Sorell Council Southern Beaches CERMP Outfall Project

Outfall Project 4_SE115474

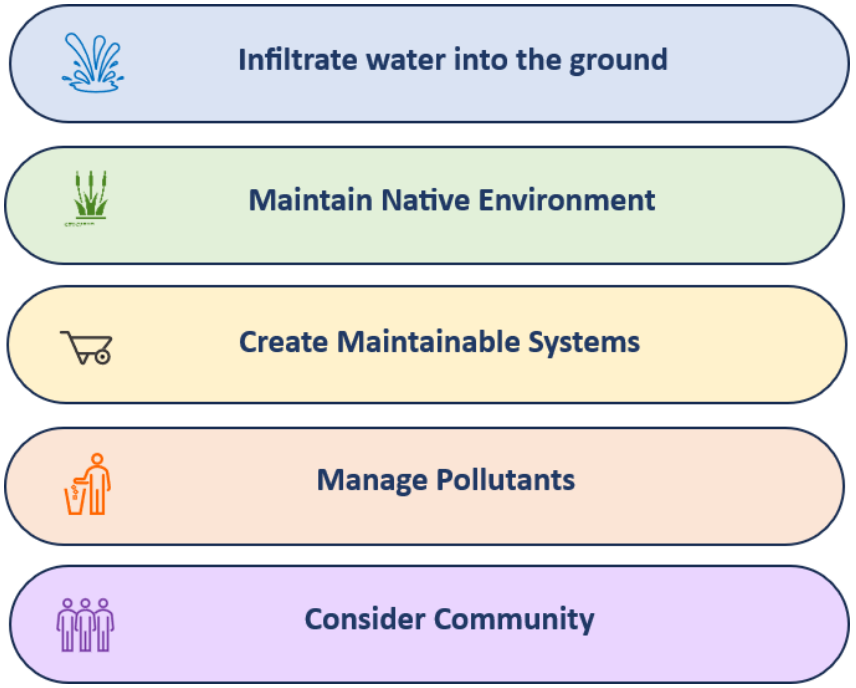
56 Grevillea Street
Anna Wilson December 2023

Brief

Manage Sorell Southern beach stormwater outfalls to protect dunes and beaches from erosion and pollutants as per the Sorell Council Coastal and Estuarine Risk Mitigation Project.
Each outfall project will follow a number of overarching principles to ensure that works are good for the community and will tie in with overall stormwater and pollution management objectives.

SE115474 Brief

Significant erosion occuring past end of current outfall arrangements.



SE115474 56 Grevillea existing conditions

The existing outfall is a 525mm dia pipe that outfall into a formed concrete channel prior to dropping off onto the unmanaged slope then outfalling onto the pebbly beach.
The channel is constructed at a cross slope angle to the pipe outlet. The channel is approximately 3m long and outfall approx. 10m above the beach line.

A significant erosion channel has formed between the concrete outfall and the beach due to the high energy the water regains rapidly after leaving the existing energy mitigation arrangement.
In several areas the gulley appears to have eroded to bedrock.

Figure 1 Existing arrangement top view

Figure 3 Detail of current outfall arrangements

Figure 4 Detail of erosion channel

Figure 2 Existing arrangement - base view, showing approximate location of channel

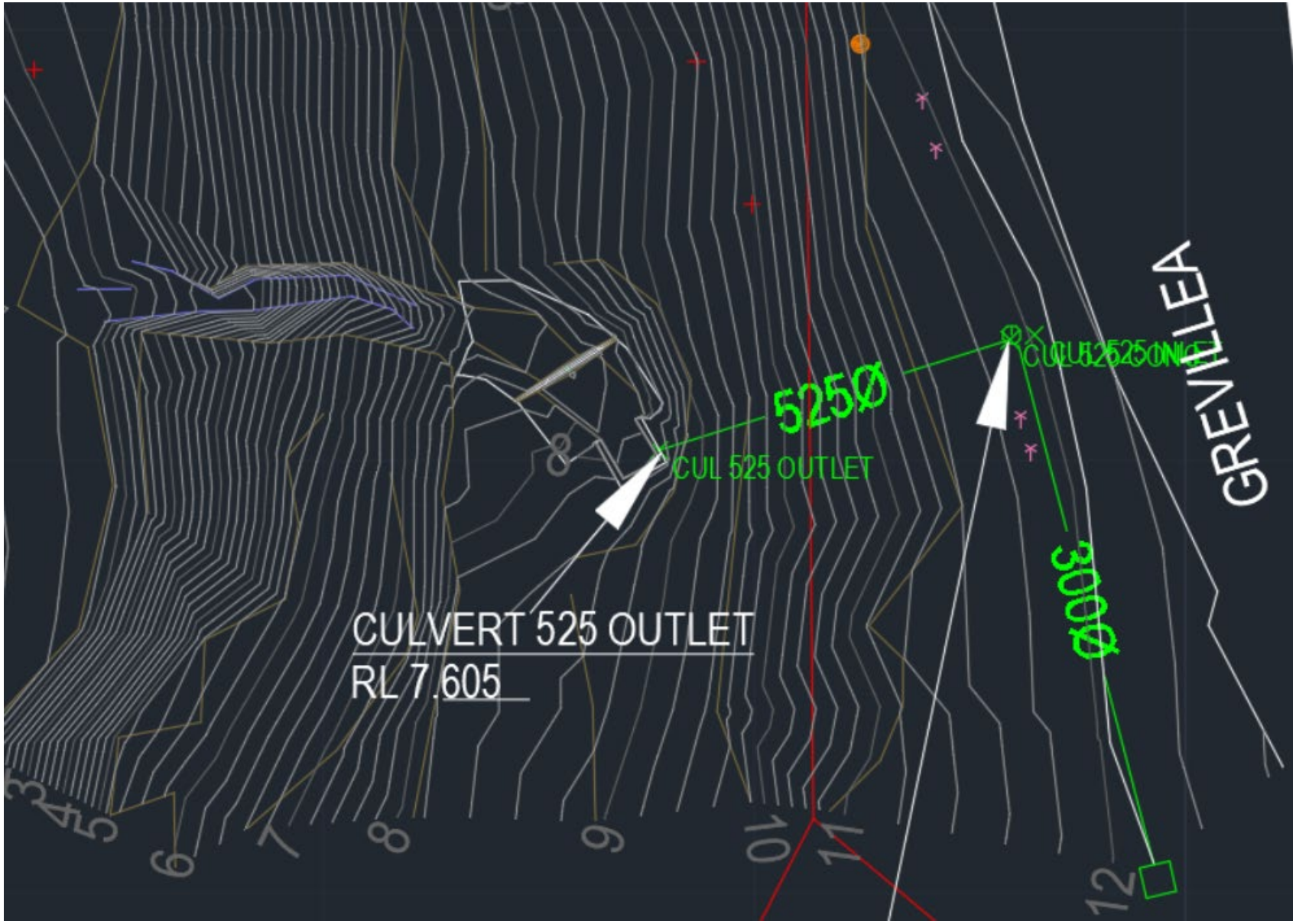


Figure 5 Survey detail of existing conditions

Notes on Survey and Grade

This location is contains a steep grade which is likely why there was not erosion management down the slope at the time of construction.
The survey of the site revealed the following grade of the channel (magenta).
Subsequent site inspection indicates that there may be sections of the channel approaching vertical , it is possible the survey did not accurately pick up the base of the channel. An estimation of the possible channel base has been show in white.
The surveyed grade is approximately 1:1 through the central section.

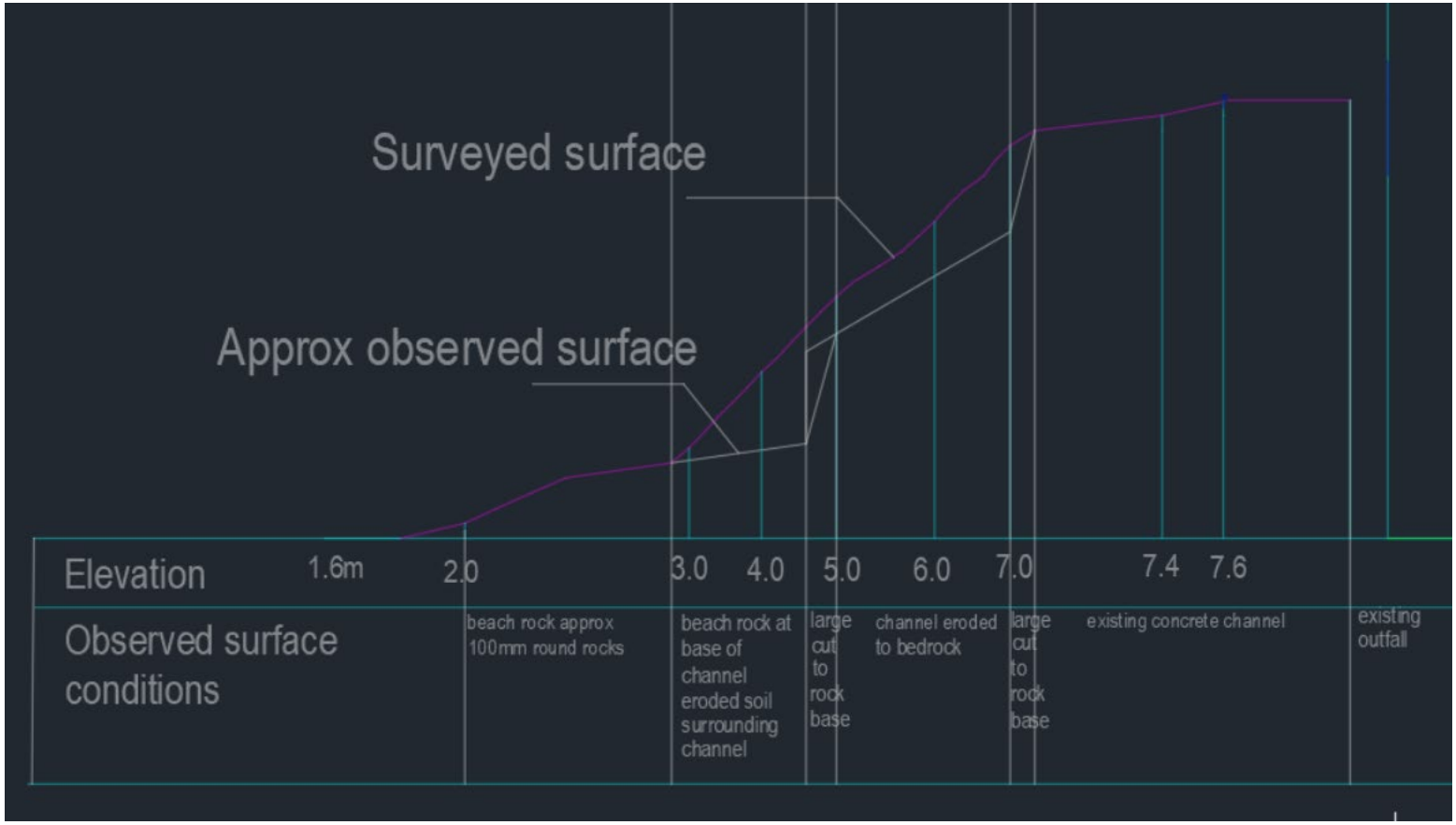


Figure 6 Detail of Survey cross section showing surveyed grade and possible actual grade.

This grade creates a number of issues:

- Rapid increase in velocity and energy past the dissipator.
- High velocities will be impossible to mitigate at this site given the required fall.
- Access difficulties.

The ramifications of these issues are:

- A vegetated solution, even if supported by the best geotextiles, may fail as the slope and channel velocity exceed what is recommended.
- A hard base is required to mitigate further erosion
- Whilst there are some areas where the channel is eroded down to bedrock this does not extend for the length of the channel. The areas that are not bedrock are actively eroding and increasing in depth. Inspection showed these areas to be the most vertical.

Options Analysis

Given the site constraints several options were investigated for the site

Option	Description	Pros	Cons	Notes	Recommended
1.Green Solution	Support vegetated areas with geofabric, leave bedrock exposed.	Aesthetically pleasant Least complicated installation	Unable to stabilise vertical sections Likely to have erosion occur at edges Out of scope for all geofabrics	It would be possible to batter out the sides and stabilise these with geofabric and the batters would likely be successfully vegetated. However the sections within the channel that are approaching vertical and have not stabilized on bedrock would be difficult to effectively protect from further erosion. Several options were considered and possibly shotcreting the vertical sections however there was no option that would effectively stabilise the vertical sections long term.	**Possible – if limitations acknowledged**
2. Harden the channel to the beach	Line channel with concrete or prefabricated concrete sections	Possible	Difficult to install and anchor. Would need to ensure water does not get underneath leading to failure Large visual impact	Any type of concrete hardening would be difficult to anchor at these grades and difficult to install given the weight of each section. Again if water gain access below the structure it will fail.	**Not recommended**
3. Pipe to beach	Continue piped section from existing outfall.	No visual impact Constrains water to limit future risk	Out of scope Difficult installation	This option creates the least future risk of water egressing out of the system and causing failure. As the site is not a significant overland flow path, if the piped flow is managed the remaining overland flow will be insignificant. Note that the upper section above the current outfall contains no erosion issues. However pipe installations at these grades is outside of standard civil guidelines and will need to be approved by Council.	**Recommended.**

Recommended solution

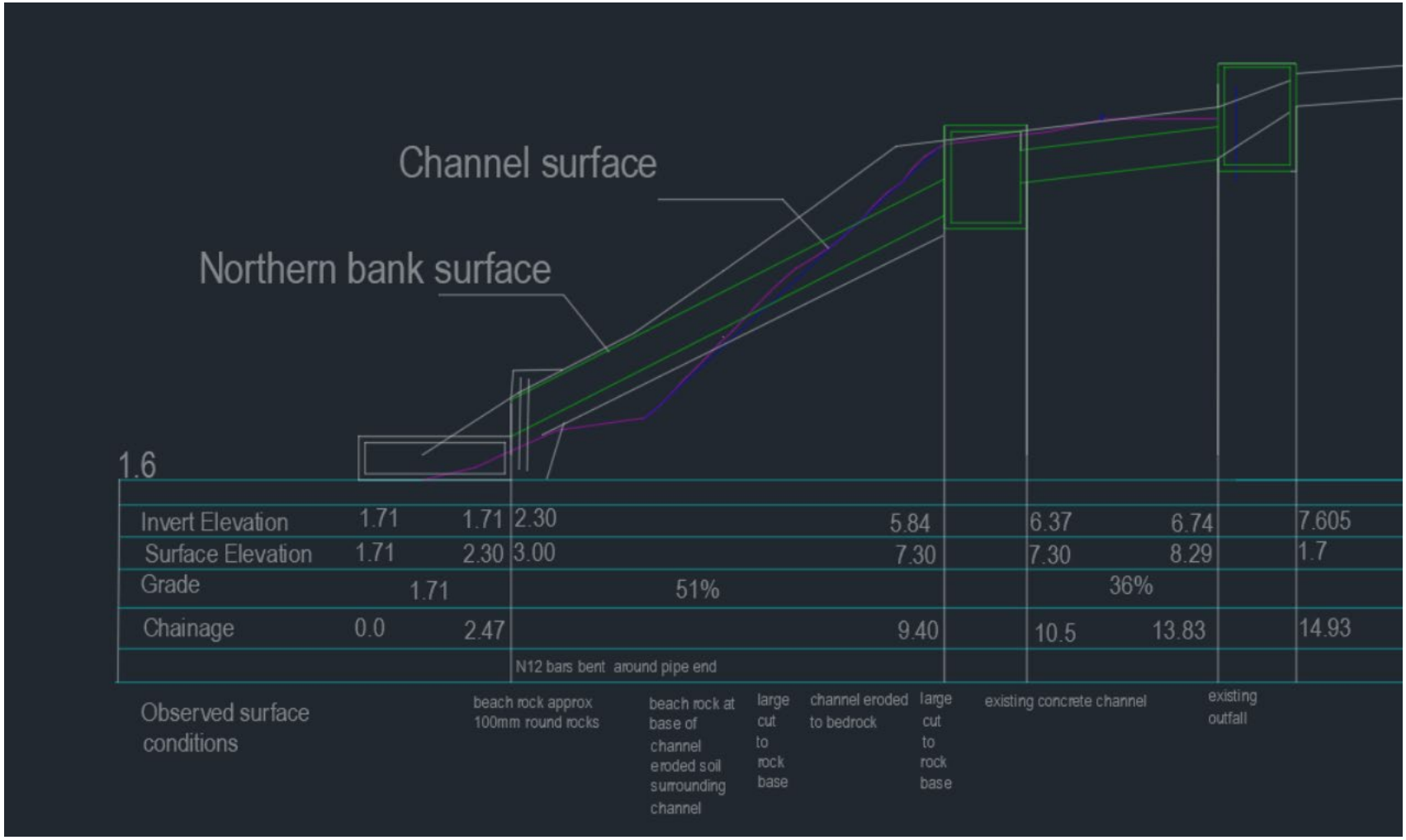
The recommended solution in this location is to extend the piped network to the shoreline. This option ensures that the water stays effectively contained minimizing future erosion risks.

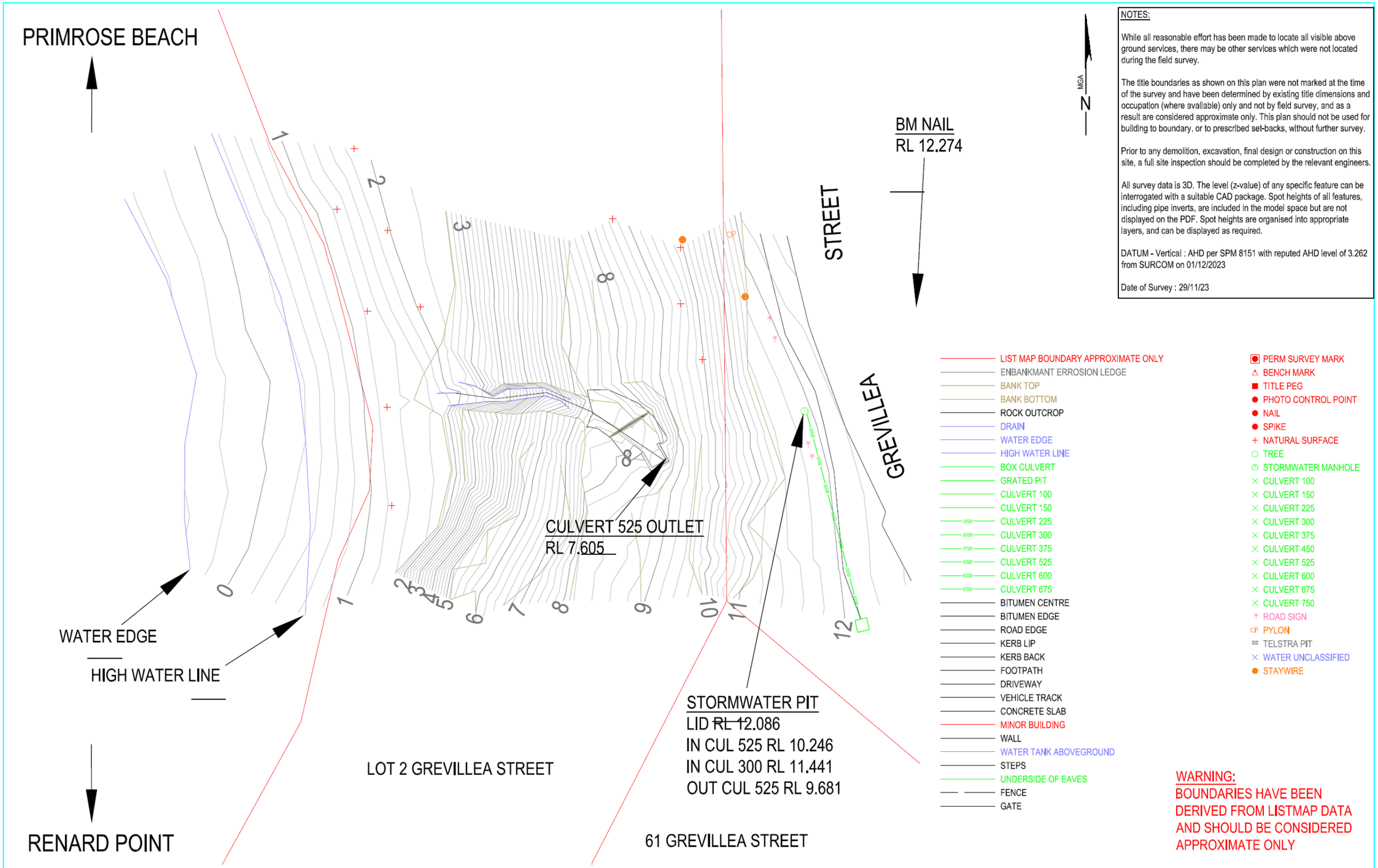
Due to the grade of the slope paling a pipe here is outside civil construction standards. Some advice has been obtained by utilising AS/NZS 2566.2:2002 – Flexible pipe installation (Standards Australia, 2018) and AS/NZS 3500.3:2021 (Standards Australia, 2021).

Recommendation:

- Remove existing concrete channel and create machine pad for works
- Excavate pipe location using either:
    - Dam excavator – this should reach to base
    - Chain anchored machine – to be determined by operator.
- Install PE pressure sewer pipe – this pipe has a higher resistance to scour than standard stormwater pipes so is recommended for this application.
- Bed pipe in concrete, pump in no mesh required as per AS/NZS 2566.2:2002 section 5.8.3.
- Place large concrete cattle trough -.45m OD at base of pipe as an energy dissipater. Face 2inch outlet toward beach.
- Concrete endwall connecting pipe end to tank.
- Surface to be reinstated with local material or imported topsoil. Seeded with local grass seed mix and covered with double layer of jute mesh anchored at 1m centres.

Note – contractor will be required to operate on steep ground.


Channel surface
Northern bank surface
1.6
Invert Elevation 1.71 1.71 2.30 5.84 6.37 6.74 7.605
Surface Elevation 1.71 2.30 3.00 7.30 7.30 8.29 1.7
Grade 1.71 51% 36%
Chainage 0.0 2.47 9.40 10.5 13.83 14.93
N12 bars bent around pipe end
Observed surface conditions
beach rock approx 100mm round rocks
beach rock at base of channel eroded soil surrounding channel
large cut to rock base
channel eroded to bedrock
large cut to rock base
existing concrete channel
existing outfall



NOTES:

While all reasonable effort has been made to locate all visible above ground services, there may be other services which were not located during the field survey.

The title boundaries as shown on this plan were not marked at the time of the survey and have been determined by existing title dimensions and occupation (where available) only and not by field survey, and as a result are considered approximate only. This plan should not be used for building to boundary, or to prescribed set-backs, without further survey.

Prior to any demolition, excavation, final design or construction on this site, a full site inspection should be completed by the relevant engineers.

All survey data is 3D. The level (z-value) of any specific feature can be interrogated with a suitable CAD package. Spot heights of all features, including pipe inverts, are included in the model space but are not displayed on the PDF. Spot heights are organised into appropriate layers, and can be displayed as required.

DATUM - Vertical : AHD per SPM 8151 with reputed AHD level of 3.262 from SURCOM on 01/12/2023

Date of Survey : 29/11/23

- LIST MAP BOUNDARY APPROXIMATE ONLY
- ENBANKMANT ERROSION LEDGE
- BANK TOP
- BANK BOTTOM
- ROCK OUTCROP
- DRAIN
- WATER EDGE
- HIGH WATER LINE
- BOX CULVERT
- GRATED PIT
- CULVERT 100
- CULVERT 150
- CULVERT 225
- CULVERT 300
- CULVERT 375
- CULVERT 525
- CULVERT 600
- CULVERT 675
- BITUMEN CENTRE
- BITUMEN EDGE
- ROAD EDGE
- KERB LIP
- KERB BACK
- FOOTPATH
- DRIVEWAY
- VEHICLE TRACK
- CONCRETE SLAB
- MINOR BUILDING
- WALL
- WATER TANK ABOVEGROUND
- STEPS
- UNDERSIDE OF EAVES
- FENCE
- GATE

- PERM SURVEY MARK
- BENCH MARK
- TITLE PEG
- PHOTO CONTROL POINT
- NAIL
- SPIKE
- NATURAL SURFACE
- TREE
- STORMWATER MANHOLE
- CULVERT 100
- CULVERT 150
- CULVERT 225
- CULVERT 300
- CULVERT 375
- CULVERT 450
- CULVERT 525
- CULVERT 600
- CULVERT 675
- CULVERT 750
- ROAD SIGN
- PYLON
- TELSTRA PIT
- WATER UNCLASSIFIED
- STAYWIRE

WARNING:
BOUNDARIES HAVE BEEN DERIVED FROM LISTMAP DATA AND SHOULD BE CONSIDERED APPROXIMATE ONLY

AMENDMENTS

No.	Revision/Issue	Date

LEARYCOX&CRIPPS
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E admin@lccsurvey.com

Project Name and Address: GREVILLEA STREET, PRIMROSE SANDS, TAS 7173

Drawing Title: DETAIL PLAN

Client: TIVOLI GREEN PTY LTD

SCALE: 0 1 2 3 4 6 8 — 1:200 at A3

Contour Interval: 0.200 m

Date: 04 / 12 / 23

FILE REF: 13699

SHEET: 4 of 6

DRAWN: LO

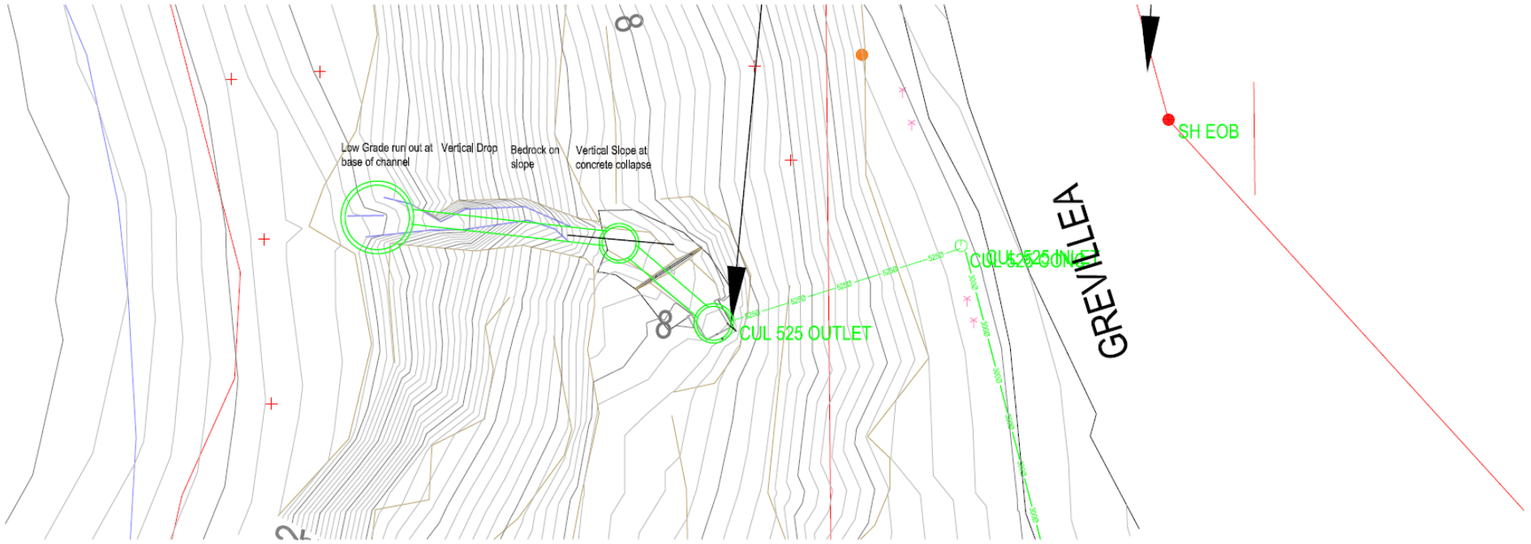
CHK'D: DC

Geocivil Ref: 1369901

AutoCAD Ref: 1369901

DATUM Horz: GDA2020 GRID

DATUM Vert: AHD



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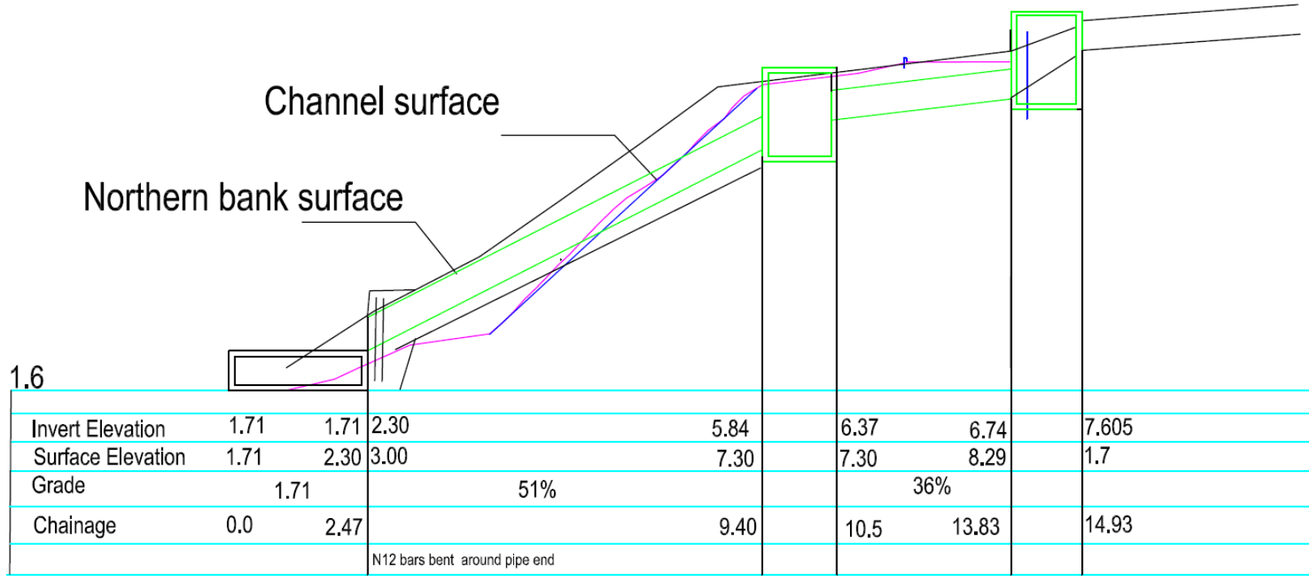

Invert Elevation	1.71	1.71	2.30		5.84	6.37	6.74		7.605
Surface Elevation	1.71	2.30	3.00		7.30	7.30	8.29		1.7
Grade		1.71		51%			36%		
Chainage	0.0	2.47			9.40	10.5	13.83		14.93
			N12 bars bent around pipe end						

Observed surface conditions

beach rock approx 100mm round rocks

beach rock at base of channel eroded soil surrounding channel

large cut to rock base

channel eroded to bedrock

large cut to rock base

existing concrete channel

existing outfall

0 0.5 1 2
1:50 at A3

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- CULVERT 750
- ROAD SIGN
- PYLON
- TELSTRA PIT
- WATER UNCLASSIFIED
- STAYWIRE
- 200mm BLUEMETAL
- 1200 - 1500mm ROCK - HARD

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Project Name and Address
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Drawing Title
DESIGN PLAN

Client
SORELL COUNCIL

SCALE
0 1 2 3 4
1:100 at A3

Contour Interval
0.200 m

14 / 12 / 23

SHEET 3 of 6

DRAWN LO
CHK'D DC

FILE REF:
13699

GeoMvll Ref 1369901
AutoCAD Ref 1369901

DATUM Horz. GDA2020 GRID
Vert. AHD

References

Engineers Australia. (2006). *Australian Runoff Quality - A Guide to Water Sensitive Urban Design.* Crows Nest: Engineers Media.
Kovacevic, S. (2020). *Sorell Stormwater System Management Plan.* Hobart: Entura.
Standards Australia. (2018). *Australian/New Zealand Standard, Buried flexible pipelines Part 2: Installation.* Sydney: SAI Global.
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