  
SCALE 1:10 (A1)



**E** TYPICAL DETAIL: INTERNAL CORNER - PLAN  
SCALE 1:10 (A1)



**F** TYPICAL DETAIL: SW PIPE THROUGH TIMBER LAGGING WITH TIMBER POLE WALL  
SCALE 1:10 (A1)

|     |                    |    |     |      |          |
|-----|--------------------|----|-----|------|----------|
| C   | FOR CONSENTING     | AV | HM  | GC   | 10.10.22 |
| B   | DETAILED DESIGN    | ES | HM  | GC   | 19.01.22 |
| A   | PRELIMINARY DESIGN | ES | AC  | NL   | 26.03.21 |
| No. | Revision           | By | CHK | Appd | Date     |

Drawing Originator:  
**Beca**

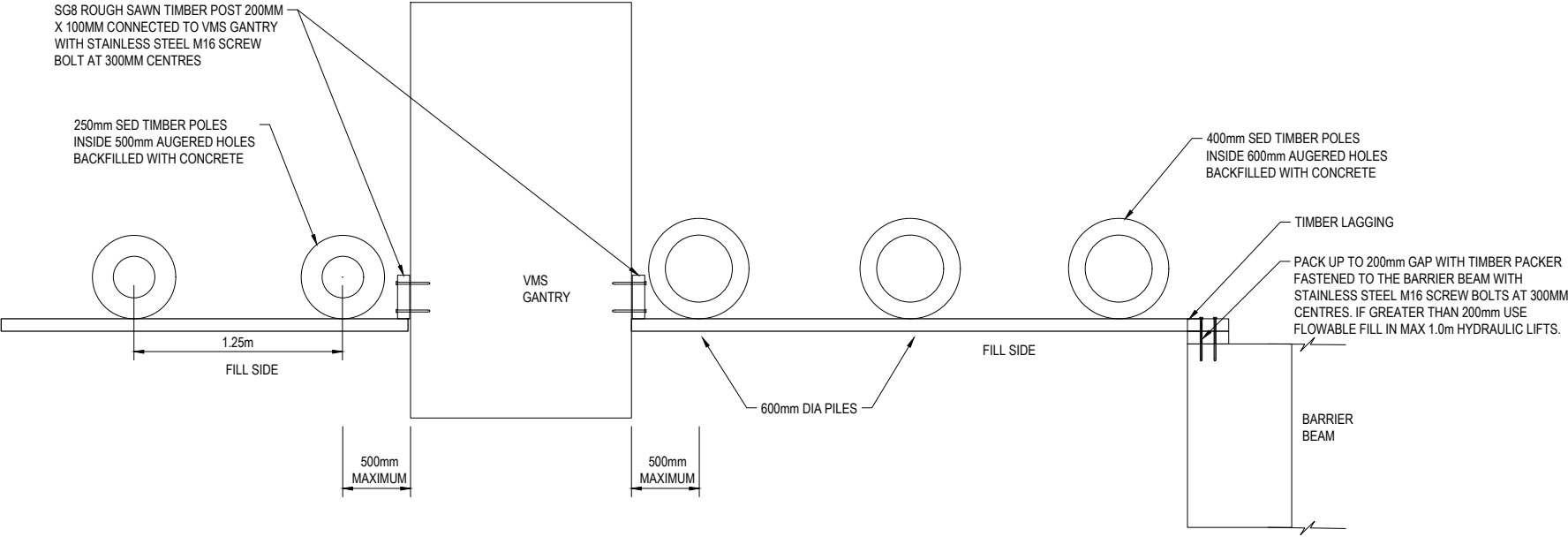
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|---------------------|----------------------------------------------|----|----------|----------------------------|
| Original Scale (A1) | Design                                       | HM | 26.03.21 | Approved For Construction* |
| Reduced Scale (A3)  | Drawn                                        | ES | 26.03.21 |                            |
|                     | Design Checker                               | DA | 19.10.22 |                            |
|                     | Design Check                                 |    |          | Date                       |
|                     | * Refer to Revision 1 for Original Signature |    |          |                            |

Client:  
**WAKA KOTAHU**  
NZ TRANSPORT AGENCY

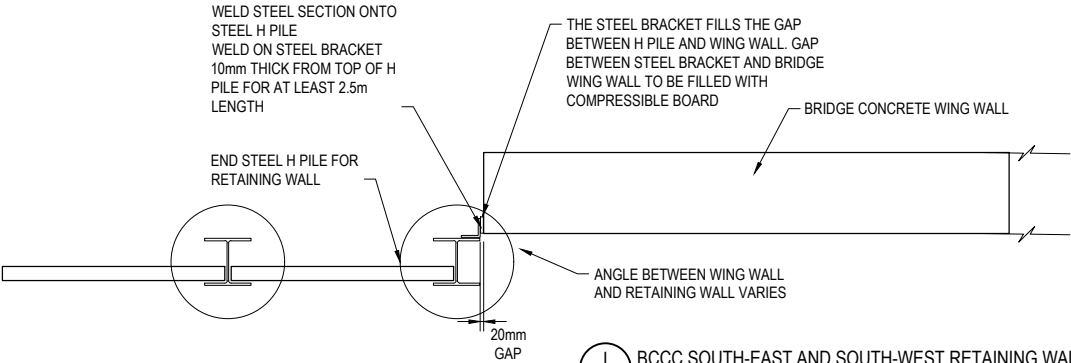
Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 2  
BRIGHAM CREEK TO KUMEU

Title: TYPICAL DETAIL  
PLAN INTERIOR/EXTERNAL CORNER

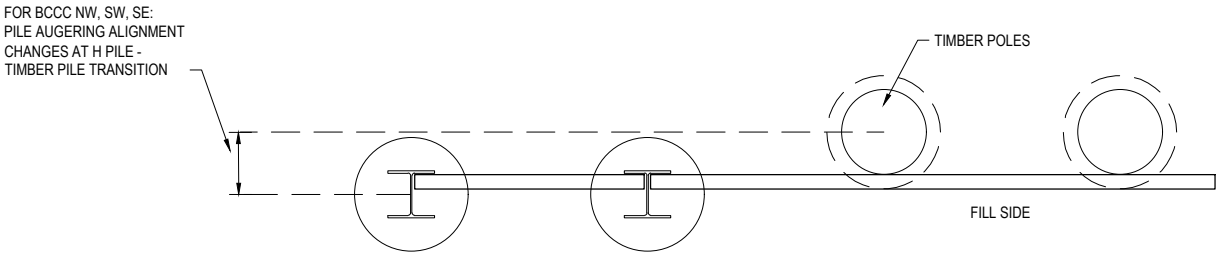
|             |                 |
|-------------|-----------------|
| Discipline  | GEOTECHNICAL    |
| Drawing No. | 3235084-GE-5037 |
| Rev.        | C               |



G BCCC NORTH-WEST AND NORTH-EAST RETAINING WALL  
SCALE 1:20 (A3)



I BCCC SOUTH-EAST AND SOUTH-WEST RETAINING WALL  
SCALE 1:20 (A3)



J PILE AUGERING ALIGNMENT OF LAGGING AT INTERFACE BETWEEN TIMBER PILES AND STEEL H PILES  
SCALE 1:20 (A3)

|     |                    |    |     |      |          |
|-----|--------------------|----|-----|------|----------|
| C   | FOR CONSENTING     | AV | HM  | GC   | 10.10.22 |
| B   | DETAILED DESIGN    | ES | HM  | GC   | 19.01.22 |
| A   | PRELIMINARY DESIGN | ES | AC  | NL   | 26.03.21 |
| No. | Revision           | By | CHK | Appd | Date     |

Drawing Originator:  
**Beca**

|                     |                                              |          |          |                            |
|---------------------|----------------------------------------------|----------|----------|----------------------------|
| Original Scale (A1) | Design                                       | HM       | 26.03.21 | Approved For Construction* |
| Drawn               | ES                                           | 26.03.21 |          |                            |
| Reduced Scale (A3)  | Design Verifier                              | DA       | 19.10.22 | Date                       |
| NTS                 | Design Check                                 |          |          |                            |
|                     | * Refer to Revision 1 for Original Signature |          |          |                            |

Client:  
**WAKA KOTAHI**  
NZ TRANSPORT AGENCY

Project: SH16 - SAFETY IMPROVEMENTS  
STAGE 2  
BRIGHAM CREEK TO KUMEU

Title: TYPICAL DETAIL  
BRIGHAM CREEK BRIDGE  
RETAINING WALL INTERFACES

|             |                 |
|-------------|-----------------|
| Discipline  | GEOTECHNICAL    |
| Drawing No. | 3235084-GE-5038 |
| Rev.        | C               |