



# Geotechnical Investigation Report

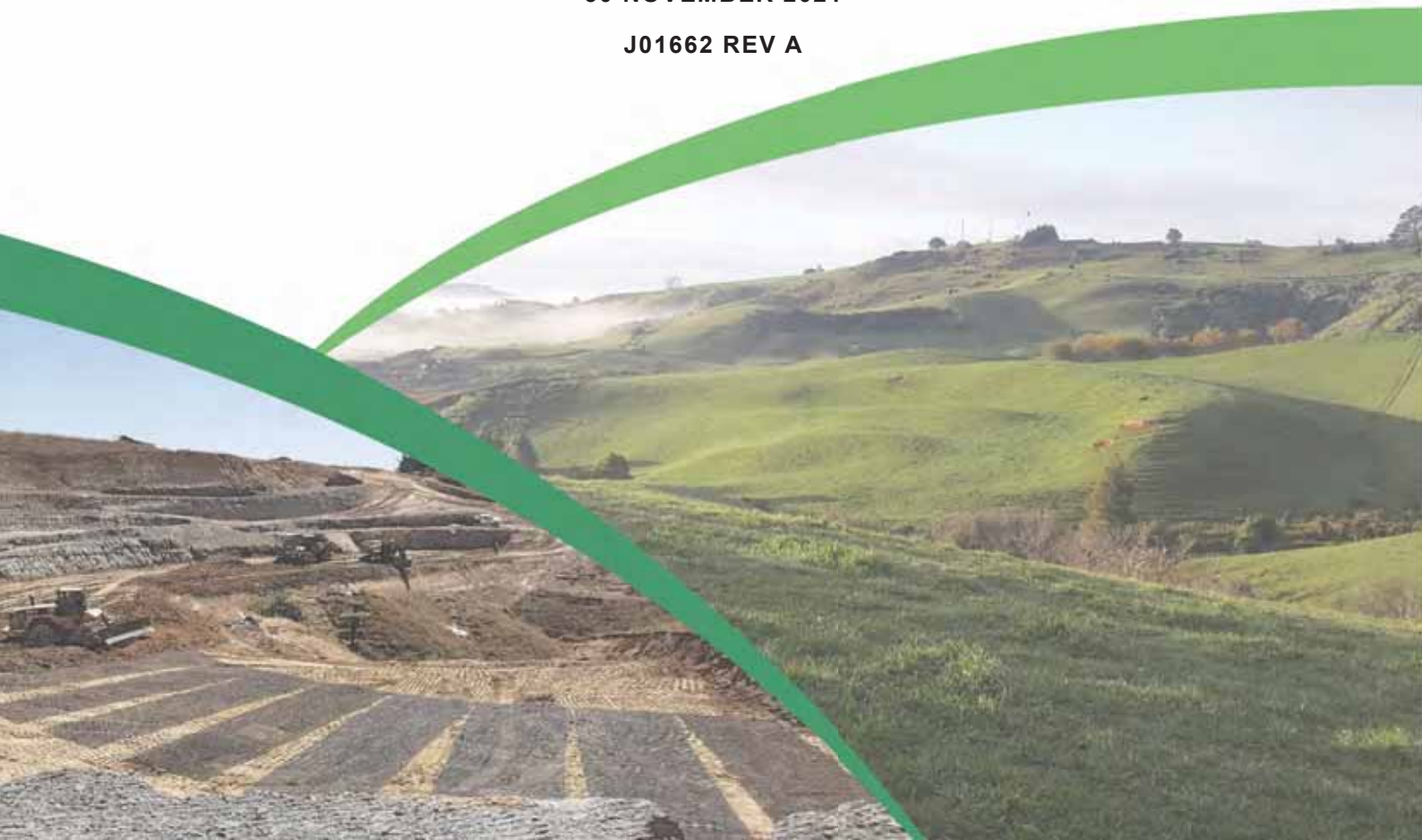
## MURIWAI DOWNS GOLF PROJECT

For

THE BEARS HOME PROJECT MANAGEMENT LIMITED

30 NOVEMBER 2021

J01662 REV A



## DOCUMENT CONTROL RECORD

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<b>Report Title</b>	Geotechnical Investigation for a Proposed Lodge Complex, Club House, and Maintenance Sheds at the Muriwai Downs Golf Project, Muriwai
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## 1 LIMITATIONS

This report has been prepared solely for the use of our client, The Bears Home Project Management Limited, its professional advisers and the relevant Territorial Authorities in relation to the specific project described herein. No liability is accepted in respect of its use for any other purpose or by any other person or entity. All future owners of this property should seek professional geotechnical advice to satisfy themselves as to its ongoing suitability for their intended use.

The opinions, recommendations and comments given in this report result from the application of normal methods of site investigation. As factual evidence has been obtained solely from boreholes trial pits which by their nature only provide information about a relatively small volume of subsoils, there may be special conditions pertaining to this site which have not been disclosed by the investigation and which have not been taken into account in the report.

If variations in the subsoils occur from those described or assumed to exist, then the matter should be referred back to us immediately.

## 2 PROJECT BRIEF AND SCOPE

This report has been prepared for The Bears Home Project Management Limited in support of an application to the Auckland Council for Resource Consent in accordance with the requirements of the Resource Management Act 1991.

Where appropriate, this report has been completed in accordance with the recommendations of NZS 4404, Land Development and Subdivision Engineering; Auckland Council Code of Practice for Land development and Subdivision (ACCoP), Section 2 Earthworks and Geotechnical Requirements (version 1.6).

The scope of this report encompasses the geotechnical suitability and stability of the land having particular focus on the Lodge complex, Clubhouse and Maintenance Shed buildings development concepts.

Its principal objectives were to assess:

- existing geomorphological features and their effects on existing site stability; and
- the nature, bearing qualities and relative uniformity of the subsoils to the depths likely to be affected by proposed land development works and future building loads.

Accordingly, this report is focused on the proposed Lodge complex, Clubhouse and Maintenance Shed areas.

## 3 DEVELOPMENT PROPOSALS AND SITE DESCRIPTION

The McKenzie and Co Consultants Limited and Jack McKinney Architects Limited Drawings refer (Appendix 1). A new private golf retreat is proposed to be constructed at Muriwai Downs.

The Muriwai Downs site is located approximately 5km south-west of the Waimauku township and approximately 3km east of Muriwai Beach. The similar rural properties surround the site.

This report focuses on proposed buildings for the golf retreat project (the Lodge complex, Clubhouse, Academy buildings and Maintenance Shed buildings), as well as the associated earthworks for these building platforms, which are located on portions of the Muriwai downs property legally described as Lots 1 DP 187057 and Lot 2 DP 196478.

The study area and approximate Lodge complex, Clubhouse and Maintenance Shed locations are outlined in Figures 2 and 3, Appendix 2.

The lodge complex is proposed to include a main lodge building, a lodge residence, a wellness centre, a yoga centre/ meeting house, a retreat and multiple chalets and cabins. From the Jack McKinney Architects Drawings the Lodge complex and Clubhouse will involve a variety of platforms at various RLs with basements, partial basements, retaining walls, artificial ponds, and swimming pools.

No detailed plans have been provided to us showing the proposed Academy buildings and Maintenance Sheds, however, based on the relatively flat contours in the areas in which these structures are proposed, we anticipate that these will comprise a series of buildings constructed at or near the existing grades. The Maintenance shed area will include a large, paved yard and parking areas.

Proposed cuts and fills to form the proposed structures will be 13m and 11m respectively (McKenzie and Co Consultants Limited, Muriwai Downs Golf Project, Proposed Earthworks. Drawings 1976-1-215 to 1976-1-228, Revision C).

## 4 RELATED REPORTS

Lander Geotechnical have previously prepared a preliminary geotechnical appraisal for Muriwai Downs (J01662 Rev A, dated 11 February 2021). Relevant recommendations from that report are reiterated herein.

## 5 GEOLOGIC SETTING

### 5.1 Geology

There are five geological units beneath the site<sup>1</sup> which are briefly described below. Refer Figure 4, Appendix 2 for delineation of each unit and more comprehensive descriptions.

- Awhitu Group: Fixed dune sands; prevails over most of the Site.
- Kariotahi Group: Mobile sand dunes; confined to the western extremity of the Site.
- Nihotupu Formation (Waitakere Group): Sandstones and siltstones; isolated to small portions of the northern and southern extremities of the Site.
- Holocene Alluvium (Tauranga Group): Alluvial deposits; prevails over the majority of the eastern (lower lying) portion of the site.
- Waiatarua Formation (Waitakere Group): Basalt flows and pillow lava; confined to a small, isolated area in the central - eastern region of the site.

Below the proposed Lodge complex, Clubhouse, Academy buildings and Maintenance Sheds, Awhitu Group fixed dune sands are the prevailing geology. These generally contain weathered near-surface clay soils overlying medium dense sands and can also contain isolated lenses of clay and organic material at depth.

Based on the prevailing geology in the area, and their respective geologic ages, it is likely that Nihotupu Formation siltstones and sandstones underlie the Awhitu Group, however, our boreholes of up to 24m depth did not encounter these materials.

Holocene alluvium is anticipated to be present within gully inverts and around Lake Okaihau.

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<sup>1</sup> Edbrooke, S.W. 2001 Geology of the Auckland area : scale 1:250,000 Institute of Geological & Nuclear Sciences 1:250,000 geological map 3

## 5.2 Geomorphology

Based on our geomorphic observations, the site is characterised by a number of steeply incised gullies between wide ridgelines which are close to flat in areas. Slope breaks into the gully flanks are generally sharp and are often comprised of several small to moderately sized slip scarp features.

Some gentle and shallowly incised overland flow channels are present on the wide flat ridgelines before they drop off sharply at their intersection with the main gullies. Lake Okaihau is located to the west of the proposed Lodge complex and is bounded by wide swaths of swampy ground followed by steep slopes which form near vertical bluffs (refer Inset A) as they approach the Lodge complex. The bluff faces show evidence of slabbing (refer Inset B), generally associated with the roots of vegetation growing on the cliffs (root jacking). Burrows (bioturbations, refer Inset C) were also observed to have been excavated into the soft, lightly cemented sands forming the bluffs.

On several moderately steep slopes, erosional channels have formed through the sandy substrate (refer Inset D). Furthermore, tomos (underground hollows caused by erosional scour) are inferred to be present underlying some of the overland flow paths as inferred by small collapses manifesting to the surface (refer Inset E). Noted instances are shown on Figure 01, Appendix 2.



Inset A: Above: Cliff face immediately below the proposed main Lodge residence



Inset B: Above: Slabbing erosion of bluff face



Inset C: Left: Burrows excavated into bluff face

Inset D: Below Left: Collapse manifested at the surface of a shallow overland flow path



Inset E: Below Right: Erosional scour formed on a moderately steep slope.



## 6 FIELDWORK, LABORATORY TESTING AND FINDINGS

### 6.1 Fieldwork Programme

Our fieldwork was conducted between 12 August and 29 September 2021 and involved the drilling of six machine boreholes, four hand auger boreholes and the supervision of the excavation of three shallow trial pits in the positions indicated on Figure 01, Appendix 2.

Scala penetrometer testing, shear vane testing, and standard penetration testing (SPT) were undertaken at regular intervals as appropriate for the testing and material types.

Several days following the completion of the machine borehole drilling programme, the site was re-visited for the purpose of checking water levels in the machine boreholes under assumed equilibrium conditions. The use of water during machine drilling precludes immediate determination of water levels.

Detailed borehole and trial pit logs can be found within Appendix 4. A summary of borehole findings is presented in Section 6.3.

### 6.2 Laboratory Testing

Laboratory samples were retrieved from machine borehole MH01 for the purposes of further laboratory testing.

Tests carried out included a consolidated triaxial compression test as described in ISO 17892:2018 Part 9 and a direct shear test as described in ISO 17892:2018 Part 10. The tests were undertaken on a representative sample of cemented and uncemented sands respectively for the purposes of obtaining angles of internal soil friction and cohesion for subsequent slope stability analyses.

All results are IANZ (International Accreditation New Zealand) endorsed and full details can be found within Appendix 3.

### 6.3 Borehole Findings

#### 6.3.1 Topsoil

Topsoil was encountered in most borehole locations up to 0.7m depth, but generally around 0.3m depth. Topsoil was absent in some areas such as around the pond and around bluffs and was generally less thick in areas where slopes were steeper.

#### 6.3.2 Filling

No filling was detected at our borehole locations although minor fills (i.e., bricks and concrete) were observed in some overland flow paths and on farm tracks. The trial pits (TP01 to TP03) were undertaken in order to determine the material type within a shallow overland flow path within the proposed Lodge complex area and found natural ground immediately underlying the topsoil.

#### 6.3.3 Holocene Alluvium

Holocene alluvium (stream and lake deposits) comprising 1.2m of mullock (organic mud) and a further 1.3m of soft, saturated sand was encountered in HA01, located within the swampy ground surrounding Lake Okaihou. Further deposits are anticipated to be present associated with the base of gullies and the lake.

#### 6.3.4 Awhitu Group

Awhitu Group materials included medium dense silicious sands, overlain in less steep areas by a thin layer of stiff cohesive soils. Awhitu Group materials extended beyond the reach of each of our test locations which were up to 24m in depth.



The cohesive mantle soils found in less steep areas were up to 4.2m deep but were generally less than 2m deep. However, the cohesive materials were generally absent or minimal on steeper areas. The soils included clays and silts with minor sand content. Where measured, undrained shear strengths ranged from 38kPa to 172kPa. SPT 'N' values (blows per 300mm penetration) were between 3 and 12 blows. The strength readings indicated that the cohesive soils were typically stiff, with some softer and denser lenses.

The Awhitu Group sands were present underlying the topsoil, Holocene alluvium and/ or cohesive soils where present and were present from the surface in other areas. These soils were generally non-cohesive and uncemented. In some instances, the sands were cemented or contained lenses of clays at depth.

SPT N-values measured were generally between 10 blows and 25 blows, consistent with a medium dense classification.

### 6.3.5 Groundwater

The following table summarises the groundwater readings:

**Table 1: Groundwater Readings**

Borehole	Borehole Depth	22 September 2021	4 October 2021
HA01	3.3m	0.1m	Not Measured*
HA02	5.0m	1.5m	Not Measured*
HA03	5.0m	Not encountered over borehole depth	Not Measured*
HA04	5.0m	Not encountered over borehole depth	Not Measured*
MH01	24.0m	Not Measured*	Not encountered over borehole depth
MH02	15.0m	Not Measured*	9.7m
MH03	19.5m	Not Measured*	Not encountered over borehole depth
MH04	15.0m	Not Measured*	2.6m
MH05	19.5m	Not Measured*	15.6m
MH06	19.5m	Not Measured*	19.5m

\*Groundwater was not measured as no piezometer standpipe was installed to facilitate groundwater readings at the measurement date

## 6.4 Laboratory Test Results

A consolidated triaxial compression test (consolidated-undrained triaxial test) as described in ISO 17892:2018 Part 9 and a direct shear test (shear box test) as described in ISO 17892:2018 Part 10 were undertaken on samples collected from MH01. The tests were undertaken on a representative sample of cemented and uncemented sands respectively for the purposes of obtaining angles of internal friction and cohesion (effective stress parameters) for subsequent slope stability analyses.

**Table 2: Effective Stress Test Results**

Sample	Angle of Friction ( $\phi'$ )	Cohesion (C')
MH01: 8.0m to 8.2m Cemented Awhitu Group Sands Consolidated-Undrained Triaxial Test	15°	204 kPa
MH01: 16.3m to 17.4m Recompacted Uncemented Awhitu Group Sands Shear Box Test	38.5°	8 kPa

The results of the consolidated-undrained triaxial test were uncharacteristic and unconservative for medium dense sand soils. Furthermore, cemented sands were found to be relatively uncommon in the remainder of the borehole tests and distinct layers could not be inferred with confidence. Therefore, the results of the consolidated-undrained triaxial test were dismissed.

Based on the shear box test results, we selected an angle of friction of 39° for modelling the medium dense Awhitu Group sands. A cohesion value of 0 kPa was conservatively selected for analyses due to the non-cohesive nature of the sandy soils observed (i.e., the lab results displaying cohesions in sands may be an aberration of cementation).

## 7 SLOPE STABILITY

### 7.1 General

Significant Clubhouse and Lodge Complex buildings are proposed adjacent to steep slopes. For high and more complex slopes, representative cross sections have been analysed via detailed computer slope stability analysis in order to determine a safe setback distance, as outlined in Section 7.3 below. For lower slopes, a safe setback distance has been assessed from a 1(v) in 3(h) geometric projection from the toe of the slopes as outlined in Section 7.2 below, which is deemed to be a conservative long term regression line.

The safe set back distance defines the building line restriction, and development encroaching over this line towards any slope will require engineering mitigation and/ or specific foundation design to mitigate slope instability risks. This will affect some buildings which are in reasonable proximity to steep slopes as per Figures 09 to 12, Appendix 2.

The landform is benign in the proposed Academy area and no geomorphic constraints were identified.

### 7.2 Geometric Assessments

Accordingly, a geometric assessment has been undertaken at the proposed maintenance shed location and has found that no proposed structures are located outside of the building line restriction. This is demonstrated on Figure 12, Appendix 2.

Further, at northern extent of the Lodge Complex, a geometric assessment has found that portions of some proposed buildings including a chalet, three cabins and a Lodge common room, extend beyond the building line restriction into a specific design zone, as demonstrated on Figure 11, Appendix 2. Further assessments should be undertaken at Building Consent stage, however, at this stage, it is considered likely that a palisade wall system to mitigate slope instability risks will be required to allow such structures at the locations proposed. Palisade walls are described in further detail in Section 7.3.

## 7.3 Computer Slope Stability Assessments

### 7.3.1 Methodology

A geologic section was drawn through site profiles provided by McKenzie and Co Consultants Limited (contained within Appendix 1) for four cross sections through representative steep slopes adjacent to the Lodge complex and the Clubhouse to facilitate a computer slope stability analysis using computer modelling software Slide 2 for circular slips. Planar surfaces have been dismissed as a mode of failure for the identified deep sand deposits.

The proposed cuts and fills have been modelled to reflect the proposed final landform. Surcharge loads have also been applied to reflect anticipated (conservative) loads from the future buildings.

Three scenarios were modelled: existing groundwater conditions (long term conditions); elevated groundwater conditions (short term transient conditions); and 1/500-year seismic conditions. For the elevated conditions, it is assumed the groundwater level rises a nominal height of 3 metres above the level measured in the standpipes.

For our analyses, effective stress soil parameters were selected based on the laboratory testing (refer Section 6.4 above), and our experience and in-situ testing and for the cohesive soils are not less conservative than soil strength parameters outlined in the ACCoP, Schedule 2E. A full table of effective stress parameters are included on the slope stability outputs contained within Appendix 5.

The degree of stability of a slope is expressed as the factor of safety, which is the ratio of the resisting and driving forces causing instability. Theoretical failure of a slope is possible when the factor is 1.0, while increasing values above 1.0 indicate improving stability. Acceptable factors of safety (FoS) for are prescribed in ACCoP Schedule 2C for residential developments as outlined below:

- Existing Conditions: 1.5
- Elevated Groundwater: 1.3
- Seismic Conditions: 1.2

### 7.3.2 Seismic Site Class

The depth to bedrock Nihotupu Formation (of the Waitakere Group) materials is unknown but is at least greater than 24m. Nearby deep well boreholes recorded materials that could be interpreted as Nihotupu Formation materials at depths varying from around 10 to 60m depth. Waitakere Group materials also outcrop at Muriwai Beach approximately 3.5km south-west. Conservatively, a seismic site class of Class C (shallow soil site, 1170.5:2004, Table 3.2) has been assumed as this site class provides the highest PGA value when compared to rock and deep soil sites.

Peak Ground Acceleration (PGA) has been calculated based on formula provided in the NZGS Earthquake Geotechnical Engineering Practice Module 1 and the NZTA Bridge Manual (SP/M/022) 3<sup>rd</sup> ed. 2016 based on a 50-year working life. The following PGA factors have been selected.

- Return Period Factor (R) as per NZS1170.5:2004 Table 3.5: 1.0 (1/500yr, as recommended by the NZGS Module 1)
- Site Response Factor (f) as per Bridge Manual Section 6.2.2: 1.33 (Site Class C)
- PGA Coefficient ( $C_{0,1000}$ ) as per Bridge Manual Table 6A.1: 0.15 (Auckland City)

Based on the above, a PGA of 0.15g is calculated.

It is generally accepted that a seismic reduction factor of 65% may be applied because the very short duration of the maximum acceleration. After applying the seismic reduction factor **PGA is calculated as 0.1g.**

### 7.3.3 Results

Our slope stability analyses found that the sections analysed did not meet minimum factors of safety for global slope stability. All but Section BB found slip circles extended into the currently proposed building locations.

A building line restriction has been placed at the ‘safe setback’ position (i.e., beyond the point at which slip circles below the minimum factors of safety intercept ground level). For all buildings encroaching over the building line restriction and into the specific design zone, engineering remediation measures will be required to meet minimum acceptable factors of safety against slope instability. For buildings not extending beyond the building line restriction (i.e., within the non-specific design zone), no engineering measures are required to maintain slope stability. Building Line Restrictions and Specific Design Zones are shown on the Figures 09 to 12, Appendix 2.

Due to the nature of the slopes (i.e., heavily vegetated in native bush), palisade pile walls were the modelled as a method of engineering mitigation, however, other options such as soil nails may be viable subject to constraints posed by existing vegetation on the slopes. Only palisade piles as a concept have been modelled herein.

Further geotechnical investigation and design is required to determine design details of any required palisade pile walls, and this is typically a matter for building consent (detailed design stage). However indicative concept design details based on the current building positions are provided in Table 3 below. It should be noted that based on the effective retained heights of the palisade walls, ground anchors will likely be required to provide additional support to the cantilevered piles.

The stability results outputs can be found in Appendix 5. Preliminary remediation measures required are summarised below:

**Table 3: Slope Stability Remediation Requirements**

Cross Section AA'
<ul style="list-style-type: none"> <li>● Building Line Restriction: 30m from steep slope break or</li> <li>● Palisade Pile Wall:                             <ul style="list-style-type: none"> <li>○ Location: 2.0m from edge of building</li> <li>○ Minimum Depth: 21.1m*</li> <li>○ Minimum Shear Capacity: 750 kN/m (single pile) * or 450 kN/m (2-pile array) *</li> <li>○ Effective Retained Height: 10.5m*</li> </ul> </li> </ul>
Cross Section BB'
<ul style="list-style-type: none"> <li>● Building Line Restriction: 11.5m from steep slope break</li> </ul>

### Cross Section CC'

- Building Line Restriction: 30m from steep slope break  
or
- Palisade Pile Wall:
  - Location: 2.0m from edge of building
  - Minimum Depth: 30.9m\*
  - Minimum Shear Capacity: 1,500 kN/m (single pile) \* or 900 kN/m (2-pile array) \*
  - Effective Retained Height: 7.0m\*

### Cross Section DD'

- Building Line Restriction: 35m from steep slope break  
or
- Palisade Pile Wall:
  - Location: 3.0m from edge of building
  - Minimum Depth: 15.2m\*
  - Minimum Shear Capacity: 750 kN/m (single pile) \*
  - Effective Retained Height: nominal 7.0m\*

\*Values as at current building position. Where the leading edge of a building is moved towards the building line restriction (i.e., moved away from steep slopes), palisade piles will be able to reduce in depth and shear capacity. Buildings beyond the building line restrictions (i.e., placed within the non-specific design zone) will not require palisade pile walls to remediate potential slope instability.

## 8 AUCKLAND UNITARY PLAN SECTION E.7 ASSESSMENT

The measured groundwater depths within the piezometers installed in machine boreholes on the ridgelines (MH01, MH03, MH05 and MH06) found groundwater at a maximum of 15.6m below ground level, which below the depths of the maximum cut levels of 13m. We therefore assess that the proposed excavations are unlikely to extend below the natural groundwater level and there should be no groundwater take or reduction in the groundwater level.

The proposed excavations therefore **comply** with E7 groundwater guidelines rules E7.6.1.6 and E7.6.1.10.

## 9 PROJECT EVALUATION AND RECOMMENDATIONS

### 9.1 General

A building line restriction has been imposed as a result of our slope stability analysis. Beyond the building line restriction, within the specific design zone, engineering mitigation measures are required in order to meet minimum acceptable factors of safety. Such measures may include the installation of palisade pile walls, probably tied back with ground anchors. General palisade pile parameters and recommendations are outlined in Section 7.3.3 above, however, all such parameters will be subject to further investigation and design at detailed design stage.

Upslope of the building line restriction, within the non-specific design zone, the site should be suitable to for the undertaking of earthworks and for the construction of the proposed buildings provided works are undertaken in accordance with the following specific recommendations, NZS 4404, and ACCoP. However, expansive Site Class provisions may apply where the clay mantle remains following earthworks and benching of the building platforms. This would be a matter to confirm in the Geotechnical Completion Report (following bulk earthworks) and/ or Building Consent(s).

In general, several buildings within the Lodge complex including the main Lodge residence, the wellness centre, the yoga centre, a common area and several chalets and cabins as well as and the Clubhouse will be subject to engineering remediation as a result of our slope stability analyses. The Maintenance Shed area is contained within a non-specific design area. The Academy buildings are located in an area with no obvious geomorphic constraints. The Maintenance Shed and Academy buildings are therefore not anticipated to require engineering remediation to achieve acceptable factors of safety against slope instability.

Notwithstanding, all buildings will be subject to specific investigation at Building Consent stage in order to confirm foundation design parameters.

It is very important that we are advised if there are any significant changes to the development philosophy following the preparation of this report.

Preliminary comments and recommendations follow:

### 9.2 Foundations for Buildings

#### 9.2.1 Bearing Capacity and Settlement Potential

A geotechnical ultimate bearing capacity of 300 kPa should generally be available for all shallow strip and pad foundations constructed on certified filling and on the natural ground.

However, where buildings extend beyond the building line restriction and into specific design zones, engineering mitigation such as a palisade pile wall will be required in order to maintain stability. This should not affect bearing capacity for shallow foundations that can be located behind palisade piles walls.

Further site-specific geotechnical investigations and specific advice will be required for the building consent(s).

#### 9.2.2 Expansive Site Class

A phenomenon common to the plastic soils of the Awhitu Group cohesive mantle is their expansive nature and tendency to shrink and swell, particularly with seasonal fluctuations of near surface water contents. Expansive soils are outside the provisions of NZS 3604 (according to its definition of "good ground") and therefore foundations on such soils require specific design to establish appropriate embedment depths and/ or concrete reinforcement configurations.

It is anticipated that the clayey mantle soils, where present, will be expansive in nature. Although sands are considered non-expansive, minor quantities of some clays can exhibit influence on the

expansivity of the soil profile and therefore the sandy soils have been assumed to be slightly expansive in the event that minor clays are present.

The assessed preliminary expansive site class for this site is as follows when assessed in accordance with MBIE (Acceptable Solution and Verification Methods Amendment 19) and AS2870:2011 guidelines is as follows:

**Table 4: Expansive Site Class Classifications.**

Soil Type	MBIE ASVM Amendment 19	AS2870:2011
Clayey Mantle	Class H (high) Characteristic ground movement of up to 78mm	Class H2 (High) Characteristic ground movement of 75mm
Sandy Soils	Class S (slight) Characteristic ground movement of up to 22mm	Class S (slight) Characteristic ground movement of 20mm

On this basis, foundation design may be carried out in accordance with NZ3604 with provision for expansive soils as outlined in MBIE B1/AS1 if the buildings meet the simple structure definition outlined in section 3.2.2 of that document or alternatively the buildings may be designed in accordance with AS2870:2011 provided they are designed to the recommendations above on expansive site class and characteristic ground movement.

For expansive soils, if on-grade floor slab construction takes place during a long dry summer, exposed building platform soils may dry out and become highly desiccated. Over time the rehydration of the soils below the floor slab can cause swelling and floor slab uplift. Floor slab uplift can cause distress on brittle building elements where cracks are more apparent. It may also rack upper storeys and/ or rooflines if non-load bearing ground floor walls are lifted and act as struts. It is prudent to place hardfill immediately upon complete of subgrade trimming, followed by thorough soaking of the hardfill prior to concrete placement (e.g., for slab on-grade construction), all of which can help to limit the problem.

This preliminary expansive site class may be re-assessed during building consent / detailed design following laboratory shrink-swell testing as recommended by MBIE for each of the proposed development areas.

### 9.2.3 Strength Reduction Factor

As required by Section B1/VM4 of the New Zealand Building Code Handbook, a strength reduction factor of 0.50 or 0.80 must be applied to all recommended geotechnical ultimate soil capacity in conjunction with their use in factored design load cases for static and earthquake overload conditions respectively.

## 9.3 Retaining Structures

### 9.3.1 Palisade Walls

Where buildings are proposed to encroach over the building line restriction and into the specific design zone, engineering intervention such as palisade pile walls (in ground retaining walls) or other engineered solution to mitigate the risk of slope instability are required. This is required so that minimum factors of safety prescribed by council ACCoP Schedule 2C for residential developments are achieved at the building platform locations, and immediate amenity / yard areas.

Palisade pile walls consist of a line of bored and concreted steel piles spaced at 3 times the pile diameter to facilitate soil arching between piles.

Effective retained heights, shear capacity and embedment depths will vary with along the wall breadth. Piles are designed in detail for specific ground conditions and as such they require targeted specific investigation and design. Where there is flexibility for buildings to be moved away from the crest of the steep slopes, palisade pile walls may also then be moved which will reduce their size. If building can be moved sufficiently so as **not** to encroach over the building line restriction, then palisade walls could be eliminated altogether.

Based on the current concept, preliminary minimum pile embedment depths, shear capacities and effective retained heights are outlined in Table 3, Section 7.3.3, above, assuming a palisade pile wall nominally located 2m to 3m beyond the buildings. Preliminary soil parameters for lateral load design are presented in Section 9.3.2.

Palisade pile design parameters should be confirmed at detailed design stage by a structural engineer and will be subject to further specific investigations dependent on final building proposals. Detailed design from a geotechnical viewpoint should include modelling via WALLAP computer analysis provide shear force, bending moment and deflection distribution, plus ground anchor loads if required, and is an iterative process between the geotechnical and structural engineers.

Due to the presence of variable strength sands and groundwater as depth (which may lead to sand collapse and pile necking) it is likely that palisade piles will require some form of temporary casing during construction.

### 9.3.2 Basements, Pools and Retaining Walls

Lateral soil loads parameters will need to be established as part of further site-specific site investigations during the detailed design / building consent phases for basements, pools and retaining walls.

Generally speaking, the designer would need to decide whether active ( $K_a$ ) or at rest ( $K_o$ ) conditions are relevant and will also need to accommodate back slope surcharges and toe slopes. For any basement walls we recommend  $K_o$  design. All walls should be drained and backfilled to within 0.3m of full height with lightly tamped, free draining granular material such as SGC 50/14. Alternatively, a proprietary strip drain may be used. Toe drainage should be connected into an approved stormwater disposal system. Any waterproofing details should be specified by the building designer.

Although no near surface groundwater was measured, it is normal be ensured that pool design includes a pressure relief valve to release groundwater pressures.

A maximum grade of 1(v) in 1(h) or angle of  $45^\circ$  for cuts up to 1.5m deep or 1(v) in 2(h) or angle of  $22.5^\circ$  for cuts exceeding 1.5m deep should be used for any temporary cut batters and will be subject to engineering observation. The cut face should be left exposed for as minimal time as possible to reduce the risk of cut face failure (or erosion / runnelling of sands), especially in winter months and during periods of heavy rainfall. Protection from the elements can be achieved by covering exposed batters with heavy duty PVC plastic sheeting.

### 9.3.3 Permanent Batters

For permanent cut and fill batters of up to 2m high, batter angles of up to 1 (v) in 2 (h) should be acceptable, provided they are planted out and a suitable ground cover is provided to prevent erosion of the sands.

In this regard, following trimming of the batter slopes, they should immediately be topsoiled or hydro-seeded and covered with enkamat (or other approved erosion control matting) and vegetated.



Wherever practicable slopes and permanent batters should be densely planted with suitable vegetation. The roots of the vegetation should aid in reducing the effects of gradual gravitational soil creep and should also reduce erosional scour from water runoff.

## 9.4 Roding and Pavements

### 9.4.1 Subgrade CBR Values

No significant problems are anticipated in relation to road and pavement construction. Following earthworks and subgrade trimming, minimum CBR's of between 2% and 4% are anticipated.

However, it appears that a significant proportion of the roading will be placed in either cut or filled ground and we therefore recommend that a programme of penetration resistance testing is carried out when the roads and pavement areas are being formed to their final levels to confirm actual CBR values.

### 9.4.2 Construction

Exposed subgrade soils, particularly sands, can be subject to degradation, erosion and/ or loosening when exposed to trafficking and weather. It would therefore be prudent to leave roads and pavement areas 200mm to 300mm high of the final subgrade level with trimming to the final grade being undertaken only immediately prior to the placement of the basecourse materials.

Furthermore, we consider it would be prudent for machinery movements to be confined to designated haul roads where possible to limit potential issues with subgrade degradation.

## 9.5 Service Trenches

Sandy soils can be dispersive and prone to piping and internal erosion under sufficient water head / velocities. Generally, on this site, groundwater is deep and should be outside of the zone through which any trenching operations are undertaken, however, perched groundwater and overland flow may result in erosional scour, particularly in the shallow gully/overland flow features, where tomos have been inferred to have manifested, and in areas of moderate slope to steep slopes (i.e., in excess of 1(v) in 4(h), where erosional channels already have manifested.

Thus, a high standard of trench backfill compaction is essential and where possible the pipe bedding in all trenches should contain a Novaflo drain coil to provide a preferential channel for groundwater.

The drain laying contractor must be made aware of these requirements and of the need to contact us when trench backfilling is to take place. We recommend a condition is made for geotechnical plan review in this regard once drainage such plans are available.

On this site, groundwater was at significant depth in the Lodge complex and Clubhouse locations, and it is not anticipated that trench excavations will be unduly troublesome on account of groundwater. Appropriate trench support methods or battering / benching to stable angles / benching is prescribed by NZ legislation.

## 9.6 Earthworks Operations

### 9.6.1 Earthworks Methodologies

The bulk earthworks for this development will include cuts of up to 13m and fills of up to 11m, likely underfill drainage where low lying areas are to be infilled and the construction of road subgrades and building platforms. Total cut and fill volumes are 440,000m<sup>3</sup> and 329,000m<sup>3</sup> respectively (McKenzie and Co Consultants Limited, Muriwai Downs Golf Project, Proposed Earthworks. Drawings 1976-1-215 to 1976-1-228, Revision C).

Earthworks in Awhitu Group geology are anticipated to comprise mainly sands and should be relatively straightforward to execute using conventional prime earthmoving machines.

The issues of subgrade disturbance and degradation are discussed in Section 9.4.2 above.

### 9.6.2 Stripping Operations

Within areas of the development affected by earthworks, all topsoil and vegetation should be cleared. All stripping operations should be inspected by us to confirm competent soils have been exposed prior to any placements of fills or topsoil.

Stripping operations should be planned to extend well beyond working areas to avoid peripheral contamination. Stockpiles of topsoil and unsuitable materials should be sited well clear of the works on suitable areas of natural ground and away from slopes exceeding 1(v) in 4(h).

### 9.6.3 Benching of Slopes

All benching of slopes prior to the placement and compaction of filling should be carried out in accordance with the normal requirements of NZS 4431 and related documents to ensure that the filling placed is keyed into the underlying natural ground. This would involve the cutting of benches approximately the width of a bulldozer, with a slight reverse gradient back into the slope. The optimum depth of each bench is best confirmed by careful Engineering inspections during construction.

### 9.6.4 Material Suitability

In the area we expect that the Awhitu Group sands on site should generally be suitable as borrow materials.

If imported filling is to be used in conjunction with the in-situ materials, it is essential that a suitably qualified and experienced geotechnical engineer considers the source or sources and determines its suitability for inclusion in the earthworks on the basis of observation, investigation and testing as considered necessary.

### 9.6.5 Underfill Drains

Although no significant groundwater was encountered in the proposed Lodge area, there is a shallow gully in the northern portion of the Lodge complex of the where flows may occur from time to time. This area also shows small collapses manifesting to the surface inferred to be tomos and is shown on Figure 01, Appendix 2 and discussed in Section 5.2. Therefore, where such gullies are proposed to be filled, perforated underfill drains should be installed in narrow trenches cut into competent strata in order to maintain the existing preferential pathways.

Drains should generally consist of heavy grade novacoil pipes bedded in an approved drainage aggregate such as SAP50 and fully wrapped in a suitable non-woven geotextile to prevent the ingress of silt / piping erosion. These should be laid a minimum of 2m below final ground level to avoid conflict with future shallow building foundations.

Requirement for underfill drainage along with guidance as to their composition and alignments will be confirmed. Final details of underfill should be provided by a suitably qualified and experienced geotechnical engineer on site following stripping of the subgrade and will be dependent on the presence of groundwater seepage and the specific development proposals in the location of any drain deemed to be necessary.

All groundwater from subsoil drains should be collected by means of sealed pipes and discharged either into the into properly designed outfall structures. All subsoil drains and associated discharge points should be carefully recorded on as-built plans by a Registered Surveyor.

### 9.6.6 Fill Compaction

Compaction of sands should be undertaken in layers not exceeding 200mm in thickness via vibratory compaction machinery. If required, application of water to each fill lift may be required to achieve maximum dry density.

Laboratory or plateau testing should be undertaken prior to the commencement of bulk earthworks to establish specific compaction control criteria, but at this stage it is envisaged that earthworks control will be in terms of 95% of the maximum dry density within the appropriate water content range for the general subdivisional work. However, air voids/shear strength criteria could also have some relevance where clay materials are available.

During the filling, regular density testing/ clegg hammer impact testing should be undertaken for quality assurance.

## 9.7 On-Site Stormwater and Wastewater Disposal

### 9.7.1 On-Site Stormwater Disposal

The control of stormwater is essential to minimise the risk of slope failures and/ or erosional scour. Water runoff from the driveway and any other impermeable surfaces should not be discharged in a concentrated and uncontrolled fashion. Permanent diversion channels and bunds should be installed to prevent stormwater runoff onto any slopes and discharged appropriately.

All drains on either side of the road should be concrete lined subject to civil design recommendations. Durable rock rip rap should be installed in any cut off drains to reduce flow velocity.

Based on the sandy soils present at the site, good stormwater soakage is anticipated. However, site specific stormwater soakage testing should be undertaken at building consent stage. Soak pits, if permitted by Council, may need to be located or deepened such that they avoid any relatively low permeability clay mantles that may be present overlying the sands. Disposal into soak pits should be avoided within the specific design zone (i.e., in close proximity to steep slopes).

### 9.7.2 On-Site Effluent Disposal

Based on visual tactile assessments of soil types, we have classified the soils Category 3 (good drainage) based on Table 5.1 of TP 58.

We consider it would be appropriate to construct wastewater fields outside of specific design zones and away from slopes exceeding 1(v) in 4(h). Due regard should be made to any overland flow paths in locating effluent fields and effluent fields are recommended to be placed upslope of any on-site discharge point for stormwater (see Section 9.7.1). Dependant on the effluent disposal method proposed, additional topsoil may need to be placed in the effluent fields to meet minimum requirements set out by TP58, as our site investigation found that some areas were relatively bare of topsoil. This is a building consent issue and can be investigated further once effluent disposal areas are defined.

In line with the requirements of TP58, wastewater disposal fields must be located at least 3m from the building platforms. Groundwater was located at significant depths in the proposed building areas and therefore, groundwater should meet the 1500mm to 600mm separation distance for groundwater as per Table 5.2.

The final placement and design of on-site effluent disposal is a building consent issue.

## 10 PLAN REVIEW AND FURTHER WORK

Further specific targeted investigation will be required commensurate with final plans and building proposals for the design of palisade pile walls where proposed buildings extend beyond the building line restrictions outlined in Figures 9, 10 and 11, Appendix 2. A WALLAP analysis is recommended for the development of the palisade wall design to optimise moment and shear force distributions for soil to structure interaction.

We recommend a suitably qualified and experienced geotechnical engineer is involved in the plan review of the final working drawings and ultimately the construction process is recommended so that any geotechnical problems can be highlighted and specifically to ensure that palisade wall construction finds substrata consistent with the design assumptions.

For and On Behalf of Lander Geotechnical Consultants Limited

Prepared By:

Reviewed/ Authorised By:



**J. Lam**

**S.G. Lander**

Engineering Geologist

Principal Geotechnical Engineer  
MIPENZ CPEng, IntPE(NZ)

# APPENDIX 1:

MCKENZIE AND CO CONSULTANTS LIMITED AND JACK  
MCKINNEY ARCHITECTS LIMITED DRAWINGS

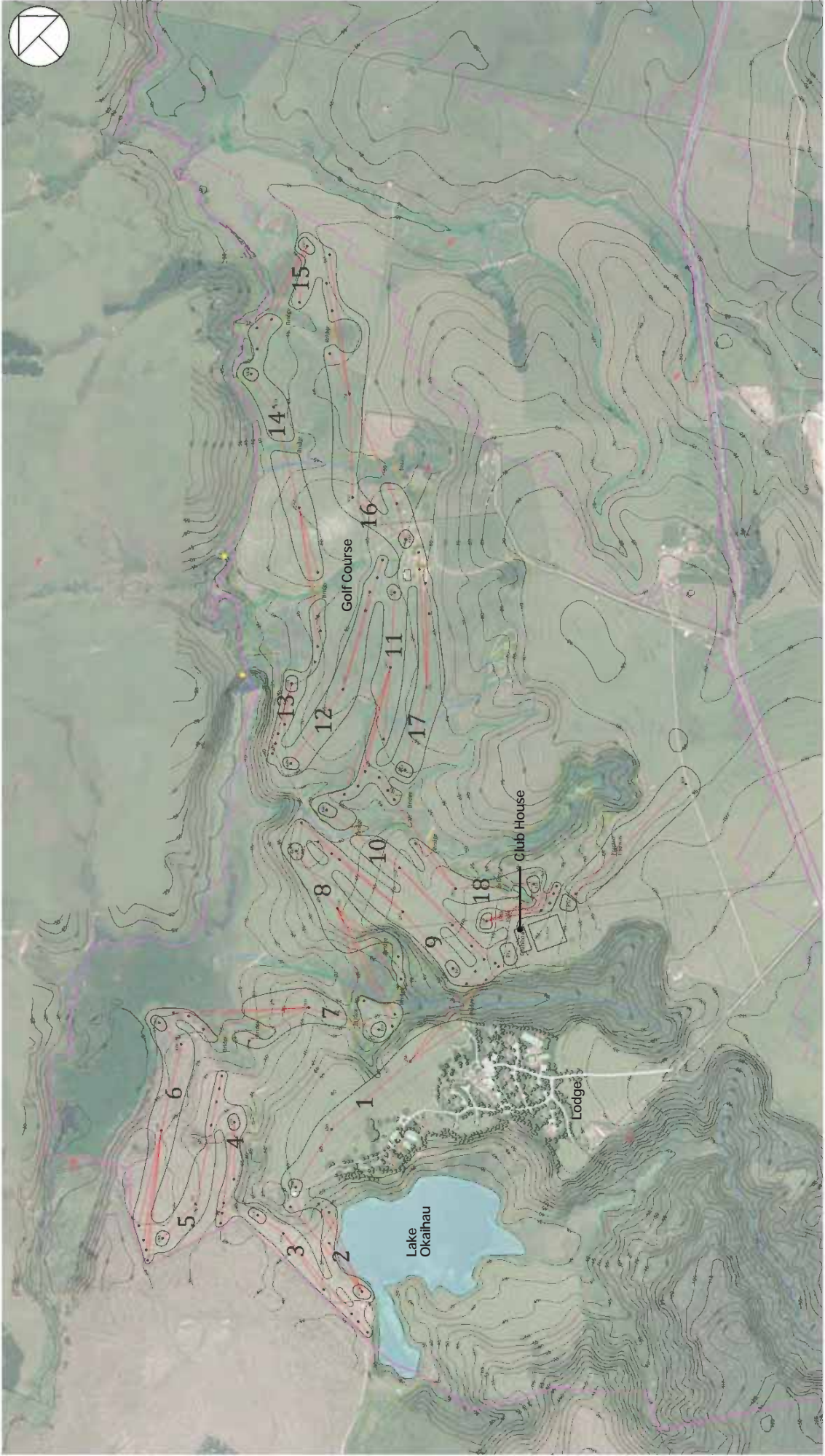


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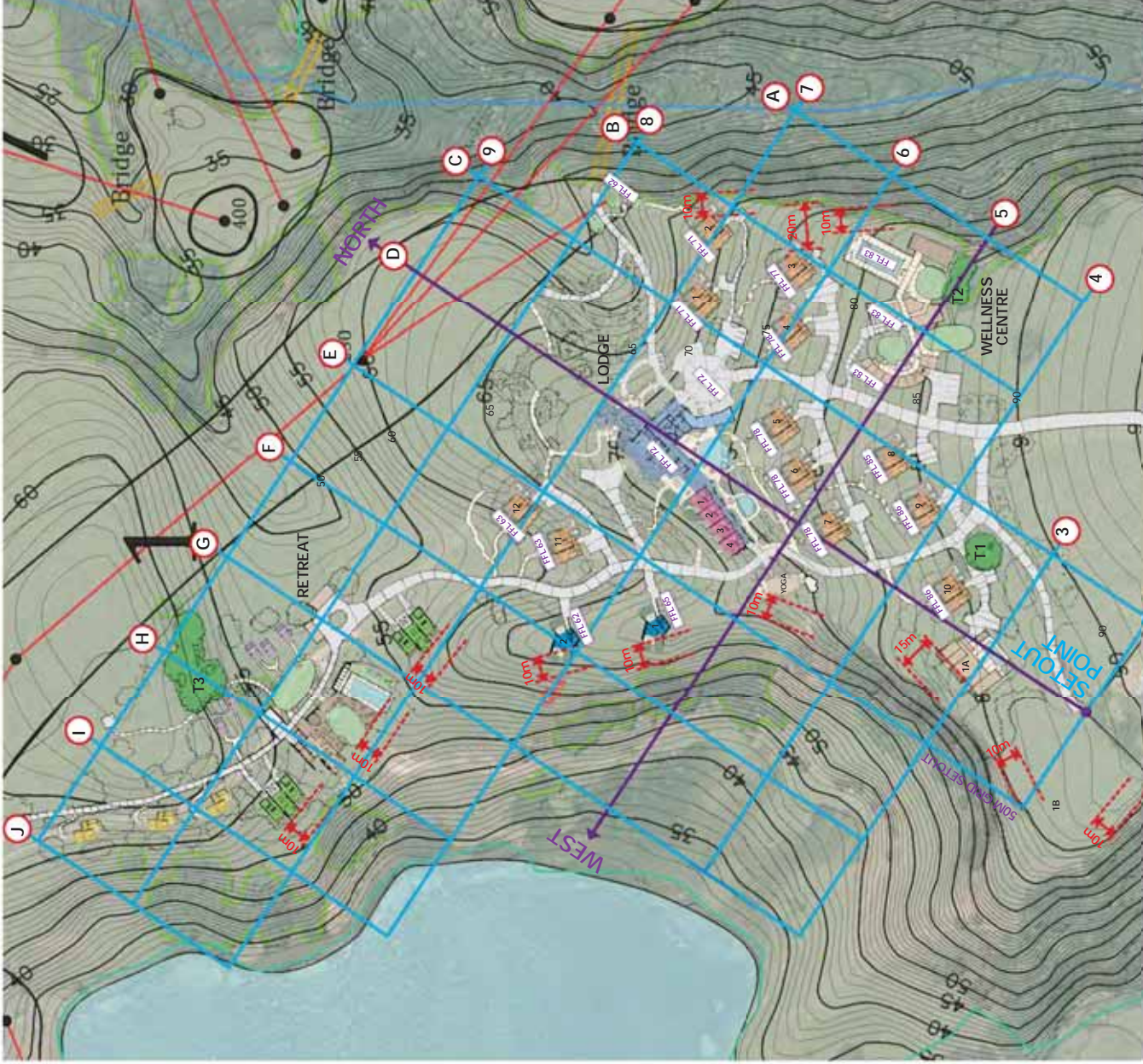


Location Plan

CONCEPT DESIGN

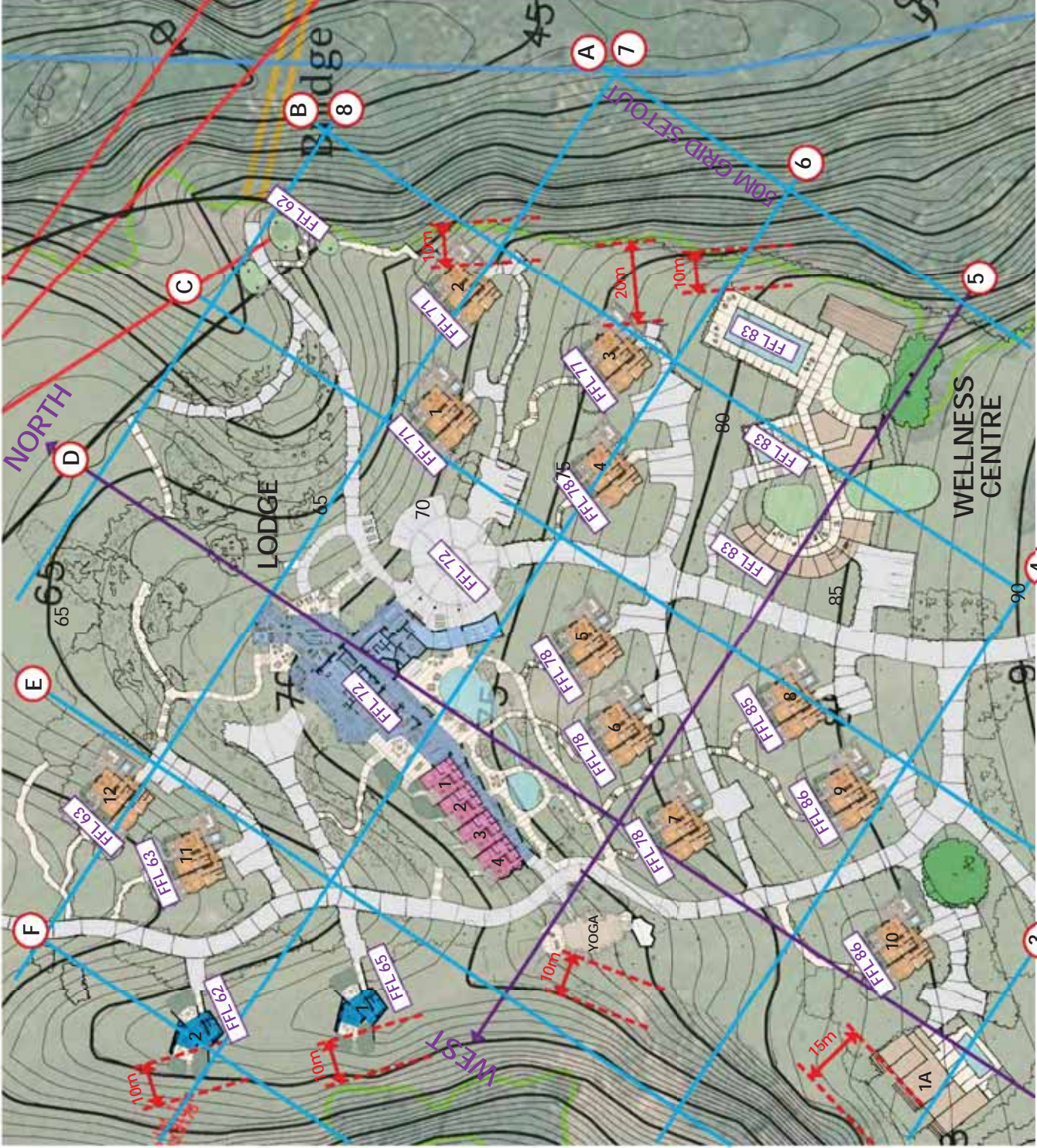






**CONCEPT DESIGN**

LODGE	AREA			
	1810m <sup>2</sup>			
	260m <sup>2</sup>			
	TBA			
<b>TOTAL</b>	<b>2070m<sup>2</sup></b>			
ACCOMMODATION				
UNITS	KEYS PER UNIT	KEYS	GUESTS	AREA
4 LODGE SUITES	1	4	8	225m <sup>2</sup>
12 HILLSIDE GARDEN CHALETs	2	24	48	1500m <sup>2</sup>
2 HIDDEN HILLSIDE RETREATS	1	2	4	150m <sup>2</sup>
2 RETREAT SUITES	2	4	8	340m <sup>2</sup>
3 RETREAT CABINS	1	3	6	225m <sup>2</sup>
<b>TOTAL ACCOMMODATION</b>	<b>7</b>	<b>37</b>	<b>74</b>	<b>2440m<sup>2</sup></b>
<b>PLUS</b>				
1 LODGE RESIDENCE	2	4	8	
5 BUNK ROOMS	1	5	10	125m <sup>2</sup>
<b>GRAND TOTAL</b>	<b>10</b>	<b>46</b>	<b>92</b>	<b>4635m<sup>2</sup></b>



# CONCEPT DESIGN

LODGE	AREA
LODGE	1810m <sup>2</sup>
MEETING HOUSE / YOGA	260m <sup>2</sup>
WELLNESS CENTRE	TBA
<b>TOTAL</b>	<b>2070m<sup>2</sup></b>

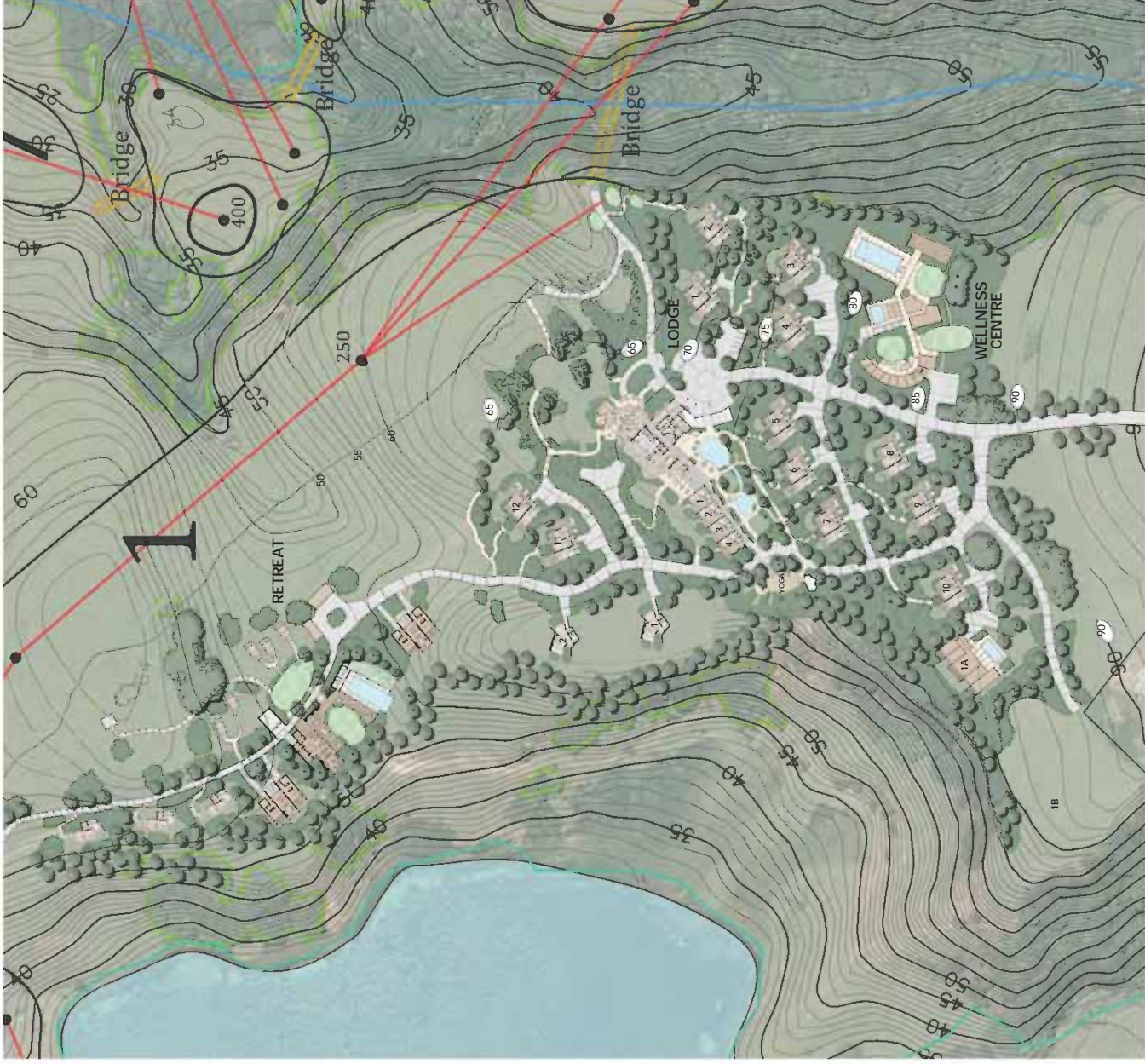
  

ACCOMMODATION UNITS	KEYS PER UNIT	KEYS	GUESTS	AREA
4 LODGE SUITES	1	4	8	225m <sup>2</sup>
12 HILLSIDE GARDEN CHALETs	2	24	48	1500m <sup>2</sup>
2 HIDDEN HILLSIDE RETREATS	1	2	4	150m <sup>2</sup>
2 RETREAT SUITES	2	4	8	340m <sup>2</sup>
3 RETREAT CABINS	1	3	6	225m <sup>2</sup>
<b>TOTAL ACCOMMODATION</b>	<b>7</b>	<b>37</b>	<b>74</b>	<b>2440m<sup>2</sup></b>

PLUS	KEYS	GUESTS	AREA	
1 LODGE RESIDENCE	2	4	8	TBA
5 BUNK ROOMS	1	5	10	125m <sup>2</sup>
<b>GRAND TOTAL</b>	<b>10</b>	<b>46</b>	<b>92</b>	<b>4635m<sup>2</sup></b>

## Master Plan Setout Diagram



CONCEPT DESIGN



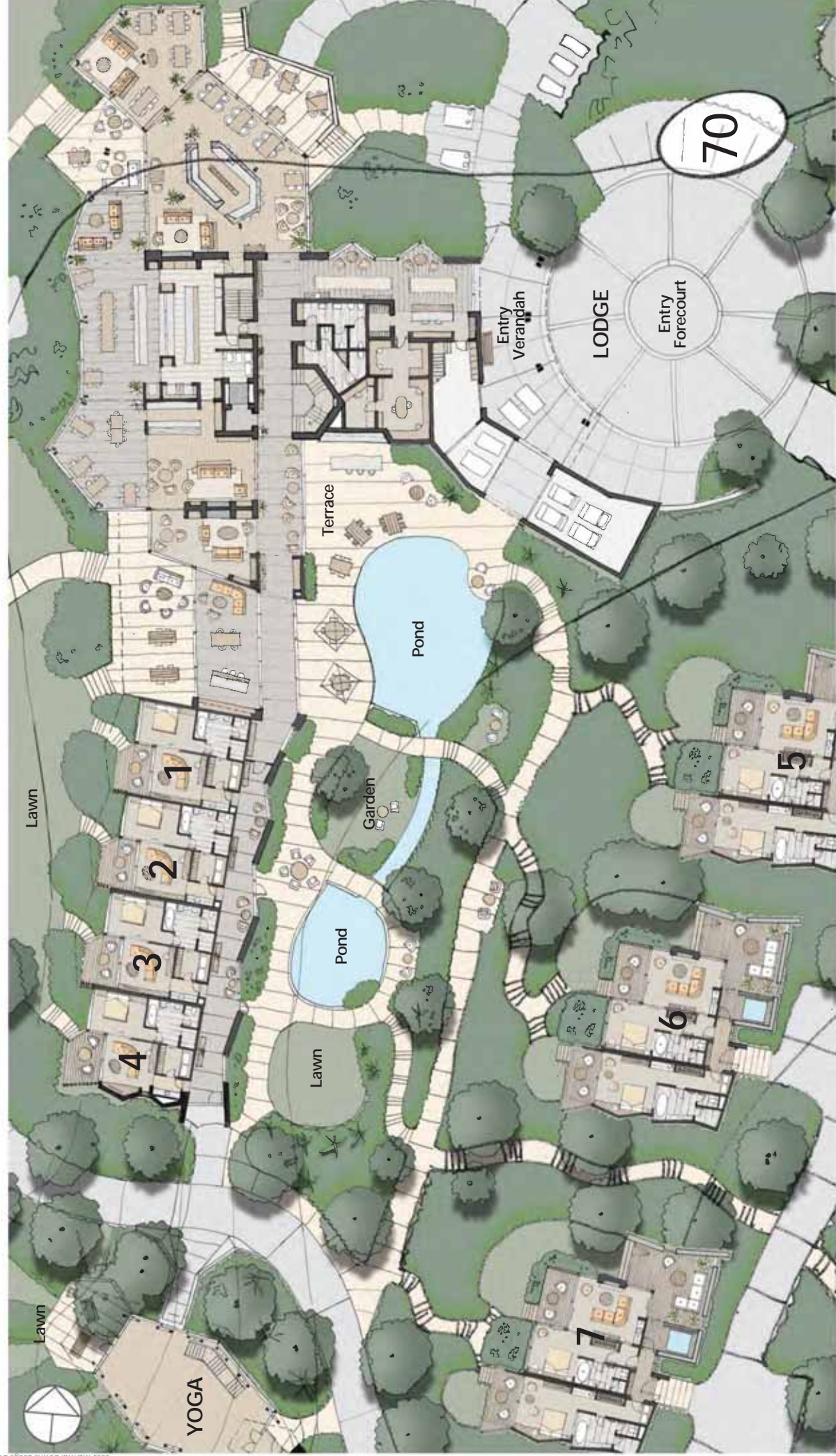
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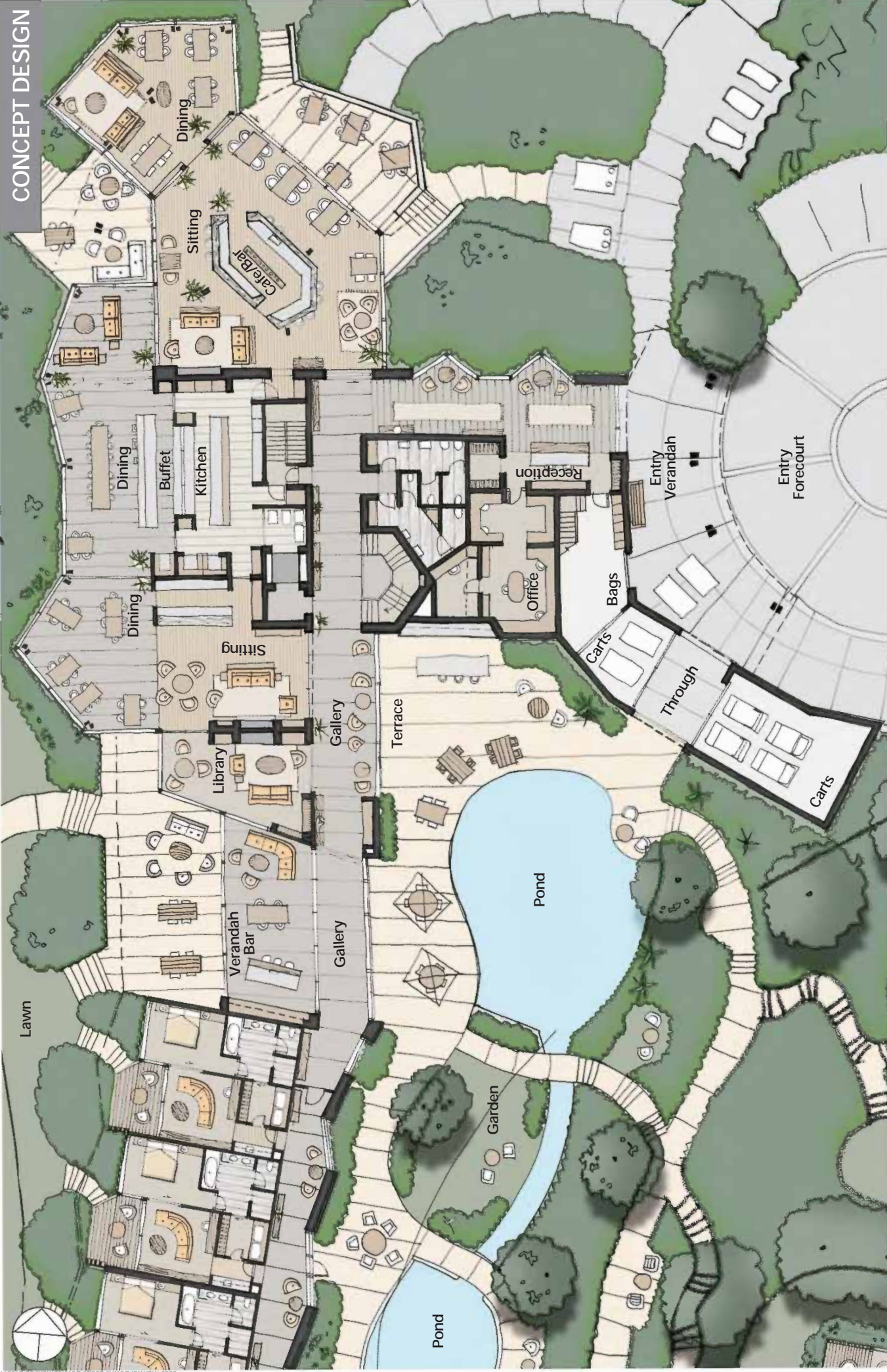


CONCEPT DESIGN



CONCEPT DESIGN





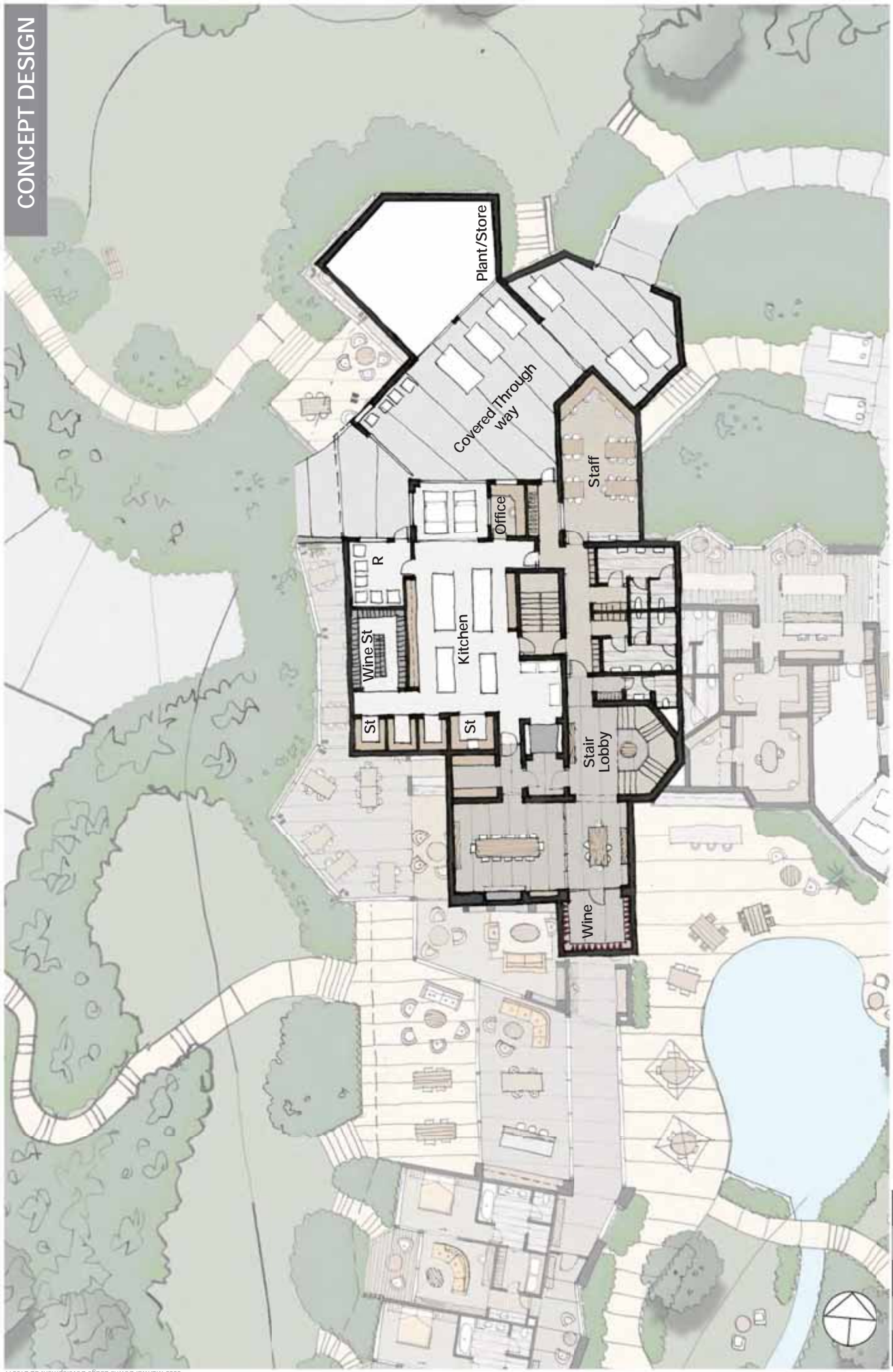
CONCEPT DESIGN

Ground Floor Plan - 1180m<sup>2</sup>

Lodge



CONCEPT DESIGN



Basement Plan - 630m<sup>2</sup>

Lodge



CONCEPT DESIGN

Lawn



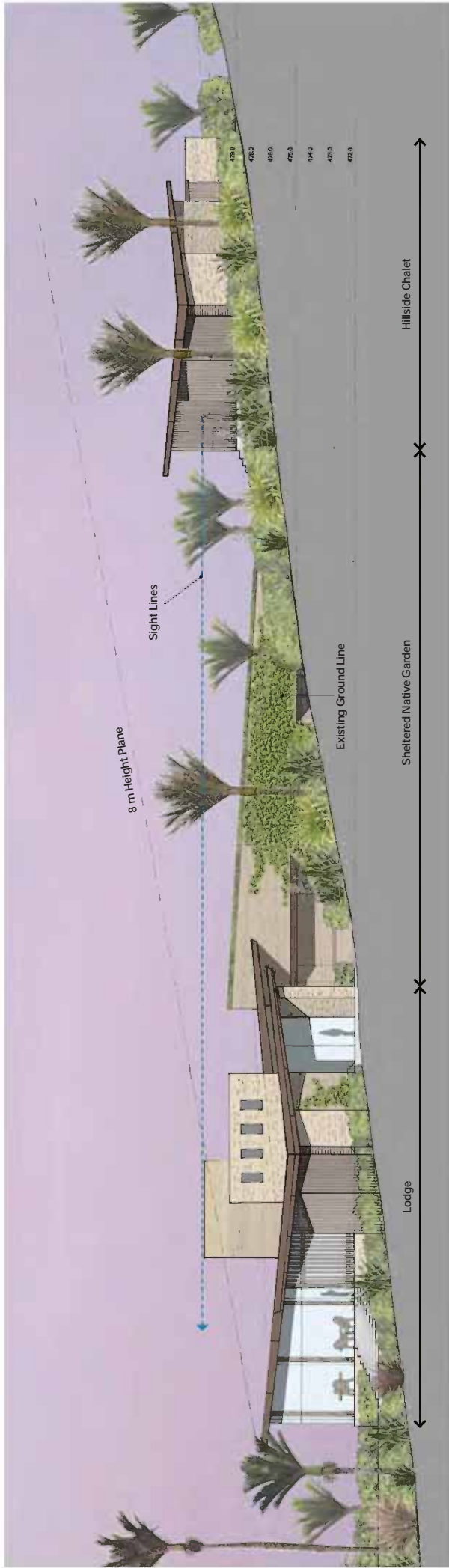
Hotel Suite Plan - 630m<sup>2</sup>



# CONCEPT DESIGN



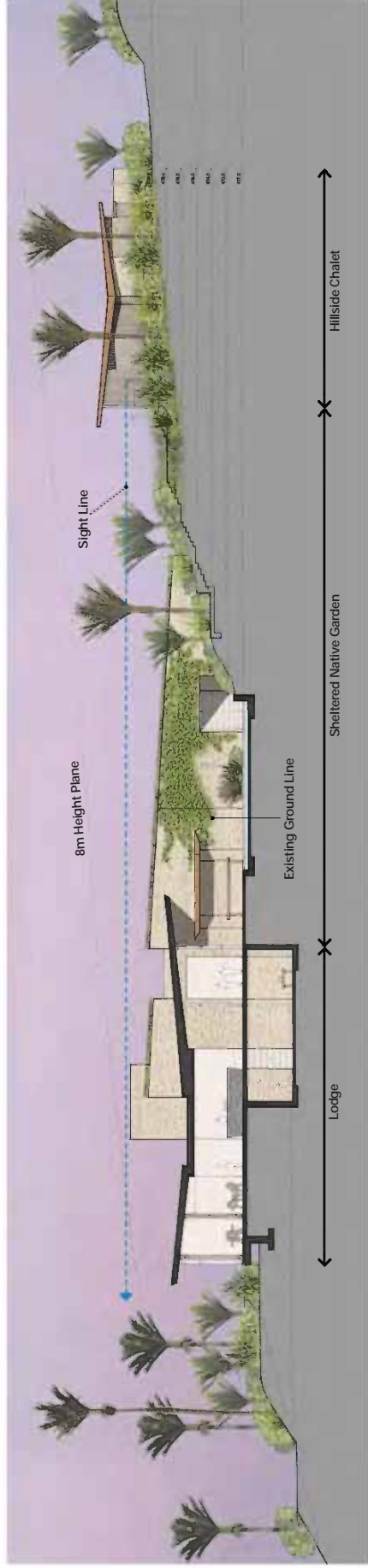
North Elevation



South Elevation



CONCEPT DESIGN



Cross Section



CONCEPT DESIGN



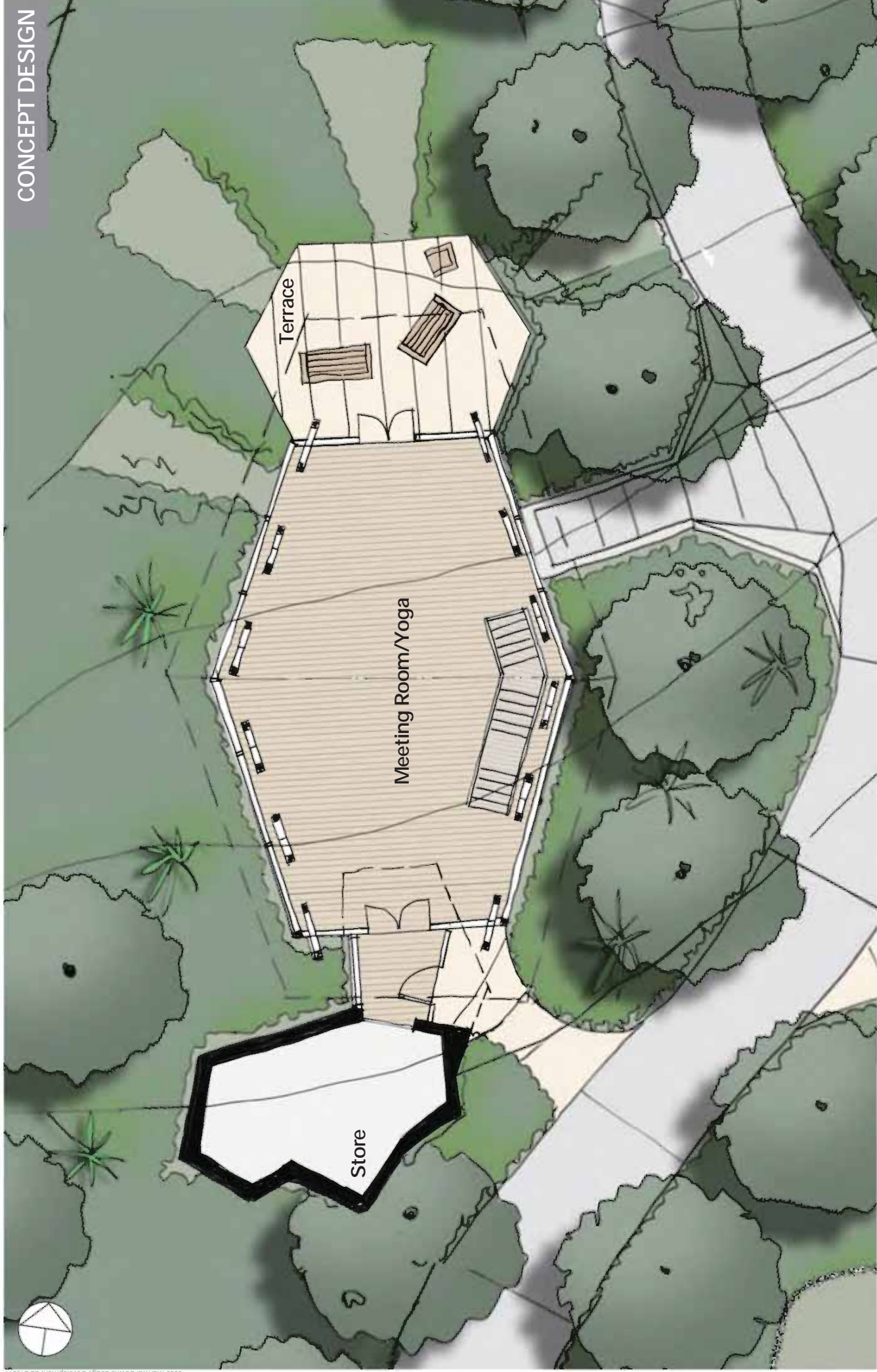
West Elevation



West Elevation



CONCEPT DESIGN

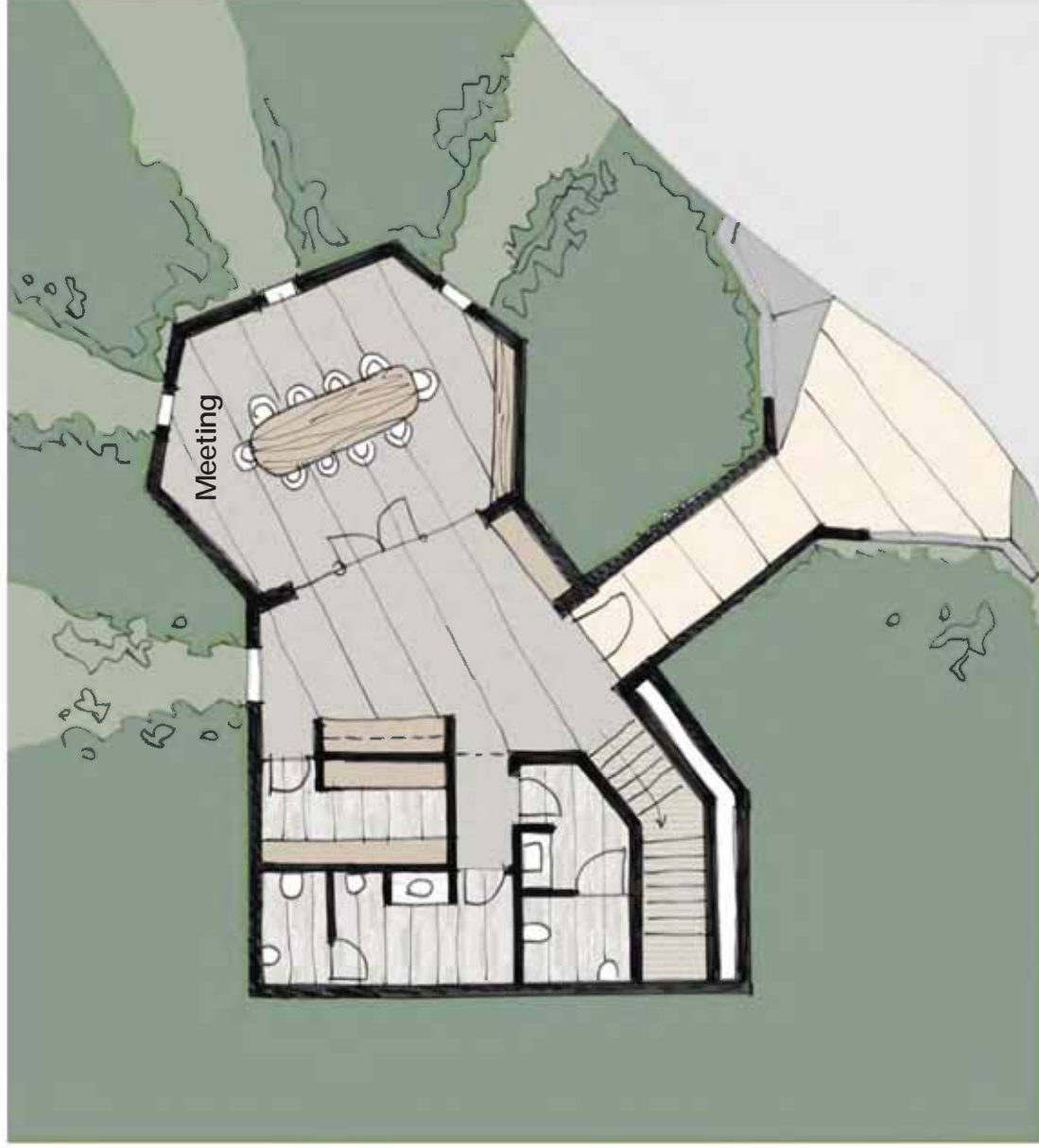


Ground Floor Plan - 150m<sup>2</sup>





CONCEPT DESIGN



Basement Plan - 110m<sup>2</sup>



CONCEPT DESIGN

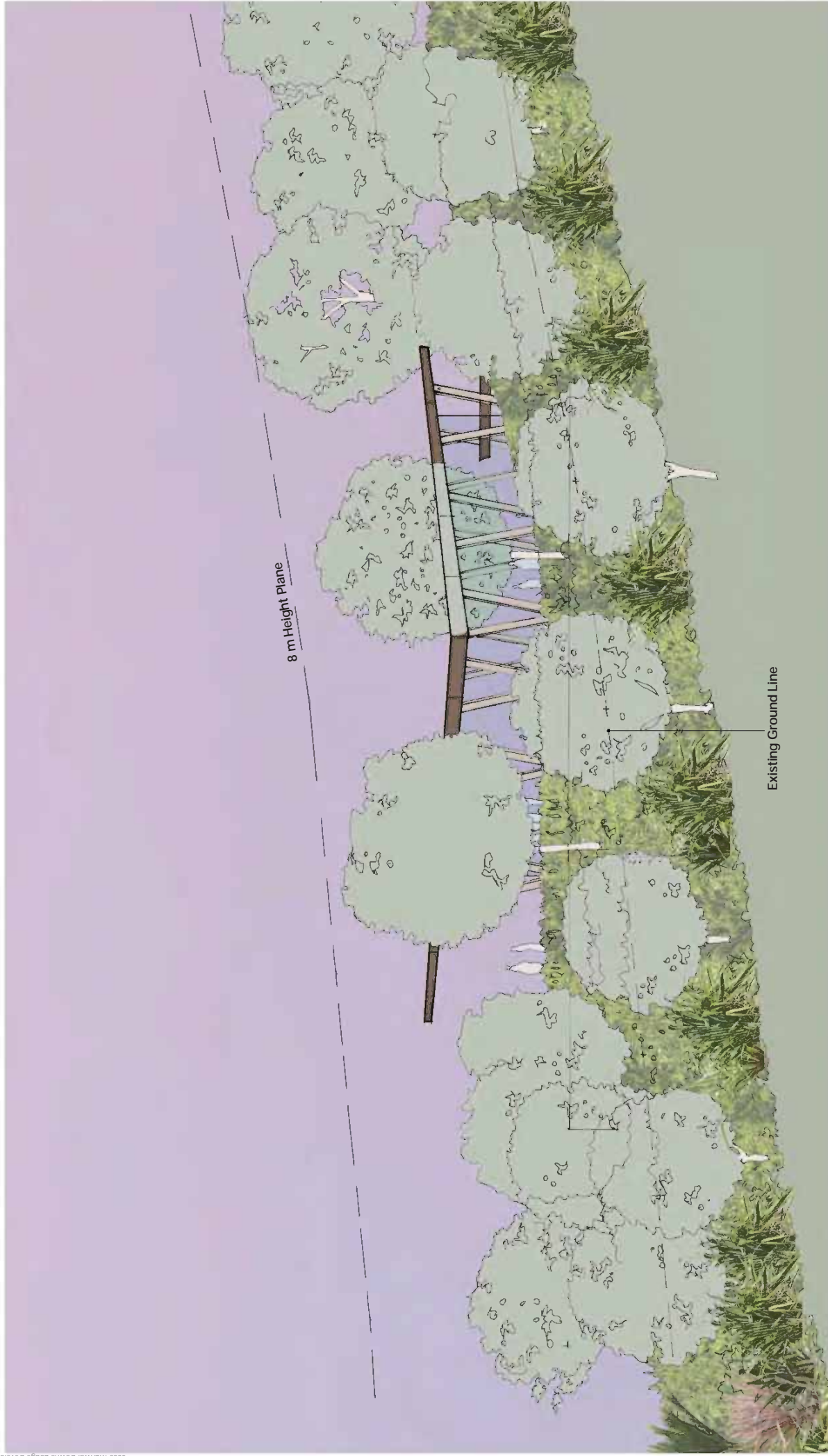


North Elevation





CONCEPT DESIGN



South Elevation



CONCEPT DESIGN



2 Key Chalet Floor Plan - 125m<sup>2</sup>



CONCEPT DESIGN



West Elevation



CONCEPT DESIGN



South Elevation





1 Key Ground Floor Plan - 75m<sup>2</sup>

CONCEPT DESIGN



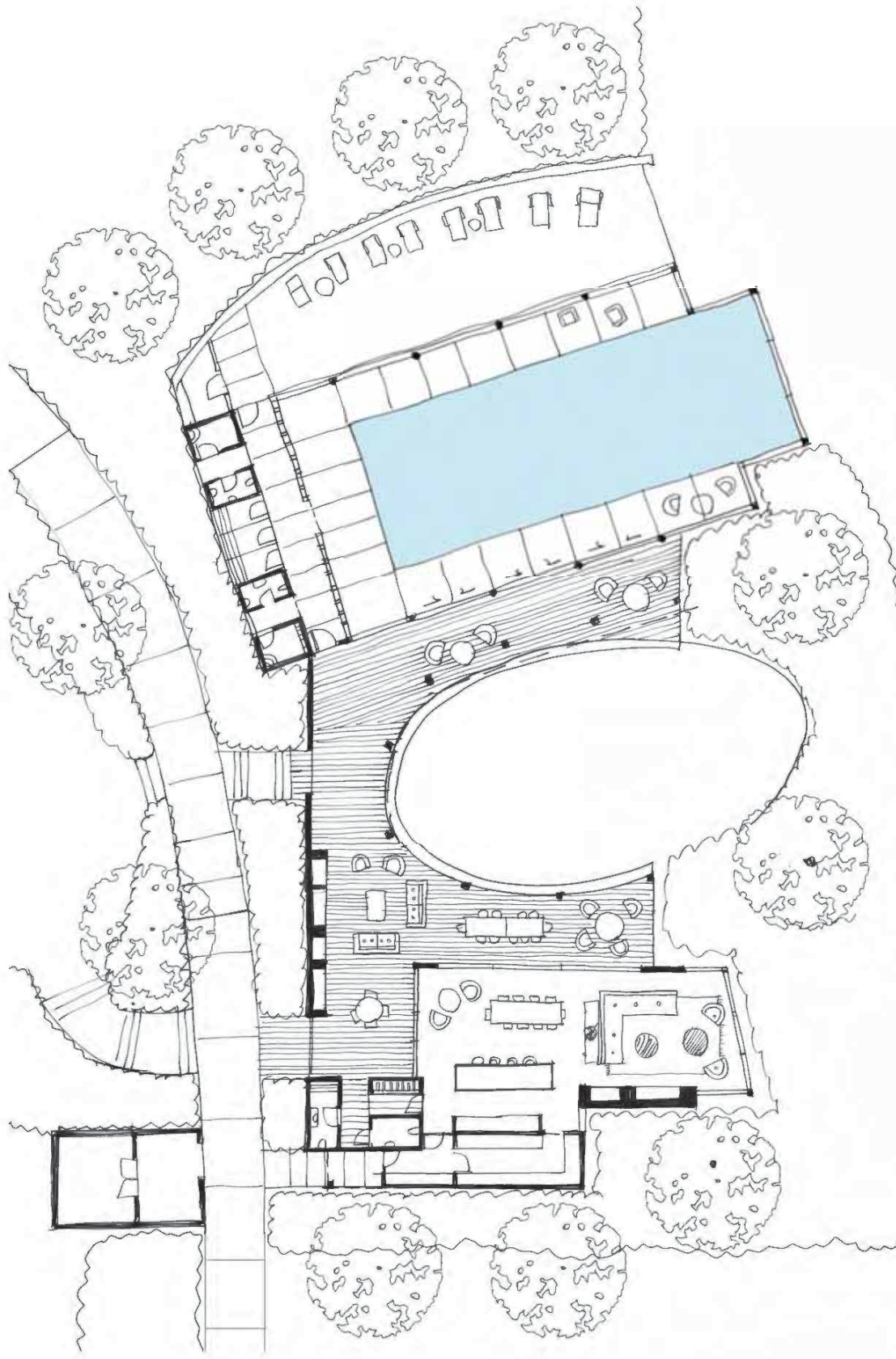
West Elevation





Common Area

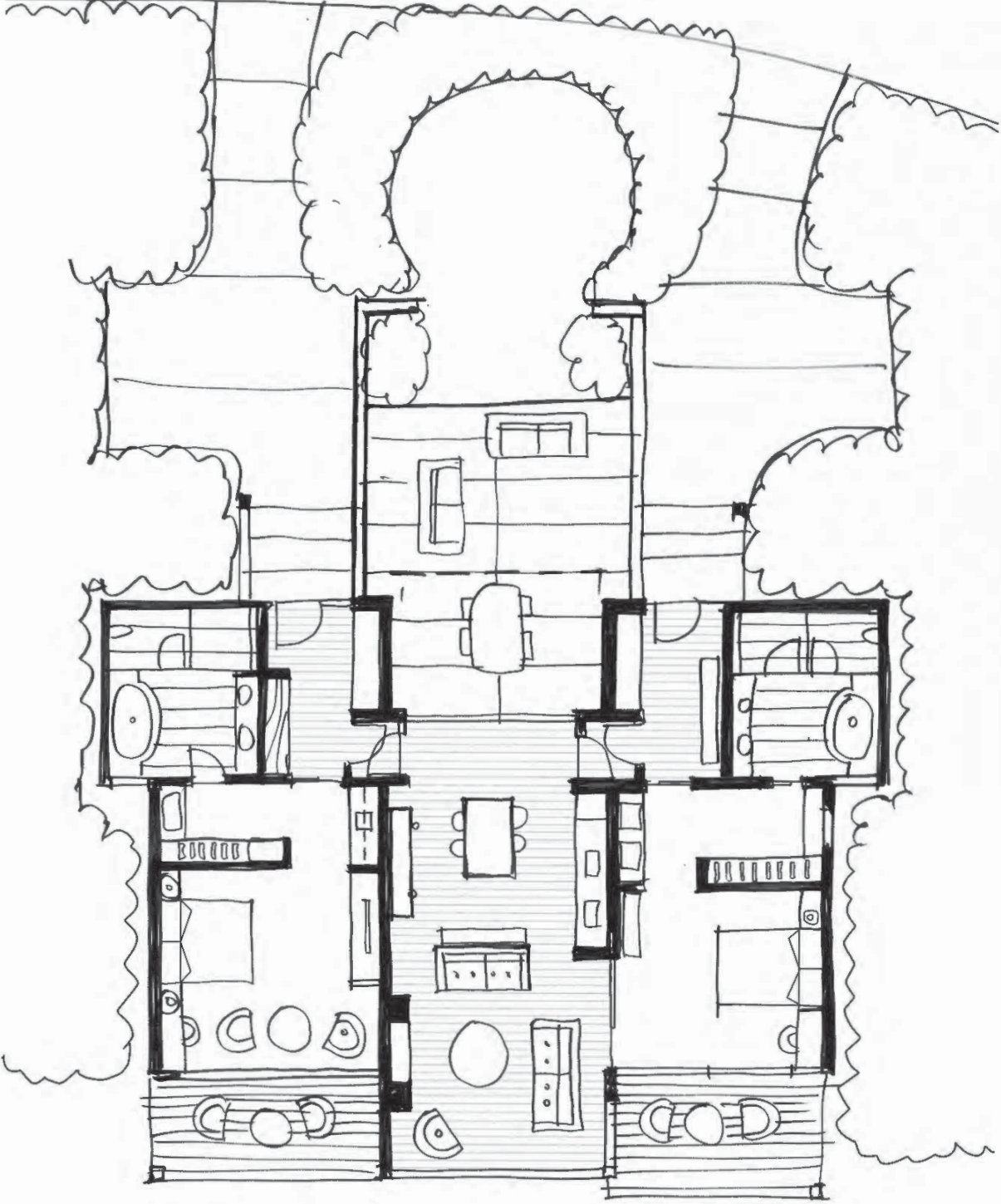




Amenities - Floor Plan - 450m<sup>2</sup>

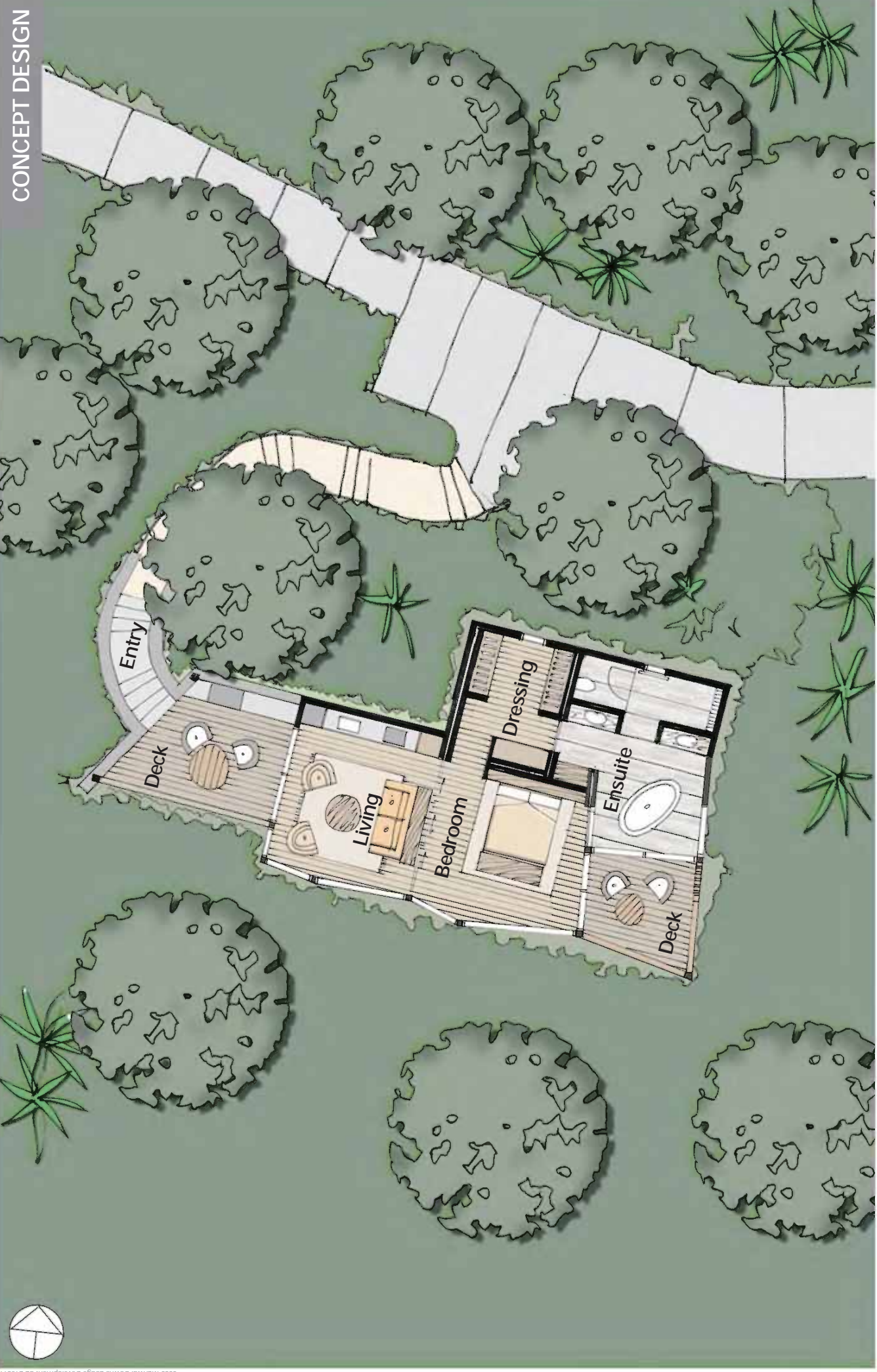






2 Key Chalet - Floor Plan - 170m<sup>2</sup>





1 Key Cabin - Floor Plan - 75m<sup>2</sup>



CONCEPT DESIGN



South Elevation

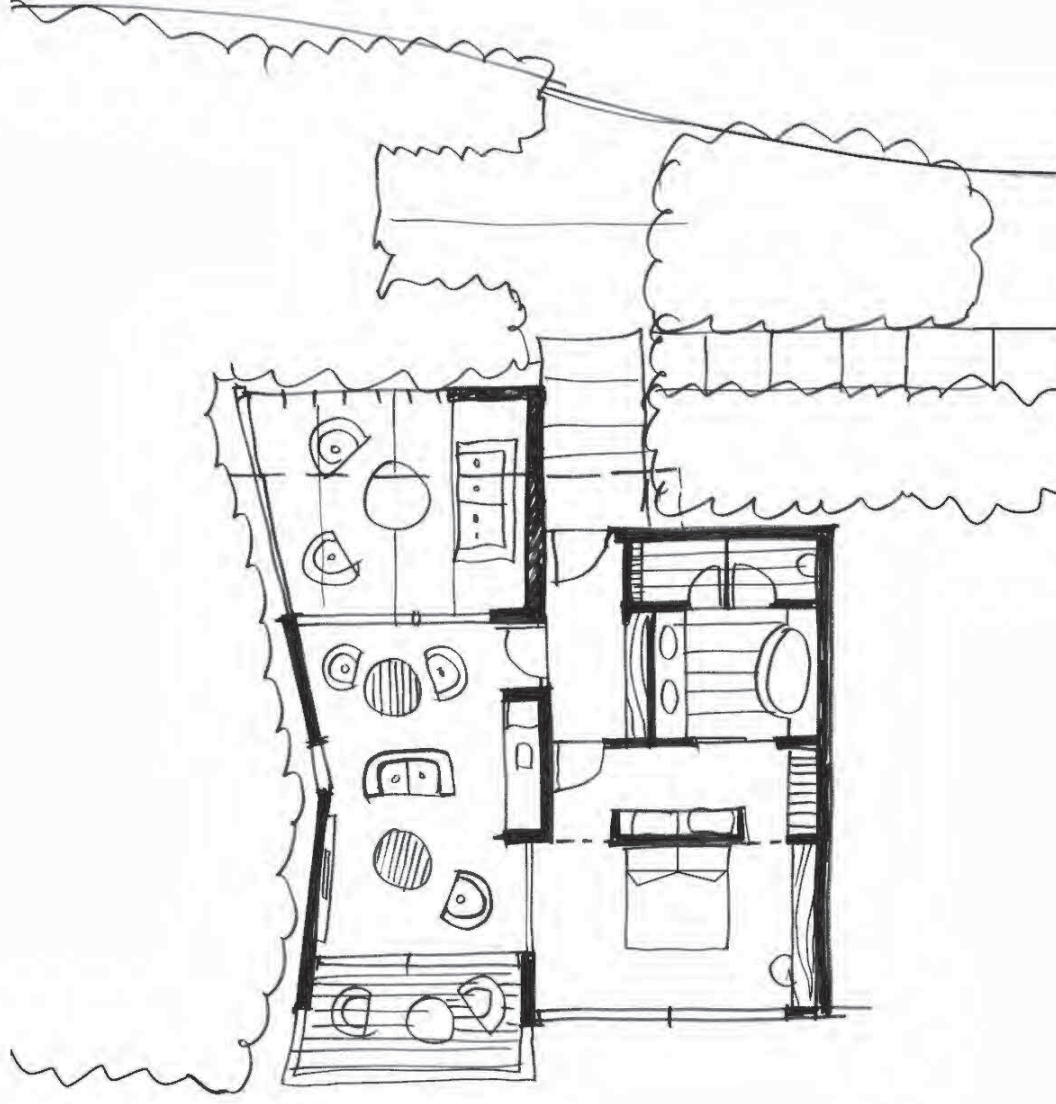


CONCEPT DESIGN



West Elevation





Optional 1 Key Chalet - Floor Plan - 80m<sup>2</sup>



CONCEPT DESIGN



CONCEPT DESIGN



Muriwai Lodge



Matakauri Lodge



CONCEPT DESIGN



Kauri Cliffs



Cape Kidnappers







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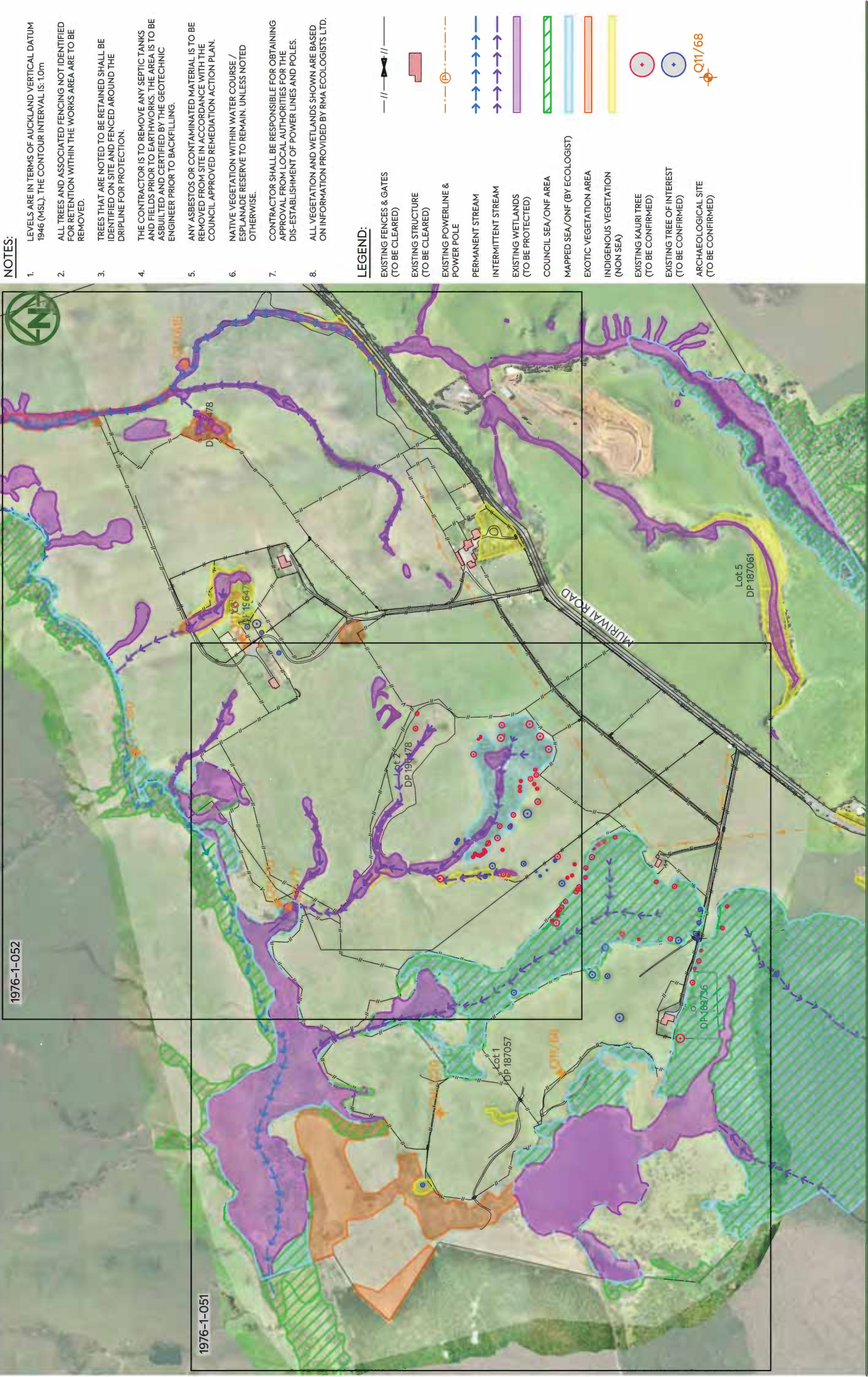
# MURIWAI VALLEY GOLF COURSE ENGINEERING DRAWINGS

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THE BEARS HOME PROJECT LIMITED

MCKENZIE & CO. PROJECT NO	1976-1 & 1976-L1 & 1976-CH1 & 1976-AC1 & 1976-R1
DATE OF ISSUE	NOVEMBER 2021
ISSUE STATUS	FOR CONSENT





**NOTES:**

- LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
- ALL TREES AND ASSOCIATED FENCING NOT IDENTIFIED FOR RETENTION WITHIN THE WORKS AREA ARE TO BE REMOVED.
- TREES THAT ARE NOTED TO BE RETAINED SHALL BE IDENTIFIED ON SITE AND FENCED AROUND THE DRIPLINE FOR PROTECTION.
- THE CONTRACTOR IS TO REMOVE ANY SEPTIC TANKS AND FIELDS PRIOR TO EARTHWORKS. THE AREAS IS TO BE ASBUILT AND CERTIFIED BY THE GEOTECHNICAL ENGINEER PRIOR TO BACKFILLING.
- ANY ASBESTOS OR CONTAMINATED MATERIAL IS TO BE REMOVED FROM SITE IN ACCORDANCE WITH THE COUNCIL APPROVED REMEDIATION ACTION PLAN.
- NATIVE VEGETATION WITHIN WATER COURSE / ESPLANADE RESERVE TO REMAIN UNLESS NOTED OTHERWISE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING APPROVAL FROM LOCAL AUTHORITIES FOR THE DIS-ESTABLISHMENT OF POWER LINES AND POLES.
- ALL VEGETATION AND WETLANDS SHOWN ARE BASED ON INFORMATION PROVIDED BY RMA ECOLOGISTS LTD.

**LEGEND:**

- EXISTING FENCES & GATES (TO BE CLEARED)
- EXISTING STRUCTURE (TO BE CLEARED)
- EXISTING POWERLINE & POWER POLE
- PERMANENT STREAM
- INTERMITTENT STREAM (TO BE PROTECTED)
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- EXOTIC VEGETATION AREA
- INDIGENOUS VEGETATION (NON SEA)
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)

1976-1-052

1976-1-051



**MCKENZIE & CO.**

THE BEARS HOME  
PROJECT MANAGEMENT LTD

MURUWA DOWNS GOLF PROJECT  
610 & 697 MURUWA ROAD  
MURUWA VALLEY

CLIENT: PROJECT: TITLE:

PURPOSE OF ISSUE:  
**FOR CONSENT**

EXISTING TOPOGRAPHY  
OVERALL PLAN

SCALE:  
**1:7500**  
DO NOT SCALE  
DRAWING NO:  
**1976-1-050**

REV: **C**

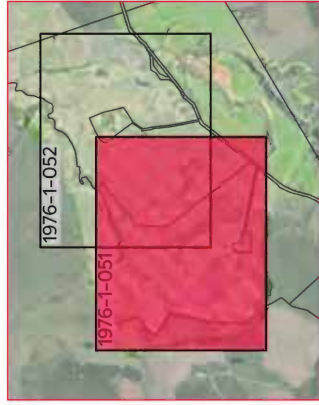
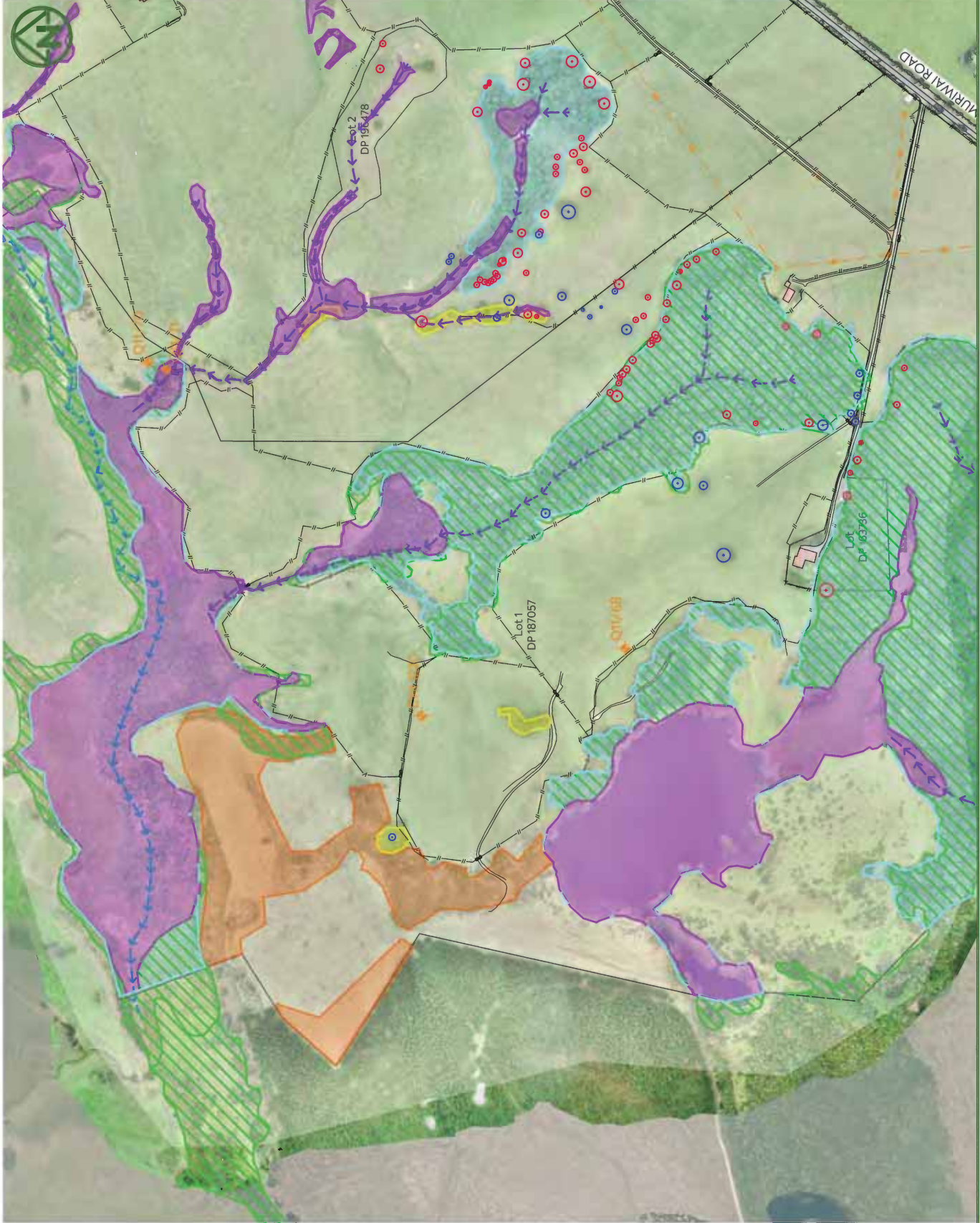
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B	SECOND ISSUE	MO	CIM	JSD	29/10/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

**NOTES:**

1. REFER TO DRAWING 1976-1-300 FOR STANDARD SITE CLEARING NOTES.

**LEGEND:**

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- EXISTING STRUCTURE (TO BE CLEARED)
- EXISTING POWERLINE & POWER POLE
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA/ONF AREA
- MAPPED SEA/ONF (BY ECOLOGIST)
- EXOTIC VEGETATION AREA
- INDIGENOUS VEGETATION (NON SEA)
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



DRAWING LAYOUT PLAN

PURPOSE OF ISSUE: FOR CONSENT  
 SCALE: 1:5000  
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 DRAWING NO.: 1976-1-051  
 REV: C

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 PROJECT: MURIWAI DOWNS GOLF PROJECT 610 & 697 MURIWAI ROAD MURIWAI VALLEY  
 CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD



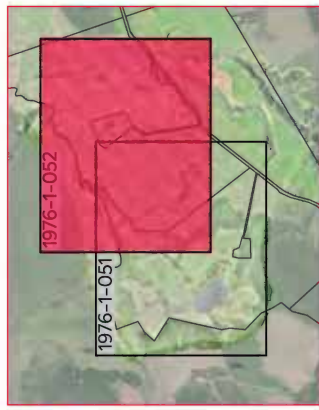
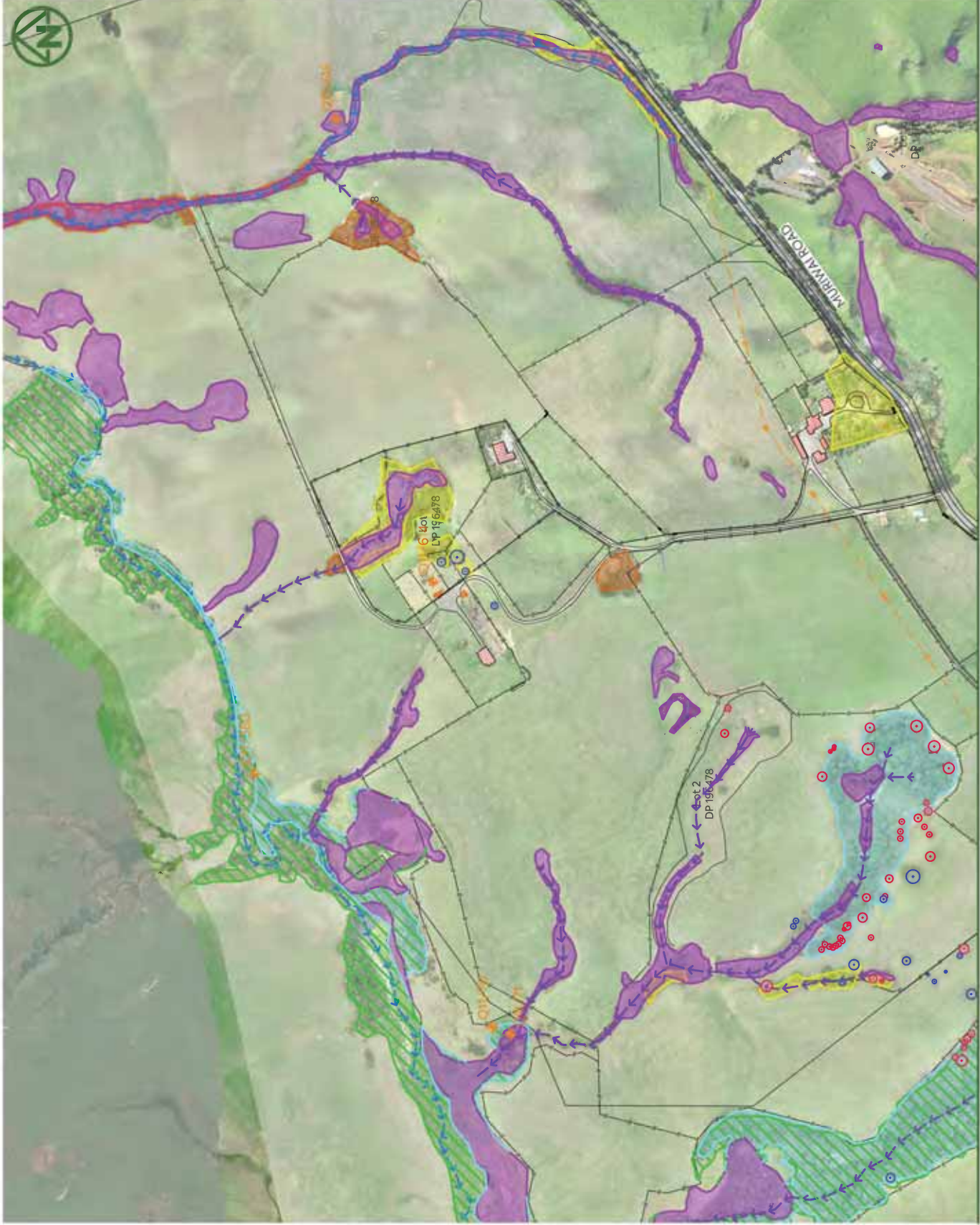
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A	FIRST ISSUE	MO	CIM	JSD	24/09/21

**NOTES:**

1. REFER TO DRAWING 1976-1-300 FOR STANDARD SITE CLEARING NOTES.

**LEGEND:**

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	EXISTING STRUCTURE (TO BE CLEARED)
	EXISTING POWERLINE & POWER POLE
	PERMANENT STREAM
	INTERMITTENT STREAM
	EXISTING WETLANDS (TO BE PROTECTED)
	COUNCIL SEA/ONF AREA
	MAPPED SEA/ONF (BY ECOLOGIST)
	EXOTIC VEGETATION AREA
	INDIGENOUS VEGETATION (NON SEA)
	EXISTING KAURI TREE (TO BE CONFIRMED)
	EXISTING TREE OF INTEREST (TO BE CONFIRMED)
	ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

<b>CLIENT:</b>	THE BEARS HOME PROJECT MANAGEMENT LTD
<b>PROJECT:</b>	MURIWAI DOWNS GOLF PROJECT 610 & 697 MURIWAI ROAD MURIWAI VALLEY
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<b>DRAWING NO.:</b>	1976-1-052
<b>REV:</b>	C



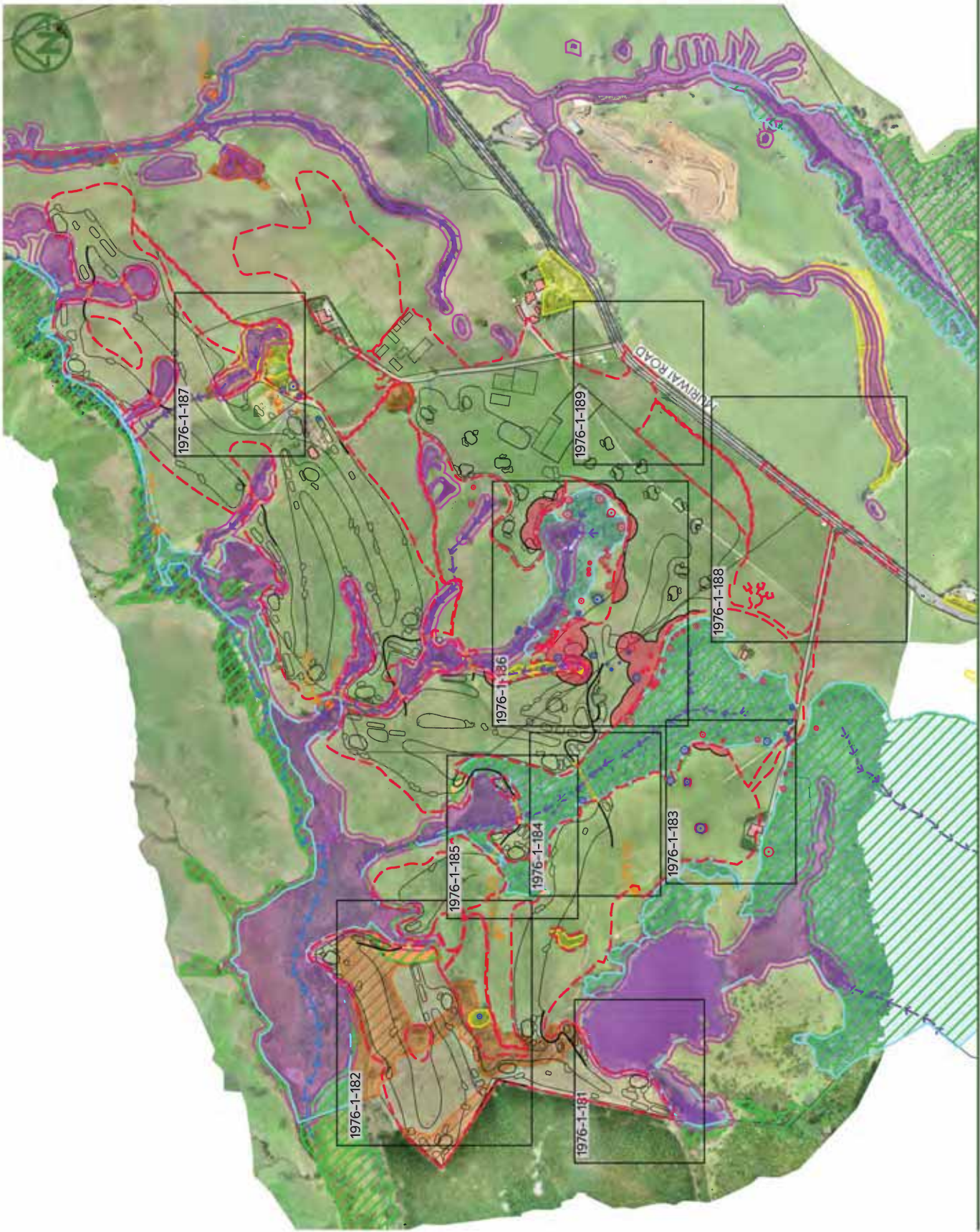
REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
3. ALL CLEARING OF VEGETATION TO BE SUPERVISED BY AN AUTHORISED ARBORIST AT ALL TIMES. NO WORKS TO BE DONE UNDER DRIFLINE UNLESS AUTHORISED.
4. ALL VEGETATION AND WETLANDS SHOWN ARE BASED ON INFORMATION PROVIDED BY RMA ECOLOGISTS LTD.
5. KAURI DIEBACK CONTAMINATED AREA ASSUMED TO BE 3 TIMES THE RADIUS OF THE OUTERMOST CANOPY DRIFLINE.

**LEGEND:**

- EXTENT OF WORKS
- 10m BUFFER FROM WETLAND
- EXISTING WETLAND (TO BE PROTECTED)
- MAPPED SEA/ONF (BY ECOLOGIST)
- COUNCIL SEA/ONF AREA
- EXOTIC VEGETATION AREA
- INDIGENOUS VEGETATION (NON SEA)
- EXOTIC VEGETATION TO BE REMOVED
- INDIGENOUS VEGETATION TO BE REMOVED
- MAPPED SEA/ONF (BY ECOLOGIST) TO BE REMOVED
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



	<p>CLIENT: <b>THE BEARS HOME PROJECT MANAGEMENT LTD</b></p> <p>PROJECT: <b>MURIWAI DOWNS GOLF PROJECT</b></p> <p>TITLE: <b>CLEARING PLAN OVERALL PLAN</b></p>	<p>PURPOSE OF ISSUE: <b>FOR CONSENT</b></p> <p>SCALE: <b>1:7500 @ A3</b></p> <p>DO NOT SCALE</p> <p>DRAWING NO: <b>1976-1-180</b></p> <p>REV: <b>C</b></p>												
<p><b>MCKENZIE &amp; CO.</b></p>														
<p>C ISSUED FOR CONSENT</p> <p>B SECOND ISSUE</p> <p>A FIRST ISSUE</p> <p>REV DESCRIPTION</p>	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">NO</td> <td style="width: 10%;">CIM</td> <td style="width: 10%;">JSD</td> <td style="width: 10%;">26/01/21</td> </tr> <tr> <td>NO</td> <td>CIM</td> <td>JSD</td> <td>29/01/21</td> </tr> <tr> <td>NO</td> <td>CIM</td> <td>JSD</td> <td>24/03/21</td> </tr> </table> <p>DRN BY: <b>CHK BY: APP BY: DATE</b></p>	NO	CIM	JSD	26/01/21	NO	CIM	JSD	29/01/21	NO	CIM	JSD	24/03/21	<p>PLOT DATE: 2021-01-23 15:24:46</p> <p>WWW.MCKENZIEANDCO.CO.NZ</p>
NO	CIM	JSD	26/01/21											
NO	CIM	JSD	29/01/21											
NO	CIM	JSD	24/03/21											
<p>THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.</p>														

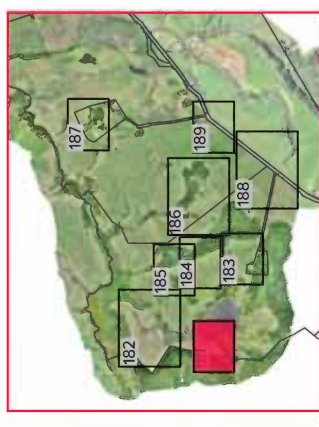


**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
3. ALL CLEARING OF VEGETATION TO BE SUPERVISED BY AN AUTHORISED ARBORIST AT ALL TIMES. NO WORKS TO BE DONE UNDER DRIPLINE UNLESS AUTHORISED.
4. ALL VEGETATION AND WETLANDS SHOWN ARE BASED ON INFORMATION PROVIDED BY RMA ECOLOGISTS LTD.
5. KAURI DIEBACK CONTAMINATED AREA ASSUMED TO BE 3 TIMES THE RADIUS OF THE OUTERMOST CANOPY DRIPLINE.

**LEGEND:**

- EXTENT OF WORKS
- 10m BUFFER FROM WETLAND
- EXISTING WETLAND (TO BE PROTECTED)
- MAPPED SEA/ONE (BY ECOLOGIST)
- COUNCIL SEA/ONE AREA
- EXOTIC VEGETATION AREA
- INDIGENOUS VEGETATION (NON SEA)
- EXOTIC VEGETATION TO BE REMOVED
- INDIGENOUS VEGETATION TO BE REMOVED
- MAPPED SEA/ONE (BY ECOLOGIST) TO BE REMOVED
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



MINOR WORKS AROUND EXISTING DRIPLINE. NO WORKS TO BE UNDERTAKEN WITHOUT ONSITE SUPERVISION OF ECOLOGIST.

MINOR SEA REMOVAL FOR EARTHWORKS  
COUNCIL SEA AREA 43m<sup>2</sup>  
ECOLOGIST SEA AREA 43m<sup>2</sup>



CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
PROJECT: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE: CLEARING LAYOUT PLAN  
SHEET 1

PURPOSE OF ISSUE: FOR CONSENT  
SCALE: 1:1000 @ A3  
DO NOT SCALE  
DRAWING NO.: 1976-1-181  
REV: C

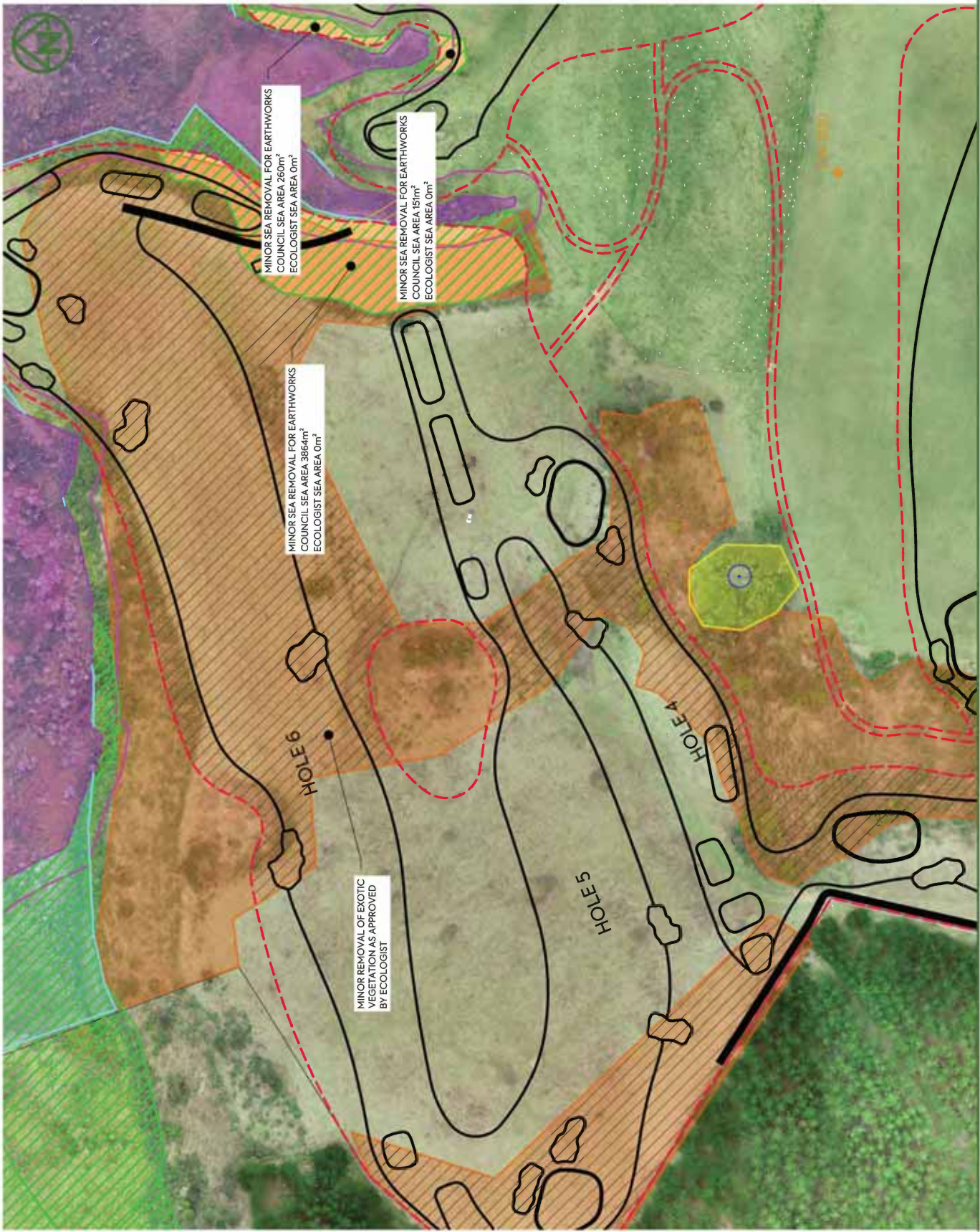
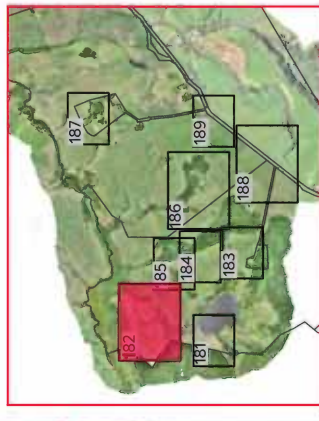
REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
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3. ALL CLEARING OF VEGETATION TO BE SUPERVISED BY AN AUTHORISED ARBORIST AT ALL TIMES. NO WORKS TO BE DONE UNDER DRIPLINE UNLESS AUTHORISED.
4. ALL VEGETATION AND WETLANDS SHOWN ARE BASED ON INFORMATION PROVIDED BY RMA ECOLOGISTS LTD.
5. KAURI DIEBACK CONTAMINATED AREA ASSUMED TO BE 3 TIMES THE RADIUS OF THE OUTERMOST CANOPY DRIPLINE.

**LEGEND:**

- EXTENT OF WORKS
- 10m BUFFER FROM WETLAND
- EXISTING WETLAND (TO BE PROTECTED)
- MAPPED SEA/ONF (BY ECOLOGIST)
- COUNCIL SEA/ONF AREA
- EXOTIC VEGETATION AREA
- INDIGENOUS VEGETATION (NON SEA)
- EXOTIC VEGETATION TO BE REMOVED
- INDIGENOUS VEGETATION TO BE REMOVED
- MAPPED SEA/ONF (BY ECOLOGIST) TO BE REMOVED
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**MCKENZIE & CO.**

THE BEARS HOME  
PROJECT MANAGEMENT LTD  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

**DRAWING LAYOUT PLAN**

CLEARING PLAN  
LAYOUT PLAN  
SHEET 2

REV	DESCRIPTION	DNB BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	29/10/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
PROJECT: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD MURIWAI VALLEY

PURPOSE OF ISSUE: FOR CONSENT

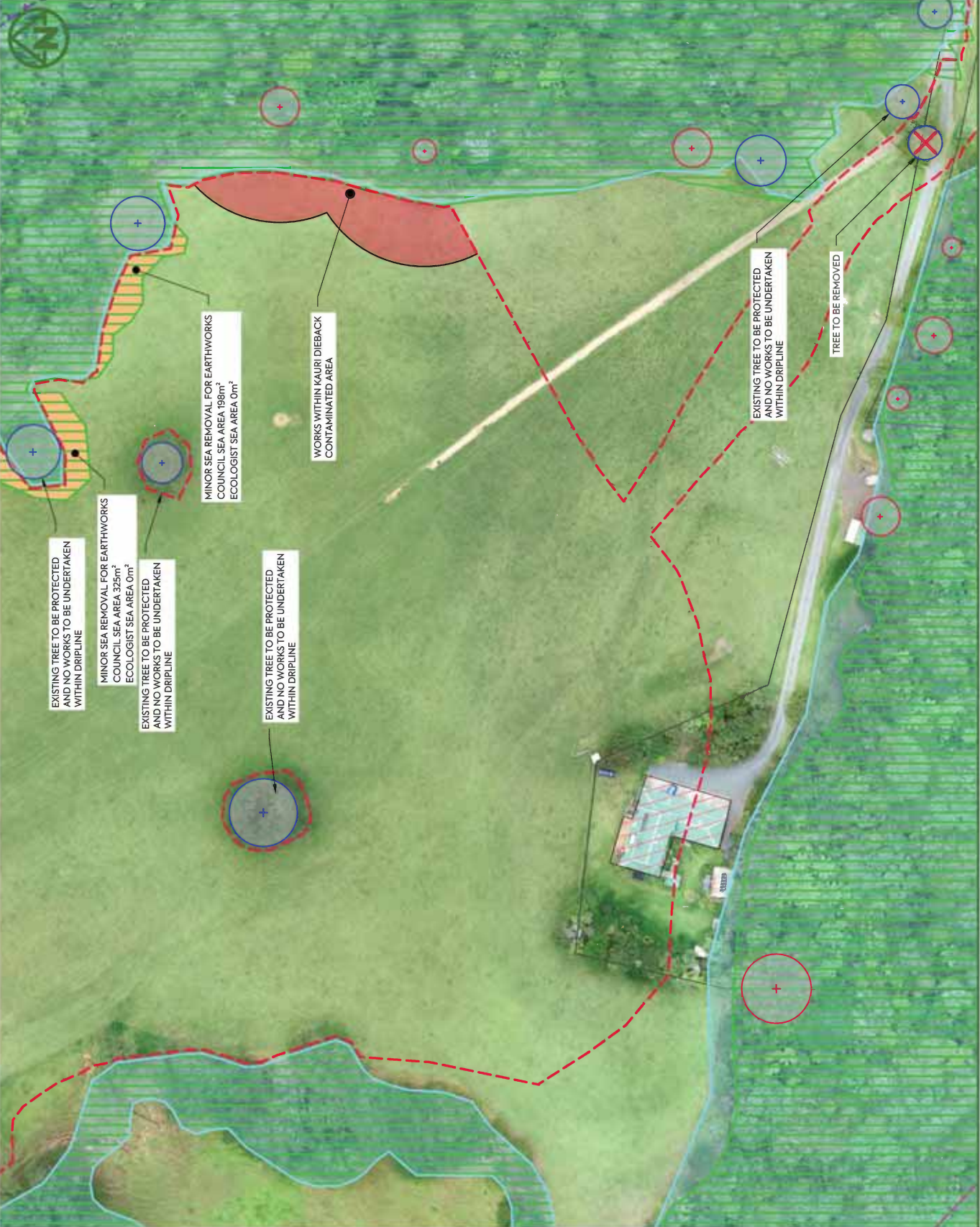
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DO NOT SCALE

DRAWING NO.: 1976-1-182

REV: C

PLOT DATE: 2021-11-23 15:24:52 WWW.MCKENZIEANDCO.CO.NZ THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE

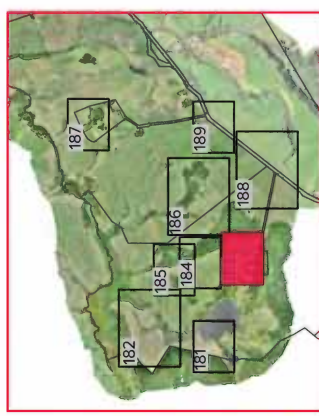




- NOTES:**
1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (AVSL). THE CONTOUR INTERVAL IS: 1.0m
  2. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
  3. ALL CLEARING OF VEGETATION TO BE SUPERVISED BY AN AUTHORISED ARBORIST AT ALL TIMES. NO WORKS TO BE DONE UNDER DRIPLINE UNLESS AUTHORISED.
  4. ALL VEGETATION AND WETLANDS SHOWN ARE BASED ON INFORMATION PROVIDED BY RMA ECOLOGISTS LTD.
  5. KAURI DIEBACK CONTAMINATED AREA ASSUMED TO BE 3 TIMES THE RADIUS OF THE OUTERMOST CANOPY DRIPLINE.

**LEGEND:**

- EXTENT OF WORKS
- 10m BUFFER FROM WETLAND
- EXISTING WETLAND (TO BE PROTECTED)
- MAPPED SEA/ONF (BY ECOLOGIST)
- COUNCIL SEA/ONF AREA
- EXOTIC VEGETATION AREA
- INDIGENOUS VEGETATION (NON SEA)
- EXOTIC VEGETATION TO BE REMOVED
- INDIGENOUS VEGETATION TO BE REMOVED
- MAPPED SEA/ONF (BY ECOLOGIST) TO BE REMOVED
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1000 @ A3

DO NOT SCALE

DRAWING NO.: 1976-1-183

REV: C

**CLEARING PLAN LAYOUT PLAN SHEET 3**

PROJECT: MURIWAI DOWNS GOLF PROJECT 610 & 697 MURIWAI ROAD MURIWAI VALLEY

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD

**MCKENZIE & CO.**

NO	CHK BY	APP BY	DATE
C	CIM	JSD	26/11/21
B	CIM	JSD	29/10/21
A	CIM	JSD	24/09/21

ISSUED FOR CONSENT

SECOND ISSUE

FIRST ISSUE

DESCRIPTION

WWW.MCKENZIEANDCO.CO.NZ

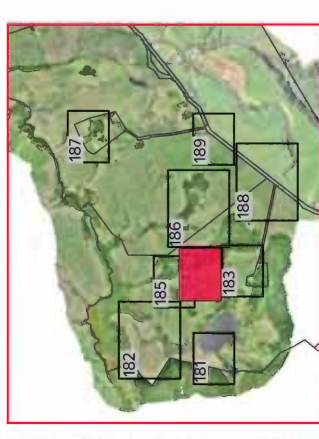
THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.

**NOTES:**

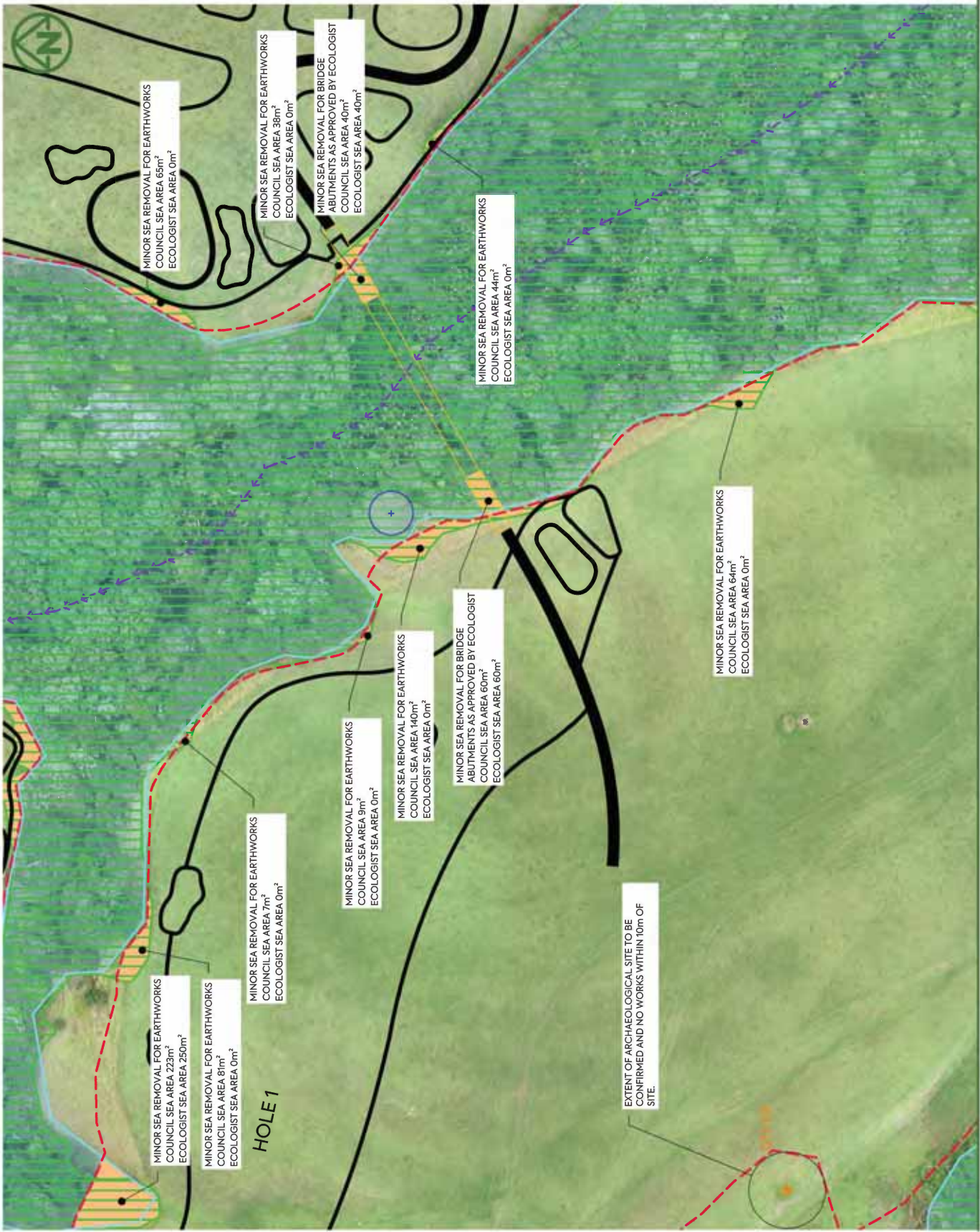
1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
3. ALL CLEARING OF VEGETATION TO BE SUPERVISED BY AN AUTHORISED ARBORIST AT ALL TIMES. NO WORKS TO BE DONE UNDER DRIPLINE UNLESS AUTHORISED.
4. ALL VEGETATION AND WETLANDS SHOWN ARE BASED ON INFORMATION PROVIDED BY RMA ECOLOGISTS LTD.
5. KAURI DIEBACK CONTAMINATED AREA ASSUMED TO BE 3 TIMES THE RADIUS OF THE OUTERMOST CANOPY DRIPLINE.

**LEGEND:**

- EXTENT OF WORKS
- 10m BUFFER FROM WETLAND
- EXISTING WETLAND (TO BE PROTECTED)
- MAPPED SEA/ONF (BY ECOLOGIST)
- COUNCIL SEA/ONF AREA
- EXOTIC VEGETATION AREA
- INDIGENOUS VEGETATION (NON SEA)
- EXOTIC VEGETATION TO BE REMOVED
- INDIGENOUS VEGETATION TO BE REMOVED
- MAPPED SEA/ONF (BY ECOLOGIST) TO BE REMOVED
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**



**PURPOSE OF ISSUE**  
FOR CONSENT

**SCALE:**  
1:1000 @ A3  
DO NOT SCALE

**DRAWING NO.:**  
1976-1-184

**REV:**  
C

**CLEARING PLAN**  
**LAYOUT PLAN**  
**SHEET 4**

**PROJECT:**  
MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

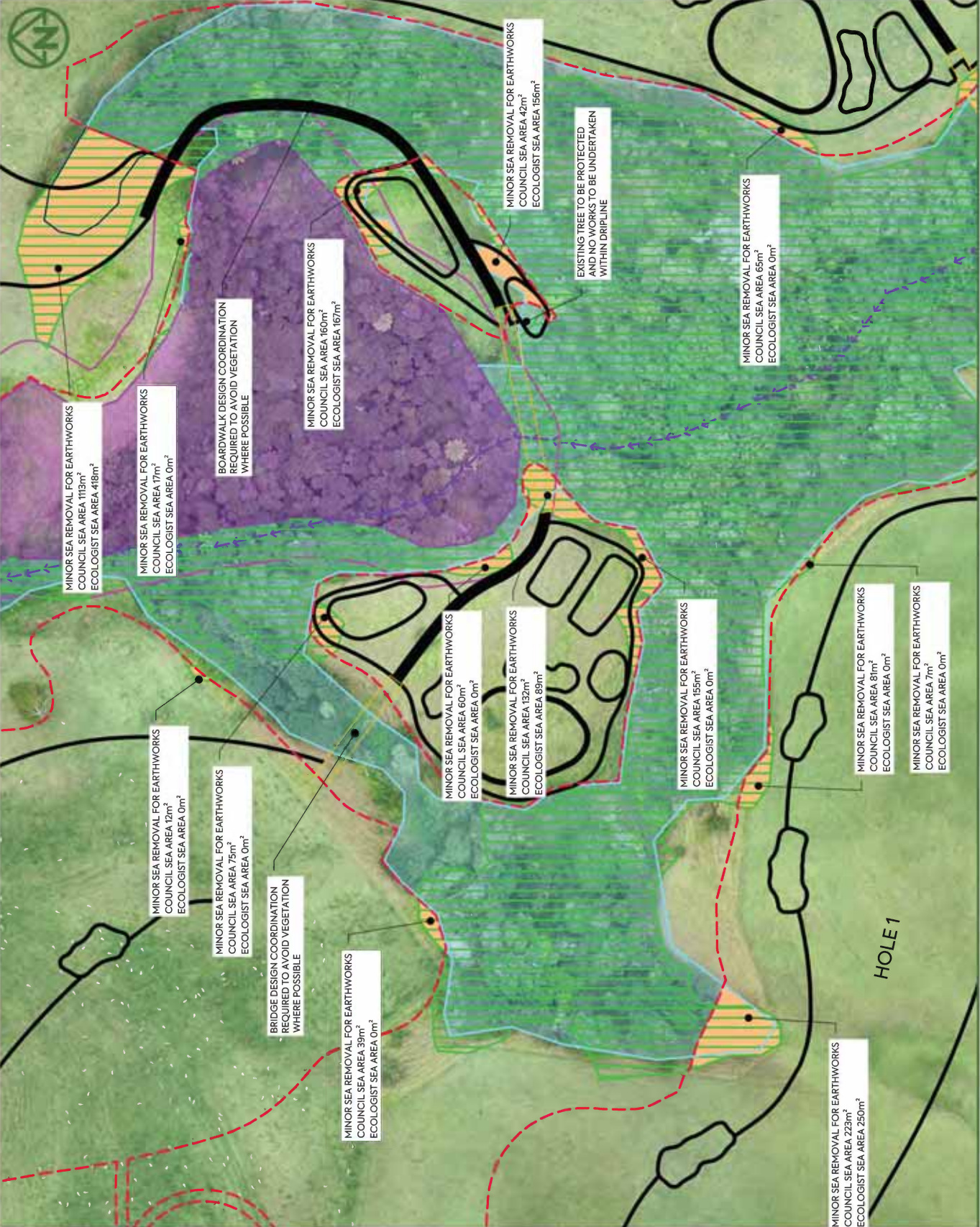
**CLIENT:**  
THE BEARS HOME  
PROJECT MANAGEMENT LTD

**MCKENZIE & CO.**

NO	CHK	APP	DATE
C	ISSUED FOR CONSENT	JSD	26/01/21
B	SECOND ISSUE	JSD	29/01/21
A	FIRST ISSUE	JSD	24/09/21

DRN BY: CHK BY: APP BY: DATE

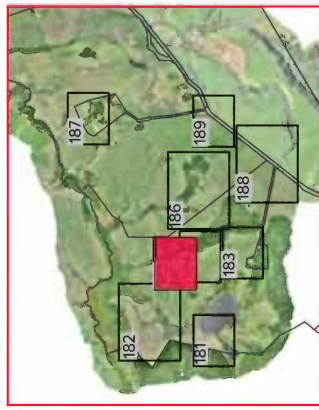
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- NOTES:**
- ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
  - EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
  - ALL CLEARING OF VEGETATION TO BE SUPERVISED BY AN AUTHORISED ARBORIST AT ALL TIMES. NO WORKS TO BE DONE UNDER DRIPLINE UNLESS AUTHORISED.
  - ALL VEGETATION AND WETLANDS SHOWN ARE BASED ON INFORMATION PROVIDED BY RMA ECOLOGISTS LTD.
  - KAURI DIEBACK CONTAMINATED AREA ASSUMED TO BE 3 TIMES THE RADIUS OF THE OUTERMOST CANOPY DRIPLINE.

**LEGEND:**

- EXTENT OF WORKS
- 10m BUFFER FROM WETLAND
- EXISTING WETLAND (TO BE PROTECTED)
- MAPPED SEA/ONF (BY ECOLOGIST)
- COUNCIL SEA/ONF AREA
- EXOTIC VEGETATION AREA
- INDIGENOUS VEGETATION (NON SEA)
- EXOTIC VEGETATION TO BE REMOVED
- INDIGENOUS VEGETATION TO BE REMOVED
- MAPPED SEA/ONF (BY ECOLOGIST) TO BE REMOVED
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3

DO NOT SCALE

DRAWING NO.: 1976-1-185

REV: C

**CLIENT:** THE BEARS HOME PROJECT MANAGEMENT LTD

**PROJECT:** MURIWAI DOWNS GOLF PROJECT 610 & 697 MURIWAI ROAD MURIWAI VALLEY

**TITLE:** CLEARING LAYOUT PLAN SHEET 5

**MCKENZIE & CO.**

REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	NO	CHM	JSD	26/01/21
B	SECOND ISSUE	NO	CHM	JSD	29/01/21
A	FIRST ISSUE	NO	CHM	JSD	24/09/21

DRN BY: CHM; BY: APP BY: DATE

PLOT DATE: 2021-01-23 16:25:00

WWW.MCKENZIEANDCO.CO.NZ

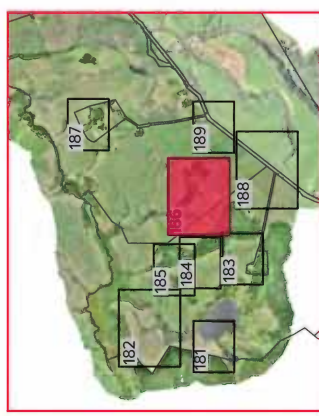
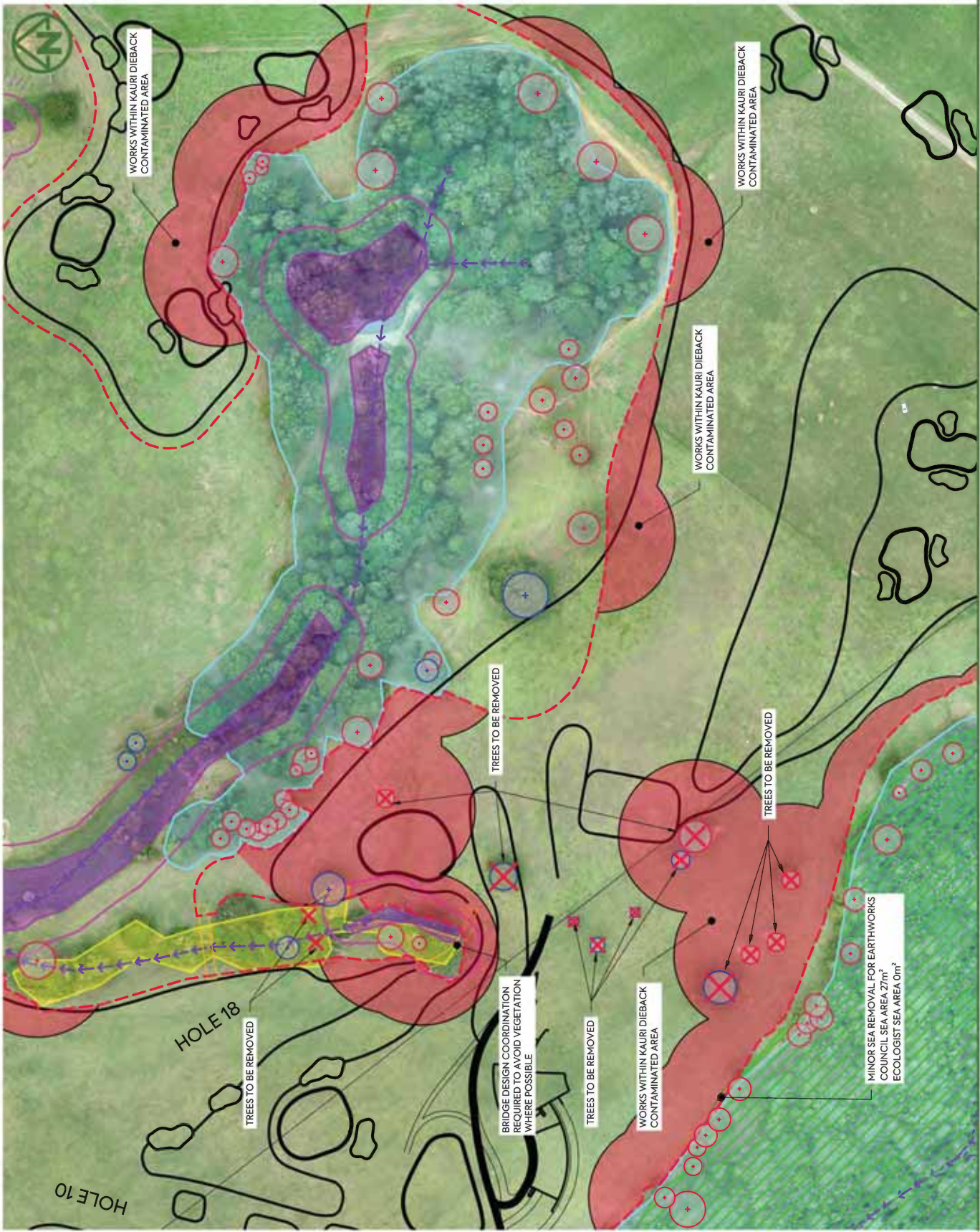
THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
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5. KAURI DIEBACK CONTAMINATED AREA ASSUMED TO BE 3 TIMES THE RADIUS OF THE OUTERMOST CANOPY DRIFLINE.

**LEGEND:**

- EXTENT OF WORKS
- 10m BUFFER FROM WETLAND
- EXISTING WETLAND (TO BE PROTECTED)
- MAPPED SEA/ONF (BY ECOLOGIST)
- COUNCIL SEA/ONF AREA
- EXOTIC VEGETATION AREA
- INDIGENOUS VEGETATION (NON SEA)
- EXOTIC VEGETATION TO BE REMOVED
- INDIGENOUS VEGETATION TO BE REMOVED
- MAPPED SEA/ONF (BY ECOLOGIST) TO BE REMOVED
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)
- Q11/68



**DRAWING LAYOUT PLAN**

<p><b>CLIENT:</b> THE BEARS HOME PROJECT MANAGEMENT LTD</p> <p><b>PROJECT:</b> MURIWAI DOWNS GOLF PROJECT 610 &amp; 697 MURIWAI ROAD MURIWAI VALLEY</p>	<p><b>TITLE:</b> CLEARING PLAN LAYOUT PLAN SHEET 6</p> <p><b>PURPOSE OF ISSUE:</b> FOR CONSENT</p> <p><b>SCALE:</b> 1:1500 @ A3</p> <p><b>DO NOT SCALE</b></p> <p><b>DRAWING NO.:</b> 1976-1-186</p> <p><b>REV:</b> C</p>	<p><b>MCKENZIE &amp; CO.</b></p> <p>ISSUED FOR CONSENT: NO CIM JSD 26/01/21</p> <p>SECOND ISSUE: NO CIM JSD 29/01/21</p> <p>FIRST ISSUE: NO CIM JSD 24/09/21</p> <p>DRN BY: CHK BY: APP BY: DATE</p> <p>PLOT DATE: 2021-01-23 16:25:03</p> <p>WWW.MCKENZIEANDCO.CO.NZ</p> <p>THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.</p>
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MINOR WORKS AROUND EXISTING DRIFLINE.  
NO WORKS TO BE UNDERTAKEN WITHOUT  
ONSITE SUPERVISION OF ECOLOGIST.

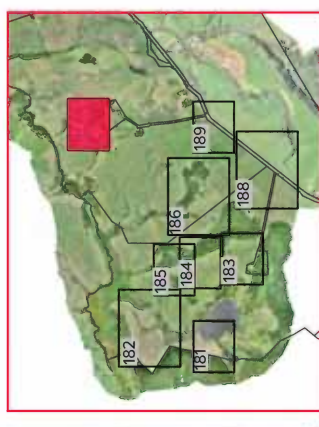
MINOR TREE REMOVAL  
FOR BRIDGE ABUTMENTS  
AS APPROVED BY ECOLOGIST

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
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**LEGEND:**

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- 10m BUFFER FROM WETLAND
- EXISTING WETLAND (TO BE PROTECTED)
- MAPPED SEA/ONF (BY ECOLOGIST)
- COUNCIL SEA/ONF AREA
- EXOTIC VEGETATION AREA
- INDIGENOUS VEGETATION (NON SEA)
- EXOTIC VEGETATION TO BE REMOVED
- INDIGENOUS VEGETATION TO BE REMOVED
- MAPPED SEA/ONF (BY ECOLOGIST) TO BE REMOVED
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE  
**FOR CONSENT**

SCALE:  
**1:1000 @ A3**

DO NOT SCALE

DRAWING NO:  
**1976-1-187**

REV:  
**C**

**CLEARING PLAN  
LAYOUT PLAN  
SHEET 7**

PROJECT:  
**MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY**

CLIENT:  
**THE BEARS HOME  
PROJECT MANAGEMENT LTD**



REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

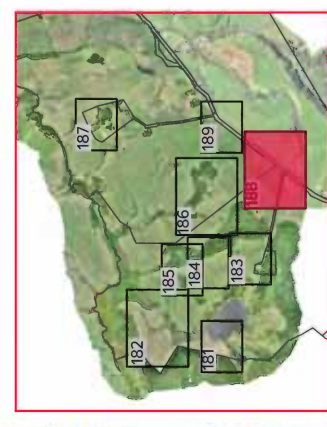


**NOTES:**

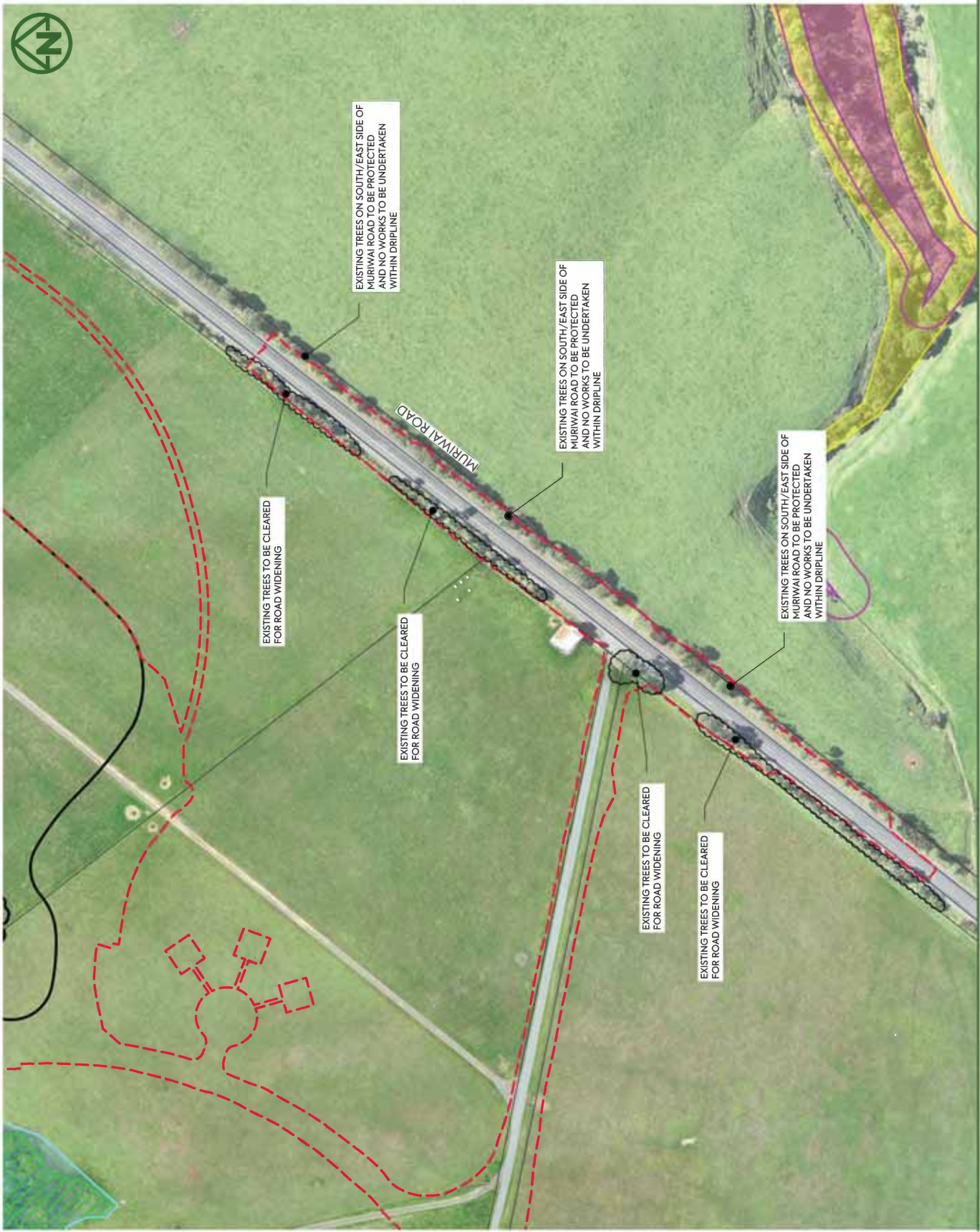
1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
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**LEGEND:**

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- EXOTIC VEGETATION AREA
- INDIGENOUS VEGETATION (NON SEA)
- EXOTIC VEGETATION TO BE REMOVED
- INDIGENOUS VEGETATION TO BE REMOVED
- MAPPED SEA/ONF (BY ECOLOGIST) TO BE REMOVED
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

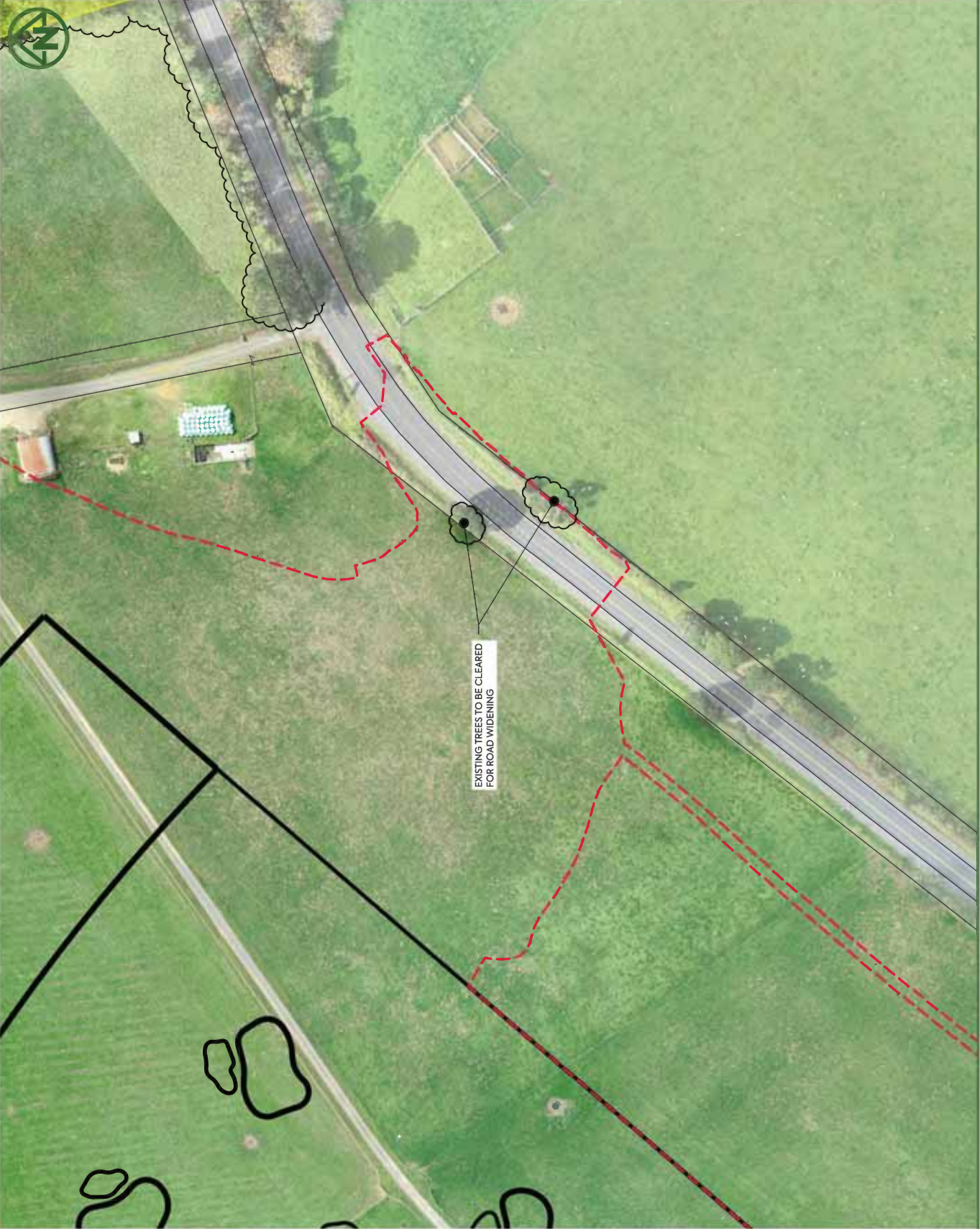


**CLIENT:** THE BEARS HOME PROJECT MANAGEMENT LTD  
**PROJECT:** MURUWAI DOWNS GOLF PROJECT  
**TITLE:** CLEARING PLAN LAYOUT PLAN SHEET 8  
**REV:** 1976-1-188

**FOR CONSENT**  
 SCALE: 1:1500 @ A3  
 DO NOT SCALE  
 DRAWING NO: 1976-1-188  
 REV: C



NO	CHK BY	APP BY	DATE
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B	SECOND ISSUE	JSD	29/01/21
A	FIRST ISSUE	JSD	24/09/21

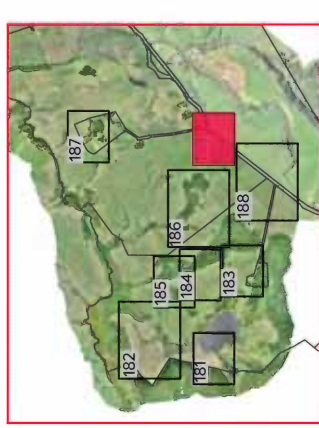


**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
3. ALL CLEARING OF VEGETATION TO BE SUPERVISED BY AN AUTHORISED ARBORIST AT ALL TIMES. NO WORKS TO BE DONE UNDER DRIPLINE UNLESS AUTHORISED.
4. ALL VEGETATION AND WETLANDS SHOWN ARE BASED ON INFORMATION PROVIDED BY RMA ECOLOGISTS LTD.
5. KAURI DIEBACK CONTAMINATED AREA ASSUMED TO BE 3 TIMES THE RADIUS OF THE OUTERMOST CANOPY DRIPLINE.

**LEGEND:**

- EXTENT OF WORKS
- 10m BUFFER FROM WETLAND
- EXISTING WETLAND (TO BE PROTECTED)
- MAPPED SEA/ONF (BY ECOLOGIST)
- COUNCIL SEA/ONF AREA
- EXOTIC VEGETATION AREA
- INDIGENOUS VEGETATION (NON SEA)
- EXOTIC VEGETATION TO BE REMOVED
- INDIGENOUS VEGETATION TO BE REMOVED
- MAPPED SEA/ONF (BY ECOLOGIST) TO BE REMOVED
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: **FOR CONSENT**

SCALE: **1:1000 @ A3**

DO NOT SCALE

DRAWING NO: **1976-1-189**

REV: **C**

**CLEARING PLAN LAYOUT PLAN SHEET 9**

**PROJECT:** MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

**CLIENT:** THE BEARS HOME  
PROJECT MANAGEMENT LTD



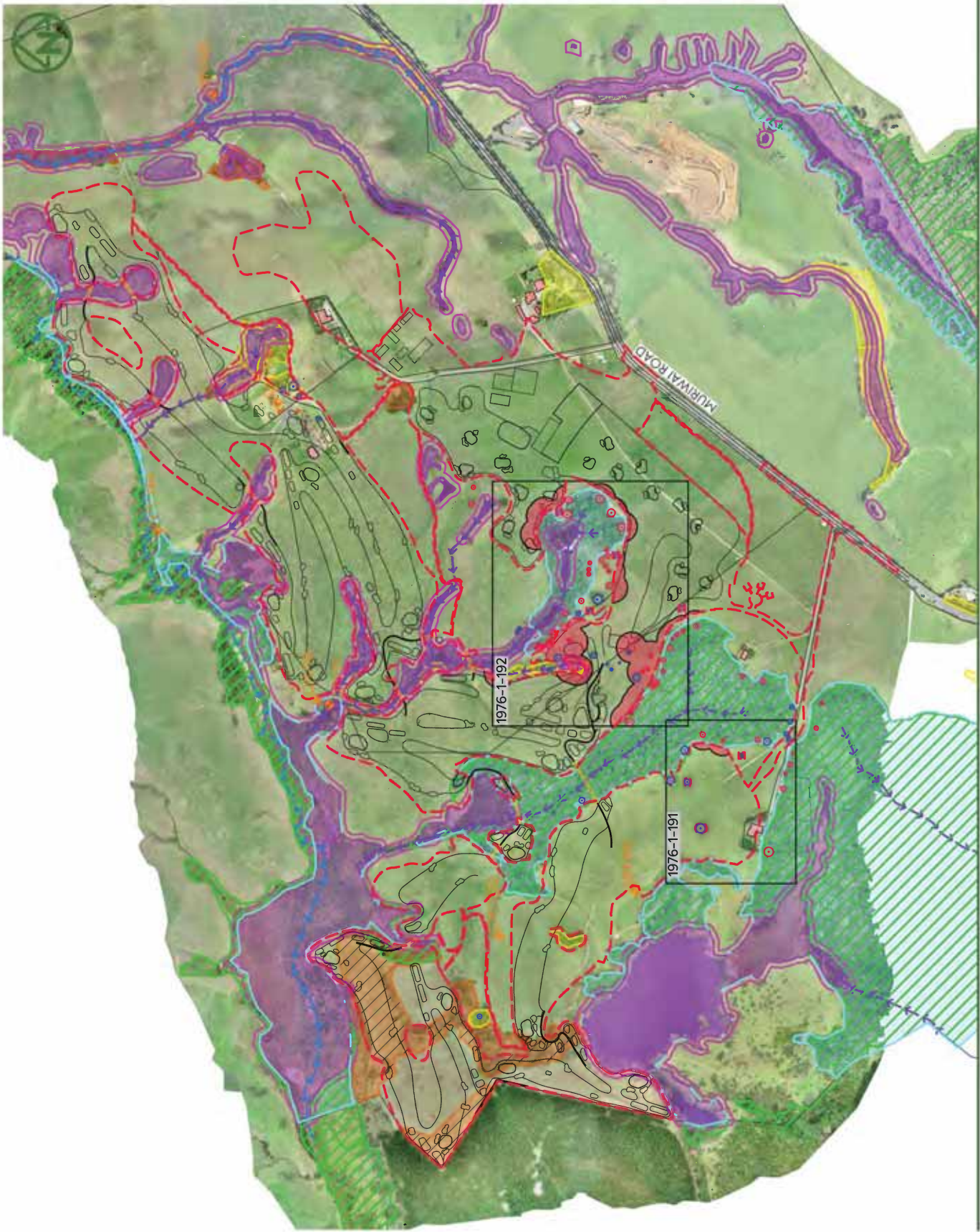
REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
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B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
3. ALL CLEARING OF VEGETATION TO BE SUPERVISED BY AN AUTHORISED ARBORIST AT ALL TIMES. NO WORKS TO BE DONE UNDER DRIPLINE UNLESS AUTHORISED.
4. ALL VEGETATION AND WETLANDS SHOWN ARE BASED ON INFORMATION PROVIDED BY RMA ECOLOGISTS LTD.
5. KAURI DIEBACK CONTAMINATED AREA ASSUMED TO BE 3 TIMES THE RADIUS OF THE OUTERMOST CANOPY DRIFLINE.
6. INDICATIVE LOCATION OF TOPSOIL STOCKPILE FROM THE KAURI DIEBACK AREA. STOCKPILE TO BE FENCED OFF AND SIGNAGE PROVIDED. NO OTHER TOPSOIL TO BE PLACED IN THE VICINITY OF THE STOCKPILE. THE STOCKPILE IS TO BE STABILISED WITH MULCH AND SEED. THE TOPSOIL IS TO BE SPREAD IN THE SAME AREA AS THE ORIGINAL LOCATION ONCE EARTHWORKS ARE COMPLETED. ALL WORKS TO BE IN ACCORDANCE WITH THE KAURI DIE BACK MANAGEMENT PLAN.

**LEGEND:**

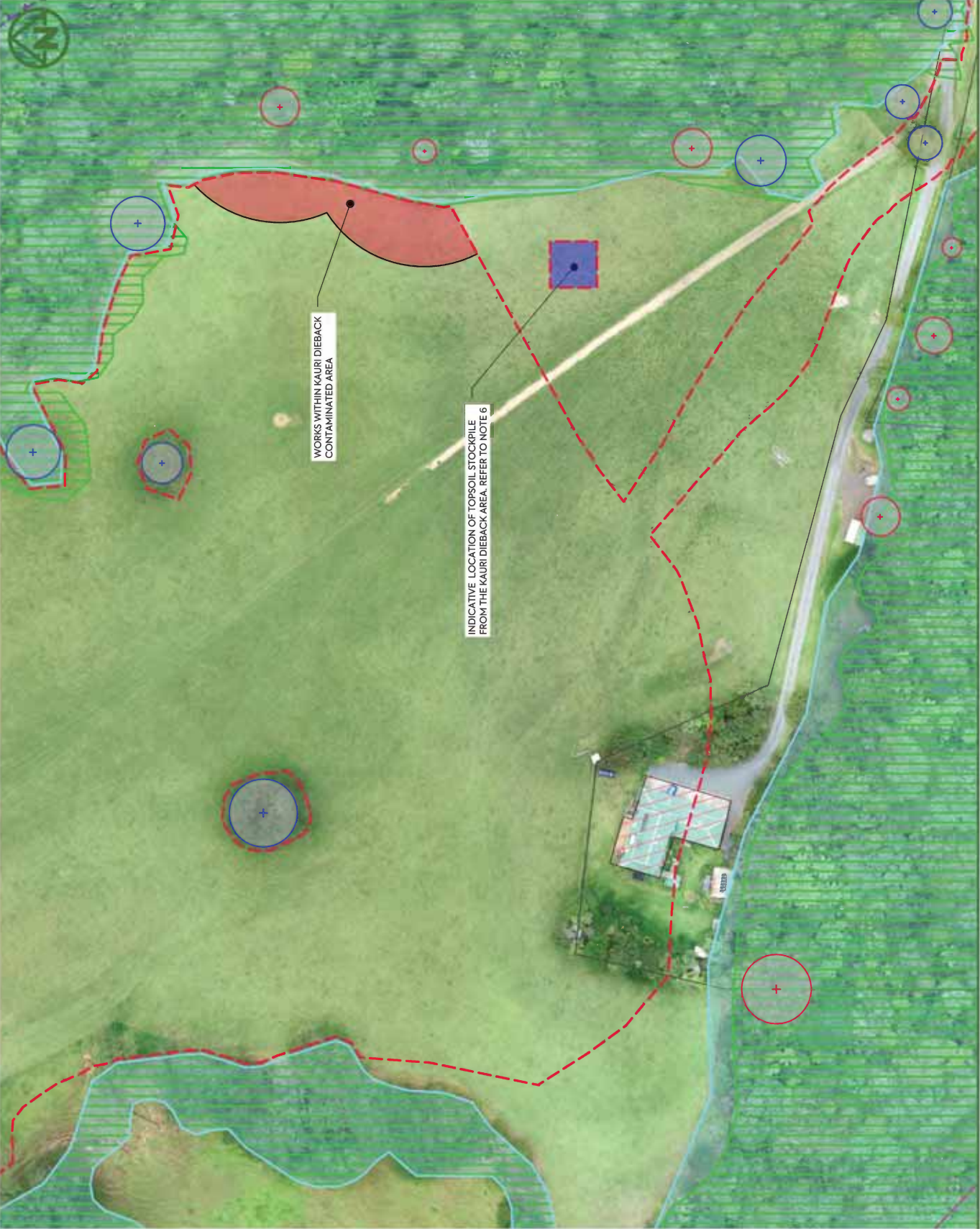
- EXTENT OF WORKS
- 10m BUFFER FROM WETLAND
- EXISTING WETLAND (TO BE PROTECTED)
- MAPPED SEA/ONF (BY ECOLOGIST)
- COUNCIL SEA/ONF AREA
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- PROPOSED KAURI DIEBACK STOCKPILE LOCATION
- INDICATIVE AREA FOR BURYING KAURI VEGETATION



	<p>CLIENT: <b>THE BEARS HOME PROJECT MANAGEMENT LTD</b></p> <p>PROJECT: <b>MURIWAI DOWNS GOLF PROJECT</b></p> <p>TITLE: <b>CONTAMINATED KAURI DIEBACK DISTURBANCE AREA OVERALL LAYOUT PLAN</b></p>	<p>PURPOSE OF ISSUE: <b>FOR CONSENT</b></p> <p>SCALE: <b>1:7500 @ A3</b></p> <p>DRAWING NO.: <b>1976-1-190</b></p>																	
<p>ISSUED FOR CONSENT</p> <p>SECOND ISSUE</p> <p>FIRST ISSUE</p> <p>REV. DESCRIPTION</p>	<table border="0"> <tr> <td>NO</td> <td>CHK</td> <td>BY</td> <td>DATE</td> </tr> <tr> <td>C</td> <td>CM</td> <td>JSD</td> <td>26/01/21</td> </tr> <tr> <td>B</td> <td>CM</td> <td>JSD</td> <td>29/01/21</td> </tr> <tr> <td>A</td> <td>CM</td> <td>JSD</td> <td>24/09/21</td> </tr> </table>	NO	CHK	BY	DATE	C	CM	JSD	26/01/21	B	CM	JSD	29/01/21	A	CM	JSD	24/09/21	<p>MCKENZIE &amp; CO.</p> <p>WWW.MCKENZIEANDCO.CO.NZ</p>	<p>REVISIONS:</p> <p>REV: <b>C</b></p>
NO	CHK	BY	DATE																
C	CM	JSD	26/01/21																
B	CM	JSD	29/01/21																
A	CM	JSD	24/09/21																

PLOT DATE: 2021-01-23 15:25:15 | THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.





**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (AVSL). THE CONTOUR INTERVAL IS: 10m
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4. ALL VEGETATION AND WETLANDS SHOWN ARE BASED ON INFORMATION PROVIDED BY RMA ECOLOGISTS LTD.
5. KAURI DIEBACK CONTAMINATED AREA ASSUMED TO BE 3 TIMES THE RADIUS OF THE OUTERMOST CANOPY DRIFLINE.
6. INDICATIVE LOCATION OF TOPSOIL STOCKPILE FROM THE KAURI DIEBACK AREA. STOCKPILE TO BE FENCED OFF AND SIGNAGE PROVIDED. NO OTHER TOPSOIL TO BE PLACED IN THE VICINITY OF THE STOCKPILE. THE STOCKPILE IS TO BE STABILISED WITH MULCH AND SEED. THE TOPSOIL IS TO BE SPREAD IN THE SAME AREA AS THE ORIGINAL LOCATION ONCE EARTHWORKS ARE COMPLETED. ALL WORKS TO BE IN ACCORDANCE WITH THE KAURI DIE BACK MANAGEMENT PLAN.

**LEGEND:**

- EXTENT OF WORKS
- 10m BUFFER FROM WETLAND
- EXISTING WETLAND (TO BE PROTECTED)
- MAPPED SEA/ONF (BY ECOLOGIST)
- COUNCIL SEA/ONF AREA
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- PROPOSED KAURI DIEBACK STOCKPILE LOCATION
- INDICATIVE AREA FOR BURYING KAURI VEGETATION



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT  
 SCALE: 1:1000 @ A3  
 DO NOT SCALE  
 DRAWING NO.: 1976-1-191  
 REV: C

TITLE: CONTAMINATED KAURI DIEBACK DISTURBANCE AREA LAYOUT PLAN SHEET 1  
 PROJECT: MURIWAI DOWNS GOLF PROJECT 610 & 697 MURIWAI ROAD MURIWAI VALLEY  
 CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD



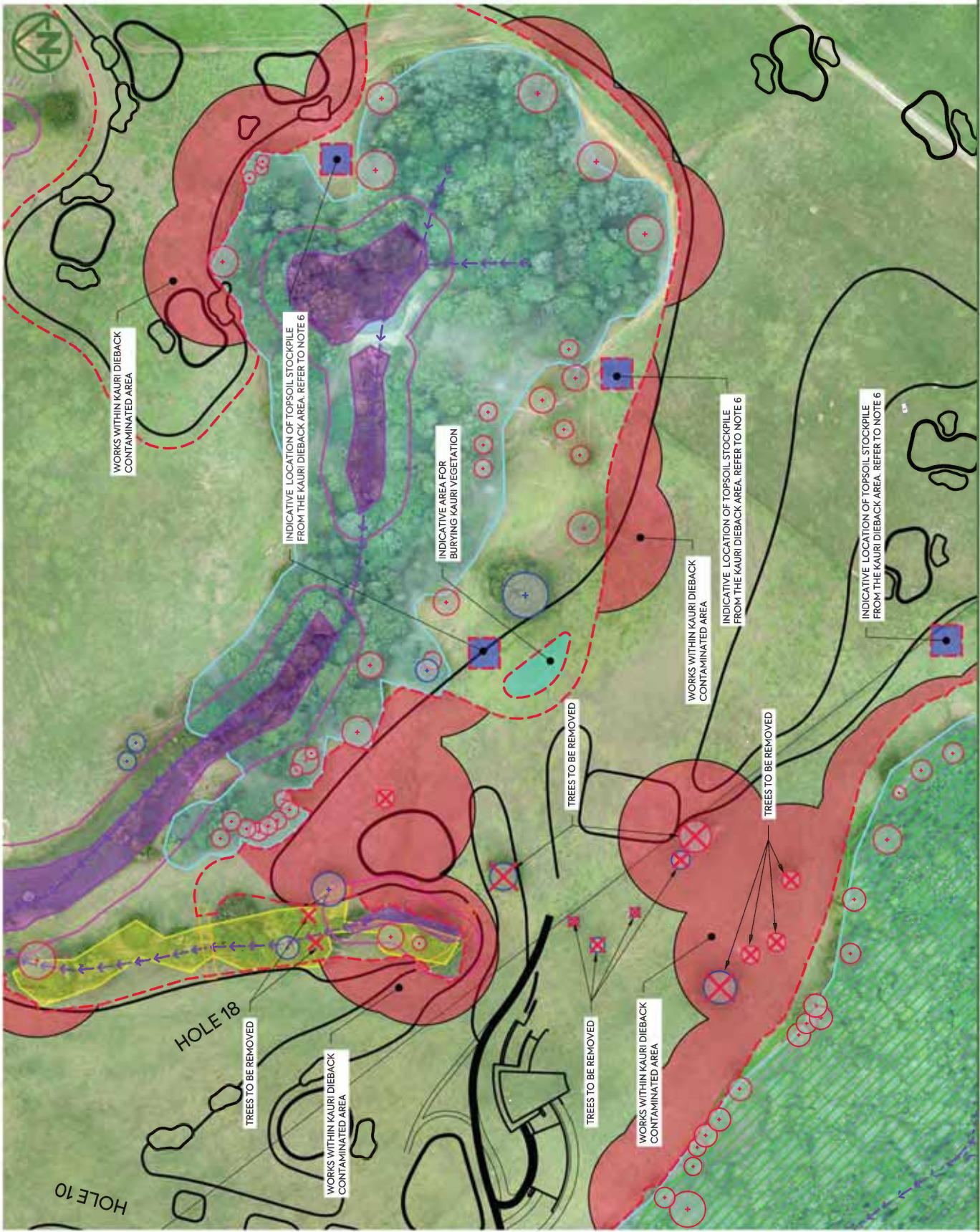
REV	DESCRIPTION	DNB BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 10m
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4. ALL VEGETATION AND WETLANDS SHOWN ARE BASED ON INFORMATION PROVIDED BY RMA ECOLOGISTS LTD.
5. KAURI DIEBACK CONTAMINATED AREA ASSUMED TO BE 3 TIMES THE RADIUS OF THE OUTERMOST CANOPY DRIPLINE.
6. INDICATIVE LOCATION OF TOPSOIL STOCKPILE FROM THE KAURI DIEBACK AREA. STOCKPILE TO BE FENCED OFF AND SIGNAGE PROVIDED. NO OTHER TOPSOIL TO BE PLACED IN THE VICINITY OF THE STOCKPILE. THE STOCKPILE IS TO BE STABILISED WITH MULCH AND SEED. THE TOPSOIL IS TO BE SPREAD IN THE SAME AREA AS THE ORIGINAL LOCATION ONCE EARTHWORKS ARE COMPLETED. ALL WORKS TO BE IN ACCORDANCE WITH THE KAURI DIE BACK MANAGEMENT PLAN.

**LEGEND:**

- EXTENT OF WORKS
- 10m BUFFER FROM WETLAND
- EXISTING WETLAND (TO BE PROTECTED)
- MAPPED SEA/ONF (BY ECOLOGIST)
- COUNCIL SEA/ONF AREA
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- KAURI DIEBACK CONTAMINATED AREA TO BE DISTURBED
- PROPOSED KAURI DIEBACK STOCKPILE LOCATION
- INDICATIVE AREA FOR BURYING KAURI VEGETATION



**DRAWING LAYOUT PLAN**

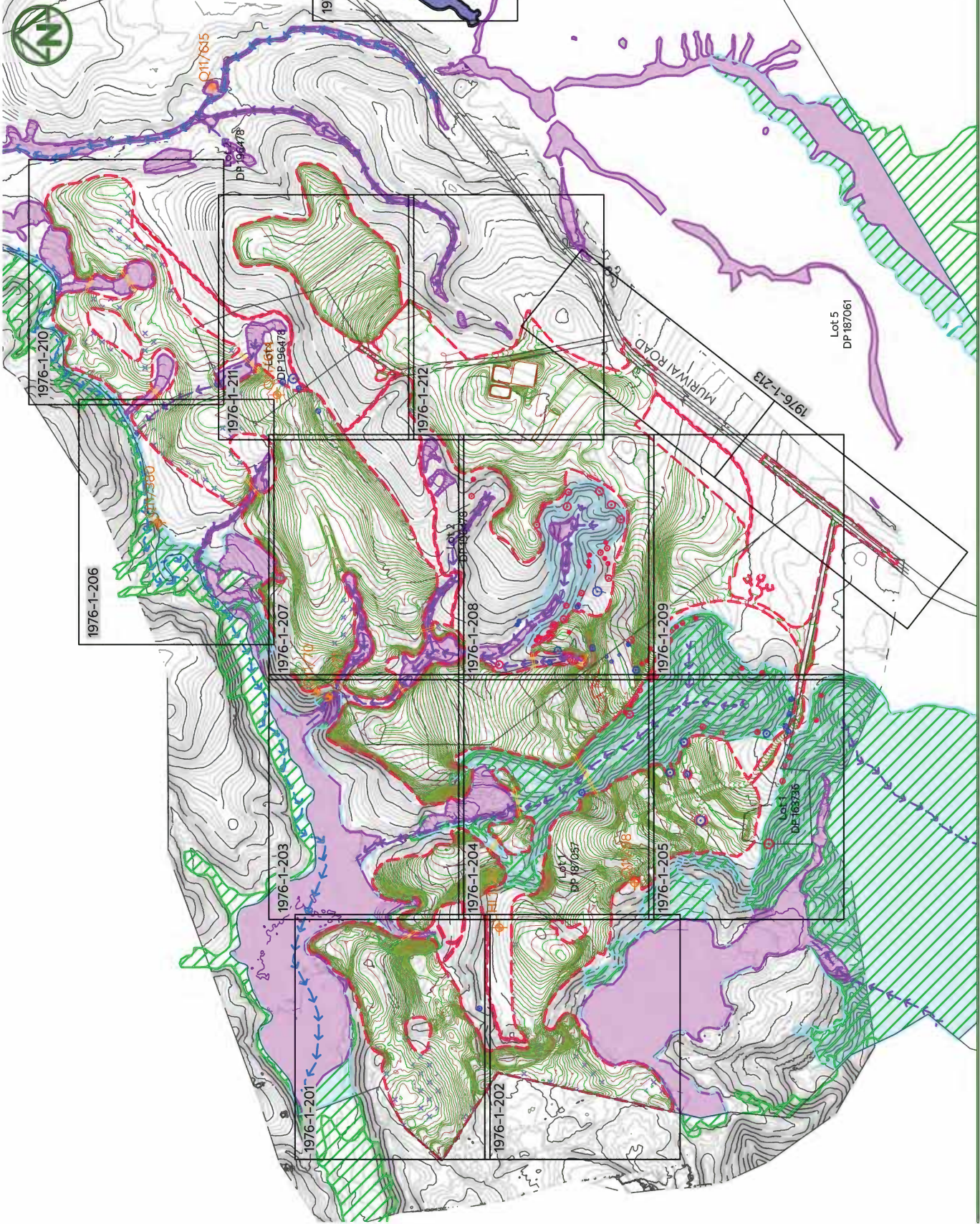
<p>CLIENT:</p> <p><b>THE BEARS HOME</b></p> <p>PROJECT MANAGEMENT LTD</p>	<p>PROJECT:</p> <p><b>MURIWAI DOWNS GOLF PROJECT</b></p> <p>610 &amp; 697 MURIWAI ROAD</p> <p>MURIWAI VALLEY</p>	<p>TITLE:</p> <p><b>CONTAMINATED KAURI DIEBACK</b></p> <p>DISTURBANCE AREA</p> <p>LAYOUT PLAN</p> <p>SHEET 2</p>	<p>PURPOSE OF ISSUE:</p> <p><b>FOR CONSENT</b></p> <p>SCALE:</p> <p><b>1:1500 @ A3</b></p> <p>DO NOT SCALE</p> <p>DRAWING NO.:</p> <p><b>1976-1-192</b></p> <p>REV:</p> <p><b>C</b></p>
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REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

**NOTES:**

- ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
- ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
- ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
- EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
- THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.



**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MAJOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MAJOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA/ONF AREA
- MAPPED SEA/ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)

**MCKENZIE & CO.**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 TITLE: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

FOR CONSENT  
 SCALE: 1:7500 @ A3  
 DO NOT SCALE  
 DRAWING NO: 1976-1-200

REV: C

ISSUED FOR CONSENT: NO CIM JSD 26/01/21  
 SECOND ISSUE: NO CIM JSD 29/01/21  
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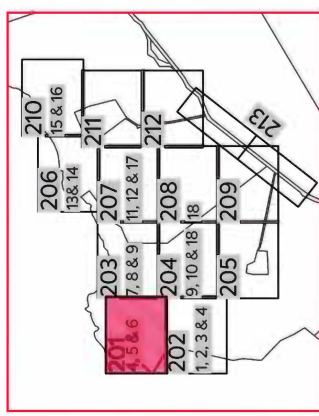
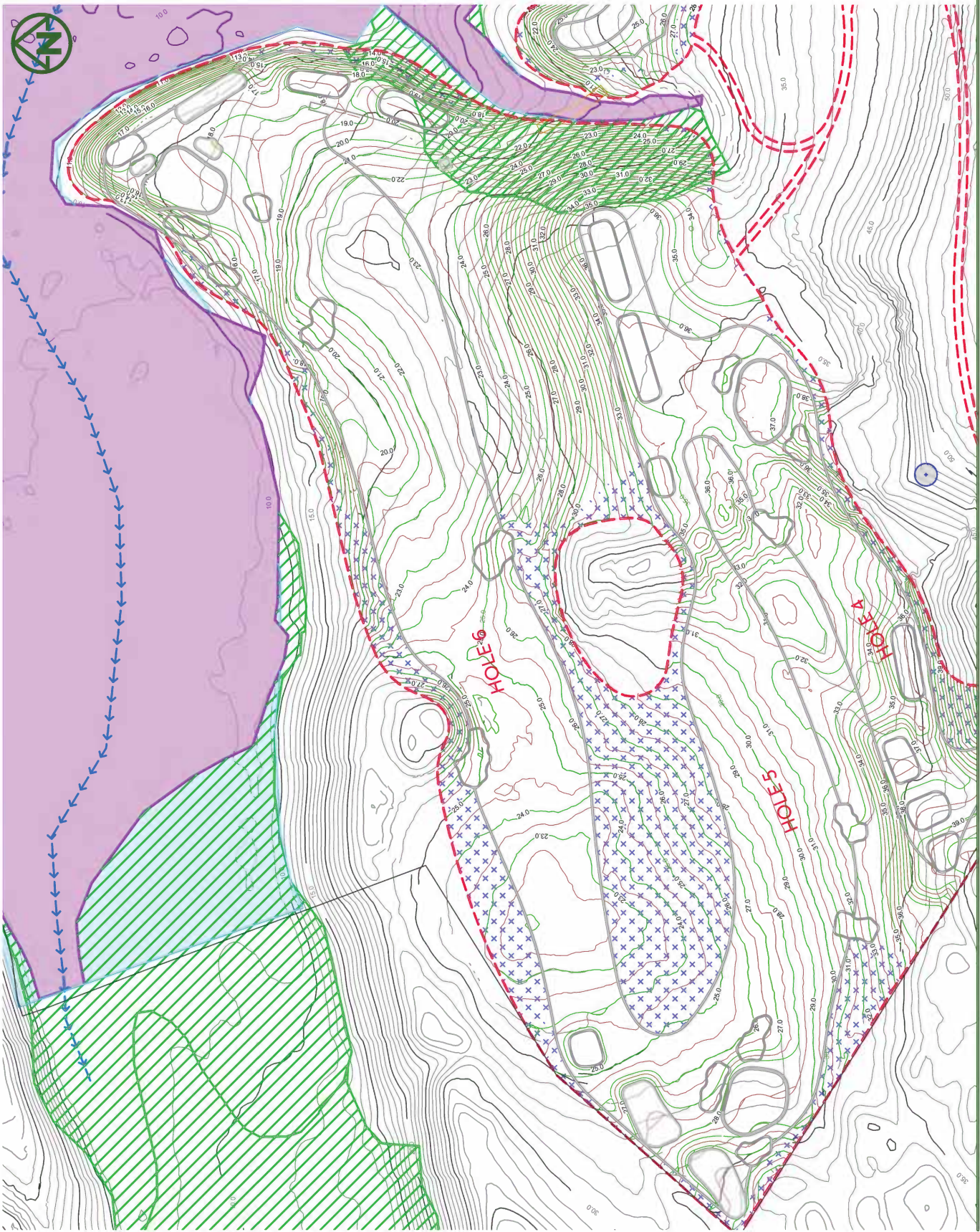
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**NOTES:**

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**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

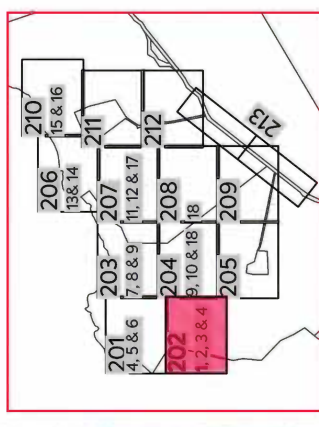
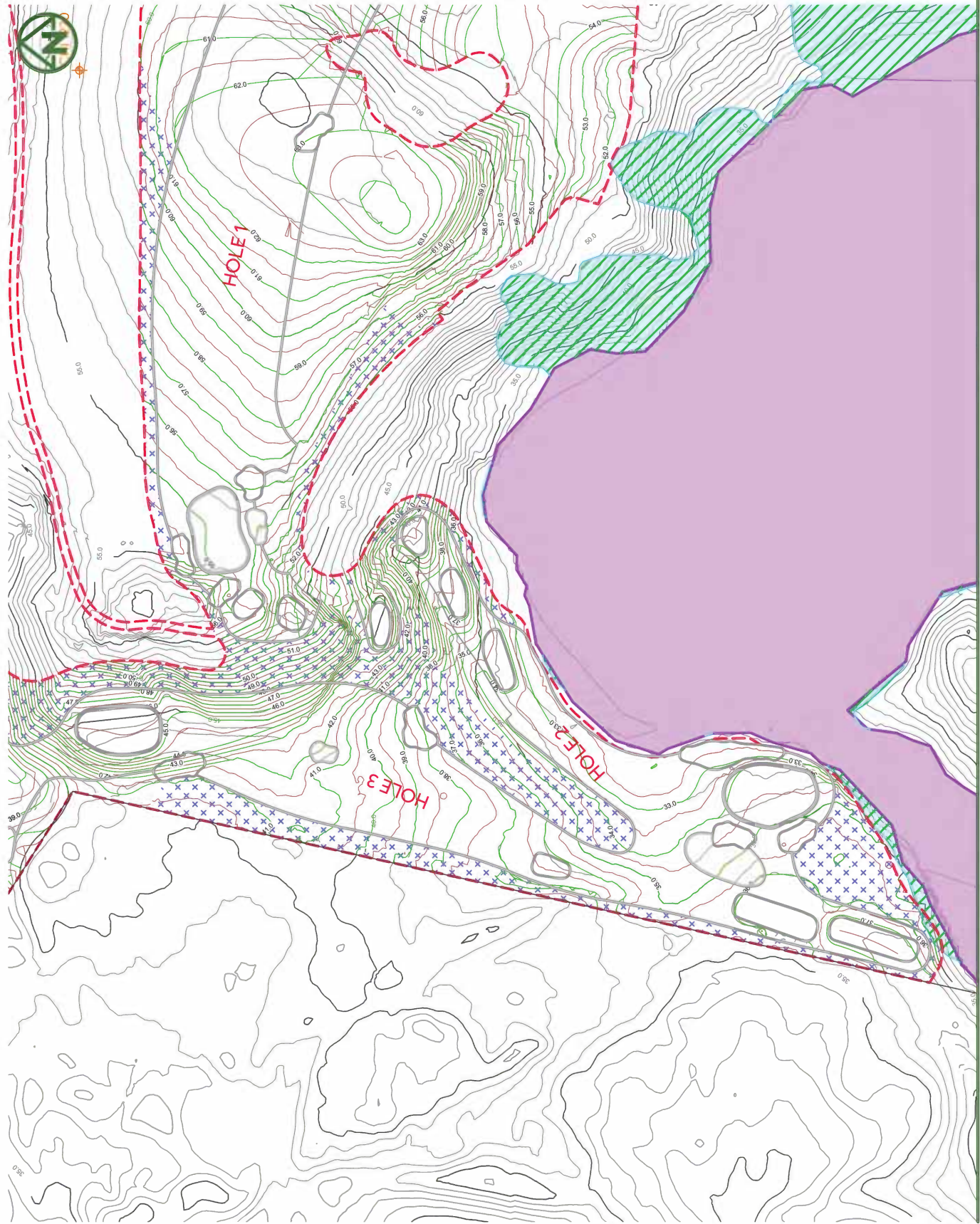
<p><b>CLIENT:</b> THE BEARS HOME PROJECT MANAGEMENT LTD</p>	<p><b>PROJECT:</b> MURIWAI DOWNS GOLF PROJECT 610 &amp; 697 MURIWAI ROAD MURIWAI VALLEY</p>	<p><b>TITLE:</b> PROPOSED EARTHWORKS FINAL CONTOURS LAYOUT PLAN</p>	<p><b>PURPOSE OF ISSUE:</b> FOR CONSENT</p>																
<p><b>MCKENZIE &amp; CO.</b></p>																			
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NO	CHK	USD	DATE																
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B	SECOND ISSUE		29/07/21																
A	FIRST ISSUE		24/08/21																
<p>REV DATE: 2021-12-24 08:15:28</p>		<p><b>1976-1-201</b></p>	<p><b>1976-1-201</b></p>																

**NOTES:**

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**LEGEND:**

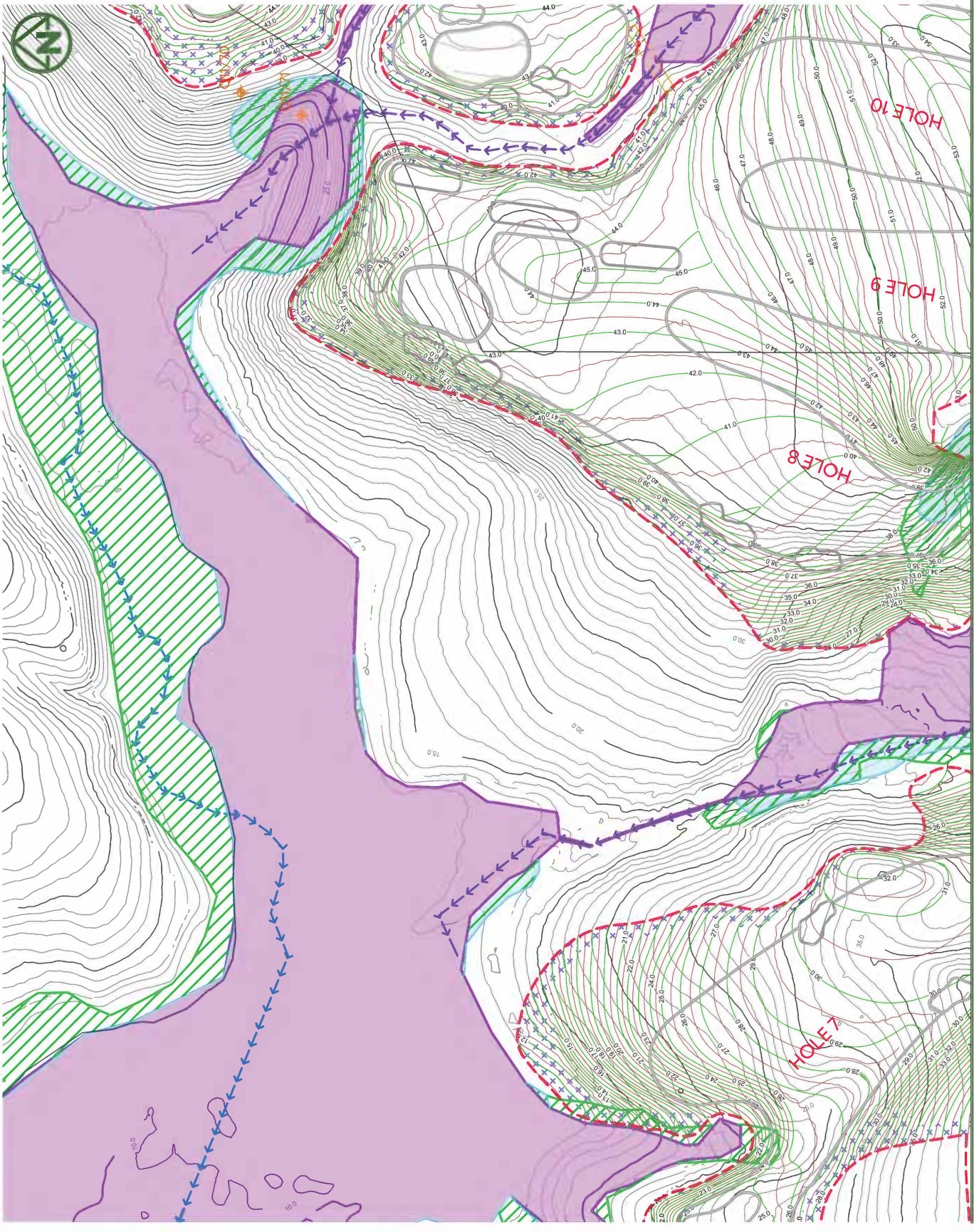
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- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

	<p><b>THE BEARS HOME</b>  <b>MURIWAI DOWNS GOLF PROJECT</b>          610 &amp; 697 MURIWAI ROAD          MURIWAI VALLEY</p>	<p><b>MCKENZIE &amp; CO.</b></p>	<p>PURPOSE OF ISSUE  <b>FOR CONSENT</b></p> <p>SCALE:  <b>1:1500 @ A3</b></p> <p>DO NOT SCALE</p> <p>DRAWING NO:  <b>1976-1-202</b></p> <p>REV: <b>C</b></p>
<p>CLIENT:</p>	<p>PROJECT:</p>	<p>TITLE:</p>	<p>PROPOSED EARTHWORKS          FINAL CONTOURS          LAYOUT PLAN          SHEET 2</p>

REV	DESCRIPTION	DNB BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	20/02/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21

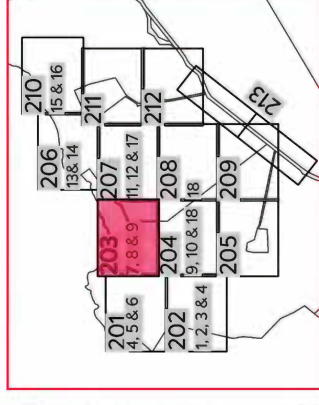


**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
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5. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.

**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
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- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

**MCKENZIE & CO.**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

TITLE: PROPOSED EARTHWORKS FINAL CONTOURS LAYOUT PLAN  
 SHEET 3

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3  
 DO NOT SCALE

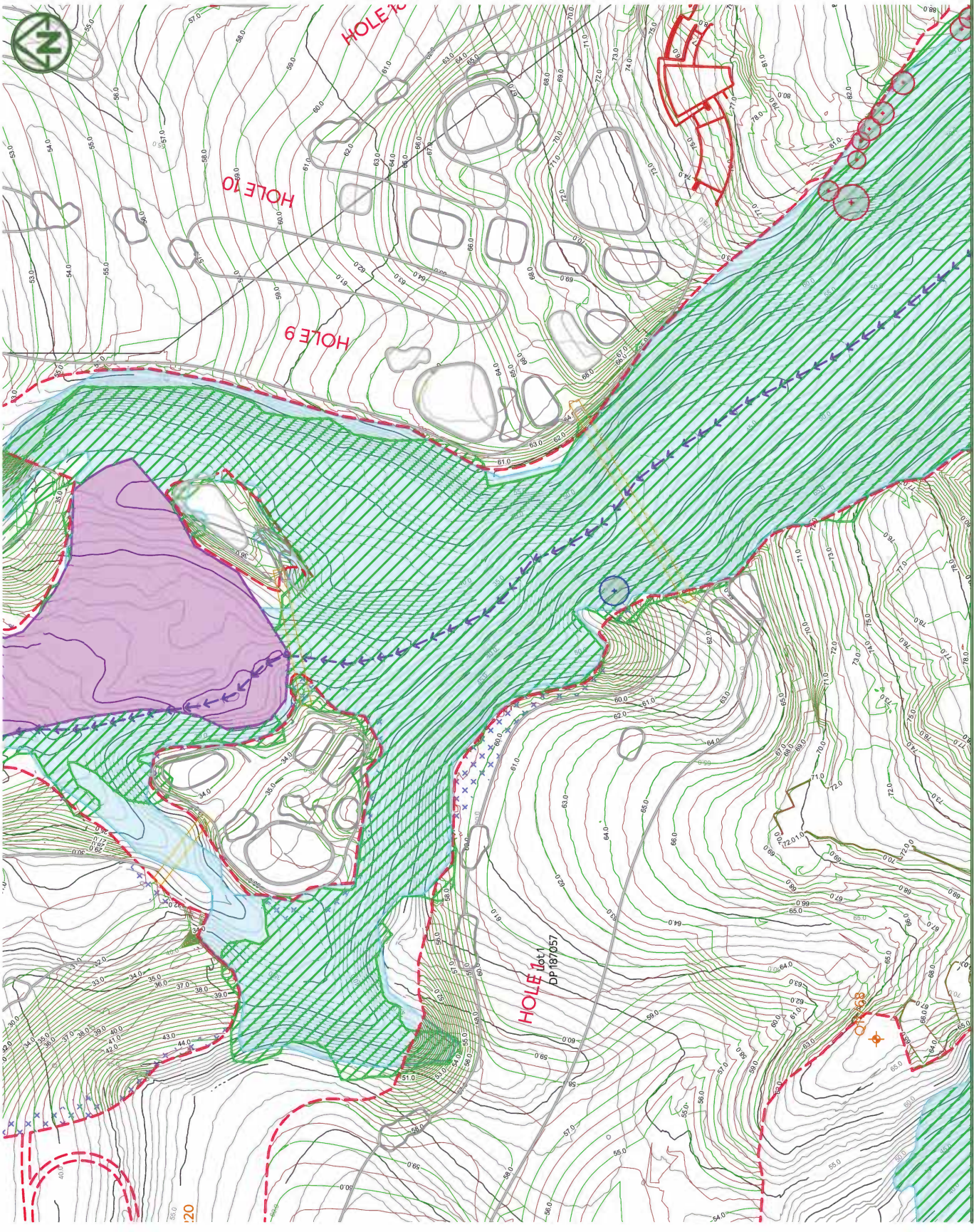
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REV	DESCRIPTION	CHK BY	APP BY	DATE
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A	FIRST ISSUE	MO CIM	JSD	24/08/21

WWW.MCKENZIEANDCO.CO.NZ THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.

PLOT DATE: 2021-01-24 08:13:34

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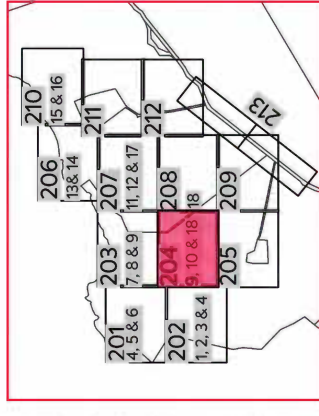


**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.

**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 TITLE: PROPOSED EARTHWORKS FINAL CONTOURS LAYOUT PLAN SHEET 4

REV: 1976-1-204

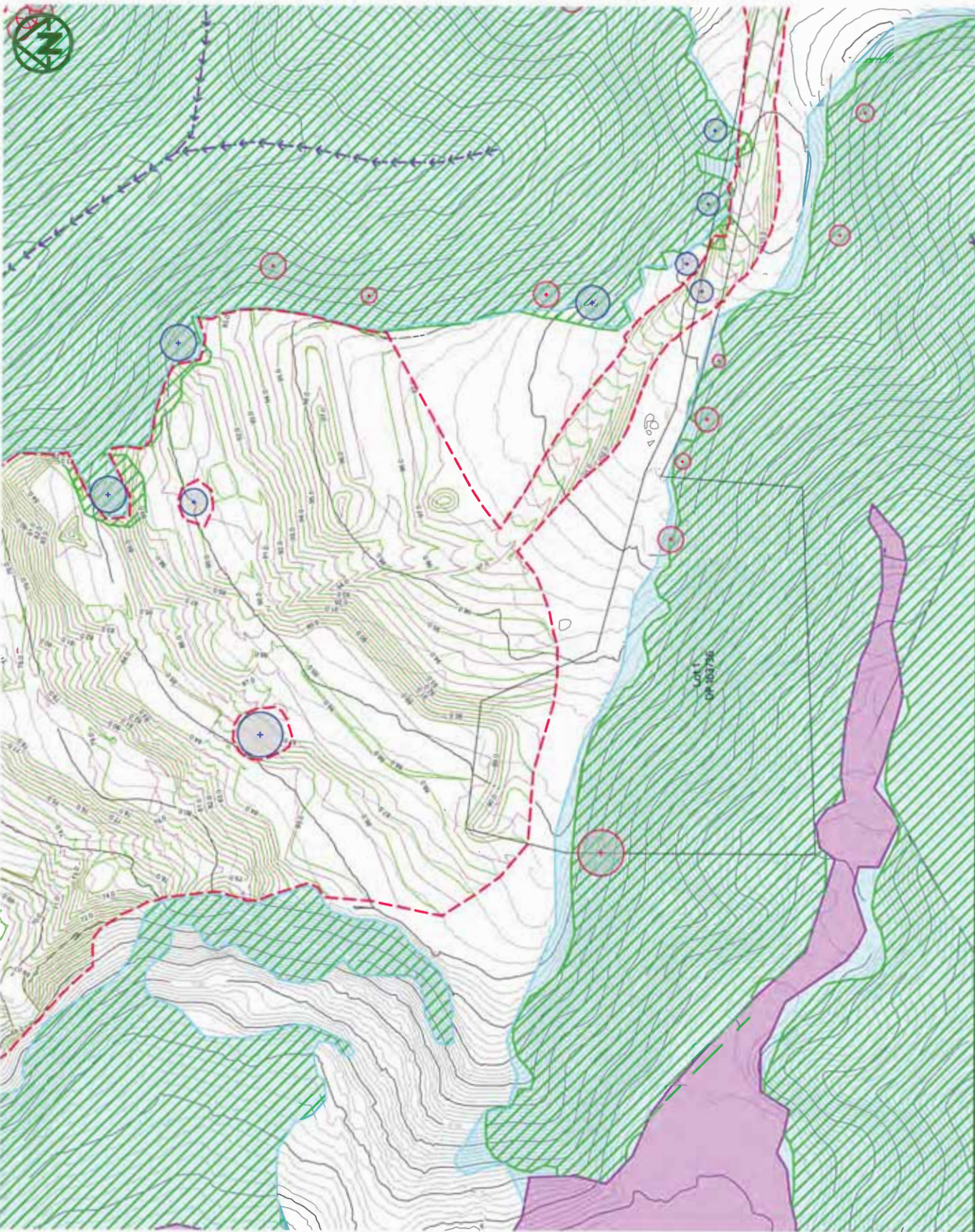
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 DRAWING NO: 1976-1-204

ISSUED FOR CONSENT: MO CIM JSD 26/01/21  
 SECOND ISSUE: MO CIM JSD 29/01/21  
 FIRST ISSUE: MO CIM JSD 24/03/21  
 DSN BY: CHK BY: APP BY: DATE

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**MCKENZIE & CO.**

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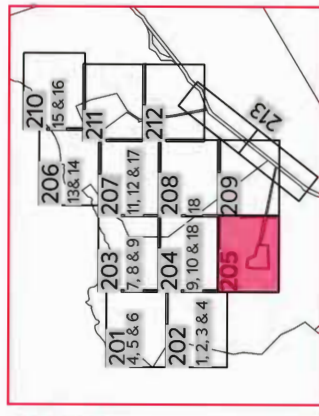


**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION(S) TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.

**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA/ONF AREA
- MAPPED SEA/ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

**MCKENZIE & CO.**

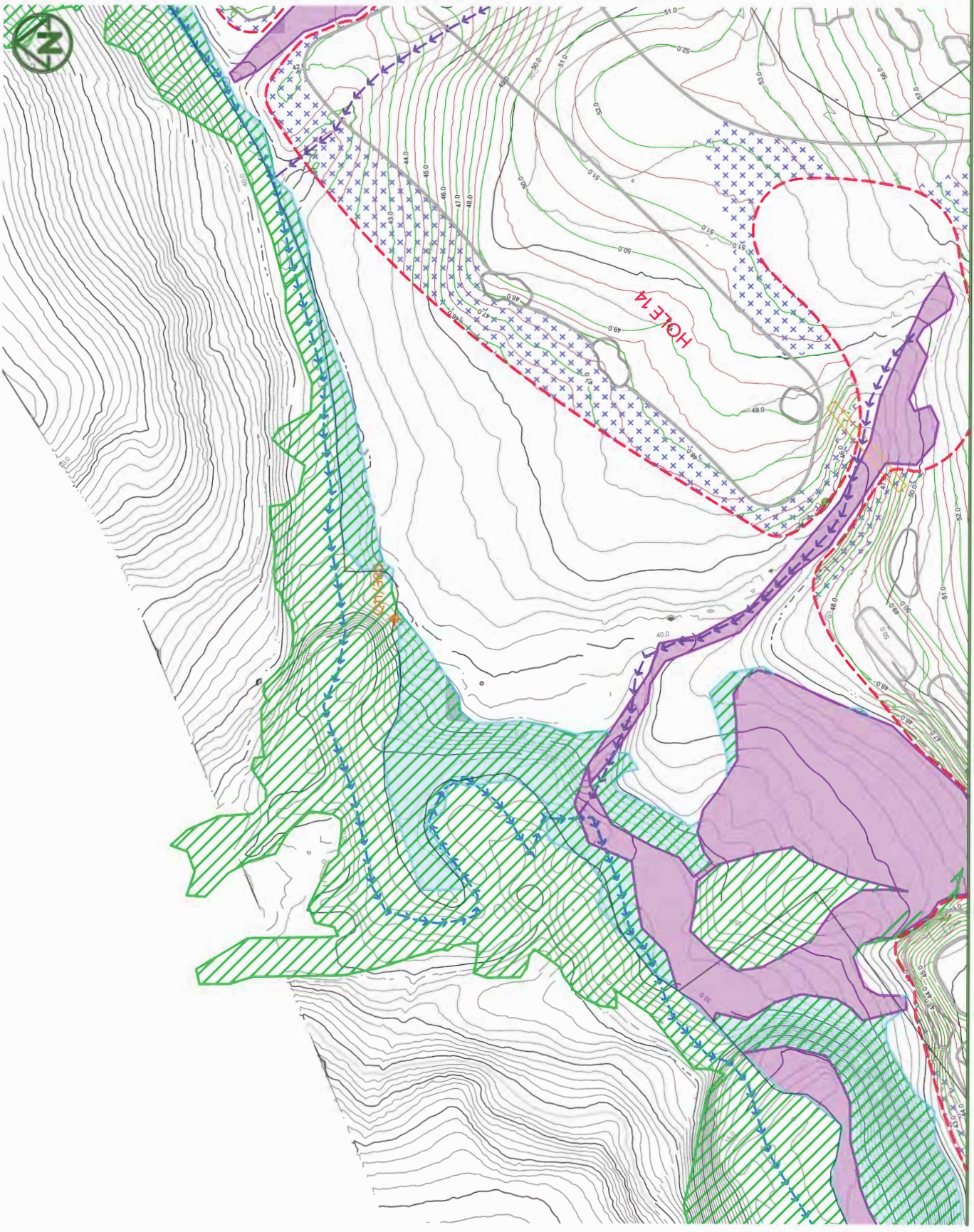
CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 TITLE: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

FOR CONSENT  
 SCALE: 1:1500 @ A3  
 DO NOT SCALE  
 DRAWING NO: 1976-1-205  
 REV: C

REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MS	CH	MS	26/11/21
B	SECOND ISSUE	MS	CH	MS	29/10/21
A	FIRST ISSUE	MS	CH	MS	24/09/21

PLANT DATE: 2021-11-24 08:13:41 | WWW.MCKENZIEANDCO.CO.NZ | THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY OR FOR ANY OTHER PURPOSE.



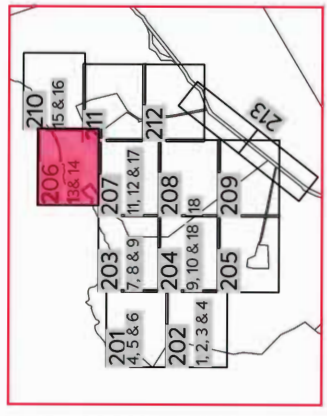


**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.

**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA/ONF AREA
- MAPPED SEA/ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 MURIWAI ROAD  
 MURIWAI VALLEY

TITLE: PROPOSED EARTHWORKS FINAL CONTOURS LAYOUT PLAN SHEET 6

PURPOSE OF ISSUE: FOR CONSENT

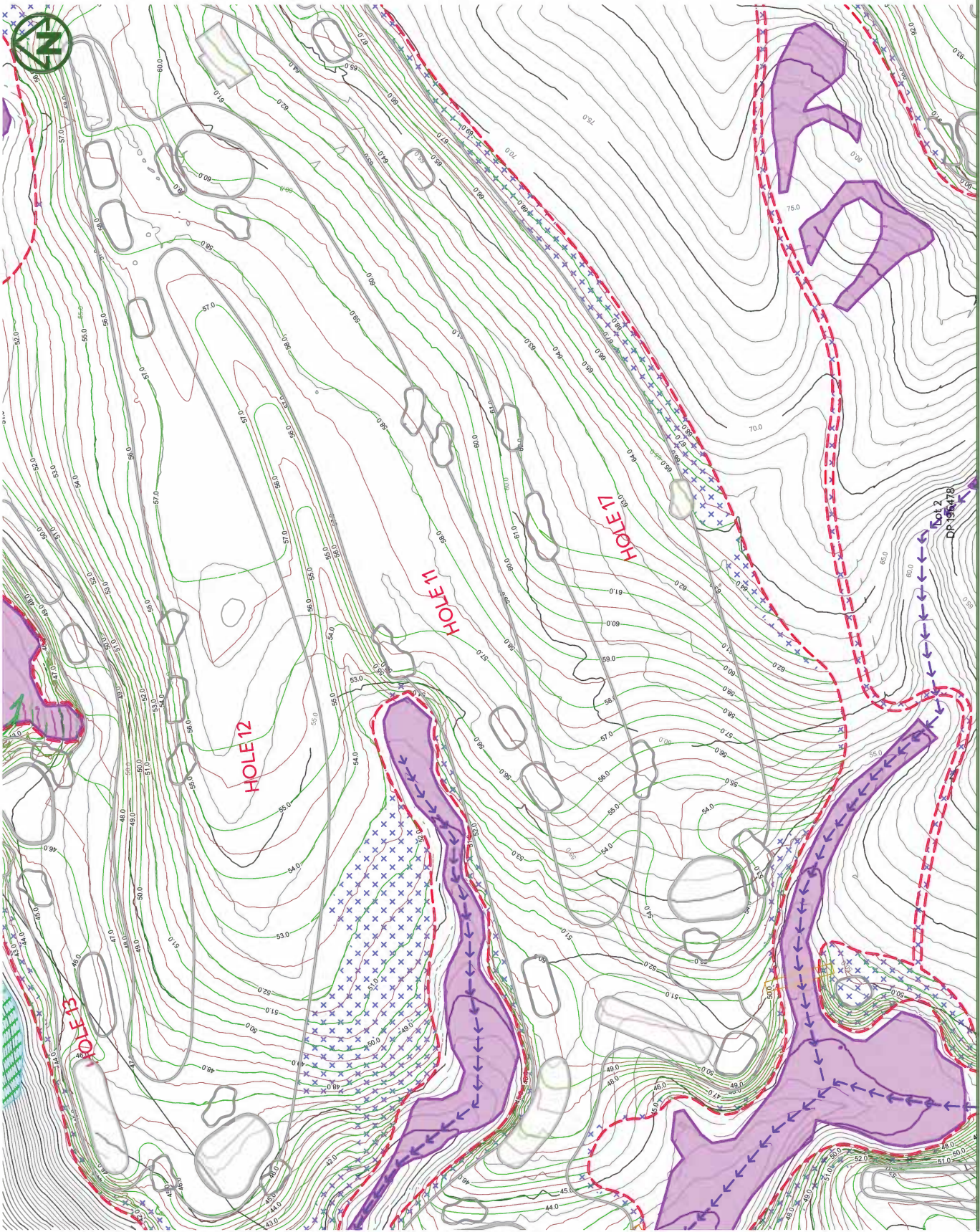
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 REV: C

ISSUED FOR CONSENT NO CH JSD 26/11/21  
 SECOND ISSUE NO CH JSD 29/10/21  
 FIRST ISSUE NO CH JSD 26/09/21

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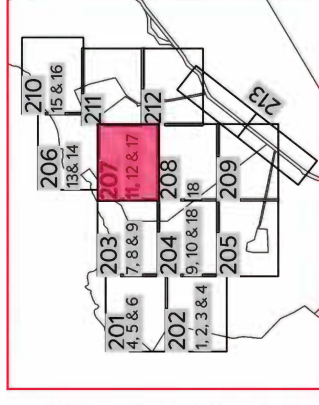


**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (M.S.L.). THE CONTOUR INTERVAL IS: 1.0m
2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.

**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

	<p>CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD          610 &amp; 697 MURUWAI ROAD          MURUWAI VALLEY</p>	<p>PROJECT: MURUWAI DOWNS GOLF PROJECT          610 &amp; 697 MURUWAI ROAD          MURUWAI VALLEY</p>	<p>TITLE: PROPOSED EARTHWORKS          FINAL CONTOURS          LAYOUT PLAN          SHEET 7</p>	<p>PURPOSE OF ISSUE: FOR CONSENT</p>
	<p>SCALE: 1:1500 @ A3          DO NOT SCALE</p>	<p>DRAWING NO.: 1976-1-207</p>	<p>REV: C</p>	<p>DATE: 2024-11-24 08:13:47</p>

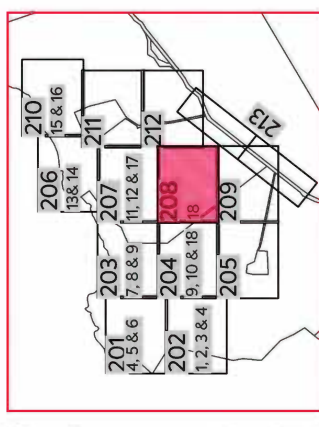
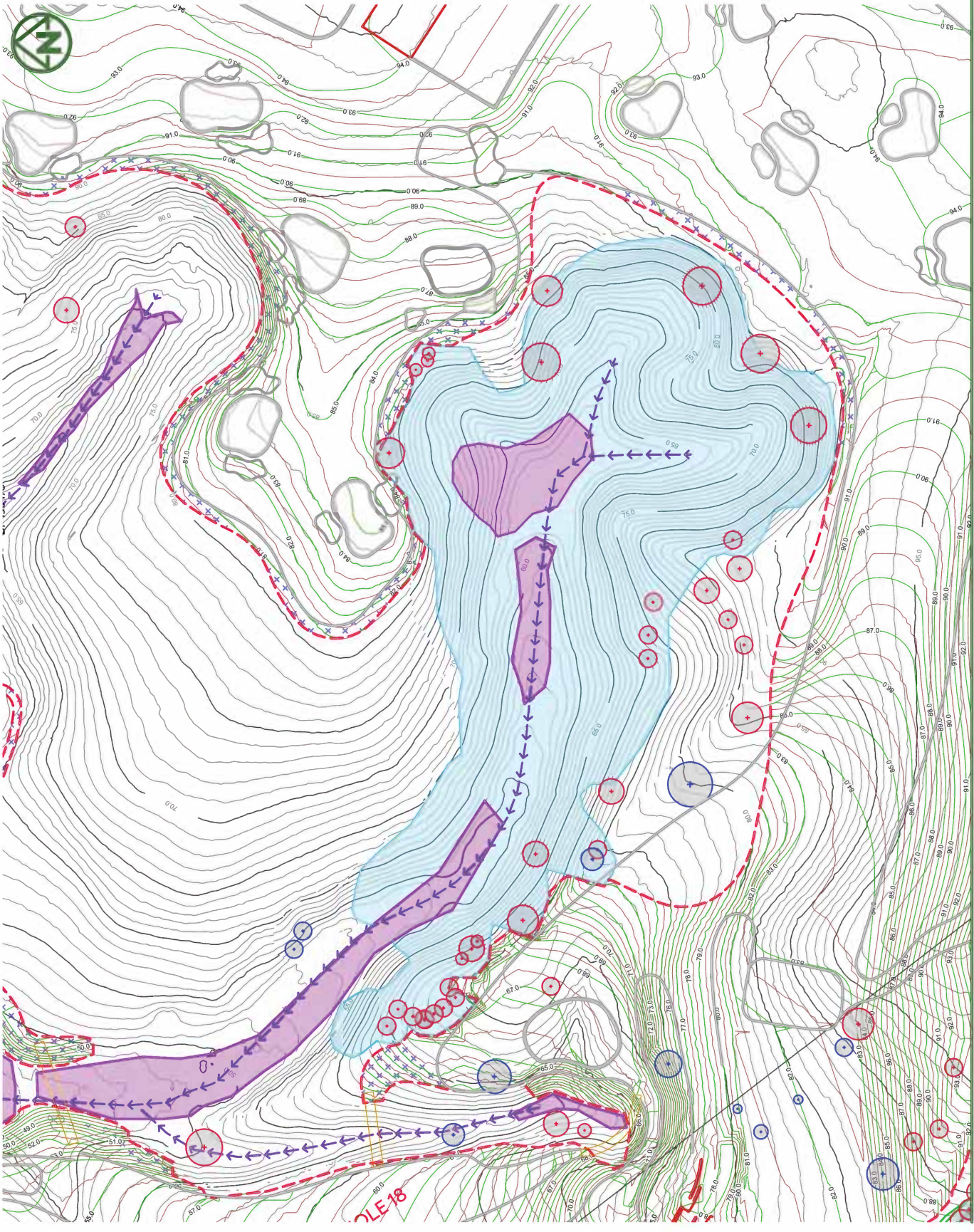
REV	DESCRIPTION	CHK BY	APP BY	DATE	
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	29/10/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
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3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.

**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3

DO NOT SCALE

DRAWING NO: 1976-1-208

REV: C

**PROPOSED EARTHWORKS FINAL CONTOURS LAYOUT PLAN SHEET 8**

**MURIWAI DOWNS GOLF PROJECT**  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

**THE BEARS HOME**  
PROJECT MANAGEMENT LTD



NO	DESCRIPTION	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	CM	JSD	26/01/21
B	SECOND ISSUE	CM	JSD	29/01/21
A	FIRST ISSUE	CM	JSD	24/03/21

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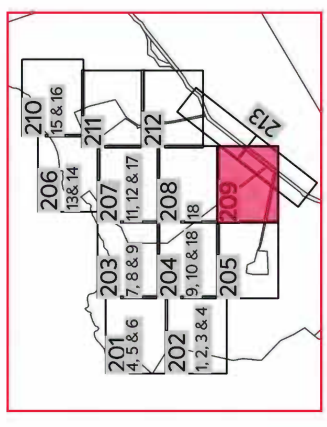
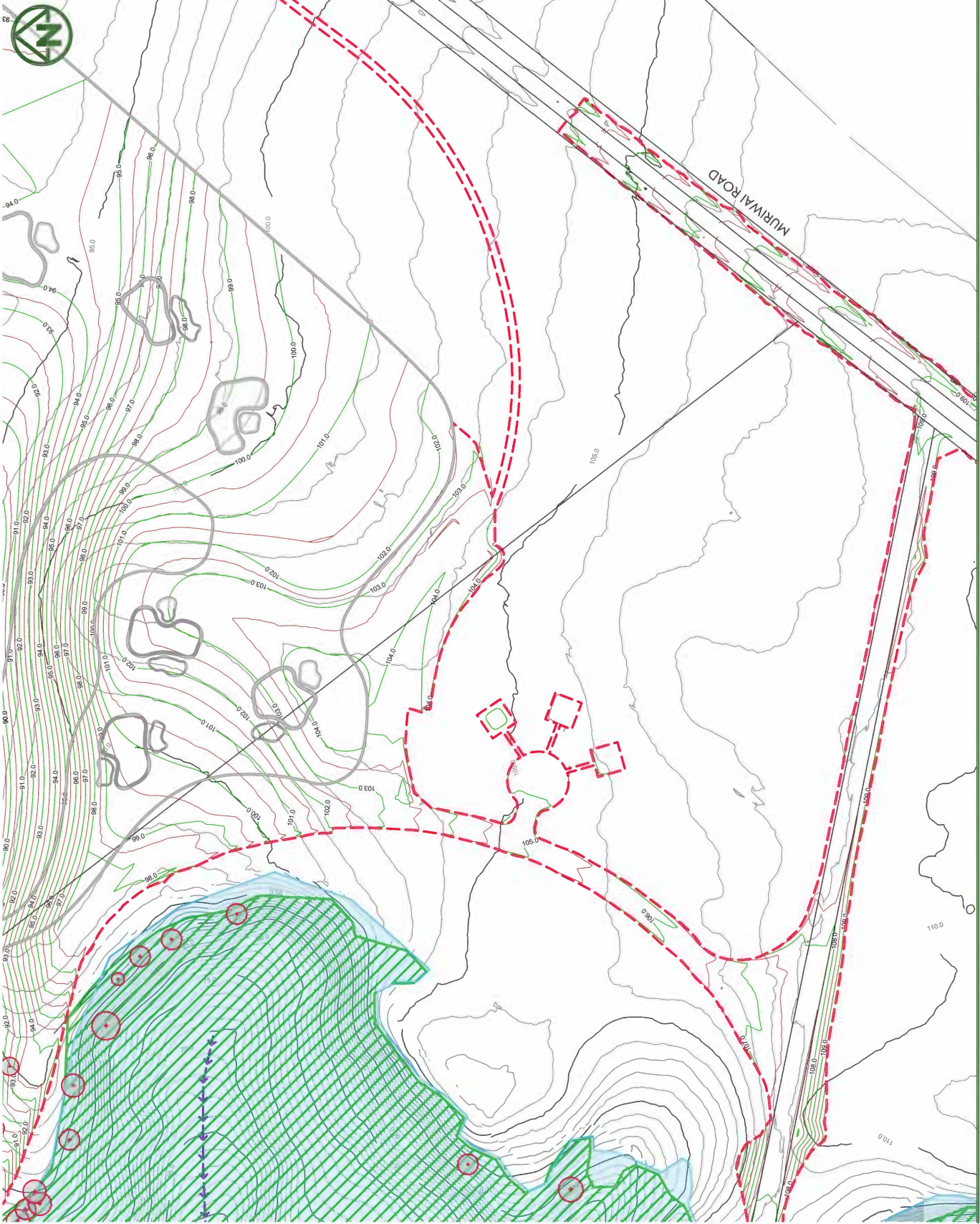


**NOTES:**

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- EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
- THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.

**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

**MCKENZIE & CO.**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURWAI DOWNS GOLF PROJECT  
 TITLE: PROPOSED EARTHWORKS FINAL CONTOURS LAYOUT PLAN SHEET 9

ISSUED FOR CONSENT: MO CIM JSD 26/01/21  
 SECOND ISSUE: MO CIM JSD 29/01/21  
 FIRST ISSUE: MO CIM JSD 24/03/21  
 DRAFTER: DSN BY CHK BY APPR DATE

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 SCALE: 1:1500 @ A3  
 DO NOT SCALE  
 DRAWING NO: 1976-1-209  
 REV: C

PURPOSE OF ISSUE

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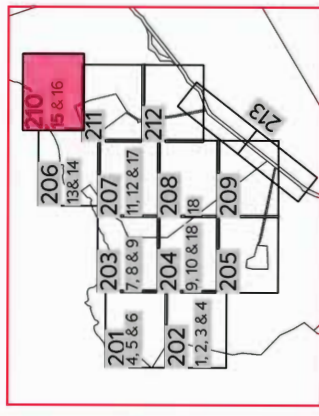
**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
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3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.

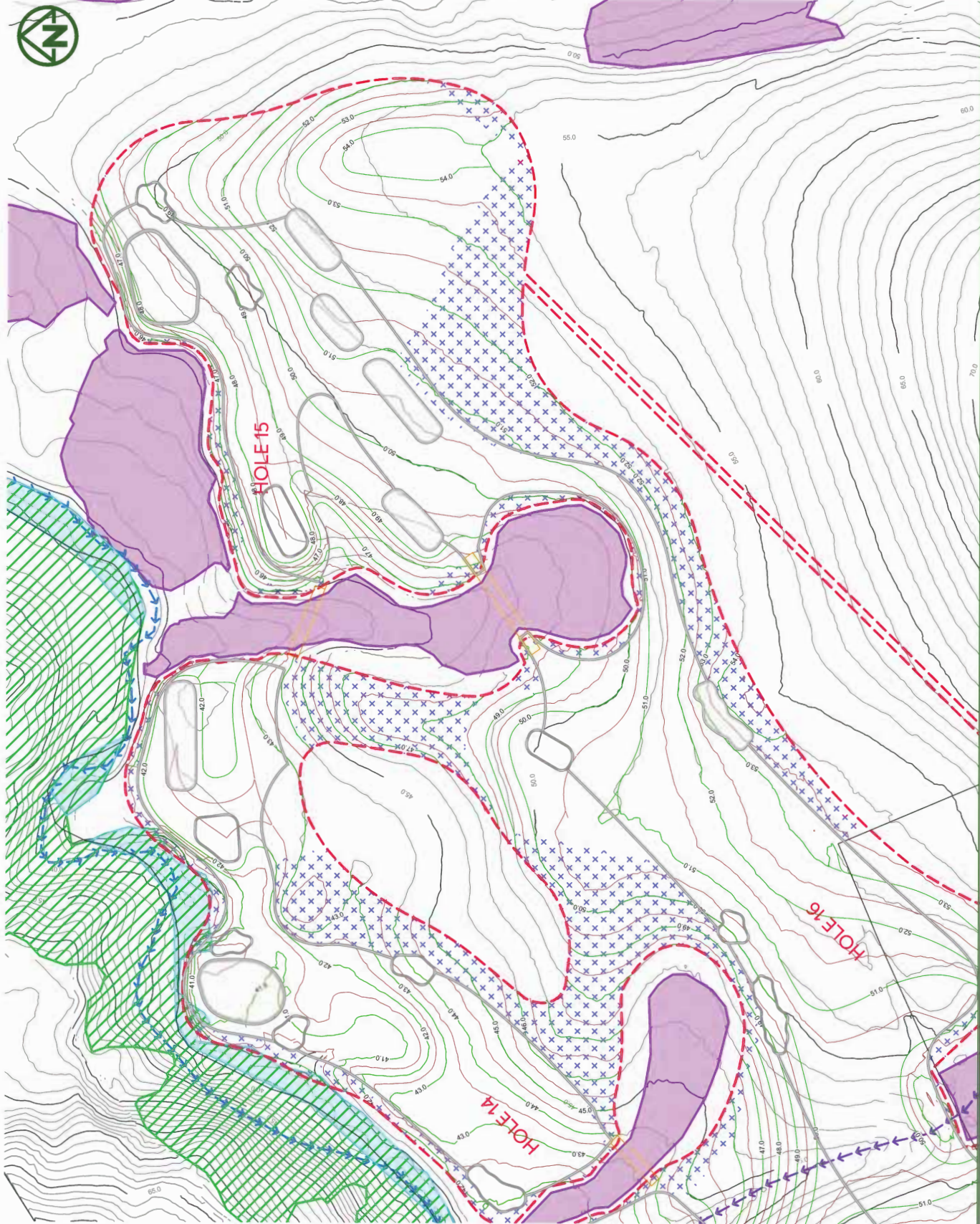


**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA/ONF AREA
- MAPPED SEA/ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



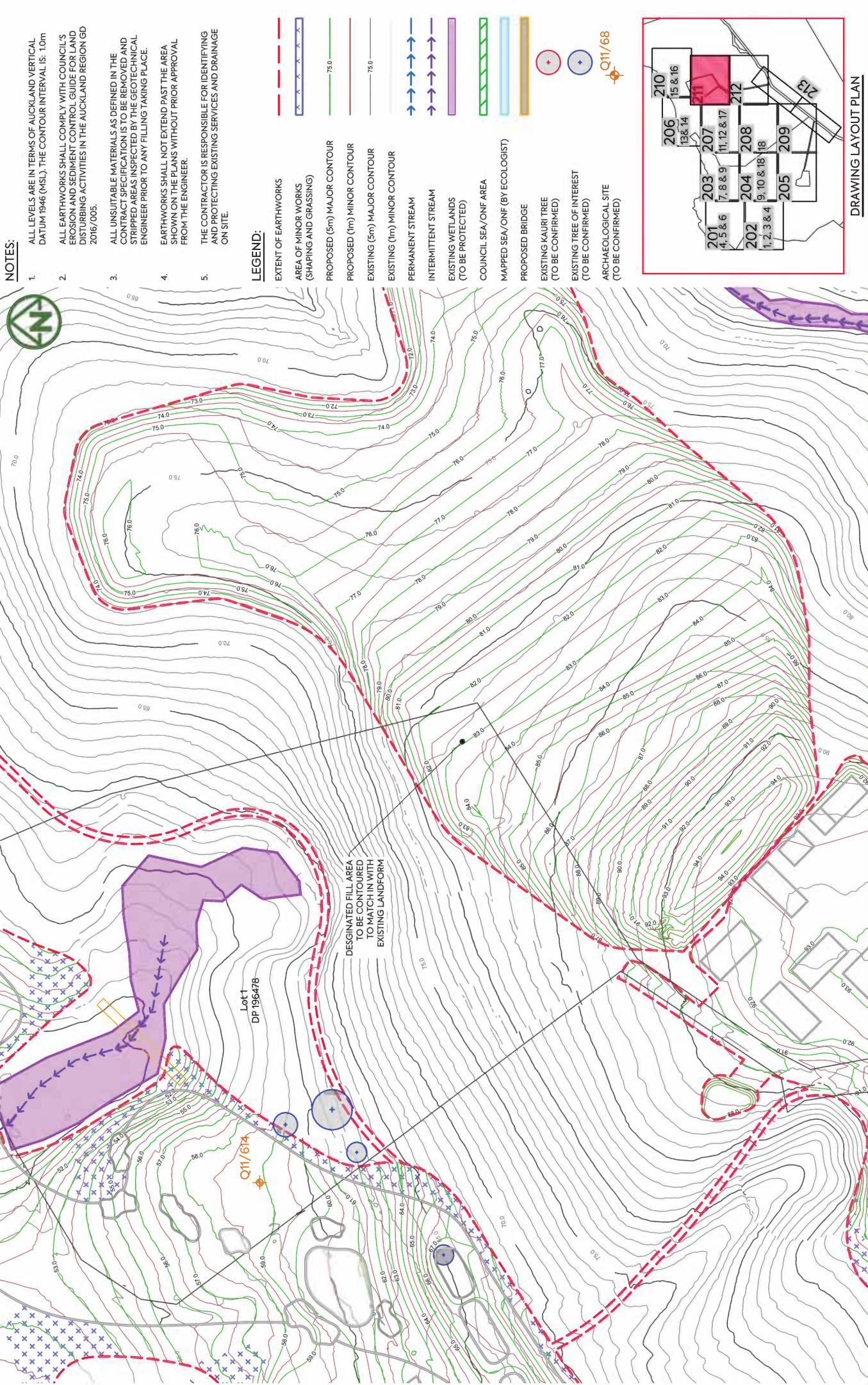
**DRAWING LAYOUT PLAN**



<p><b>CLIENT:</b> THE BEARS HOME PROJECT MANAGEMENT LTD</p> <p><b>PROJECT:</b> MURIWAI DOWNS GOLF PROJECT</p> <p><b>TITLE:</b> PROPOSED EARTHWORKS FINAL CONTOURS LAYOUT PLAN</p>	<p><b>MCKENZIE &amp; CO.</b></p> <p>610 &amp; 697 MURIWAI ROAD MURIWAI VALLEY</p>	<p><b>PURPOSE OF ISSUE:</b> FOR CONSENT</p> <p><b>SCALE:</b> 1:1500 @ A3</p> <p><b>DRAWING NO.:</b> 1976-1-210</p> <p><b>REV.:</b> C</p>
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REV.	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CH	JS	26/11/21
B	SECOND ISSUE	MO	CH	JS	29/10/21
A	FIRST ISSUE	MO	CH	JS	24/08/21

PLOT DATE: 2021-11-24 08:13:56 WWW.MCKENZIEANDCO.CO.NZ THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY OR FOR ANY OTHER PURPOSE.

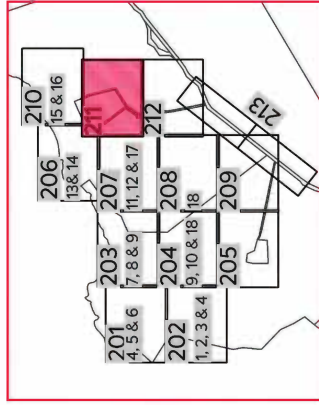


**NOTES:**

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4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.

**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 TITLE: PROPOSED EARTHWORKS FINAL CONTOURS LAYOUT PLAN SHEET 11

REV: 1976-1-211

FOR CONSENT  
 SCALE: 1:1500 @ A3  
 DO NOT SCALE  
 DRAWING NO.: 1976-1-211

ISSUED FOR CONSENT  
 NO. C14 JSD 26/01/21  
 SECOND ISSUE  
 NO. C14 JSD 29/01/21  
 FIRST ISSUE  
 NO. C14 JSD 24/08/21  
 DRA BY: CHK BY: APP BY: DATE

WWW.MCKENZIE.CO.NZ THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.

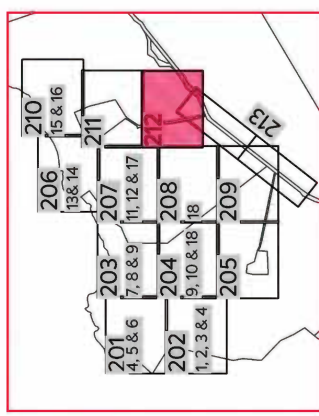
**MCKENZIE & CO.**

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
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**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
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- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



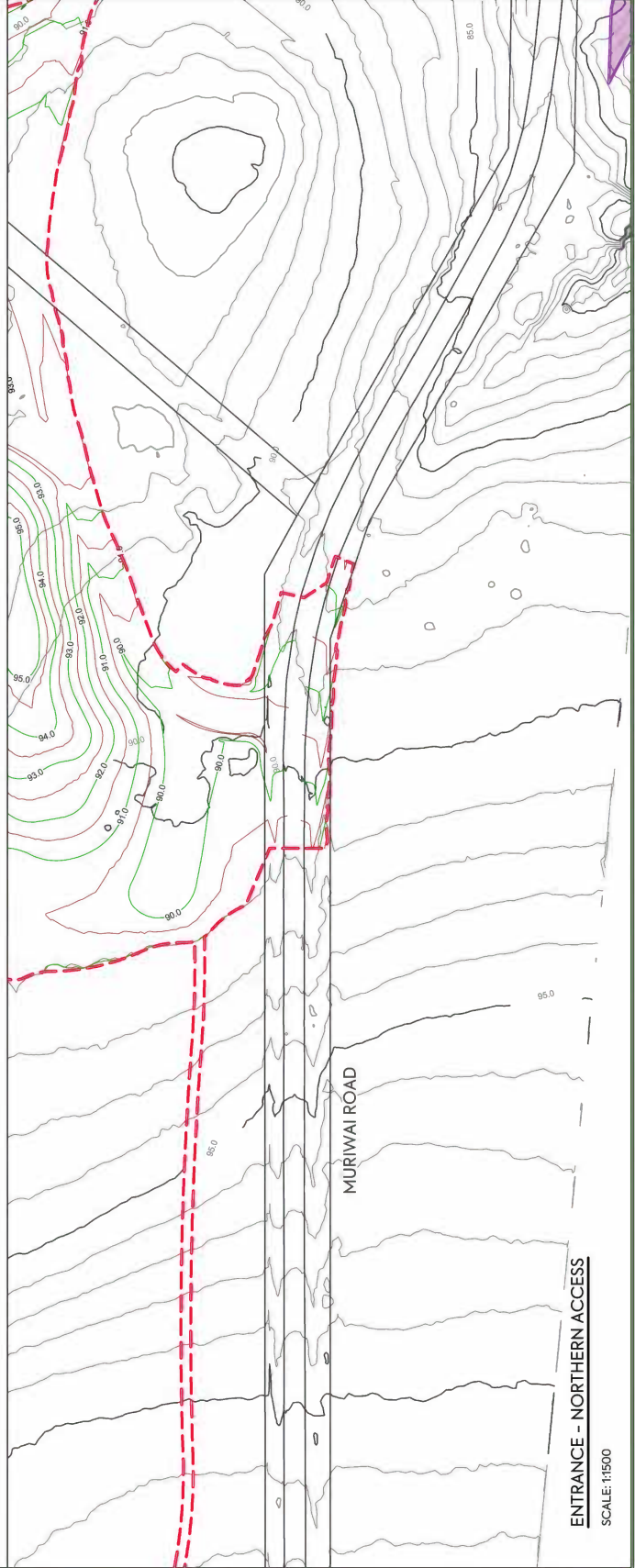
**DRAWING LAYOUT PLAN**

<p><b>CLIENT:</b> THE BEARS HOME PROJECT MANAGEMENT LTD</p>	<p><b>PROJECT:</b> MURIWAI DOWNS GOLF PROJECT 610 &amp; 697 MURIWAI ROAD MURIWAI VALLEY</p>	<p><b>TITLE:</b> PROPOSED EARTHWORKS FINAL CONTOURS LAYOUT PLAN SHEET 12</p>																				
<p><b>MCKENZIE &amp; CO.</b></p>																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV</th> <th>DESCRIPTION</th> <th>CHK BY</th> <th>APP BY</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>C</td> <td>ISSUED FOR CONSENT</td> <td>MO CIM</td> <td>JSD</td> <td>26/01/21</td> </tr> <tr> <td>B</td> <td>SECOND ISSUE</td> <td>MO CIM</td> <td>JSD</td> <td>29/01/21</td> </tr> <tr> <td>A</td> <td>FIRST ISSUE</td> <td>MO CIM</td> <td>JSD</td> <td>24/03/21</td> </tr> </tbody> </table>	REV	DESCRIPTION	CHK BY	APP BY	DATE	C	ISSUED FOR CONSENT	MO CIM	JSD	26/01/21	B	SECOND ISSUE	MO CIM	JSD	29/01/21	A	FIRST ISSUE	MO CIM	JSD	24/03/21	<p><b>PURPOSE OF ISSUE:</b> FOR CONSENT</p> <p><b>SCALE:</b> 1:1500 @ A3</p> <p><b>DO NOT SCALE</b></p> <p><b>DRAWING NO.:</b> 1976-1-212</p> <p><b>REV:</b> C</p>	<p><b>PLANT DATE:</b> 2021-01-24 08:14:02</p> <p><b>WWW.MCKENZIEANDCO.CO.NZ</b></p> <p><small>THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.</small></p>
REV	DESCRIPTION	CHK BY	APP BY	DATE																		
C	ISSUED FOR CONSENT	MO CIM	JSD	26/01/21																		
B	SECOND ISSUE	MO CIM	JSD	29/01/21																		
A	FIRST ISSUE	MO CIM	JSD	24/03/21																		



**ENTRANCE - MAIN ACCESS**

SCALE: 1:1500



**ENTRANCE - NORTHERN ACCESS**

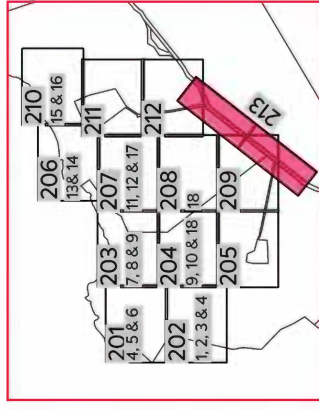
SCALE: 1:1500

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.

**LEGEND:**

- EXTENT OF EARTHWORKS
- AREA OF MINOR WORKS (SHAPING AND GRASSING)
- PROPOSED (5m) MAJOR CONTOUR
- PROPOSED (1m) MINOR CONTOUR
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- PROPOSED BRIDGE
- EXISTING KAURI TREE (TO BE CONFIRMED)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT  
 SCALE: 1:1500 @ A3  
 DO NOT SCALE  
 DRAWING NO.: 1976-1-213  
 REV: C

PROJECT: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

CLIENT: THE BEARS HOME  
 PROJECT MANAGEMENT LTD

**MCKENZIE & CO.**

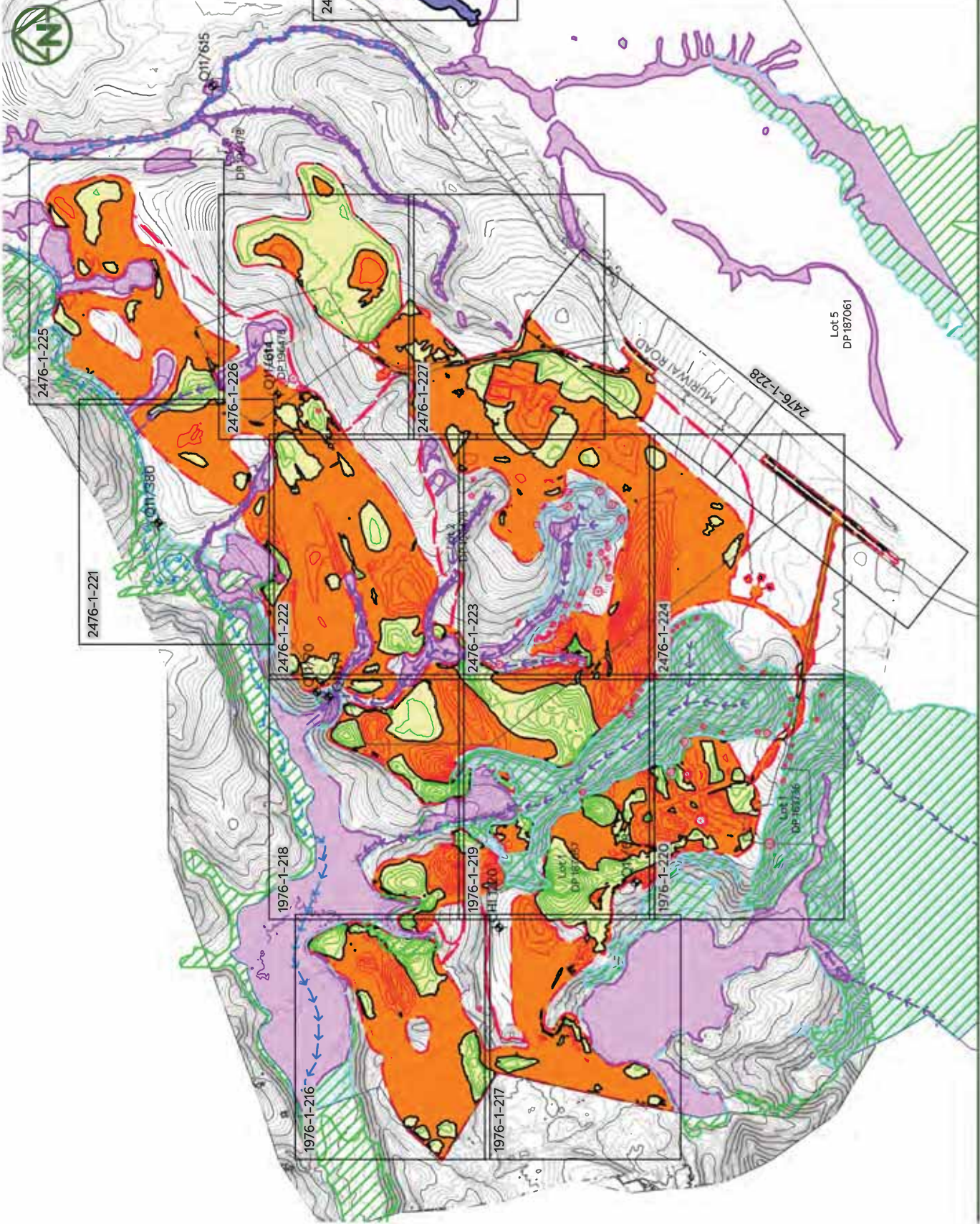
REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	NO	CIM	JSD	26/01/21
B	SECOND ISSUE	NO	CIM	JSD	29/01/21
A	FIRST ISSUE	NO	CIM	JSD	24/08/21

DRN BY: CHK BY: APP BY: DATE

WWW.MCKENZIE-ENGINEERING.CO.NZ



- NOTES:**
- ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
  - CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
  - VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:  
CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
  - VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>



**LEGEND:**

- EXTENT OF EARTHWORKS
- PROPOSED FILL
- PROPOSED CUT
- PROPOSED FILL (MAJOR CONTOUR)
- PROPOSED CUT (MAJOR CONTOUR)
- CUT/FILL (ZERO CONTOUR)
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA/ONF AREA
- MAPPED SEA/ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:7500

DO NOT SCALE

DRAWING NO.: 1976-1-215

REV: C

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD

PROJECT: MURIWAI DOWNS GOLF PROJECT

TITLE: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

PROPOSED EARTHWORKS  
CUT/FILL ISOPAC  
OVERALL PLAN



**MCKENZIE & CO.**

REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	NO	CIM	JSD	26/01/21
B	SECOND ISSUE	NO	CIM	JSD	29/01/21
A	FIRST ISSUE	NO	CIM	JSD	24/09/21

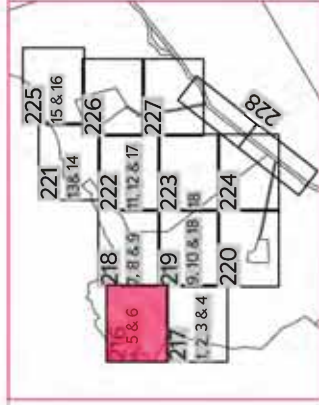
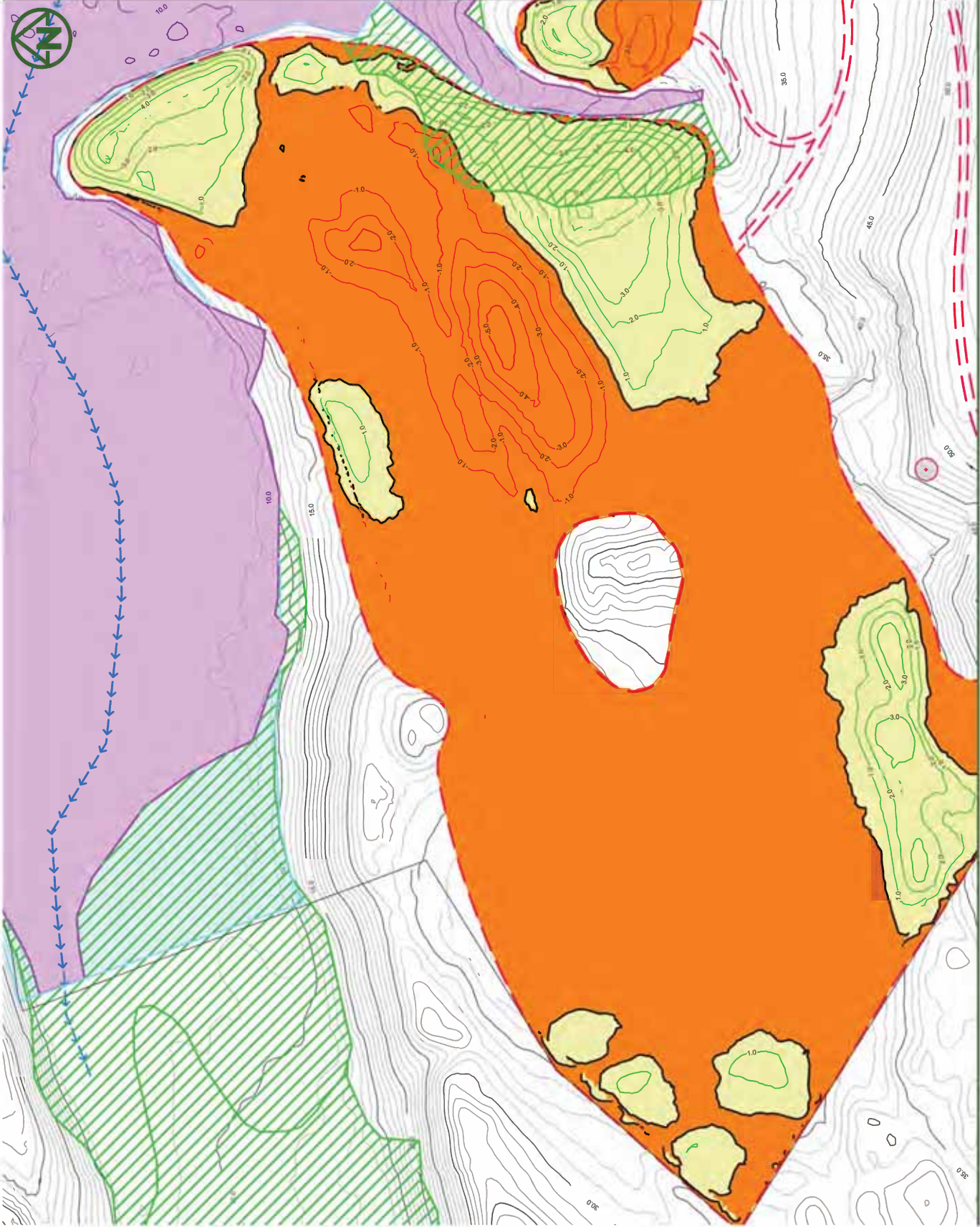


**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
3. VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:  
CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
4. VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha

**LEGEND:**

- EXTENT OF EARTHWORKS
- PROPOSED FILL
- PROPOSED CUT
- PROPOSED FILL (MAJOR CONTOUR)
- PROPOSED CUT (MAJOR CONTOUR)
- CUT/FILL (ZERO CONTOUR)
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500

DO NOT SCALE

DRAWING NO.: 1976-1-216

REV: C

PROPOSED EARTHWORKS  
CUT/FILL ISOPAC  
LAYOUT PLAN  
SHEET 1

CLIENT: THE BEARS HOME  
PROJECT MANAGEMENT LTD

PROJECT: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY



REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

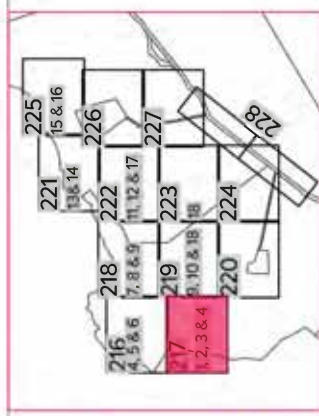
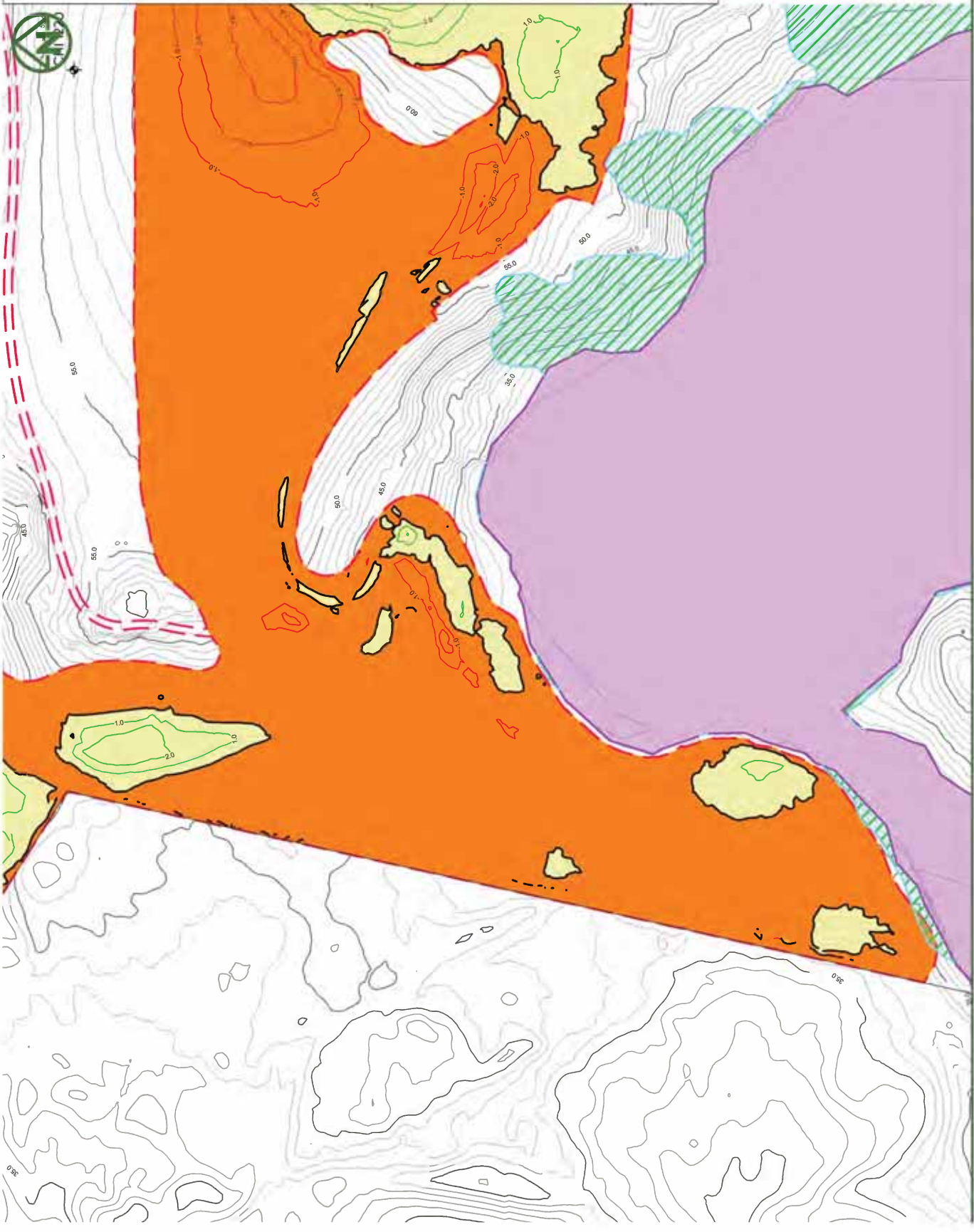


**NOTES:**

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2. CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
3. VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:  
CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
4. VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha

**LEGEND:**

- EXTENT OF EARTHWORKS
- PROPOSED FILL
- PROPOSED CUT
- PROPOSED FILL (MAJOR CONTOUR)
- PROPOSED CUT (MAJOR CONTOUR)
- CUT/FILL (ZERO CONTOUR)
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT  
 SCALE: 1:1500  
 DO NOT SCALE  
 DRAWING NO.: 1976-1-217  
 REV: C

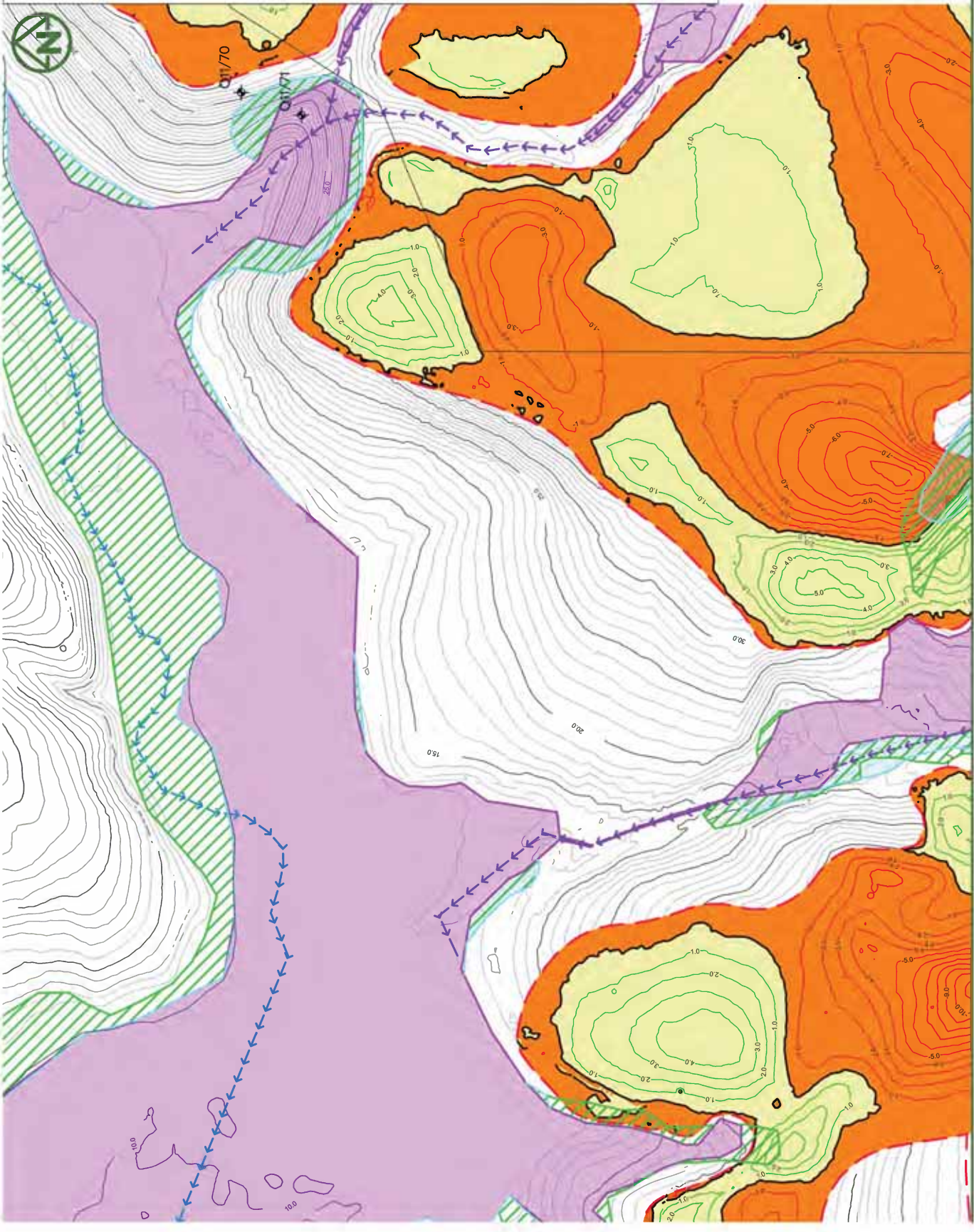
PROPOSED EARTHWORKS  
 CUT/FILL ISOPAC  
 LAYOUT PLAN  
 SHEET 2

PROJECT: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

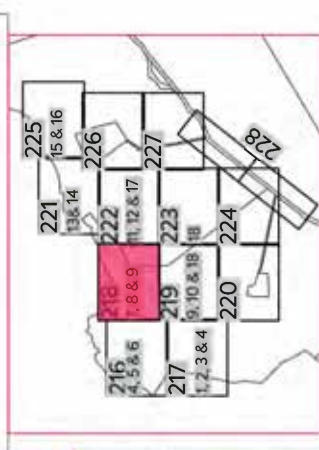
CLIENT: THE BEARS HOME  
 PROJECT MANAGEMENT LTD



REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21



- NOTES:**
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CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
  - VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha
- LEGEND:**
- EXTENT OF EARTHWORKS
  - PROPOSED FILL
  - PROPOSED CUT
  - PROPOSED FILL (MAJOR CONTOUR)
  - PROPOSED CUT (MAJOR CONTOUR)
  - CUT/FILL (ZERO CONTOUR)
  - EXISTING (5m) MAJOR CONTOUR
  - EXISTING (1m) MINOR CONTOUR
  - PERMANENT STREAM
  - INTERMITTENT STREAM
  - EXISTING WETLANDS (TO BE PROTECTED)
  - COUNCIL SEA / ONF AREA
  - MAPPED SEA / ONF (BY ECOLOGIST)
  - EXISTING TREE OF INTEREST (TO BE CONFIRMED)
  - ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

TITLE: PROPOSED EARTHWORKS CUT/FILL ISOPAC LAYOUT PLAN SHEET 3

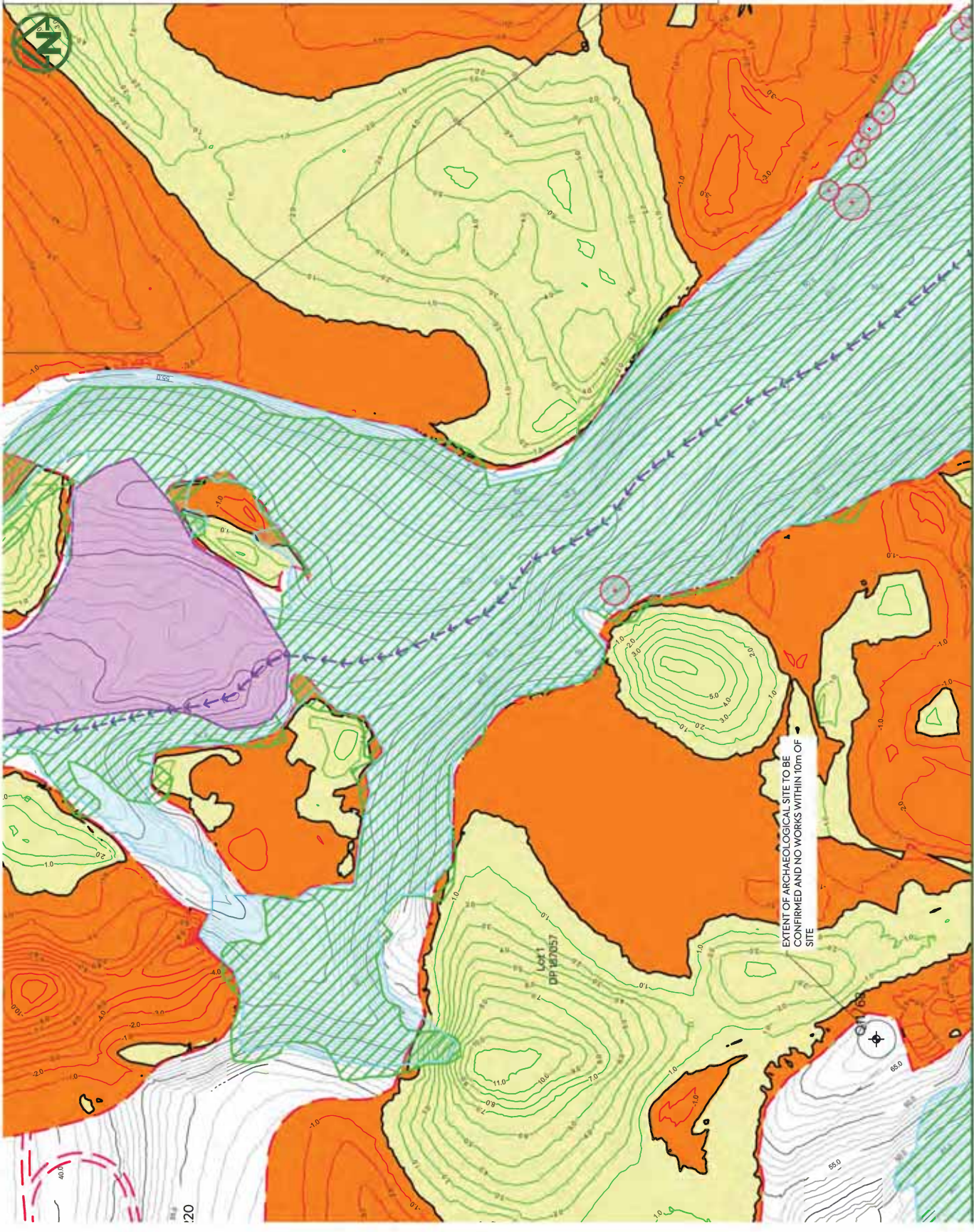
PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500  
 DO NOT SCALE

DRAWING NO.: 1976-1-218  
 REV: C



REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
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B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

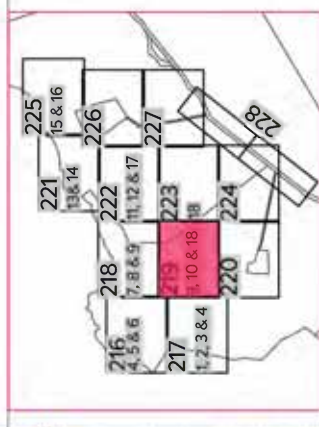


**NOTES:**

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2. CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
3. VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:  
CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
4. VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha

**LEGEND:**

- EXTENT OF EARTHWORKS
- PROPOSED FILL
- PROPOSED CUT
- PROPOSED FILL (MAJOR CONTOUR)
- PROPOSED CUT (MAJOR CONTOUR)
- CUT/FILL (ZERO CONTOUR)
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT  
 SCALE: 1:1500  
 DO NOT SCALE  
 DRAWING NO.: 1976-1-219  
 REV: C

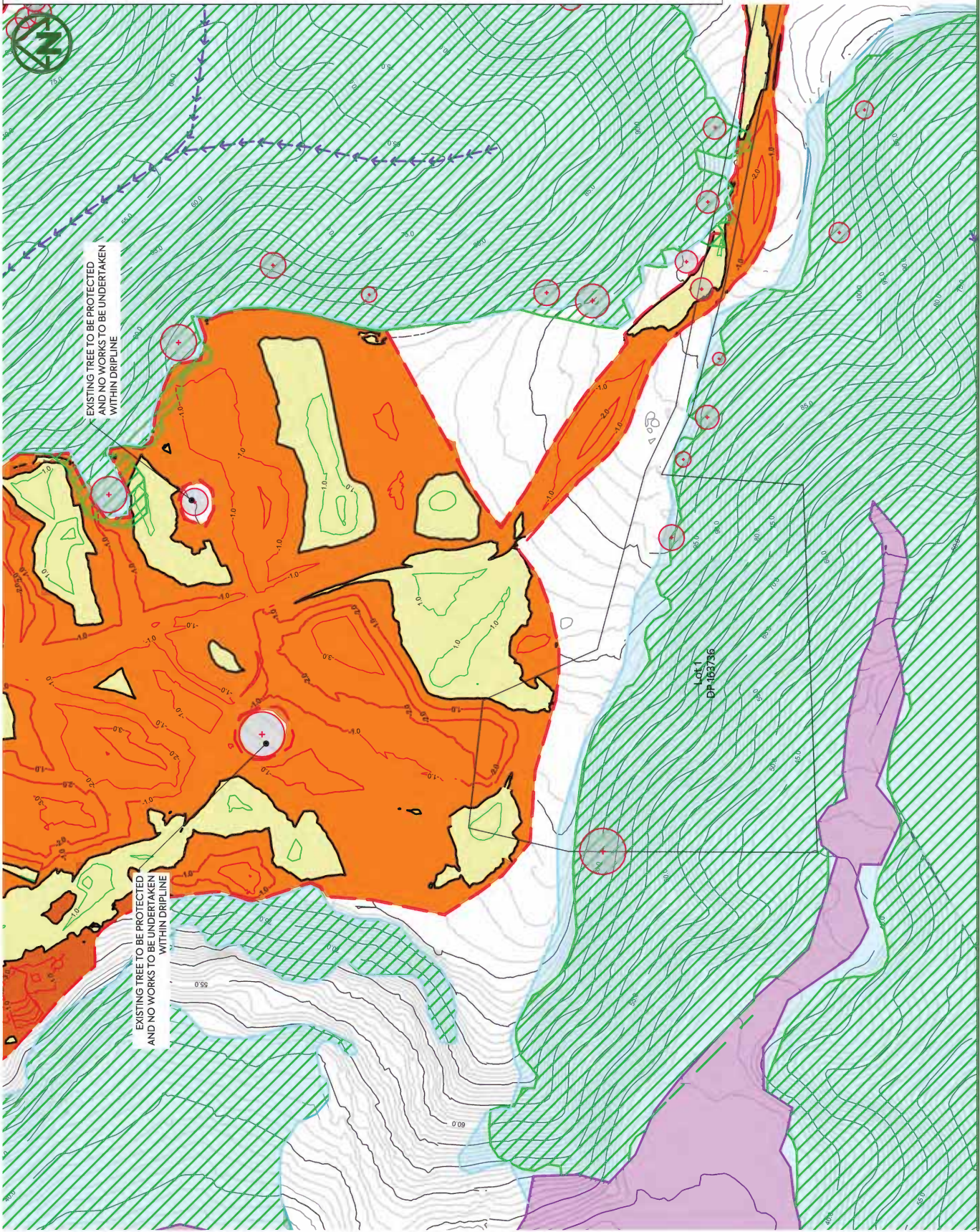
TITLE: PROPOSED EARTHWORKS CUT/FILL ISOPAC LAYOUT PLAN SHEET 4

PROJECT: MURIWAI DOWNS GOLF PROJECT 610 & 697 MURIWAI ROAD MURIWAI VALLEY

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD



REV	DESCRIPTION	CHK BY	APP BY	DATE	
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21



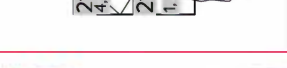
**NOTES:**

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2. CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
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CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
4. VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha

**LEGEND:**

- EXTENT OF EARTHWORKS
- PROPOSED FILL
- PROPOSED CUT
- PROPOSED FILL (MAJOR CONTOUR)
- PROPOSED CUT (MAJOR CONTOUR)
- CUT/FILL (ZERO CONTOUR)
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)

Q11/68



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500

DO NOT SCALE

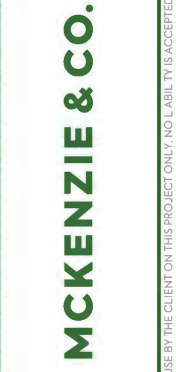
DRAWING NO: 1976-1-220

REV: C

PROPOSED EARTHWORKS  
CUT/FILL ISOPAC  
LAYOUT PLAN  
SHEET 5

CLIENT: THE BEARS HOME  
PROJECT MANAGEMENT LTD

PROJECT: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY



REV	DESCRIPTION	CHK BY	APP BY	DATE	
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

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PLOT DATE: 2021-01-23 10:05:01

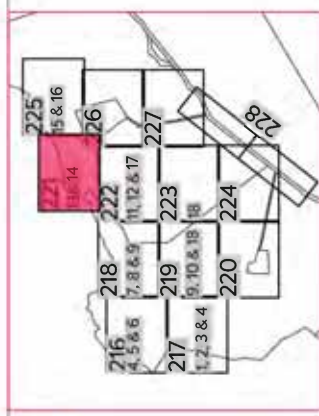
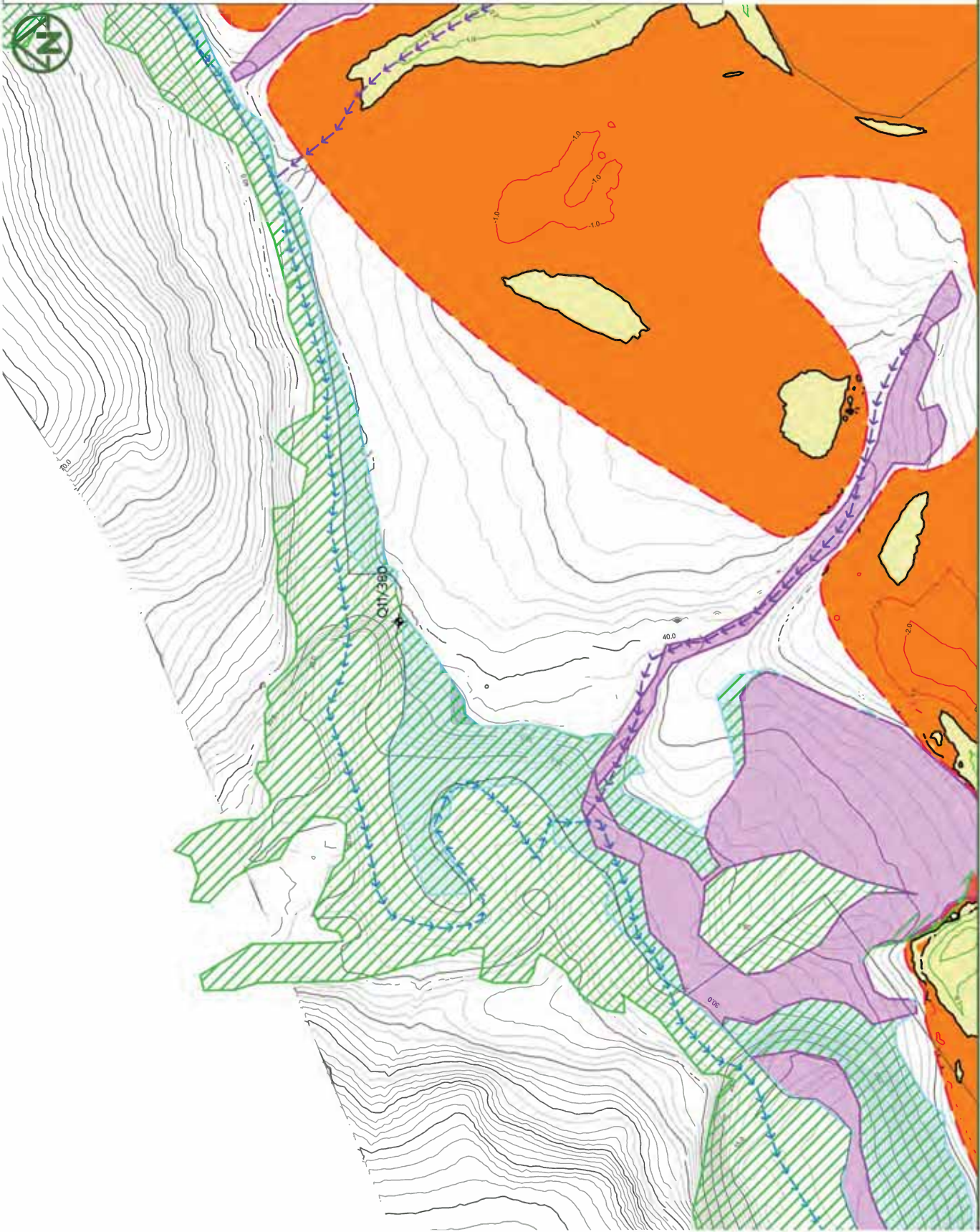
**NOTES:**

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3. VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:  
CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
4. VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha

**LEGEND:**

**EXTENT OF EARTHWORKS**

- PROPOSED FILL (Yellow hatched)
- PROPOSED CUT (Orange hatched)
- PROPOSED FILL (MAJOR CONTOUR) (Green hatched)
- PROPOSED CUT (MAJOR CONTOUR) (Red hatched)
- CUT/FILL (ZERO CONTOUR) (Black hatched)
- EXISTING (5m) MAJOR CONTOUR (Grey line)
- EXISTING (1m) MINOR CONTOUR (Light grey line)
- PERMANENT STREAM (Blue dashed line)
- INTERMITTENT STREAM (Purple dashed line)
- EXISTING WETLANDS (TO BE PROTECTED) (Purple solid area)
- COUNCIL SEA / ONF AREA (Green hatched)
- MAPPED SEA / ONF (BY ECOLOGIST) (Light blue hatched)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED) (Red circle with dot)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED) (Black circle with crosshair)



**DRAWING LAYOUT PLAN**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

TITLE: PROPOSED EARTHWORKS  
 CUT/FILL ISOPAC  
 LAYOUT PLAN  
 SHEET 6

PURPOSE OF ISSUE: FOR CONSENT  
 SCALE: 1:1500  
 DO NOT SCALE  
 DRAWING NO.: 1976-1-221  
 REV: C



REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	NO	CIM	JSD	26/01/21
B	SECOND ISSUE	NO	CIM	JSD	29/01/21
A	FIRST ISSUE	NO	CIM	JSD	24/09/21



- NOTES:**
1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
  2. CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
  3. VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:  
CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
  4. VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha

**LEGEND:**

EXTENT OF EARTHWORKS

PROPOSED FILL

PROPOSED CUT

PROPOSED FILL (MAJOR CONTOUR)

PROPOSED CUT (MAJOR CONTOUR)

CUT/FILL (ZERO CONTOUR)

EXISTING (5m) MAJOR CONTOUR

EXISTING (1m) MINOR CONTOUR

PERMANENT STREAM

INTERMITTENT STREAM

EXISTING WETLANDS (TO BE PROTECTED)

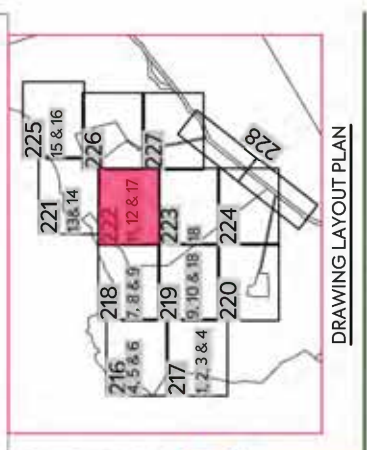
COUNCIL SEA / ONF AREA

MAPPED SEA / ONF (BY ECOLOGIST)

EXISTING TREE OF INTEREST (TO BE CONFIRMED)

ARCHAEOLOGICAL SITE (TO BE CONFIRMED)

Q11/68



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500

DO NOT SCALE

DRAWING NO.: 1976-1-222

REV: C

PROJECT: MURWAI DOWNS GOLF PROJECT  
610 & 697 MURWAI ROAD  
MURWAI VALLEY

CLIENT: THE BEARS HOME  
PROJECT MANAGEMENT LTD

TITLE: PROPOSED EARTHWORKS  
CUT/FILL ISOPAC  
LAYOUT PLAN  
SHEET 7

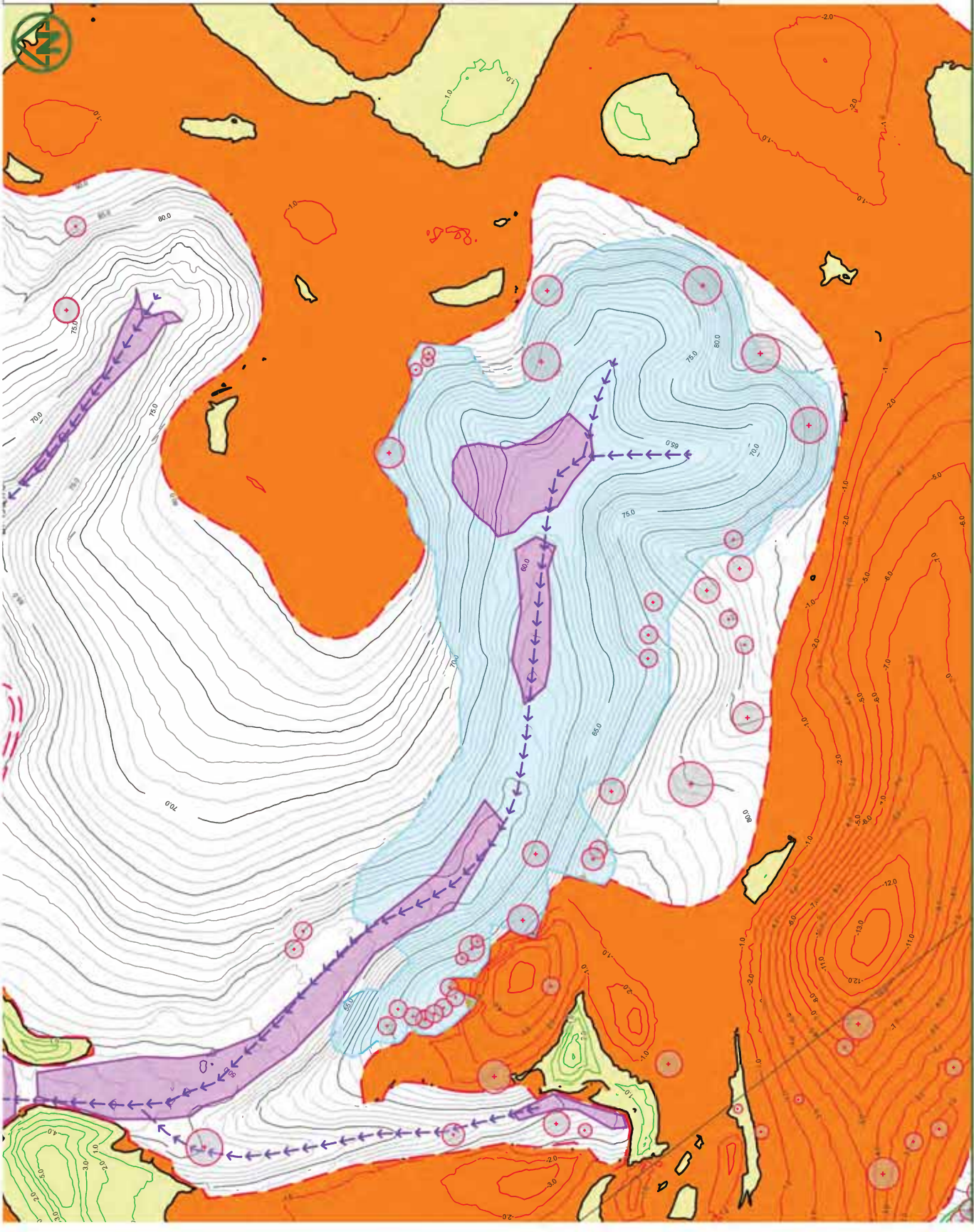
**MCKENZIE & CO.**

NO	CHK BY	APP BY	DATE		
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

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THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LABEL IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.





- NOTES:**
- ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
  - CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
  - VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:  
CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
  - VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha

**LEGEND:**

EXTENT OF EARTHWORKS

PROPOSED FILL

PROPOSED CUT

PROPOSED FILL (MAJOR CONTOUR)

PROPOSED CUT (MAJOR CONTOUR)

CUT/FILL (ZERO CONTOUR)

EXISTING (5m) MAJOR CONTOUR

EXISTING (1m) MINOR CONTOUR

PERMANENT STREAM

INTERMITTENT STREAM

EXISTING WETLANDS (TO BE PROTECTED)

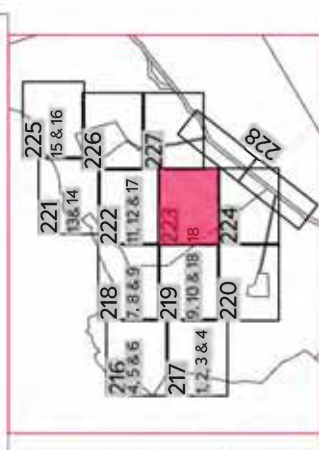
COUNCIL SEA / ONF AREA

MAPPED SEA / ONF (BY ECOLOGIST)

EXISTING TREE OF INTEREST (TO BE CONFIRMED)

ARCHAEOLOGICAL SITE (TO BE CONFIRMED)

Q11/68



**DRAWING LAYOUT PLAN**

**CLIENT:** THE BEARS HOME PROJECT MANAGEMENT LTD

**PROJECT:** MURWAI DOWNS GOLF PROJECT 610 & 697 MURWAI ROAD MURWAI VALLEY

**TITLE:** PROPOSED EARTHWORKS CUT/FILL ISOPAC LAYOUT PLAN SHEET 8

**REV:** C

**SCALE:** 1:1500

**DO NOT SCALE**

**DRAWING NO.:** 1976-1-223

**REVISIONS:**

REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

**WWW.MCKENZIEANDCO.CO.NZ** THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LABEL IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.

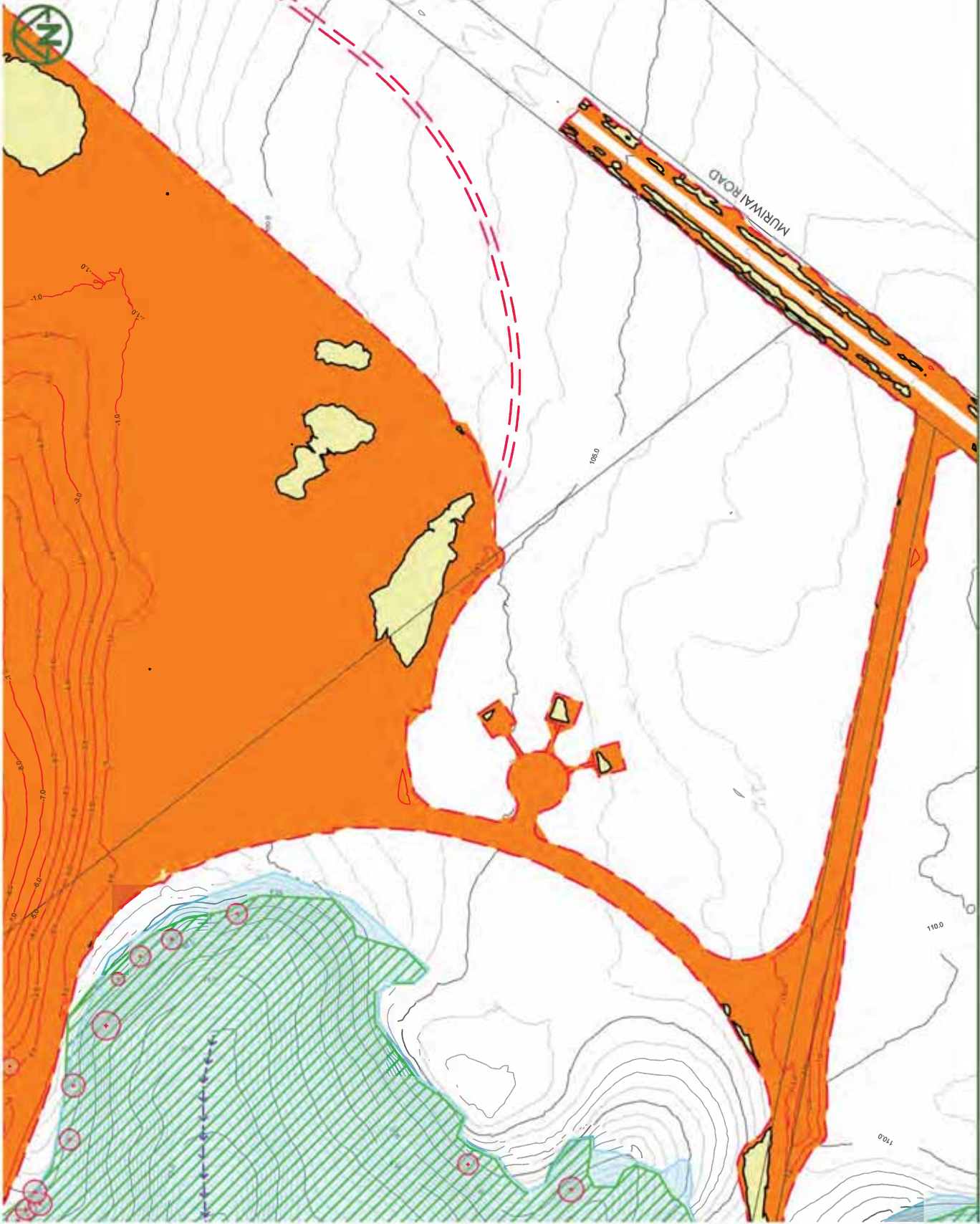
**MCKENZIE & CO.**

**FOR CONSENT**

**1976-1-223**

**C**

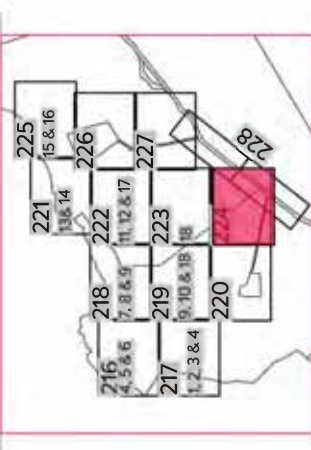
C:\USERS\DATA\MCKENZIE\1976-1-223\MURWAI ROAD 786\DRAWINGS\1976-1-223 RESOURCE CONSENT 1976-1-223.DWG



- NOTES:**
1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
  2. CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
  3. VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:  
CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
  4. VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha

**LEGEND:**

- EXTENT OF EARTHWORKS
- PROPOSED FILL
- PROPOSED CUT
- PROPOSED FILL (MAJOR CONTOUR)
- PROPOSED CUT (MAJOR CONTOUR)
- CUT/FILL (ZERO CONTOUR)
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500

DO NOT SCALE

DRAWING NO: 1976-1-224

REV: C

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD

PROJECT: MURIWAI DOWNS GOLF PROJECT

TITLE: PROPOSED EARTHWORKS CUT/FILL ISOPAC LAYOUT PLAN SHEET 9

MURIWAI ROAD

610 & 697 MURIWAI ROAD

MURIWAI VALLEY

**MCKENZIE & CO.**

REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

WWW.MCKENZIEANDCO.CO.NZ THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LABEL IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
3. VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:  
CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
4. VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha

**LEGEND:**

**EXTENT OF EARTHWORKS**

**PROPOSED FILL** (Yellow fill)

**PROPOSED CUT** (Orange fill)

**PROPOSED FILL (MAJOR CONTOUR)** (Green dashed line)

**PROPOSED CUT (MAJOR CONTOUR)** (Red dashed line)

**CUT/FILL (ZERO CONTOUR)** (Black dashed line)

**EXISTING (5m) MAJOR CONTOUR** (Grey dashed line)

**EXISTING (1m) MINOR CONTOUR** (Thin grey dashed line)

**PERMANENT STREAM** (Blue dashed line with arrows)

**INTERMITTENT STREAM** (Purple dashed line with arrows)

**EXISTING WETLANDS (TO BE PROTECTED)** (Purple fill)

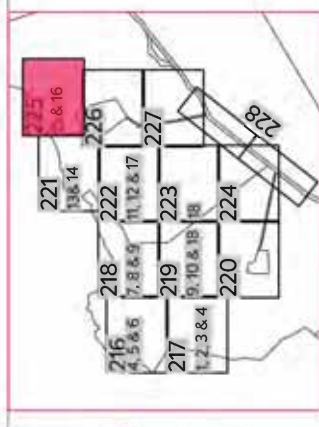
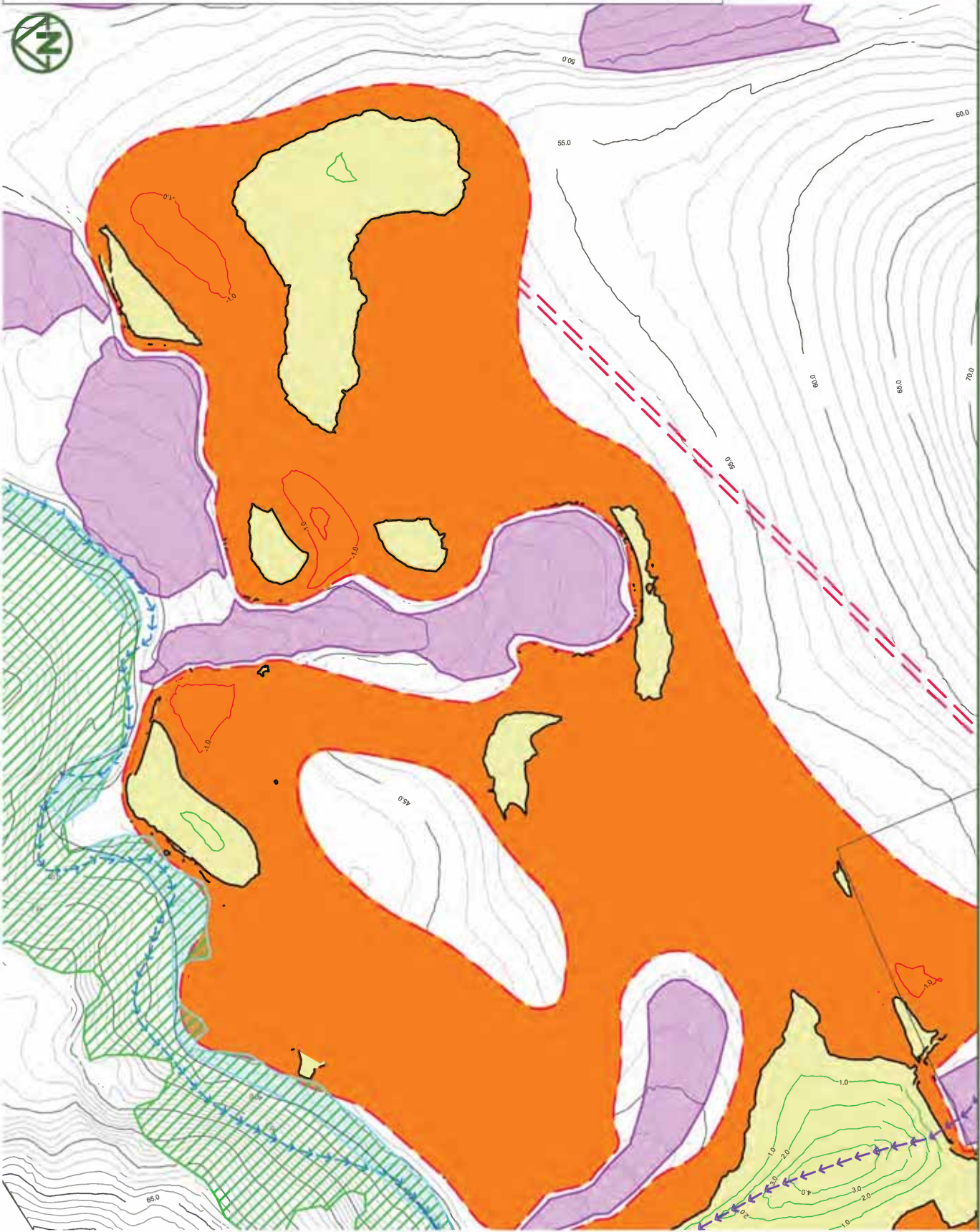
**COUNCIL SEA / ONF AREA** (Green hatched area)

**MAPPED SEA / ONF (BY ECOLOGIST)** (Light blue hatched area)

**EXISTING TREE OF INTEREST (TO BE CONFIRMED)** (Red circle with dot)

**ARCHAEOLOGICAL SITE (TO BE CONFIRMED)** (Black circle with dot)

Q11/68



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500

DO NOT SCALE

DRAWING NO.: 1976-1-225

REV: C

TITLE: PROPOSED EARTHWORKS CUT/FILL ISOPAC LAYOUT PLAN SHEET 10

PROJECT: MURIWAI DOWNS GOLF PROJECT 610 & 697 MURIWAI ROAD MURIWAI VALLEY

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD



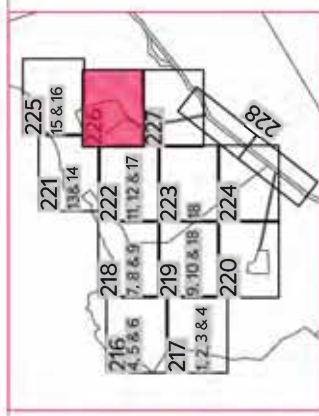
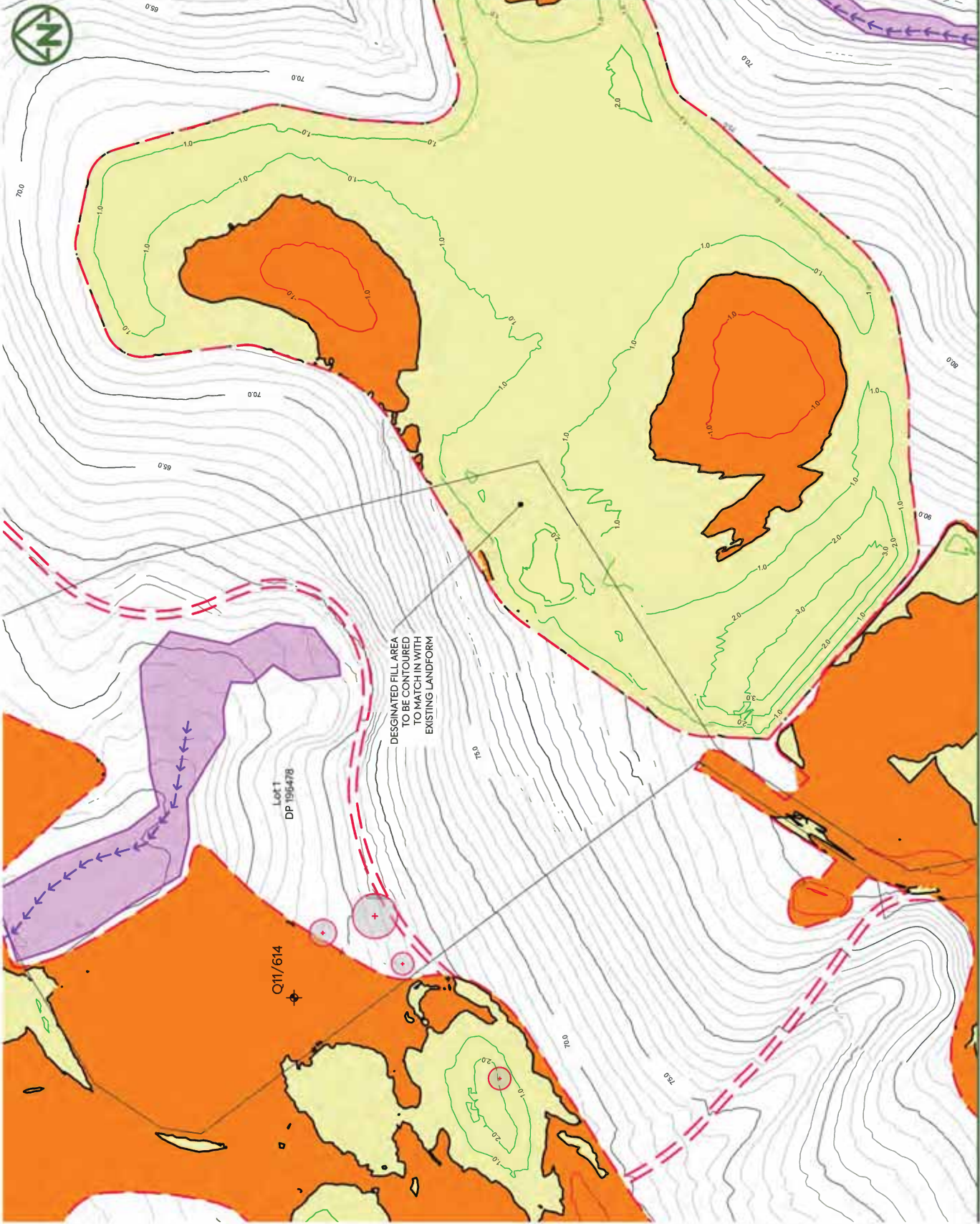
REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
3. VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:  
CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
4. VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha

**LEGEND:**

- EXTENT OF EARTHWORKS
- PROPOSED FILL
- PROPOSED CUT
- PROPOSED FILL (MAJOR CONTOUR)
- PROPOSED CUT (MAJOR CONTOUR)
- CUT/FILL (ZERO CONTOUR)
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



DRAWING LAYOUT PLAN

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500

DO NOT SCALE

DRAWING NO.: 1976-1-226

REV: C

TITLE: PROPOSED EARTHWORKS CUT/FILL ISOPAC LAYOUT PLAN SHEET 11

PROJECT: MURWAI DOWNS GOLF PROJECT 610 & 697 MURWAI ROAD MURWAI VALLEY

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD



REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	29/10/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

**NOTES:**

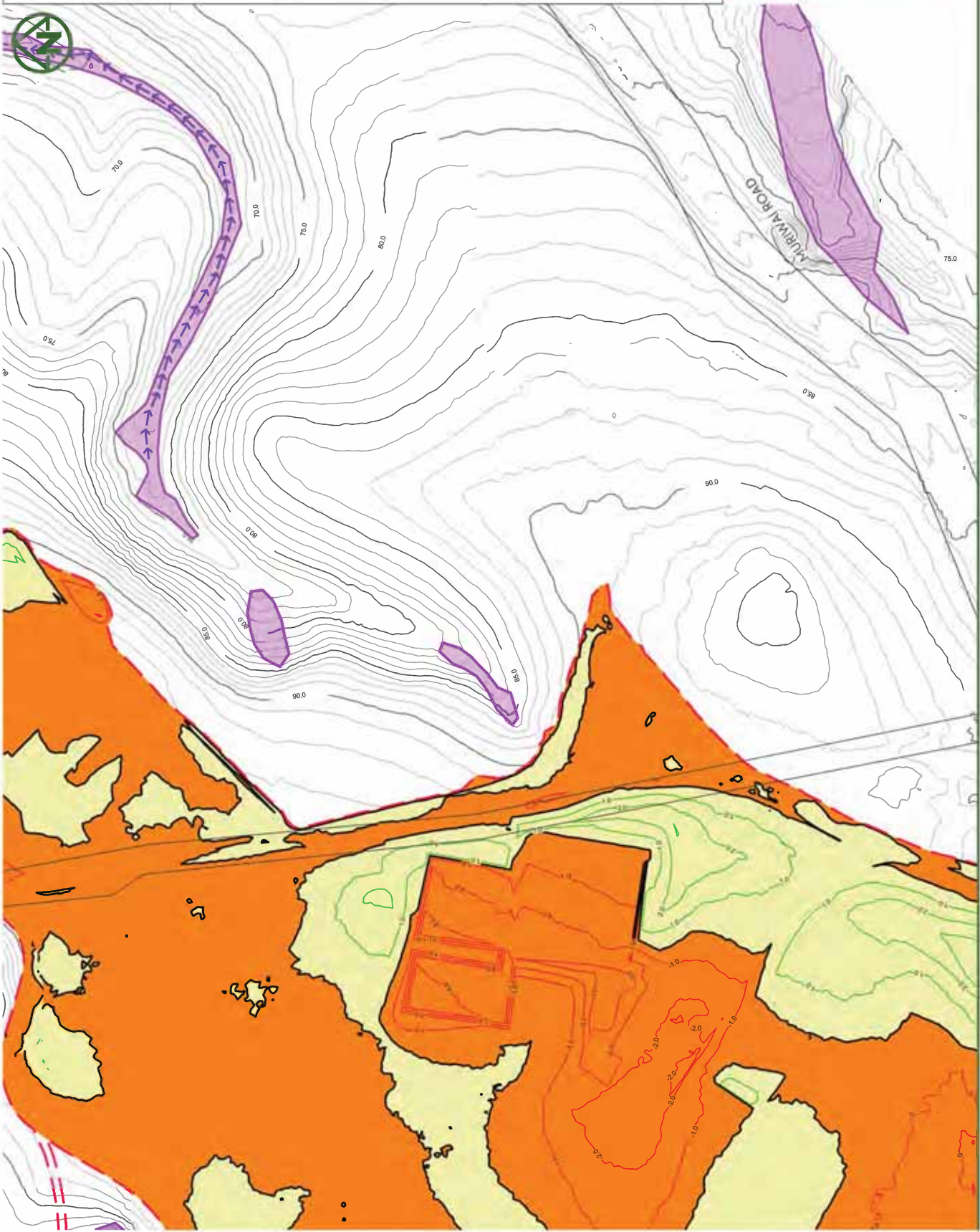
- ALL LEVELS ARE IN TERMS OF AUCLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
- CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
- VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:  
CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
- VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha

**LEGEND:**

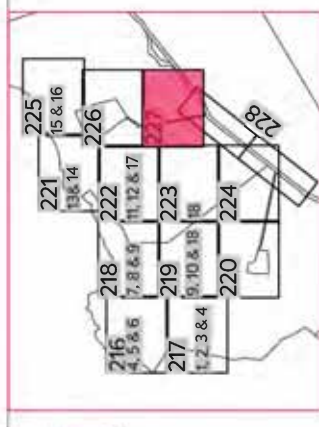
**EXTENT OF EARTHWORKS**

- PROPOSED FILL
- PROPOSED CUT
- PROPOSED FILL (MAJOR CONTOUR)
- PROPOSED CUT (MAJOR CONTOUR)
- CUT/FILL (ZERO CONTOUR)
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)

**Q11/68**



**DRAWING LAYOUT PLAN**



PURPOSE OF ISSUE: FOR CONSENT  
 SCALE: 1:1500  
 DO NOT SCALE  
 DRAWING NO.: 1976-1-227  
 REV: C

TITLE: PROPOSED EARTHWORKS CUT/FILL ISOPAC LAYOUT PLAN SHEET 12  
 PROJECT: MURIRAI DOWNS GOLF PROJECT 610 & 697 MURIRAI ROAD MURIRAI VALLEY  
 CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD

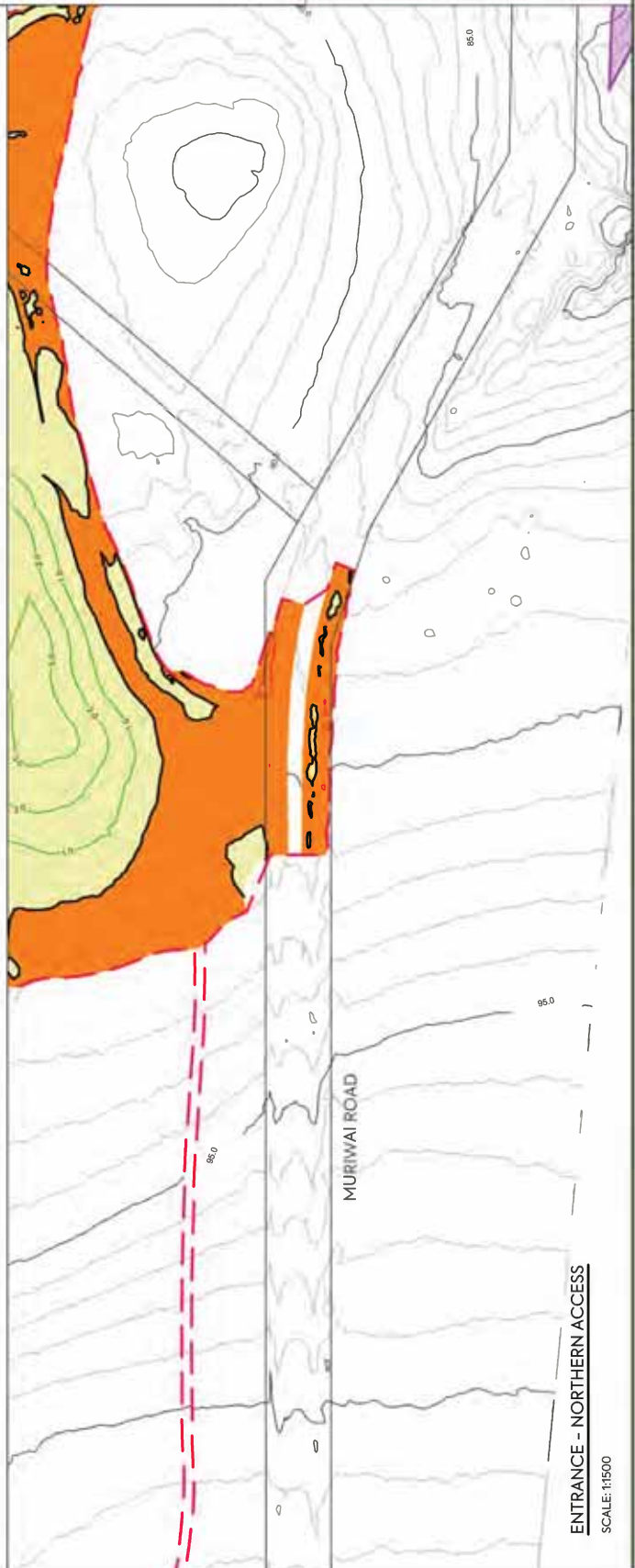


REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
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B	SECOND ISSUE	02	CIM	JSD	29/01/21
A	FIRST ISSUE	01	CIM	JSD	24/09/21



**ENTRANCE - MAIN ACCESS**

SCALE: 1:1500



**ENTRANCE - NORTHERN ACCESS**

SCALE: 1:1500

- NOTES:**
1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
  2. CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
  3. VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:  
CUT: 440,000m<sup>3</sup>  
FILL: 329,000m<sup>3</sup>  
AREA: 69.62 ha
  4. VOLUME OF EARTHWORKS IN DESIGNATED FILL AREA:  
FILL: 110,000m<sup>3</sup>  
AREA: 6.60 ha

**LEGEND:**

- EXTENT OF EARTHWORKS
- PROPOSED FILL
- PROPOSED CUT
- PROPOSED FILL (MAJOR CONTOUR)
- PROPOSED CUT (MAJOR CONTOUR)
- CUT/FILL (ZERO CONTOUR)
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

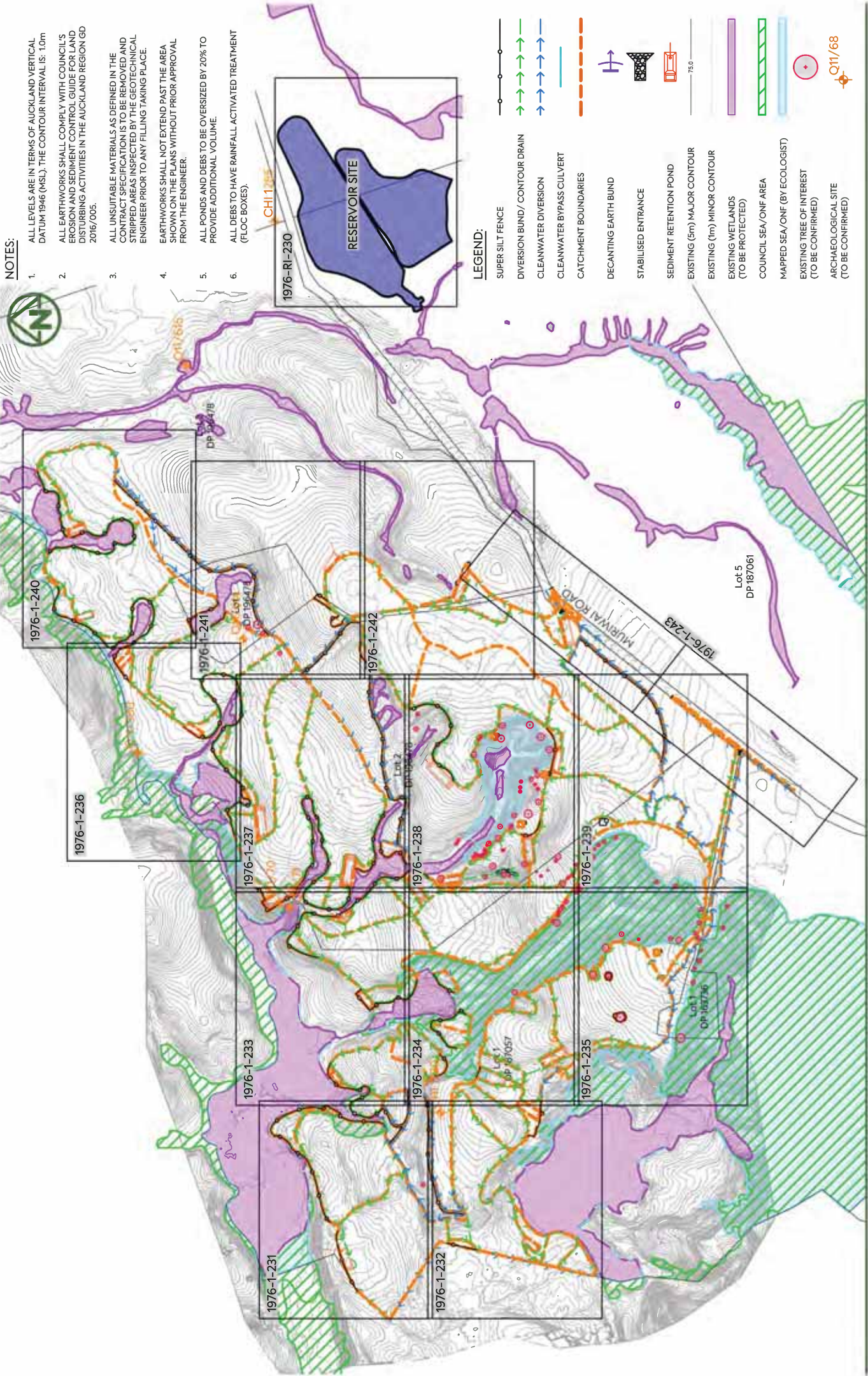
PURPOSE OF ISSUE: FOR CONSENT  
 SCALE: 1:1500  
 DO NOT SCALE  
 DRAWING NO: 1976-1-228  
 REV: C

TITLE: PROPOSED EARTHWORKS CUT/FILL ISOPAC LAYOUT PLAN SHEET 13

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

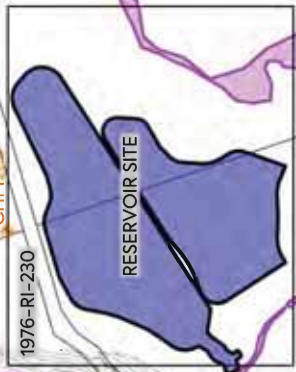


REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21



**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCLAND REGION GD 2016/005.
3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. ALL PONDS AND DEBS TO BE OVERSEEN BY 20% TO PROVIDE ADDITIONAL VOLUME.
6. ALL DEBS TO HAVE RAINFALL ACTIVATED TREATMENT (FLOC BOXES).



**LEGEND:**

- SUPER SILT FENCE
- DIVERSION BUND/ CONTOUR DRAIN
- CLEAN WATER DIVERSION
- CLEAN WATER BYPASS CULVERT
- CATCHMENT BOUNDARIES
- DECANTING EARTH BUND
- STABILISED ENTRANCE
- SEDIMENT RETENTION POND
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA /ONF AREA
- MAPPED SEA /ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)

REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	NO	CIM	JSD	26/11/21
B	SECOND ISSUE	NO	CIM	JSD	29/10/21
A	FIRST ISSUE	NO	CIM	JSD	24/09/21

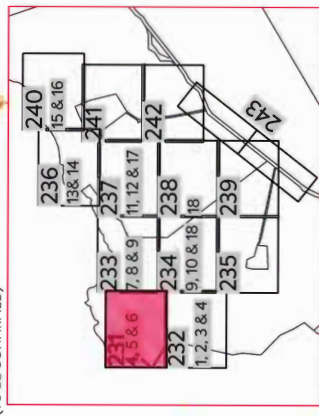
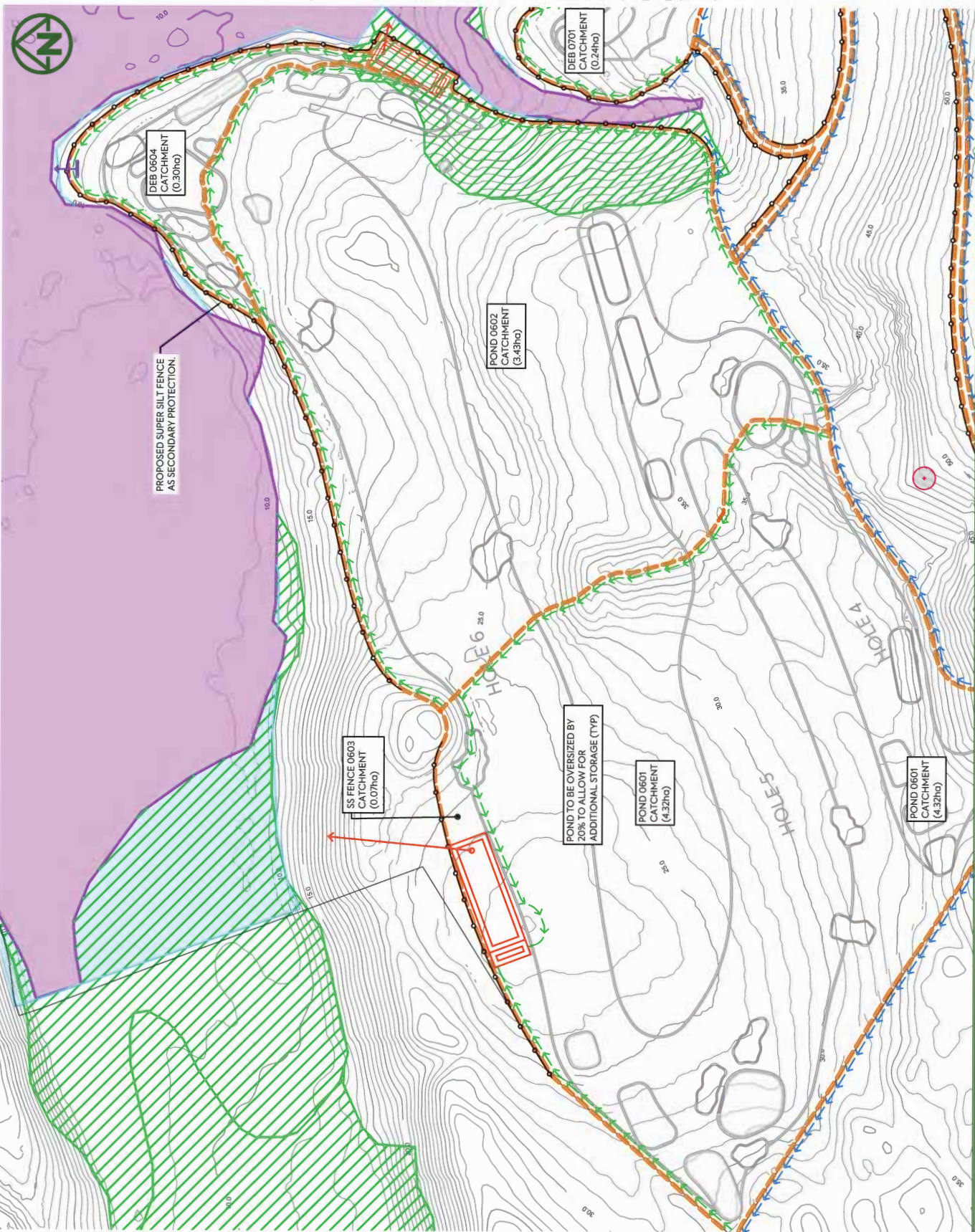
CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURWAI DOWNS GOLF PROJECT  
 TITLE: PROPOSED EARTHWORKS EROSION SEDIMENT CONTROL OVERALL PLAN  
 MURWAI ROAD 610 & 697 MURWAI ROAD MURWAI VALLEY  
 MCKENZIE & CO.  
 WWW.MCKENZIE.CO.NZ THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.  
 PURPOSE OF ISSUE: FOR CONSENT  
 SCALE: 1:7500 @ A3  
 DO NOT SCALE  
 DRAWING NO: 1976-1-230  
 REV: C

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. ALL PONDS AND DEBS TO BE OVERSIZED BY 20% TO PROVIDE ADDITIONAL VOLUME.
6. ALL DEBS TO HAVE RAINFALL ACTIVATED TREATMENT (FLOC BOXES).

**LEGEND:**

- SUPER SILT FENCE
- DIVERSION BUND/ CONTOUR DRAIN
- CLEANWATER DIVERSION
- CLEANWATER BYPASS CULVERT
- CATCHMENT BOUNDARIES
- DECANTING EARTH BUND
- STABILISED ENTRANCE
- SEDIMENT RETENTION POND
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA/ONF AREA
- MAPPED SEA/ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

TITLE: PROPOSED EARTHWORKS EROSION SEDIMENT CONTROL LAYOUT PLAN SHEET 1

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3  
 DO NOT SCALE

DRAWING NO: 1976-1-231  
 REV: C

ISSUED FOR CONSENT: NO CH JS 26/11/21  
 SECOND ISSUE: NO CH JS 29/10/21  
 FIRST ISSUE: NO CH JS 24/08/21

DRN BY: CHK BY: APP BY: DATE

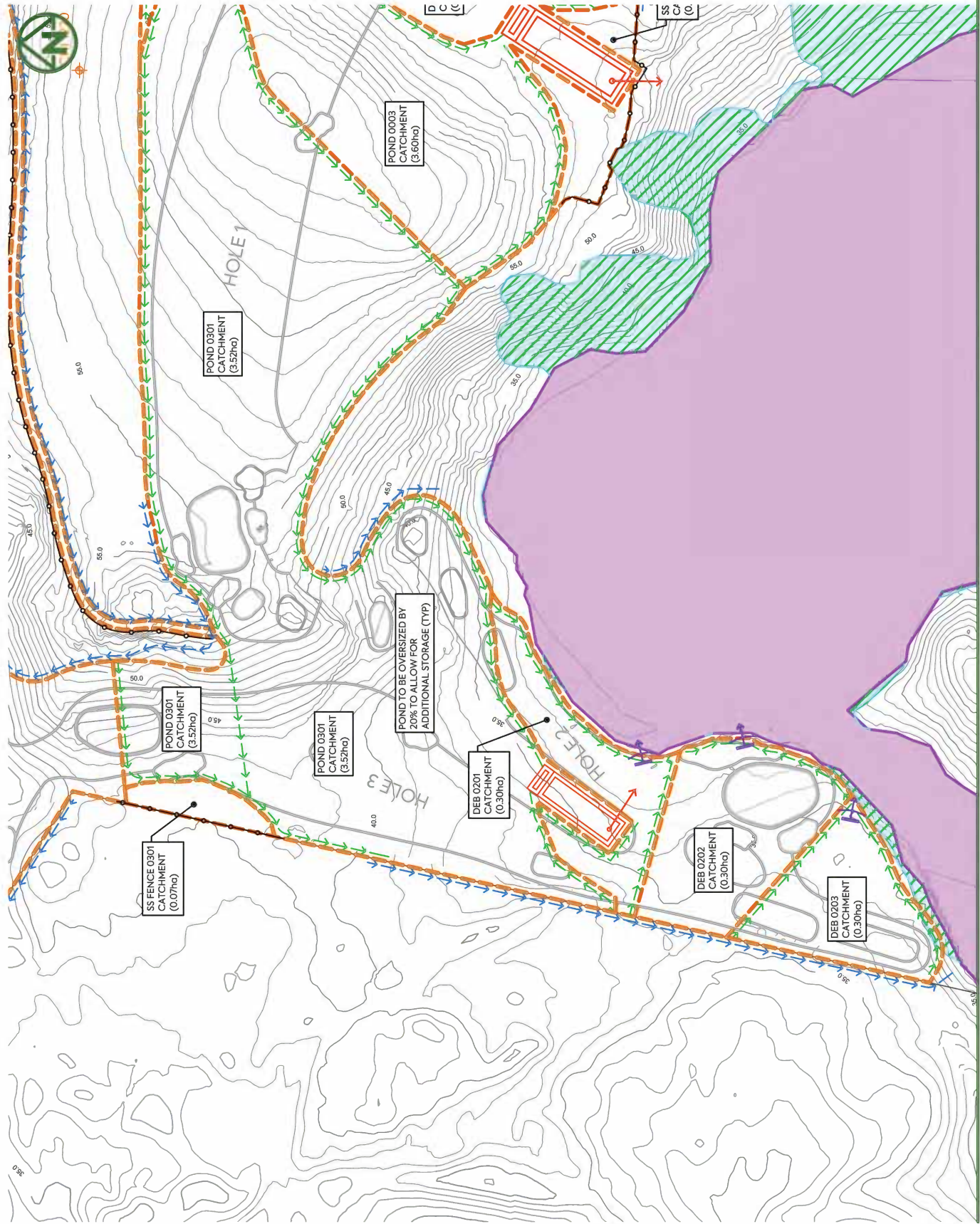
WWW.MCKENZIEANDCO.CO.NZ THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY OR FOR ANY OTHER PURPOSE.

**MCKENZIE & CO.**

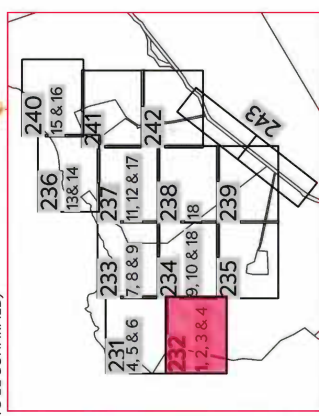
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- NOTES:**
1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
  2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
  3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
  4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
  5. ALL PONDS AND DEBS TO BE OVERSIZED BY 20% TO PROVIDE ADDITIONAL VOLUME.
  6. ALL DEBS TO HAVE RAINFALL ACTIVATED TREATMENT (FLOC BOXES).



- LEGEND:**
- SUPER SILT FENCE
  - DIVERSION BUND/ CONTOUR DRAIN
  - CLEANWATER DIVERSION
  - CLEANWATER BYPASS CULVERT
  - CATCHMENT BOUNDARIES
  - DECANTING EARTH BUND
  - STABILISED ENTRANCE
  - SEDIMENT RETENTION POND
  - EXISTING (5m) MAJOR CONTOUR
  - EXISTING (1m) MINOR CONTOUR
  - EXISTING WETLANDS (TO BE PROTECTED)
  - COUNCIL SEA / ONF AREA
  - MAPPED SEA / ONF (BY ECOLOGIST)
  - EXISTING TREE OF INTEREST (TO BE CONFIRMED)
  - ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

<b>CLIENT:</b>	THE BEARS HOME PROJECT MANAGEMENT LTD	<b>PROJECT:</b>	MURIWAI DOWNS GOLF PROJECT 610 & 697 MURIWAI ROAD MURIWAI VALLEY		
<b>ISSUED FOR CONSENT</b>	NO	CIM	JSD	26/01/21	
<b>SECOND ISSUE</b>	NO	CIM	JSD	29/01/21	
<b>FIRST ISSUE</b>	NO	CIM	JSD	24/08/21	
<b>REV</b>	<b>DESCRIPTION</b>	<b>DNB BY</b>	<b>CHK BY</b>	<b>APP BY</b>	<b>DATE</b>

WWW.MCKENZIE.CO.NZ THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.

**MCKENZIE & CO.**

**FOR CONSENT**

SCALE: 1:1500 @ A3  
DO NOT SCALE

DRAWING NO: 1976-1-232

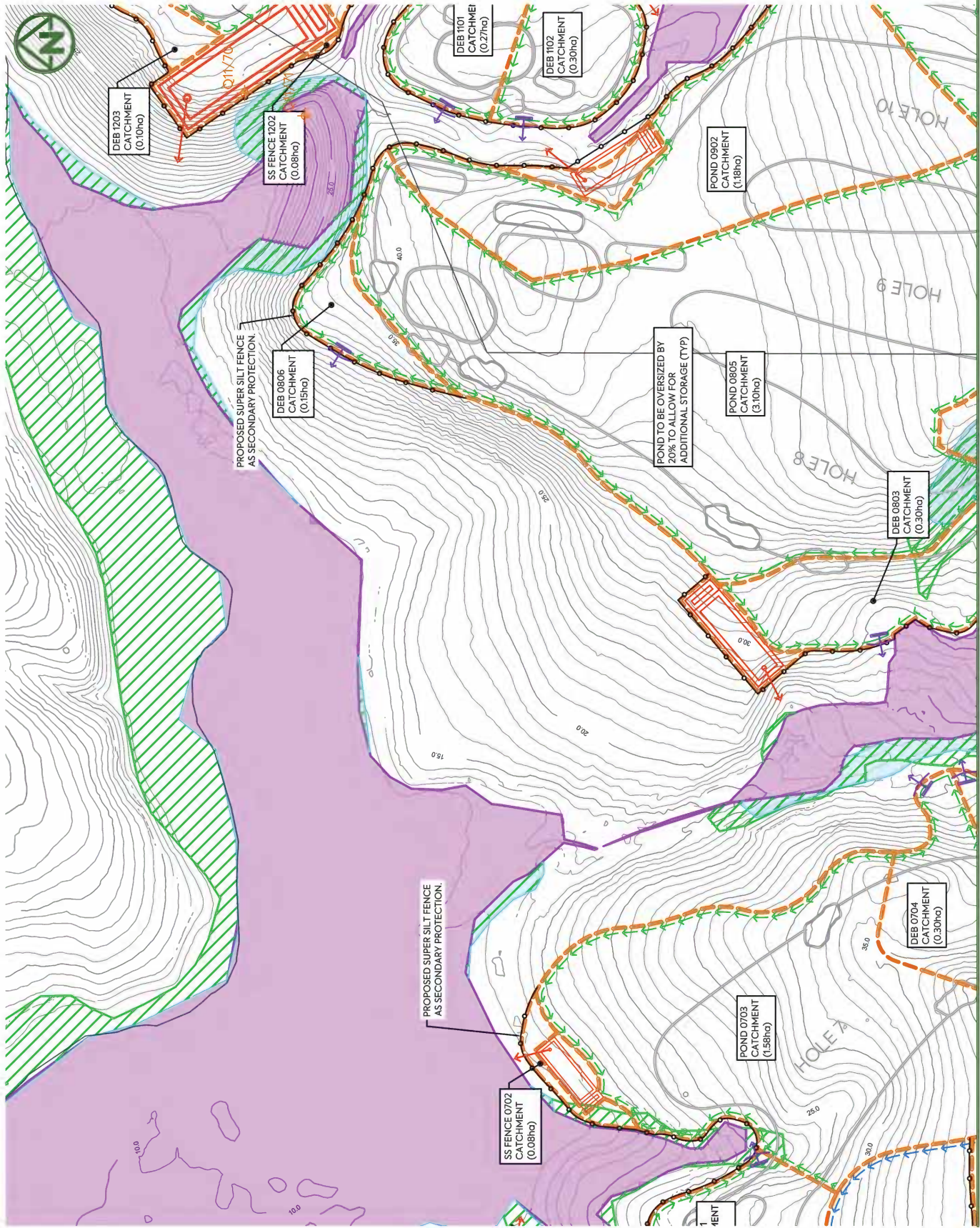
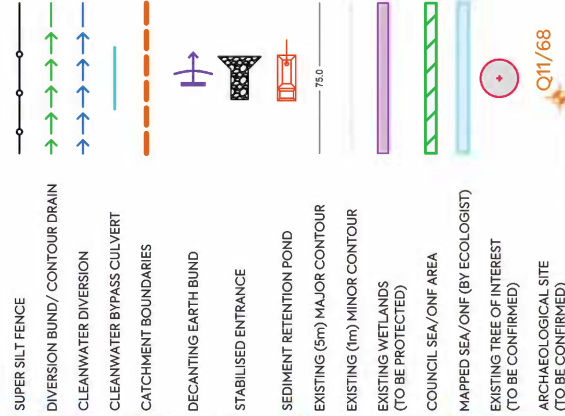
REV: C

PLOT DATE: 2021-02-25 4:17:35

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. ALL PONDS AND DEBS TO BE OVERSIZED BY 20% TO PROVIDE ADDITIONAL VOLUME.
6. ALL DEBS TO HAVE RAINFALL ACTIVATED TREATMENT (FLOC BOXES).

**LEGEND:**



**DRAWING LAYOUT PLAN**

**MCKENZIE & CO.**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 TITLE: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

ISSUED FOR CONSENT: JSD 26/01/21  
 SECOND ISSUE: JSD 29/01/21  
 FIRST ISSUE: JSD 24/03/21  
 DRA BY: CHZ BY: APP BY: DATE

REVISIONS:

REV	DESCRIPTION	NO	DATE
A	FIRST ISSUE	JSD	24/03/21
B	SECOND ISSUE	JSD	29/01/21
C	ISSUED FOR CONSENT	JSD	26/01/21

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3  
 DO NOT SCALE

DRAWING NO: 1976-1-233

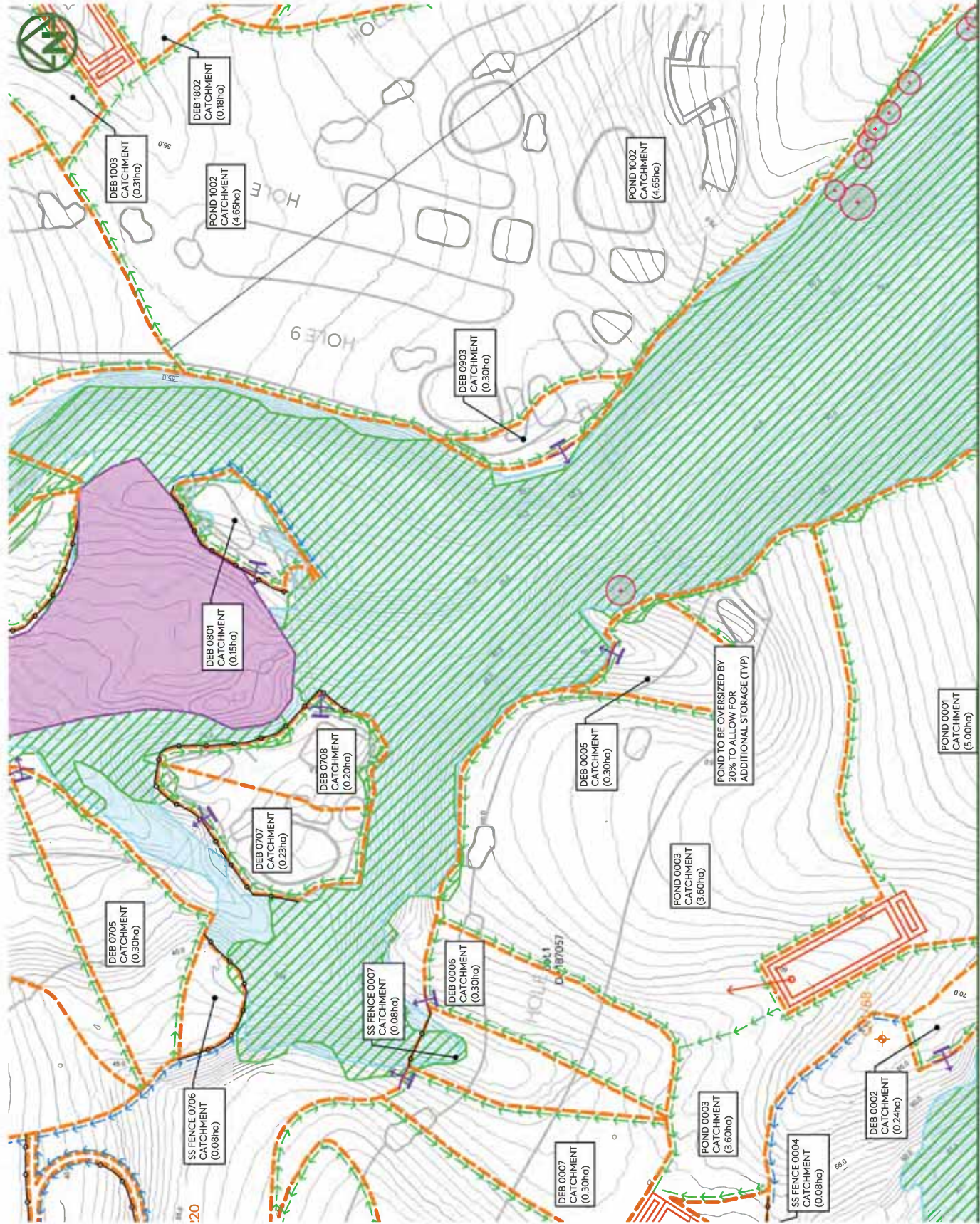
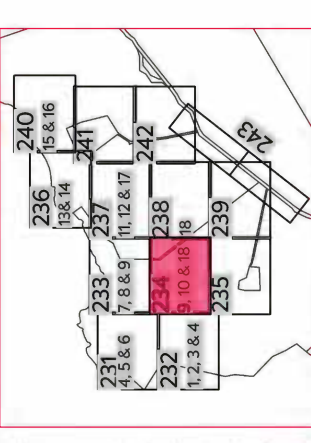
SHEET 3

REVISIONS: C

- NOTES:**
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  6. ALL DEBS TO HAVE RAINFALL-ACTIVATED TREATMENT (FLOC BOXES).

**LEGEND:**

- SUPER SILT FENCE
- DIVERSION BUND/ CONTOUR DRAIN
- CLEANWATER DIVERSION
- CLEANWATER BYPASS CULVERT
- CATCHMENT BOUNDARIES
- DECANTING EARTH BUND
- STABILISED ENTRANCE
- SEDIMENT RETENTION POND
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA/ONF AREA
- MAPPED SEA/ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3

DO NOT SCALE

DRAWING NO: 1976-1-234

REV: C

**PROPOSED EARTHWORKS EROSION SEDIMENT CONTROL LAYOUT PLAN SHEET 4**

**CLIENT:** THE BEARS HOME PROJECT MANAGEMENT LTD

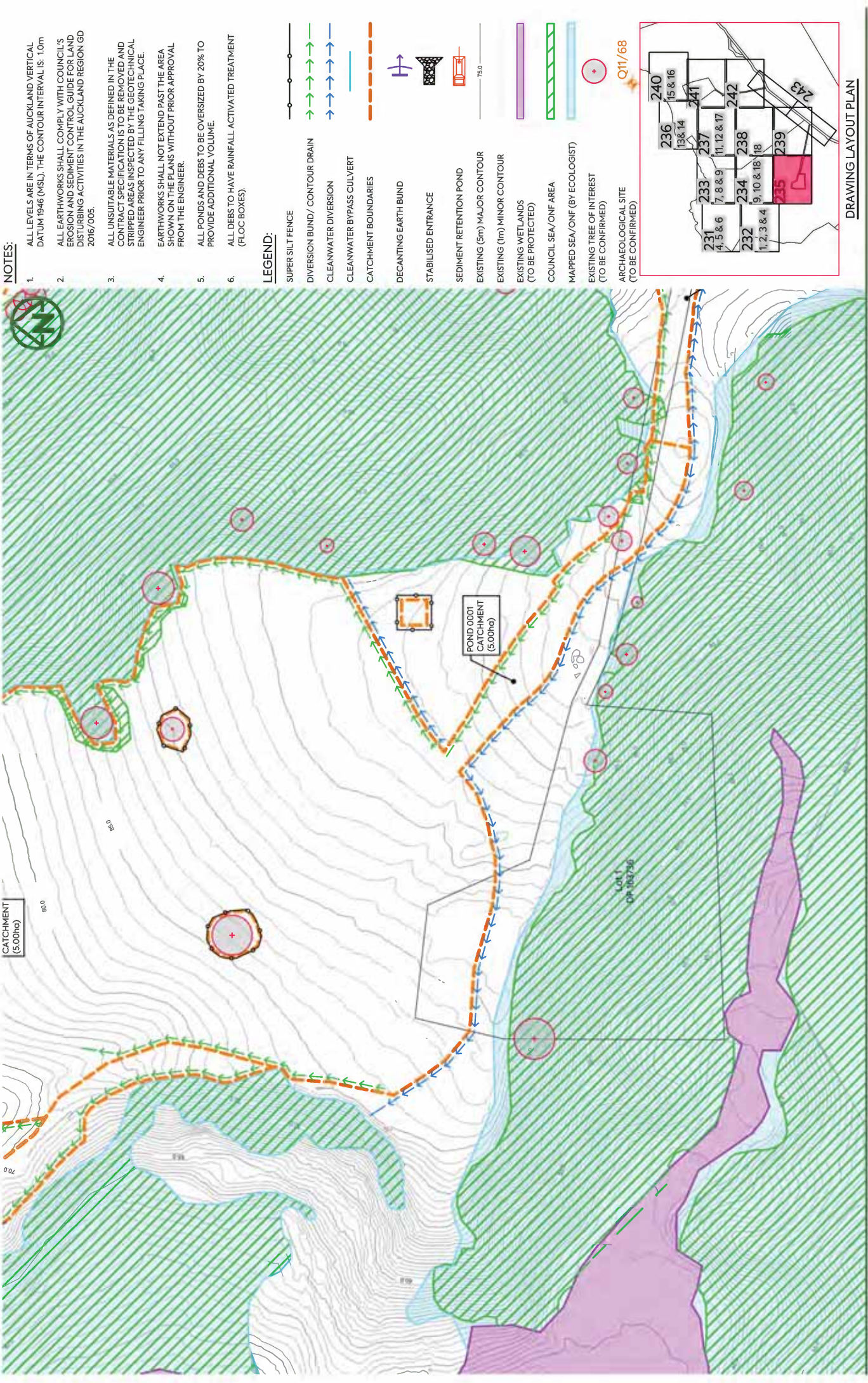
**PROJECT:** MURIWAI DOWNS GOLF PROJECT 610 & 697 MURIWAI ROAD MURIWAI VALLEY

**MCKENZIE & CO.**

NO	CHK BY	APP BY	DATE		
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/01/21
B	SECOND ISSUE	MO	CIM	JSD	29/01/21
A	FIRST ISSUE	MO	CIM	JSD	24/09/21

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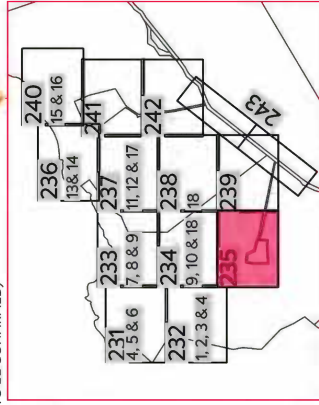


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**LEGEND:**

- SUPER SILT FENCE
- DIVERSION BUND/ CONTOUR DRAIN
- CLEAN WATER DIVERSION
- CLEAN WATER BYPASS CULVERT
- CATCHMENT BOUNDARIES
- DECANTING EARTH BUND
- STABILISED ENTRANCE
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- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

CATCHMENT (5.00ha)

POND 0001 CATCHMENT (5.00ha)

Lot 1 CP 104736

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD

PROJECT: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE: PROPOSED EARTHWORKS  
EROSION SEDIMENT CONTROL  
LAYOUT PLAN

PURPOSE OF ISSUE: FOR CONSENT

**MCKENZIE & CO.**

REV	DESCRIPTION	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MCK	JSD	26/01/21
B	SECOND ISSUE	MCK	JSD	29/01/21
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CLIENT: MCKENZIE & CO. LTD  
PROJECT: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3  
DO NOT SCALE

DRAWING NO: 1976-1-235

REV: C

PROJECT: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE: PROPOSED EARTHWORKS  
EROSION SEDIMENT CONTROL  
LAYOUT PLAN

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3  
DO NOT SCALE

DRAWING NO: 1976-1-235

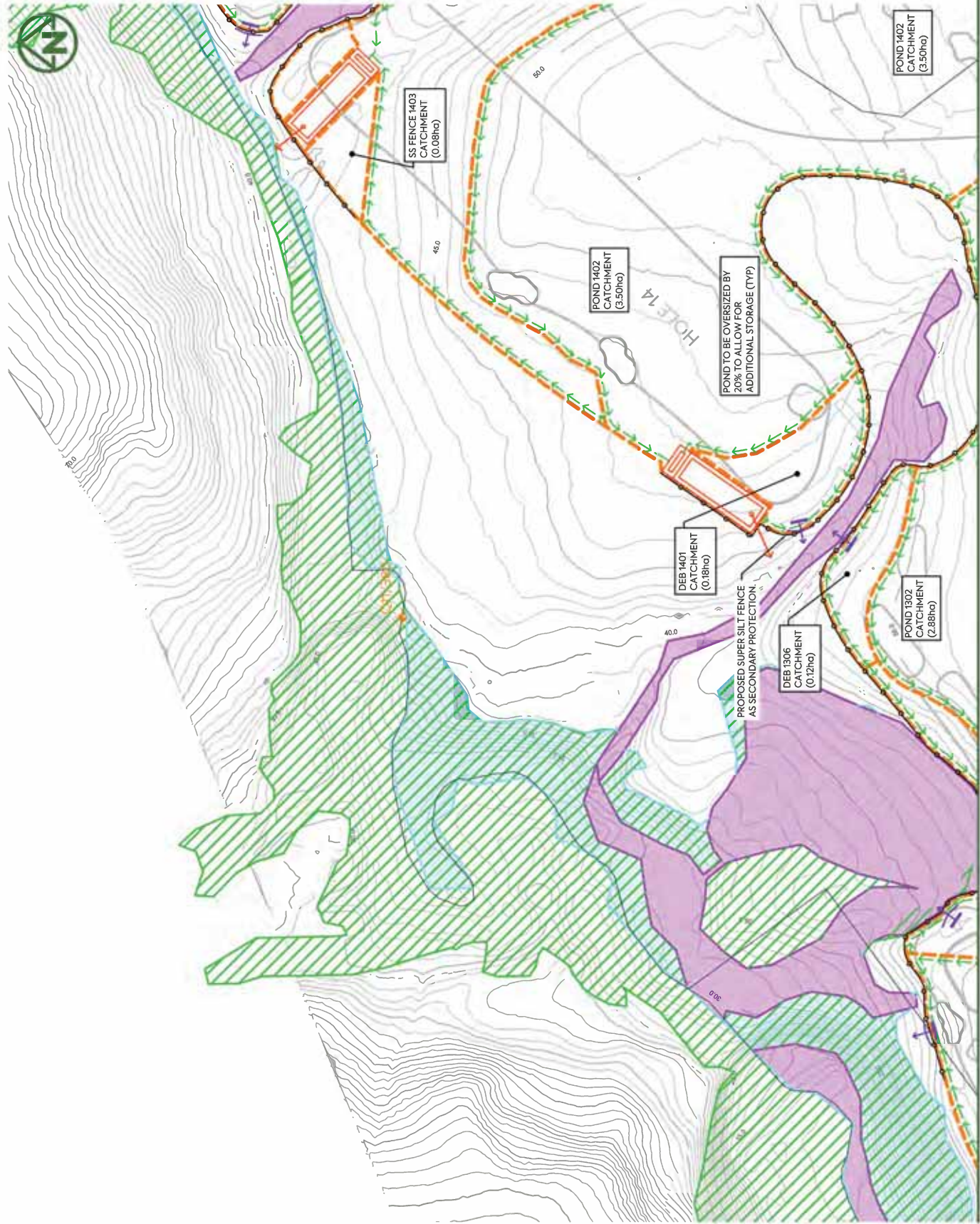
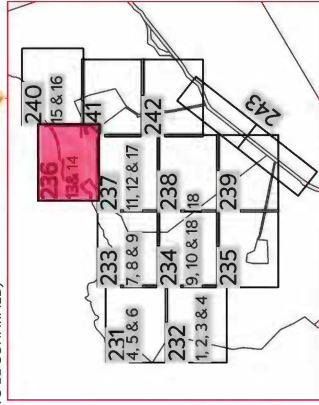
REV: C

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**LEGEND:**

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**DRAWING LAYOUT PLAN**

<p>CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD</p>		<p>PROJECT: MURIWAI DOWNS GOLF PROJECT</p>		<p>TITLE: PROPOSED EARTHWORKS EROSION SEDIMENT CONTROL LAYOUT PLAN</p>	
<p>610 &amp; 697 MURIWAI ROAD MURIWAI VALLEY</p>		<p>610 &amp; 697 MURIWAI ROAD MURIWAI VALLEY</p>		<p>SHEET 6</p>	
<p>ISSUED FOR CONSENT: MO CIM JSD 26/01/21</p>		<p>FOR CONSENT</p>		<p>SCALE: 1:1500 @ A3</p>	
<p>SECOND ISSUE: MO CIM JSD 29/01/21</p>		<p>DO NOT SCALE</p>		<p>DRAWING NO: 1976-1-236</p>	
<p>FIRST ISSUE: MO CIM JSD 24/08/21</p>		<p>REVISIONS:</p>		<p>C</p>	
<p>REV DESCRIPTION: DNB BY CHZ BY APP BY DATE</p>		<p>WWW.MCKENZIE.CO.NZ</p>		<p>THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.</p>	

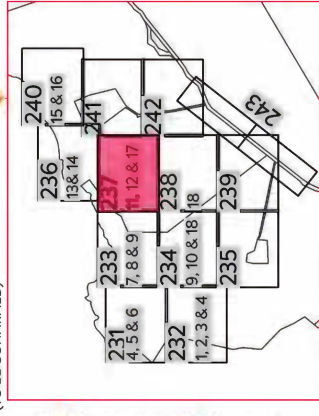


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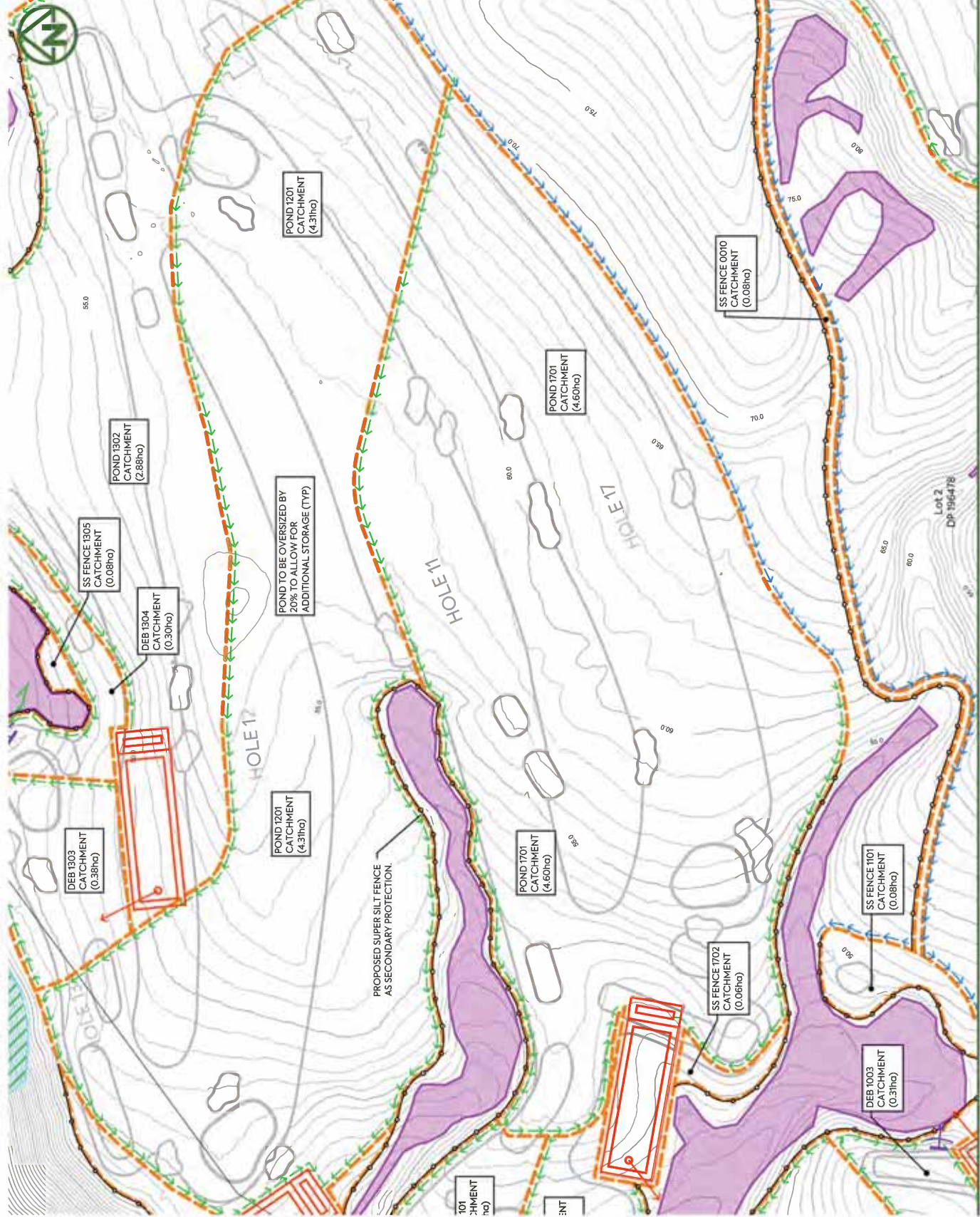
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**LEGEND:**

- SUPER SILT FENCE
- DIVERSION BUNDY / CONTOUR DRAIN
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- CLEANWATER BYPASS CULVERT
- CATCHMENT BOUNDARIES
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- STABILISED ENTRANCE
- SEDIMENT RETENTION POND
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- COUNCIL SEA / ONF AREA
- MAPPED SEA / ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**



**MCKENZIE & CO.**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 TITLE: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

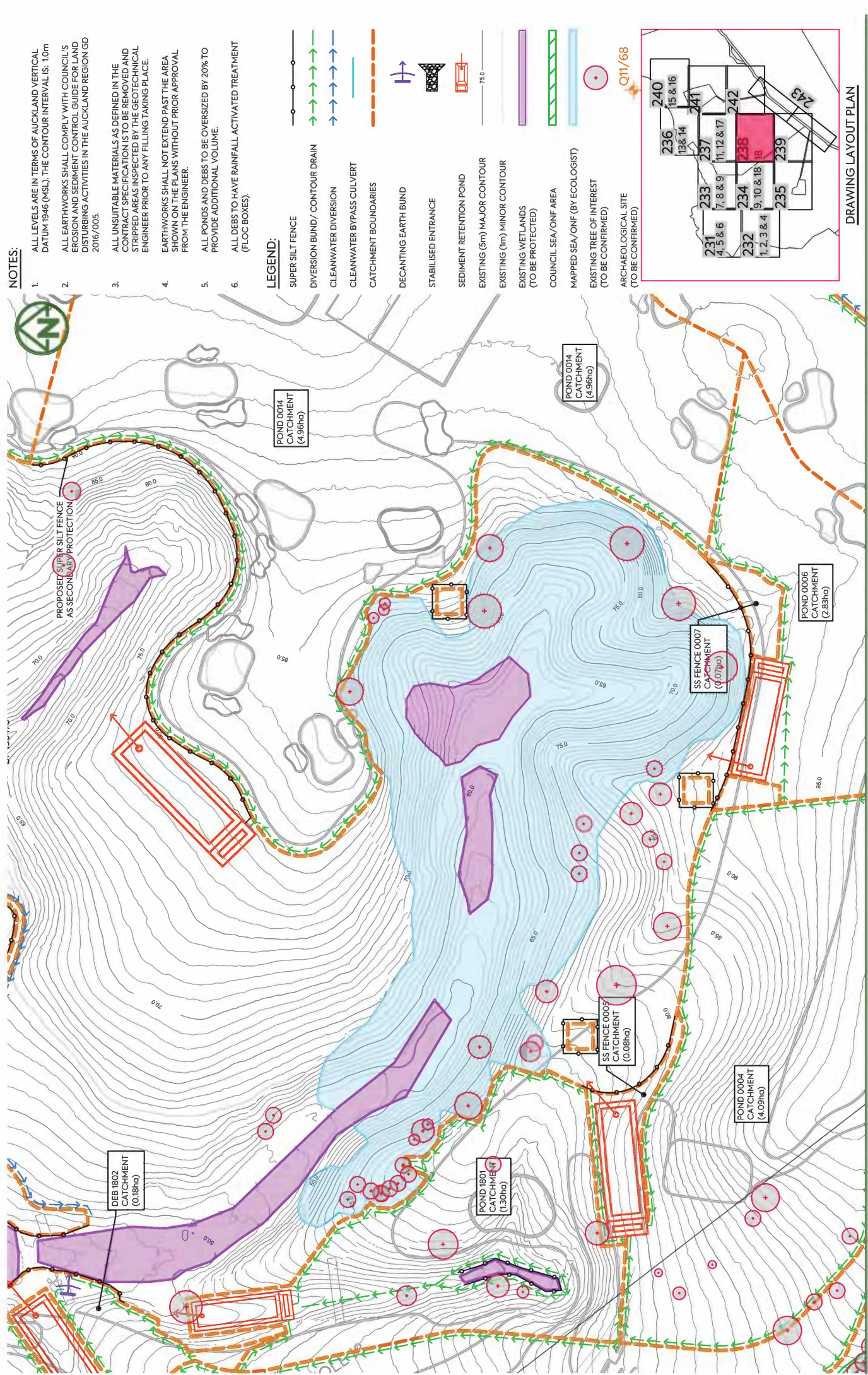
PROPOSED EARTHWORKS  
 EROSION SEDIMENT CONTROL  
 LAYOUT PLAN  
 SHEET 7

PURPOSE OF ISSUE: FOR CONSENT  
 SCALE: 1:1500 @ A3  
 DO NOT SCALE  
 DRAWING NO.: 1976-1-237  
 REV: C

NO	DESCRIPTION	DATE
C	ISSUED FOR CONSENT	26/01/21
B	SECOND ISSUE	29/01/21
A	FIRST ISSUE	24/08/21

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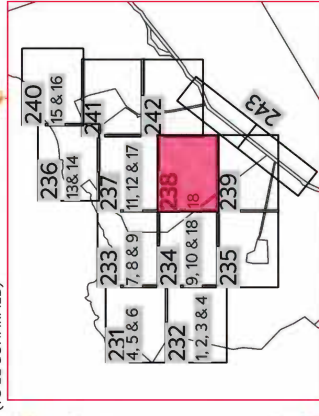


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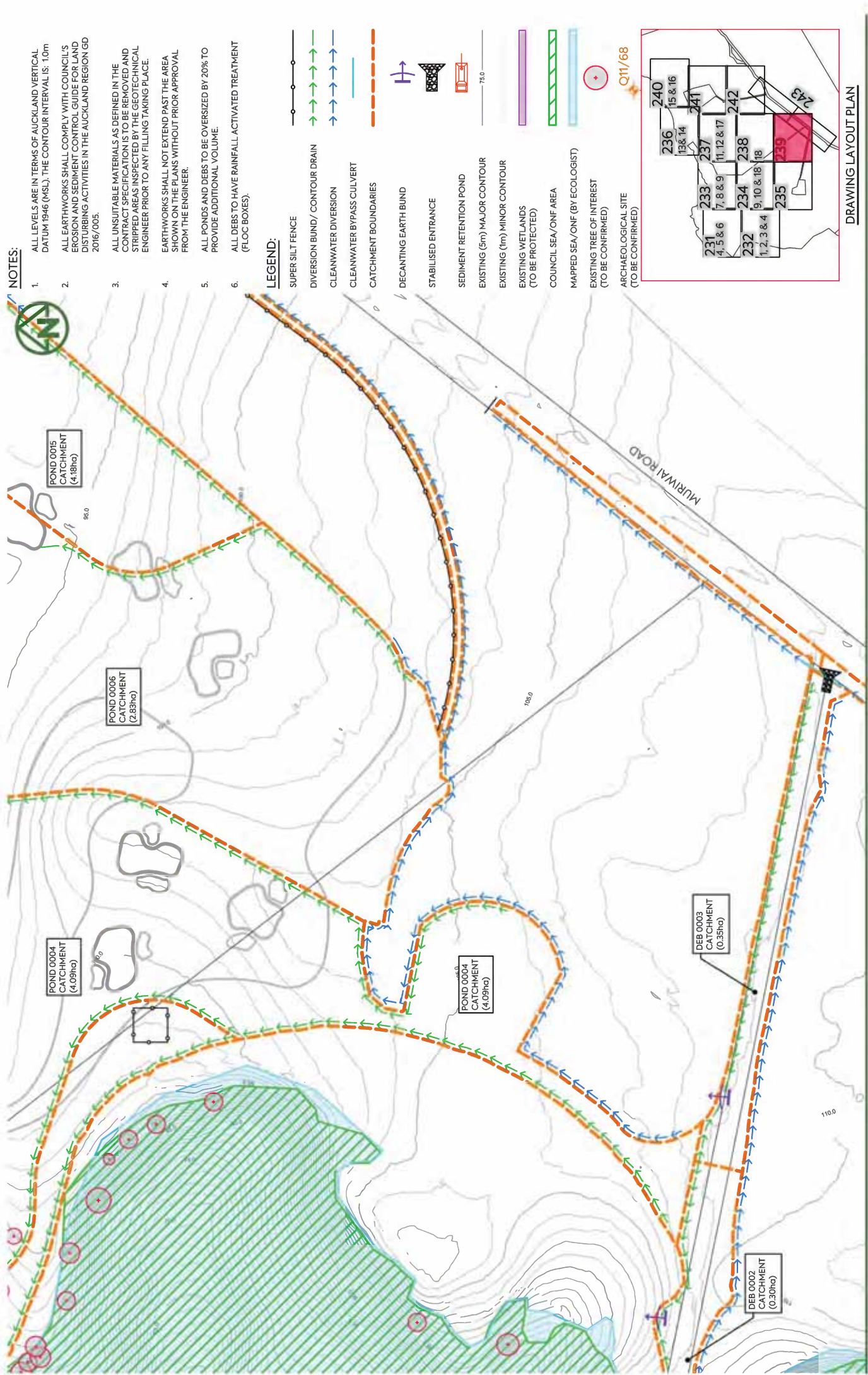
**DRAWING LAYOUT PLAN**

<p><b>CLIENT:</b> THE BEARS HOME PROJECT MANAGEMENT LTD</p> <p><b>PROJECT:</b> MURIWAI DOWNS GOLF PROJECT 610 &amp; 697 MURIWAI ROAD MURIWAI VALLEY</p>	<p><b>TITLE:</b> PROPOSED EARTHWORKS EROSION SEDIMENT CONTROL LAYOUT PLAN</p> <p><b>SHEET 8</b></p>	<p><b>PURPOSE OF ISSUE:</b> FOR CONSENT</p> <p><b>SCALE:</b> 1:1500 @ A3 DO NOT SCALE</p> <p><b>DRAWING NO.:</b> 1976-1-238</p> <p><b>REV:</b> C</p>
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**MCKENZIE & CO.**

C ISSUED FOR CONSENT	NO	CIM	JSD	26/01/21
B SECOND ISSUE	NO	CIM	JSD	29/01/21
A FIRST ISSUE	NO	CIM	JSD	24/08/21

PLOT DATE: 2021-02-24 11:50    WWW.MCKENZIE.CO.NZ    THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.

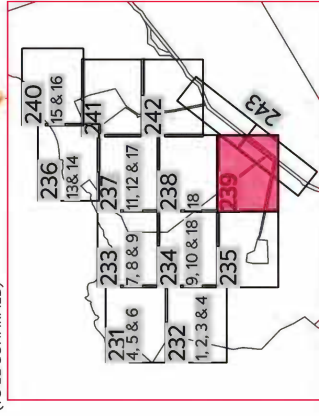


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**LEGEND:**

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- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

<p>CLIENT: <b>THE BEARS HOME PROJECT MANAGEMENT LTD</b></p> <p>PROJECT: <b>MURWAI DOWNS GOLF PROJECT</b></p> <p>TITLE: <b>PROPOSED EARTHWORKS EROSION SEDIMENT CONTROL LAYOUT PLAN</b></p>	<p>PURPOSE OF ISSUE: <b>FOR CONSENT</b></p> <p>SCALE: <b>1:1500 @ A3</b></p> <p>DRAWING NO.: <b>1976-1-239</b></p> <p>REV: <b>C</b></p>
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**MCKENZIE & CO.**

MURWAI VALLEY SHEET 9

C:\USERS\DATA\MCKENZIE\1976-1-239\MURWAI ROAD\_765\DRAWINGS\1976-1-239.DWG  
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C	ISSUED FOR CONSENT	CIM	JSD	26/01/21
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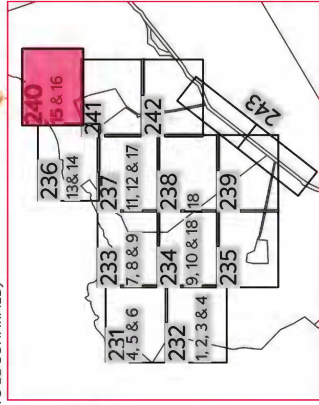


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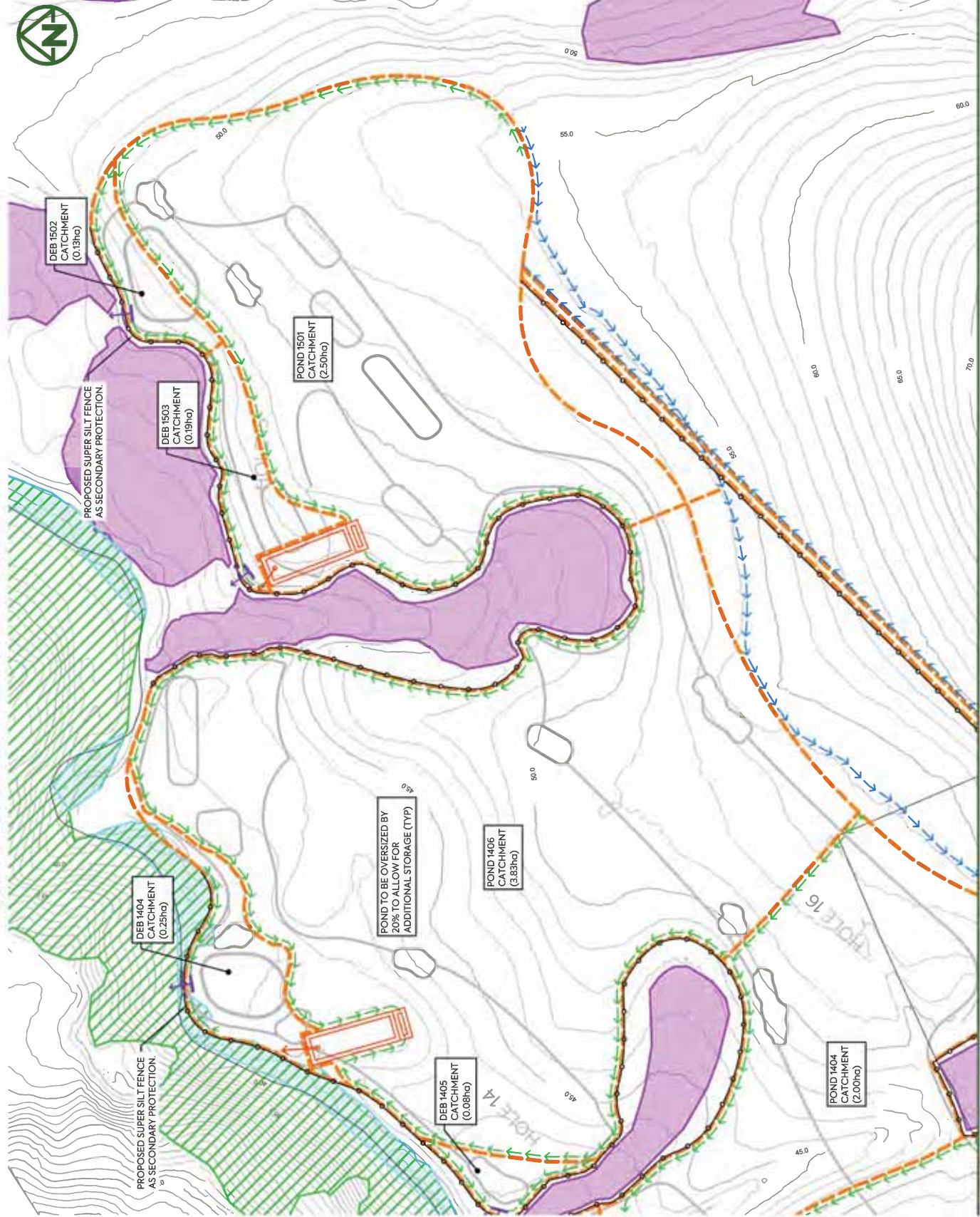
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**LEGEND:**

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**DRAWING LAYOUT PLAN**



CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 TITLE: PROPOSED EARTHWORKS EROSION SEDIMENT CONTROL LAYOUT PLAN

MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3  
 DO NOT SCALE

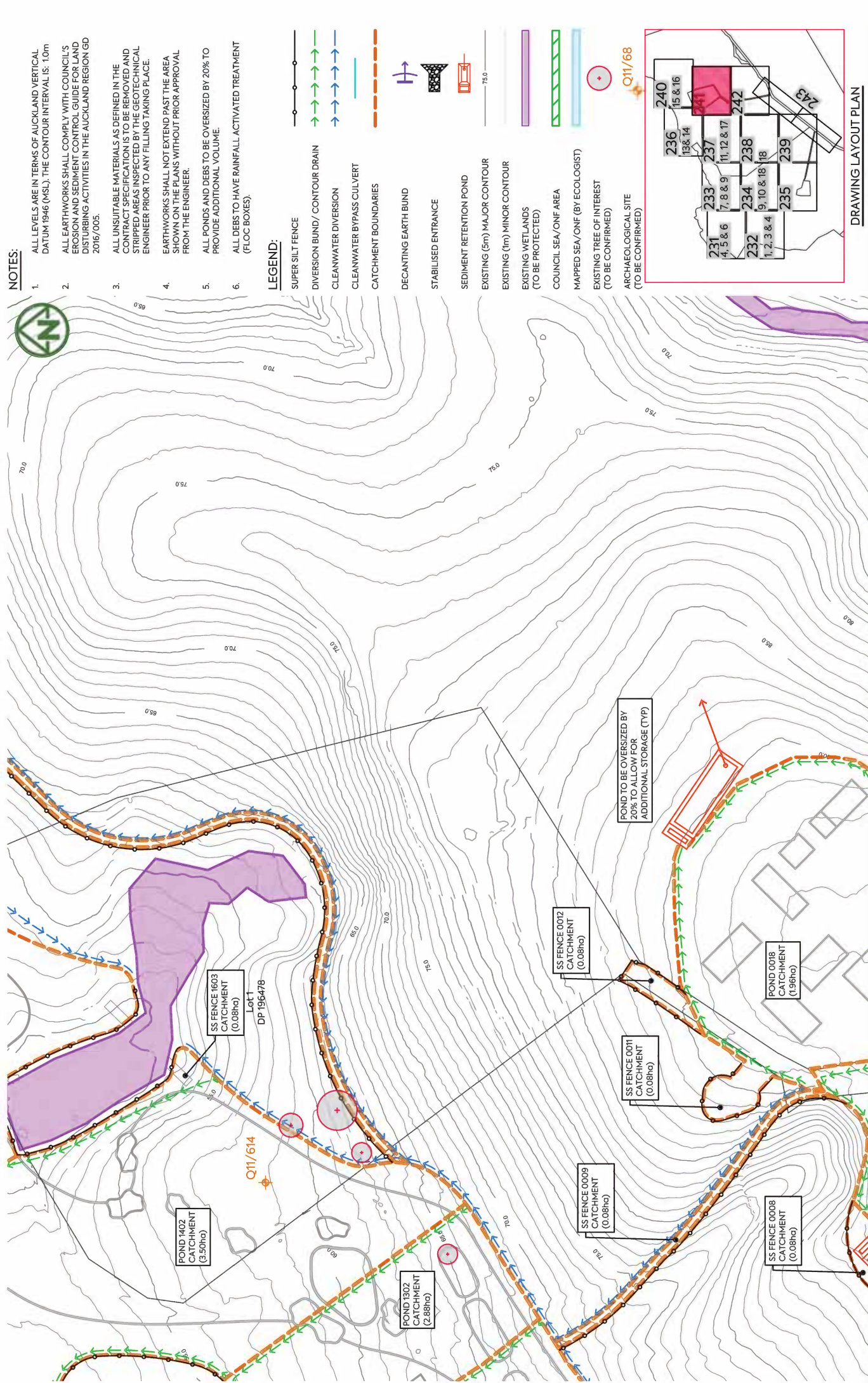
DRAWING NO.: 1976-1-240

REV: C



REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	NO	CIM	JSD	26/01/21
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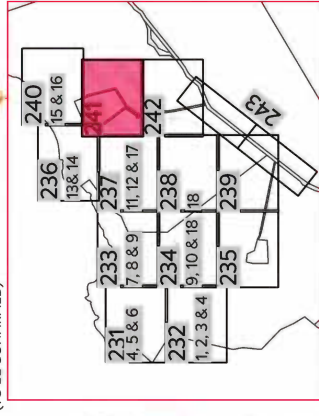


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**DRAWING LAYOUT PLAN**

PROJECT: MURWAI DOWNS GOLF PROJECT  
 610 & 697 MURWAI ROAD  
 MURWAI VALLEY

CLIENT: THE BEARS HOME  
 PROJECT MANAGEMENT LTD

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3  
 DO NOT SCALE

DRAWING NO: 1976-1-241

REV: C

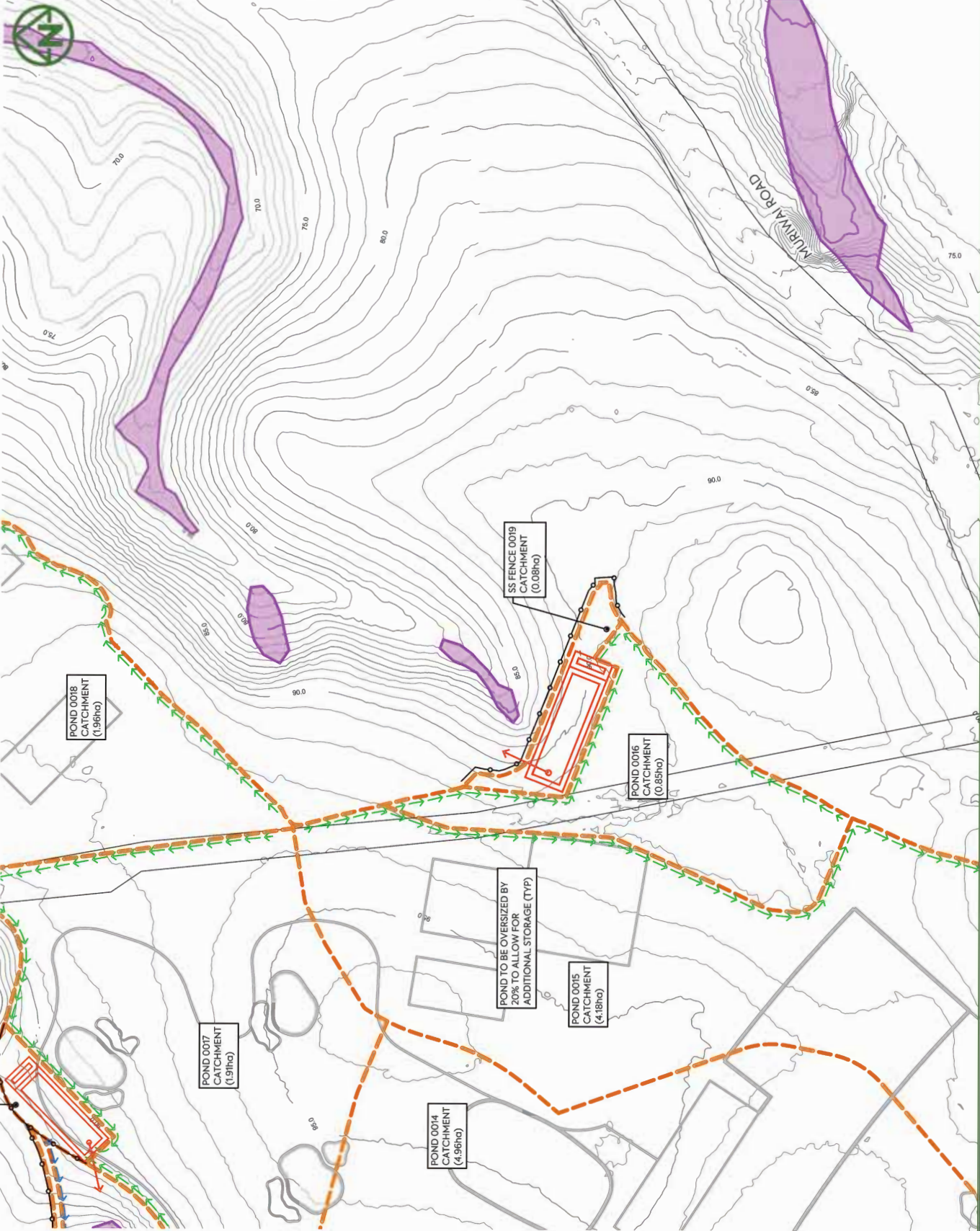
TITLE: PROPOSED EARTHWORKS  
 EROSION SEDIMENT CONTROL  
 LAYOUT PLAN  
 SHEET 11

DATE: 2023-12-25 14:17:57

REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	NO	CIM	JSD	26/11/21
B	SECOND ISSUE	NO	CIM	JSD	29/10/21
A	FIRST ISSUE	NO	CIM	JSD	24/08/21

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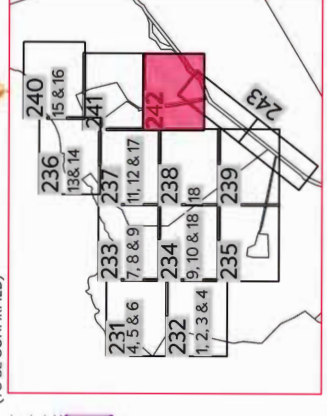


**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. ALL PONDS AND DEBS TO BE OVERSIZED BY 20% TO PROVIDE ADDITIONAL VOLUME.
6. ALL DEBS TO HAVE RAINFALL ACTIVATED TREATMENT (FLOC BOXES).

**LEGEND:**

- SUPER SILT FENCE
- DIVERSION BUND/ CONTOUR DRAIN
- CLEANWATER DIVERSION
- CLEANWATER BYPASS CULVERT
- CATCHMENT BOUNDARIES
- DECANTING EARTH BUND
- STABILISED ENTRANCE
- SEDIMENT RETENTION POND
- EXISTING (5m) MAJOR CONTOUR
- EXISTING (1m) MINOR CONTOUR
- EXISTING WETLANDS (TO BE PROTECTED)
- COUNCIL SEA/ONF AREA
- MAPPED SEA/ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**DRAWING LAYOUT PLAN**

**CLIENT:** THE BEARS HOME PROJECT MANAGEMENT LTD

**PROJECT:** MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

**TITLE:** PROPOSED EARTHWORKS  
EROSION SEDIMENT CONTROL  
LAYOUT PLAN  
SHEET 12

**PURPOSE OF ISSUE:** FOR CONSENT

**SCALE:** 1:1500 @ A3  
DO NOT SCALE

**DRAWING NO:** 1976-1-242

**REV.:** C

**ISSUED FOR CONSENT** NO CH JSD 26/11/21

**B SECOND ISSUE** NO CH JSD 29/10/21

**A FIRST ISSUE** NO CH JSD 24/08/21

**REV. DESCRIPTION** DRN BY CHK BY APP BY DATE

**CLIENT:** MCKENZIE & CO.

**PROJECT:** THE BEARS HOME PROJECT MANAGEMENT LTD

**TITLE:** PROPOSED EARTHWORKS  
EROSION SEDIMENT CONTROL  
LAYOUT PLAN  
SHEET 12

**PURPOSE OF ISSUE:** FOR CONSENT

**SCALE:** 1:1500 @ A3  
DO NOT SCALE

**DRAWING NO:** 1976-1-242

**REV.:** C

**ISSUED FOR CONSENT** NO CH JSD 26/11/21

**B SECOND ISSUE** NO CH JSD 29/10/21

**A FIRST ISSUE** NO CH JSD 24/08/21

**REV. DESCRIPTION** DRN BY CHK BY APP BY DATE

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD

PROJECT: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE: PROPOSED EARTHWORKS  
EROSION SEDIMENT CONTROL  
LAYOUT PLAN  
SHEET 12

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3  
DO NOT SCALE

DRAWING NO: 1976-1-242

REV.:

ISSUED FOR CONSENT NO CH JSD 26/11/21

B SECOND ISSUE NO CH JSD 29/10/21

A FIRST ISSUE NO CH JSD 24/08/21

REV. DESCRIPTION DRN BY CHK BY APP BY DATE

CLIENT: MCKENZIE & CO.

PROJECT: THE BEARS HOME PROJECT MANAGEMENT LTD

TITLE: PROPOSED EARTHWORKS  
EROSION SEDIMENT CONTROL  
LAYOUT PLAN  
SHEET 12

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3  
DO NOT SCALE

DRAWING NO: 1976-1-242

REV.:

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REV. DESCRIPTION DRN BY CHK BY APP BY DATE

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD

PROJECT: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE: PROPOSED EARTHWORKS  
EROSION SEDIMENT CONTROL  
LAYOUT PLAN  
SHEET 12

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3  
DO NOT SCALE

DRAWING NO: 1976-1-242

REV.:

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B SECOND ISSUE NO CH JSD 29/10/21

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CLIENT: MCKENZIE & CO.

PROJECT: THE BEARS HOME PROJECT MANAGEMENT LTD

TITLE: PROPOSED EARTHWORKS  
EROSION SEDIMENT CONTROL  
LAYOUT PLAN  
SHEET 12

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:1500 @ A3  
DO NOT SCALE

DRAWING NO: 1976-1-242

REV.:

ISSUED FOR CONSENT NO CH JSD 26/11/21

B SECOND ISSUE NO CH JSD 29/10/21

A FIRST ISSUE NO CH JSD 24/08/21

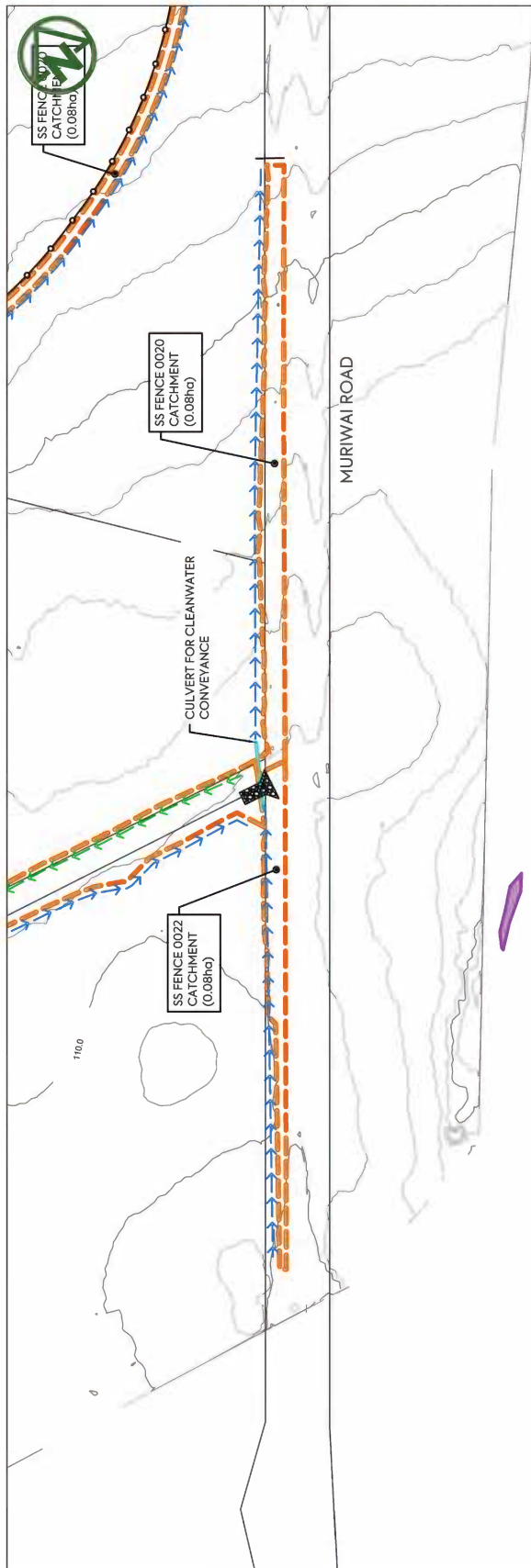
REV. DESCRIPTION DRN BY CHK BY APP BY DATE

**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
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3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. ALL PONDS AND DEBS TO BE OVERSIZED BY 20% TO PROVIDE ADDITIONAL VOLUME.
6. ALL DEBS TO HAVE RAINFALL ACTIVATED TREATMENT (FLOC BOXES).

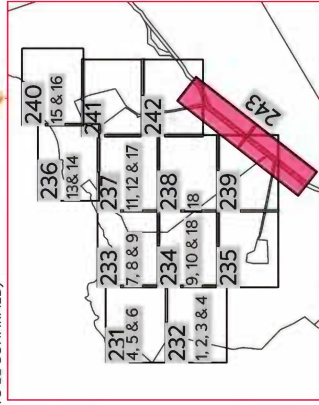
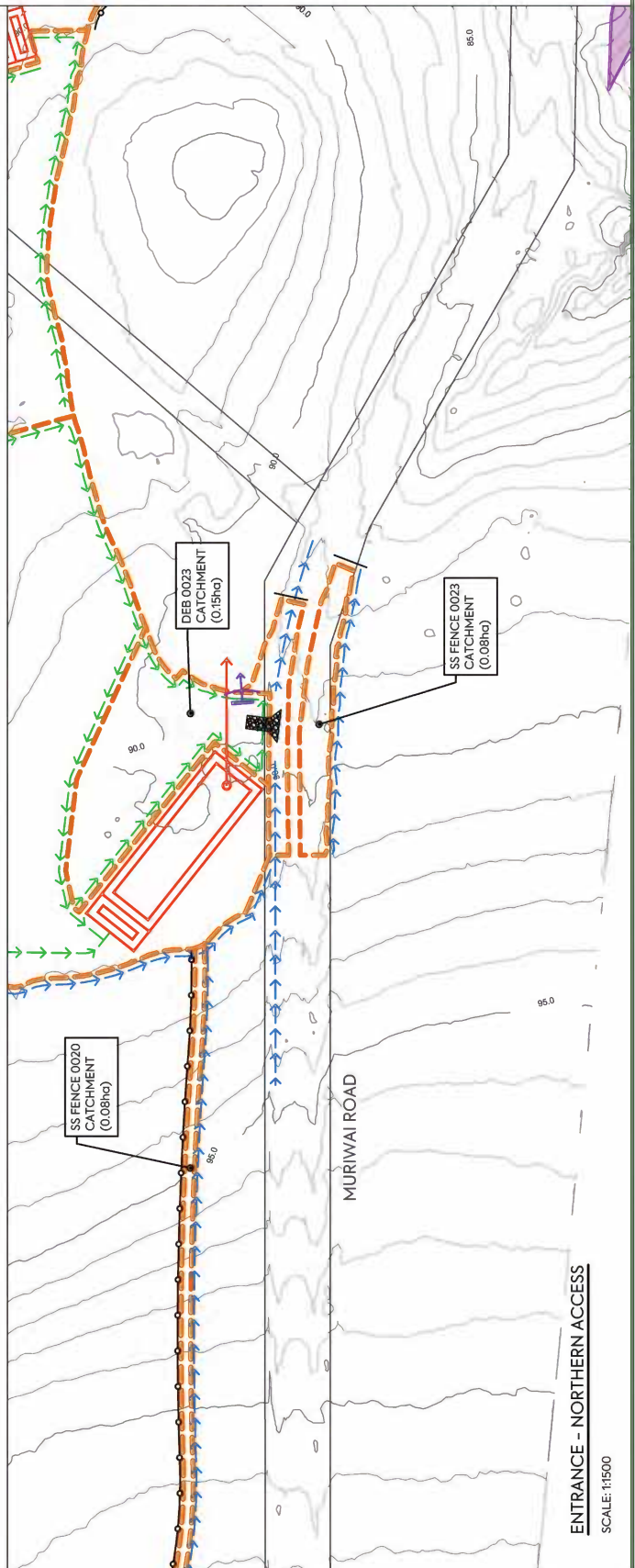
**LEGEND:**

- SUPER SILT FENCE
- DIVERSION BUNDY / CONTOUR DRAIN
- CLEANWATER DIVERSION
- CLEANWATER BYPASS CULVERT
- CATCHMENT BOUNDARIES
- DECANTING EARTH BUND
- STABILISED ENTRANCE
- SEDIMENT RETENTION POND
- EXISTING (5m) MAJOR CONTOUR
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- MAPPED SEA / ONF (BY ECOLOGIST)
- EXISTING TREE OF INTEREST (TO BE CONFIRMED)
- ARCHAEOLOGICAL SITE (TO BE CONFIRMED)



**ENTRANCE - NORTHERN ACCESS**

SCALE: 1:1500



**DRAWING LAYOUT PLAN**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

ISSUED FOR CONSENT: MO CIM JSD 26/01/21  
 SECOND ISSUE: MO CIM JSD 29/01/21  
 FIRST ISSUE: MO CIM JSD 24/08/21  
 DSN BY: CHK BY: APP BY: DATE

FOR CONSENT  
 SCALE: 1:1500 @ A3  
 DO NOT SCALE  
 DRAWING NO: 1976-1-243  
 REV: C

PURPOSE OF ISSUE: PROPOSED EARTHWORKS EROSION SEDIMENT CONTROL LAYOUT PLAN SHEET 13

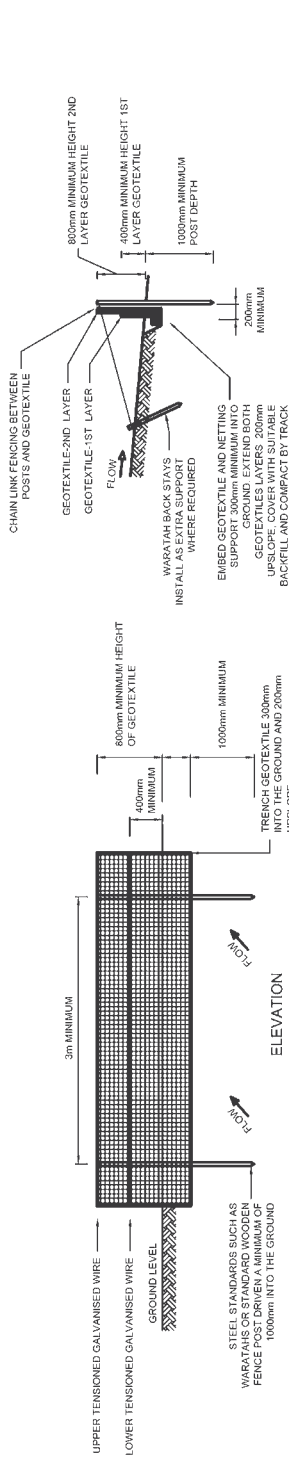
MCKENZIE & CO.

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**NOTES:**

- PROPOSED BULK EARTHWORKS DRAWINGS ARE AN AMENDMENT TO APPROVED CONSENT BUN60344551.
- ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 10m
- ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
- ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE OPERATIONAL PRIOR TO ANY OTHER WORKS COMMENCING ON SITE. THE CONTRACTOR SHALL ARRANGE FOR AND ATTEND A PRELIMINARY SEDIMENT CONTROL MEETING, ONSITE WITH THE ENGINEER AND CONTROL REPRESENTATIVE.
- A COPY OF THE SEDIMENT CONTROL PLAN SHALL BE AVAILABLE ON SITE DURING WORK HOURS. ALL PERSONNEL INVOLVED IN EARTHWORK ACTIVITIES ON THE SITE (INCLUDING OF SUB-CONTRACTORS) SHALL BE FAMILIAR WITH THE PLANS REQUIREMENTS.
- ALL "CLEAN WATER" RUNOFF FROM STABILISED SURFACES, INCLUDING CATCHMENT AREAS ABOVE THE SITE, SHALL BE DIVERTED AWAY FROM THE EARTHWORK AREAS VIA A STABILIZED SYSTEM TO PREVENT EROSION.
- ALL "DIRTY WATER" DIVERSION BUNDS CONSTRUCTED ON STEEP AREAS SHALL INCLUDE DROP-OUT PITS. DROP-OUT PIT SPACING TO BE IN ACCORDANCE WITH SECTION E2.2 IN THE AUCKLAND REGION GD 2016/005.
- THE MAIN SILT CONTROL MEASURES FOR THIS SITE ARE:
  - DIVERSION OF CLEAN WATER FROM UPSTREAM CATCHMENTS AROUND THE EARTHWORKS AREA BY MEANS OF DIVERSION BUNDS AND /OR OTHER APPROVED METHODS AS DIRECTED BY THE ENGINEER;
  - REMOVAL OF SEDIMENT FROM SILT- LADEN WATERS USING SILT PONDS, DECANTING EARTH BUNDS, HAY BALE BARRIERS OR SILT FENCES AS SHOWN;
  - STABILISATION OF THE SITE AGAINST EROSION AS SOON AS PRACTICABLE AND IN A PROGRESSIVE MANNER AS EARTHWORKS ARE FINISHED OVER VARIOUS AREAS OF THE SITE;
  - NEW CESSPITS MUST BE PROTECTED TO PREVENT SILT-LADEN RUNOFF ENTERING THE NEW STORMWATER LINES; AND
  - MAINTENANCE OF ALL SEDIMENT CONTROL MEASURES AS REQUIRED.
- FURTHER SEDIMENT CONTROL MEASURES MAY BE REQUIRED BY THE ENGINEER AS THE PROJECT ADVANCES. THESE WILL BE INSTALLED AS AND WHERE DIRECTED BY THE ENGINEER. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ENSURING THAT THE SITE HAS EFFECTIVE MEASURES OPERATING AT ALL TIMES.
- ALL SILT PONDS ARE TO BE CHEMICALLY FLOCCULATED WITH POLY ALUMINUM CHLORIDE (PAC) OR AN APPROVED ALTERNATIVE. SET-UP OF PAC DOSING SYSTEMS IS BE UNDERTAKEN BY A SUITABILITY QUALIFIED SPECIALIST.
- POND LOCATIONS CAN BE ALTERED ON SITE AFTER CONSULTATION WITH THE ENGINEER.

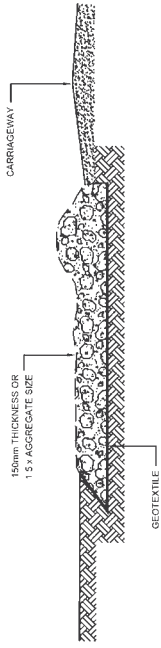


CROSS SECTION

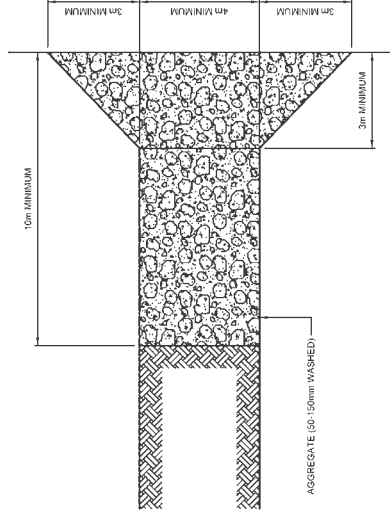
SUPER SILT FENCE DESIGN CRITERIA:

SLOPE STEEPNESS %	SILT FENCE LENGTH (m) (MAXIMUM)	SPACING OF RETURNS (m)
0-10%	UNLIMITED	60
10-20%	60	50
20-35%	30	40
35-50%	30	30
>50%	15	20

SUPER SILT FENCE CONSTRUCTION



SIDE ELEVATION



PLAN VIEW

STABILISED CONSTRUCTION ENTRANCE

**STABILISED CONSTRUCTION ENTRANCE SPECIFICATIONS:**

**APPLICATION**

USE A STABILISED CONSTRUCTION ENTRANCE AT ALL POINTS OF CONSTRUCTION SITE ACCESS AND EGRESS WITH A CONSTRUCTION PLAN LIMITING TRAFFIC TO THESE ENTRANCES ONLY. THEY ARE PARTICULARLY USEFUL ON SMALL CONSTRUCTION SITES BUT CAN BE UTILISED FOR ALL PROJECTS.

**DESIGN:**

- CLEAR THE ENTRANCE AND EXIT AREA OF ALL VEGETATION, ROOTS AND OTHER UNSUITABLE MATERIAL AND PROPERLY GRADE IT.
- LAY WOVEN GEOTEXTILE. PIN DOWN EDGES AND OVERLAP JOINTS.
- PROVIDE DRAINAGE TO CARRY RUNOFF FROM THE STABILISED CONSTRUCTION ENTRANCE TO A SEDIMENT CONTROL MEASURE.
- PLACE AGGREGATE TO THE SPECIFICATIONS BELOW AND SMOOTH IT.

STABILISED CONSTRUCTION ENTRANCE AGGREGATE SPECIFICATIONS:

AGGREGATE SIZE	5-150mm WASHED AGGREGATE
THICKNESS	150mm MINIMUM OR 15 X AGGREGATE SIZE
LENGTH	10m MINIMUM LENGTH RECOMMENDED
WIDTH	4m MINIMUM

**MAINTENANCE**

- MAINTAIN THE STABILISED CONSTRUCTION ENTRANCE IN A CONDITION TO PREVENT SEDIMENT FROM LEAVING THE CONSTRUCTION SITE. AFTER EACH RAINFALL INSPECT ANY STRUCTURE USED TO TRAP SEDIMENT FROM THE STABILISED CONSTRUCTION ENTRANCE AND CLEAN OUT AS NECESSARY.
- WHEN WASHED, WASHING IS ALSO REQUIRED. ENSURE THIS IS DONE ON AN AREA STABILISED WITH AGGREGATE WHICH DRAINS TO AN APPROVED SEDIMENT RETENTION FACILITY.



THE BEARS HOME  
PROJECT MANAGEMENT LTD

CLIENT:

MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE:

PROPOSED EARTHWORKS  
EROSION AND SEDIMENT  
CONTROL DETAILS  
DRAWING 1

PURPOSE OF ISSUE:

FOR CONSENT

SCALE  
AS SHOWN  
DO NOT SCALE

DRAWING NO:

1976-1-295

REV

C

NO CH J53 26/1/21

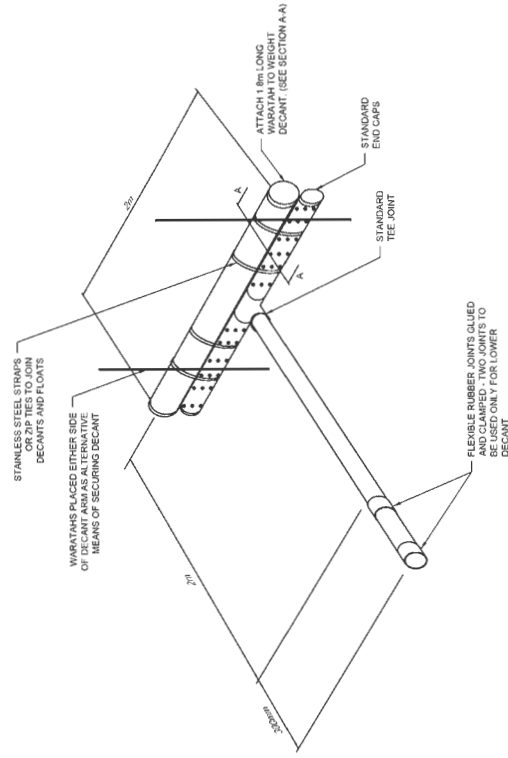
NO CH J53 18/1/21

NO CH J53 24/08/21

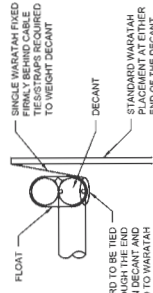
DATE BY: CHW BY: ABW DATE

**NOTES:**

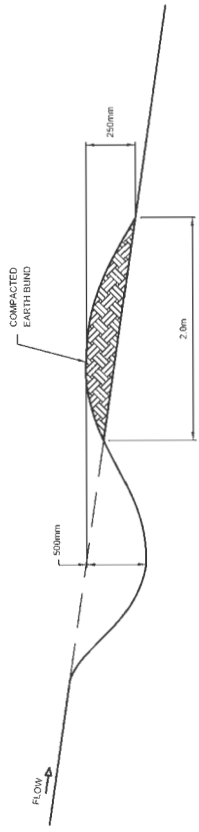
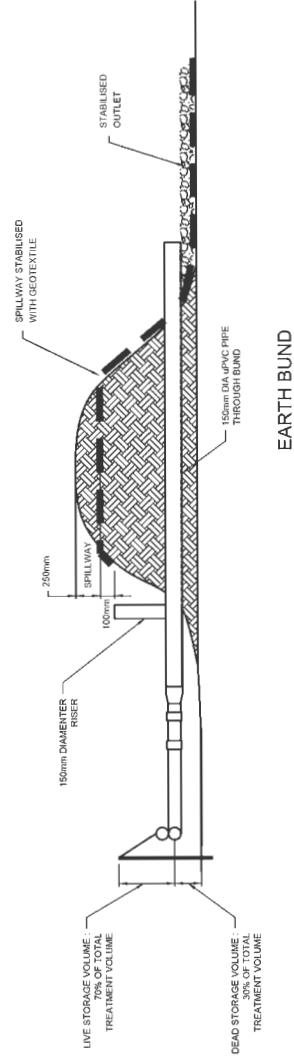
1. TO BE READ IN CONJUNCTION WITH DRAWING 295



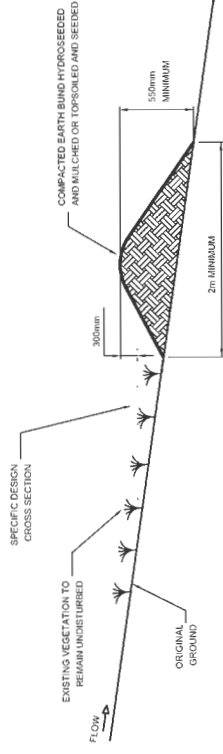
**DECANT WITH UPSTAND FOR DECANTING EARTH BUND**



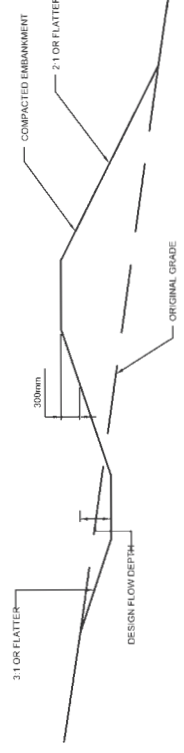
**SECTION A-A**



**CONTOUR DRAIN**



**CLEANWATER RUNOFF DIVERSION BUND - CROSS SECTION**



**RUNOFF DIVERSION BUND - CROSS SECTION**



**MCKENZIE & CO.**

THE BEARS HOME  
PROJECT MANAGEMENT LTD

MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

PROPOSED EARTHWORKS  
EROSION AND SEDIMENT  
CONTROL DETAILS  
DRAWING 2

FOR CONSENT

SCALE  
AS SHOWN  
DO NOT SCALE

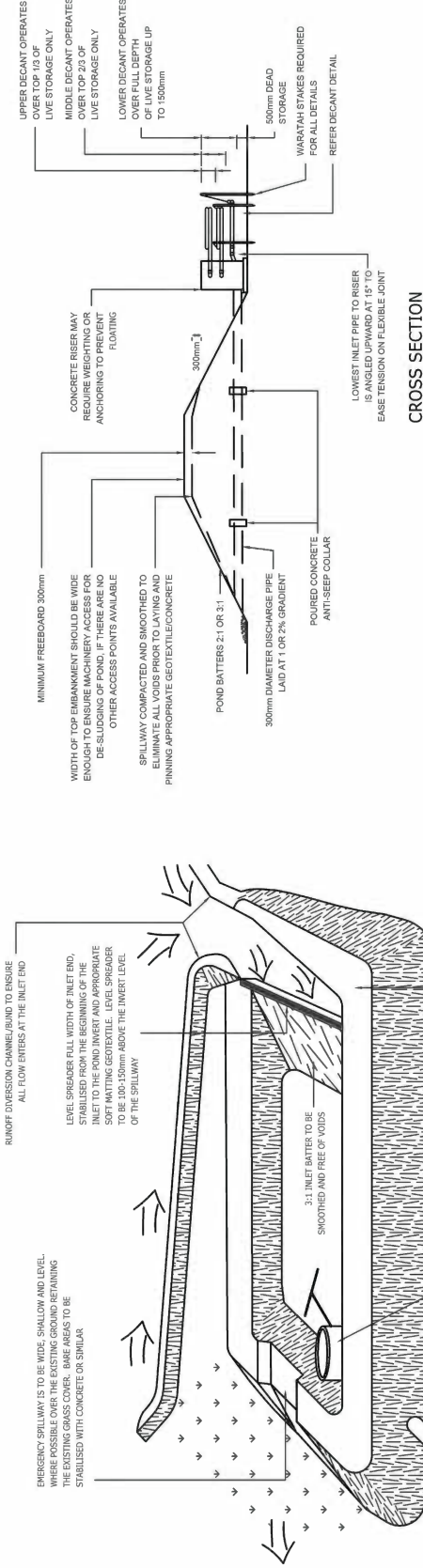
DRAWING NO.  
1976-1-296

REV.  
C

C	ISSUED FOR CONSENT	HC	CH	JSD	26/11/21
B	SECOND ISSUE	HC	CH	JSD	18/11/21
A	HP1 ISSUE	HC	CH	JSD	24/08/21

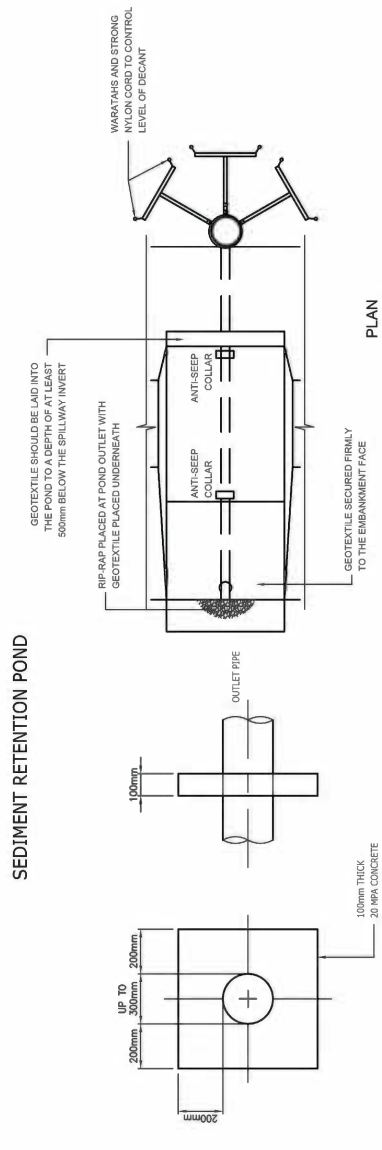
**NOTES:**

1. TO BE READ IN CONJUNCTION WITH DRAWING 295.



**SEDIMENT RETENTION POND SPECIFICATIONS**

CATCHMENT DESCRIPTION	AREA (ha)	ADDITIONAL STORAGE (%)	BASE		CREST		VOLUME (m³)
			Length (m)	Width (m)	Length (m)	Width (m)	
POND 0001	5.00	20	50.0	15.3	54.8	20.1	1808
POND 0003	3.60	20	42.1	12.7	46.9	17.5	1304
POND 0004	4.09	20	45.0	13.7	49.8	18.5	1480
POND 0006	2.83	20	37.1	11.0	41.9	15.8	1027
POND 0014	4.96	20	49.8	15.3	54.6	20.1	1794
POND 0015	4.18	20	45.5	13.8	50.3	18.6	1513
POND 0016	0.85	20	34.0	10.0	36.8	14.8	872
POND 0017	1.91	20	34.0	10.0	36.8	14.8	872
POND 0018	1.96	20	34.0	10.0	36.8	14.8	872
POND 0301	3.52	20	41.6	12.5	46.4	17.3	1275
POND 0601	4.32	20	46.3	14.1	51.1	18.9	1563
POND 0602	3.43	20	41.0	12.3	45.8	17.1	1243
POND 0703	1.58	20	34.0	10.0	36.8	14.8	872
POND 0805	3.10	20	38.9	11.6	43.7	16.4	1124
POND 0902	1.18	20	34.0	10.0	36.8	14.8	872
POND 1002	4.56	20	47.6	14.5	52.4	19.3	1650
POND 1201	4.31	20	46.2	14.1	51.0	18.9	1540
POND 1302	2.88	20	37.4	11.1	42.2	15.9	1045
POND 1402	3.50	20	41.5	12.5	46.3	17.3	1268
POND 1404	2.00	20	34.0	10.0	36.8	14.8	872
POND 1406	3.83	20	43.5	13.2	48.3	18.0	1387
POND 1501	2.50	20	34.0	10.0	36.8	14.8	872
POND 1701	4.60	20	47.8	14.6	52.6	19.4	1664
POND 1801	1.30	20	34.0	10.0	36.8	14.8	872



**SEDIMENT RETENTION POND**

NUMBER OF DECANTS FOR EACH POND SHALL BE AS FOLLOWS:

- I) UP TO 1.5HA CATCHMENT - 1 DECANT
- II) 1.5-3.0HA CATCHMENT - 2 DECANTS
- III) 3 TO 5 HA CATCHMENT - 3 DECANTS

**ANTI-SLEEP COLLAR**

REV	DESCRIPTION	NO	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	NO	CIM	JSD	26/01/21
B	SECOND ISSUE	NO	CIM	JSD	19/01/21
A	FIRST ISSUE	NO	CIM	JSD	24/09/21

DRN BY: CHK BY: APP BY: DATE

REV DATE: 2021-11-23 15:26:09

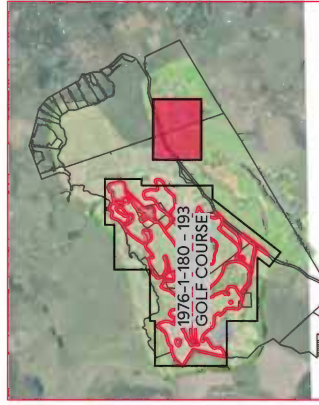


**NOTES:**

1. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. ALL TREES AND ASSOCIATED FENCING NOT IDENTIFIED FOR RETENTION WITHIN THE WORKS AREA ARE TO BE REMOVED.
3. TREES THAT ARE NOTED TO BE RETAINED SHALL BE IDENTIFIED ON SITE AND FENCED AROUND THE DRIPLINE FOR PROTECTION.
4. WILLOWS AND NOXIOUS WEEDS WITHIN THE RIPARIAN MARGIN ARE TO BE CUT BACK AND TREATED TO PREVENT REGROWTH.
5. THE CONTRACTOR IS TO REMOVE ANY SEPTIC TANKS AND FIELDS PRIOR TO EARTHWORKS. THE AREA IS TO BE ASBUILT AND CERTIFIED BY THE GEOTECHNICAL ENGINEER PRIOR TO BACKFILLING.
6. ANY ASBESTOS OR CONTAMINATED MATERIAL IS TO BE REMOVED FROM SITE IN ACCORDANCE WITH THE COUNCIL APPROVED REMEDIATION ACTION PLAN.
7. NATIVE VEGETATION WITHIN WATER COURSE / ESPLANADE RESERVE TO REMAIN, UNLESS NOTED OTHERWISE.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING APPROVAL FROM LOCAL AUTHORITIES FOR THE DIS-ESTABLISHMENT OF POWER LINES AND POLES.

**LEGEND:**

- EXISTING CONTOUR (1.0m CONTOUR) ——— 70.0
- PROPOSED MAJOR CONTOUR (5.0m CONTOUR) ——— 70.0
- PROPOSED MINOR CONTOUR (1.0m CONTOUR) ———
- PROPOSED TOP OF BANK - - - - -
- PROPOSED BOTTOM OF BANK \_ \_ \_ \_ \_
- EXISTING WETLANDS (TO BE PROTECTED) █



CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD

PROJECT: MURIWAI DOWNS GOLF PROJECT  
PROPOSED RESERVOIR  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE: EXISTING TOPOGRAPHY  
SITE CLEARING  
LAYOUT PLAN

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:2000  
DO NOT SCALE  
DRAWING NO: 1976-R1-150  
REV: B

REV	DESCRIPTION	MO	CIM	USD	DATE
B	ISSUED FOR CONSENT			JSD	26/01/21
A	FIRST ISSUE			JSD	17/09/21
		DNB	CHK	BY	APP BY

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C:\GDS\DATA\WORKS\1976-610 MURIWAI ROAD\_766.DRAW\MCKENZIE\_RESERVOIR\_CONSENT\1976-R1-150.DWG



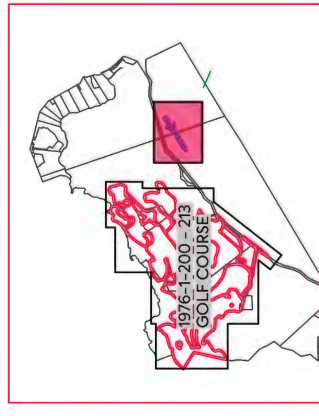
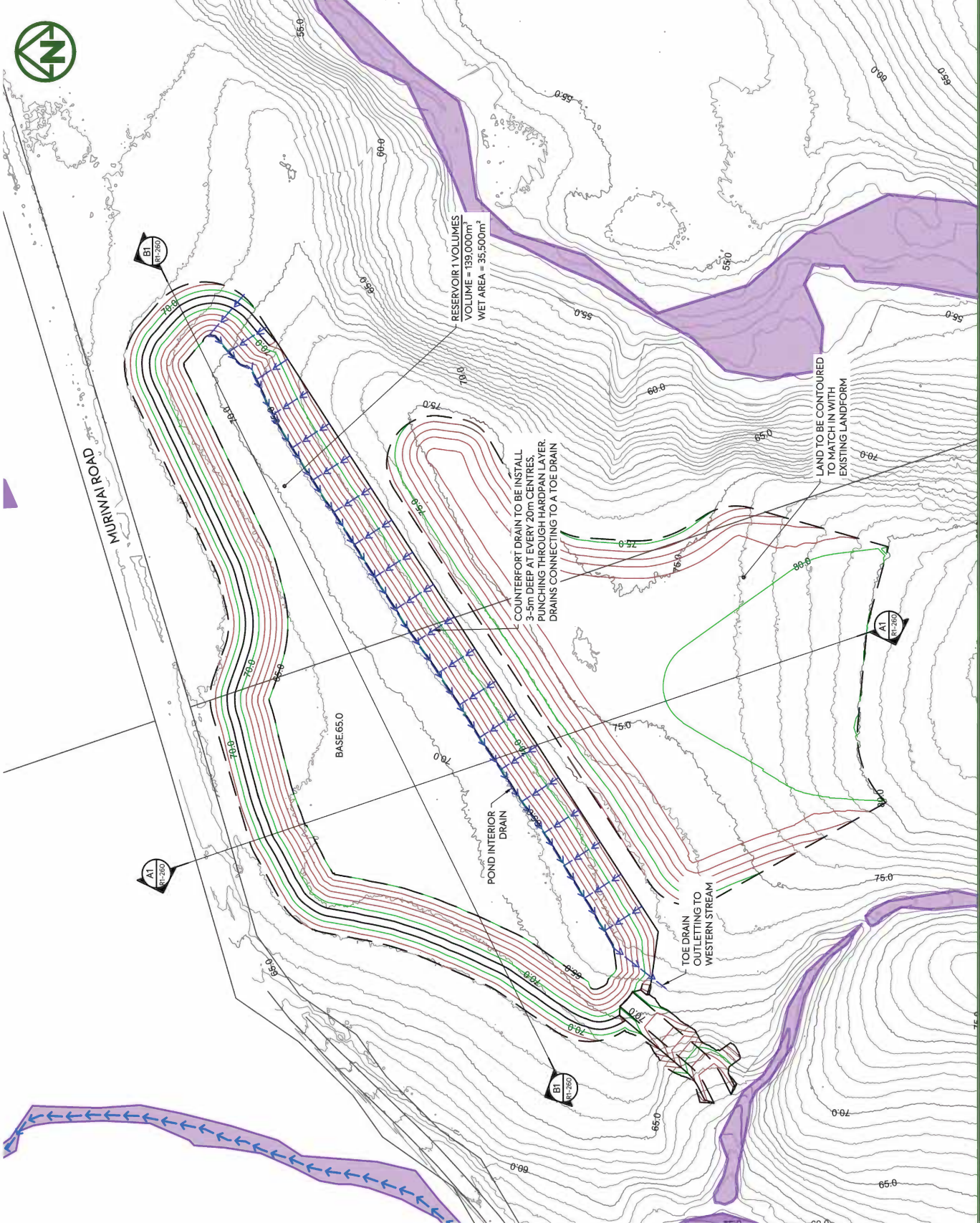


**NOTES:**

1. ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL). THE CONTOUR INTERVAL IS: 1.0m
2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.

**LEGEND:**

- EXISTING CONTOUR (1.0m CONTOUR) 70.0
- PROPOSED MAJOR CONTOUR (5.0m CONTOUR) 70.0
- PROPOSED MINOR CONTOUR (1.0m CONTOUR)
- PROPOSED TOP OF BANK
- PROPOSED BOTTOM OF BANK
- PROPOSED COUNTERFORT DRAINS AS SPECIFIED BY GEOTECHNICAL ENGINEER
- EXISTING STREAM/WETLANDS



**DRAWING LAYOUT PLAN**

	PROJECT: <b>MURIWAI DOWNS GOLF PROJECT</b>	CLIENT: <b>THE BEARS HOME PROJECT MANAGEMENT LTD</b>	TITLE: <b>PROPOSED EARTHWORKS CONTOURS PLAN</b>	PURPOSE OF ISSUE: <b>FOR CONSENT</b>
	610 & 697 MURIWAI ROAD MURIWAI VALLEY			SCALE: <b>1:2000m</b> DO NOT SCALE
				DRAWING NO: <b>1976-R1-200</b>
				REV: <b>B</b>



REV.	DESCRIPTION	MO	CM	JD	26/11/21
B	ISSUED FOR CONSENT				
A	FIRST ISSUE				
	DRAWN BY: CHK BY: APP BY: DATE				



**NOTES:**

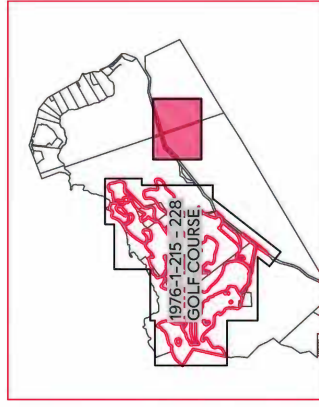
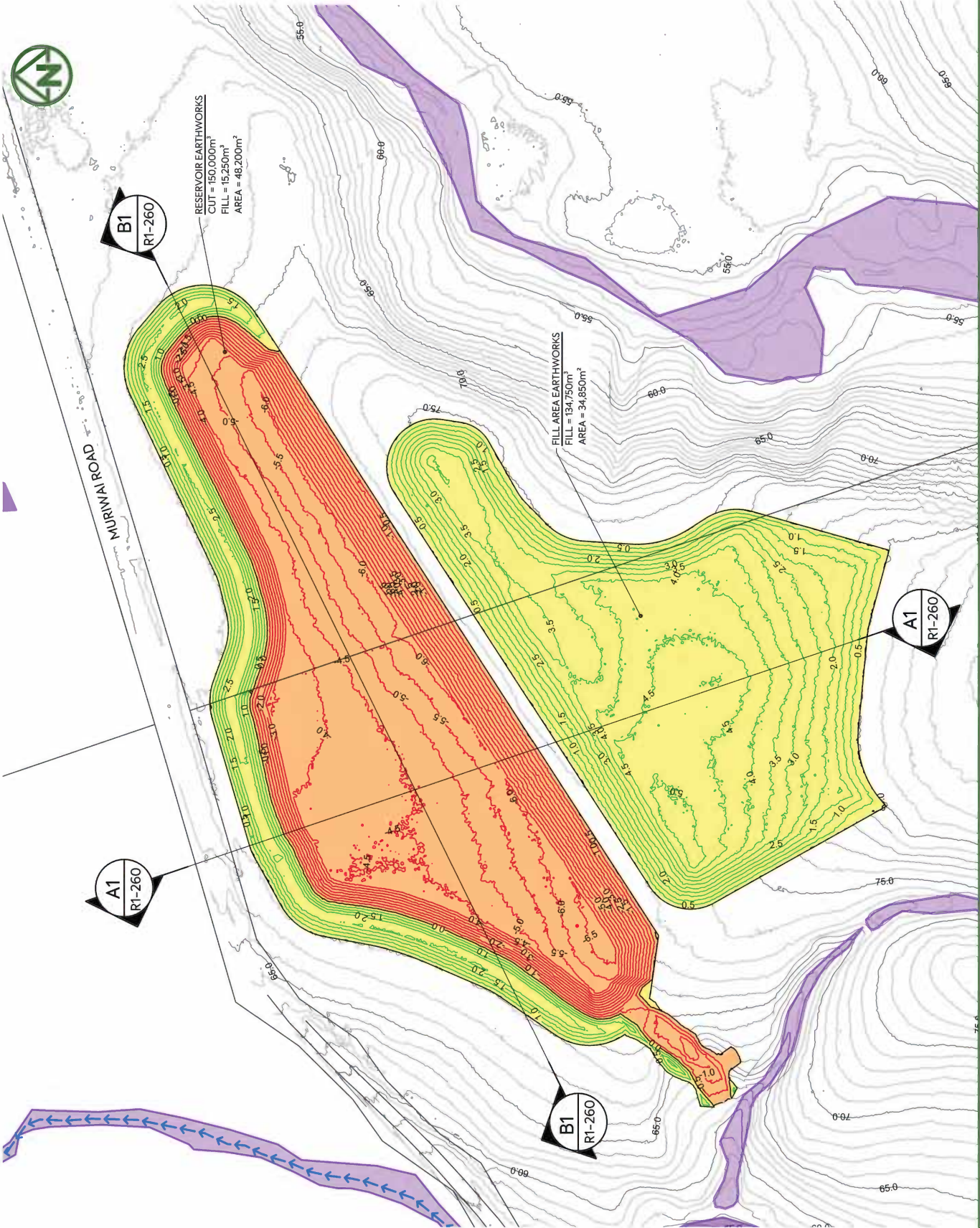
- ALL LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL), THE CONTOUR INTERVAL IS: 1.0m
- CUT / FILL BETWEEN EXISTING SURFACE AND FINISHED DESIGN SURFACE.
- VOLUME OF EARTHWORKS IS SOLID MEASURE VALUES:

**RESERVOIR**  
 CUT: 150,000m<sup>3</sup>  
 FILL: 15,250m<sup>3</sup>  
 AREA: 48,200m<sup>2</sup>

**EARTHWORKS**  
 CUT: 0m<sup>3</sup>  
 FILL: 134,750m<sup>3</sup>  
 AREA: 34,850m<sup>2</sup>

**LEGEND:**

- EXISTING CONTOUR (1.0m CONTOUR)
- PROPOSED FILL CONTOUR (1.0m CONTOUR)
- PROPOSED CUT CONTOUR (1.0m CONTOUR)
- PROPOSED TOP OF BANK
- PROPOSED BOTTOM OF BANK
- EXISTING STREAM/WETLANDS
- EXISTING (GIS) FLOOD LEVEL



CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 TITLE: PROPOSED RESERVOIR CUT/FILL PLAN

PURPOSE OF ISSUE: FOR CONSENT

SCALE: 1:2000m  
 DO NOT SCALE  
 DRAWING NO: 1976-R1-210  
 REV: B

**MCKENZIE & CO.**

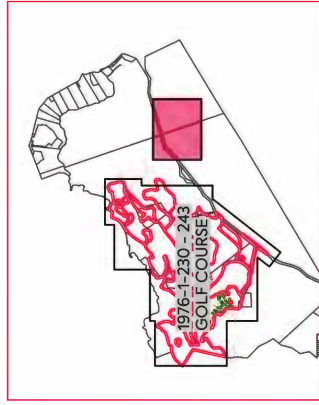
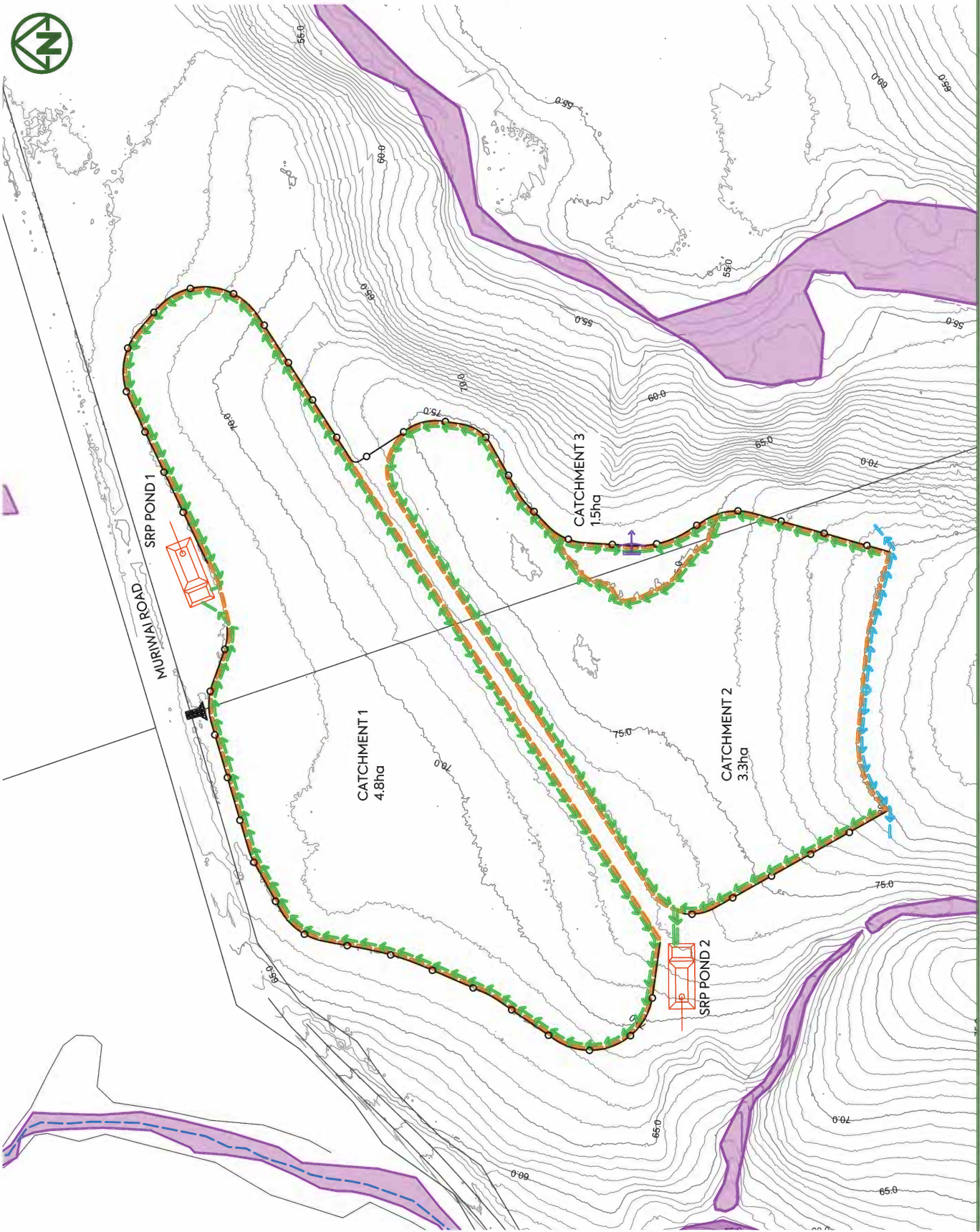
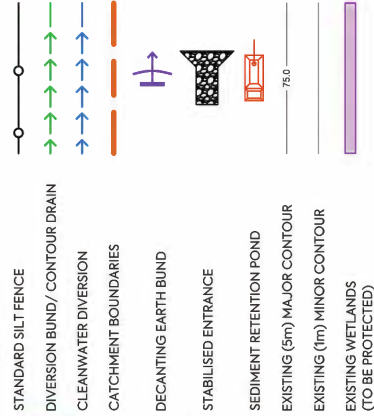


REV	DESCRIPTION	CHK BY	APP BY	DATE
B	ISSUED FOR CONSENT	MO	CH	JSD 26/11/21
A	FIRST ISSUE	MO	CH	JSD 17/09/21

**NOTES:**

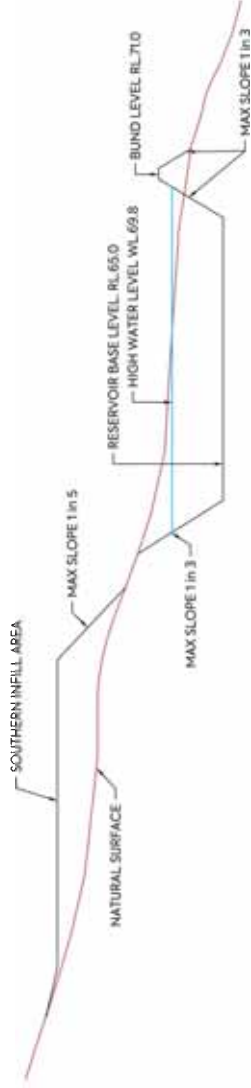
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2. ALL EARTHWORKS SHALL COMPLY WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES IN THE AUCKLAND REGION GD 2016/005.
3. ALL UNSUITABLE MATERIALS AS DEFINED IN THE CONTRACT SPECIFICATION IS TO BE REMOVED AND STRIPPED AREAS INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO ANY FILLING TAKING PLACE.
4. EARTHWORKS SHALL NOT EXTEND PAST THE AREA SHOWN ON THE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
5. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.

**LEGEND:**

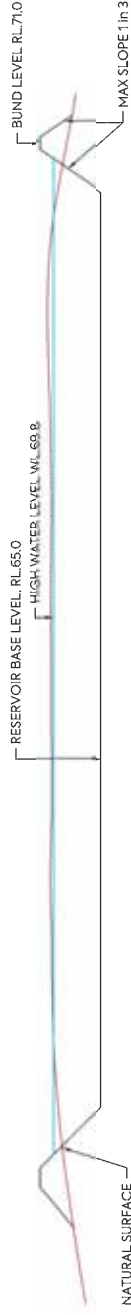


**DRAWING LAYOUT PLAN**

	<p><b>THE BEARS HOME</b> MURIWAI DOWNS GOLF PROJECT</p>	<p><b>PROPOSED EARTHWORKS</b> CONTOURS PLAN</p>	<p><b>FOR CONSENT</b></p>
	<p>PROJECT MANAGEMENT LTD 610 &amp; 697 MURIWAI ROAD MURIWAI VALLEY</p>	<p>TITLE</p>	<p>SCALE: 1:2000 DO NOT SCALE</p>
	<p><b>MCKENZIE &amp; CO.</b></p>	<p>CLIENT</p>	<p>DRAWING NO: 1976-R1-230</p>
	<p>NO. CIM JSD 26/11/21 MO CIM JSD 17/09/21</p>	<p>ISSUED FOR CONSENT</p>	<p>REV: B</p>
	<p>NO. CIM JSD 17/09/21 DRA BY: CHK BY: APP BY: DATE</p>	<p>PROJECT DESCRIPTION</p>	<p>REV: A</p>
	<p>WWW.MCKENZIEANDCO.CO.NZ</p>	<p>THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY FOR ANY OTHER PURPOSE.</p>	<p>DATE: 2021-11-23 16:02:15</p>



**A1** TYPICAL SECTION A1 - A1  
 RT-200 SCALE HOR = 1:250 VERT = 1:50



**B1** TYPICAL SECTION B1 - B1  
 RT-200 SCALE HOR = 1:250 VERT = 1:50



**MCKENZIE & CO.**

CLIENT:

THE BEARS HOME  
 PROJECT MANAGEMENT LTD

PROJECT:

MURIWAI DOWNS GOLF PROJECT  
 PROPOSED RESERVOIR  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

TITLE:

PROPOSED EARTHWORKS  
 TYPICAL SECTIONS

PURPOSE OF ISSUE:

FOR CONSENT

SCALE  
 AS SHOWN

DO NOT SCALE

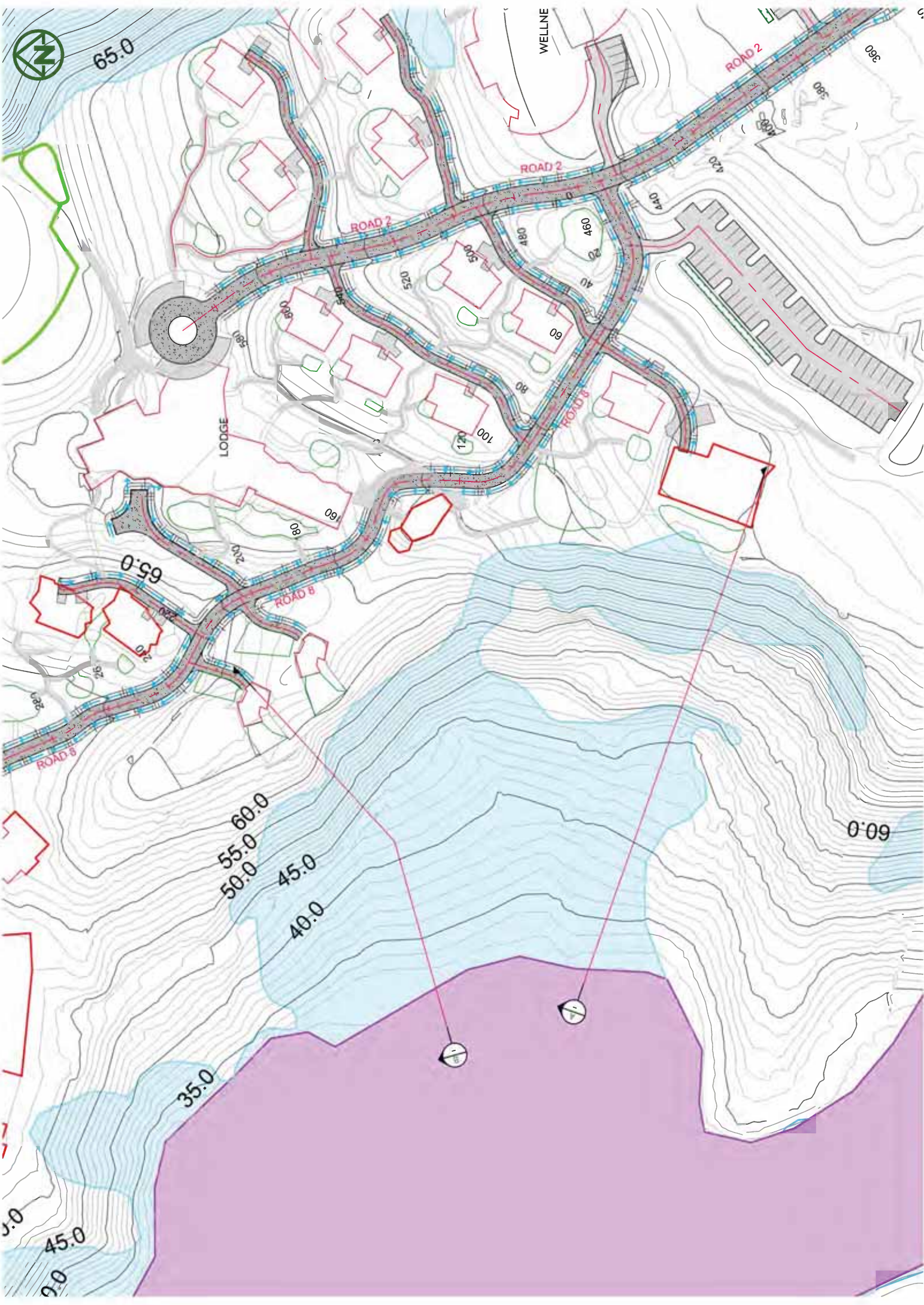
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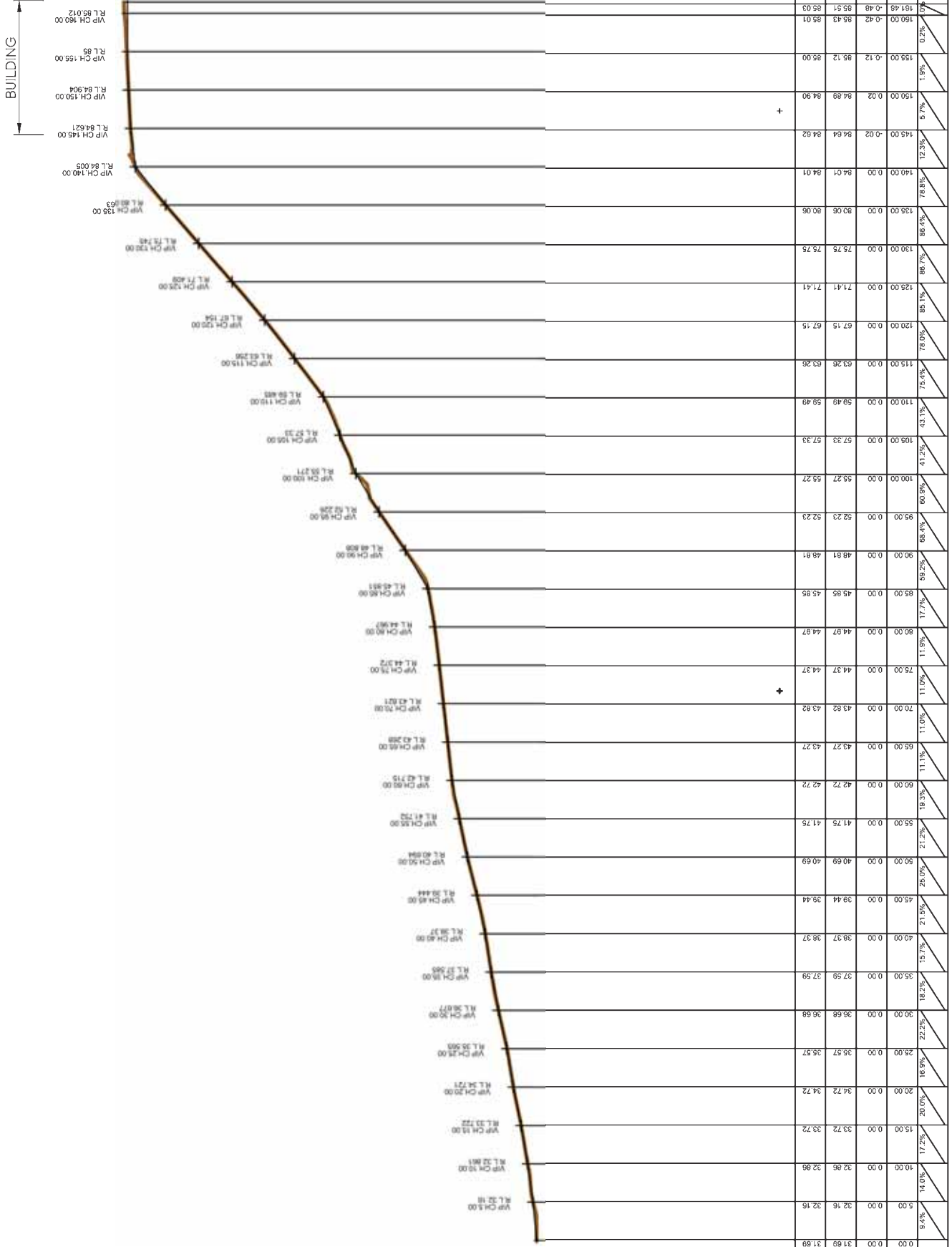
1976-R1-260

REV:

B

REV	DESCRIPTION	CHK BY	APP BY	DATE	
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A	PREPARED	HO	CM	JS	17/09/21



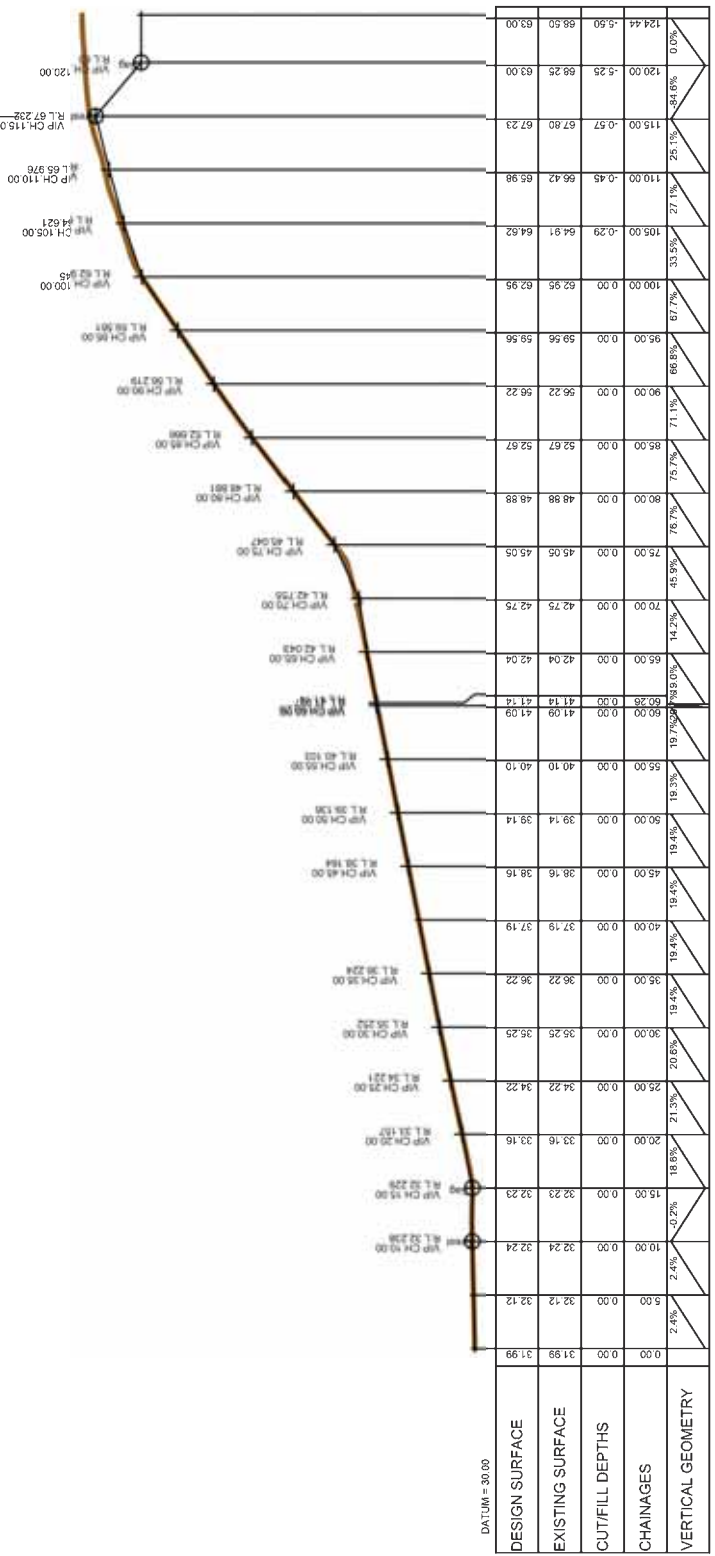


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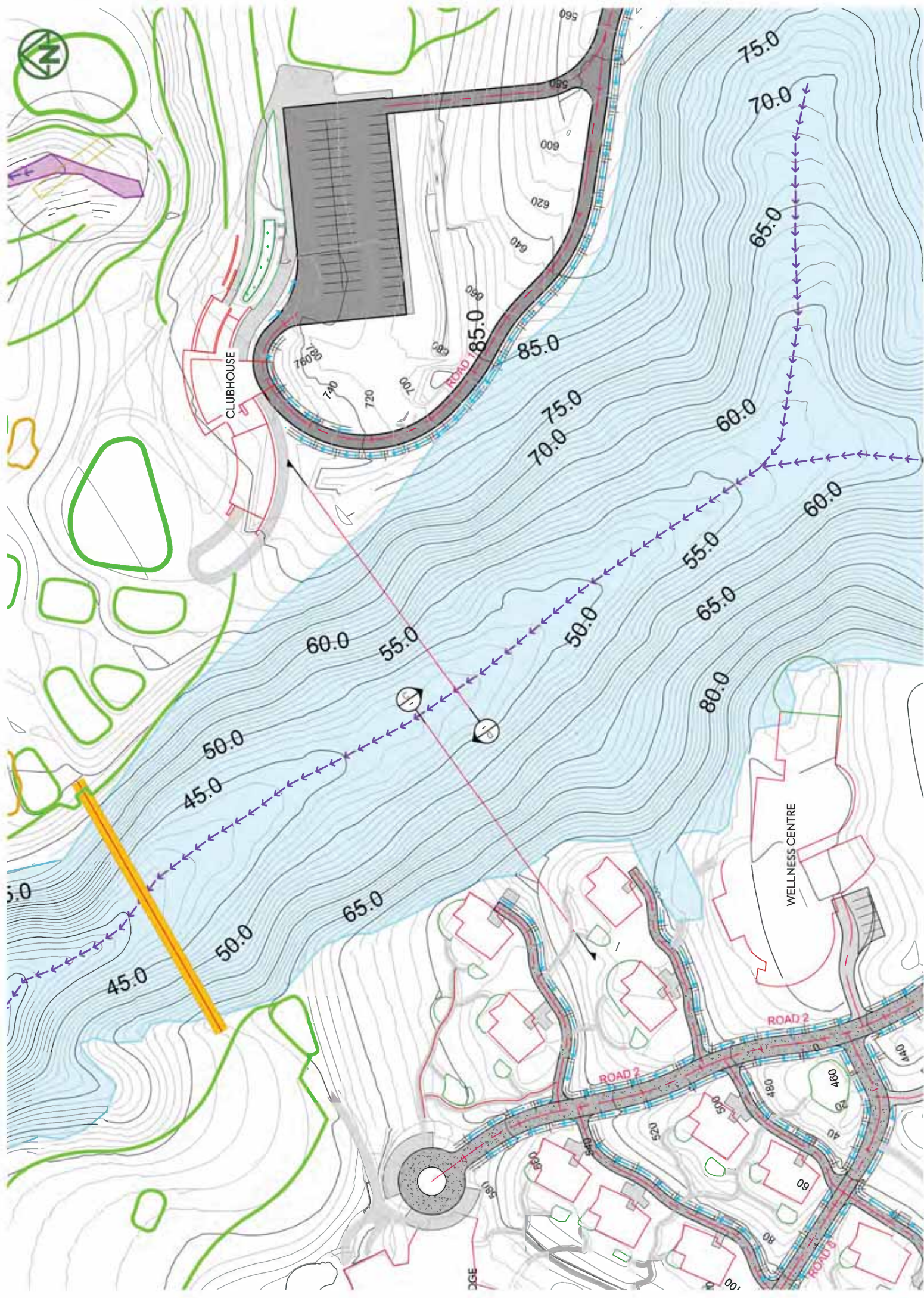
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32.16	32.16	0.00	5.00	14.0%
32.86	32.86	0.00	10.00	17.2%
33.72	33.72	0.00	15.00	20.0%
34.72	34.72	0.00	20.00	22.2%
35.57	35.57	0.00	25.00	25.0%
36.66	36.66	0.00	30.00	21.5%
37.59	37.59	0.00	35.00	18.2%
38.37	38.37	0.00	40.00	15.7%
39.44	39.44	0.00	45.00	21.2%
41.75	41.75	0.00	55.00	18.3%
42.72	42.72	0.00	60.00	11.1%
43.27	43.27	0.00	65.00	11.0%
43.82	43.82	0.00	70.00	11.0%
44.37	44.37	0.00	75.00	11.9%
44.97	44.97	0.00	80.00	17.7%
45.85	45.85	0.00	85.00	19.2%
48.81	48.81	0.00	90.00	68.4%
52.23	52.23	0.00	95.00	60.9%
55.27	55.27	0.00	100.00	41.2%
57.33	57.33	0.00	105.00	43.1%
59.49	59.49	0.00	110.00	75.4%
63.26	63.26	0.00	115.00	78.0%
67.15	67.15	0.00	120.00	85.1%
71.41	71.41	0.00	125.00	86.7%
75.75	75.75	0.00	130.00	88.5%
80.06	80.06	0.00	135.00	78.8%
84.01	84.01	0.00	140.00	12.3%
84.62	84.62	-0.02	145.00	5.7%
84.90	84.90	0.02	150.00	1.9%
85.00	85.00	-0.12	155.00	0.2%
85.01	85.01	85.43	160.00	
85.03	85.03	85.51	161.48	

LONGITUDINAL SECTION SECTION A  
SCALE HORIZ=1:200 @ A1 VERT=1:200 @ A1

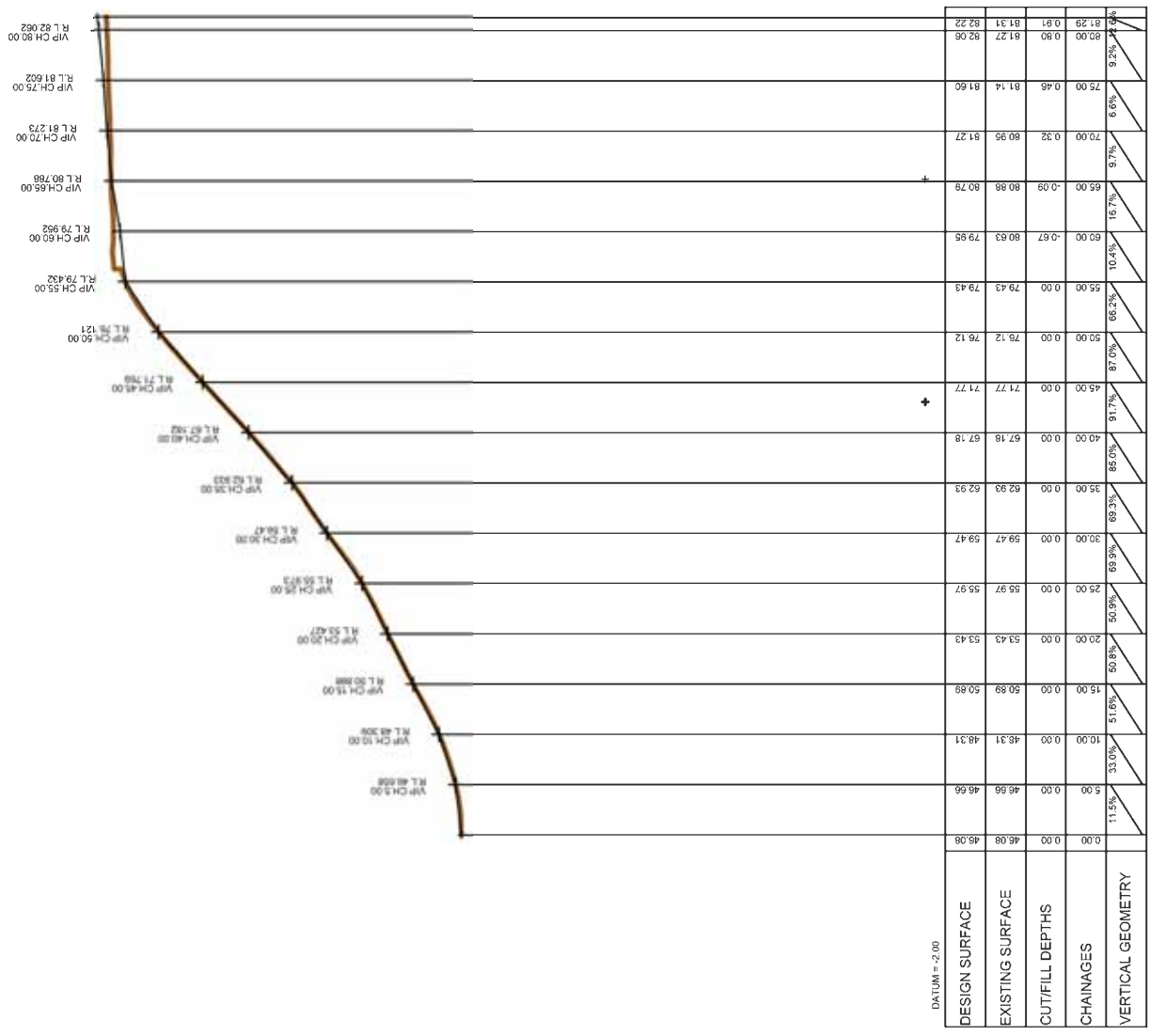
HIDDEN VILLA



LONGITUDINAL SECTION SECTION B  
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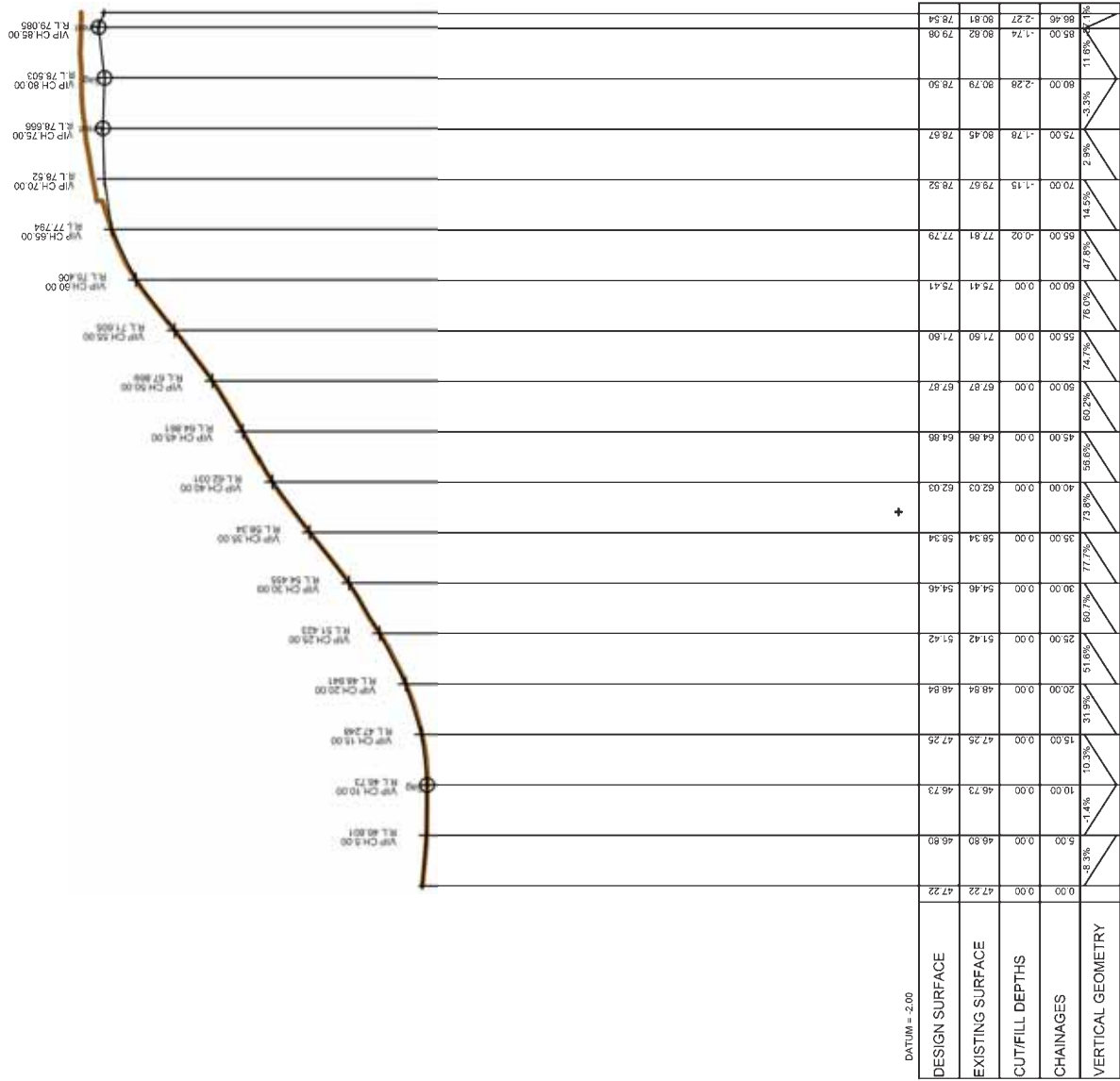






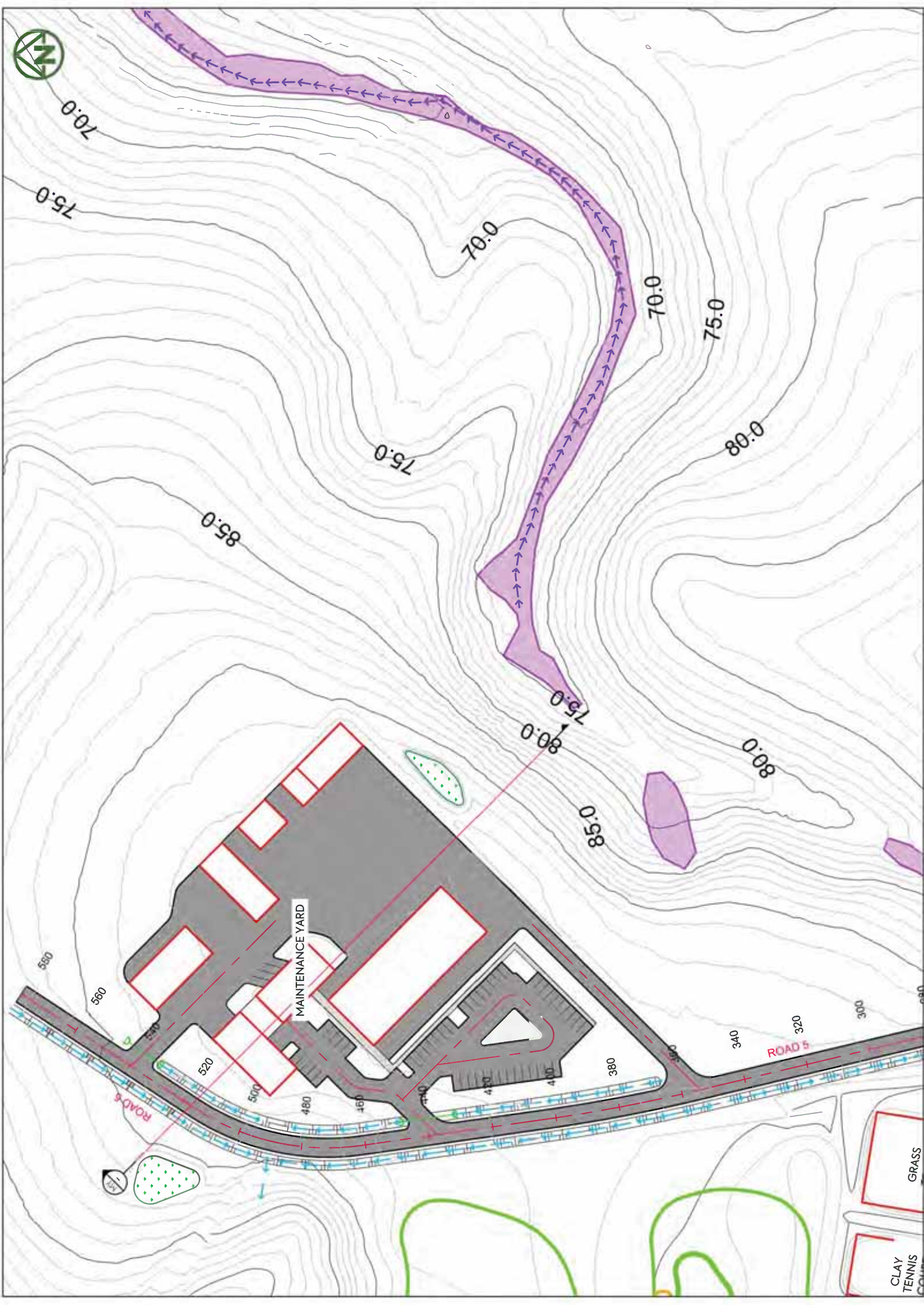
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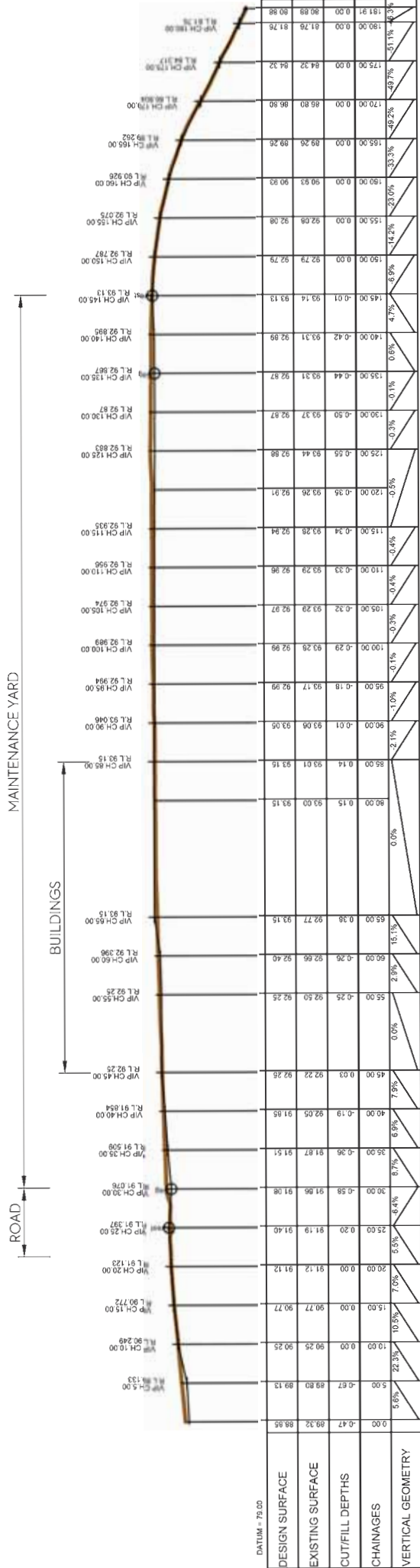
LONGITUDINAL SECTION C  
SCALE HORZ=1:200 @ A1 VERT=1:200 @ A1



DATUM = -2.00

LONGITUDINAL SECTION SECTION D  
SCALE HORIZ=1:200 @ 41





LONGITUDINAL SECTION MY-MY  
SCALE HORIZONTAL=1:200 @ 1"=200' @ A1

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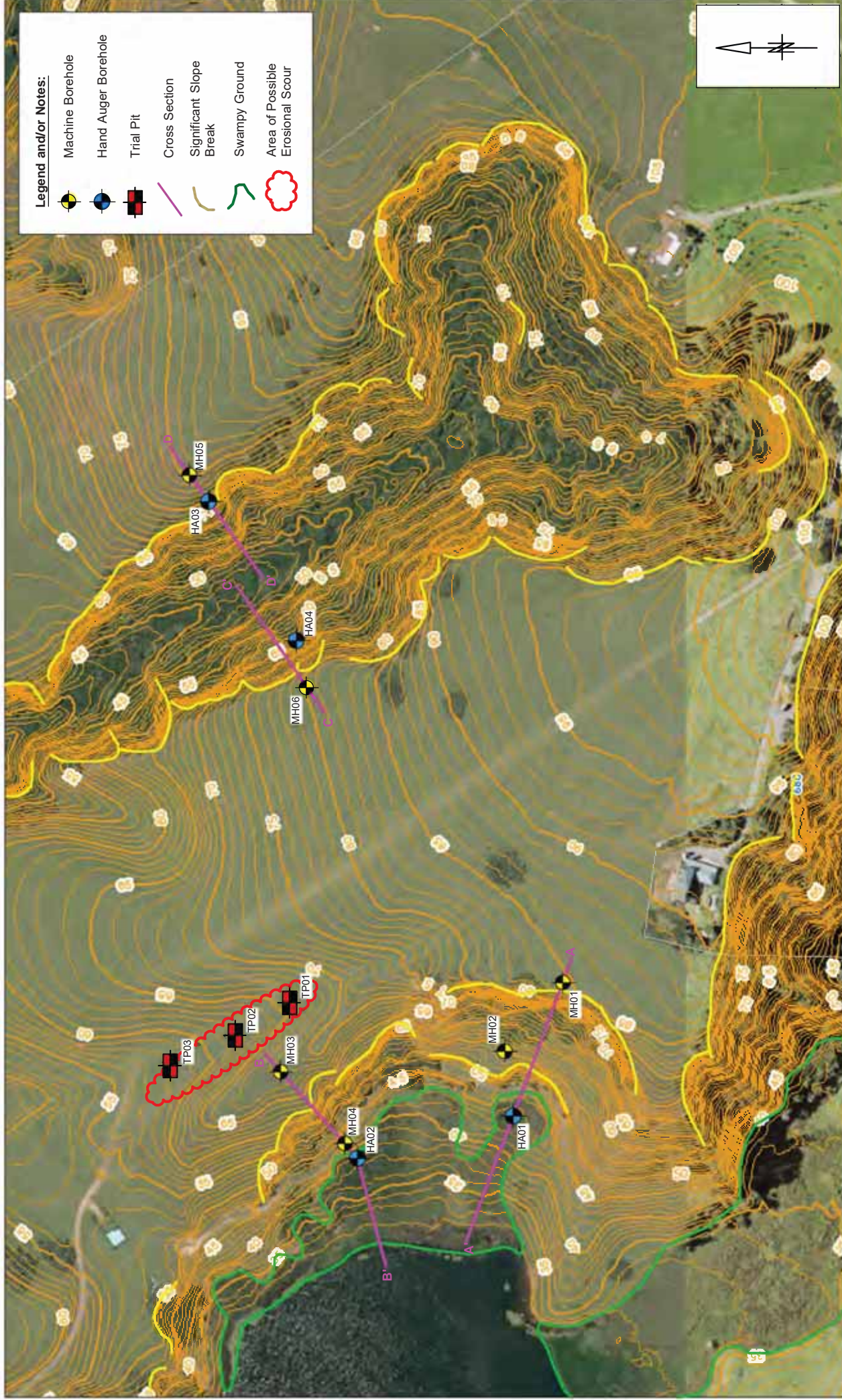
ROAD

BUILDINGS

MAINTENANCE YARD

# APPENDIX 2:

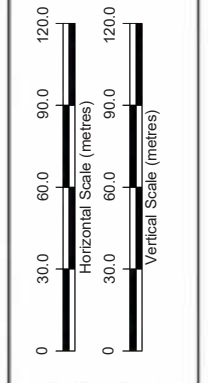
LANDER GEOTECHNICAL CONSULTANTS LIMITED  
DRAWINGS



client: THE BEARS HOME PROJECT MANAGEMENT LTD  
 project: MURIWAI DOWNS GOLF PROJECT  
 title: SITE PLAN  
 project no: J01662 figure no: 01



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approved	SL
date	10 August 2021
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original size	A3

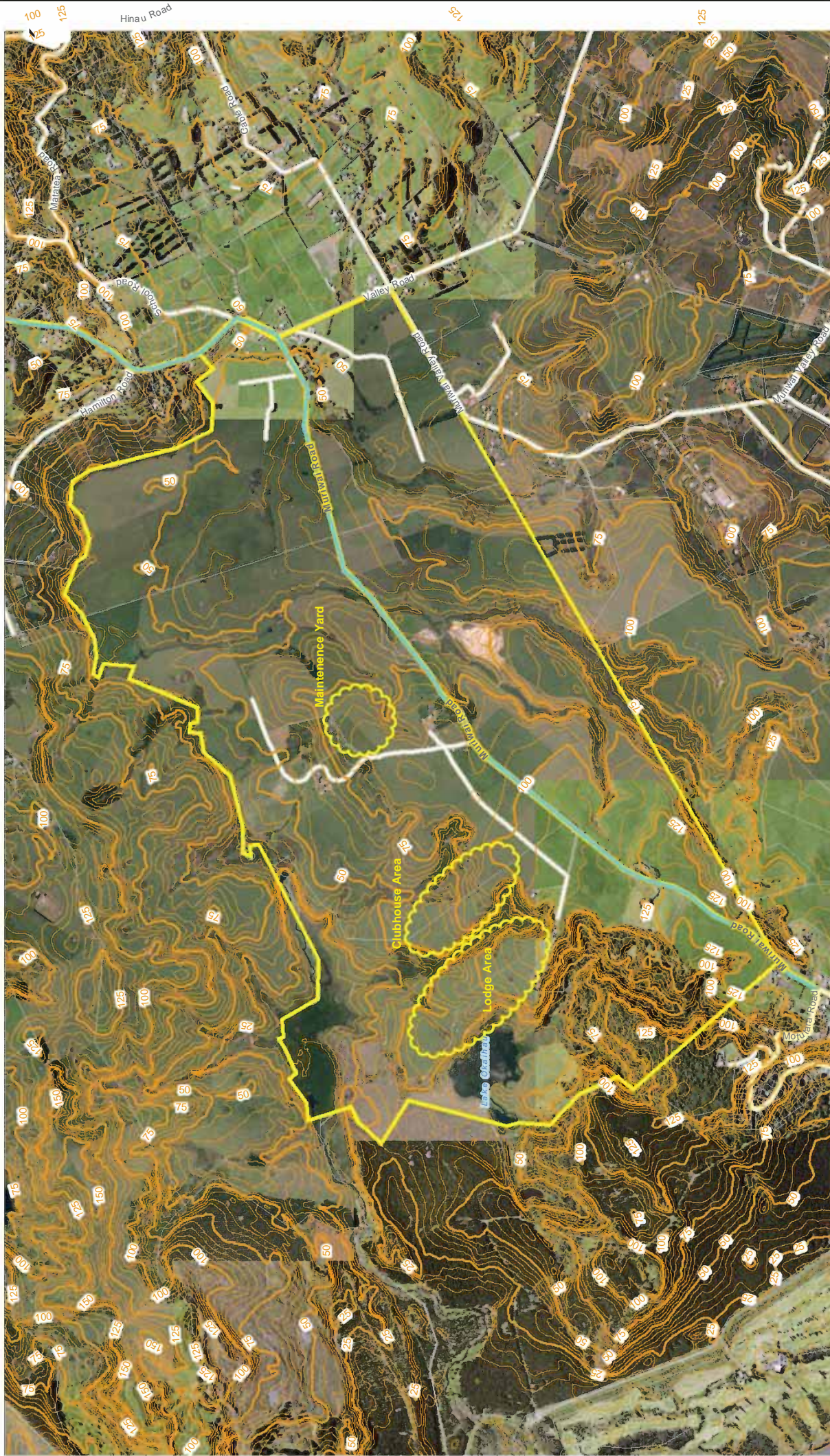


description	drawn	approved	date

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 be before taking any action. Copyright  
 al Bo in day information from LINZ  
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 irration... the accuracy and plan



DISCLAIMER: This map/plan is illustrative only and all information should be independently verified on site before taking any action. Copyright Auckland Council. Land Parcel Boundary information from LINZ. Crown Copyright Reserved. Whilst due care has been taken, Auckland Council gives no warranty as to the accuracy and plan completeness of any information on this map/plan and accepts no liability for any error, omission or use of the information. Height datum: Auckland 1946.		drawn	approved	date	description		drawn	approved	date	client: THE BEARS HOME PROJECT MANAGEMENT LTD project: MURIWAI DOWNS FARM scale @ A3 title: 1:15,000 Auckland Council GIS AERIAL 11/12/2020 figure no: 02	
		drawn	approved	date	description		drawn	approved	date	0 <b>LANDER</b> geotechnical Limited	
		drawn	approved	date	description		drawn	approved	date	sl SGL 26/01/21 1:15,000 A3	



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 This map/plan is illustrative only. Description information should be independently verified on site before taking any action. Copyright Auckland Council. Land Parcel Boundary information from LINZ (Copyright Reserved). Whilst due care has been taken, Auckland Council gives no warranty as to the accuracy and plan completeness of any information on this map/plan and accepts no liability for any error, omission or use of the information. Height datum: Auckland 1946.

drawn	approved	date

drawn	si
approved	SGL
date	26/01/21
scale	1:15,000
original size	A3

**LANDER**  
geotechnical

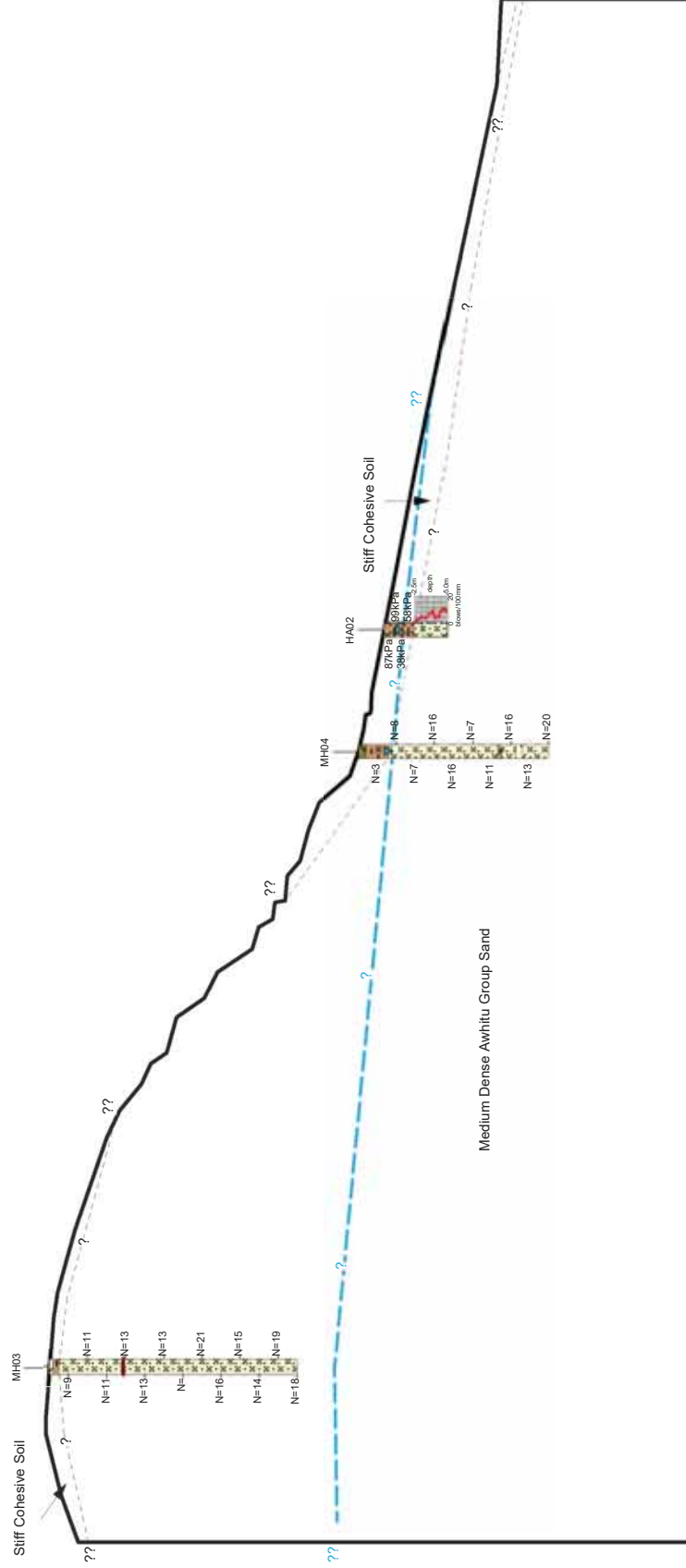
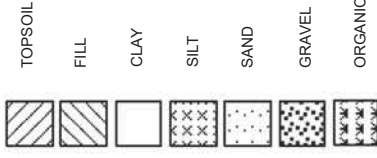
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 project no: **J01662** figure no: **03**







Legend and/or Notes:



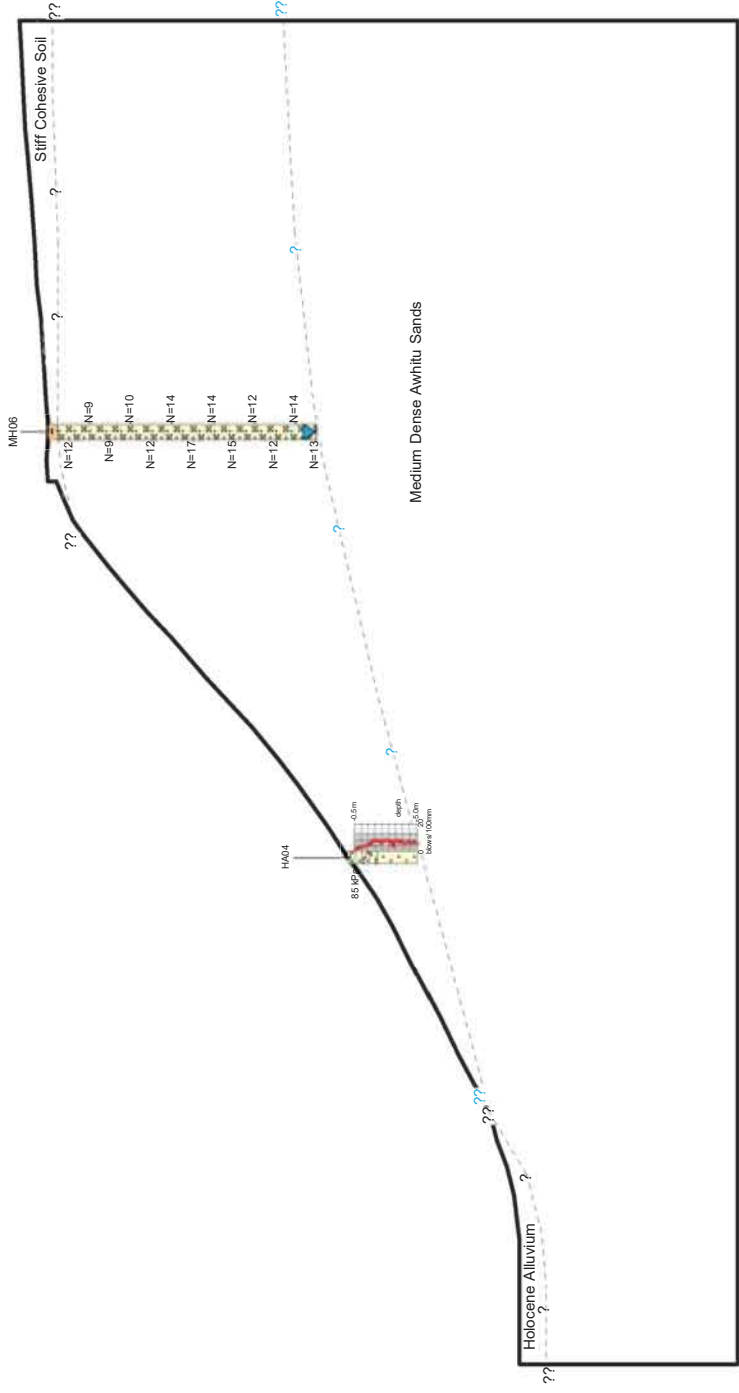
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title:		CROSS SECTION BB		
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revision	description	drawn	approved	date
drawn		JL	SL	
approved		date		
date		21/10/21		
scale		1:400		
original size		A3		
Horizontal Scale (metres)				
Vertical Scale (metres)				



template revision: 12/01/17 (22/1/17)

Legend and/or Notes:

- TOPSOIL
- FILL
- CLAY
- SILT
- SAND
- GRAVEL
- ORGANIC

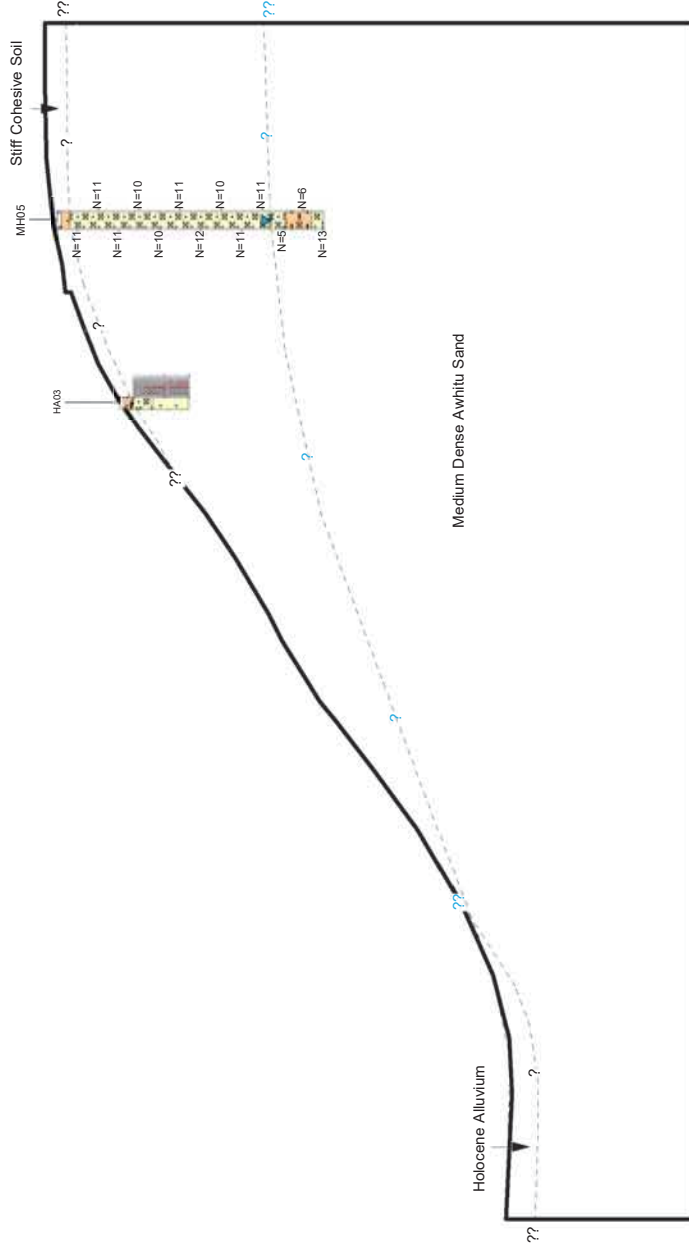


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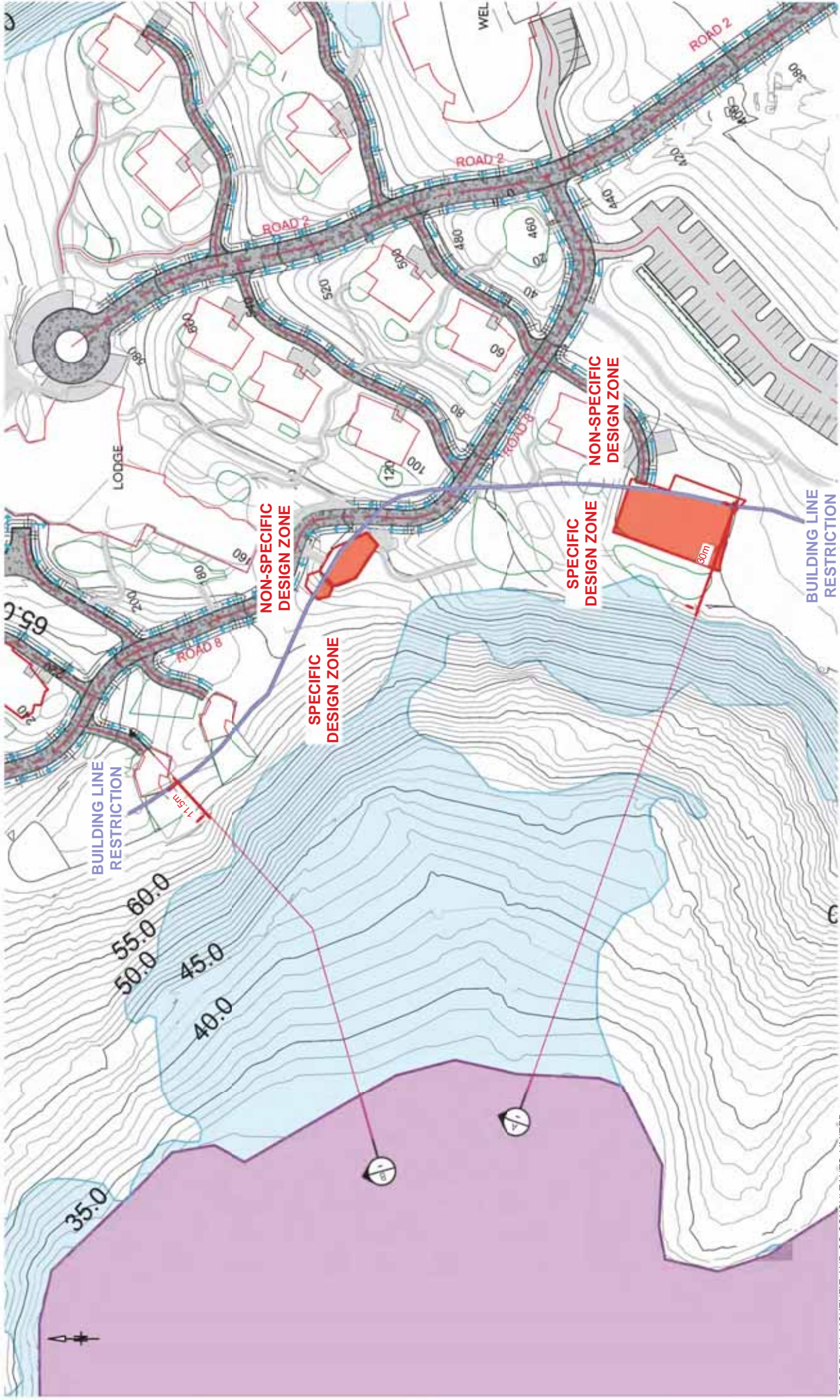


**Legend and/or Notes:**

	TOPSOIL
	FILL
	CLAY
	SILT
	SAND
	GRAVEL
	ORGANIC



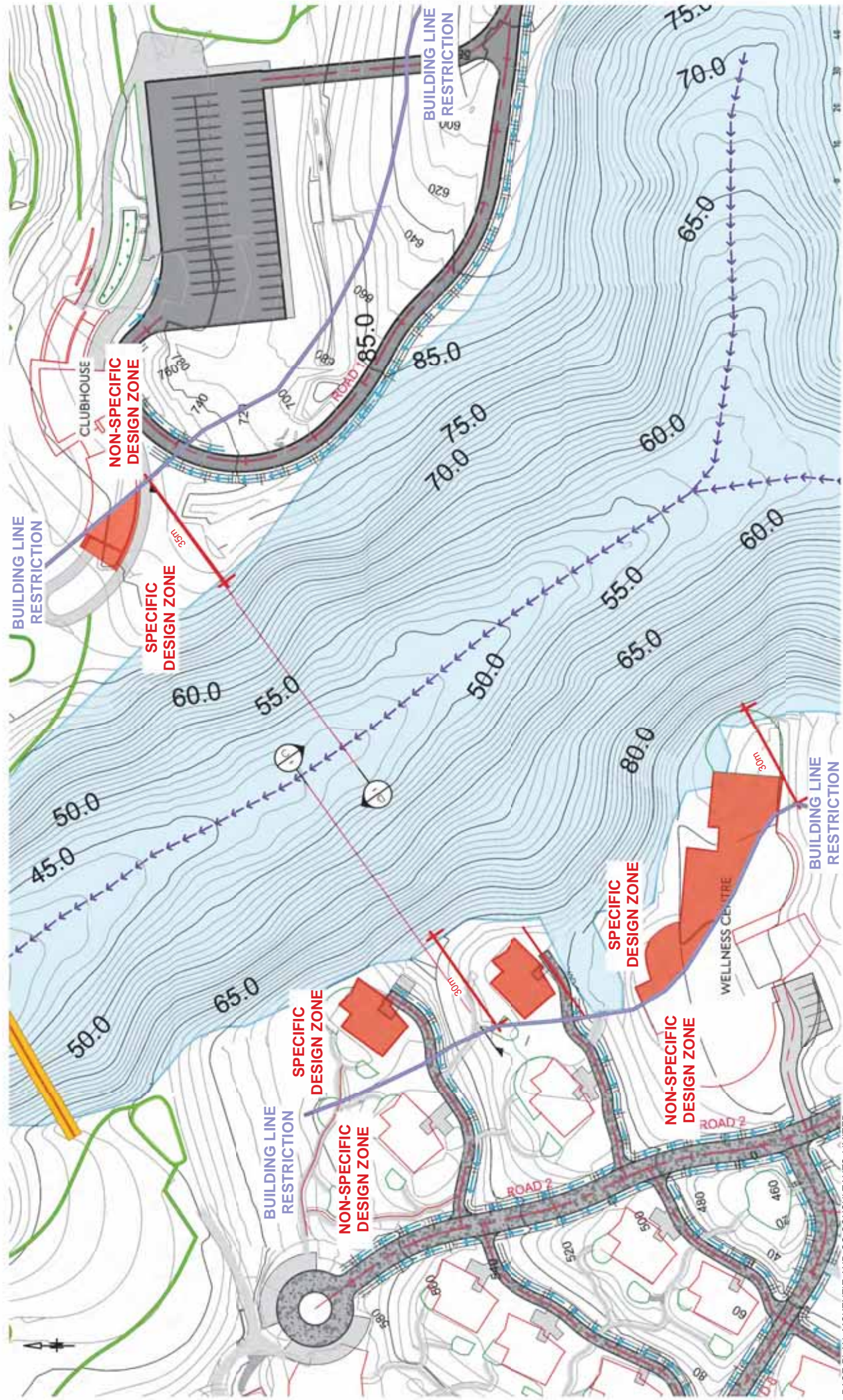
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revision	drawn	approved	date	scale	original size	title: CROSS SECTION DD	project no: J01662
						figure no: 08	



BASE PLAN: MCKENZIE AND CO CONSULTANTS LIMITED

revision	description	drawn	approved	date	horizontal scale (metres)	vertical scale (metres)	drawn	approved	date	scale	original size	client	project	title	project no.	figure no.
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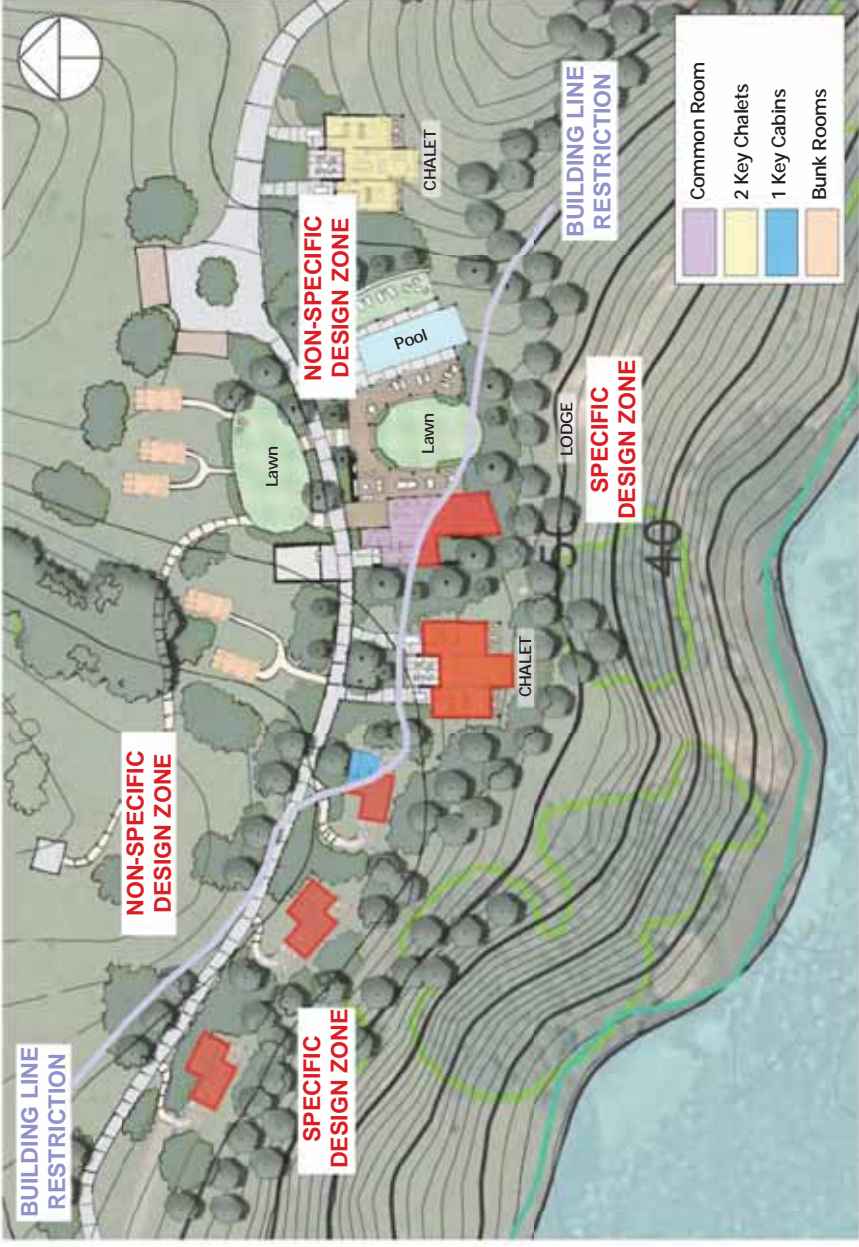




BASE PLAN: MCKENZIE AND CO CONSULTANTS LIMITED

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					0 20.0 40.0 60.0	0 20.0 30.0 60.0	JL	SL	22/10/21	1:1000	A3	THE BEARS HOME PROJECT MANAGEMENT LIMITED	MURIWAI DOWNS GOLF PROJECT	BUILDING LINE RESTRICTION - EAST	J01662	10





Common Area

BASE PLAN: JACK MCKINNEY ARCHITECTS LIMITED

revision	description	drawn	approved	date

drawn	JL
approved	SL
date	22/10/21

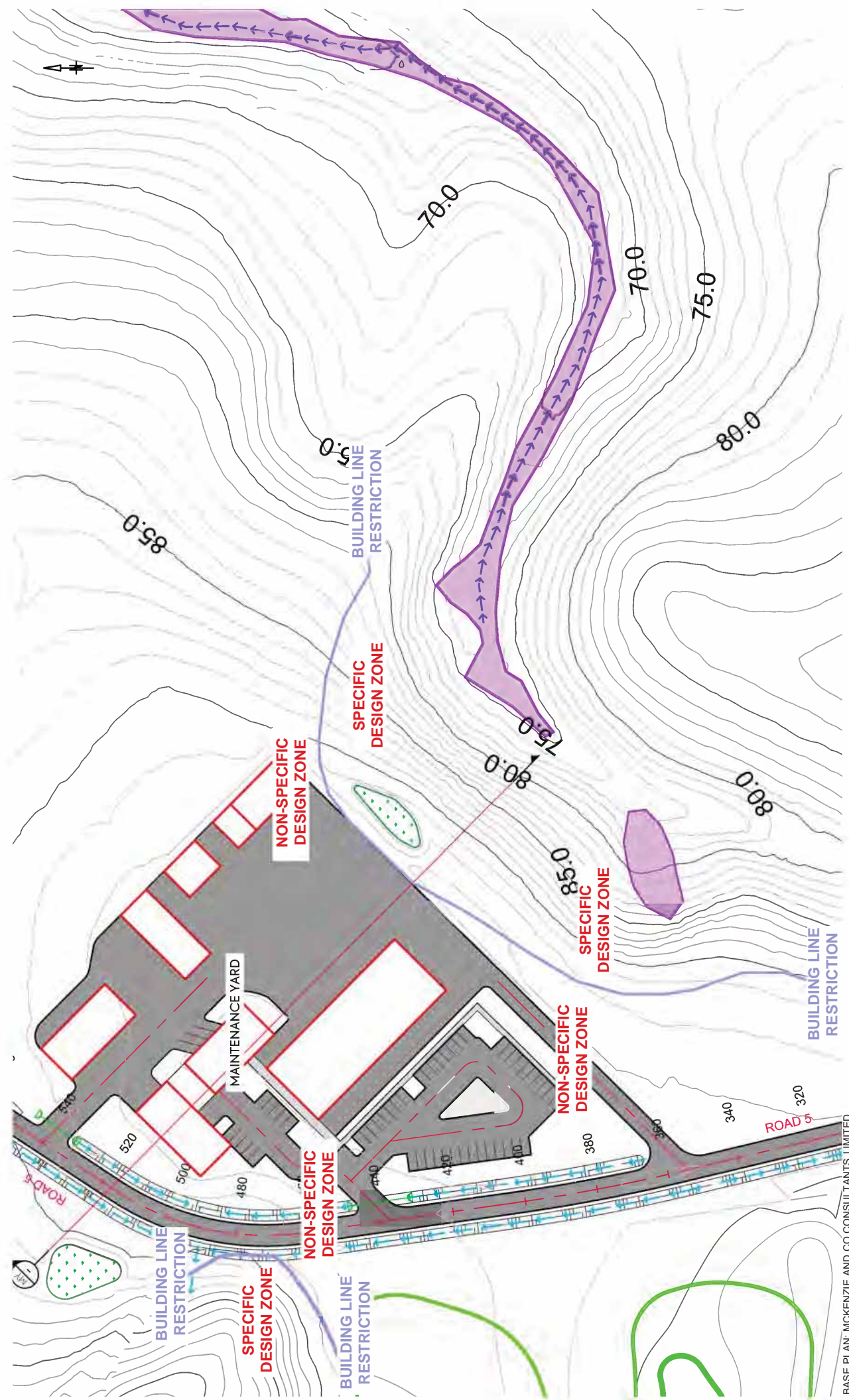
  

Horizontal Scale (metres)	0 20.0 40.0 60.0
Vertical Scale (metres)	0 20.0 30.0 60.0

client	THE BEARS HOME PROJECT MANAGEMENT LIMITED
project	MURIWAI DOWNS GOLF PROJECT
location	MURIWAI DOWNS GOLF PROJECT
figure no.	11





BASE PLAN: MCKENZIE AND CO CONSULTANTS LIMITED

revision	description	drawn	approved	date

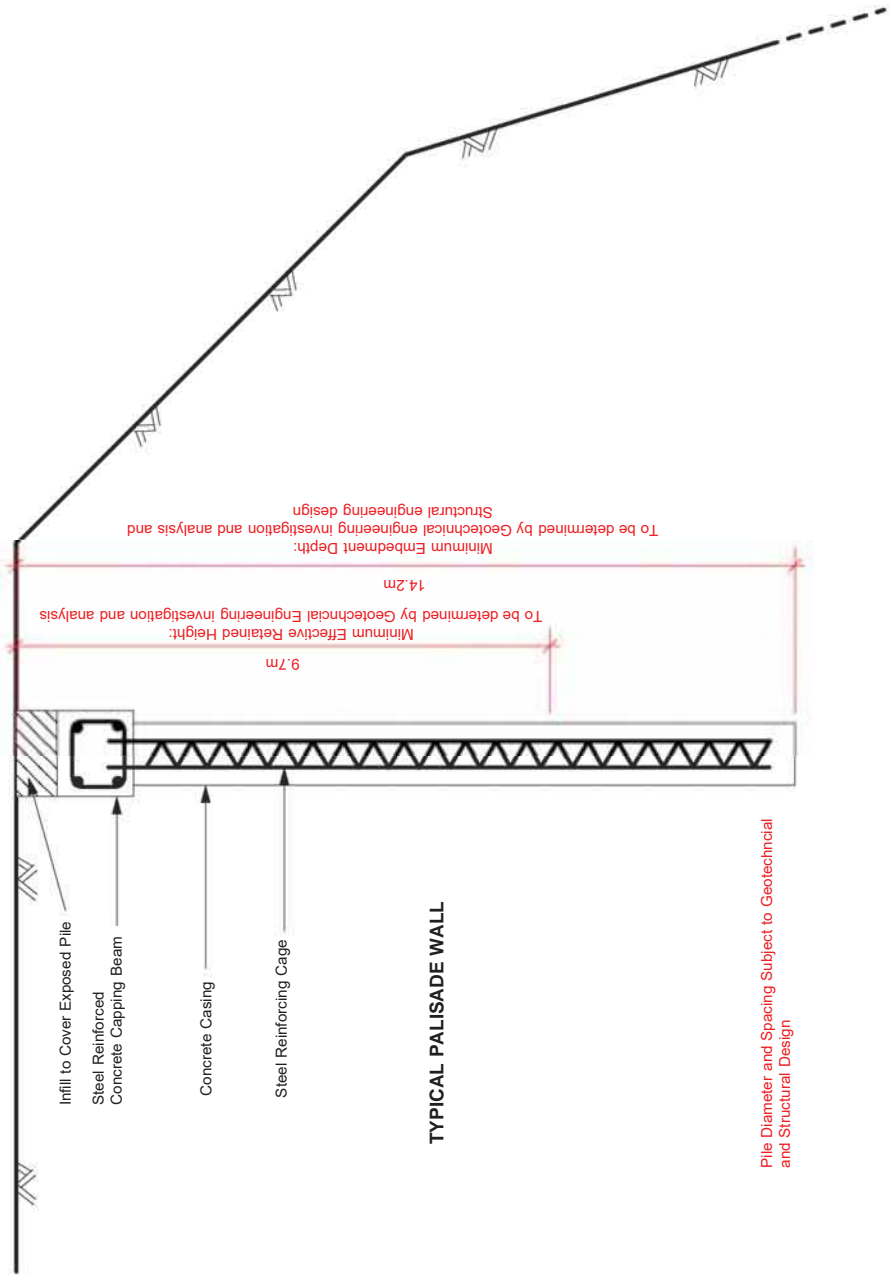
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original size	A3	figure no.	J01662

client:	THE BEARS HOME PROJECT MANAGEMENT LIMITED
project:	MURIWAI DOWNS GOLF PROJECT
title:	BUILDING LINE RESTRICTION - MAINTENANCE SHED
project no.:	J01662
figure no.:	12

Horizontal Scale (metres)	0 20.0 40.0 60.0
Vertical Scale (metres)	0 20.0 30.0 60.0



**TYPICAL PALISADE WALL**

Pile Diameter and Spacing Subject to Geotechnical and Structural Design

revision	description	drawn	approved	date

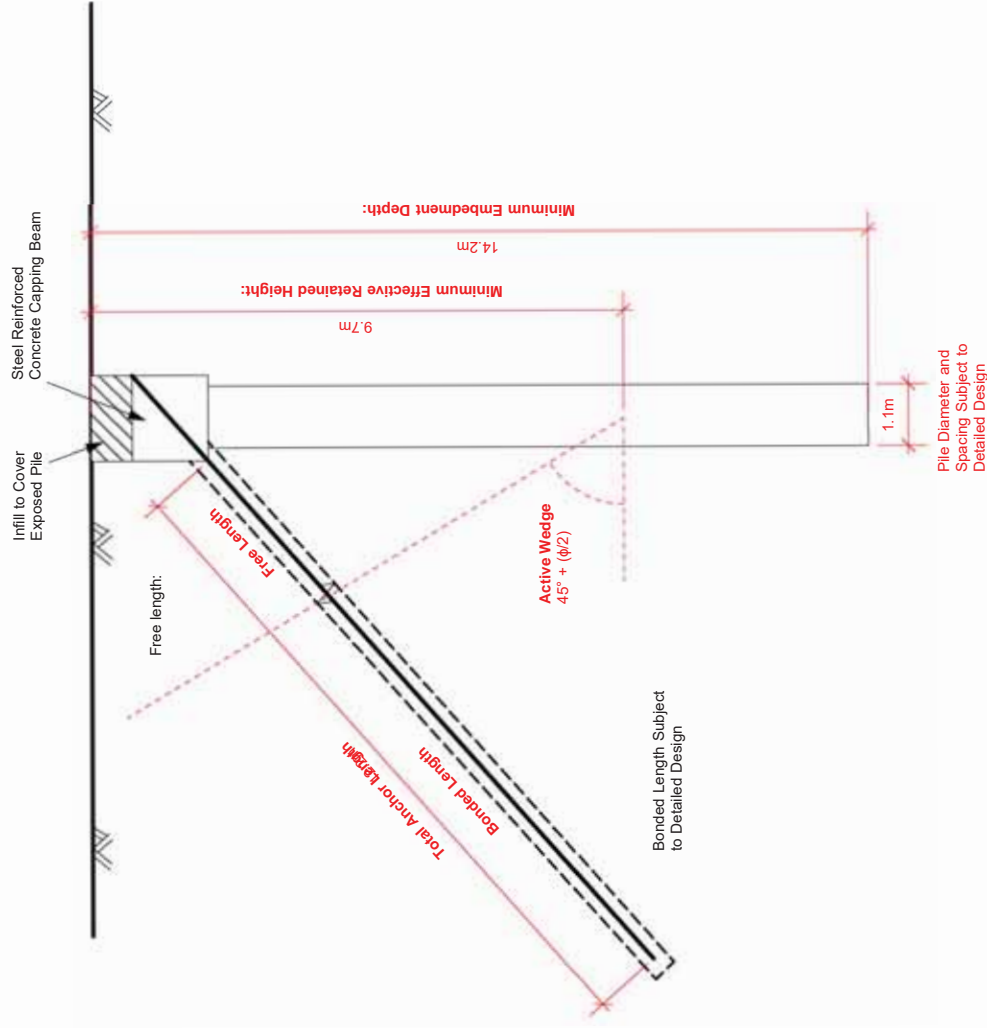
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date	22 October 2021	scale	NOT TO SCALE
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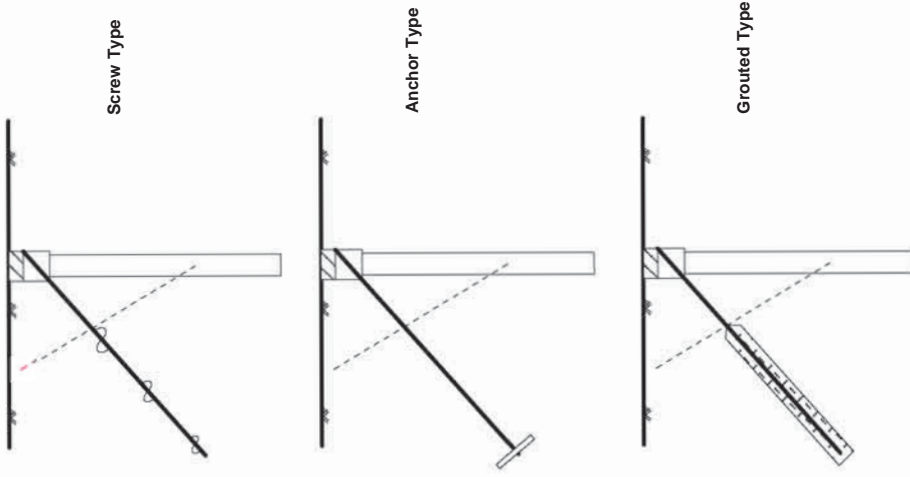
client	THE BEARS HOME PROJECT MANAGEMENT LIMITED
project	MURIWAI DOWNS GOLF PROJECT
title	TYPICAL PALISADE WALL
project no.	J01662
figure no.	13



**TYPICAL TIED-BACK PALISADE WALL**



**ANCHOR TYPES FOR TIED-BACK PALISADE WALL**



revision

description	drawn	approved	date

drawn	JL
approved	SL
date	22 October 2021
scale	NOT TO SCALE
original size	A3



client: THE BEARS HOME PROJECT MANAGEMENT LIMITED	
project:	MURIWAI DOWNS GOLF PROJECT
title:	TYPICAL TIED BACK PALISADE WALL
project no.:	J01662
figure no.:	14

# APPENDIX 3:

## LABORATORY TEST RESULTS



Our Ref: 1100938.0000/Rep1  
Customer Ref: J01662  
20 October 2021

Lander Geotechnical Consultants Limited  
PO Box 97385  
Auckland 2241

Attention: Jasmine Lam

Dear Jasmine

## **Muriwai Downs Golf Project Laboratory Test Report**

### **Customer's Instructions**

We were instructed to perform triaxial and direct shear tests on the samples received.

### **Sampling Procedure**

Samples have been tested as received from the customer.

### **Sample Location Plan**

Not applicable.

### **Samples**

Two core samples and two bag samples were received. The samples were labelled with reference numbers.

### **Date of Sample Receipt**

17/08/2021

### **Test Method(s)**

ISO 17892:2018 Part 9 - Consolidated triaxial compression tests on water saturated soils

ISO 17892:2018 Part 10 - Direct shear tests

NZS 4402: 1986 Test 2.1 - Water Content

### **Material Description**

Descriptions are provided in the attached presentation pages.

### **Test Results**

Test results are attached.

### **Test Remarks**

Test remarks are included in the presentation pages.

### General Remarks

Samples not destroyed during testing, will be retained for one month from the date of this report before being discarded.

Descriptions are enclosed for your information, are not covered under the IANZ endorsement of this report.

This report has been prepared for the benefit of Lander Geotechnical Consultants Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement.

Please reproduce this report in full when transmitting to others or including in internal reports.

If we can be of any further assistance, feel free to get in touch. Contact details are provided at the bottom of the letterhead page.

GEOTECHNICS LTD

Report prepared by:



.....  
Cameron Tier  
Triaxial Laboratory Technician

Authorised for Geotechnics by:

.....  
Steven Anderson  
Project Director

Report checked by:



.....  
Helen Wang  
Triaxial Laboratory Manager  
Approved Signatory



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

20-Oct-21

t:\geotechnicsgroup\projects\1100938\issueddocuments\20211020 muriwai downs cati.rep1.docx



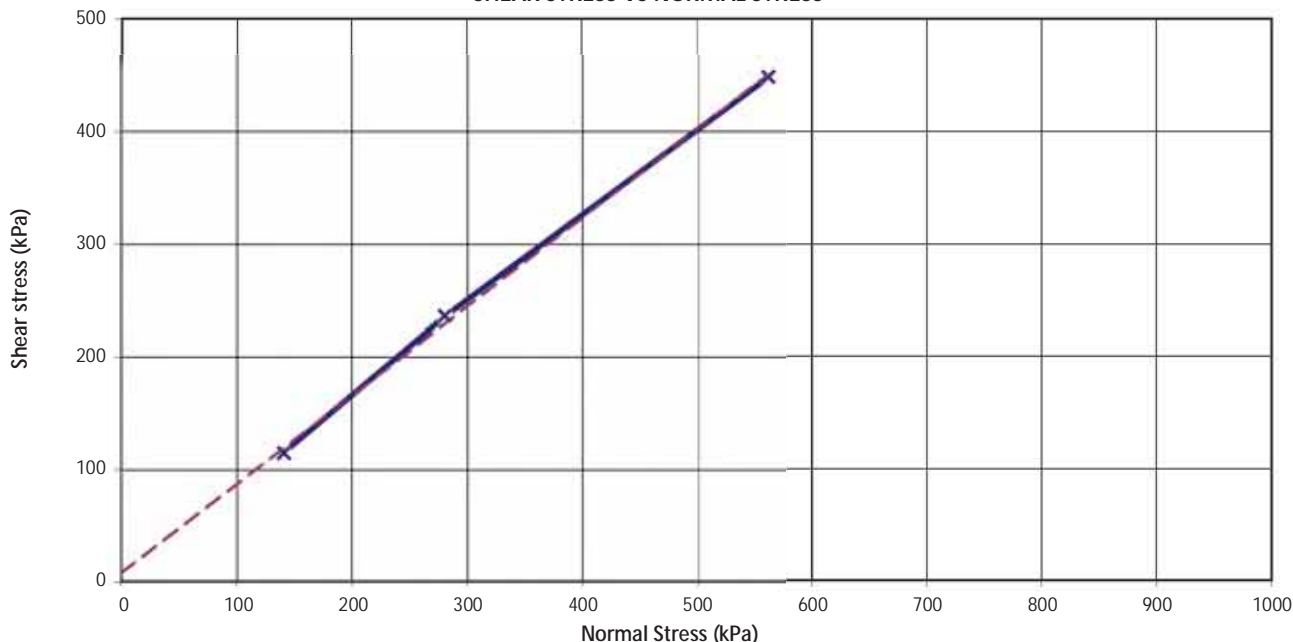
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 New Zealand  
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Geotechnics Project ID: 1100938.0000  
 QESTLab Work Order ID:  
 Customer Project ID: J01662

Site/Location: Muriwai Downs - Gold Project - Muriwai Location ID: MH01  
 Sample Ref.: S4 Depth: 16.3 - 17.4 (m)  
 Test method used: ISO 17892-10:2018 Part 10 Direct shear tests  
 NZS 4402:1986 Test 2.1 Determination of Water Content

**SHEARBOX TEST**

**SHEAR STRESS VS NORMAL STRESS**



**General Sample Parameters**

	Specimen 1		Specimen 2		Specimen 3	
Sample Thickness:	20.95	mm	21.00	mm	20.99	mm
Sample Width:	59.88	mm	59.88	mm	59.88	mm
Initial Water Content:	29.6	%	29.6	%	29.6	%
Initial Bulk Density:	1.84	t/m <sup>3</sup>	1.84	t/m <sup>3</sup>	1.84	t/m <sup>3</sup>
Initial Dry Density:	1.42	t/m <sup>3</sup>	1.42	t/m <sup>3</sup>	1.42	t/m <sup>3</sup>
Final Water Content:	28.1	%	26.7	%	25.3	%

**Test Results**

	Consolidation Stage		Peak Strength		
	Normal Stress (kPa)	Sample Height after Consolidation (mm)	Horizontal Displacement (mm)	Peak Shear Stress (kPa)	Test Speed (mm/min)
Specimen 1	141	20.27	6.54	114.62	0.12
Specimen 2	280	19.73	8.90	235.94	0.12
Specimen 3	561	19.19	7.44	448.46	0.12

**Peak Strength**

Angle of Frictional Resistance:  $\phi' = 38.5^\circ$   
 Cohesion:  $C' = 8 \text{ kPa}$   
 Linear Regression Coefficient:  $r = 0.999$

Sample History: Each specimen was remoulded at natural water content to the target bulk density of 1.835 t/m<sup>3</sup> (18 kN/m<sup>3</sup>).

The test was performed on whole soil.

Soil description: SAND, with trace of silt, loose (disturbed), brown.

Test Remarks: The test was performed in a shear box apparatus, and tested submerged.

Failure for each specimen was determined by either the peak shear stress or the horizontal deformation at around 15% shearbox length.

Shear strength parameters have been derived by using a linear regression fitting method.

Approved Signatory:

Date: 19/10/2021



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Geotechnics Project ID: 1100938.0000  
 QESTLab Work Order ID:  
 Customer Project ID: J01662

Site/Location: Muriwai Downs - Gold Project - Muriwai

Location ID: MH01

Sample Ref.: S4

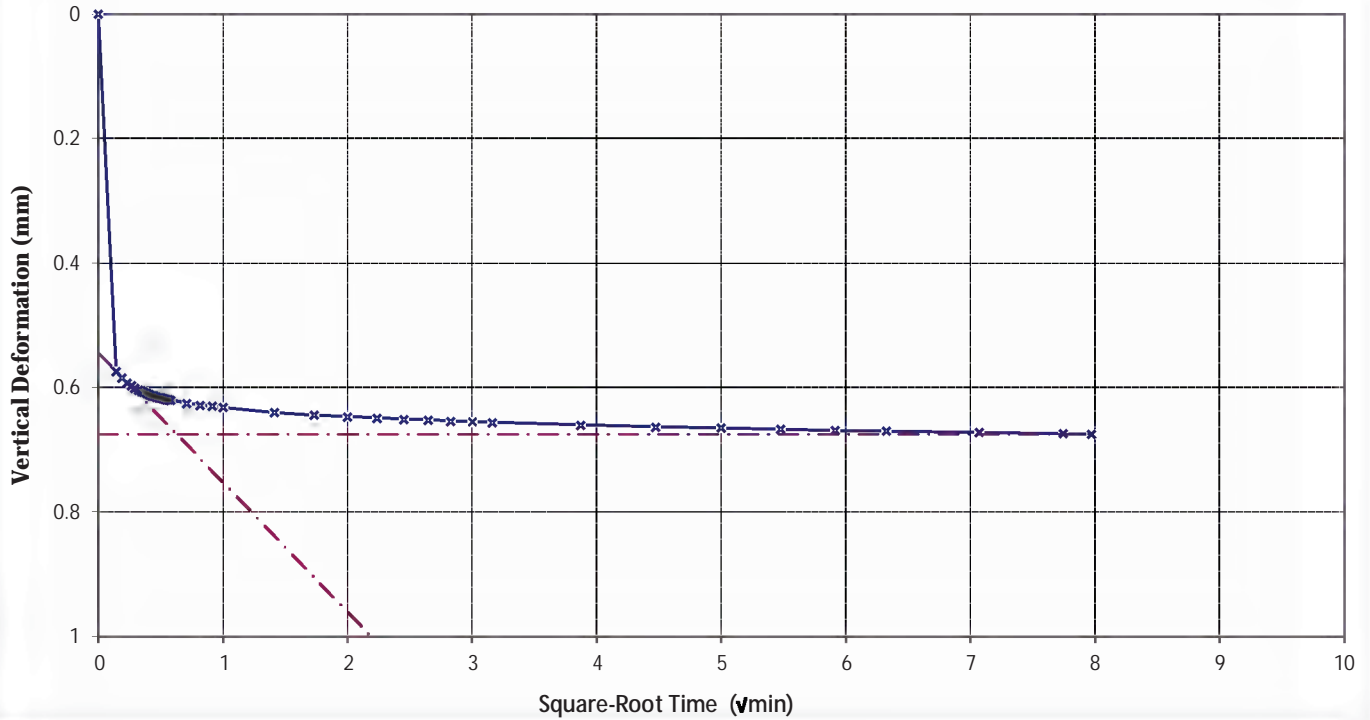
Depth: 16.3 - 17.4 (m)

Test method used: ISO 17892-10:2018 Part 10 Direct shear tests

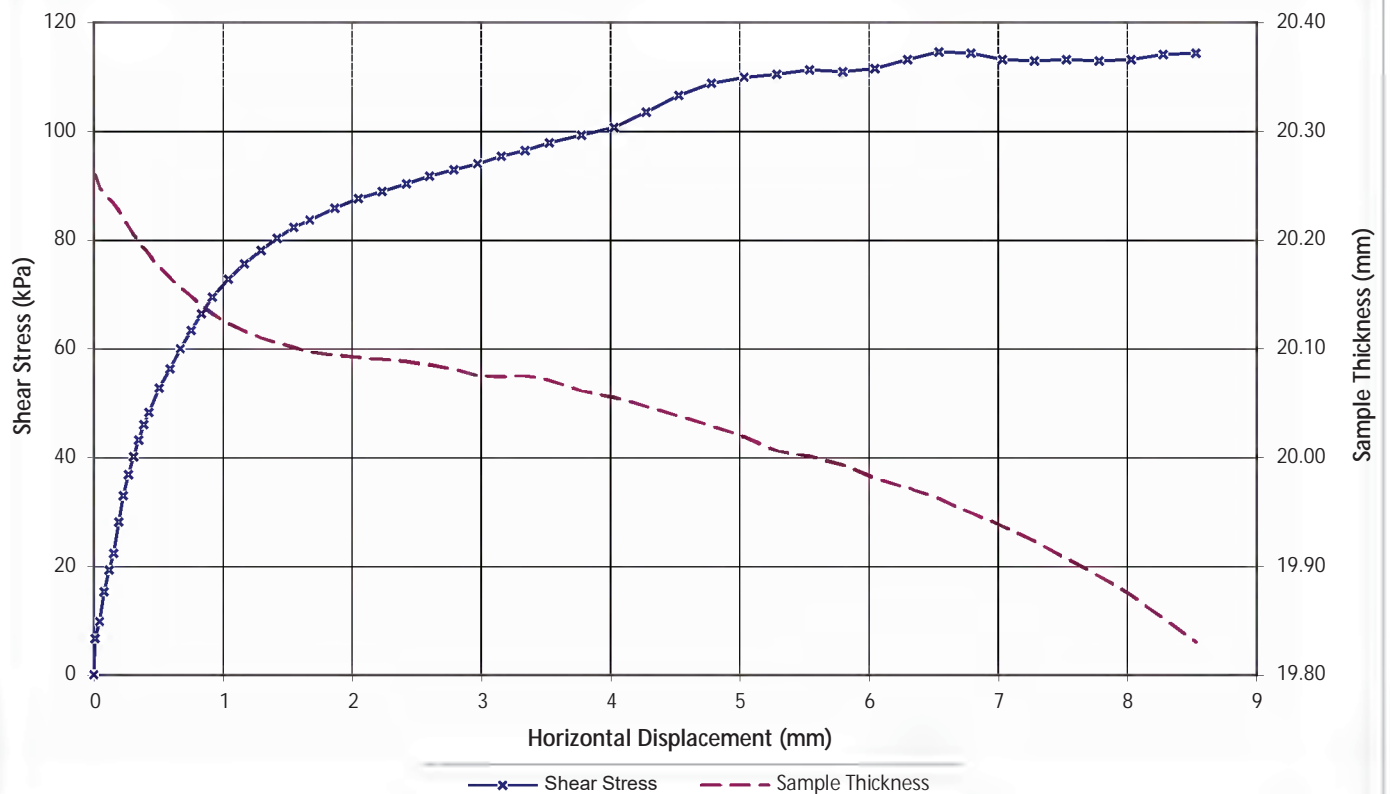
NZS 4402:1986 Test 2.1 Determination of Water Content

**SPECIMEN 1 GRAPHS**

**CONSOLIDATION**



**SHEAR STRESS VS LINEAR DISPLACEMENT**



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Date: 19/10/2021





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 QESTLab Work Order ID:  
 Customer Project ID: J01662

Site/Location: Muriwai Downs - Gold Project - Muriwai

Location ID: MH01

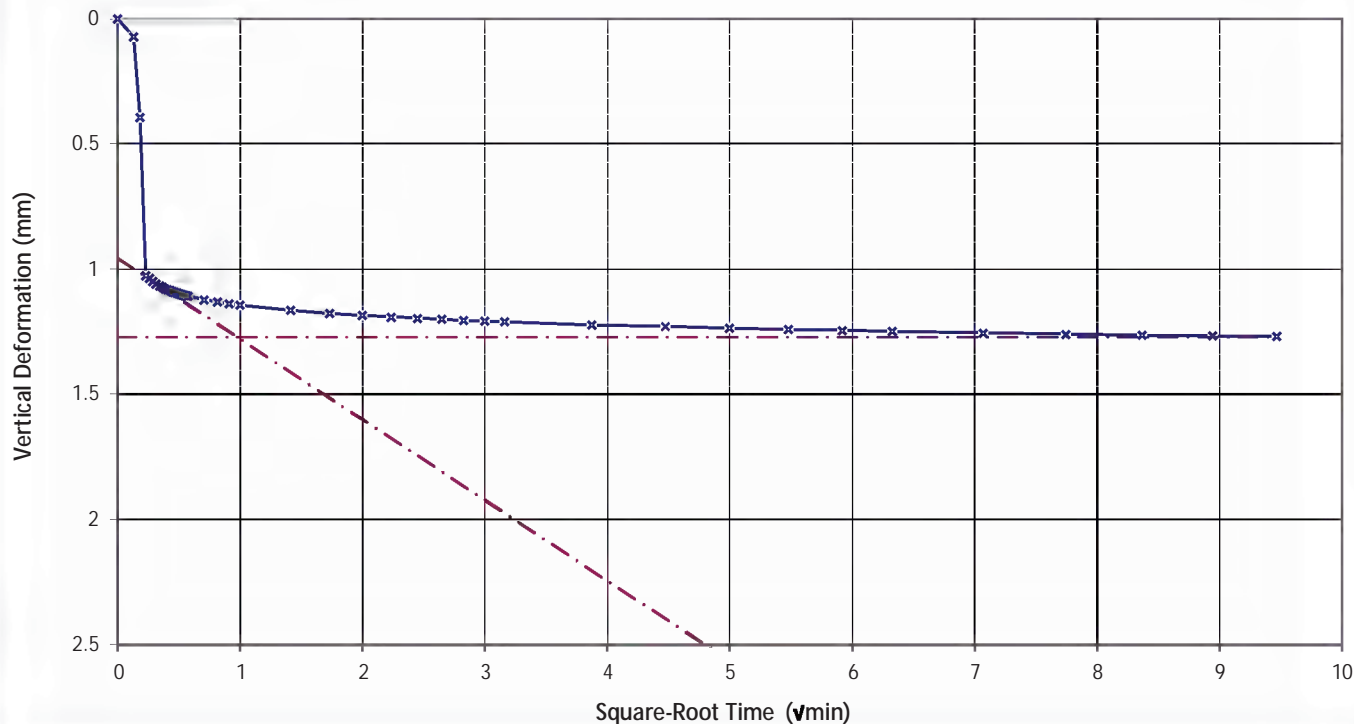
Sample Ref.: S4

Depth: 16.3 - 17.4 (m)

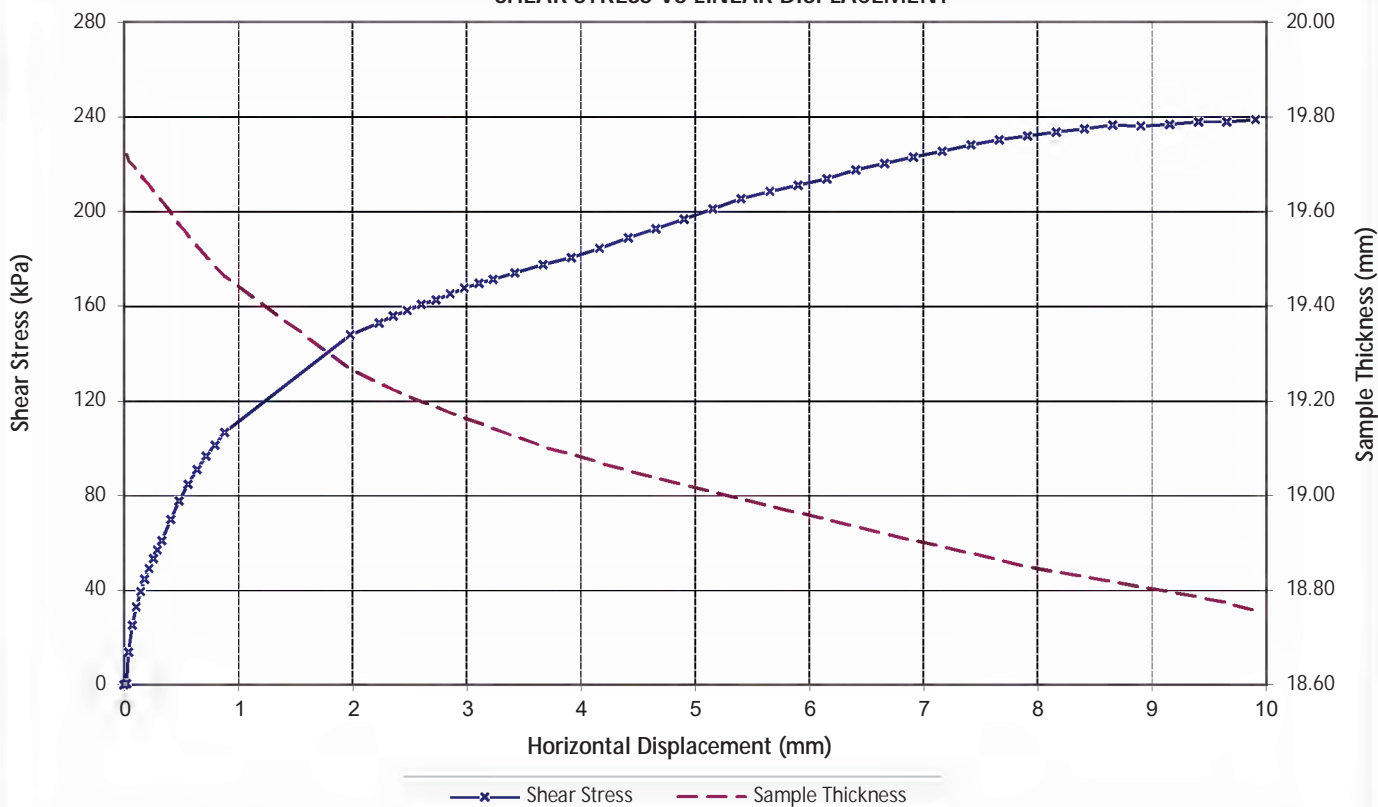
Test method used: ISO 17892-10:2018 Part 10 Direct shear tests  
 NZS 4402:1986 Test 2.1 Determination of Water Content

**SPECIMEN 2 GRAPHS**

**CONSOLIDATION**



**SHEAR STRESS VS LINEAR DISPLACEMENT**



Approved Signatory:

Date: 19/10/2021



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Geotechnics Project ID: 1100938.0000  
 QESTLab Work Order ID:  
 Customer Project ID: J01662

Site/Location: Muriwai Downs - Gold Project - Muriwai

Location ID: MH01

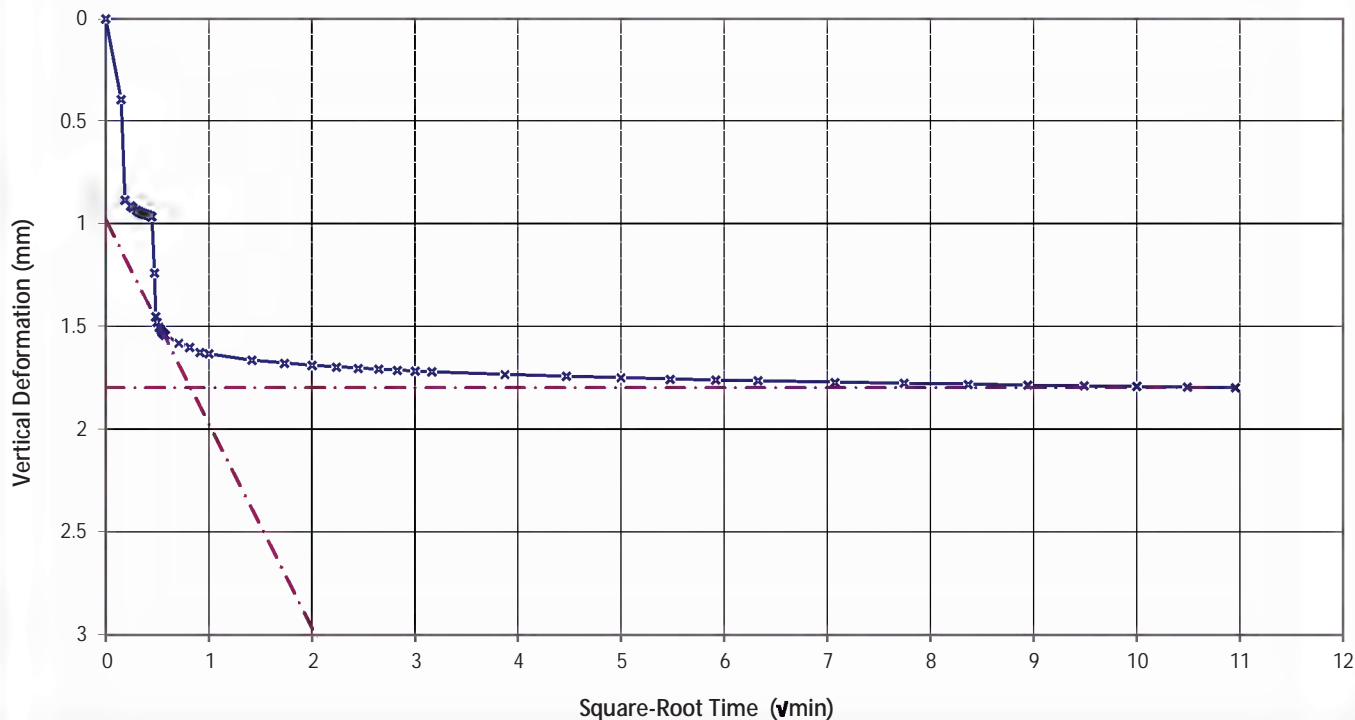
Sample Ref.: S4

Depth: 16.3 - 17.4 (m)

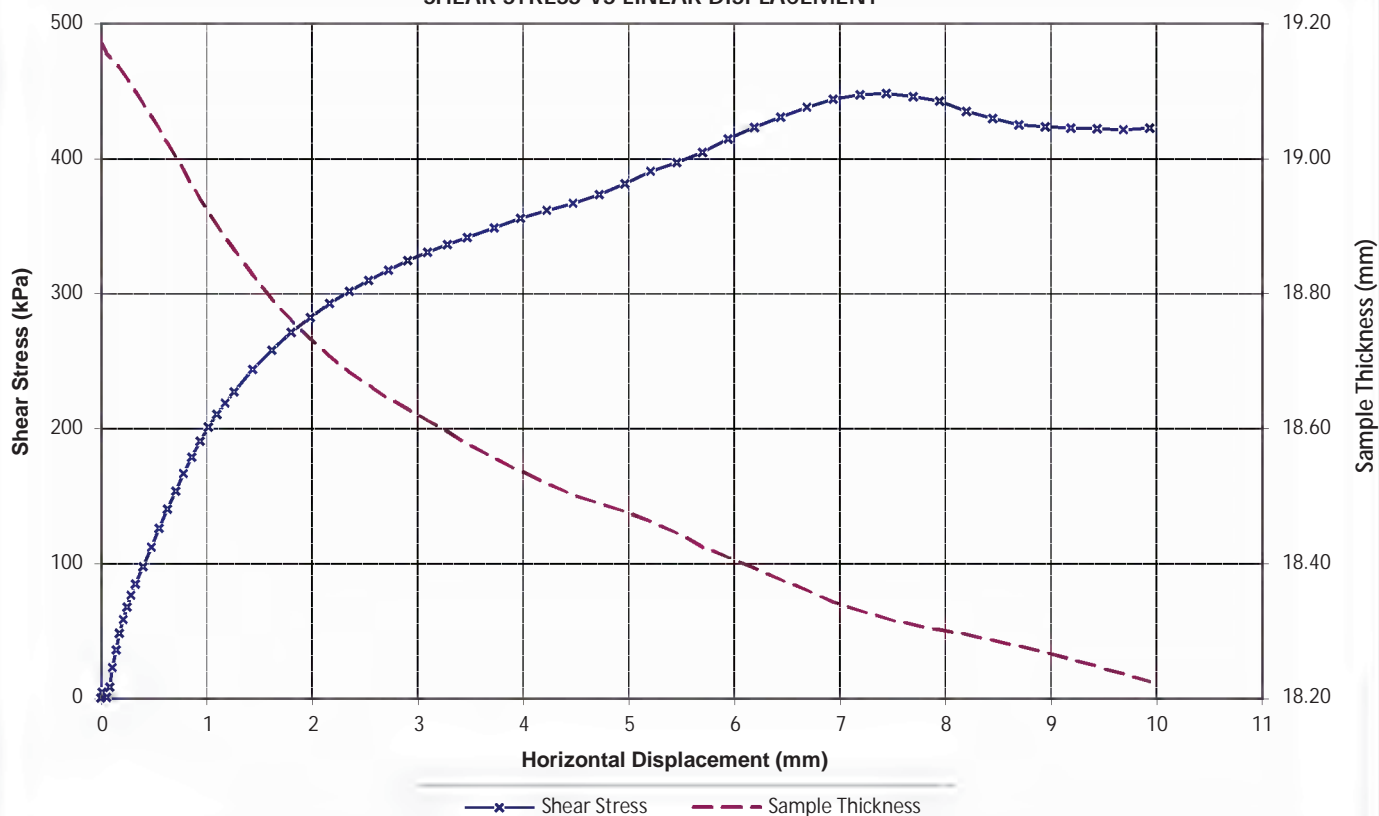
Test method used: ISO 17892-10:2018 Part 10 Direct shear tests  
 NZS 4402:1986 Test 2.1 Determination of Water Content

**SPECIMEN 3 GRAPHS**

**CONSOLIDATION**



**SHEAR STRESS VS LINEAR DISPLACEMENT**

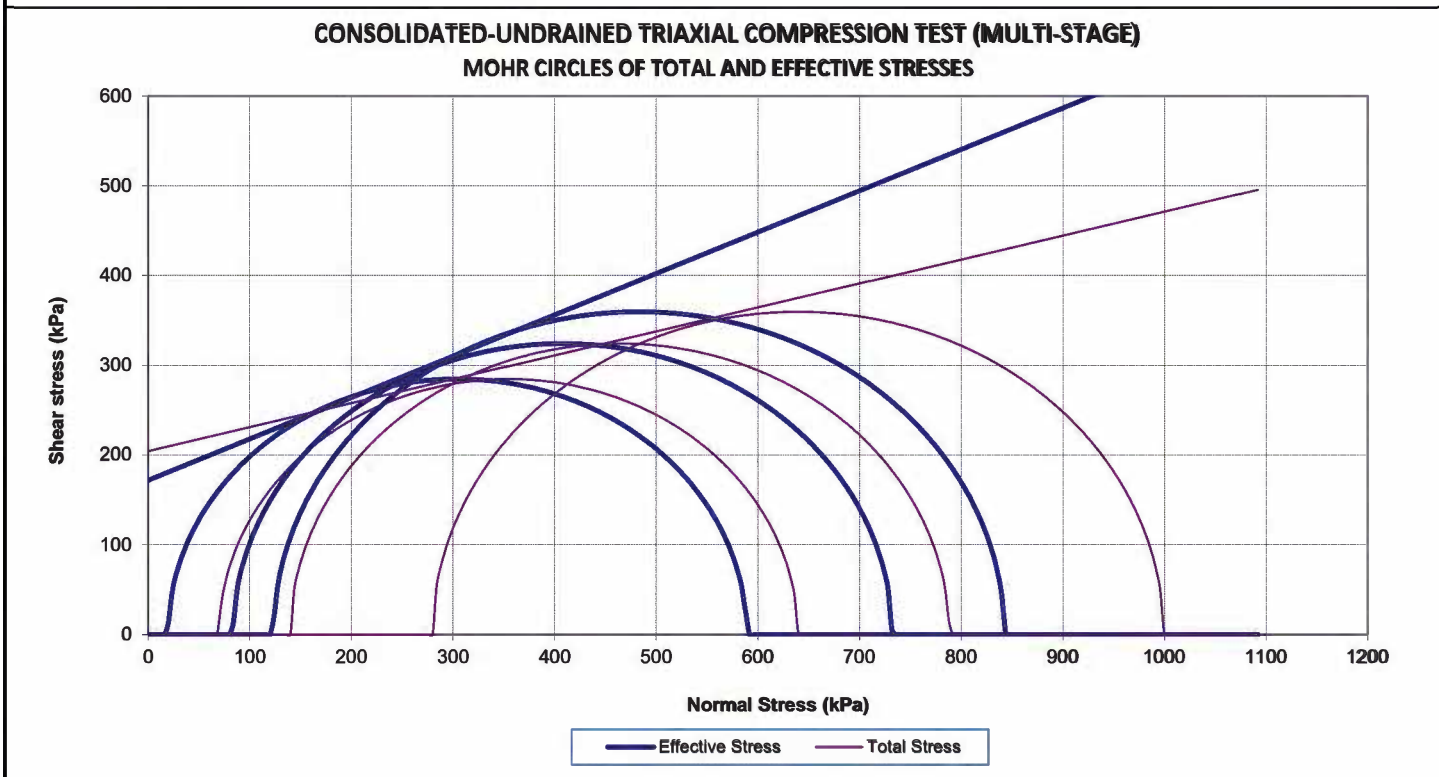


Approved Signatory:


Date: 19/10/2021

 <b>GEOTECHNICS</b>	1 Hill Street Onehunga Auckland New Zealand p. +64 9 356 3510	<b>Geotechnics Project ID:</b> 1100938.0000
		<b>QESTLab Work Order ID:</b>
		<b>Customer Project ID:</b> J01662

<b>Site:</b> Muriwai Downs - Golf Project - Muriwai	<b>Location ID:</b> --
<b>Sample Ref.:</b> S2	<b>Depth:</b> 8.0 - 8.2 (m)
<b>Test method used:</b> ISO 17892-9:2018 Part 9 Isotropic consolidated-undrained triaxial compression test on water saturated soils (CIU) NZS 4402:1986 Test 2.1 Determination of Water Content	



General Sample Parameters					
<b>Initial Sample Height:</b>	125.06	mm	<b>Initial Water Content:</b>	40.1	%
<b>Initial Sample Diameter:</b>	61.71	mm	<b>Initial Bulk Density:</b>	1.51	t/m <sup>3</sup>
<b>Initial B Value:</b>	4	%	<b>Initial Dry Density:</b>	1.08	t/m <sup>3</sup>
<b>B Value before Consolidation:</b>	96	%	<b>Final Water Content:</b>	50.8	%

Test Results												
	At the End of Consolidation Stage					Failure Values						Failure Mode & Photo
	Effective Stress		Back Pressure	Volumetric		Deviator Stress ( $\sigma_v' - \sigma_h'$ ) (kPa)	Vertical Strain $\epsilon$ (%)	Effective Stress		Corrections (kPa)		
	Horizontal $\sigma_h'$ (kPa)	Vertical $\sigma_v'$ (kPa)		Strain (%)	Rate (%/hr)			Vertical $\sigma_v'$ (kPa)	Horizontal $\sigma_h'$ (kPa)	Membrane ( $\Delta\sigma_m$ )	Filter P ( $\Delta\sigma_{fp}$ )	
<b>Stage 1</b>	70	71	400	0.88	0.00	569.38	0.50	589.08	19.70	0.15	1.02	
<b>Stage 2</b>	140	141	400	0.46	0.00	648.35	0.38	732.05	83.70	0.11	0.78	
<b>Stage 3</b>	280	281	400	0.42	0.00	719.24	0.69	842.64	123.40	0.20	1.41	

<b>Angle of Frictional Resistance:</b> $\phi = 15^\circ$	<b>Effective</b> $\phi' = 25^\circ$
<b>Cohesion:</b> $c = 204$ kPa	$c' = 172$ kPa
<b>Linear Regression Coefficient:</b> $r = 0.973$	$r = 0.997$

**Sample History:** Undisturbed core trimmed at natural water content.

**Soil description:** SAND, with minor silt, tightly packed, orangey brown with light grey and black.

**Test Speed:** 0.007 - 0.018 (mm/min)

**Test Remarks:** The sample was saturated by increments of cell pressure and back pressure. It was drained from radial boundary and both ends in the consolidation stages. Failure for each stage was determined by the maximum Deviator stress. Strength parameters have been derived by using a linear regression fitting method.

Approved Signatory:  Date: 30/09/2021

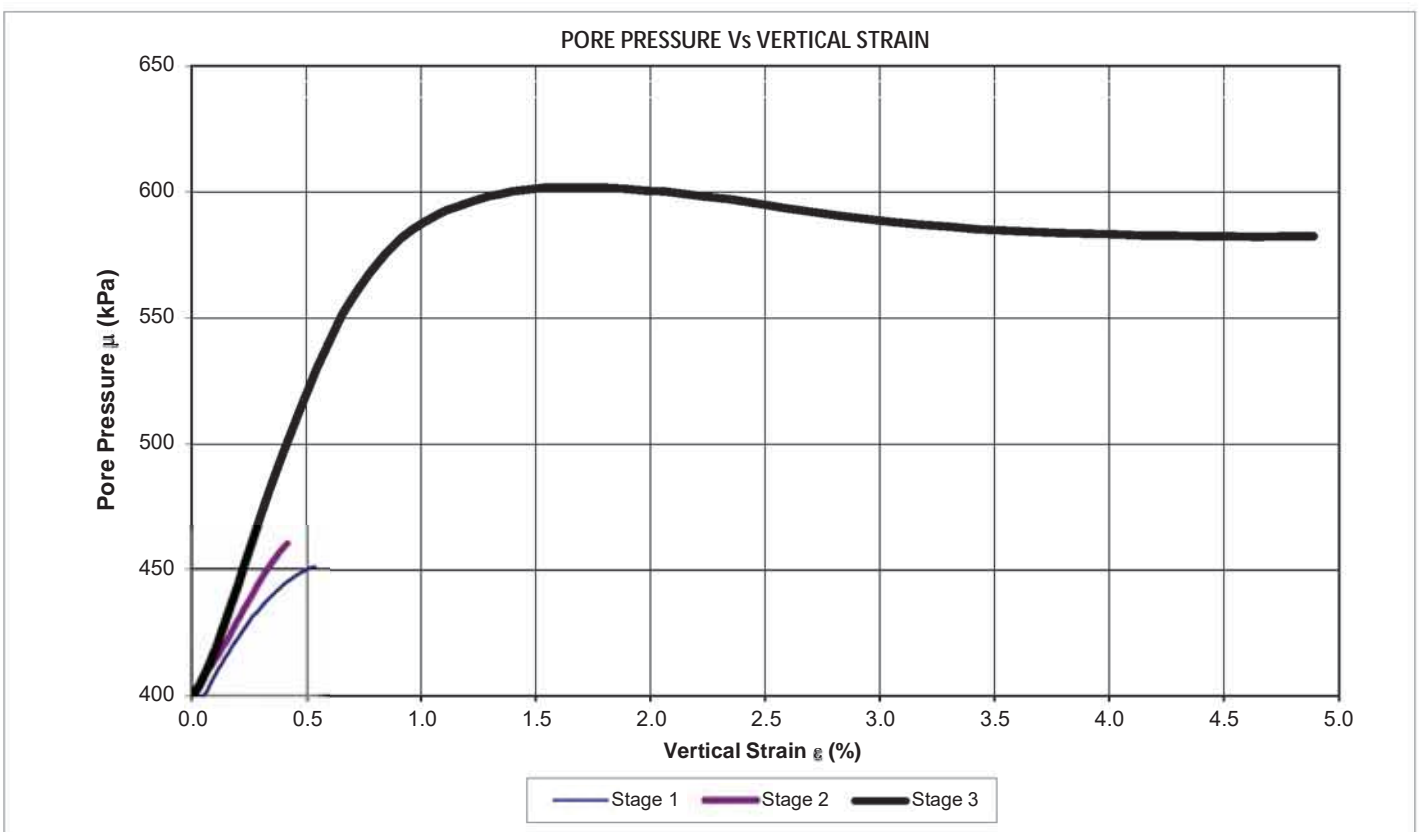
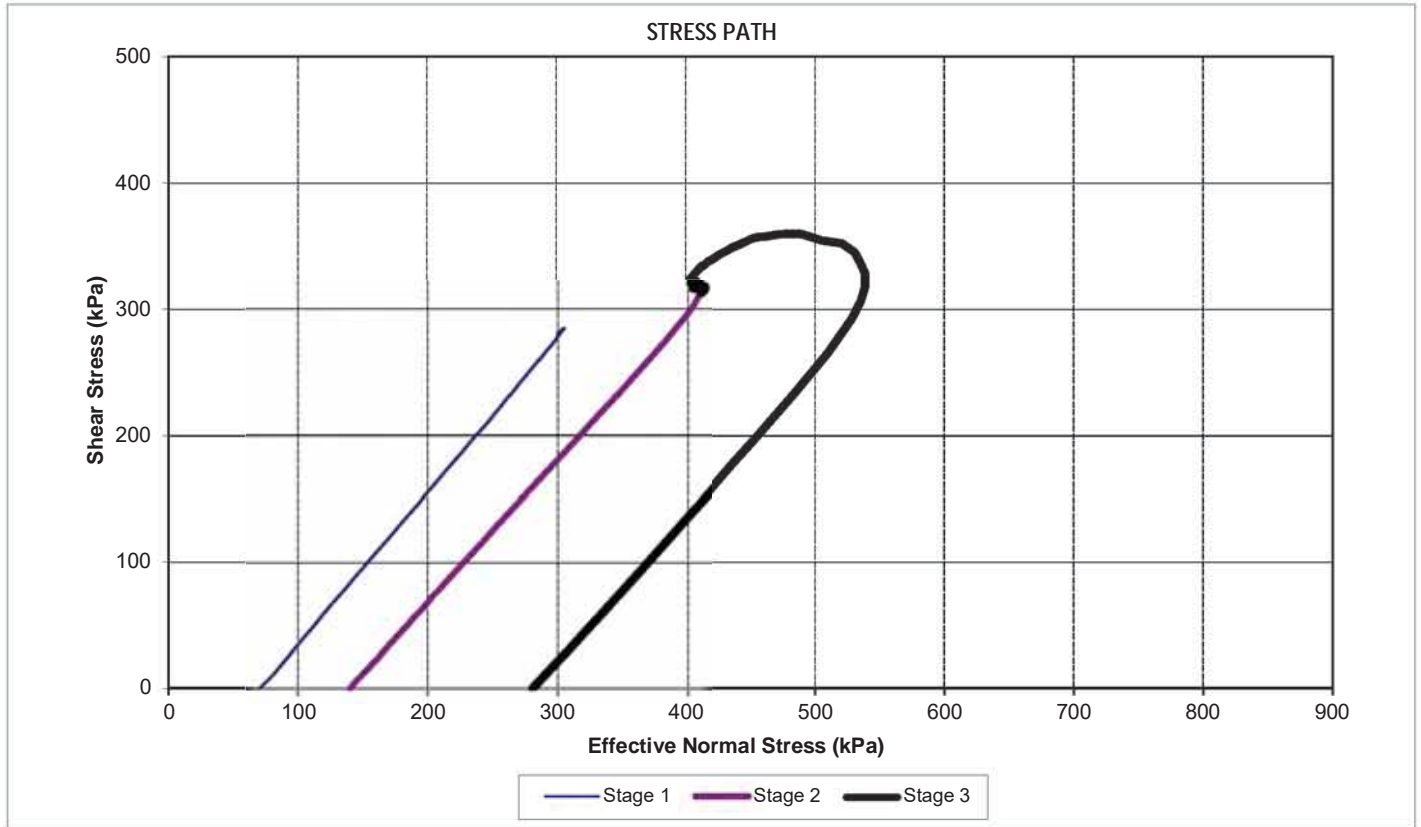


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Geotechnics Project ID: 1100938.0000  
 QESTLab Work Order ID:  
 Customer Project ID: J01662

Site: Muriwai Downs - Golf Project - Muriwai Location ID: --  
 Sample Ref.: S2 Depth: 8.0 - 8.2 (m)  
 Test method used: ISO 17892-9:2018 Part 9 Isotropic consolidated-undrained triaxial compression test on water saturated soils (CIU)  
 NZS 4402:1986 Test 2.1 Determination of Water Content

GRAPHS



Approved Signatory: [Signature]

Date: 30/09/2021



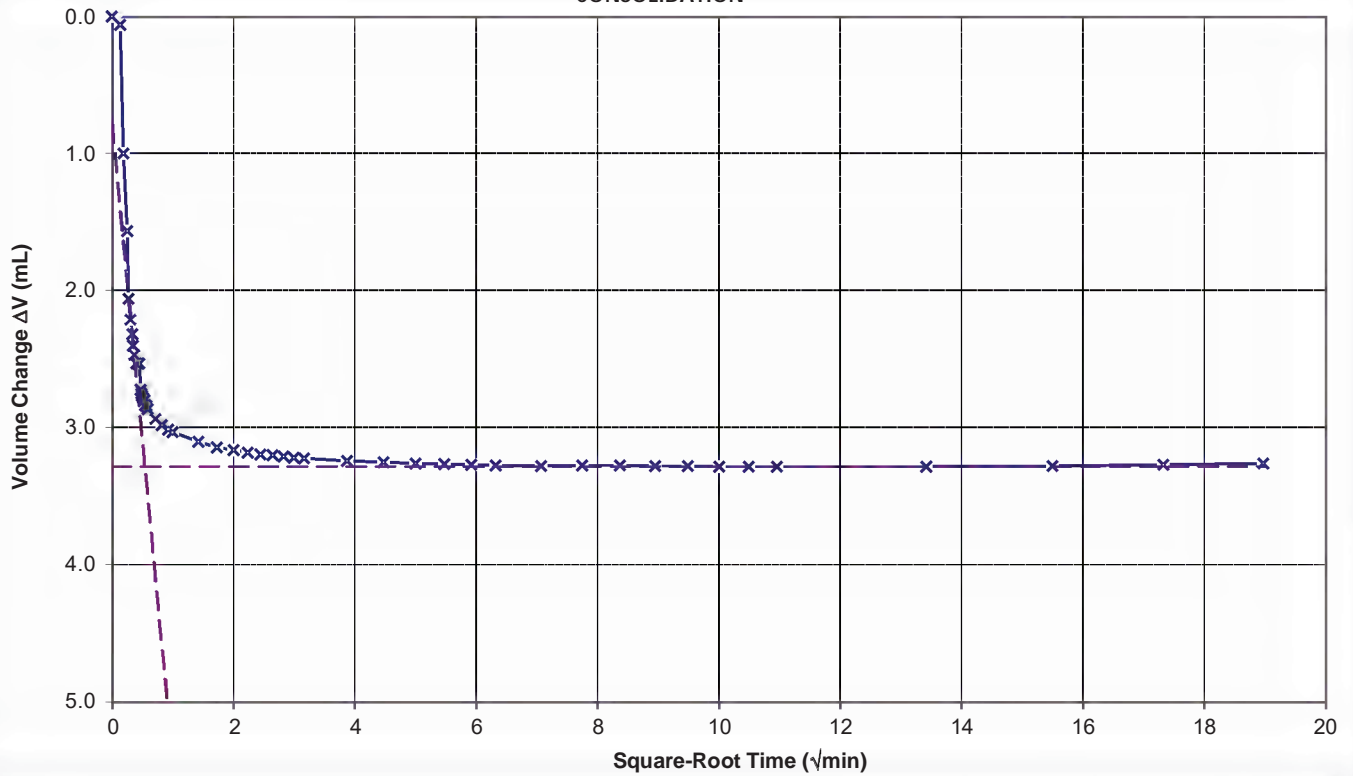
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Geotechnics Project ID: 1100938.0000  
 QESTLab Work Order ID:  
 Customer Project ID: J01662

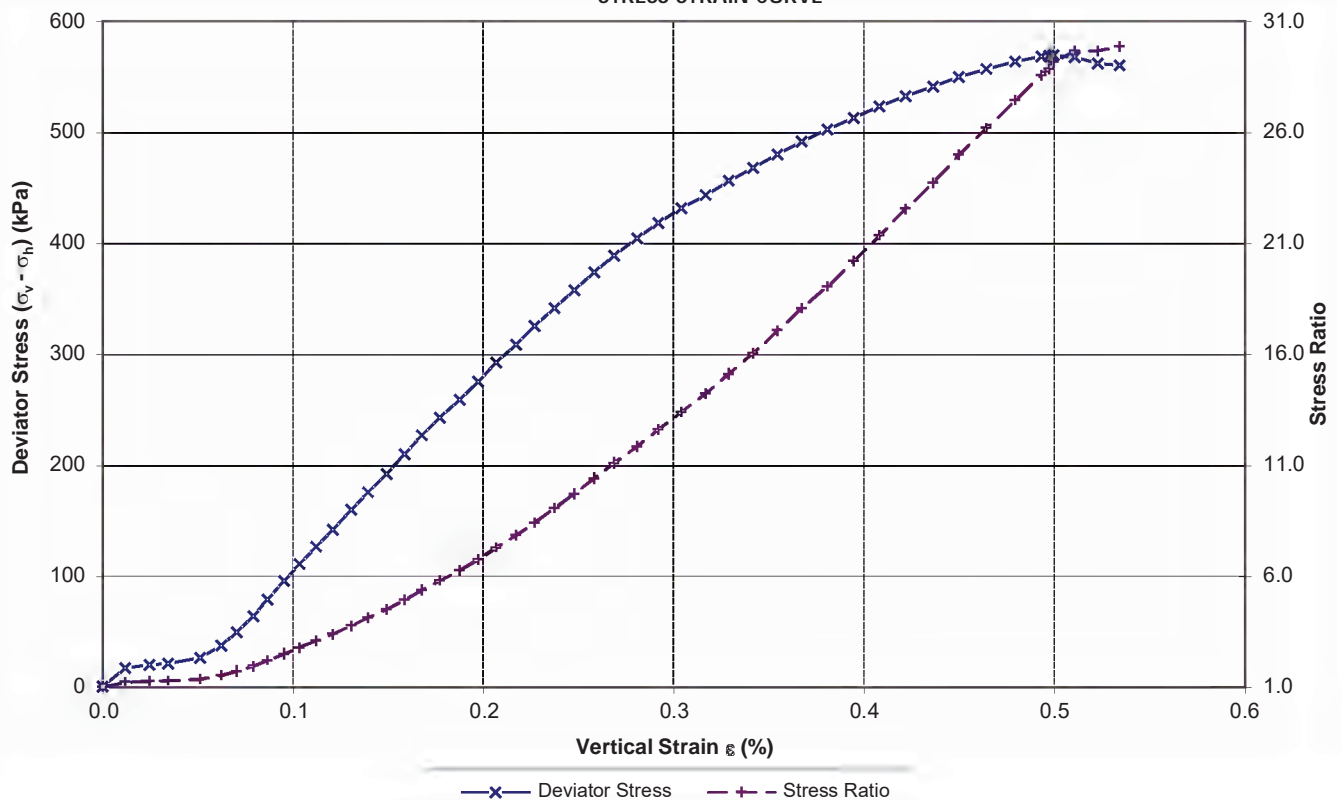
Site: Muriwai Downs - Golf Project - Muriwai Location ID: --  
 Sample Ref.: S2 Depth: 8.0 - 8.2 (m)  
 Test method used: ISO 17892-9:2018 Part 9 Isotropic consolidated-undrained triaxial compression test on water saturated soils (CIU)  
 NZS 4402:1986 Test 2.1 Determination of Water Content

STAGE 1 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



Approved Signatory:

Date: 30/09/2021



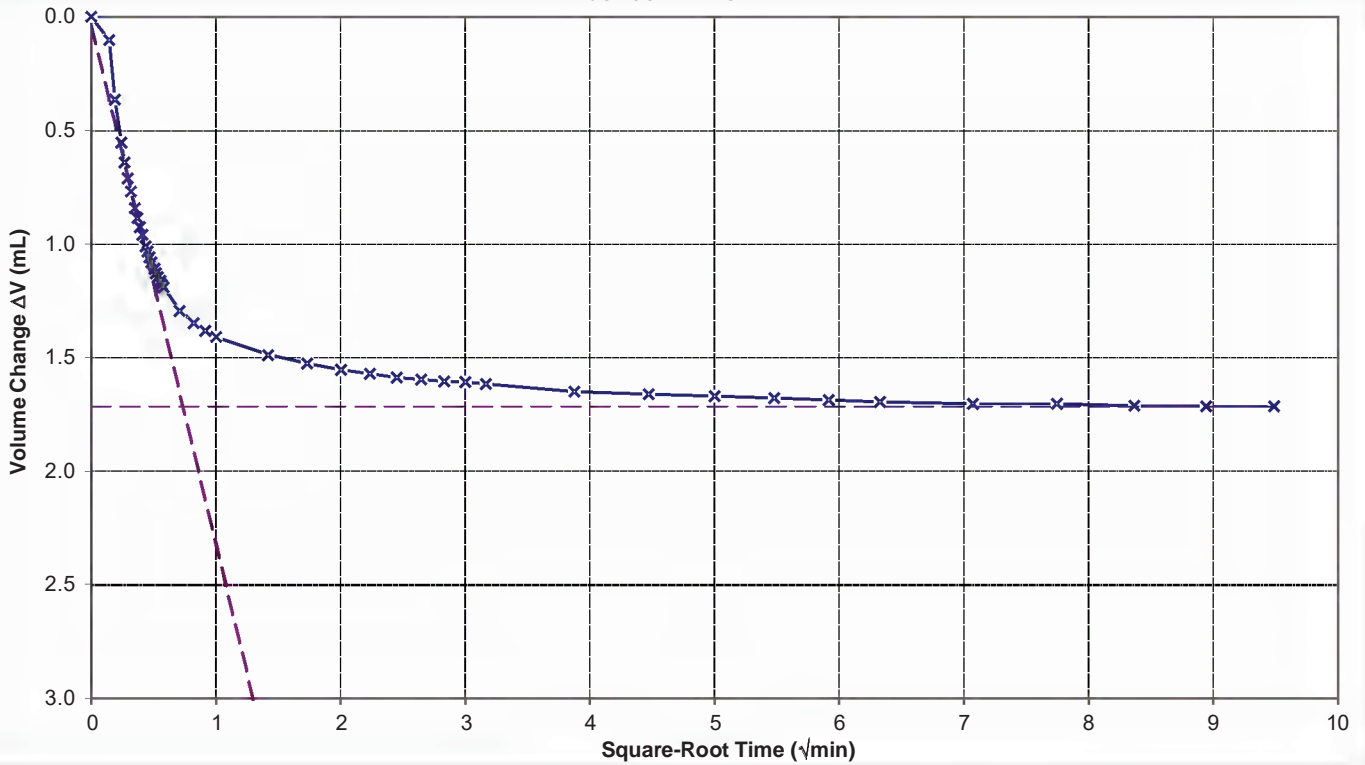
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Geotechnics Project ID: 1100938.0000  
 QESTLab Work Order ID:  
 Customer Project ID: J01662

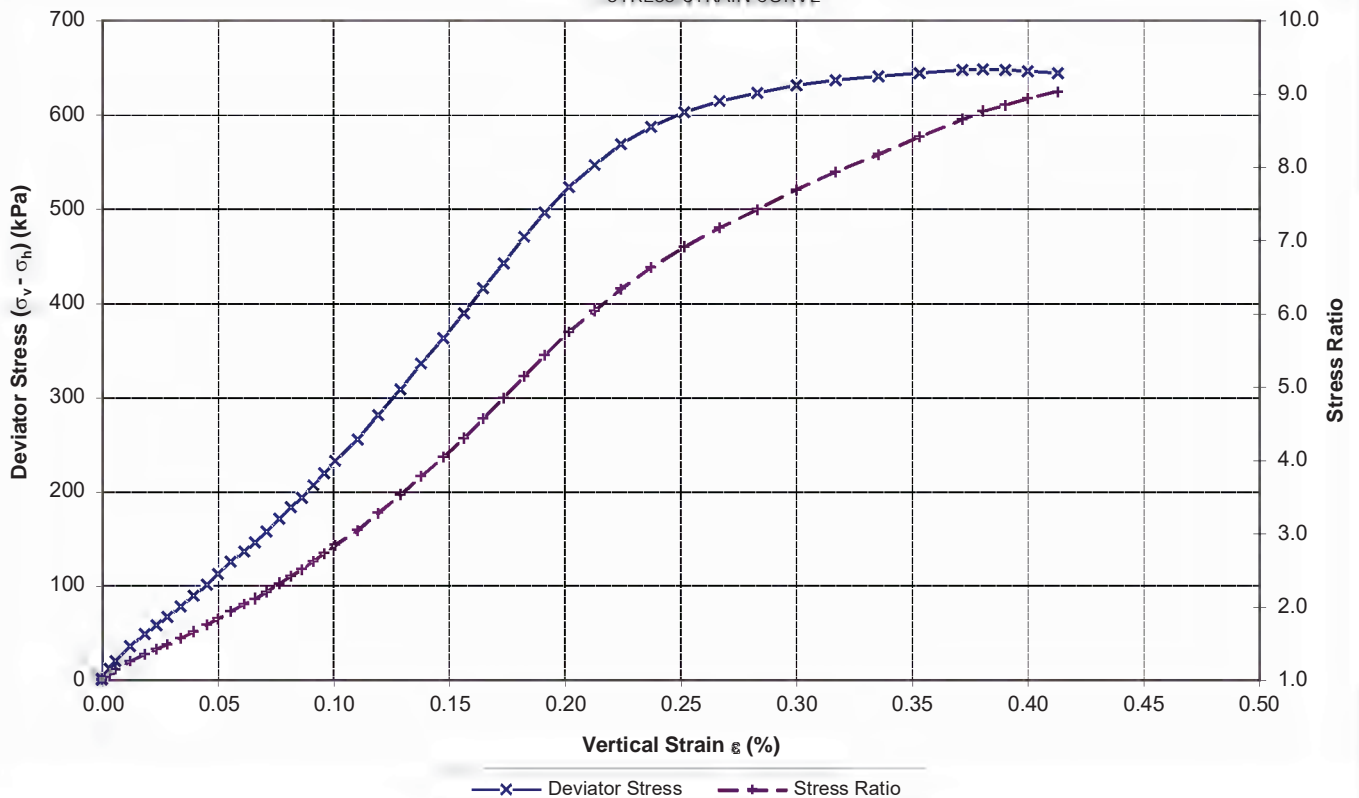
Site: Muriwai Downs - Golf Project - Muriwai Location ID: --  
 Sample Ref.: S2 Depth: 8.0 - 8.2 (m)  
 Test method used: ISO 17892-9:2018 Part 9 Isotropic consolidated-undrained triaxial compression test on water saturated soils (CIU)  
 NZS 4402:1986 Test 2.1 Determination of Water Content

STAGE 2 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



Approved Signatory:

Date: 30/09/2021



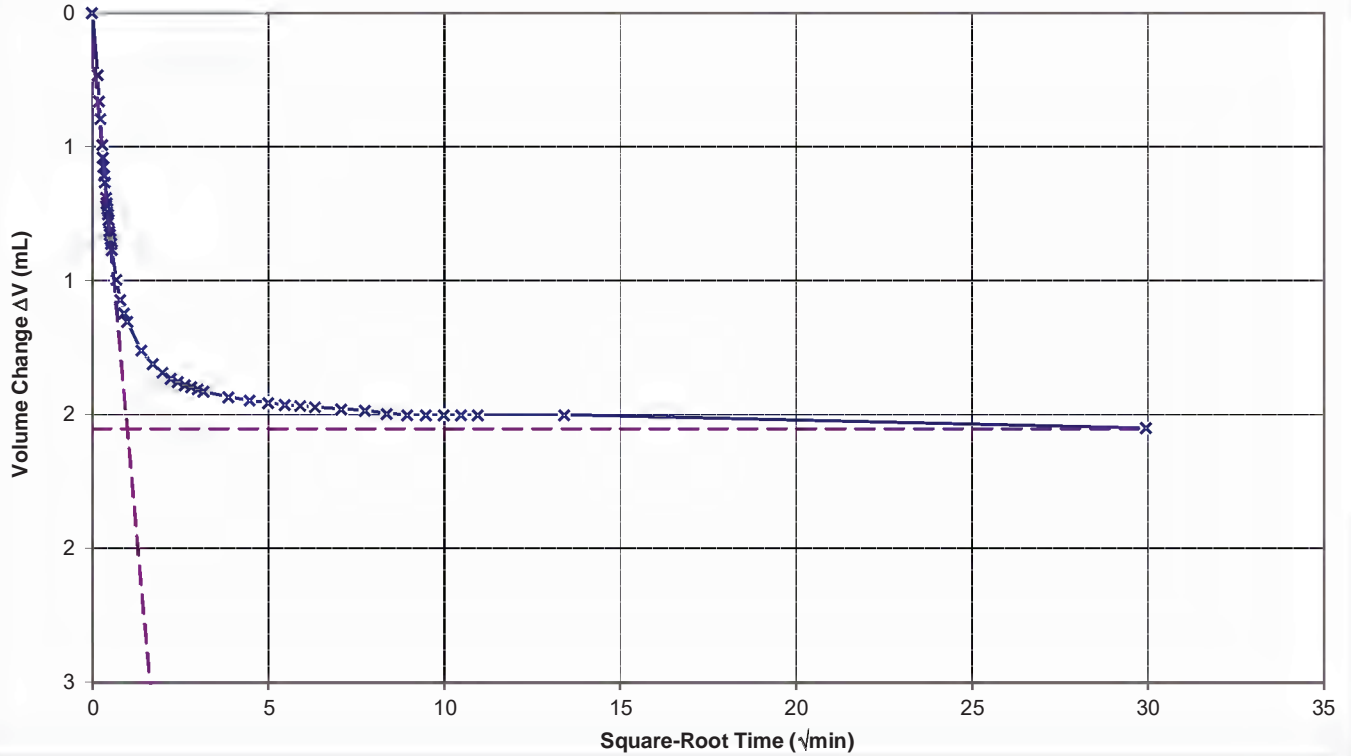
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Geotechnics Project ID: 1100938.0000  
 QESTLab Work Order ID:  
 Customer Project ID: J01662

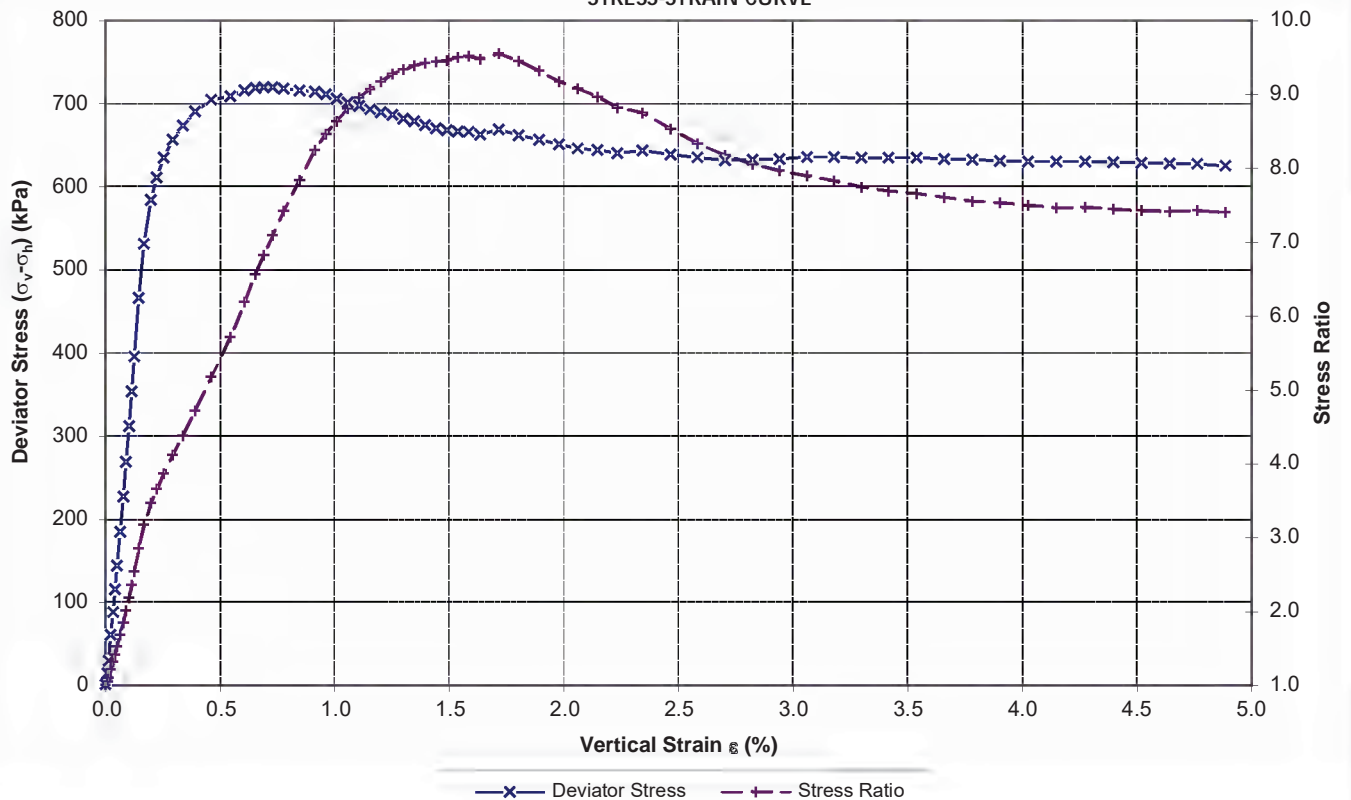
Site: Muriwai Downs - Golf Project - Muriwai Location ID: --  
 Sample Ref.: S2 Depth: 8.0 - 8.2 (m)  
 Test method used: ISO 17892-9:2018 Part 9 Isotropic consolidated-undrained triaxial compression test on water saturated soils (CIU)  
 NZS 4402:1986 Test 2.1 Determination of Water Content

STAGE 3 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



Approved Signatory:

Date: 30/09/2021

# APPENDIX 4:

## FIELD INVESTIGATION DATA



## Machine Borehole Records

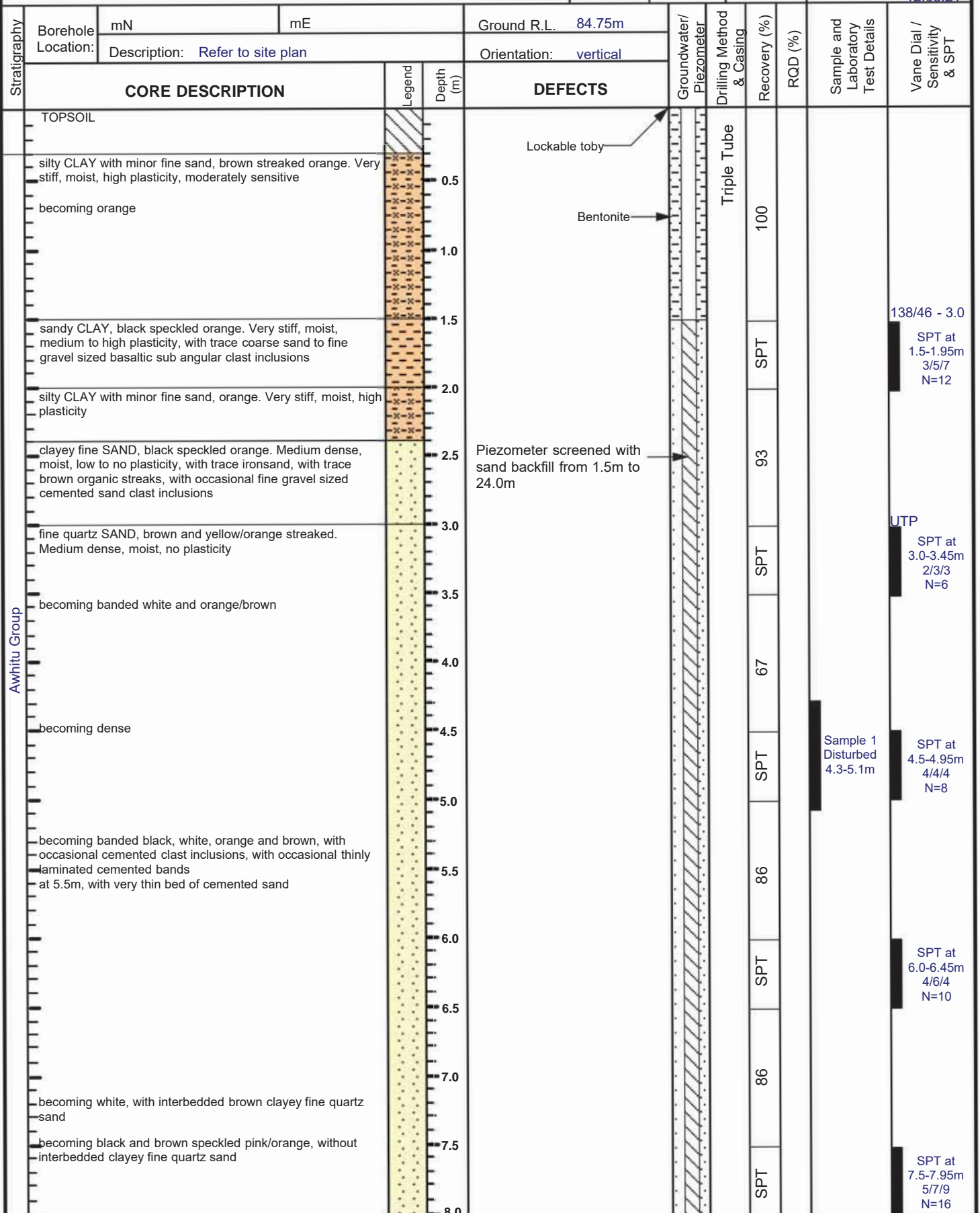
**Client :** THE BEARS HOME PROJECT  
**Project Location :** MANAGEMENT LIMITED  
 MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 01

Sheet 1 of 3

**Job Number:** J01662

Vane Head: 2007  
 Logged By: JL  
 Processor: PL  
 Start Date: 12.08.21  
 Finish Date: 12.08.21



**Comments:**  
 No groundwater measured

Checked: JM

Driller: Pro-Drill      Rig: Tractor

Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic		+++
	water								
	Fill		Gravel		Siltstone		No Core		
Checked:	Clay		Organic		limestone				
	Silt		Pumice		Volcanic				

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 01  
 Sheet 2 of 3

**Job Number:** J01662

Vane Head: 2007  
 Logged By: JL  
 Processor: PL  
 Start Date: 12.08.21  
 Finish Date: 12.08.21

Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	84.75m	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT	
	Description: Refer to site plan			Orientation: vertical								
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS						
Awhitu Group	cemented fine SAND, white, orange and brown streaked. Dense, moist, no plasticity, with occasional laminated to very thin beds of cemented black sand				8.5							Sample 2 Disturbed 8.0-8.2m Sample 3 Disturbed 8.3-8.5m
	fine SAND, black and orange striped white. Dense, moist, no plasticity				9.0	SPT						
	cemented fine SAND, black and orange striped white. Dense, moist, no plasticity				9.5							
	fine SAND, black and orange striped white. Medium dense, moist, no plasticity at 10.0m, becoming red/orange				10.0	100						
	becoming white, dense				10.5	SPT						SPT at 10.5-10.95m 5/7/9 N=16
	becoming black speckled orange				11.0							
	becoming very dense				11.5	95						
	becoming dark orange/brown, with some limonite				12.0	SPT						SPT at 12.0-12.45m 6/10/11 N=21
	becoming black speckled yellow/brown, with trace limonite				12.5							
	becoming black speckled and yellow/brown streaked yellow/orange				13.0	89						
			13.5	SPT						SPT at 13.5-13.95m 6/7/11 N=18		
			14.0									
			14.5	90								
			15.0	SPT						SPT at 15.0-15.45m 5/8/10 N=18		
			15.5									
			16.0	95								



**Comments:**  
 No groundwater measured

Checked: JM

Driller: Pro-Drill      Rig: Tractor

Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	+++
	water							
	Fill		Gravel		Siltstone		No Core	
Checked:	Clay		Organic		Limestone			
	Silt		Pumice		Volcanic			

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 01

Sheet 3 of 3

**Job Number:** J01662

Vane Head: 2007  
 Logged By: JL  
 Processor: PL  
 Start Date: 12.08.21  
 Finish Date: 12.08.21

Stratigraphy	Borehole Location:	mN	mE	Ground R.L. 84.75m		Groundwater/Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT
				Description: Refer to site plan							
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS					
Awhitu Group	becoming dense				16.5			95		Sample 4 Disturbed 16.3-17.4m	SPT at 16.5-16.95m 5/6/10 N=16
					17.0		SPT				
	becoming very dense				17.5			80			SPT at 18.0-18.45m 7/12/11 N=23
	becoming yellow				18.0		SPT				
	interbedded very thin beds of fine SAND, yellow/orange. Medium dense, moist, no plasticity and very thin beds of fine sandy CLAY, orange/brown. Stiff, moist, medium to high plasticity				18.5			100			SPT at 19.5-19.95m 7/9/12 N=21
	interbedded very thin beds of fine SAND, speckled brown, black, orange and white. Medium dense, moist, no plasticity and laminated beds of fine sandy CLAY, brown. Stiff, moist, medium to high plasticity				19.0		SPT				
	fine SAND, speckled brown, black, orange and white. Very dense, moist, no plasticity				19.5			100			SPT at 21.0-21.45m 9/7/11 N=18
	interbedded very thin beds of fine SAND, black speckled orange. Medium dense, moist, no plasticity and laminated beds of fine sandy CLAY, brown. Stiff to very stiff, moist, medium to high plasticity				20.0		SPT				
	with very thin bed of dry cemented sand				20.5			87			SPT at 22.5-22.95m 8/9/10 N=19
	fine SAND, black speckled orange. Very dense, moist, no plasticity				21.0		SPT				
	becoming dense				21.5			88			SPT at 24.0-24.45m 8/8/8 N=16
	EOB at 24.0m. Target Depth				22.0		SPT				
				22.5							
				23.0							
				23.5							
				24.0							



**Comments:**  
 No groundwater encountered

Driller: Pro-Drill      Rig: Tractor

Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	
	water		Gravel		Siltstone		No Core	
Checked:	Clay		Organic		Limestone			
	JM		Silt		Volcanic			



0.0-3.0m



3.0-7.0m



7.0-10.2m



10.2-10.95m



10.95-14.35m



14.35-18.0m



client:

project:

title:

THE BEARS HOME PROJECT MANAGEMENT LIMITED

MURIWAI DOWNS GOLF PROJECT

MH01 Photo Summary - 0.0-18.0m

project no:

J01662

completed:




JM

figure no:

Figure MH01-A

date:

12.08.21

 <p>18.0-21.45m</p>	 <p>21.45-24.45m</p>				<p>client: THE BEARS HOME PROJECT MANAGEMENT LIMITED</p> <p>project: MURIWAI DOWNS GOLF PROJECT</p> <p>title: MH01 Photo Summary - 18.0-21.45m</p>	<p>project no: J01662</p> <p>completed: JM</p> <p>figure no: Figure MH01-B</p> <p>date: 12.08.21</p>
--	--	--	--	---	--	--

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT  
**Job Number:** J01662

**Machine Borehole No.** MH 02

Sheet 1 of 2

Vane Head: Logged By: Processor : Start Date: 22.09.21  
 JL AH Finish Date: 22.09.21

Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT																																		
	Description: Refer to site plan			Orientation: vertical																																								
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS																																						
Awhitu Group	BENTONITE					Lockable toby Bentonite Piezometer screened with sand backfill from 1.5m to 15.0m Triple Tube	91	SPT	100	SPT	SPT at 1.5-1.95m 1/1/4 N=5																																	
	TOPSOIL											0.5	SPT	100	SPT	SPT at 3.0-3.45m 2/2/3 N=5																												
	sandy CLAY, dark orange/brown. Very stiff, moist, medium plasticity											1.0					SPT	100	SPT	SPT at 4.5-4.95m 5/6/7 N=13																								
	clayey fine SAND, orange. Medium dense, moist, no to low plasticity											1.5									SPT	100	SPT	SPT at 6.0-6.45m 7/10/10 N=20																				
	with thin bed of hardened limonite band becoming pink/orange											2.0													SPT	100	SPT	SPT at 7.5-7.95m 7/9/10 N=19																
	fine sandy CLAY, dark orange/brown. Very stiff, moist, medium plasticity, with occasional fine gravel size cemented sandy clasts, with hardened limonite											2.5																	SPT	100	SPT													
	at 2.5m, becoming slightly fine sandy CLAY, high plasticity											3.0																					SPT	100	SPT									
	becoming fine sandy CLAY, medium plasticity											3.5																									SPT	100	SPT					
	with thin bed fine sand											4.0																													SPT	100	SPT	
	fine SAND, orange speckled black. Medium dense, moist, no plasticity											4.5																																
becoming light yellow/orange and black speckled				5.0	SPT	100	SPT																																					
becoming grey/yellow, with occasional dark orange bands				5.5					SPT	100	SPT																																	
				6.0									SPT	100	SPT																													
				6.5													SPT	100	SPT																									
				7.0																	SPT	100	SPT																					
				7.5																					SPT	100	SPT																	
				8.0																									SPT	100	SPT													



**Comments:**

Driller: Pro-Drill      Rig: Tractor

Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic		+++
	water								
Checked:	Fill		Gravel		Siltstone		No Core		
	Clay		Organic		limestone				
	Silt		Pumice		Volcanic				

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 02

Sheet 2 of 2

**Job Number:** J01662

Vane Head:   
 Logged By: JL   
 Processor: AH   
 Start Date: 22.09.21   
 Finish Date: 22.09.21

Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT			
	Description: Refer to site plan			Orientation: vertical									
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS							
Awhitu Group	becoming dark orange, with limonite staining, minor hardening				Legend	8.5			Triple Tube	86	SPT	86	
	becoming black specked grey/yellow, with occasional dark orange bands					9.0				SPT			
	with very thin grey/brown organic stained band					9.5	Groundwater level as measured on 4/10/21: 9.7m			100			
	EOMB at 15.0m. Target Depth.					10.0				SPT			
						10.5				100			
						11.0				SPT			
						11.5				100			
						12.0				SPT			
						12.5				81			
						13.0				SPT			
				13.5			98						
				14.0			SPT						
				14.5			98						
				15.0			SPT						
				15.5			98						
				16.0			SPT						

SPT at 9.0-9.45m  
7/10/12  
N=22

SPT at 10.5-10.95m  
6/7/10  
N=17

SPT at 12.0-12.45m  
6/7/11  
N=18

SPT at 13.5-13.95m  
7/11/14  
N=25

SPT at 15.0-15.45m  
10/13/17  
N=30



**Comments:**

Driller: Pro-Drill      Rig: Tractor

Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	
	water							
Checked:	Fill		Gravel		Siltstone		No Core	
	Clay		Organic		limestone			
	Silt		Pumice		Volcanic			



			<p>client: THE BEARS HOME PROJECT MANAGEMENT LIMITED</p>	<p>project no: J01662</p>	<p>figure no: Figure MH02</p>
			<p>project: MURIWAI DOWNS GOLF PROJECT</p>	<p>completed: JM</p>	<p>date: 22.09.21</p>
			<p>title: MH02 Photo Summary - 0.0-15.0m</p>		

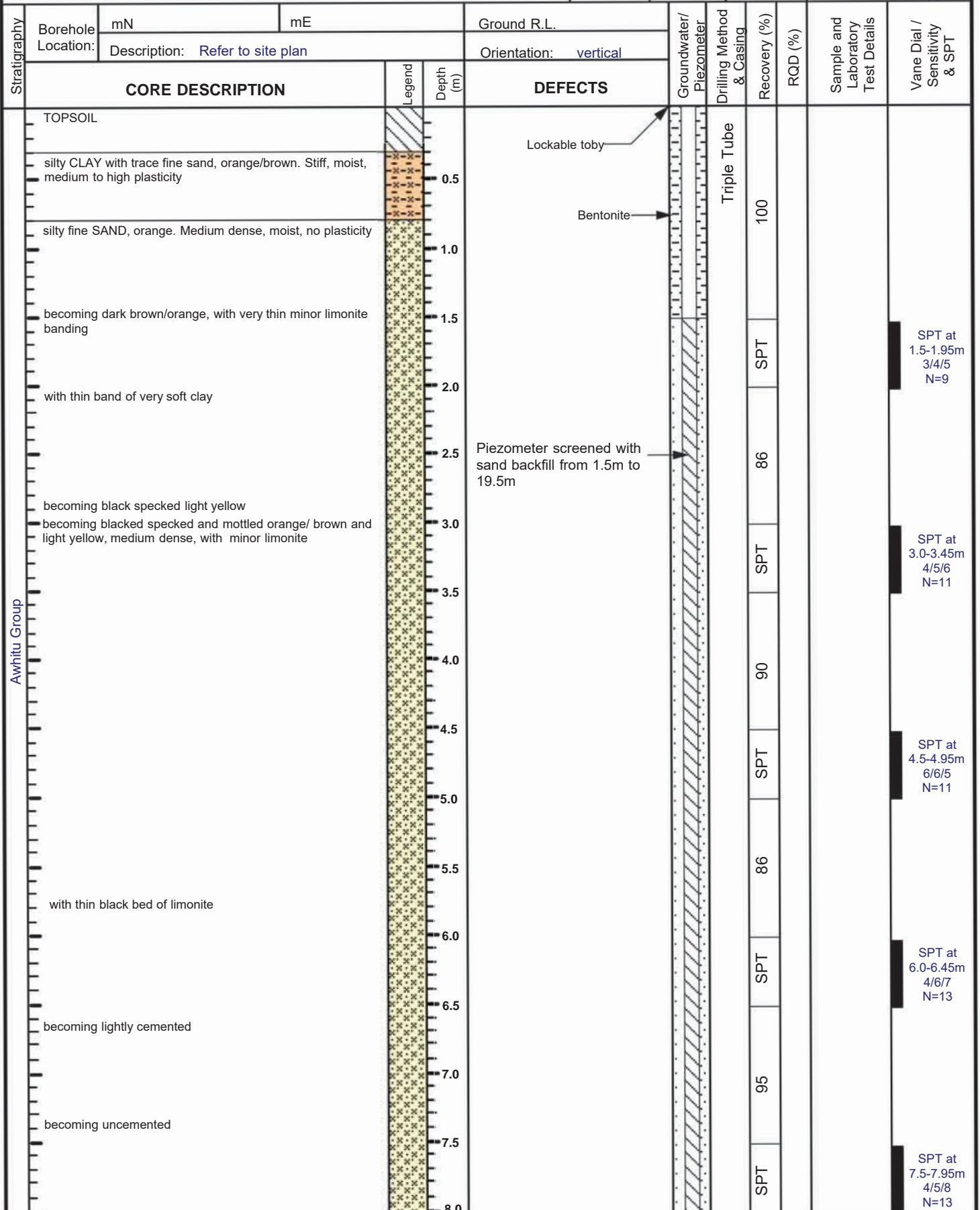
**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 03

Sheet 1 of 3

**Job Number:** J01662

Vane Head: Logged By: Processor : Start Date: 24.09.21  
 JL AH Finish Date: 24.09.21



**Comments:**  
 No groundwater measured

Driller: Pro-Drill      Rig: Tractor

Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	
	water							
Checked:	Fill		Gravel		Siltstone		No Core	
	Clay		Organic		limestone			
PL	Silt		Pumice		Volcanic			

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MANAGEMENT LIMITED  
 MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 03

Sheet 2 of 3

**Job Number:** J01662

Vane Head: Logged By: Processor : Start Date: 24.09.21  
 JL AH Finish Date: 24.09.21

Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT	
	Description: Refer to site plan			Orientation: vertical							
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS					
Awhitu Group	becoming cemented				8.5						
					9.0						
	becoming uncemented				9.5						SPT at 9.0-9.45m 2/5/8 N=13
					10.0						
	becoming cemented				10.5						
					11.0						
	becoming uncemented				11.5						
					12.0						
	becoming cemented				12.5						SPT at 12-12.45m 5/9/12 N=21
					13.0						
	becoming uncemented				13.5						
					14.0						
			14.5								
			15.0								
			15.5								
			16.0						SPT at 15-15.45m 5/7/8 N=15		



**Comments:**  
 No groundwater measured

Checked: PL

Driller: Pro-Drill      Rig: Tractor

Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	
	water							
	Fill		Gravel		Siltstone		No Core	
	Clay		Organic		limestone			
	Silt		Pumice		Volcanic			

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MANAGEMENT LIMITED  
MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 03

Sheet 3 of 3

**Job Number:** J01662

Vane Head: \_\_\_\_\_ Logged By: JL Processor: AH  
Start Date: 24.09.21  
Finish Date: 24.09.21








Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT
	Description: Refer to site plan			Orientation: vertical						
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS				
Awhitu Group					[Green cross-hatch pattern]	16.5		100		SPT at 16.5-16.95m 4/6/8 N=14
							SPT			
						17.0				SPT at 18-18.45m 5/8/9 N=17
							SPT			
						17.5		86		SPT at 19.5-19.95m 5/7/11 N=18
							SPT			
						18.0				SPT at 19.5-19.95m 5/7/11 N=18
							SPT			
						18.5				SPT at 19.5-19.95m 5/7/11 N=18
							SPT			
19.0		86		SPT at 19.5-19.95m 5/7/11 N=18						
	SPT									
19.5	EOB at 19.5m. Target depth.									
20.0										
20.5										
21.0										
21.5										
22.0										
22.5										
23.0										
23.5										
24.0										



**Comments:**  
No groundwater measured

Checked: PL  
Driller: Pro-Drill Rig: Tractor

Drilling Fluid:	Topsoil	[Diagonal lines]	Sand	[Dotted]	Sandstone	[Stippled]	Plutonic	++++
	water							
	Fill	[Diagonal lines]	Gravel	[Dotted]	Siltstone	[Stippled]	No Core	
Checked:	Clay	[Horizontal lines]	Organic	[Cross-hatch]	Limestone	[Stippled]		
	Silt	[X pattern]	Pumice	[Diamond pattern]	Volcanic	[Stippled]		

						
		client:	THE BEARS HOME PROJECT MANAGEMENT LIMITED			
project:		MURIWAI DOWNS GOLF PROJECT				
title:		MH03 Photo Summary - 0.0-20.0m				
project no:		J01662		figure no:		
completed:		JM		date:		
				24.09.21		

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT


**Machine Borehole No.** MH 04

Sheet 1 of 2

**Job Number:** J01662

Vane Head: 2007  
 Logged By: AH  
 Processor: AH  
 Start Date: 22.09.21  
 Finish Date: 22.09.21

Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT	
	Description: Refer to site plan			Orientation:							
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS					
	TOPSOIL				0.0 - 0.5	Lockable toby					
	clayey SILT with trace fine sand, orange/brown. Firm, moist, medium plasticity				0.5 - 1.5	Bentonite			87		
	becoming black speckled light orange/brown becoming low plasticity				1.5 - 2.0				SPT	SPT at 1.5-1.95m 0/1/2 N=3	
	silty SAND, dark red/brown black streaks. Loose, moist, no plasticity, with minor fine to medium gravel with moderately thin bed of black organic inclusions				2.0 - 2.5	Piezometer screened with sand backfill from 1.5m to 15.0m			100		
	with black carboneous inclusions				2.5 - 3.0				SPT	SPT at 3.0-3.45m 2/4/4 N=8	
	becoming black speckled dark red/brown, without gravel becoming light yellow/brown				3.0 - 3.5				100		
	becoming black speckled orange/brown mottled grey				3.5 - 4.0				SPT	SPT at 4.5-4.95m 2/3/4 N=7	
	becoming light grey/brown with moderately thin bed of black speckled dark red/brown				4.0 - 4.5				100		
	becoming light grey/brown becoming black speckled dark red/brown				4.5 - 5.0				SPT	SPT at 6.0-6.45m 3/6/10 N=16	
	becoming medium dense				5.0 - 5.5				100		
	becoming light grey/brown				5.5 - 6.0				SPT		
	becoming orange/brown mottled red				6.0 - 6.5				96		
					6.5 - 7.0				SPT	SPT at 7.5-7.95m 5/7/9 N=16	
					7.0 - 7.5						
					7.5 - 8.0						



**Comments:**

Driller: Drill-Force      Rig: SLG

Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	
	water		Gravel		Siltstone		No Core	
Checked:	Clay		Organic		limestone			
PL	Silt		Pumice		volcanic			

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 04

Sheet 2 of 2

**Job Number:** J01662

Vane Head: 2007  
 Logged By: AH  
 Processor: AH  
 Start Date: 22.09.21  
 Finish Date: 22.09.21

Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT		
	Description: Refer to site plan			Orientation: vertical								
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS						
Awhitu Group	becoming light grey mottled orange					8.5			Triple Tube	100		
	with moderately thin bed of black speckled orange/brown											
	becoming light orange/grey											
	becoming black speckled orange/black streaked red/brown											
	at 9.0m, becoming loose											
	becoming black speckled grey mottled orange											
	with thin bed of orange/brown											
	becoming dark orange/brown											
	becoming medium dense											
	CLAY, grey/purple. Very stiff, moist, high plasticity											
	silty SAND, grey. Loose, moist, no plasticity											
	SAND, grey mottled orange. Medium dense, moist, no plasticity											
	silty SAND, blue/grey streaked light grey/brown. Medium dense, wet, medium plasticity											
	becoming yellow/brown and black/grey specked light grey/brown											
	becoming grey/brown, no plasticity											
becoming light brown specked light grey												
with trace limonite												
EOB at 15.0m. Target depth.												
				15.5								
				16.0								

SPT at 9.0-9.45m  
2/3/4  
N=7

SPT at 10.5-10.95  
4/4/7  
N=11

SPT at 12.0-12.45  
5/7/9  
N=16

SPT at 13.5-13.95  
4/6/7  
N=13






SPT at 15.0-15.5m  
6/9/11  
N=20



**Comments:**

Driller: Drill-Force      Rig: SLG

Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	
	water							
Checked:	Fill		Gravel		Siltstone		No Core	
	Clay		Organic		limestone			
	Silt		Pumice		Volcanic			

					<p>client: THE BEARS HOME PROJECT MANAGEMENT LIMITED</p> <p>project: MURIWAI DOWNS GOLF PROJECT</p> <p>title: MH04 Photo Summary - 0.0-15.0m</p>	<p>figure no: J01662</p> <p>date: JM</p> <p>04.10.21</p>
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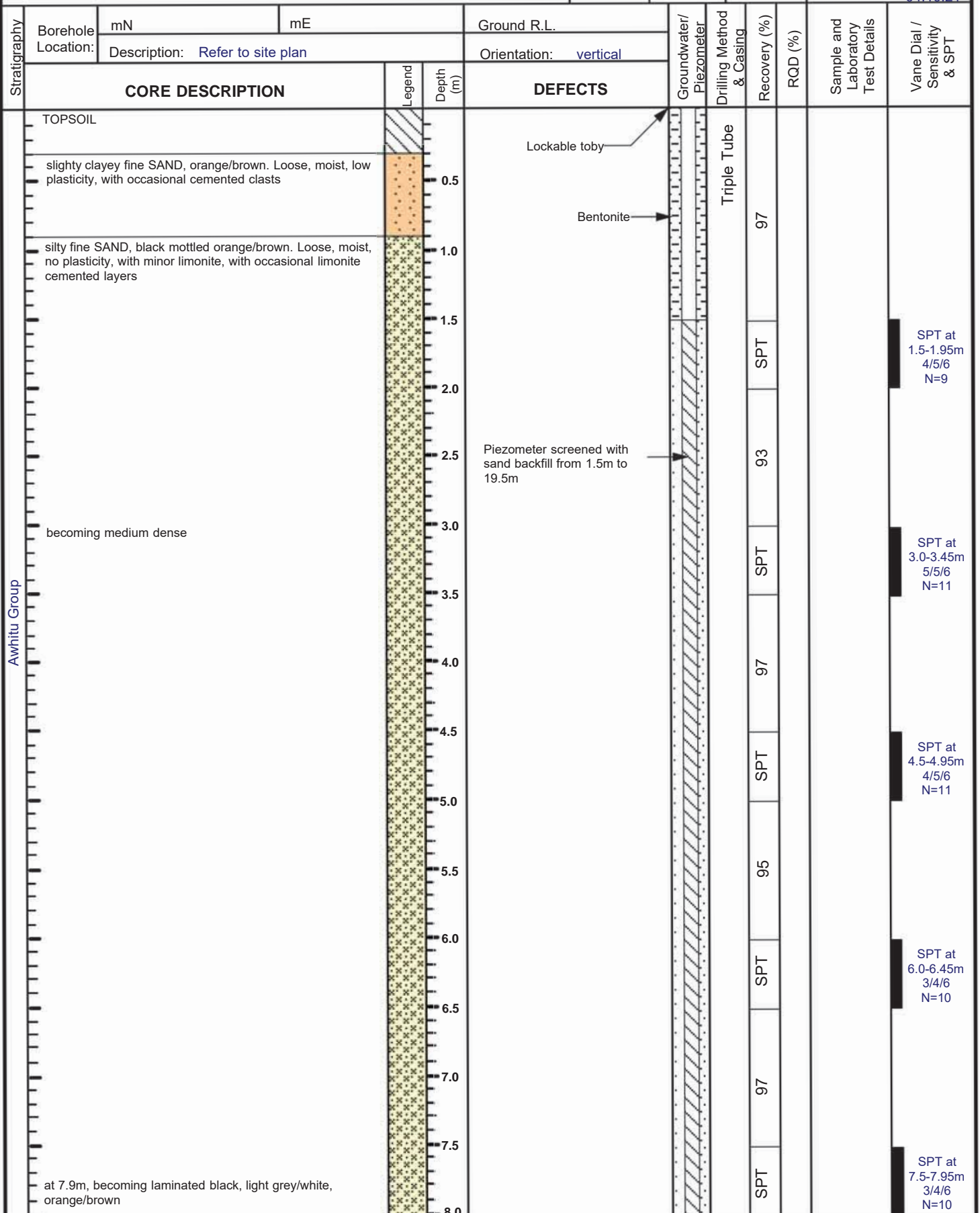
**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 05

Sheet 1 of 3

**Job Number:** J01662

Vane Head: Logged By: Processor : Start Date: 04.10.21  
 JL AH Finish Date: 04.10.21



**Comments:**

Driller: Pro-Drill Rig: SLG

Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	+++
	water							
Checked:	Fill		Gravel		Siltstone		No Core	
	PL		Organic		limestone			
	Silt		Pumice		volcanic			

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 05

Sheet 2 of 3

**Job Number:** J01662

Vane Head: \_\_\_\_\_ Logged By: JL Processor: AH  
 Start Date: 04.10.21  
 Finish Date: 04.10.21

Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT				
	Description: Refer to site plan			Orientation: vertical										
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS								
Awhitu Group	with steeply inclined laminated black speckled light orange and grey/white, orange/brown				[Pattern]	[Pattern]	Triple Tube	110			SPT at 9.0-9.45m 4/5/6 N=11			
												SPT	SPT at 10.5-10.95m 5/6/6 N=12	
												97		
												SPT		
												95		
												SPT		
												97		
												SPT		
												99		
												SPT		
												94		SPT at 13.5-13.95m 2/5/6 N=11
														SPT at 15-15.45m 3/4/7 N=11
					Groundwater measured on 4/10/21: 15.6m									



**Comments:**

Driller: Pro-Drill Rig: SLG

Drilling Fluid:	Topsoil	[Pattern]	Sand	[Pattern]	Sandstone	[Pattern]	Plutonic	+++
	water							
Checked:	Fill	[Pattern]	Gravel	[Pattern]	Siltstone	[Pattern]	No Core	
	Clay	[Pattern]	Organic	[Pattern]	limestone	[Pattern]		
PL	Silt	[Pattern]	Pumice	[Pattern]	Volcanic	[Pattern]		

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MANAGEMENT LIMITED  
 MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 05  
 Sheet 3 of 3

**Job Number:** J01662

Vane Head: \_\_\_\_\_ Logged By: JL Processor: AH  
 Start Date: 04.10.21  
 Finish Date: 04.10.21

Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT
	Description: Refer to site plan			Orientation: vertical						
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS				
Awhitu Group	slightly silty CLAY, light blue/grey. Very stiff, moist, high plasticity			[Pattern]	16.5					
	silty CLAY, striped orange and light blue/grey. Hard, moist, medium plasticity, flaky texture becoming blue/grey mottled dark orange/brown			[Pattern]	17.0					
	silty fine SAND, yellow/grey. Medium dense, moist, no plasticity with thin bed limonite becoming orange/brown			[Pattern]	17.5					
	EOB at 19.5. Target dpeth.			[Pattern]	18.0					
				[Pattern]	18.5					
				[Pattern]	19.0					
				[Pattern]	19.5					
				[Pattern]	20.0					
				[Pattern]	20.5					
				[Pattern]	21.0					
			[Pattern]	21.5						
			[Pattern]	22.0						
			[Pattern]	22.5						
			[Pattern]	23.0						
			[Pattern]	23.5						
			[Pattern]	24.0						

SPT at 16.5-16.95m  
6/2/3  
N=5

SPT at 18-18.45m  
3/4/4  
N=8


SPT at 19.5-19.95m  
3/5/8  
N=13



**Comments:**

Driller: Pro-Drill Rig: SLG

Drilling Fluid:	Topsoil	[Pattern]	Sand	[Pattern]	Sandstone	[Pattern]	Plutonic	+++
	water	[Pattern]	Gravel	[Pattern]	Siltstone	[Pattern]	No Core	
Checked:	Clay	[Pattern]	Organic	[Pattern]	Limestone	[Pattern]		
PL	Silt	[Pattern]	Pumice	[Pattern]	Volcanic	[Pattern]		

		
		
<p>client: THE BEARS HOME PROJECT MANAGEMENT LIMITED</p>		
<p>project: MURIWAI DOWNS GOLF PROJECT</p>		
<p>title: MH05 Photo Summary - 0.0-20.0m</p>		
<p>figure no: J01662</p>	<p>project no: J01662</p>	<p>figure no: Figure MH05</p>
<p>date: 04.10.21</p>	<p>completed: JM</p>	<p>date: 04.10.21</p>



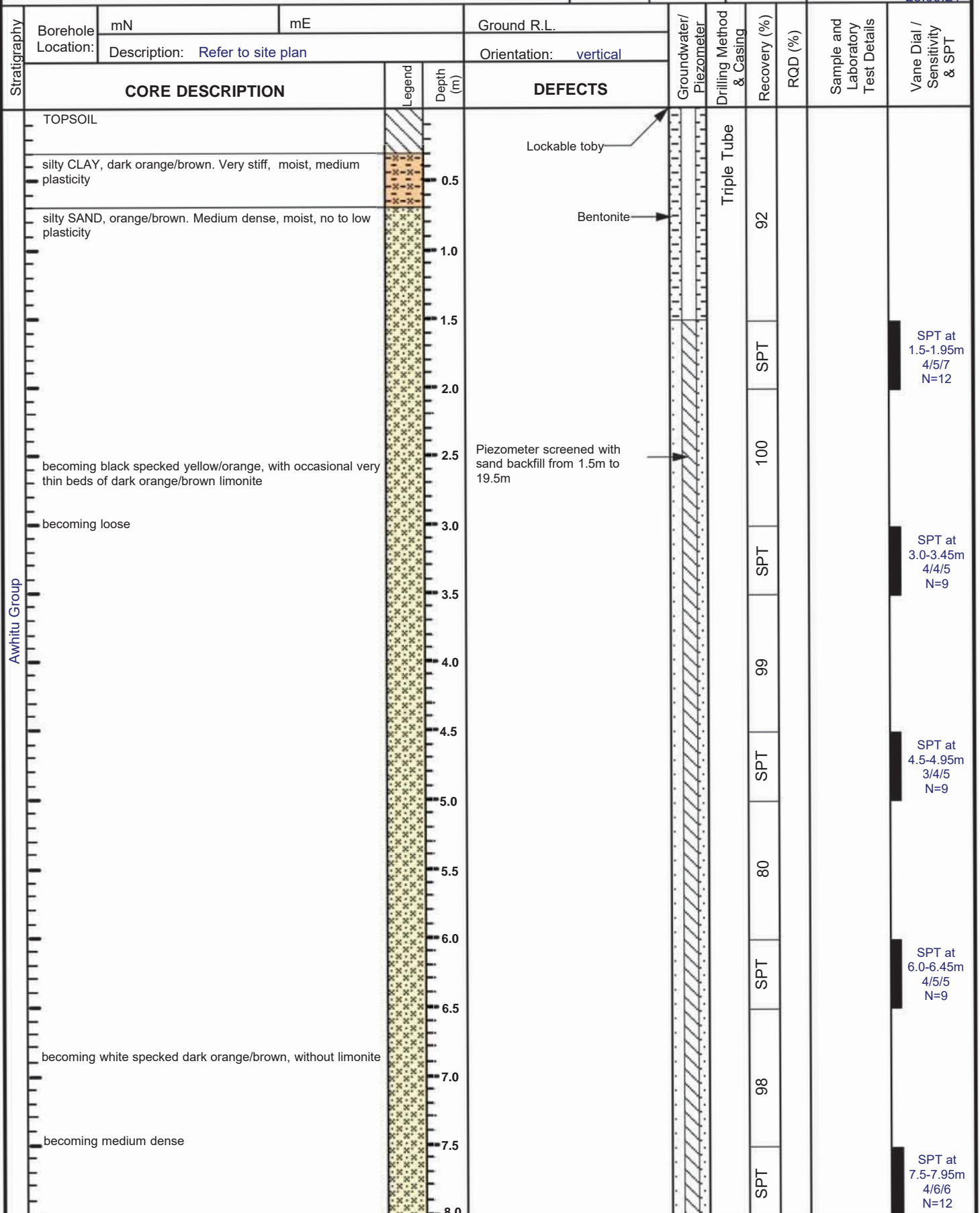
**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT















**Machine Borehole No.** MH 06

Sheet 1 of 3

**Job Number:** J01662

Vane Head: Logged By: Processor : Start Date: 28.09.21  
 JL AH Finish Date: 28.09.21



	<b>Comments:</b>  Driller: Pro-Drill      Rig: SLG	Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	
		water	Fill		Gravel		Siltstone		No Core	
		Checked:	Clay		Organic		limestone			
		PL	Silt		Pumice		volcanic			

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MANAGEMENT LIMITED  
 MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 06

Sheet 2 of 3

**Job Number:** J01662

Vane Head: 2007  
 Logged By: JL  
 Processor: AH  
 Start Date: 28.09.21  
 Finish Date: 28.09.21

Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT
	Description: Refer to site plan			Orientation: vertical						
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS				
Awhitu Group	becoming white and black speckled light orange				[Pattern]	Triple Tube	100	100	SPT	SPT at 9.0-9.45m 5/6/8 N=14
							SPT			
							100			
							SPT			
							100			
							SPT			
							100			
							SPT			
							100			
							SPT			
							91			



**Comments:**

Driller: Pro-Drill  
 Rig: SLG

Drilling Fluid:	Topsoil	[Pattern]	Sand	[Pattern]	Sandstone	[Pattern]	Plutonic	+++
	water							
Checked:	Fill	[Pattern]	Gravel	[Pattern]	Siltstone	[Pattern]	No Core	
	Clay	[Pattern]	Organic	[Pattern]	limestone	[Pattern]		
	Silt	[Pattern]	Pumice	[Pattern]	Volcanic	[Pattern]		

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MANAGEMENT LIMITED  
MURIWAI DOWNS GOLF PROJECT

**Machine Borehole No.** MH 06

Sheet 3 of 3

**Job Number:** J01662

Vane Head: \_\_\_\_\_ Logged By: JL Processor: AH  
Start Date: 28.09.21  
Finish Date: 28.09.21

Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT		
	Description: Refer to site plan			Orientation: vertical								
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS						
Awhitu Group	<p>becoming black specked orange/brown, cemented</p> <p>becoming orange streaked, black specked, yellow/brown</p> <p>at 19.5m, becoming uncemented</p> <p>EOB at 19.5m. Target Depth</p>				16.5	<p>groundwater measured on 4/10/21: 19.5m</p>	<p>Triple Tube</p>	91	<p>SPT</p>	<p>SPT at 16.5-16.95m 5/6/6 N=12</p>		
					17.0			97			SPT	<p>SPT at 18-18.45m 4/6/8 N=14</p>
					17.5			100			SPT	
					18.0			SPT				
					18.5			SPT				
					19.0			SPT				
					19.5			SPT				
					20.0			SPT				
					20.5			SPT				
					21.0			SPT				
21.5	SPT											
22.0	SPT											
22.5	SPT											
23.0	SPT											
23.5	SPT											
24.0	SPT											




**Comments:**

Driller: Pro-Drill Rig: SLG

Drilling Fluid:	Topsoil	Sand	Sandstone	Plutonic	+++
water	Fill	Gravel	Siltstone	No Core	
Checked:	Clay	Organic	Limestone		
PL	Silt	Pumice	Volcanic		



	client:	THE BEARS HOME PROJECT MANAGEMENT LIMITED	
	project:	MURIWAI DOWNS GOLF PROJECT	
title:	MH06 Photo Summary - 0.0-20.0m		
completed:	JM	project no:	J01662
date:	04.10.21	figure no:	Figure MH06



## Hand Auger Borehole Records

<b>Client :</b> THE BEARS HOME PROJECT MANAGEMENT <b>Project Location :</b> MURIWAI DOWNS GOLF PROJECT		<b>Auger Borehole No.</b> HA01 Sheet 1 of 4										
<b>Job Number:</b> J01662		Vane Head: 2007	Logged By: AH	Processor : JM	Date: 22.09.21							
Borehole Location:	mN Description: Refer to site plan	mE Ground R.L.	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak / residual	Soil Sensitivity	Sample and Laboratory / Other Test Details				
<b>SOIL DESCRIPTION</b>												
MULLOCK						sank under own weight		Scala Penetrometer Test (Blows/100mm) 1 2 0 0 0 0 0 2 2 3 5 7 4 5 5 7 10 12 18 20+ (ER) ER = Effective Refusal				
fine to medium SAND, brown/orange. Very loose, saturated, no plasticity, with trace fine to medium gravel, with limited sample recovery [RECENT ALLUVIUM]					sank under own weight							
becoming red/brown and orange streaked, with minor fine to medium gravel												
fine to medium SAND, brown/orange. Medium dense, saturated, no plasticity, with trace fine to medium gravel, with limited sample recovery [AWHITU GROUP FIXED SAND DUNES]												
becoming dense												
EOB at 3.3m. Too Dense to Auger Further. Scala penetrometer testing found effective refusal at 3.4m.												
			<b>Comments:</b> Groundwater encountered at 0.0m. UTP = unable to penetrate. EOB = end of borehole.	Borehole Diameter: 50mm Checked: RZ	Topsoil Fill Clay Silt		Sand Gravel Organic Pumice		Sandstone Siltstone Limestone Volcanic		Plutonic No Core	

**Client :** THE BEARS HOME PROJECT MANAGEMENT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT

**Auger Borehole No.** HA02  
 Sheet 2 of 4

**Job Number:** J01662

Vane Head: 2007  
 Logged By: AH  
 Processor: JM  
 Date: 22.09.21

Borehole Location:	mN	mE	Ground R.L.
Description:	Refer to site plan		

**SOIL DESCRIPTION**

Legend	Depth (m)	Standing Water Level	Vane Shear (kPa) peak / residual	Soil Sensitivity	Sample and Laboratory / Other Test Details
TOPSOIL					
clayey SILT with trace fine sand, dark brown/black mottled orange. Stiff, moist to wet, low plasticity, sensitive [AWHITU GROUP FIXED SAND DUNES]	0.5		87/19	4.6	
becoming orange/brown, with trace fine gravel limonite	1.0		99/19	5.2	
becoming medium plasticity					
becoming wet					
becomin firm to stiff, moderately sensitive, low plasticity, with minor fine to medium sand	1.5	▽	38/13	2.9	Scala Penetrometer Test (Blows/100mm)
becoming brown/yellow mottled orange	2.0		58/22	2.6	
silty SAND, dark orange/brown. Loose, saturated, no plasticity, with trace fine gravel with limited sample recovery	2.5				2
becoming medium dense	3.0				2 3 3 3 5 4
fine gravelly SAND, dark orange/brown. Medium dense, saturated, no plasticity, with some limonite with limited sample recovery	3.5				4 3 4 5 6 7 7
becoming medium dense to dense	4.0				10 5 3 5 4 4
EOB at 5.0m. Target Depth.	4.5				9 9 11 11 8
	5.0				
	5.5				
	6.0				

	<b>Comments:</b> Groundwater encountered at 2.3m. UTP = unable to penetrate. EOB = end of borehole.	Borehole Diameter:	Topsoil	Sand	Sandstone	Plutonic	++ + +
		50mm	Fill	Gravel	Siltstone	No Core	
		Checked: RZ	Clay	Organic	Limestone		
			Silt	Pumice	Volcanic		



**Client :** THE BEARS HOME PROJECT MANAGEMENT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT

**Auger Borehole No.** HA04  
 Sheet 4 of 4

**Job Number:** J01662

Vane Head: 3195  
 Logged By: AT  
 Processor: JM  
 Date: 22.09.21

Borehole Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Standing Water Level	Vane Shear (kPa) peak / residual	Soil Sensitivity	Sample and Laboratory / Other Test Details
Description: Refer to site plan									
<b>SOIL DESCRIPTION</b>									
TOPSOIL									
fine sandy SILT, orange/brown mottled dark brown. Loose, moist, no plasticity [AWHITU GROUP FIXED SAND DUNES]					0.5		85/29	2.9	Scala Penetrometer Test (Blows/100mm)
fine to medium SAND with some silt, light orange/brown, dark brown and light brown mottled. Loose, moist, no plasticity, moderately sensitive									1
fine sandy SILT, orange/brown. Medium dense, moist, no plasticity					1.0				2
with trace clay to 1.4m									3
silty fine SAND, orange/brown mottled light grey/brown. Medium dense, moist, no plasticity					1.5				2
becoming brown and white speckled orange/brown becoming dense									3
fine SAND with trace silt, brown and white speckled orange/brown. Medium dense to dense, moist, no plasticity					2.0				4
at 2.2m, becoming light orange/brown									4
					2.5				4
									5
					3.0				5
									6
					3.5				6
									7
					4.0				7
									7
					4.5				7
									8
EOB at 5.0m. Target Depth.					5.0				8
					5.5				
					6.0				



**Comments:**  
 Groundwater not encountered.  
 UTP = unable to penetrate.  
 EOB = end of borehole.

Borehole Diameter: 50mm	Topsoil		Sand		Sandstone		Plutonic	
	Fill		Gravel		Siltstone		No Core	
Checked: RZ	Clay		Organic		Limestone			
	Silt		Pumice		Volcanic			

## Trial Pit Records

**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT  
**MANAGEMENT LIMITED**

**Trial Pit No.** TP 01

Sheet 1 of 3

**Job Number:** J01662

Vane Head: \_\_\_\_\_  
 Logged By: JL  
 Processor: AH  
 Date: 28.09.21

Stratigraphy

Pit Location: mN \_\_\_\_\_ mE \_\_\_\_\_ Ground R.L. \_\_\_\_\_  
 Description: Refer to site plan

Legend  
 Depth (m)  
 Groundwater  
 Vane Dial Reading  
 Soil Sensitivity  
 Sample and Laboratory Test Details

**SOIL DESCRIPTION**

TOPSOIL

clayey SILT with some fine sand, dark yellow/brown. Very stiff, moist, low plasticity

EOTP at 1.0m. Target depth.



**Comments:**  
 no groundwater inflow

Excavator Used \_\_\_\_\_  
 Checked: JL

Topsoil	Sand	Sandstone	Plutonic
Fill	Gravel	Siltstone	No Core
Clay	Organic	Limestone	
Silt	Pumice	Volcanic	


**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT

**Trial Pit No.** TP 02















Sheet 2 of 3

**Job Number:** J01662

Vane Head:      Logged By: JL      Processor : AH      Date: 28.09.21

Stratigraphy	Pit Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details
	Description: Refer to site plan									
<b>SOIL DESCRIPTION</b>										
Awhitu	TOPSOIL					0.0 - 0.5				
	clayey SILT with some fine sand, orange/yellow. Very stiff, moist, medium plasticity									
EOTP at 0.4m. Target depth.						0.5				
						1.0				
						1.5				
						2.0				
						2.5				
						3.0				
						3.5				
						4.0				
						4.5				
						5.0				
						5.5				
						6.0				



	<b>Comments:</b> no groundwater inflow	Excavator Used:	Topsoil		Sand		Sandstone		Plutonic	
			Fill		Gravel		Siltstone		No Core	
		Checked: JL	Clay		Organic		Limestone			
			Silt		Pumice		Volcanic			



**Client :** THE BEARS HOME PROJECT  
**Project Location :** MURIWAI DOWNS GOLF PROJECT  
**MANAGEMENT LIMITED**

**Trial Pit No.** TP 03

Sheet 3 of 3

**Job Number:** J01662

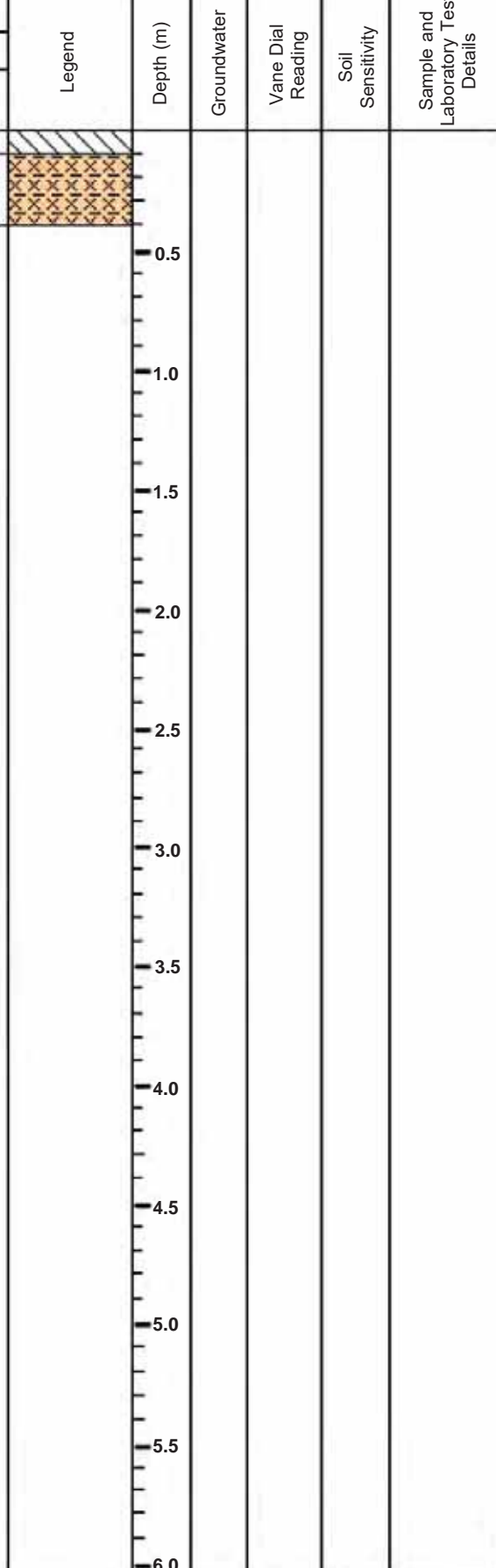
Vane Head: Logged By: Processor : Date:  
 JL AH 28.09.21

Stratigraphy	Pit Location:	mN	mE	Ground R.L.
	Description:	Refer to site plan		

**SOIL DESCRIPTION**

TOPSOIL  
 clayey SILT with some fine sand, orange/yellow. Very stiff, moist, low plasticity

EOTP at 0.4m. Target depth.



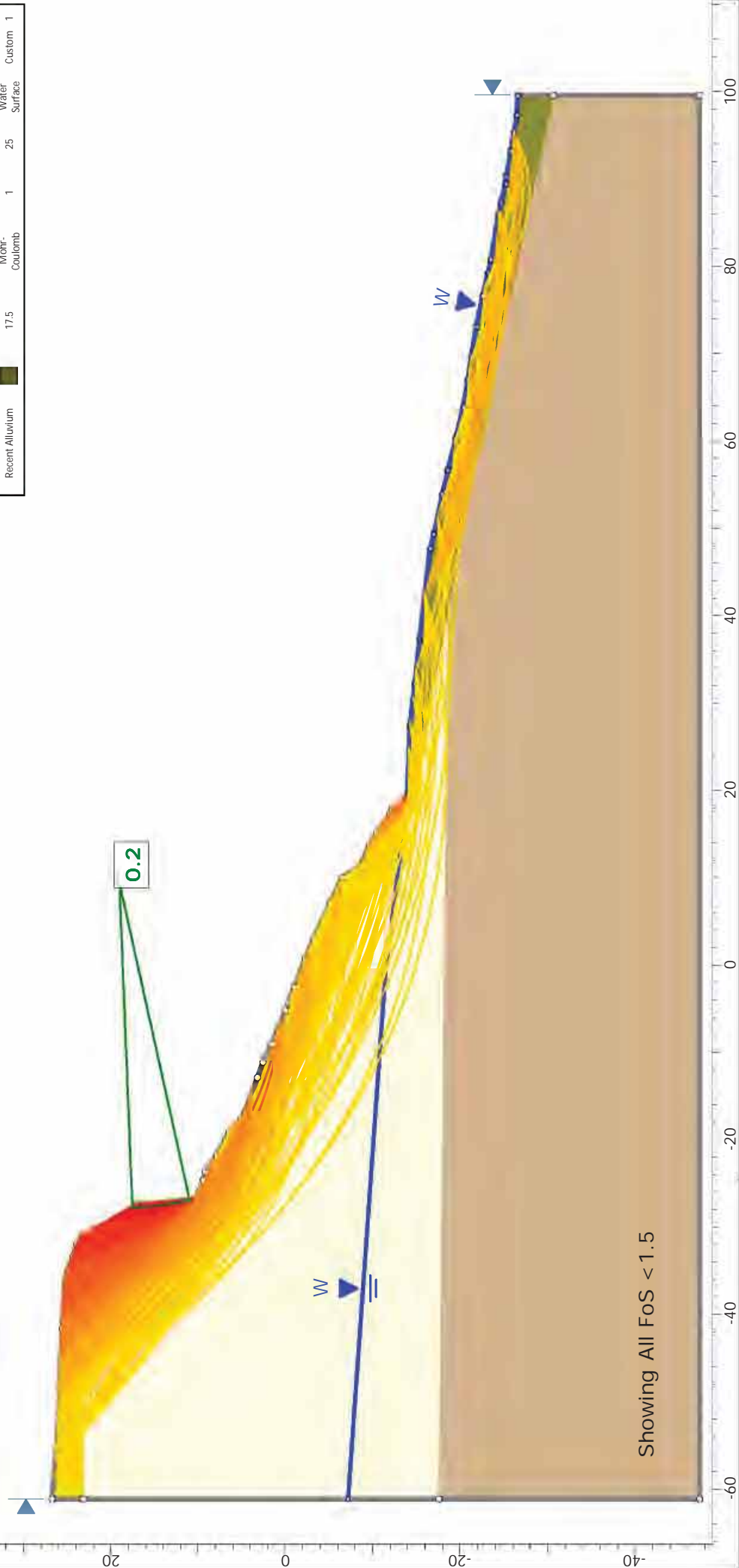
	<b>Comments:</b> no groundwater inflow	Excavator Used:	Topsoil		Sand		Sandstone		Plutonic	
			Fill		Gravel		Siltstone		No Core	
		Checked: JL	Clay		Organic		Limestone			
			Silt		Pumice		Volcanic			

# APPENDIX 5:

## SLOPE STABILITY ANALYSIS RESULTS OUTPUTS

Cross Section AA'

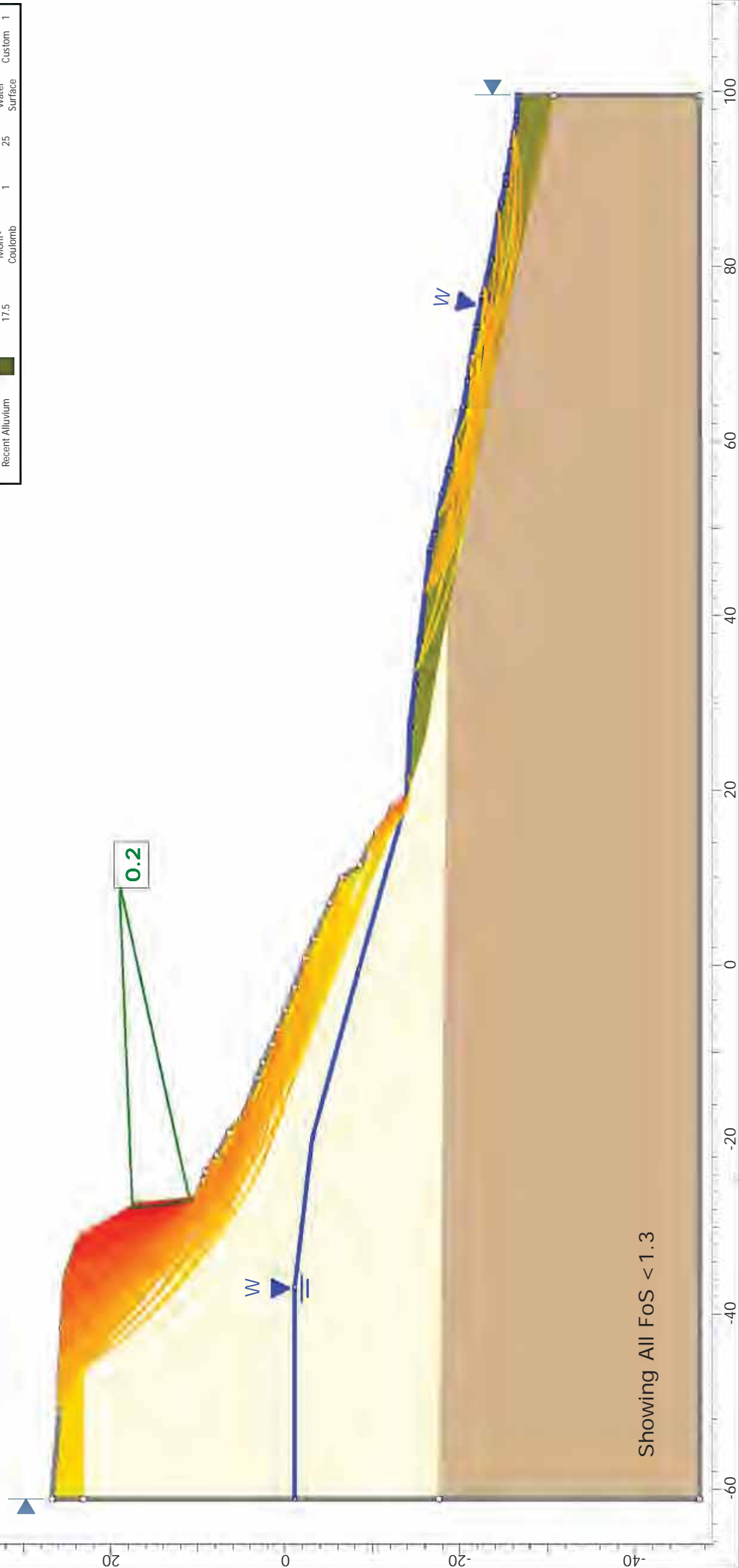
Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Stiff Awahitu Clay	Yellow	17.5	Mohr-Coulomb	5	30	Water Surface	Custom	1
Medium Dense Awahitu Sand	Light Yellow	18.5	Mohr-Coulomb	0	39	Water Surface	Custom	1
Dense Awahitu	Dark Yellow	20	Mohr-Coulomb	0	45	Water Surface	Custom	1
Recent Alluvium	Dark Green	17.5	Mohr-Coulomb	1	25	Water Surface	Custom	1



Project		J01662 Muriwai Downs Golf Project	
Group	Existing Slope	Scenario	Existing Conditions
	20 October 2021 JL		Cross Section AA'
		Lander Geotechnical Consultants Limited	

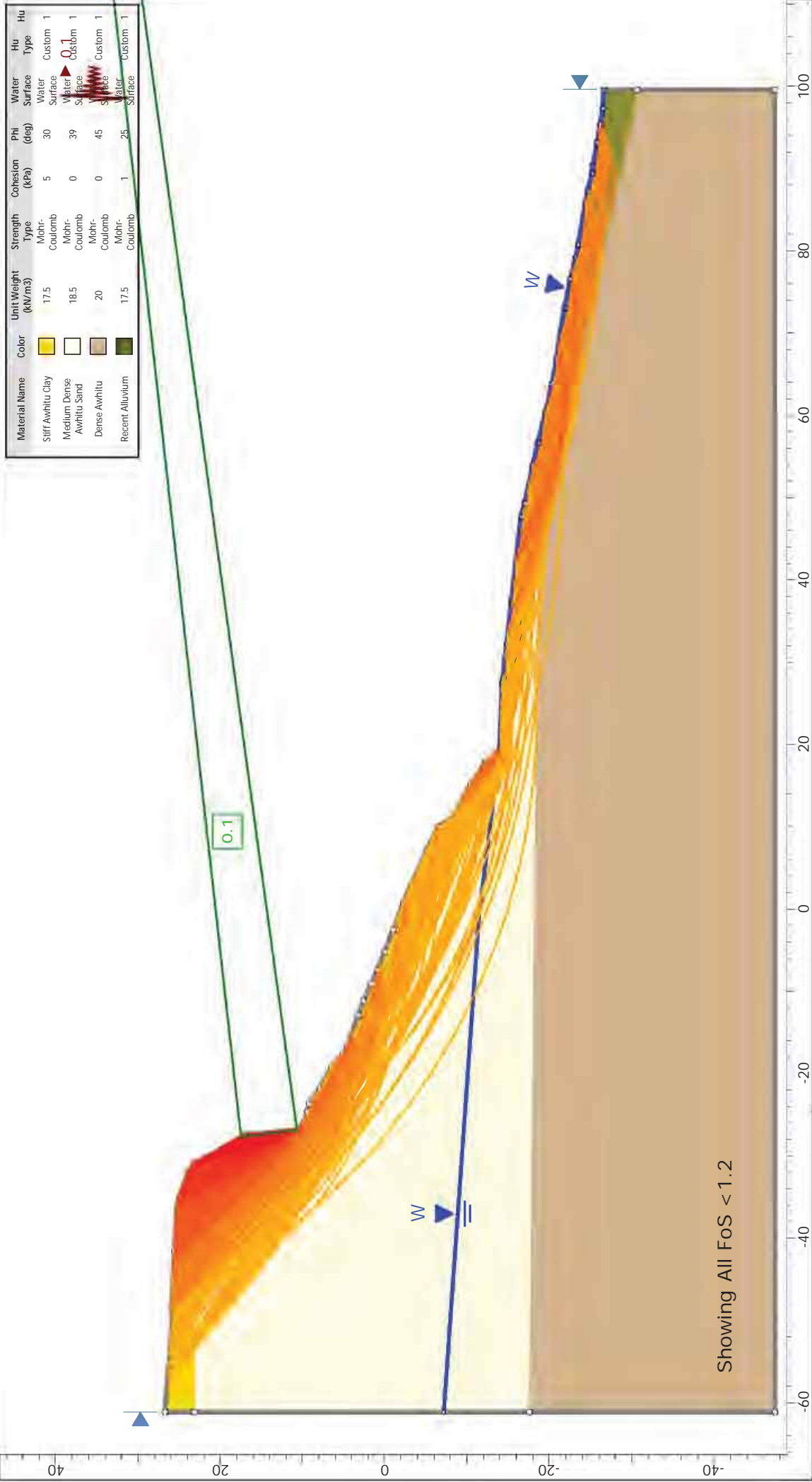


Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Stiff Awihitu Clay	Yellow	17.5	Mohr-Coulomb	5	30	Water Surface	Custom 1
Medium Dense Awihitu Sand	Light Green	18.5	Mohr-Coulomb	0	39	Water Surface	Custom 1
Dense Awihitu	Dark Green	20	Mohr-Coulomb	0	45	Water Surface	Custom 1
Recent Alluvium	Brown	17.5	Mohr-Coulomb	1	25	Water Surface	Custom 1



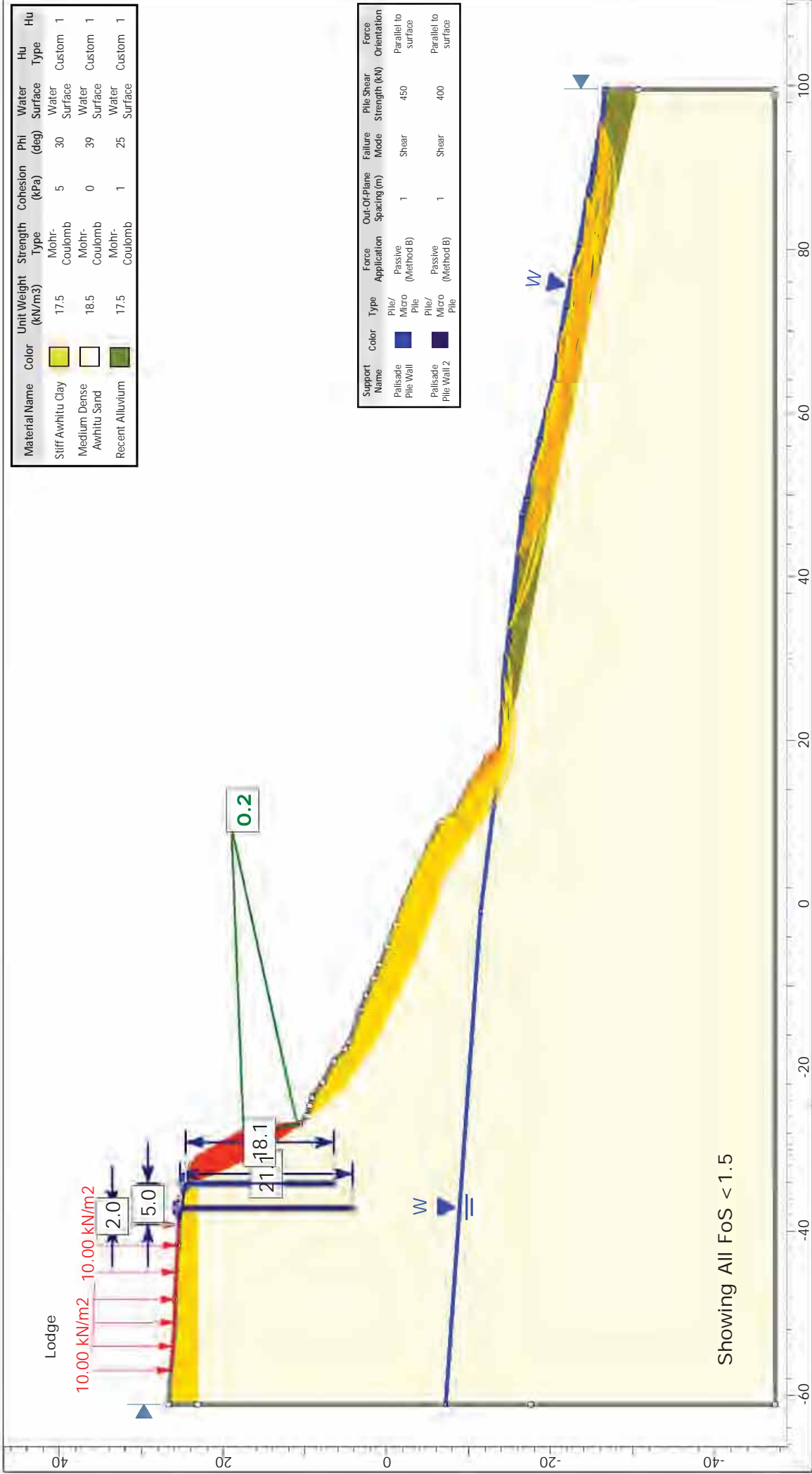
Project		J01662 Muriwai Downs Golf Project	
Group	Existing Slope	Scenario	Elevated Groundwater
20 October 2021 JL		Cross Section AA'	
Lander Geotechnical Consultants Limited			





Project		J01662 Muriwai Downs Golf Project	
Group	Existing Slope	Scenario	Seismic
	20 October 2021 JL		Cross Section AA'
			Lander Geotechnical Consultants Limited





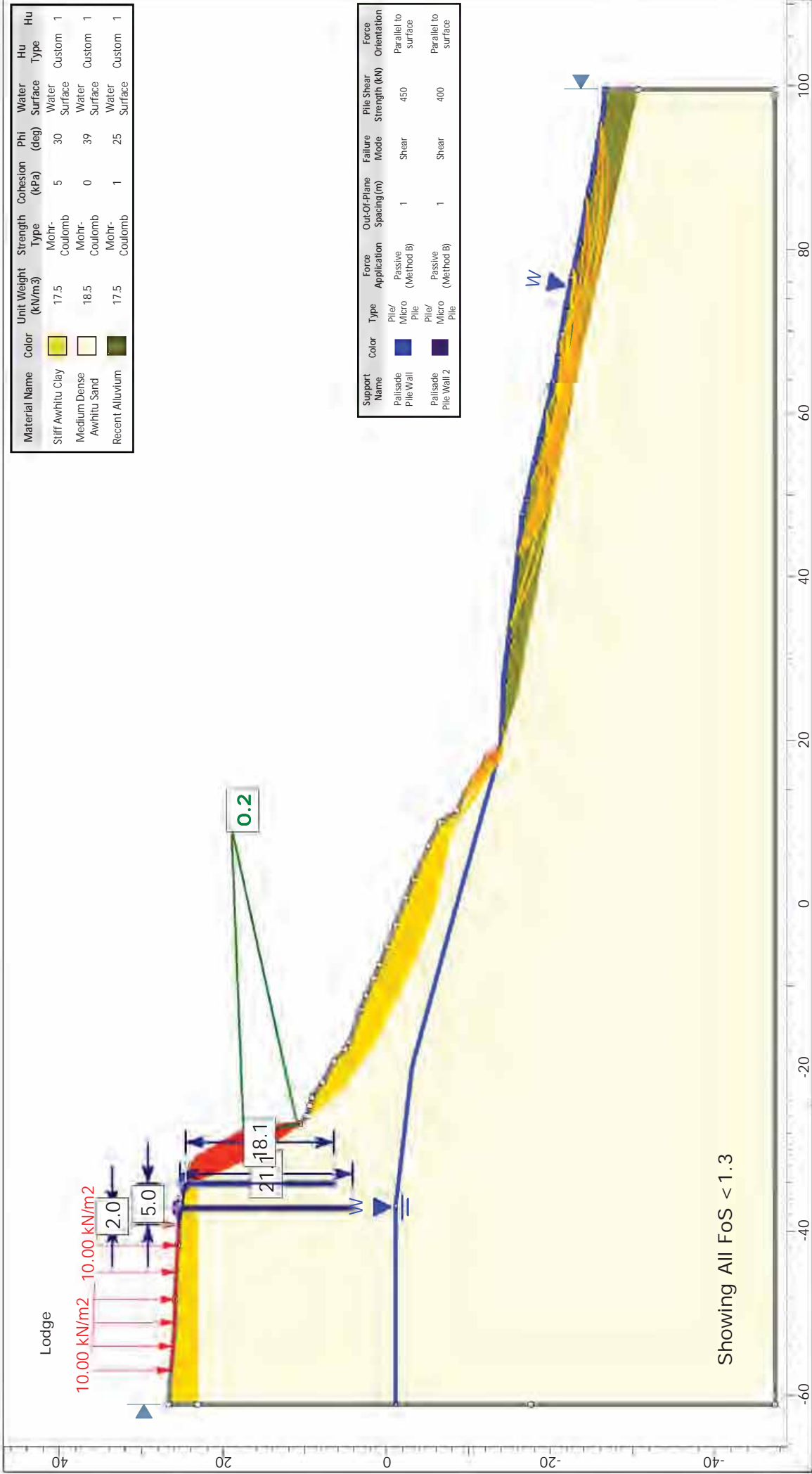
Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Stiff Awahitu Clay		17.5	Mohr-Coulomb	5	30	Water Surface	Custom 1
Medium Dense Awahitu Sand		18.5	Mohr-Coulomb	0	39	Water Surface	Custom 1
Recent Alluvium		17.5	Mohr-Coulomb	1	25	Water Surface	Custom 1

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
Palisade Pile Wall		Pile/Micro Pile	Passive (Method B)	1	Shear	450	Parallel to surface
Palisade Pile Wall 2		Pile/Micro Pile	Passive (Method B)	1	Shear	400	Parallel to surface




J01662 Muriwai Downs Golf Project

Group	Proposed Slope - Tiered Pile	Scenario	Existing Conditions
	20 October 2021 - JL		Cross Section AA'
			Lander Geotechnical Consultants Limited



Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Stiff Awihitu Clay	Yellow	17.5	Mohr-Coulomb	5	30	Water Surface	Custom	1
Medium Dense Awihitu Sand	Light Yellow	18.5	Mohr-Coulomb	0	39	Water Surface	Custom	1
Recent Alluvium	Dark Green	17.5	Mohr-Coulomb	1	25	Water Surface	Custom	1

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
Palisade Pile Wall	Blue	Pile/Micro Pile	Passive (Method B)	1	Shear	450	Parallel to surface
Palisade Pile Wall 2	Dark Blue	Pile/Micro Pile	Passive (Method B)	1	Shear	400	Parallel to surface



**J01662 Muriwai Downs Golf Project**

Proposed Slope - Tiered Pile

20 October 2021 - JL

Elevated Groundwater

Cross Section AA'

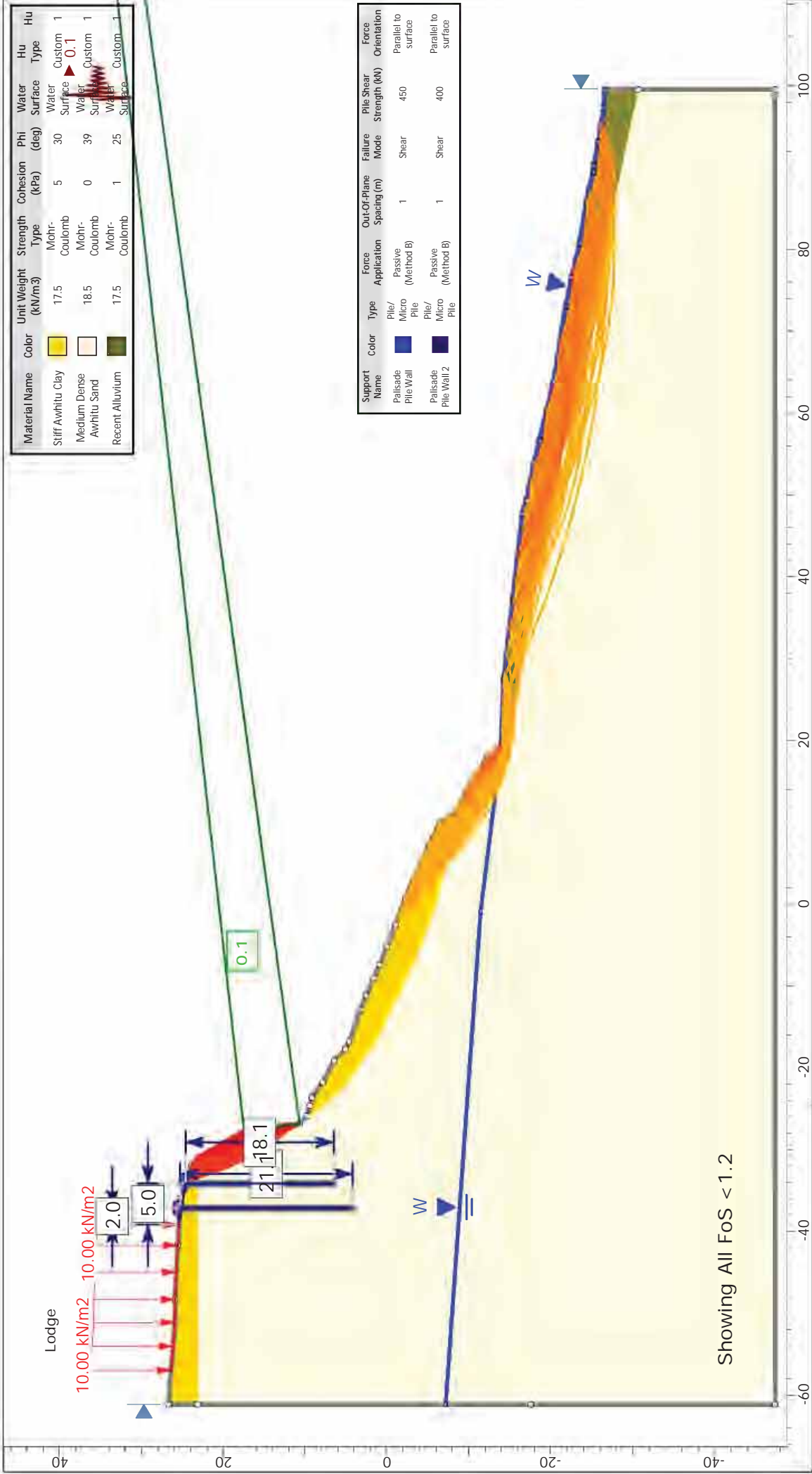
Lander Geotechnical Consultants Limited

Project

Group


Scenario





Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Stiff Awahitu Clay	Yellow	17.5	Mohr-Coulomb	5	30	Surface	Custom	1
Medium Dense Awahitu Sand	Orange	18.5	Mohr-Coulomb	0	39	Surface	Custom	1
Recent Alluvium	Green	17.5	Mohr-Coulomb	1	25	Surface	Custom	1

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
Palisade Pile Wall	Blue	Pile/Micro (Method B)	Passive	1	Shear	450	Parallel to surface
Palisade Pile Wall 2	Dark Blue	Pile/Micro (Method B)	Passive	1	Shear	400	Parallel to surface



**J01662 Muriwai Downs Golf Project**

Proposed Slope - Tiered Pile  
20 October 2021 - JL

Scenario: Seismic  
Cross Section AA'

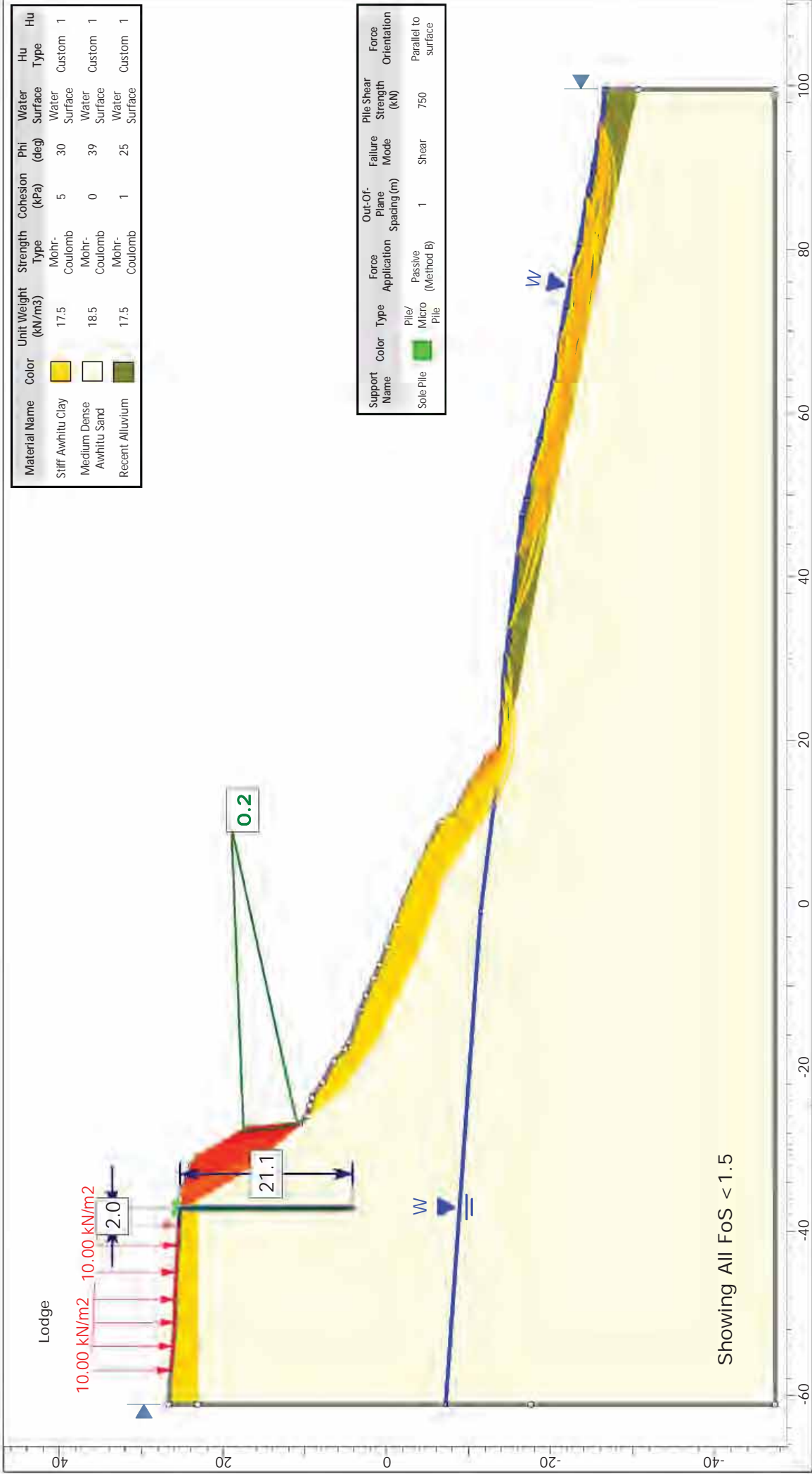
Lander Geotechnical Consultants Limited

Project

Group


Showing All FoS < 1.2

SLIDE/INTERPRET 9.017



Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Stiff Awahitu Clay	Yellow	17.5	Mohr-Coulomb	5	30	Water Surface	Custom 1
Medium Dense Awahitu Sand	White	18.5	Mohr-Coulomb	0	39	Water Surface	Custom 1
Recent Alluvium	Green	17.5	Mohr-Coulomb	1	25	Water Surface	Custom 1

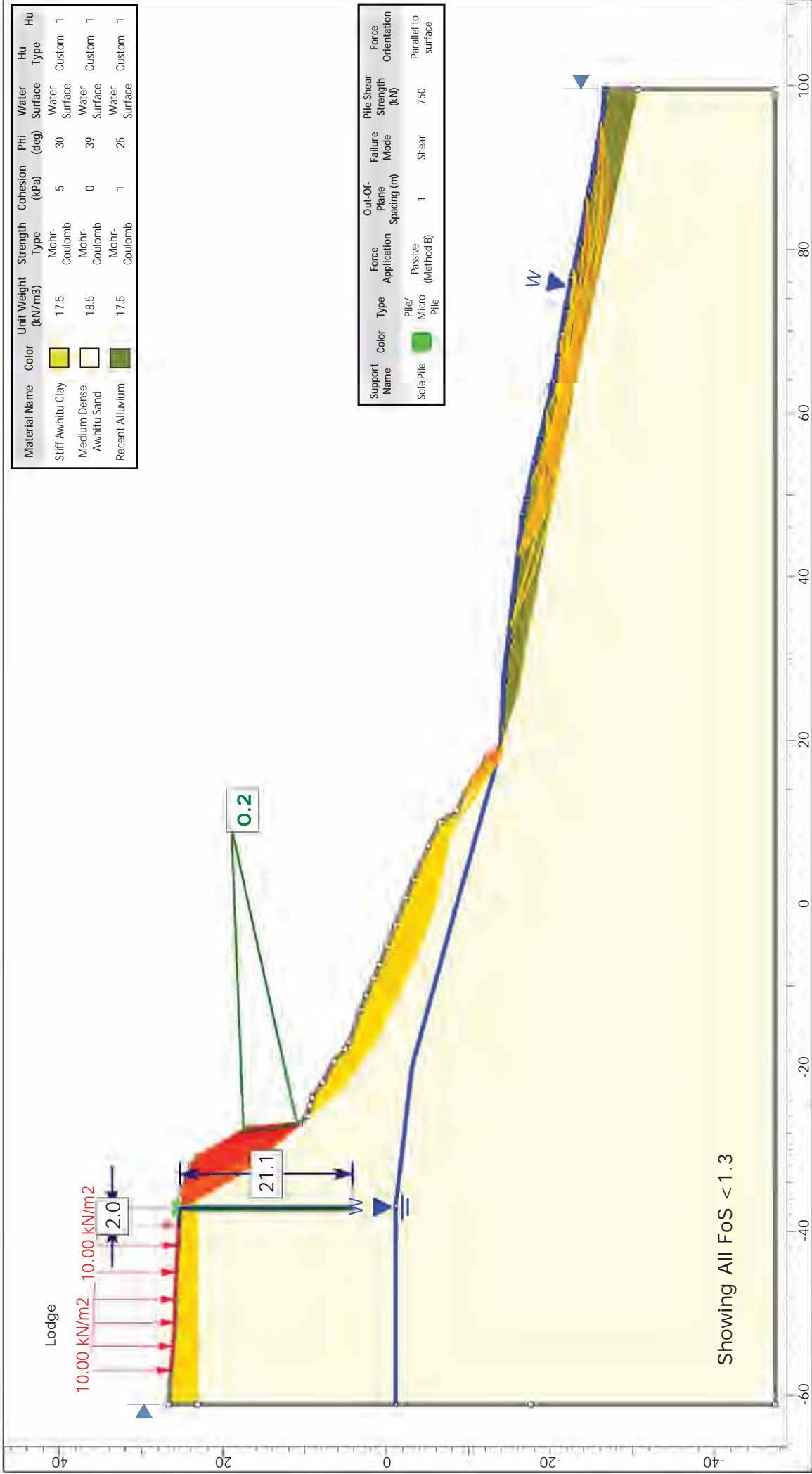
Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
Sole Pile	Green	Pile/Micro Pile	Passive (Method B)	1	Shear	750	Parallel to surface



SLIDE/INTERPRET 9.017

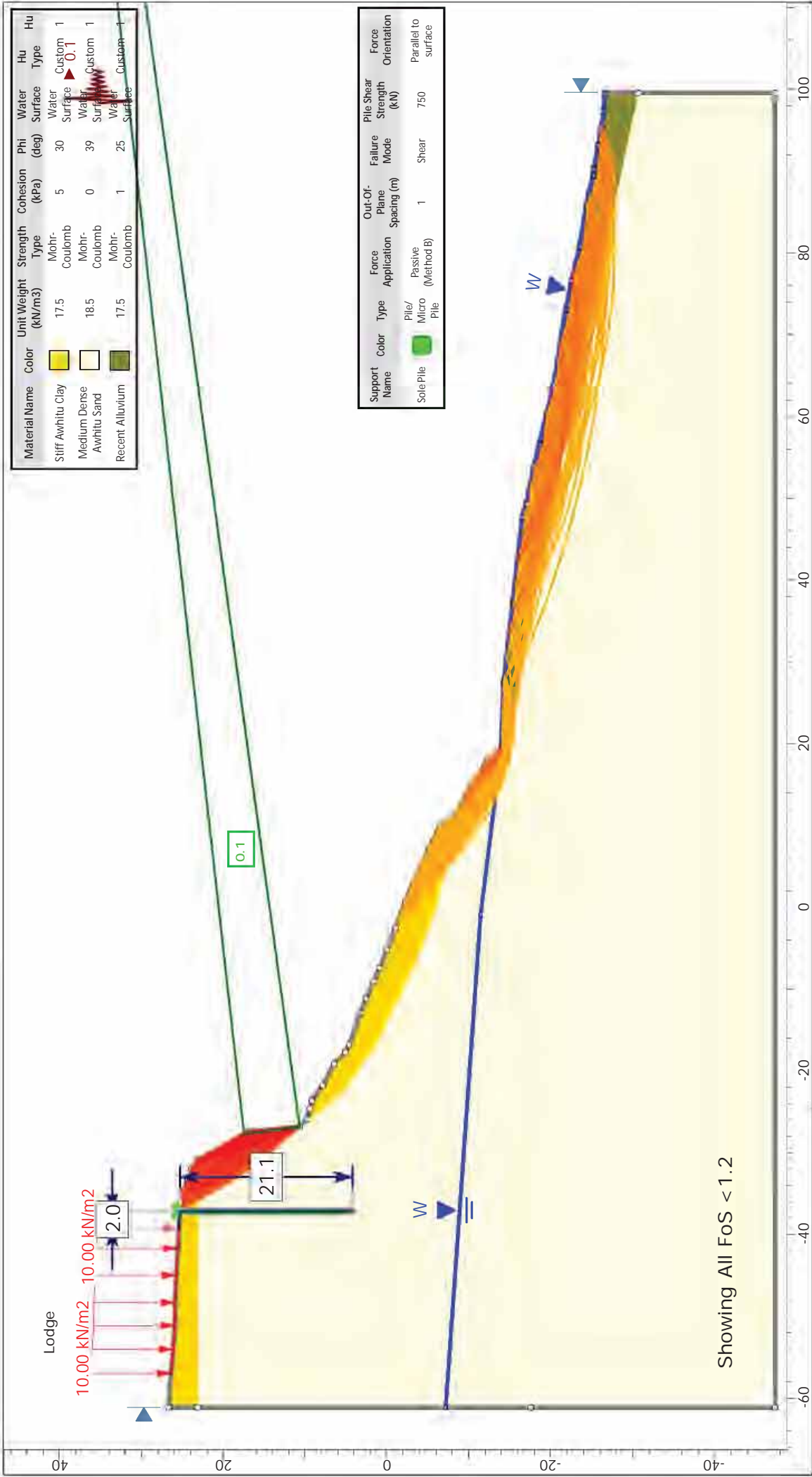
**J01662 Muriwai Downs Golf Project**

<i>Group</i>	Proposed Slope - Single Pile
<i>Scenario</i>	Existing Conditions
	Cross Section AA'
	20 October 2021 - JL
	Lander Geotechnical Consultants Limited



Project		J01662 Muriwai Downs Golf Project	
Group	Proposed Slope - Single Pile	Scenario	Elevated Groundwater
	20 October 2021 - JL		Cross Section AA'
			Lander Geotechnical Consultants Limited





Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Stiff Awhitu Clay	Yellow	17.5	Mohr-Coulomb	5	30	Surface	Custom	1
Medium Dense Awhitu Sand	Light Yellow	18.5	Mohr-Coulomb	0	39	Surface	Custom	1
Recent Alluvium	Green	17.5	Mohr-Coulomb	1	25	Surface	Custom	1

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
Sole Pile	Green	Pile/Micro Pile	Passive (Method B)	1	Shear	750	Parallel to surface



SLIDE/INTERPRET 9.017

J01662 Muriwai Downs Golf Project

Scenario

Proposed Slope - Single Pile

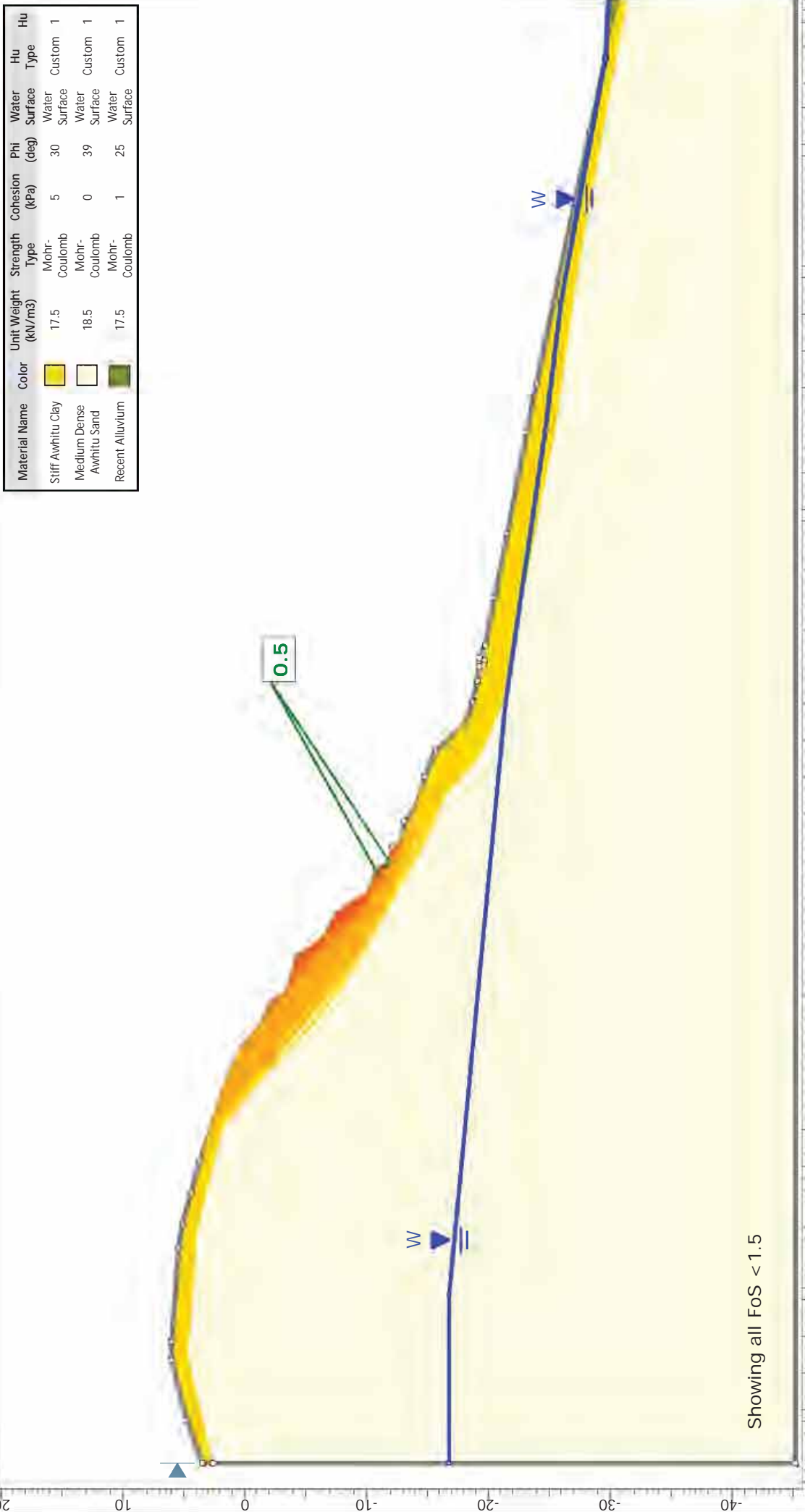
Seismic

20 October 2021 - JL

Cross Section AA'




Lander Geotechnical Consultants Limited

Cross Section BB'



Project		J01162 Muriwai Downs Golf	
Group	Existing Slope	Existing Conditions	
	20 October 2021 - JL	Cross Section	
		Lander Geotechnical Consultants Limited	



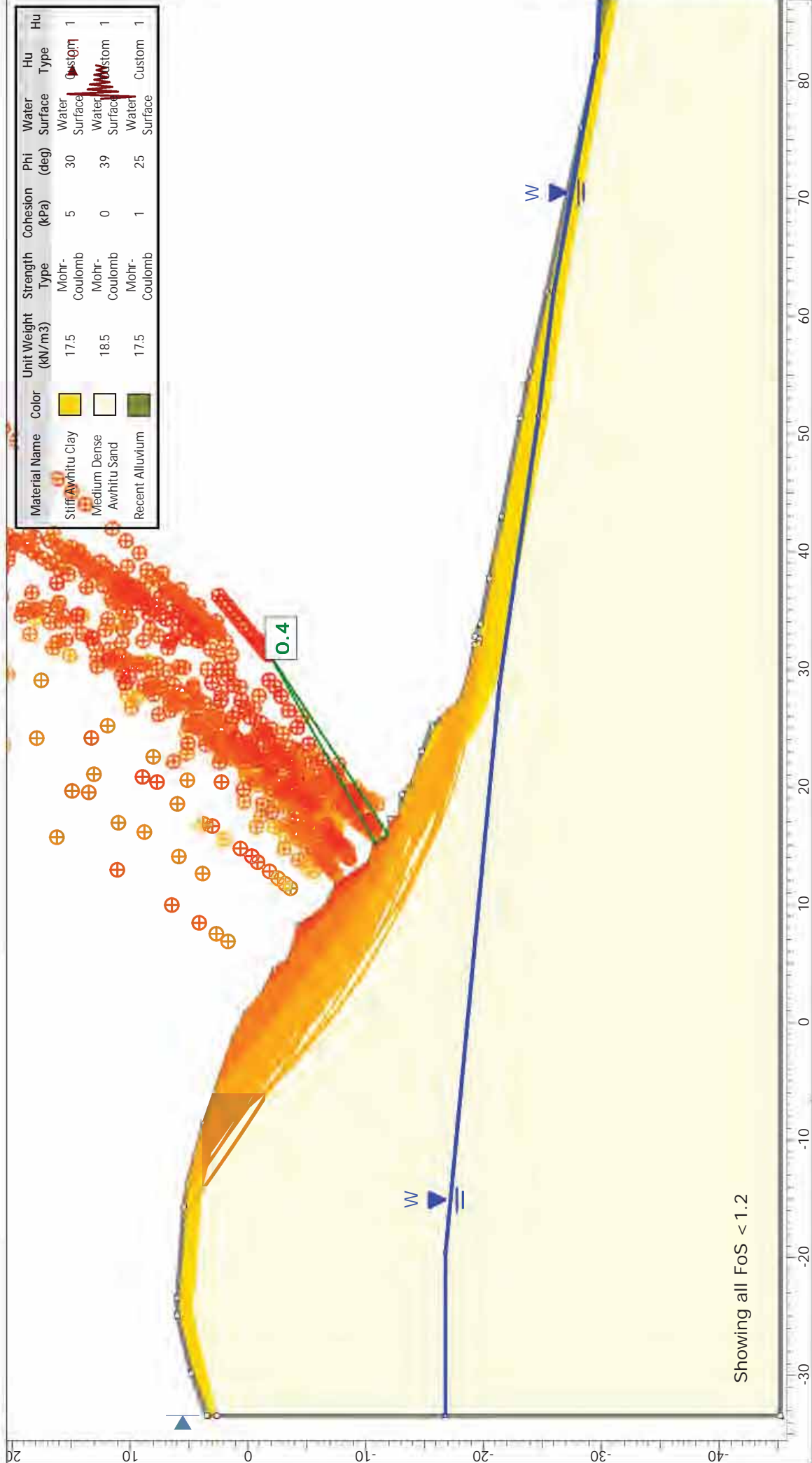
Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Stiff Awahitu Clay		17.5	Mohr-Coulomb	5	30	Water Surface	Custom	1
Medium Dense Awahitu Sand		18.5	Mohr-Coulomb	0	39	Water Surface	Custom	1
Recent Alluvium		17.5	Mohr-Coulomb	1	25	Water Surface	Custom	1



Showing all FoS < 1.3

Project		J01162 Muriwai Downs Golf	
Group	Existing Slope	Scenario	Elevated Groundwater
	20 October 2021 JL		Cross Section
		Lander Geotechnical Consultants Limited	

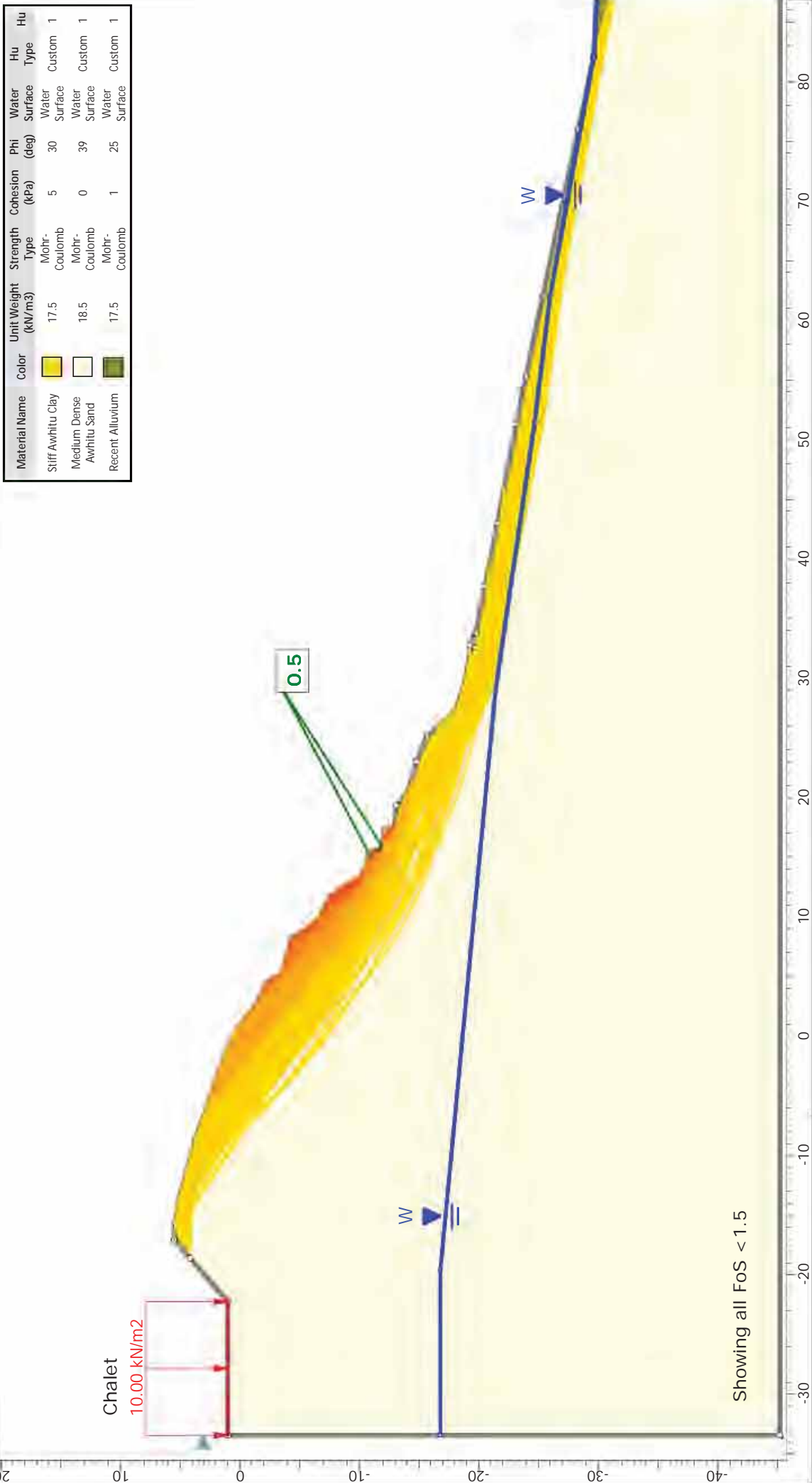




Project		J01162 Muriwai Downs Golf	
Group	Existing Slope	Scenario	Seismic
20 October 2021 JL		Cross Section	
Lander Geotechnical Consultants Limited			







Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Stiff Awahitu Clay	Yellow	17.5	Mohr-Coulomb	5	30	Water Surface	Custom	1
Medium Dense Awahitu Sand	White	18.5	Mohr-Coulomb	0	39	Water Surface	Custom	1
Recent Alluvium	Green	17.5	Mohr-Coulomb	1	25	Water Surface	Custom	1

Chalet

10.00 kN/m<sup>2</sup>

0.5

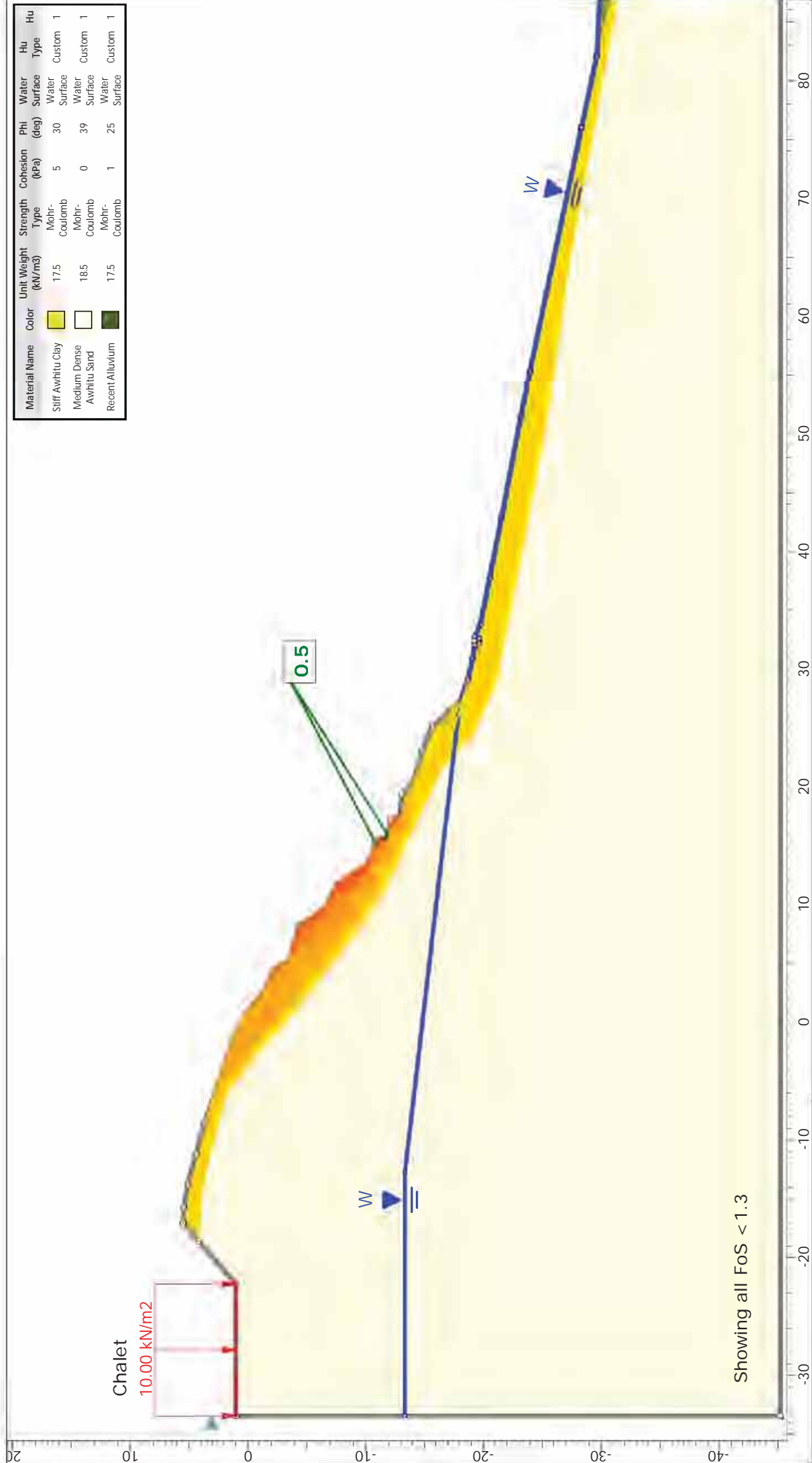
Showing all FoS < 1.5



SLIDE INTERPRET 9.017

Project		J01162 Muriwai Downs Golf	
Group	Proposed Slope	Scenario	Existing Conditions
	20 October 2021 JL		Cross Section
		Lander Geotechnical Consultants Limited	

Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Stiff Awwhitu Clay	Yellow	17.5	Mohr-Coulomb	5	30	Water Surface	Custom 1
Medium Dense Awwhitu Sand	White	18.5	Mohr-Coulomb	0	39	Water Surface	Custom 1
Recent Alluvium	Dark Green	17.5	Mohr-Coulomb	1	25	Water Surface	Custom 1



Chalet

10.00 kN/m<sup>2</sup>

0.5

Showing all FoS < 1.3

Project		J01162 Muriwai Downs Golf	
Group	Proposed Slope	Scenario	Elevated Groundwater
	20 October 2021 - JL		Cross Section
		Lander Geotechnical Consultants Limited	



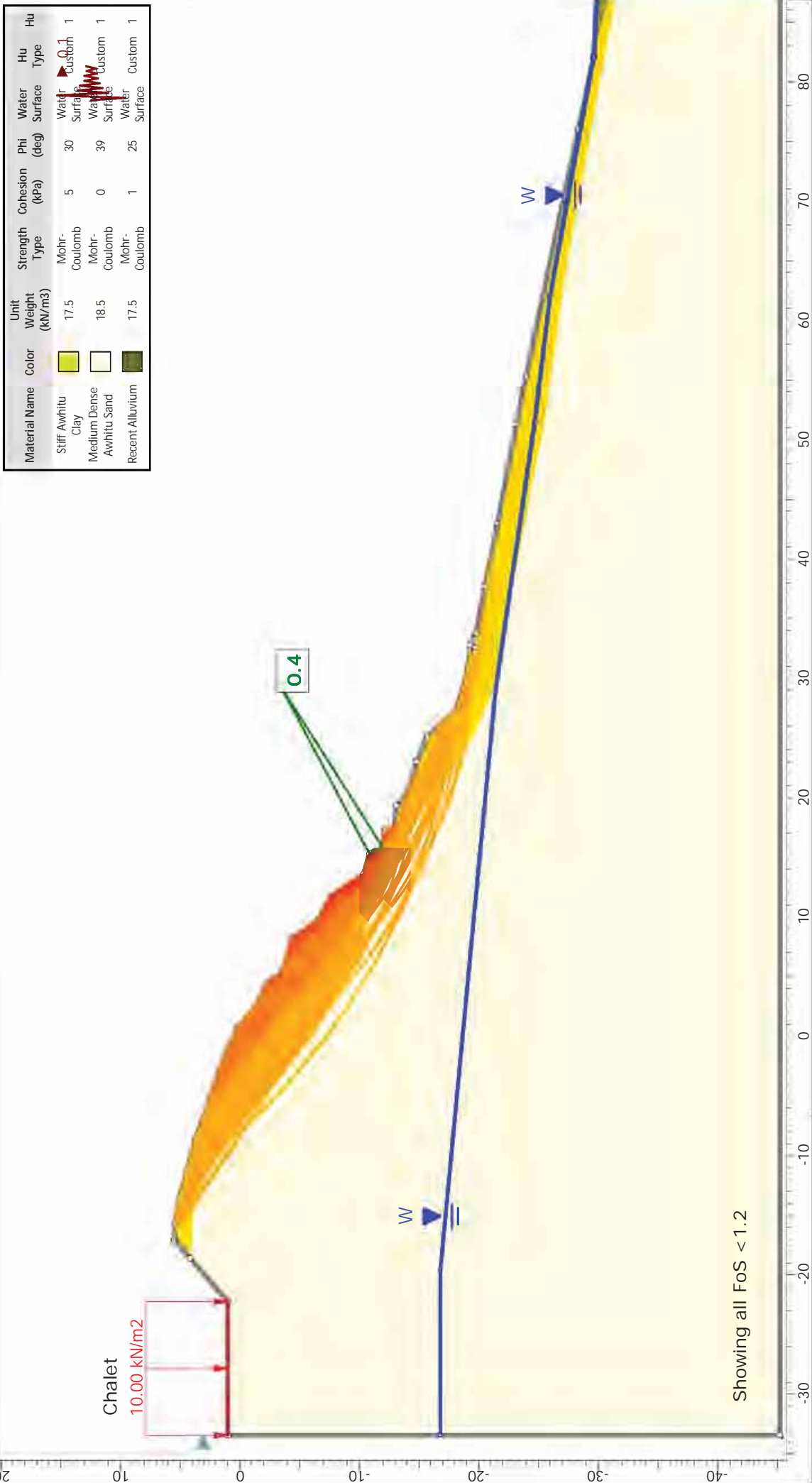
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Stiff Awahitu Clay	Light Green	17.5	Mohr-Coulomb	5	30	Water Surface	Custom	1
Medium Dense Awahitu Sand	Light Yellow	18.5	Mohr-Coulomb	0	39	Water Surface	Custom	1
Recent Alluvium	Dark Green	17.5	Mohr-Coulomb	1	25	Water Surface	Custom	1

Chalet

10.00 kN/m2

0.4




Showing all FoS < 1.2



Project		J01162 Muriwai Downs Golf	
Group	Proposed Slope	Scenario	Seismic
	20 October 2021 - JL		Cross Section
		Lander Geotechnical Consultants Limited	



Cross Section CC'

Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Cohesion (kPa)	Phi (deg)
Stiff Awahitu Clay		17.5	5	30
Medium Dense Awahitu Sand		18.5	0	39
Recent Alluvium		17.5	1	25

0.9



SLIDE INTERPRET 9.017

Project

J01662 Muriwai Downs Golf

Group

Existing Slope




Existing Conditions

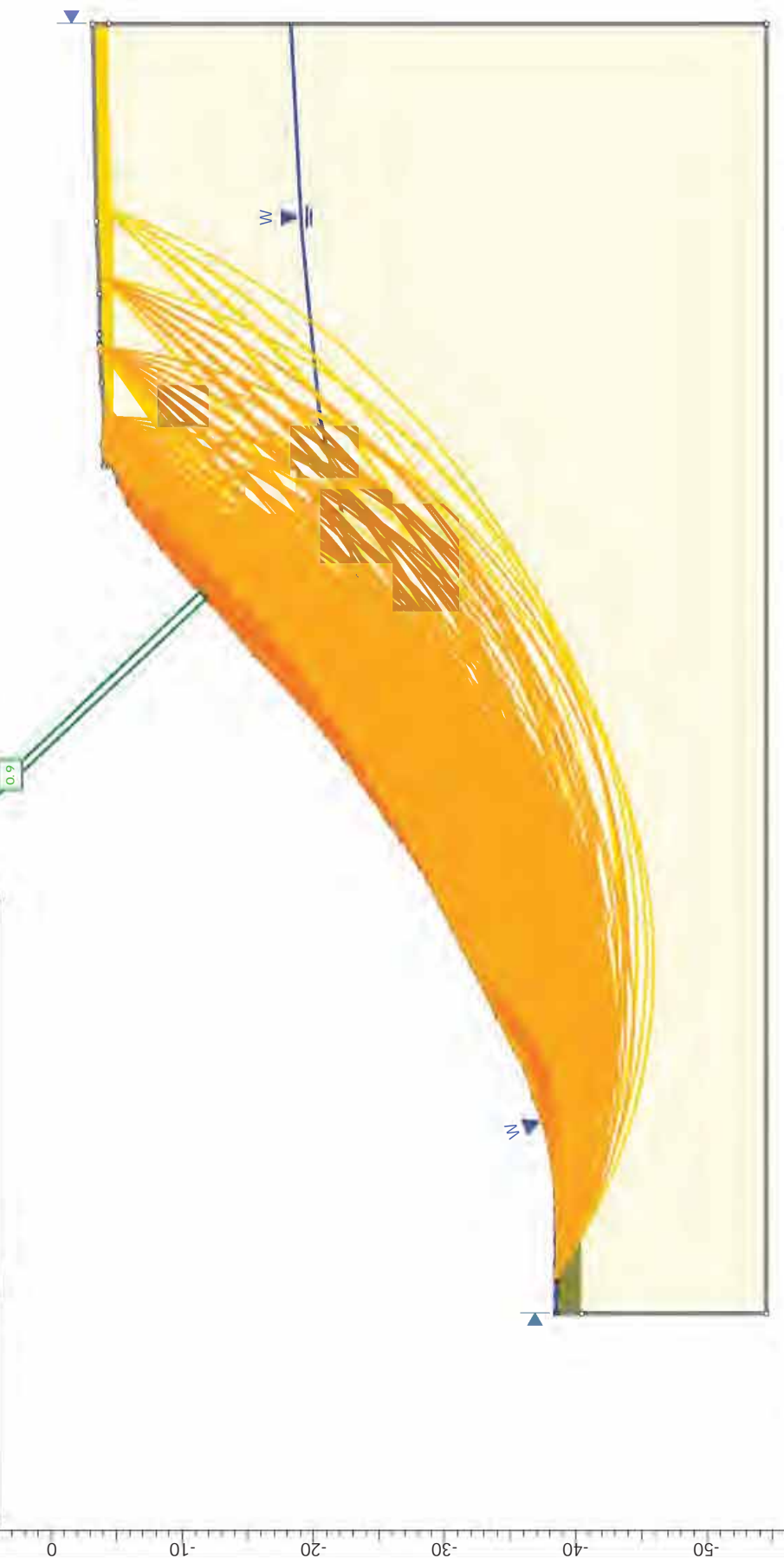
20 October 2021 JL

Cross Section

Scenario

Lander Geotechnical Consultants Limited

Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Cohesion (kPa)	Phi (deg)
Stiff Awahitu Clay		17.5	5	30
Medium Dense Awahitu Sand		18.5	0	39
Recent Alluvium		17.5	1	25



Project



J01662 Muriwai Downs Golf

Elevated Groundwater

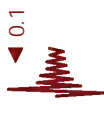
Scenario

Existing Slope

Cross Section

20 October 2021 - JL

Lander Geotechnical Consultants Limited



Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Cohesion (kPa)	Phi (deg)
Stiff Awahitu Clay	Yellow	17.5	5	30
Medium Dense Awahitu Sand	Light Green	18.5	0	39
Recent Alluvium	Dark Green	17.5	1	25

0.7



Project



J01662 Muriwai Downs Golf

Group

Existing Slope

Scenario

Seismic

20 October 2021 JL

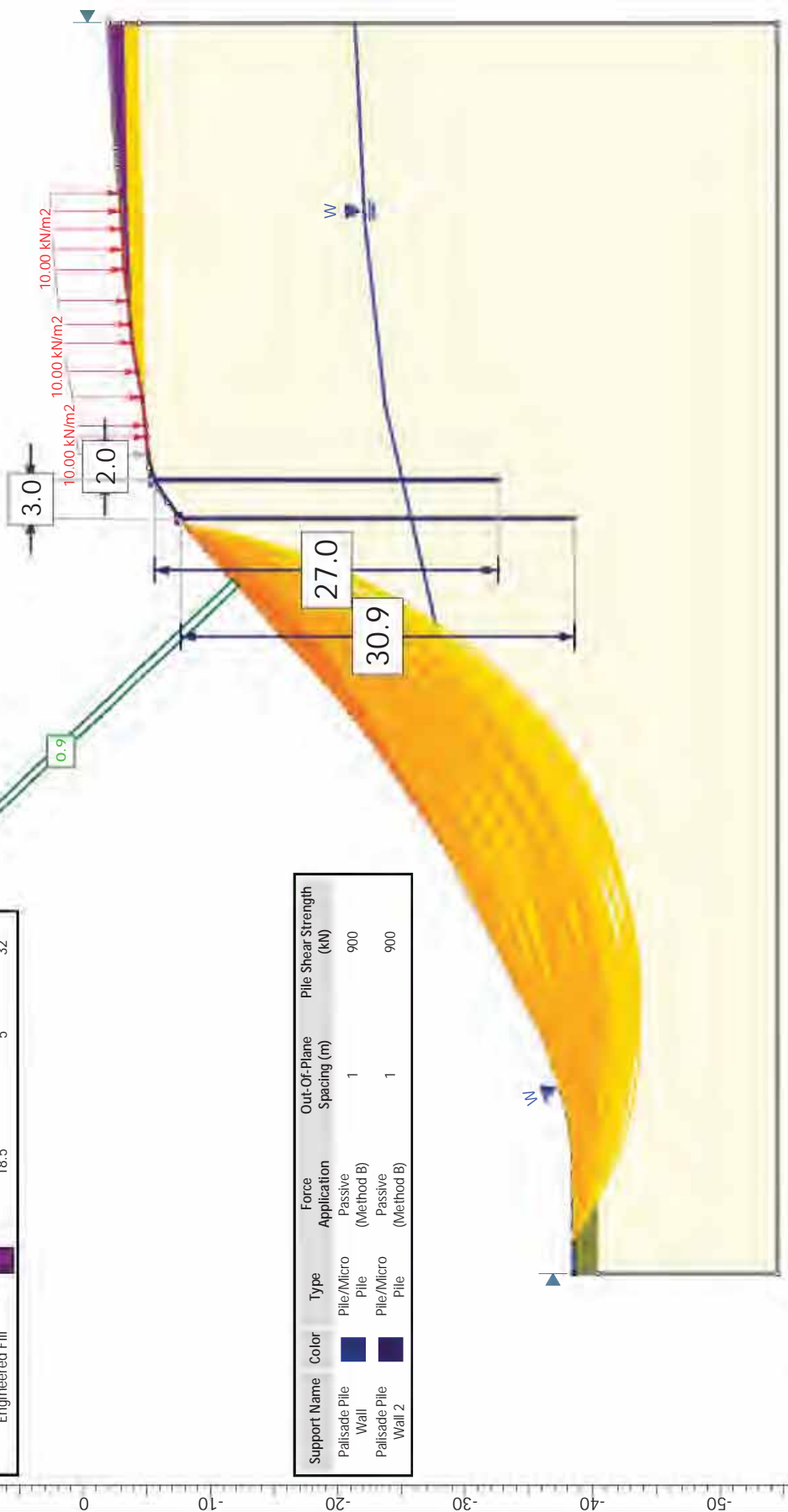
Cross Section

Lander Geotechnical Consultants Limited

Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Cohesion (kPa)	Phi (deg)
Stiff Awahitu Clay		17.5	5	30
Medium Dense Awahitu Sand		18.5	0	39
Recent Alluvium		17.5	1	25
Engineered Fill		18.5	5	32

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Pile Shear Strength (kN)
Palisade Pile Wall		Pile/Micro Pile	Passive (Method B)	1	900
Palisade Pile Wall 2		Pile/Micro Pile	Passive (Method B)	1	900

Chalet



Project



J01662 Muriwai Downs Golf

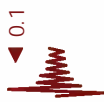
Proposed Slope - Pile Array  
20 October 2021 - JL

Existing Conditions  
Cross Section

Lander Geotechnical Consultants Limited



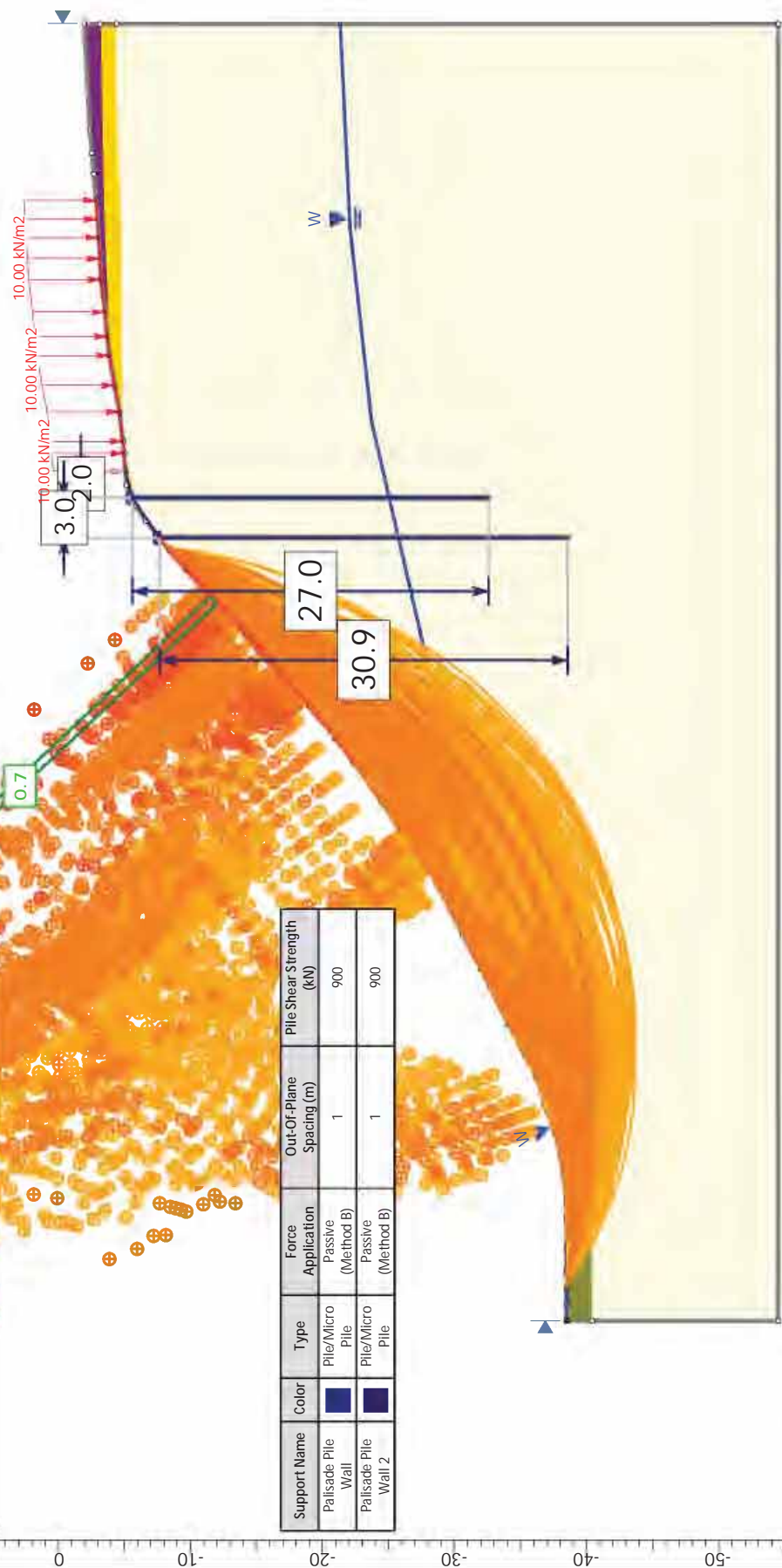




Chalet

Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Cohesion (kPa)	Phi (deg)
Stiff Awahitu Clay	Yellow	17.5	5	30
Medium Dense Awahitu Sand	Light Green	18.5	0	39
Recent Alluvium	Dark Green	17.5	1	25
Engineered Fill	Purple	18.5	5	32

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Pile Shear Strength (kN)
Palisade Pile Wall	Blue	Pile/Micro Pile	Passive (Method B)	1	900
Palisade Pile Wall 2	Blue	Pile/Micro Pile	Passive (Method B)	1	900



Project



J01662 Muriwai Downs Golf

Proposed Slope - Pile Array





Scenario

Seismic

20 October 2021 - JL

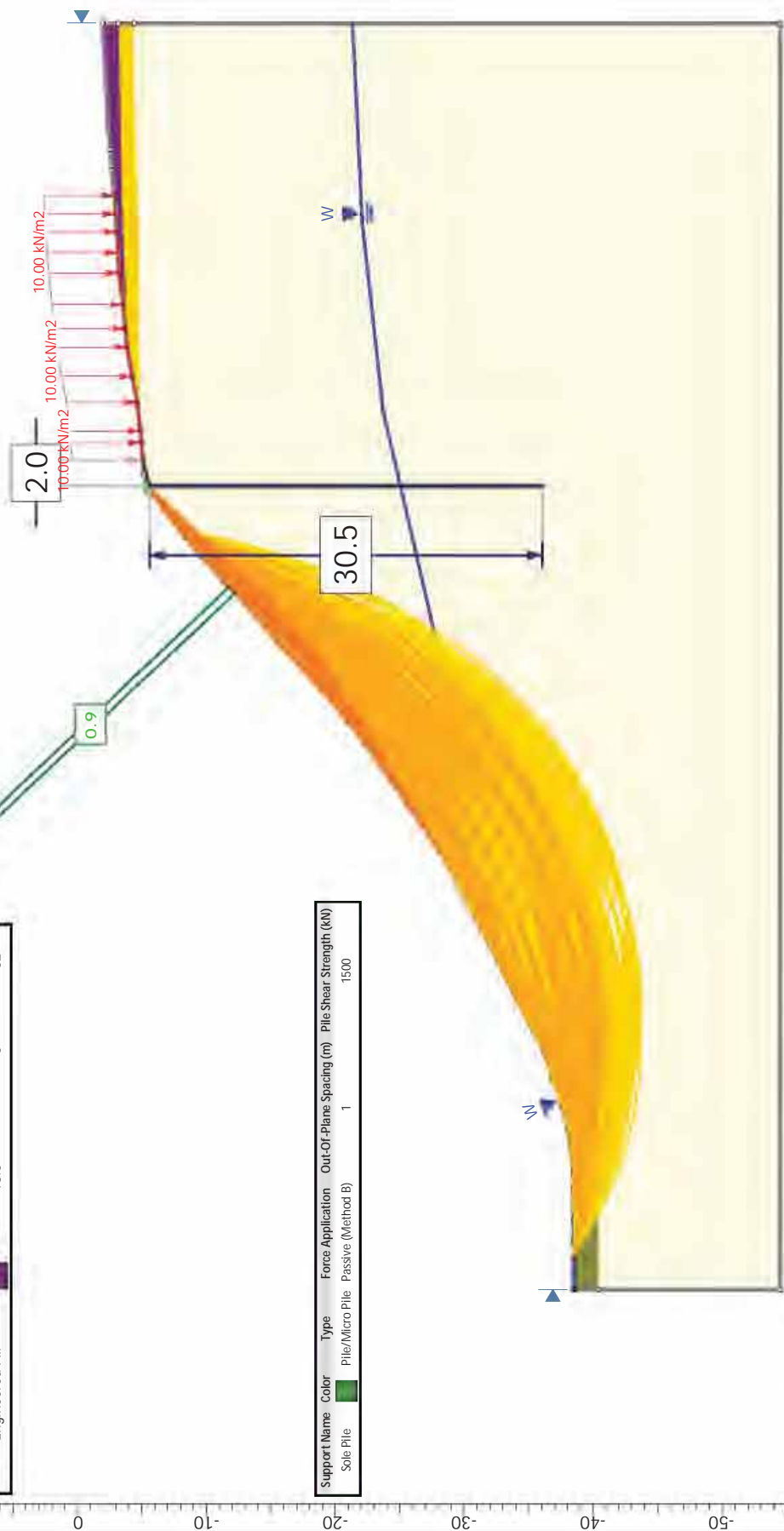
Cross Section

Lander Geotechnical Consultants Limited

Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Cohesion (kPa)	Phi (deg)
Stiff Awahitu Clay		17.5	5	30
Medium Dense Awahitu Sand		18.5	0	39
Recent Alluvium		17.5	1	25
Engineered Fill		18.5	5	32

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Pile Shear Strength (kN)
Sole Pile		Pile/Micro Pile	Passive (Method B)	1	1500

Chalet



SLIDE INTERPRET 9.017

Project

J01662 Muriwai Downs Golf

Group

Proposed Slope - Single Pile

Existing Conditions

Date

20 October 2021 - JL

Cross Section

Client

Lander Geotechnical Consultants Limited

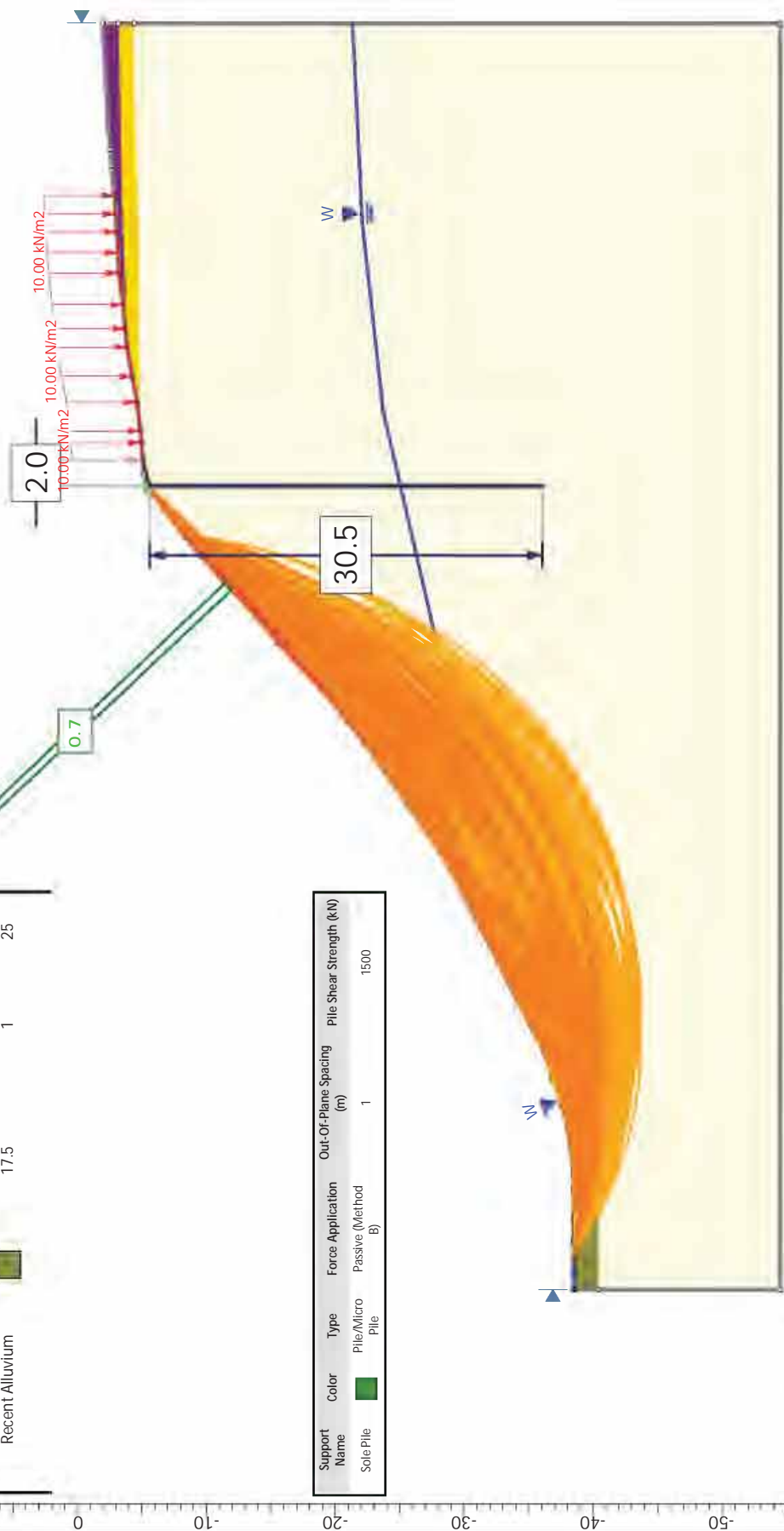




Chalet

Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Cohesion (kPa)	Phi (deg)
Stiff Awahu Clay		17.5	5	30
Medium Dense Awahu Sand		18.5	0	39
Recent Alluvium		17.5	1	25

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Pile Shear Strength (kN)
Sole Pile		Pile/Micro Pile	Passive (Method B)	1	1500



SLIDE INTERPRET 9.017

Project

J01662 Muriwai Downs Golf

Group

Proposed Slope - Single Pile

Scenario

Seismic

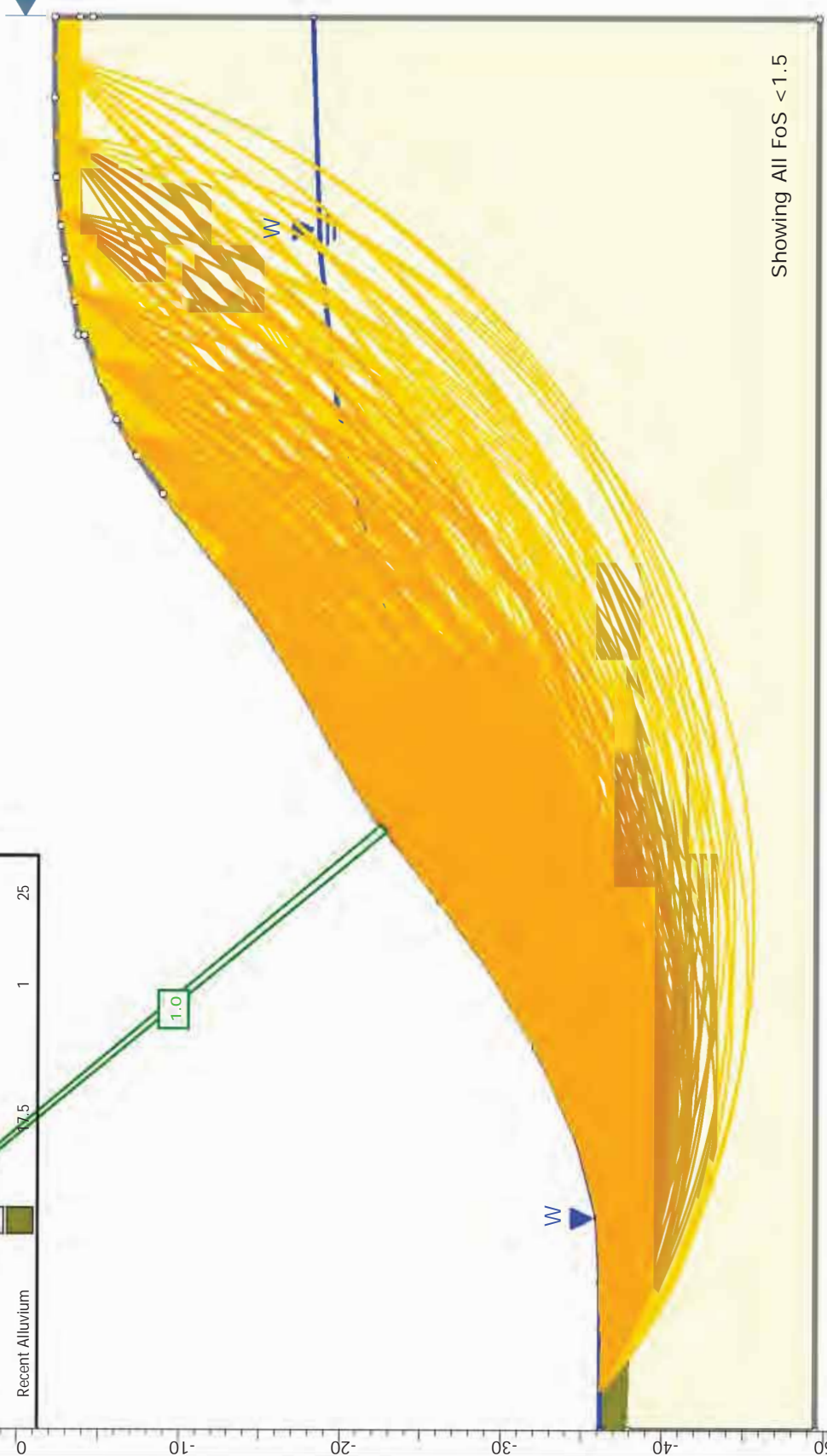
20 October 2021 - JL


Cross Section



Lander Geotechnical Consultants Limited

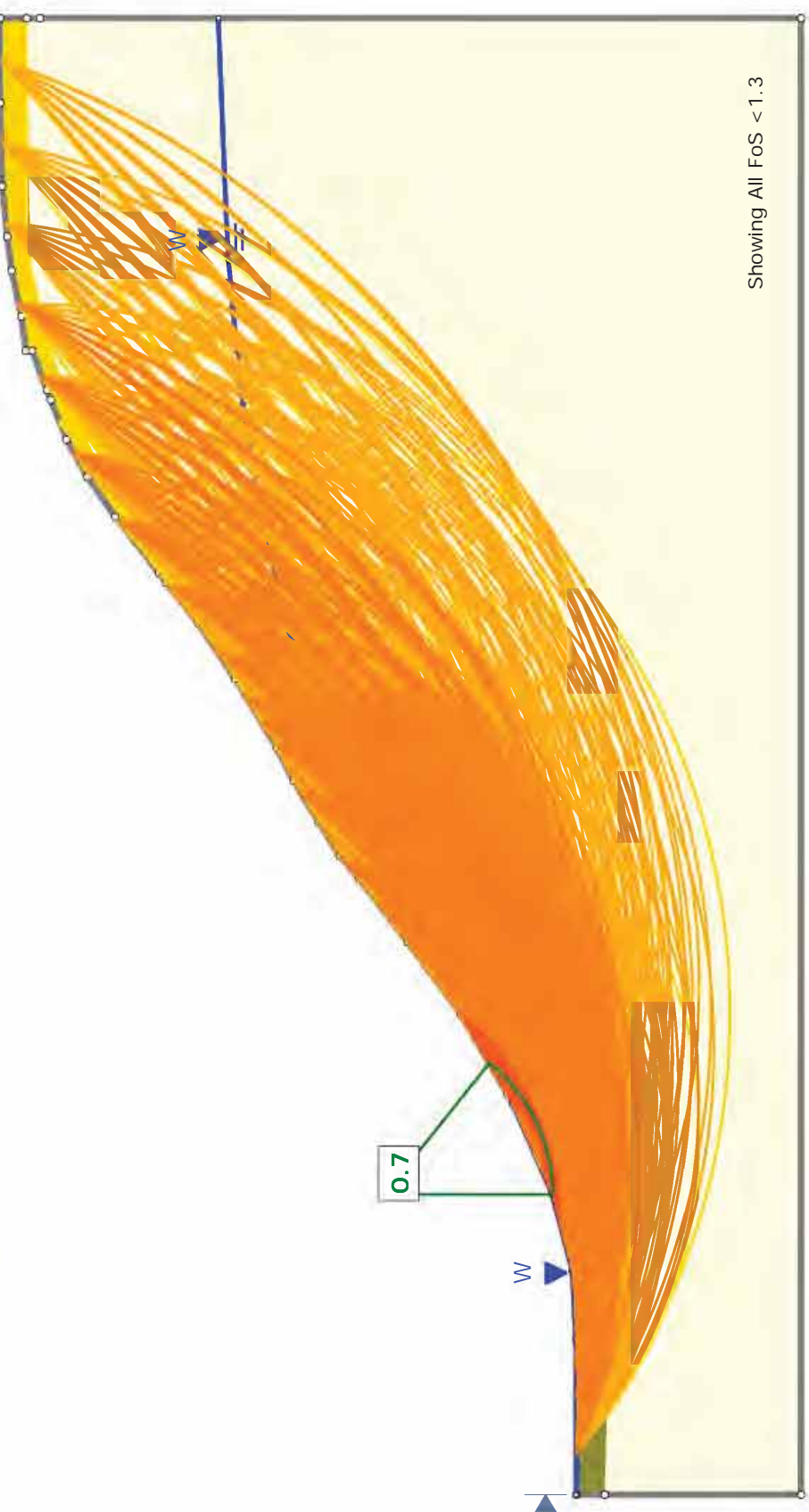
Cross Section DD'


Soil Type	Soil Strength (kPa)	Soil Weight (kN/m <sup>3</sup> )	Soil Friction (kPa)	Soil Cohesion (kPa)
Stiff Awahitu Clay	17.5	5	30	0
Medium Dense Awahitu Sand	18.5	0	39	0
Recent Alluvium	17.5	1	25	0



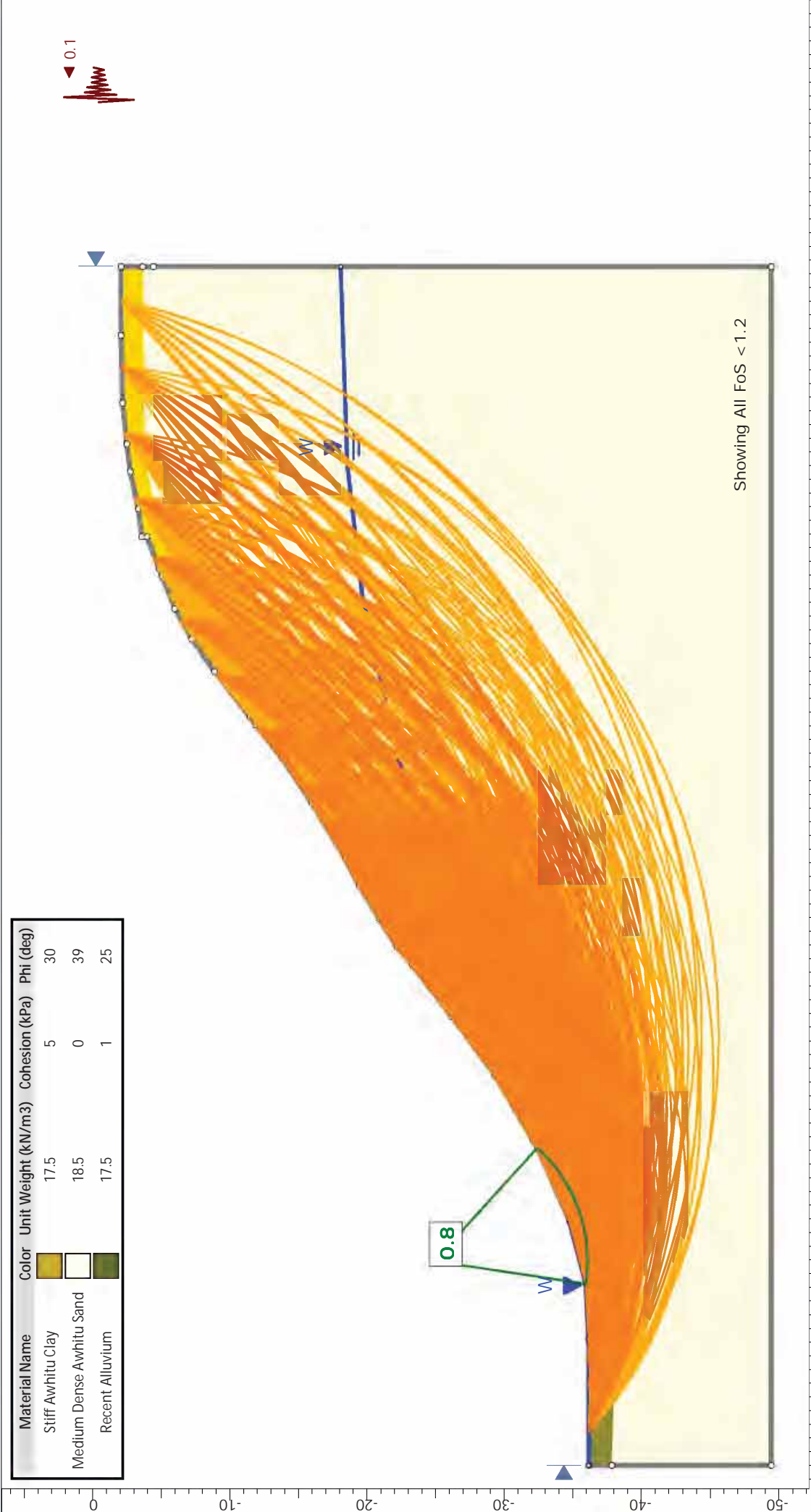
		Project J01662 Muriwai Downs Golf Project	
Group Existing Slope 20 October 2021 JL		Scenario Existing Conditions Cross Section	
SLIDEINTERPRET 9.017		Lander Geotechnical Consultants Limited	


Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Cohesion (kPa)	Phi (deg)
Stiff Awahitu Clay		17.5	5	30
Medium Dense Awahitu Sand		18.5	0	39
Recent Alluvium		17.5	1	25



		Project	
		J01662 Muriwai Downs Golf Project	
Group	Existing Slope		Scenario
	20 October 2021 JL		Elevated Groundwater
		Cross Section	
		Lander Geotechnical Consultants Limited	

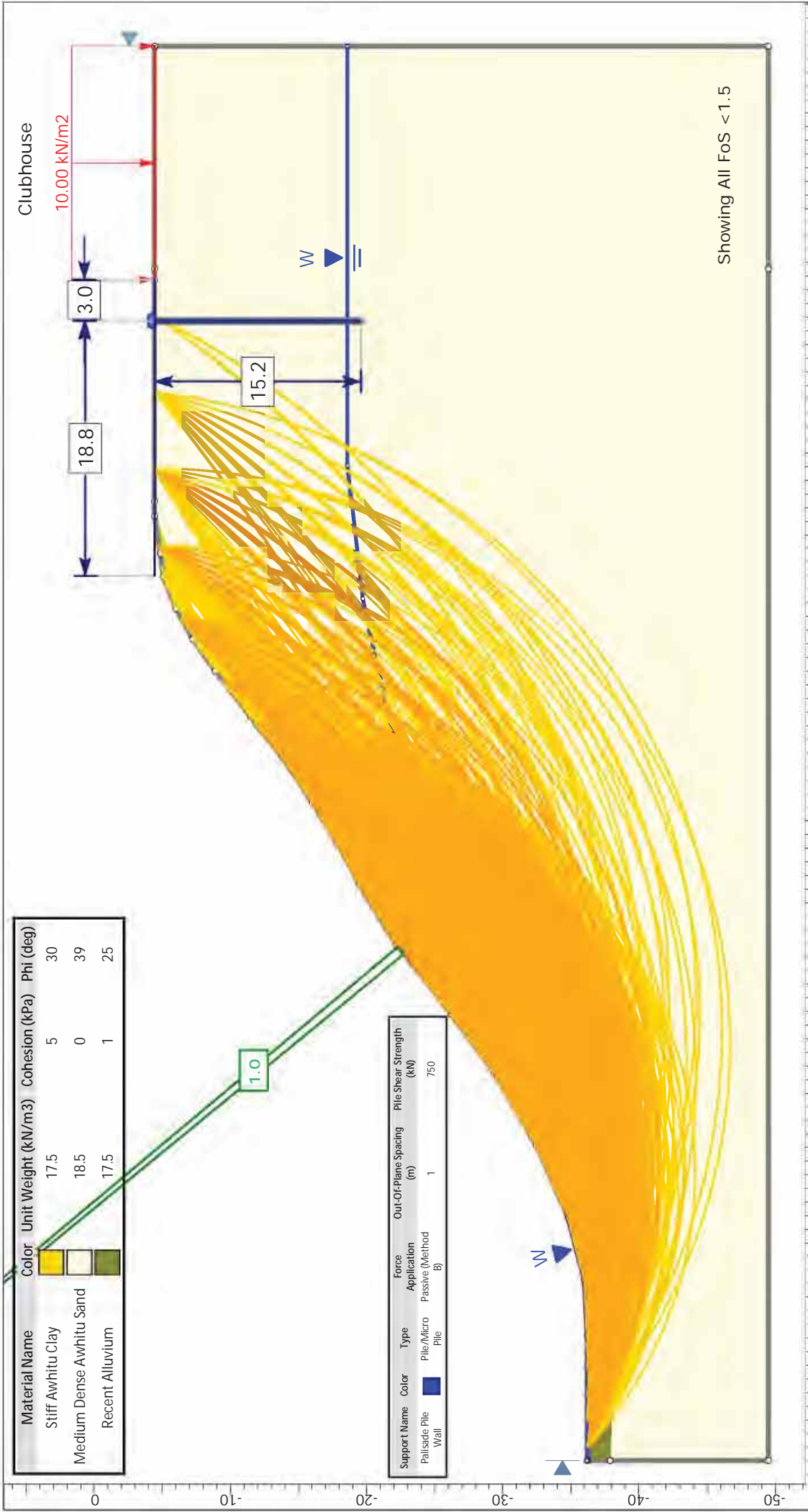




		Project J01662 Muriwai Downs Golf Project	
Group Existing Slope 20 October 2021 JL		Scenario Seismic Cross Section	
Lander Geotechnical Consultants Limited			

Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Cohesion (kPa)	Phi (deg)
Stiff Awahitu Clay		17.5	5	30
Medium Dense Awahitu Sand		18.5	0	39
Recent Alluvium		17.5	1	25

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Pile Shear Strength (kN)
Palisade Pile Wall		Pile/Micro Pile	Passive (Method B)	1	750



Project



J01662 Muriwai Downs Golf Project

Proposed Slope

Existing Conditions

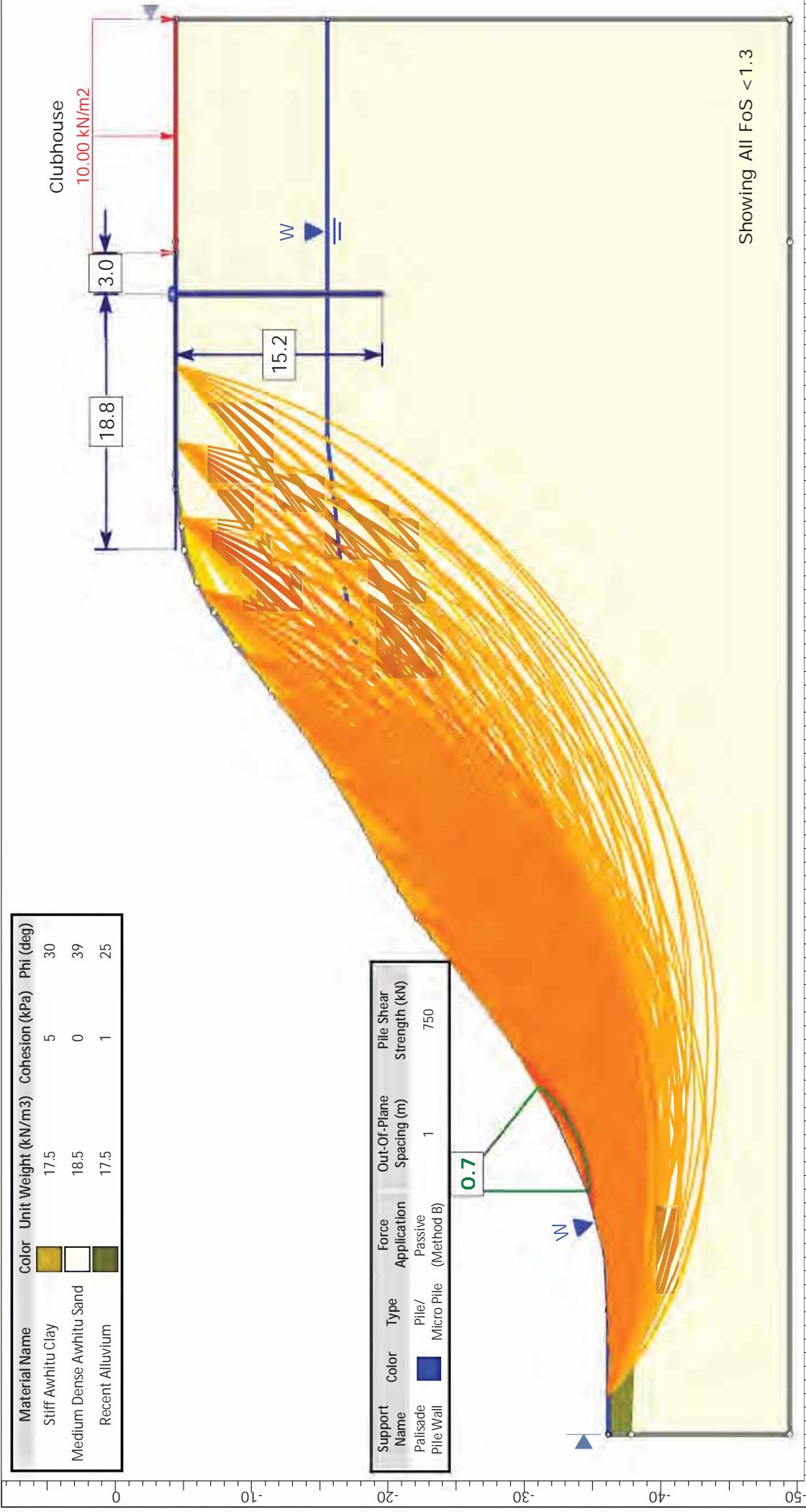
20 October 2021 JL


Cross Section

Lander Geotechnical Consultants Limited

Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Cohesion (kPa)	Phi (deg)
Stiff Awhitu Clay		17.5	5	30
Medium Dense Awhitu Sand		18.5	0	39
Recent Alluvium		17.5	1	25

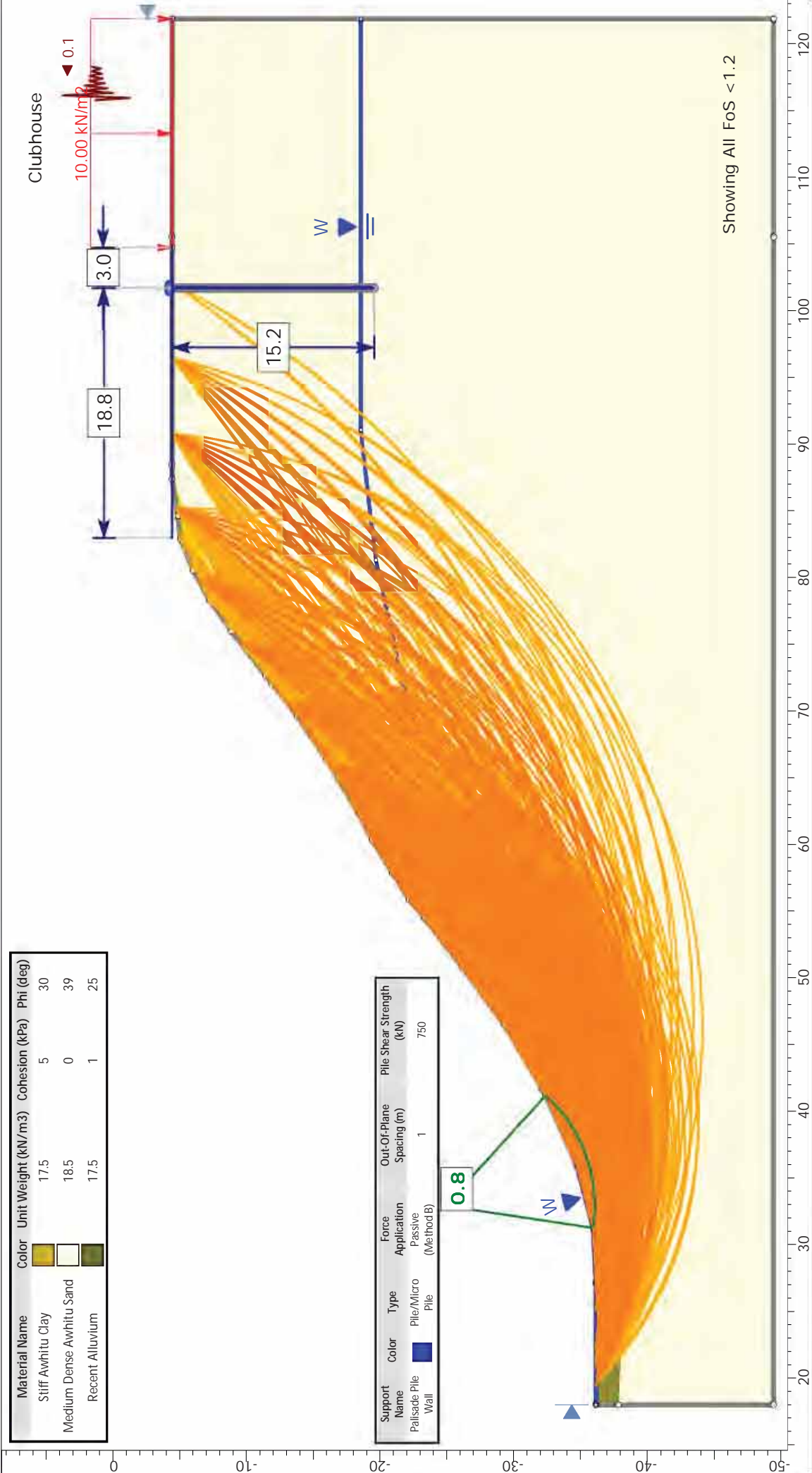
Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Pile Shear Strength (kN)
Palisade		Pile/	Passive	1	750
Pile Wall		Micro Pile	(Method B)		




		Project	
		J01662 Muriwai Downs Golf Project	
Group		Scenario	
Proposed Slope		Elevated Groundwater	
20 October 2021 JL		Cross Section	
Lander Geotechnical Consultants Limited			

Material Name	Color	Unit Weight (kN/m <sup>3</sup> )	Cohesion (kPa)	Phi (deg)
Stiff Awahitu Clay		17.5	5	30
Medium Dense Awahitu Sand		18.5	0	39
Recent Alluvium		17.5	1	25

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Pile Shear Strength (kN)
Palisade Pile Wall		Pile/Micro Pile	Passive (Method B)	1	750



		Project	
		J01662 Muriwai Downs Golf Project	
Proposed Slope 20 October 2021 JL		Scenario	
		Seismic	
Lander Geotechnical Consultants Limited		Cross Section	