

CIVIL INFRASTRUCTURE REPORT



1206 Great South Road Drury

PROJECT INFORMATION

CLIENT: Drury LP
PROJECT: 261002

DOCUMENT CONTROL

DATE OF ISSUE: 11 June 2025

REVISION: A

AUTHOR



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APPROVED BY



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1. OVERVIEW

1.1 PROJECT BACKGROUND

The purpose of this report is to provide an assessment of civil engineering considerations in relation to the intended interim land use which seeks Council approval for the construction of hardstand (compacted gravel) areas to enable storage-based activities at 1206 Great South Road, Drury. This is supported by a stormwater discharge consent, to allow for the increased runoff from the gravelled platforms. Widespread recontouring and a new vehicle crossing are also proposed.

The long-term development of the area is discussed at a high-level, however, the design and nature of the final solutions will be the subject of Plan Change and/or further resource consent processes.

1.2 SITE DESCRIPTION

The site is located to the west of Great South Road, and adjoins existing rural properties to the west, south and north. The northern most property is used for commercial uses, as can be seen below in the aerial. Runciman Road is located nearby to the north-west of the site (SH1) to the east, and Great South Road to the west. The location of the development site is identified within Figure 1.

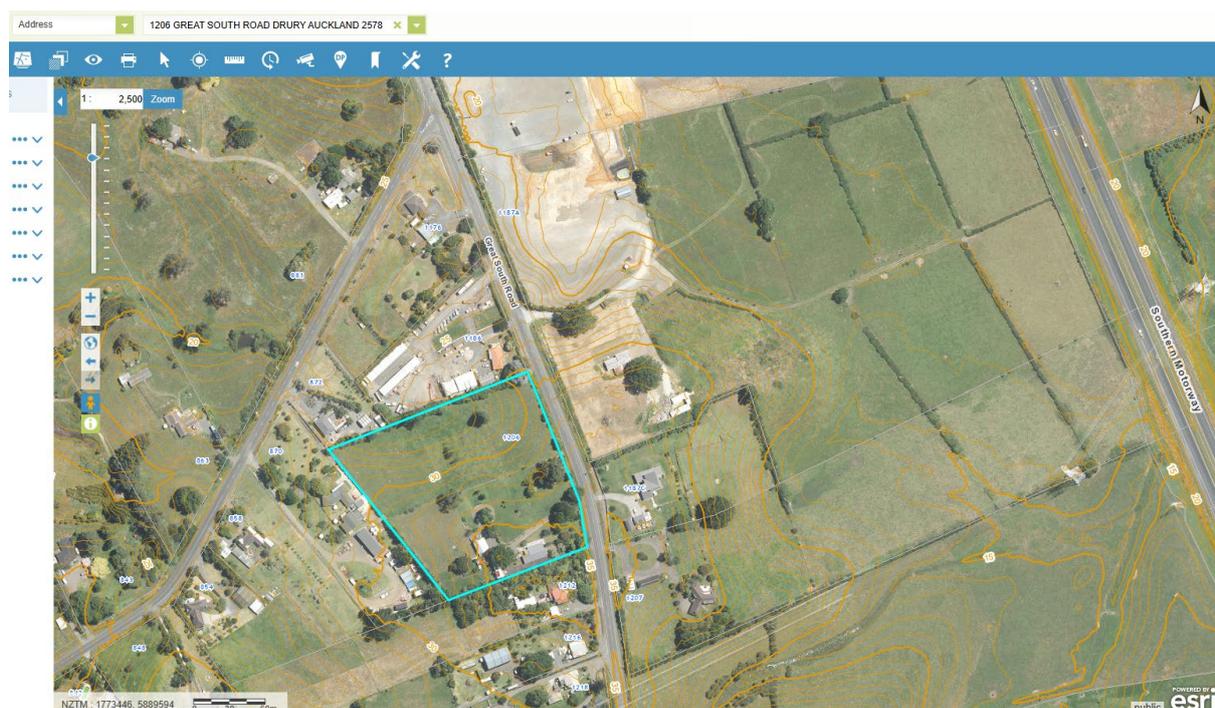


Figure 1: Site location (1206 GSR extent shown in blue). Source: AC Geomaps

The site does not feature any natural features, wetlands or watercourses. The site supports some existing sheds, hardstand area and a dwelling near the southern boundary. Two existing vehicle crossings are provided from Great South Road.

The site falls towards the north, with circa 8m of fall throughout the site. The low point is along the northern boundary, to the rear of 872 Runciman Road. There is an existing 225mmØ SW line which provides existing discharge., which discharges west of Runciman Road.

The low-point is identified as being contained within the 1% AEP Flood Plain, and the OLFP discharge point, which would be somewhat sheet flow in nature.

Refer to the Topo Plan provided within Appendix A for further information.

2. EARTHWORKS

The site will be largely earthworked to form the platforms, accessways and to provide a means of stormwater attenuation and disposal. Whilst existing grades are not excessive, cut and fill operations will be undertaken to allow more suitable grades, with the platform featuring a consistent 3% fall to the northwest. The civil design is based on a recent survey undertaken.

Although Geotech Reporting has not been done, we have extensive Geotech reporting and knowledge for the nearby sites which have all been underlain by competent ground conditions and clay. The topsoil depth is based on the average from the nearby sites (1187a and 1159 Great South Road)

A summary of the earthworks proposed is provided below:

- Earthworks area = 3.14 ha
- Total cut volume = 14,100m³
- Total fill volume = 13,600m³
- Topsoil stripped (assumed 250mm) = 5,400m³
- Maximum cut depth = 3.5m
- Maximum fill depth = 4m

Sediment control will be required in support of any bulk recontouring of the site. A single Sediment Retention Pond (SRP) will be constructed in the low point of the site near the northwest. A series of perimeter dirty water bunds will direct all water into the SRP, where it will be treated before discharge over land towards the exit point (existing 225mm connection).

3. ROADING

The existing crossing near the southern boundary of the site will be retained for initial access, and private vehicle access to the house. This will not be upgraded or removed. A new vehicle crossing is proposed further to the north, the location and design of which allows for the required heavy vehicle tracking and has been designed in conjunction with Michael Hall from CKL.

The final designs will be subject to vehicle crossing applications and associated detailed design. The new crossing will be sealed as per AT standards.

To minimise tracking of gravel onto the public road, it is proposed to asphalt the first section of the accessways within the site. Whilst not a specific requirement, this reduces the likelihood of gravel being tracked onto the road and causing nuisance. The formed width within the site will be determined at time of construction.

The remaining accessway will feature suitably compacted gravel. This gravel will be remediated as required to enable continued vehicle traffic. All grades are less than 5% thus complying with the safety platform requirement of the AUP.

For further detail refer to the appended engineering plans, C300.

4. OTHER SERVICES

The site is provided with existing power and telco connections, other than what is provided to the existing house and outbuildings. Water is provided onsite, via roof caught water. No changes are proposed as part of this consent, however, upgraded power and phone connections can be applied for on an as-required basis. Ducting can be installed within the accessway (either along fence lines or in ducts) to provide for this, or future proof this as required.

5. STORMWATER

The Auckland Council Stormwater Code of Practice sets out design and construction standards for stormwater and requires all land development projects to be provided with a means of stormwater disposal and treatment.

The following section summarises the interim stormwater solution with respect to reticulation, treatment, and capacity.

The interim solution would not propose the vesting any network to Healthy Waters, with the network remaining private, and maintained accordingly. The interim solution has been guided by the requirements of the Region Wide Network Discharge Consent, although a formal SMP is not considered necessary in support of such a temporary activity, which is consistent with that the approach taken by Auckland Council on the adjoining sites which have been consented and constructed.

5.1 STORMWATER RETICULATION

There is no existing public network located near the site, with the surrounding area still largely rural in nature. The existing 225mm \emptyset within the site is not a public asset, but provide discharge from the site, the adjoining property and Runciman Road, thus should be considered a public asset. The location and size of this pipe has been surveyed by Maven (as was not picked up by Surveying Company who did initial topo).

Stormwater from the site currently discharges via sheet flow, towards the low point behind 872 Runciman Road. Low flows are discharged via this existing 225mm line, however, larger events will exceed the capacity of the line, and sheet flow into 872, and towards Runciman Road.

Noting that the proposal would be in support of an interim use within the site, no piped infrastructure is proposed. Instead, stormwater runoff from the hardstand areas will be directed to swales which will direct stormwater to one attenuation basin (refer to Section 5.3, below) before ultimate discharge to the north, via the existing stormwater line.

5.2 STORMWATER CAPACITY AND ATTENUATION

New stormwater infrastructure is proposed to service the development for the 10-year storm event as required by the Stormwater Code of Practice. The design assumes the bulk of the site is gravelled (which the AUP considers impervious area) aside from the batter slopes, riparian margins, swales, and margins of dry basins/swales.

Piped networks have been minimised as far as practical, given the temporary nature of the design.

The dry basin provides detention (as per SMAF Flow-1 and for 100yr). Extended detention for the combined retention and detention volumes is proposed within the solution. Although the swales will

provide retention, this retention volume has not been factored into the overall design, and thus the actual combined volume will exceed that required for stream hydrology mitigation.

Refer to the engineering calculations in Appendix C and plan series C400 in Appendix B for more information. Attenuation for downstream flooding is detailed further under Section 6 of this Report.

5.3 STORMWATER QUALITY

As the site will be largely compacted hardstand, and will support a variety of storage uses, treatment as per GD-01 although not strictly necessary, is considered prudent to allow for.

Given the temporary nature of the intended use, grassed swales are the most practical and efficient means of providing quality treatment. The overall grades of the platform (circa 1-3%) also work well with swales. Depending on the receiving catchment, final swales sizes vary in width as per the appended plans.

The design follows the natural fall of the site. Sheet flows from the hardstand areas will be captured by the swales, with treatment provided before discharge into the dry basins. The swales will feature grasses which will require low future maintenance needs. Please refer to the appended design plans and calculations for further detail.

6. OVERLAND FLOW AND FLOODING

6.1 FLOODING

Auckland Council Geomaps identifies existing overland flowpaths and flood plain towards the low-point in the northern part of the site. The existing OLFPs and the floodplain are shown below within Figure 2:



Figure 2: Existing Flood Plain and OLFPs (Auckland Council Geomaps)

Whilst the area is not within a Stormwater Management Plan, the flood modelling provided by Council / Healthy Waters assumes that the site and surrounding FUZ land is developed to a maximum impervious area of 70%. Whilst MPD could therefore be relied upon as the basis of discharge, given the

nature of the discharge and downstream property (872), attenuation to pre-development levels for and up to the 100-yr event is proposed. This will be provided within the dry basin, which also offsets the existing volume of the flood plain which is also offset within the dry basin.

Please refer to the HEC modelling report appended (Appendix D). This confirms that there is no effect, with all discharge less than the existing pre-development flows.

The outfall from the dry basin feeds into the existing 225mmØ. Overflows above this will bubble out the scruffy dome located below the basin, and then will sheet flow out through a specifically designed level spreader as to ensure larger rainfall events are discharged in a sheet flow manner and at the same low-point as per the existing situation. As such, there will be no downstream effects.

The dry basin will instead provide positive effects, as it will control and manage more frequent smaller rainfall events which would otherwise exceed the limit of the existing stormwater line.

6.2 OVERLAND FLOWPATHS

The site is subject to several overland flowpaths (“OLFPs”). As can be seen from the image above (Figure 2), these largely commence within the site and are directed to the existing low point behind 872 Runciman Road.

Although the OLFPs are redirected within the platforms, the discharge remains consistent, via the designed outfall, and resource consent is therefore not required.

7. WASTEWATER

The Watercare Code of Practice for Land Development and Subdivision sets out the design principles for wastewater and requires any development project to be provided with a means of wastewater disposal.

At this stage, it is assumed that there will be no reticulated facilities within the site, and there is no need for wastewater provision. Future development proposals will be provided with a means of wastewater disposal, via a new public network extension. The existing septic tank will be retained; for as long as the dwelling and buildings are kept within the site.

8. WATER SUPPLY

The Watercare Code of Practice for Land Development and Subdivision sets out the design principles for water supply and requires assessment against SNZPAS 4509:2008 NZ Fire Service Fire Fighting Water Supply Code of Practice.

No public water supply is being sought as part of this resource consent. Temporary solutions will be considered in the future on an as required basis, including the retention of the existing system.

9. CONCLUSION

This report provides an assessment of infrastructure in support of the intended interim use of the site, which consists of storage facility on hardstand platforms. Based on the information available at the time of issue, there are no infrastructure issues which would impede the intended use of the site.

Emphasis has been provided on stormwater design and assessment, which is the main area of design and risk associated with storage uses. Maven have taken a conservative approach, whereby it has been assumed that treatment (via swales) and attenuation (SMAF) via a dry basin will be required.

Earthworks will be required in support of the proposal, and bulk recontouring of the site is proposed. Suitable sediment and erosion controls will be in place throughout the duration of the earthwork's operation.

Although there is flooding identified within the site, this flood volume is compensated for within the proposed dry basin. 100-yr attenuation is provided to ensure there is no increase in flows from the pre-development condition. This ensures there is no downstream effects created by the increased impervious area, as does the specifically designed outfall which will result with sheet flows into the adjoining site, once the capacity of the 225mm \varnothing is reached.

The new sealed crossing will provide access to the site, and a small extent of hot mixed accessway is considered prudent to minimise tracking of gravel onto Great South Road. The remaining accessway(s) will feature compacted GAP. The final design of the crossing will be subject to a future vehicle crossing application from Auckland Transport.

Existing wastewater and water networks exist, and connections in support of future development is possible. No connections are sought at this stage, with the retention of the existing disposal and storage methods retained in support of the interim use.

Connections are possible to power and phone networks. Any such upgrades will be provided on an as-required basis, and are not needed in support of this interim use,

The report confirms that the proposal is supportable from a civil engineering perspective.

10. APPENDICES

10.i APPENDIX A – TOPO SURVEY

Unauthorised copying or use of this plan for any other purpose is not permitted without the prior consent of The Surveying Company Limited. Areas and dimensions shown on this plan are approximate only and are subject to confirmation by survey. This survey has been carried out adopting techniques required to produce a plot, which is accurate at the intended scale. CAD packages are capable of calculating the relationship between points which is greatly in excess of this accuracy. Data calculated from CAD files should be confirmed by on-site measurement. Copyright and ownership of data transferred electronically is as set out in The Surveying Company Limited's Standard Conditions Of Engagement / Client Engagement Contract. Boundaries defined mathematically as part of any electronic dataset must not be accepted in substitution of the requirements for Redefinition Surveys as set out in the Surveyor-General's Rules for Cadastral Survey 2021/1. This dataset is forwarded in its entirety. This plan shall not be amended and/or reprinted without the written permission of The Surveying Company Limited.



LOCAL AUTHORITY : AUCKLAND COUNCIL
ZONING : FUTURE URBAN ZONE
TOTAL AREA : 2.4281ha & 4000m²
COMPRISED IN : RT NA756/242 & NA90B/616
REGISTERED OWNERS : HARRY COLIN JOHN LAW,
 JUSHU LAW & CHARLES
 FOO CHOY SUE (NA756/242)
 JACQUELINE FARR, WAYNE
 GERARD MARTIN(NA90B/616)

LEGEND

	FENCE
	BANK TOP
	BANK BOTTOM
	30.00 CONTOUR
	BUILDING
	STORMWATER PIPE
	METAL EDGE
	EDGE OF SEAL
	ROAD CL

- NOTE**
1. CONTOUR INTERVAL = 0.5m
 2. COORDINATES ARE IN TERMS OF MOUNT EDEN CIRCUIT 2000
 3. LEVELS ARE IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016
 4. ORIGIN: RM SO 45115 (DLA9) HEIGHT = 12.43m
 5. EXISTING IMAGE EXTRACTED FROM AUCKLAND COUNCIL GEOMAP.
 6. AERIAL SURVEYED BY DRONE.


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PMG FUNDS
 EXISTING SITE PLAN OF PART LOT 1 DEEDS 167 & LOT 1 DP 151639 -#1206 GREAT SOUTH ROAD & 1206 GREAT SOUTH ROAD, RUNCIMAN

SITE PLAN
 DRAWN: LL SURVEYED: YJ CHECKED: CF DWG: J2407 - SITE PLAN
 SCALE: @A3 1 : 1000 DATE: MAY 2025 JOB NUM: J2407



10.ii APPENDIX B – ENGINEERING PLANS



LOT 1 DP 151639
4000

LOT 2 DP 345389
126470

LOT 2 DP 44182
12199

PT LOT 1 DEEDS
REG 167 24281

LOT 2 DP 345389
126470

LOT 1 DP 345389
11800

LOT 1 DEEDS
REG 1139 15985

GREAT SOUTH ROAD

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
 3. LEVELS IN TERMS OF THE NZVD2016.
 4. ORIGIN: RM SO 45115 (DLA9) HEIGHT = 12.43m
 5. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 6. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
 7. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 8. SEDIMENT CONTROL SHALL BE INSTALLED AND OPERATIONAL BEFORE EARTHWORKS START ONSITE IN ACCORDANCE WITH COUNCIL STANDARDS.
 9. CONTRACTOR SHALL PROVIDE AS-BUILT OF WORKING SEDIMENT CONTROL DEVICES AND CONFIRMATION OF POND/DECENT VOLUMES TO ENGINEER.
 10. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

LEGEND

- EX BDY
- PROP BDY
- - - EX MAJOR CONTOUR
- - - EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- EX OLFP

Rev	Description	By	Date
A	FOR RESOURCE CONSENT	JAW	06/2025
Survey	-		05/2025
Design	JAW		05/2025
Drawn	JAW		05/2025
Checked	TM		05/2025

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Project
**DEVELOPMENT OF
1206 GREAT SOUTH ROAD
RUNCIMAN
FOR
PMG FUNDS**

Title
**PROPOSED
EARTHWORKS
PLAN**

Project no.	261002
Scale	1:750 @ A3
Cad file	261002-C200.DWG
Drawing no.	C200
Rev	A

RESOURCE CONSENT



LOT 1 DP 151639
4000

LOT 2 DP 345389
126470

LOT 2 DP 44182
12199

LOT 2 DP 345389
126470

LOT 1 DP 345389
11800

LOT 1 DEEDS
REG 1139 15985

GREAT SOUTH ROAD

LEGEND

	EX BDY
	PROP BDY
	EX MAJOR CONTOUR
	EX MINOR CONTOUR
	EX OLFP

Cut/Fill Table			
Number #	Minimum Elevation	Maximum Elevation	Color
1	-4.000	-3.000	
2	-3.000	-2.000	
3	-2.000	-1.000	
4	-1.000	0.000	
5	0.000	1.000	
6	1.000	2.000	
7	2.000	3.000	
8	3.000	4.000	
9	4.000	5.000	

Rev	Description	By	Date
A	FOR RESOURCE CONSENT	JAW	06/2025
Survey	-		05/2025
Design	JAW		05/2025
Drawn	JAW		05/2025
Checked	TM		05/2025



Project
**DEVELOPMENT OF
1206 GREAT SOUTH ROAD
RUNCIMAN
FOR
PMG FUNDS**

Title
**PROPOSED
EARTHWORKS
PLAN**

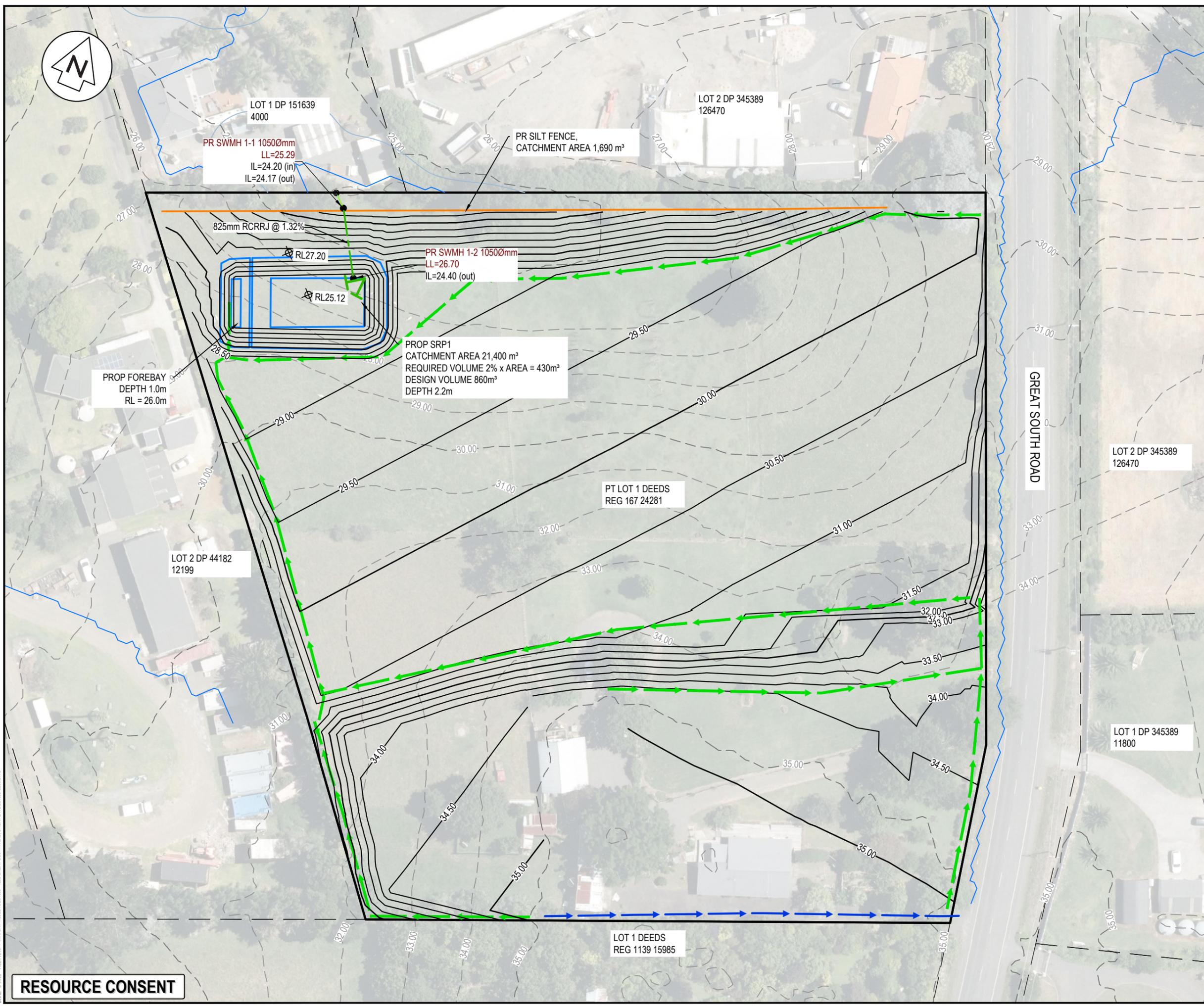
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Scale	1:750 @ A3
Cad file	261002-C200.DWG
Drawing no.	C220
Rev	A

EARTH WORKS (SURFACE EGL-250mm COMPARISON WITH SURFACE PGL-300mm)
 CUT VOLUME 14,100 m³
 FILL VOLUME 13,600m³
 NET CUT 500 m³
 TOPSOIL STRIPPED (250mm) = 5,400 m³
 EARTHWORKS AREA = 21400m² / 2.14 Ha

NOTE: NO ALLOWANCE FOR SERVICES TRENCHES, VOLUMES ARE UNFACTORED AND IN SITU

RESOURCE CONSENT

DATE: 01/25 FILE PATH: F:\Maven\PROJECTS\261002 - 1206 GREAT SOUTH ROAD, DRAWING\DWG\261002-C200.DWG



LEGEND

---	EX BDY
---	PROP BDY
---	EX MAJOR CONTOUR
---	EX MINOR CONTOUR
---	PR MAJOR CONTOUR
---	PR MINOR CONTOUR
---	PROP EXTENT WORK
---	PROP CLEANWATER
---	PROP DIRTYWATER
---	PROP SILT FENCE
---	PROP DECANT
---	PROP DECANT BAR

A	FOR RESOURCE CONSENT	JAW	06/2025
Rev	Description	By	Date
Survey	-	-	05/2025
Design	JAW	-	05/2025
Drawn	JAW	-	05/2025
Checked	TM	-	05/2025

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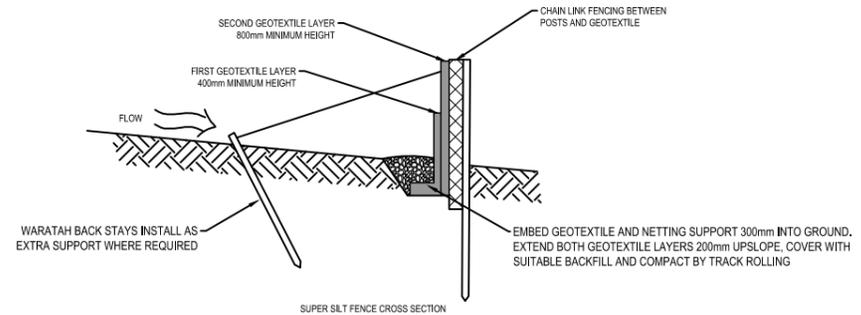
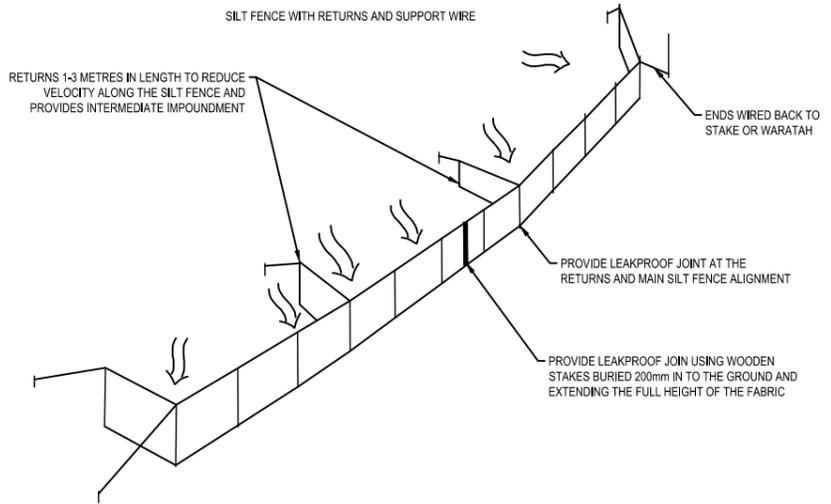
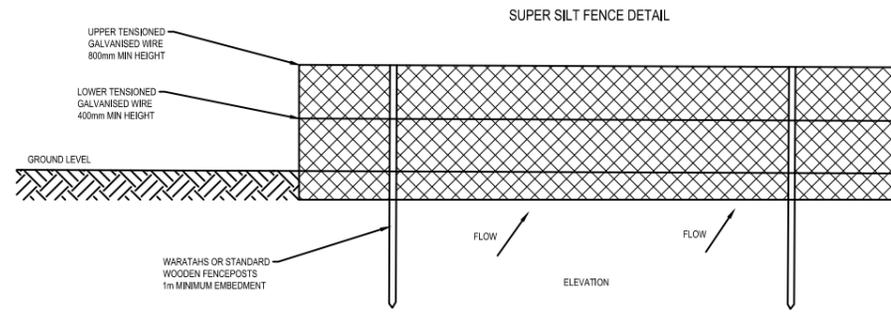
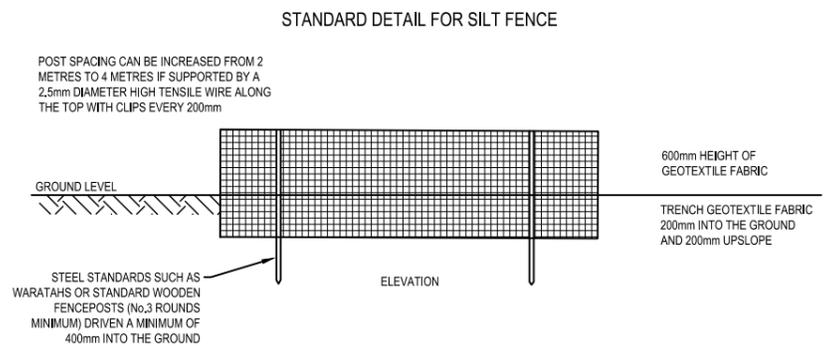
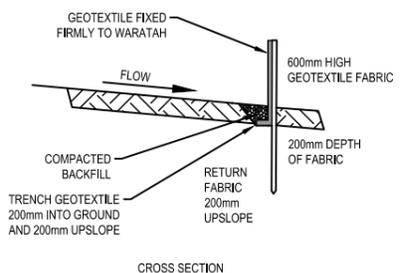
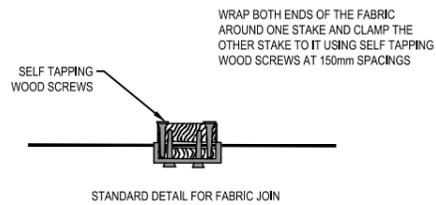
Project
**DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 RUNCIMAN
 FOR
 PMG FUNDS**

Title
**PROPOSED
 EROSION AND SEDIMENT
 CONTROL PLAN**

Project no.	261002
Scale	1:750 @ A3
Cad file	261002-C230.DWG
Drawing no.	C230
Rev	A

RESOURCE CONSENT

DATE: 6/11/25 FILEPATH: F:\Maven\PROJECTS\261002 - 1206 GREAT SOUTH ROAD, RUNCIMAN\DWG\261002-C230.DWG



DATE: 6/11/25

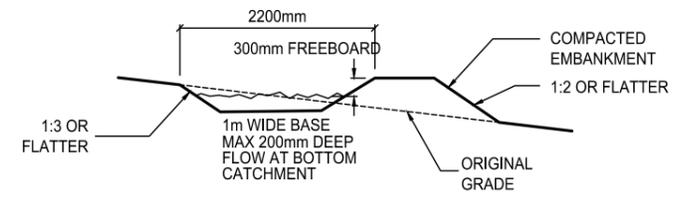
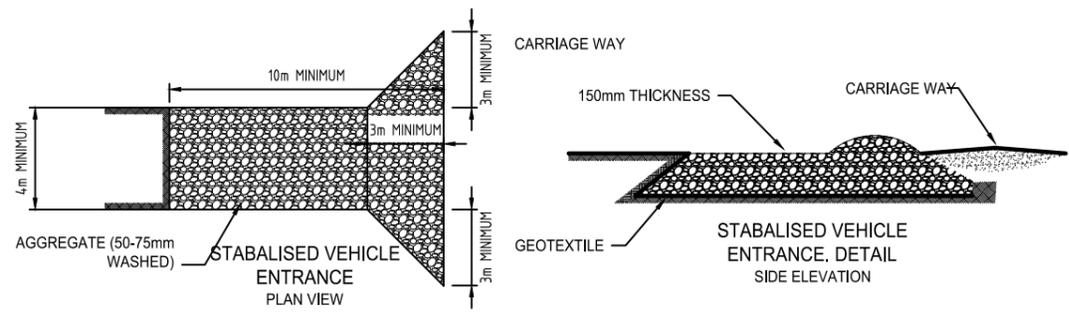
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Survey	SURVEY THE BAY		02/21
Design	SM		02/21
Drawn	SM		02/21
Checked	AC		02/21

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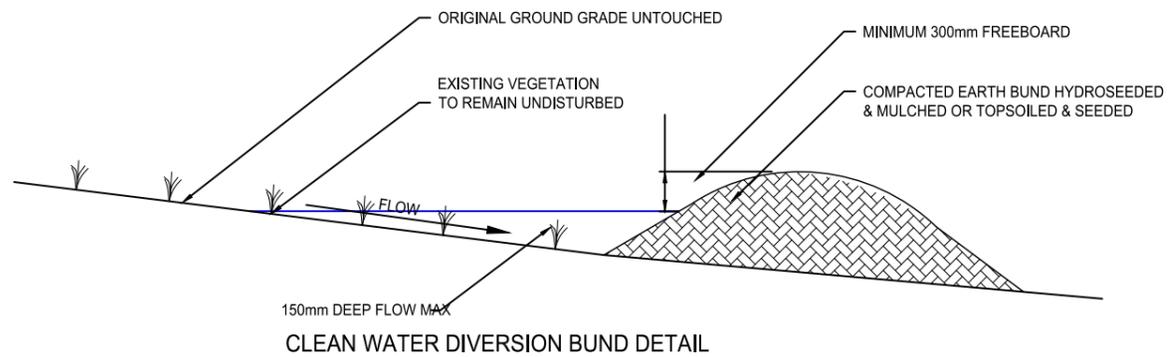
Project
**PROP DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 DRURY, AUCKLAND
 FOR
 PMG FUNDS**

Title
**EROSION AND SEDIMENT
 STANDARD DETAILS**

Project no.	285002
Scale	NTS
Cad file	261002-C240 DETAILS.DWG
Drawing no.	C241
Rev	A



TYPICAL CROSS SECTION OF A RUNOFF DIVERSION
TYPICAL DIMENSIONS UNLESS OTHERWISE NOTED



CLEAN WATER DIVERSION BUND DETAIL

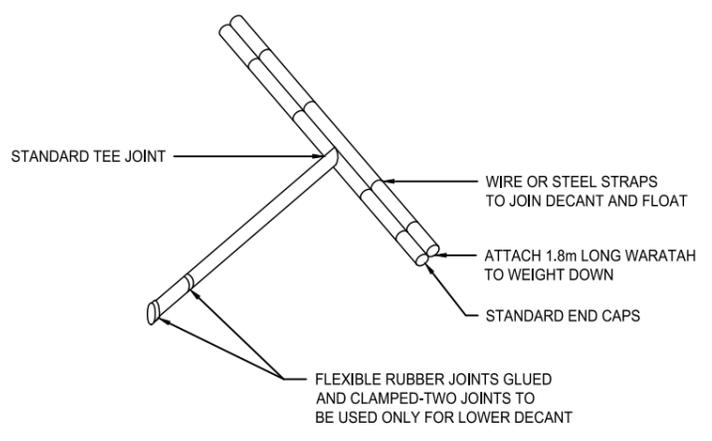
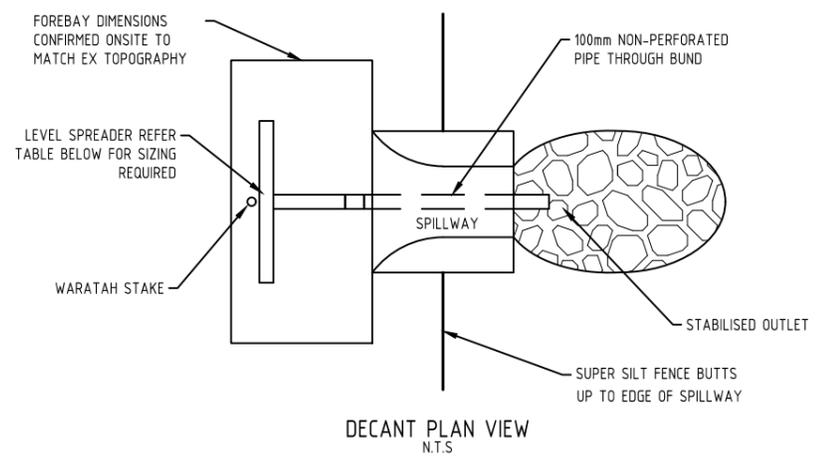
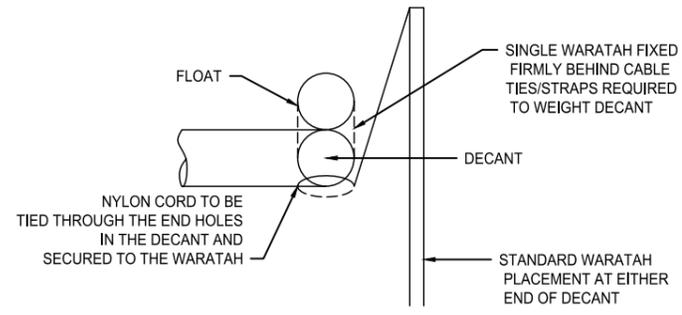
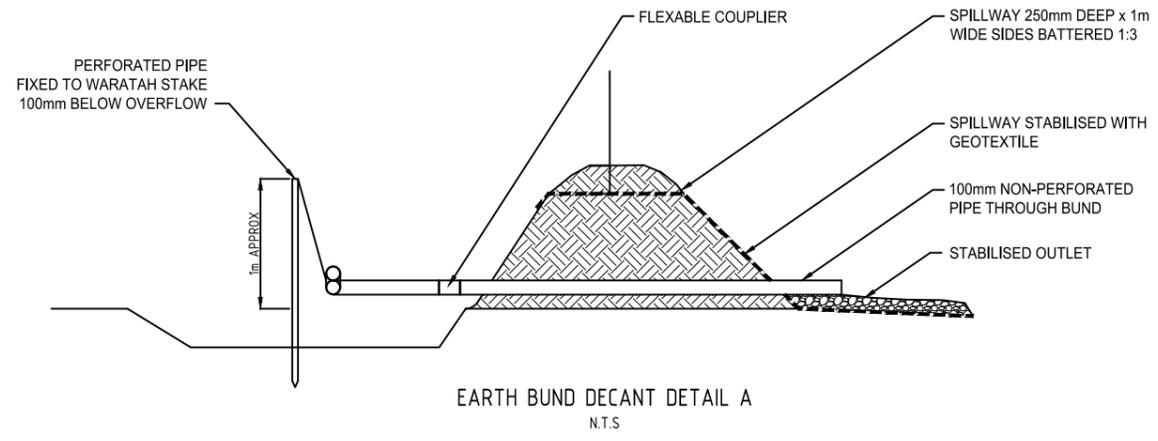
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Survey	SURVEY THE BAY		02/21
Design	SM		02/21
Drawn	SM		02/21
Checked	AC		02/21

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Project
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 DRURY, AUCKLAND
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 PMG FUNDS**

Title
**EROSION AND SEDIMENT
 STANDARD DETAILS**

Project no.	285002
Scale	NTS
Cad file	261002-C240 DETAILS.DWG
Drawing no.	C242
Rev	A



LEVEL SPREADER DESIGN CRITERIA (20 YEAR STORM EVENT)				
DESIGN FLOW (m ³ /sec)	INLET WIDTH (m)	DEPTH (m)	END WIDTH (m)	LENGTH (mm)
0-0.3	3	150	1	3
0.3-0.6	5	180	1	7
0.6-0.9	7	220	1	10

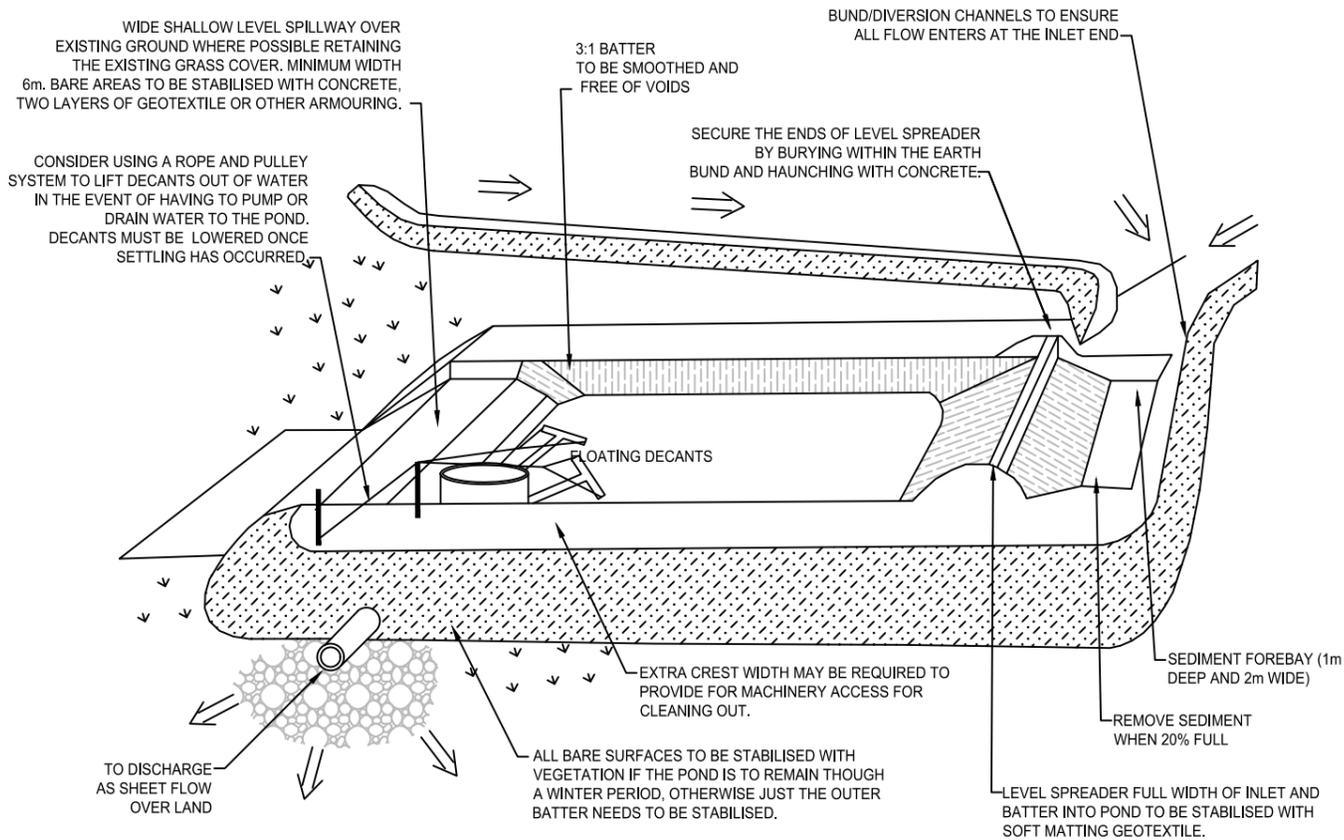
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Survey	SURVEY THE BAY		02/21
Design	SM		02/21
Drawn	SM		02/21
Checked	AC		02/21

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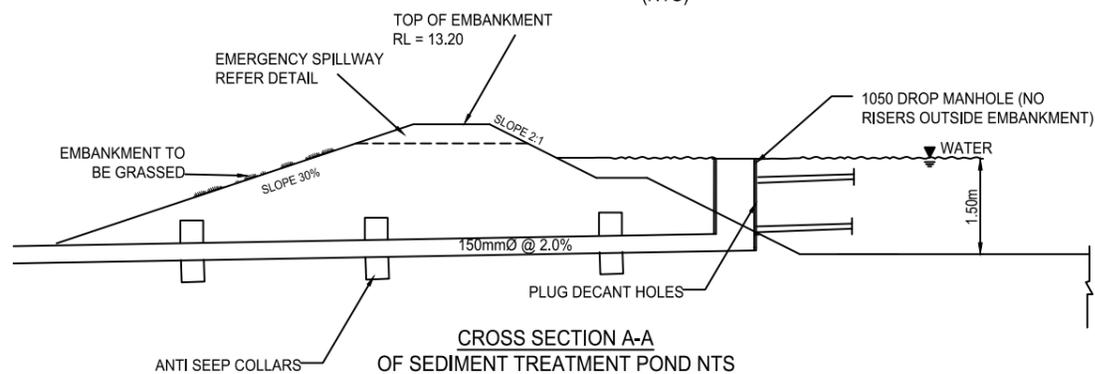
Project
**PROP DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 DRURY, AUCKLAND
 FOR
 PMG FUNDS**

Title
**EROSION AND SEDIMENT
 STANDARD DETAILS**

Project no.	285002
Scale	NTS
Cad file	261002-C240 DETAILS.DWG
Drawing no.	C243
Rev	A



SEDIMENT POND DETAILS (NTS)



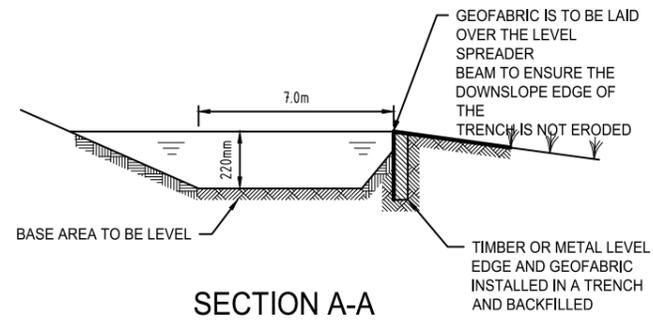
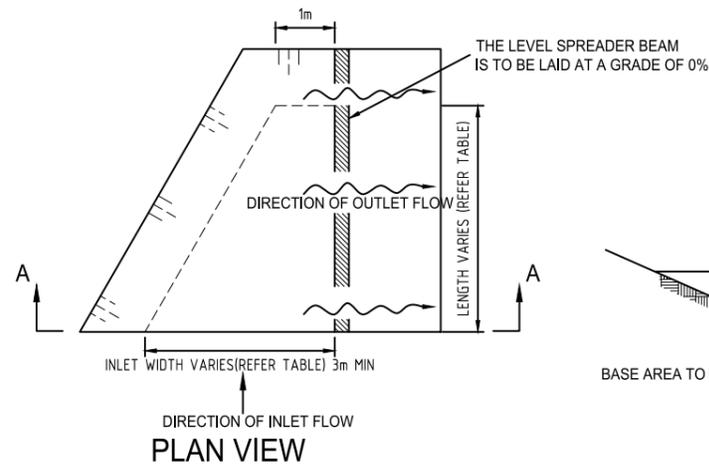
A	RC	JAW	05/2024
Rev	Description	By	Date
Survey	SURVEY THE BAY		02/21
Design	SM		02/21
Drawn	SM		02/21
Checked	AC		02/21

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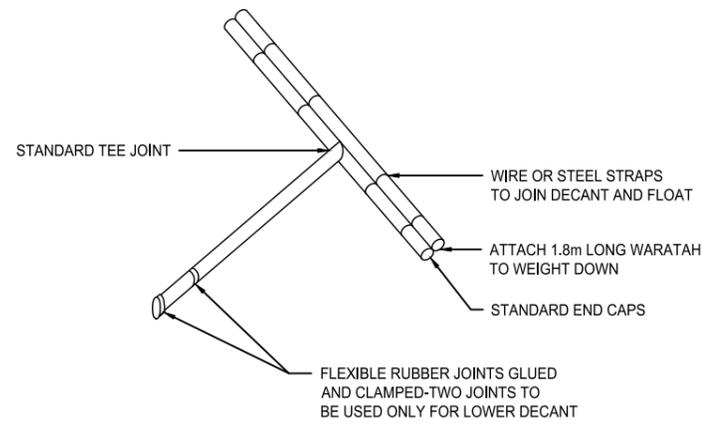
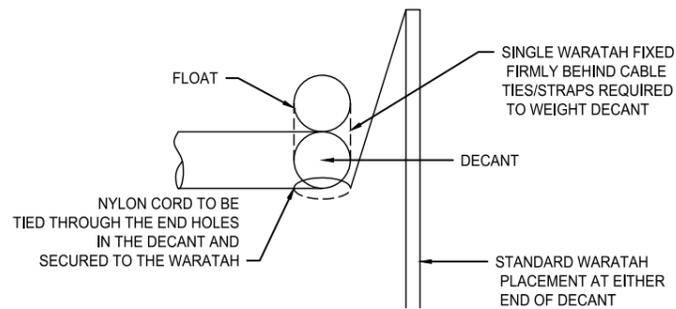
Project
**PROP DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 DRURY, AUCKLAND
 FOR
 PMG FUNDS**

Title
**EROSION AND SEDIMENT
 STANDARD DETAILS**

Project no.	285002
Scale	NTS
Cad file	261002-C240 DETAILS.DWG
Drawing no.	C244
Rev	A



LEVEL SPREADER DESIGN CRITERIA (20 YEAR STORM EVENT)				
DESIGN FLOW (m ³ /sec)	INLET WIDTH (m)	DEPTH (m)	END WIDTH (m)	LENGTH (mm)
0-0.3	3	150	1	3
0.3-0.6	5	180	1	7
0.6-0.9	7	220	1	10



A	RC	JAW	05/2024
Rev	Description	By	Date
Survey	SURVEY THE BAY	02/21	
Design	SM	02/21	
Drawn	SM	02/21	
Checked	AC	02/21	

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Project
**PROP DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 DRURY, AUCKLAND
 FOR
 PMG FUNDS**

Title
**EROSION AND SEDIMENT
 STANDARD DETAILS**

Project no.	285002
Scale	NTS
Cad file	261002-C240 DETAILS.DWG
Drawing no.	C245
Rev	A

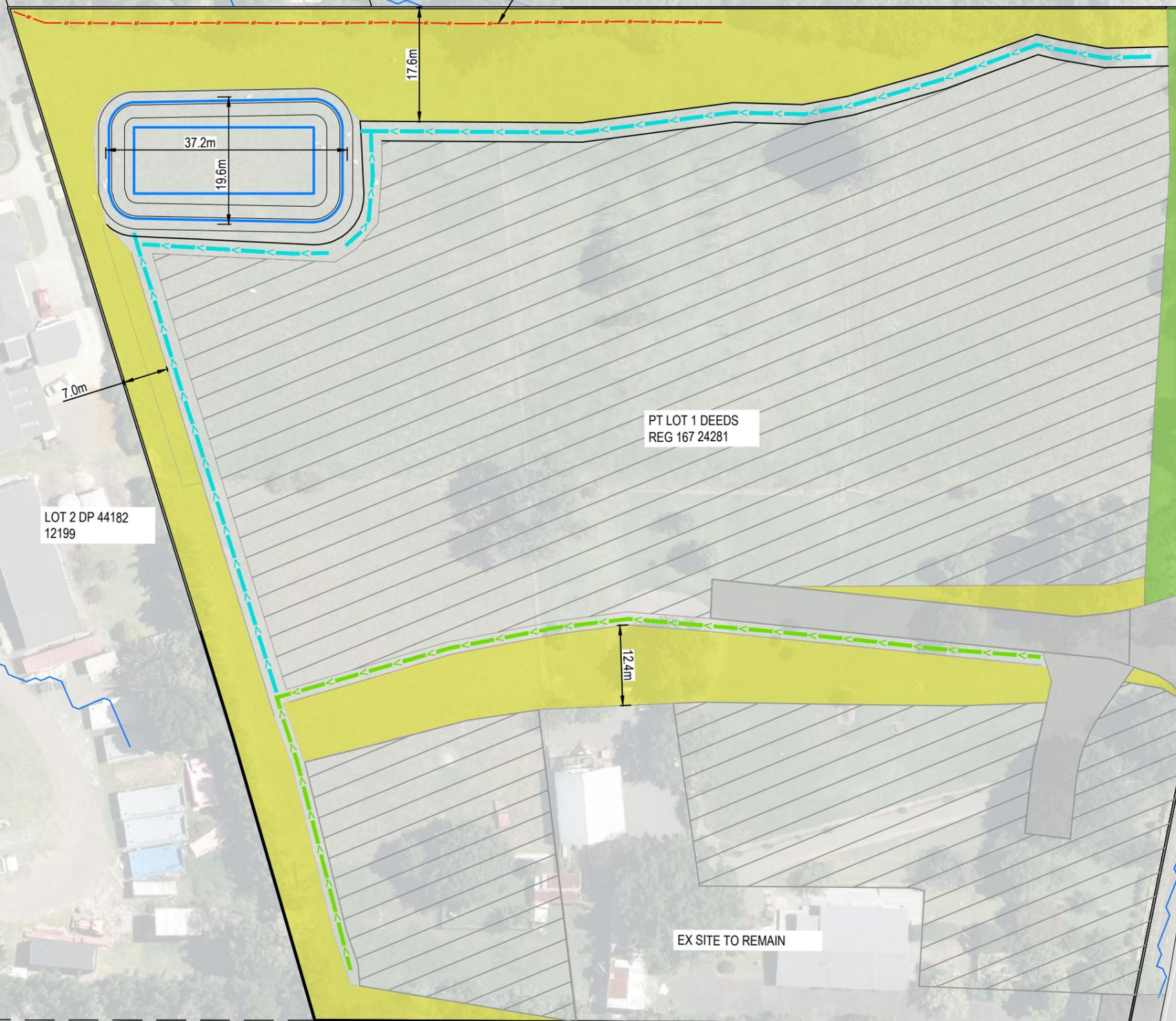


LOT 1 DP 151639
4000

LOT 2 DP 345389
126470

EX FENCE TO REMAIN

PR HARDFILL & PAVE :	15,237 m ² (62.8%)
PR SWALE / POND :	1,828 m ²
PR LANDSCAPE:	5,320m ²
WORK EXTENT:	22,385 m ²
EX SITE TO REMAIN:	1,894m ²
TOTAL:	24,279 m ²



PT LOT 1 DEEDS
REG 167 24281

LOT 2 DP 44182
12199

GREAT SOUTH ROAD

LOT 2 DP 345389
126470

EX SITE TO REMAIN

LOT 1 DEEDS
REG 1139 15985

LOT 1 DP 345389
11800

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
 3. LEVELS IN TERMS OF THE NZVD 2016.
 4. ORIGIN: RM SO 45115 (DLA9) HEIGHT = 12.43m
 4. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 5. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
 6. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 7. SEDIMENT CONTROL SHALL BE INSTALLED AND OPERATIONAL BEFORE EARTHWORKS START ONSITE IN ACCORDANCE WITH COUNCIL STANDARDS.
 8. CONTRACTOR SHALL PROVIDE AS-BUILT OF WORKING SEDIMENT CONTROL DEVICES AND CONFIRMATION OF POND/DECENT VOLUMES TO ENGINEER.
 9. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

LEGEND

	EX BDY
	PROP BDY
	PR SWALE 2 m WIDTH
	PR SWALE 3 m WIDTH
	PR DRY POND
	PROP/EX ACCESS
	PROP HARDFILL
	PROP LANDSCAPE
	PROP FRONT TRIM
	EX OLFP

Rev	Description	By	Date
A	FOR DRAFT ISSUE	JAW	05/2025
Survey	-		05/2025
Design	JAW		05/2025
Drawn	JAW		05/2025
Checked	TM		05/2025

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Project
**DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 RUNCIMAN
 FOR
 PMG FUNDS**

Title
**PROPOSED
 SITE
 PLAN**

Project no.	261002
Scale	1:750 @ A3
Cad file	261002-C250.DWG
Drawing no.	C250
Rev	A



LOT 1 DP 151639
4000

LOT 2 DP 345389
126470

LOT 2 DP 44182
12199

PT LOT 1 DEEDS
REG 167 24281

LOT 2 DP 345389
126470

GREAT SOUTH ROAD

LOT 1 DP 345389
11800

LOT 1 DEEDS
REG 1139 15985

EX VEHICLE CROSSING 2
TO REMAIN

EX VEHICLE CROSSING 1
TO BE RELOCATED
STANDARD DETAIL AS
PER VX0303 C

300mm RCRRJ
CLASS 4 @3.4%
DETAIL AS PER
C321

LOT 1 ACCESS

CH 94
CH 90
CH 80
CH 70
CH 60
CH 50
CH 40
CH 30
CH 20
CH 10
CH 0

7.00m

7.00m

15.20m

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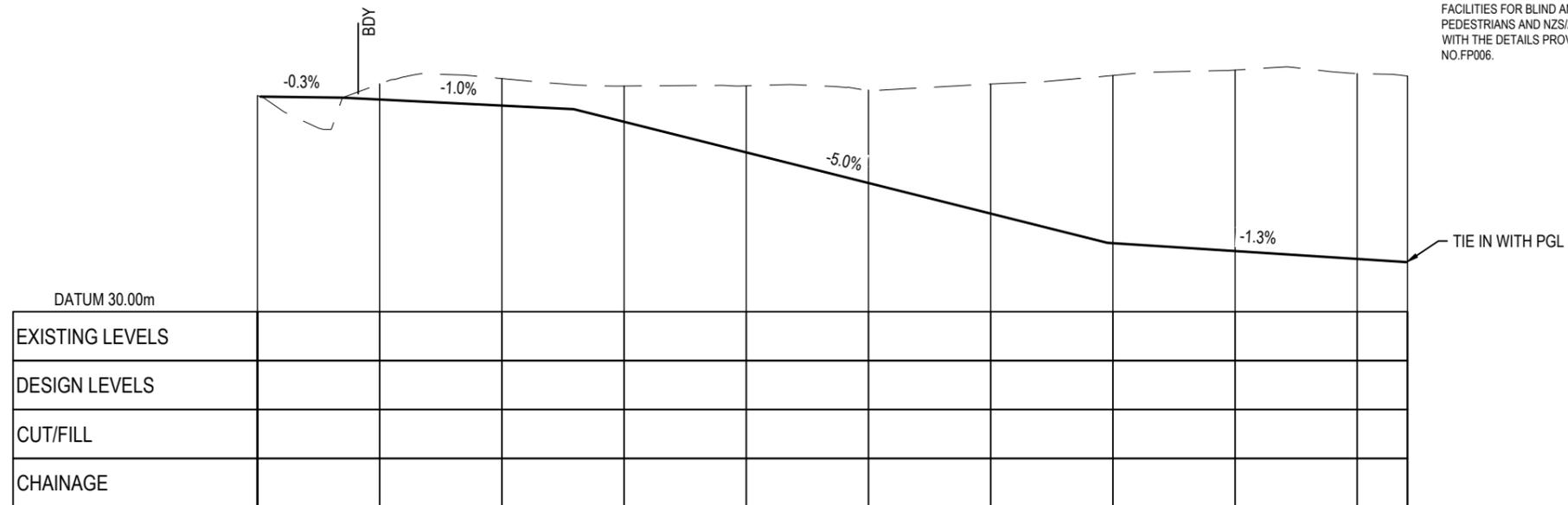
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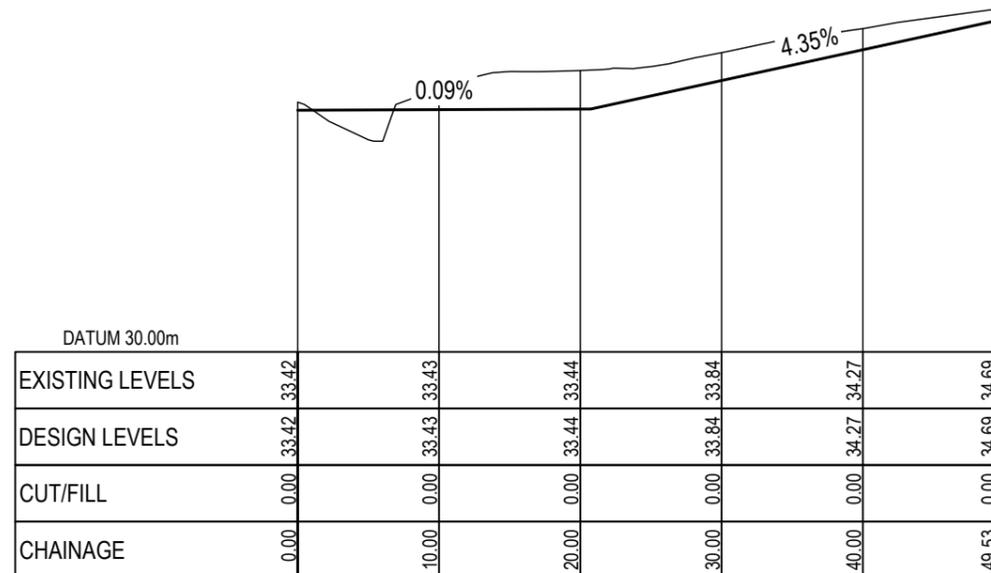
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10. PRAM CROSSINGS ARE TO BE FLUSH TO THE CHANNEL WITH NO LIP.
11. ALL KERB AND CHANNEL TO HAVE SAW CUTS AT MAX. 3M CENTRES. ALL SAW CUTS TO COINCIDE WITH FOOTPATH JOINTS.
12. ALL SIGNAGE AND PAVEMENT MARKINGS TO BE IN ACCORDANCE WITH NZTA MOTSAM STANDARDS AND THE ATCOP TDM.
13. ALL STREET NAME SIGNS SHALL FOLLOW ATCOP GUIDELINES IN TERMS OF LAYOUT, CLEARANCES, AND CONSTRUCTION DETAILS.
14. ALL LINE MARKINGS TO BE REFLECTORISED IN ACCORDANCE WITH MOTSAM STANDARDS.
15. THE MINIMUM VERTICAL AND LATERAL CLEARANCES FOR SIGNAGE SHALL BE IN ACCORDANCE WITH MOTSAM STANDARDS.
16. STREET LIGHTING SHALL BE DESIGNED IN ACCORDANCE WITH ALL APPLICABLE NEW ZEALAND STANDARDS INCLUDING BUT NOT RESTRICTED TO THE CURRENT VERSION OF AS/NZS 1158 LIGHTING FOR ROADS AND PUBLIC SPACES SERIES OF STANDARDS.
17. ALL NEW, MODIFIED OR UPGRADED PRAM CROSSINGS MUST BE IN ACCORDANCE WITH RTS 14 GUIDELINES FOR FACILITIES FOR BLIND AND VISION-IMPAIRED PEDESTRIANS AND NZS/AS 1428.4 AND MUST COMPLY WITH THE DETAILS PROVIDED IN AT'S STANDARD PLAN NO.FP006.

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
 2. CONTRACTOR IS TO AVOID USING GPS FOR SET OUT OF THE KERB LEVELS WHERE GRADIENTS ARE LESS THAN 1%.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
 5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. FINAL PAVEMENT DESIGN SUBJECT TO CBR/BEAM TESTS ON SUBGRADE MATERIAL.
 7. SETOUT SCHEDULE WITH COORDINATES OF CHAINAGE POINTS ALONG ROAD CENTRELINE TO BE SUPPLIED TO THE CONTRACTOR PRIOR TO CONSTRUCTION.
 8. REFER TO LONG SECTION FOR FINISHED CENTRELINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
 9. ALL DUCTS SHALL HAVE LOCATIONS MARKED ON KERB LINES IN ACCORDANCE WITH SPECIFICATION.



VEHICLE CORSSING LONG SECTION
SCALE: HORI 1:500 VERT 1:100



LOT 1 VEHICLE ACCESS LONG SECTION
SCALE: HORI 1:500 VERT 1:100

Rev	Description	By	Date
A	FOR RESOURCE CONSENT	JAW	06/2025
Survey	-		05/2025
Design	JAW		05/2025
Drawn	JAW		05/2025
Checked	TM		05/2025



Project
**DEVELOPMENT OF
1206 GREAT SOUTH ROAD
RUNCIMAN
FOR
PMG FUNDS**

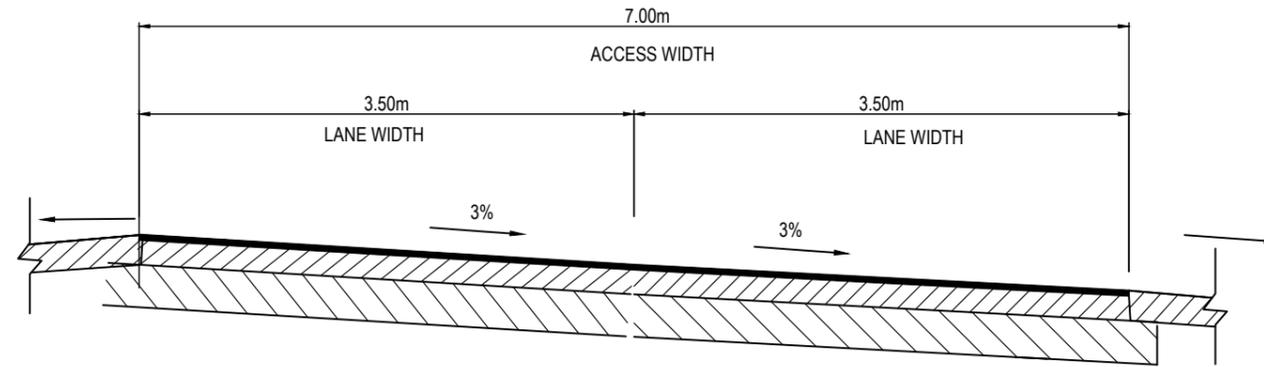
Title
**PROPOSED
VEHICLE ACCESS
LONG SECTION**

Project no.	261002
Scale	AS SHOWN
Cad file	261002-C300.DWG
Drawing no.	C310
Rev	A

RESOURCE CONSENT

10. PRAM CROSSINGS ARE TO BE FLUSH TO THE CHANNEL WITH NO LIP.
11. ALL KERB AND CHANNEL TO HAVE SAW CUTS AT MAX. 3M CENTRES. ALL SAW CUTS TO COINCIDE WITH FOOTPATH JOINTS.
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- NOTES
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 8. REFER TO LONG SECTION FOR FINISHED CENTRELINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
 9. ALL DUCTS SHALL HAVE LOCATIONS MARKED ON KERB LINES IN ACCORDANCE WITH SPECIFICATION.



○ TYPICAL ACCESS PAVE CROSS SECTION
NTS

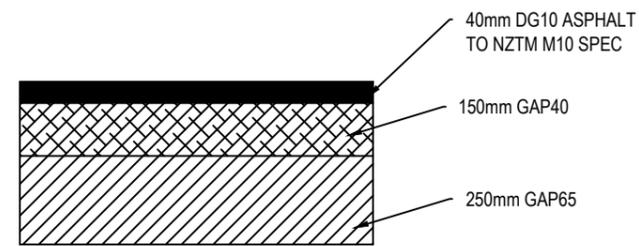
Rev	Description	By	Date
A	FOR RESOURCE CONSENT	JAW	06/2025
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Design	JAW		05/2025
Drawn	JAW		05/2025
Checked	TM		05/2025

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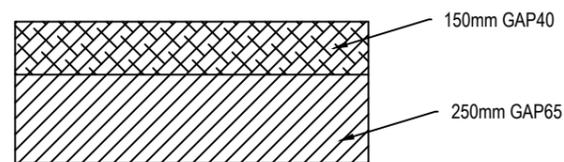
Project
**DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 RUNCIMAN
 FOR
 PMG FUNDS**

Title
**PROPOSED
 ROADING
 DETAILS**

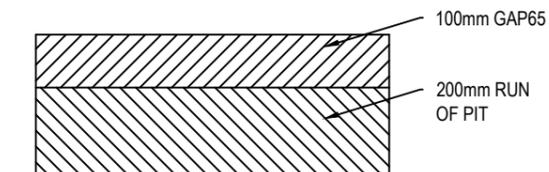
Project no.	261002
Scale	NTS
Cad file	261002-C300.DWG
Drawing no.	C320
Rev	A



○ TYPICAL ASPHALT PAVE DETAIL
NTS, SUBGRADE Min. CBR 5



○ TYPICAL METALLED ACCESS
NTS, SUBGRADE Min. CBR 5



○ SITE HARDFILL DETAIL
NTS, SUBGRADE Min. CBR 5

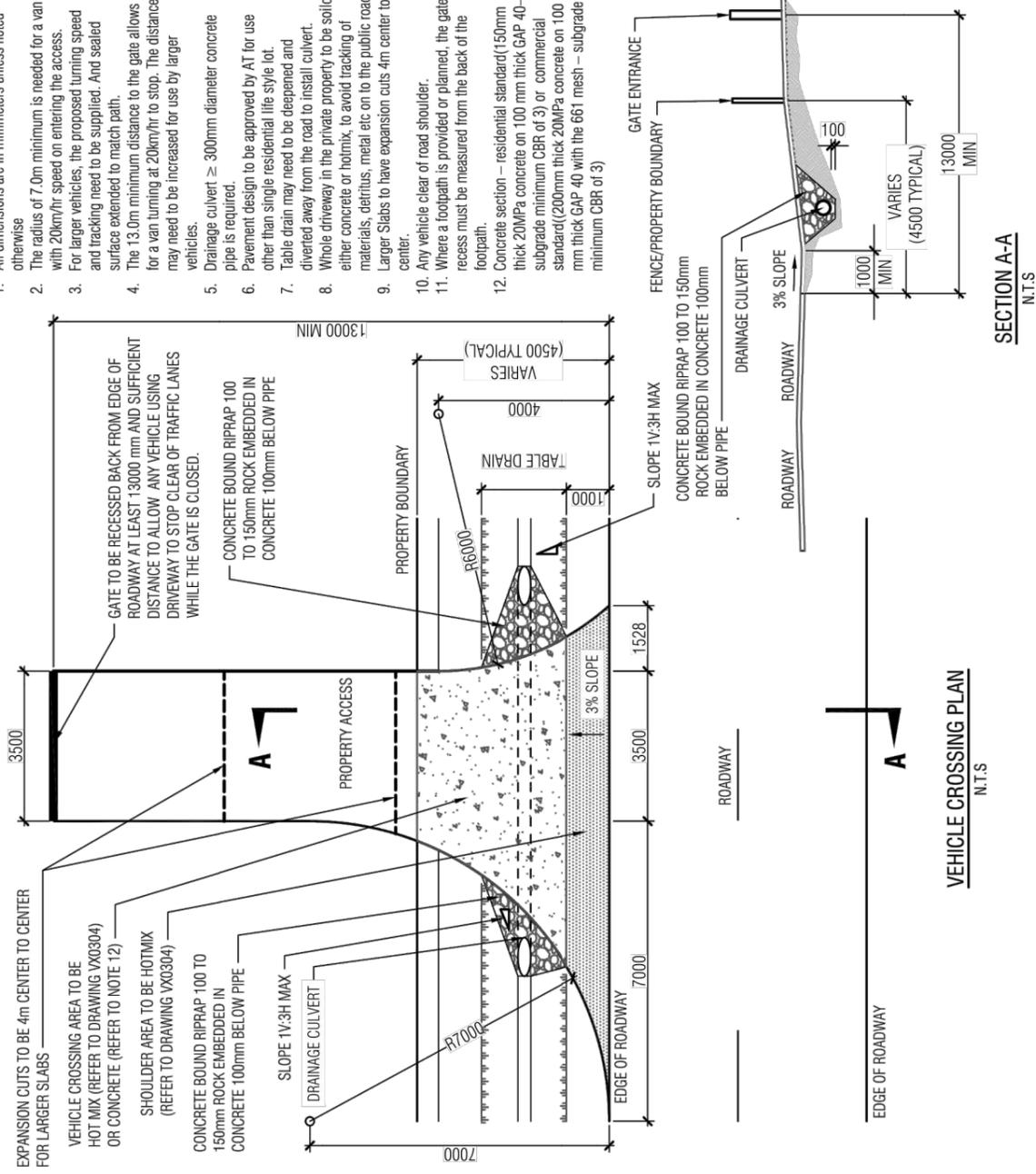
RESOURCE CONSENT

DATE: 01/25 FILEPATH: F:\MVEN\PROJECTS\261002-1206 GREAT SOUTH ROAD.DWG\DWG\261002-C300.DWG

VX0303



3D VIEW
N.T.S



Transport Design Manual | Standard Engineering Details

NOTES:

- All dimensions are in millimeters unless noted otherwise
- The radius of 7.0m minimum is needed for a van with 20km/hr speed on entering the access.
- For larger vehicles, the proposed turning speed and tracking need to be supplied. And sealed surface extended to match path.
- The 13.0m minimum distance to the gate allows for a van turning at 20km/hr to stop. The distance may need to be increased for use by larger vehicles.
- Drainage culvert \geq 300mm diameter concrete pipe is required.
- Pavement design to be approved by AT for use other than single residential life style lot.
- Table drain may need to be deepened and diverted away from the road to install culvert.
- Whole driveway in the private property to be solid, either concrete or hotmix, to avoid tracking of materials, detritus, metal etc on to the public road.
- Larger Slabs to have expansion cuts 4m center to center.
- Any vehicle clear of road shoulder.
- Where a footpath is provided or planned, the gate recess must be measured from the back of the footpath.
- Concrete section – residential standard (150mm thick 20MPa concrete on 100 mm thick GAP 40-subgrade minimum CBR of 3) or commercial standard (200mm thick 20MPa concrete on 100 mm thick GAP 40 with the 66:1 mesh – subgrade minimum CBR of 3)

AT

TDM TECHNICAL STANDARDS
Rural Vehicle Crossing (Zone Speed > 60km/hr)

Date: 11/04/2022
Version: **VX0303 C**

APPROVED ENGINEER

Rev	Description	By	Date
A	FOR RESOURCE CONSENT	JAW	06/2025

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Auckland 1023

Project
**DEVELOPMENT OF
1206 GREAT SOUTH ROAD
RUNCIMAN
FOR
PMG FUNDS**

Title
**VEHICLE CROSSING
STANDARD DETAIL**

Project no.	261002
Scale	
Cad file	261002-C300.DWG
Drawing no.	C321
Rev	A



REFER TO C401

LOT 1 DP 151639
4000

LOT 2 DP 345389
126470

EX FLOODING PLAIN TO BE FILLED.
PRE DEVELOPMENT VOLUME: 261m³
POST-DEVELOPMENT VOLUME: 0m³
DIFFERENCE: -261m³
THE LOST STORAGE TO BE COMPENSATED
BY PROPOSED DRY POND

S2-1

S1-4

S2-2

PT LOT 1 DEEDS
REG 167 24281

LOT 2 DP 44182
12199

S1-3

S1-1

GREAT SOUTH ROAD

LOT 2 DP 345389
126470

PR 300mm RCRRJ
CLASS 4 @3.4%
FOR VEHICLE CROSSING

LOT 1 DP 345389
11800

LOT 1 DEEDS
REG 1139 15985

EX CULVERT TO REMIAN

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NZVD2016.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING, 10 - 20% WEAK CONCRETE BEDDING, GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
 5. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
 6. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS.
 7. ALL MANHOLES ARE TO BE 1050MMØ PRECAST CONCRETE UNLESS SHOWN OTHERWISE.
 8. ALL CATCHPIT LEADS SHALL HAVE MIN COVER 1.0M.
 9. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.

LEGEND

	EX BDY
	PROP BDY
	PR SWALE 2 m WIDTH
	PR SWALE 3 m WIDTH
	EX OLFP
	PR DRY POND
	EX FLOODPLAIN
	EX FLOOD PLAIN TO BE FILLED
	PR RIPRAP
	EX STORMWATER
	PR STORMWATER
	EX/PROP SWMH

A	FOR RESOURCE CONSENT	JAW	06/2025
Rev	Description	By	Date
Survey			05/2025
Design	JAW		05/2025
Drawn	JAW		05/2025
Checked	TM		05/2025

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Auckland 1023

Project
**DEVELOPMENT OF
1206 GREAT SOUTH ROAD
RUNCIMAN
FOR
PMG FUNDS**

Title
**PROPOSED
STORMWATER
PLAN**

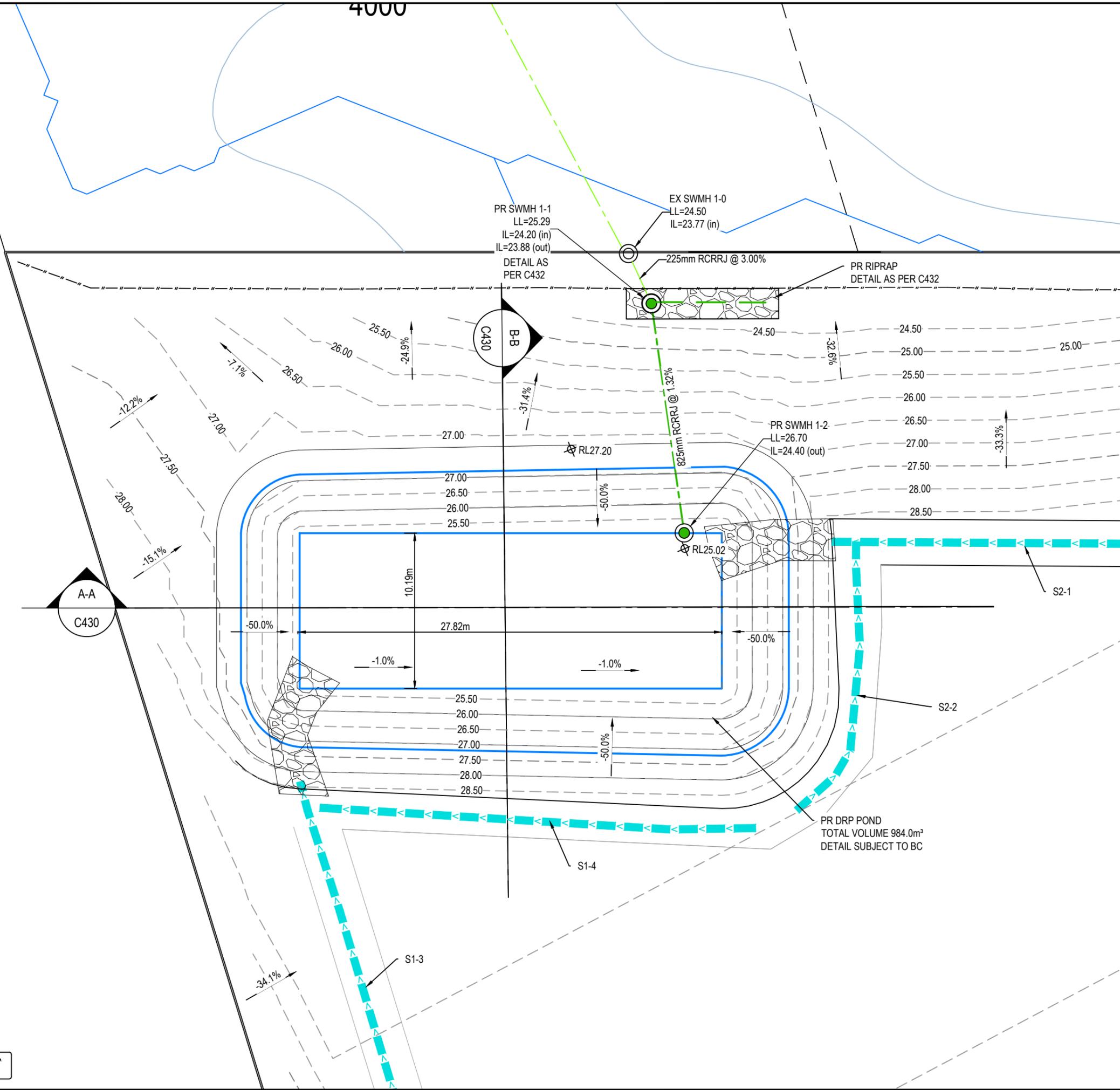
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Scale	1:750 @ A3
Cad file	261002-C400.DWG
Drawing no.	C400
Rev	A

RESOURCE CONSENT

DATE: 9/12/25 FILEPATH: F:\MVEN\PROJECTS\261002 - 1206 GREAT SOUTH ROAD, DRURY\DWG\261002-C400.DWG



4000



- NOTES
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 7. ALL MANHOLES ARE TO BE 1050MMØ PRECAST CONCRETE UNLESS SHOWN OTHERWISE.
 8. ALL CATCHPIT LEADS SHALL HAVE MIN COVER 1.0M.
 9. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.

LEGEND

	EX BDY
	PROP BDY
	PR MAJOR CONTOUR
	PR MINOR CONTOUR
	PR SWALE 2 m WIDTH
	PR SWALE 3 m WIDTH
	EX OLFP
	PR DRY POND
	EX FLOODPLAIN
	EX FLOOD PLAIN TO BE FILLED
	PR RIPRAP
	EX STORMWATER
	PR STORMWATER
	EX/PROP SWMH

A	FOR RESOURCE CONSENT	JAW	06/2025
Rev	Description	By	Date
Survey	-		05/2025
Design	JAW		05/2025
Drawn	JAW		05/2025
Checked	TM		05/2025

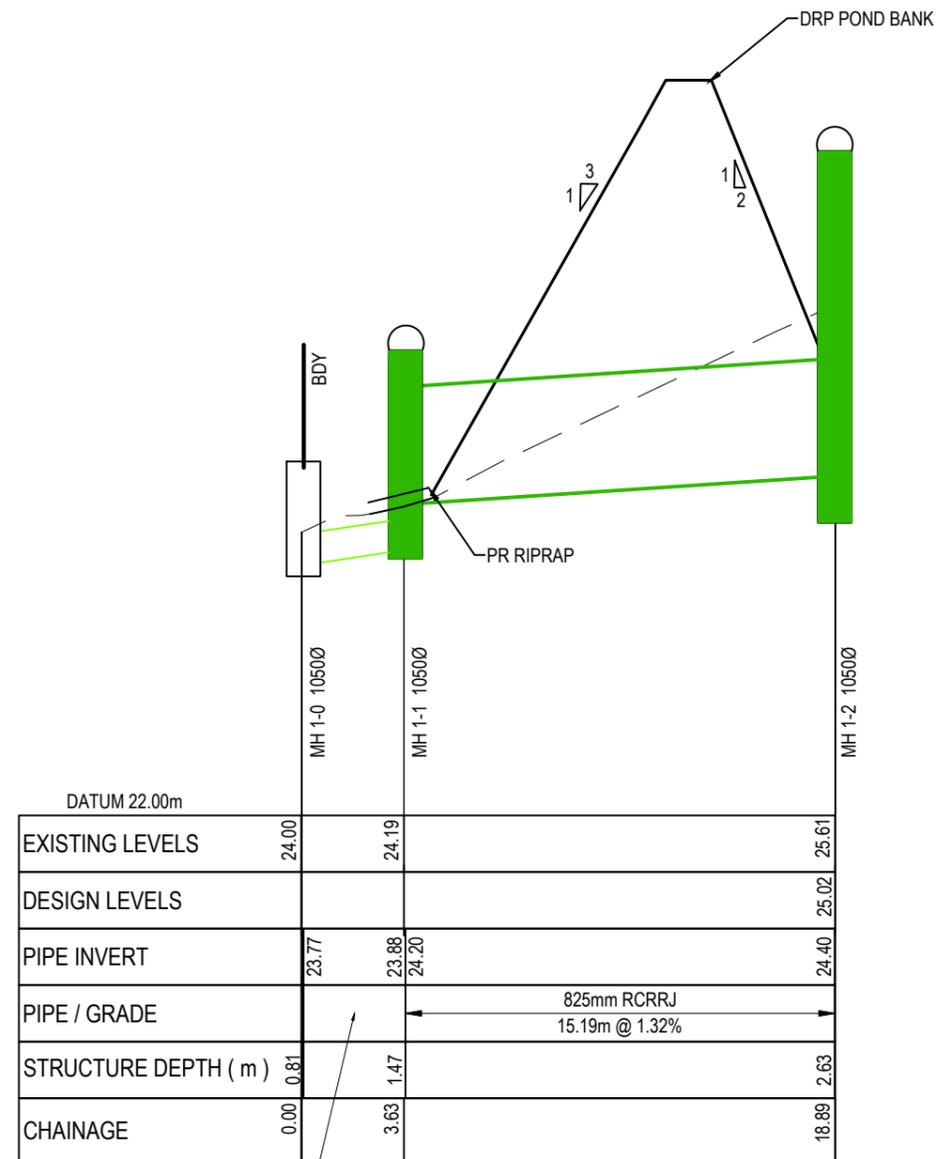
Project
**DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 RUNCIMAN
 FOR
 PMG FUNDS**

Title
**PROPOSED
 STORMWATER
 PLAN**

Project no.	261002
Scale	1:250 @ A3
Cad file	261002-C400.DWG
Drawing no.	C401
Rev	A

RESOURCE CONSENT

DATE: 9/12/25 FILEPATH: F:\MVEN\PROJECTS\261002-1206 GREAT SOUTH ROAD\DRY\DWG\261002-C400.DWG



SW 1 LONG SECTION
SCALE: HORI 1:250 VERT 1:50

- NOTES
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LEGEND
 --- EGL
 --- PGL

Rev	Description	By	Date
A	FOR RESOURCE CONSENT	JAW	06/2025
Survey	-		05/2025
Design	JAW		05/2025
Drawn	JAW		05/2025
Checked	TM		05/2025

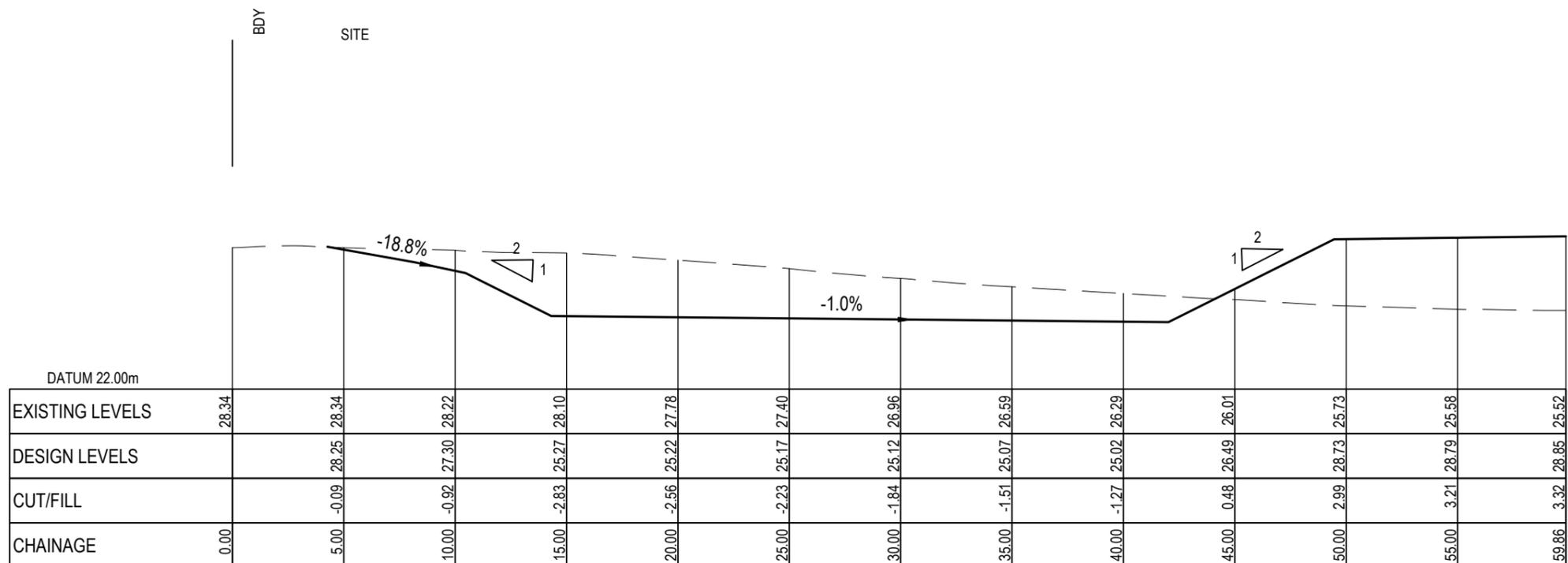


Project
**DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 RUNCIMAN
 FOR
 PMG FUNDS**

Title
**PROPOSED
 SW1
 LONG SECTION**

Project no.	261002
Scale	AS SHOWN
Cad file	261002-C400.DWG
Drawing no.	C410
Rev	A

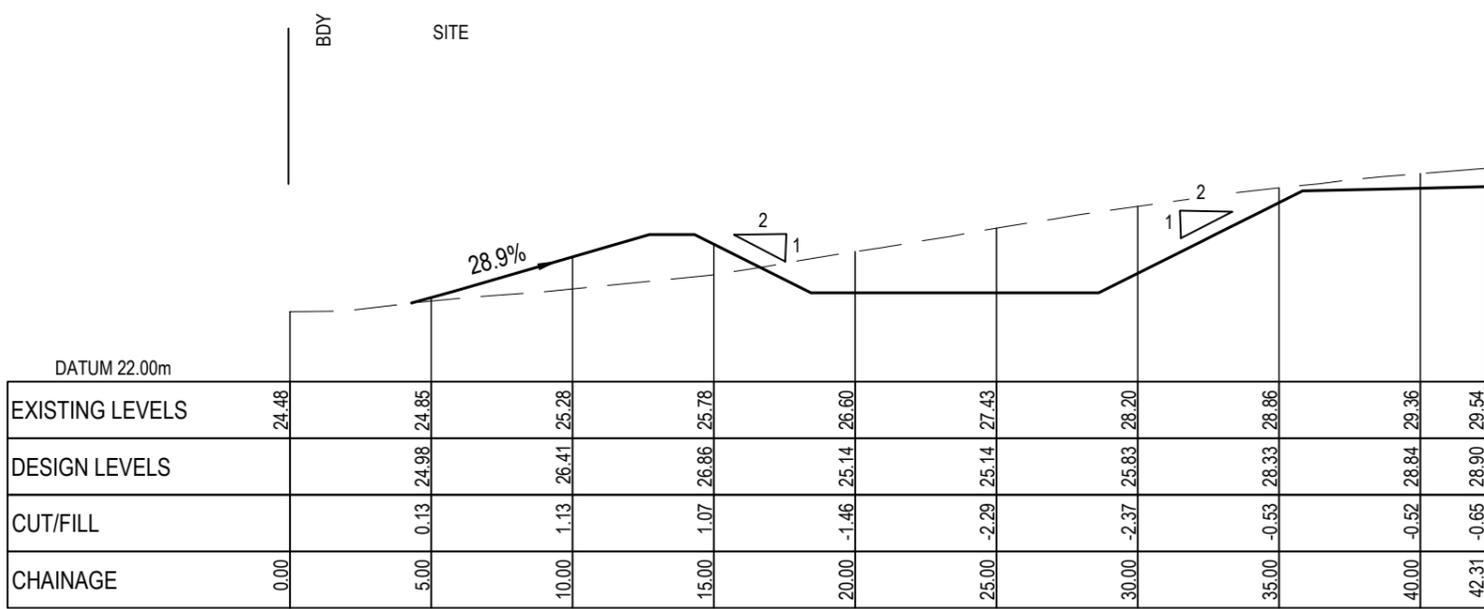
RESOURCE CONSENT



DRY POND CROSS SECTION A-A
SCALE: HORI 1:250 VERT 1:250

- NOTES
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LEGEND
 --- EGL
 ——— PGL



DRY POND CROSS SECTION B-B
SCALE: HORI 1:250 VERT 1:250

Rev	Description	By	Date
A	FOR RESOURCE CONSENT	JAW	06/2025
Survey	-		05/2025
Design	JAW		05/2025
Drawn	JAW		05/2025
Checked	TM		05/2025

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 Auckland 1023

Project
**DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 RUNCIMAN
 FOR
 PMG FUNDS**

Title
**PROPOSED
 DRY POND
 CROSS SECTIONS**

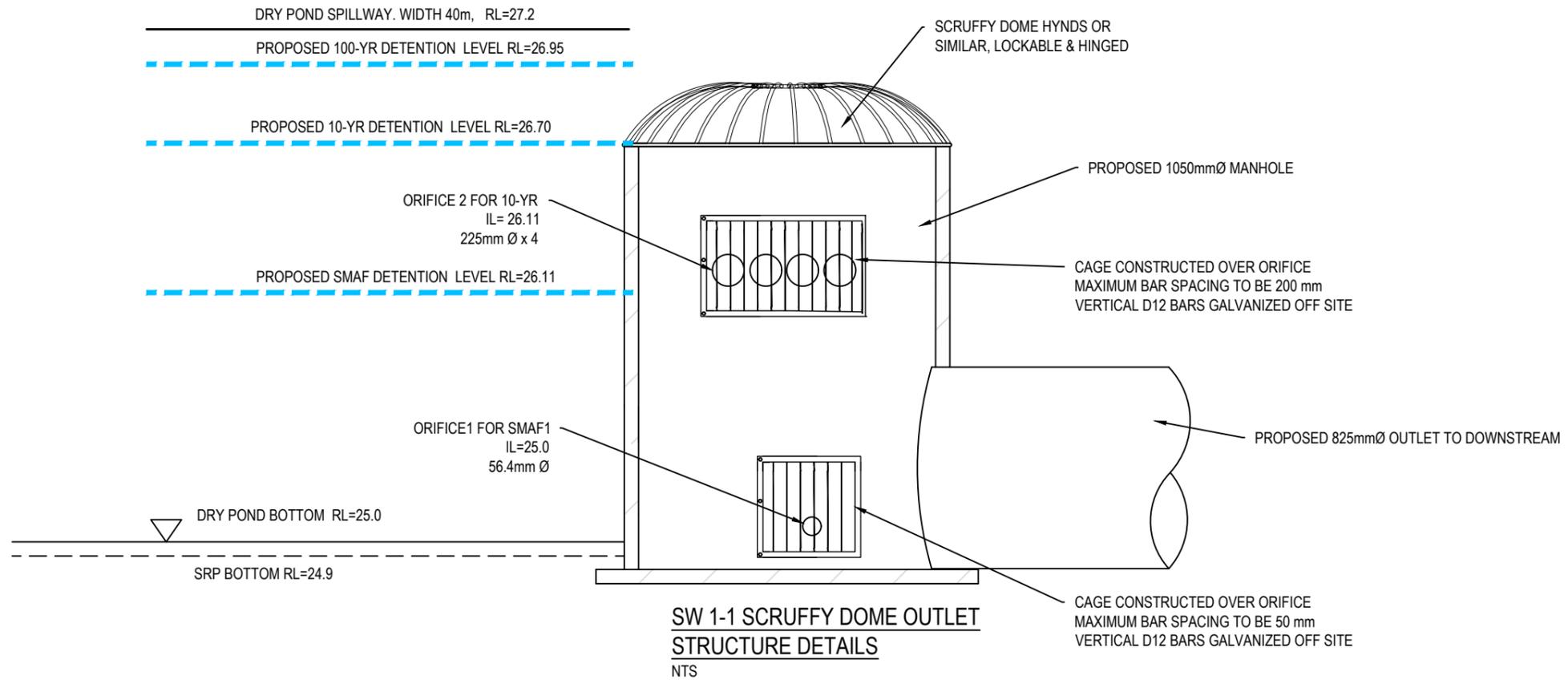
Project no.	261002
Scale	AS SHOWN
Cad file	261002-C400.DWG
Drawing no.	C430
Rev	A

RESOURCE CONSENT

DATE: 9/12/25 FILEPATH: F:\MAVEN\PROJECTS\261002 - 1206 GREAT SOUTH ROAD DRYPOND\DWG\261002-C400.DWG

ORIFICE CORE DRILLED THROUGH MANHOLE OR ALTERNATIVELY FIX ORIFICE PLATE OVER SAWCUT HOLE. BOLT PLATE IN FOUR CORNERS AND EPOXY SEAL.

- NOTES
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LEGEND
 --- EGL
 --- PGL

Rev	Description	By	Date
A	FOR RESOURCE CONSENT	JAW	06/2025
Survey	-		05/2025
Design	JAW		05/2025
Drawn	JAW		05/2025
Checked	TM		05/2025

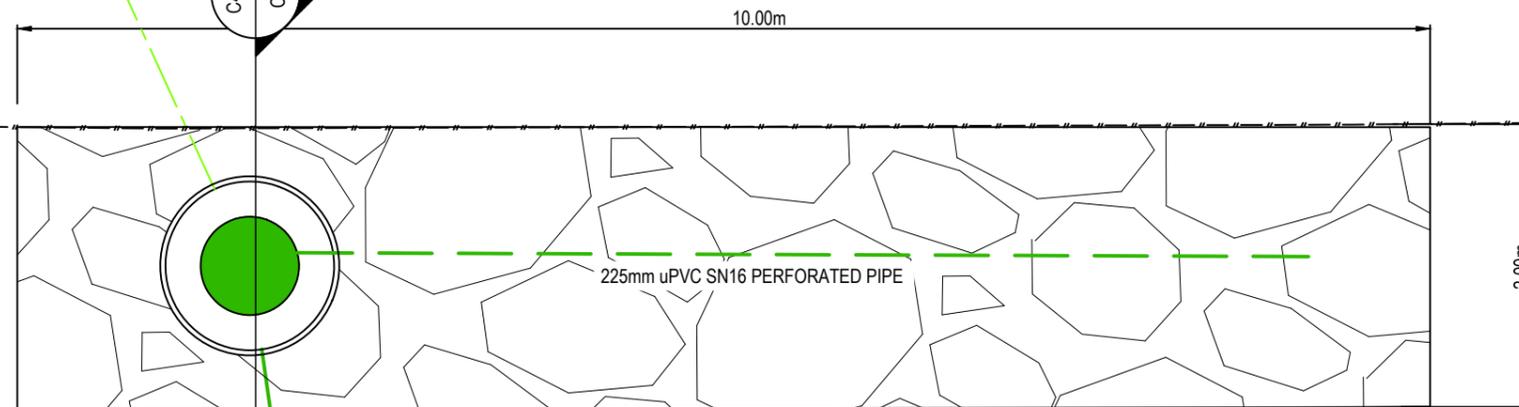
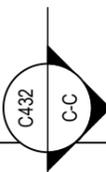
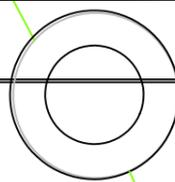
M Maven Associates
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 Auckland 1023

Project
**DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 RUNCIMAN
 FOR
 PMG FUNDS**

Title
**PROPOSED
 DRY POND
 OUTLET STRUCTURE**

Project no.	261002
Scale	AS SHOWN
Cad file	261002-C400.DWG
Drawing no.	C431
Rev	A

RESOURCE CONSENT



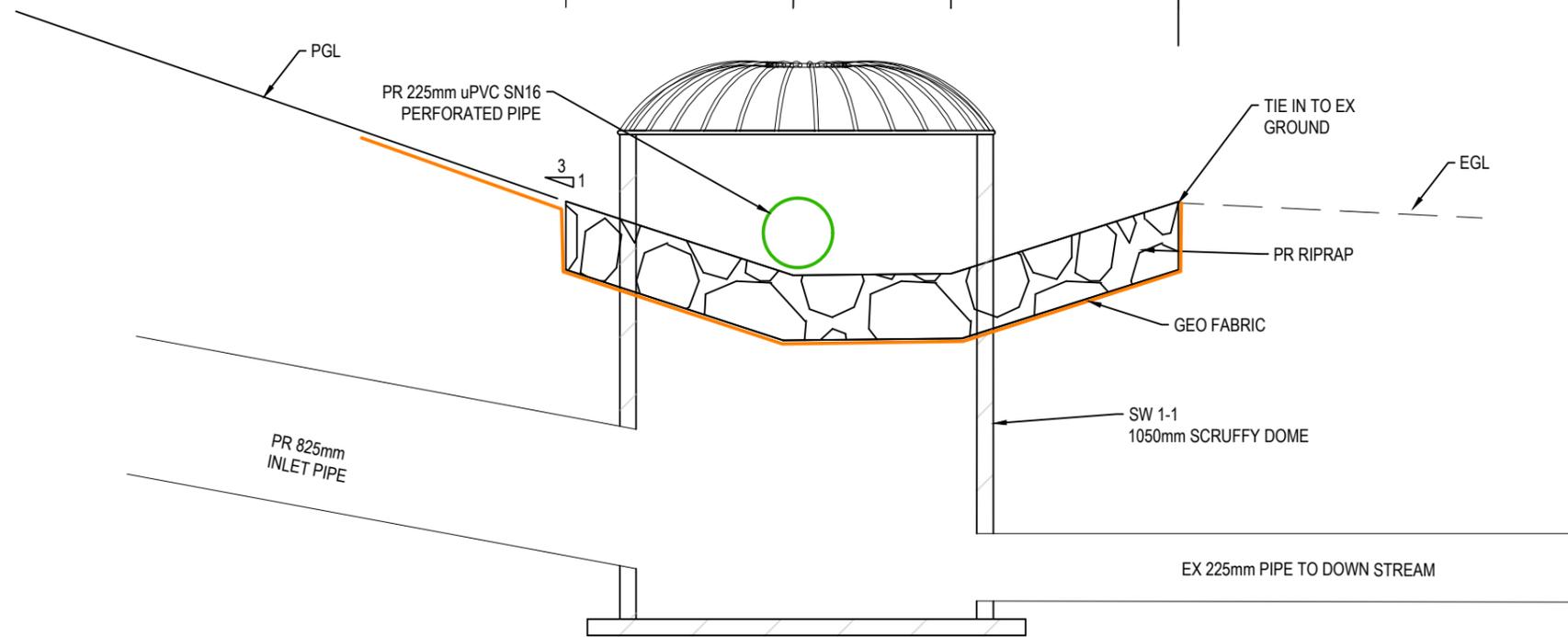
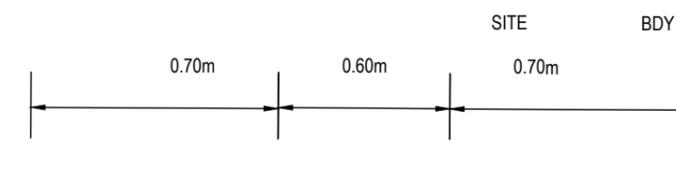
ORIFICE CORE DRILLED THROUGH MANHOLE OR ALTERNATIVELY FIX ORIFICE PLATE OVER SAWCUT HOLE. BOLT PLATE IN FOUR CORNERS AND EPOXY SEAL.

SW 1-1 SCRUFFY DOME OUTLET AND RIPRAP PLAN
1:50@ A3

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LEGEND

- EX BDY
- PROP BDY
- EX STORMWATER
- PR STORMWATER
- EX/PROP SWMH



CROSS SECTION C-C
SW 1-1 SCRUFFY DOME OUTLET AND RIPRAP DETAILS
NTS

Rev	Description	By	Date
A	FOR RESOURCE CONSENT	JAW	06/2025
Survey	-		05/2025
Design	JAW		05/2025
Drawn	JAW		05/2025
Checked	TM		05/2025

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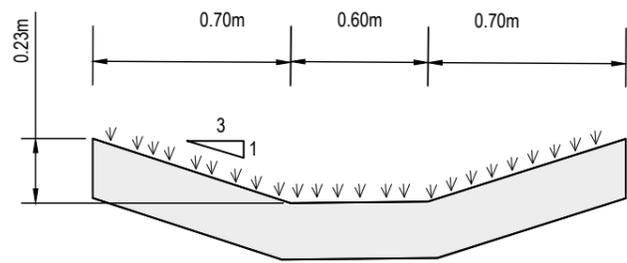
Project
**DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 RUNCIMAN
 FOR
 PMG FUNDS**

Title
**PROPOSED
 DRY POND
 OUTLET STRUCTURE**

Project no.	261002
Scale	AS SHOWN
Cad file	261002-C400.DWG
Drawing no.	C432
Rev	A

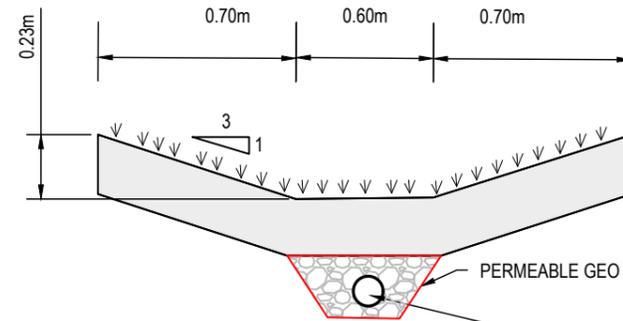
RESOURCE CONSENT

DATE: 9/12/25 FILEPATH: F:\MAVEN\PROJECTS\261002-1206 GREAT SOUTH ROAD DRYPOND\DWG\261002-C400.DWG



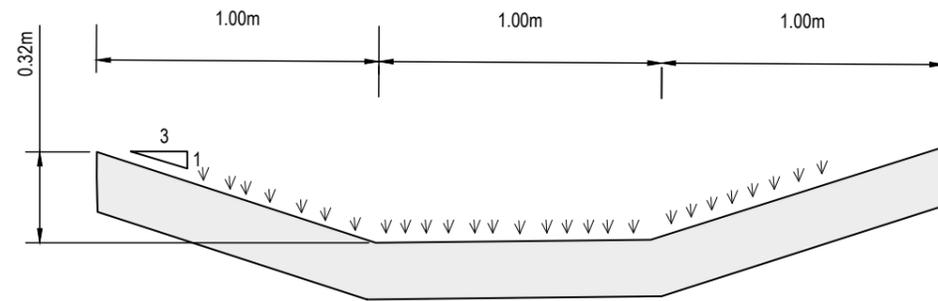
TYPICAL 2.0m SWALE CROSS SECTION DETAIL (GRADE 2% to 5%)

NTS



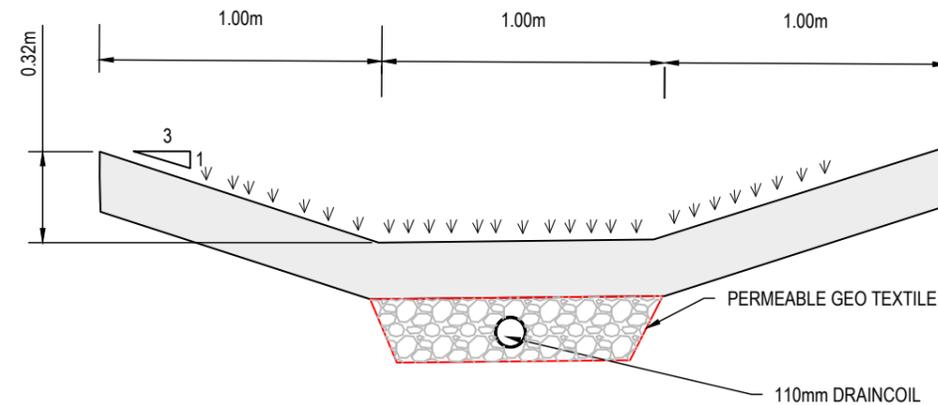
TYPICAL 2.0m SWALE CROSS SECTION DETAIL (GRADE < 2%)

NTS



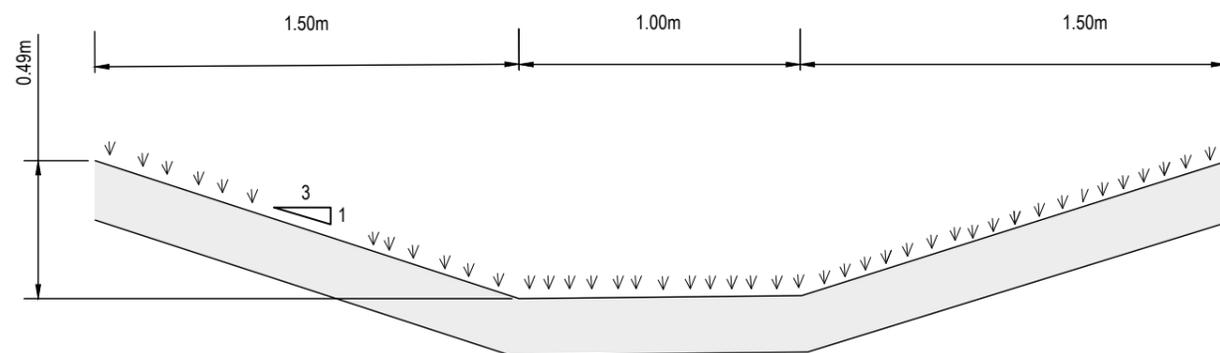
TYPICAL 3.0m SWALE CROSS SECTION DETAIL (GRADE 2% TO 5%)

NTS



TYPICAL 3.0m SWALE CROSS SECTION DETAIL (GRADE < 2%)

NTS



TYPICAL 4.0m SWALE CROSS SECTION DETAIL

NTS

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Rev	Description	By	Date
A	FOR RESOURCE CONSENT	JAW	06/2025
Survey	-		05/2025
Design	JAW		05/2025
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Checked	TM		05/2025

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 Auckland 1023

Project
**DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 RUNCIMAN
 FOR
 PMG FUNDS**

Title
**PROPOSED
 SWALES
 CROSS SECTIONS**

Project no.	261002
Scale	AS SHOWN
Cad file	261002-C400.DWG
Drawing no.	C435
Rev	A

RESOURCE CONSENT



LOT 1 DP 151639
4000

LOT 2 DP 345389
126470



GREAT SOUTH ROAD

LOT 2 DP 345389
126470

LOT 2 DP 44182
12199

PT LOT 1 DEEDS
REG 167 24281

LOT 1 DP 345389
11800

LOT 1 DEEDS
REG 1139 15985

NOTES

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LEGEND

- EX BDY
- PROP BDY
- PR DRY POND
- EX STORMWATER
- PR STORMWATER
- EX/PROP SWMH
- PR SWALE 2 m WIDTH
- PR SWALE 3 m WIDTH

Rev	Description	By	Date
A	FRO RC	JAW	05/2025
Survey	-		05/2025
Design	JAW		05/2025
Drawn	JAW		05/2025
Checked	TM		05/2025

Project
**DEVELOPMENT OF
 1206 GREAT SOUTH ROAD
 RUNCIMAN
 FOR
 PMG FUNDS**

Title
**PROPOSED
 SWALES CATCHMENT
 PLAN**

Project no.	261002
Scale	1:750 @ A3
Cad file	261002-C440.DWG
Drawing no.	C440
Rev	A

RESOURCE CONSENT

DATE: 6/12/25 FILEPATH: F:\Maven\PROJECTS\261002 - 1206 GREAT SOUTH ROAD, DRURY\DWG\261002-C440.DWG

10.iii APPENDIX C – ENGINEERING CALCULATIONS



Maven Associates

Job Number

Sheets

Rev

1

A

Job Title
Calc Title

1206 GSR
SRP

Author
JW

Date
05/2025

Checked
AC

Catchment Area	21400	m ²
Pond Volume 4% of Area	856	m ³
Dead Storage 30% of volume	257	m ³
Live Storage 70% of volume	599	m ³
Decant Dewatering (3l/s/ha)	6.42	l/s

Size Decant

Standard decant	4.5 l/s	=	200 holes
Therefore	6.42 l/s	=	285 holes
Use	2		decants

Pond Dimensions

v =	856	m ³
d =	2.2	m
x =	width of pond base	

Pond calculations allow for the sides and outlet of the pond to be at a 2:1 batter slope and for the inlet of the pond to be at a 3:1 batter slope.

Calc 2: Calculate width and length of base, Quadratic Equation

3:1 ratio

$$v = \frac{((3x^2) + ((x+4d)(3x+5d)))}{2}d$$

=> $v = 3x^2d + 8.5xd^2 + 10d^3$ quadratic equation to find "x"

		a		b		c
0	=	6.6	x ² +	41.14	x +	-749.52
x	=	7.99	width of pond base			
or	=	-14.22				
		Check	=	856		m ³

5:1 ratio

$$v = \frac{((5x^2) + ((x+4d)(5x+5d)))}{2}d$$

=> $v = 5x^2d + 12.5xd^2 + 10d^3$ quadratic equation to find "x"

		a		b		c
0	=	11	x ² +	60.5	x +	-749.52
x	=	5.95	width of pond base			
or	=	-11.45				
		Check	=	856		m ³

Width	=	7.99	m
Length	=	23.96	m

Dead Storage Depth

Pond Dimensions

x = 7.99 m
 v = 256.8 m³
 d = Dead storage depth

Pond calculations allow for the sides and outlet of the pond to be at a 2:1 batter slope and for the inlet of the pond to be at a 3:1 batter slope.

3:1 ratio

$$v = (((3x^2) + ((x+4d)(3x+5d)))/2)d$$

=> $v = 10d^3 + 8.5xd^2 + 3x^2d$ cubic equation to find "d"

		a		b		c
0	=	d ³ + 6.7884078	d ² + 19.13459	+d	-25.68	
e	=	1.26				
f	=	22.90				
g	=	3.58				
h	=	-0.35				
d	=	0.965 depth of dead storage				

Check v = 256.80 m³

Spillway Dimensions

Side Slope horizontal 3 vertical 1
 Gradient 1 %
 Base Width 10.00 m

Calc 3: Calculate spillway flow (Q) Rational Formula

$$Q = CIA \quad 1\% \text{ AEP}$$

where C = 0.85
 I = 0.0000528 m/s 190 mm/hr
 A = 21400 m²

Therefore Q = 0.96 m³/sec

Calc 4: Calculate spillway depth (H) Mannings Formula

$$V = (1/n)R^{2/3}S^{1/2} \quad R = A/P \quad Q = AV$$

n = 0.018 Flow path is firm earth

Where: H = depth of channel P = wetted parameter
 A = Sectional Area S = slope of channel

H	P	A	S	R	V	Q
0.15	10.94868	1.5675	0.01	0.143168	1.5204	2.383227

Therefore H = 0.15 m

GD01 Online Toolbox Calculator

Retention and Detention Calculator Output

This tool is intended to be used for initial estimation and validation purposes. It is not a substitute for professional expert advice and design.

Information

Date	06 November 2025
Project Identifier	1206 GSR, Drury
Designer	JAW
Reviewer	IZ

Disclaimer

This GD01 Online Toolbox Calculator (the tool) is intended for use within the Auckland region for validating the size and volumes of stormwater management devices which support Unitary Plan requirements for stormwater mitigation. The tool should only be used for calculation verification purposes.

Although all reasonable care has been taken in developing the tool, Auckland Council does not warrant that any calculation or result is accurate, correct or complete. Auckland Council does not accept responsibility for any loss or damage resulting from the use of the tool and any person relying on the tool does so at their own risk. Auckland Council strongly recommends that any person intending to rely on the tool should independently verify the accuracy of the calculations and results.

Auckland Council recommends that users seek professional advice when requiring formal volume estimations.

The tool may be updated or changed at any time without notice.

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Use of the tool is free for personal, non-commercial use.

If you want to use the tool or any content of the website for any other purpose, please contact Auckland Council's Engineering and Technical Services on wsd@aucklandcouncil.govt.nz.

Input data

Initial Parameters		
Total site area	24279	m ²
Pre-construction site areas		
Existing impervious area	0	m ²
Post-construction site areas		
New/redeveloped impervious area	15237	m ²
Existing impervious area remaining untouched	1894	m ²
Control data		
Rainfall depth	34	mm
Hydrological soil group	Group_C	
Soil curve number	74	

Design summary

Pre-development condition		
Total impervious area	0	m ²
Total pervious area	24279	m ²
% total impervious	0	%
% total pervious	100	%
Post-development condition		
Total impervious area	17131	m ²
Total pervious area	7148	m ²
% total impervious	70.56	%
% total pervious	29.44	%
Volumes		
Post-development runoff volume	556.19	m ³
Pre-development runoff volume	172.62	m ³
Hydrology mitigation volume	383.57	m ³
Retention volume	85.66	m ³
Detention volume	297.92	m ³



MAVEN ASSOCIATES

Job Number	Sheet	Rev	1206 Great South Road, Drury, Auckland			Author	Date		Checked
261002	1	A	Calc Title: Swale 10-yr rainfall CapacityCheck			JW	JAW		TM

Rainfall Depth	ARI 100YR (mm)		CN Number		CN Number	
TP108 rainfall data	181.8	from Tp108 Maps	Impervious area	98	Harfill area	95.6 (90% impervious)
Climate change Increase	241.25	32.7% increase	Pervious	74		

Swale number	Catchment letter	Catchment Area m2	Description	CN	Peak Flow rate - 10YR ARI l/s	Cum. Flow l/s	Swale Width m	A m2	P m	R m/m	N	S	Capacity l/s	Percent Capacity %	Velocity m/s	Swale Length	Check
S1-1	CA 1-1	5904	Hardfill	95.6	234.9	234.9	2.000	0.303	2.076	0.146	0.050	0.026	271	86.8%	0.89	119.0	OK
S1-2	CA 1-2	2158	Hardfill	95.6	85.8	85.8	2.000	0.303	2.076	0.146	0.050	0.007	140	61.1%	0.46	43.0	OK
S1-3	CA 1-3	1540	Hardfill	95.6	61.3	320.7	3.000	0.645	3.101	0.208	0.050	0.026	730	43.9%	1.13	82.0	OK
S1-4	CA 1-4	1705	Hardfill	95.6	67.8	67.8	3.000	0.645	3.101	0.208	0.050	0.010	453	15.0%	0.70	28.0	OK
S2-1	CA 2-1	8180	Hardfill	95.6	325.4	325.4	3.000	0.645	3.101	0.208	0.050	0.010	453	71.9%	0.70	128.0	OK
S2-2	CA 2-2	1431	Hardfill	95.6	56.9	382.3	3.000	0.645	3.101	0.208	0.050	0.010	453	84.5%	0.70	19.0	OK



MAVEN ASSOCIATES

Job Number	Sheet	Rev	1206 Great South Road, Drury, Auckland			Author	Date			Checked
261002	1	A	Calc Title: Swale 90th percentile rainfall quality control Check			JAW	9/5/2025			TM

Rainfall Depth	90th Rainfall	CN Number
TP108 rainfall data	25	Impervious area
Climate change Increase	25 (from Tp108 Maps)	Pervious
		Harfill area
		CN Number
		96.8 (5% impervious)

Swale number	Catchment letter	Catchment Area m2	Description	CN	Peak Flow rate - 90th rainfall l/s	Cum. Flow l/s	Swale Width m	A (full) m2	A (Reall) m2	P m	R m/m	N	S	Capacity l/s	Percent Capacity %	Velocity m/s	Swale Length	Tc Min	Check
S1-1	CA 1-1	5904	Hardfill	95.6	17.5	17.5	2.000	0.303	0.0195	0.800	0.024	0.050	0.026	271	6.5%	0.27	119.0	7.3	OK
S1-2	CA 1-2	2158	Hardfill	95.6	6.4	6.4	2.000	0.303	0.0138	0.800	0.017	0.050	0.007	140	4.5%	0.11	43.0	6.4	OK
S1-3	CA 1-3	1540	Hardfill	95.6	4.6	28.4	3.000	0.645	0.0251	1.200	0.021	0.050	0.026	730	3.9%	0.24	82.0	5.6	OK
S1-4	CA 1-4	1705	Hardfill	95.6	5.0	23.8	3.000	0.645	0.0340	1.200	0.028	0.050	0.010	453	5.3%	0.19	28.0	2.5	-
S2-1	CA 2-1	8180	Hardfill	95.6	24.2	24.2	3.000	0.645	0.0345	1.200	0.029	0.050	0.010	453	5.3%	0.19	128.0	11.4	OK
S2-2	CA 2-2	1431	Hardfill	95.6	4.2	4.2	3.000	0.645	0.0060	1.200	0.005	0.050	0.010	453	0.9%	0.06	19.0	5.4	-



MAVEN ASSOCIATES

Job Number	Sheet	Rev	Author	Date	Checked
261002	1	A	JAW	05/2025	-

Rainfall Depth	ARI 10YR (mm)
TP108 rainfall data	110.1
Climate change Increase	128.817

(from TO108 Maps)

Pipe ks factor = 1.5 mm (pipes up to 1.0m dia)
0.6 mm (pipes over 1.0m dia)

	CN Number		CN Number
Impervious area	98	Site	90.8
Pervious	74		

Equivalent CN - (70% impervious coverage, 30% pervious coverage)

Discharge Point: SW OUTLET 2

Line number	MH to MH number	Flow From description	Catchment letter	Catchment Area m2	CN	Peak Flow rate - 10YR ARI l/s	Cum. Flow l/s	Pipe dia m	Gradient %	Capacity l/s	Percent Capacity %	Remaining l/s	Velocity m/s	Check OK
SW1	1-2 to 1-1	lots		24300	94.4	300.0	300.0	0.825	1.32	1634.5	18.4%	1334.5	3.1	OK
	1-1 to 1-0	lots		0	98	0.0	300.0	0.225	3.00	79.4	377.9%	-220.6	2.0	*
		1-0 outfall structure, 225mm x 1 for 10-yr		0	74	0.0	220.6	0.225	1.00	91.6	240.7%	-129.0	1.2	OK

* flow velocity large than allowed standard. SW outfall structure detail as per drawing C451



MAVEN ASSOCIATES

Job Number	Sheet	Rev	Author	Date	Checked
261002	1	A	JAW	05/2025	-

Rainfall Depth	ARI 100YR (mm)
TP108 rainfall data	181.8
Climate change Increase	241.2486

(from TO108 Maps)

Pipe ks factor = 1.5 mm (pipes up to 1.0m dia)
0.6 mm (pipes over 1.0m dia)

	CN Number		CN Number
Impervious area	98	Site	90.8
Pervious	74		

Equivalent CN - (70% impervious coverage, 30% pervious coverage)

Discharge Point: SW OUTLET 2

Line number	MH to MH number	Flow From description	Catchment letter	Catchment Area m2	CN	Peak Flow rate - 10YR ARI l/s	Cum. Flow l/s	Pipe dia m	Gradient %	Capacity l/s	Percent Capacity %	Remaining l/s	Velocity m/s	Check OK
SW1	1-2 to 1-1	lots		24300	94.4	800.0	800.0	0.825	1.32	1634.5	48.9%	834.5	3.1	OK
	1-1 to 1-0	lots		0	98	800.0	800.0	0.225	3.00	79.4	1007.8%	-720.6	2.0	*
		1-0 outfall structure, 225mm x 1 for 10-yr		0	74	800.0	720.6	0.225	1.00	91.6	786.3%	-629.0	1.2	OK

* flow velocity large than allowed standard. SW outfall structure detail as per drawing C451

STORMWATER MODELLING REPORT

PROPOSED DEVELOPMENT OF

1206 GREAT SOUTH ROAD

DRURY, AUCKLAND

 MAVEN ASSOCIATES	Job Number 285002		Rev A
Job Title 1206 Great South Road, Drury Title Stormwater Modelling Report	Author JAW	Date 05/24	Checked IZ

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this report is to provide an assessment for stormwater modelling to study

- 1) During 95TH event, Proposed Pond 1 extended detention volume would meet SMAF1 control requirement.
- 2) During 10-yr event, the post-development 10-yr peak flow would maintain to pre-development level.
- 3) During 100-yr event, the post-development 100-yr peak flow would maintain to pre-development level.

1.2 STORMWATER MODELLING

Stormwater modelling has been completed using HEC-HMS Version 4.12 for the actual site development to determine to peak flows of the 100yr event for the whole catchments relative to the property.

The modelling allows for Climate change (3.8 degree, as required by V4 of SWcoP) which comprises of both an increase in the rainfall depth for a given event and modification of the normalised 24hour Temporal rainfall intensity profile.

Table 2: TP108 Normalised 24-hour temporal rainfall intensity profile

Time (hrs: mins)	Time interval (min)	TP108 normalised rainfall intensity (l/24)		
		Existing condition	Future climate change - 2.1°	Future climate change - 3.8°
0:00 - 6:00	360	0.34	0.29	0.27
6:00 - 9:00	180	0.74	0.69	0.66
9:00 - 10:00	60	0.96	0.93	0.91
10:00 - 11:00	60	1.40	1.42	1.43
11:00 - 11:30	30	2.20	2.30	2.36
11:30 - 11:40	10	3.80	4.14	4.35
11:40 - 11:50	10	4.80	5.23	5.50
11:50 - 12:00	10	8.70	9.49	9.97
12:00 - 12:10	10	16.20	17.66	18.56
12:10 - 12:20	10	5.90	6.43	6.76
12:20 - 12:30	10	4.20	4.58	4.81
12:30 - 13:00	30	2.90	3.08	3.20
13:00 - 14:00	60	1.70	1.65	1.62
14:00 - 15:00	60	1.20	1.20	1.19
15:00 - 18:00	180	0.75	0.72	0.70
18:00 - 24:00	360	0.40	0.36	0.34

Model assumptions:

95 th Rainfall Data (TP108 rainfall map data)	= 34mm
10yr Rainfall Data (TP108 rainfall map data)	= 110.1mm
Climate change Increase 3.8°	= 128.8mm (17% increase)
100yr Rainfall Data (TP108 rainfall map data)	= 181.8mm
Climate change Increase 3.8°	= 241.2mm (32.7% increase)

Runoff Factors – Type C Soil (Conservative area is known to have good soakage)

Hardfill	CN = 98
Pavement	CN = 98
Permeable	CN = 74

In terms of the impervious coverages assumed within the model, please refer to the break down below:

Pre - development:

- 100% pervious

Post -development:

- Stream/swale/landscape– pervious, 29.4% of total area
- Proposed industrial – impervious, 70.6% of total area.

1.3 SMAF EXTENDED DETENTION STUDY

1.3.1 Dry Pond/ Extended Detention SMAF pond level volume

Level	Area	Volume
m	m2	m3
25	282.2	0.0
26	420	348.8
27	605	858.5
27.2	645	983.5

1.3.2 Dry Pond/ Extended Detention SMAF pond outlet structure

SMAF Control	
SMAF Required Volume (m3)	383.6
Design Storage Volume (m3)	394.8
Orifice 1 diameter (mm)	56.4
Invert level (m)	25
10-yr Control	
Orifice 2 diameter (mm)	225 x 4
Invert level (m)	26.11
100-yr Control	
Scruffy dome (mm)	1050
Invert level (m)	26.7
Emergency spill way	
Pond bank (m)	40
Invert level (m)	27.0

(Refer to calculation sheet)

*** Pond detail subject to building consent design**

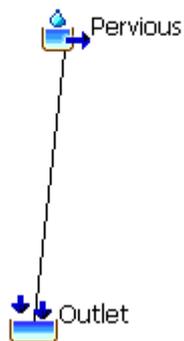
2.0 HEC-HMS MODEL

2.1 CATCHMENT STUDY

The site flow discharges to existing 225mm pipe on the north boundary of the site. The existing pipeline is under capacity of 10-yr peak flow. Extra flow will discharge to neighbour (LOT 1 DP 151639) through existing OLFP.

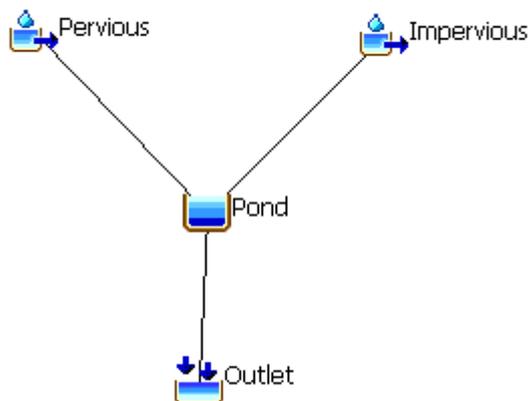
2.2 HEC-HMS MODEL

2.1.1 Pre-development Model



2.1.2 Post-development Model

All swales are designed for 100-yr capacity. Details as per calculation sheet



3.0 MODEL RESULT

3.1 SMAF1 EXTENDED DETENTION

Summary Results for Reservoir "Pond"

Project: 1206 GSR Simulation Run: SMAF Post-development
Reservoir: Pond

Start of Run: 01Jan2000, 00:00 Basin Model: Post
End of Run: 02Jan2000, 00:00 Meteorologic Model: SMAF
Compute Time: 11Jun2025, 10:20:03 Control Specifications: Control 1

Volume Units: MM 1000 M3

Computed Results

Peak Inflow: 0.0916 (M3/S)	Date/Time of Peak Inflow: 01Jan2000, 18:00
Peak Discharge: 0.0070 (M3/S)	Date/Time of Peak Discharge: 01Jan2000, 22:10
Inflow Volume: 0.6306 (1000 M3)	Peak Storage: 0.3948 (1000 M3)
Discharge Volume: 0.2670 (1000 M3)	Peak Elevation: 1.0897 (M)

3.2 10-YR PEAK FLOW STUDY

3.2.1 Pre-development

Summary Results for Sink "Outlet"

Project: 1206 GSR Simulation Run: Pre_10yrCC
Sink: Outlet

Start of Run: 01Jan2000, 00:00 Basin Model: Pre
End of Run: 02Jan2000, 00:00 Meteorologic Model: 10-yrCC
Compute Time: 11Jun2025, 10:19:37 Control Specifications: Control 1

Volume Units: MM 1000 M3

Computed Results

Peak Discharge: 0.3180 (M3/S)	Date/Time of Peak Discharge: 01Jan2000, 12:10
Volume: 1.7402 (1000 M3)	

3.2.2 Post-development

Summary Results for Sink "Outlet"

Project: 1206 GSR Simulation Run: Post_10yrCC
Sink: Outlet

Start of Run: 01Jan2000, 00:00 Basin Model: Post
End of Run: 02Jan2000, 00:00 Meteorologic Model: 10-yrCC
Compute Time: 12Jun2025, 09:37:48 Control Specifications: Control 1

Volume Units: MM 1000 M3

Computed Results

Peak Discharge: 0.2947 (M3/S)	Date/Time of Peak Discharge: 01Jan2000, 12:20
Volume: 2.2650 (1000 M3)	

3.2.3 Pond detail

Summary Results for Reservoir "Pond"

Project: 1206 GSR Simulation Run: Post_10yrCC
Reservoir: Pond

Start of Run: 01Jan2000, 00:00 Basin Model: Post
End of Run: 02Jan2000, 00:00 Meteorologic Model: 10-yrCC
Compute Time: 12Jun2025, 09:37:48 Control Specifications: Control 1

Volume Units: MM 1000 M3

Computed Results

Peak Inflow:	0.4551 (M3/S)	Date/Time of Peak Inflow:	01Jan2000, 12:10
Peak Discharge:	0.2947 (M3/S)	Date/Time of Peak Discharge:	01Jan2000, 12:20
Inflow Volume:	2.7133 (1000 M3)	Peak Storage:	0.6774 (1000 M3)
Discharge Volume:	2.2650 (1000 M3)	Peak Elevation:	1.6439 (M)

3.3 100-YR PEAK FLOW STUDY

3.3.1 Pre-development

Summary Results for Sink "Outlet"

Project: 1206 GSR Simulation Run: Pre_100yr
Sink: Outlet

Start of Run: 01Jan2000, 00:00 Basin Model: Pre
End of Run: 02Jan2000, 00:00 Meteorologic Model: 100-yrCC
Compute Time: 11Jun2025, 10:19:43 Control Specifications: Control 1

Volume Units: MM 1000 M3

Computed Results

Peak Discharge:	0.8000 (M3/S)	Date/Time of Peak Discharge:	01Jan2000, 12:10
Volume:	4.1493 (1000 M3)		

3.3.2 Post-development

Summary Results for Sink "Outlet"

Project: 1206 GSR Simulation Run: Post_100yr
Sink: Outlet

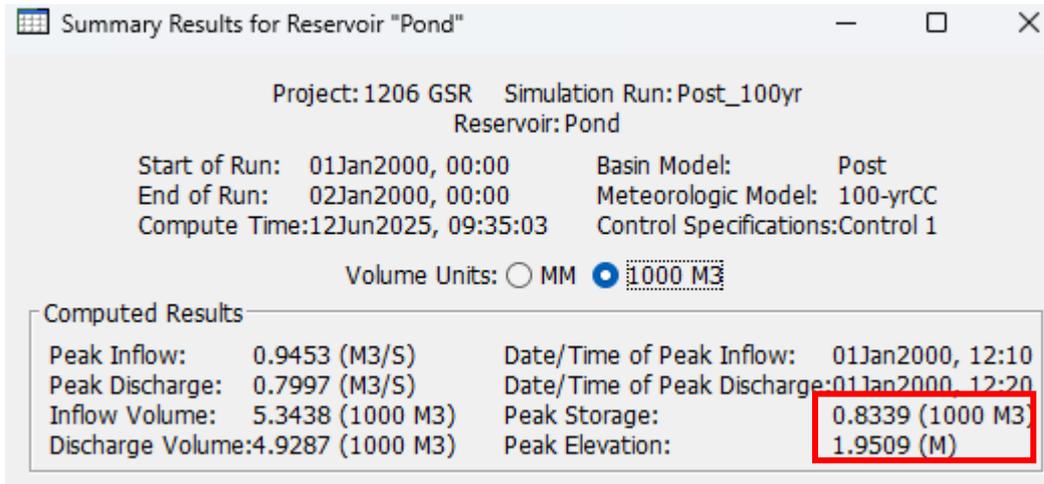
Start of Run: 01Jan2000, 00:00 Basin Model: Post
End of Run: 02Jan2000, 00:00 Meteorologic Model: 100-yrCC
Compute Time: 12Jun2025, 09:35:03 Control Specifications: Control 1

Volume Units: MM 1000 M3

Computed Results

Peak Discharge:	0.7997 (M3/S)	Date/Time of Peak Discharge:	01Jan2000, 12:20
Volume:	203.0035 (MM)		

3.3.3 Pond detail



4.0 CONCLUSION

Summary:

Under the post-development scenario,

- 1) In 95th event, Proposed Dry Pond provides sufficient extended detention for SMAF1 Control.
- 2) In 10-yr event, the sites 10-year flow will be maintained at pre-development level, ensuring no effect from the intended development.
- 3) In 100-yr event, the sites 100-year flow will be maintained at Pre-development level, ensuring no effect from the intended development.