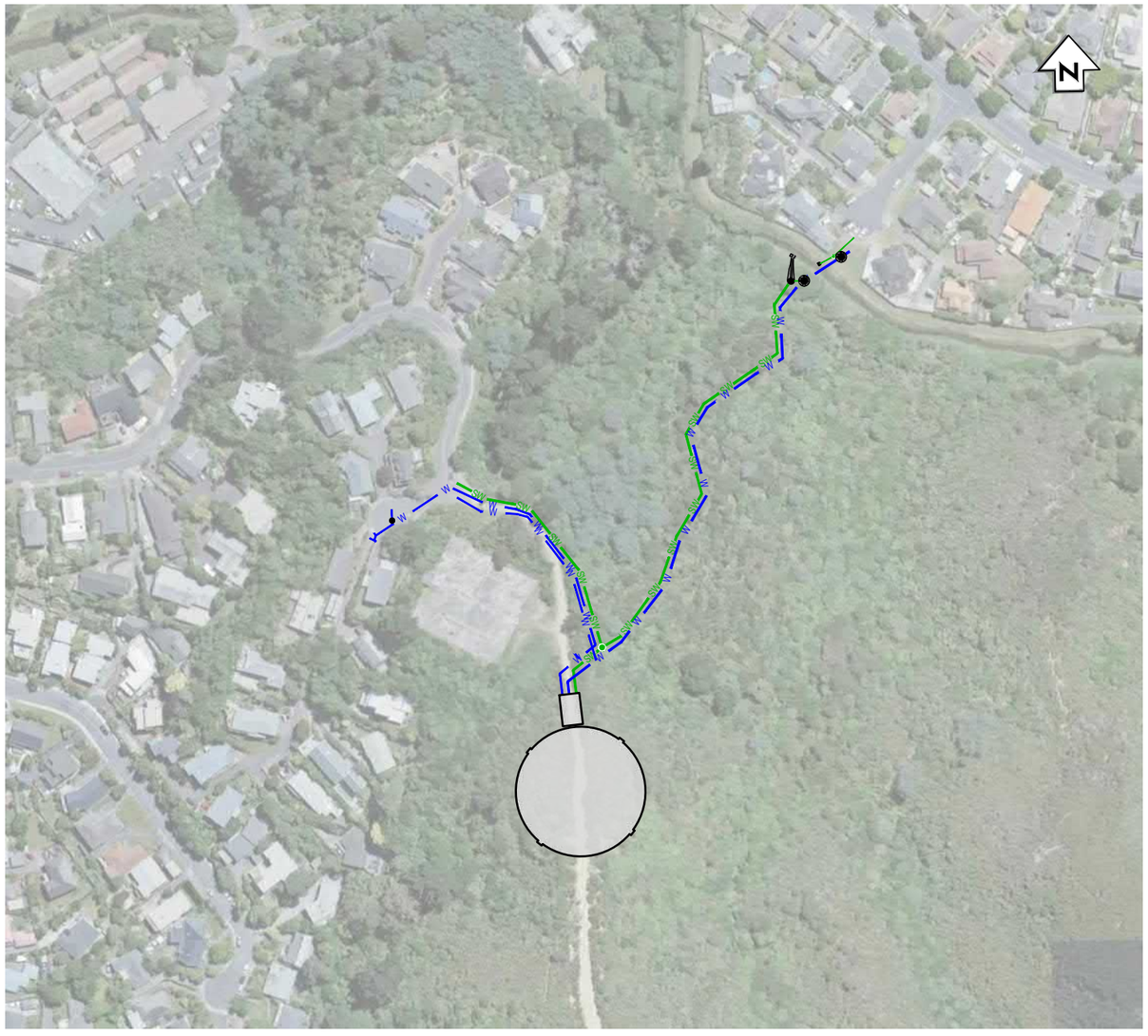
WELLINGTON WATER
EASTERN HILLS RESERVOIR



LOCALITY PLAN

SCALE: 1:1250-A1 1:2500-A3

DISTRIBUTION			NUMBER OF COPIES				
CONNECT WATER			1	1	1		
WELLINGTON WATER			1	1	1		
		ISSUE STATUS	FOR INFORMATION ONLY	ISSUED WITH CONCEPT DESIGN - FINAL	FOR INFORMATION ONLY	ISSUED FOR REVIEW	UPDATED POST INDEPENDENT REVIEW
	DRAWING PRINT SIZE:		A3	A3	A3	A3	A3
	ISSUE FORMAT:		PDF	PDF	PDF	PDF	PDF
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CAD FILE REFERENCE:	3-WW021.02	MM	12	3	8	9	9
DRAWING NUMBER	DRAWING TITLE	YY	22	23	23	23	23
3-WW021.02_C000	COVER SHEET, DRAWING REGISTER AND TRANSMITTAL, LOCATION PLAN		0	1	2		3
3-WW021.02_C001	GENERAL NOTES AND LEGENDS		0	1	2		
3-WW021.02_C002	SAFETY IN DESIGN RISK ASSESSMENT - SH1		0	1	2		
3-WW021.02_C003	SAFETY IN DESIGN RISK ASSESSMENT - SH2		0	1	2		
3-WW021.02_C004	SAFETY IN DESIGN RISK ASSESSMENT - SH3		0	1	2		
3-WW021.02_C005	SAFETY IN DESIGN RISK ASSESSMENT - SH4				0		
3-WW021.02_C006	SAFETY IN DESIGN RISK ASSESSMENT - SH5				0		
3-WW021.02_C007	PROCESS & INSTRUMENTATION DIAGRAM				0		
3-WW021.02_C008	RESERVOIR AND PIPELINE - CONSENT DESIGNATION				0		1
3-WW021.02_W001	SITE PIPELINES - GENERAL LAYOUT		0	1	2		3
3-WW021.02_W002	RESERVOIR PIPEWORK - GENERAL LAYOUT		0	1	2		
3-WW021.02_W003	RESERVOIR PIPEWORK - VALVEHOUSE		0	1	2		
3-WW021.02_W004	WAIWHETU STREAM - CROSSING AND DISCHARGE - 1		0	1	2		
3-WW021.02_W007	SITE PIPELINES - SUMMIT ROAD				0		1
3-WW021.02_W008	PIPELINE - TYPICAL DETAILS				1		
3-WW021.02_W010	RESERVOIR AND SITE PIPELINES - EARTHWORKS				0		1
3-WW021.02_W011	RESERVOIR AND SITE PIPELINES - EARTHWORKS SECTIONS				0		
3-WW021.02_W012	LONG SECTION - DELIVERY PIPELINE				0		1
3-WW021.02_W013	LONG SECTION - OVERFLOW / SCOUR CONNECTION				0		1
3-WW021.02_W014	SITE STORMWATER PLAN						0
3-WW021.02_L0001	LANDSCAPE CONCEPT PLAN - SHEET 01 OF 03		0	1		2	
3-WW021.02_L0002	LANDSCAPE CONCEPT PLAN - SHEET 02 OF 03					0	
3-WW021.02_L0003	LANDSCAPE CONCEPT PLAN - SHEET 03 OF 03					0	
3-WW021.02_S001	RESERVOIR & VALVEHOUSE - GENERAL ARRANGEMENT - GROUND LEVEL		0	1	2		
3-WW021.02_S002	RESERVOIR & VALVEHOUSE - GENERAL ARRANGEMENT - ROOF LEVEL		0	1	2		
3-WW021.02_S003	RESERVOIR & VALVEHOUSE - TYPICAL DETAILS SHEET 1 OF 2		0	1	2		
3-WW021.02_S004	RESERVOIR & VALVEHOUSE - TYPICAL DETAILS SHEET 2 OF 2				0		
3-WW021.02_S005	RESERVOIR & VALVEHOUSE - ELEVATION				0		

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
3	UPDATED POST INDEPENDENT REVIEW	G.H.	G.B.	J.L.	29/09/23
2	ISSUED FOR INFORMATION	G.H.	G.B.	J.L.	18/08/23
1	ISSUED WITH CONCEPT DESIGN - FINAL	G.H.	G.B.	J.L.	03/03/23
0	ISSUED FOR INFORMATION	C.Y.	G.B.	J.L.	07/12/23

Drawing Originator: Connect Water
c/- WSP
PO Box 12-003 Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) 1:1250	Design	L.H.	29/09/23
	Drawn	G.H.	29/09/23
Reduced Scale (A3) 1:2500	Dsg Verifier	J.L.	29/09/23
	Dwg Check	L.H.	29/09/23

Approved For Construction* Date-
* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: COVER SHEET, DRAWING REGISTER AND TRANSMIT AND LOCATION PLAN

Discipline: CIVIL

Drawing No.: 3-WW021.02_C000

Rev.: 3

DOCUMENT NO: 3-WW021.02_C000.DWG

DOCUMENT PATH: \\CORP\NZ\PROJECTS\NZ3\W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

A1 REPRODUCTION SCALE
0mm 20 40 60 80 100

A3 REPRODUCTION SCALE
0mm 10 20 30 40 50

PLOTTED BY: PIETERSEN, RIAAN

DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 20-Jun-23

GENERAL NOTES

1. PIPES, CABLES AND OTHER UTILITIES, FOUNDATIONS, LEVELS, REFERENCE MARKS AND OTHER OBSTRUCTIONS INDICATED ON THIS DRAWING ARE BASED ONLY ON READILY AVAILABLE RECORD PLANS AND OTHER INFORMATION. THIS INFORMATION MAY NOT BE COMPLETE, ACCURATE OR UP TO DATE PRIOR TO CARRYING OUT ANY EXCAVATION OR OTHER PHYSICAL WORK, CONTRACTORS SHALL OBTAIN THE LATEST INFORMATION FROM UTILITY PROVIDERS AND CARRY OUT DETAILED EXPLORATORY WORK, TRACING, LOCATING, PROTECTION, ISOLATION AND ALTERATIONS AS REQUIRED UNDER NZS 3910 CLAUSE 5.13. CONTRACTOR MUST FOLLOW OSH GUIDELINES FOR SAFE LOCATION OF UNDERGROUND SERVICES.
2. RESIDENTS SHALL BE ADEQUATELY NOTIFIED PRIOR TO WORKS COMMENCING, AND 24 HOURS PRIOR TO DISRUPTION OF SERVICE.
3. ALL CARE MUST BE TAKEN BY THE CONTRACTOR NOT TO DAMAGE PRIVATE PROPERTY, OR ANY GARDENED AREA OTHER THAN THOSE NECESSARY AS PART OF THE WORKS.
4. ALL WORKS ARE TO BE CONSTRUCTED USING BEST TRADE PRACTICES.
5. APPROVAL MUST BE SOUGHT FROM THE ENGINEER PRIOR TO REMOVAL OF ANY FIXTURE (I.E. FENCE, TREE) IN PRIVATE PROPERTY.
6. ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH THE MOST RECENT VERSIONS OF: NATIONAL CODE OF PRACTICE FOR UTILITIES ACCESS TO TRANSPORT CORRIDORS HUTT VALLEY LOCAL CONDITIONS, NATIONAL CODE OF PRACTICE FOR UTILITIES ACCESS TO THE TRANSPORT CORRIDOR, REGIONAL SPECIFICATION FOR WATER SERVICES, REGIONAL STANDARD FOR WATER SERVICES, WELLINGTON WATER APPROVED PRODUCTS REGISTER, AND MANUFACTURER'S SPECIFICATIONS.

UNDERGROUND GAS PIPES

MACHINE DIGGING
STRATEGIC INTERMEDIATE PRESSURE (FEEDER MAIN OPERATING AT PRESSURES GREATER THAN 700 KPa (100 psi) AND MEDIUM PRESSURE GAS PIPES

(A) MACHINE DIGGING IS NOT PERMITTED CLOSER THAN 1.0m FROM ANY STRATEGIC INTERMEDIATE PRESSURE AND MEDIUM PRESSURE GAS MAINS OR SERVICES. ANY EXCAVATION WORK WITHIN THE DISTANCE MUST BE PERFORMED BY HAND DIGGING AND UNDER THE OBSERVATION OF A POWERCO APPROVED WORKS PROTECTION OBSERVER INCLUDING THE BACKFILLING OPERATION.

(B) PLEASE REFER TO THE POWERCO STANDARD "EXCAVATION WORKS IN THE VICINITY OF STRATEGIC CABLES AND PIPES" BEFORE COMMENCING EXCAVATION WORK IN THE VICINITY OF STRATEGIC GAS PIPES.

MEDIUM AND LOW PRESSURE GAS PIPES

(C) MACHINE DIGGING IS NOT PERMITTED CLOSER THAN 500mm FROM ANY MEDIUM OR LOW PRESSURE GAS MAIN OR SERVICE UNLESS THE POSITION OF THE PIPES HAS BEEN VERIFIED BY HAND DIGGING AND EXPOSING THEM FIRST.

NOTIFICATION OF WORK NEAR STRATEGIC INTERMEDIATE PRESSURE AND MEDIUM PRESSURE GAS PIPES.

(A) AT LEAST 2 WORKING DAYS NOTICE MUST BE GIVEN TO POWERCO PRIOR TO ANY EXCAVATION WORK TAKING PLACE.

(B) IT IS THE EXCAVATION CONTRACTOR'S RESPONSIBILITY TO CONTACT THE POWERCO HELP DESK ON 0800 769 372 FOR THE ABOVE NOTIFICATION.

(C) THE EXCAVATION CONTRACTOR WILL BE ISSUED WITH A WORKS AGREEMENT WHICH MUST BE COMPLETED AND SIGNED PRIOR TO ANY EXCAVATION WORK TAKING PLACE NEAR ANY STRATEGIC INTERMEDIATE PRESSURE OR MEDIUM PRESSURE GAS PIPES.

LOCATION OF OTHERS SERVICES

(A) INTERMEDIATE PRESSURE GAS PIPES
NO SERVICES SHALL BE LAID CLOSER THAN 300mm FROM ANY INTERMEDIATE PRESSURE GAS PIPE

(B) LOW OR MEDIUM PRESSURE GAS PIPES
NO SERVICES SHALL BE LAID CLOSER THAN 150mm FROM ANY LOW OR MEDIUM PRESSURE GAS PIPE

UNDERGROUND POWER

AT LEAST 2 WORKING DAYS NOTICE REQUIRED PRIOR TO EXCAVATION. HAND DIGGING IS REQUIRED WHEN EXCAVATING WITHIN 1m OF CABLE. REPLACEMENT TRENCH BACKFILL MATERIAL MUST BE THE SAME AS THAT REMOVED AND MUST BE REPLACED TO THE SAME LEVEL OF COMPACTION.

UNDERGROUND TELECOM

ONSITE CABLE LOCATE OR STANDOVER IS REQUIRED IF WORKING WITHIN 1m OF THESE CABLES. AT LEAST 2 WORKING DAYS NOTICE REQUIRED PRIOR TO EXCAVATION. FOR LOCATE AND STANDOVER CONTACT 0800 248 344.

WATER NOTES

1. THE CONTRACTOR TO CHECK INVERT LEVELS OF EXISTING AND PROPOSED SYSTEM AND ADVISE ENGINEER OF ANY ANOMALIES PRIOR TO COMMENCING PIPE LAYING.
2. WATER MAIN IS TO BE SCOURED TO REMOVE ALL DEBRIS BEFORE COMMISSIONING TESTING AND SERVICES ARE CONNECTED TO HOUSES.
3. MINIMUM COVER OF 750mm AT ALL PLACES MEASURED FROM THE GROUND SURFACE. MAXIMUM COVER TO BE 1350mm.
4. CONCRETE THRUST BLOCKS TO BE CONSTRUCTED ON ALL BENDS,TAPERS, TEES AND DEAD ENDS, CONCRETE TO BE 20 MPa, THRUST BLOCKS TO BE CONSTRUCTED TO MAINTAIN ACCESS TO THE BOLTS, ADJACENT JOINTS / FLANGES AND FITTINGS CONCRETE THRUST BLOCKS TO BE SIZED AS PER THE MOST RECENT VERSION OF THE REGIONAL STANDARD FOR WATER SERVICES .
5. BACKFILL MATERIAL SHALL BE AS PER THE REQUIREMENTS OF REGIONAL SPECIFICATION SECTION 4.7. ALL BACKFILL MATERIAL SHOULD BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 200mm IN LOOSE DEPTH.
6. THE CONTRACTOR SHALL CARRY OUT SCALA PENETROMETER TESTING AT NOT MORE THAN 5m DISTANCES ALONG TRENCH, THE RESULTS MUST BE RECORDED AND MADE AVAILABLE TO THE ENGINEER A COMPACTION OF NOT LESS THAN 7 BLOWS / 50mm, 4 BLOWS / 50mm AND 2 BLOWS / 50mm IN CARRIAGEWAYS, FOOTPATHS AND BERMS RESPECTIVELY MUST BE ACHIEVED.
7. DETECTOR TAPE MUST BE LAID ABOVE ALL WATER PIPES IN ACCORDANCE WITH REGIONAL STANDARDS FOR WATER SERVICES.
8. CONTRACTOR TO REMOVE ABANDONED VALVES AND HYDRANTS. NOTE ALL REINSTATEMENT IS TO COMPLY WITH NATIONAL CODE OF PRACTICE FOR UTILITY OPERATOR'S ACCESS TO TRANSPORT CORRIDORS.
9. LOCATION AND REQUIREMENTS FOR BENDS SHOWN ARE INDICATIVE. CONTRACTOR TO CONFIRM SPECIFIC LOCATIONS AND REQUIREMENTS WITH ENGINEER ON SITE.
10. SERVICE CONNECTION LOCATIONS ARE INDICATIVE ONLY, SERVICE PIPES SHALL BE LAID PERPENDICULAR TO THE MAIN. ALL SERVICE PIPES SHALL BE EXTENDED TO THE NEW MAIN.
11. ALL SERVICE CONNECTIONS SHALL CONNECT TO NEW MAIN USING ELECTROFUSION TAPPING SADDLE AS PER REGIONAL SPECIFICATION DRAWING WS02.
12. ALL MATERIALS USED SHALL BE LISTED ON WELLINGTON WATER APPROVED PRODUCTS REGISTER.
13. PRESSURE TESTING OF ALL PIPELINES SHALL BE LIMITED TO MAXIMUM LENGTHS, TESTING PRESSURE AND DURATION AS PER REGIONAL SPECIFICATION.
14. ALL PIPELINES SHALL BE DISINFECTED AND BACTERIOLOGICALLY TESTED AS PER REQUIREMENTS OF REGIONAL SPECIFICATION.

SEWER / STORMWATER NOTES

1. THE CONTRACTOR IS TO ENSURE ALL WASTEWATER IS CONTAINED WITHIN THE SEWER SYSTEM. ANY OVERPUMPING IS TO BE ALLOWED FOR IN THE CONTRACT RATES. THERE ARE TO BE NO SEWAGE SPILLS IN PRIVATE PROPERTY.
2. THE CONTRACTOR IS TO ALLOW FOR ALL SHORING REQUIRED FOR TRENCHING IN ANY UNSTABLE GROUND WHICH MAY BE ENCOUNTERED.
3. THE LATERAL STUB POSITIONS TO BE CONFIRMED FROM CCTV BY THE CONTRACTOR. PRIOR TO RECONNECTION TO THE NEW PIPELINE, TESTS SHALL BE CARRIED OUT TO DETERMINE LIVE LATERALS. NO DEAD LATERALS SHALL BE CONNECTED.
4. EXISTING LAWN SHALL BE REMOVED AS TURF SLABS AND REINSTATED ON COMPLETION.
5. CONTRACTOR TO DEWATER AS NECESSARY TO COMPLETE THE WORKS.
6. CONTRACTOR TO REINSTATE ALL ROAD SURFACE MARKINGS AND RRPMs.
7. PROVIDE WATER STOPS ON STEEP SECTIONS IN ACCORDANCE WITH REGIONAL WATER SPECIFICATIONS, UNLESS OTHERWISE REQUIRED BY THE CONTRACT DOCUMENTS.
8. EXISTING SEWER PIPES TO BE ABANDONED SHALL BE CAPPED OFF AT BOTH ENDS WITH A CONCRETE PLUG.
9. WHERE EXISTING MANHOLES ARE BEING REPLACED WITH NEW, THE CONTRACTOR SHALL RECONNECT ALL EXISTING PIPELINES TO THE NEW MANHOLE.
10. THE PIPELINES ARE TO BE CONSTRUCTED AT THE INVERT LEVELS SHOWN ON THE LONG SECTIONS, WITH DEPTHS TO INVERT AND PIPE GRADES PROVIDED FOR GUIDANCE ONLY. DEPTHS TO INVERT AND PIPE GRADES SHALL BE ADJUSTED BY THE CONTRACTOR IF NECESSARY TO ACHIEVE THE SPECIFIED INVERT LEVELS.
11. THE CONTRACTOR SHALL CHECK AND CONFIRM ALL EXISTING SEWER LOCATIONS AND LEVELS ON SITE AS AN INITIAL ACTIVITY, ADVISE THE ENGINEER FOR FURTHER INSTRUCTION SHOULD THESE DIFFER FROM THE INFORMATION SHOWN ON THE DRAWINGS.
12. ALL MANHOLES AFFECTED BY THE WORKS SHALL HAVE THEIR CONDITION REVIEWED BY THE CONTRACTOR AS AN INITIAL ACTIVITY INCLUDING A RECOMMENDATION AS TO WHETHER UPGRADE OR REPLACEMENT IS REQUIRED. THE ENGINEER SHALL INSTRUCT ON THE REQUIRED APPROACH THEN.

IMPORTANT SERVICES NOTE

THE SERVICES SHOWN SHOULD BE CONSIDERED INDICATIVE ONLY AND ARE BASED ON RECORDS SUPPLIED BY THE UTILITY COMPANIES. PRIVATE SERVICES AND CONNECTIONS ARE NOT SHOWN.

THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL SERVICES ARE LOCATED/MARKED BY THE APPROPRIATE SERVICE AUTHORITY, OR THEIR OWN STAFF, PRIOR TO ANY SITE WORKS, AND FOR PROTECTING THESE SERVICES FOR THE DURATION OF THE SITE CONTRACT.

PIPE MATERIAL

CODE	DESCRIPTION	SUPERSEDED CODE
ABS	ACRYLONITRITE BUTADIENE STYRENE	
AC	ASBESTOS CEMENT	
AC-E	ASBESTOS CEMENT EVERITE	
AC-I	ASBESTOS CEMENT ITALITE	
AL	ALUMINIUM	
CI	CAST IRON	
CU	COPPER	
DI	DUCTILE IRON	
EW	EARTHEN WARE	
GI	GALVANISED IRON	
LBST	LOCKBAR STEEL	
PVC-M	MODIFIED POLYVINYL CHLORIDE	
PE100	POLYETHYLENE HDPE	
PE80	POLYETHYLENE MDPE	
PVC	POLYVINYL CHLORIDE	
RC	REINFORCED CONCRETE	CC
SS	STAINLESS STEEL	
ST	MILD STEEL	
UNK	UNKNOWN	
PVC-U	UNPLASTICISED POLYVINYL CHLORIDE	

PIPE LINING

CODE	DESCRIPTION	SUPERSEDED CODE
BL	BITUMEN	
CL	CONCRETE	
CML	CEMENT MORTAR	
CTL	COAL TAR ENAMEL	EL, CTE
EL	EPOXY	PL
NL	NO LINING	
TEL	COAL TAR EPOXY	CTE
UL	UNKNOWN LINING (use UL when not specified)	

PIPE COATING

CODE	DESCRIPTION	SUPERSEDED CODE
BC	BITUMEN	
CTE	COAL TAR ENAMEL, PITCH ENAMEL, ENAMEL	MC, EC
DC	DIMET (EPOXY)	
EC	EPOXY	
GC	GUNITE	
NC	NO COATING	
PC	POLYETHYLENE, POLYKEN TAPE	TC
PW	POLYETHYLENE WRAP (polyethylene sleeve on DI pipe)	
UC	UNKNOWN COATING (use UC when not specified)	KC

WW SERVICES LEGEND

NEW WATER MAIN — W
EXISTING WATER MAIN — W
NEW STORMWATER — SW
EXISTING STORMWATER — SW
NEW SEWER — SS
EXISTING SEWER — SS
ABANDONED SERVICE — X X X
PRIVATE WATER
PRIVATE SW
PRIVATE SEWER
KERBS
CONTOURS MAJOR
CONTOURS MINOR
PARCEL BOUNDARY
VALVE NEW OR EX / REDUNDANT — V V
BOUNDARY VALVE
HYDRANT NEW OR EX / REDUNDANT — FH FH
MANIFOLD NEW/EXISTING
EXISTING TOBY
PUMP
NEW SS/SW MANHOLE
EXISTING SS/SW MANHOLE
EXISTING SS/SW LHCE
EXISTING SW SUMP
PROPERTY NUMBER — 1

UTILITIES LEGEND

GAS - POWERCO — G
GAS - NOVA — NG
U/G POWER — UP
400V U/G POWER — 400V
11kV U/G POWER — 11kV
33kV U/G POWER — 33kV
O/H POWER / TROLLEY WIRE — OP
TELECOMMS / CHORUS — T
VODAFONE — V
FIBRE OPTIC — FO
CITYLINK BROADBAND — B
VECTOR COMMS — VC
OIL — OIL
LINZ SURVEY MARK — SM
POLE

A1 REPRODUCTION SCALE: 100 80 60 40 20 0mm
A3 REPRODUCTION SCALE: 50 40 30 20 10 0mm

No.	Revision	By	Chk	Appd	Date
2	ISSUED FOR INFORMATION	G.H.	G.B.	J.L.	30-06-23
1	ISSUED WITH CONCEPT DESIGN - FINAL	G.H.	G.B.	J.L.	03-03-23
0	ISSUED FOR INFORMATION	C.Y.	G.B.	J.L.	07-12-22

Drawing Originator: Connect Water — c/- WSP, PO Box 12-003 Thorndon, Wellington 6144, T 64 4 471 7000

Original Scale (A1) AS SHOWN	Design	L.H.	03/03/23
	Drawn	G.H.	03/03/23
Reduced Scale (A3) 1/2 SHOWN	Dsg Verifier	J.L.	03/03/23
	Dwg Check	L.H.	03/03/23

Approved For Construction* - Date-
* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER EASTERN HILLS RESERVOIR

Title: GENERAL NOTES, LEGEND AND ABBREVIATIONS SHEET

Discipline: CIVIL

Drawing No.: 3-WW021.02_C001 Rev. 2

FOR INFORMATION NOT FOR CONSTRUCTION

DOCUMENT PATH: \\CORPANZPROJECTSNZ\3WS-WW021.02 NAENAE NO.2 RESERV\OIR\HOME\700 DRAWINGS
DOCUMENT NO: 3-WW021.02_C001.DWG

PLOTTED BY: HAMBLYN, GARTH

DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 29-Jun-23

Safety in Design H&S Risk Assessment

Administration

Project Name	Eastern Hills Reservoir (previoulsy Naenae No 2)				
Project No. (if applicable)	OPC101031				
Assessment Date	5/07/2023	**Asset Type**	Water - Reservoir	**Location / Site Name**	Summiit Road, Faifield, Lower H
Designer	Connect Water	**SID Process Step**	Review H&S Risk Assessment (Step IV)		

Safety in Design Process Decisions

Opex: Technical Input Required? (Step III)	Yes
Design Meeting Required? (Step V)	Yes
Record decision reasoning for Step V:	Require input from WWL stakeholders around operation of the reservoir. Held design meeting with WWL COG.
More Detailed Assessment (e.g. Hazop) Required? (Step VIII)	Yes
Record decision reasoning for Step VIII :	HAZOP to be held during detailed design.

Safety in Design Stakeholders

Name	Gareth Penhale (WWL)	**Role**	Project Manager
Name	Lewis Hensman (Connect Water)	**Role**	Designer
Name	Jane Nichols (WWL)	**Role**	Investigator
Name	Paul Winstanley (WWL)	**Role**	Operator
Name	Francis Leniston (WWL)	**Role**	WWL Design Manager
Name	Jo Lucas (Connect Water)	**Role**	Project Manager
Name		**Role**	
Name	Ray Bewley (WWL) - Apology	**Role**	
Name	Kacey Paul (WWL) - Apology	**Role**	
Name		**Role**	
Name		**Role**	
Name		**Role**	
Name		**Role**	

If additional stakeholders are required, select the row above and insert new row. Record Name and Role as per Safety in Design Process.

Raw risk						Risk management								
Specific Asset Reference (if applicable)	Risk Source (Hazard)	Risk Description	Raw Consequence	Raw Likelihood	Raw Risk Rating	Control Measure	Control Type	Control Description	Control Justification (if not eliminated)	Control Owner	Residual Consequence	Residual Likelihood	Residual Risk Rating	Risk Owner
1. Pre-Construction														
Summit Rd	Vehicles And Mobile Equipment	Pre-construction vehicles creating hazard on Summit Rd and connecting streets.	Moderate 40	Possible 4	Moderate 160	Minimise	2. Adminstration Control	Follow road rules and park sensibly on Farrelly Grove.	No other route available for construction vehicles.	Contractor	Minor 10	Unlikely 3	Low 30	Contractor
2. Construction														
Summit Rd	Traffic or Pedestrian Movement during construction	Construction vehicles creating hazard on Summit Rd and connecting streets.	Substantial 100	Possible 4	Extreme 400	Minimise	2. Adminstration Control	Manage using a TMP in accordance with CoPTTM. Potentially restrict access to Summit Rd for residents only. Early engagement with residents. Some construction traffic using Balgownie Grove.	No other route available for construction vehicles.	Contractor	Major 70	Unlikely 3	High 210	Contractor
Reservoir site	Traffic or Pedestrian Movement during construction	Construction vehicles creating hazard to persons using the firebreak and adjoining tracks for recreational use.	Substantial 100	Possible 4	Extreme 400	Minimise	1. Isolate	Close access to the tracks to the public for the duration of the construction period. Use physical barriers to isolate the area and provide signage. Engage early with users of the track using on-line survey and open evenings.	During preliminary design and ECI the team considered the practicalities and safety of maintaining access to the track. It was agreed that with a tight site it was safer to close the track.	Contractor	Moderate 40	Highly Unlikely 2	Moderate 80	Contractor
Outlet pipe	Traffic or Pedestrian Movement during construction	Construction vehicles creating hazard during construction of new outlet main. Vehicles on road posing risk to contractors.	Substantial 100	Possible 4	Extreme 400	Minimise	2. Adminstration Control	Manage using a TMP in accordance with CoPTTM. Potentially restrict access to Balgownie Grove for residents only.	Have changed the route of the outlet pipe to avoid going down Summit Rd. Selected pipe route down hill and connecting at Balgownie Gr. Has reduced impact on traffic movements.	Contractor	Major 70	Unlikely 3	High 210	Contractor
Whole site	Natural events	During construction there is a risk of high rainfall, high winds or earthquakes causing failure of temporary works or other hazards.	Substantial 100	Possible 4	Extreme 400	Minimise	1. Engineering Control	Design all temporary works to account for service limit state wind loads and earthquake loads. Engineer to provide guidance on the propping of permanent elements until construction complete. Work adjacent to slopes is of particular concern and should be avoided in high winds or heavy rain. After heavy rain slopes to be inspected before construction vehicles used on them.	Contractor will still be required to assess the conditions before undertaking works and have appropriate procedures in the event of an extreme natural event.	Designer	Substantial 100	Rare 1	Moderate 100	Contractor
Waiwhetu stream	Natural events	High rainfall causing stream level to rise. Potential significant risk to those working on or adjacent to stream. Can engulf trenches or wash away equipment and assets causing a hazard down stream.	Substantial 100	Possible 4	Extreme 400	Minimise	1. Engineering Control	Work adjacent to stream to have control measures such as weather warnings. Stage work for summer. Ensure that site is made safe if high rainfall is expected, removing equipment from site, or ensuring it is secured if it cannot be removed.	Contractor will still be required to assess the conditions before undertaking works and have appropriate procedures in the event of an extreme natural event.	Contractor	Substantial 100	Highly Unlikely 2	High 200	Contractor
Whole site	Mobile Plant	Due to small construction area required to minimise excavation work, restricted area for vehicle movements and risk of injury or fatality.	Substantial 100	Possible 4	Extreme 400	Minimise	1. Engineering Control	While there is a desire to minimise the excavation, need to design in an area for vehicle turnaround, laydown and lifting platform. Have levelled the area between the new reservoir and existing reservoir.	During consent/ECI phase the working area was confirmed with the contractors. Design can mitigate where practical, but cannot eliminate. Contractor will need to follow standard mobile plant safety protocols while on site.	Designer	Substantial 100	Highly Unlikely 2	High 200	Contractor
Reservoir site	Working at height, raised or falling objects	Lifting of reservoir panels, multiple risks of injury or fatality during crane lifting operations.	Substantial 100	Possible 4	Extreme 400	Minimise	1. Engineering Control	Design in dedicated lifting areas and minimise the size of the panels to be lifted in reducing risk. Review scheduling of the works to complete lift operations at time of the year when high winds are least likely.	On-site administrative controls required such as lift plans.	Designer	Major 70	Unlikely 3	High 210	Contractor

0 5 10 15 20 25
SCALE 1:500 AT ORIGINAL SIZE

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2	ISSUED FOR INFORMATION	G.H.	G.B.	J.L.	28-07-23
1	ISSUED WITH CONCEPT DESIGN - FINAL	G.H.	G.B.	J.L.	03-03-23
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	Dwg Check	L.H.	28/07/23

Approved For Construction* -
Date-
* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: SAFETY IN DESIGN ASSESSMENT
SHEET 1

Discipline: CIVIL

Drawing No.: 3-WW021.02_C002

Rev.: 2

DOCUMENT PATH: \\CORP\ANZ\PROJECTS\NZ3W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

DOCUMENT NO: 3-WW021.02_C002-C006.DWG

A1 REPRODUCTION SCALE: 100 80 60 40 20 0mm

A3 REPRODUCTION SCALE: 50 40 30 20 10 0mm

PLOTTED BY: HAMBLYN, GARTH

DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 21-Jun-23

Specific Asset Reference (if applicable)	Risk Source (Hazard)	Risk Description	Raw Consequence	Raw Likelihood	Raw Risk Rating	Control Measure	Control Type	Control Description	Control Justification (if not eliminated)	Control Owner	Residual Consequence	Residual Likelihood	Residual Risk Rating	Risk Owner
Reservoir site	Structural failure	Existing reservoir adjacent to the construction site: risk of exceeding structural loads on reservoir due to plant or equipment, falling objects. May cause injury if reservoir roof collapses. Damage to the reservoir poses risk to water supply.	Substantial 100	Possible 4	Extreme 400	Minimise	1. Engineering Control	Have assessed the potential loading the existing reservoir can withstand and planned site accordingly. Still requires temporary works design and confirmation during detailed design and construction.	Will need to be conservative in defining activities can occur on the reservoir roof, cannot risk disruption to water supply. Will need to take into account the existing reservoir in all lifting plans.	Designer	Substantial 100	Highly Unlikely 2	High 200	Contractor
Whole site	Confined Space	Some trenches around the site may be classified as a confined space, as will the reservoir and any manholes during points in construction. Standard confined space hazards.	Substantial 100	Possible 4	Extreme 400	Minimise	1. Engineering Control	Design trenches to be as shallow as practical to mitigate the risk.	Standard CSE to apply where a confined space is identified.	Designer	Substantial 100	Unlikely 3	High 300	Contractor
Reservoir site	Members of the public accessing site	Members of the public forcing entry to site and putting themselves at risk of harm or damaging assets	Major 70	Possible 4	High 280	Minimise	1. Isolate	Ensure that the perimeter of the site is fenced and that appropriate security measures are in place when on site. Secure all equipment and vehicles when site is unmanned	Cannot be avoided, need to manage through construction procedures	Contractor	Major 70	Highly Unlikely 2	Moderate 140	Contractor
Site access	Steep embankments adjacent to vehicle access way	Potential for vehicle to topple down the side of the access way, especially a concern for large vehicles due to the width of the access track.	Major 70	Possible 4	High 280	Minimise	1. Isolate	Widen, grade and resurface track as part of the site establishment. Consider the use of barriers, such as bollards or armco barriers to protect from the edge. These could also help provide safe pedestrian access up the access track. For oversize vehicles, consider the use of a pilot to guide the vehicle up the track. Where vehicles are required to arrive while dark, light the track to assist.	Due to the slope being very steep on one side and the existing reservoir on the other, it is difficult to widen the track to a point where this risk would be extremely unlikely. Need to manage through a mix of isolation, engineering and administrative controls.	Contractor	Major 70	Unlikely 3	High 210	Contractor
Reservoir site	Vehicles operating on a slope	Risk of vehicle run-away on site slopes, could cause significant damage to assets and pose a significant safety risk.	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	Ensure the correct vehicle is selected for the task and operators are trained and competent. Emergency brakes to be engaged and chocks used to prevent runaway. Avoid leaving vehicles unattended on steep slopes, only park on steep slopes when required for work	Not possible to eliminate as work on a hill.	Contractor	Major 70	Unlikely 3	High 210	Contractor
Site access	Narrow width site access	Chance of vehicle collision on narrow access track, or toppling down slope to avoid collision.	Major 70	Possible 4	High 280	Minimise	2. Adminstration Control	Widen, grade and resurface track as part of the site establishment. Reduced speed zone through construction site. Will likely require traffic controllers on the access track, especially when large vehicles are using track.	Due to the slope being very steep on one side and the existing reservoir on the other, it is difficult to widen the track to a point where this risk would be extremely unlikely. Need to manage through a mix of isolation, engineering and administrative controls.	Contractor	Major 70	Highly Unlikely 2	Moderate 140	Contractor
Whole Site	Services – Working With or Near	Risk of striking underground or overhead services. This is a general risk, any risks associated with specific services or operations will be addressed separately.	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	Use service drawings to inform pipe alignment and reservoir location. Design to avoid need to cross services.	Will reduce risk through design. Will still need appropriate administration controls through the construct period, such as following "Guidance to Utility Management in Design and Construction".	Designer	Major 70	Highly Unlikely 2	Moderate 140	Contractor
Outlet pipe	Services – Working With or Near	Services (large supply and delivery pipe) down Summit Road cross the street back and forth. Any pipe installed down this route would require multiple service crossings and deep trenches.	Major 70	Possible 4	High 280	Eliminate		Have eliminated this specific risk by rerouting the pipe down the hill to Balgownie Grove. Note this only refers to the delivery pipe and scour / overflow pipes. Does not eliminate the overall risk of striking services at the top of Summit Rd and Farrelly Grv, due to the installation of the new inlet, scour connection and delivery connection						
Outlet pipe	Excavation	Deep trench causing hazard of falling into trench or trench collapse causing injury.	Major 70	Possible 4	High 280	Minimise	1. Substitute	Designed delivery (outlet) pipe alignment down hill to minimise service crossings on Summit Rd and therefore the depth of trench required. Consider directional drilling for sections of the pipe.	Will reduce risk through design where practical. During construction will still require standard trench safety to be followed such as shoring and barriers. Don't anticipate deep trenches for delivery pipe.	Designer	Moderate 40	Unlikely 3	Moderate 120	Contractor
Reservoir site	Excavation	Risk of injury from being struck by excavator, collapse of any slopes, or toppling of excavator when operating on a slope.	Major 70	Possible 4	High 280	Minimise	1. Isolate	Review of the ground conditions on the construction site, will assist in determining where to locate machinery and the risk of slope failure.	Standard control of the site using barricading around operating excavators and training of contractors.	Designer	Major 70	Highly Unlikely 2	Moderate 140	Contractor

A1 REPRODUCTION SCALE 100 80 60 40 20 0mm

A3 REPRODUCTION SCALE 50 40 30 20 10 0mm

0 5 10 15 20 25
SCALE 1:500 AT ORIGINAL SIZE

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
2	ISSUED FOR INFORMATION	G.H.	G.B.	J.L.	28-07-23
1	ISSUED WITH CONCEPT DESIGN - FINAL	G.H.	G.B.	J.L.	03-03-23
0	ISSUED FOR INFORMATION	C.Y.	G.B.	J.L.	07-12-22

Drawing Originator: Connect Water
c/- WSP
PO Box 12-003 Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) AS SHOWN	Design	L.H.	28/07/23
	Drawn	G.H.	28/07/23
Reduced Scale (A3) 1/2 SHOWN	Dsg Verifier	J.L.	28/07/23
	Dwg Check	L.H.	28/07/23

Approved For Construction* -
Date-
* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: SAFETY IN DESIGN ASSESSMENT
SHEET 2

Discipline: CIVIL

Drawing No.: 3-WW021.02_C003

Rev.: 2

DO NOT SCALE - IF IN DOUBT ASK

PLOTTED BY: HAMBLYN, GARTH

DRAWING PLOTTED: 21-Jun-23

DOCUMENT PATH: \\CORPANZ\PROJECTSNZ\3W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

DOCUMENT NO: 3-WW021.02_C002-C006.DWG

Specific Asset Reference (if applicable)	Risk Source (Hazard)	Risk Description	Raw Consequence	Raw Likelihood	Raw Risk Rating	Control Measure	Control Type	Control Description	Control Justification (if not eliminated)	Control Owner	Residual Consequence	Residual Likelihood	Residual Risk Rating	Risk Owner
Outlet / overflow pipe	Slope failure	During the construction of the pipe down the hill towards Balgownie Grove there is a risk of slope failure under heavy machinery causing toppling.	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	During design undertake geotechnical assessment of route to assess the risk of failure. Provide advice to the contractor regarding construction methodology. Programme works for summer when fewer heavy rain events.	Design can mitigate risk, however contractor will need to ensure controls in place when using machinery. This may be by reducing the size of excavator etc used, and locating as far as practical from slope edges. Ensure suitably qualified team constructing pipeline. Installation method will depend on material selected, this is currently being left flexible for the D&C contractor	Designer	Moderate 40	Unlikely 3	Moderate 120	Contractor
Waiwhetu stream crossing	Slope failure	During the construction of the crossing of the Waiwhetu stream there is a risk of slope failure below heavy machinery.	Major 70	Possible 4	High 280	Minimise	2. Adminstration Control	Locate heavy machinery away from slope and schedule work for summer to avoid heavy rain events. Design has considered location of abutments to avoid slope failure.	Design can mitigate risk, however contractor will need to ensure controls in place when using machinery.	Contractor	Moderate 40	Unlikely 3	Moderate 120	Contractor
Reservoir site	Working at height, raised or falling objects	Working on the reservoir roof or above the valve pit, risk of falling off roof or objects being dropped on people.	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	Multiple controls to be used during construction, from guardrails to fall restraint. Working at height procedures will need to be followed.	Standard procedures to be followed.	Contractor	Major 70	Unlikely 3	High 210	Contractor
Outlet pipe	Working at height, raised or falling objects	Crane lifting of the pipes into trenches in the carriageway. Potential for injury or fatality, including general public.	Major 70	Possible 4	High 280	Minimise	1. Isolate	Follow standard lifting procedures and putting in public exclusion zones.	Standard procedures to be followed.	Contractor	Major 70	Unlikely 3	High 210	Contractor
Water network cut-ins	Pressurised pipework and confined space	Risk of injury if cut into a pressurised line. Risk of engulfment in trenches due to cutting into live pipe.	Major 70	Possible 4	High 280	Minimise	1. Isolate	Ensure through the construction period that all isolations are in place and lines drained before cutting in. Follow standard WWL procedures.	Cannot eliminate this risk.	Contractor	Moderate 40	Rare 1	Low 40	Contractor
Valvehouse	Slope failure	The valvehouse will be constructed in a pit, risk of slope failure causing injury.	Major 70	Unlikely 3	High 210	Minimise	1. Engineering Control	Specify that the excavation should be benched or sloped at 1:1 to reduce risk. Further site investigations will inform risk.	Unable to avoid excavation, minimise risk. Excavation will likely be in rock and therefore the likelihood of collapse is minimised.	Designer	Moderate 40	Highly Unlikely 2	Moderate 80	Contractor
Whole site	Stormwater	Sedimentation and pollution to waterways, specifically the Waiwhetu Stream. Flooding of the site.	Major 70	Unlikely 3	High 210	Minimise	1. Engineering Control	Design the erosion and sediment control measures and stormwater management for storm events.	Cannot eliminate risk of rain.	Designer	Moderate 40	Unlikely 3	Moderate 120	Contractor
Waiwhetu stream crossing	Water - Being In, Near, Or On	Risk of falling into stream during construction.	Major 70	Unlikely 3	High 210	Minimise	2. Adminstration Control	Scheduling of work in summer to avoid high water levels.	Follow safety procedures for working around/over water.	Contractor	Moderate 40	Highly Unlikely 2	Moderate 80	Contractor
Reservoir	Scaffolding disassembly	Removal of scaffolding from the reservoir introduces multiple hazards including working from heights, suspended loads, manual handling and confined space,	Major 70	Unlikely 3	High 210	Minimise	1. Engineering Control	Ensure that during the detailed design of the reservoir, removal of scaffolding is taken into account when designing the size and location of any reservoir roof penetrations. Contractor should also consider during their construction sequencing.	Residual risk will still be present and need to be managed by contractor HSE procedures.	Designer	Major 70	Highly Unlikely 2	Moderate 140	Contractor
Whole site	House Keeping	An untidy site presents hazard for people and vehicles moving around site	Moderate 40	Possible 4	Moderate 160	Minimise	1. Isolate	Design a laydown area and construction offices area.	Will still require the administrative controls on site to keep a tidy site.	Designer	Minor 10	Unlikely 3	Low 30	Contractor
Whole site	Fires or explosions or hot work	Welding operations and storage of flammable/combustible materials on site. Risk of injury.	Moderate 40	Possible 4	Moderate 160	Minimise	2. Adminstration Control	Follow standard hot work procedures, correct storage and handling of hazardous materials.	Standard procedures to be followed.	Contractor	Moderate 40	Unlikely 3	Moderate 120	Contractor
Whole site	Manual handling	Risk of injury due to manual handling	Moderate 40	Possible 4	Moderate 160	Minimise	2. Adminstration Control	Ensure proper training and suitable lifting aids are provided where practical.	Standard procedures to be followed.	Contractor	Minor 10	Unlikely 3	Low 30	Contractor
Whole site	Tools and equipment	Risk of injury due to improper use of tools and equipment.	Moderate 40	Possible 4	Moderate 160	Minimise	2. Adminstration Control	Ensure all power tools are tested and tagged, operators to be trained	Standard procedures to be followed.	Contractor	Minor 10	Unlikely 3	Low 30	Contractor
Whole site	Hazardous substances	Injury due to improper storage or handling of hazardous materials.	Moderate 40	Possible 4	Moderate 160	Minimise	2. Adminstration Control	Ensure MSDS's are available and followed	Standard procedures to be followed.	Contractor	Minor 10	Unlikely 3	Low 30	Contractor
Reservoir site	Noise	Large amount of noise during rock breaking activities during construction. Risk of hearing damage.	Moderate 40	Possible 4	Moderate 160	Minimise	1. Engineering Control	Reduce earthworks required as far as possible, such as changing the outlet pipe alignment to reduce the rock breaking required. Noise assessment being undertaken and mitigation measures proposed.	Will need to manage construction hours and hearing protection for contractors on site.	Designer	Minor 10	Unlikely 3	Low 30	Contractor
Site access	Rutting of access way	Rutting / erosion of the track during wet weather events, creating driving hazards potentially resulting in loss of control of a vehicle.	Moderate 40	Possible 4	Moderate 160	Minimise	1. Engineering Control	Grade and surface the access track to manage stormwater, minimising the rutting of the track.	Contractor will need to monitor condition of access throughout project and maintain as required.	Designer	Minor 10	Highly Unlikely 2	Low 20	Contractor
Whole site	Noise	General risk of noise due to construction activities.	Minor 10	Possible 4	Low 40	Minimise	2. Adminstration Control	Will need to manage construction hours and hearing protection for contractors on site. Engage early with the public around noise and night works.	Standard procedures to be followed and working hours/days. For night works noise limited and monitored as much as possible.	Contractor	Minor 10	Unlikely 3	Low 30	Contractor
3. Commissioning														
Reservoir internal	Confined space	Use of hazardous substances in a confined space during disinfecting of reservoir. Health risks.	Major 70	Possible 4	High 280	Minimise	3. PPE	Comply with MSDS and standard CSE procedures	Cannot eliminate requirement to disinfect.	Contractor	Major 70	Highly Unlikely 2	Moderate 140	Contractor
Reservoir valvehouse	Confined space	General confined space risks.	Major 70	Possible 4	High 280	eliminate		Design the valvehouse for occupancy to eliminate confined space designation.		Designer				

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	Dwg Check	L.H.	28/07/23

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Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: SAFETY IN DESIGN ASSESSMENT
SHEET 3

Discipline: CIVIL

Drawing No.: 3-WW021.02_C004

Rev.: 2

DOCUMENT PATH: \\CORP\ANZ\PROJECTS\NZ\3W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

DOCUMENT NO: 3-WW021.02_C002-C006.DWG

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Specific Asset Reference (if applicable)	Risk Source (Hazard)	Risk Description	Raw Consequence	Raw Likelihood	Raw Risk Rating	Control Measure	Control Type	Control Description	Control Justification (if not eliminated)	Control Owner	Residual Consequence	Residual Likelihood	Residual Risk Rating	Risk Owner
Reservoir - Roof	Water - Being In, Near, Or On	Personnel on roof observing water levels during drop test of reservoir.	Major 70	Possible 4	High 280	Minimise	1. Substitute	Consider use of remotely operated devices to carry out task, such as pole extensions or CCTV. If not possible, ensure personnel are anchored with fall arrestors.	Testing required, but control measures or substitution can minimise risk.	Contractor	Major 70	Rare 1	Moderate 70	Contractor
Reservoir - Roof	Working at height	Accessing roof for commissioning, risk of injury due to falling off access way or the roof	Major 70	Possible 4	High 280	Minimise	1. Isolate	Reservoir to have a wrap around staircase and handrails. Anchor points/fall arrestors to be used when required.	Can minimise, not eliminate.	Designer	Major 70	Rare 1	Moderate 70	Contractor
Electrical and Controls	Electrocution	Potential for electrocution during the commissioning of the electrical and controls equipment.	Major 70	Possible 4	High 280	Minimise	1. Isolate	Ensure lock out / tag out procedures are followed and aligned with shutdown procedures.	To be included in contractor HSE plans.	Contractor	Major 70	Highly Unlikely 2	Moderate 140	Contractor
Reservoir	Hazardous substances	Introduction of Cl, for disinfection and commissioning presents a hazard of exposure	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	Comply with MSDS. Include the commissioning in HAZOP and detail any design changes able to mitigate risk.	To be included in HAZOP	Designer	Moderate 40	Unlikely 3	Moderate 120	Contractor
4. Operations / Maintenance														
Reservoir Internal	Confined space	Reservoir is considered a confined space, general risks.	Substantial 100	Possible 4	Extreme 400	Minimise	1. Engineering Control	Design internal stair case for ease of access/egress. Ensure that double isolation is available to reduce risk of water being introduced during inspection.	Standard CSE procedures will need to be followed. Consider the use of drones to inspect where possible to eliminate the risk to operators.	Designer	Substantial 100	Highly Unlikely 2	High 200	Operator
Reservoir	Water quality	Tampering of the reservoir supply resulting in a public health risk.	Substantial 100	Possible 4	Extreme 400	Minimise	1. Engineering Control	Security as per WWL standards for Tier 1 security (access hatches, roof vents) .Adopt Tier 2 security at base of reservoir staircase. Control hut to be secured and alarmed. Have alarms on roof hatches. Identified security cameras don't work as they are frequently vandalised.	Minimise security risk as much as possible based on WWL experience at other sites.	Designer	Substantial 100	Rare 1	Moderate 100	Asset Manager
Valvehouse	Heavy lifting	Lifting of valves or equipment causes risk of injury.	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	Design in lifting hoists in the valvehouse and make section of the platform removable.	Confirm in Principal's requirements and during D&C.	Designer	Minimal 1	Highly Unlikely 2	Low 2	Operator
Valvehouse	Vehicle movements	Risk of vehicle hitting and damaging valvehouse / control hut.	Major 70	Possible 4	High 280	Minimise	1. Isolate	Design in bollards.	Widely used for this purpose.	Designer	Major 70	Rare 1	Moderate 70	Operator
Valvehouse	Accessing pipework and equipment	Risk of injury going down in to valvehouse to access the pipework/equipment.	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	Design so most frequent operations, such as sampling, can be completed at ground level. Valve wheels to be accessible from ground level platform. Use stairway with handrails to access valves/equipment below ground level. Design in an adequate means of drainage, including floor sump and pump.	Confirm in Principal's requirements and during D&C.	Designer	Moderate 40	Highly Unlikely 2	Moderate 80	Operator
Reservoir roof hatch	Water - Being In, Near, Or On	Risk of falling into reservoir when operator on roof with hatch open.	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	Sampling to be completed in valvehouse to reduce activities which need to be conducted on roof. Standard HCC hatch design to be used (15kg limit).	WWL to advise on preference.	Designer	Moderate 40	Highly Unlikely 2	Moderate 80	Operator
Reservoir roof hatch	Manual handling	Risk of injury if operator required to shock dose the reservoir e.g. carrying 20kg drum of chlorine	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	Consider alternative shock dosing methods, such as smaller drums or pumping from low level. Consider further during HAZOP.	Confirm during HAZOP.	Designer	Moderate 40	Unlikely 3	Moderate 120	Operator
Reservoir roof hatch	Manual handling	Reservoir roof hatch may be too heavy for single person lift.	Moderate 40	Likely 5	High 200	Minimise	1. Engineering Control	Consider weight of hatch during design and any lifting aids that can be installed.	WWL to advise on preference. Confirmed in Principal's requirements and during D&C.	Designer	Minor 10	Highly Unlikely 2	Low 20	Operator
Whole site	Public access	Site is in a public access area, risk of public injuring themselves.	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	Security at the site as previously stated. Design to include any anti-climb barriers around conduits going up reservoir side or all conduits to be within the secured area. Include signage? Include handrails on valvehouse roof to prevent accidental falling.	Operations manual needs to include standard procedures for securing the site before leaving.	Designer	Major 70	Rare 1	Moderate 70	Asset Manager
Reservoir roof	Access to roof	Risk of falling off roof.	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	Security at the site as previously stated. Design to include any anti-climb barriers around conduits going up reservoir side or all conduits to be within the secured area. Include signage? Include handrails on valvehouse roof to prevent accidental falling.	Confirm in Principal's requirements and during D&C.	Designer	Major 70	Rare 1	Moderate 70	Operator
Reservoir Walls	External wall inspections	Risk of falling during inspection of reservoir walls.	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	Use standard EWP or scaffold practices. Design ground around the reservoir to be flat for an EWP to be stable.	Consider alternative means of inspection such as drones or cameras on extendable poles. This would eliminate the risk of working at height.	Designer	Major 70	Rare 1	Moderate 70	Operator

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A3 REPRODUCTION SCALE 0 10 20 30 40 50 0mm

0 5 10 15 20 25

SCALE 1:500 AT ORIGINAL SIZE

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0	ISSUED FOR INFORMATION	G.H.	G.B.	J.L.	28-07-23

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Reduced Scale (A3) 1/2 SHOWN	Dwg Check	L.H.	28/07/23

Approved For Construction* -
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Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: SAFETY IN DESIGN ASSESSMENT
SHEET 4

Discipline: CIVIL

Drawing No.: 3-WW021.02_C005

Rev.: 0

DOCUMENT PATH: \\CORP\ANZ\PROJECTS\NZ\3W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

DOCUMENT NO: 3-WW021.02_C002-C006.DWG

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PLOTTED BY: HAMBLYN, GARTH

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Specific Asset Reference (if applicable)	Risk Source (Hazard)	Risk Description	Raw Consequence	Raw Likelihood	Raw Risk Rating	Control Measure	Control Type	Control Description	Control Justification (if not eliminated)	Control Owner	Residual Consequence	Residual Likelihood	Residual Risk Rating	Risk Owner
Outlet pipework	Maintenance on pipework	Risk of injury if work needed on pipework running down hill due to the nature of terrain. Potential for vermin to enter pipe.	Major 70	Possible 4	High 280	Minimise	1. Engineering Control	Consider using a corrosion resistant material such as PE to reduce the likelihood that work required. Design trench as per WWL standards to prevent damage to pipe. Maintain a clear path over pipe for ease of access, identifying the closest (safest) access point to the bubble up camber. Investigate methods for vermin protection which do not impede flow.	Confirm in Principal's requirements and during D&C.	Designer	Moderate 40	Highly Unlikely 2	Moderate 80	Operator
Reservoir	Emergency water collection	Risk in the event that water needs to be taken directly from the reservoir (accessed from the roof) in the event of an emergency.	Major 70	Possible 4	High 280	Eliminate	1. Substitute	Design to provide emergency FH points within valvehouse.		Designer				
Stream Crossing	Height and water	Risk of falling into stream from people climbing across pipe stream crossing.	Major 70	Possible 4	High 280	Minimise	1. Isolate	Consider safety barriers or other methods to prevent climbing on the pipe stream crossing.	While aerial pipe stream crossing is being consented, a submarine crossing has not been fully ruled out and will be left open to the D&C contractor to investigate further.	Designer	Major 70	Unlikely 3	High 210	Asset Manager
Reservoir roof	Water contamination and additional maintenance	Water seals on the roof need replacing every 20 years - failure of these seals can lead to water quality issues. The need for replacement also introduces multiple risks from the works.	Major 70	Possible 4	High 280	Eliminate		Specify that the roof is to be a single pour.						
Site access	Steep slopes on side of access road	Risk of vehicle tipping down slope	Major 70	Possible 4	High 280	Minimise	1. Isolate	Widen and re-grade road, introduce permanent barriers to protect slope edge. Reinstate site gate to prevent public access.	Need to access site, so minimise risk SFARP	Designer	Major 70	Highly Unlikely 2	Moderate 140	Asset Manager
Reservoir site	Vehicle movements	Vehicles need to be able to drive up to reservoir and around reservoir. Risk of incident occurring.	Moderate 40	Possible 4	Moderate 160	Minimise	1. Engineering Control	Design clear vehicle access (3m min) around perimeter of reservoir and a compliant slope up to the site. Operator preference for asphalt to provide a hard and "level" surface around perimeter, with water drained away from reservoir	Vehicles require access but sufficient space reduces risk. Confirm with consenting specialists if asphalt is	Designer	Moderate 40	Highly Unlikely 2	Moderate 80	Operator
Valvehouse	Manual handling	Confined conditions of pipework and valves may present risk of injury	Moderate 40	Possible 4	Moderate 160	Minimise	1. Engineering Control	Use 3D modelling to provide an early 'feel' for the space. Can modify design based on operator input.	Confirm in Principal's requirements and during D&C.	Designer	Minor 10	Highly Unlikely 2	Low 20	Operator
Reservoir Internal	Internal inspection	Rushed inspection due to time pressure, may lead to unsafe work practices.	Moderate 40	Possible 4	Moderate 160	Minimise	1. Engineering Control	Design a full internal staircase with non-slip treads. Consider marking of the columns during construction to aid in inspections.	Consider the use of drones to inspect where possible to eliminate the risk to operators. Include in O&M manual?	Designer	Moderate 40	Highly Unlikely 2	Moderate 80	Operator
Reservoir Internal	Pipework replacement	Risk of injury during the replacement of internal/underfloor pipework.	Moderate 40	Possible 4	Moderate 160	Minimise	1. Engineering Control	Design pipework to minimise the need for replacement. Use stainless steel for all pipework.	Avoid risk as much as possible.	Designer	Moderate 40	Rare 1	Low 40	Operator
Overflow/Scour	Scour	Need to access manhole on scour line to dose during scouring. HSE risk.	Moderate 40	Possible 4	Moderate 160	Minimise	1. Engineering Control	Locate scour manhole in easy to reach location, ensuring clear drive up access.	Discuss potential dosing methods during HAZOP, which may eliminate the need to open a manhole.	Designer	Minor 10	Highly Unlikely 2	Low 20	Operator
Valve chambers	Confined Space	Risk of injury while accessing in-line valve chambers.	Moderate 40	Possible 4	Moderate 160	Minimise	1. Engineering Control	Design of chambers to be a minimum of 1.5m in diameter and have a Sike lid. Chambers to include drainage.	Need to mitigate as best as possible.	Designer	Moderate 40	Highly Unlikely 2	Moderate 80	Operator

SCALE 1:500 AT ORIGINAL SIZE

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Wellington 6144
T 64 4 471 7000

Original Scale (A1) AS SHOWN	Design	L.H.	28/07/23	Approved For Construction*
	Drawn	G.H.	28/07/23	-
Reduced Scale (A3) 1/2 SHOWN	Dsg Verifier	J.L.	28/07/23	
	Dwg Check	L.H.	28/07/23	Date-
* Refer to Revision 1 for Original Signature				

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: SAFETY IN DESIGN ASSESSMENT
SHEET 5

Discipline: CIVIL

Drawing No.: 3-WW021.02_C006

Rev.: 0

DOCUMENT NO: 3-WW021.02_C002-C006.DWG

DOCUMENT PATH: \\CORP\ANZ\PROJECTS\NZ\3W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

DO NOT SCALE - IF IN DOUBT ASK

PLOTTED BY: HAMBLYN, GARTH

DRAWING PLOTTED: 21-Jun-23

A1 REPRODUCTION SCALE: 0mm 20 40 60 80 100

A3 REPRODUCTION SCALE: 0mm 10 20 30 40 50

NOTES:
1. INLET UPSTAND TO BE A TEE AT 60% TWL, BOTH OUTLETS TO BE ORIENTATED AT 60°
2. EXISTING ASSETS ASSOCIATED WITH NAENAE RESERVOIR ARE INDICATIVE ONLY, THIS P&ID SHOULD NOT BE CONSIDERED AN AS-BUILT
3. SMALL BORE LOW POINT DRAINS AND BLEEDS HAVE NOT BEEN SHOWN. THESE WILL NEED TO BE DETERMINED AS PART OF HAZOP
4. SECURITY INSTRUMENTATION HAS NOT BEEN PROVIDED FOR ON THE DRAWINGS
5. SWING CHECK VALVE WITH VERMIN PREVENTION

LEGEND
- EXISTING
- NEW
- GATE VALVE
- BUTTERFLY VALVE
- BALL VALVE
- NON-RETURN VALVE
- PRESSURE REDUCING VALVE
- FLEXIBLE BELLOWS
- FLEX-TEND
- VENT WITH MESH
- AIR VALVE
- H HYDRANT

NAENAE RESERVOIR (EXISTING)
11.3 ML
BWL: 66.05M
TWL: 72.53M

PROPOSED EASTERN HILLS RESERVOIR
15 ML
Ø 55M
BWL: 66.05M
TWL: 72.53M

FROM WATERLOO WTP
TO SUMMIT ROAD
TO WAIWHETU STREAM
TO BALGOWNIE GROVE
TO STORMWATER
TO FARRELLY GRV MAIN
TO FARRELLY GRV MAIN
TO SUMMIT RD MAIN
TO PRIVATE CONNECTION
SCOUR TO STORMWATER
SCOUR TO WAIWHETU STREAM
SCOUR TO WAIWHETU STREAM
ALLOWANCE FOR FUTURE NAENAE RESERVOIR REPLACEMENT
REMOVABLE SPOOL FOR FUTURE NAENAE RESERVOIR REPLACEMENT CONNECTION
ACCESS HATCH
ACCESS HATCH
INLET
OVERFLOW
SCOUR
OUTLET
SUMP
VALVE HOUSE
VALVEHOUSE SUMP
STREAM CROSSING
NOTE 1
NOTE 5
TIP 01
TIP 02
TIP 03
TIP 04
TIP 05
TIP 06
TIP 07
TIP 08

A1 REPRODUCTION SCALE: 0mm 100 80 60 40 20
A3 REPRODUCTION SCALE: 0mm 50 40 30 20 10

No.	Revision	By	Chk	Appd	Date
0	ISSUED FOR INFORMATION	K.R	G.B	J.L	28/07/23

Drawing Originator: Connect Water, c/- WSP, PO Box 12-003, Thorndon, Wellington 6144, T 64 4 471 7000

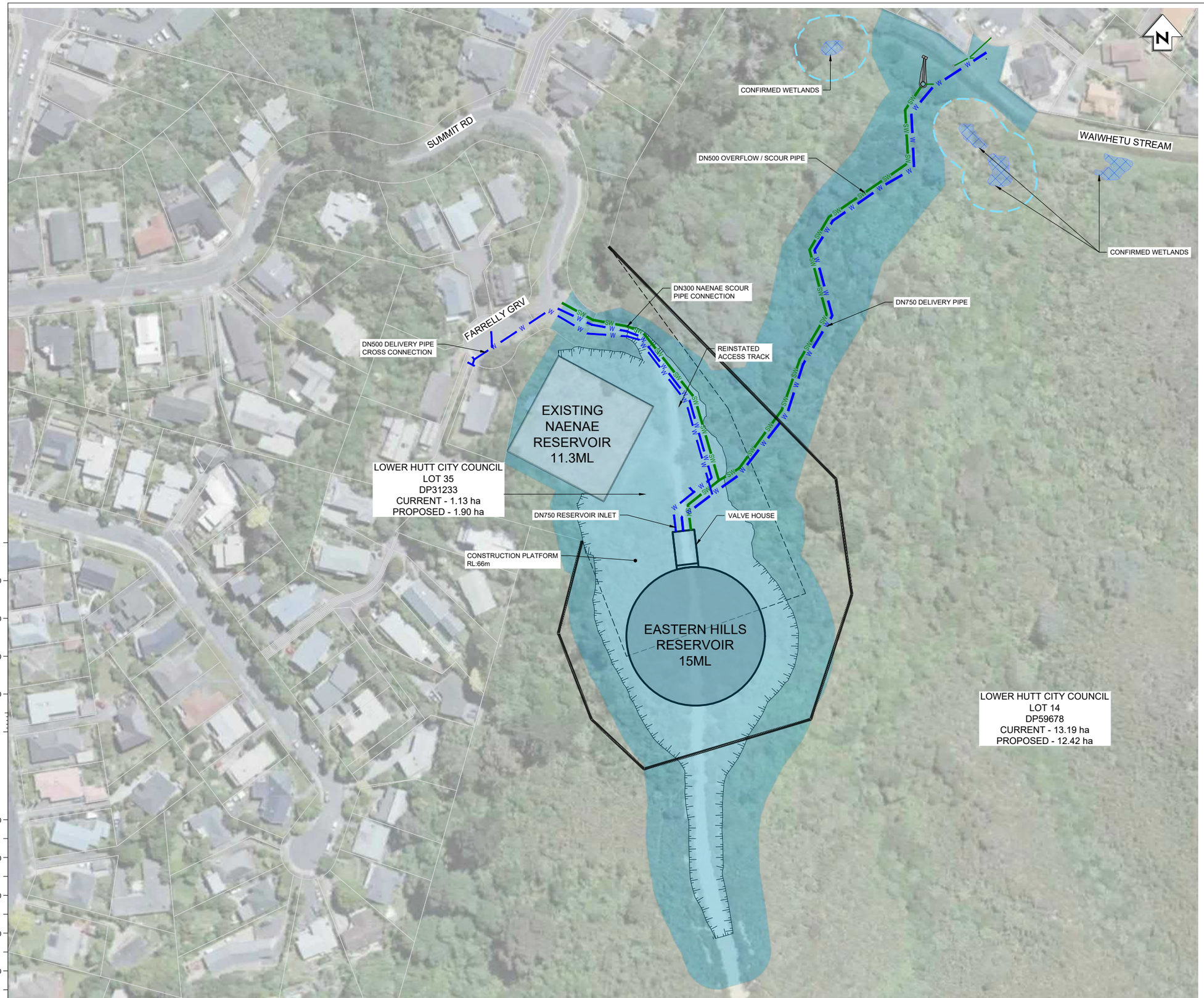
Original Scale (A1)
Reduced Scale (A3)

Design	L.H	28/07/23	Approved For Construction*
Drawn	K.R	28/07/23	
Dsg Verifier	G.B	28/07/23	
Dwg Check	G.B	28/07/23	Date

* Refer to Revision 1 for Original Signature

Client: Wellington Water
Project: WELLINGTON WATER EASTERN HILLS RESERVOIR
Title: EASTERN HILLS RESERVOIR - P&ID
Discipline: MECHANICAL
Drawing No.: 3-WW021.02_C007
Rev.: 0

DO NOT SCALE - IF IN DOUBT ASK



NOTES:

1. DO NOT SCALE OFF DRAWINGS.

LEGEND

- PROPERTY BOUNDARY
- PROPERTY BOUNDARY, TO BE ADJUSTED
- PROPOSED NEW PROPERTY BOUNDARY
- 10m WETLAND BUFFER
- DELIVERY / INLET PIPE (W)
- OVERFLOW / SCOUR DISCHARGE PIPE (SW)
- DESIGNATION BOUNDARY
- WETLAND (CONFIRMED)

A1 REPRODUCTION SCALE
100 80 60 40 20 0mm

A3 REPRODUCTION SCALE
50 40 30 20 10 0mm

0 5 10 15 20 25 30 35
SCALE 1:750 AT ORIGINAL SIZE

FOR INFORMATION
NOT FOR CONSTRUCTION

DOCUMENT PATH: \\CORP\ANZ\PROJECTS\NZ\3W\3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

DOCUMENT NO: 3-WW021.02_C008.DWG

No.	Revision	By	Chk	Appd	Date
1	UPDATED POST INDEPENDENT REVIEW	G.H.	L.H.	J.L.	29/09/23
0	ISSUED FOR INFORMATION	G.H.	L.H.	J.L.	18/08/23

Drawing Originator: Connect Water
c/- WSP
PO Box 12-003 Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) 1:750
Reduced Scale (A3) 1:1500

Design	L.H.	29/09/23	Approved For Construction*
Drawn	G.H.	29/09/23	-
Dsg Verifier	J.L	29/09/23	
Dwg Check	J.L.	29/09/23	Date-

* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: RESERVOIR AND PIPELINES
CONSENT DESIGNATION

Discipline: CIVIL

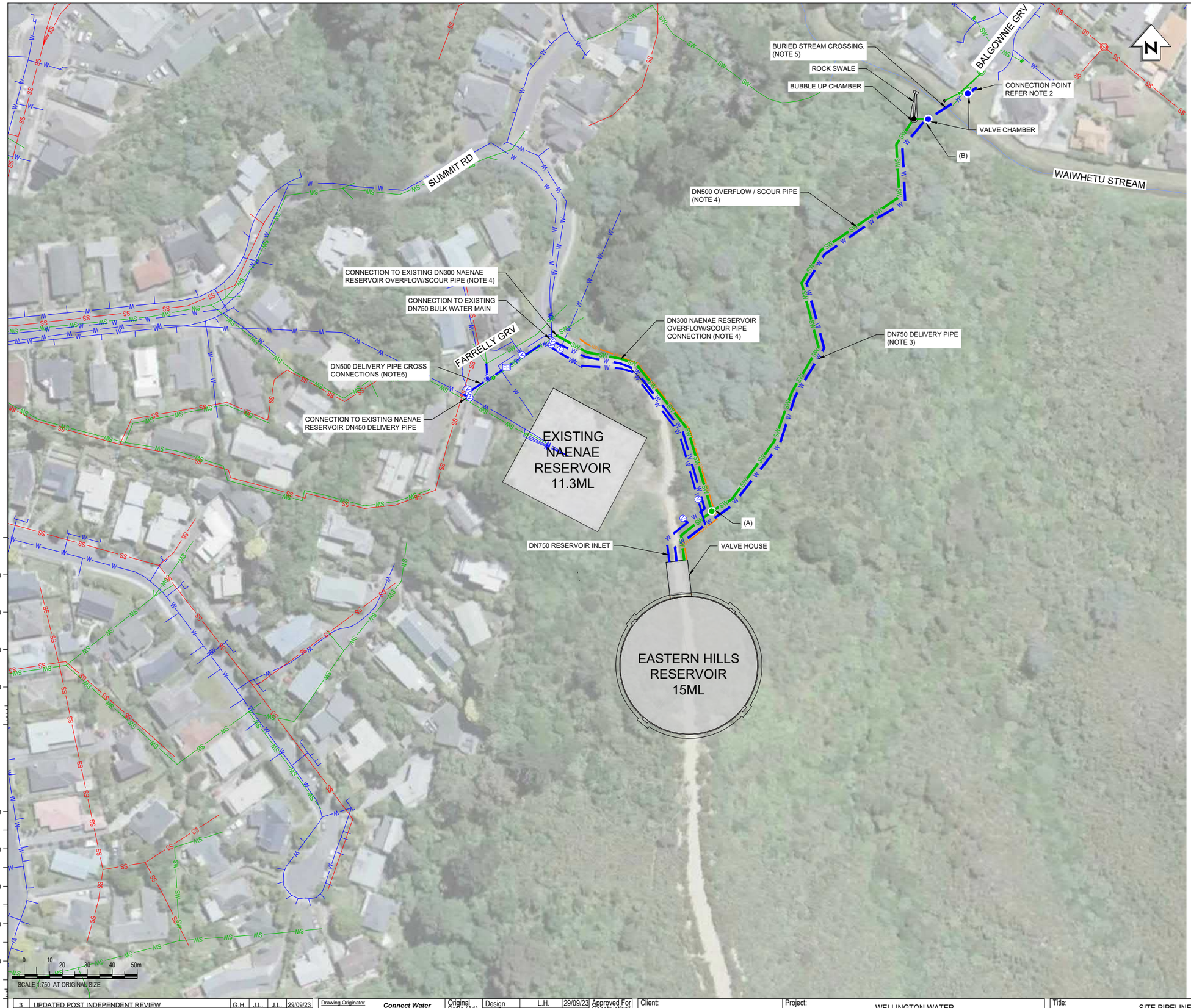
Drawing No.: 3-WW021.02_C008

Rev.: 1

DO NOT SCALE - IF IN DOUBT ASK

PLOTTED BY: PIETERSEN, RIAAN

DRAWING PLOTTED: 29-MAY-23



NOTES:

1. DO NOT SCALE OFF DRAWINGS.
2. CONNECTION POINT FOR URBAN DELIVERY ALIGNMENT
3. DELIVERY PIPE LONG SECTION SHOWN ON 3-WW021.02_W012
4. EXISTING DN300 EW FARRELLY GR, DN300 NAENAE SCOUR PIPE CONNECTION AND DN55 OVERFLOW/ SCOUR LONG SECTIONS SHOWN ON 3-WW021.02_W013
5. DELIVERY PIPE BURIED STREAM CROSSING SHOWN ON 3-WW021.02_W004 AND 3-WW021.02_W005
6. SITE PIPELINES FOR FARRELLY GRV AND SUMMIT ROAD SHOWN ON 3-WW021.02_W007
7. WATER STOPS WITH SUBSOIL DRAINS TO BE INSTALLED IN THE SHARED TRENCH FROM POINT (A) TO (B). REFER TO 3-WW021.02_W012 AND W013 FOR FURTHER DETAIL.

WW SERVICES LEGEND

NEW WATER MAIN	W
EXISTING WATER MAIN	W
NEW STORMWATER	SW
EXISTING STORMWATER	SW
NEW SEWER	SS
EXISTING SEWER	SS
NEW POWER LINE	400V
VALVE NEW OR EX / REDUNDANT	V V
HYDRANT NEW OR EX /REDUNDANT	FH FH
NEW SW MANHOLE	
EXISTING SW MANHOLE	

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
3	UPDATED POST INDEPENDENT REVIEW	G.H.	J.L.	J.L.	29/09/23
2	ISSUED FOR INFORMATION	G.H.	J.L.	J.L.	18/08/23
1	ISSUED WITH CONCEPT DESIGN - FINAL	G.H.	G.B.	J.L.	03/03/23
0	ISSUED FOR INFORMATION	C.Y.	G.B.	J.L.	07/12/22

Drawing Originator: Connect Water
Connect Water
a WSP
PO Box 12-003 Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) 1:750	Design	L.H.	29/09/23
	Drawn	G.H.	08/09/23
Reduced Scale (A3) 1:1500	Dsg Verifier	J.L.	29/09/23
	Dwg Check	L.H	29/09/23

Approved For Construction* -
Date-
* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: SITE PIPELINES
GENERAL LAYOUT

Discipline: CIVIL

Drawing No.: 3-WW021.02_W001

Rev.: 3

DOCUMENT NO: 3-WW021.02_W001.DWG

DOCUMENT PATH: \\CORP\ANZ\PROJECTS\NZ03\W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

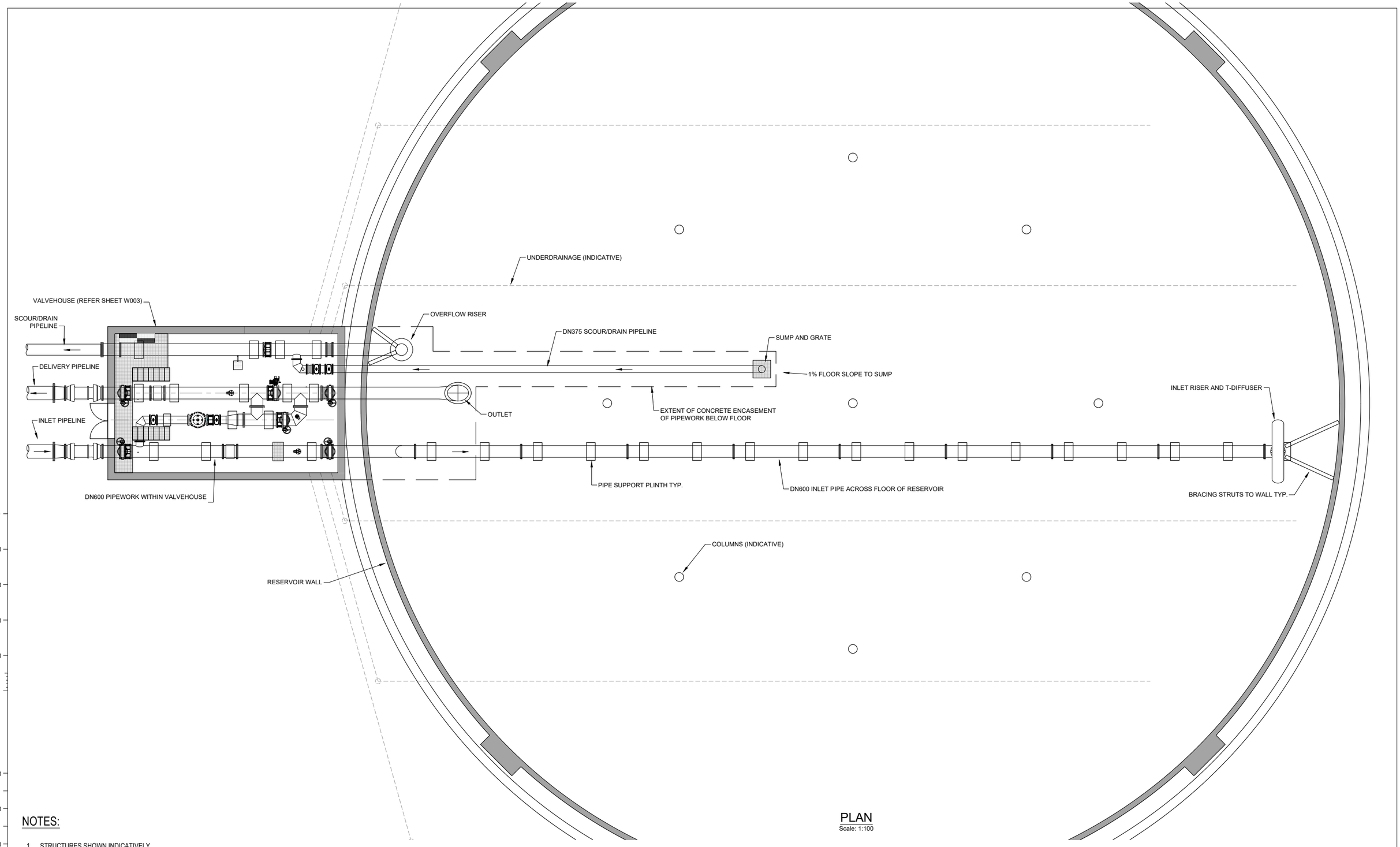
A1 REPRODUCTION SCALE
0mm 10 20 40 60 80 100

A3 REPRODUCTION SCALE
0mm 10 20 30 40 50

DO NOT SCALE - IF IN DOUBT ASK

PLOTTED BY: PIETERSEN, RIAAN

DRAWING PLOTTED: 18-Jul-23



PLAN
Scale: 1:100

NOTES:

1. STRUCTURES SHOWN INDICATIVELY

A1 REPRODUCTION SCALE
100 80 60 40 20 0mm

A3 REPRODUCTION SCALE
50 40 30 20 10 0mm

0 5 10 15 20 25
SCALE 1:500 AT ORIGINAL SIZE

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
2	ISSUED FOR INFORMATION	G.H.	L.H.	J.L.	28/07/23
1	ISSUED WITH CONCEPT DESIGN - FINAL	G.B	L.H.	J.L.	03/03/23
0	ISSUED FOR INFORMATION	G.B.	L.H.	J.L.	07/12/22

Drawing Originator: Connect Water
c/- WSP
PO Box 12-003 Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) AS SHOWN	Design	G.B.	28/07/23
	Drawn	G.B.	28/07/23
Reduced Scale (A3) 1/2 SHOWN	Dsg Verifier	L.H.	28/07/23
	Dwg Check	L.H.	28/07/23

Approved For Construction* -
Date-
* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: RESERVOIR PIPEWORK
GENERAL LAYOUT

Discipline: CIVIL

Drawing No.: 3-WW021.02_W002

Rev.: 2

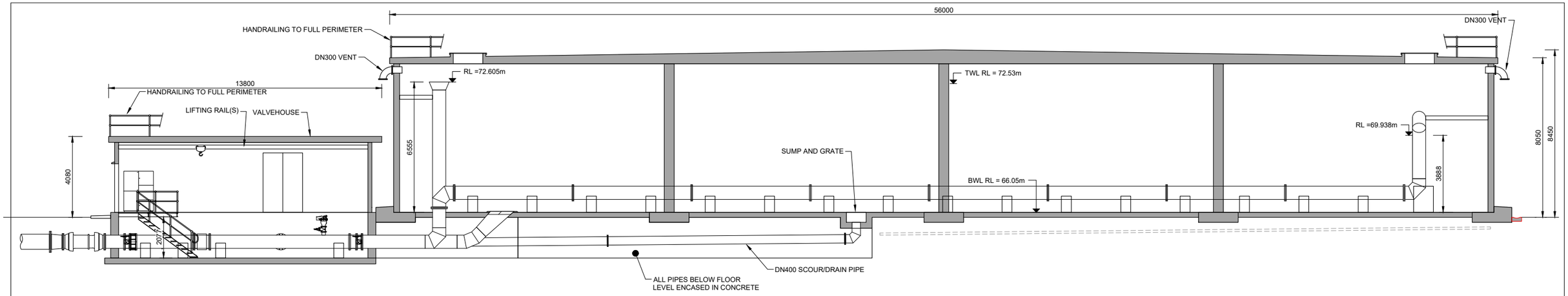
DOCUMENT PATH: \\CORP.PBWAN.NET\ANZ\PROJECTS\NZ3\W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

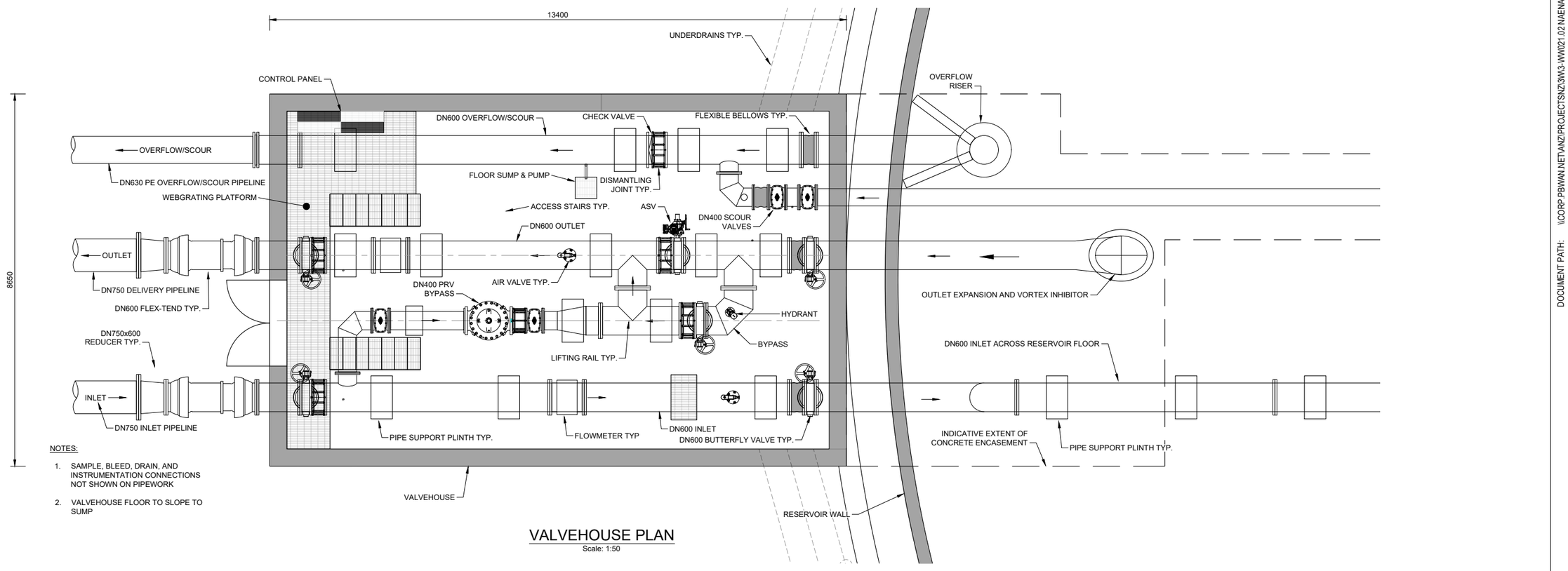
DOCUMENT NO: 3-WW021.02_W002.DWG

DO NOT SCALE - IF IN DOUBT ASK

PLOTTED BY: BIRDLING, GREG

DRAWING PLOTTED: 27-Jul-23





NOTES:

1. SAMPLE, BLEED, DRAIN, AND INSTRUMENTATION CONNECTIONS NOT SHOWN ON PIPEWORK
2. VALVEHOUSE FLOOR TO SLOPE TO SUMP

VALVEHOUSE PLAN

Scale: 1:50

A1 REPRODUCTION SCALE: 100 80 60 40 20 0mm

A3 REPRODUCTION SCALE: 50 40 30 20 10 0mm

0 5 10 15 20 25

SCALE 1:500 AT ORIGINAL SIZE

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
2	ISSUED FOR INFORMATION	G.B.	L.H.	J.L.	28/07/23
1	ISSUED WITH CONCEPT DESIGN - FINAL	G.B.	L.H.	J.L.	03/03/23
0	ISSUED FOR INFORMATION	G.B.	L.H.	J.L.	07/12/22

Drawing Originator: Connect Water
c/- WSP
PO Box 12-003 Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) AS SHOWN	Design	G.B.	28/07/23
	Drawn	G.B.	28/07/23
Reduced Scale (A3) 1/2 SHOWN	Dsg Verifier	L.H.	28/07/23
	Dwg Check	L.H.	28/07/23

Approved For Construction* -
Date-
* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: RESERVOIR PIPEWORK
VALVEHOUSE LAYOUT

Discipline: CIVIL

Drawing No.: 3-WW021.02_W003

Rev.: 2

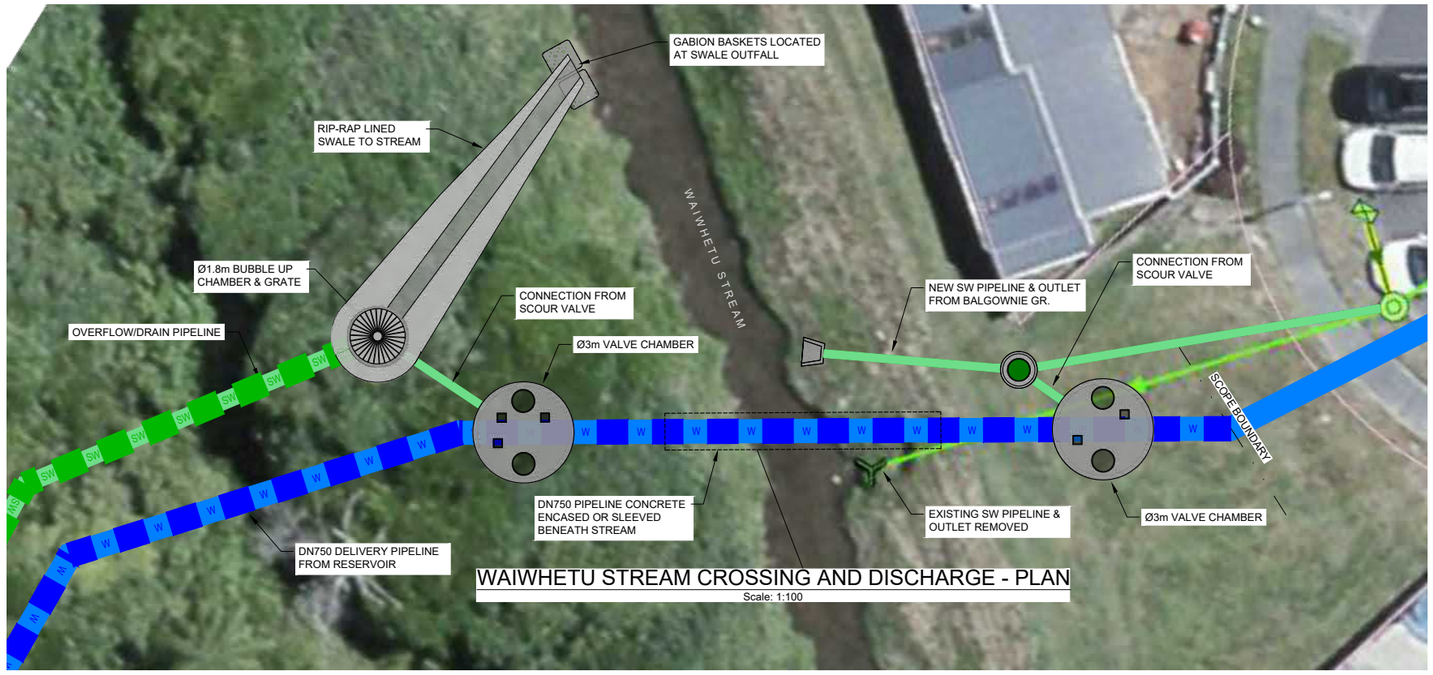
DOCUMENT PATH: \\CORP.PBWAN.NET\ANZ\PROJECTS\NZ\3W\3-WW\021.02 NAENAE NO.2 RESERV\OIR\HOME\700 DRAWINGS

DOCUMENT NO: 3-WW021.02_W003.DWG

PLOTTED BY: BIRDLING, GREG

DO NOT SCALE - IF IN DOUBT ASK

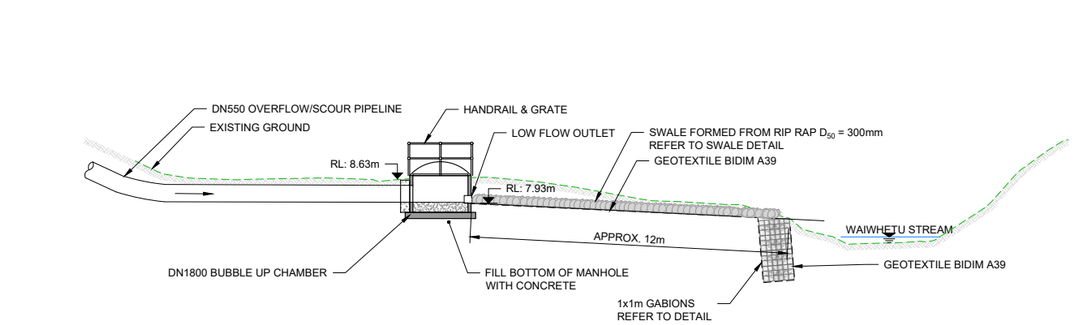
DRAWING PLOTTED: 21-Jun-23



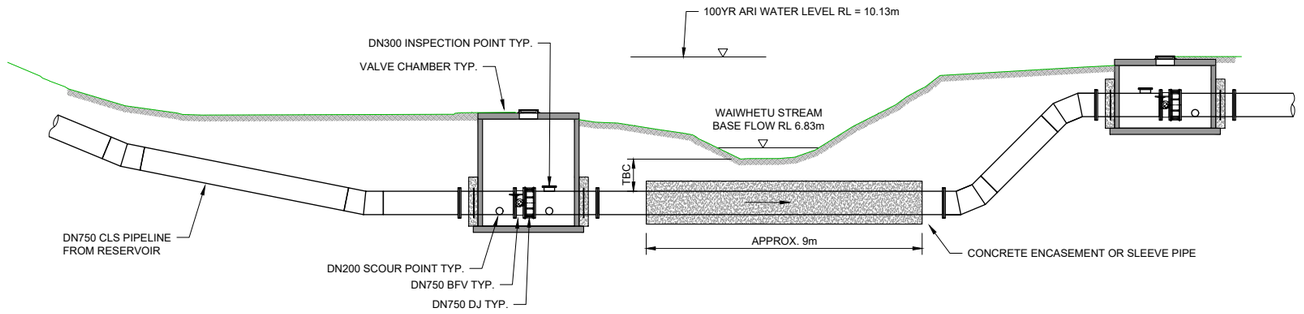
WAIWHETU STREAM CROSSING AND DISCHARGE - PLAN
Scale: 1:100

NOTES
1. DETAILED DESIGN TO CONSIDER THE SHAPE OF THE GROUND AROUND THE BUBBLE UP CHAMBER TO ENSURE DISPATCHED WATER IS CAPTURED AND REDIRECTED INTO THE SWALE.

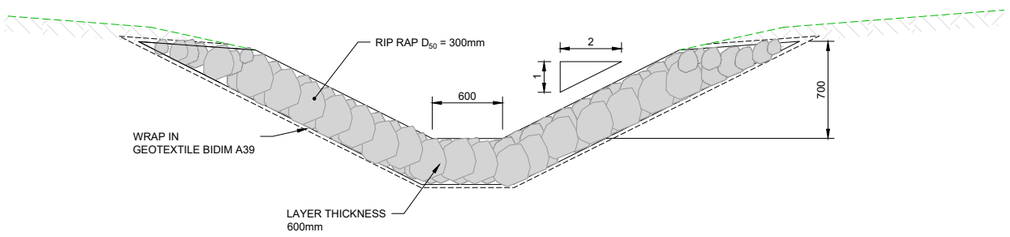
2. LOW FLOW OUTLET FROM BUBBLE UP CHAMBER TO BE SIZED IN DETAILED DESIGN.



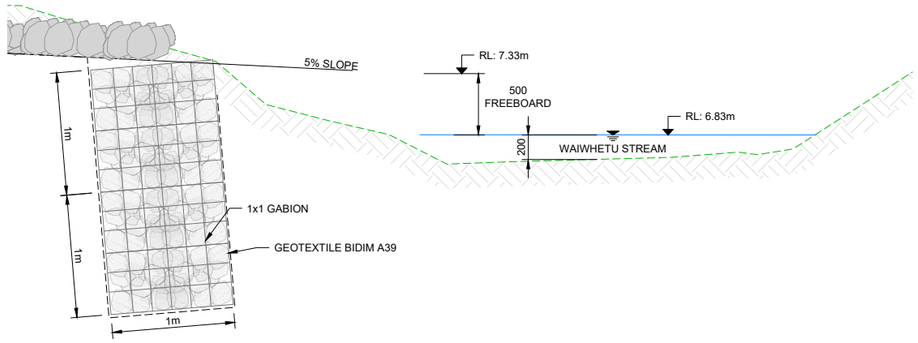
OVERFLOW/SCOUR DISCHARGE ELEVATION
Scale: 1:100



WAIWHETU STREAM CROSSING - BURIED OPTION
Scale: 1:100



SWALE DETAIL
Scale: 1:20



GABION DETAIL
Scale: 1:25

SCALE 1:20 AT ORIGINAL SIZE
SCALE 1:25 AT ORIGINAL SIZE
SCALE 1:100 AT ORIGINAL SIZE

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
2	ISSUED FOR INFORMATION	G.H.	L.H.	J.L.	28/07/23
1	ISSUED WITH CONCEPT DESIGN - FINAL	G.B	L.H.	J.L.	03/03/23
0	ISSUED FOR INFORMATION	G.B.	L.H.	J.L.	07/12/22

Drawing Originator: Connect Water — c/- WSP, PO Box 12-003 Thorndon, Wellington 6144, T 64 4 471 7000

Original Scale (A1) AS SHOWN	Design	T.G.	28/07/23
	Drawn	G.B.	28/07/23
	Dsg Verifier	G.B.	28/07/23
Reduced Scale (A3) 1/2 SHOWN	Dwg Check	L.H.	28/07/23

Approved For Construction* - Date-
* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: RESERVOIR PIPEWORK
WAIWHETU STREAM CROSSING
AND DISCHARGE

Discipline: CIVIL
Drawing No.: 3-WW021.02_W004
Rev.: 2

PLOTTED BY: PIETERSEN, RIAAN

DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 21-Jun-23

DOCUMENT PATH: \\CORP\ANZ\PROJECTS\NZ\3W\3-WW021.02 NAENAE NO.2 RESERV\OIR\HOME\700 DRAWINGS

DOCUMENT NO: 3-WW021.02_W004.DWG

A1 REPRODUCTION SCALE: 100 80 60 40 20 0mm

A3 REPRODUCTION SCALE: 50 40 30 20 10 0mm

On this drawing I would leave the boundary line type the same as the other boundaries i.e. white

VALVEHOUS

DN300 NAENAE RESERVOIR OVERFLOW/SCOUR PIPE CONNECTION REFER TO LONG SECTION ON 3-WW021.02_W013

SUMMIT RD

DN750 RESERVOIR INLET PIPE

CONNECTION TO EXISTING DN300 NAENAE RESERVOIR OVERFLOW/SCOUR PIPE

CONNECTION TO EXISTING DN750 BULK WATER MAIN REFER TO DETAIL A, DWG 3-WW021.02_W008

VALVE CHAMBER

CONNECTION TO DN150 SUMMIT RD MAIN

CONNECTION FOR FUTURE NAENAE RESERVOIR REPLACEMENT

VALVE HOUSE

EXISTING NAENAE RESERVOIR 11.3ML

CONNECTION TO DN40 FARRELLY GRV MAIN

REINSTATE OR REPLACE FIRE HYDRANT

FARRELLY GRV

REPLACE EXISTING DN150 MAIN ALONG FARRELLY GROVE

SCOUR TO SW

DN100 SCOUR VALVE

DN500 DELIVERY PIPE

CONNECTION TO DN40 FARRELLY GRV MAIN

CONNECTION TO EXISTING NAENAE RESERVOIR DN450 DELIVERY PIPE DETAIL B, DWG 3-WW021.02_W008

REMOVE EXISTING SW MANHOLE, REPLACE WITH DN300 PIPE

CONSTRUCTION PLATFORM RL:66m

Make the colour the same as the pipe line type on the drawing (legend is lighter orange)

WW SERVICES LEGEND

NEW WATER MAIN	W
EXISTING WATER MAIN	W
NEW STORMWATER	SW
EXISTING STORMWATER	SW
NEW SEWER	
EXISTING SEWER	SS
PARCEL BOUNDARY	
VALVE NEW OR EX / REDUNDANT	V V
HYDRANT NEW OR EX /REDUNDANT	FH FH
NEW SW MANHOLE	
EXISTING SW MANHOLE	
NEW 400V CABLE	400V
EXISTING 400V CABLE	400V

A1 REPRODUCTION SCALE
100 80 60 40 20 0mm

A3 REPRODUCTION SCALE
50 40 30 20 10 0mm

0 2.5 5 7.5 10 12.5
SCALE 1:250 AT ORIGINAL SIZE

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
1	UPDATED POST INDEPENDENT REVIEW	G.H.	G.B.	J.L.	29/09/23
0	ISSUED FOR INFORMATION	G.H.	G.B.	J.L.	18/08/23

Drawing Originator: Connect Water — c/- WSP, PO Box 12-003 Thorndon, Wellington 6144, T 64 4 471 7000

Original Scale (A1) 1:750
Reduced Scale (A3) 1:1500

Design	L.H.	29/09/23	Approved For Construction*
Drawn	G.H.	29/09/23	-
Dsg Verifier	G.B.	29/09/23	
Dwg Check	J.L.	29/09/23	Date-

* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER EASTERN HILLS RESERVOIR

Title: SITE PIPELINES SUMMIT ROAD

Discipline: CIVIL

Drawing No.: 3-WW021.02_W007

Rev.: 1

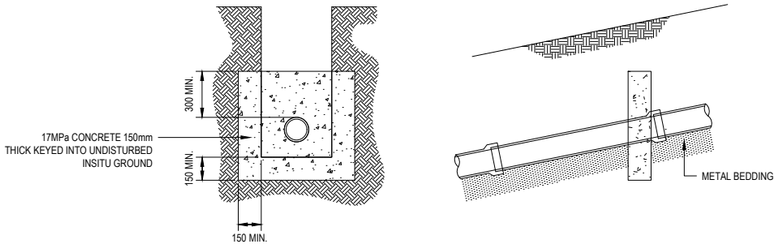
DOCUMENT PATH: \\CORP\ANZ\PROJECTS\NZ3\W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

DOCUMENT NO.: 3-WW021.02_W007.DWG

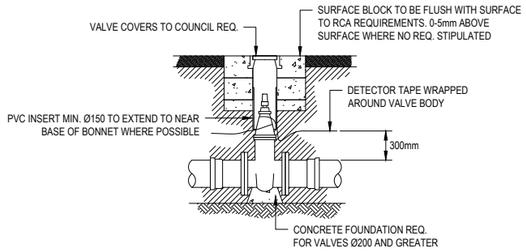
PLOTTED BY: PIETERSEN, RIAAN

DO NOT SCALE - IF IN DOUBT ASK

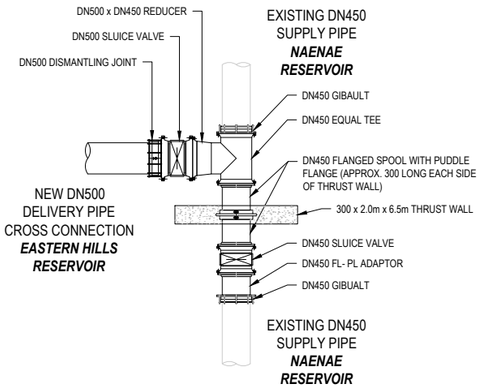
DRAWING PLOTTED: 27-Jul-23



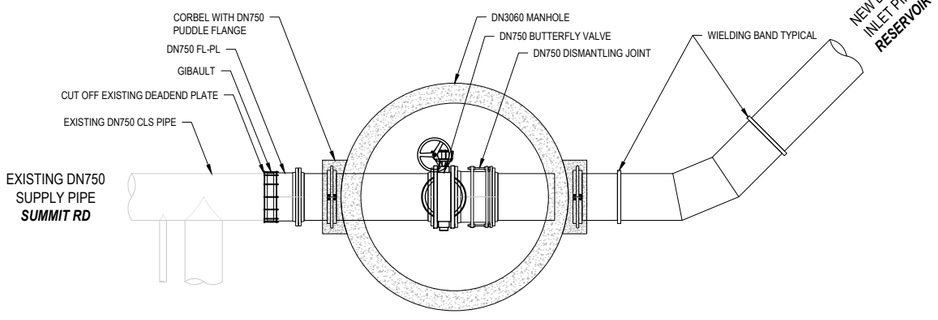
TYPICAL WATERSTOP DETAIL



GATE VALVES
Ø80 AND ABOVE



DETAIL B: CONNECTION TO NAENAE RESERVOIR
N.T.S.



DETAIL A: CONNECTION TO EXISTING INLET MAIN
N.T.S.

A1 REPRODUCTION SCALE
100
80
60
40
20
0mm
50
40
30
20
10
0mm
A3 REPRODUCTION SCALE

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
1	ISSUED FOR INFORMATION	G.H.	G.B.	G.B.	28-07-23

Drawing Originator: Connect Water
c/- WSP
PO Box 12-003 Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) N.T.S.
Reduced Scale (A3) N.T.S.

Design	T.G.	28/07/23	Approved For Construction*
Drawn	G.H.	28/07/23	-
Dsg Verifier	GB.	28/07/23	Date-
Dwg Check	L.H	28/07/23	

* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: RESERVOIR AND SITE PIPELINES
PIPELINE - TYPICAL DETAILS

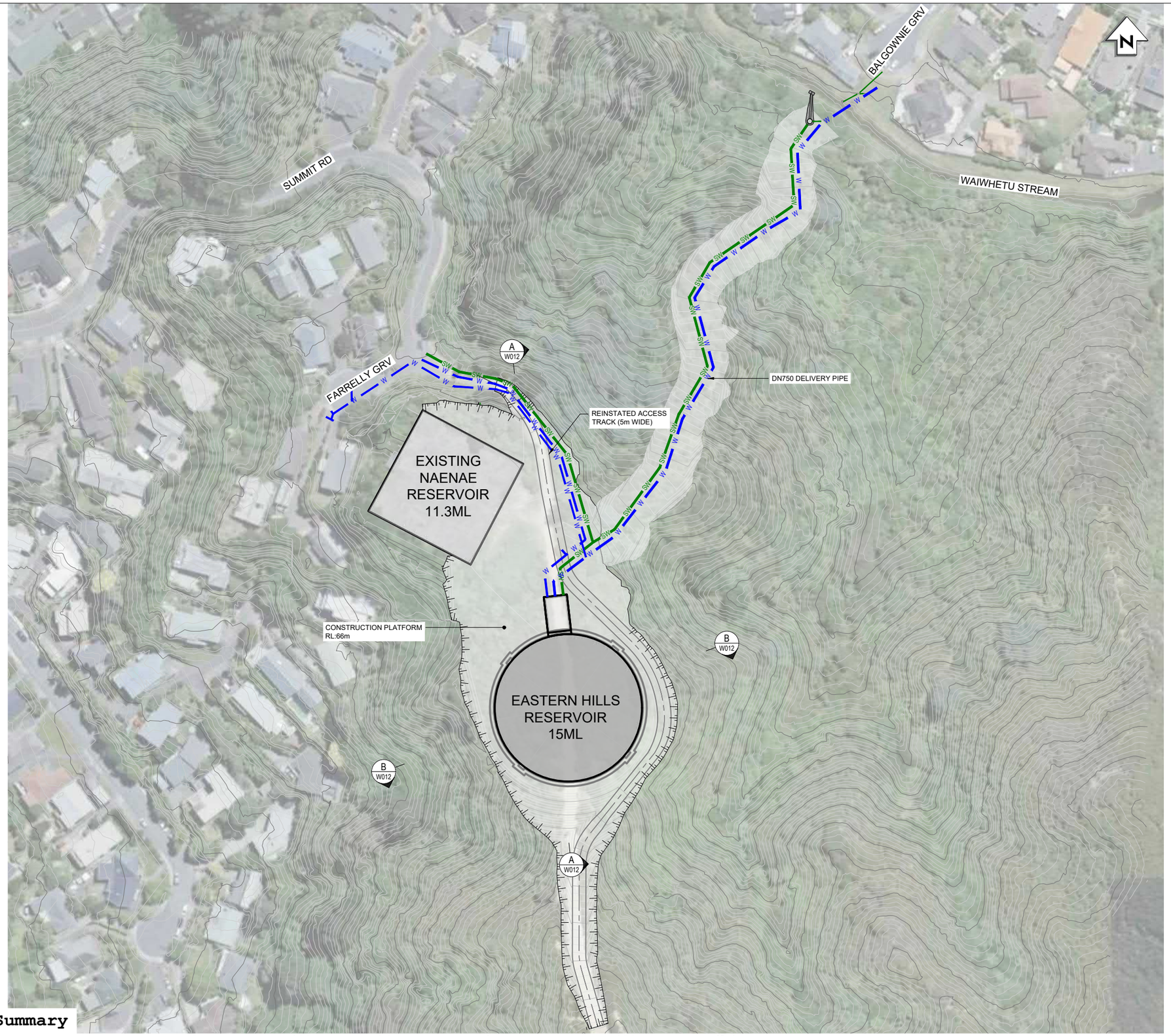
Discipline: CIVIL
Drawing No.: 3-WW021.02_W008
Rev.: 1

DOCUMENT PATH: \\CORP\ANZ\PROJECTS\NZ\3W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS
DOCUMENT NO: 3-WW021.02_W008.DWG

DO NOT SCALE - IF IN DOUBT ASK

PLOTTED BY: HAMBLYN, GARTH

DRAWING PLOTTED: 22-Jun-23



NOTES:

1. DO NOT SCALE OFF DRAWINGS.
2. NEW SLOPE BATTERS 1H:1V
3. FOR EARTHWORKS SECTION REFER TO 3-WW021.02_W0W12

LEGEND

WATER SUPPLY (PROPOSED

DELIVERY / INLET PIPE — W

OVERFLOW / SCOUR DISCHARGE PIPE — SW

0 5 10 15 20 25 30 35
SCALE 1:750 AT ORIGINAL SIZE

A1 REPRODUCTION SCALE
0mm 20 40 60 80 100

A3 REPRODUCTION SCALE
0mm 10 20 30 40 50

Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
Totals			14417.91sq.m	90473.91 Cu. M.	398.00 Cu. M.	90075.90 Cu. M.<Cut>

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
1	UPDATED POST INDEPENDENT REVIEW	G.H.	J.L.	J.L.	29/09/23
0	ISSUED FOR INFORMATION	G.H.	J.L.	J.L.	18/08/23

Drawing Originator: Connect Water
Connect Water
c/- WSP
PO Box 12-003 Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) 1:750
Reduced Scale (A3) 1:1500

Design	L.H.	29/09/23	Approved For Construction* - Date-
Drawn	G.H.	29/09/23	
Dsg Verifier	G.B.	29/09/23	
Dwg Check	J.L.	29/09/23	

* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: RESERVOIR AND SITE PIPELINES
EARTHWORKS

Discipline: CIVIL

Drawing No.: 3-WW021.02_W010

Rev.: 1

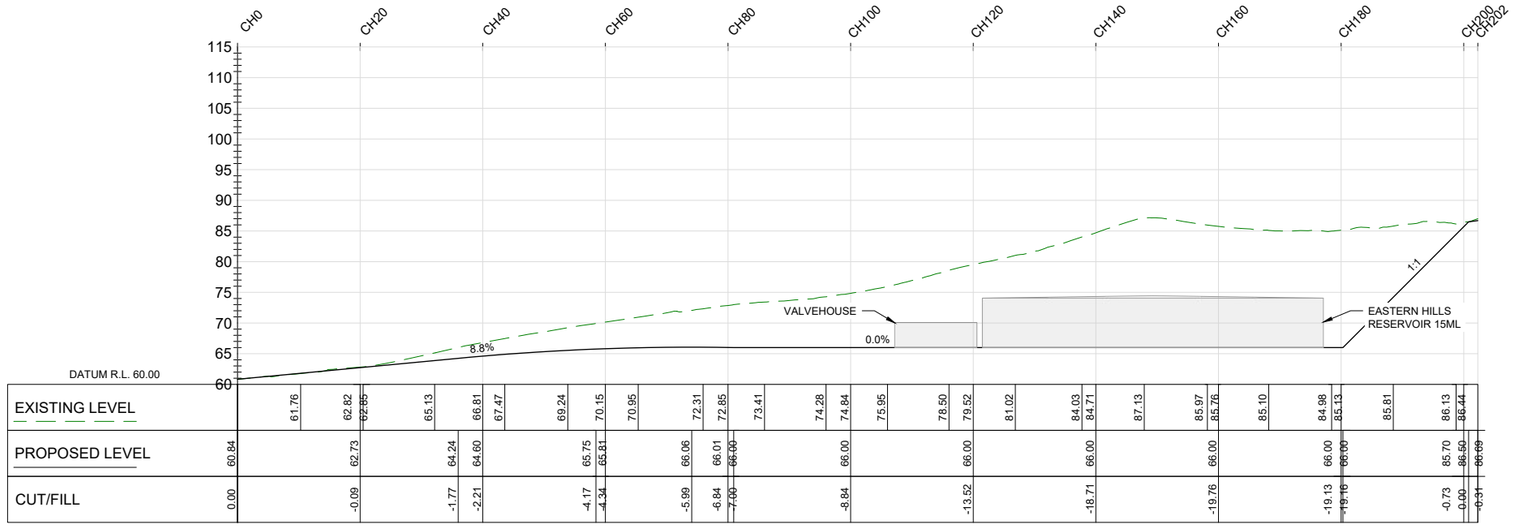
DOCUMENT PATH: \\CORP\ANZ\PROJECTS\NZ\3\W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

DOCUMENT NO: 3-WW021.02_W010.DWG

PLOTTED BY: PIETERSEN, RIAAN

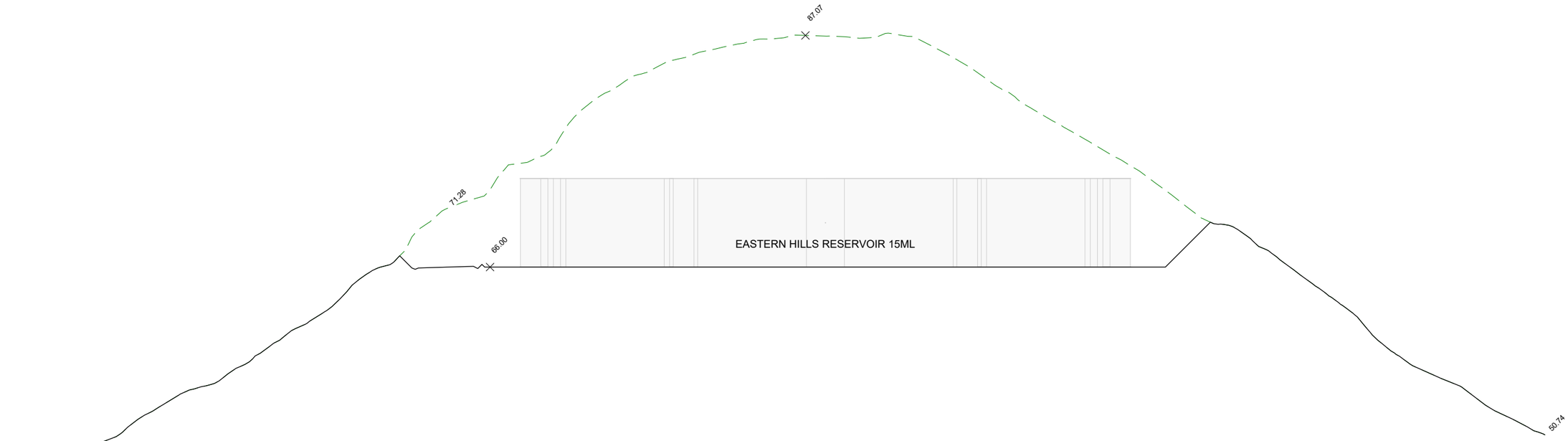
DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 27-Jul-23



0 5 10 15 20 25
SCALE 1:500 AT ORIGINAL SIZE

EARTHWORKS SECTION A-A
1:500 A1
1:1000 A3



0 2 4 6 8 10
SCALE 1:200 AT ORIGINAL SIZE

EARTHWORKS SECTION B-B
1:200 A1
1:400 A3

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
0	ISSUED FOR INFORMATION	G.H.	J.L.	J.L.	28/07/23

Drawing Originator: Connect Water — c/- WSP, PO Box 12-003 Thorndon, Wellington 6144, T 64 4 471 7000

Original Scale (A1) AS SHOWN	Design	L.H.	28/07/23	Approved For Construction* -
	Drawn	G.H	28/07/23	
	Dsg Verifier	G.B.	28/07/23	
Reduced Scale (A3) AS SHOWN	Dwg Check	J.L.	28/07/23	Date-
* Refer to Revision 1 for Original Signature				

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: GENERAL OVERVIEW
RESERVOIR LONGITUDINAL SECTIONS

Discipline: CIVIL

Drawing No.: 3-WW021.02_W011

Rev.: 0

A1 REPRODUCTION SCALE

A3 REPRODUCTION SCALE

DOCUMENT PATH: \\CORPANZPROJECTSNZ\3WS-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

DOCUMENT NO.: 3-WW021.02_W011.DWG

PLOTTED BY: HAMBLYN, GARTH

DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 29-MAY-23

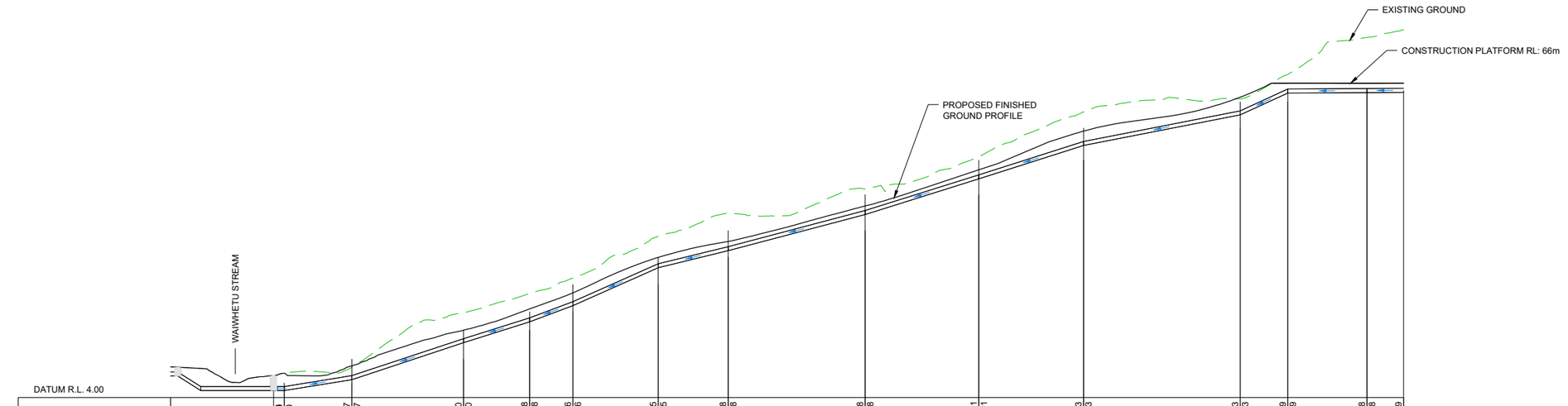
THIS DRAWING HAS BEEN PREPARED BY CONNECT WATER, ON BEHALF OF WSP, AND ON THE SPECIFIC INSTRUCTIONS OF WELLINGTON WATER. IT IS SOLELY FOR THE USE OF WELLINGTON WATER FOR THE PURPOSE FOR WHICH IT IS INTENDED IN ACCORDANCE WITH THE AGREED SCOPE OF WORK. ANY USE OR RELIANCE BY ANY PERSON CONTRARY TO THE ABOVE, TO WHICH CONNECT WATER HAS NOT GIVEN ITS PRIOR WRITTEN CONSENT, IS AT THAT PERSON'S OWN RISK. WHERE APPLICABLE, IN PRODUCING THIS DELIVERABLE CH2M BECA DOES SO SOLELY AS SUBCONSULTANT TO WSP AND DOES NOT ASSUME OR ACCEPT ANY LIABILITY TO WELLINGTON WATER.

NOTES:

1. DO NOT SCALE OFF DRAWINGS.
2. REFER TO GENERAL AND STANDARD NOTES AND LEGENDS ON DRAWING: 3-WW021.02_C001
3. COORDINATES ARE IN TERMS OF WELLINGTON CIRCUIT 2000 (NZGD2K.WELLINGTON).
4. LEVELS ARE IN TERMS OF METRES ABOVE NZVD2016 DATUM.
5. WATER STOPS WITH SUBSOIL DRAINS TO BE INSTALLED IN THE SHARED TRENCH FORM THE DISTANCE 23.39 - 220.11. SPACING TO BE IN ACCORDANCE WITH TABLE 4-8 OF THE REGIONAL STANDARD. WATER STOP TO BE AS PER DR03.

A1 REPRODUCTION SCALE

100
80
60
40
20
0mm



GROUND LEVEL (m)	8.80 8.80	10.27 10.27	17.30 17.30	21.48 21.48	24.66 24.66	31.65 31.65	34.78 34.78	41.78 41.78	48.91 48.91	56.53 56.53	63.23 63.23	65.99 65.99	65.98 65.98	65.99
DEPTH TO INVERT (m)	3.40 3.40	2.72 2.72	2.46 2.46	2.54 2.54	2.52 2.52	2.04 2.04	1.80 1.80	1.68 1.68	1.78 1.78	2.82 2.82	3.48 3.48	1.94 1.94	1.84 1.84	1.81
PIPE INVERT LEVEL (m)	5.40 5.40	7.54 7.54	14.84 14.84	18.94 18.94	22.14 22.14	29.61 29.61	32.97 32.97	40.10 40.10	47.13 47.13	53.72 53.72	59.74 59.74	64.05 64.05	64.14 64.14	64.18
DISTANCE (m)	22.39 22.39	35.72 35.72	57.72 57.72	70.74 70.74	79.27 79.27	96.08 96.08	109.85 109.85	136.84 136.84	159.24 159.24	179.87 179.87	210.72 210.72	220.11 220.11	235.70 235.70	242.93

GRADIENT	0.00% (Horizontal)	16.12% (1:6)	33.15% (1:3)	31.48% (1:3)	37.52% (1:3)	44.45% (1:2)	24.42% (1:4)	26.39% (1:4)	31.38% (1:3)	31.94% (1:3)	19.53% (1:5)	45.90% (1:2)	0.55% (1:182)	0.55% (1:182)
PIPE SIZE	DN750	DN750	DN750	DN750	DN750	DN750	DN750	DN750	DN750	DN750	DN750	DN750	DN750	DN750

A1 REPRODUCTION SCALE

50
40
30
20
10
0mm

LONGITUDINAL PROFILE 0.0 m TO 242.9 m

HORIZONTAL SCALE 1:500 @ A1
VERTICAL SCALE 1:500 @ A1

DN750 DELVERY PIPELINE LONGITUDINAL SECTION

A3 REPRODUCTION SCALE

0 5 10 15 20 25
SCALE 1:500 AT ORIGINAL SIZE

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
1	UPDATED POST INDEPENDENT REVIEW	G.H.	G.B.	J.L.	29/09/23
0	ISSUED FOR INFORMATION	G.H.	G.B.	J.L.	18/08/23

Drawing Originator
Connect Water
Connect Water
c/– WSP
PO Box 12–003
Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) 1:750
Reduced Scale (A3) 1:1500

Design	L.H.	29/09/23	Approved For Construction*
Drawn	G.H.	29/09/23	-
Dsg Verifier	J.L.	29/09/23	
Dwg Check	L.H	29/09/23	Date-

* Refer to Revision 1 for Original Signature

Client:
Wellington Water

Project:
WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title:
LONG SECTION
DELIVERY PIPELINE

Discipline
CIVIL

Drawing No.
3-WW021.02_W012

Rev.
1

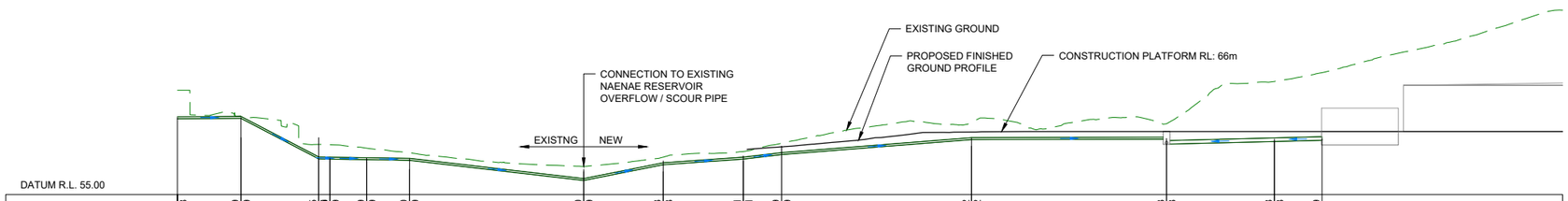
PLOTTED BY: PIETERSEN, RIAAN

DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 30-Jun-23

DOCUMENT PATH: \\CORP\ANZ\PROJECTSNZ\3\W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

DOCUMENT NO: 3-WW021.02_W012.DWG



NOTES:

1. DO NOT SCALE OFF DRAWINGS.
2. REFER TO GENERAL AND STANDARD NOTES AND LEGENDS ON DRAWING: 3-WW021.02_C001
3. COORDINATES ARE IN TERMS OF WELLINGTON CIRCUIT 2000 (NZGD2K.WELLINGTON).
4. LEVELS ARE IN TERMS OF METRES ABOVE NZVD2016 DATUM.
5. LONG SECTION OF EXISTING DN300 NAENAE RESERVOIR SCOUR/OVERFLOW PIPE IS ASSUMED INVERT LEVEL BASED ON HCC INFORMATION.
6. FROM DISTANCE 11.46 - 192.55 WATER STOPS WITH SUBSOIL DRAINS TO BE INSTALLED IN THE SHARED TRENCH. SPACING TO BE IN ACCORDANCE WITH TABLE 4-8 OF THE REGIONAL STANDARD. WATER STOP TO BE AS PER DR03.

DATUM R.L. 55.00

GROUND LEVEL (m)	DEPTH TO INVERT (m)	PIPE INVERT LEVEL (m)	DISTANCE (m)
73.18	4.93	68.24	0.00
68.59 68.59	0.28 0.28	68.30 68.30	11.10 11.10
63.75	2.51	61.25	24.67
63.69	2.50	61.29	26.63
63.69	2.50	61.19	26.63
63.09 63.09	1.97 1.97	61.11 61.11	33.04 33.04
62.30 59.89	1.31 2.42	60.99 57.47	40.52 197.38
62.30 59.89	1.30 2.42	60.99 57.47	211.39 70.95
61.53 61.53	1.30 1.30	60.22 60.22	84.84 84.84
62.51 62.51	1.30 1.30	61.20 61.20	98.81 98.81
63.29 63.29	1.30 1.30	61.99 61.99	105.51 105.51
65.92 65.92	1.32 1.32	64.60 64.60	138.68 138.68
66.03 66.03	1.35 2.25	64.68 63.79	172.73 192.55
65.98 65.98	1.73 1.73	64.26 64.26	211.39 211.39
65.99	1.52	64.47	219.71

GRADIENT	PIPE SIZE
-0.55% (-1:182)	DN300
52.00% (1:2)	DN300
2.84% (1:35)	DN3(
1.22% (1:82)	DN300
1.60% (1:62)	DN300
11.57% (1:9)	DN300
-19.80% (-1:5)	DN300
-7.01% (-1:14)	DN300
-11.77% (-1:8)	DN300
-7.87% (-1:13)	DN300
-0.24% (-1:411)	DN300
2.50% (1:40)	DN600
2.50% (1:40)	DN600

LONGITUDINAL PROFILE 0.0 m TO 241.9 m

HORIZONTAL SCALE 1:500 @ A1
VERTICAL SCALE 1:500 @ A1

DN300 NAENAE SCOUR PIPE LONGITUDINAL SECTION

DATUM R.L. 4.00

GROUND LEVEL (m)	DEPTH TO INVERT (m)	PIPE INVERT LEVEL (m)	DISTANCE (m)
8.42	1.26	7.16	0.00
10.22 10.22	2.54 2.54	7.68 7.68	11.46 11.46
16.98 16.98	2.29 2.29	14.69 14.69	32.48 32.48
21.47	2.75	18.73	44.55
25.99	2.58	23.41	56.08
31.77 31.77	1.84 1.84	29.94 29.94	70.61 70.61
34.87 34.87	1.77 1.77	33.10 33.10	85.74 85.74
41.81 41.81	1.50 1.50	40.31 40.31	112.37 112.37
48.65 48.65	1.59 1.59	47.06 47.06	133.28 133.28
56.53	1.59	54.93	154.31
59.72	1.58	58.14	172.15
62.64 62.64	1.68 1.68	60.95 60.95	183.02 183.02
66.03 66.03	2.28 2.25	63.76 63.79	192.55 192.55
65.98 65.98	1.73 1.73	64.26 64.26	211.39 211.39
65.99	1.52	64.47	219.71

GRADIENT	PIPE SIZE
4.51% (1:22)	DN500
33.36% (1:3)	DN500
33.40% (1:3)	DN500
44.95% (1:2)	DN500
20.91% (1:5)	DN500
27.08% (1:4)	DN500
32.26% (1:3)	DN500
37.46% (1:3)	DN500
25.86% (1:4)	DN500
29.39% (1:3)	DN500
2.50% (1:40)	DN600
2.50% (1:40)	DN600

LONGITUDINAL PROFILE 0.0 m TO 219.7 m

HORIZONTAL SCALE 1:500 @ A1
VERTICAL SCALE 1:500 @ A1

EASTERN HILLS RESERVOIR OVERFLOW/SCOUR PIPE LONGITUDINAL SECTION

A1 REPRODUCTION SCALE
100
80
60
40
20
0mm

A3 REPRODUCTION SCALE
50
40
30
20
10
0mm

0 5 10 15 20 25
SCALE 1:500 AT ORIGINAL SIZE

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
1	UPDATED POST INDEPENDENT REVIEW	G.H.	L.H.	J.L.	29/09/23
0	ISSUED FOR INFORMATION	G.H.	L.H.	J.L.	18/08/23

Drawing Originator
Connect Water
c/- WSP
PO Box 12-003
Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) 1:750
Reduced Scale (A3) 1:1500

Design	T.G.	29/09/23	Approved For Construction*
Drawn	G.H.	29/09/23	-
Dsg Verifier	L.H.	29/09/23	
Dwg Check	L.H	29/09/23	Date-

* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project:
WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title:
LONG SECTION
OVERFLOW / SCOUR CONNECTION
EXISTING DN300 EW FARRELLY GRV

Discipline: CIVIL
Drawing No.: 3-WW021.02_W013
Rev.: 1

DOCUMENT PATH: \\CORP\ANZ\PROJECTSNZ\3\W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

DOCUMENT NO: 3-WW021.02_W013.DWG

PLOTTED BY: PIETERSEN, RIAAN

DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 25-Jul-23

NOTES:

1. DO NOT SCALE OFF DRAWINGS.

WW SERVICES LEGEND

- NEW STORMWATER — SW
- EXISTING STORMWATER — SW
- NEW STORMWATER V-CHANNEL
- STORMWATER FLOW ARROW
- STORMWATER MANHOLE

A1 REPRODUCTION SCALE: 0mm 10 20 30 40 50 60 80 100

A3 REPRODUCTION SCALE: 0mm 10 20 30 40 50

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
0	UPDATED POST INDEPENDENT REVIEW	G.H.	J.D.	J.L.	29/09/23

Drawing Originator: Connect Water
c/- WSP
PO Box 12-003 Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) 1:750
Reduced Scale (A3) 1:1500

Design	T.G.	29/09/23	Approved For Construction*
Drawn	G.H.	29/09/23	-
Dsg Verifier	J.D.	29/09/23	
Dwg Check	J.D.	29/09/23	Date-

* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: SITE STORMWATER PLAN
PRELIMINARY DESIGN

Discipline: CIVIL

Drawing No.: 3-WW021.02_W014

Rev.: 0

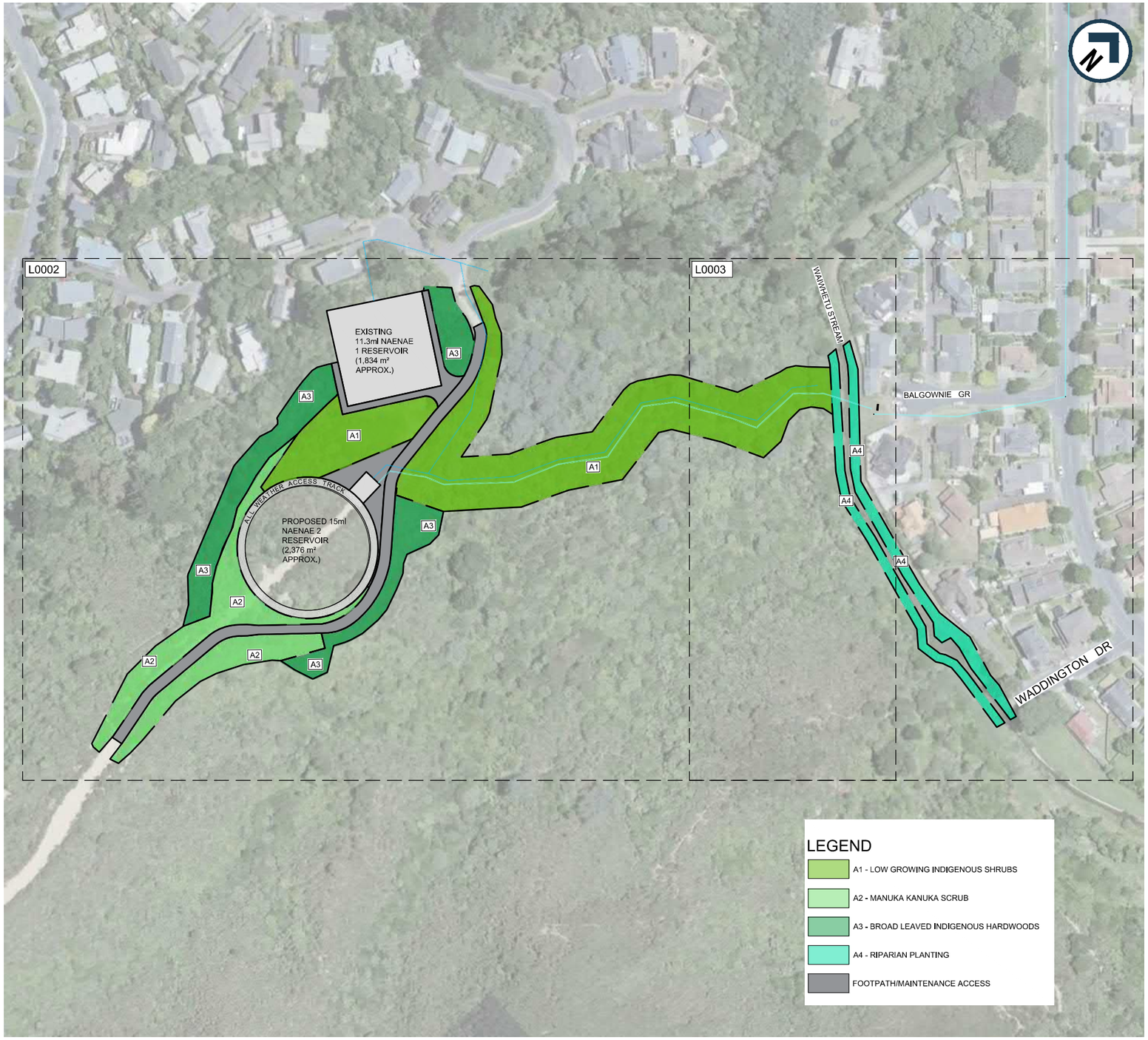
DOCUMENT NO: 3-WW021.02_W014.DWG

DOCUMENT PATH: \\CORP\ANZ\PROJECTS\NZ3\W3-WW021.02 NAENAE NO.2 RESERVOIR\HOME\700 DRAWINGS

DO NOT SCALE - IF IN DOUBT ASK

PLOTTED BY: PIETERSEN, RIAAN

DRAWING PLOTTED: 18-Jul-23



A1 REPRODUCTION SCALE
100 80 60 40 20 0mm

A3 REPRODUCTION SCALE
50 40 30 20 10 0mm

CONCEPT LANDSCAPE PLAN

1:1000 @ A1, 1:2000 @ A3

A1 1:1000
A3 1:2000
0 10 20 30 40 50m

NOTES:

Indicative Only - to be confirmed after vegetation losses have been assessed during the construction phase

No trees to be placed over the pipe alignment, only shrubs or grasses.

Where possible, all native species to be eco-sourced from the ecological areas.

All plants to be placed in a quincunx arrangement. Confirm set out with landscape architect or ecologist prior to undertaking any planting work.

All vegetation removal to be in accordance with the vegetation management plan.

PLANTING SCHEDULE

Botanical Name	Common Name	Quantity	Size	Spacing
A1 - LOW GROWING INDIGENOUS SHRUBS		7178m2		
Asplenium bulbiferum gracillimum	Fern	373	1.5L	5% @ 1m oc
Astelia fragrans	Bush Astelia	746	2.5L	10% @ 1m oc
Coprosma autumnalis	Kanono	94	3L	5% @ 2m oc
Coprosma lucida	Karamu	94	2.5L	5% @ 2m oc
Coprosma robusta	Karamu	94	2.5L	5% @ 2m oc
Dianella nigra	Ink Berry	896	1.5L	12% @ 1m oc
Freycinetia banksii	KieKie	299	2.5L	4% @ 1m oc
Geniostoma ligustrifolium	Hangehange	75	1L	4% @ 2m oc
Leptospermum scoparium	Manuka	112	2.5L	6% @ 2m oc
Muehlenbeckia australis	Pohuehue	280	2.5L	15% @ 2m oc
Myrsine australis	Red matipo	19	2.5L	4% @ 4m oc
Phormium tenax	Harakeke	187	2.5L	10% @ 2m oc
Piper excelsum	Kawakawa	94	2.5L	5% @ 2m oc
Veronica salicifolia	Koromiko	332	2.5L	10% @ 1.5m oc
A2 - MANUKA/KANUKA SHRUB		3804.5m2		
Austroderia toetoe	New Zealand Toetoe	99	2.5L	10% @ 2m oc
Gahnia setifolia	Mapere	44	2.5L	10% @ 3m oc
Kunzea robusta	Kanuka	95	2.5L	60% @ 5m oc
Leptospermum scoparium	Manuka	16	5L	10% @ 5m oc
Pteridium esculentum	Bracken Fern	44	5L	10% @ 3m oc
A3 - INDIGENOUS HARDWOODS		3004.37m2		
Alectryon excelsus	Titoki	4	5L	3% @ 5m oc
Alsophila tricolor	Silver fern	28	5L	8% @ 3m oc
Aristotelia serrata	Makomako	63	2.5L	8% @ 2m oc
Beilschmiedia tawa	Tawa	4	5L	3% @ 5m oc
Brachyglottis repanda	Hedge Ragwort	14	1.5L	4% @ 3m oc
Cordyline australis	Cabbage Tree	24	2.5L	3% @ 2m oc
Corynocarpus laevigatus	Karaka	20	2.5L	10% @ 4m oc
Elaeocarpus dentatus	Hinau	14	2.5L	4% @ 3m oc
Fuchsia excorticata	Tree Fuchsia	42	2.5L	12% @ 3m oc
Fuscospora truncata	Whairaunui	6	2.5L	3% @ 4m oc
Griselinia littoralis	Broadleaf	32	2.5L	4% @ 2m oc
Knightia excelsa	Rewarewa	5	2.5L	4% @ 5m oc
Kunzea robusta	Kanuka	21	2.5L	6% @ 3m oc
Laurelia novae-zelandiae	Pukatea	6	2.5L	3% @ 4m oc
Melicytus ramiflorus	Whitey Wood	11	2.5L	3% @ 3m oc
Metrosideros robusta	Northern Rata	4	5L	3% @ 5m oc
Pittosporum eugenioides	Lemonwood	14	2.5L	4% @ 3m oc
Pseudopanax arboreus	Five Finger	28	2.5L	8% @ 3m oc
Pterophylla racemosa	Kamahi	14	2.5L	4% @ 3m oc
Sphaeropteris medullaris	Black Tree Fern	24	1.5L	3% @ 2m oc
A4 - RIPARIAN PLANTING		1658m2		
Aristotelia serrata	Makomako	77	2.5L	10% @ 1.5m oc
Carex secta	Sedge	345	2.5L	20% @ 1m oc
Cordyline australis	Cabbage Tree	22	2.5L	5% @ 2m oc
Juncus edgariae	Wiwi Rush	154	2.5L	20% @ 1.5m oc
Macropiper excelsum	Kawakawa	44	2.5L	10% @ 2m oc
Phormium tenax	New Zealand Flax	65	2.5L	15% @ 2m oc
Typha orientalis	Oriental Cattail	154	2.5L	20% @ 1.5m oc

PLANT SCHEDULE

No.	Revision	By	Chk	Appd	Date
2	ISSUED FOR REVIEW	M.P	A.K.	J.L.	27/09/23
1	ISSUED WITH CONCEPT DESIGN - FINAL	N.O.	A.K.	J.L.	06/03/23
0	ISSUED FOR INFORMATION	N.O.	A.K.	J.L.	07/12/22

Drawing Originator: Connect Water c/- WSP, PO Box 12-003 Thorndon, Wellington 6144, T 64 4 471 7000

Original Scale (A1) 1:1000
Reduced Scale (A3) 1/2 SHOWN

Design	M.P	27.09.23	Approved For Construction*
Drawn	H.S.	27.09.23	
Dsg Verifier	A.K.	27.09.23	
Dwg Check	A.K.	27.09.23	Date

* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: LANDSCAPE CONCEPT PLAN
SHEET 01 OF 03

Discipline: LANDSCAPE ARCHITECTURE

Drawing No.: 3-WW021.02_L0001

Rev.: 2

DO NOT SCALE - IF IN DOUBT ASK

A1 - LOW GROWING INDIGENOUS SHRUBS (1,466 m²)
(77) Asplenium bulbiferum gracillimum
(153) Astelia fragrans
(20) Coprosma autumnalis
(20) Coprosma lucida
(20) Coprosma robusta
(183) Dianella nigra
(61) Freycinetia banksii
(16) Geniostoma ligustrifolium
(23) Leptospermum scoparium
(58) Muehlenbeckia australis
(4) Myrsine australis
(39) Phormium tenax
(20) Piper excelsum
(68) Veronica salicifolia

A3 - INDIGENOUS HARDWOODS (494 m²)
(1) Alectryon excelsus
(5) Alsophila tricolor
(11) Aristotelia serrata
(1) Beilschmiedia tawa
(3) Brachyglottis repanda
(4) Cordyline australis
(4) Corynocarpus laevigatus
(3) Elaeocarpus dentatus
(7) Fuchsia excorticata
(1) Fuscospora truncata
(6) Griselinia littoralis
(1) Knightia excelsa
(4) Kunzea robusta
(1) Laurelia novae-zelandiae
(2) Melicytus ramiflorus
(1) Metrosideros robusta
(3) Pittosporum eugenioides
(5) Pseudopanax arboreus
(3) Pterophylla racemosa
(4) Sphaeropteris medullaris

EXISTING
11.3ml NAENAE
1 RESERVOIR
(1,834 m²
APPROX.)

WAIWHETU STREAM

A3 - INDIGENOUS HARDWOODS (1,380 m²)
(2) Alectryon excelsus
(13) Alsophila tricolor
(29) Aristotelia serrata
(2) Beilschmiedia tawa
(7) Brachyglottis repanda
(11) Cordyline australis
(9) Corynocarpus laevigatus
(7) Elaeocarpus dentatus
(20) Fuchsia excorticata
(3) Fuscospora truncata
(15) Griselinia littoralis
(3) Knightia excelsa
(10) Kunzea robusta
(3) Laurelia novae-zelandiae
(5) Melicytus ramiflorus
(2) Metrosideros robusta
(7) Pittosporum eugenioides
(13) Pseudopanax arboreus
(7) Pterophylla racemosa
(11) Sphaeropteris medullaris

A1 - LOW GROWING INDIGENOUS SHRUBS (5,723 m²)
(296) Asplenium bulbiferum gracillimum
(593) Astelia fragrans
(74) Coprosma autumnalis
(74) Coprosma lucida
(74) Coprosma robusta
(713) Dianella nigra
(238) Freycinetia banksii
(59) Geniostoma ligustrifolium
(89) Leptospermum scoparium
(222) Muehlenbeckia australis
(15) Myrsine australis
(148) Phormium tenax
(74) Piper excelsum
(264) Veronica salicifolia

BENCH SEAT

ALL WEATHER ACCESS TRACK

PROPOSED 15ml
NAENAE 2
RESERVOIR
(2,376 m²
APPROX.)

A1
A2
A3
A4

A2 - MANUKA/KANUKA SHRUB (1,659 m²)
(44) Austroderia toetoe
(20) Gahnia setifolia
(42) Kunzea robusta
(7) Leptospermum scoparium
(20) Pteridium esculentum

A3 - INDIGENOUS HARDWOODS (943 m²)
(2) Alectryon excelsus
(9) Alsophila tricolor
(20) Aristotelia serrata
(2) Beilschmiedia tawa
(5) Brachyglottis repanda
(8) Cordyline australis
(7) Corynocarpus laevigatus
(5) Elaeocarpus dentatus
(14) Fuchsia excorticata
(2) Fuscospora truncata
(10) Griselinia littoralis
(2) Knightia excelsa
(7) Kunzea robusta
(2) Laurelia novae-zelandiae
(4) Melicytus ramiflorus
(2) Metrosideros robusta
(5) Pittosporum eugenioides
(9) Pseudopanax arboreus
(5) Pterophylla racemosa
(8) Sphaeropteris medullaris

A2 - MANUKA/KANUKA SHRUB (1,020 m²)
(27) Austroderia toetoe
(12) Gahnia setifolia
(26) Kunzea robusta
(5) Leptospermum scoparium
(12) Pteridium esculentum

LEGEND
- A1 - LOW GROWING INDIGENOUS SHRUBS
- A2 - MANUKA KANUKA SCRUB
- A3 - BROAD LEAVED INDIGENOUS HARDWOODS
- A4 - RIPARIAN PLANTING
- FOOTPATH/MAINTENANCE ACCESS

A1 REPRODUCTION SCALE
100 80 60 40 20 0mm

A3 REPRODUCTION SCALE
50 40 30 20 10 0mm

CONCEPT LANDSCAPE PLAN

1:500 @ A1, 1:1000 @ A3

A1 1:500
A3 1:1000
0 20m

No.	Revision	By	Chk	Appd	Date
0	ISSUED FOR REVIEW	H.S	A.K.	J.L.	27/09/23

Drawing Originator: Connect Water
WSP
PO Box 12-003 Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) 1:500
Reduced Scale (A3) 1/2 SHOWN

Design	M.P	27.09.23	Approved For Construction*
Drawn	H.S.	27.09.23	
Dsg Verifier	A.K.	27.09.23	
Dwg Check	A.K.	27.09.23	Date

* Refer to Revision 1 for Original Signature

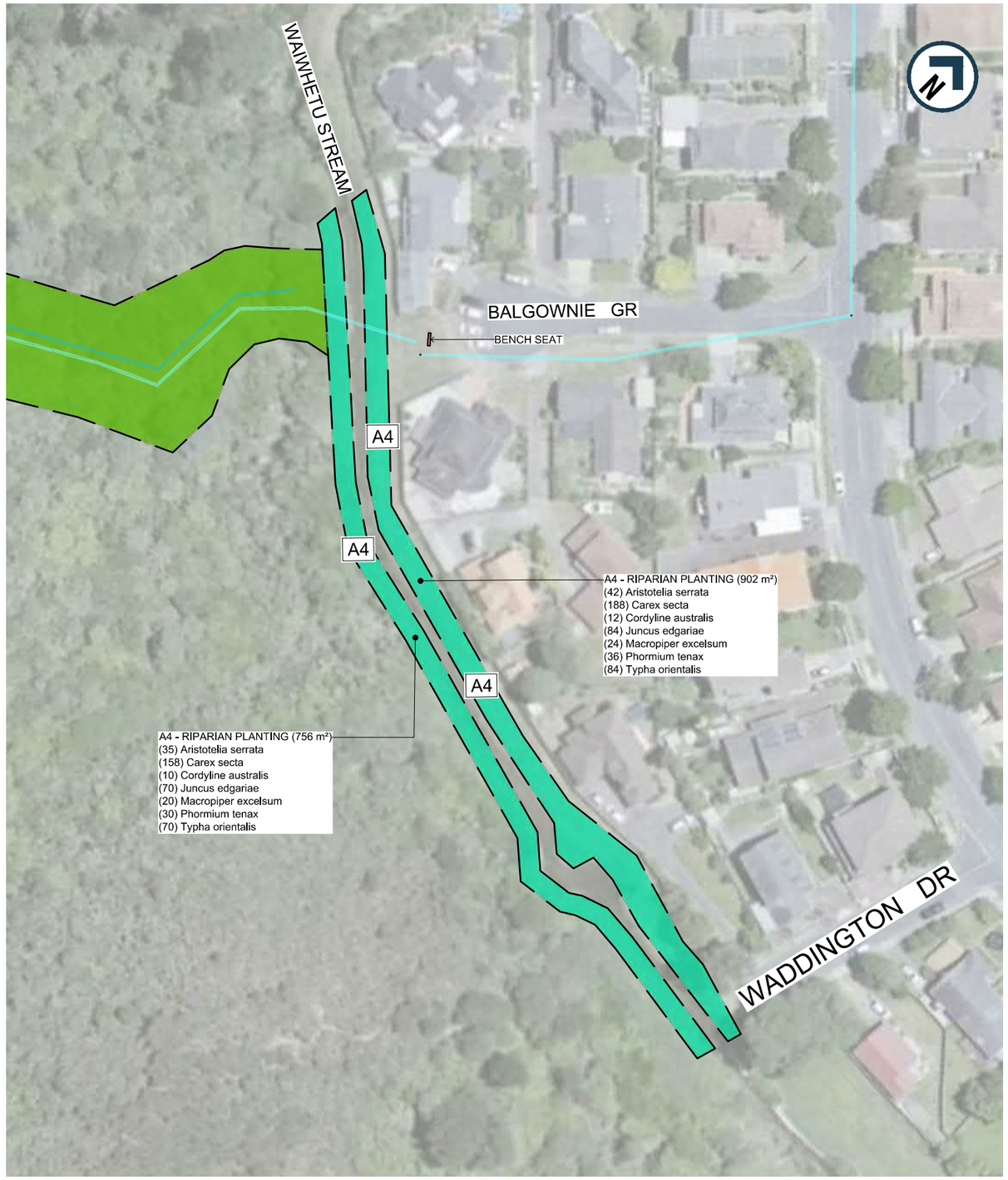
Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: LANDSCAPE CONCEPT PLAN
SHEET 02 OF 03

Discipline: LANDSCAPE ARCHITECTURE
Drawing No.: 3-WW021.02_L0002
Rev.: 0

DO NOT SCALE - IF IN DOUBT ASK



LEGEND

- A1 - LOW GROWING INDIGENOUS SHRUBS
- A2 - MANUKA KANUKA SCRUB
- A3 - BROAD LEAVED INDIGENOUS HARDWOODS
- A4 - RIPARIAN PLANTING
- FOOTPATH/MAINTENANCE ACCESS

CONCEPT LANDSCAPE PLAN

1:500 @ A1, 1:1000 @ A3

A1 REPRODUCTION SCALE: 100 80 60 40 20 0mm

A3 REPRODUCTION SCALE: 50 40 30 20 10 0mm

A1 1:500 | **A3 1:1000** 0 20m

No.	Revision	By	Chk	Appd	Date
0	ISSUED FOR REVIEW	H.S	A.K.	J.L.	27/09/23

Drawing Originator: Connect Water c- WSP, PO Box 13-003 Thorndon, Wellington 6144, T 64 4 471 7000

Original Scale (A1) 1:500 | Reduced Scale (A3) 1/2 SHOWN

Design	M.P	27.09.23	Approved For Construction*
Drawn	H.S.	27.09.23	
Dsg Verifier	A.K.	27.09.23	
Dwg Check	A.K.	27.09.23	Date

* Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: LANDSCAPE CONCEPT PLAN
SHEET 03 OF 03

Discipline: LANDSCAPE ARCHITECTURE

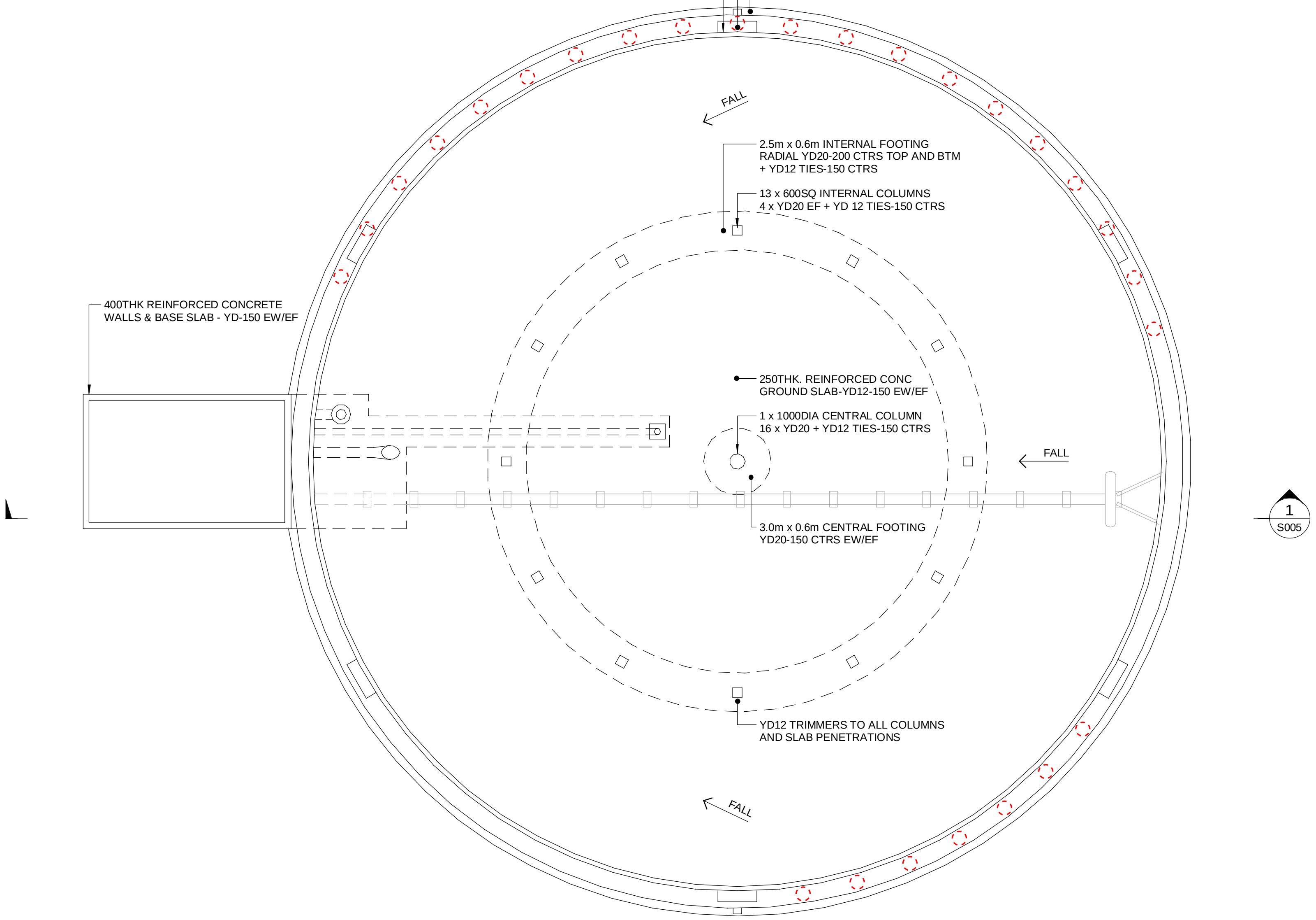
Drawing No.: 3-WW021.02_L0003

Rev.: 0

DO NOT SCALE - IF IN DOUBT ASK

A1 REPRODUCTION SCALE 0mm 20 40 60 80 100

A3 REPRODUCTION SCALE 0mm 10 20 30 40 50



RESERVOIR GROUND FLOOR PLAN

SCALE 1 : 200

DESIGN INFORMATION

CONCRETE STRENGTH

- MINIMUM CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS SHALL BE 65MPa FOR ALL PRECAST UNITS.
- INSITU JOINT BETWEEN PANELS SHALL BE 50MPa AT POST TENSIONING AND 65MPa AT 28 DAYS.

COVER TO REINFORCEMENT

- MINIMUM 50mm TO ALL FACES.

STRESSING AND REINFORCEMENT

- ALL GRADE 500E REINFORCEMENT SHALL BE MICRO ALLOY AND COMPLY WITH AS/NZS4671.

HORIZONTAL POST-TENSIONING :

- ALL STRESSING SHALL BE COMPLETED WITH THE BASE OF THE WALL FREE TO SLIDE.
- THE TENDON SHALL COMPRISE 17-15.2mm DIAMETER SUPERSTAND. SUPERSTRANDS SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH (UTS) OF 261kN/STRAND.

VERTICAL PRESTRESSING :

- THE VERTICAL PRESTRESSING STEEL SHALL BE 12.7mm DIAMETER SUPERSTRAND WITH A MINIMUM ULTIMATE TENSILE STRENGTH OF 184kN/STRAND.

NOTES

1. THIS DESIGN IS IN ACCORDANCE WITH NZS 3101 : PART 1 : 2006 CODE OF PRACTICE FOR THE DESIGN OF CONCRETE STRUCTURES.
2. EPOXY MORTAR TO BE SIKADUR UA OR SIMALAR APPROVED PRODUCT.

LEGEND

C11	600x600 CONC COL.
C21	1000Ø CONC CENTRAL COL.
B11	800x1000 CONC BEAM.
TB11	PRECAST TEE BEAM TYPE 1
TB13	PRECAST TEE BEAM TYPE 2

BORED CAST IN-SITU PILES - NUMBER AND SIZE OF PILES TO BE CONFIRMED.
LENGTH WILL VARY, PILES EMBEDDED 3m NOM. INTO COMPETENT ROCK.

PILECAP TO CONSIST OF NOM. 1.5m DEPTH CONTINUOUS BEAM - REINFORCEMENT TO BE CONFIRMED.

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	Appd	Date
2	ISSUED FOR INFORMATION	B.L.C	28-07-23
0	ISSUED FOR INFORMATION	B.L.C	7-12-22
1	ISSUED WITH CONCEPT DESIGN - FINAL	B.L.C	3-03-23

Drawing Originator: **Connect Water** c/- WSP, PO Box 12-003 Thorndon, Wellington 6144, T 64 4 471 7000

Design	R.BARTOLOME	28-07-23	Approved For Construction*
Drawn	C.GONZALEZ	28-07-23	
Dsg Verifier	B.CORNELL	28-07-23	
Dwg Check	K.HAMPSHIRE	28-07-23	Date

Original Scale (A1) AS SHOWN
Reduced Scale (A3) 1/2 SHOWN
*Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER EASTERN HILLS RESERVOIR

Title: RESERVOIR AND VALVEHOUSE GENERAL ARRANGEMENT - GROUND LEVEL

Discipline: STRUCTURAL

Drawing No: 3-WW021.02-S001 Rev. 2

DOCUMENT NO: RESERVOIR.DWG

DOCUMENT PATH: \\corplanz\Projects\NZ\3-WW021.02 ... EASTERN HILLS RESERVOIR

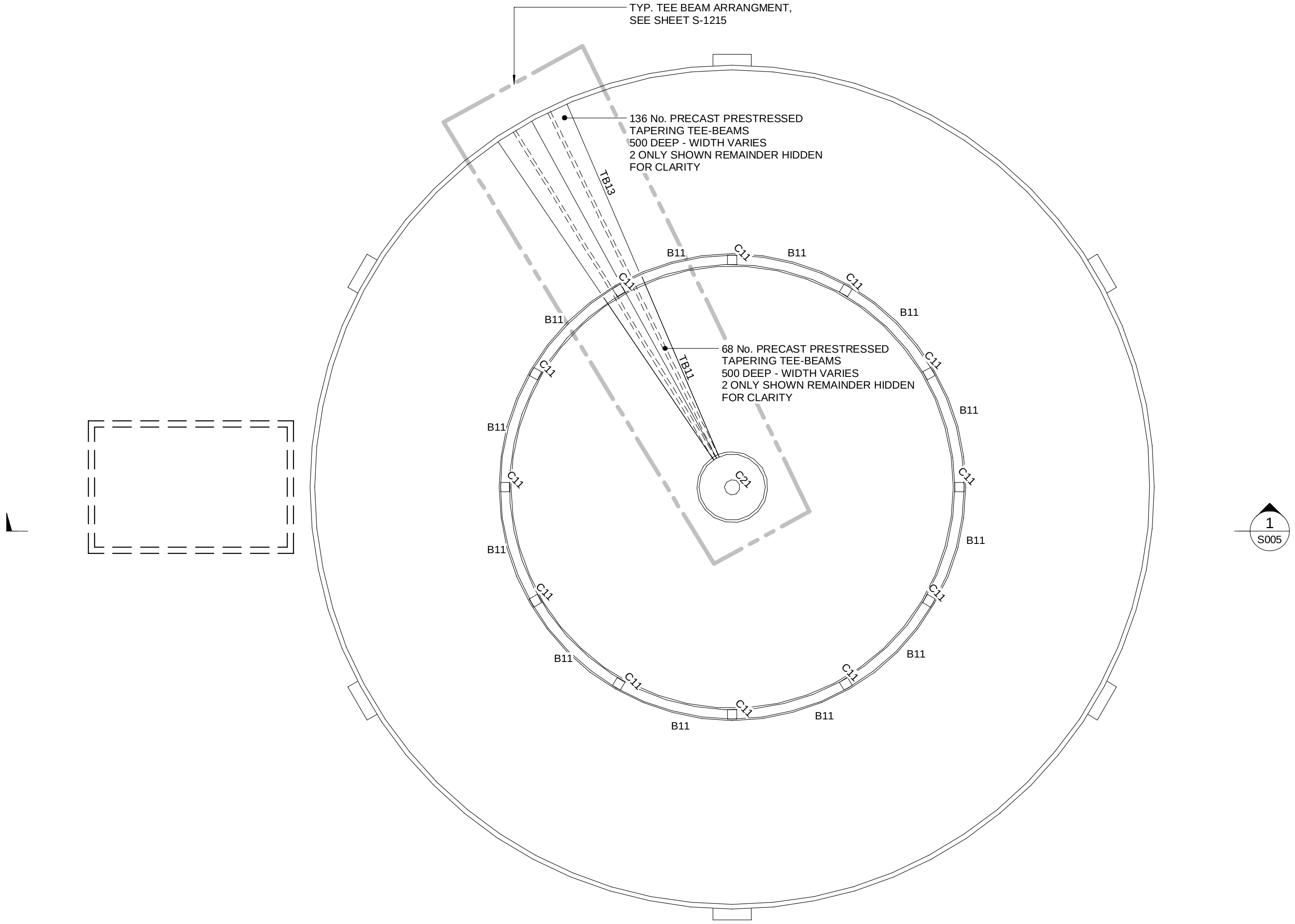
PLOTTED BY: GONZALEZ, CALEB

DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 27/07/2023 3:23:56 pm

A1 REPRODUCTION SCALE: 0mm, 20, 40, 60, 80, 100

A3 REPRODUCTION SCALE: 0mm, 10, 20, 30, 40, 50



RESERVOIR ROOF PLAN

SCALE 1 : 200

DESIGN INFORMATION

CONCRETE STRENGTH

- MINIMUM CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS SHALL BE 65MPa FOR ALL PRECAST UNITS.
- INSITU JOINT BETWEEN PANELS SHALL BE 50MPa AT POST TENSIONING AND 65MPa AT 28 DAYS.

COVER TO REINFORCEMENT

- MINIMUM 50mm TO ALL FACES.

STRESSING AND REINFORCEMENT

- ALL GRADE 500E REINFORCEMENT SHALL BE MICRO ALLOY AND COMPLY WITH AS/NZS4671.

HORIZONTAL POST-TENSIONING :

- ALL STRESSING SHALL BE COMPLETED WITH THE BASE OF THE WALL FREE TO SLIDE.
- THE TENDON SHALL COMPRISE 17-15.2mm DIAMETER SUPERSTAND. SUPERSTRANDS SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH (UTS) OF 261kN/STRAND.

VERTICAL PRESTRESSING :

- THE VERTICAL PRESTRESSING STEEL SHALL BE 12.7mm DIAMETER SUPERSTRAND WITH A MINIMUM ULTIMATE TENSILE STRENGTH OF 184kN/STRAND.

NOTES

1. THIS DESIGN IS IN ACCORDANCE WITH NZS 3101 : PART 1 : 2006 CODE OF PRACTICE FOR THE DESIGN OF CONCRETE STRUCTURES.
2. EPOXY MORTAR TO BE SIKADUR UA OR SIMALAR APPROVED PRODUCT.

LEGEND

C11	600x600 CONC COL.
C21	1000Ø CONC CENTRAL COL.
B11	800x1000 CONC BEAM.
TB11	PRECAST TEE BEAM TYPE 1
TB13	PRECAST TEE BEAM TYPE 2

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision			Appd	Date
2	ISSUED FOR INFORMATION			B.L.C	28-07-23
0	ISSUED FOR INFORMATION			B.L.C	7-12-22
1	ISSUED WITH CONCEPT DESIGN - FINAL			B.L.C	3-03-23

Drawing Originator

Connect Water
c/- WSP
PO Box 12-003 Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1): AS SHOWN
Reduced Scale (A3): 1/2 SHOWN

Design	R.BARTOLOME	28-07-23	Approved For Construction*
Drawn	C.GONZALEZ	28-07-23	
Dsg Verifier	B.CORNELL	28-07-23	
Dwg Check	K.HAMPSHIRE	28-07-23	Date

*Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER EASTERN HILLS RESERVOIR

Title: RESERVOIR AND VALVE HOUSE GENERAL ARRANGEMENT - ROOF LEVEL

Discipline: STRUCTURAL

Drawing No: 3-WW021.02-S002

Rev.: 2

DOCUMENT NO: RESEVOIR.DWG

PLOTTED BY: GONZALEZ, CALEB

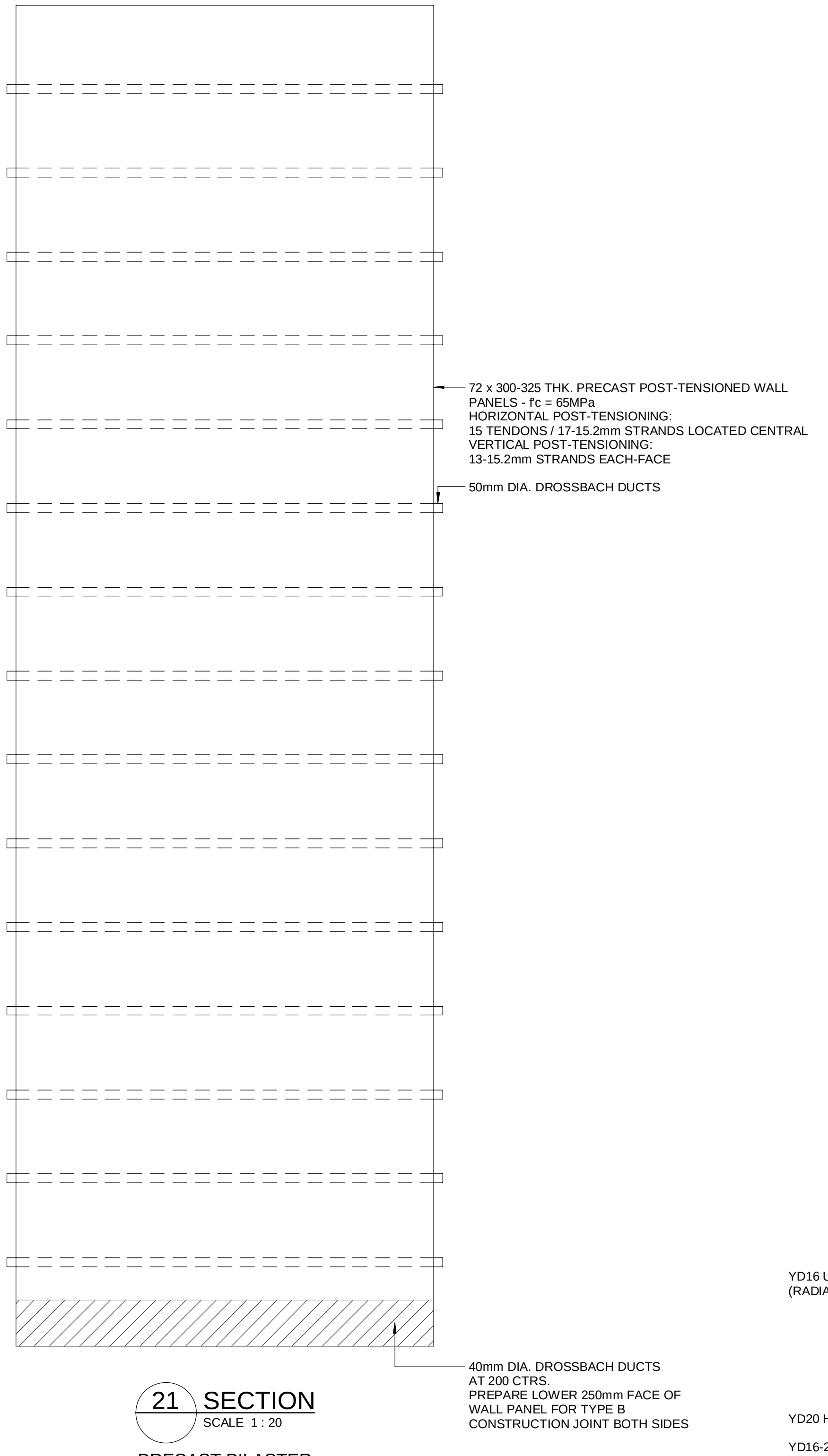
DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 27/07/2023 3:23:56 pm

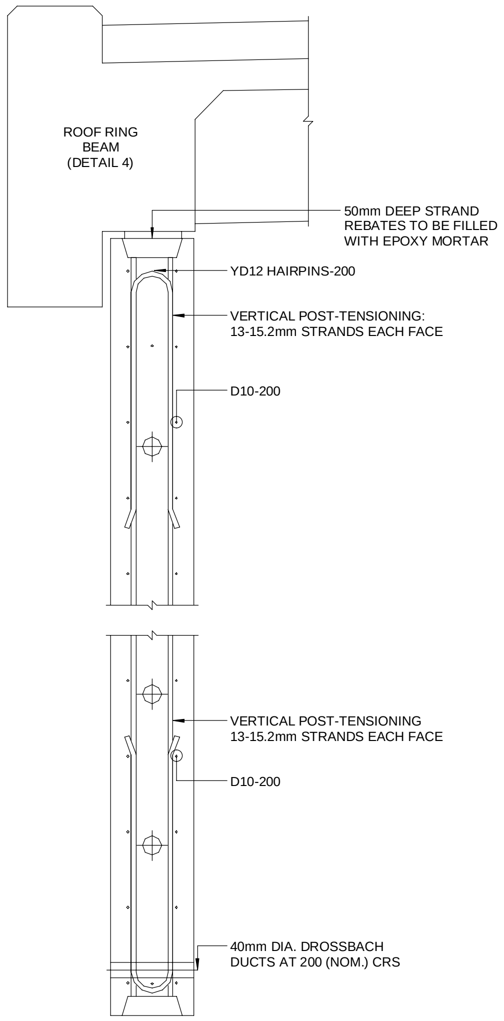
NOTE: THESE ARE REPRESENTATIVE DETAILS ONLY.
DESIGN OF THESE ELEMENTS HAS NOT BEEN CARRIED OUT

A1 REPRODUCTION SCALE

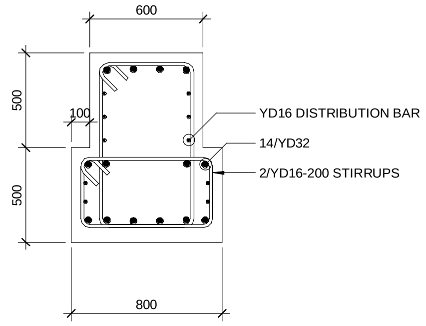
A3 REPRODUCTION SCALE



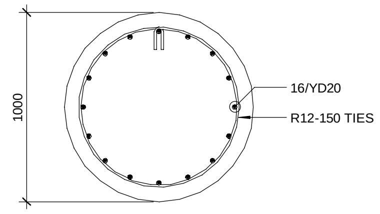
21 SECTION
SCALE 1 : 20
PRECAST PILASTER



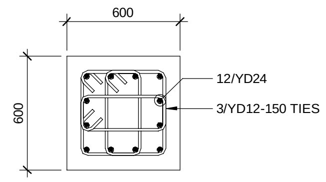
23 DETAIL
S005
SCALE 1 : 10
PRECAST WALL



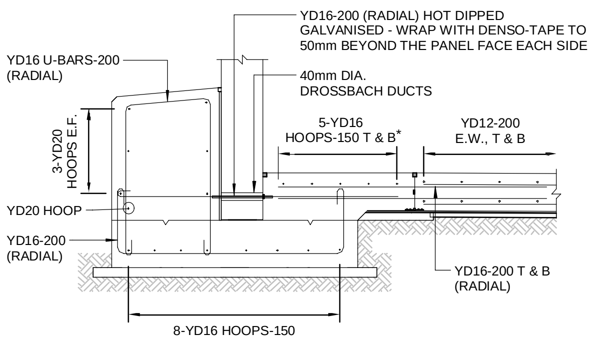
31 SECTION
SCALE 1 : 20
RC BEAM - B1



33 SECTION
SCALE 1 : 20
RC COLUMN - C1



37 SECTION
SCALE 1 : 20
RC COLUMN - C2



25 SECTION
SCALE 1 : 20
EXTERIOR WALL FOUNDATION

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision			Appd	Date
2	ISSUED FOR INFORMATION			B.L.C	28-07-23
0	ISSUED FOR INFORMATION			B.L.C	7-12-22
1	ISSUED WITH CONCEPT DESIGN - FINAL			B.L.C	3-03-23

Drawing Originator
Connect Water
c/- WSP
PO Box 12-003 Thorndon
Wellington 6144
T 64 4 471 7000

Original Scale (A1) AS SHOWN	Design	R.BARTOLOME	28-07-23	Approved For Construction*
	Drawn	C.GONZALEZ	28-07-23	
Reduced Scale (A3)	Dsg Verifier	B.CORNELL	28-07-23	
	Dwg Check	K.HAMPSHIRE	28-07-23	Date
1/2 SHOWN	*Refer to Revision 1 for Original Signature			

Client: Wellington Water

Project: WELLINGTON WATER
EASTERN HILLS RESERVOIR

Title: RESERVOIR AND VALVEHOUSE TYPICAL DETAILS SHEET 1 OF 2

Discipline: STRUCTURAL

Drawing No: 3-WW021.02-S003

Rev.: 2

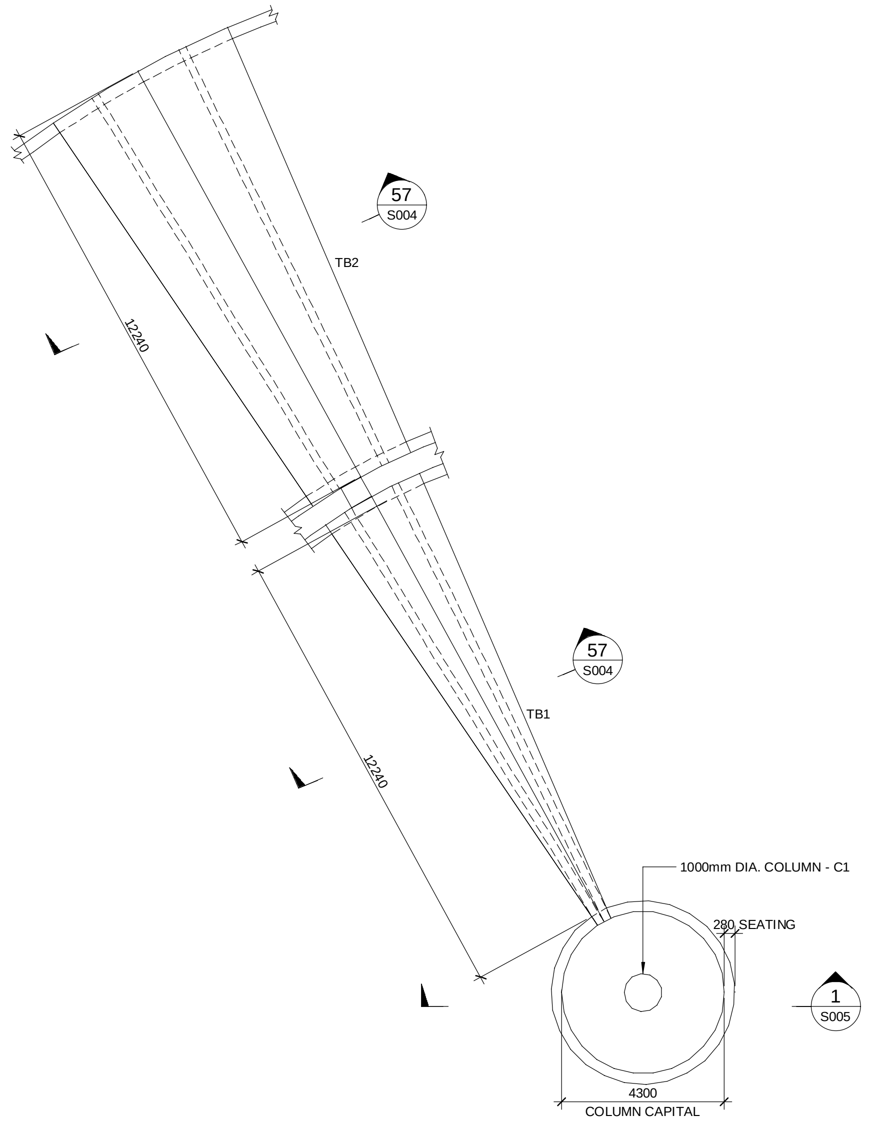
DOCUMENT NO: RESERVOIR.DWG

PLOTTED BY: GONZALEZ, CALEB

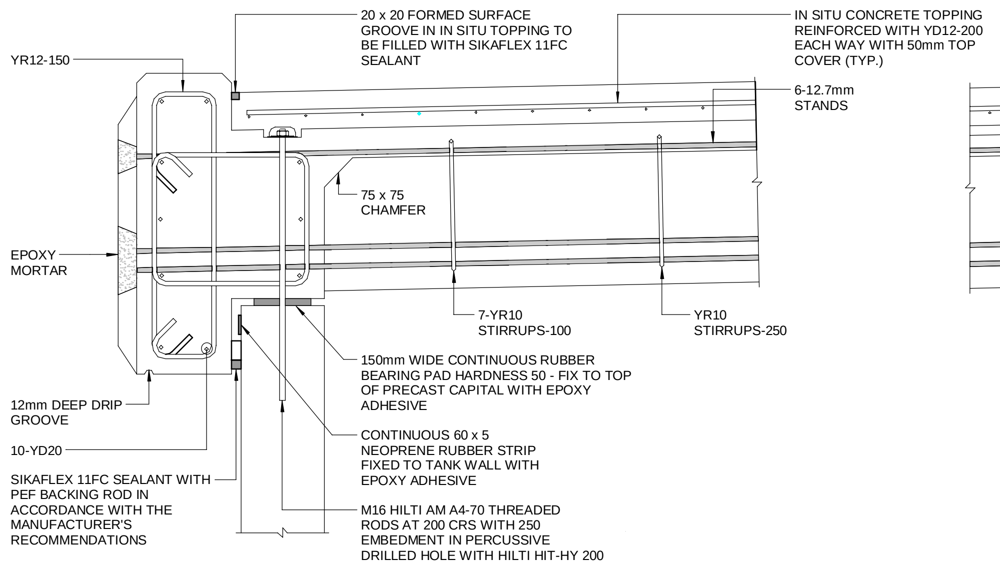
DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 27/07/2023 3:23:57 pm

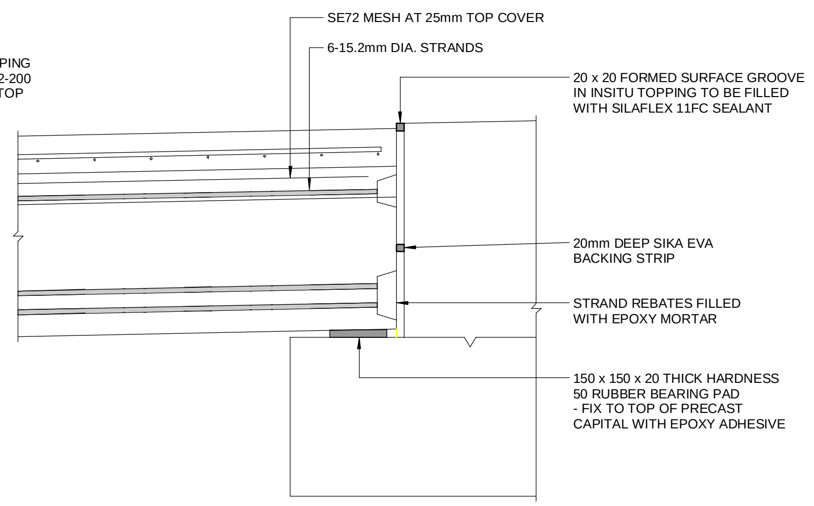
NOTE: THESE ARE REPRESENTATIVE DETAILS ONLY.
DESIGN OF THESE ELEMENTS HAS NOT BEEN CARRIED OUT



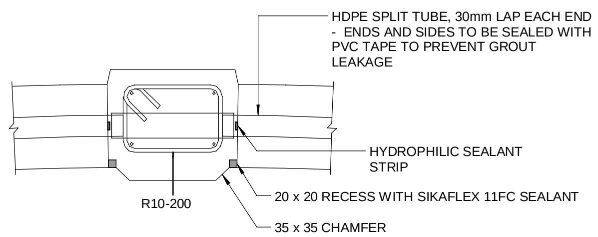
TYPICAL T BEAM ARRANGEMENT
SCALE 1 : 100



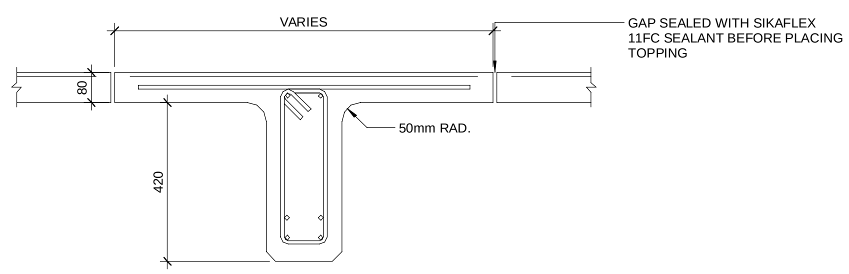
51 DETAIL
S005 SCALE 1 : 10
EXTERIOR RING BEAM



53 DETAIL
S005 SCALE 1 : 10
INTERIOR RING BEAM



55 SECTION
SCALE 1 : 10
WALL PANEL JOINT



57 SECTION
S004 SCALE 1 : 10
TB1 & TB2

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	Appd	Date
0	ISSUED FOR INFORMATION	B.L.C	28-07-23

Drawing Originator: Connect Water c/- WSP, PO Box 12-003 Thorndon, Wellington 6144, T 64 4 471 7000

Original Scale (A1) AS SHOWN	Design	R.BARTOLOME	28-07-23
	Drawn	C.GONZALEZ	28-07-23
Reduced Scale (A3)	Dsg Verifier	B.CORNELL	28-07-23
	Dwg Check	K.HAMPSHIRE	28-07-23
1/2 SHOWN	*Refer to Revision 1 for Original Signature		

Approved For Construction* Date

Client: Wellington Water

Project: WELLINGTON WATER EASTERN HILLS RESERVOIR

Title: RESERVOIR AND VALVEHOUSE TYPICAL DETAILS SHEET 2 OF 2

Discipline: STRUCTURAL

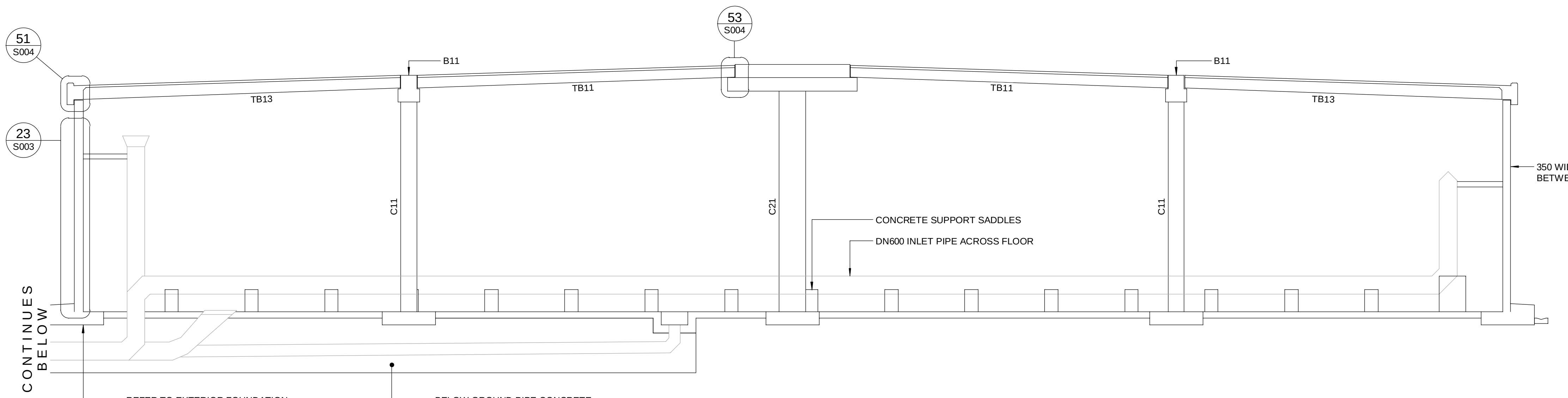
Drawing No: 3-WW021.02-S004 Rev. 0

DOCUMENT NO: RESEVOIR.DWG

PLOTTED BY: GONZALEZ, CALEB

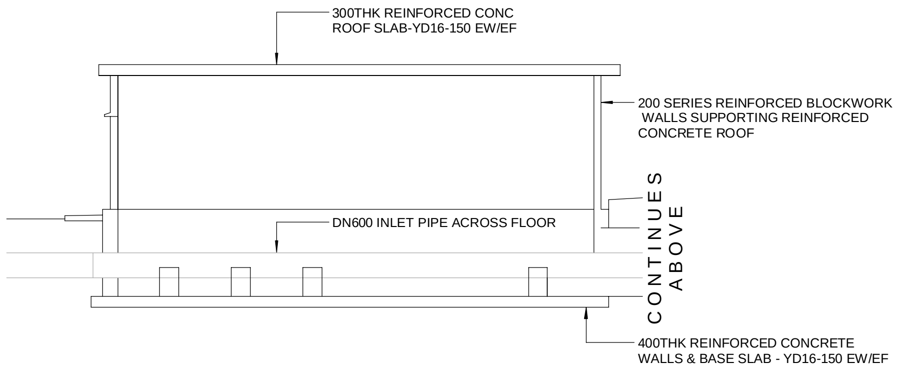
DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 27/07/2023 3:23:57 pm



SECTION 1 - WATER TANK PART ELEVATION

SCALE 1 : 100



SECTION 1 - CONTROL STATION PART ELEVATION

SCALE 1 : 100

A1 REPRODUCTION SCALE: 0mm, 20, 40, 60, 80, 100

A3 REPRODUCTION SCALE: 0mm, 10, 20, 30, 40, 50

DESIGN INFORMATION

CONCRETE STRENGTH

- MINIMUM CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS SHALL BE 65MPa FOR ALL PRECAST UNITS.
- INSITU JOINT BETWEEN PANELS SHALL BE 50MPa AT POST TENSIONING AND 65MPa AT 28 DAYS.

COVER TO REINFORCEMENT

- MINIMUM 50mm TO ALL FACES.

STRESSING AND REINFORCEMENT

- ALL GRADE 500E REINFORCEMENT SHALL BE MICRO ALLOY AND COMPLY WITH AS/NZS4671.

HORIZONTAL POST-TENSIONING :

- ALL STRESSING SHALL BE COMPLETED WITH THE BASE OF THE WALL FREE TO SLIDE.
- THE TENDON SHALL COMPRISE 17-15.2mm DIAMETER SUPERSTAND. SUPERSTRANDS SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH (UTS) OF 261kN/STRAND.

VERTICAL PRESTRESSING :

- THE VERTICAL PRESTRESSING STEEL SHALL BE 12.7mm DIAMETER SUPERSTRAND WITH A MINIMUM ULTIMATE TENSILE STRENGTH OF 184kN/STRAND.

NOTES

1. THIS DESIGN IS IN ACCORDANCE WITH NZS 3101 : PART 1 : 2006 CODE OF PRACTICE FOR THE DESIGN OF CONCRETE STRUCTURES.
2. EPOXY MORTAR TO BE SIKADUR UA OR SIMALAR APPROVED PRODUCT.

LEGEND

C11	600x600 CONC COL.
C21	1000Ø CONC CENTRAL COL.
B11	800x1000 CONC BEAM.
TB11	PRECAST TEE BEAM TYPE 1
TB13	PRECAST TEE BEAM TYPE 2

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	Appd	Date
0	ISSUED FOR INFORMATION	B.LC	28-07-23

Drawing Originator: Connect Water c/- WSP, PO Box 12-003 Thorndon, Wellington 6144, T 64 4 471 7000

Original Scale (A1) AS SHOWN	Design	R.BARTOLOME	28-07-23
	Drawn	C.GONZALEZ	28-07-23
Reduced Scale (A3)	Dsg Verifier	B.CORNELL	28-07-23
1/2 SHOWN	Dwg Check	K.HAMPSHIRE	28-07-23

Approved For Construction* — Date

*Refer to Revision 1 for Original Signature

Client: Wellington Water

Project: WELLINGTON WATER EASTERN HILLS RESERVOIR

Title: RESERVOIR AND VALVEHOUSE ELEVATION

Discipline: STRUCTURAL

Drawing No: 3-WW021.02-S005 — Rev. 0

DOCUMENT NO: RESERVOIR.DWG

PLOTTED BY: GONZALEZ, CALEB

DO NOT SCALE - IF IN DOUBT ASK

DRAWING PLOTTED: 27/07/2023 3:23:57 pm