



Cover Letter

To
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Lithgow City Council,
180 Mort Street,
Lithgow NSW 2790
E: council@lithgow.nsw.gov.au

Property Owner:
Mr Benjamin Harris
Experience OZ Pty Ltd (ABN: 71 637 922 966)
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Earthworks (Construction) Soil and Water Management Proposal for proposed ecotourism facility for Experience OZ Pty Ltd at 51 Atkinson Street, Mort's Estate, NSW 2790, Lot 152, DP 659519.

Dear Sir or Madam,

This document covers erosion and sediment control and touches on stormwater management as detailed in the attached soil and water management plan. Stormwater, in particular, is covered in more detail in the submitted water cycle study, accompanied by a MUSIC model.

The report at hand additionally describes and summarises the proposed earthworks detailed in the earthworks plans by MH Environmental Drafting. It aims to provide a clearer understanding of what is proposed for developing 51 Atkinson Street.

Please feel free to contact me if you require further information. Our office number is 02 6352 5758 or mobile 0407 990 613.

Sincerely

Jane T Aiken CPSS, CEnvP.
Project Lead, Consulting & Environmental
Services Pty Ltd





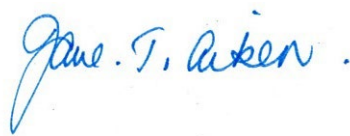
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Document Registration

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Property:	51 Atkinson Street, Mort's Estate, Lithgow NSW 2790 Lot 152, DP 659519
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1 Introduction

Consulting and Environmental Services have prepared a construction soil and water management report summarising earthworks, erosion and sediment control, and stormwater management for the proposed ecotourism facility development at Lot 152 in DP 659519 for Mr Ben Harris, the landowner of 51 Atkinson Street. The report extends the scope of a general soil and water management plan described in the Development Control Plan 2021 (Lithgow City Council, 2021), describing “how water will be managed to minimise erosion and provide sediment control”.

1.1 Scope

The scope includes:

1. Summarise proposed earthworks to place 12 cabins, the common room, the check-in office and the manager’s residence onto Lot 152.
2. Describe the locations of all soil, erosion, and sediment controls that prevent contamination of soil or water and sediment from entering waterways.
3. Describe stormwater control measures that satisfy a neutral or beneficial effect on water quality.

This report has been prepared as supporting documentation for a Development Application seeking approval for the works from Lithgow City Council.

1.2 Design DA Methodology

The report at hand additionally describes and summarises the proposed earthworks detailed in the earthworks plans by MH Environmental Drafting. It aims to provide a clearer understanding of what is proposed for developing 51 Atkinson Street.

Reference plans are.

- Existing landform by contour and detail and the digital elevation model.
- Cross sections on landform and State Mine Creek alignments.
- Project proposal.
- Evaluation of predevelopment levels.
- Conceptual design of finished levels (ground).
- Concept cut and fill plan.
- Notation on retaining wall structure.
- Landscaping site plan
- Erosion and sediment controls
- Stormwater interventions
- Modelling for Neutral or Beneficial Effect
- Proprietary products



Aspects of the proposal relevant to earthworks are.

- The earthworks plan that shows cut and fill to finished levels.
- Concurrence with the preliminary site investigation concerning the former land use of coal chitter storage so that remedial action includes soil management for landscaping and site development (capping).
- Concurrence with the water cycle management study and modelling of stormwater.
- Installation of landscaping soils and ground cover stabilisation.
- Concept design for wastewater, stormwater, tanks etc
- Notes on resource recovery and waste soil management.

2 Site Description

The subject site, identified as 51 Atkinson Street (Lot 152 in DP 659519), is a block of approximately 2.085ha in the northern part of Mort's Estate. The site is bound by residential allotments to the south and southwest, Lots 10 and 11 in DP1240259 belonging to the heritage-listed State Mine Heritage Park to the north and east and State Mine Creek to the west ([Figure 2-1](#)).

The site slopes gently uphill from State Mine Creek to the east on an average slope of 10% ([Figure 2-2](#)). The allotment is currently vacant land, apart from a few site sheds that store machinery.



Legend
 [Red outline] Lot 152 +/- DP659519 (2.085 ha; Land zoning: C3 - Environmental Management)
 [Black outline] Lot
 [Yellow line] Road
 [Grey line] Railway tracks
 [Blue line] Watercourse

Scale at A3: 1:2,000 Magnetic North: 12.28°E Name: GD42020 MGA Zone 56

Consulting & Environmental Services
 cesssoils.com.au – on behalf of the client.

This design plan proposed must be verified accurately when used for construction purposes.

**Drawing title: Location Plan for Flood Impact Assessment
 EXPERIENCE OZ ECOTOURISM FACILITY**

Lot 152, DP 659519
 Client: Ben Harris
 Site address: 51 Atkinson Street Mort's Estate Lithgow 2790 NSW

Project number: 136-2107
 Drawing number: 41-2107

Drawn by: M.H. Environmental Drafting Date: 20/03/2024 11:39 AM

Figure 2-1 Location Plan

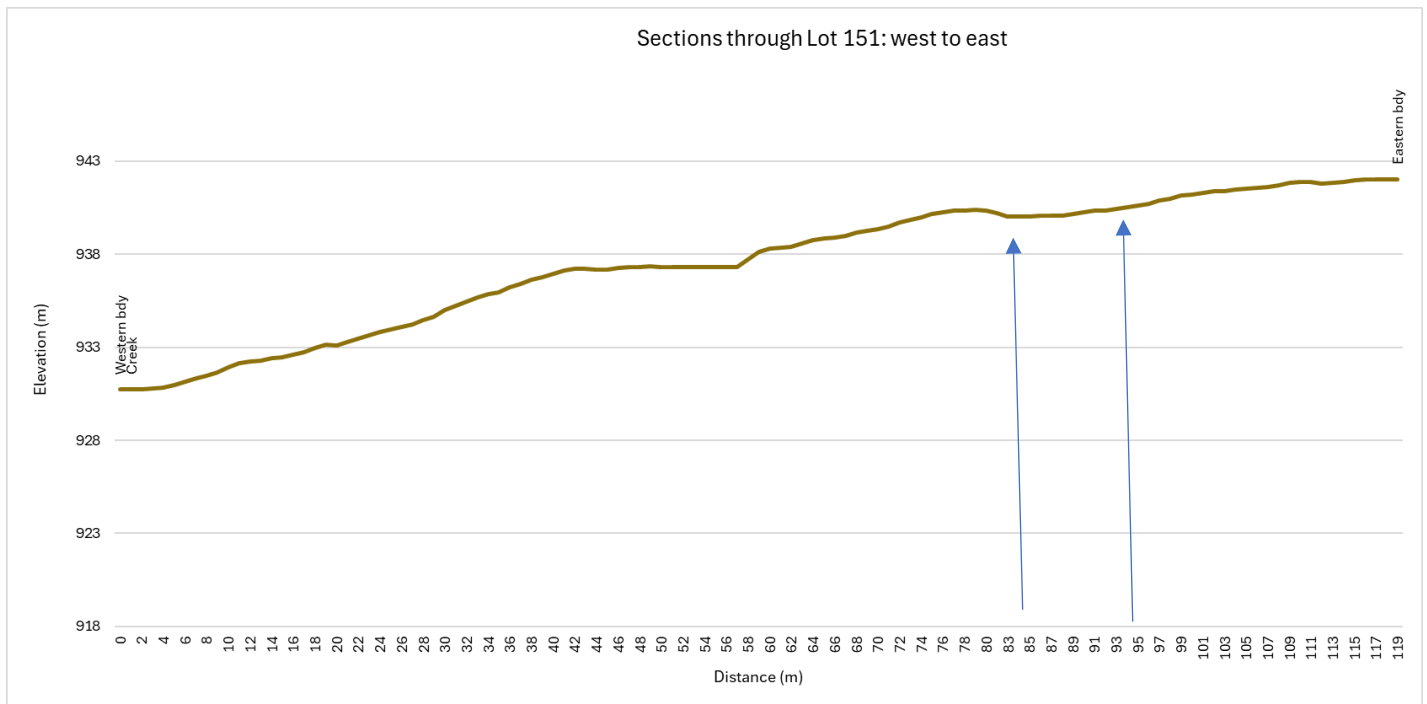


Figure 2-2 Section through Lot 152 from west to east with a vertical exaggeration of 4.



3 Proposed Development

The proposed development is for an ecotourism facility including:

- Proposed new dwelling (manager's residence), as located on site plans.
- Nine two-bedroom cabins.
- Eight one-bedroom units in three cabins
- A common room (bushfire-safe refuge).
- A check-in building (constructed within the same scale and form as all accommodation cabins).
- A driveway (6 m min. width) from the property gate to the house, with access to car parking at the cabins, and access for heavy vehicles turning within the site for bushfire and to the firefighting water supply tank.
- Three water tanks.
- Offsite wastewater treatment via the municipal sewerage services.
- Onsite stormwater treatment through a small reed bed, swales, and rain gardens.

The project proposal concept plan can be found in [Figure 3-1](#).

The development application is accompanied by a comprehensive statement of environmental effects and an ecotourism management plan that addresses the development's relevance as an ecotourism facility.

The total extent of the construction zone is 6,403 m² with a total site coverage of buildings and driveways of 1,033 m², or 5.12% of the total property allotment.



Figure 3-1 Project Proposal Concept Plan



4 Assessment of Landform and Drainage

Our design of the earthworks, as well as placement for erosion and sediment control and stormwater interventions, is based on assessing and mapping the site's existing landform features using a digital elevation model with 1m ground accuracy from August 2011 (Spatial Services, 2021). The DEM was used to calculate contours compared with the detailed survey (CEH Survey) ([Figure 4-2](#)) to verify their accuracy. [Figure 4-3](#) combines the detailed survey with the proposed development.

Further, the DEM was used to visualise the existing landform ([Figure 5-1](#)) to design finished levels and model cut and fill extent and volumes ([Figures 5-2](#) and [5-3](#)).

We modelled drainage lines using the Strahler Order tool in SAGA 7.8.2 (SAGA, 2024) through QGIS (QGIS Development Team, 2024) ([Figure 4-1](#)). This shows that two drainage lines are intersecting the proposed development. One is going through the centre of the allotment towards the northern concrete spillway. This drainage line is modelled where there is a slight depression in the land created as a final landform for the site (Consulting & Environmental Services, 2023). This depression can be seen in [Figure 2-2](#) section at around 83-93m from the creek.

The other drainage line intersects at the proposed driveway into the property. This flows from east to west and feeds into State Mine Creek through the southwestern concrete drain.

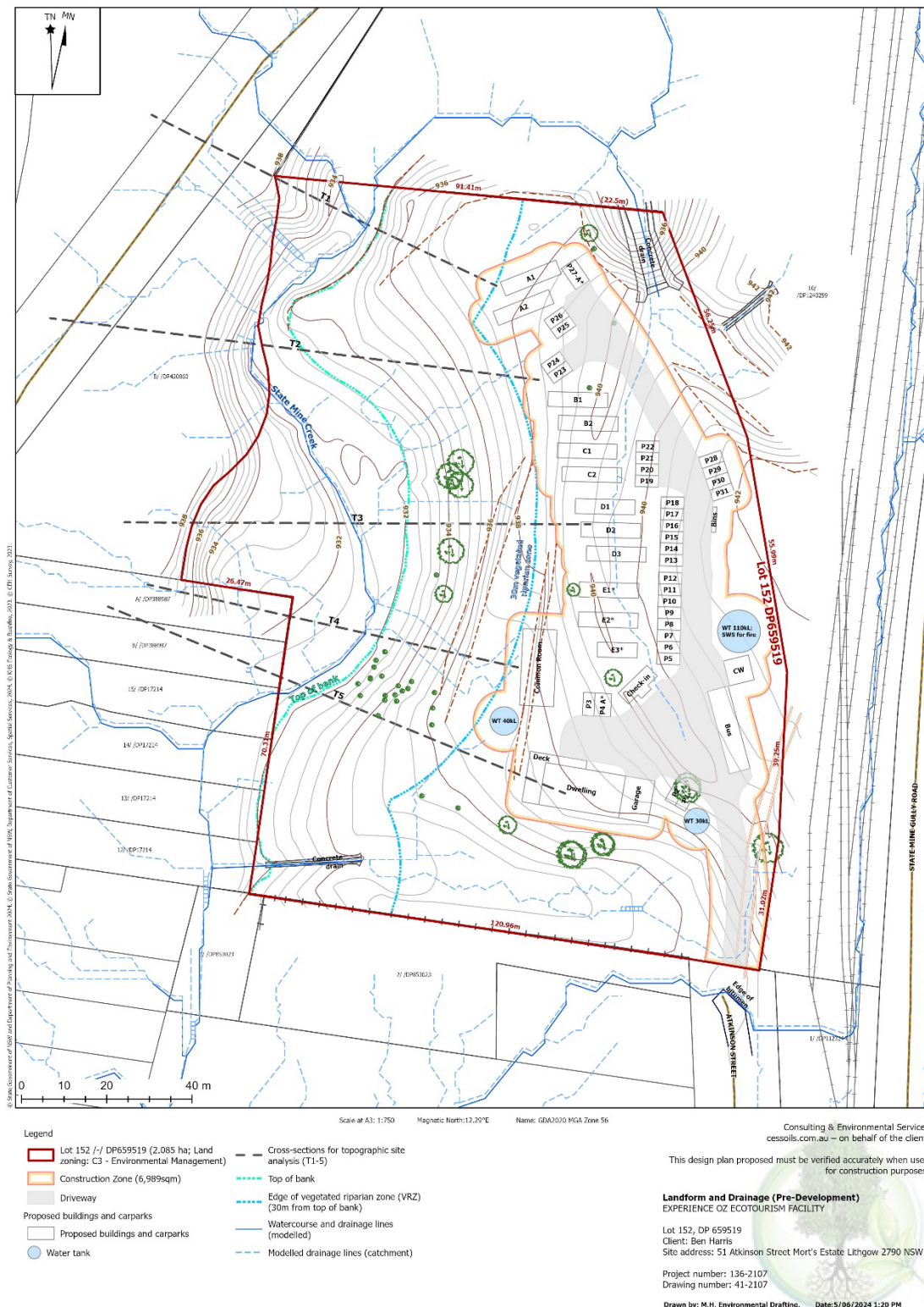


Figure 4-1 Existing landform and drainage

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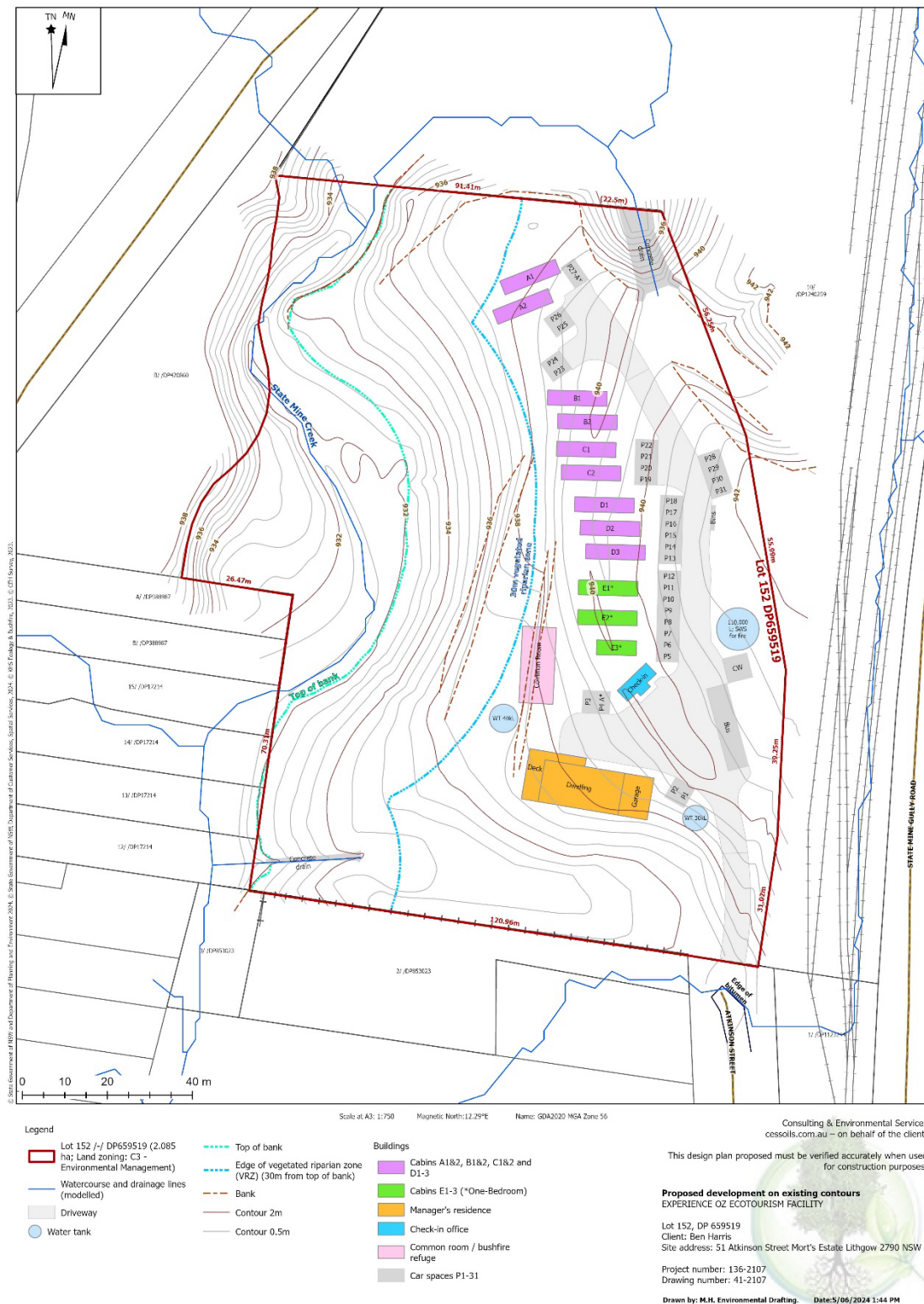


Figure 4-3 Proposed development on existing contours from detailed survey



5 Earthworks Site Design

The earthworks' design was prepared using a minimal-impact approach, which is in line with the ethics and objectives of the proposed ecotourism facility. Where possible, cut and fill are minimised to avoid major fill disturbance and the need for large retaining walls.

5.1 Pre-development levels

[Figure 5-1](#) shows our first step in designing earthworks and finished levels.

The final plan is modelling to represent the existing landform upslope of the vegetated riparian zone (VRZ) (Department of Planning & Environment, 2022). Relative elevation was classified using a mapping colour scheme at 0.25m interval (Esri Australia, 2023).

Thus, the mapping shown by Figure 5-1 is displayed in colours ranging from dark blue (lowest – RL 934.5) over light blues, light greens, white, yellows, oranges, and reds to dark red (highest – RL 943).

For this site design the datum is RL 940 ± 0.1m visualised as white / transparent as this was determined as the most common RL that would be used as a baseline to design the levels on which the buildings, driveway and parking areas will be placed.

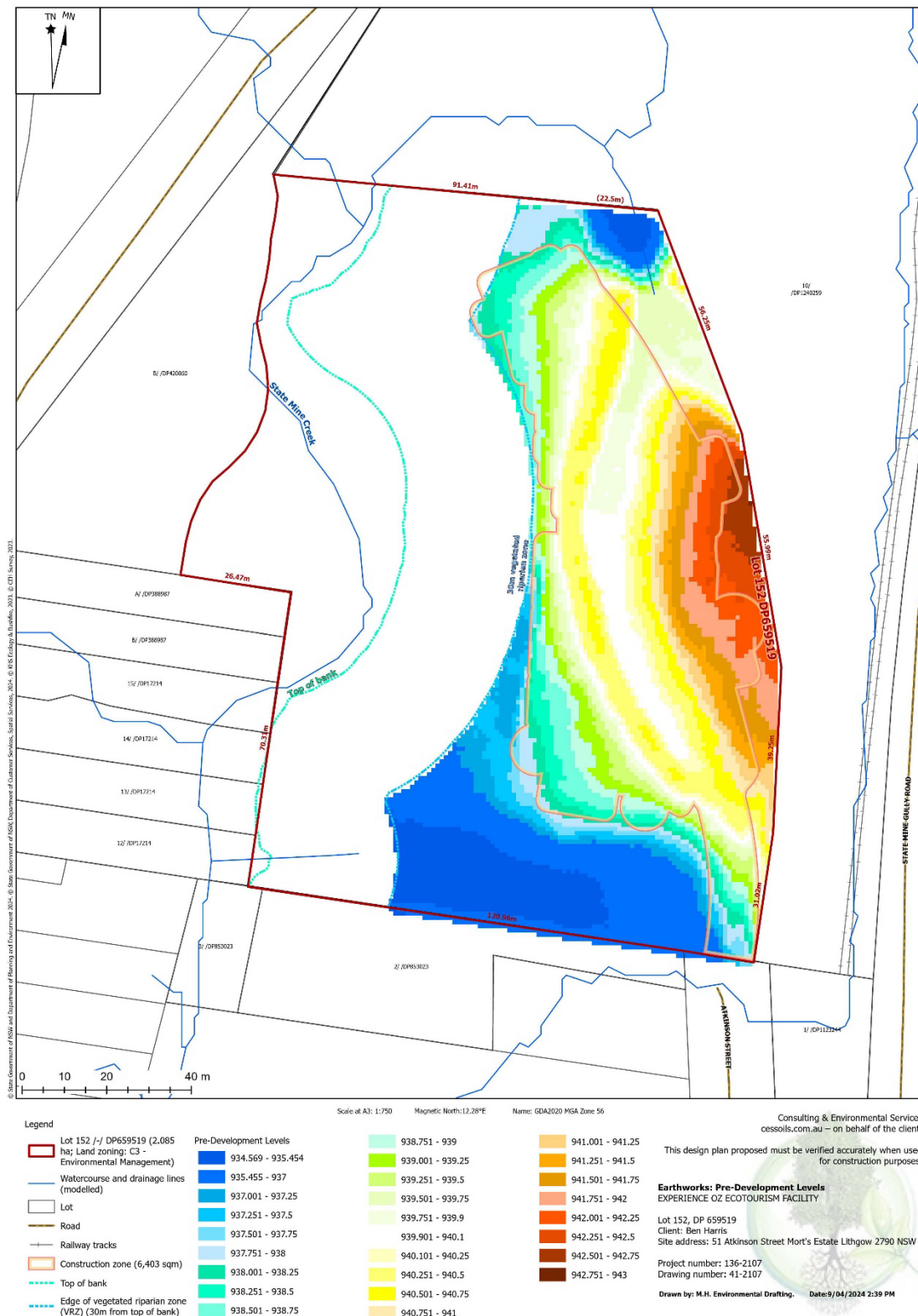


Figure 5-1 Pre-development levels



5.2 Conceptual Design Finish Levels

Using [Figure 5-1](#), we designed the finished levels shown in [Figure 5-2](#). The presented levels must be conceptual, as this plan does not substitute an engineering drawing. Instead, the indicated levels were used to design the site and to give an idea of the finished ground and how the development will affect drainage, stormwater runoff, flood mitigation and trafficability. We believe that this is sufficient at the consent stage. Engineering drawings may be submitted at the construction certification stage if the Council determines this to be necessary.

The conceptual design finish levels are not the same as the finished floor levels of the cabins. Instead, adding 100 mm of topsoil or gravel to the proposed levels is proposed. Additionally, the cabins will be placed at least 300mm above the finished ground level using a pier and beam construction if this is considered appropriate in the post-consent geotechnical assessment by Edge Geotechnical. This is further discussed in the Flood Impact Assessment Report (Consulting & Environmental Services, 2024a). Thus, the design finished floor levels are at least 400mm above the proposed conceptual design finish levels shown in [Figure 5-2](#).

The finished levels were designed to minimise cut and fill as much as possible to avoid soil disturbance and utilise a minimal-impact approach.

5.2.1 Description of finished levels

This section describes the finished levels of the site from south to north as if the reader were walking through the facility. Please note that the RLs mentioned in this section are the finished ground level and **not** the finished floor levels, as explained above in [Section 5.2](#).

The entry driveway is on natural ground and grades upslope at 10% from the southern boundary / Atkinson Street. This part of the driveway will be constructed using reinforced concrete to ensure that vehicles can safely enter and exit the site in flood conditions. It is also equipped with Megaflo® subsurface drainage to avoid low flow undermining the driveway (See Flood Impact Assessment Report (Consulting & Environmental Services, 2024a).

As the driveway becomes the southern turning area in front of the manager's residence, it becomes level at RL 939.5. The entire turning circle, carparks P1, P2, P3 and P4, and the carparks of the manager's residence are on this level. The patio of the manager's residence is slightly lower than this. The manager's residence is built on piers and the ground is battered from RL 939.5 at the turning area to the natural ground at a maximum grade of 20%.

From the southern turning area at RL 939.5, the driveway slopes slightly uphill to the highest point of the driveway, which is RL 940.75. This graded area includes the bus parking area and the ground underneath the check-in office. The driveway, the carwash, and the parking spots P5 to P18 area all on the level of RL 940.75. From the carparks there will be a few steps down to the walkway that runs behind the carparks and to the cabins and the common room.

As RL 940 is the most common pre-development level ([Section 5-1](#)), this level is proposed as the finished level for the largest part of the development. This covers Cabins C1, C2, D1, D2, D3 and the common room with its outdoor space.



Back on the driveway, it slopes gently down from RL 940.75 to 940.5, which covers the carparks P19-22 and P28-31, and then down to RL 939.5 in the northern turning area. Both cabins B1 and B2, as well as carparks P23-26, are on this level.

From here, material from the higher areas that require cuts will be used to fill and batter from RL 939.5 to natural ground at the edge of the vegetated riparian zone (VRZ). The slope is expected to be around 10% and covers the ground underneath cabins A1 and A2. The areas west of the flattened areas will require some battering and, in some cases, retaining walls where the edge of the VRZ is too close to avoid earthwork in the riparian buffer.

The one-bedroom cabins E1, E2 and E3 will be placed on the batter to the natural ground.

5.3 Cut and Fill

In the third step, we used the DEM with the pre-development levels and the design finished levels to calculate the difference between them, which resulted in an approximation of the depth of cut and fill required to achieve the finished ground levels ([Fig. 5-3](#)). The Earthworks – Proposed Extent and Volumes of Cut and Fill ([Fig. 5-3](#)) shows the areas of fill as dark- to light-green and the areas of cut as light yellow to orange, red and dark red.

The grey areas are those that do not require any cut or fill. Those areas are those around RL 940. The table in the top right corner of the plan shows the estimated volumes of cut and fill required in each area (same areas as in [Fig. 5-2](#)). The volumes were calculated in QGIS using the Raster Volume function of the SAGA toolbox with the design finished levels as the baseline for each zone. Please note that the volumes are an estimation only and that the remaining material from the cut along the eastern part of the construction zone will be used to form batters to the natural ground with slopes of less than 1:5 (vertical to horizontal) or 20%.

The deepest excavation cuts are required along the eastern side of the development footprint, where the maximum cut is up to 2m. Split-level retaining walls are proposed around these cuts to retain the remaining upslope material. The split design reduces the bulk and mass of the retaining walls and uses the space between the levels for gardens such as those detailed in [Figure 5-4](#). This design softens the look of the retaining wall and fits into the character of the ecotourism facility.

The areas that require the most fill are those along the western side of the development, such as the edge of the southern turning circle in front of the manager's residence. Consequently, we seek approval to further re-shape the site using the reclamation materials.

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Figure 5-4 Design of split-level retaining wall with potential for herb and vegetable and bushtucker gardens (richmondsandgravelandlandscaping.com.au).

The site preparation will require importing soils such as topsoil and road base. It is proposed to cover the soil after cut and fill work is completed with 100 mm of topsoil for landscaping and impetrated gravel or road base for paths and driveways. Driveways and hardstand areas are to be sealed according to the Council's engineering guidelines.

All batters will be stabilised with a managed lawn, as detailed in [Figure 5-5](#).

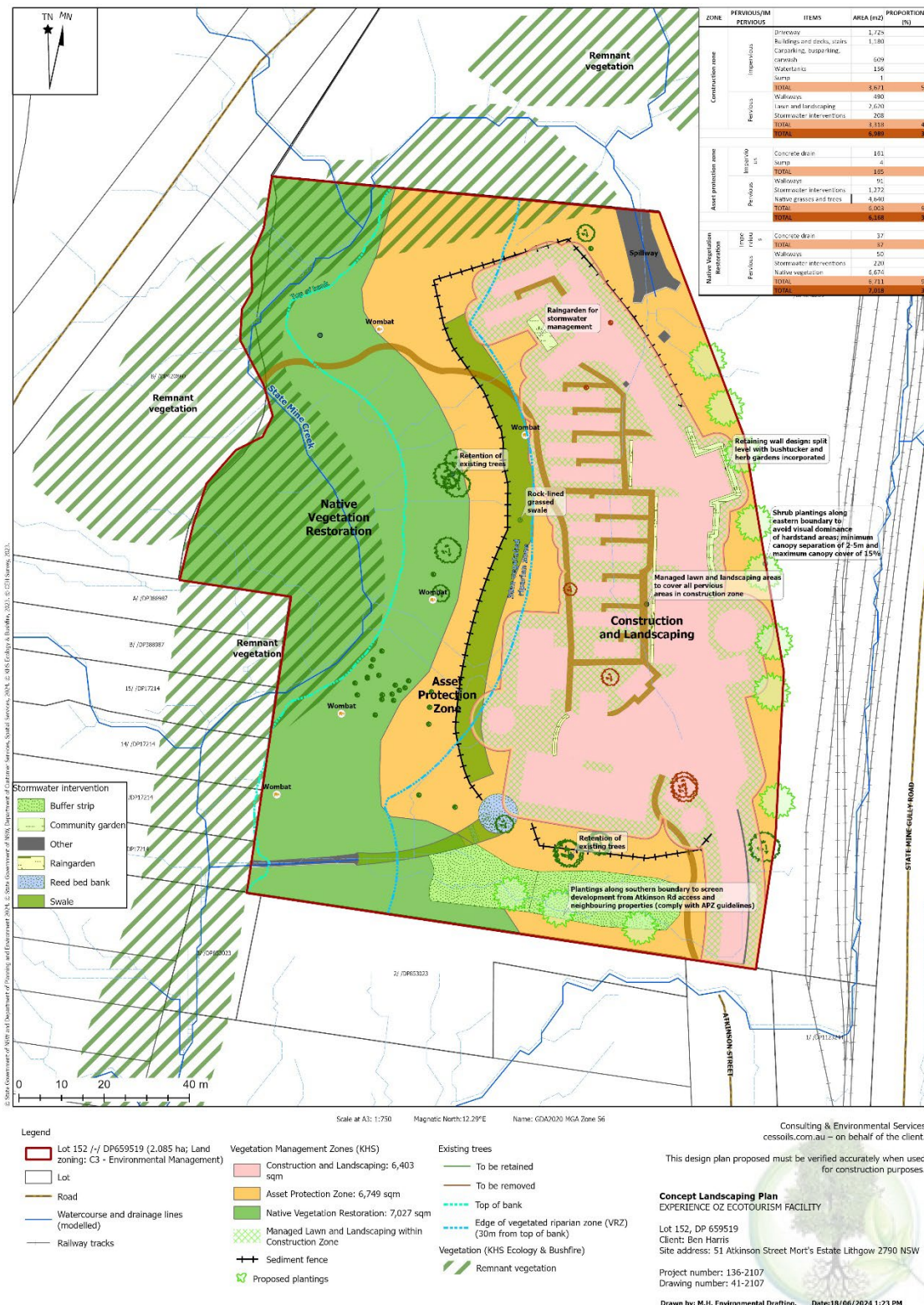


Figure 5-5: Landscaping site plan



6 Erosion and Sediment Control

A 260 m long sediment fence is to be installed west and downslope of the proposed construction zone before the commencement of any earthworks, as shown on several site plans, such as [Figure 5-5](#). We recommend using the Silt Fence 1500 from Geofabrics ([Attachment 1](#)).

For the silt fence to function optimally, it must be placed immediately downslope of the construction zone on contours for progressive filtering. Regular inspections after storms are a must, and any excessive silt deposits must be promptly removed to maintain the erosion control's capacity.

The installation of stormwater interventions that reduce overland flow and erosion avoids the need for additional erosion and sediment control. However, smaller areas of on-site work may need materials retained or stabilised. Consequently, our proposal will use standard methods for erosion control and utilise the sites nominated for stormwater implementation as the primary locations for site management.

7 Stormwater

Rainwater on the site flows naturally to the northeast and to the southwest, where existing concrete spillways manage the outflows from the site and the environmental inflows into State Mine Creek. The flow occurs on the surface and through the porous fill layer.

The cabin proposal uses the central ridge of the allotment, which will develop about 35% of the land. The proportion of impervious surfaces in the site area is 20%, leaving 80% of the site for natural water infiltration.

Disturbance to the existing drainage patterns of the site is minimised by reducing cut and fill as much as possible and designing the facility to fit onto the existing landform. The facility was designed to minimise impervious surfaces to maximise infiltration. Plantings in the porous areas of the construction zone, as well as in the asset protection zone, as located within the Vegetation Management Plan (Hammill, 2023), will increase infiltration rates and slow down and filter runoff not intercepted by the proposed (modelled) stormwater interventions.

Disturbance to natural drainage patterns is minimised by utilising the existing stormwater spillways to manage environmental inflows in the State Mine Creek.

The Water Cycle Management Study and the incorporated MUSIC model, which presents the proposed facility as a case study (Aiken and Hoeppner, 2024), outline the stormwater infrastructure details and the site's different catchments post-development. Therefore, this report only touches briefly on this.



7-1 Grey water recycling

Recycled water is generated by the capture and treatment of greywater from the manager's unit. Under maximum tenancy (four bedrooms), up to 780 L per day can be provided from greywater for reuse in the laundry and the toilets. Thus, 7.3 % of water volume can be recycled via greywater reuse.

7-3 Stormwater interventions

Stormwater interventions proposed in this development application are rain gardens, rock-lined and grassed swales, a reed bed, an infiltration bed, and a large buffer strip area. The location of these interventions is shown in [Figure 7-1](#).

7-3-1 Rainwater tanks

Stormwater management is proposed to include three large rainwater tanks (1 x 109,584-litre; 1 x 39,383 L; 1 x 27,396-litre steel (Heritage Tanks Australia, Malaga WA, colour Monument) for stormwater retention as well as nine 2,000 L slimline tanks for the 2-bedroom cabins where the runoff from the roofs is retained and used for toilet flushes in the community building.

The overflow from the rainwater tanks is discharged into the stormwater management system. The overflow from the large 110,000L tank goes into the rain gardens behind the carparks. The outflow from these rain gardens goes into a sump and then gets discharged into the northern spillway.

The smallest tank of the three, the 27,396L tank, is fed by the carwash and requires to be fitted with a sediment trap. The overflow goes into the reed bed.

7-3-2 Raingarden

A series of rain gardens are proposed for installation behind the carparks, along the entrance driveway and as part of a split-level retaining wall along the western edge of the southern turning circle.

These three rain gardens are typically small bioretention basins distributed and are often vertically-sided. They include various layers, including a planting area with native macrophytes and groundcovers adapted to periodic wetting, a temporary ponding area, a bio-filtration area with the filter media (sandy loam) where the stormwater percolates through the soil and roots, a transition layer (coarse sand), a drainage layer (fine aggregate) and an underdrain with an outlet pipe. The proposed rain gardens are lined for water flow rather than seepage.

7-3-3 Swales

Vegetated swales are typically trapezoidal or dish-shaped open channels to convey and filter stormwater runoff through vegetation to remove coarse sediment and total suspended solids. The



performance of these measures in MUSIC depends on the vegetation height, gradient, and length of the swale.

Swales are proposed below the reed bed to filter the water from the outflow of the reed bed. The outflow of this swale is into the southern spillway.

Additionally, a 106 m long swale has been sited along the entire length of the development on contours adjacent to the western edge of the construction zone to buffer any additional runoff from landscaping and impervious surfaces. This swale is designed as a rock-lined grassed swale to divert both high- and low-flow. The swale grades from the north to the south so that the high flow from the swale flows into the reed bed. The low flow gets dispersed into the existing drainage lines in the riparian zone.

7-3-4 Reed bed

A reed bed is proposed southwest of the manager's residence. It picks up the overflow from the 40,000L rain tank adjacent to the manager's residence and the E-cabins as well as the high-flow from the long north-to-south swale.

A reed bed works as a stormwater detention/retention system. The *Phragmites australis* plantings temporarily detain and filter the water before the outflow goes into another stormwater treatment measure. The reed bed is lined with geotextile and has a depth of approximately 0.6 m. The outflow of the reed bed is into a stabilised swale, which diverts the outflow into the existing concrete spillway. Other plantings suited to the reed bed include the *Vetiver* species¹, known to establish in a cold climate.

7-3-5 Buffer strip

Buffer strips are grassed or otherwise vegetated areas that filter sheet flow runoff from impervious surfaces. Buffer strips remove coarse matter that may otherwise overload a downstream measure. A large buffer strip covers the flood-prone areas along the southern boundary (Flood Impact Assessment Report, (Consulting & Environmental Services, 2024a) It picks up the runoff from the upgraded part of Atkinson Street, diverted through a culvert in the concrete entryway and discharges into the buffer strip. Scour protection is required at the inlet and discharge sides. The detail is shown in the Concept Road Design Detail (CEH Survey Pty Ltd, 2024). The buffer strip also picks up runoff from the higher areas on the eastern side of the driveway. Runoff not infiltrated in the buffer strip gets discharged into the swale and into the existing concrete spillway. This buffer strip is expected to require surface stabilisation for the long-term retention of topsoil.

¹ <https://vetiver-australia.com/about-vetiver-grass/>



7-3-6 Proprietary Products

The proprietary products nominated for this project will provide quality outcomes to the installations of the stormwater retention features. They are products that have a solid range of technical and design support. Consulting & Environmental Services recommend Geofabrics Australasia products.

For drainage Megaflo®, and fabrics in subsurface applications the non-woven Green Bidum® materials. Other woven materials degrade in water and become obsolete. For physical barriers for sedimentation and water retention the installation of Silt Fence 2000.

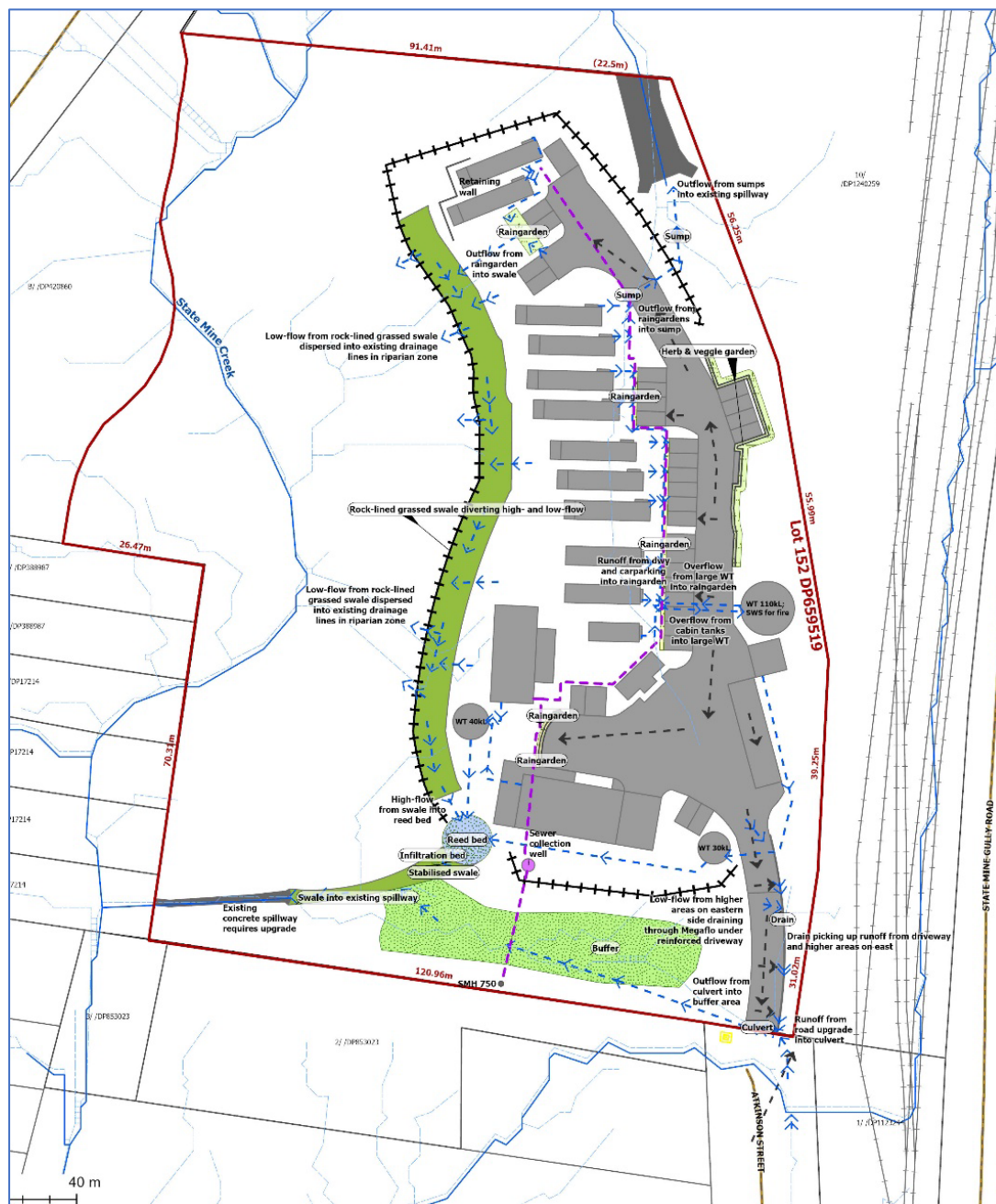


Figure 7-1 Soil and Water Management Plan



7-4 Post development catchments (MUSIC Model)

The MUSIC model in the Water Cycle Management Study explains the post-development site in six catchment areas. [Figure 7-1](#) shows how the site was divided into the catchments and the stormwater interventions used in the MUSIC model. [Figure 7-2](#) provides details about the stormwater interventions and the installation of the sediment fence.

The Water Cycle Management Study (Aiken and Hoepfner, 2024)) and the Statement of Environmental Effects (Consulting & Environmental Services, 2024b) describe these catchments in detail.

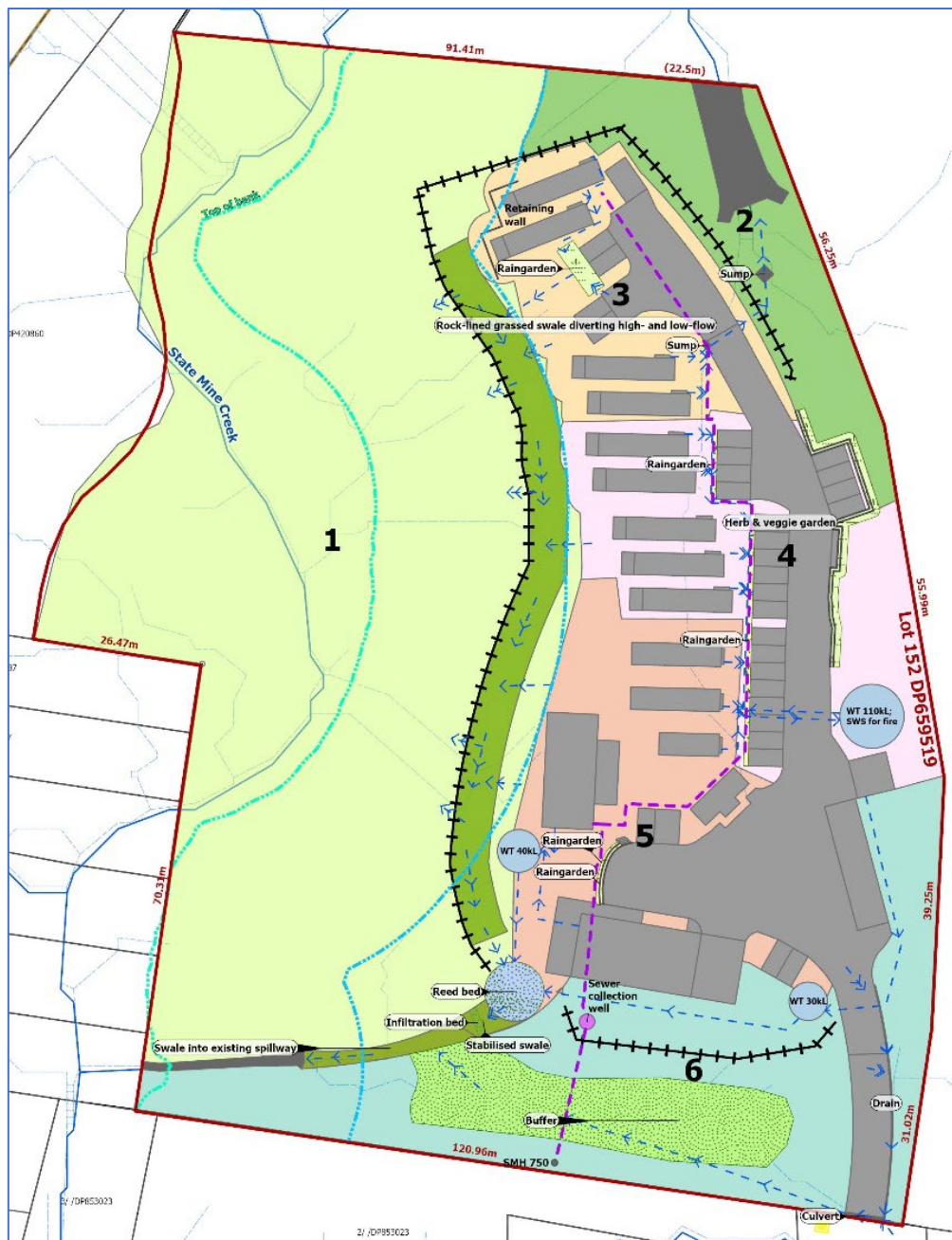


Figure 7-2 MUSIC Post-Development Catchments (see full site plan attached)

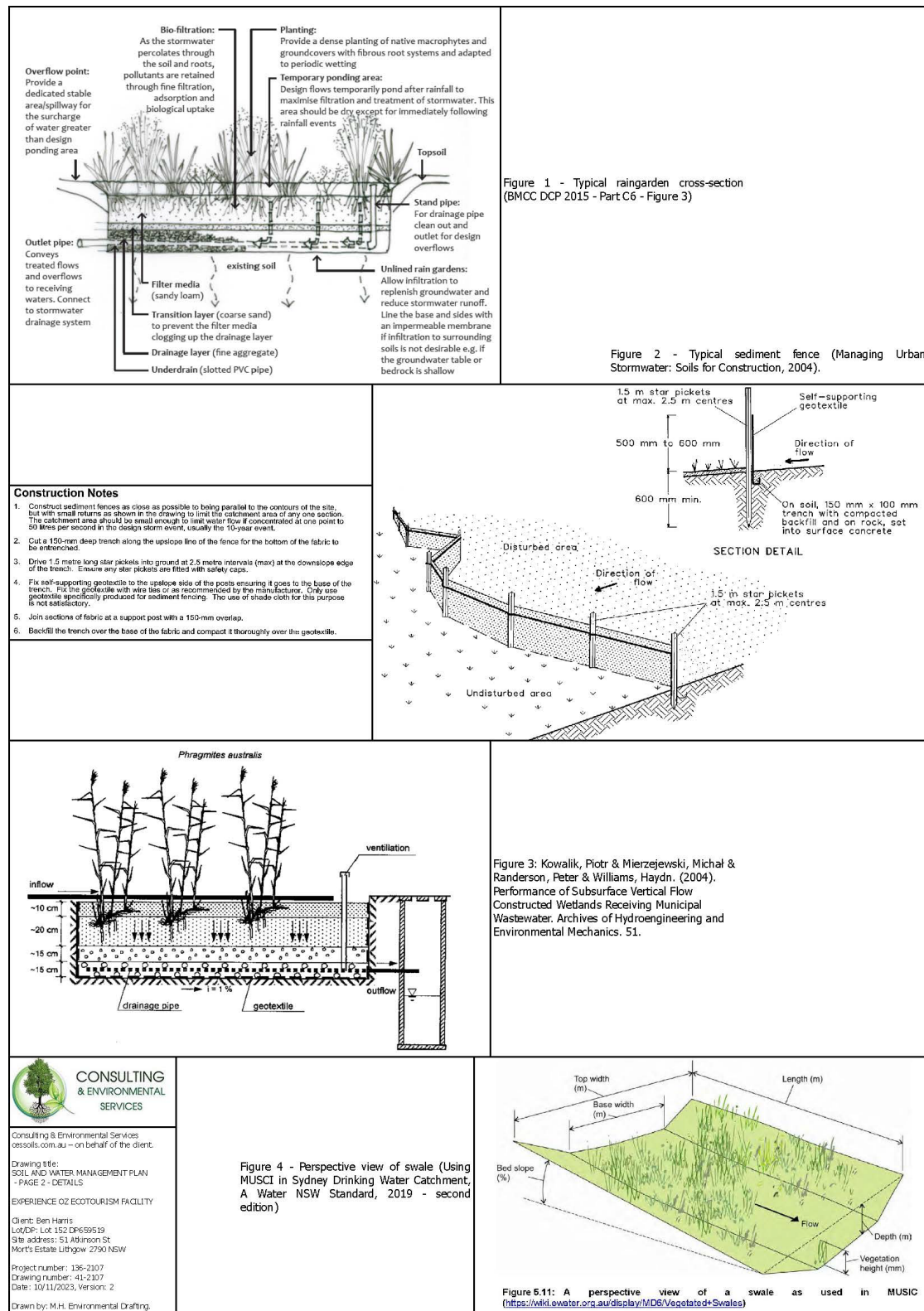


Figure 7-3 Soil and water management plan – Page 2 – Details



7-5 Summary Conclusions of the Water Cycle Management Study

Drinking Water Supply

Our proposal is consistent with the water reuse policy for stormwater as recommended by the State Environmental Planning Policy (Sustainable Buildings) 2022 (NSW Government, 2022). We confirm that rainfall capture will supplement the total drinking water requirement for the facility by 30 %. In this proposal, we have further reduced the municipal (drinking) water requirement by 15.8 % by recycling grey water for landscaping and toilets in the manager's residence.

The remaining municipal water requirement (5,352 L) can be supplemented with rainwater when the two-bedroom cabins are installed and connected to the tanks.

Modelling for Stormwater

The water cycle study is submitted with MUSIC Version 5b as the working model for the stormwater treatments proposed in the original project design. The flow modelling indicates that, based on the proposal presented, this proposal will reduce flow by 26 %.

Wastewater

When all cabins are installed, the total outflow from the facility to the sewer is 6,780 L/day at full capacity. A holding tank of 5,000 litres is specified for dose loading.

Landscape Amenity

The proposal has a disturbance impact of 6,403 sqm. The remaining 6,749 sqm will be managed as revegetated land for bushfire asset protection and 7,027 sqm for riparian creek frontage.

Of the total 20,170 sqm of the site (Lot 152), the pervious area is 16,442 sqm, and the impervious is 3,737 sqm. Thus, the impervious percentage that is the development footprint is 18.5%.

Neutral or Beneficial Effect Rationalising for Water Quality Objectives

A neutral or beneficial effect is modelled for this proposal. This result demonstrates, by using default C*values for background concentrations, that the proposed treatment trains will be effective for each of the six catchments and the total site resulting from the proposed site design ([Fig 7-1](#)).



8 Conclusion & Recommendations

This report summarised the proposed earthworks to place 12 cabins, a common room, a check-in office, and a manager's residence as part of an ecotourism facility onto Lot 152 in DP659519. It has detailed the process used to design the earthworks. It describes the locations of all soil, erosion, and sediment controls that prevent any soil or water from being contaminated and any sediment from entering waterways. It also refers to the Water Cycle Management Study and the MUSIC model, which describes how neutral or beneficial effects on water quality are satisfied. The report shows that the proposal has considered all aspects relevant to water and soil management and meets the Lithgow Development Control Plan 2021 requirements.

Highlights in this report are.

1. We seek approval to further re-shape the site using the reclamation materials.
2. Use standard methods for erosion control.
3. Use standard design details for stormwater management.
4. Utilise the sites nominated in stormwater implementation as the primary locations for site-specific interventions and management of sedimentation and post-construction erosion impacts.
5. The recommendation to use Geofabrics Australasia products.
 - a. For drainage Megflo®,
 - b. Geofabrics in subsurface applications are the non-woven Green Bidum® materials. Other woven materials degrade in water and become obsolete.
 - c. Soil and sediment retention Silt Fence 2000 (260 m).
6. The primary location for sediment control is to cover the downslope of the entire construction zone, materials for this purpose are Silt Fence 2000.
7. Follow recommendations in the Water Cycle Management Study.

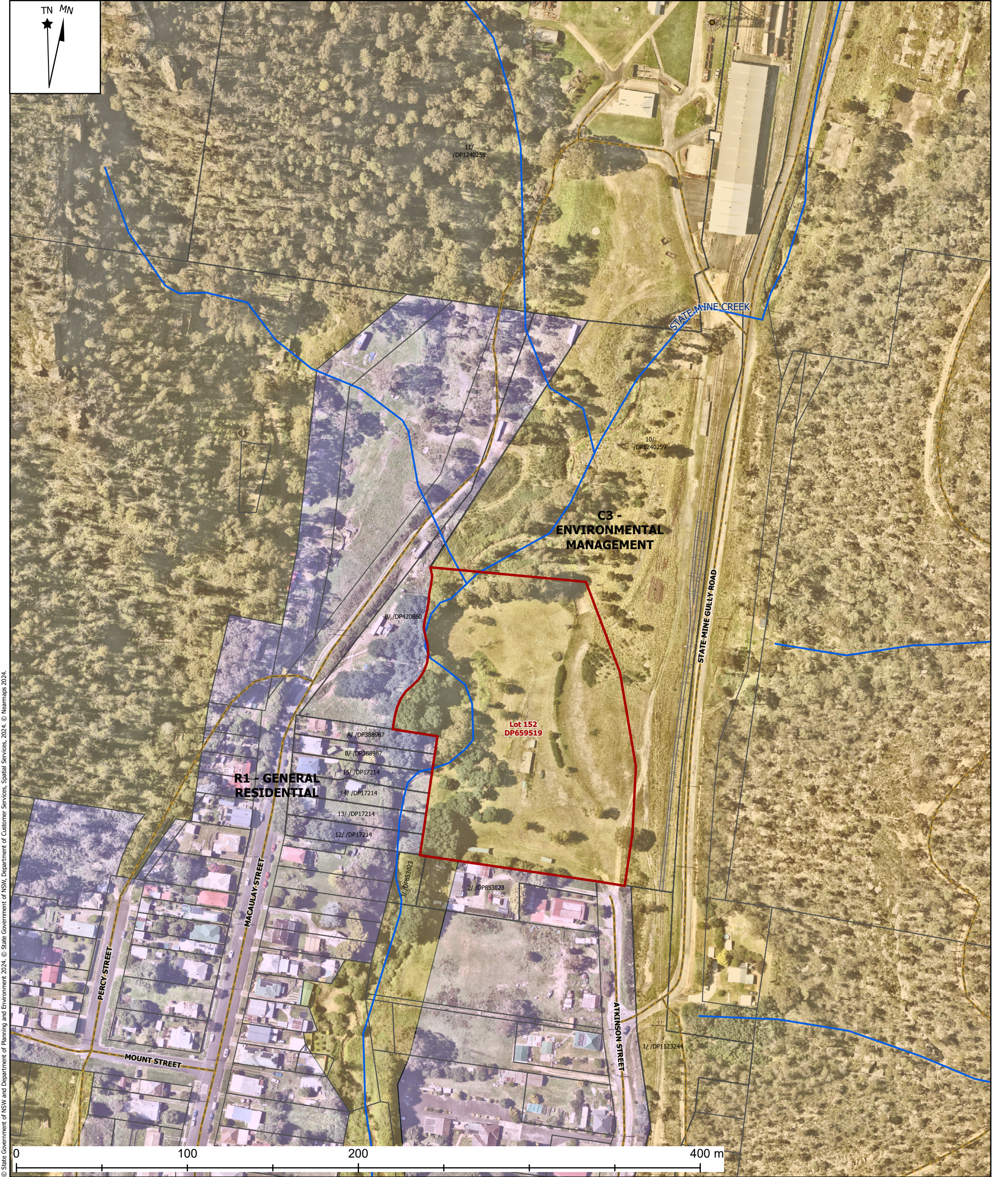


References

- Aiken, J. T., and Hoepfner, J. M. (2024). "Water Cycle Management Study for 51 Atkinson Street, Mort's Estate, Lithgow 2790 – Experience Oz Pty Ltd Ecotourist Facility." Consulting & Environmental Services Lithgow NSW 2790.
- CEH Survey Pty Ltd (2024). Concept Road Design Detail - Atkinson Street - Location and Detail Plan, No. 51 Atkinson Street, Morts Estate NSW 2790. (P. J. R. S. Grosfeld, ed.), pp. 4. CEH Survey, 'Astrolabe' 1 Rutherford Land Lithgow 2790.
- Consulting & Environmental Services (2023). "136-2107 Preliminary Site Investigation for 51 Atkinson Street Lithgow NSW 2790, Development Application to Lithgow City Council Lot 152, DP 659519." Consulting & Environmental Services, Suite 1, 52 Eskbank Street, Lithgow NSW 2790.
- Consulting & Environmental Services (2024a). "136-2107 – Flood Impact Assessment Report for the Experience OZ Ecotourist Facility at 51 Atkinson Street Mort's Estate 2790_V01." Consulting & Environmental Services, Lithgow NSW 2790.
- Consulting & Environmental Services (2024b). "Statement of Environmental Effects Experience OZ Ecotourist Facility Lot 152, DP: 659519 No. 51 Atkinson Street Morts Estate NSW 2790." Consulting & Environmental Services, Suite 1/52 Eskbank Street Lithgow NSW 2790.
- Department of Planning & Environment (2022). Controlled activities – Guidelines for riparian corridors on waterfront land. . (S. o. N. S. W. t. D. o. P. a. Environment, ed.).
- Esri Australia (2023). ArcGIS Pro Version 3.3. Esri Australia Pty Ltd, Brisbane, Australia.
- Hammill, K. (2023). "Vegetation Management Plan for proposed ecotourism development at 51 Atkinson Street Morts Estate Lithgow, Lot 152/-/DP659519." KHS Ecology & Bushfire Pty Ltd.
- Lithgow City Council (2021). Lithgow Development Control Plan 2021. <https://council.lithgow.com/development/development-control-plans/>, Lithgow, NSW.
- NSW Government (2022). State Environmental Planning Policy (Sustainable Buildings) 2022. NSW legislation.



Appendix A – All Site Plans Depicted as Figures



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Legend

- Lot 152 /-/ DP659519 (2.085 ha; Land zoning: C3 - Environmental Management)
- Lot
- Road
- Railway tracks
- Watercourse

Scale at A3: 1:2,000 Magnetic North:12.28°E Name: GDA2020 MGA Zone 56

Consulting & Environmental Services
cessoils.com.au – on behalf of the client.

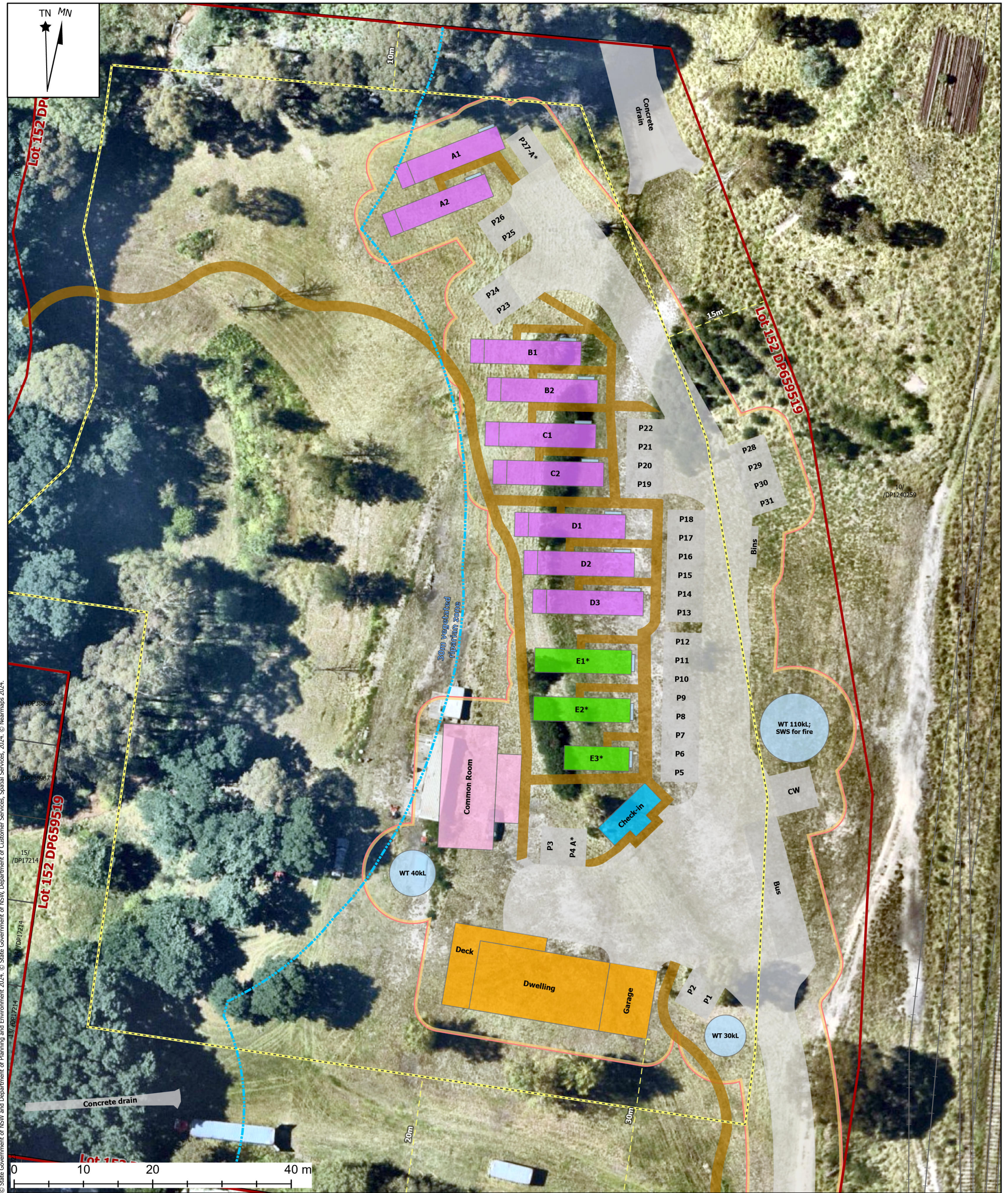
This design plan proposed must be verified accurately when used for construction purposes.

Drawing title: Location Plan for Flood Impact Assessment
EXPERIENCE OZ ECOTOURISM FACILITY

Lot 152, DP 659519
Client: Ben Harris
Site address: 51 Atkinson Street Mort's Estate Lithgow 2790 NSW

Project number: 136-2107
Drawing number: 41-2107

Drawn by: M.H. Environmental Drafting. Date:20/03/2024 11:40 AM



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Legend

- Lot 152 /- DP659519 (2.085 ha; Land zoning: C3 - Environmental Management)
- Lot
- Railway tracks
- Setbacks (DCP 2022 Cl. 6.3.1)
- Construction Zone (6,989sqm)
- Driveway
- Walkways
- Water tank
- Cabins A1&2, B1&2, C1&2 and D1-3
- Cabins E1-3 (*One-Bedroom)
- Manager's residence
- Check-in office
- Common room / bushfire refuge
- Car spaces P1-31
- Edge of vegetated riparian zone (VRZ) (30m from top of bank)

Scale at A3: 1:500 Magnetic North:12.28°E Name: GDA2020 MGA Zone 56

Consulting & Environmental Services
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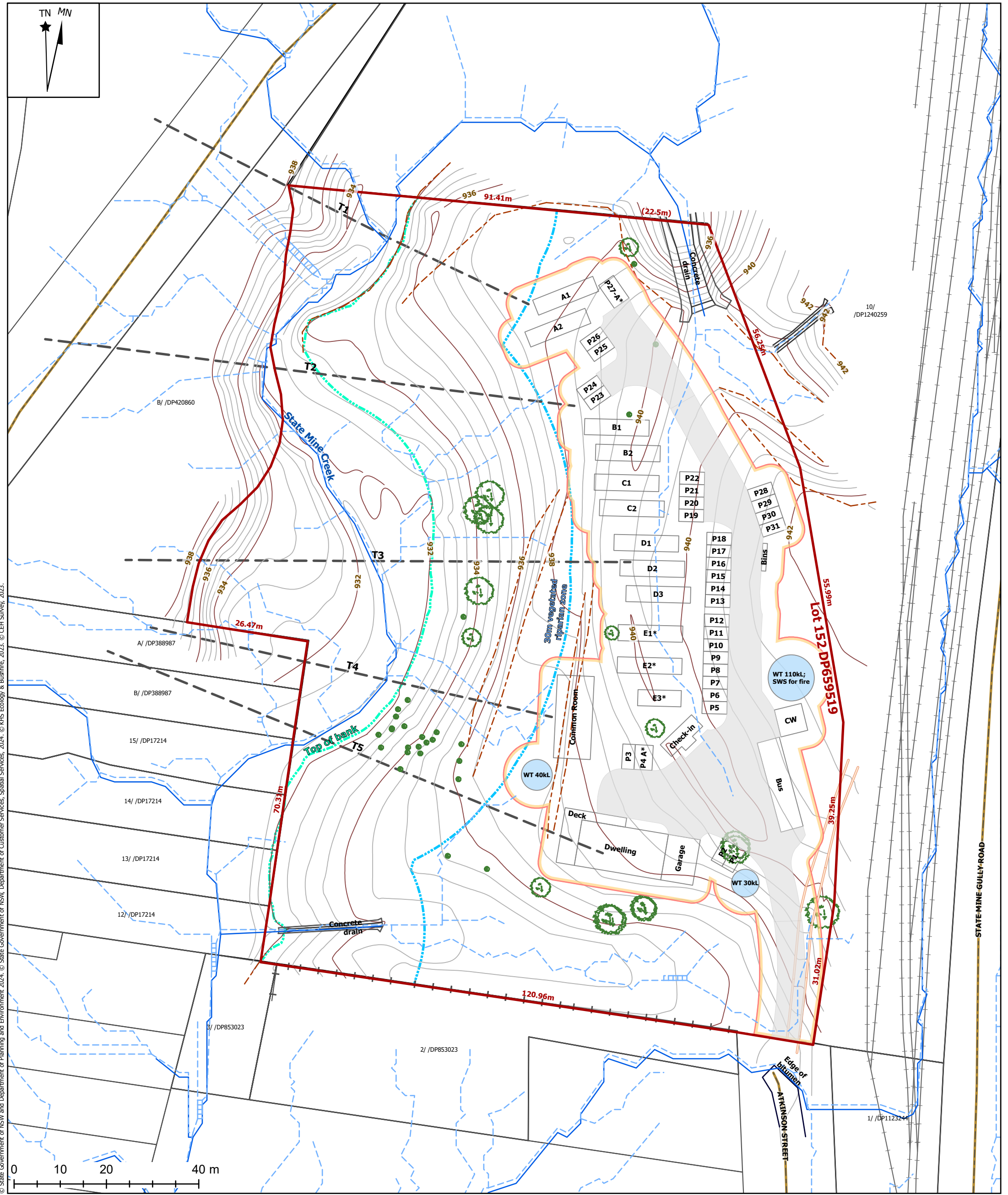
This design plan proposed must be verified accurately when used for construction purposes.

Drawing title: Project Proposal Concept Plan
EXPERIENCE OZ ECOTOURISM FACILITY

Lot 152, DP 659519
Client: Ben Harris
Site address: 51 Atkinson Street Mort's Estate Lithgow 2790 NSW

Project number: 136-2107
Drawing number: 41-2107

Drawn by: M.H. Environmental Drafting. Date: 14/05/2024



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Scale at A3: 1:750 Magnetic North:12.29°E Name: GDA2020 MGA Zone 56

Legend

- Lot 152 /- DP659519 (2.085 ha; Land zoning: C3 - Environmental Management)
- Construction Zone (6,989sqm)
- Driveway
- Proposed buildings and carparks
- Water tank
- Cross-sections for topographic site analysis (T1-5)
- Top of bank
- Edge of vegetated riparian zone (VRZ) (30m from top of bank)
- Watercourse and drainage lines (modelled)
- Modelled drainage lines (catchment)

Consulting & Environmental Services
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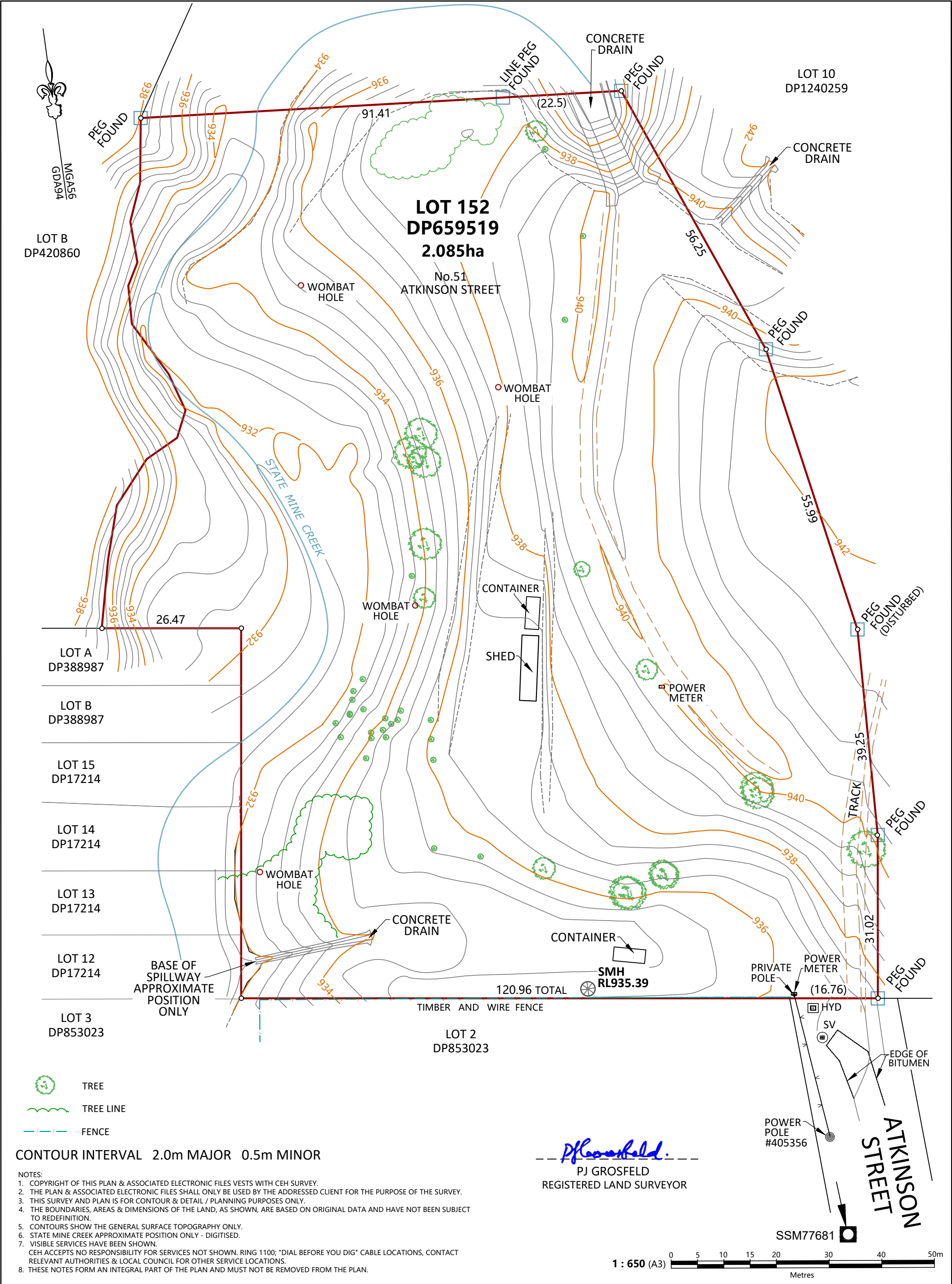
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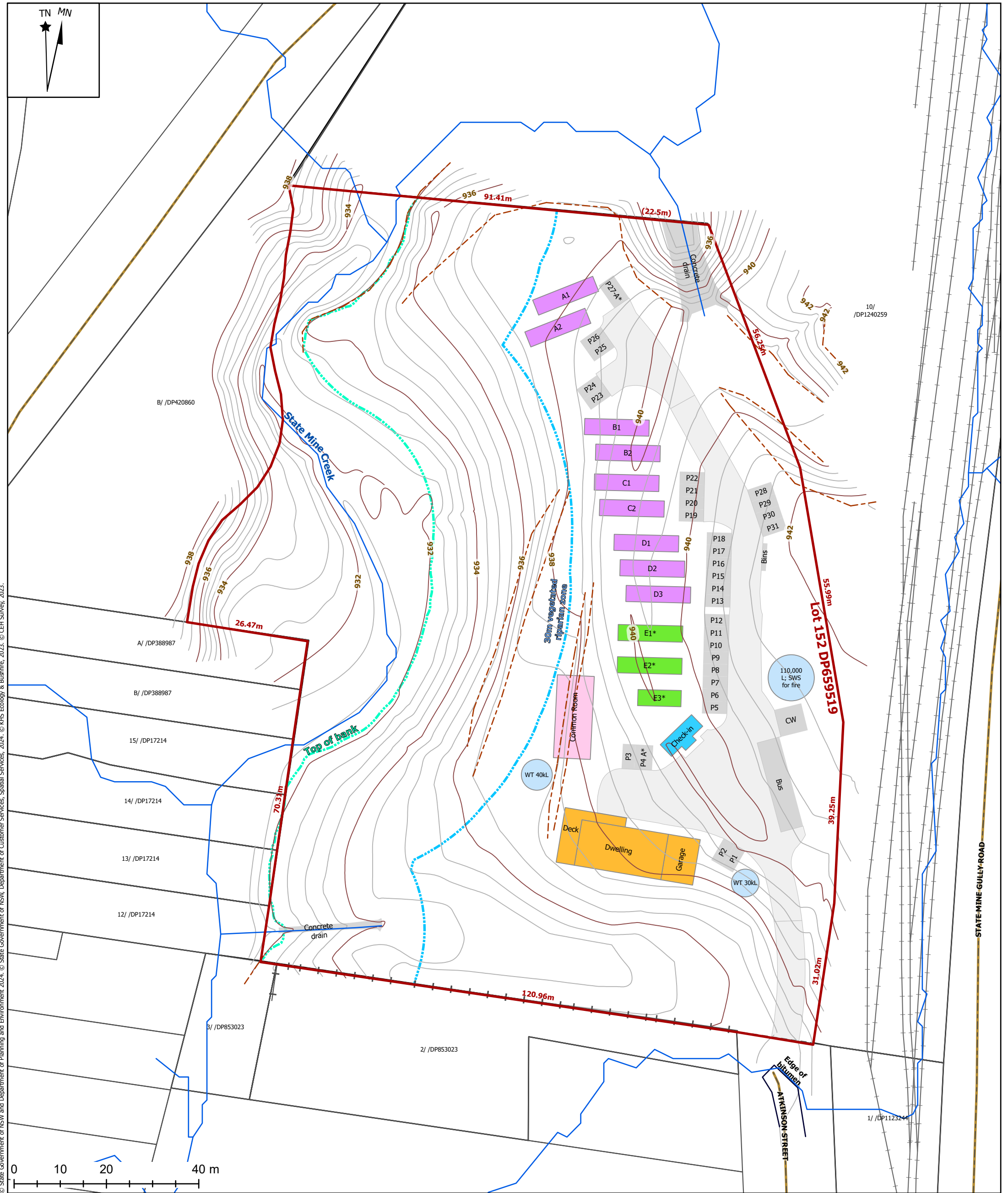
Landform and Drainage (Pre-Development)
EXPERIENCE OZ ECOTOURISM FACILITY

Lot 152, DP 659519
Client: Ben Harris
Site address: 51 Atkinson Street Mort's Estate Lithgow 2790 NSW

Project number: 136-2107
Drawing number: 41-2107

Drawn by: M.H. Environmental Drafting. Date:5/06/2024 1:19 PM





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Legend

- Lot 152 +/- DP659519 (2.085 ha; Land zoning: C3 - Environmental Management)
- Watercourse and drainage lines (modelled)
- Driveway
- Water tank
- Top of bank
- Edge of vegetated riparian zone (VRZ) (30m from top of bank)
- Bank
- Contour 2m
- Contour 0.5m

Buildings

- Cabins A1&2, B1&2, C1&2 and D1-3
- Cabins E1-3 (*One-Bedroom)
- Manager's residence
- Check-in office
- Common room / bushfire refuge
- Car spaces P1-31

Consulting & Environmental Services
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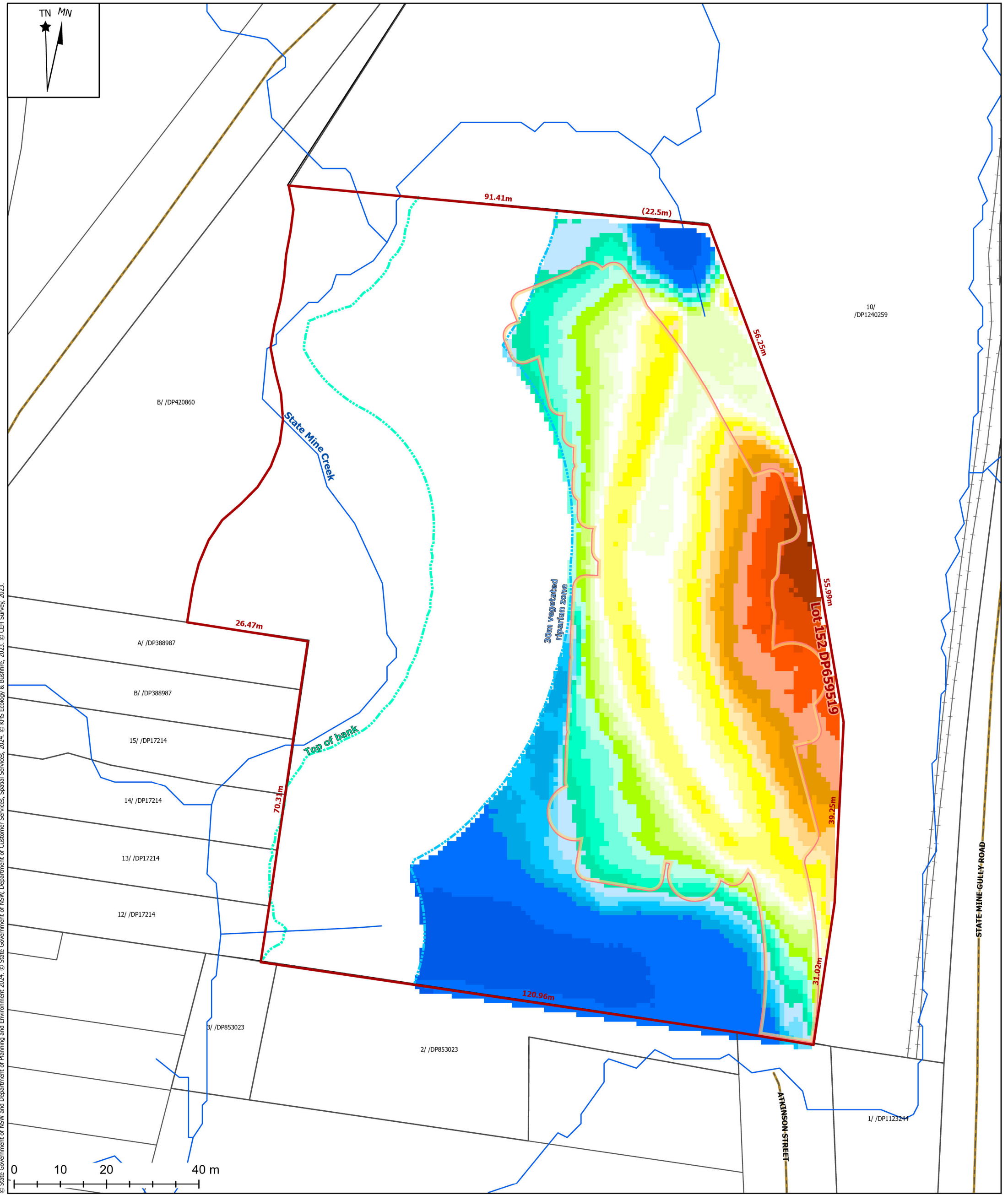
This design plan proposed must be verified accurately when used for construction purposes.

Proposed development on existing contours
EXPERIENCE OZ ECOTOURISM FACILITY

Lot 152, DP 659519
Client: Ben Harris
Site address: 51 Atkinson Street Mort's Estate Lithgow 2790 NSW

Project number: 136-2107
Drawing number: 41-2107

Drawn by: M.H. Environmental Drafting. Date: 5/06/2024 1:46 PM



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Legend

- Lot 152 /- DP659519 (2.085 ha; Land zoning: C3 - Environmental Management)
- Watercourse and drainage lines (modelled)
- Lot
- Road
- +— Railway tracks
- Construction zone (6,403 sqm)
- - - Top of bank
- - - Edge of vegetated riparian zone (VRZ) (30m from top of bank)

- Pre-Development Levels
- 934.569 - 935.454
 - 935.455 - 937
 - 937.001 - 937.25
 - 937.251 - 937.5
 - 937.501 - 937.75
 - 937.751 - 938
 - 938.001 - 938.25
 - 938.251 - 938.5
 - 938.501 - 938.75

- 938.751 - 939
- 939.001 - 939.25
- 939.251 - 939.5
- 939.501 - 939.75
- 939.751 - 939.9
- 939.901 - 940.1
- 940.101 - 940.25
- 940.251 - 940.5
- 940.501 - 940.75
- 940.751 - 941

- 941.001 - 941.25
- 941.251 - 941.5
- 941.501 - 941.75
- 941.751 - 942
- 942.001 - 942.25
- 942.251 - 942.5
- 942.501 - 942.75
- 942.751 - 943

Scale at A3: 1:750 Magnetic North:12.28°E Name: GDA2020 MGA Zone 56

Consulting & Environmental Services
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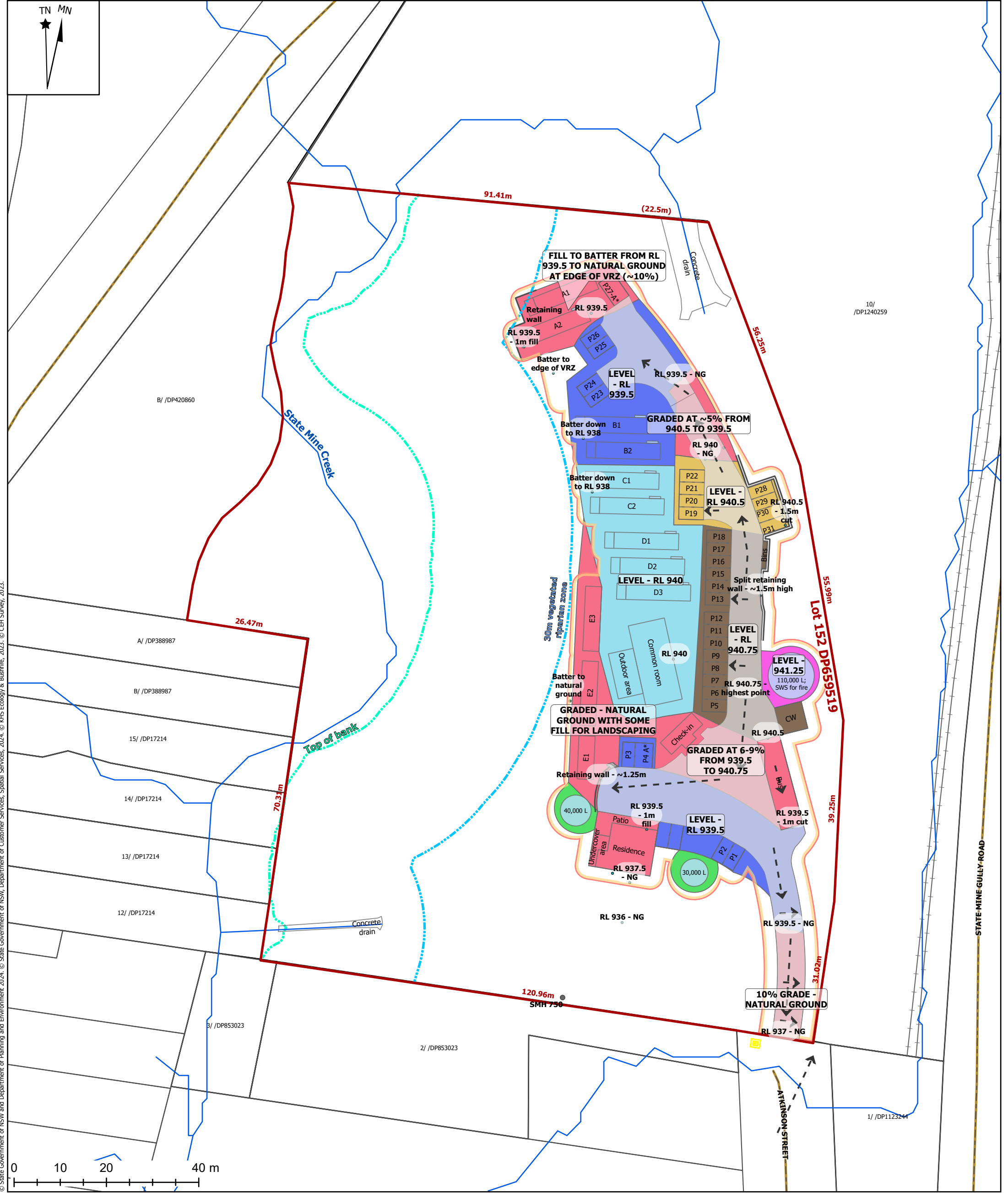
This design plan proposed must be verified accurately when used for construction purposes.

Earthworks: Pre-Development Levels
EXPERIENCE OZ ECOTOURISM FACILITY

Lot 152, DP 659519
Client: Ben Harris
Site address: 51 Atkinson Street Mort's Estate Lithgow 2790 NSW

Project number: 136-2107
Drawing number: 41-2107

Drawn by: M.H. Environmental Drafting. Date:9/04/2024 2:39 PM



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Legend

- Lot 152 /- DP659519 (2.085 ha; Land zoning: C3 - Environmental Management)
- Watercourse and drainage lines (modelled)
- Lot
- Road
- Railway tracks
- Construction zone (6,403 sqm)
- Proposed buildings and car spaces
- Driveway
- Water tank
- Top of bank
- Edge of vegetated riparian zone (VRZ) (30m from top of bank)

- Design finish levels
- Graded
 - Level 938.5
 - Level 939.5
 - Level 940
 - Level 940.5
 - Level 940.75
 - Level 941.25
 - Direction of slope/drainage

Scale at A3: 1:750 Magnetic North:12.28°E Name: GDA2020 MGA Zone 56

Consulting & Environmental Services
cessoils.com.au – on behalf of the client.

This design plan proposed must be verified accurately when used for construction purposes.

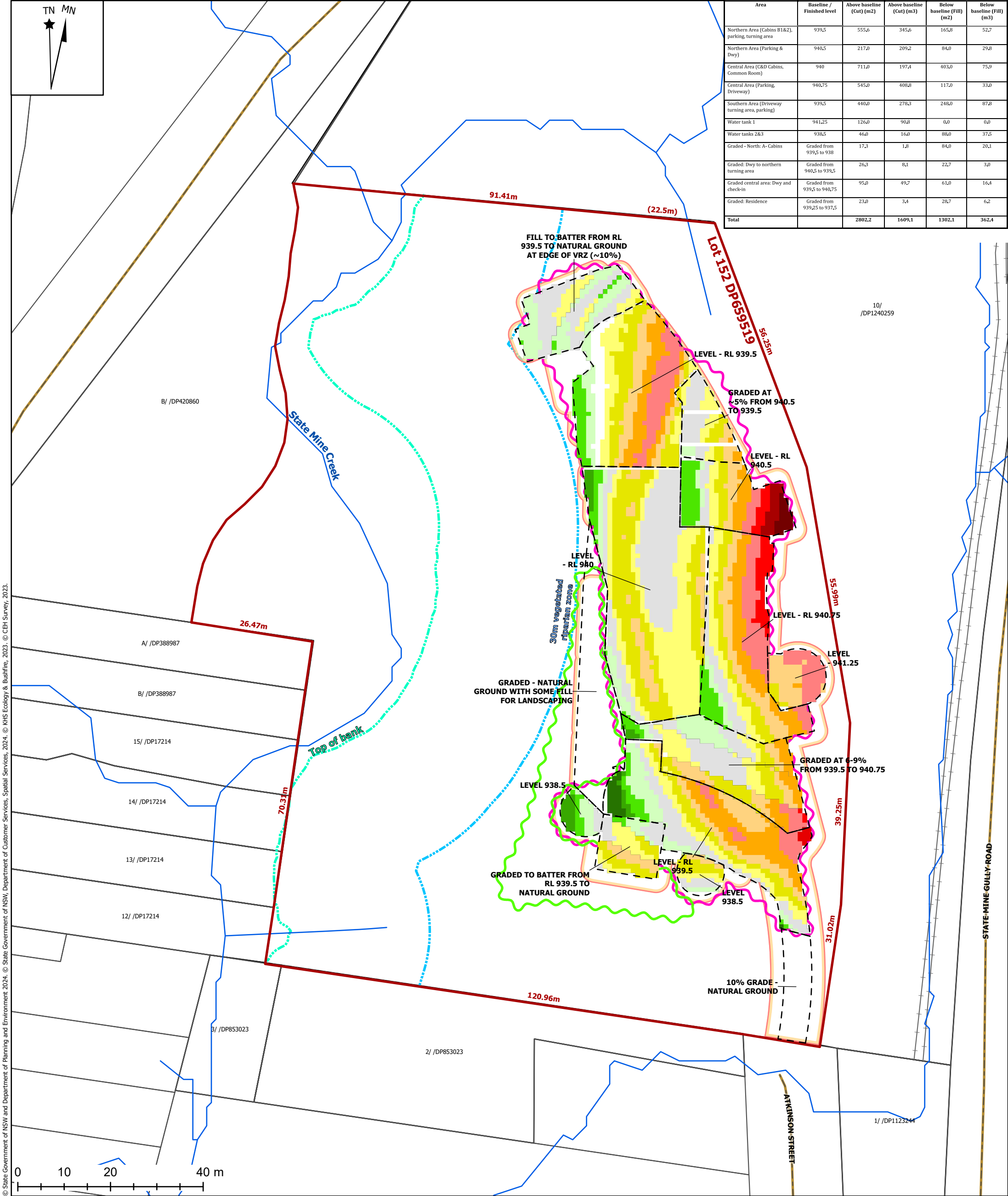
Earthworks: Conceptual Design Finish Levels
EXPERIENCE OZ ECOTOURISM FACILITY

Lot 152, DP 659519
Client: Ben Harris
Site address: 51 Atkinson Street Mort's Estate Lithgow 2790 NSW

Project number: 136-2107
Drawing number: 41-2107

Drawn by: M.H. Environmental Drafting. Date:6/03/2024 12:03 PM

Area	Baseline / Finished level	Above baseline (Cut) (m2)	Above baseline (Cut) (m3)	Below baseline (Fill) (m2)	Below baseline (Fill) (m3)
Northern Area (Cabins B1&2), parking, turning area	939.5	555.6	345.6	165.8	52.7
Northern Area (Parking & Dwy)	940.5	217.0	209.2	84.0	29.8
Central Area (C&D Cabins, Common Room)	940	711.0	197.4	403.0	75.9
Central Area (Parking, Driveway)	940.75	545.0	408.8	117.0	33.0
Southern Area (Driveway turning area, parking)	939.5	440.0	278.3	248.0	87.8
Water tank 1	941.25	126.0	90.8	0.0	0.0
Water tanks 2&3	938.5	46.0	16.0	88.0	37.5
Graded - North: A- Cabins	Graded from 939.5 to 938	17.3	1.8	84.0	20.1
Graded: Dwy to northern turning area	Graded from 940.5 to 939.5	26.3	8.1	22.7	3.0
Graded central area: Dwy and check-in	Graded from 939.5 to 940.75	95.0	49.7	61.0	16.4
Graded: Residence	Graded from 939.25 to 937.5	23.0	3.4	28.7	6.2
Total		2802.2	1609.1	1302.1	362.4



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Legend

- Lot 152 /-/ DP659519 (2.085 ha; Land zoning: C3 - Environmental Management)
- Lot
- Road
- Railway tracks
- Construction zone (6,403 sqm)

- Top of bank
- Edge of vegetated riparian zone (VRZ) (30m from top of bank)
- Approximate extent of earthworks
- Landscaping
- Earthworks
- Design finish levels

- Conceptual cut and fill
- Fill 0.75-1m
- Fill 0.5-0.75m
- Fill 0.25-0.5m
- Fill<0.25m

- Cut <0.25m
- Cut 0.25-0.5m
- Cut 0.5-0.75m
- Cut 0.75-1m
- Cut 1-1.25m
- Cut 1.25-1.5m
- Cut 1.5-1.75m
- Cut 1.75-2m

Consulting & Environmental Services
cessoils.com.au – on behalf of the client.

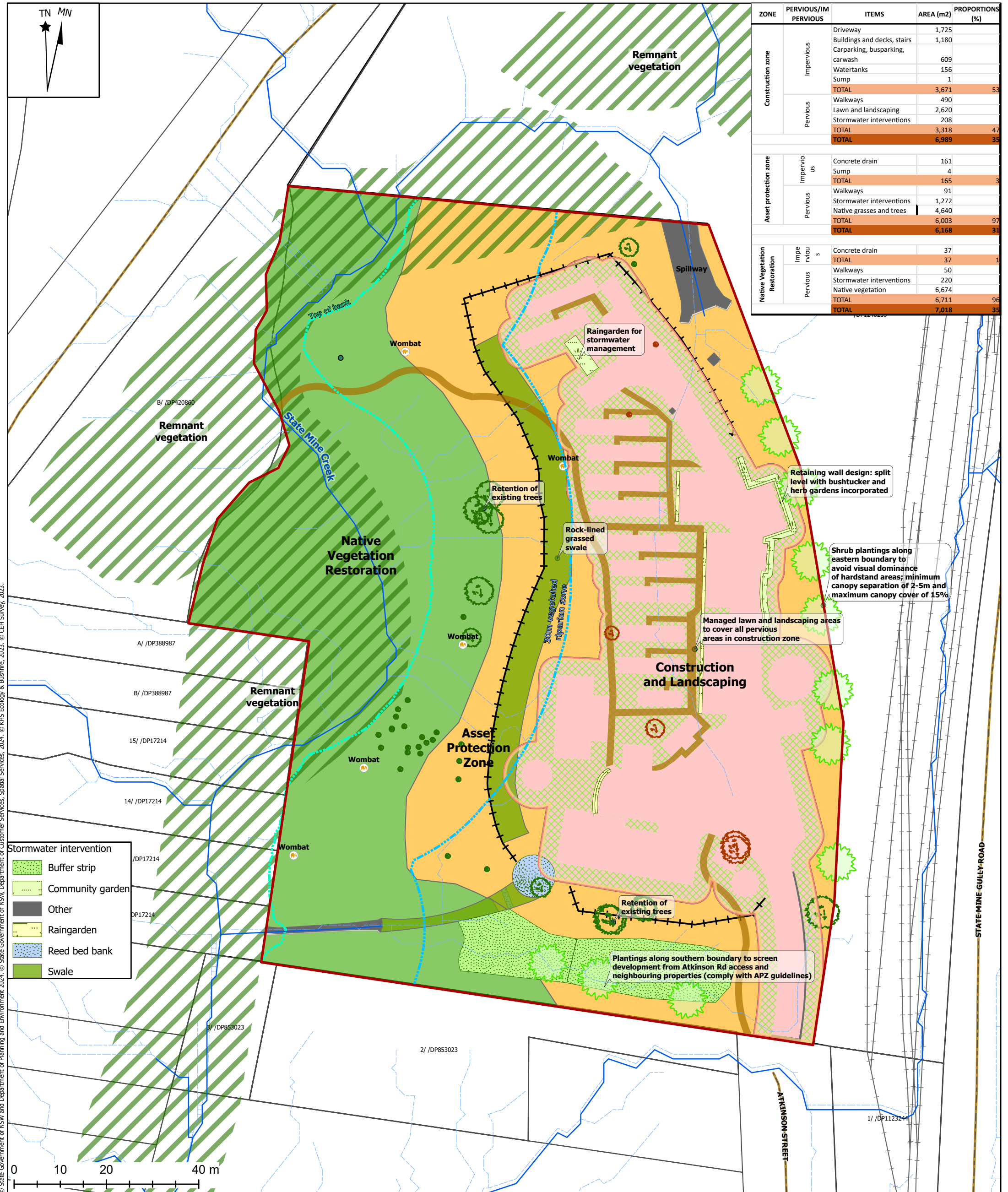
This design plan proposed must be verified accurately when used for construction purposes.

Earthworks: Conceptual Cut and Fill EXPERIENCE OZ ECOTOURISM FACILITY

Lot 152, DP 659519
Client: Ben Harris
Site address: 51 Atkinson Street Mort's Estate Lithgow 2790 NSW

Project number: 136-2107
Drawing number: 41-2107

Drawn by: M.H. Environmental Drafting. Date:20/03/2024 9:48 AM



ZONE	PERVIOUS/IM PERVIOUS	ITEMS	AREA (m2)	PROPORTIONS (%)
Construction zone	Impervious	Driveway	1,725	
		Buildings and decks, stairs	1,180	
		Carparking, busparking, carwash	609	
		Watertanks	156	
		Sump	1	
		TOTAL	3,671	53
	Pervious	Walkways	490	
		Lawn and landscaping	2,620	
		Stormwater interventions	208	
		TOTAL	3,318	47
TOTAL		6,989	35	
Asset protection zone	Impervious	Concrete drain	161	
		Sump	4	
		TOTAL	165	3
	Pervious	Walkways	91	
		Stormwater interventions	1,272	
		Native grasses and trees	4,640	
		TOTAL	6,003	97
		TOTAL	6,168	31
Native Vegetation Restoration	Impervious	Concrete drain	37	
		TOTAL	37	1
	Pervious	Walkways	50	
		Stormwater interventions	220	
		Native vegetation	6,674	
		TOTAL	6,711	96
		TOTAL	7,018	33

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Legend

Lot 152 /- DP659519 (2.085 ha; Land zoning: C3 - Environmental Management)

Lot

Road

Watercourse and drainage lines (modelled)

Railway tracks

Vegetation Management Zones (KHS)

Construction and Landscaping: 6,403 sqm

Asset Protection Zone: 6,749 sqm

Native Vegetation Restoration: 7,027 sqm

Managed Lawn and Landscaping within Construction Zone

Sediment fence

Proposed plantings

Existing trees

To be retained

To be removed

Top of bank

Edge of vegetated riparian zone (VRZ) (30m from top of bank)

Vegetation (KHS Ecology & Bushfire)

Remnant vegetation

Scale at A3: 1:750 Magnetic North:12.29°E Name: GDA2020 MGA Zone 56

Consulting & Environmental Services
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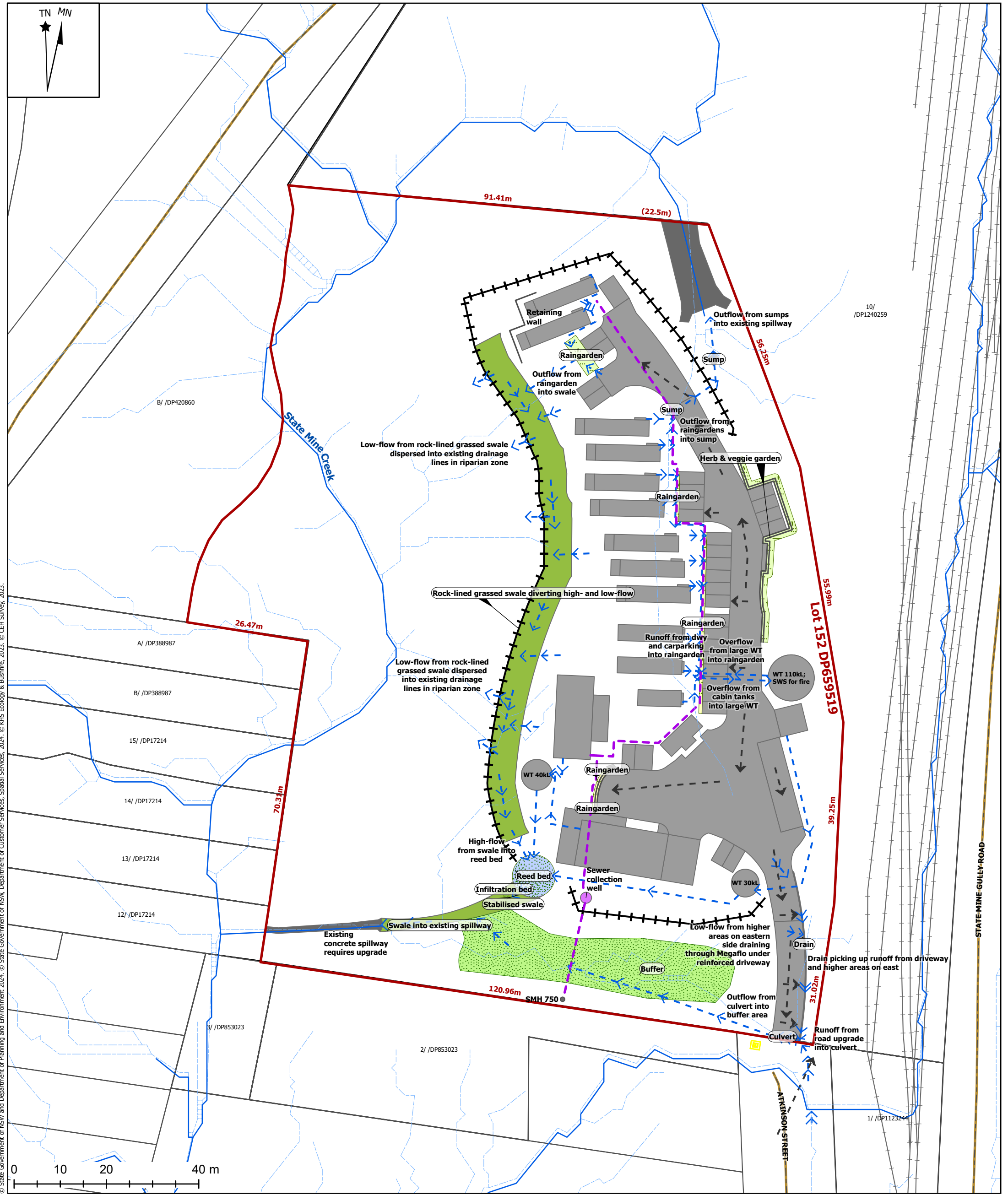
This design plan proposed must be verified accurately when used for construction purposes.

Concept Landscaping Plan
EXPERIENCE OZ ECOTOURISM FACILITY

Lot 152, DP 659519
Client: Ben Harris
Site address: 51 Atkinson Street Mort's Estate Lithgow 2790 NSW

Project number: 136-2107
Drawing number: 41-2107

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- Legend**

 - Lot 152 /- DP659519 (2.085 ha; Land zoning: C3 - Environmental Management)
 - Lot
 - Road
 - Railway tracks
 - Watercourse and drainage lines (modelled)
 - Drainage lines
 - Impervious surfaces
- Direction of grade
 - Sewer line
 - Stormwater lines
 - Sediment fence (260m)

- Stormwater interventions**
- Buffer strip
 - Community garden
 - Other
 - Raingarden
 - Reed bed bank
 - Swale
 - Water tank

Consulting & Environmental Services
cessoils.com.au – on behalf of the client.

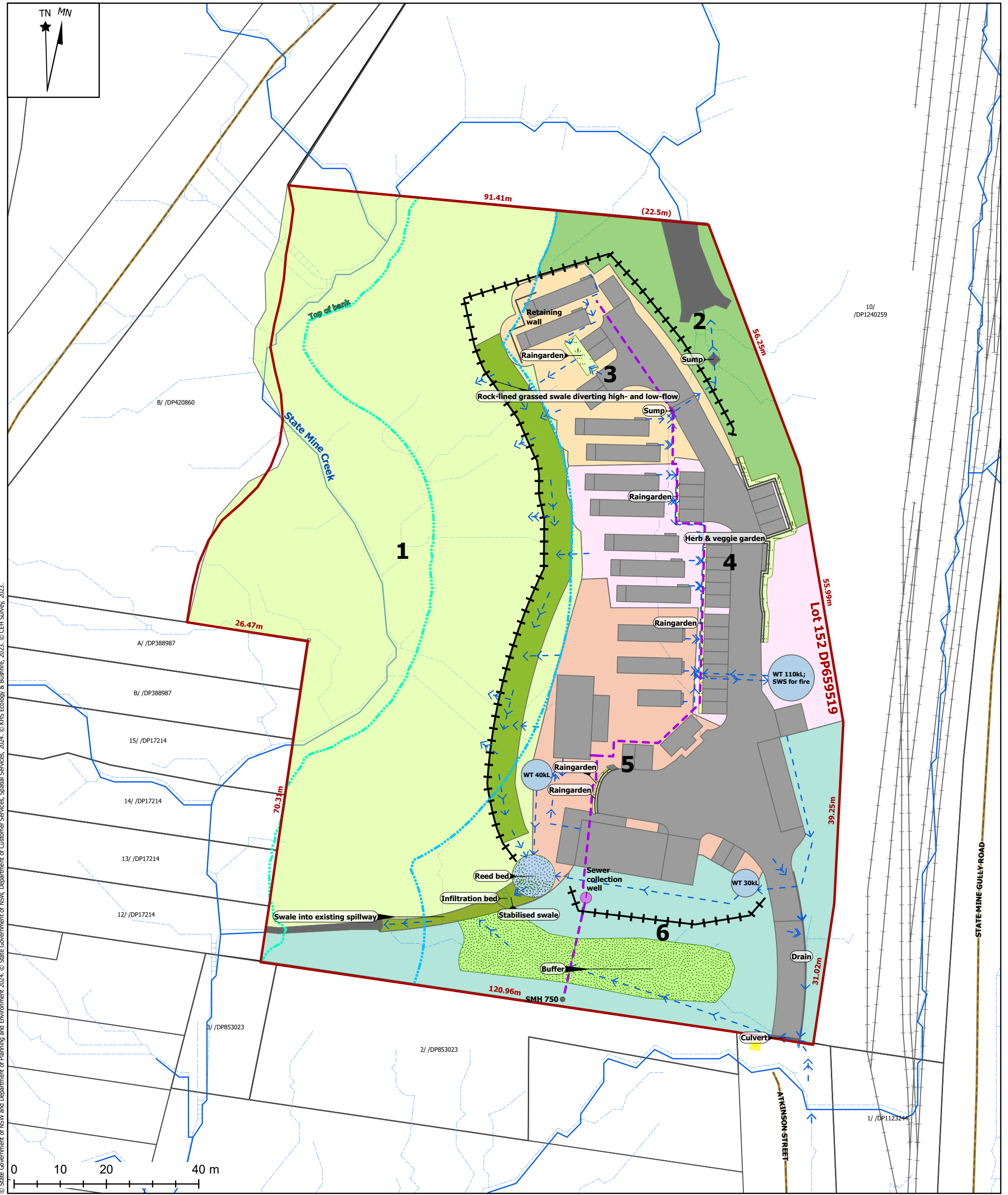
This design plan proposed must be verified accurately when used for construction purposes.

Water and Soil Management Plan
EXPERIENCE OZ ECOTOURISM FACILITY

Lot 152, DP 659519
Client: Ben Harris
Site address: 51 Atkinson Street Mort's Estate Lithgow 2790 NSW

Project number: 136-2107
Drawing number: 41-2107

Drawn by: M.H. Environmental Drafting. Date: 5/06/2024 2:17 PM



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Legend

- Lot 152 /- DP659519 (2.085 ha; Land zoning: C3 - Environmental Management)
- Lot
- Road
- Railway tracks
- Watercourse and drainage lines (modelled)
- Drainage lines
- Impervious surfaces

- Water tank
- Top of bank
- Edge of vegetated riparian zone (VRZ) (30m from top of bank)
- Sewer line
- Stormwater lines
- Sediment fence (260m)

- Stormwater interventions
- Buffer strip
 - Community garden
 - Other
 - Raingarden
 - Reed bed bank
 - Swale

- MUSIC Catchments
- Catchment 1
 - Catchment 2
 - Catchment 3
 - Catchment 4
 - Catchment 5
 - Catchment 6

Consulting & Environmental Services
cessoils.com.au – on behalf of the client.

This design plan proposed must be verified accurately when used for construction purposes.

MUSIC Catchments
EXPERIENCE OZ ECOTOURISM FACILITY

Lot 152, DP 659519
Client: Ben Harris
Site address: 51 Atkinson Street Mort's Estate Lithgow 2790 NSW

Project number: 136-2107
Drawing number: 41-2107

Drawn by: M.H. Environmental Drafting. Date: 5/06/2024 2:42 PM

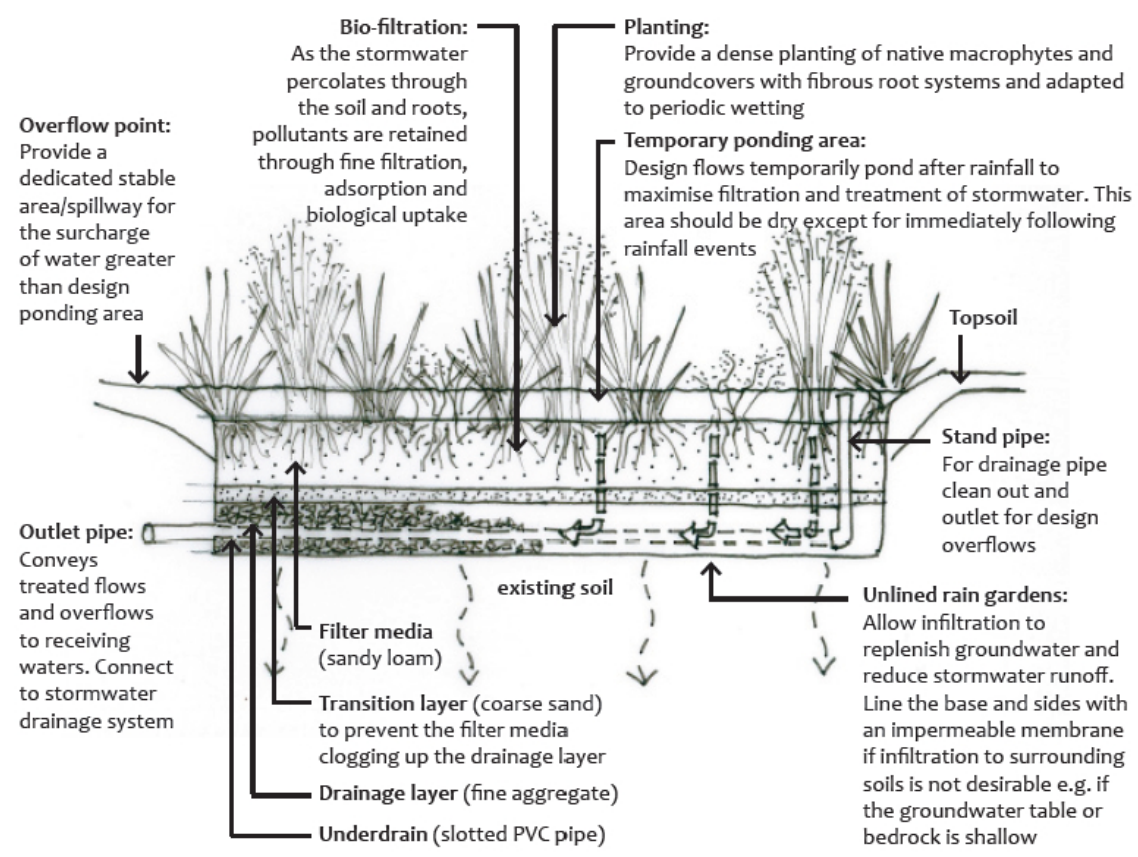


Figure 1 - Typical raingarden cross-section (BMCC DCP 2015 - Part C6 - Figure 3)

Figure 2 - Typical sediment fence (Managing Urban Stormwater: Soils for Construction, 2004).

Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

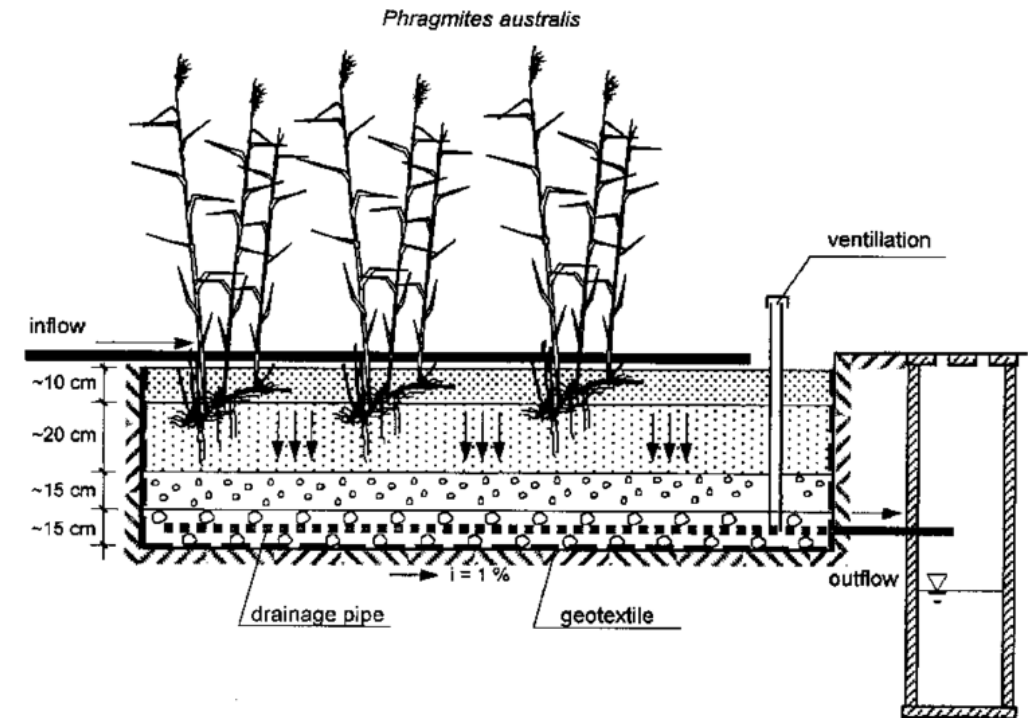
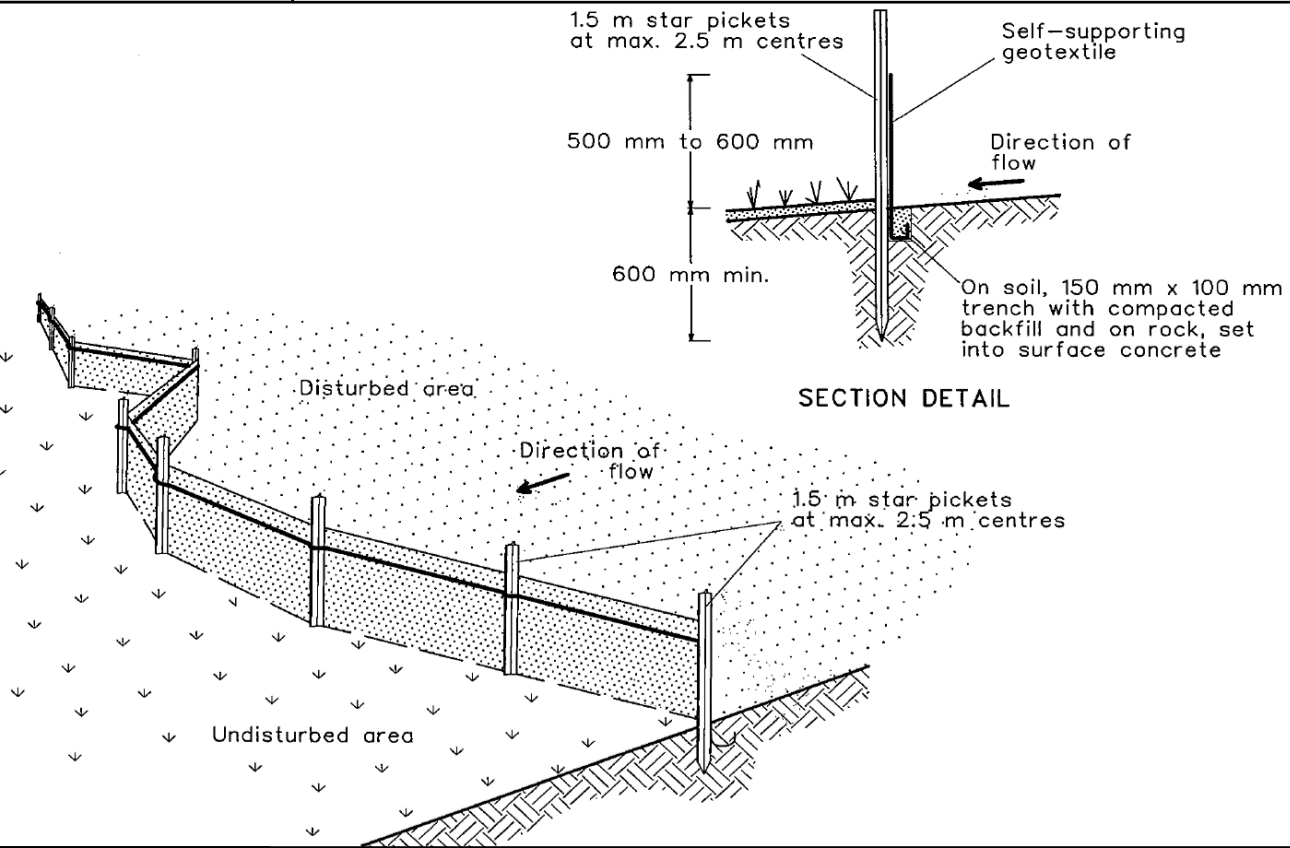


Figure 3: Kowalik, Piotr & Mierzejewski, Michał & Randerson, Peter & Williams, Haydn. (2004). Performance of Subsurface Vertical Flow Constructed Wetlands Receiving Municipal Wastewater. Archives of Hydroengineering and Environmental Mechanics. 51.



Consulting & Environmental Services
cessoils.com.au – on behalf of the client.

Drawing title:
SOIL AND WATER MANAGEMENT PLAN
- PAGE 2 - DETAILS

EXPERIENCE OZ ECOTOURISM FACILITY

Client: Ben Harris
Lot/DP: Lot 152 DP659519
Site address: 51 Atkinson St
Mort's Estate Lithgow 2790 NSW

Project number: 136-2107
Drawing number: 41-2107
Date: 10/11/2023, Version: 2

Drawn by: M.H. Environmental Drafting.

Figure 4 - Perspective view of swale (Using MUSCI in Sydney Drinking Water Catchment, A Water NSW Standard, 2019 - second edition)

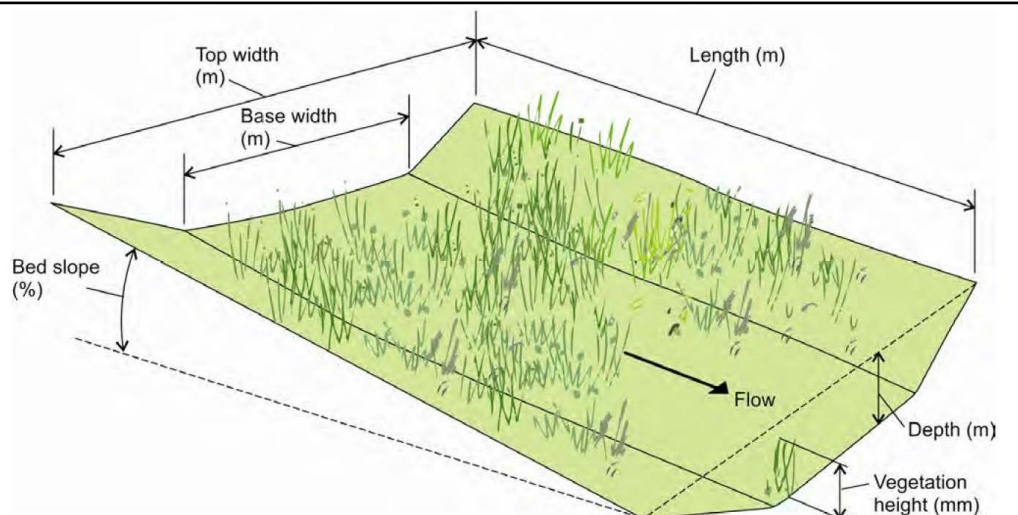


Figure 5.11: A perspective view of a swale as used in MUSIC (<https://wiki.ewater.org.au/display/MD6/Vegetated+Swales>)



Attachment 1 – Proprietary Products Siltfence 2000

Silt Fence 2000

High Strength Premium Composite Silt Fence



BENEFITS

- **SILT FENCE 2000** is a composite geotextile combining the benefits of **bidim**® non-woven, needlepunched, continuous filament geotextiles and a high-strength woven fabric.
- **SILT FENCE 2000** is an economical, easy to install silt fence which ensures the effectiveness of any sedimentation and erosion control plan.
- **SILT FENCE 2000** is manufactured to withstand the stresses caused by the build-up of sediment on the upstream face.
- **SILT FENCE 2000** is self supporting between posts due to its high structural rigidity.
- **SILT FENCE 2000** prevents undermining below the silt fence due to a unique non-woven geotextile flap forming an effective, highly permeable below ground filter.

COMPOSITION

Top 500mm composite of **bidim**® non-woven, needle punched, continuous filament geotextile and a high strength woven fabric. Base 300mm of **bidim**® non-woven, needlepunched continuous filament geotextile.

APPLICATIONS

SILT FENCE 2000 is installed:

- at the downstream boundary fence
- immediately downstream of erodible soils
- immediately upstream of grass buffer zones
- on contours for progressive filtering

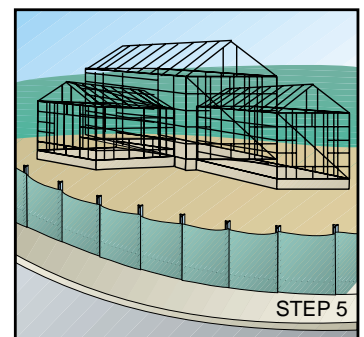
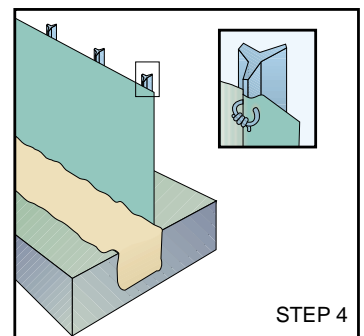
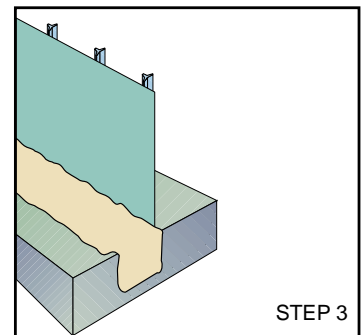
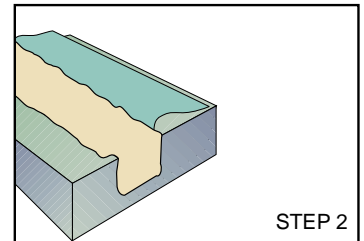
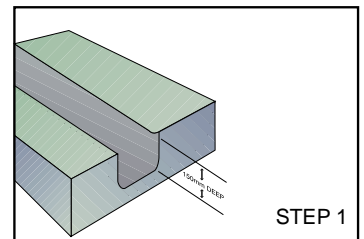
INSTALLATION

Step 1 excavate 150 mm deep trench on the upstream side of the silt fence.

Step 2 Bury the unique non-woven flap in trench and backfill with soil, compacting to ensure anchorage.

Step 3-4 Drive support posts into ground until sufficient resistance is achieved at maximum 3 metre centres. Position **SILT FENCE 2000** against support posts and tension. Attach with galvanised tie wire supplied.

Step 5 Regular inspection of **SILT FENCE 2000** (especially after rainfall) and the removal of excessive silt deposits assists the prevention of long-term soil erosion.



Properties	Test Method	Units	SF2000
Product Code			
Material	-	-	Woven/non-woven composite
Pore Size (EOS-O ₉₅)	AS3706.7	µm	110
Flow Rate Under 100mm Head	AS3706.9	l/m ² /s	145
Wide Strip Tensile Strength	AS3706.2	kN/m	17.2
Width	-	mm	800
Length	-	m	50

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