

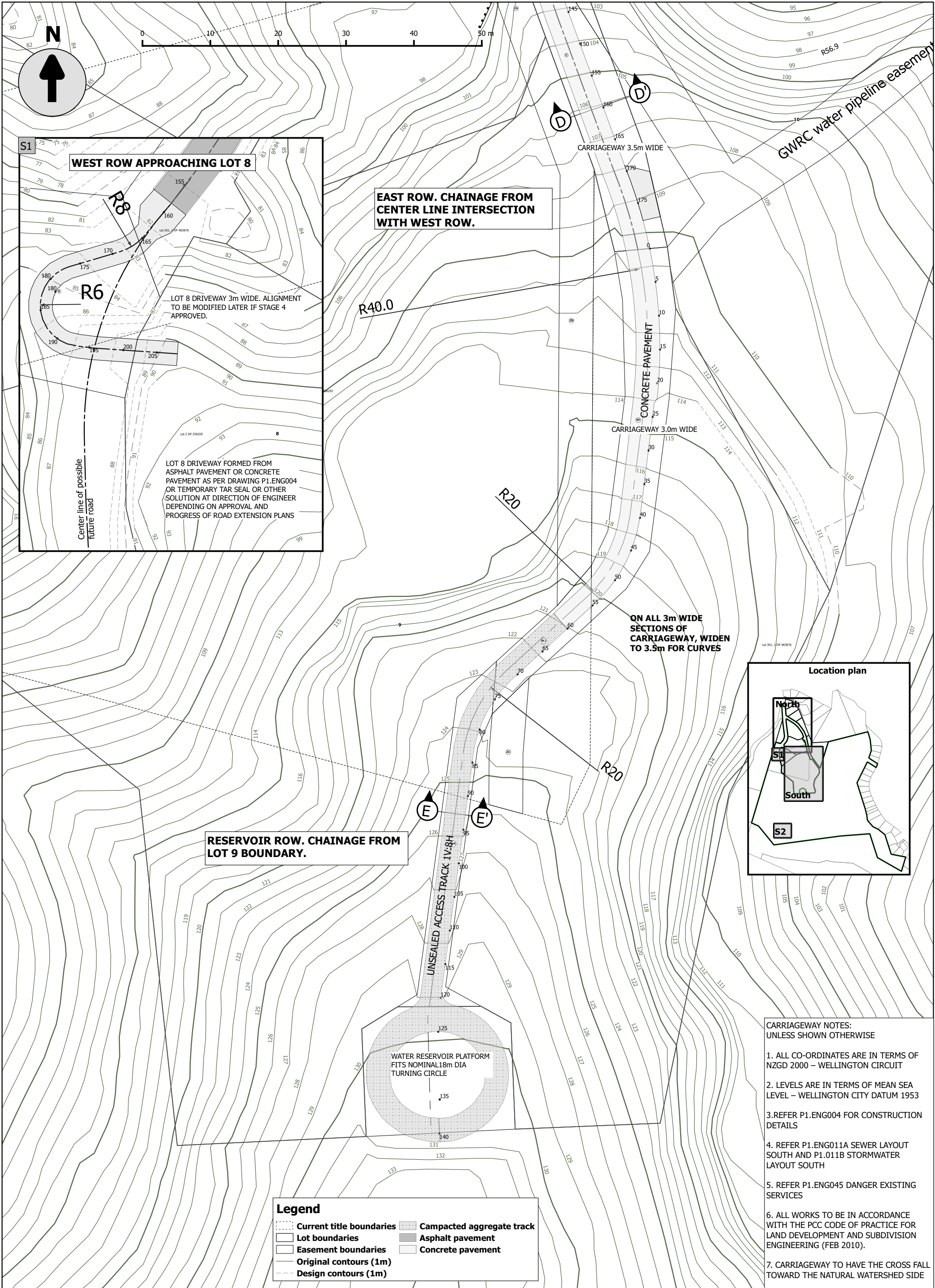
EXPLORATION HEIGHTS SUBDIVISION RC6601

ROAD AND SERVICES PLAN SET

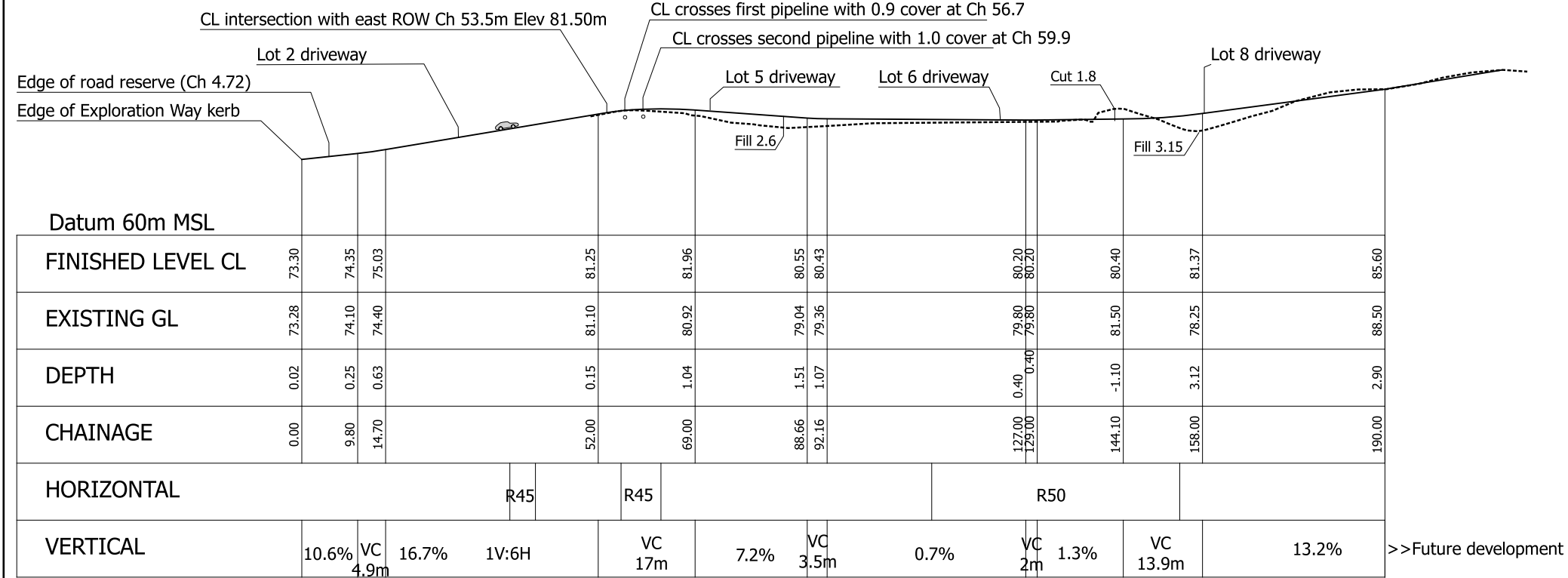
Progeni Ltd
68 Exploration Way, Porirua 5024
david.harpham@progeni.nz

| | |
|----------|---|
| Client: | Progeni Ltd |
| Project: | Exploration Heights |
| Title: | ROAD AND SERVICES PLANS COVER PAGE |

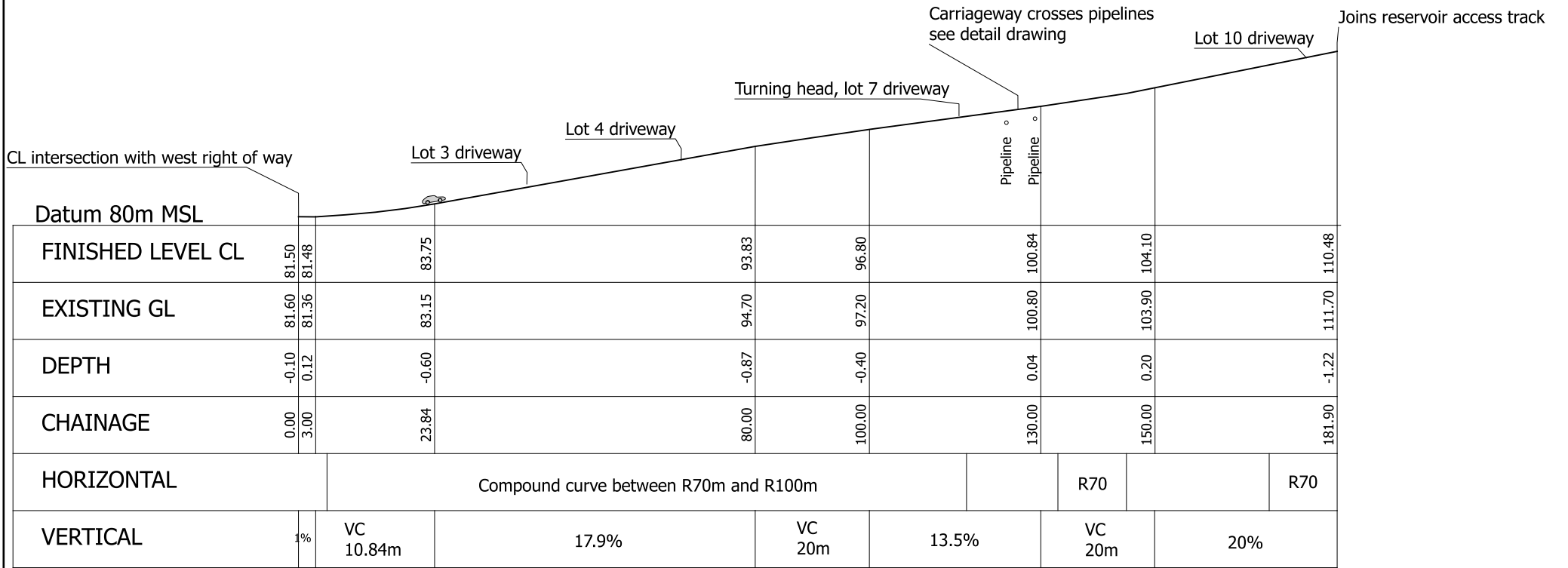
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|------------|------------------|------------|----------------|
| Fieldwork: | | Scale: | 1:2000 at A3 |
| Designed: | Harpham(Progeni) | ID | P1.ENG000 Rev: |
| Drawn: | Harpham(Progeni) | Issued by: | David Harpham |
| Checked: | | Date: | 2017-11-06 |



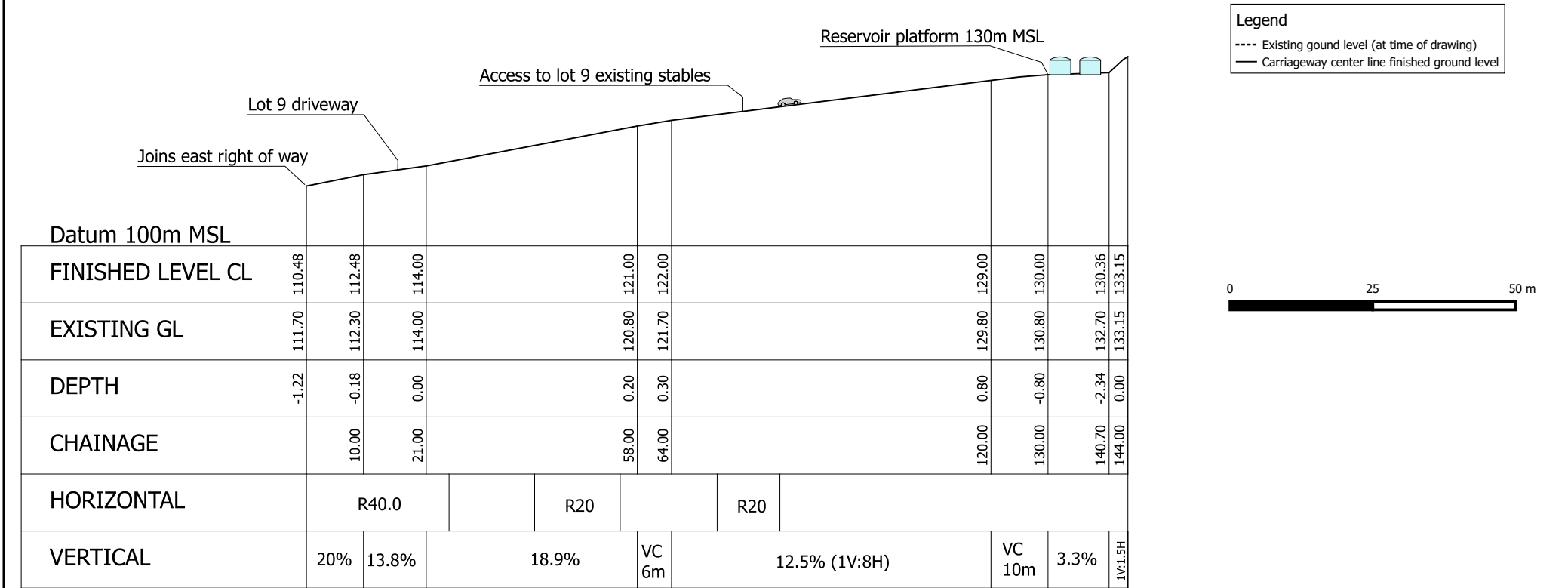
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|---|---------------------------------|--|----------------------------|-------|---------------------------------|
| Progeni Ltd 68 Exploration Way, Porirua 5024 Ph 64 022 0819600 | Client: Progeni Ltd | | Fieldwork: - | - | Scale: 1:250 at A1; 1:500 at A3 |
| | Project: Exploration Heights | | Designed: Harpham(Progeni) | 03/15 | ID: P1.ENG002 Rev: |
| | Title: Road layout south | | Drawn: Harpham(Progeni) | 01/16 | Issued by: David Harpham |
| | | | Checked: | | Date: 2017-09-20 |



LONGITUDINAL SECTION WEST RIGHT OF WAY

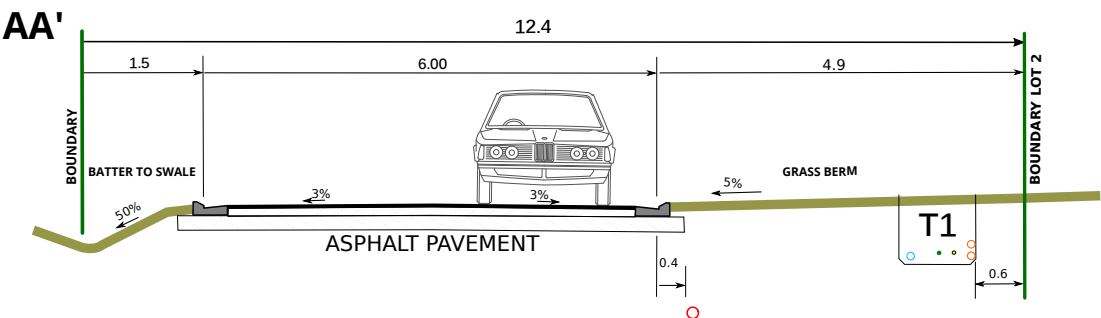


LONGITUDINAL SECTION EAST RIGHT OF WAY



LONGITUDINAL SECTION RESERVOIR ACCESS TRACK

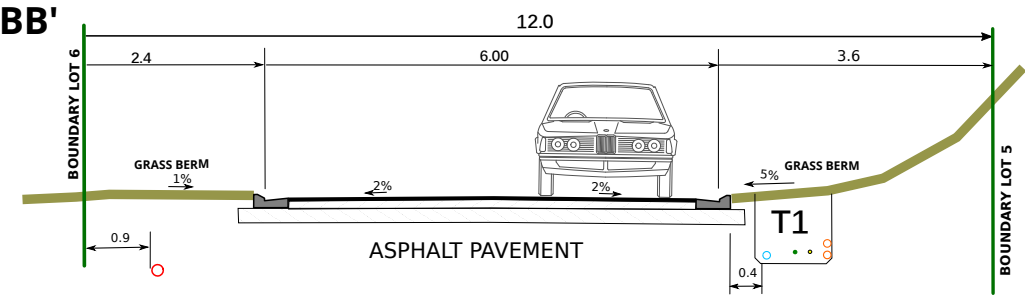
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|--|------------------------------|----------------------------|-------|----------------------------------|
| <div>Progeni Ltd</div> <div>68 Exploration Way, Porirua 5024 Ph 64 022 0819600</div> | Client: Progeni Ltd | Fieldwork: - | - | Scale: 1:500 at A1; 1:1000 at A3 |
| | Project: Exploration Heights | Designed: Harpham(Progeni) | | ID: P1.ENG003 Rev: |
| | Title: Road long sections | Drawn: Harpham(Progeni) | 02/16 | Issued by: David Harpham |
| | | Checked: | | Date: 2017-10-29 |



ASPHALT PAVEMENT LAYERS:
=====

1) 30mm COMPACTED THICKNESS MIX 10 ASPHALT ON WATERPROOF COAT.
2) 120mm MIN COMPACTED THICKNESS AP40 BASECOURSE.
3) 230mm MIN COMPACTED THICKNESS AP65 SUBBASE.
4) SHAPED AND COMPACTED SUBGRADE CBR 7%.

FINAL DEPTH OF PAVEMENT TO BE CONFIRMED BY ENGINEER AFTER TESTING SUBGRADE.



CONCRETE PAVEMENT LAYERS :
=====

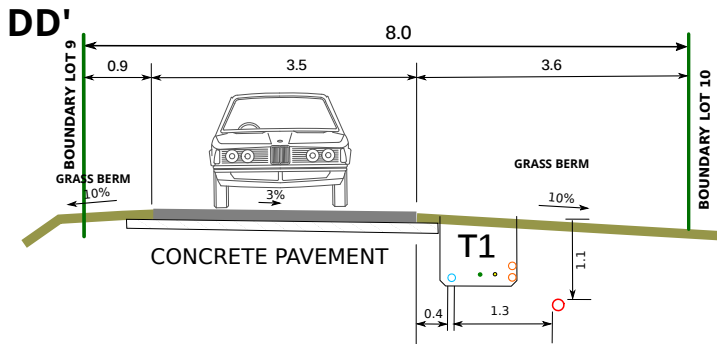
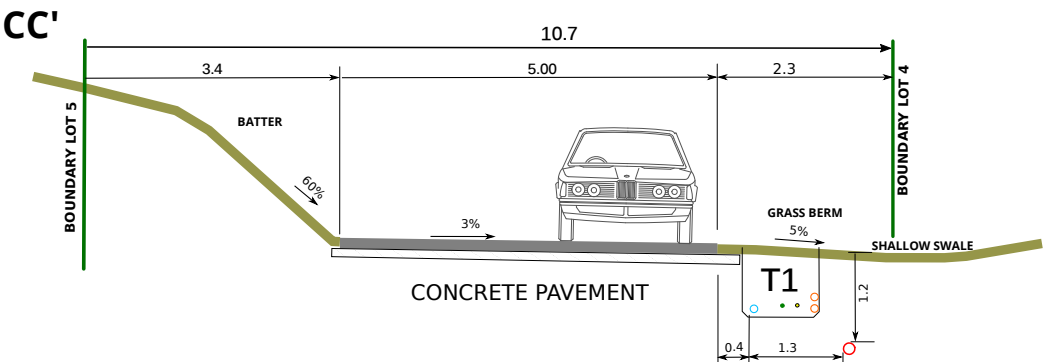
1) 145mm 30MPa SSF47 STRUCTUAL FIBRE REINFORCED CONCRETE
2) 100mm MIN COMPACTED THICKNESS AP40 BASECOURSE
3) SHAPED AND COMPACTED SUBGRADE CBR 7%

SCALE 1:25 at A3

FINAL DEPTHS TO BE CONFIRMED BY ENGINEER AFTER TESTING SUBGRADE

NOTES:
=====

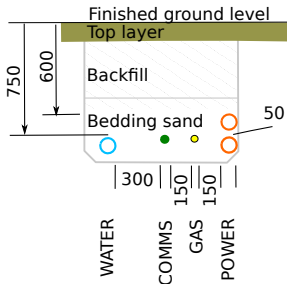
1) CONCRETE TO BE CERTIFIED 30MPa WITH SSF47 FIBRE DOSE RATE OF 4 kg/m3.
2) D12 LONGITUDINAL REINFORCING TO BE PLACED MID DEPTH ADJACENT TO ALL PERIMETERS MIN 75mm FROM SIDE.
3) CONSTRUCTION JOINTS AT 25m NOMINAL SPACING.
4) 40mm DEEP SAW CUTS PLACED EVERY 5m. CUTS ARE TO BE MADE AS SOON AS POSSIBLE BEFORE CONCRETE CURING AND CONTRACTION TAKES PLACE.
5) THOROUGHLY WET BASE COURSE IMMEDIATELY PRIOR TO PLACING CONCRETE



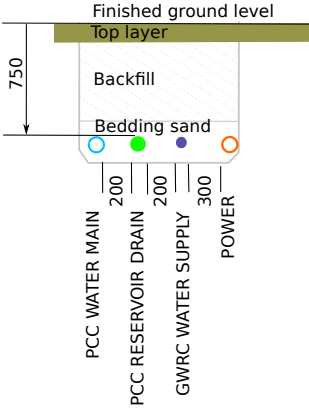
- PIPE KEY**
- Power: 4/120 Al XLPE 400V cable in 100mm Orange duct (or spare power duct)
 - Gas: 50mm PE yellow (<210Kpa)
 - Telecom fibre microducts
 - PCC Water main: 125mm OD PE100 SDR11
 - GWRC Water supply: 63mm OD PE100 SDR11
 - Reservoir drain: 110mm OD PE100 SDR17
 - PCC Sewer main: 160mm OD PE100 SDR17

TRENCH KEY AND MINIMUM CLEARANCE SPECIFICATIONS
SCALE 1:25 (A3 1:50)

T1 Shared services trench

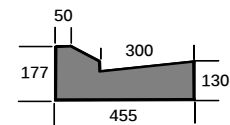


T2 Lot 10 to Water Reservoir



- TRENCH NOTES:**
=====
- TOP LAYER:**
- TRAFFICKED AREAS AS FOR ADJACENT PAVEMENT DESIGN.
 - UN-TRAFFICKED AREAS ARE TO HAVE A MINIMUM OF 75MM TOPSOIL COVER SEEDED WITH GRASS AND LIGHTLY COMPACTED.
- BACKFILL:**
- TRAFFICKED AREAS ARE TO BE AP65 COMPACTED IN LAYERS.
 - UN-TRAFFICKED AREAS ARE TO BE FILLED FROM CLEAN INSITU MATERIAL FREE OF ORGANIC MATTER AND DETRITUS COMPACTED IN LAYERS.
- BEDDING SAND COVERAGE (Excluding power ducts):**
- MINIMUM 100mm ABOVE AND BELOW PIPE/DUCT.
 - MINIMUM 75mm FROM PIPE/DUCT TO SIDE OF TRENCH.
- GENERAL NOTES:**
=====
1. SWALES AND GRASS BERMS ARE TO HAVE A MINIMUM OF 75MM TOPSOIL COVER SEEDED WITH GRASS AND LIGHTLY COMPACTED.
2. BERMS ADJACENT TO PAVEMENTS TO BE 15mm ABOVE SUCH EXCEPT WHERE PAVEMENT CROSSFALL DISCHARGES TO BERM THE BERM SHALL BE 15mm BELOW THE ADJACENT PAVEMENT.
3. ALL KERBS AND CHANNELS TO BE PLACED ON A MINIMUM OF 150mm COMPACTED THICKNESS OF AP65 SUBBASE, WITH FINAL DEPTH TO BE CONFIRMED AFTER TESTING SUBGRADE.
4. DEPTH OF COMPACTED THICKNESS OF AP65 SUBBASE FOR PAVEMENTS TO BE CONFIRMED AFTER TESTING SUBGRADE.
4. ALL WORK TO BE IN ACCORDANCE WITH PCC CODE OF LAND DEVELOPMENT AND SUBDIVISION ENGINEERING (2010) AND RELEVANT NEW ZEALAND STANDARDS.

KERB AND CHANNEL
SCALE 1:25 (A3 1:50)
Deano's Kerb MKC 12 or similar
as approved by engineer.

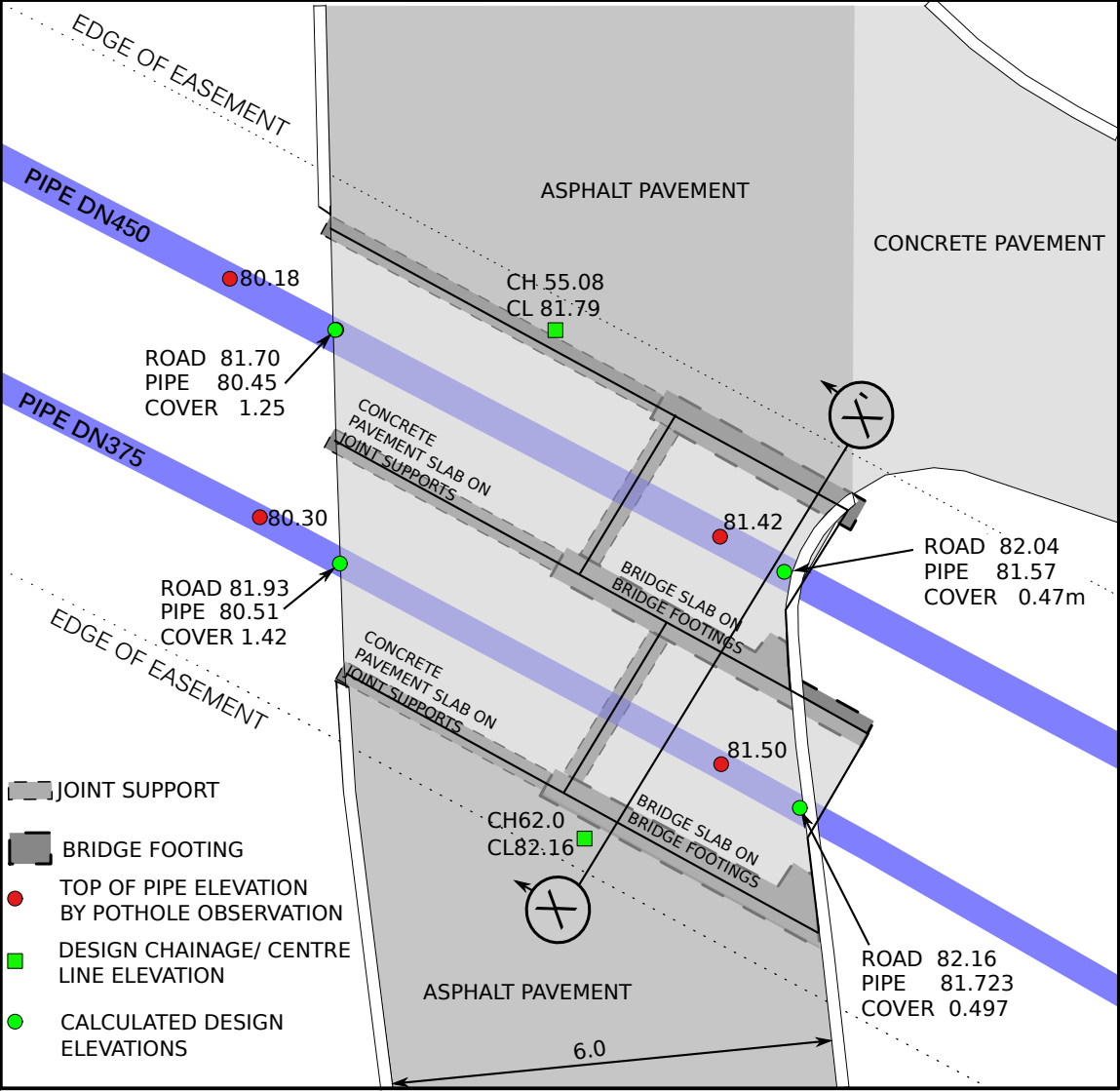


Progeni Ltd

68 Exploration Way, Porirua 5024, NZ
Ph 022 0819600

Client Progeni Ltd
Project Exploration Heights
Title **Road cross sections**

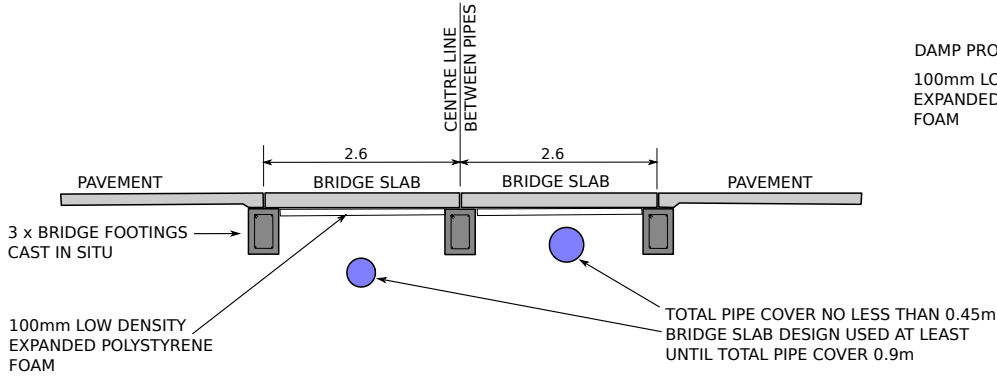
Fieldwork:
Design: D Harpham
Drawn: D Harpham
Checked:
Scale: 1:100 at A3
ID: P1.ENG004 Rev:
Issued by: D Harpham
Date: 2017-10-04



- PIPELINE CROSSING :
- =====
- 1) PIPE SECTIONS WITH COVER LESS THAN 0.9m AND GREATER THAN 0.45m ARE TO BE PROTECTED WITH A REINFORCED CONCRETE BRIDGE AS SHOWN HERE.
- 2) CONCRETE PAVEMENT AS SPECIFIED IN P1.ENG004 ROAD CROSS SECTIONS TO BE USED WHERE PIPE COVER IS GREATER THAN 0.9m.
- 3) PAVEMENT SLABS OVER THE PIPES ARE TO HAVE FREE JOINTS AND CAST IN SITU ON DAMP PROOF MEMBRANE TO FACILITATE LIFT OUT FOR MAINTENANCE.
- 4) DESIGN ASSUMES GOOD GROUND. FINAL DEPTHS TO BE CONFIRMED BY ENGINEER AFTER TESTING SUBGRADE AND POSSIBLE REMEDIATION.
- 5) ALL WORK WITHIN EASEMENT TO BE NOTIFIED AT LEAST 3 DAYS IN ADVANCE TO WELLINGTON WATER FOR POSSIBLE STANDOVER.

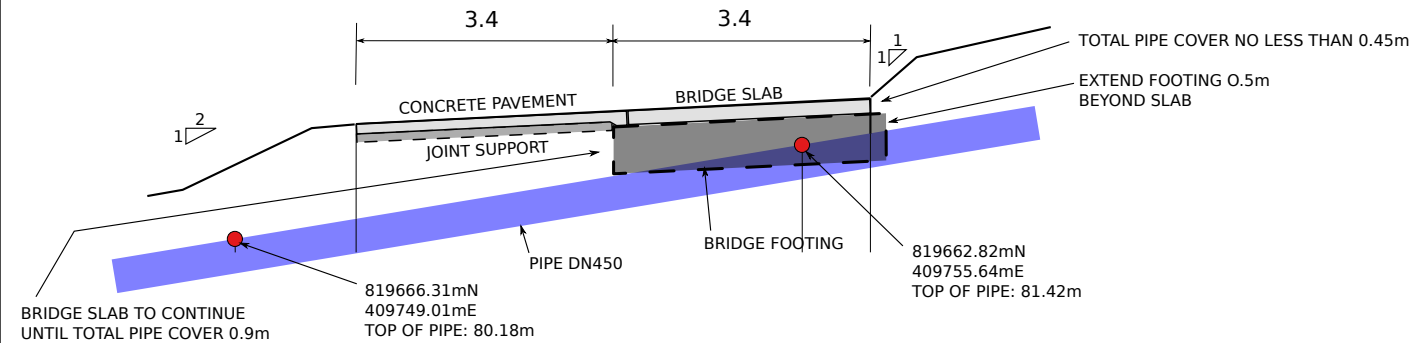
PIPELINE CROSSING WEST RIGHT OF WAY

SCALE 1:100 at A3



CROSS SECTION XX'

SCALE 1:100 at A3

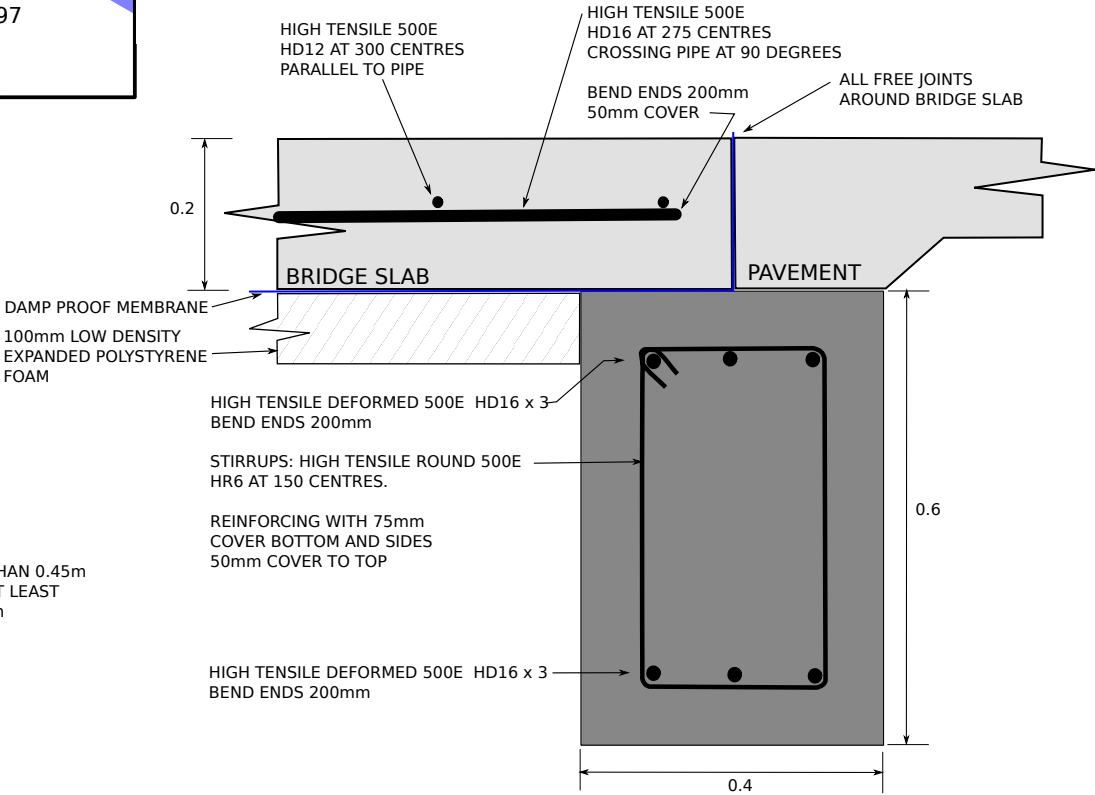


LONG SECTION PIPE DN450

SCALE 1:100 at A3

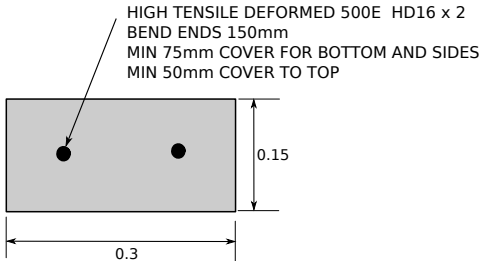
BRIDGE SLAB

30MPa REINFORCED CONCRETE
SCALE 1:20 at A3



BRIDGE FOOTING

30MPa REINFORCED CONCRETE
SCALE 1:20 at A3



JOINT SUPPORT

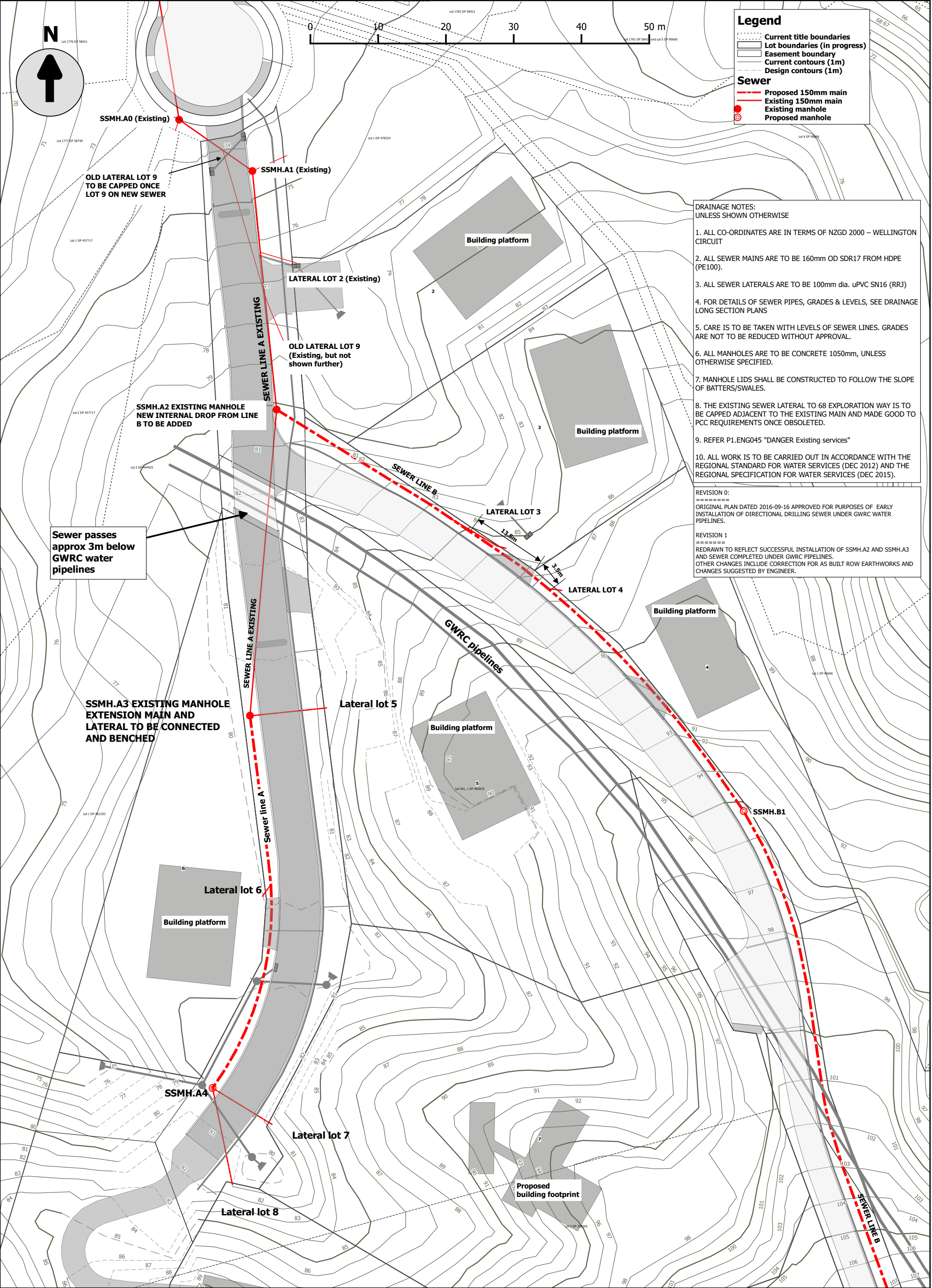
30MPa REINFORCED CONCRETE
SCALE 1:20 at A3

COORDINATES:
=====

1) LEVELS ARE IN TERMS OF MEAN SEA LEVEL
WELLINGTON CITY DATUM 1953. ORIGIN OF LEVELS IS IL
71.40 EXISTING MANHOLE IN FOOTPATH AT ENTRANCE
TO 71 EXPLORATION WAY.

2) DATUM IS NZGD2000 (WLG CIRCUIT)

| | | | | | | |
|--|---------|---|------------|-----------|------------|------------------|
| Progeni Ltd 68 Exploration Way, Porirua 5024, NZ Ph 022 0819600 | Client | Progeni Ltd | Fieldwork: | | Scale: | AS SHOWN |
| | Project | Exploration Heights | Design: | D Harpham | ID: | P1.ENG005 Rev: |
| | Title | ROAD CONSTRUCTION DETAILS PIPELINE CROSSING | Drawn: | D Harpham | Issued by: | D Harpham |
| | | | Checked: | R Twiname | 2017-09-28 | Date: 2017-09-28 |



DRAINAGE NOTES:
UNLESS SHOWN OTHERWISE

1. ALL CO-ORDINATES ARE IN TERMS OF NZGD 2000 – WELLINGTON CIRCUIT
2. ALL SEWER MAINS ARE TO BE 160mm OD SDR17 FROM HDPE (PE100).
3. ALL SEWER LATERALS ARE TO BE 100mm dia. uPVC SN16 (RRJ)
4. FOR DETAILS OF SEWER PIPES, GRADES & LEVELS, SEE DRAINAGE LONG SECTION PLANS
5. CARE IS TO BE TAKEN WITH LEVELS OF SEWER LINES. GRADES ARE NOT TO BE REDUCED WITHOUT APPROVAL.
6. ALL MANHOLES ARE TO BE CONCRETE 1050mm, UNLESS OTHERWISE SPECIFIED.
7. MANHOLE LIDS SHALL BE CONSTRUCTED TO FOLLOW THE SLOPE OF BATTERS/SWALES.
8. THE EXISTING SEWER LATERAL TO 68 EXPLORATION WAY IS TO BE CAPPED ADJACENT TO THE EXISTING MAIN AND MADE GOOD TO PCC REQUIREMENTS ONCE OBSOLETE.
9. REFER P1.ENG045 "DANGER Existing services"
10. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE REGIONAL STANDARD FOR WATER SERVICES (DEC 2012) AND THE REGIONAL SPECIFICATION FOR WATER SERVICES (DEC 2015).

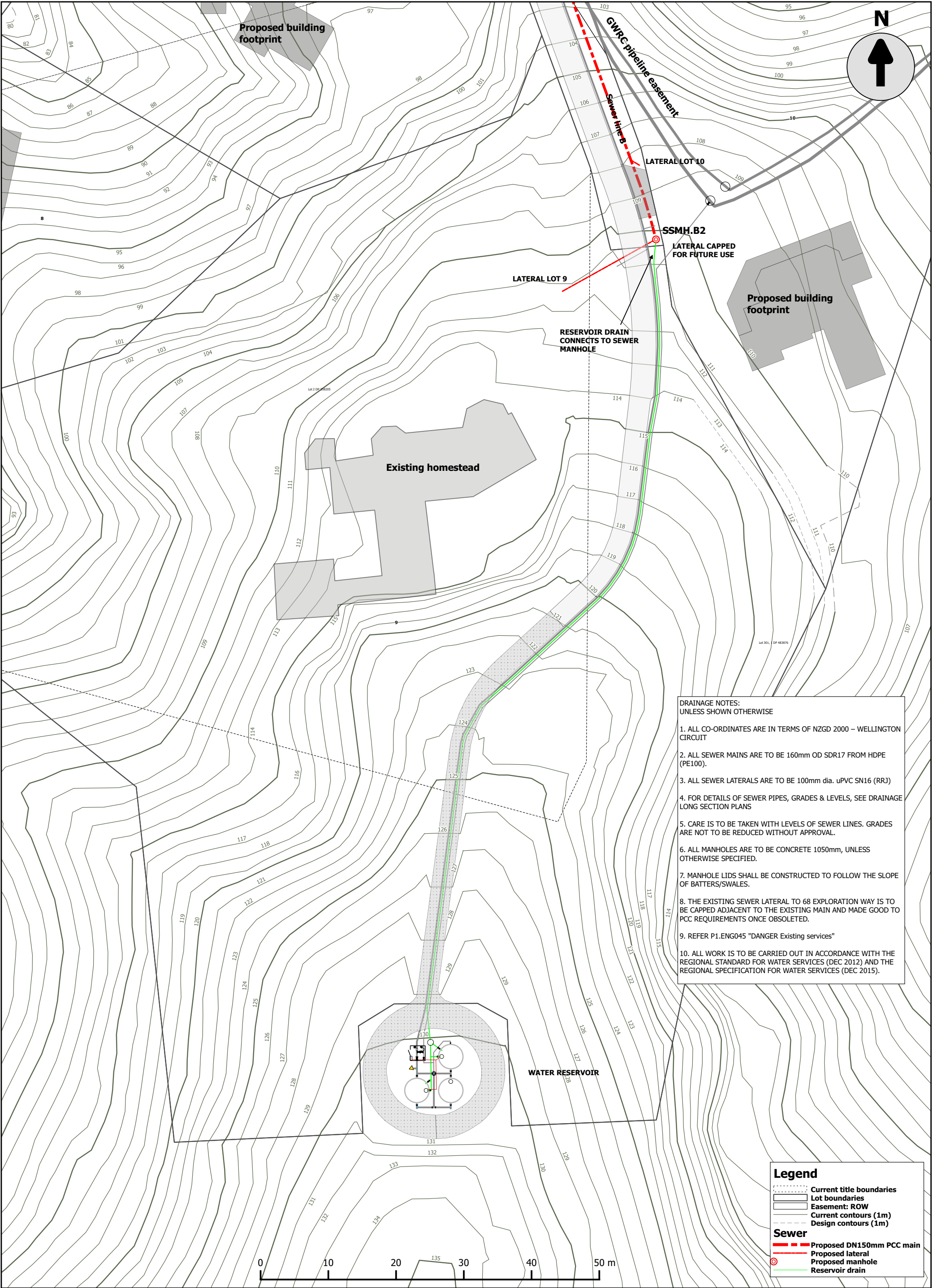
REVISION 0:
=====

ORIGINAL PLAN DATED 2016-09-16 APPROVED FOR PURPOSES OF EARLY INSTALLATION OF DIRECTIONAL DRILLING SEWER UNDER GWRC WATER PIPELINES.

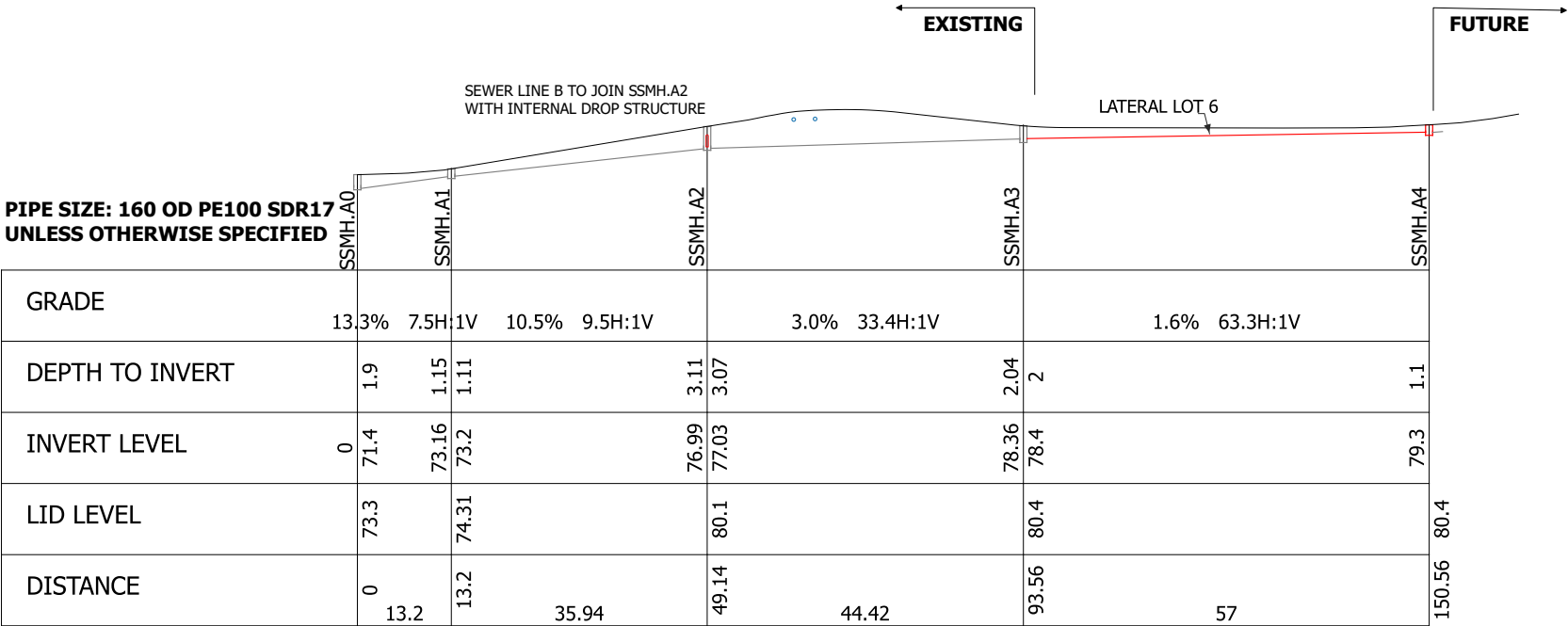
REVISION 1
=====

REDRAWN TO REFLECT SUCCESSFUL INSTALLATION OF SSMH.A2 AND SSMH.A3 AND SEWER COMPLETED UNDER GWRC PIPELINES.
OTHER CHANGES INCLUDE CORRECTION FOR AS BUILT ROW EARTHWORKS AND CHANGES SUGGESTED BY ENGINEER.

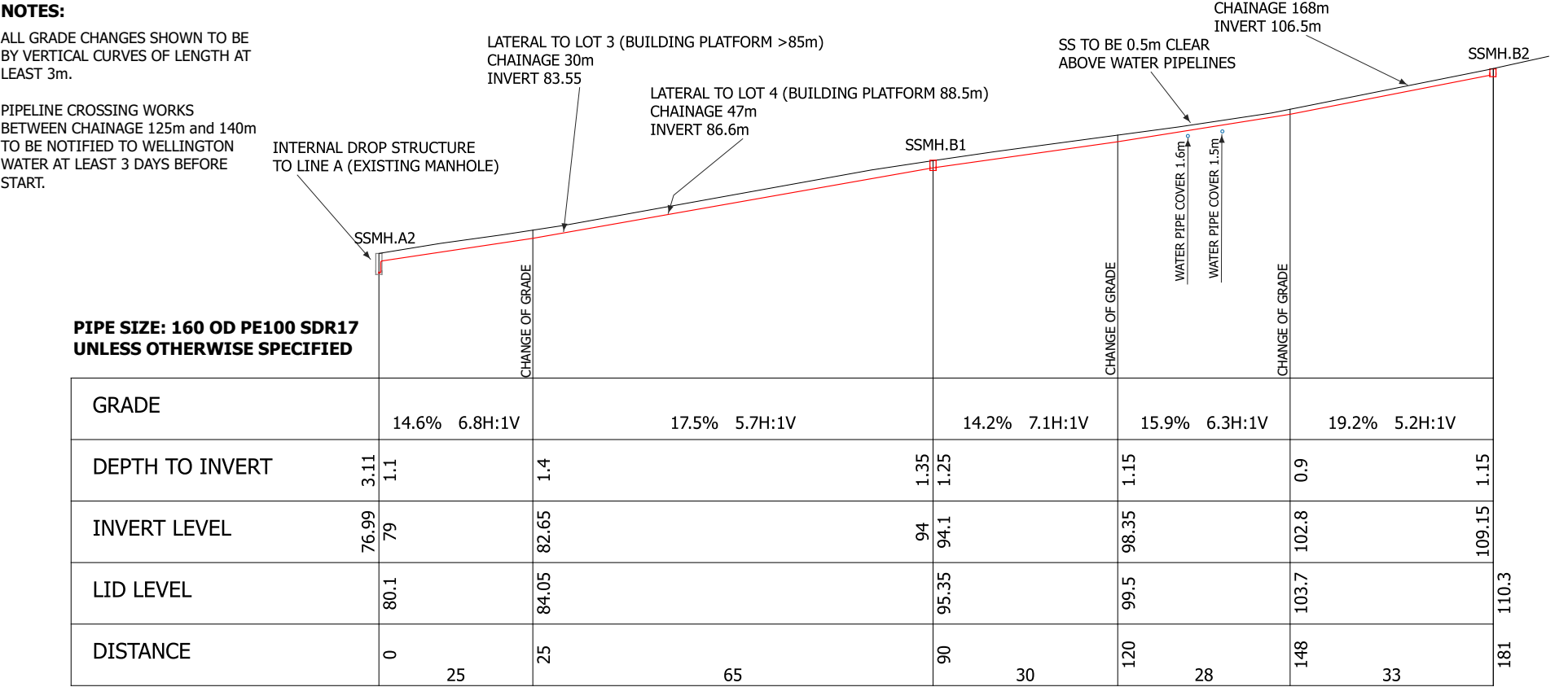
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|---|----------------------------------|--|----------------------------|-------|--------------------------------|
| Progeni Ltd 68 Exploration Way, Porirua 5024 Ph 64 022 0819600 | Client: Progeni Ltd | | Fieldwork: - | - | Scale:1:250 at A1; 1:500 at A3 |
| | Project: Exploration Heights | | Designed: Harpham(Progeni) | 03/15 | ID: P1.ENG010A Rev: 1 |
| | Title: Sewer layout North | | Drawn: Harpham(Progeni) | 08/17 | Issued by: David Harpham |
| | | | Checked: O'CALLAGHAN | 09/17 | Date: 2017-10-30 |
| | | | | | |



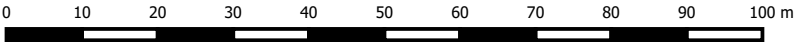
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|---|----------------------------------|----------------------------|-------|---------------------------------|
| Progeni Ltd 68 Exploration Way, Porirua 5024 Ph 64 022 0819600 | Client: Progeni Ltd | Fieldwork: - | - | Scale: 1:250 at A1; 1:500 at A3 |
| | Project: Exploration Heights | Designed: Harpham(Progeni) | 03/15 | ID: P1.ENG011A Rev: |
| | Title: Sewer layout South | Drawn: Harpham(Progeni) | 09/16 | Issued by: David Harpham |
| | | Checked: O'CALLAGHAN | 09/16 | Date: 2017-10-30 |



Sewer long section Line A



Sewer long section Line B

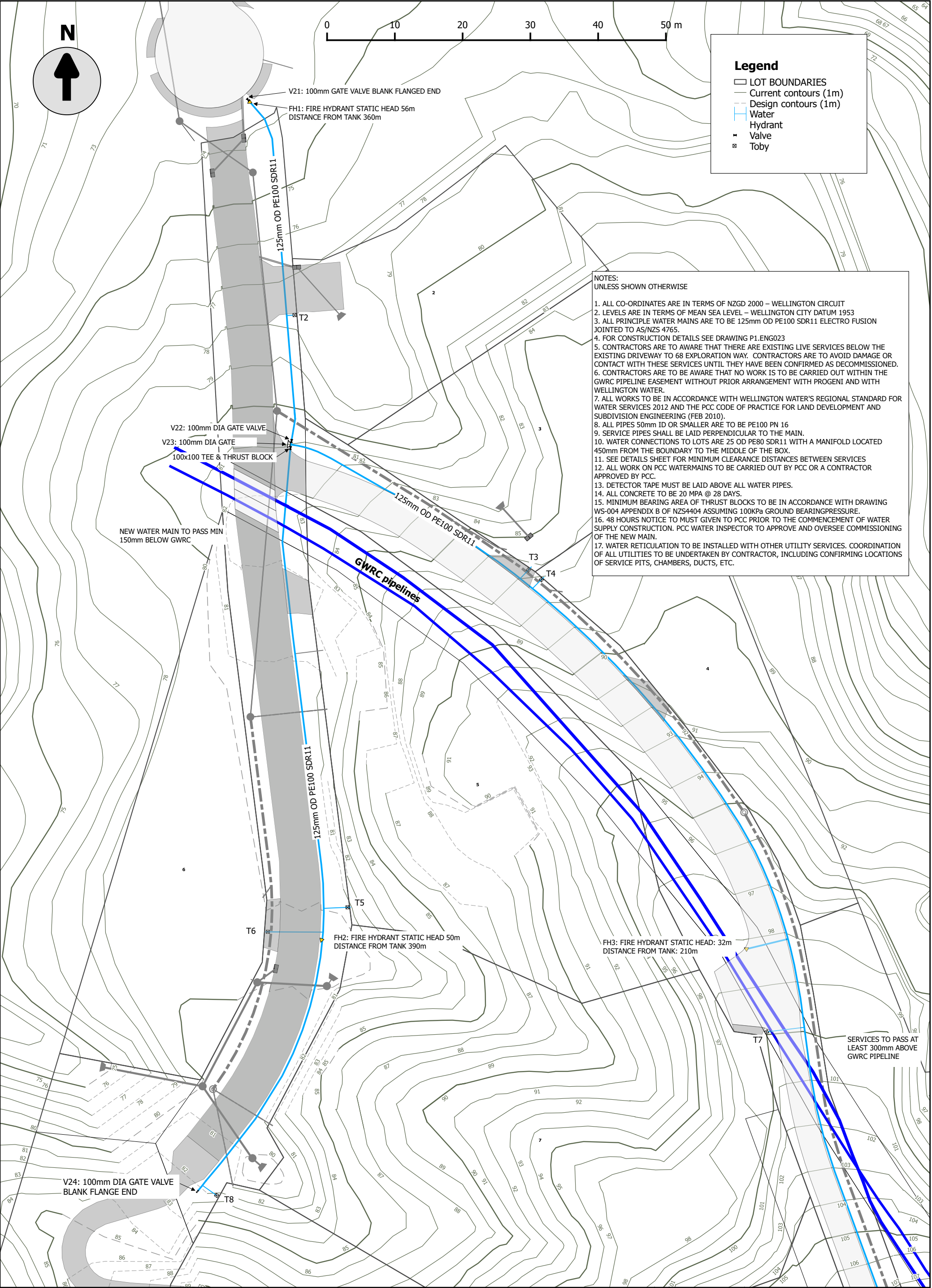


| |
|--|
| REVISION 0: ===== |
| ORIGINAL PLAN DATED 2016-09-16 APPROVED FOR PURPOSES OF EARLY INSTALLATION BY DIRECTIONAL DRILLING OF SEWER UNDER GWRC WATER PIPELINES. |
| REVISION 1 ===== |
| REDRAWN TO REFLECT SUCCESSFUL INSTALLATION OF SSMH.A2 AND SSMH.A3 AND SEWER COMPLETED UNDER GWRC PIPELINES. OTHER CHANGES INCLUDE CORRECTION FOR AS BUILT ROW EARTHWORKS AND CHANGES SUGGESTED BY ENGINEER. |

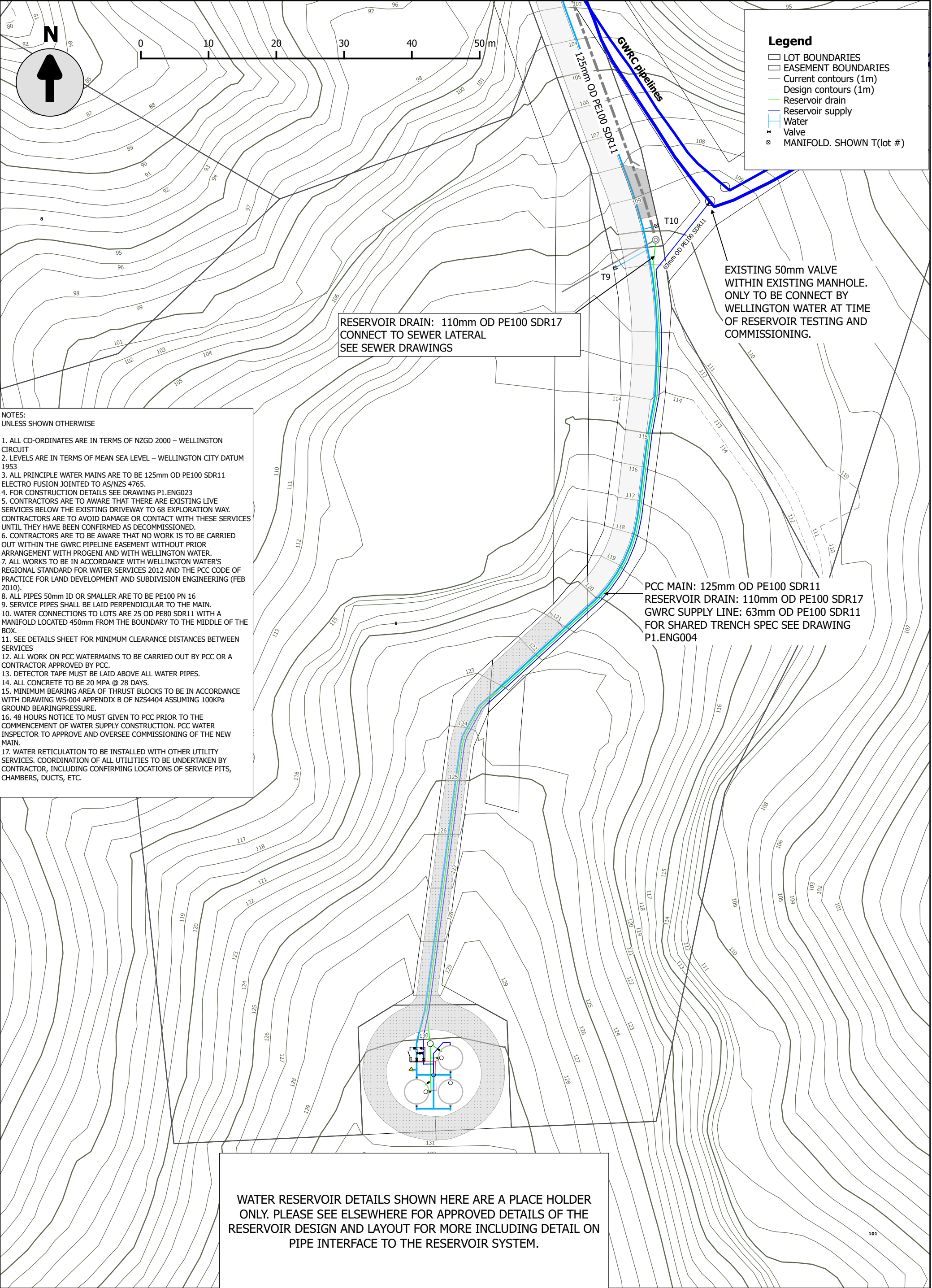
Progeni Ltd

68 Exploration Way, Porirua 5024
Ph 64 022 0819600

| | | |
|------------------------------|----------------------------|----------------------------------|
| Client: Progeni Ltd | Fieldwork: - | Scale: 1:500 at A1; 1:1000 at A3 |
| Project: Exploration Heights | Designed: Harpham(Progeni) | ID: P1.ENG012A Rev: 1 |
| Title: Sewer long sections | Drawn: Harpham(Progeni) | Issued by: David Harpham |
| | Checked: O'CALLAGHAN | Date: 2017-10-30 |



| | | | | | | |
|---|----------------------------------|--|----------------------------|-------|--------------------------------|--|
| Progeni Ltd 68 Exploration Way, Porirua 5024 Ph 64 022 0819600 | Client: Progeni Ltd | | Fieldwork: - | - | Scale:1:250 at A1; 1:500 at A3 | |
| | Project: Exploration Heights | | Designed: Harpham(Progeni) | 03/15 | ID: P1.ENG021 Rev: | |
| | Title: Water layout north | | Drawn: Harpham(Progeni) | 12/15 | Issued by: David Harpham | |
| | | | Checked: O'CALLAGHAN | | Date: 2017-11-02 | |



| | | | | |
|---|----------------------------------|----------------------------|-------|--------------------------------|
| Progeni Ltd 68 Exploration Way, Porirua 5024 Ph 64 022 0819600 | Client: Progeni Ltd | Fieldwork: - | - | Scale:1:250 at A1; 1:500 at A3 |
| | Project: Exploration Heights | Designed: Harpham(Progeni) | 03/15 | ID: P1.ENG022 Rev: |
| | Title: Water layout south | Drawn: Harpham(Progeni) | 09/17 | Issued by: David Harpham |
| | | Checked: O'CALLAGHAN | | Date: 2017-11-02 |