



# 22 Johnson Street, Auckland

## Geotechnical Investigation Report



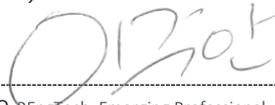
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Appendix A: Architecture Drawings

Appendix B: Geotechnical Investigation Location Plan and Hand Auger Logs

## 1 Introduction

G.DECO has been commissioned by Srujith Sirikonda (the Client) to undertake a geotechnical investigation for the proposed development located at 22 Johnson Street, Tuakau.

This report presents the subsoils geotechnical investigation using hand operated equipment. The information obtained has been used to assess ground conditions, review site stability, determine foundation options and provide geotechnical parameters for use in structural design.

The report presents our findings and recommendations and has been prepared in support of a Building Consent application.

## 2 Scope of Work

In preparation of this report, we have undertaken the following tasks:

- A site walkover investigation by G.DECO Geotechnical Engineers
- Three (3) hand auger boreholes with Scala penetrometer tests (AS's) or shear vane tests as appropriate
- Review of client supplied information including geotechnical investigation and report, topographical plan, and architectural drawings
- Desktop study of geological maps and books
- Interpretation of the subsurface conditions based on site specific investigation results
- Seismic assessment
- Geotechnical recommendation for proposed development

## 3 Site Description

### 3.1 General

The site is located at 22 Johnson Street, Tuakau and has a total area of 3,874m<sup>2</sup>. The site is bounded by residential properties on two side, dense bush to the north, and by Johnson Street to the west. It can be accessed off Johnson Street directly. The site was vacant during the site visit. The majority of the land within the site is generally sloping downwards west at a gradient of approximately 1 vertical (V) to 3 Horizontal (H).

The property details of 22 Johnson Street, Tuakau are summarised in Table 1 below.

Table 1: Property Details

| PROPERTY LOCATION         | LEGAL TITLE      | PROPOSED DEVELOPMENT       |
|---------------------------|------------------|----------------------------|
| 22 Johnson Street, Tuakau | LOT 26 DP 354076 | One Double Storey Dwelling |

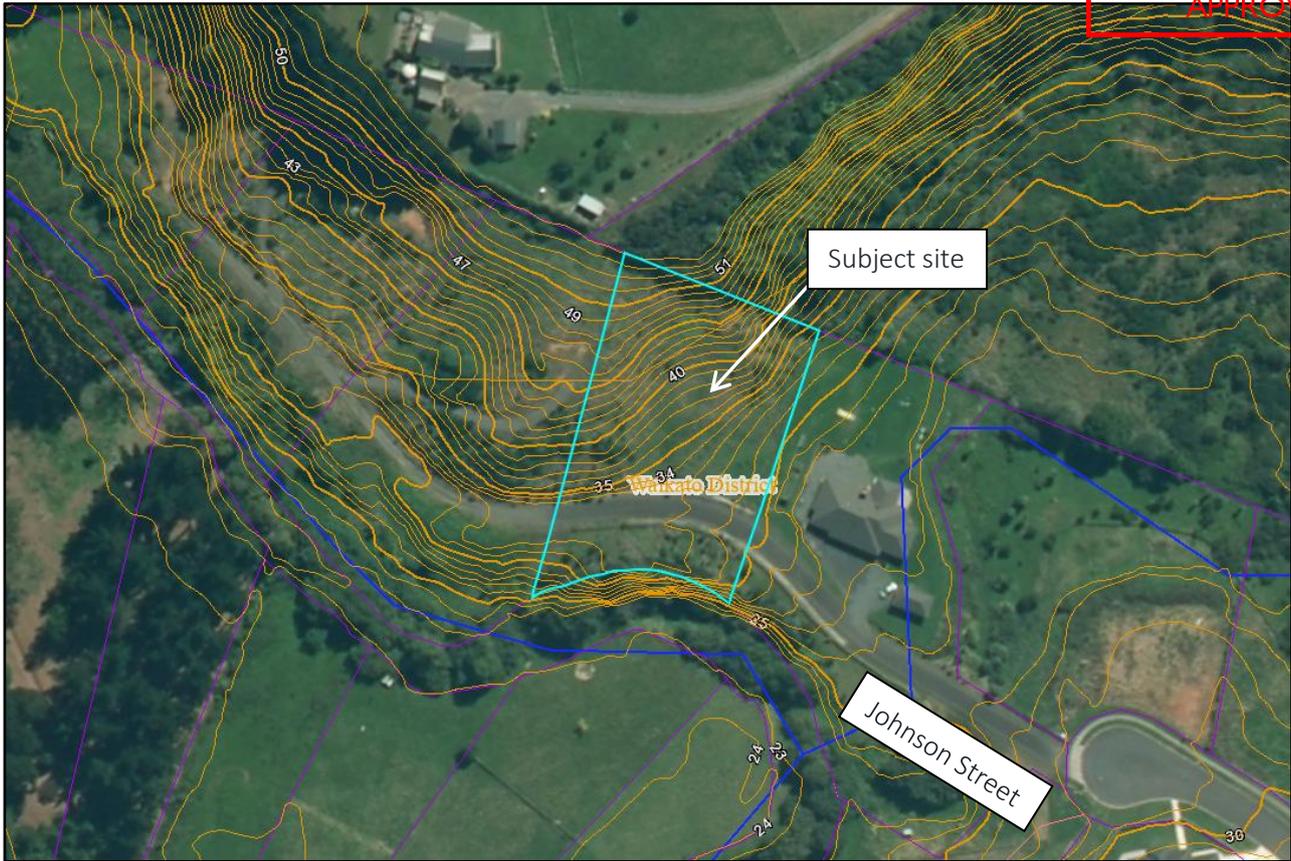


Figure 1: Site Location from Waikato Regional Council Website (Waikato Regional Council, 2022)

### 3.2 Regional Geology

The geology of the site and surrounding area is given on the Geological Map of New Zealand, Sheet R11, Auckland Urban Area (scale 1:50,000). This shows the site to be underlain by deposits of the Auckland Volcanic Field. These deposits comprise of lava flows, scoria, tuff, ash and lapilli mantles of varying thickness. The lava is commonly unweathered and is usually a hard to very hard, grey to very dark grey, dense, fine grained basalt or basanite rock. In a weathered condition the scoria, tuff, ash and lapilli become silty sand, clay and sandy clay respectively.

## 4 Proposed Development

The architectural drawings provided by L.W. Architecture Ltd indicate the proposed development will comprise one double storey dwelling. The architectural drawings are presented in Appendix A.

## 5 Geotechnical Investigation

A geotechnical investigation was undertaken on 28<sup>th</sup> February, 2022. The investigation comprised three (3) hand auger (AS) tests supplemented with Shear Vane test as appropriate. The purpose of the investigation was to assess shallow subsoils to provide data to inform geotechnical assessment. A ground investigation location plan and AS logs are presented in Appendix B.

## 6 Groundwater

Groundwater was not encountered to the depth of 3.0m below ground level (bgl) following completion of drilling on 28<sup>th</sup> February, 2022. It should be noted that groundwater level fluctuates seasonally during a prolonged dry or wet period.

## 7 Ground Conditions

The hand augers identified the following generalised soil profile across the footprint of the proposed development. The generalised soil profile was summarised in Table 2. It should be accepted that ground conditions do vary between boreholes.

At the points of investigation, the ground is summarised to comprise the following:

### Topsoil

A thin veneer of organic silt (topsoil) up to approximately 0.4m bgl

### Auckland Volcanic Formation (AVF)

Auckland Volcanic Formation soils were encountered below the topsoil layer up to the final depth drilled within all boreholes. The soils comprise silty CLAY, clayey SILT, silty SAND and fine SAND. Vane shear strength of CLAY ranged from 98kPa to 155kPa. The average shear strength is generally above 110kPa. The SAND recorded blows ranging from 4 to 8 per 100mm of penetration

Table 2: Generalised Soil Profile at 22 Johnson Street, Tuakau

| FROM (m BGL) | TO (m BGL)  | TYPICAL SOIL MATERIALS                               |
|--------------|-------------|--|
| 0.0          | 0.4         | Topsoil  |
| 0.4          | 1.0 to >3.0 | Clayey SILT and silty CLAY (AVF)                     |
| 1.0          | >3.0        | Silty SAND and fine SAND (AVF) (in AS1 and AS2 only) |

## 8 Design Parameters

### 8.1 Geotechnical Soil Parameters

For the purpose of this report, the ground conditions on the site have been interpolated between the investigation holes and consequently some variation on site can be expected. We have assumed the following soil parameters in Table 3 across the site to inform the geotechnical assessment.

Table 3: Assumed Geotechnical Soil Parameters

| MATERIAL                   | UNIT WEIGHT (kN/m <sup>3</sup> ) | EFFECTIVE FRICTION ANGLE (°) | EFFECTIVE COHESION (kPa) | UNDRAINED SHEAR STRENGTH (kPa) |
|----------------------------|----------------------------------|------------------------------|--------------------------|--------------------------------|
| Very stiff SILT/CLAY (AVF) | 18                               | 30                           | 5                        | 70                             |
| SAND (AVF)                 | 17                               | 30                           | 0                        | -                              |

### 8.2 Seismic Requirement

In accordance with NZS1170 - Structural Design Actions (NZS, 2004), the following two earthquake loading scenarios were considered based on the proposed structures having an Importance Level 2 classification and a 50-year design life.

- Serviceability Limit State (SLS) – to avoid damage that would prevent the structure from being used as originally intended, without repair; and,
- Ultimate Limit State (ULS) – to avoid collapse of the structural system.

Based on our site-specific investigations and with reference to NZS1170.5:2004 site sub-soil classes, we have considered the site to be a Class C (Shallow Soil) site.

The methodology presented in the Earthquake Geotechnical Code of Practice, Module 1 (NZGS/MBIE, 2016) has been adopted for deriving the site peak ground accelerations. Table 4 below provides a summary of the seismic design parameters adopted for each seismic case analysed in the liquefaction assessment.

Table 4: Seismic Design Parameters

| SEISMIC DESIGN CASE              | ANNUAL EXCEEDANCE PROBABILITY | EFFECTIVE MAGNITUDE | PEAK HORIZONTAL GROUND ACCELERATION (g) |
|----------------------------------|-------------------------------|---------------------|---|
| Serviceability Limit State (SLS) | 1/25                          | 5.9                 | 0.05                                    |
| Ultimate Limit State (ULS)       | 1/500                         | 5.9                 | 0.18                                    |

## 9 Slope Stability

The proposed development will involve excavation up to 1.5m and 1.7m fill with reference to erosion and sediment plan. Site formation works involves cut into existing sloping ground at different levels to form the building platform. All fill and cut faces will be supported by engineer designed retaining walls.

## 10 Site Formation Works

Based on the contours within the Auckland Council GIS and architectural drawings, the following should be considered to undertake to form the building platform:

- Site cut up to 1.5m and fill up to 1.7m to create a platform for the proposed dwelling, the cut and fill face is expected to be retained by specific engineering designed retaining wall.
- Cuts and fills on site should be designed by a suitably qualified and experienced engineer.
- The control of surface water is to be always maintained during construction to ensure no surface runoff shall flow over or immediately above the excavation cut faces.
- Consideration should be given to staging the excavation so that this can be achieved. We recommend the temporary cutting to be undertaken in sections and for the shortest possible duration. If for unforeseen circumstances, the excavated faces were left open, appropriate temporary support measures and protection shall be implemented.
- We advise that the site-won excavated material may be reused as fill, provided the water content is adjusted to an acceptable level by either wetting or drying as found necessary. Alternatively, imported cohesive or granular fill could be used subject to approval by a suitably qualified geotechnical engineer.
- Regardless of the material source, all fills must be placed in accordance with NZS 4431:1989, Code of Practice for Earth Fill for Residential Development.
- Current industry safe working practices shall always be followed when working near cut faces.

## 11 Soil Expansivity

It is our opinion that the cohesive soils encountered on site are susceptible to some volume change due to alteration of moisture content. Soils may be susceptible to shrink-swell soil processes as clay cyclically dries out and shrinks in summer and re-wets and expands in winter. Expansive soils are to be approached with practical foundation solutions regarding the proposed development. The November 2019 Amendment 19 of NZBC Structure B1/AS1, Clause 3.2 "slab-on-ground in expansive soils", which provides a new Clause 7.5.13, of the same name, into NZS3604. For the purpose of design, the site may be designed as moderately reactive

(Class M). A specific engineering design for all structure foundations shall be undertaken by a competent Chartered Professional Engineer taking into consideration of soil expansivity effects.

## 12 Liquefaction Potential

We have undertaken a high-level desktop liquefaction assessment for the site. Considering the site is underlain by clayey and silty soils (Auckland Volcanic Field), liquefaction is unlikely to occur under a ULS seismic event and its effects at ground level are expected to be a very low risk for the proposed development.

In addition, the structural Engineer shall design the foundation and structures in accordance with the latest updated Building Code B1 (MBIE, 2021).

## 13 Construction Methodology Requirements

Detailed construction methodology shall be prepared by the Contractor and subject to a geotechnical review and approvals from Auckland Council and Client prior to the site work. At the time of writing this report, we are not a party to the design of specific engineering design (SED) retaining walls. In view of the uncertainties involved, we recommend the construction methodology shall include, but not limited to the following sections.

Retaining walls (block wall) up to a maximum retained height of 2.7m are proposed.

Our previous experience is that excavations at some construction sites within similar soil conditions in Auckland which were opened up in an uncontrolled manner have undergone stability issues as they became exposed to inclement weather over a prolonged period of time. In some instances, there has also been little working area for subsequent waterproofing and drainage works behind the wall at the site, the proposed excavation is relatively close to the lot boundaries. Hence, the consequences of failures of the temporary cut slopes must be considered carefully.

On the preparation of the detailed construction methodology for building consent, we recommend the retaining wall designer shall take into consideration of the following:

1. No works are to be carried out until a construction methodology is submitted and approved by the project team and a pre-construction meeting held onsite to discuss the methodology. To establish a methodology, as a minimum, the following aspects are to be discussed and confirmed:
  - Site Formation works required to gain access for construction plant.
  - Staging of the wall construction, taking into account weather effects and construction programme.
  - Locations and gradients of any temporary cut slope batter.
  - The clearance distance allowed for water proofing and drainage works behind the retaining walls.
2. Cut slopes should be protected against wet weather.
3. Pile foundations with minimum embedment depth recommended.
4. Placement of Polyrock in the area with significant fills proposed.
5. Temporary stability measures such as propping, or shoring may need to be considered.
6. The above must consider constructing the walls in short lengths of no more than 5m.

## 14 Pavement

Topsoil and non-engineered fill (if any) should be removed from the accessway area. Based on our experience of similar subgrade soils, a design CBR value of 3% would be appropriate for the underlying natural in situ subgrade soils. We also recommend that Scala penetrometer testing be carried out on the exposed subgrade prior to construction to confirm the design CBR.

## 15 Stormwater Disposal

Stormwater from the dwelling and all hard standing areas must be collected and discharged in a controlled manner in accordance with current Council requirements. We recommend that stormwater be taken to discharge in a controlled manner away from building foundation.

Stormwater should not be allowed to discharge onto nearby sloping ground or the ground around the foundation as this may cause softening of the foundation soils.

Careful consideration should be given to the grading of the site surface to channel any stormwater runoff away from the dwelling and towards a suitable connection point. **No soakage shall be allowed prior to the approval of the geotechnical engineer who are familiar with this site and this report.**

## 16 Geotechnical Recommendations

The following recommendations can be made to support the Building Consent application of the proposed development.

### 16.1 Foundations

Based on near surface soil assessment, we consider the site does NOT meet the requirements of 'good ground' in accordance with the NZS 3604 Timber-frame Building (NZS, 2011). A soil expansivity of 'Class M' could be expected at this site. The dwellings may be founded on shallow foundations (ribraft foundation). The geotechnical investigation results indicate that subsoils with Geotechnical Ultimate Bearing Capacity (GUBC) of 300kPa could be present at approximately 0.4m bgl.

### 16.2 Retaining Walls

Retaining walls, up to a maximum height of 2.7m are required to support the cut and fill faces. Provided adequate drainage was implemented behind the retaining walls, the following soil parameters can be considered.

- |   |                     |
|---|---------------------|
| - Bulk unit weight ( $\gamma$ ) for the retained soils  | 18kN/m <sup>3</sup> |
| - Undrained shear strength ( $s_u$ ) for foundation     | 70kPa               |
| - Cohesion ( $c'$ )                                     | 0                   |
| - Internal friction angle ( $\phi'$ )                   | 30°                 |
| - Bearing capacity (Block walls, if not in Foundations) | 300kPa              |

For concrete block retaining walls or retaining structure by building exterior wall, a higher coefficient of earth pressure (K) of no less than 0.6 is recommended to take into account the stiffness of the such walls.

**The retaining wall design shall take account of any sloping ground above or below the wall and any surcharges that may apply.**

Adequate drainage must be incorporated behind all retaining walls to prevent the build-up of hydrostatic pressures on the wall(s).

## 17 Engineering Observations

Topsoil and any soft or unsuitable material approximately 0.4m bgl within the proposed building footprint shall be removed. Specific geotechnical inspections of building platform preparation and/or foundation excavations with certification by a Producer Statement (PS4) are often required by Council and outlined in the Building Consent.

We are able to carry out the engineering inspections and provide the PS4 documentation. Provision ought to be permitted to change the recommendations of this report should the ground conditions encountered vary from those expected. Prior notification of at least 48 hours ahead of any site inspection is appreciated.

## 18 References

- Kermode, L.O. (1992). *Geology of the Auckland urban area: sheet R11. Scale 1:50 000. Institute of Geological & Nuclear Sciences geological map 2. 1 Sheet + 63 p.* Lower Hutt New Zealand: Institute of Geological & Nuclear Sciences Limited.
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- Waikato Regional Council. (2022). *Waikato Regional Council Maps.* Retrieved from <https://waikatomaps.waikatoregion.govt.nz/Viewer/?map=8d6d6fda779b4e59951953ae97d0ec4a#>

## 19 Limitations

This report has been prepared by G.DECO Ltd (G.DECO) for the Client in respect of the proposed development for the purposes agreed between the Client and G.DECO and as specified in the report (Purpose). G.DECO accepts no responsibility for the validity, appropriateness, sufficiency or consequences of the Client using the report for purposes other than for the defined Purposes and the report is not to be produced without G.DECO's prior written permission.

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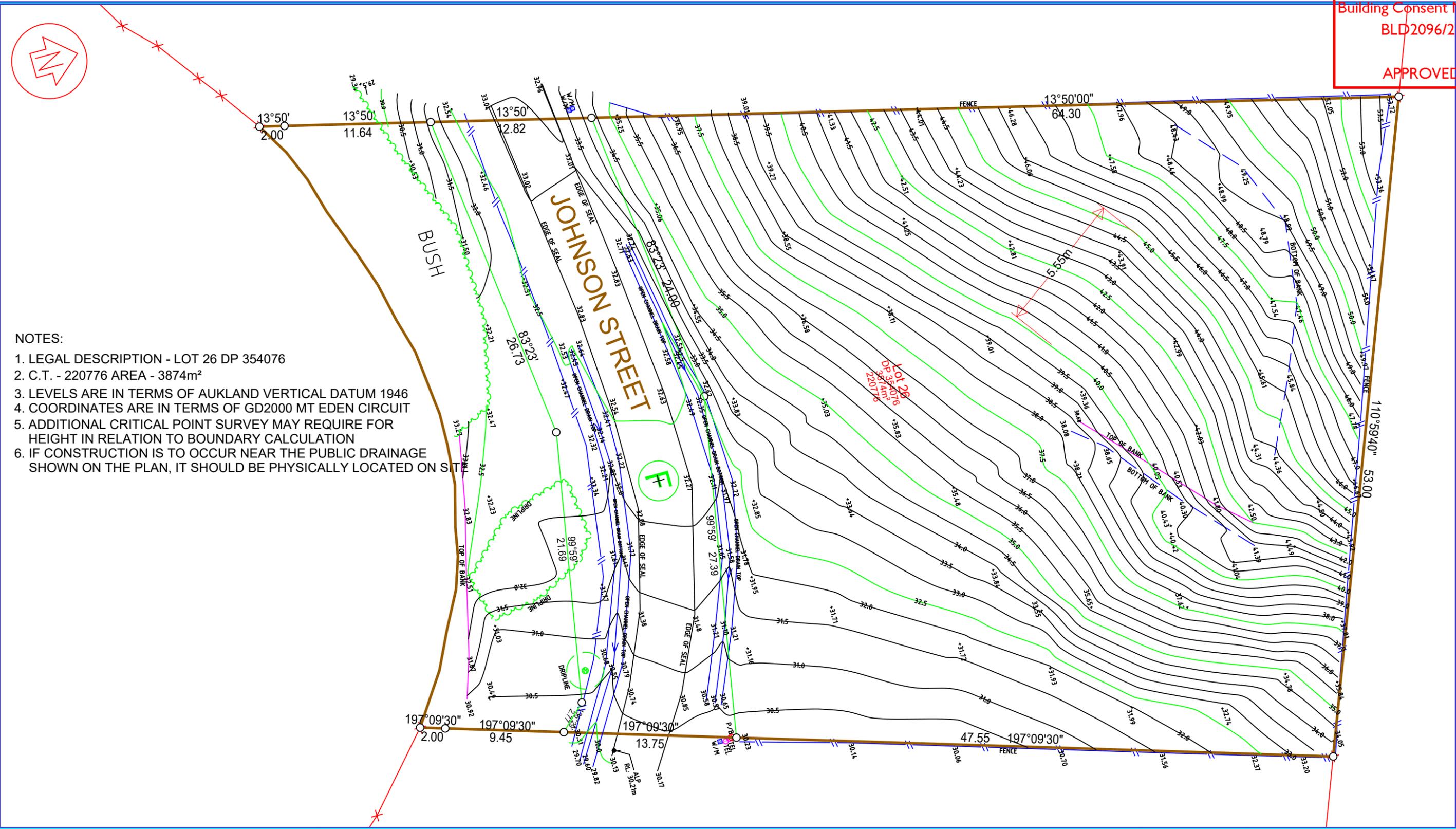
- G.DECO has provided the report based on the various assumptions contained in this report.
- Where we have obtained information from a government register or database, we have assumed that the information is accurate. Where an assumption has been made, we have not made any independent investigations with respect to the matters the subject of that assumption. We are not aware of any reason why any of the assumptions are incorrect.
- No calculations, other than those noted within, have been undertaken in support of the conclusions of this report.
- A change in circumstances, facts, information after the report has been provided may affect the adequacy or accuracy of the report. G.DECO is not responsible for the adequacy or accuracy of the report as a result of a change.

- This report specifically excludes assessment or advice relating to hazardous materials, such as asbestos or contaminated land.
- G.DECO's professional services are performed using a degree of care and skill normally exercised, under similar circumstances, by reputable consultants practicing in this field at this time.

Subsurface conditions are formed through a variety of natural processes and can be altered by human activities. Subsurface conditions cannot be exhaustively defined by investigations at discrete locations. Therefore, it is unlikely that the results and assessments expressed in this report will represent conditions at any location. Furthermore, subsurface conditions can change over time, which should be considered when interpreting or using the data within this report.

# Appendix A

## Architectural Drawings



- NOTES:
1. LEGAL DESCRIPTION - LOT 26 DP 354076
  2. C.T. - 220776 AREA - 3874m<sup>2</sup>
  3. LEVELS ARE IN TERMS OF AUKLAND VERTICAL DATUM 1946
  4. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT
  5. ADDITIONAL CRITICAL POINT SURVEY MAY REQUIRE FOR HEIGHT IN RELATION TO BOUNDARY CALCULATION
  6. IF CONSTRUCTION IS TO OCCUR NEAR THE PUBLIC DRAINAGE SHOWN ON THE PLAN, IT SHOULD BE PHYSICALLY LOCATED ON SITE

**Lim Surveyors Ltd**  
 REGISTERED SURVEYORS - LAND DEVELOPMENT CONSULTANTS  
 228A Ellerslie Panmure H'Way, Ellerslie  
 Phone 09 589 1981  
 Fax 09 589 1983  
 e-mail: limsur@xtra.co.nz



**TOPOGRAPHICAL PLAN**  
**22 JOHNSON STREET, TUAKAU**

|          |                  |
|----------|------------------|
| FILE     | G2875            |
| SCALE    | 1:300            |
| DATE     | 04 February 2022 |
| SURVEYOR | J LIN            |
| REVISION |                  |

APPROVED

LEGENDS:

-  Driveway
-  Cut within building platform
-  Fill within building platform
-  Cut out of building platform
-  Fill out of building platform
- SM** Storage of materials
- COS** Cleaning works on site
-  Silt Fence

Outside of proposed building form

Excavation Area:96.7m<sup>2</sup>  
 Excavation Volume:29.8m<sup>3</sup>  
 Fill Area:81.5m<sup>2</sup>  
 Fill Volume:72.5m<sup>3</sup>

Under proposed building form

Excavation Area:104.2m<sup>2</sup>  
 Excavation Volume:73.4m<sup>3</sup>  
 Fill Area:68.8m<sup>2</sup>  
 Fill Volume:54.7m<sup>3</sup>

Total Earthwork Area:351.2m<sup>2</sup>  
 Total Earthwork Volume:230.4m<sup>3</sup>

-All erosion and sediment controls to be in accordance with "Erosion and sediment control guidelines for land disturbing activities" or guideline documents 2016/005 "Erosion and sediment control guide for land disturbing activities in the auckland region"

| Rev   | Description  | Date   |
|-------|--------------|--------|
| Rev.1 | BC Lodgement | Date 1 |



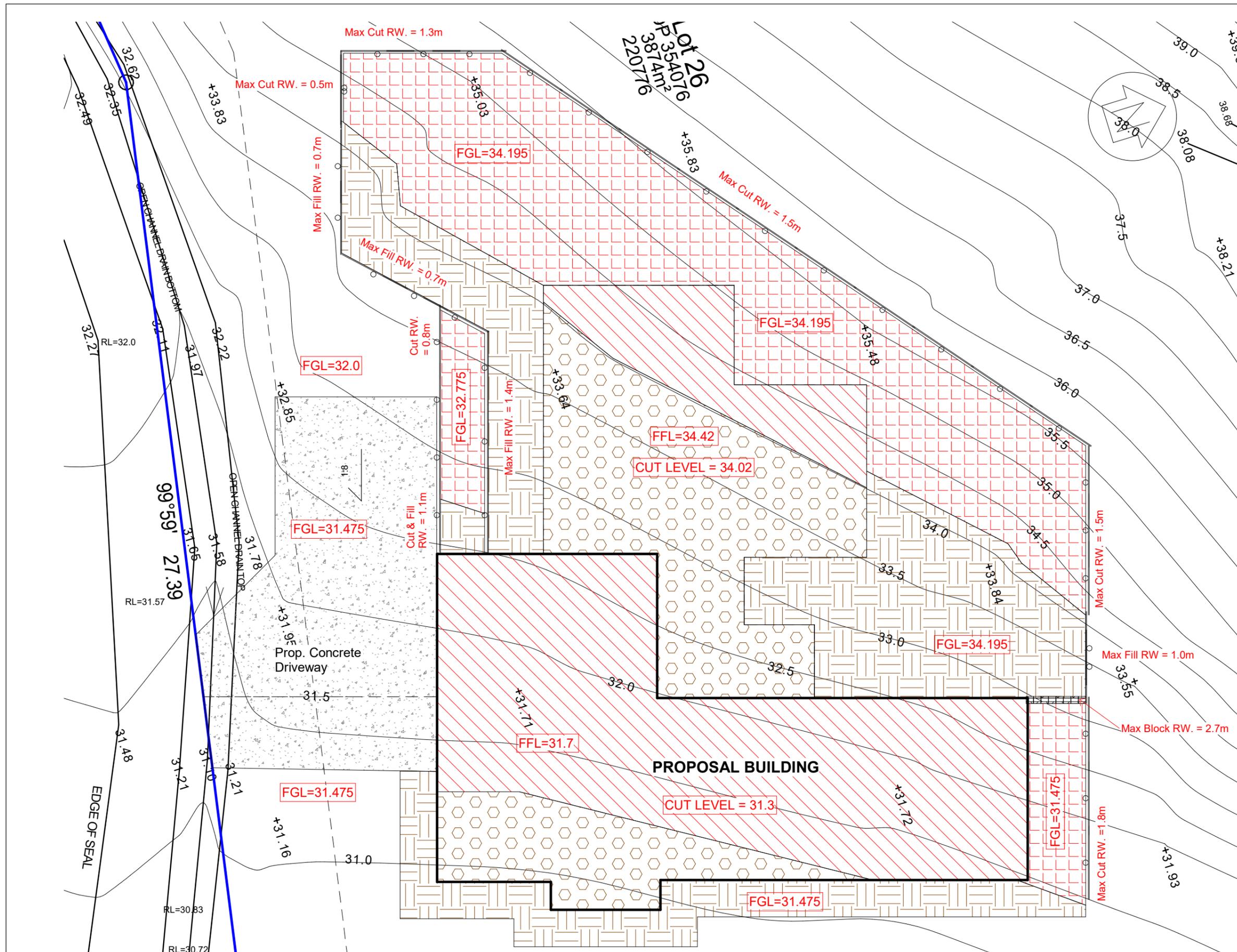
Email: jcli@lwarchitecture.co.nz  
 Add: 13 William Pickering Drive, Rosedale  
 Ph:09-4759599 Mob:021-766855

**Job Title**  
 Lot 26 DP 354076, 22 Johnson Street, Tuakau, Waikato, 2121

**Drawing Title**  
 Erosion & Sediment Control Plan

|          |             |            |
|----------|-------------|------------|
| Job no.  | 21069       | Sheet      |
| Scale    | 1 : 100     | <b>103</b> |
| Date     | 16 FEB 2022 | Revision:  |
| Drawn    | A.H         | Rev.1      |
| Checked  | L.L         |            |
| Approved | L.L         |            |

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 Revit\22 Johnson Street, Tuakau 20220216.rvt



1 Erosion & Sediment Control Plan  
 1 : 100

APPROVED

Lot 26  
 DP 354076  
 3874m<sup>2</sup>  
 220776

**PROPOSED DWELLING**

|                                     |                       |
|-------------------------------------|-----------------------|
| Ground Floor Area                   | : 108.7m <sup>2</sup> |
| First Floor Area (Included Balcony) | : 182.8m <sup>2</sup> |
| Total Building Area                 | : 291.5m <sup>2</sup> |



| Rev | Description | Date |
|-----|-------------|------|
|     |             |      |



Ph:09-4759599 Em: Luke.moderna@gmail.com  
 Mob:021-766 855 Add:109 Medallion Drive, Oteta

**Job Title**  
 22 Johnson Street, Tuakau

**Drawing Title**  
 Ground Floor Plan

|          |              |           |    |
|----------|--------------|-----------|----|
| Job no.  | 21069        | Sheet     |    |
| Scale    | 1:100        |           | 21 |
| Date     | 15 FEB 2024  |           |    |
| Drawn    | Gilbert Wong | Revision: |    |
| Checked  |              |           |    |
| Approved | L.L.         |           |    |

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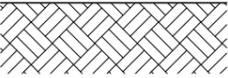


1 GFFL  
 1:100

47.55 197°09'30"

APPROVED

LEGENDS:

-  Vertical Shiplap
-  Weatherboard
-  Brick Veneer
-  Shingle Roof
- 



1 West Elevation  
 1 : 100



2 East Elevation  
 1 : 100

| RISK MATRIX - WEST ELEVATION  |           |   |
|-------------------------------|-----------|---|
| Wind Zone                     | Very high | 0 |
| Number of storeys             | Very high | 0 |
| Roof/wall intersection design | Very high | 0 |
| Eave width                    | Very high | 0 |
| Envelope complexity           | Very high | 0 |
| Deck design                   | Very high | 0 |
| Total Risk Score              |           | 0 |

| RISK MATRIX - WEST ELEVATION  |           |   |
|-------------------------------|-----------|---|
| Wind Zone                     | Very high | 0 |
| Number of storeys             | Very high | 0 |
| Roof/wall intersection design | Very high | 0 |
| Eave width                    | Very high | 0 |
| Envelope complexity           | Very high | 0 |
| Deck design                   | Very high | 0 |
| Total Risk Score              |           | 0 |

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|-------|--------------|--------|
| Rev   | Description  | Date   |
|       |              |        |



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**Job Title**  
 Lot 26 DP 354076, 22 Johnson Street, Tuakau

**Drawing Title**  
 West & East Elevation

|          |              |           |
|----------|--------------|-----------|
| Job no.  | 21069        | Sheet     |
| Scale    | 1 : 100      | 301       |
| Date     | 16 FEB 2022  | Revision: |
| Drawn    | Gilbert Wong |           |
| Checked  |              | Rev.1     |
| Approved | L.L          |           |

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APPROVED

LEGENDS:

-  Vertical Shiplap
-  Weatherboard
-  Brick Veneer
-  Shingle Roof
- 



1 North Elevation  
 1 : 100



2 South Elevation  
 1 : 100

RISK MATRIX - NORTH ELEVATION

|                               |           |          |
|-------------------------------|-----------|----------|
| Wind Zone                     | Very high | 0        |
| Number of storeys             | Very high | 0        |
| Roof/wall intersection design | Very high | 0        |
| Eave width                    | Very high | 0        |
| Envelope complexity           | Very high | 0        |
| Deck design                   | Very high | 0        |
| <b>Total Risk Score</b>       |           | <b>0</b> |

RISK MATRIX - SOUTH ELEVATION

|                               |           |          |
|-------------------------------|-----------|----------|
| Wind Zone                     | Very high | 0        |
| Number of storeys             | Very high | 0        |
| Roof/wall intersection design | Very high | 0        |
| Eave width                    | Very high | 0        |
| Envelope complexity           | Very high | 0        |
| Deck design                   | Very high | 0        |
| <b>Total Risk Score</b>       |           | <b>0</b> |

| Rev   | Description  | Date   |
|-------|--------------|--------|
| Rev.1 | BC Lodgement | Date 1 |



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**Job Title**  
 Lot 26 DP 354076, 22 Johnson Street, Tuakau

**Drawing Title**  
 North & South Elevation

|          |             |            |
|----------|-------------|------------|
| Job no.  | 21069       | Sheet      |
| Scale    | 1 : 100     | <b>302</b> |
| Date     | 16 FEB 2022 |            |
| Drawn    | Alison Ho   | Revision:  |
| Checked  | L.L         | Rev.1      |
| Approved | L.L         |            |

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 20220216.rvt



# Appendix B

## Geotechnical Investigation Location Plan and Hand Auger Logs

**CLIENT:** Srujith Sirikonda  
**PROJECT:** 22 Johnson Street, Tuakau  
**LOCATION:** Auckland





# INVESTIGATION LOG

**CLIENT:** Srujith Sirikonda  
**PROJECT:** 22 Johnson Street, Tuakau  
**SITE LOCATION:** Auckland  
**CO-ORDINATES:** 1772429mE, 5875260mN  
**CONTRACTOR:** Internal **RIG:** Hand Auger

**START DATE:** 28/02/2022  
**END DATE:** 28/02/2022  
**LOGGED BY:** JL

**JOB NO.:**  
**APPROVED**  
**G22-A0037**

| MATERIAL DESCRIPTION<br>(See Classification & Symbology sheet for details)  | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER<br>(Blows / 100mm) |   |   |   |    |    |    | VANE SHEAR STRENGTH<br>(kPa)<br>Vane: Geovane |    |    |     | WATER |     |     |        |
|---|---------|-----------|--------|---------------------------------------|---|---|---|----|----|----|---|----|----|-----|-------|-----|-----|--------|
|   |         |           |        | 2                                     | 4 | 6 | 8 | 10 | 12 | 14 | 16  | 18 | 50 | 100 |       | 150 | 200 | Values |
| SILT; dark brown. Stiff, dry, low plasticity, moderately sensitive (TOPSOIL).                                       |         | 0.0 - 0.2 | TS     | 1                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
| Clayey SILT; light orangish brown. Very stiff, dry, low plasticity, moderately sensitive (Auckland Volcanic Field). |         | 0.2 - 0.4 | TS     | 2                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 0.4 - 0.6 | TS     | 3                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 0.6 - 0.8 | TS     | 4                                     |   |   |   |    |    |    |   |    |    |     |       |     |     | 124    |
|   |         | 0.8 - 1.0 | TS     | 4                                     |   |   |   |    |    |    |   |    |    |     |       |     |     | 56     |
|   |         | 1.0 - 1.2 | TS     | 6                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 1.2 - 1.4 | TS     | 6                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 1.4 - 1.6 | TS     | 6                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 1.6 - 1.8 | TS     | 6                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 1.8 - 2.0 | TS     | 6                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 2.0 - 2.2 | TS     | 6                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
| Silty SAND; light brown. Medium dense, moist, poorly graded (Auckland Volcanic Field).                              |         | 2.2 - 2.4 | TS     | 6                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 2.4 - 2.6 | TS     | 7                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 2.6 - 2.8 | TS     | 7                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 2.8 - 3.0 | TS     | 8                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 3.0 - 3.2 | TS     | 8                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
| Fine SAND; light grey. Medium dense, moist, poorly graded (Auckland Volcanic Field).                                |         | 3.2 - 3.4 | TS     | 7                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 3.4 - 3.6 | TS     | 7                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 3.6 - 3.8 | TS     | 8                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
| EOH: 3.00m  |         | 3.8 - 4.0 | TS     | 6                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 4.0 - 4.2 | TS     | 6                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 4.2 - 4.4 | TS     | 6                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 4.4 - 4.6 | TS     | 6                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |
|   |         | 4.6 - 4.8 | TS     | 5                                     |   |   |   |    |    |    |   |    |    |     |       |     |     |        |

Groundwater Not Encountered

**PHOTO(S)**

**REMARKS**



Test Methods:  
 Field Description of Soil and Rock, NZ Geotechnical Society, 2005  
 Determination of Penetration Resistance of a Soil, NZS 4402 Test 6.5.2: 1988  
 Guideline for Hand Held Shear Vane Test, NZ Geotechnical Society, 2001  
 Shear Vane No. 3093, Cert.No 715915.16  
 \*Shear vane limit 197kPa

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- Hand Auger
- Test Pit



# INVESTIGATION LOG

**CLIENT:** Srujith Sirikonda  
**PROJECT:** 22 Johnson Street, Tuakau

**JOB NO.:**  
**APPROVED**  
**G22-A0037**

**SITE LOCATION:** Auckland  
**CO-ORDINATES:** 1772433mE, 5875284mN  
**CONTRACTOR:** Internal **RIG:** Hand Auger

**ELEVATION:** Ground  
**DRILLER:** TB

**START DATE:** 28/02/2022  
**END DATE:** 28/02/2022  
**LOGGED BY:** JL

| MATERIAL DESCRIPTION<br><small>(See Classification &amp; Symbology sheet for details)</small>  | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER<br><small>(Blows / 100mm)</small> |   |   |   |    |    |    |    |    |    |     | VANE SHEAR STRENGTH<br><small>(kPa)</small><br><small>Vane: Geovane</small> |     |        |  | WATER |  |     |  |
|--|---------|-----------|--------|--|---|---|---|----|----|----|----|----|----|-----|---|-----|--------|--|-------|--|-----|--|
|  |         |           |        | 2  | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 50 | 100 | 150   | 200 | Values |  |       |  |     |  |
| SILT; dark brown. Stiff, dry, low plasticity, moderately sensitive (TOPSOIL).  |         | 0.0 - 0.2 | TS     | 1  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
| Silty CLAY with some sand; light creamy brown. Stiff to very stiff, dry, low plasticity, moderately sensitive (Auckland Volcanic Field). |         | 0.2 - 0.4 | TS     | 2  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  | 115 |  |
|  |         | 0.4 - 0.6 | TS     | 4  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  | 53  |  |
|  |         | 0.6 - 0.8 | TS     | 5  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 0.8 - 1.0 | TS     | 5  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
| Silty SAND; light brown. Medium dense, moist, poorly graded (Auckland Volcanic Field).   |         | 1.0 - 1.2 | TS     | 6  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  | 98  |  |
|  |         | 1.2 - 1.4 | TS     | 4  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  | 39  |  |
|  |         | 1.4 - 1.6 | TS     | 4  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 1.6 - 1.8 | TS     | 4  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 1.8 - 2.0 | TS     | 4  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 2.0 - 2.2 | TS     | 5  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 2.2 - 2.4 | TS     | 5  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 2.4 - 2.6 | TS     | 5  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 2.6 - 2.8 | TS     | 6  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 2.8 - 3.0 | TS     | 6  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 3.0 - 3.2 | TS     | 5  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 3.2 - 3.4 | TS     |  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 3.4 - 3.6 | TS     |  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 3.6 - 3.8 | TS     |  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
|  |         | 3.8 - 4.0 | TS     |  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |
| EOH: 3.00m   |         |           |        |  |   |   |   |    |    |    |    |    |    |     |   |     |        |  |       |  |     |  |

Groundwater Not Encountered

**PHOTO(S)**

**REMARKS**



Test Methods:  
 Field Description of Soil and Rock, NZ Geotechnical Society, 2005  
 Determination of Penetration Resistance of a Soil, NZS 4402 Test 6.5.2: 1988  
 Guideline for Hand Held Shear Vane Test, NZ Geotechnical Society, 2001  
 Shear Vane No. 3093, Cert.No 715915.16  
 \*Shear vane limit 197kPa

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- Hand Auger
- Test Pit



# INVESTIGATION LOG

**CLIENT:** Srujith Sirikonda  
**PROJECT:** 22 Johnson Street, Tuakau  
**SITE LOCATION:** Auckland  
**CO-ORDINATES:** 1772407mE, 5875279mN  
**CONTRACTOR:** Internal **RIG:** Hand Auger

**JOB NO.:**  
**APPROVED**  
**G22-A0037**

**START DATE:** 28/02/2022  
**END DATE:** 28/02/2022  
**DRILLER:** TB  
**LOGGED BY:** JL

| MATERIAL DESCRIPTION<br>(See Classification & Symbology sheet for details)   | SAMPLES   | DEPTH (m) | LEGEND | SCALA PENETROMETER<br>(Blows / 0mm) |   |   |   |    |    | VANE SHEAR STRENGTH<br>(kPa)<br>Vane: Geovane |    |    |    | WATER |     |     |     |
|--|-----------|-----------|--------|-------------------------------------|---|---|---|----|----|---|----|----|----|-------|-----|-----|-----|
|  |           |           |        | 2                                   | 4 | 6 | 8 | 10 | 12 | 14  | 16 | 18 | 50 |       | 100 | 150 | 200 |
| SILT; dark brown. Stiff, dry, low plasticity, moderately sensitive (TOPSOIL).  |           | 0.0 - 0.4 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     |     |
| Silty CLAY; light orangish brown. Very stiff, dry, low plasticity, moderately sensitive (Auckland Volcanic Field).                   |           | 0.4 - 0.6 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     | 110 |
|  |           | 0.6 - 0.8 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     | 59  |
| Clayey SILT with some sand; light brown. Stiff to very stiff, moist, low plasticity, moderately sensitive (Auckland Volcanic Field). |           | 0.8 - 1.0 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     | 146 |
|  |           | 1.0 - 1.2 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     | 67  |
| EOH: 3.00m   |           | 1.2 - 1.4 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     | 155 |
|  |           | 1.4 - 1.6 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     | 79  |
|  |           | 1.6 - 1.8 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     | 118 |
|  |           | 1.8 - 2.0 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     | 56  |
|  |           | 2.0 - 2.2 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     | 110 |
|  |           | 2.2 - 2.4 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     | 45  |
|  |           | 2.4 - 2.6 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     | 98  |
|  |           | 2.6 - 2.8 | TS     |                                     |   |   |   |    |    |   |    |    |    |       |     |     | 37  |
|  | 2.8 - 3.0 | TS        |        |                                     |   |   |   |    |    |   |    |    |    |       |     |     |     |
|  | 3.0 - 3.2 | TS        |        |                                     |   |   |   |    |    |   |    |    |    |       |     |     |     |
|  | 3.2 - 3.4 | TS        |        |                                     |   |   |   |    |    |   |    |    |    |       |     |     |     |
|  | 3.4 - 3.6 | TS        |        |                                     |   |   |   |    |    |   |    |    |    |       |     |     |     |
|  | 3.6 - 3.8 | TS        |        |                                     |   |   |   |    |    |   |    |    |    |       |     |     |     |
|  | 3.8 - 4.0 | TS        |        |                                     |   |   |   |    |    |   |    |    |    |       |     |     |     |

Groundwater Not Encountered

**PHOTO(S)**

**REMARKS**



Test Methods:  
 Field Description of Soil and Rock, NZ Geotechnical Society, 2005  
 Determination of Penetration Resistance of a Soil, NZS 4402 Test 6.5.2: 1988  
 Guideline for Hand Held Shear Vane Test, NZ Geotechnical Society, 2001  
 Shear Vane No. 3093, Cert.No 715915.16  
 \*Shear vane limit 197kPa

**WATER**

**INVESTIGATION TYPE**

- ▼ Standing Water Level
- ▽ Out flow
- ↔ In flow

- Hand Auger
- Test Pit

## CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION

**APPROVED**

| GRAIN SIZE DEFINITIONS |          |             |             | GRAPHIC LOG |          |
|------------------------|----------|-------------|-------------|-------------|----------|
| Fraction               | Type     | Subdivision | Size (mm)   |             |          |
| Oversize               | BOULDERS |             | >200        |             | PEAT     |
|                        | COBBLES  |             | 60-200      |             | CLAY     |
| Coarse grained         | GRAVEL   | Coarse      | 20-60       |             | SILT     |
|                        |          | Medium      | 6-20        |             | SAND     |
|                        |          | Fine        | 2-6         |             | GRAVEL   |
|                        | SAND     | Coarse      | 0.60-2.00   |             | COBBLES  |
|                        |          | Medium      | 0.20-0.60   |             | BOULDERS |
| Fine grained           | SILT     |             | 0.002-0.060 |             |          |
|                        | CLAY     |             | <0.002      |             |          |

| MOISTURE CONDITION |  | USCS SOIL CLASSIFICATION CODES |   |
|--------------------|--|--------------------------------|---|
| Term               | Description  |                                |   |
| Dry (D)            | - Looks and feels dry  | GW - well graded gravel        | ML - silt, low plasticity                         |
| Moist (M)          | - Feels cool, darkened in colour,<br>- Tends to cohere, but no free water.                 | GP - poorly graded gravel      | CL - clay, low plasticity                         |
|                    |  | GM - silty gravel              | OL - organic silt / organic clay, low plasticity  |
| Wet (W)            | - Feels cool, darkened in colour,<br>- Tends to cohere,<br>free water forms when handling. | GC - clayey gravel             | MH - silt, high plasticity                        |
|                    |  | SW - well graded sand          | CH - clay, high plasticity                        |
| Saturated (S)      | - Feels cool, darkened in colour and free water is present on the sample                   | SP - poorly graded sand        | OH - organic silt / organic clay, high plasticity |
|                    |  | SM - silty sand                | Pt - peat   |
|                    |  | SC - clayey sand               |   |

| CONSISTENCY TERMS |  |   | RELATIVE DENSITY |                 |
|-------------------|--|---|------------------|-----------------|
| Term              | Field guide to consistency   | Indicative Undrained Shear Strength (kPa) | Term             | Density Index % |
| Very Soft (VS)    | Exudes between the fingers when squeezed                                 | <12                                       | Very dense       | > 85            |
| Soft (S)          | Easily indented by fingers   | 12 - 25                                   | Dense            | 65 - 85         |
| Firm (F)          | Indented by strong finger pressure and can be indented by thumb pressure | 25 - 50                                   | Medium Dense     | 35 - 65         |
| Stiff (St)        | Cannot be indented by thumb pressure                                     | 50 - 100                                  | Loose            | 15 - 35         |
| Very Stiff (VSt)  | Can be indented  | 100 - 200                                 | Very Loose       | < 15            |
| Hard (H)          | Difficult to indent  | >200                                      |                  |                 |

| WATER   | PLASTICITY (fine grained soil)   | GRADING (Gravel & Sands)       |                                |                                |          |                |                |                  |                |                |                     |     |     |                        |                |            |                      |     |     |  |      |             |                  |  |                    |   |         |                          |            |   |
|---|--|--------------------------------|--------------------------------|--------------------------------|----------|----------------|----------------|------------------|----------------|----------------|---------------------|-----|-----|------------------------|----------------|------------|----------------------|-----|-----|--|------|-------------|------------------|--|--------------------|---|---------|--------------------------|------------|---|
| - Level (date observed)<br>- Inflow<br>- Outflow<br>- Complete Loss | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Term</th> <th>Range of liquid limit for silt</th> <th>Range of liquid limit for clay</th> </tr> </thead> <tbody> <tr> <td>Dilatent</td> <td>Not applicable</td> <td>Not applicable</td> </tr> <tr> <td>Non-Plastic (NP)</td> <td>Not applicable</td> <td>Not applicable</td> </tr> <tr> <td>Low Plasticity (LP)</td> <td>≤50</td> <td>≤35</td> </tr> <tr> <td>Medium Plasticity (MP)</td> <td>Not applicable</td> <td>35 and ≤50</td> </tr> <tr> <td>High Plasticity (HP)</td> <td>&gt;50</td> <td>&gt;50</td> </tr> </tbody> </table> | Term                           | Range of liquid limit for silt | Range of liquid limit for clay | Dilatent | Not applicable | Not applicable | Non-Plastic (NP) | Not applicable | Not applicable | Low Plasticity (LP) | ≤50 | ≤35 | Medium Plasticity (MP) | Not applicable | 35 and ≤50 | High Plasticity (HP) | >50 | >50 | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Term</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Well Graded (WG)</td> <td>Having good representation of all particle sizes from the largest to the smallest.</td> </tr> <tr> <td rowspan="2">Poorly Graded (PG)</td> <td>With one or more intermediate sizes poorly represented.</td> </tr> <tr> <td>Uniform</td> <td>Essentially of one size.</td> </tr> <tr> <td>Gap Graded</td> <td>With one or more intermediate sizes absent.</td> </tr> </tbody> </table> | Term | Description | Well Graded (WG) | Having good representation of all particle sizes from the largest to the smallest. | Poorly Graded (PG) | With one or more intermediate sizes poorly represented. | Uniform | Essentially of one size. | Gap Graded | With one or more intermediate sizes absent. |
| Term  | Range of liquid limit for silt   | Range of liquid limit for clay |                                |                                |          |                |                |                  |                |                |                     |     |     |                        |                |            |                      |     |     |  |      |             |                  |  |                    |   |         |                          |            |   |
| Dilatent  | Not applicable   | Not applicable                 |                                |                                |          |                |                |                  |                |                |                     |     |     |                        |                |            |                      |     |     |  |      |             |                  |  |                    |   |         |                          |            |   |
| Non-Plastic (NP)  | Not applicable   | Not applicable                 |                                |                                |          |                |                |                  |                |                |                     |     |     |                        |                |            |                      |     |     |  |      |             |                  |  |                    |   |         |                          |            |   |
| Low Plasticity (LP)   | ≤50  | ≤35                            |                                |                                |          |                |                |                  |                |                |                     |     |     |                        |                |            |                      |     |     |  |      |             |                  |  |                    |   |         |                          |            |   |
| Medium Plasticity (MP)  | Not applicable   | 35 and ≤50                     |                                |                                |          |                |                |                  |                |                |                     |     |     |                        |                |            |                      |     |     |  |      |             |                  |  |                    |   |         |                          |            |   |
| High Plasticity (HP)  | >50  | >50                            |                                |                                |          |                |                |                  |                |                |                     |     |     |                        |                |            |                      |     |     |  |      |             |                  |  |                    |   |         |                          |            |   |
| Term  | Description  |                                |                                |                                |          |                |                |                  |                |                |                     |     |     |                        |                |            |                      |     |     |  |      |             |                  |  |                    |   |         |                          |            |   |
| Well Graded (WG)  | Having good representation of all particle sizes from the largest to the smallest.   |                                |                                |                                |          |                |                |                  |                |                |                     |     |     |                        |                |            |                      |     |     |  |      |             |                  |  |                    |   |         |                          |            |   |
| Poorly Graded (PG)  | With one or more intermediate sizes poorly represented.  |                                |                                |                                |          |                |                |                  |                |                |                     |     |     |                        |                |            |                      |     |     |  |      |             |                  |  |                    |   |         |                          |            |   |
|   | Uniform  | Essentially of one size.       |                                |                                |          |                |                |                  |                |                |                     |     |     |                        |                |            |                      |     |     |  |      |             |                  |  |                    |   |         |                          |            |   |
| Gap Graded  | With one or more intermediate sizes absent.  |                                |                                |                                |          |                |                |                  |                |                |                     |     |     |                        |                |            |                      |     |     |  |      |             |                  |  |                    |   |         |                          |            |   |

### Core Penetration Test (CPT)

| LIQUEFACTION POTENTIAL INDEX (LPI)  | SOIL BEHAVIOUR TYPE (SBT) - ROBERTSON ET AL. 1986 |                |   |           |  |          |   |   |           |   |   |   |                        |   |                                   |   |                     |   |                             |   |                           |   |                           |   |   |   |                    |
|---|---|----------------|---|-----------|--|----------|---|---|-----------|---|---|---|------------------------|---|-----------------------------------|---|---------------------|---|-----------------------------|---|---------------------------|---|---------------------------|---|---|---|--------------------|
| <table style="width: 100%;"> <tr> <td style="background-color: red; width: 20px; height: 20px;"></td> <td>Very High Risk</td> </tr> <tr> <td style="background-color: orange; width: 20px; height: 20px;"></td> <td>High Risk</td> </tr> <tr> <td style="background-color: lightgreen; width: 20px; height: 20px;"></td> <td>Low Risk</td> </tr> </table> |   | Very High Risk |   | High Risk |  | Low Risk | <table style="width: 100%;"> <tr> <td style="background-color: black; width: 20px; height: 20px; text-align: center; color: white;">0</td> <td>Undefined</td> <td style="background-color: lightblue; width: 20px; height: 20px; text-align: center;">5</td> <td>Sand mixtures: silty sand to sandy silt</td> </tr> <tr> <td style="background-color: red; width: 20px; height: 20px; text-align: center; color: white;">1</td> <td>Sensitive fine-grained</td> <td style="background-color: yellow; width: 20px; height: 20px; text-align: center;">6</td> <td>Sands: clean sands to silty sands</td> </tr> <tr> <td style="background-color: orange; width: 20px; height: 20px; text-align: center; color: white;">2</td> <td>Clay - organic soil</td> <td style="background-color: lightgreen; width: 20px; height: 20px; text-align: center;">7</td> <td>Dense sand to gravelly sand</td> </tr> <tr> <td style="background-color: grey; width: 20px; height: 20px; text-align: center; color: white;">3</td> <td>Clays: clay to silty clay</td> <td style="background-color: lightgrey; width: 20px; height: 20px; text-align: center;">8</td> <td>Stiff sand to clayey sand</td> </tr> <tr> <td style="background-color: lightblue; width: 20px; height: 20px; text-align: center;">4</td> <td>Silt mixtures: clayey silt &amp; silty clay</td> <td style="background-color: grey; width: 20px; height: 20px; text-align: center;">9</td> <td>Stiff fine-grained</td> </tr> </table> | 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt | 1 | Sensitive fine-grained | 6 | Sands: clean sands to silty sands | 2 | Clay - organic soil | 7 | Dense sand to gravelly sand | 3 | Clays: clay to silty clay | 8 | Stiff sand to clayey sand | 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff fine-grained |
|   | Very High Risk                                    |                |   |           |  |          |   |   |           |   |   |   |                        |   |                                   |   |                     |   |                             |   |                           |   |                           |   |   |   |                    |
|   | High Risk   |                |   |           |  |          |   |   |           |   |   |   |                        |   |                                   |   |                     |   |                             |   |                           |   |                           |   |   |   |                    |
|   | Low Risk  |                |   |           |  |          |   |   |           |   |   |   |                        |   |                                   |   |                     |   |                             |   |                           |   |                           |   |   |   |                    |
| 0   | Undefined   | 5              | Sand mixtures: silty sand to sandy silt |           |  |          |   |   |           |   |   |   |                        |   |                                   |   |                     |   |                             |   |                           |   |                           |   |   |   |                    |
| 1   | Sensitive fine-grained                            | 6              | Sands: clean sands to silty sands       |           |  |          |   |   |           |   |   |   |                        |   |                                   |   |                     |   |                             |   |                           |   |                           |   |   |   |                    |
| 2   | Clay - organic soil                               | 7              | Dense sand to gravelly sand             |           |  |          |   |   |           |   |   |   |                        |   |                                   |   |                     |   |                             |   |                           |   |                           |   |   |   |                    |
| 3   | Clays: clay to silty clay                         | 8              | Stiff sand to clayey sand               |           |  |          |   |   |           |   |   |   |                        |   |                                   |   |                     |   |                             |   |                           |   |                           |   |   |   |                    |
| 4   | Silt mixtures: clayey silt & silty clay           | 9              | Stiff fine-grained                      |           |  |          |   |   |           |   |   |   |                        |   |                                   |   |                     |   |                             |   |                           |   |                           |   |   |   |                    |

**Notes**  
 Terms and values based off of the New Zealand Geotechnical Society Soil and Rock Field Guide

**L.W. ARCHITECTURE LTD**

# **Onsite Private Wastewater Assessment Report for 22 Johnson Street Tuakau**

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Neil Yin

2022-05-18

Edition: A

22 Johnson Street, Tuakau

Email: [NeilYin@lwarchitecture.co.nz](mailto:NeilYin@lwarchitecture.co.nz)

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## Chapter 1 INTRODUCTION

L.W. ARCHITECTURE LTD has been engaged by the owners of LOT 26 DP 354076, 22 Johnson Street to undertake an onsite private wastewater assessment for the proposed new dwelling.

The site is legally known as LOT 26 DP 354076 that has total site area of 3,874m<sup>2</sup> is located in Waikato. The table 1 below shows the site details.

*TABLE 1 SUMMARY OF DETAILS*

|                             |                           |
|-----------------------------|---------------------------|
| Location                    | 22 Johnson Street, Tuakau |
| Legal Description           | LOT 26 DP 354076          |
| Total Site area             | 3,874m <sup>2</sup>       |
| Territorial Local Authority | Waikato Council           |

### 1.1 EXISTING FEATURES

The majority of the land within the site is generally sloping downwards west at a gradient of approximately 1 Vertical to 3 Horizontal. The local area is supported by public stormwater and public water supply, wastewater reticulation is not serviced in the area. Therefore, onsite wastewater is required for the proposed development. The local area is serviced by utility services including power and telecommunication reticulation.

According to the geotechnical report prepared for the site, the soil comprises silty clay, clayey silt, silty sand and fine sand. It shows that the soil category on site is category 5, which is used for onsite wastewater disposal design.

## Chapter 2 WASTEWATER TREATMENT SYSTEM DESIGN FLOWS

### 2.1 PROPOSED RESIDENTIAL DEVELOPMENT

The proposal involves the construction of a new main residential building at the subject site. The development also includes an onsite wastewater treatment system which has been sized to treat the wastewater flows from the proposed house. An advanced secondary treatment process is proposed with land-based disposal of the treated effluent by dripper irrigation to a TP58 approved planted area. A copy of Architectural Design Plans is enclosed.

### 2.2 HOUSEHOLD OCCUPANCY ASSESSMENT

The proposed dwellings comprise a six-bedroom main residential accommodation as specified by the client. The water usage is estimated as 160 litres per person per day.

Based on the ARC TP58 assessment of occupancy, the proposed development includes a six-bedroom main dwelling. The anticipated occupancy assessment (Table 6.1, TP 58):

Main dwelling: 6 bedrooms, 9 residents

In summary, the main dwelling is estimated to have maximum of 9 residents.

### 2.3 WASTEWATER PRODUCTION

The design criterion upon which the selection of the domestic wastewater disposal system was based is summarised below:

| Table 2: Wastewater Design Details                     |  |
|--|--|
| Nature of Wastewater:                                  | 100% Domestic                                      |
| Water Source   | Onsite Roof Water Tank Supply                      |
| Wastewater Source:                                     | 6 bedrooms main dwelling                           |
| Household<br>Allowance:                      Occupancy | 9 persons  |
| Design Flow (non-reticulated<br>town water supply):    | 1440 L/day (160 L/person/d) < 2m <sup>2</sup> /L/d |

|  |  |
|--|--|
| Site Area to wastewater discharge volume | $3874/1280=3.03 > 1.5 \text{ m}^2 \text{ per litre per day}$ |
| TP58 Soil Category                       | 5 (3mm/day)  |

## 2.4 WASTEWATER TREATMENT SYSTEM

A site and parameter specific wastewater treatment plant has been designed by HYNDS LifeStyle Advanced. This system will treat wastewater to an advanced secondary level prior to disposal to the irrigation field.

Further detailed information can be found in the enclosed layout plans. The treatment details are also enclosed.

## 2.5 WASTEWATER TREATMENT SYSTEM SEPARATION

### DISTANCES

| Separation Distance from    | Treatment Separation Distance (m) | Disposal Field Separation Distance (m) |
|-----------------------------|-----------------------------------|--|
| Boundaries                  | >1.5                              | >1.5                                   |
| Surface Water               | -                                 | -                                      |
| Groundwater                 | -                                 | -                                      |
| Stands of Trees/Shrubs      | -                                 | -                                      |
| Wells/ water bores          | >20                               | >20                                    |
| Embankments/retaining walls | >3                                | >3                                     |
| Buildings                   | >3                                | >3                                     |

## 2.6 LAND DISPOSAL SYSTEM

The land based disposal option for this site will be a pressure compensated dripper Irrigation system (PCDI).

The pressure compensated dripper Irrigation system will be laid into 100mm deep trenches and backfilled with topsoil and re-vegetated with grass or TP58 approved planting. The

irrigation disposal field is to be fenced off to prevent people and stock from coming into contact with treated effluent and possibly damaging the irrigation lines.

The areas required for treatment are based on category 5 soils as defined by the geotechnical report.

| Table 4: Land Disposal Details |   |
|--------------------------------|---|
| Areal Application Area         | $\frac{1440\text{L/day}}{3\text{L/m}^2\text{/day}} = 480 \text{ m}^2$ |
| Reserve Area                   | 50% reserve area = 240 m <sup>2</sup>                                 |

Keeping in line with the minimum clearance distances required by TP58 for the disposal field areas. A site plan has been produced showing the proposed location of the disposal fields.

## Chapter 3 ASSESSMENT OF ENVIRONMENTAL EFFECTS: WASTEWATER

This section contains a detailed assessment of the actual and potential environmental effects associated with the proposed wastewater treatment system. The actual and potential effects of the proposed works are discussed under the following headings. A standard ARC checklist is enclosed.

- Earthworks & Sediment Control
- Water Quality
- Stormwater
- Transportation Network
- Alteration to the Natural Landscape
- Visual Amenity
- Infrastructure
- Land Stability

### 3.1 EARTHWORKS & SEDIMENT CONTROL

The works comprise of earthworks for the installation of a wastewater treatment system. The volume of earthworks required is minor, involving approximately 150m<sup>3</sup> to be excavated.

The proposed earthworks will be in accordance with Auckland Regional Council's Technical Publication 90 (TP90) 'Guidelines for Land Disturbing Activities'.

The general methodology for the proposed earthworks incorporates best practice methods for minimising adverse effects on the environment. In particular, earthworks and vegetation clearance will be limited to the footprint of the works, thus minimising disturbance and therefore erosion.

Therefore, it is considered that the effects associated with erosion and sedimentation will be no more than minor.

### **3.2 ODOUR**

The proposed wastewater treatment system, treats impurities to such a level that there is no odour emitted from the system.

Accordingly, it is considered that the proposal will not create any adverse odours; hence the potential odour effects of this proposal are negligible.

### **3.3 WATER QUALITY**

Receiving environment of the proposed wastewater systems effluent is to be the northern side of the site. The effluent is to be dripper irrigated to an area that will be revegetated with grass or TP58 approved planting and mulch. Any runoff from the treatment disposal field would be conveyed overland through grass paddock that would act as a buffer before entering a tributary of the stream at the downstream.

The proposed treated effluent discharge in the TP58 planted area will aid in the evapotranspiration and sequestration of pollutants and excess groundwater.

Accordingly, it is considered that the water quality of local water-bodies within the vicinity of the site will not be compromised by the wastewater treatment system. Any adverse effects of the proposal on local water quality of the receiving environment will be no more than minor.

### **3.4 TRANSPORT NETWORK**

The public road to the subject site is an arterial urban road with relatively small traffic volumes; construction traffic along this road will add a small volume to the existing traffic volumes.

The movements of plant and machinery will be restricted where possible to reduce potential impacts, a "both way" policy for truck movements to and from the site will be adopted. The proposed work will have a minimal impact on the congestion of the road due to the minor nature of the works and short-term period of construction.

Accordingly, it is considered that the proposal will not create any adverse effects on the safety and efficiency of the local road network, hence the potential traffic effects of this proposal are negligible.

### **3.5 ALTERATION TO NATURAL LANDSCAPE**

The site has average value as a natural landscape in its present condition.

The proposed works are not going to change the existing characteristics of the landscape significantly.

Once the wastewater treatment system is installed it will be level with the ground and thus will not impacting on the surround landscape. The lids of the septic tanks and treatment chambers will be visible.

The wastewater treatment system irrigation field is located beside the driveway and will be either grassed or mulched and planted with TP58 approved planting species, which will aid in the evapotranspiration of the effluent.

Therefore, it is considered that the effects of the proposed wastewater treatment system on the natural landscape are negligible, whilst the outcome of the proposed works is positive.

### **3.6 VISUAL AMENITY**

The site is considered to have a low value in terms of on-site vegetation. Adverse effects on amenity values are considered to be restricted to the visual impact of the installation of the wastewater system as viewed within the site. Timely remediation of the exposed areas will assist in maintaining the visual amenity of the site.

As a result of the above discussion, it is considered that the adverse visual effects of this application will be negligible during construction and positive once construction and landscaping are completed.

### **3.7 INFRASTRUCTURE**

There is no significant infrastructure located near the subject site. Therefore the effects of the proposal on the existing infrastructure will be nil.

### **3.8 LAND STABILITY**

The area proposed for the irrigation of the treated effluent is located away from any cliffs ridges, thus reducing the risk of slips through soil saturation. The irrigation field is also located away from any areas of filling. There are to be no uncontrolled stormwater discharges that would compromise land stability.

Therefore, the effects of the proposal on the land stability will be nil.

## Chapter 4 CONCLUSION

A geotechnical report has been done. The soil type referred to geotechnical report is soil category 5, which is used for onsite wastewater disposal design. The full geotechnical report is attached.

This report concludes that the proposed development will be able to treat and dispose of wastewater from the residential dwelling within the site area.

This report demonstrates that the proposal will be able to facilitate wastewater treatment and also the possible wastewater treatment solutions.

Under AUP E5.6.2. and TP 58 5.7

- 1) The design flow is not greater than 2m<sup>3</sup>.
- 2) the ratio of the site area to discharge volume is greater than 1.5m<sup>2</sup> per litre per day.
- 3) 50 per cent reserve wastewater disposal area per system is provided within the site.
- 4) The site investigation procedures, design, installation and operation of the onsite wastewater treatment and land application disposal system is or is to be undertaken in accordance with Technical Publication 58 Onsite Wastewater Systems: Design and Management Manual 2004 (TP58).

Given the above discussion, it can be concluded that the subject site will be able to facilitate the treatment and disposal of effluent on site.

The proposed activity E5.4.1(A1) comply with E5.6.1. and E5.6.2, it should be a permitted activity.

Please contact us if you have any queries with regard to this assessment report.

**Neil Yin**  
**Civil Engineer**

## APPENDIX A DESIGN MANUAL

Waikato District Council  
Building Consent Number  
BLD2096/22

APPROVED

OPERATION & MAINTENANCE MANUAL

# HYNDS LIFESTYLE

WASTEWATER SYSTEM



LIFESTYLE WASTEWATER SYSTEM OPERATION MANUAL



+64 9 271 9503  
[www.hyndsenv.co.nz](http://www.hyndsenv.co.nz)

**HYNDS**  
ENVIRONMENTAL

# OPERATION & MAINTENANCE MANUAL

## HYNDS LIFESTYLE WASTEWATER SYSTEM

|   |          |
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# The Hynds Lifestyle Wastewater System is a technologically advanced wastewater treatment system.

Using aeration technology, the naturally occurring aerobic organisms in the tank accelerate the digestion to treating the wastewater from the household to a clear odourless liquid for irrigating the landscaped garden, bush or tree stand.

## 1 INTRODUCTION

This manual contains important information on how to care for the system.

Understanding and following this manual will not only ensure the system achieves a high level of treatment, it will also help the system run trouble free and achieve the longest possible life span for the electrical components in the system.

## 2 IMPORTANT INFORMATION

Most importance sections are five and six of this manual which explain the maintenance requirements and offer tips and advice on how to care for the Lifestyle system. If a problem does occur in the system, the first step is to clean the irrigation filter to ensure it is not blocked.

Secondly, check the electricity supply to the system (you should be able to hear the blower working in the tank). If you are unable to rectify the problem, please call Hynds Environmental on 0800-4 A Lifestyle (0800 425 433).

## 3 INTENDED USE

The Hynds Lifestyle treatment plant is designed to treat wastewater from a domestic dwelling with a maximum flow design of 1800 litres per day. The performance and health of the naturally occurring microbiological bacteria that live in the tank rely on the home occupiers attention to ensure no harmful products are inserted into the system...

The Lifestyle system has been designed for a maximum daily flow of 1800 litres of domestic wastewater. Any additional volume will be deemed to be contrary to the intended purpose and design of the system. The manufacturer assumes no liability for damages resulting from this.

### 3.1 Harmful products

| Bleaches                   | Harsh cleaning products          |
|----------------------------|----------------------------------|
| Milk                       | Coffee grounds                   |
| Fat, grease or oil         | Acids or caustics                |
| Paints                     | Condoms                          |
| Sanitary products          | Cigarettes                       |
| Photographic chemicals     | Poisons                          |
| Blood, meat flesh or skins | Medication (such as antibiotics) |
| Pharmaceutical drugs       | Spa or swimming pool backflush   |

- Table 1: Prohibitive Products to Enter Sewer Connection.
- It is recommended to use products that are labelled bio-degradable such as the Eco Store range which are available in most supermarkets

## 4 TECHNICAL DATA

**Description:** Hynds Lifestyle Domestic Treatment Plant  
**Maximum Flow:** 1.8 m<sup>3</sup> per day  
**Designer:** Hynds Environmental  
**Manufacturer:** Hynds Environmental

### Expected effluent characteristics:

| Treatment Option | cBOD (g/m <sup>3</sup> ) | TSS (g/m <sup>3</sup> ) | NH <sub>3</sub> (g/m <sup>3</sup> ) | TN (g/m <sup>3</sup> ) |
|------------------|--------------------------|-------------------------|-------------------------------------|------------------------|
| SAF              | < 20                     | < 20                    | < 5                                 | < 15-25                |

### Air blower

**Manufacturer:** Rietschle  
**Type:** LP80HN  
**Connection:** 230 V, 50 Hz  
**Power:** 0.12 kW  
**Number:** 1 unit

### Irrigation Pump

**Manufacturer:** Davey  
**Type:** D42 A/B  
**Connection:** 220-240 V, 50 Hz  
**Power:** 0.6 kW  
**Number:** 1 unit  
**Max. total head:** 32 m

### Irrigation filter

**Manufacturer:** Amiad  
**Type:** 25mm Diameter with 130 micron screen  
**Number:** 1 unit

## 5 SAFETY INSTRUCTIONS

This operating manual contains basic information that should be observed when operating and servicing the plant. This manual should be read before operating, maintaining or repairing the system.

This operating manual must be kept accessible at the premises where the tank has been installed. Installation and servicing of the Hynds plant and electrical componentry is to be carried out in accordance with best practice and applicable guidelines.

### 5.1 Maintenance and repair work

Only the manufacturer or an approved contractor may carry out maintenance and repair work (except filter cleaning) on the system. A service contract should be in place with an authorised service agent. Any work carried out by unauthorised organization or person may result in the warranties for the system becoming invalid.

### 5.2 Owner Responsibility

The plant runs automatically and requires no special knowledge on the part of the owner / user.

However an irrigation filter may require cleaning on a routine basis. (see filter cleaning instructions)

### Irrigation Cleaning Instructions

- Unscrew the filter housing (placed outside the tank before the irrigation field).
- Remove the cartridge.
- Loosen the ends of the filter to loosen the disks and proceed to clean with a hosepipe.
- Replace cartridge and filter base.



### 5.3 Basic information about safety

Potential risks when operating, checking or maintaining sewage treatment plants may be:

- Inflammations and infections
- Falling into the empty or filled tank chamber
- Suffocation
- Electrocutation

### 5.4 Care

Wastewater can contain harmful bacteria such as infectious pathogens. When carrying out any maintenance, servicing of the system or filter cleaning, the following should be observed.

- Thoroughly clean your hands with soapy water and disinfect. Always wear rubber gloves,
- If eye or mouth contact occurs, flush with plenty of water and seek medical advice if any irritation occurs.

### 5.5 Danger of falling into the empty or full tank

To avoid falling into an empty or filled tank and/or chamber you should:

- Always have a firm foothold
- Wear safety footwear
- Cover access holes when not in use

### 5.6 Danger of suffocation

Do not enter the inside of the tank under any circumstances.

The production of toxic gases in sewage treatment plants can occur. If the tank is to be entered by a contractor, standard confined space procedures must be followed and the relevant safety equipment must be utilised (includes gas detector, breathing apparatus, tripod and winch).

No smoking in the vicinity of the sewage treatment plant is allowed.

### 5.7 Risk of electrocution

Before entering any part of the sewage treatment plant, making contact with the water or working on or near motorised equipment, ensure the power to the relevant components are switched off and safely isolated using standard isolation procedures. (see irrigation cleaning instructions)

**6 TREATMENT PROCESS**

The treatment process occurs through a series of treatment chambers within the system before disposal via a network of self-compensating drip irrigation.

**Treatment Stages of a Hynds Lifestyle Wastewater System**



- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| 1. Wastewater enters from dwelling. | 5. Second stage aeration chamber. |
| 2. Primary treatment tank.          | 6. Lamimer plate clarification.   |
| 3. Biological filter.               | 7. Pump out / irrigation.         |
| 4. First stage aeration chamber.    |                                   |

**6.1 Chamber Functions**

For specific chamber capacities refer to Table 1.

**6.2 Pretreatment Chamber (Anaerobic)**

The primary (anaerobic chamber) is designed to retain wastewater where solids matter settle at the bottom of the chamber. Floating solids combine to form a thick biological layer at the top of the tank. Natural occurring anaerobic organisms work to break down the sludge.

Any suspended solids are captured in a biological filter situated at the outlet of the pretreatment chamber.

**6.3 Biological Disc Filter**

The biological filter on the outlet assists in surge reduction and retain any indigestible solids in the tank for potential anaerobic breakdown or eventual pump out.



**Figure 3:** Biological Disc Filter

**6.4 Submerged Aerated Filtration Chambers (Aerobic Digestion) – Stage 1**

The aerated filtration chamber is a two-stage process. Wastewater is initially infused with finely diffused oxygen bubbles from the base of the chamber. A biomass filter media is situated to allow the aerobic bacteria to rapidly multiply on this surface and roam to digest the suspended waste particles.

| System Type | Pre-treatment Volumes (Litre) | Aeration Volumes (Stage 1) (Litre) | Aeration Volumes (Stage 2) (Litre) | Irrigation Volume (Litre) | Total System Working Volume (Litre) | Emergency Capacity (Litre) | Total System Capacity (Litre) | Standard System Surge Capacity | Standard System Treatment Capacity |
|-------------|-------------------------------|------------------------------------|------------------------------------|---------------------------|-------------------------------------|----------------------------|-------------------------------|--------------------------------|------------------------------------|
| Advanced    | 3,000                         | 1530                               | 1530                               | 1000                      | 7,200                               | 1,770                      | 8,450                         | 600 litres per hour            | 2,000 litres per day               |
| Compact     | 3,000                         | 1500                               | 1250                               | 1500                      | 6,500                               | 2,300                      | 7,500                         | 600 litres per hour            | 2,000 litres per day               |
| Elite       | Stage 1 4,500<br>Stage 2 3000 | 1530                               | 1530                               | 1000                      | 11,200                              | 3,020                      | 12,950                        | 800 litres per hour            | 3,000 litres per day               |

**Table 1:** Lifestyle Wastewater Treatment Systems chamber capacities



**Figure 4:** Submerged Aerated Filtration

### 6.5 Submerged Aerated Filtration Chambers (Aerobic Digestion) – Stage 2

The aerated filtration process is repeated in a second chamber, to further improve the quality of the treatment.

### 6.6 Laminar Plate Separator and Sludge Return System

The final clarification of effluent occurs through the liquid passing through a laminar plate separator, located at the end of the stage 2 aeration chamber. The laminar plates remove any fine suspended particles remaining in the effluent. Any fine slurry falling to the base of the hopper shaped chamber is transferred by a venturi system back to the primary chamber to recycle once again through the system. This high energy activated slurry assists break down the anaerobic sludge in the primary chamber, thereby reducing the frequency that this chamber will require to be pumped out.

### 6.7 Irrigation Pump Chamber

The final chamber (irrigation chamber) pumps the treated effluent into the irrigation lines at regular intervals during the day, set off by a float switch which operates at an activation level. The tank has an emergency capacity of 1770 litres (a full day usage)

## 7 MAINTENANCE

This section deals with maintenance issues only and does not include any requirements stipulated in the resource consent.

**Please note:** Hynds Environmental Technicians will require foot access to your Lifestyle system every six months. The green lids on the tank will need to be removed and it is therefore essential that access is not restricted due to excess landscaping by the landowner.

### 7.1 Preventative Maintenance

The Hynds Lifestyle Domestic Wastewater Treatment system operates automatically however as with any high performing product, preventative maintenance is required to ensure your system continues to perform to its peak performance. Irrigation cleaning will be required by the owner on a regular basis (minimum frequency bi-monthly). The procedure for this operation is included in Appendix B.

### 7.2 General Servicing

The treatment system requires specialised periodic servicing, performed by a suitably trained technician. The general servicing will include:

- Checking and cleaning all filters including blower filter
- Checking and flushing irrigation lines as per manufacturer's instructions and recording pressure in lines
- Checking all pumps and the blower as per manufacturer's instructions
- Checking controller operation
- Test all alarms
- Check aeration of Aeration Tank
- Monitor sludge build up
- General inspection of site condition
- Taking samples for testing (if applicable)
- On completion of the service, a service report is completed and sent to both the homeowner and the required council(s).

### 7.3 Trouble Shooting and Call Outs

The custom built controller identifies faults within the treatment system. If a fault does occur, an alarm is activated on the control panel. Once a fault occurs there will be 24 hours emergency storage before the system starts to overflow therefore it is recommended the fault is addressed immediately.

If the fault is not diagnosed and remedied by a simple irrigation service, phone your service agent and/or Hynds Environmental.

### 8 TIPS AND ADVICE

Only domestic wastewater should be inserted into the treatment system. Below is a list of helpful points that should be observed and followed:

- Do not allow any rainwater, groundwater, swimming or spa pool backflush enter the system.
- Ensure no large objects such as toys or nappies are put down the drains.
- Food scraps and leftovers should be composted or put in the rubbish bin.
- Distribute your washing machine loads over the week. This is to prevent surge loading which affect the performance of the bacteria.
- Use biodegradable and water soluble products for cleaning and washing such as the Eco-Store range available in supermarkets or on the web.



Photo 1: Cleaning of irrigation filter – refer Appendix B

#### Solid or liquid substances not to be disposed of through sink and/or toilet

| Substances   | What they cause   | Where they belong   |
|--|---|---|
| Wastes (also when reduced in size), e.g. ash, tins, fibres, glass, sweepings, cork, trash, cloths, sand, sludge, rubble, stones, wallpaper residues, textiles, cigarette stubs | Clog the pipes, deposit and do not decompose, Block the filter                      | Waste bin   |
| Aggressive or toxic substances, e.g. acids (sulphuric acid), Dyes (caustic-soda solution) and salts, agricultural biocides, herbicides and pesticides                          | Intoxicate the sewage, damage the biomass and can cause concrete corrosion, foaming | Municipal collecting points   |
| Hardening substances, e.g. cement, lime, lime wash, gypsum, mortar, carbides, synthetic resins, bitumen, tar   | Clog the pipes, damage the biomass, block the filter                                | Waste bin, Municipal collecting points                              |
| Substances forming flammable, explosive mixtures, solvent residues, e.g. petrol, heating oil, lubes, thinners, spirit, paints, varnishes, phenols                              | Intoxicate the sewage, damage the biomass, destroy the filter                       | Municipal collecting points   |
| Fatty or oily substances, e.g. edible fat, deep-fry fat  | Deposit in the pipes, cause plugging  | Put this in the waste bin when cold                                 |
| Photo-chemicals, e.g. developer fluids, fixer, etc.  | Intoxicate the sewage, damage the biomass   | Municipal collecting points   |
| Hygiene articles, e.g. cotton-wool balls, sanitary towels, nappies, dressings, paper towels, cotton swabs, plaster, razor blades   | Clog the pipes, deposit and do not decompose, Block the filter                      | Waste bin   |
| Cats' litter   | Deposits in the pipes   | Waste bin   |
| Soldering fluid  | Intoxicate the sewage   | Municipal collecting points   |
| Medicines and drug residues (antibiotics, etc.),   | Intoxicate the sewage   | Municipal collecting points, chemists                               |
| Motor oil, oil-containing wastes, e.g. cloths, oil filters, cans, etc.   | Intoxicate the sewage, clog the pipes   | Municipal collecting points, motor repair shops and petrol stations |

APPROVED



**Branches Nationwide** Refer to [www.hynds.co.nz](http://www.hynds.co.nz) for further branch details

Support Office & **Technical Services** 09 274 0316

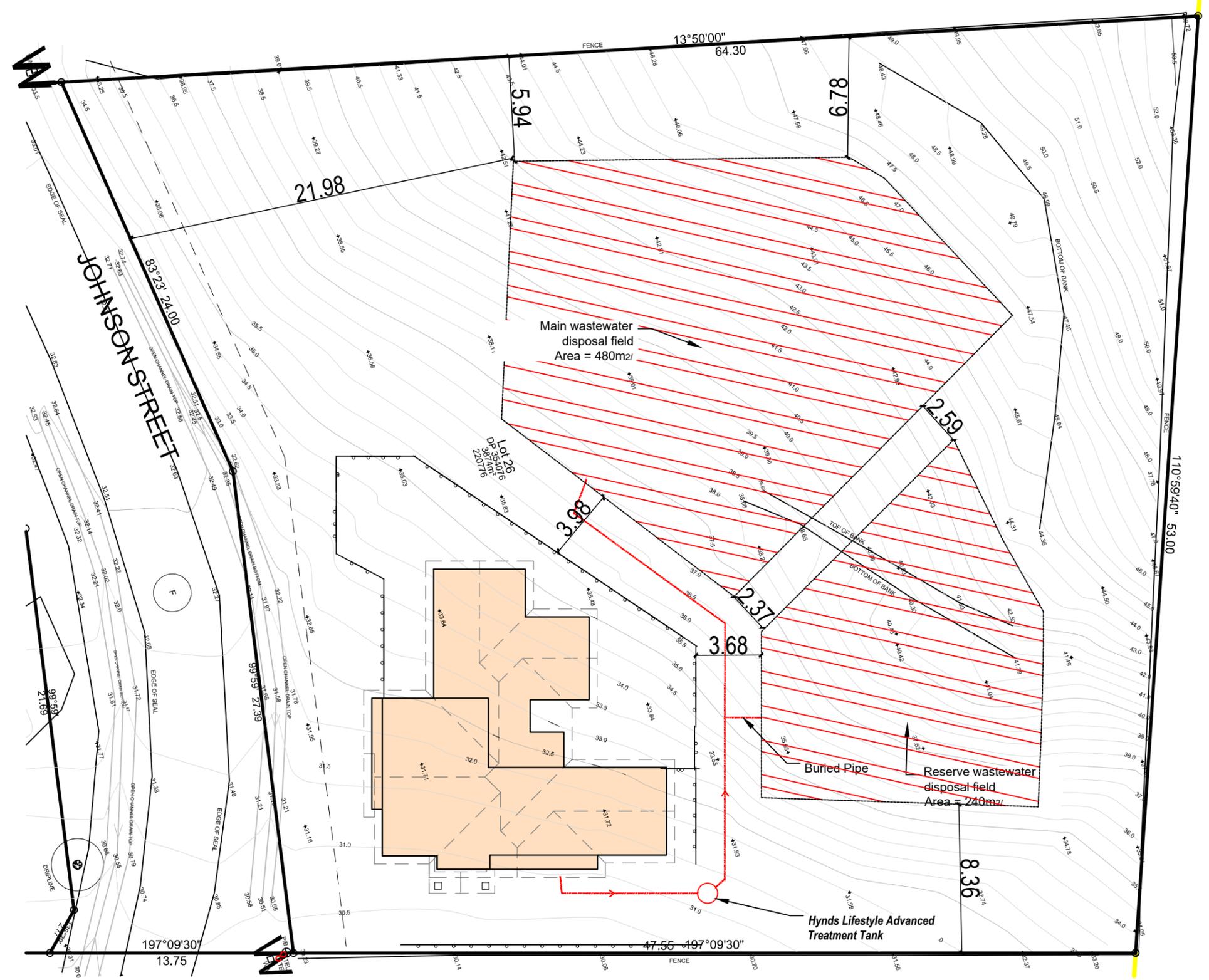
- **Northland** Whangarei ▪ **Auckland** Warkworth, Albany, Avondale, Penrose, Manukau, Pukekohe ▪ **Waikato** Hamilton, Te Kuiti, Taupo
- **Bay Of Plenty** Tauranga, Rotorua ▪ **Taranaki** New Plymouth ▪ **Manawatu** Palmerston North ▪ **Wellington** Masterton, Kapiti, Petone, Kaiwharawhara
- **Hawkes Bay** Hastings ▪ **Nelson/Malborough** Nelson, Blenheim ▪ **Otago/Southland** Oamaru, Dunedin, Cromwell, Winton, Invercargill
- **Canterbury** Amberley, Christchurch – Hornby, Bromley, Wiamak

**Disclaimer:** While every effort has been made to ensure that the information in this document is correct and accurate, users of Hynds product or information within this document must make their own assessment of suitability for their particular application. Product dimensions are nominal only, and should be verified if critical to a particular installation. No warranty is either expressed, implied, or statutory made by Hynds unless expressly stated in any sale and purchase agreement entered into between Hynds and the user.

**0800 WE PIPE (93 7473)**  
[www.hynds.co.nz](http://www.hynds.co.nz)

**HYNDS**  
 ENVIRONMENTAL

## APPENDIX B SITE PLAN



**L.W. ARCHITECTURE LIMITED**  
 Ph: 09 4759599 Email: luke.modernaa@gmail.com  
 Mob: 021 766 855 Add: 109 Medallion Drive, Oteha

**NOTE:**  
 Contractor to check & verify all dimensions and levels prior to commencing any work. All work to be in accord with Auckland Code of Practice.

**JOB TITLE**  
 PROPOSED DEVELOPMENT ON  
 22 Johnson St, Tuakau  
 LOT 26 DP 354076

**DRAWING TITLE**  
 PROPOSED DRAINAGE  
 PLAN

| JOB NO:  | 21069      | REVISION NO. | DATE |
|----------|------------|--------------|------|
| SCALE:   | 1:250      |              |      |
| DATE:    | 2022-05-18 |              |      |
| DRAWN:   | N.Y.       |              |      |
| CHECKED: |            |              |      |

**SHEET**  
 D01

## APPENDIX C GEO REPORT