

Memorandum

To: Michael Campbell – Campbell Brown Planning Limited

From: Phil Fairgray

Date: 17 December 2021

Job No: 1628 M2

Subject: Earthworks design for the proposed residential subdivision at 2182 East Coast Road, Silverdale, Stages 3 and 4

This Memorandum has been prepared to detail the proposed earthworks for the proposed Build Rich Limited Stage 3 and 4 residential development at 2182 East Coast Road, Silverdale.

1.0 Introduction and Proposal:

The proposed earthworks are located at 1 Silverwater Drive Silverdale 0993, Lot 7 DP 545151 (10.29 ha in area). This work is Stage 3 and 4 of a staged development at 2182 East Coast Road, Silverdale.

Please refer to the Aspire earthworks resource consent design drawings attached.



Fig 1: Extract from Auckland Council GIS-existing site location plan

2.0 Earthworks:

2.1 Existing Site & Topography

The site is generally sloping from east to west with undulating farm terrain. The maximum contour is RL 85.5m and minimum RL 30.0m. There is an existing ridge line through the site from the south-eastern corner through to the north-western area of the site. Overland flow paths travel through the site in both east to north-west and east to south-west in direction, as well as part of the north-western development area shown to be within a flood plain. The development area is not within a recognised flood prone zone. A watercourse classifications and freshwater ecological values assessment has been prepared by Boffa Miskel. Refer Appendix B for detail.

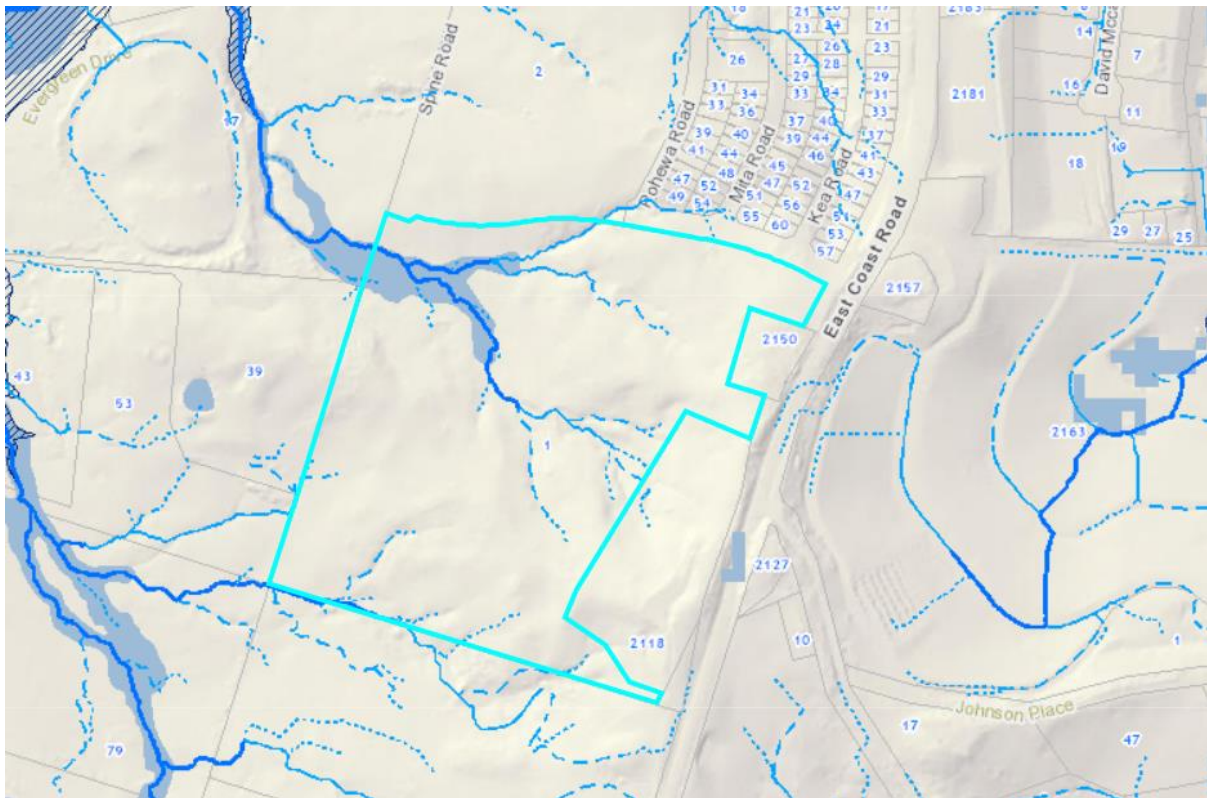


Fig 2: Extract from Auckland Council GIS-existing overland flow paths and flood plan

2.2 Proposed Earthworks

Cut and fill earthworks modelling has been carried out indicating approximate cut volumes of 149,881m³ and fill volumes of 219,703m³. A maximum of 10.0m cut and 9.0m fill depth respectively is proposed over the total earthworks area of 114,504 m² (11.45 Ha). The shortfall of onsite material required to achieve an earthworks balance will be imported from the neighbouring site at 17 Small Road, Silverdale. There is an underlying Land Use Consent (REF: LUC60386771) allowing acceptance of cut material to be transported and imported for fill use from this same location adopting the same construction methodology.



2.3 Neighbouring Works

It is proposed to earthwork in the following listed neighbouring properties to allow suitable batter formation required for the extension of Spine Road into the development:

- 17 Small Road, Silverdale (Legal Description: Sec 216 Psh of Okura SO18072)
- 39 Small Road, Silverdale (Legal Description: LOT 3 DP554131)
- 53 Small Road, Silverdale (Legal Description: LOT 2 DP554131)

Aspire are of the understanding that the developer Build Rich Limited have liaised directly with the individual neighbouring lot owners and have obtained their acceptance as well as signed written neighbours' agreements to carry out the proposed earthworks. The approximate volume and area of earthworks required at each neighbouring sites are summarised in table 2.1. The extents are illustrated on Aspire earthworks plan 1628-RC-EW202 for further detail.

Site ID	Cut Volume (m ³)	Fill Volume (m ³)	Balance (m ³)	Area (m ²)
1 Silverwater Drive, Silverdale	144,718	208,910	+64,192	108,097
17 Small Road, Silverdale	0	4,185	+4,185	1,393
39 Small Road, Silverdale	5,169	4,163	-1,006	3,769
53 Small Road, Silverdale	0	2,445	+2,445	1,245
TOTAL	149,881	219,703	69,822	114,504

Table 2.1: Proposed Earthworks Volumes Summary

2.4 Geotechnical Investigation & Remediation

A site-specific geotechnical investigation has been completed on the site by CMW Geosciences Limited. The investigation includes but is not limited to a geotechnical investigation summary, ground modelling, geohazard assessment and geotechnical recommendations and remediations for the proposed development. Refer Appendix C: CMW Geosciences Geotechnical Investigation Report for detail.

CMW Geosciences Limited will be engaged to complete the earthwork testing and certification on completion of the works.

2.5 Retaining Structures

Retaining wall structures are proposed within the site. Most of the retaining walls are likely to be of timber pole construction and range in height from 0.2m – 3.0m subject to detailed design at Building Consent stage. In addition to timber pole retaining walls, a 'green spine' engineered batter at a 1:V to 1:H grade is proposed through the middle of the development. The mechanically stabilised batter is designed by CMW Geosciences in accordance with their geotechnical investigation stability review and design parameters respectively.



2.6 Silt Control & Methodology

Erosion and sediment controls are to be installed prior to the commencement of any earthworks on the site and maintained for the full duration of the works. Site access is to be provided at the northern side of the site opposite Pohewa Road via stabilised metalled access. Erosion and sediment control plans have been prepared refer appendix A for details.

Typical silt control measures will be utilised and are to include chemically treated sediment retention ponds, silt fences, contour drains, clean water diversion bunds and dirty water diversion bunds, where appropriate, in accordance with Auckland Council GD05 – Erosion and Sediment Control Guide for Land Disturbing Activities. A watercart will be onsite to assist with dust suppression of either the haul road or fill area.

The construction methodology for the earthworks is likely to be as follows throughout the duration of construction:

- Install erosion and sediment controls
- Undertake clearing
- Strip topsoil to stockpile
- Install subsoil and underfill drainage and
- Undertake all necessary geotechnical remediation
- Undertake cut to fill
- Progressively respread topsoil, grass and straw mulch as earthworks areas are completed
- Remove erosion and sediment controls when the site is stabilised.

Please refer to preliminary and general plans 1628-RC-PG101 to PG105 and earthworks plans 1628-RC-EW201 to EW219 attached for the proposed earthworks and erosion and sediment control.

Please feel free to contact us if you require any further information.

BUILD RICH LIMITED

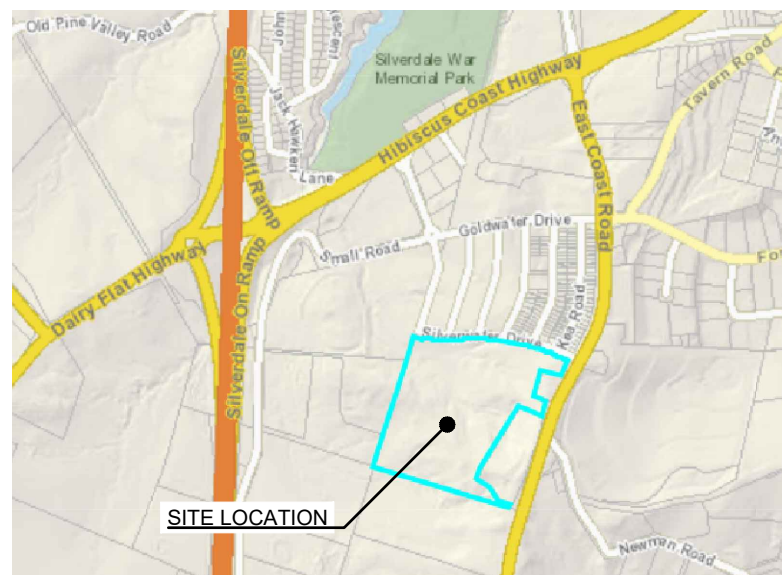
2182 EAST COAST ROAD SILVERDALE

EAST COAST HEIGHTS - STAGE 3 & 4

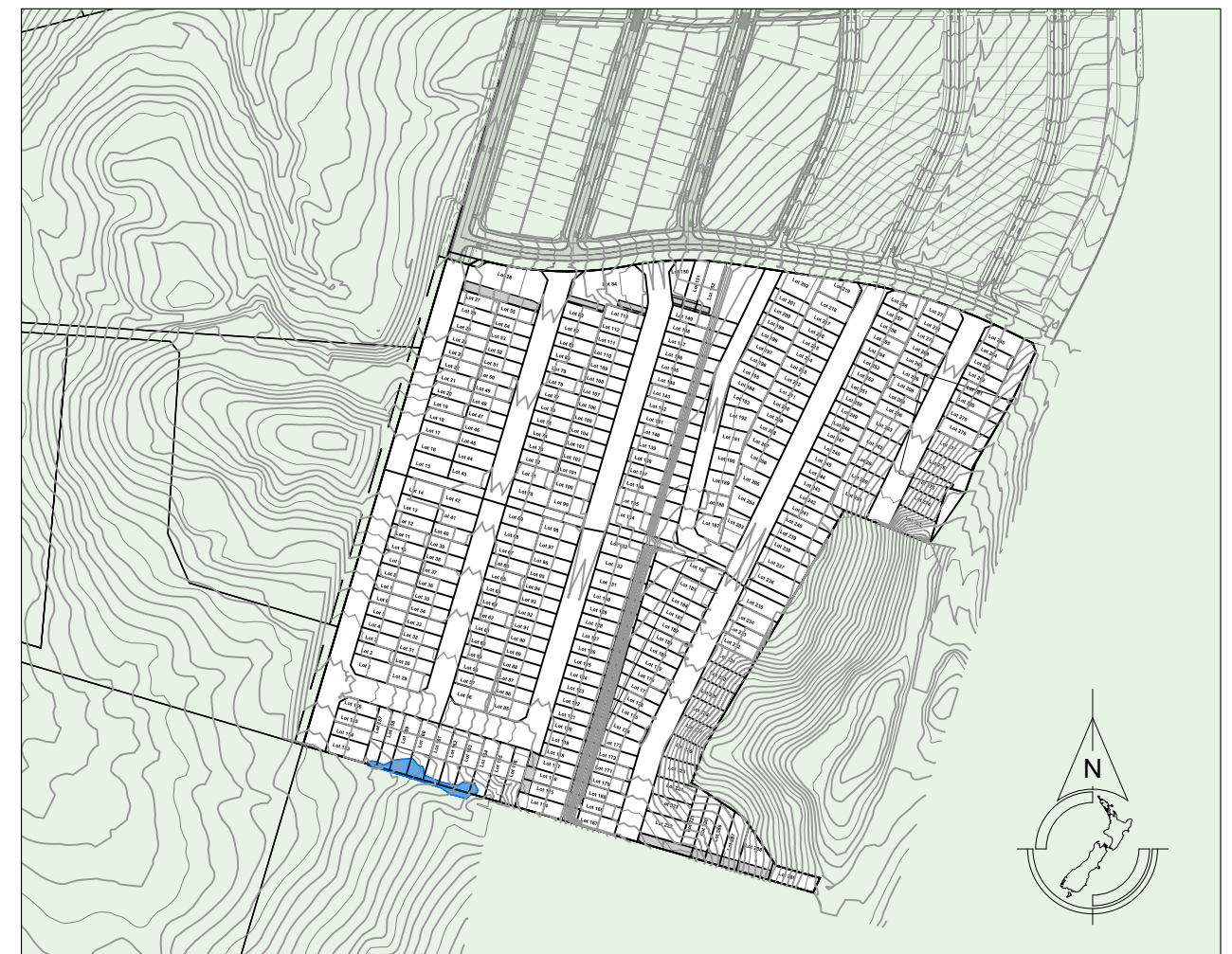
RESOURCE CONSENT PLANS



- PG100 - PRELIMINARY & GENERAL**
- EW200 - EARTHWORKS**
- RD300 - ROADING**
- SW400 - STORMWATER**
- WW500 - WASTEWATER**
- WS600 - WATER SUPPLY**



SITE LOCALITY



RESOURCE CONSENT DRAWINGS:

PRELIMINARY & GENERAL PG100

- PG101

PG102

PG103

PG104

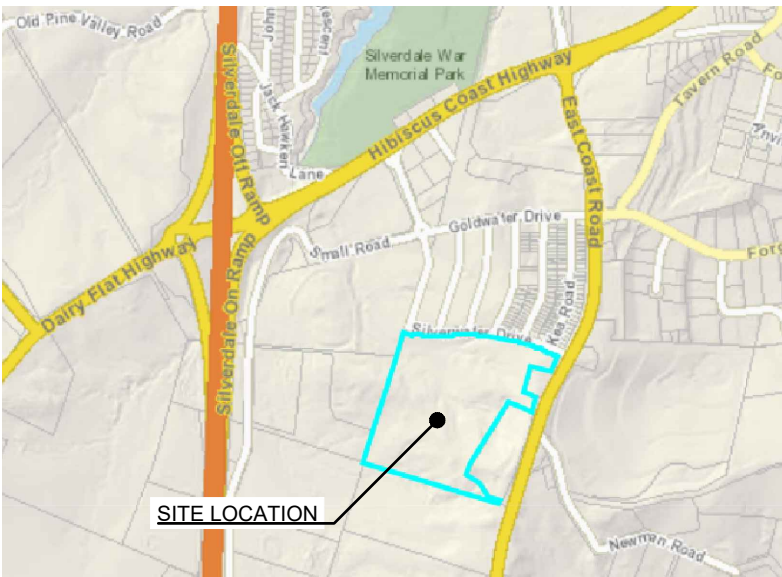
PG105
- COVER PAGE

CONTENTS PAGE

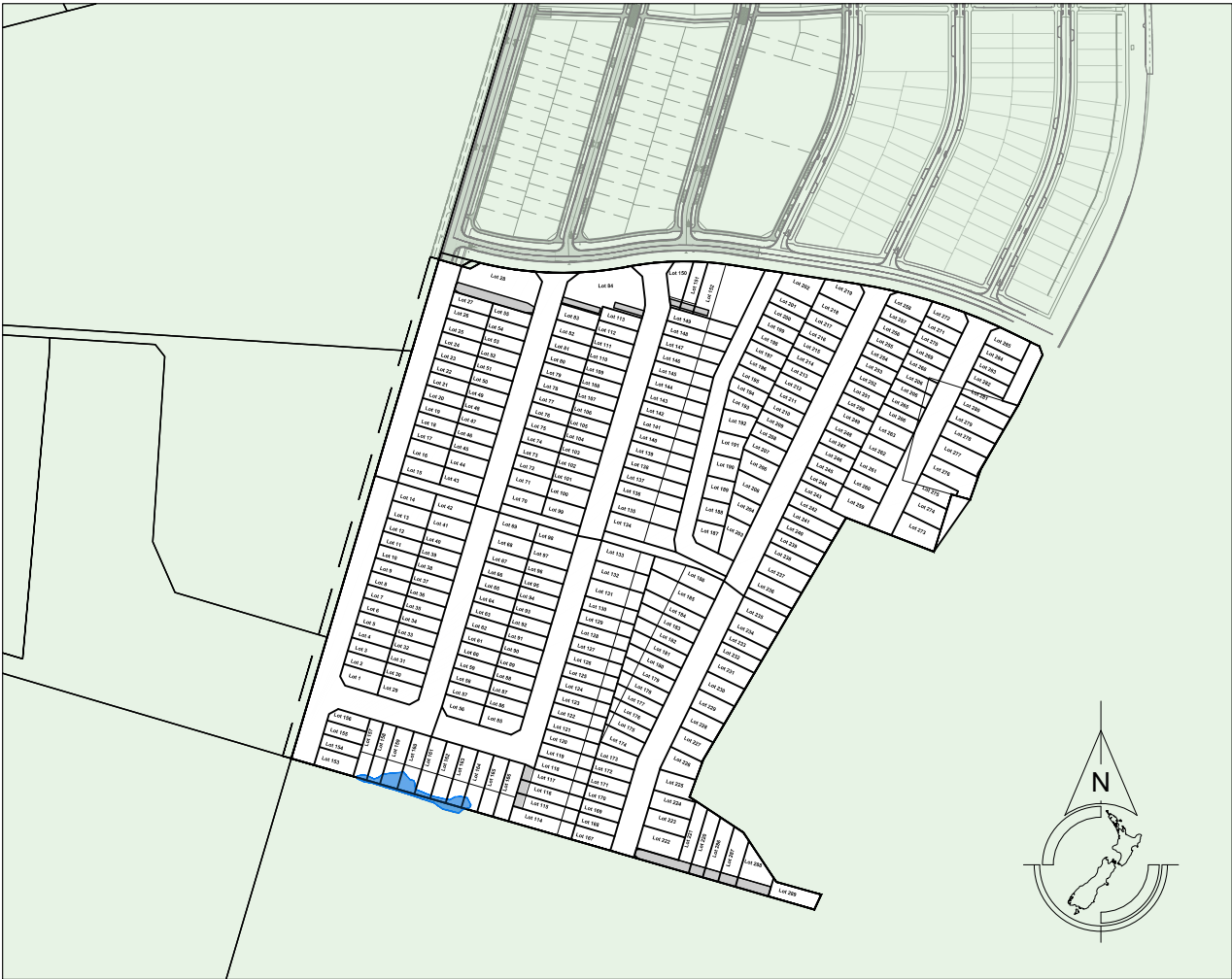
EXISTING SITE PLAN

PROPOSED DEVELOPMENT OVERVIEW PLAN

PROPOSED STAGING PLAN

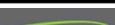


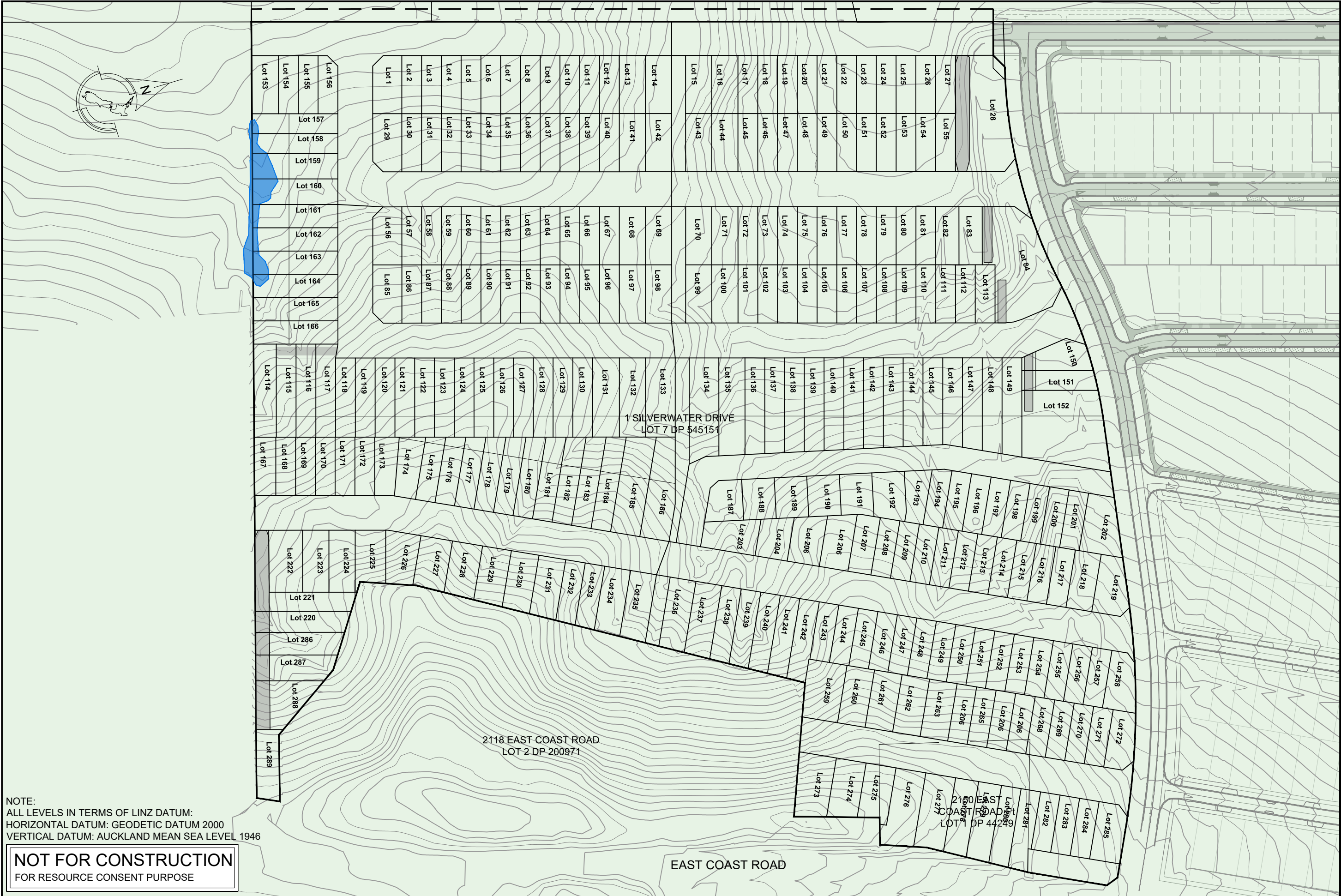
SITE LOCALITY



NOT FOR CONSTRUCTION
FOR RESOURCE CONSENT PURPOSE

JOB NUMBER: 1628

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE N.T.S AT A3			CLIENT BUILD RICH LIMITED	SITE ADDRESS 2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)	DRAWING NUMBER 1628 - RC - PG102		 Ph: 09 426 6552 Web: www.aspeng.co.nz
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NOTE:
ALL LEVELS IN TERMS OF LINZ DATUM:
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VERTICAL DATUM: AUCKLAND MEAN SEA LEVEL 1946

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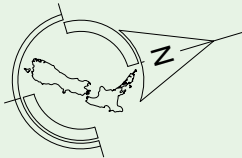
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EXISTING SITE PLAN

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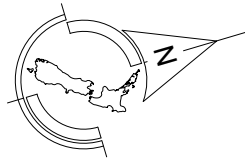
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SITE ADDRESS
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DRAWING TITLE
PROPOSED DEVELOPMENT OVERVIEW PLAN

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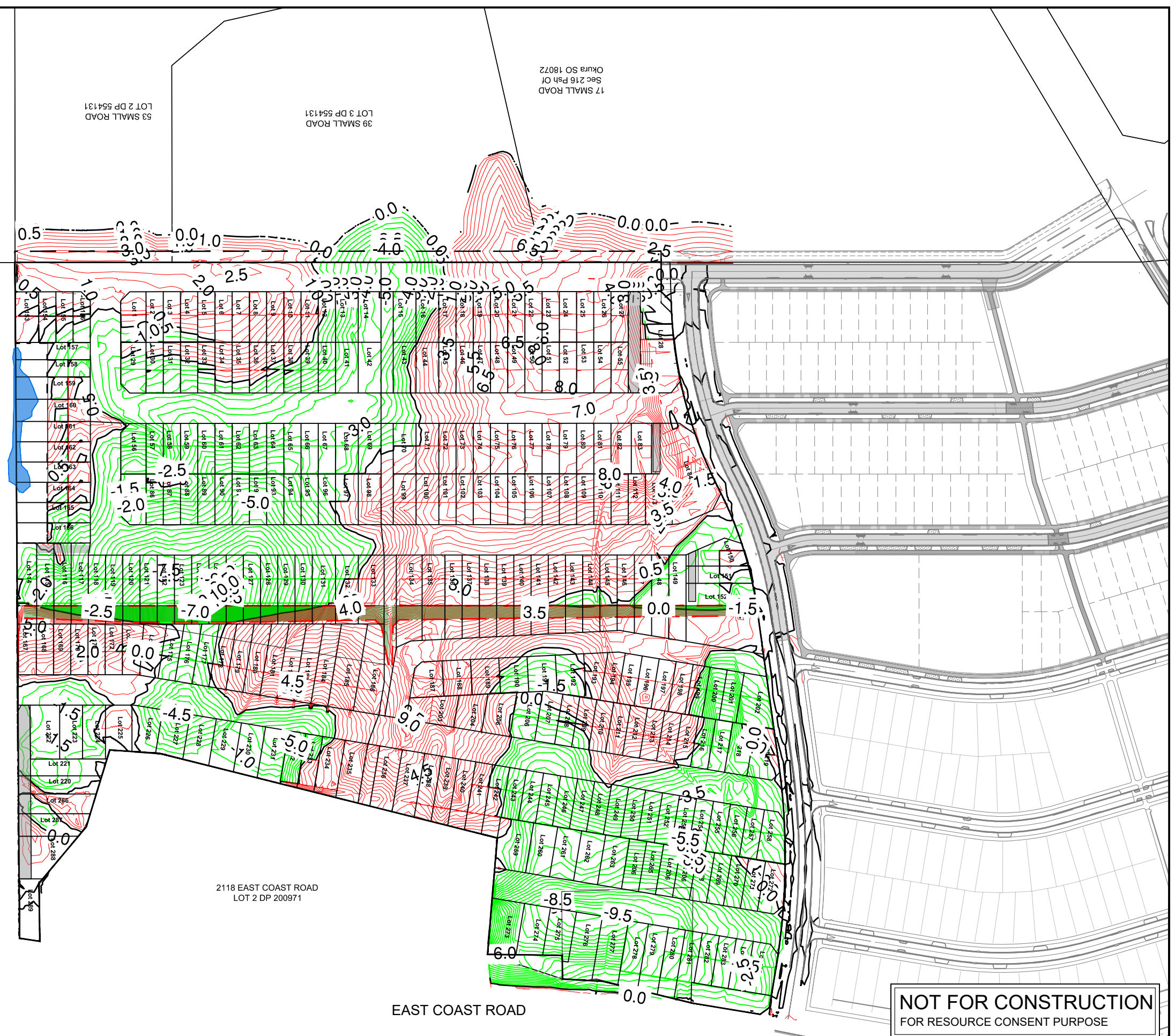
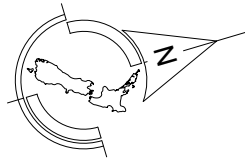
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SITE ADDRESS
2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)
DRAWING TITLE
PROPOSED OVERALL CONTOUR PLAN

DRAWING NUMBER	
1628 - RC - EW201	
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CUT AND FILL SCHEDULE:

LOCATION	CUT (m³)	FILL (m³)	AREA (m²)
1 SILVERWATER DRIVE	144,718	208,910	108,097
17 SMALL ROAD	0	4,185	1,393
39 SMALL ROAD	5,169	4,163	3,769
53 SMALL ROAD	0	2,445	1,245
TOTAL	149,881	219,703	114,504

LEGEND

3.0

2.0

CUT AREA:

3.0

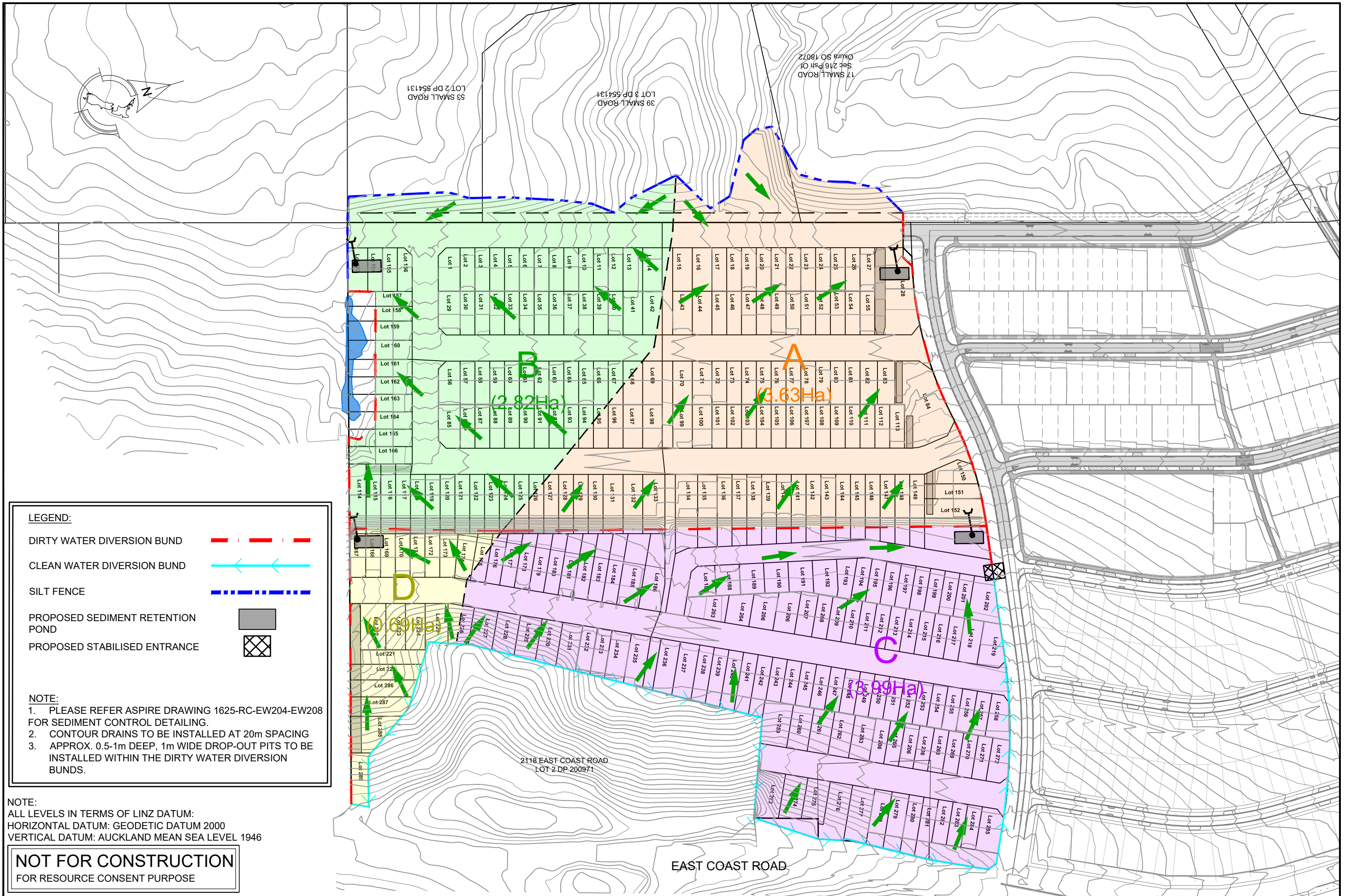
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FILL AREA:

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LEGEND:

- DIRTY WATER DIVERSION BUND
CLEAN WATER DIVERSION BUND
SILT FENCE
PROPOSED SEDIMENT RETENTION POND
PROPOSED STABILISED ENTRANCE

NOTE:

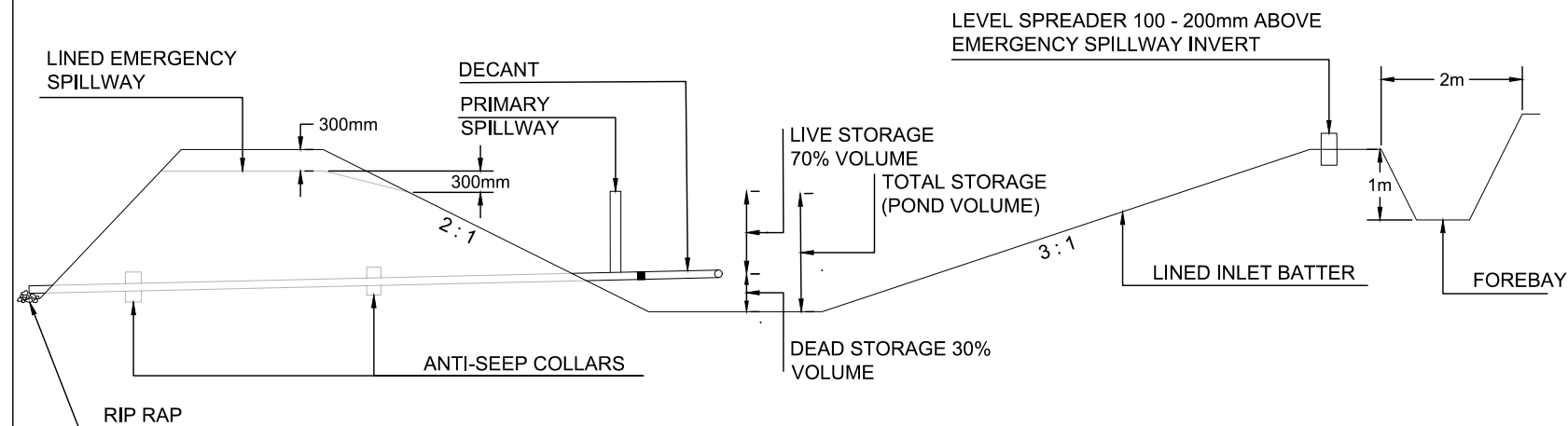
- PLEASE REFER ASPIRE DRAWING 1625-RC-EW204-EW208 FOR SEDIMENT CONTROL DETAILING.
- CONTOUR DRAINS TO BE INSTALLED AT 20m SPACING
- APPROX. 0.5-1m DEEP, 1m WIDE DROP-OUT PITS TO BE INSTALLED WITHIN THE DIRTY WATER DIVERSION BUNDS.

NOTE:

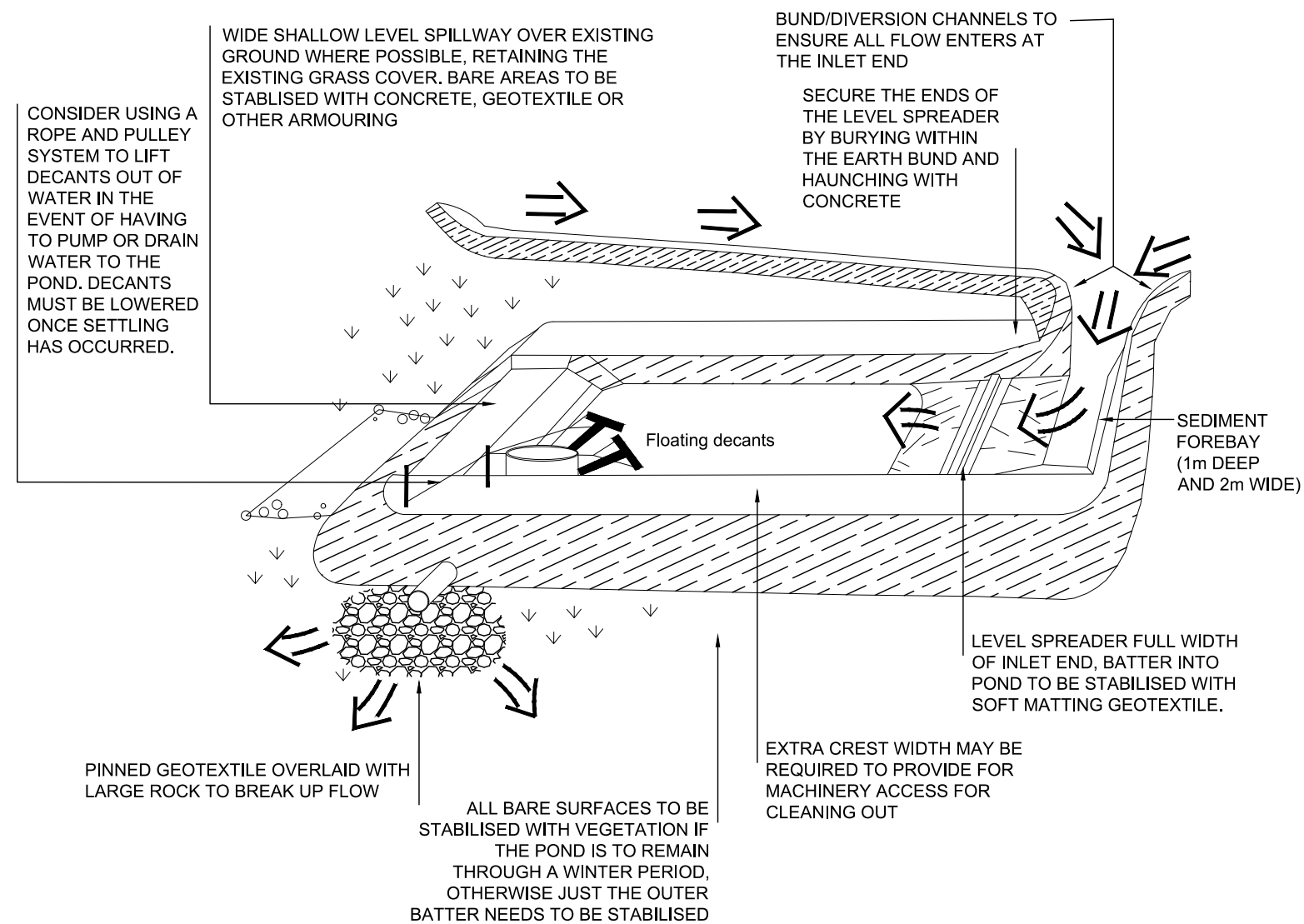
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						APPROVED	PF	12.21		-		
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SEDIMENT RETENTION POND CROSS SECTION



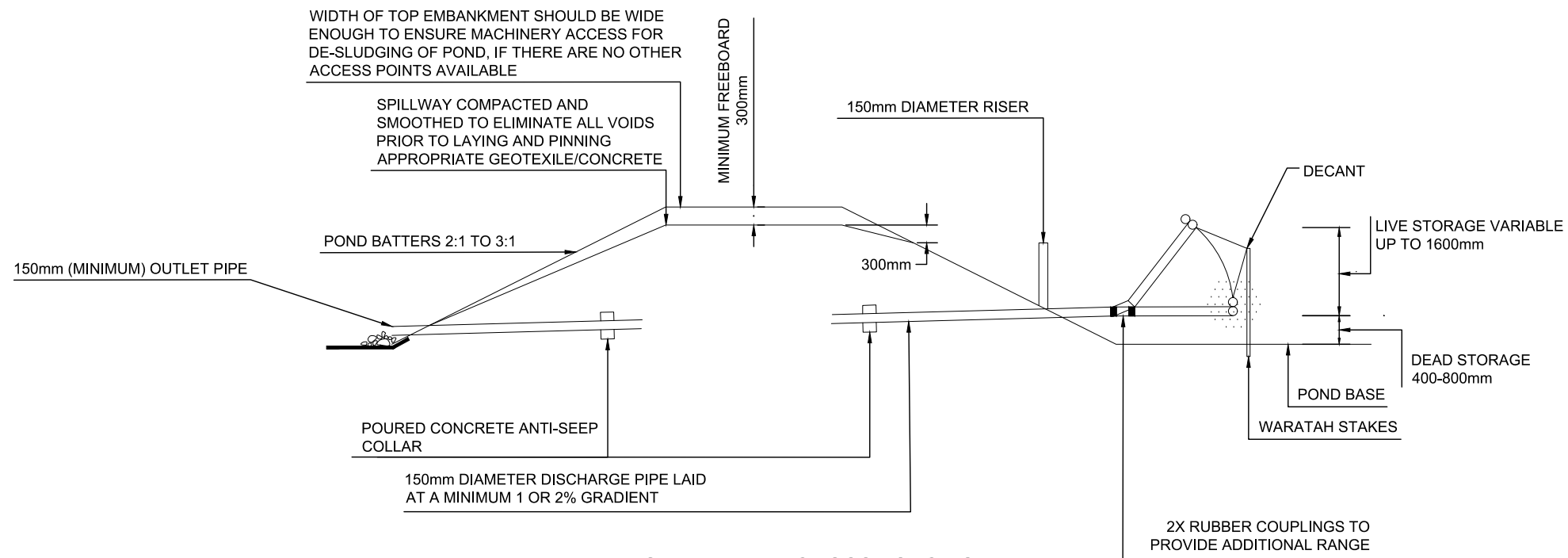
SEDIMENT RETENTION POND SCHEMATIC

SRP SIZING:

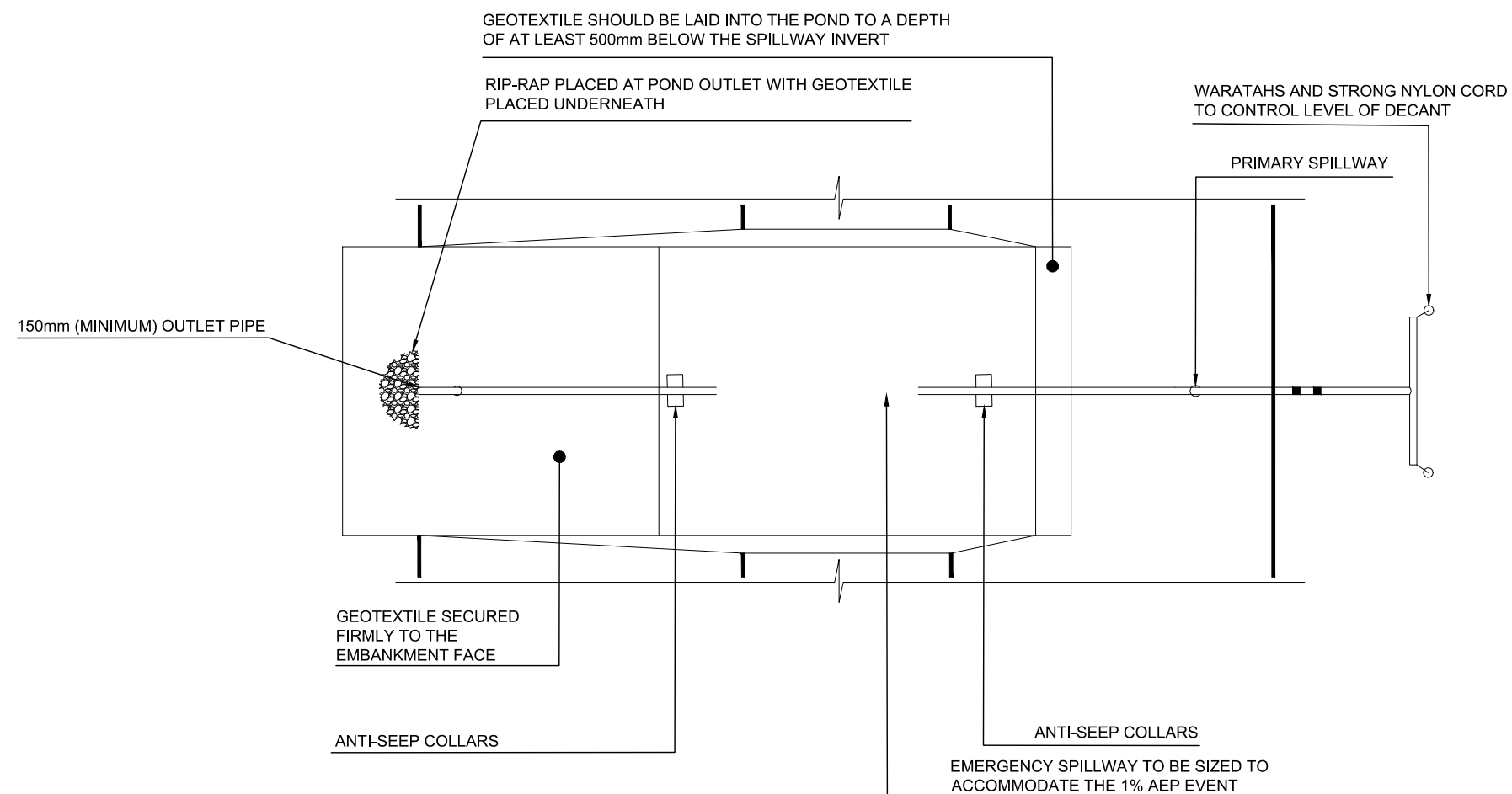
- SIZE SRPs BASED ON THE CONTRIBUTING CATCHMENT AREA AND SLOPE LENGTH.
- ON EARTHWORKS SITES WITH SLOPES LESS THAN 18% AND LESS THAN 200m IN LENGTH, DESIGN SRPs WITH A MINIMUM VOLUME OF 2% OF THE CONTRIBUTING CATCHMENT AREA (200m³ FOR EACH Ha OF CONTRIBUTING CATCHMENT).
- ON EARTHWORKS SITES WITH SLOPES GREATER THAN 18% OR GREATER THAN 200m IN LENGTH, DESIGN SRPs WITH A MINIMUM VOLUME OF 3% OF THE CONTRIBUTING CATCHMENT AREA (300m³ FOR EACH Ha OF CONTRIBUTING CATCHMENT).
- THE ABOVE CALCULATION DEFINES THE TOTAL STORAGE VOLUME, WHICH IS MEASURED FROM THE BASE OF THE POND TO THE TOP OF THE PRIMARY SPILLWAY.
- THE SLOPE ANGLE IS DETERMINED BY THE SLOPE IMMEDIATELY (WITHIN 20m) ABOVE THE SRP, OR BY THE AVERAGE SLOPE OVER THE CONTRIBUTING CATCHMENT, WHICHEVER IS GREATER. THE SLOPE ANGLE SHOULD ALSO BE THE GREATER OF THE PRE- OR POST- CONSTRUCTION SLOPE.

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						APPROVED	PF 12.21					
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SRP <1.5 Ha - CROSS - SECTION



SRP < 1.5 Ha - CROSS - SECTION

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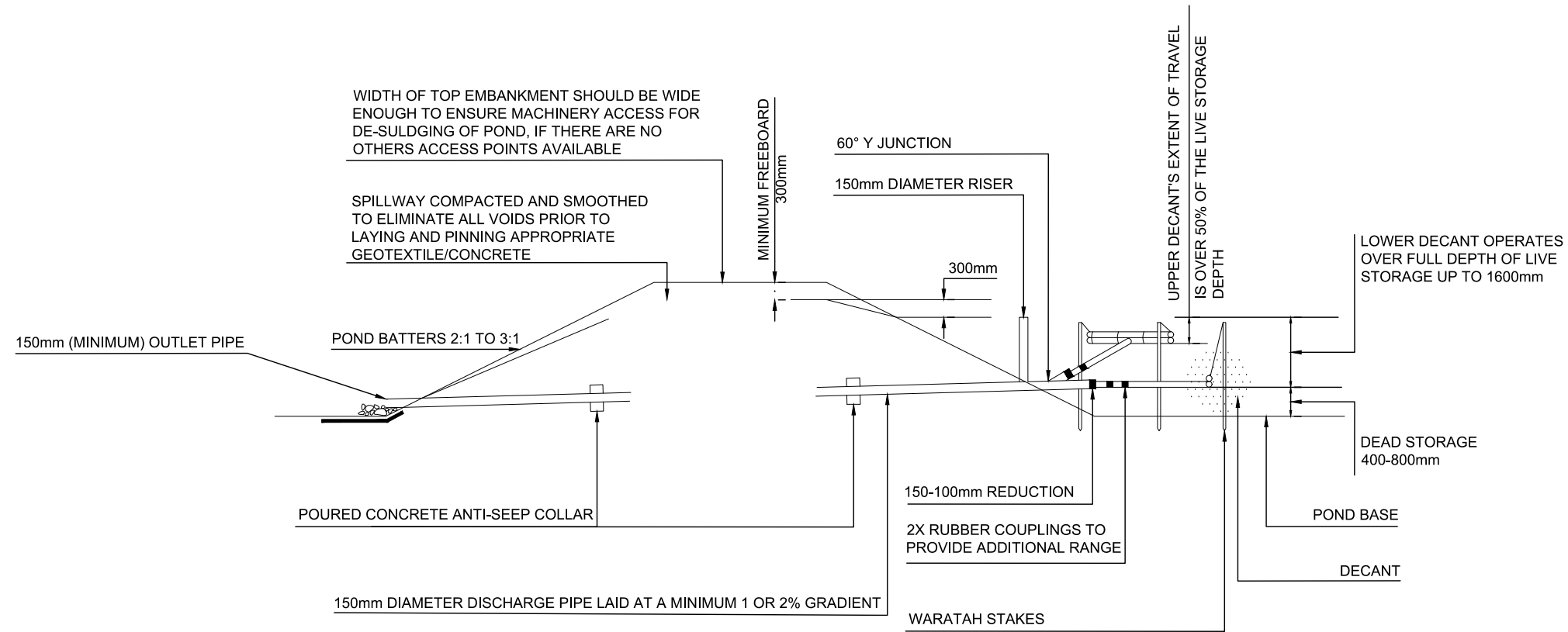
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SITE ADDRESS
2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)
DRAWING TITLE
PROPOSED EROSION AND SEDIMENT CONTROL DETAILS

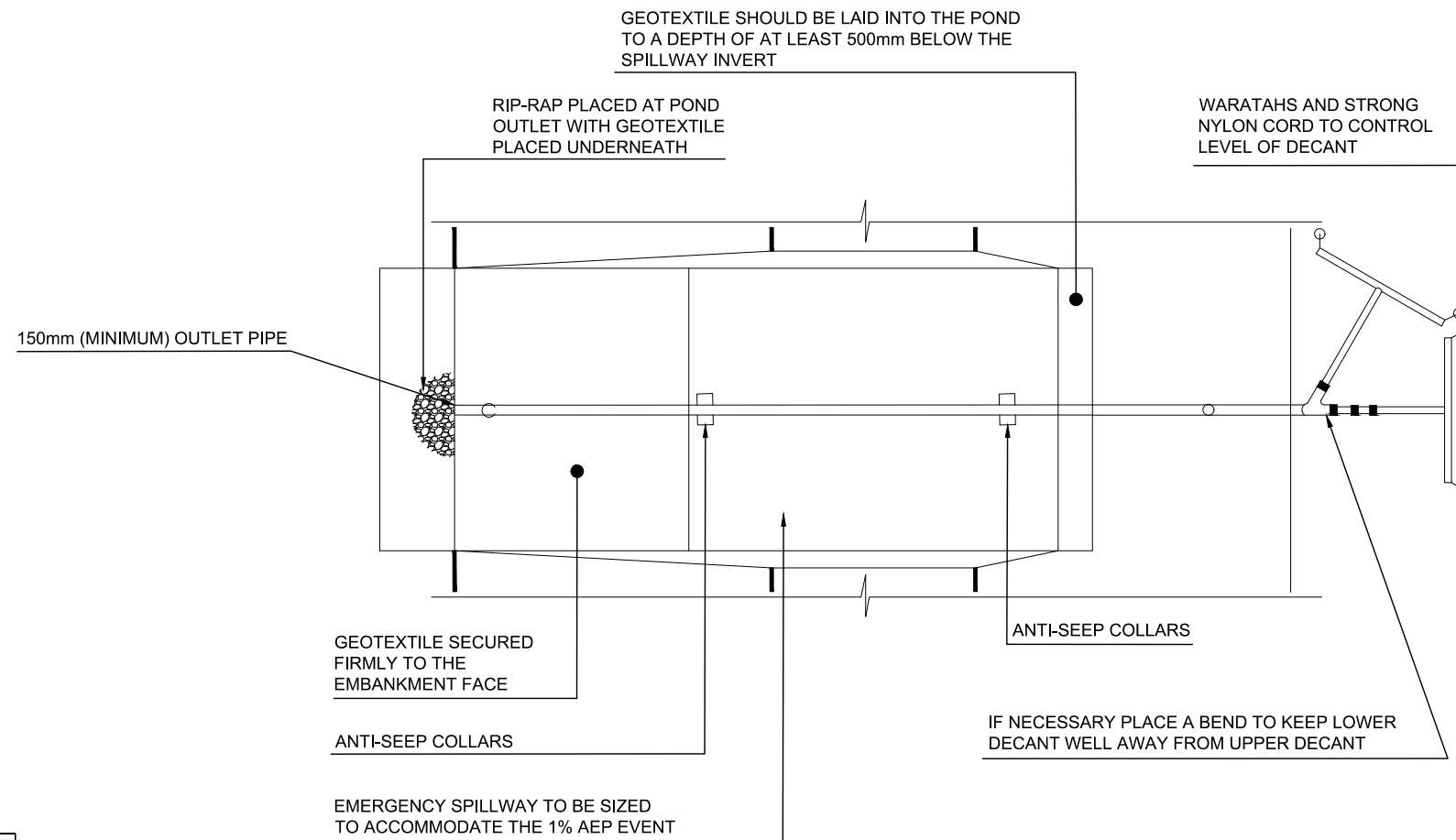
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1628 - RC - EW205
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SRP 1.5 - 3.0 Ha - CROSS - SECTION



SRP 1.5 - 3.0 Ha - PLAN VIEW

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REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	N.T.S AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER
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						DATE			
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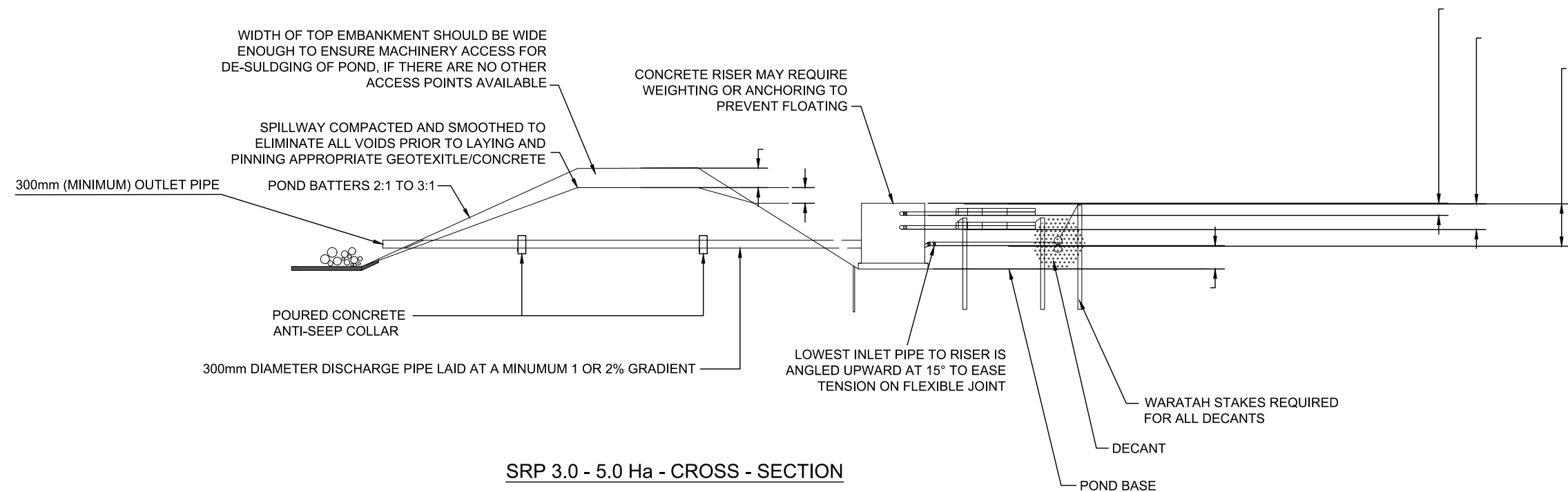
DRAWING TITLE
PROPOSED EROSION AND
SEDIMENT CONTROL DETAILS

DATE
DEC 2021

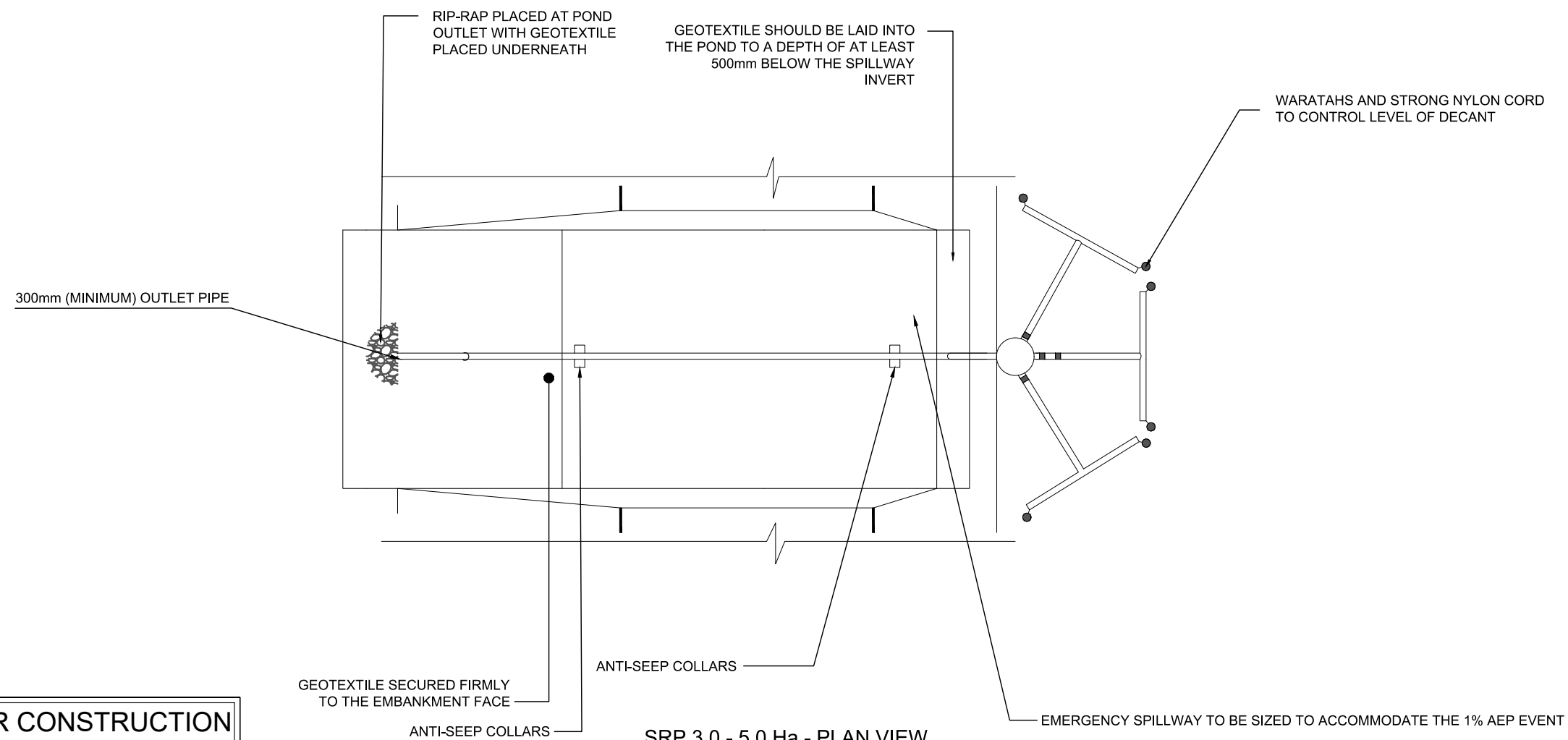
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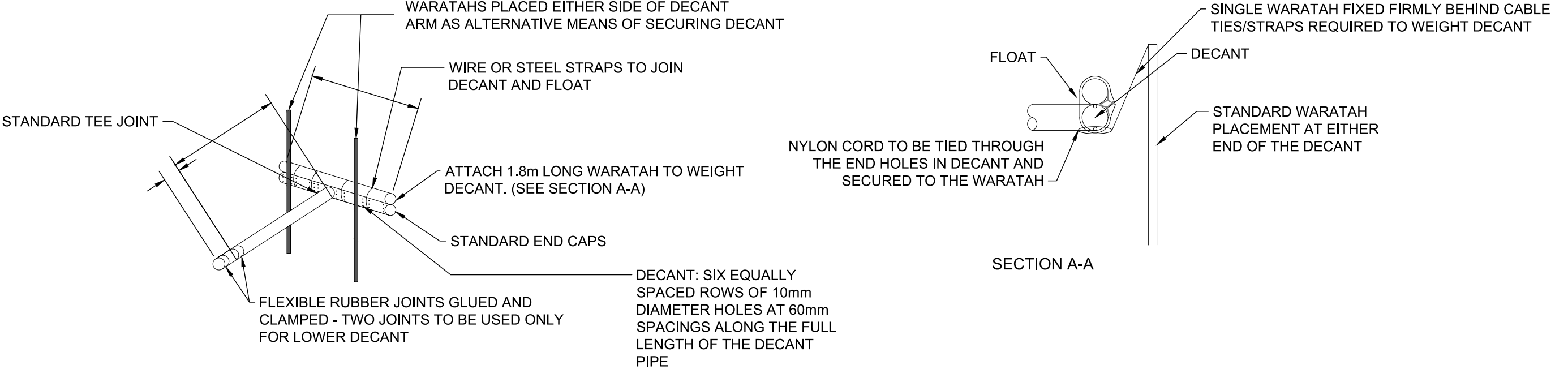
SRP 3.0 - 5.0 Ha - CROSS - SECTION



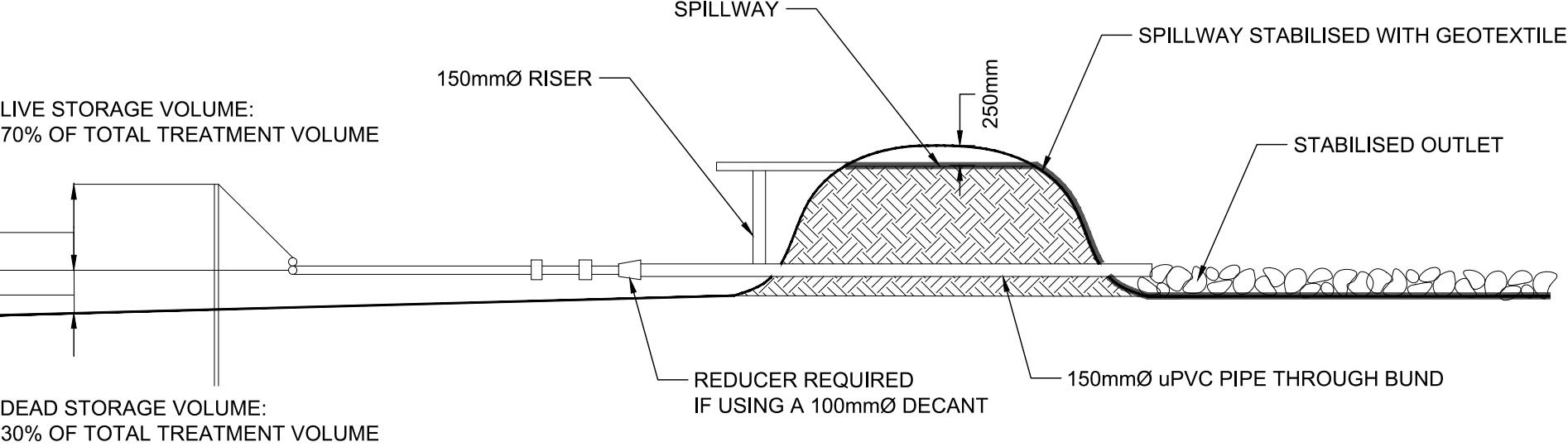
SRP 3.0 - 5.0 Ha - PLAN VIEW

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					APPROVED	PF	12.21					
									ASPIRE CONSULTING ENGINEERS Ph: 09 426 6552 Web: www.aspeng.co.nz			



STANDARD T-BAR DESIGN SCHEMATIC



DECANTING EARTH BUND CROSS-SECTION

DEB SIZING:

- DEB SIZING IS BASED ON CONTRIBUTING CATCHMENT AREA
- DECANTING EARTH BUND TO HAVE A MINIMUM VOLUME OF 2% OF THE CONTRIBUTING CATCHMENT AREA (20m³ FOR EACH 1,000m²)
- THE SLOPE ANGLE IS DETERMINED BY THE SLOPE IMMEDIATELY ABOVE THE DEB, OR BY THE AVERAGE SLOPE OVER THE CONTRIBUTING CATCHMENT, WHICHEVER IS GREATER. THE SLOPE ANGLE SHOULD ALSO BE THE GREATER OF THE PRE- OR POST- CONSTRUCTION SLOPE.
- THE ABOVE CALCULATION DEFINES THE TOTAL STORAGE VOLUME WHICH IS MEASURED FROM THE BASE OF THE DEB TO THE TOP OF THE PRIMARY SPILLWAY.
- BASE OF THE DEB TO BE MINIMUM OF 2m WIDE
- LENGTH-TO-WIDTH RATIO TO BE NO LESS THAN 3:1 AND NO GREATER THAN 5:1. LENGTH TO WIDTH RATIO IS MEASURED AT THE HEIGHT OF THE PRIMARY SPILLWAY.
- THE LENGTH OF THE DEB IS MEASURED AS THE DISTANCE BETWEEN THE INLET AND THE OUTLET. THE LENGTH BETWEEN THE INLET AND THE OUTLET SHOULD BE A MINIMUM OF 5m.

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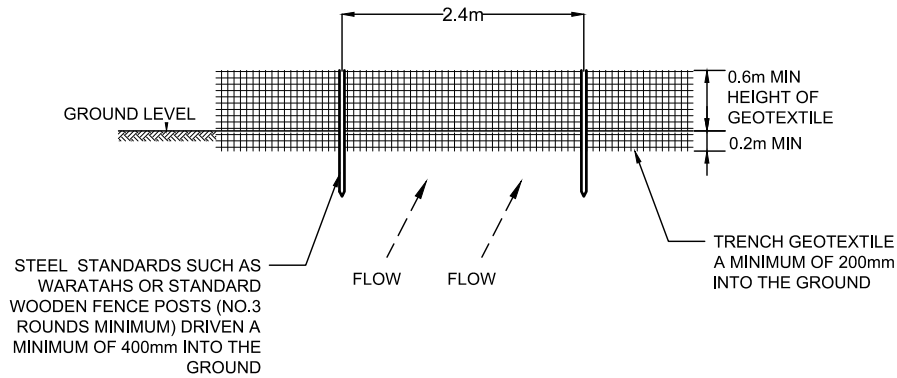
SITE ADDRESS
2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)
DRAWING TITLE
PROPOSED EROSION AND SEDIMENT CONTROL DETAILS

DRAWING NUMBER	
1628 - RC - EW208	
DATE	REVISION
DEC 2021	-

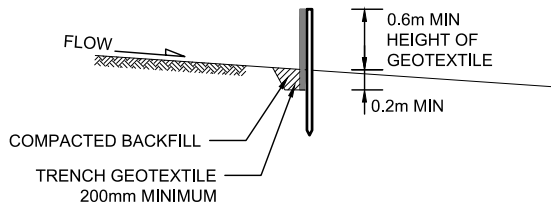
Ph: 09 426 6552
Web: www.aspeng.co.nz

Slope steepness %	Slope length (m) (maximum)	Spacing of returns (m)	Silt fence length (m) (maximum)
Flatter than 2%	Unlimited	N/A	Unlimited
2 – 10%	40	60	300
10 – 20%	30	50	230
20 – 33%	20	40	150
33 – 50%	15	30	75
> 50%	6	20	40

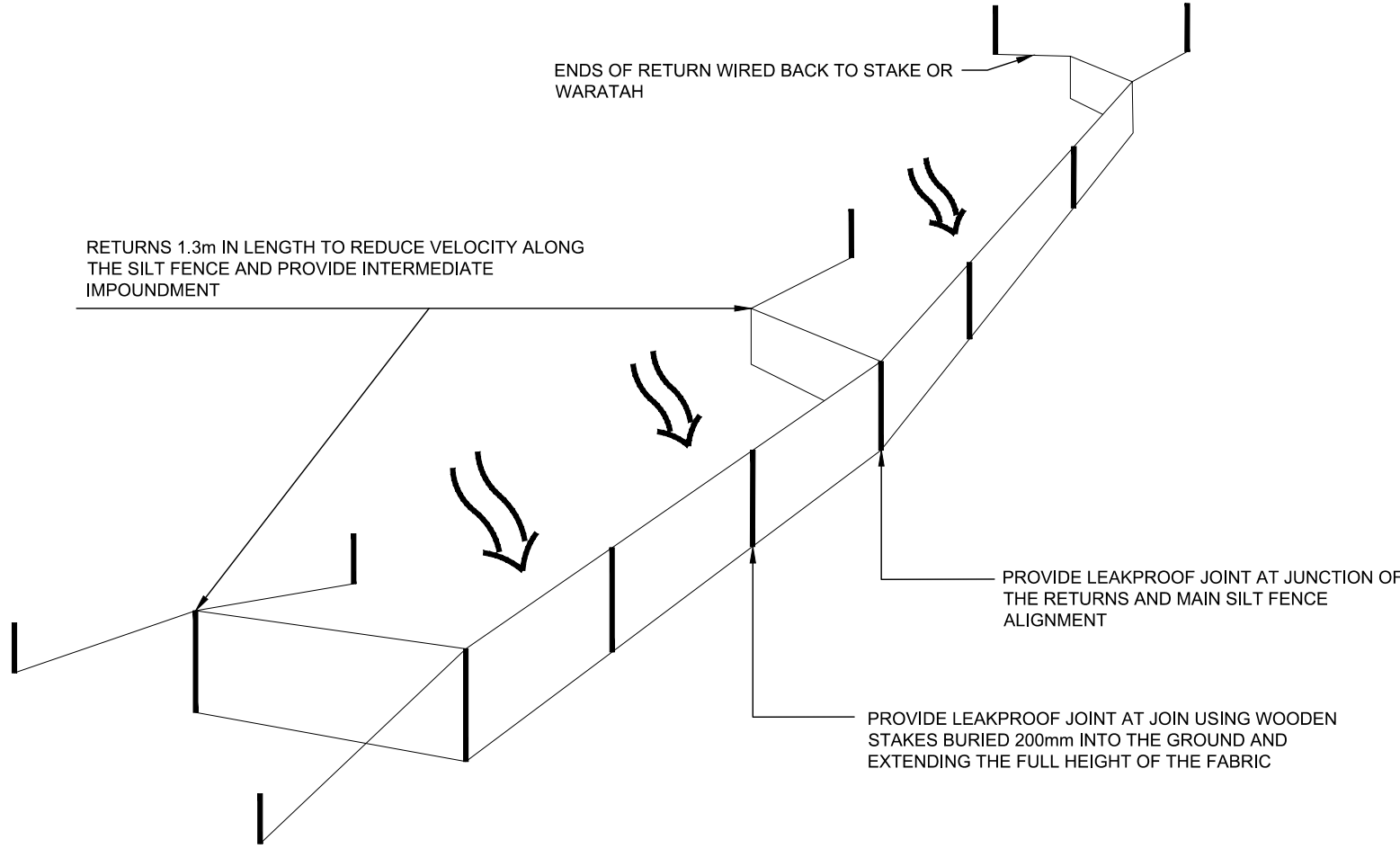
SILT FENCE DESIGN CRITERIA TABLE



SILT FENCE ELEVATION



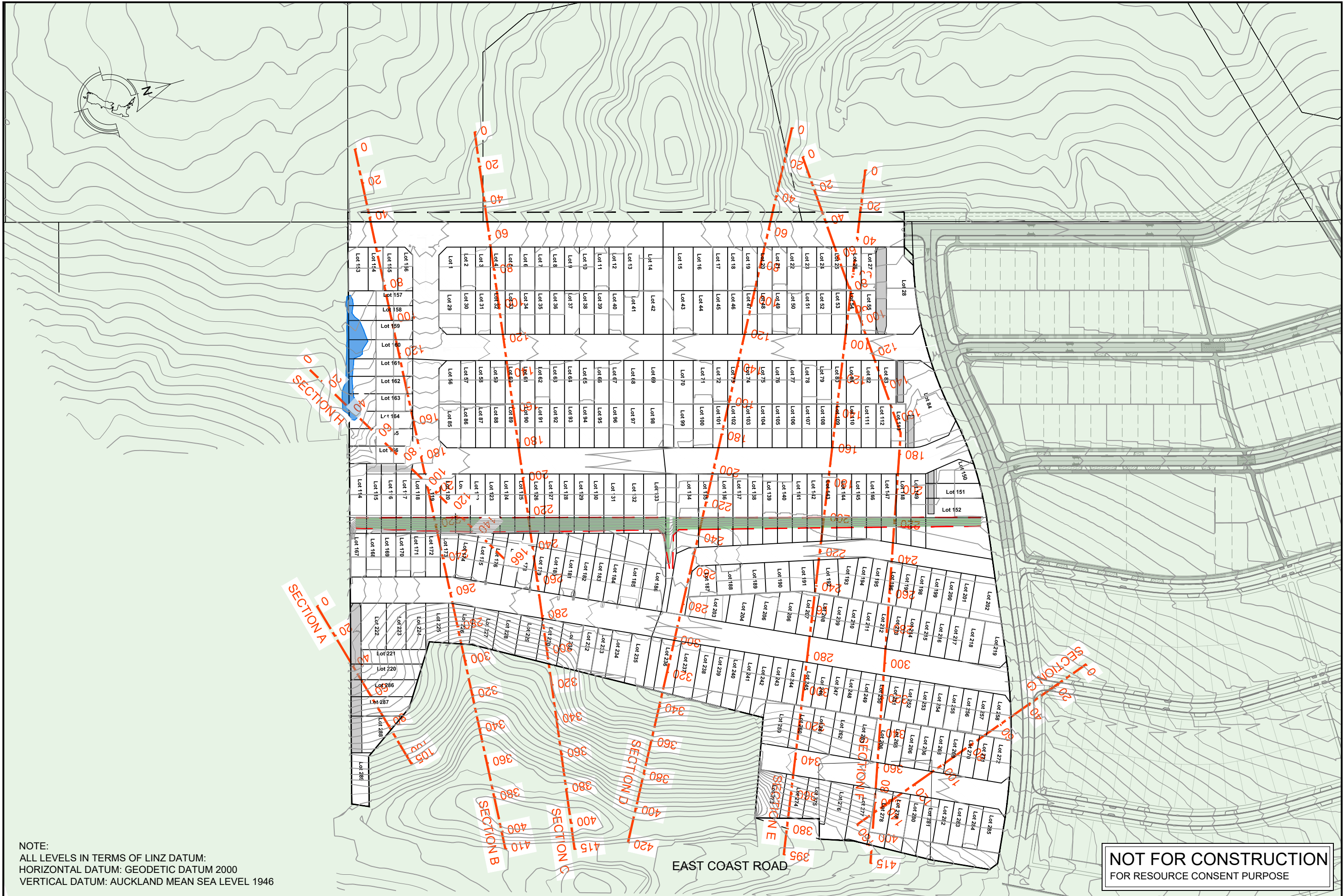
SILT FENCE CROSS-SECTION



SILT FENCE WITH RETURNS AND SUPPORT WIRE

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REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	N.T.S AT A3			CLIENT	SITE ADDRESS	DRAWING NUMBER		 Ph: 09 426 6552 Web: www.aspeng.co.nz
						NAME	DATE	BUILD RICH LIMITED	2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)	1628 - RC - EW210			
					DESIGN	JH	12.21			DATE	REVISION		
					DRAWN	JH	12.21						
					DRAWING CHECK	PF	12.21						
					DESIGN CHECK	PF	12.21						
					APPROVED	PF	12.21	DEC 2021		-			
									Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.	DRAWING TITLE		PROPOSED EROSION AND SEDIMENT CONTROL DETAILS	



REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE 1:2000 AT A3		
					NAME	DATE	
					DESIGN	JH	12.21
					DRAWN	JH	12.21
					DRAWING CHECK	PF	12.21
					DESIGN CHECK	PF	12.21
					APPROVED	PF	12.21

CLIENT
BUILD RICH LIMITED
Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.

SITE ADDRESS
2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)
DRAWING TITLE
PROPOSED EARTHWORKS SECTIONS PLAN

DRAWING NUMBER	
1628 - RC - EW211	
DATE	REVISION
DEC 2021	-

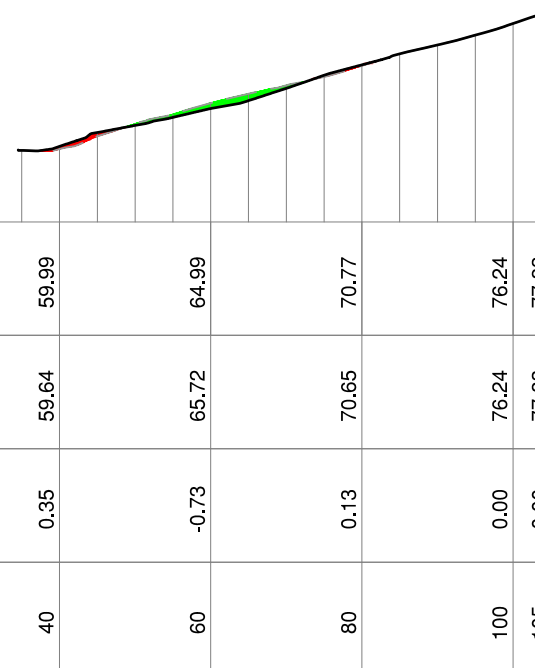


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CUT 

FILL 

VERT EXAG 1:1
Datum 50.000



EARTHWORKS SECTION A

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REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:1000 AT A3		CLIENT BUILD RICH LIMITED	SITE ADDRESS 2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)	DRAWING NUMBER 1628 - RC - EW212	
						NAME	DATE			DATE	REVISION
					DESIGN	JH	12.21				
					DRAWN	JH	12.21				
					DRAWING CHECK	PF	12.21				
					DESIGN CHECK	PF	12.21	Conditions of Use: <i>These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.</i>	DRAWING TITLE PROPOSED EARTHWORKS SECTION A	DATE DEC 2021	REVISION -
					APPROVED	PF	12.21				



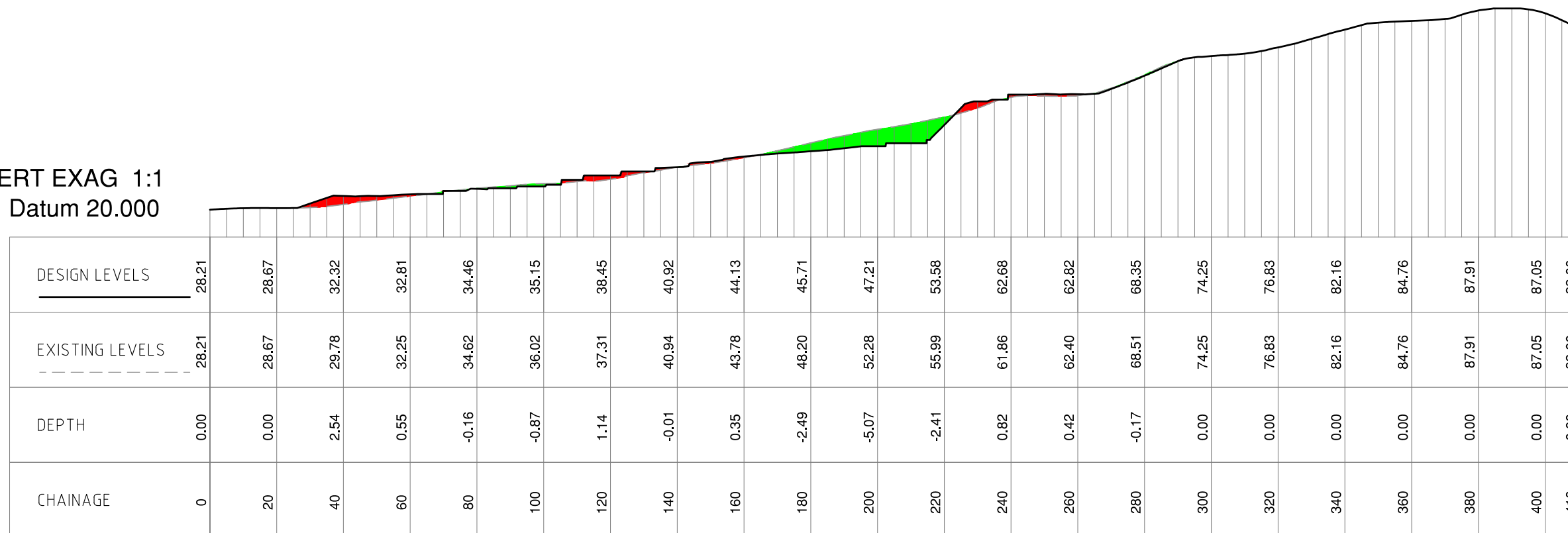
Ph: 09 426 6552

Web: www.aspeng.co.nz

CUT 

FILL 

VERT EXAG 1:1
Datum 20.000



EARTHWORKS SECTION B

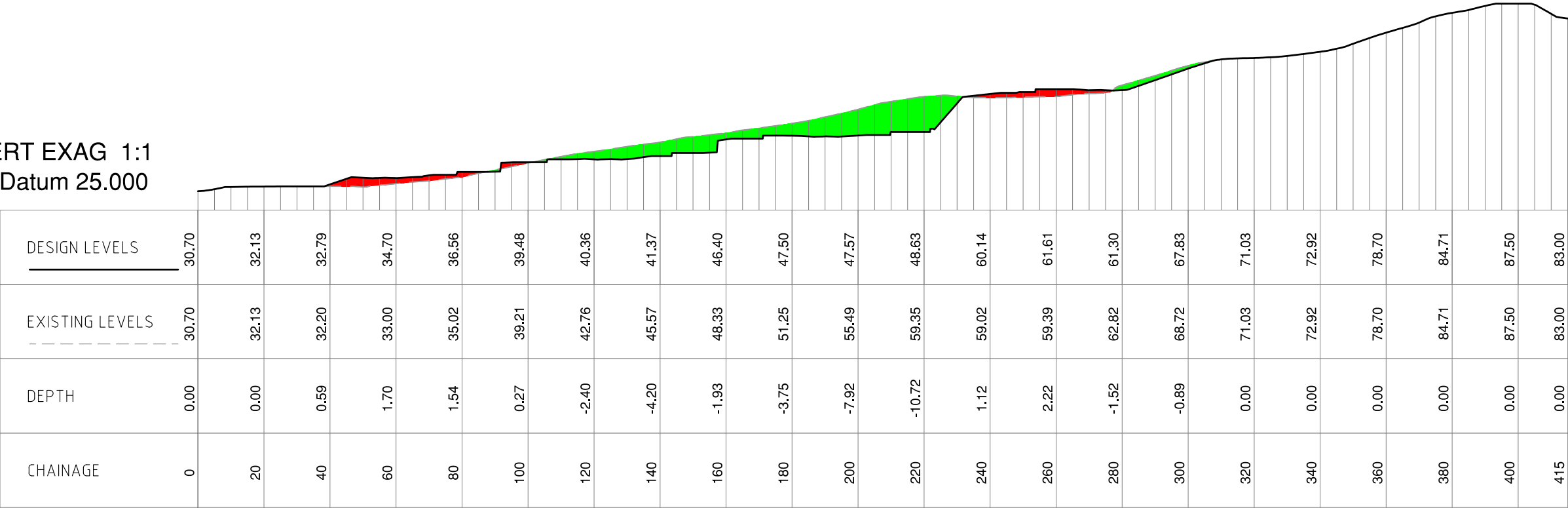
NOT FOR CONSTRUCTION
FOR RESOURCE CONSENT PURPOSE

REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE	1:1500 AT A3		CLIENT BUILD RICH LIMITED	SITE ADDRESS 2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)	DRAWING NUMBER 1628 - RC - EW213		 Ph: 09 426 6552 Web: www.aspeng.co.nz	
						NAME	DATE			DRAWING TITLE PROPOSED EARTHWORKS SECTION B	DATE DEC 2021		REVISION -
					DESIGN	JH	12.21						
					DRAWN	JH	12.21						
					DRAWING CHECK	PF	12.21						
					DESIGN CHECK	PF	12.21	Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.					
					APPROVED	PF	12.21						

CUT

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VERT EXAG 1:1
Datum 25.000



EARTHWORKS SECTION C

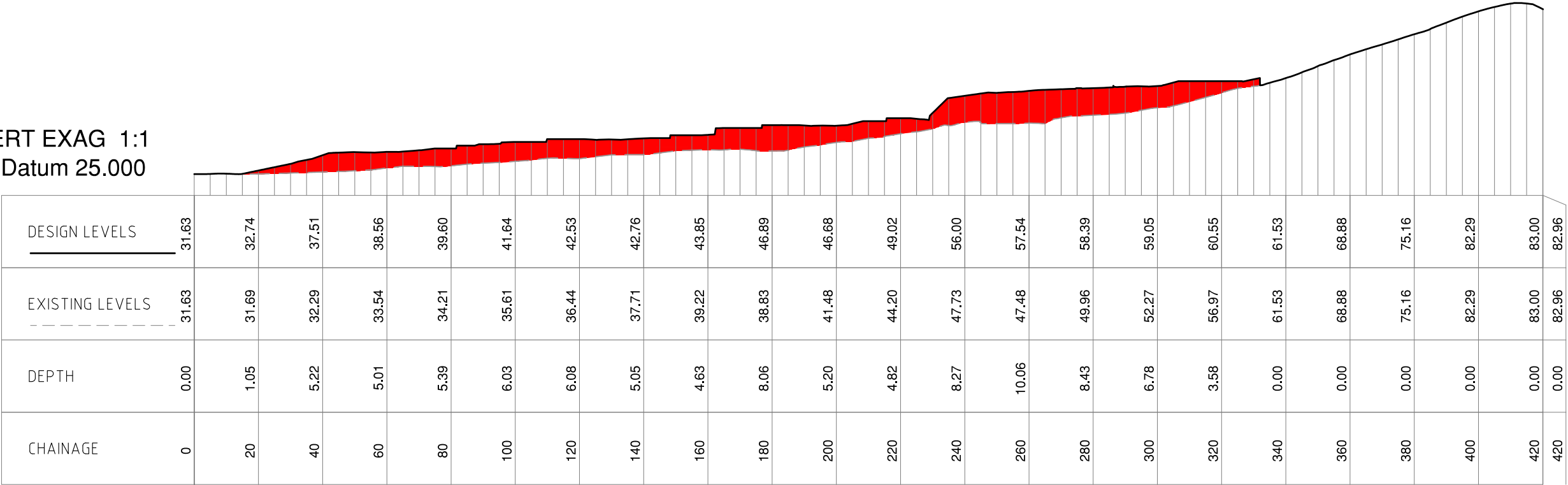
NOT FOR CONSTRUCTION
FOR RESOURCE CONSENT PURPOSE

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE 1:1500 AT A3			CLIENT BUILD RICH LIMITED	SITE ADDRESS 2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)	DRAWING NUMBER 1628 - RC - EW214		 Ph: 09 426 6552 Web: www.aspeng.co.nz
					NAME	DATE	DATE					
					DESIGN	JH	12.21					
					DRAWN	JH	12.21					
					DRAWING CHECK	PF	12.21					
					DESIGN CHECK	PF	12.21	Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.	DRAWING TITLE PROPOSED EARTHWORKS SECTION C	DATE	REVISION	
					APPROVED	PF	12.21			DEC 2021	-	

CUT

FILL

VERT EXAG 1:1
Datum 25.000



EARTHWORKS SECTION D

NOT FOR CONSTRUCTION
FOR RESOURCE CONSENT PURPOSE

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:1500 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER
						NAME	BUILD RICH LIMITED	2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)	1628 - RC - EW215
						DATE			
						DESIGN			
						JH			
						12.21			
						DRAWN			
						JH			
						12.21			
						DRAWING CHECK			
						PF			
						12.21			
						DESIGN CHECK			
						PF			
						12.21			
						APPROVED			
						PF			
						12.21			

Conditions of Use:

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DRAWING TITLE

PROPOSED EARTHWORKS SECTION D

DRAWING NUMBER

1628 - RC - EW215

DATE

DEC 2021

REVISION

-

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CONSULTING ENGINEERS

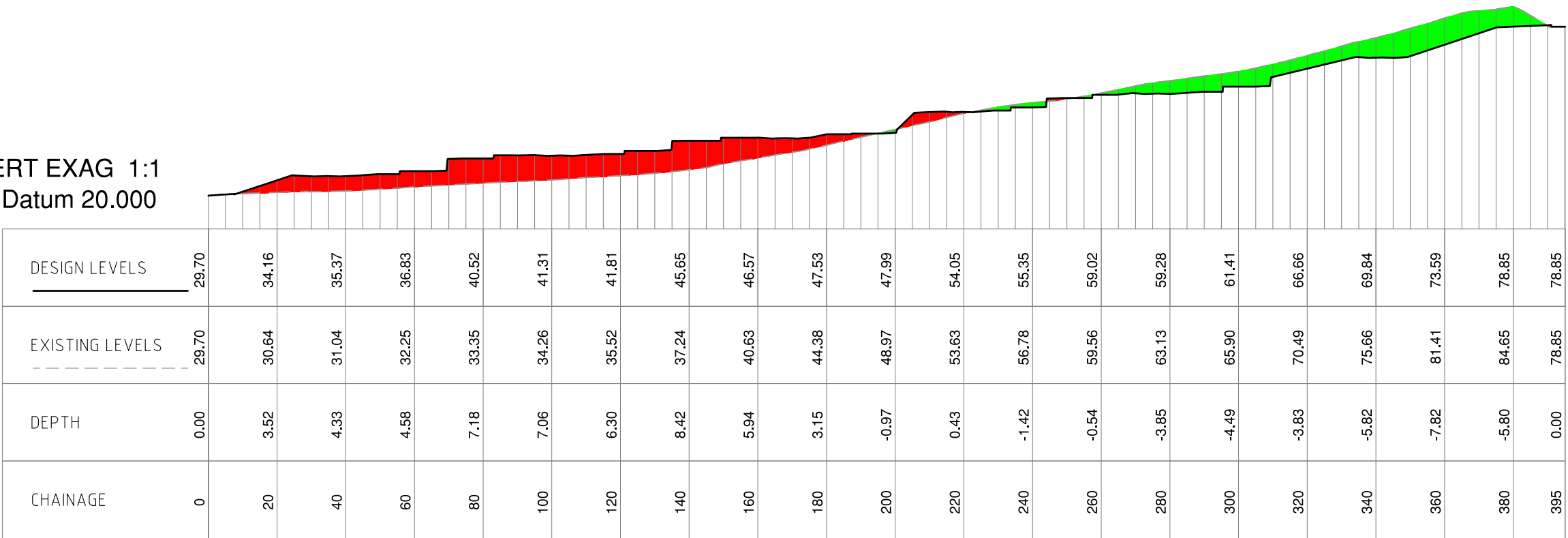
Ph: 09 426 6552

Web: www.aspeng.co.nz

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FILL

VERT EXAG 1:1
Datum 20.000



EARTHWORKS SECTION E

NOT FOR CONSTRUCTION
FOR RESOURCE CONSENT PURPOSE

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE 1:1500 AT A3			CLIENT BUILD RICH LIMITED	SITE ADDRESS 2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)	DRAWING NUMBER 1628 - RC - EW216	
					NAME	DATE	DATE DEC 2021			REVISION -	
				DESIGN	JH	12.21					
				DRAWN	JH	12.21					
				DRAWING CHECK	PF	12.21					
				DESIGN CHECK	PF	12.21	DRAWING TITLE PROPOSED EARTHWORKS SECTION E				
				APPROVED	PF	12.21					
								Conditions of Use: <i>These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.</i>			



Ph: 09 426 6552
Web: www.aspeng.co.nz



REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:1500 AT A3	
						NAME	DATE
					DESIGN	JH	12.21
					DRAWN	JH	12.21
					DRAWING CHECK	PF	12.21
					DESIGN CHECK	PF	12.21
					APPROVED	PF	12.21

CLIENT

BUILD RICH LIMITED

Conditions of Use:
These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.

SITE ADDRESS	2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)
DRAWING TITLE	PROPOSED EARTHWORKS SECTION F

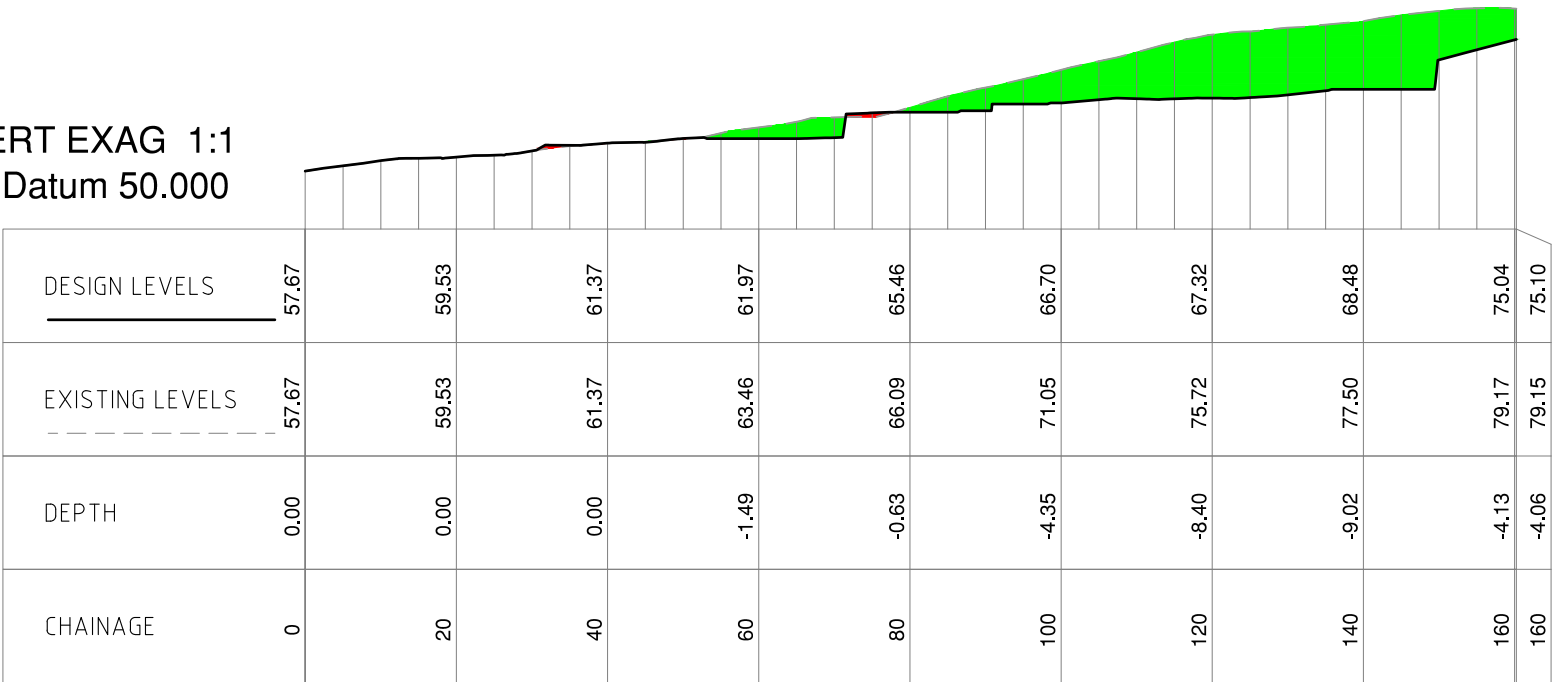
DRAWING NUMBER	
1628 - RC - EW217	
DATE	REVISION
DEC 2021	-



CUT

FILL

VERT EXAG 1:1
Datum 50.000



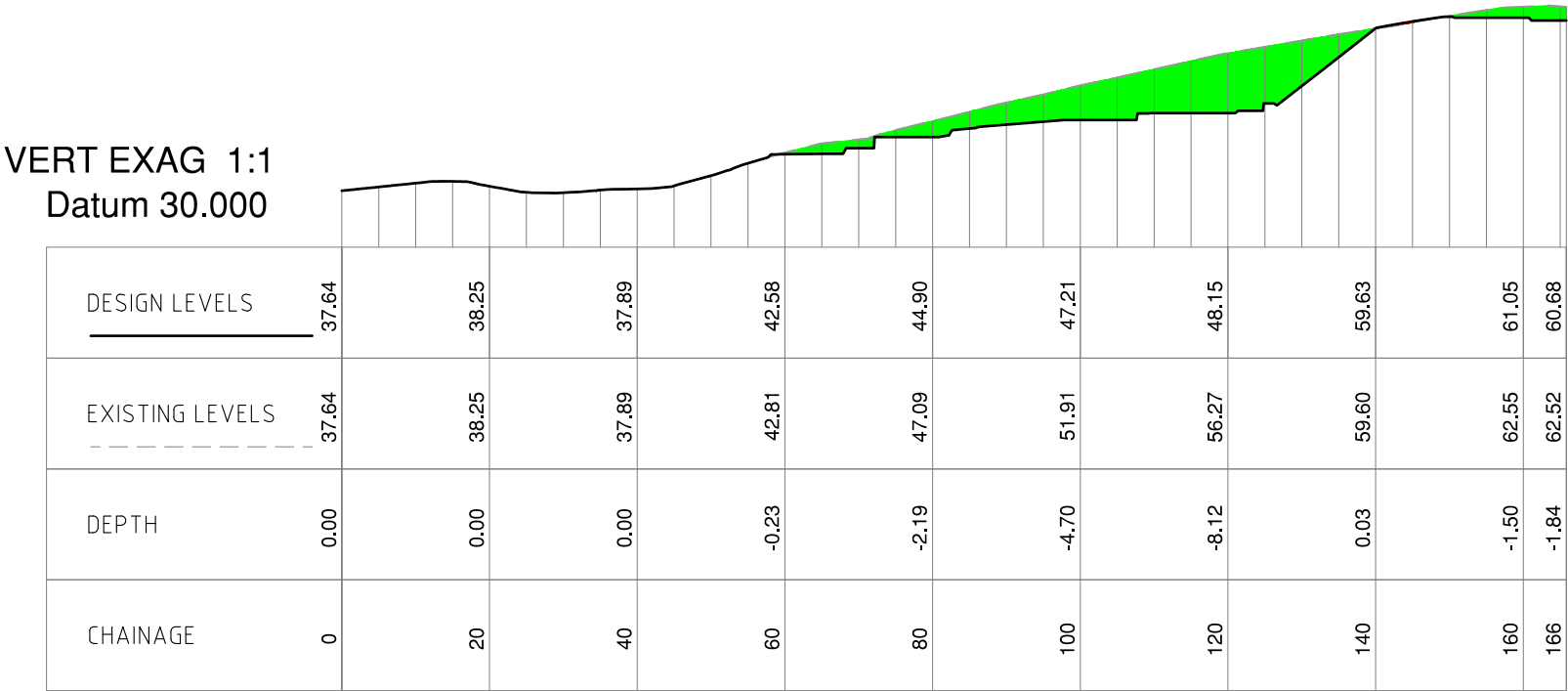
EARTHWORKS SECTION G

NOT FOR CONSTRUCTION
FOR RESOURCE CONSENT PURPOSE

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE 1:1000 AT A3			CLIENT BUILD RICH LIMITED	SITE ADDRESS 2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)	DRAWING NUMBER 1628 - RC - EW218		
					NAME	DATE	DRAWING TITLE PROPOSED EARTHWORKS SECTION G			DATE	REVISION	
					DESIGN	JH 12.21				Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.	DEC 2021	-
					DRAWN	JH 12.21						
					DRAWING CHECK	PF 12.21						
					DESIGN CHECK	PF 12.21			Ph: 09 426 6552			
					APPROVED	PF 12.21			Web: www.aspeng.co.nz			

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EARTHWORKS SECTION H

NOT FOR CONSTRUCTION
FOR RESOURCE CONSENT PURPOSE

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:1000 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER
						NAME	BUILD RICH LIMITED	2182 EAST COAST ROAD SILVERDALE (STAGE 3 & 4)	1628 - RC - EW219
						DATE			
						DESIGN			
						JH			
						12.21			
						DRAWN			
						JH			
						12.21			
						DRAWING CHECK			
						PF			
						12.21			
						DESIGN CHECK			
						PF			
						12.21			
						APPROVED			
						PF			
						12.21			

Conditions of Use:

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DRAWING TITLE

PROPOSED EARTHWORKS SECTION H

DATE

DEC 2021

REVISION

-

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Ph: 09 426 6552

Web: www.aspeng.co.nz