LAND DEVELOPMENT REPORT

REV D

DURHAM PROPERTIES LTD

16-38 WILLOWBANK AVE
NAPIER

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J4345

DURHAM PROPERTIES LTD
Te Awa Development

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Table of Contents

1. Introduction 4
2. Design Considerations 4
2.1 Topographical Information 5
2.2 Staging 5
3. Preliminary Road Design 7
3.1 Existing Roads 7
3.2 Proposed Roads 7
4. Earthworks 8
5. Stormwater 9
6. Wastewater 10
7. Water Supply 11
8. Utility Services 12
9. Summary 13
Appendix A. Drawings 14

1. Introduction

Strata Group Consulting Engineers Ltd has been engaged by Durham Property Ltd (the Applicant) to investigate the civil engineering aspects of the proposed subdivision at 16-38 Willowbank Ave.

This report forms an engineering assessment for the proposal and includes investigation into the following aspects:

- Preliminary Roading design
- Earthworks
- Stormwater collection and disposal
- Wastewater disposal
- Water supply
- Utilities

The purpose of the investigations summarised in this report is to accompany an application to be made to the Napier City Council for a residential subdivision. The legal description for the site is Lot 1 DP14417 4.5526Ha and Lot 2 DP14417 9.2648Ha.

The proposed subdivision consists of:

- 19 Residential allotments fronting Eriksen Road
- 163 Lifestyle Units
- 2,010m of private accessway
- A drainage reserve and service corridors

Figure 1: Location Map

2. Design Considerations

To complete the engineering assessment of the proposed subdivision it was first necessary to obtain the following:

- Sufficient topographical information regarding the site, including suitably detailed contour data and aerial imagery.
- Information regarding any protected areas, easements or areas of significance within the site which may have an impact on the layout
- Sufficient information with regards to existing services within & surrounding the site

2.1 Topographical Information

A current aerial photograph was captured by drone and a detailed topo survey undertaken by Surveying the Bay for the proposed development site and existing services. The subdivision scheme plan was prepared by Development Nous.

2.2 Staging

The development would be undertaken in stages commencing from Eriksen Road with the road frontage residential lots. The development would progress from there in groups of approximately 20 lots.

The first stage involves connection to the underground services. Roading is available at the site boundary. The water supply connection can also be made to existing services in Ericksen Road.

The stormwater would require NCC to install the proposed box culvert under Eriksen Road to the Cowshed Drain on the western side.

A single pump station will be installed and will be positioned adjacent to Eriksen Road and the Subdivision's main entrance. This will service the development in its entirety. A gravity sewer system towards the pump station will be utilized for the whole development including the Ericksen Road frontage lots. Beyond the road frontage lots, the staging would commence from the main entrance to the lifestyle village. This proposal will see the pump station being installed as part of the first stage of the development.

The pump station could be connected to the existing 100mm diameter pumping at the front of the development, however we have proposed that the connection be made further to the south where the pump main increases in size from 100mm to 150mm. This connection is some 250m south of the development and would be undertaken at the developer's expense as provided for in the structure plan.

Refer to the proposed staging plan on the following page.

Figure 2: Proposed Development Staging

3.1 Existing Roads

The existing roads consist of Eriksen Road and Willowbank Road. There is no access onto Willowbank Road from the proposed development. Eriksen Road is partially formed to service the residential development on the Eastern side. A similar upgrade and widening on the western side is required to service the proposed development.

3.2 Proposed Roads

The 19 Lots fronting Eriksen Road would have access directly from the upgraded road. The remainder of the development would be serviced with two entry points onto Eriksen Road.

Within the development the roading network is constructed in a 13.5m wide road reserve. The carriageway width is 6m with asphalt surfacing and kerb and channel both sides. A single 1.4m wide concrete foot path on one side provides safe pedestrian linkages to the open space areas and walkway network.

The roading philosophy is one of connectivity for both pedestrians and vehicles. The narrow roads are designed to encourage a slow speed environment and pedestrians to have a number of route selections to gain access to the open space and wider walkway network.

The road design and formations are generally in accordance with the Code of Practice and District Plan requirements for minor roads.

Final pavement design will be based on design traffic volumes and subgrade CBR strengths as determined by the geotechnical engineer.

Photograph 1: Existing Eriksen Road formation (to be replicated)

4. Earthworks

The majority of the existing site contour is above the modeled flood level of RL 11.28m for the Te Awa area (Beca three waters report), however the lower lying areas would require imported structural fill of up to 0.6m to mitigate potential flood risks. It is expected river silt will be used as bulk fill which is common practice for the Te Awa and Parklands development areas.

Land to the East of the proposed site has been lifted with imported material during previous construction. It is intended to match into these existing levels and shape lots to fall toward roads and accessways.

The structure plan drainage swale along the Western and Southern boundaries will provide fill material for raising the land and will minimise the volume of imported material.

Topsoil will be stripped and stockpiled prior to bulk filling and placed back on lots before grassing. Approximately 40,000 m^3 of topsoil will be stripped to stockpile. Excess topsoil would be removed from site on completion of the bulk earthworks.

A site-specific earthworks and silt management plan will be submitted to Napier City Council for approval prior to earthworks commencing on site.

Preliminary earthworks volumes are as follows:

- Strip top soil to stockpile 40,000m^3
- Cut open drainage channel 33,000m^3
- Fill low lying land 26,000m^3
- Import river silt 7,000m^3

5. Stormwater

The proposed stormwater system has been designed to convey the development catchment through a piped network to the proposed structure plan swale drain along Western and Southern boundaries. This connects into Te Awa structure plan attenuation pond via the upgraded Cowshed Drain swale.

The swale drains are located within the 40m wide designation area and would be constructed to the profile determined in the Beca report and the structure plan. This is a similar profile to the Cowshed Drain re-construction on the Western side of Eriksen Road. Refer Photograph 2 below.

Photograph 2: Cowshed Drain West of Eriksen Road

The piped network has three discharge points into the swale drain These are into the Willowbank Road drain. The Eriksen Road allotments are serviced with a piped system discharging into the proposed box culvert under Eriksen Road.

The pipes range in size from 375mm to 750mm diameter and the length of each run has been controlled by the outlet invert level to avoid a “bubble-up” system into the open drain network.

Stormwater design parameters have been taken from NCC CoP 2015; I1.9. Coefficients have been set at 0.55 for all allotments except lots 12-19 of Stage 1 where, owing to the potential for higher site coverage (up to 56%), a higher coefficient of 0.65 (‘Town house development’ from NZBC E1/VM1) has been adopted. Roads and reserves have been assigned coefficients of 0.85 and 0.30 respectively.

The pipe network has been designed to allow for both a 10% and combined 10/2% AEP events. Rainfall data has been taken from the NCC Code of Practice which has been extracted from the April 2008 NIWA report titled Impacts of Climate Change on Napier High Intensity Rainfall with the extracted rainfall depths under the year 2090 and includes the mid-range temperature climate change scenario.

Stormwater calculations will be submitted with detailed design at the Engineering approval phase.

6. Wastewater

Wastewater services can be provided to the site through a pumping main that could connect to the existing Ericksen Road pumping main some 250m south of the development.

A gravity connection will be extended along the full length of the Eriksen Road frontage allotments for service connection discharging into a pump station located immediately north of the main entrance on Eriksen Road. The same is to be done beyond the frontage lots to the lifestyle village where a wastewater gravity system discharging towards the same pump station is also proposed.

The pump station's proposed location mitigates the impact of lateral spreading. This pump station will be positioned to keep the gravity pipe and chamber depths to a minimum for safety in design considerations.

A 100mm sewer pumping main could be extended from the pump station to the existing pumping main on Ericksen Road where it enlarges to a 150mm pumping main some 250m south of the development site.

The wastewater demand is as follows:

Internal Allotments

- Allotments serviced: 163 Units
- Land area: 163 x 400m^2 = 6.52 Ha
- Peak wet weather flow (PWWF): 6.52 x 0.3 Litres/sec/Ha = 1.96 Litres/sec

Lots Fronting Eriksen Road

- Allotments serviced: 19 Lots
- Land area: 19 x 700m^2 = 1.33 Ha
- Peak wet weather flow (PWWF): 1.33 x 0.3 Litres/sec/Ha = 0.4 Litres/sec

- Emergency Storage: 6 hours ADWF: 13.5m^3
    - Assumptions:
        - EP Eriksen frontage lots: 3.5 persons per Lot
        - EP Lifestyle village: 1.25 person per unit
        - Average Dry Weather Flow: 200 Litres/person/day (*ARC TP58 Table 6.2*)

The total PWWF for the development is 2.36 Litres/sec.

7. Water Supply

A water supply for the development can be fed from the 200mm diameter main in Ericksen Road. This main currently terminates at the Hurunui Drive intersection, but we understand that NCC are intending to extend the main along Ericksen Drive.

The extended Council main would provide two connection points to the development as shown on the proposed water layout plan, Appendix A.

Within the development, a principal DN150 main would run along one side of the road with a looped 63mm rider main running back along the opposite side. A series of appropriately sized feeder branches will be run up each accessway to serve the required Lots.

The site also has a 100mm and a 75mm bore for irrigation and domestic water supply as per Figure 3 below. It is proposed that the bore will be professionally plugged and removed below ground level.

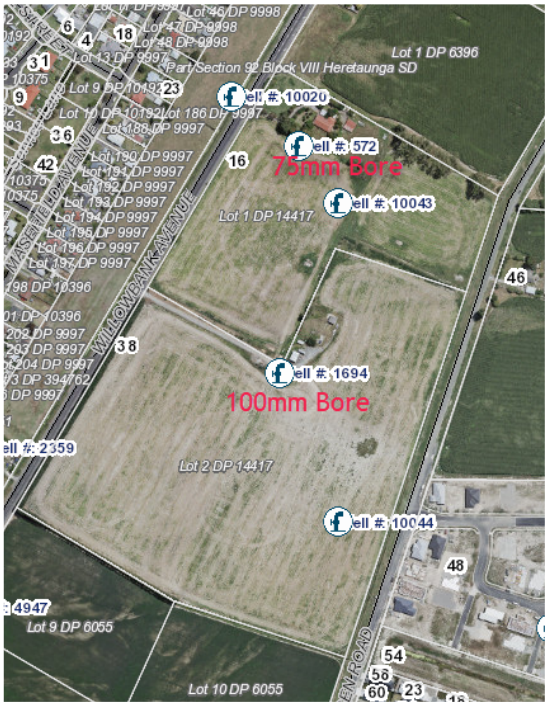


Figure 3: Existing Water Bores

The water demand for the development is as follows:

- Residential dwellings: 19 houses x 3.5 people per dwelling = 67 people
- Lifestyle village: 163 units x 1.25 people per unit = 204 people
- Total occupancy = 271 people
- Average daily demand per person: 250 Litres/person/day
- Average daily demand: 250 L/p/d x 271 people = 68 m^3/day
- Peaking Factor 5
- Peak daily demand: 3.93 Litres/sec

8. Utility Services

Power and telecommunications have been laid through to the proposed development site as part of the Eriksen Road and Hurunui Road residential development. It is intended to extend these services through the development.

Provisional width for laying utilities will be allowed for within the proposed road corridor in accordance with NCC code.

The existing overhead power lines in Eriksen Road would remain in place. Undergrounding would be undertaken in the future by Unison as part of their seismic upgrade programme.

Power-Co have been approached to service the site for Gas. It is expected this service will run with others in the proposed trenches.

9. Summary

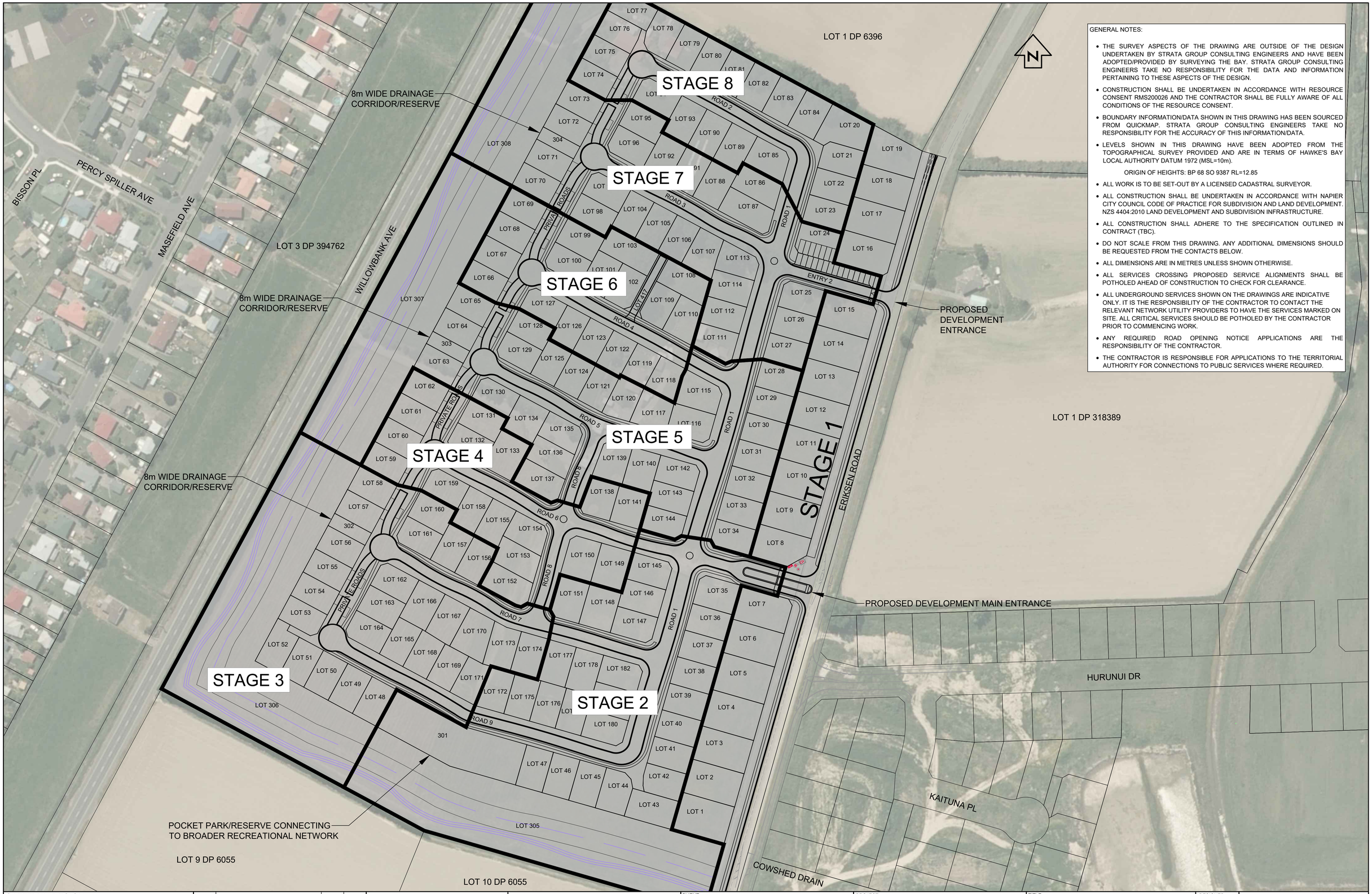
From our assessment of the site, engineering servicing for the proposed development can be achieved to an acceptable standard as follows:

- Earthworks will be required to bring the proposed land above the modeled 2% AEP flood level for the Te Awa development area of RL 11.28 (300mm freeboard is required above the flood level for building platforms – RL 11.58). Approximately 6,000m³ of imported structural fill is proposed.
- All proposed roading for the development can be constructed in accordance with the NCC Engineering Code of Practice.
- Conveyance of onsite stormwater up to 2% AEP event can be provided for via a piped network discharging into the Te Awa stormwater system which includes the proposed Willowbank Avenue and Cowshed Drain open channels
- Potable water can be supplied via the DN200 Eriksen Road trunk main and proposed extension.
- A gravity sewer network to a pump station can service the Eriksen Road frontage lots as well as the lifestyle village.
- The sewer pump station would collect and pump to the common main in Eriksen Road.
- Utility services can be provided to all sites.

All final designs and calculations for engineering approval will comply with NCC code of practice and district plan rules and regulations.

Preliminary desktop and site investigations have not revealed any significant engineering issues for the proposed development.

Appendix A. Drawings



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PROJECT: TE AWA SUBDIVISION (WILLOWBANK AVE) 16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED SITE SCHEME PLAN

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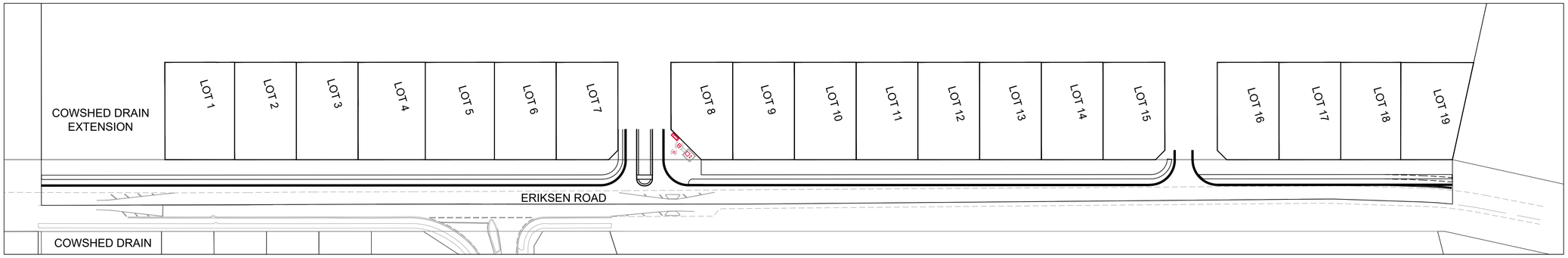

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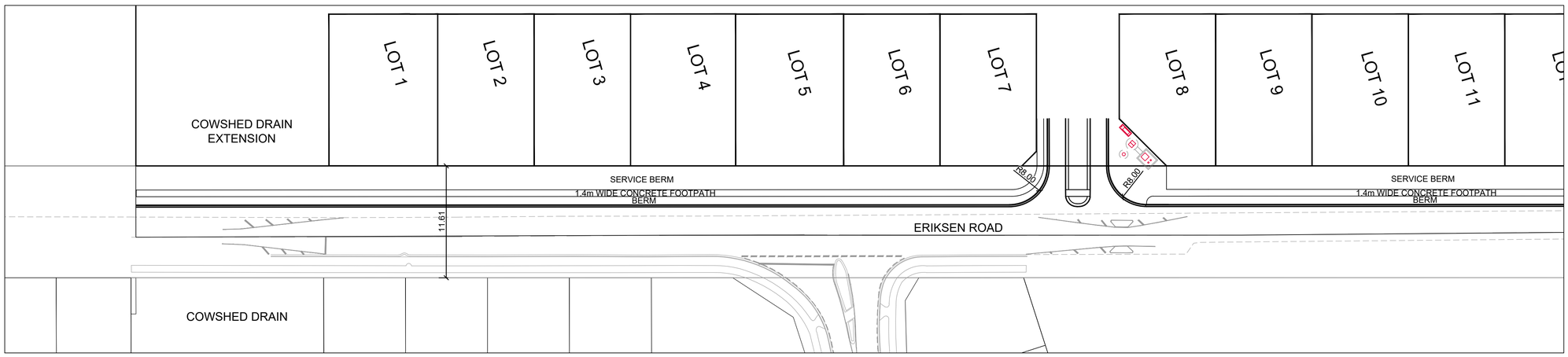

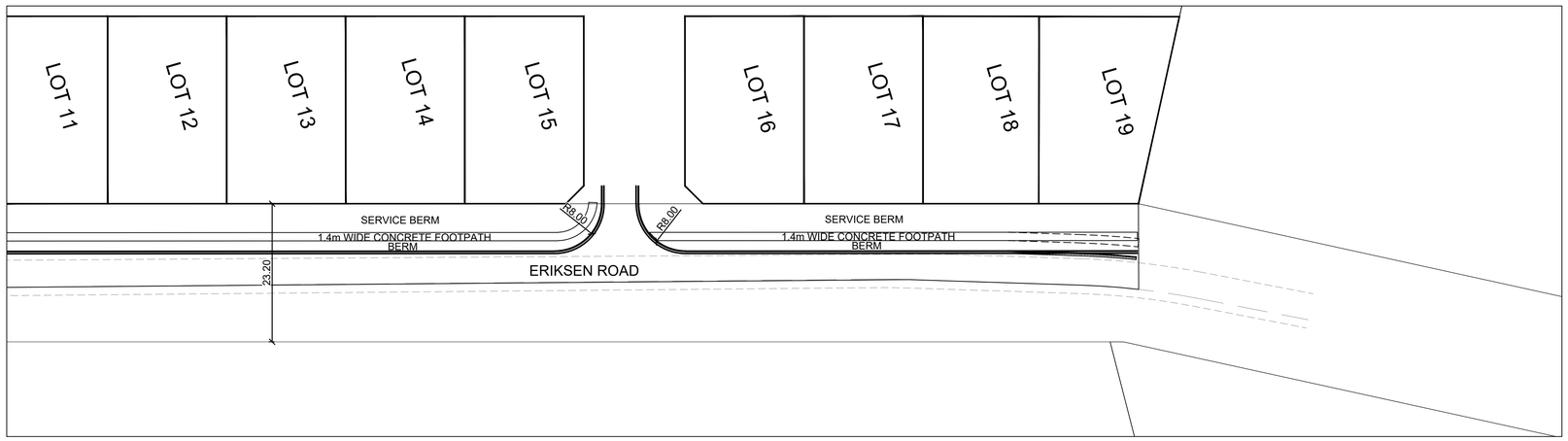

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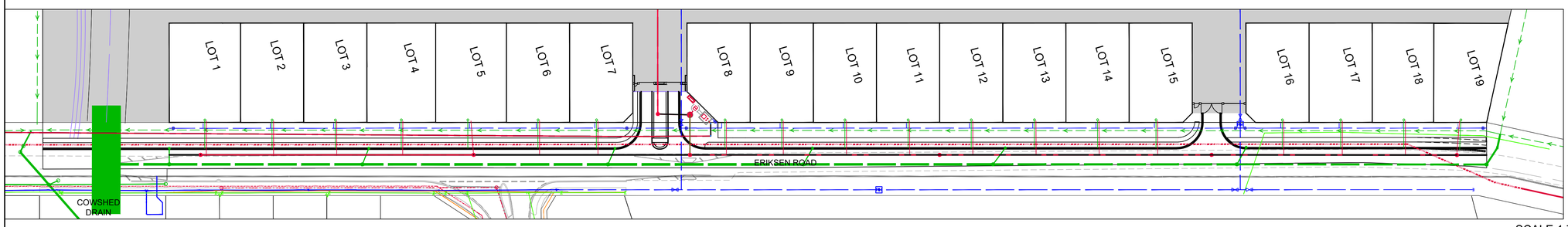
LEGEND:

- PROPOSED WATER PIPE
- WATER VALVES
- FIRE HYDRANT
- PROPOSED STORMWATER SYSTEM
- EXISTING SWALE DRAIN
- SEWER PUMPING MAIN
- PROPOSED SEWER SYSTEM
- EXISTING FIBRE
- EXISTING GAS



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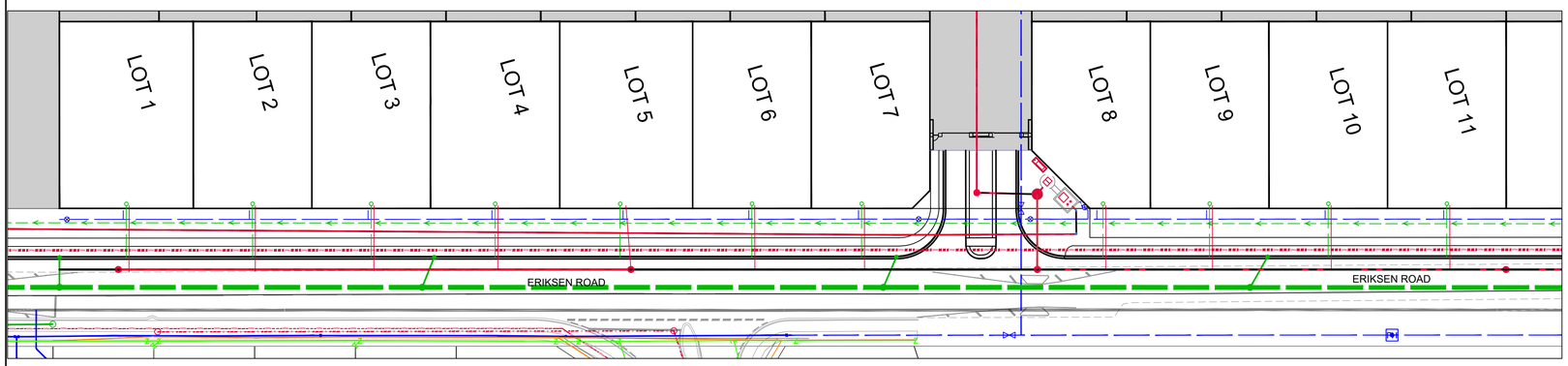

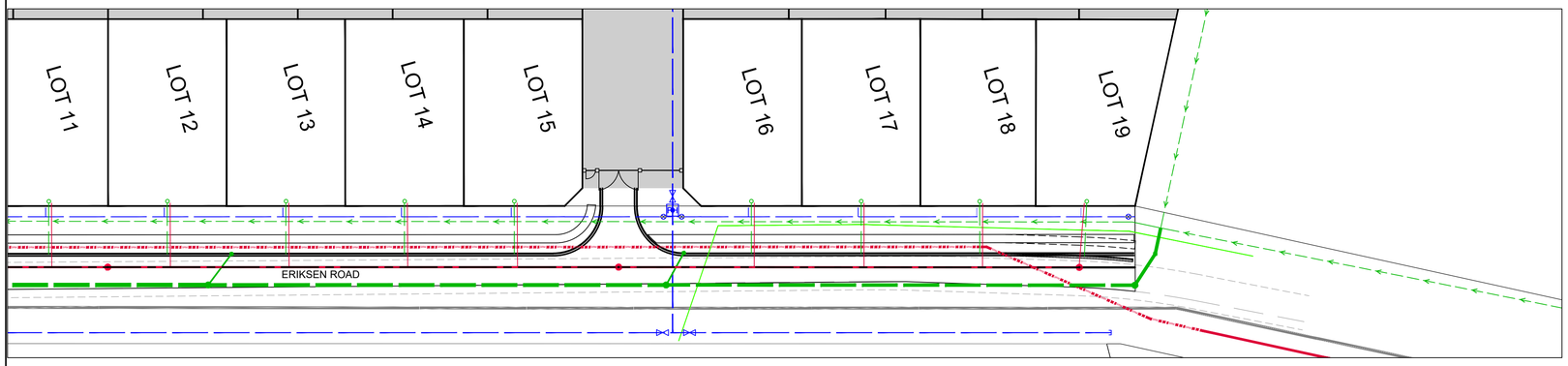

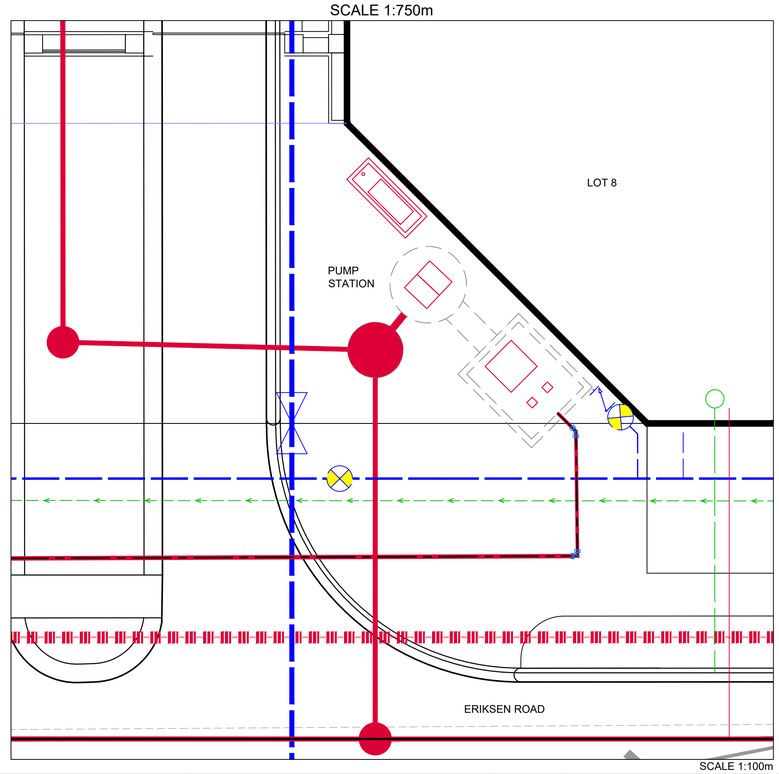

SCALE 1:100m

SAFETY IN DESIGN

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REV	REASON FOR ISSUE	DATE	BY
2	FOR APPROVAL	03.12.2020	
1	FOR INFORMATION ONLY	21.09.2020	

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Hastings, New Zealand
Structural Fire Civil Project Management

CLIENT: DURHAM PROPERTY LTD

PROJECT: TE AWA SUBDIVISION (WILLOWBANK AVE) 16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED OVERALL WATER SERVICES LAYOUT STAGE 1

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DRAWN	MA
CHECKED	DJ
DATE	SEP2020

0 5 10 20 30
Full Size 1:500 ; Half Size 1:1000
Scale (m)

PROJECT NO.:	SHEET:	REVISION:
J4345	C400	2

PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\SHEETS\J4345-DRG-C400-PROPOSED DRAINAGE LAYOUT.DWG DATE:7/2/2018

GENERAL NOTES:

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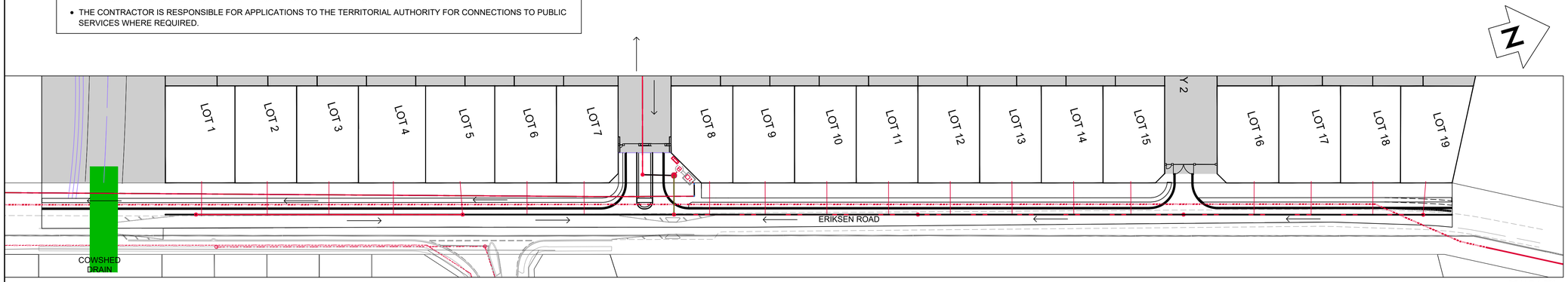
LEGEND:

- SEWER PUMPING MAIN
- PROPOSED SEWER SYSTEM



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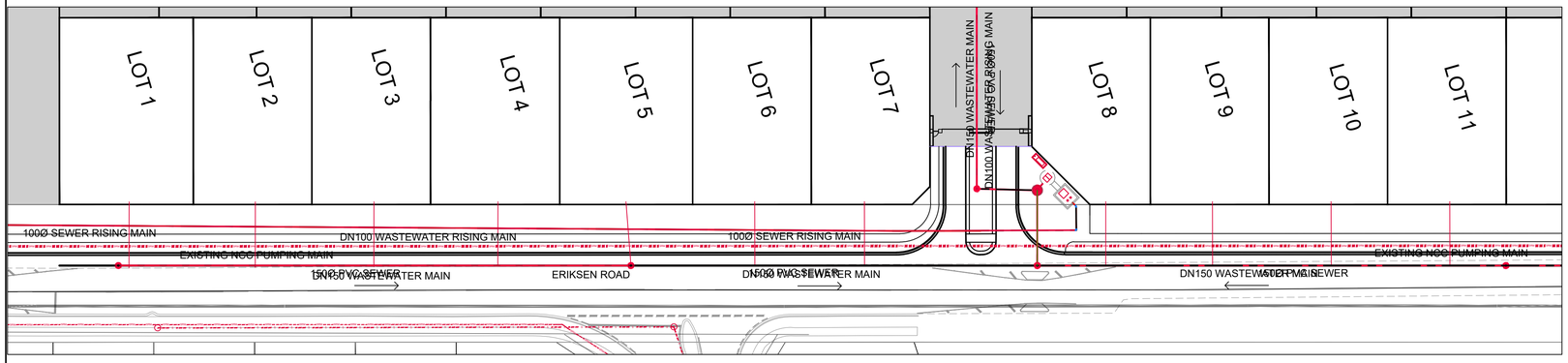

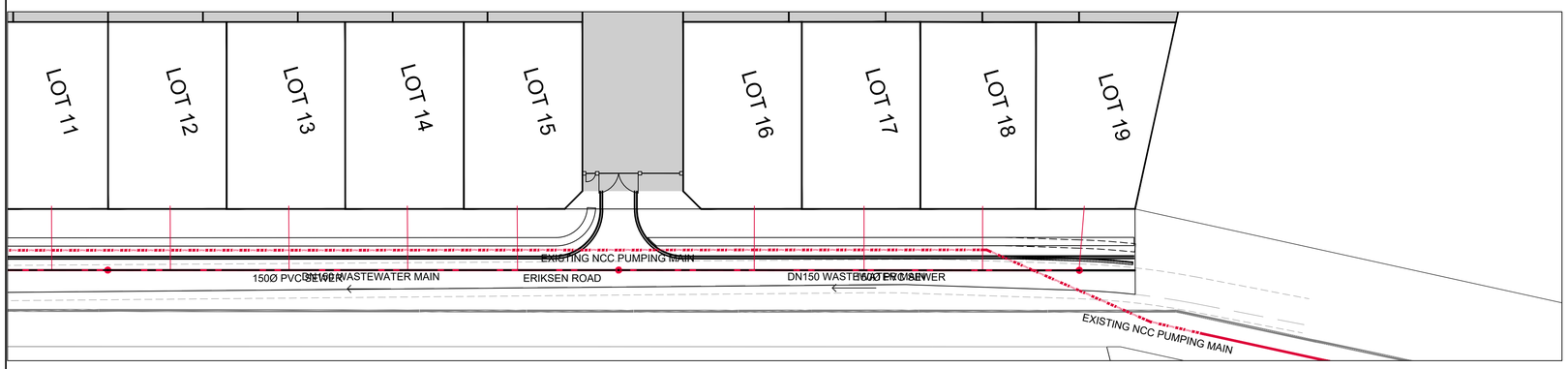

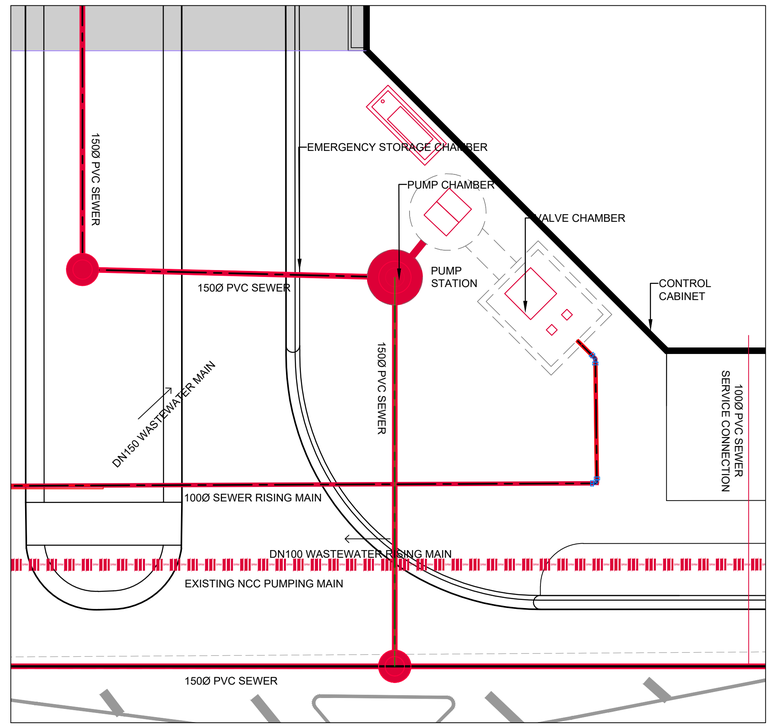

SCALE 1:100m

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Structural Fire Civil Project Management

CLIENT: DURHAM PROPERTY LTD

PROJECT: TE AWA SUBDIVISION (WILLOWBANK AVE) 16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED DRAINAGE WASTEWATER LAYOUT STAGE 1

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DRAWN	MA
CHECKED	DJ
DATE	SEP2020

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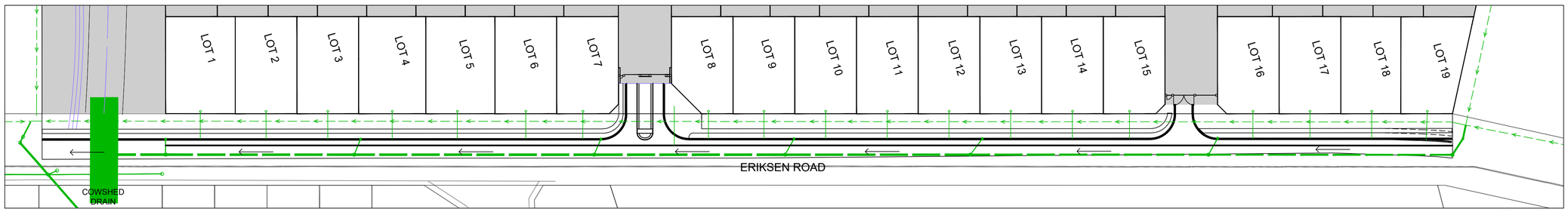
Full Size 1:500 ; Half Size 1:1000
Scale (m)

PROJECT NO.:	SHEET:	REVISION:
J4345	C410	2

PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\SHEETS\J4345-DRG-C400-PROPOSED DRAINAGE LAYOUT.DWG DATE:7/2/2018



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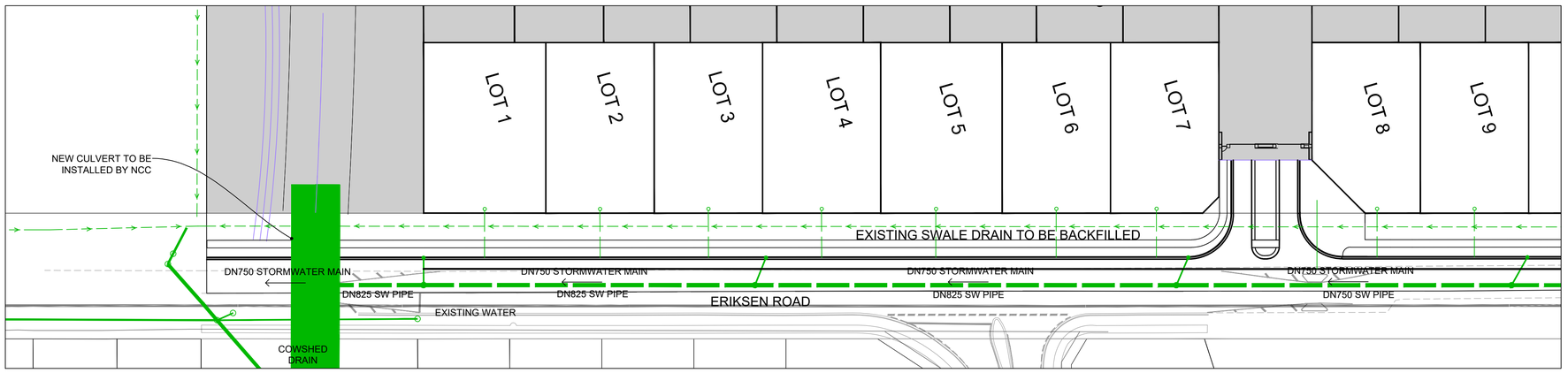

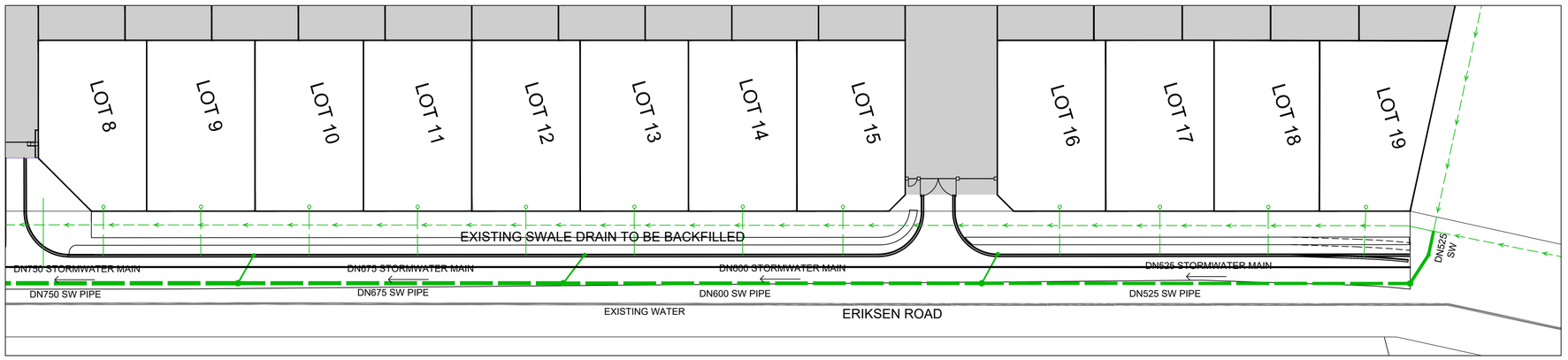

LEGEND:

- PROPOSED STORMWATER SYSTEM
- EXISTING SWALE DRAIN

GENERAL NOTES:

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Structural Fire Civil Project Management

CLIENT: DURHAM PROPERTY LTD

PROJECT: TE AWA SUBDIVISION (WILLOWBANK AVE) 16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED DRAINAGE STORMWATER LAYOUT STAGE 1

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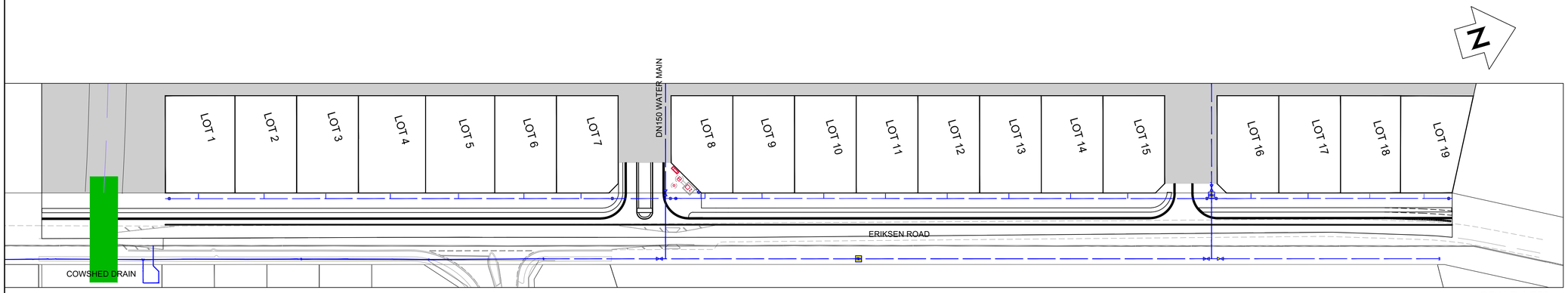
DESIGNED	MA
DRAWN	MA
CHECKED	DJ
DATE	SEP2020

0 5 10 20 30
Full Size 1:500 ; Half Size 1:1000
Scale (m)

PROJECT NO.:	SHEET:	REVISION:
J4345	C420	2

PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\SHEETS\J4345-DRG-C400-PROPOSED DRAINAGE LAYOUT.DWG DATE:7/2/2018



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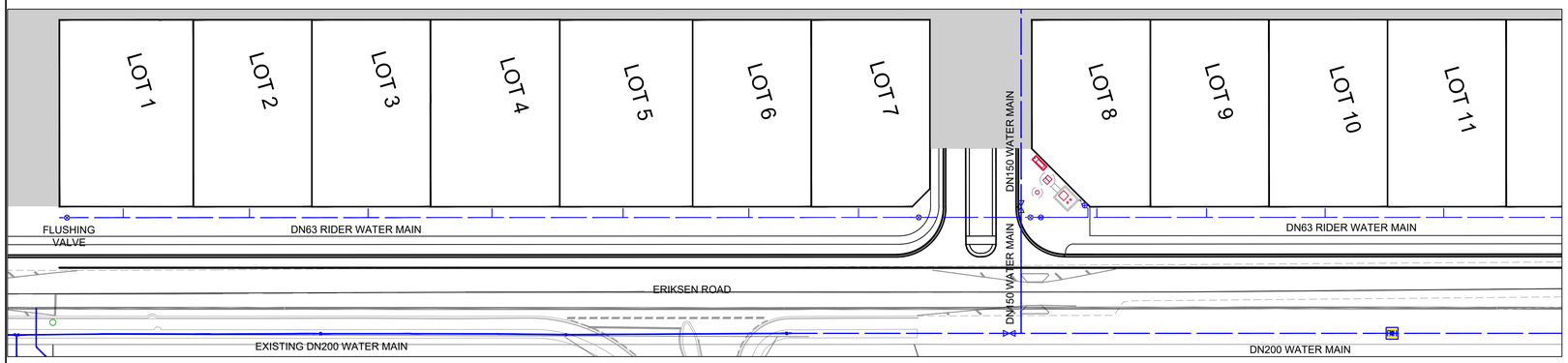

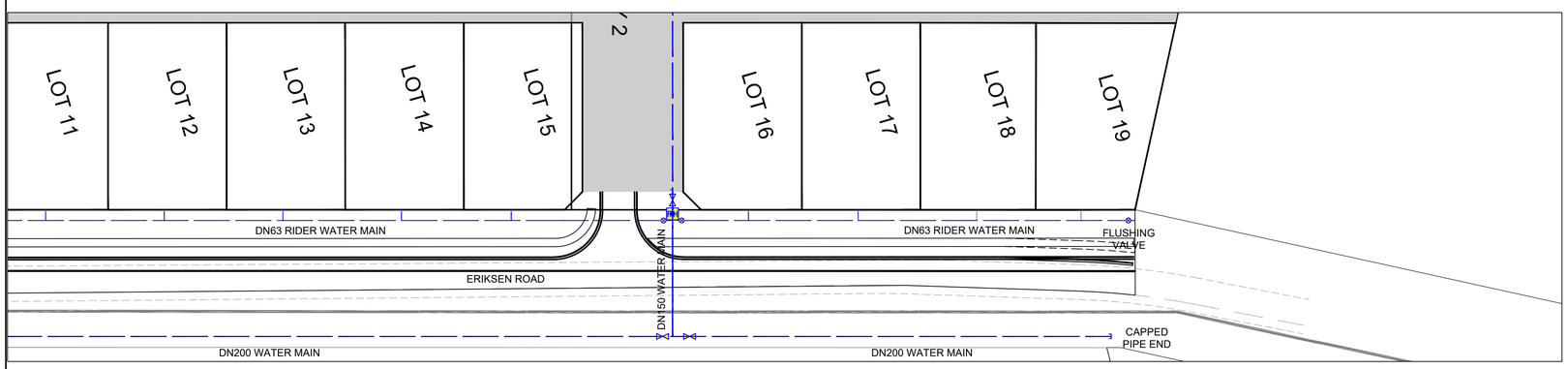

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LEGEND:

- PROPOSED WATER PIPE
- WATER VALVES
- FIRE HYDRANT

SAFETY IN DESIGN

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CLIENT: DURHAM PROPERTY LTD

PROJECT: TE AWA SUBDIVISION (WILLOWBANK AVE) 16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED OVERALL WATER SERVICES LAYOUT STAGE 1

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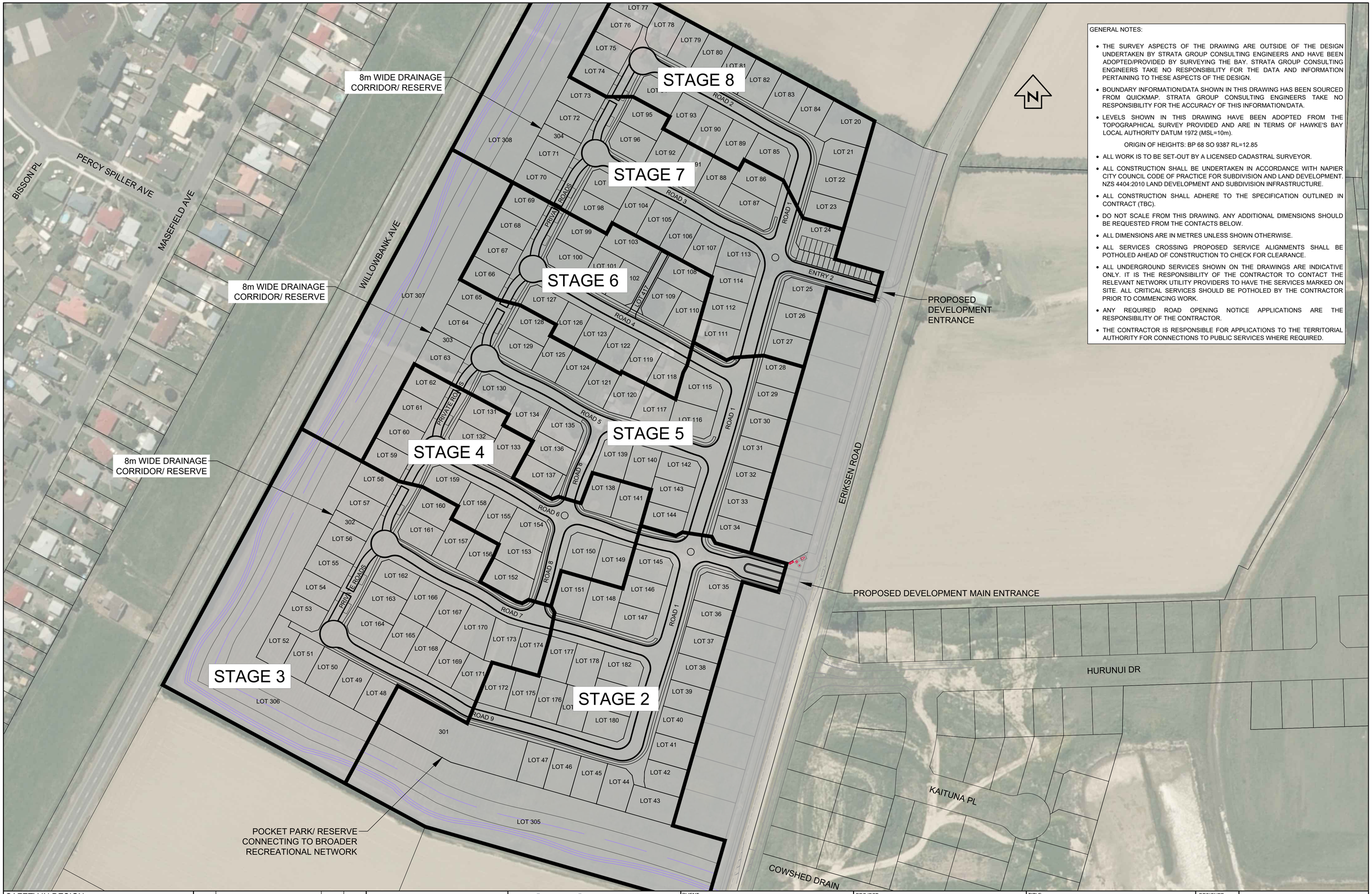
DESIGNED	MA
DRAWN	MA
CHECKED	DJ
DATE	SEP2020

0 5 10 20 30
Full Size 1:500 ; Half Size 1:1000
Scale (m)

PROJECT NO.:	SHEET:	REVISION:
J4345	C500	2

PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\SHEETS\J4345-DRG-C500-PROPOSED WATER LAYOUT.DWG DATE:7/2/2018



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  ORIGIN OF HEIGHTS: BP 68 SO 9387 RL=12.85
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PROJECT: TE AWA SUBDIVISION (WILLOWBANK AVE) 16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED SITE PLAN STAGES 2 TO 8

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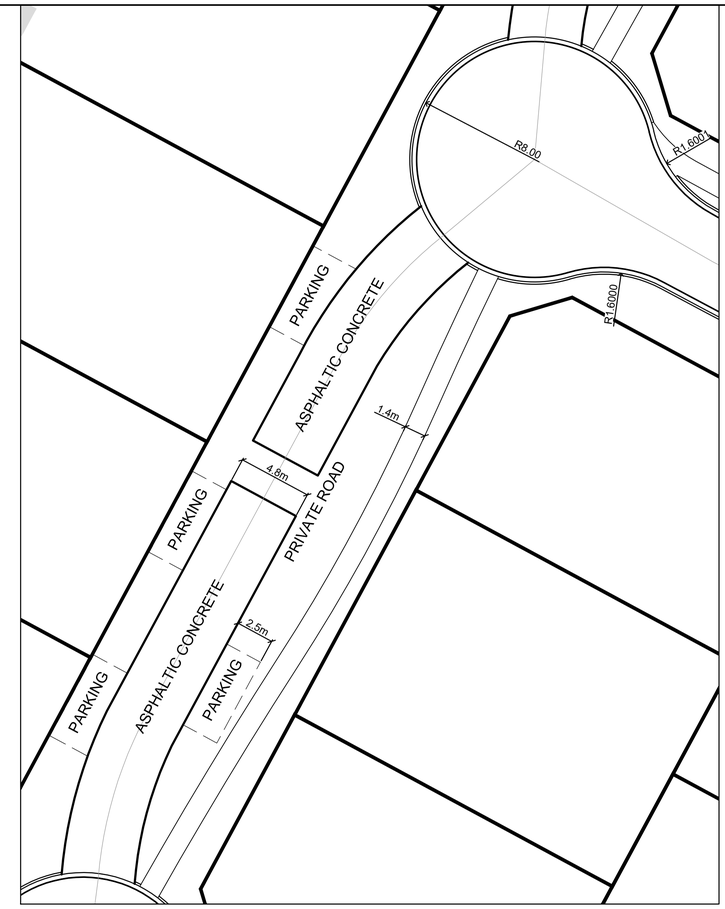
DESIGNED	
DRAWN	MA
CHECKED	DJ
DATE	SEP2020

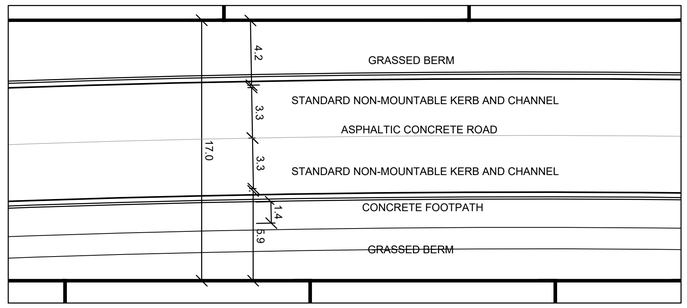
0 10 20 40 60
Full Size 1:1000 ; Half Size 1:2000
Scale (m)

PROJECT NO.:	SHEET:	REVISION:
J4345	C202	1

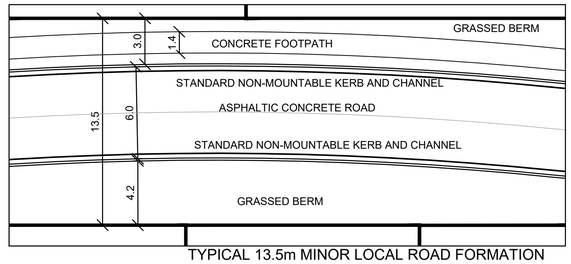
PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\SHEETS\J4345-DRG-C200-PROPOSED SCHEME PLAN.DWG DATE:7/2/2018



TYPICAL PRIVATE ROAD FORMATION
SCALE 1:200



TYPICAL 17.0m MAJOR LOCAL ROAD FORMATION
SCALE 1:200



TYPICAL 13.5m MINOR LOCAL ROAD FORMATION
SCALE 1:200

SAFETY IN DESIGN

ALL REASONABLY PRACTICABLE STEPS HAVE BEEN TAKEN TO ENSURE SAFETY IN DESIGN HAS BEEN CONSIDERED WITHIN STRATA GROUP'S SCOPE OF WORK FOR THIS DESIGN IN ACCORDANCE WITH IPENZ PRACTICE NOTE 07 "DESIGN FOR SAFETY IN BUILDINGS AND OTHER STRUCTURES (JULY 2006)". IT REMAINS THE RESPONSIBILITY OF THE OWNER AND/OR OPERATOR TO ENSURE APPROPRIATE PRACTICES ARE IN PLACE TO PROTECT THE SAFETY OF THE WORKERS AND THE PUBLIC IN THE OPERATION OF THE FACILITY.

REV	REASON FOR ISSUE	DATE	BY
1	FOR CONSENT APPROVAL	03.12.2020	-

THE CONTRACTOR IS TO BE AWARE OF ALL INSPECTIONS TO BE MADE BY THE ENGINEER AS A REQUIREMENT OF THE PRODUCER STATEMENT PS4 CONSTRUCTION REVIEW DOCUMENTATION. THE ENGINEER WILL REQUIRE 24 HOURS PRIOR NOTIFICATION FOR ALL INSPECTIONS.

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Structural Fire Civil Project Management

CLIENT: DURHAM PROPERTY LTD

PROJECT: TE AWA SUBDIVISION
(WILLOWBANK AVE)
16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED ROAD FORMATION STAGE 2 - 8

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DESIGNED	MA
DRAWN	MA
CHECKED	DJ
DATE	SEP2020

0 10 20 40 60
Full Size 1:1000 ; Half Size 1:2000
Scale (m)

PROJECT NO.:	SHEET:	REVISION:
J4345	C301	1

PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\SHEETS\J4345-DRG-C300-PROPOSED ROADING LAYOUT.DWG DATE:7/2/2018

GENERAL NOTES:

- THE SURVEY ASPECTS OF THE DRAWING ARE OUTSIDE OF THE DESIGN UNDERTAKEN BY STRATA GROUP CONSULTING ENGINEERS AND HAVE BEEN ADOPTED/PROVIDED BY SURVEYING THE BAY. STRATA GROUP CONSULTING ENGINEERS TAKE NO RESPONSIBILITY FOR THE DATA AND INFORMATION PERTAINING TO THESE ASPECTS OF THE DESIGN.
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- BOUNDARY INFORMATION/DATA SHOWN IN THIS DRAWING HAS BEEN SUPPLIED BY SURVEYING THE BAY. STRATA GROUP CONSULTING ENGINEERS TAKE NO RESPONSIBILITY FOR THE ACCURACY OF THIS INFORMATION/DATA.
- LEVELS SHOWN IN THIS DRAWING HAVE BEEN ADOPTED FROM BP 68 SO 9378 WITH RL = 12.85 AND ARE IN TERMS OF HAWKE'S BAY LOCAL AUTHORITY DATUM 1972 (MSL=10.00m).
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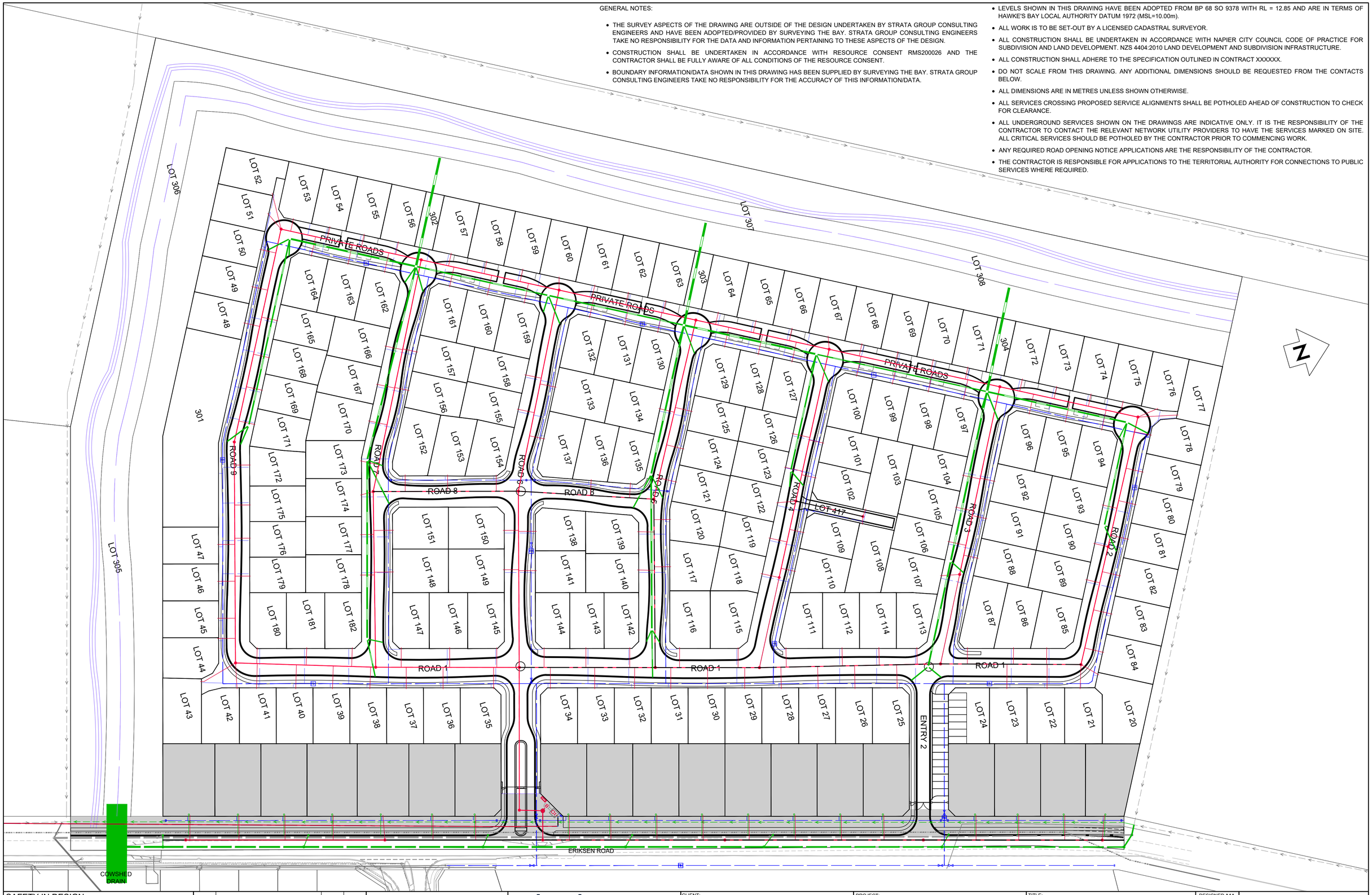

SAFETY IN DESIGN

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REV	REASON FOR ISSUE	DATE	BY
2	FOR CONSENT APPROVAL	03.12.2020	
1	FOR INFORMATION ONLY	21.09.2020	

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Structural Fire Civil Project Management

CLIENT: DURHAM PROPERTY LTD

PROJECT: TE AWA SUBDIVISION (WILLOWBANK AVE) 16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED OVERALL WATER SERVICES LAYOUT STAGES 2 - 8

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DESIGNED	MA
DRAWN	MA
CHECKED	DJ
DATE	SEP2020

0 7.5 15 30 45
Full Size 1:750 ; Half Size 1:1500
Scale (m)

PROJECT NO.:	SHEET:	REVISION:
J4345	C401	2

PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\SHEETS\J4345-DRG-C400-PROPOSED DRAINAGE LAYOUT.DWG DATE:7/2/2018

GENERAL NOTES:

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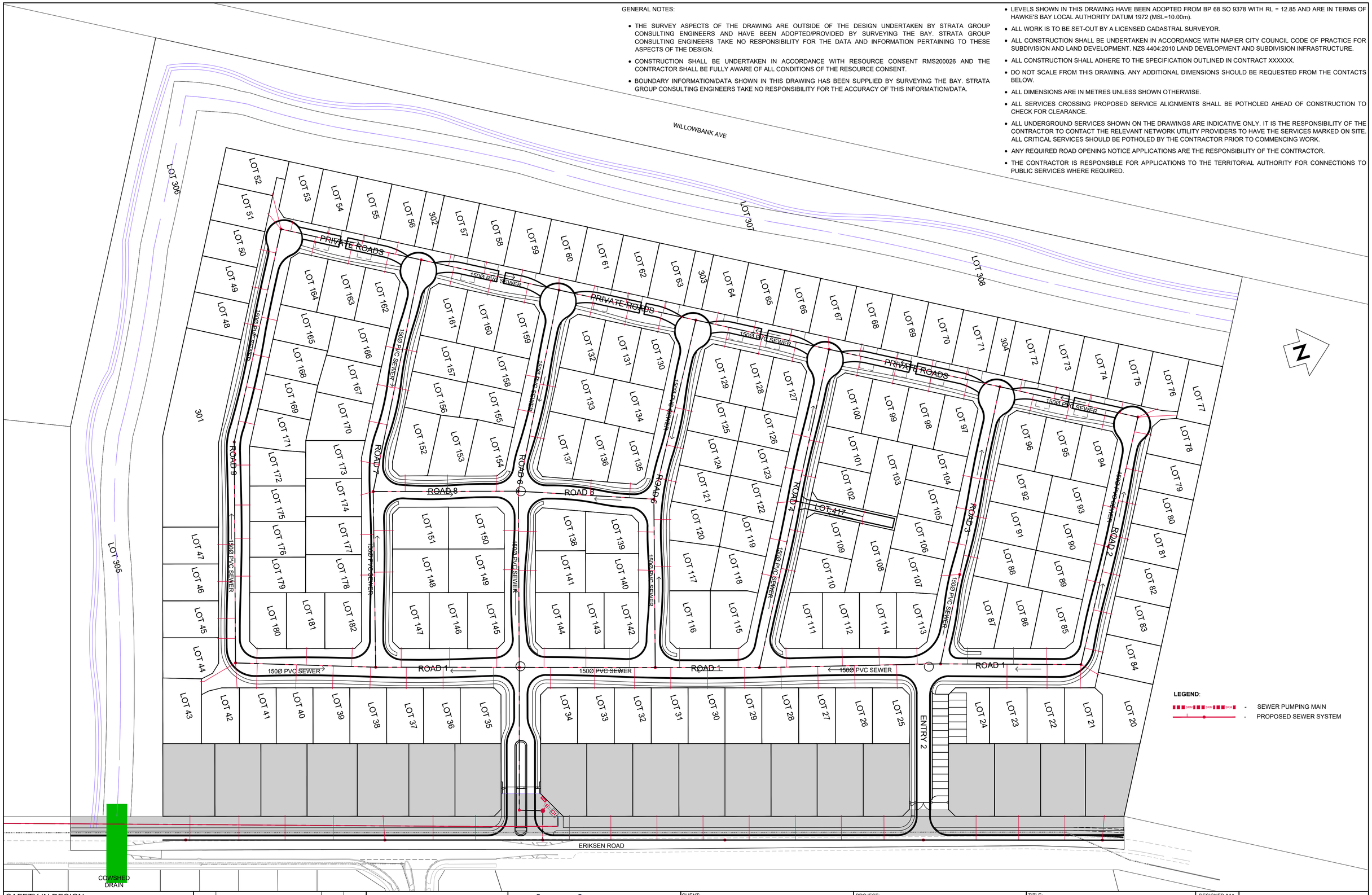

SAFETY IN DESIGN

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REV	REASON FOR ISSUE	DATE	BY
2	FOR CONSENT APPROVAL	03.12.2020	
1	FOR INFORMATION ONLY	21.09.2020	

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Structural Fire Civil Project Management

CLIENT: DURHAM PROPERTY LTD

PROJECT: TE AWA SUBDIVISION (WILLOWBANK AVE) 16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED DRAINAGE WASTEWATER LAYOUT STAGES 2 - 8

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DESIGNED	MA
DRAWN	MA
CHECKED	DJ
DATE	SEP2020

0 7.5 15 30 45
Full Size 1:750 ; Half Size 1:1500
Scale (m)

PROJECT NO.:	SHEET:	REVISION:
J4345	C411	2

PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\SHEETS\J4345-DRG-C400-PROPOSED DRAINAGE LAYOUT.DWG DATE:7/2/2018

GENERAL NOTES:

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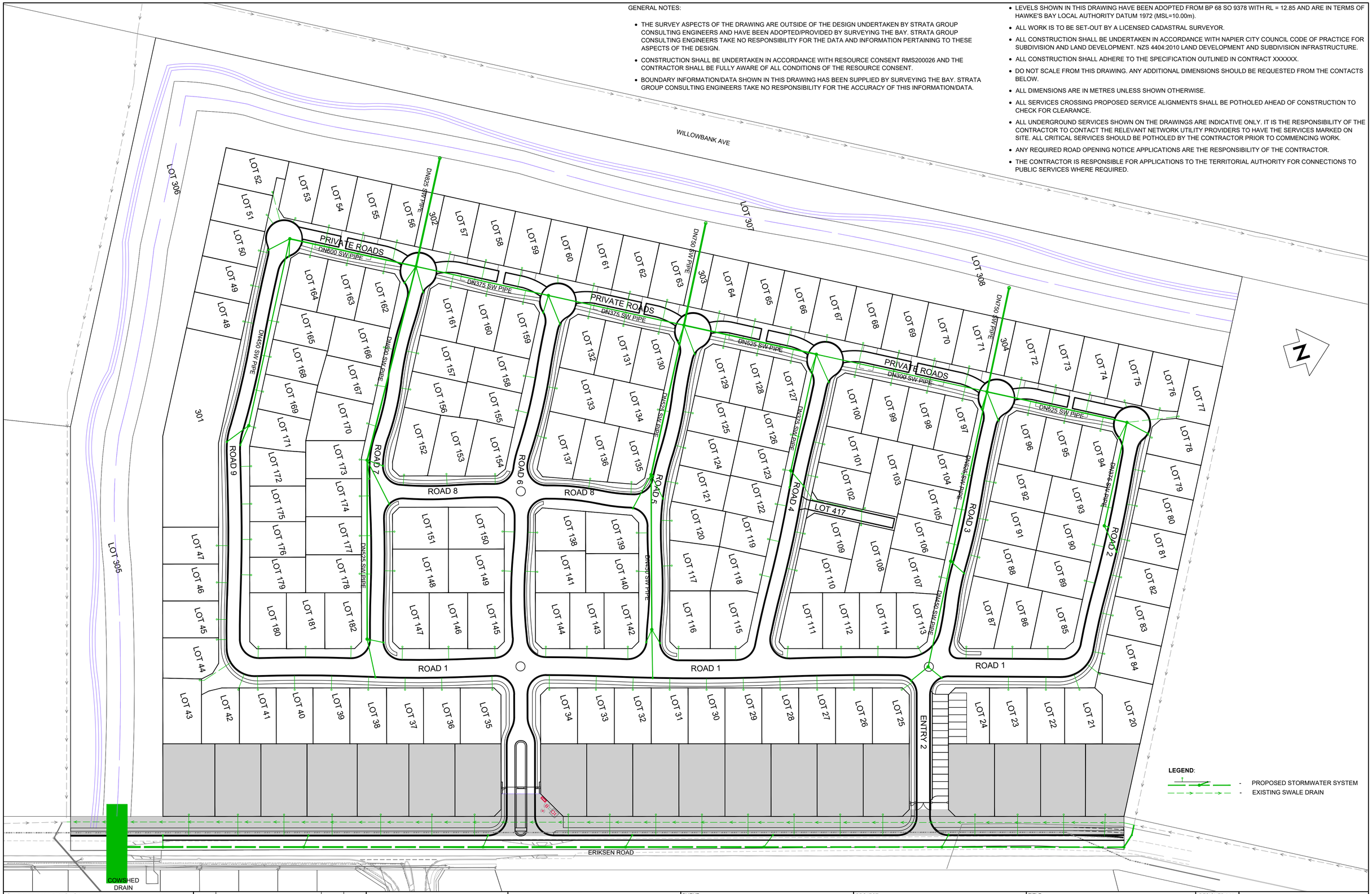

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CLIENT: DURHAM PROPERTY LTD

PROJECT: TE AWA SUBDIVISION (WILLOWBANK AVE) 16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED DRAINAGE STORMWATER LAYOUT STAGES 2 - 8

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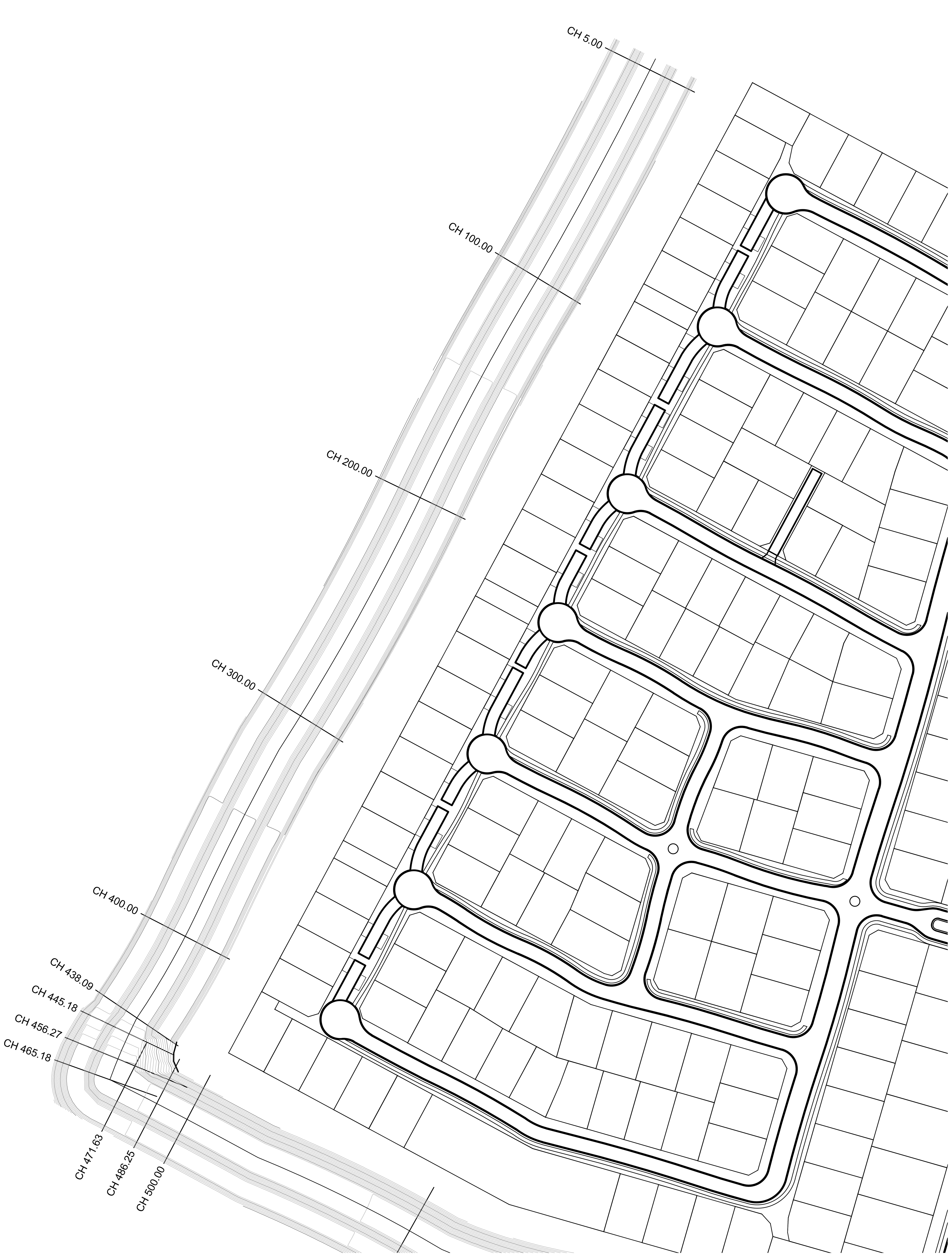
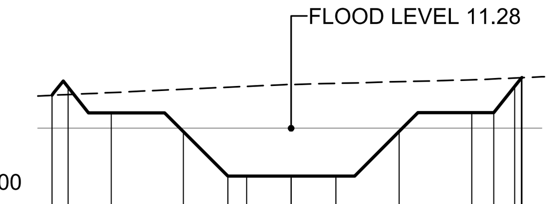
DESIGNED	MA
DRAWN	MA
CHECKED	DJ
DATE	SEP2020

0 7.5 15 30 45
Full Size 1:750 ; Half Size 1:1500
Scale (m)

PROJECT NO.:	SHEET:	REVISION:
J4345	C421	2

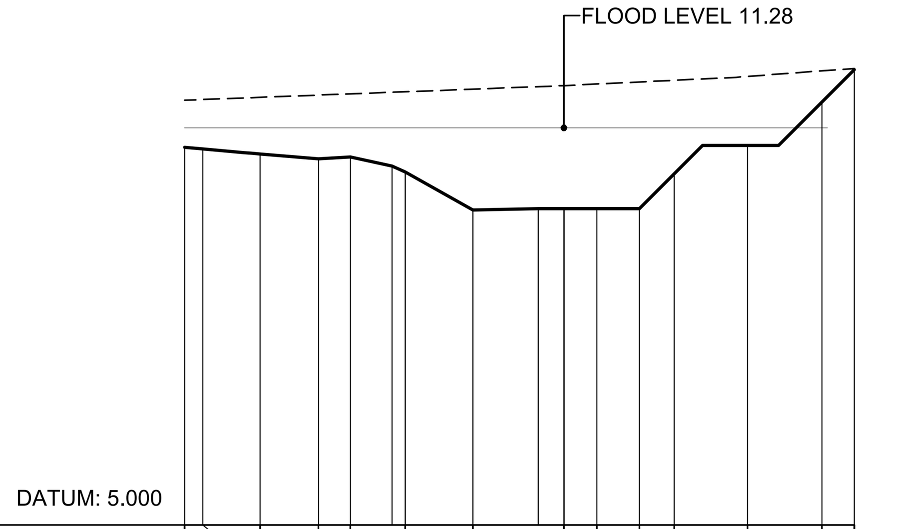
PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\SHEETS\J4345-DRG-C400-PROPOSED DRAINAGE LAYOUT.DWG DATE:7/2/2018





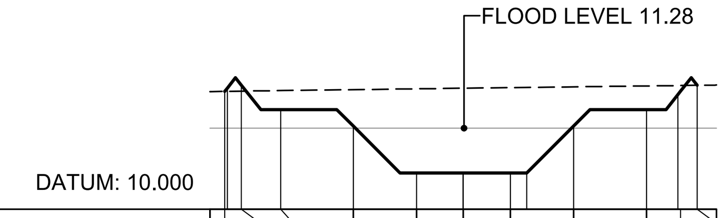
PROPOSED LEVELS	11.798	11.927	11.522	11.226	10.523	10.523	10.523	11.228	11.523	11.938	12.077
EXISTING LEVELS	11.798	11.810	11.841	11.893	11.939	11.969	11.987	12.013	12.043	12.072	12.077
LEVEL DIFFERENCE	0.000	0.117	-0.319	-0.668	-1.416	-1.446	-1.464	-0.785	-0.520	-0.134	0.000
OFFSETS	-18.882	-17.615	-14.208	-8.506	-3.506	0.000	3.536	8.536	14.259	17.664	18.221

CHAINAGE 300.000



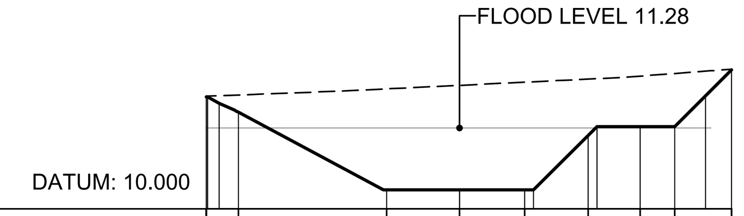
PROPOSED LEVELS	10.969	10.943	10.865	10.789	10.817	10.579	9.980	10.000	9.999	10.000	10.551	10.999	11.684	12.198
EXISTING LEVELS	11.714	11.725	11.760	11.795	11.814	11.847	11.888	11.945	11.970	12.002	12.029	12.089	12.178	12.216
LEVEL DIFFERENCE	-0.745	-0.782	-0.895	-1.006	-0.997	-1.268	-1.908	-1.945	-1.971	-2.002	-1.478	-1.090	-0.494	-0.018
OFFSETS	-11.405	-11.271	-10.859	-10.452	-10.234	-9.867	-7.188	0.000	2.595	5.973	8.722	14.513	20.405	22.972

CHAINAGE 456.269



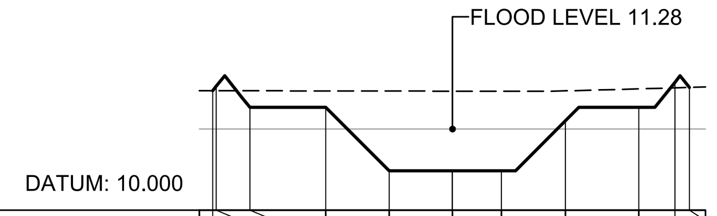
PROPOSED LEVELS	11.860	11.958	11.573	11.313	10.573	10.573	10.573	11.315	11.573	11.865	11.954
EXISTING LEVELS	11.860	11.863	11.871	11.886	11.899	11.909	11.919	11.931	11.945	11.951	11.954
LEVEL DIFFERENCE	0.000	0.095	-0.298	-0.574	-1.326	-1.336	-1.346	-0.616	-0.372	-0.087	0.000
OFFSETS	-18.845	-17.534	-14.429	-8.690	-3.690	0.000	3.718	8.718	14.461	17.169	18.475

CHAINAGE 200.000



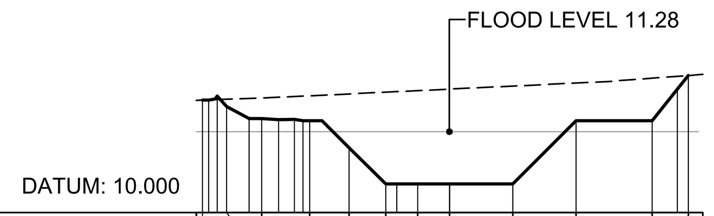
PROPOSED LEVELS	11.770	11.526	10.300	10.300	10.301	11.161	11.300	11.300	12.197
EXISTING LEVELS	11.780	11.800	11.896	11.952	12.001	12.050	12.098	12.139	12.206
LEVEL DIFFERENCE	-0.011	-0.274	-1.596	-1.652	-1.701	-0.889	-0.798	-0.839	-0.009
OFFSETS	-20.000	-17.456	-5.765	0.000	5.149	10.150	14.266	16.998	21.476

CHAINAGE 445.182



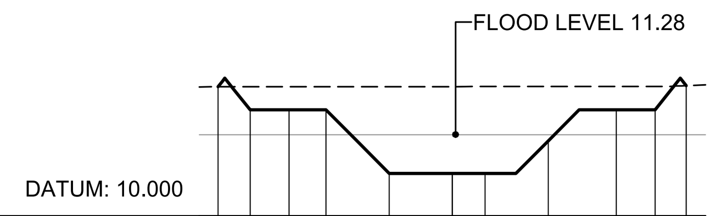
PROPOSED LEVELS	11.887	11.958	11.623	11.623	10.623	10.623	10.623	11.411	11.623	12.019	11.939
EXISTING LEVELS	11.887	11.887	11.886	11.884	11.882	11.880	11.878	11.884	11.916	11.932	11.939
LEVEL DIFFERENCE	0.000	0.071	-0.263	-0.261	-1.259	-1.257	-1.256	-0.473	-0.294	0.087	0.000
OFFSETS	-18.957	-18.664	-16.008	-10.008	-5.008	0.000	3.875	8.933	14.720	17.578	18.722

CHAINAGE 100.000



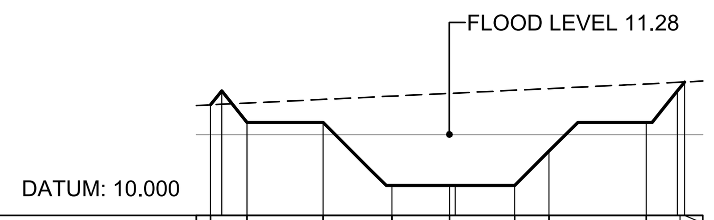
PROPOSED LEVELS	11.780	11.676	11.486	11.453	11.026	10.454	10.454	10.454	10.454	11.454	11.454	12.168
EXISTING LEVELS	11.780	11.794	11.814	11.847	11.877	11.905	11.929	11.953	12.001	12.049	12.125	12.168
LEVEL DIFFERENCE	0.000	-0.118	-0.328	-0.394	-0.851	-1.451	-1.475	-1.499	-1.547	-0.595	-0.671	0.000
OFFSETS	-19.364	-17.462	-14.710	-10.955	-7.865	-5.001	-2.497	0.000	5.000	10.000	16.000	18.856

CHAINAGE 438.094



PROPOSED LEVELS	12.034	11.670	11.670	11.670	10.670	10.670	10.670	11.182	11.670	11.670	12.053
EXISTING LEVELS	12.034	12.035	12.035	12.036	12.037	12.038	12.039	12.040	12.041	12.039	12.053
LEVEL DIFFERENCE	0.000	-0.364	-0.365	-0.366	-1.367	-1.368	-1.368	-0.857	-0.370	-0.369	0.000
OFFSETS	-18.528	-15.992	-12.920	-9.992	-4.992	0.000	2.567	7.567	12.947	16.023	18.468

CHAINAGE 05.000



PROPOSED LEVELS	11.751	11.473	11.473	10.473	10.473	10.473	11.019	11.473	12.024	12.113
EXISTING LEVELS	11.751	11.779	11.837	11.889	11.933	11.982	12.009	12.082	12.109	12.113
LEVEL DIFFERENCE	0.000	-0.306	-0.364	-1.416	-1.460	-1.510	-0.990	-0.609	-0.085	0.000
OFFSETS	-18.868	-15.984	-9.984	-4.550	0.000	5.143	7.871	15.536	18.208	18.568

CHAINAGE 400.000

SAFETY IN DESIGN

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REV	REASON FOR ISSUE	DATE	BY
2	FOR CONSENT APPROVAL	12.01.2021	-
1	FOR CONSENT APPROVAL	03.12.2020	-

THE CONTRACTOR IS TO BE AWARE OF ALL INSPECTIONS TO BE MADE BY THE ENGINEER AS A REQUIREMENT OF THE PRODUCER STATEMENT PS4 CONSTRUCTION REVIEW DOCUMENTATION. THE ENGINEER WILL REQUIRE 24 HOURS PRIOR NOTIFICATION FOR ALL INSPECTIONS.

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Structural Fire Civil Project Management

CLIENT: DURHAM PROPERTY LTD

PROJECT: TE AWA SUBDIVISION (WILLOWBANK AVE) 16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED OPEN DRAIN WILLOWBANK CROSS SECTIONS

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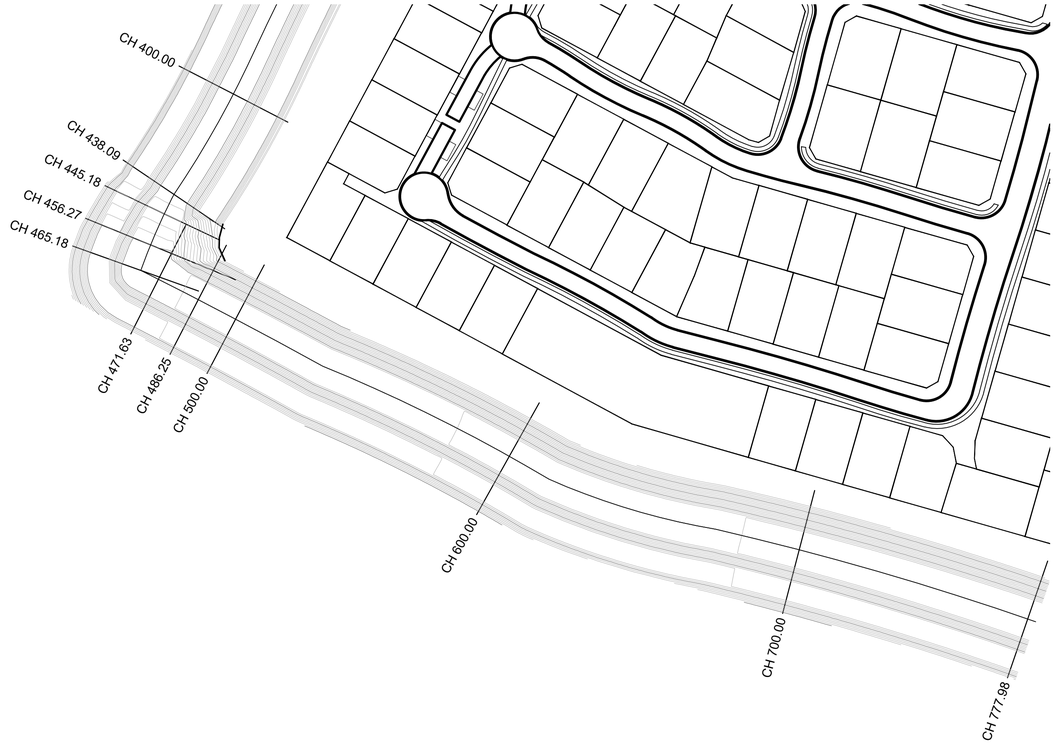
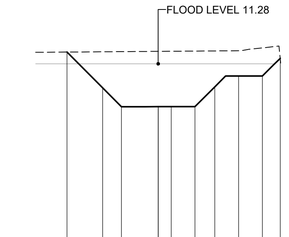
DESIGNED MA
DRAWN MA
CHECKED DJ
DATE NOV2020

0 5 10 20 30
Full Size 1:500 ; Half Size 1:1000
Scale (m)

PROJECT NO.: J4345 | SHEET: C450 | REVISION: 2

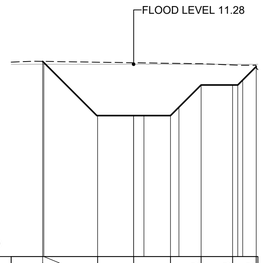
PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\DESIGN\J4345-CIV-DESIGN SURFACE_OPEN DRAIN.DWG DATE:7/2/2018





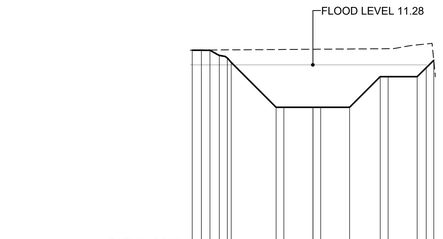
PROPOSED LEVELS	11.663	10.497	9.880	9.881	9.881	10.527	10.881	10.881	11.459
EXISTING LEVELS	11.663	11.672	11.677	11.686	11.696	11.701	11.707	11.800	11.459
LEVEL DIFFERENCE	0.000	-1.176	-1.797	-1.806	-1.815	-1.173	-0.826	-0.919	0.000
OFFSETS	-14.889	-9.072	-5.995	0.000	6.005	9.238	13.134	17.005	19.922

CHAINAGE 500.000



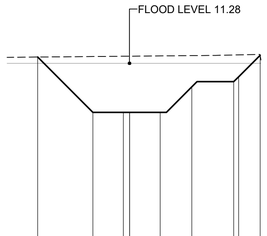
PROPOSED LEVELS	11.372	11.335	9.603	9.603	9.603	10.603	10.603	11.203
EXISTING LEVELS	11.372	11.372	11.346	11.328	11.310	11.295	11.256	11.203
LEVEL DIFFERENCE	0.000	-0.037	-1.743	-1.725	-1.707	-0.692	-0.653	0.000
OFFSETS	-14.847	-14.662	-5.873	0.000	6.010	11.009	16.159	20.003

CHAINAGE 777.981



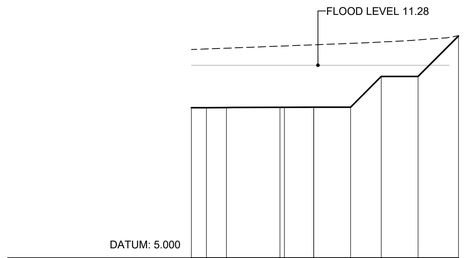
PROPOSED LEVELS	11.761	11.758	11.359	9.894	9.894	9.894	10.894	10.894	11.429
EXISTING LEVELS	11.761	11.765	11.770	11.783	11.790	11.799	11.806	11.931	11.429
LEVEL DIFFERENCE	0.000	-0.006	-0.411	-1.889	-1.896	-1.904	-0.912	-1.037	0.000
OFFSETS	-19.693	-16.796	-13.317	-4.723	0.000	6.004	11.004	17.018	19.730

CHAINAGE 486.251



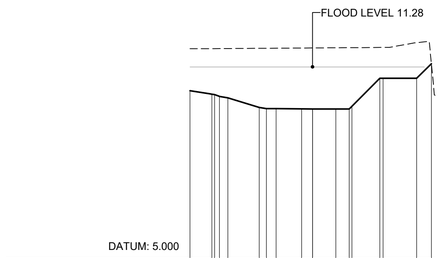
PROPOSED LEVELS	11.486	9.681	9.681	9.681	10.513	10.681	11.541	
EXISTING LEVELS	11.486	11.502	11.513	11.523	11.532	11.554	11.541	
LEVEL DIFFERENCE	0.000	-1.822	-1.833	-1.842	-1.019	-0.873	0.000	
OFFSETS	-15.008	-5.993	0.000	5.003	10.169	17.006	21.314	

CHAINAGE 700.000



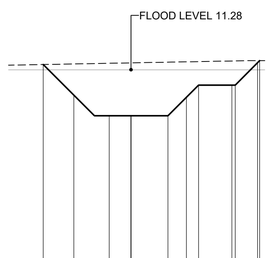
PROPOSED LEVELS	9.896	9.898	9.903	9.911	9.916	9.916	10.916	10.916	12.236
EXISTING LEVELS	11.796	11.815	11.848	11.912	11.949	11.995	12.041	12.110	12.248
LEVEL DIFFERENCE	-1.900	-1.916	-1.944	-2.001	-2.034	-2.080	-1.125	-1.194	-0.012
OFFSETS	-2.524	-2.201	-1.640	-0.587	0.000	6.000	11.000	17.000	23.603

CHAINAGE 465.179



PROPOSED LEVELS	10.505	10.391	10.270	9.957	9.919	9.909	9.909	9.997	10.909	10.909	11.384
EXISTING LEVELS	11.875	11.877	11.881	11.888	11.892	11.900	11.906	11.910	11.916	12.073	11.384
LEVEL DIFFERENCE	-1.370	-1.486	-1.611	-1.931	-1.973	-1.991	-1.997	-1.912	-1.007	-1.164	0.000
OFFSETS	-7.953	-7.826	-7.692	-7.328	-5.947	0.000	3.819	6.441	11.001	17.001	19.418

CHAINAGE 471.633



PROPOSED LEVELS	11.452	10.454	9.780	9.781	9.781	10.382	10.781	11.510	11.578
EXISTING LEVELS	11.452	11.471	11.493	11.506	11.529	11.540	11.568	11.578	11.578
LEVEL DIFFERENCE	0.000	-1.017	-1.712	-1.725	-1.748	-1.158	-0.787	-0.068	0.000
OFFSETS	-14.328	-9.344	-3.560	0.000	6.018	9.024	16.465	20.651	20.992

CHAINAGE 600.000

SAFETY IN DESIGN

ALL REASONABLY PRACTICABLE STEPS HAVE BEEN TAKEN TO ENSURE SAFETY IN DESIGN HAS BEEN CONSIDERED WITHIN STRATA GROUP'S SCOPE OF WORK FOR THIS DESIGN IN ACCORDANCE WITH IPENZ PRACTICE NOTE 07 "DESIGN FOR SAFETY IN BUILDINGS AND OTHER STRUCTURES (JULY 2006)". IT REMAINS THE RESPONSIBILITY OF THE OWNER AND/OR OPERATOR TO ENSURE APPROPRIATE PRACTICES ARE IN PLACE TO PROTECT THE SAFETY OF THE WORKERS AND THE PUBLIC IN THE OPERATION OF THE FACILITY.

REV	REASON FOR ISSUE	DATE	BY
2	FOR CONSENT APPROVAL	12.01.2021	-
1	FOR CONSENT APPROVAL	03.12.2020	-

THE CONTRACTOR IS TO BE AWARE OF ALL INSPECTIONS TO BE MADE BY THE ENGINEER AS A REQUIREMENT OF THE PRODUCER STATEMENT PS4 CONSTRUCTION REVIEW DOCUMENTATION. THE ENGINEER WILL REQUIRE 24 HOURS PRIOR NOTIFICATION FOR ALL INSPECTIONS.

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Structural Fire Civil Project Management

CLIENT: DURHAM PROPERTY LTD

PROJECT: TE AWA SUBDIVISION (WILLOWBANK AVE) 16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED OPEN DRAIN COWSHED EXTENSION CROSS SECTIONS

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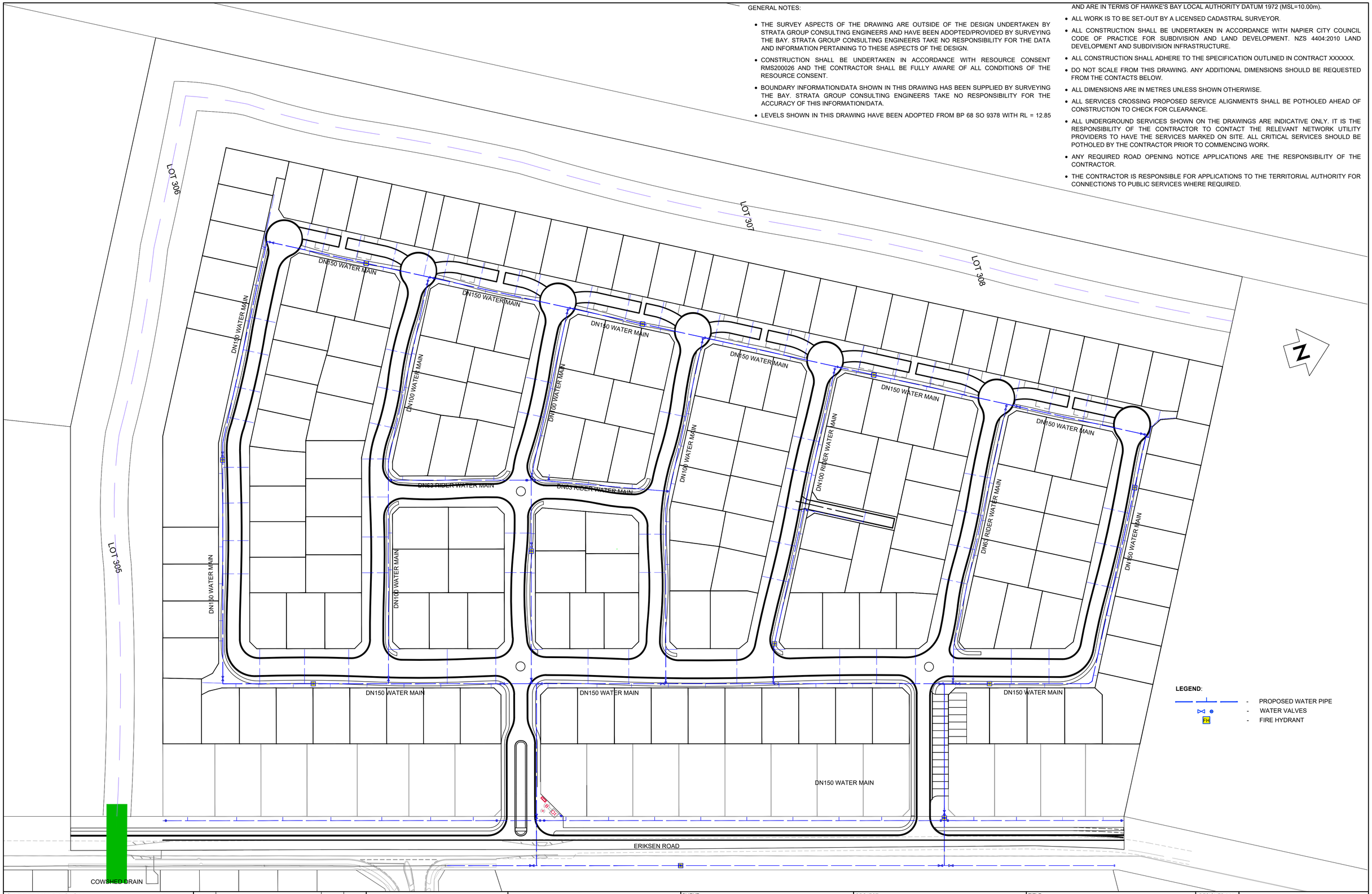
DESIGNED MA
DRAWN MA
CHECKED DJ
DATE NOV2020
PROJECT NO.: J4345
SHEET: C451
REVISION: 2

0 0.05 0.1 0.2 0.3
Full Size 1:5 ; Half Size 1:10
Scale (m)

PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\DESIGN\J4345-CIV-DESIGN SURFACE_OPEN DRAIN.DWG DATE:7/2/2018

GENERAL NOTES:

- THE SURVEY ASPECTS OF THE DRAWING ARE OUTSIDE OF THE DESIGN UNDERTAKEN BY STRATA GROUP CONSULTING ENGINEERS AND HAVE BEEN ADOPTED/PROVIDED BY SURVEYING THE BAY. STRATA GROUP CONSULTING ENGINEERS TAKE NO RESPONSIBILITY FOR THE DATA AND INFORMATION PERTAINING TO THESE ASPECTS OF THE DESIGN.
- CONSTRUCTION SHALL BE UNDERTAKEN IN ACCORDANCE WITH RESOURCE CONSENT RMS200026 AND THE CONTRACTOR SHALL BE FULLY AWARE OF ALL CONDITIONS OF THE RESOURCE CONSENT.
- BOUNDARY INFORMATION/DATA SHOWN IN THIS DRAWING HAS BEEN SUPPLIED BY SURVEYING THE BAY. STRATA GROUP CONSULTING ENGINEERS TAKE NO RESPONSIBILITY FOR THE ACCURACY OF THIS INFORMATION/DATA.
- LEVELS SHOWN IN THIS DRAWING HAVE BEEN ADOPTED FROM BP 68 SO 9378 WITH RL = 12.85 AND ARE IN TERMS OF HAWKE'S BAY LOCAL AUTHORITY DATUM 1972 (MSL=10.00m).
- ALL WORK IS TO BE SET-OUT BY A LICENSED CADASTRAL SURVEYOR.
- ALL CONSTRUCTION SHALL BE UNDERTAKEN IN ACCORDANCE WITH NAPIER CITY COUNCIL CODE OF PRACTICE FOR SUBDIVISION AND LAND DEVELOPMENT. NZS 4404:2010 LAND DEVELOPMENT AND SUBDIVISION INFRASTRUCTURE.
- ALL CONSTRUCTION SHALL ADHERE TO THE SPECIFICATION OUTLINED IN CONTRACT XXXXXX.
- DO NOT SCALE FROM THIS DRAWING. ANY ADDITIONAL DIMENSIONS SHOULD BE REQUESTED FROM THE CONTACTS BELOW.
- ALL DIMENSIONS ARE IN METRES UNLESS SHOWN OTHERWISE.
- ALL SERVICES CROSSING PROPOSED SERVICE ALIGNMENTS SHALL BE POTHOLED AHEAD OF CONSTRUCTION TO CHECK FOR CLEARANCE.
- ALL UNDERGROUND SERVICES SHOWN ON THE DRAWINGS ARE INDICATIVE ONLY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE RELEVANT NETWORK UTILITY PROVIDERS TO HAVE THE SERVICES MARKED ON SITE. ALL CRITICAL SERVICES SHOULD BE POTHOLED BY THE CONTRACTOR PRIOR TO COMMENCING WORK.
- ANY REQUIRED ROAD OPENING NOTICE APPLICATIONS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
- THE CONTRACTOR IS RESPONSIBLE FOR APPLICATIONS TO THE TERRITORIAL AUTHORITY FOR CONNECTIONS TO PUBLIC SERVICES WHERE REQUIRED.



SAFETY IN DESIGN

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REV	REASON FOR ISSUE	DATE	BY
2	FOR CONSENT APPROVAL	03.12.2020	
1	FOR INFORMATION ONLY	21.09.2020	

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Structural Fire Civil Project Management

CLIENT: DURHAM PROPERTY LTD

PROJECT: TE AWA SUBDIVISION
(WILLOWBANK AVE)
16-38 WILLOWBANK AVE, NAPIER

TITLE: PROPOSED OVERALL WATER SERVICES LAYOUT STAGES 2 - 8

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DESIGNED	MA
DRAWN	MA
CHECKED	DJ
DATE	SEP2020

0 7.5 15 30 45
Full Size 1:750 ; Half Size 1:1500
Scale (m)

PROJECT NO.:	SHEET:	REVISION:
J4345	C501	2

PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\SHEETS\J4345-DRG-C500-PROPOSED WATER LAYOUT.DWG DATE:7/2/2018

EARTHWORKS NOTES:

- CUT AND FILL INDICATES EG UNDERCUT (TOPSOIL STRIP) TO FINISHED SURFACE PRIOR TO TOPSOIL FILL.
- ALL VOLUMES HAVE BEEN CALCULATED IN SOLID ON FIXED DESIGN DEPTHS. VOLUMES EXCLUDE POSSIBLE UNDER-CUT OF SOFT SPOTS, UNDERGROUND FEATURES AND CONTAMINATED MATERIALS.
- DO NOT SCALE FROM DRAWING, IF EXTRA INFORMATION IS REQUIRED, PLEASE CONTACT STRATA GROUP CONSULTING ENGINEERS.

CUT/FILL TABLE

Number	Minimum Level	Maximum Level	Colour
1	-2.30	-1.50	
2	-1.50	-0.70	
3	-0.70	-0.60	
4	-0.60	-0.20	
5	-0.20	-0.10	
6	-0.10	0.10	
7	0.10	0.30	
8	0.30	1.80	

CUT AND FILL VOLUMES:

EXISTING GROUND TO TOPSOIL UNDERCUT (300mm DEPTH) - 41,466m³ CUT

IMPORTED HARDFILL FROM TOPSOIL UNDERCUT TO TOP OFF OF DESIGN FILL SURFACE LEVELS - 26,481m³ FILL

DESIGN SURFACE IMPORTED TOPSOIL - 22,268m³ FILL

SAFETY IN DESIGN

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REV	REASON FOR ISSUE	DATE	BY
2	FOR NOTIFICATION	-	-
1	-	-	-

THE CONTRACTOR IS TO BE AWARE OF ALL INSPECTIONS TO BE MADE BY THE ENGINEER AS A REQUIREMENT OF THE PRODUCER STATEMENT PS4 CONSTRUCTION REVIEW DOCUMENTATION. THE ENGINEER WILL REQUIRE 24 HOURS PRIOR NOTIFICATION FOR ALL INSPECTIONS.

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Structural Fire Civil Project Management

CLIENT: DURHAM PROPERTY LTD

PROJECT: TE AWA SUBDIVISION (WILLOWBANK AVE)

TITLE: EARTHWORKS PLAN

DESIGNED DJ
DRAWN EM
CHECKED DJ
DATE OCT 18

0 250 500 750
Full Size 1:12500 ; Half Size 1:25000
Scale (m)

PROJECT NO.: J4345 | SHEET: C005 | REVISION: 2

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PATH:J:\DUR - DURHAM PROPERTIES\J4345 - TE AWA SUBDIVISION (WILLOWBANK AVE)\2 - DWGS\XREF'S\J4345 - BASE SERVICES PLAN 2020.DWG DATE:7/2/2018