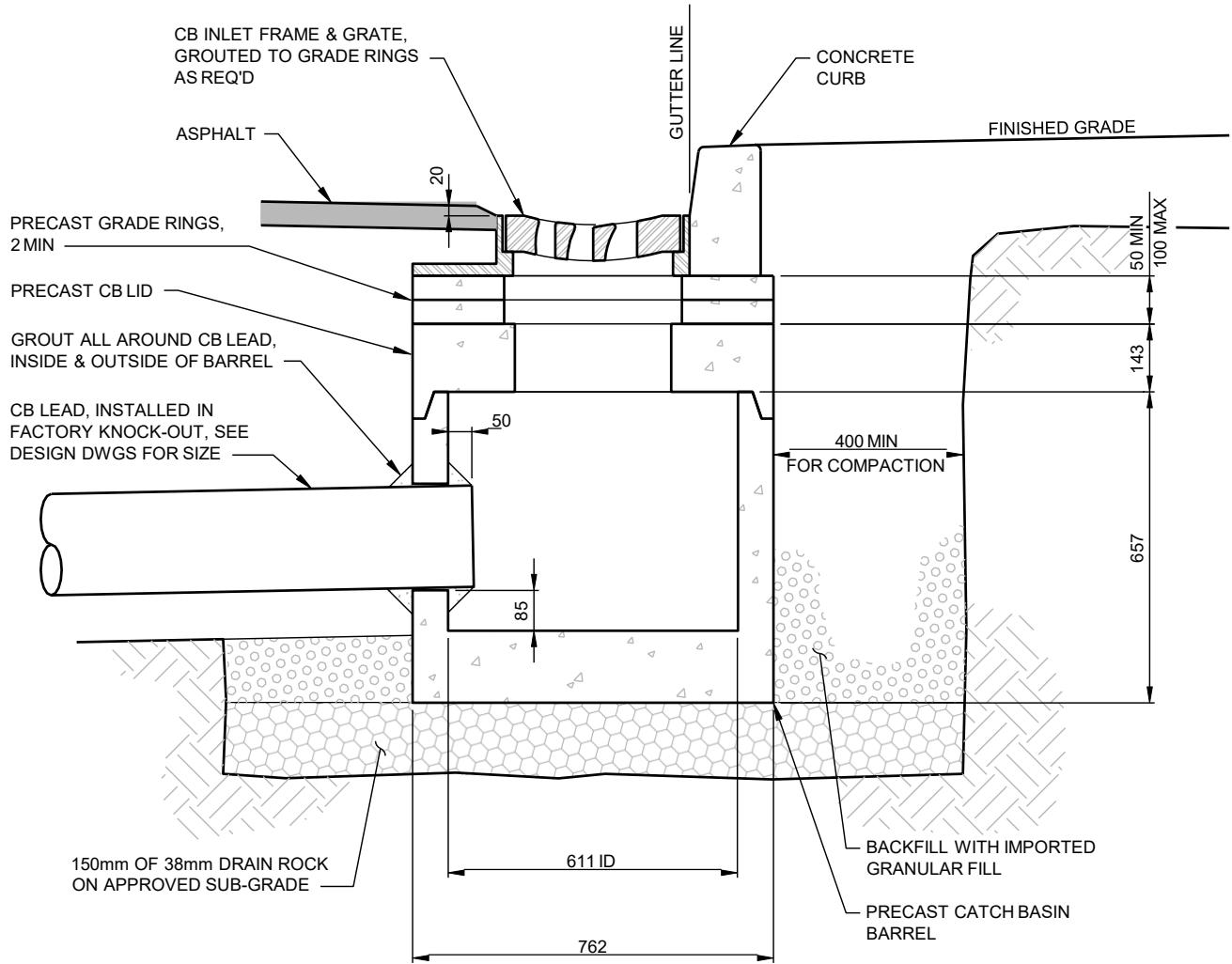


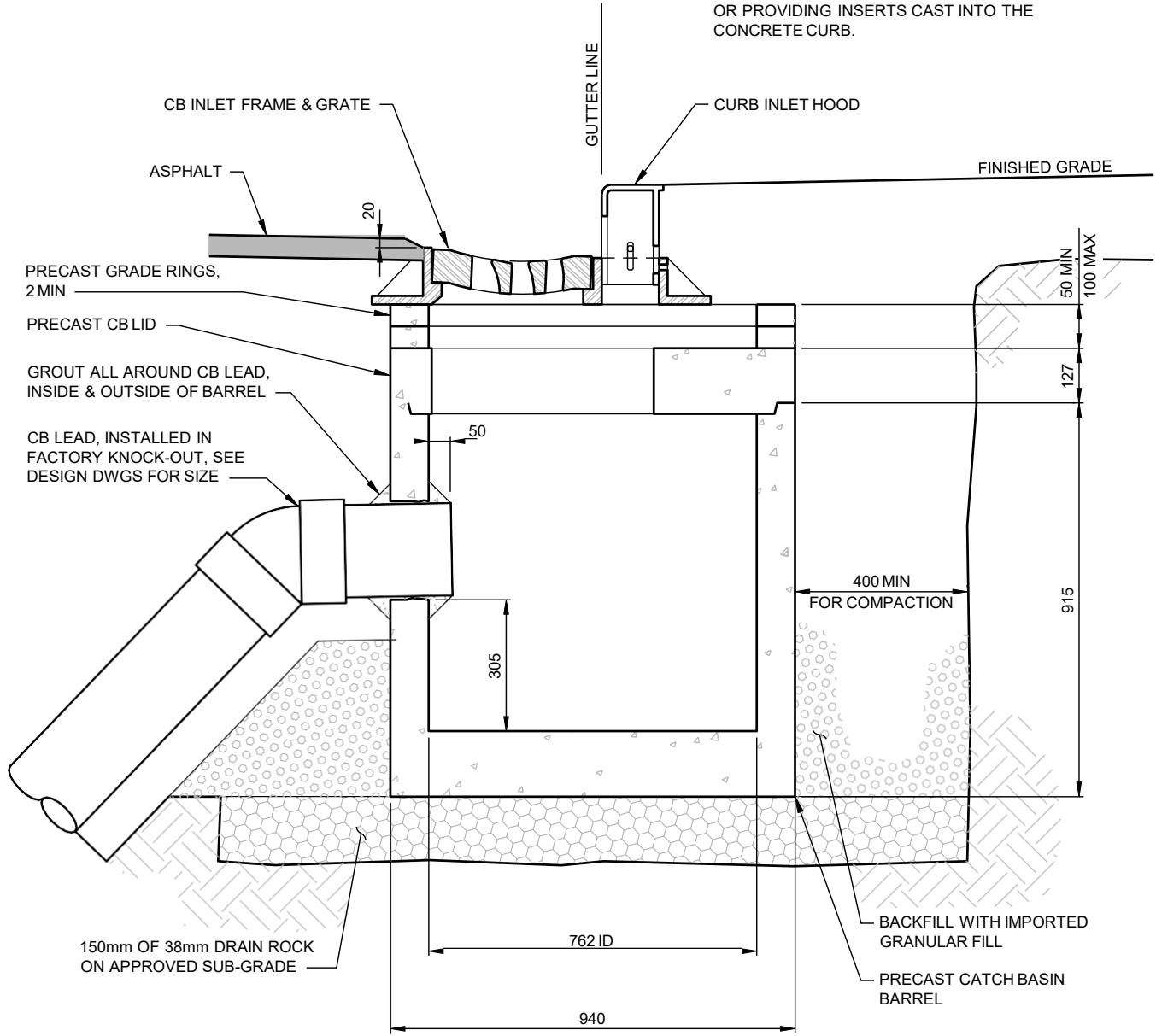
NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. FOR FRAME & GRATE DETAILS, SEE STD DWG SW-6.
3. ALL JOINTS TO BE PRE-WETTED BEFORE MORTAR IS PLACED.
4. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
5. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.
6. CATCH BASIN LID TO MEET CS-600 LOADING.



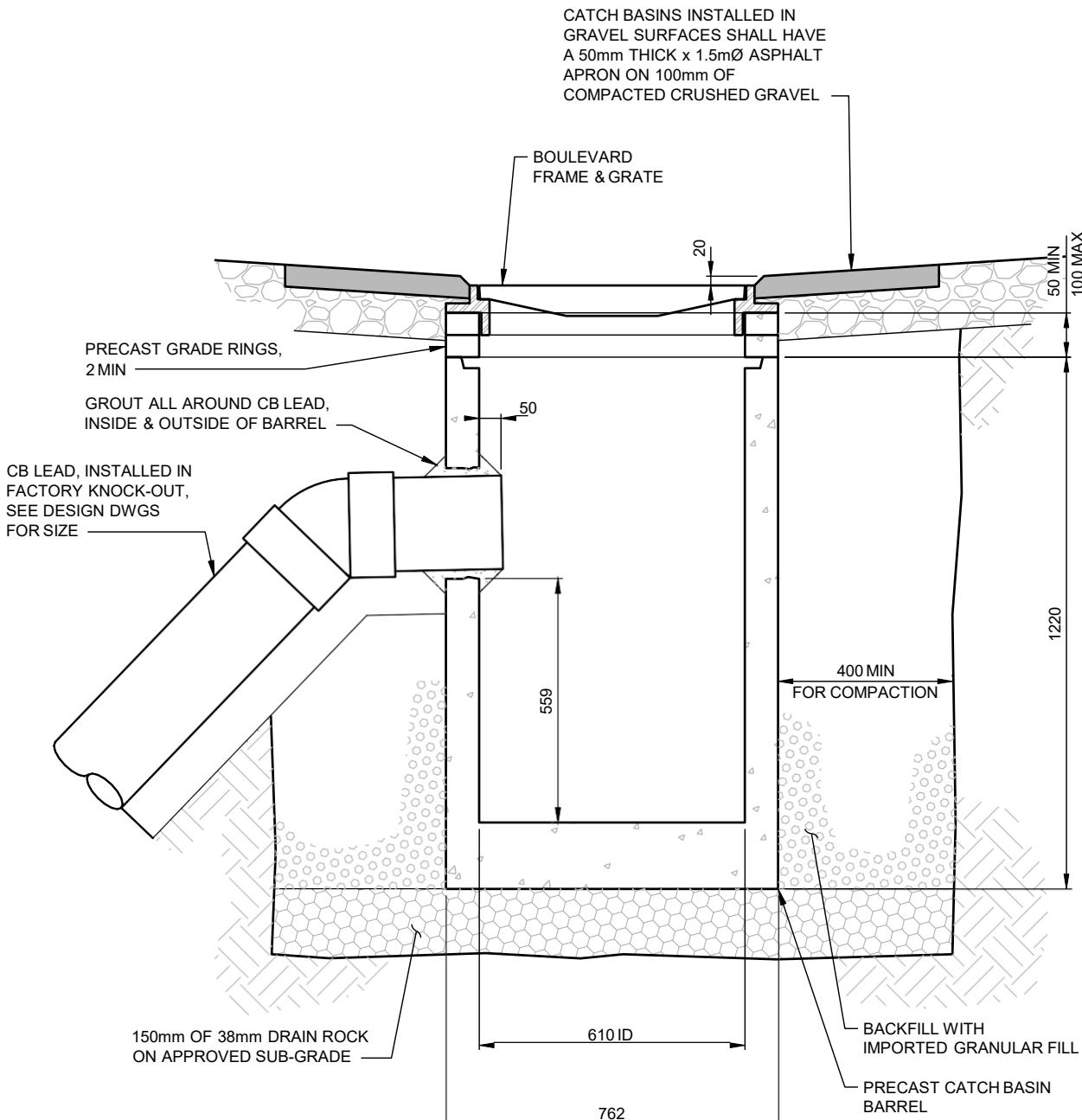
NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. FOR FRAME & GRATE DETAILS, SEE STD DWG SW-6.
3. ALL JOINTS TO BE PRE-WETTED BEFORE MORTAR IS PLACED.
4. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
5. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.
6. CATCH BASIN LID TO MEET CS-600 LOADING.



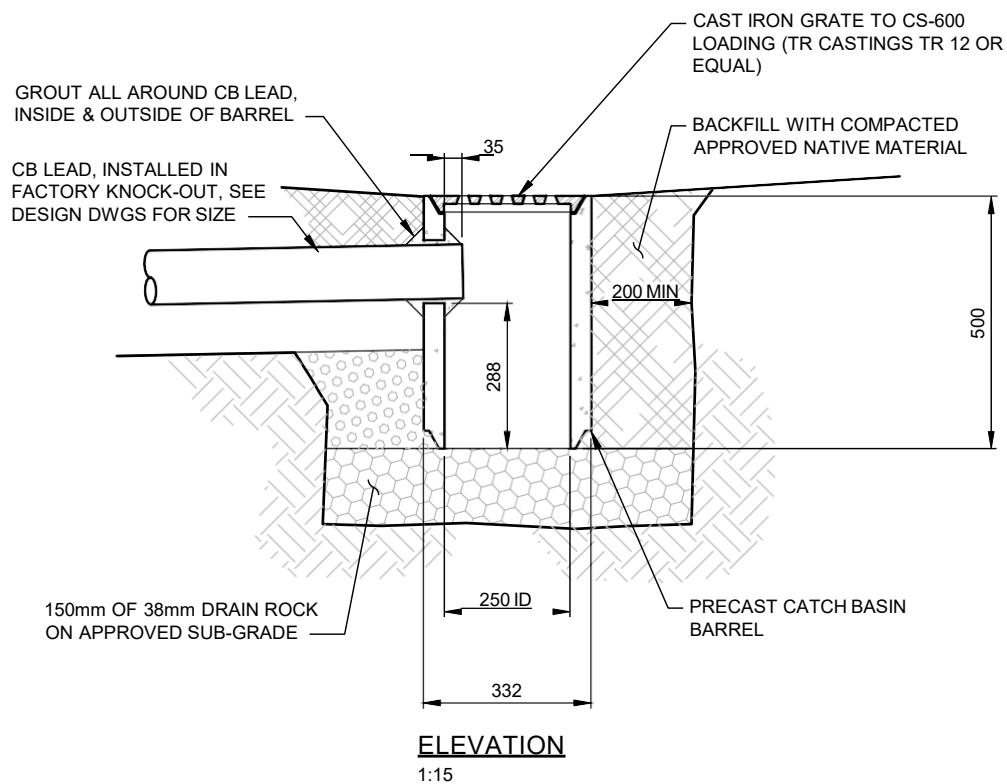
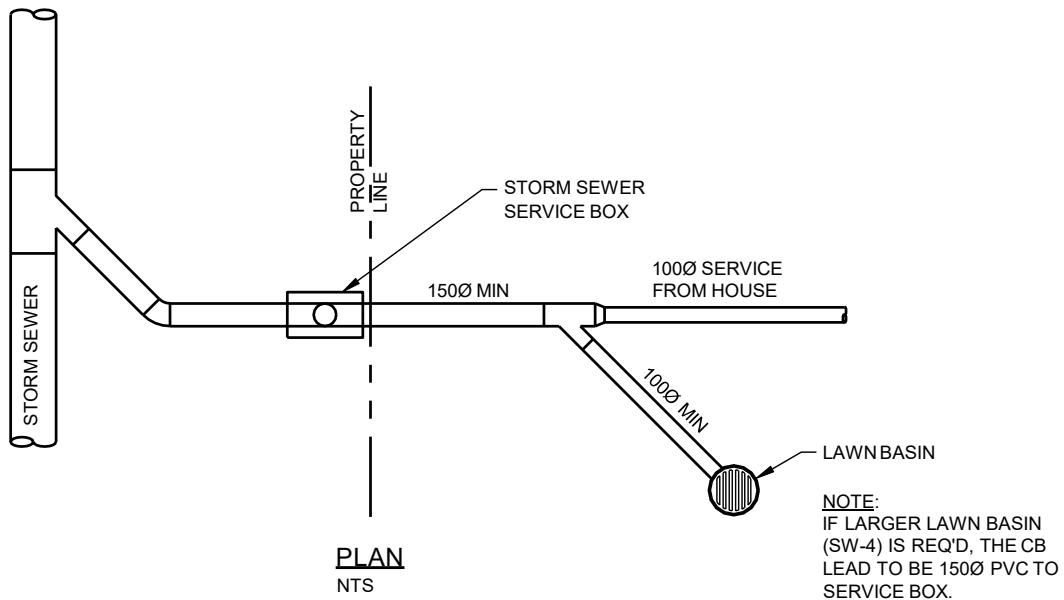
NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. FOR FRAME & HOOD DETAILS, SEE STD DWG SW-7.
3. ALL JOINTS TO BE PRE-WETTED BEFORE MORTAR IS PLACED.
4. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
5. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.
6. CATCH BASIN LID TO MEET CS-600 LOADING.



NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. FOR FRAME & GRATE DETAILS, SEE STD DWG SW-8.
3. ALL JOINTS TO BE PRE-WETTED BEFORE MORTAR IS PLACED.
4. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
5. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.

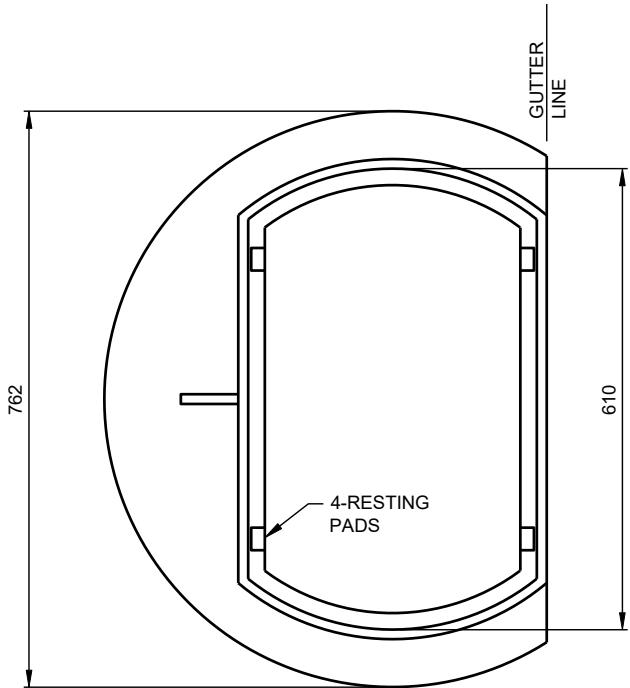


NOTES:

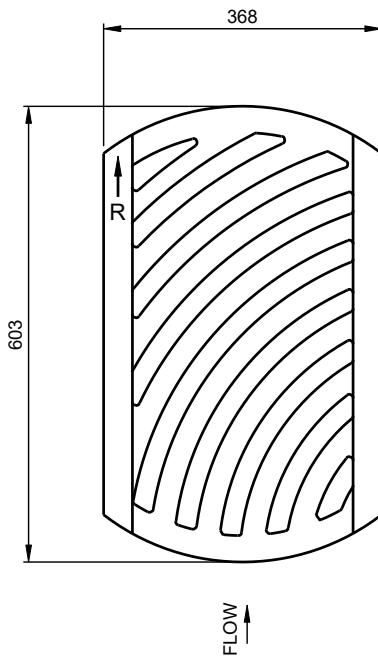
1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
3. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



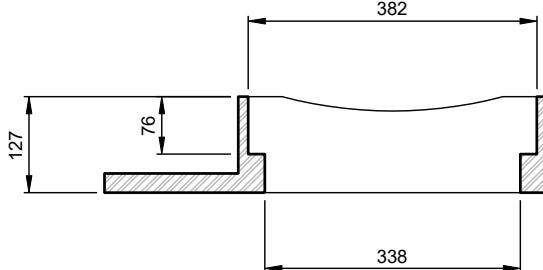
SMALL LAWN BASIN ON PRIVATE PROPERTY



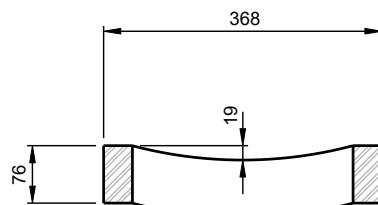
FRAME PLAN



GRATE PLAN



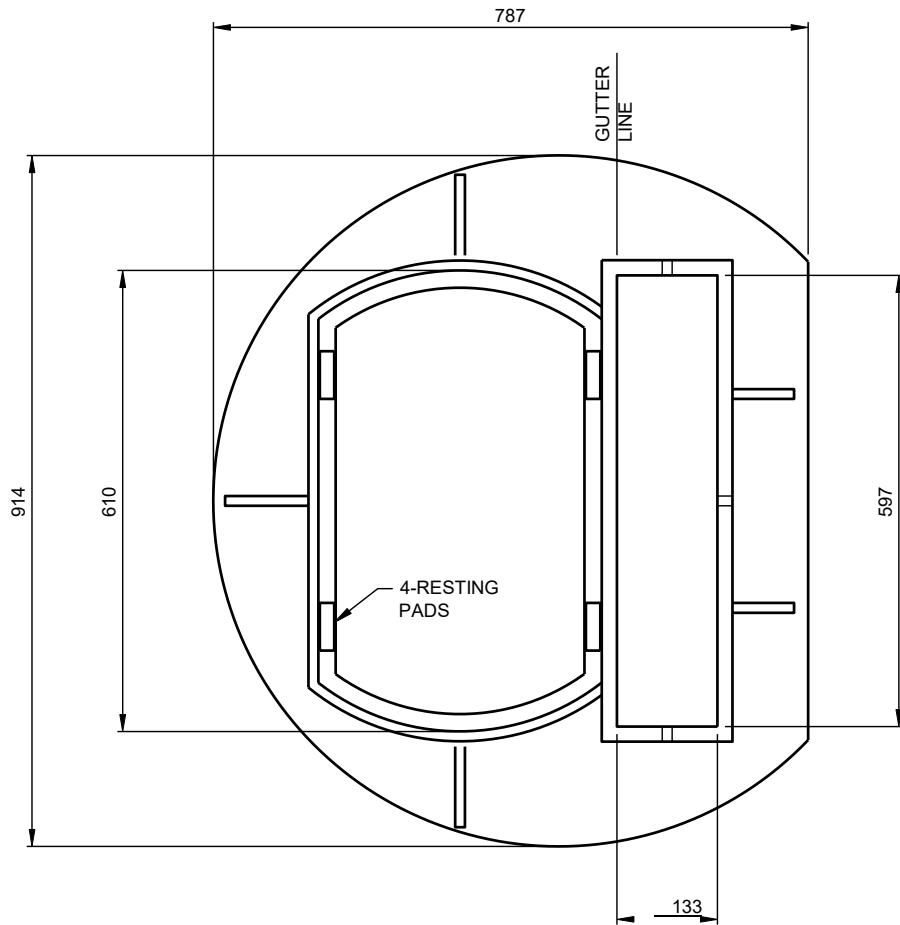
FRAME SECTION



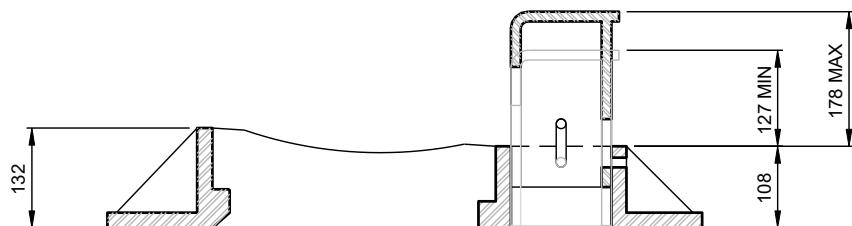
GRATE SECTION

NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. CASTINGS SHALL BE CERTIFIED TO MEET CS-600 LOADING.
3. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
4. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



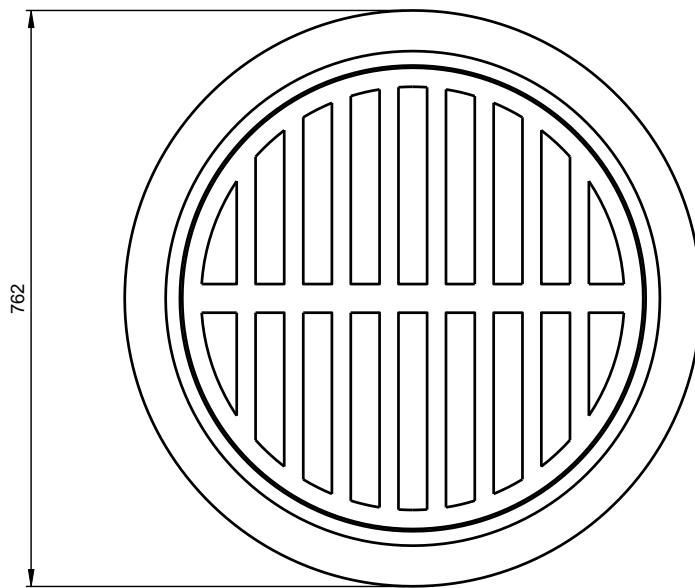
FRAME PLAN



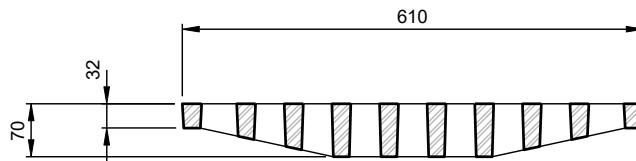
SECTION

NOTES:

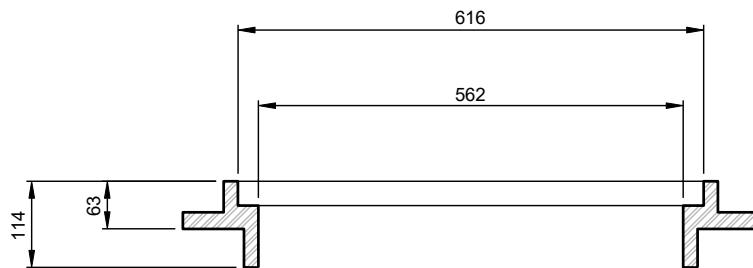
1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. CASTINGS SHALL BE CERTIFIED TO MEET CS-600 LOADING.
3. FOR GRATE, SEE STD DWG SW-6.
4. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
5. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



FRAME AND GRATE PLAN



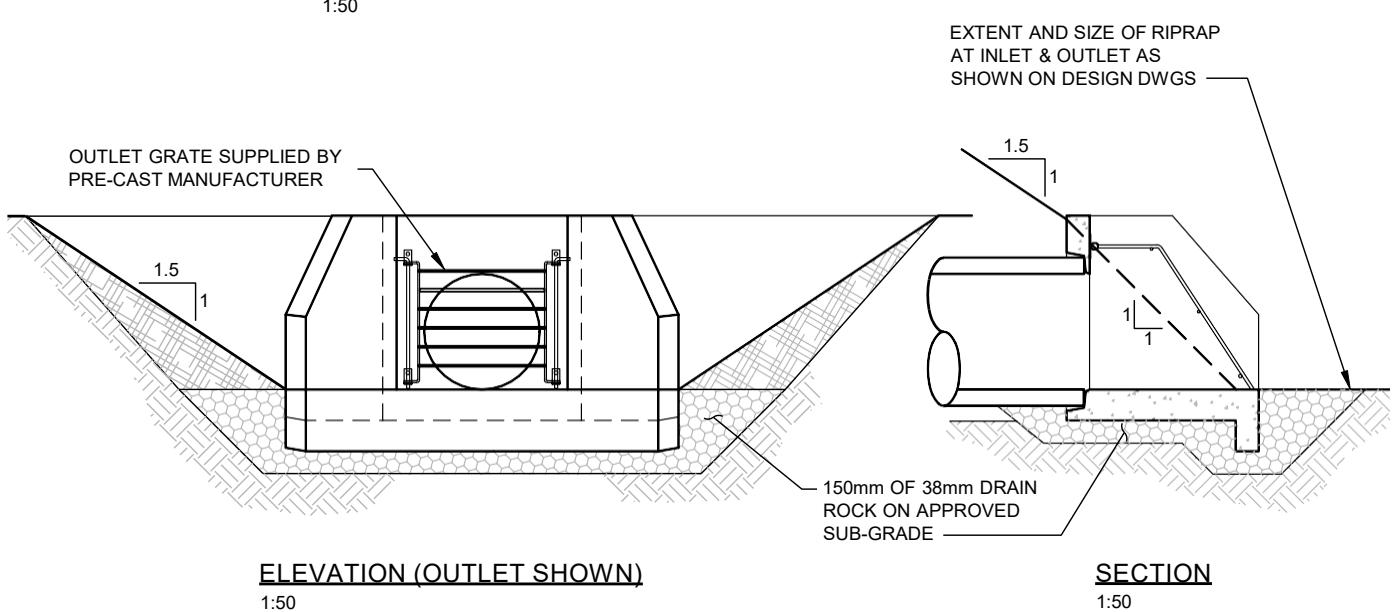
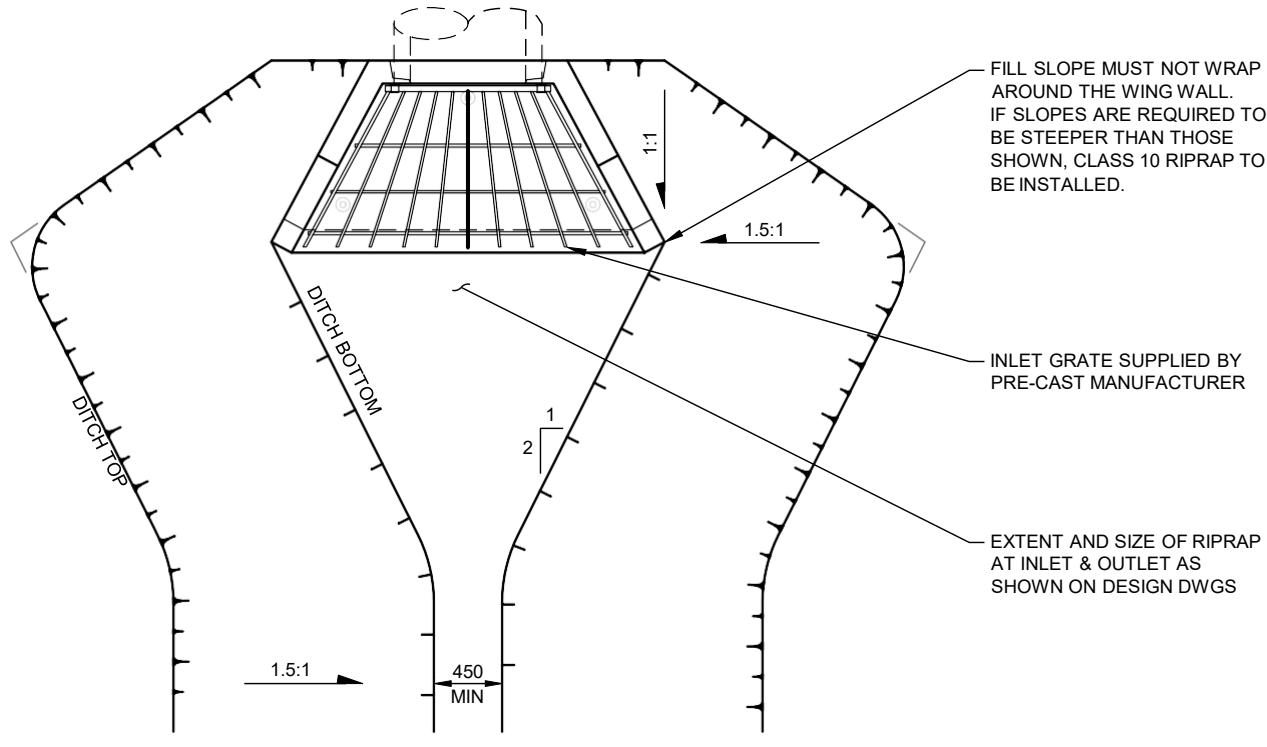
GRATE SECTION



FRAME SECTION

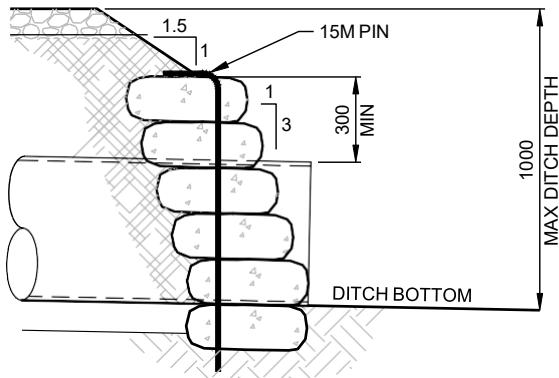
NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. ALL BEARING SURFACES BETWEEN FRAME, COVER AND RISER RINGS SHALL BE MACHINED FOR NON-ROCKING FIT IN ALL POSITIONS. ALLOW 1.5mm RAISED FACE IN CASTINGS FOR MACHINING.
3. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
4. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



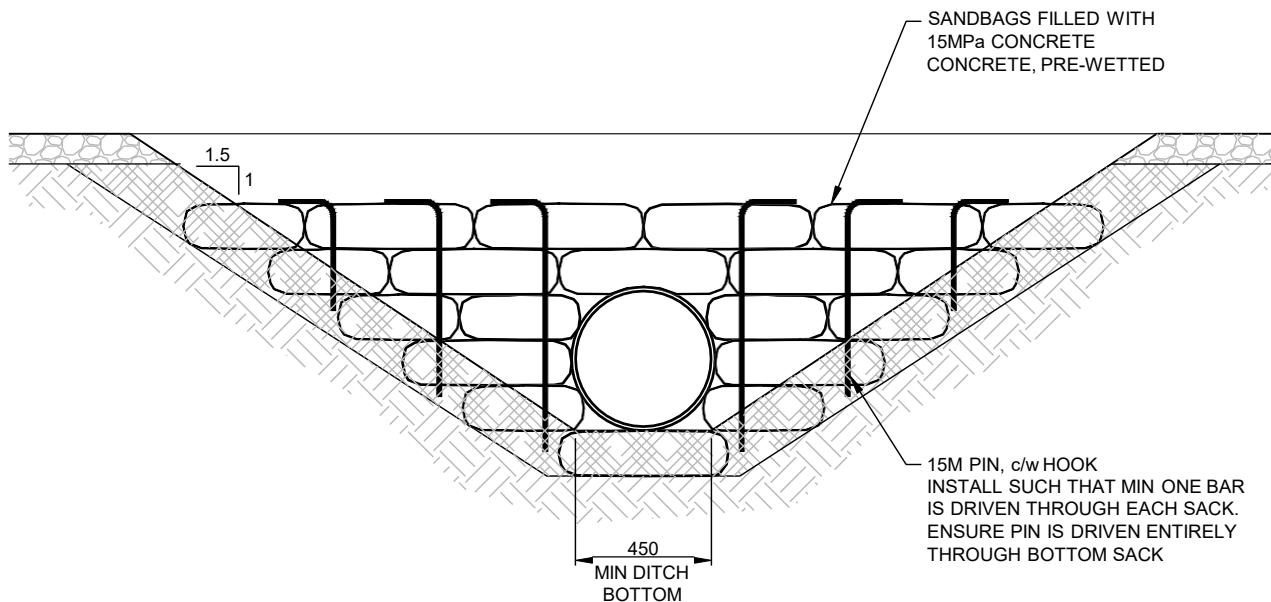
NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. INLET AND OUTLET GRATES TO BE WELDED AND HOT-DIP GALVANIZED TO ASTM A123/A123M.
3. GRATES TO BE EASILY LIFTED TO ALLOW ACCESS TO THE PIPE FOR CLEARING OF DEBRIS.
4. GRATES TO BE DESIGNED IN ACCORDANCE WITH SECTION 7.11.
5. IF SPECIFIED ON DESIGN DRAWINGS, GUARD RAIL TO BE INSTALLED PER STD DWG SW-12.
6. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
7. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



SECTION

1:25



ELEVATION

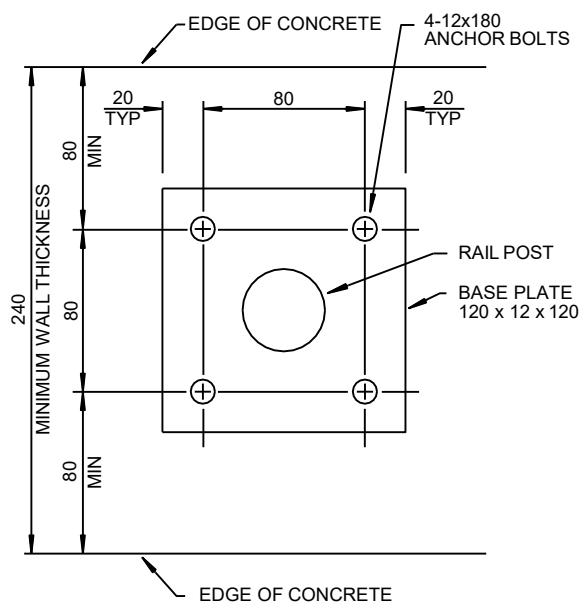
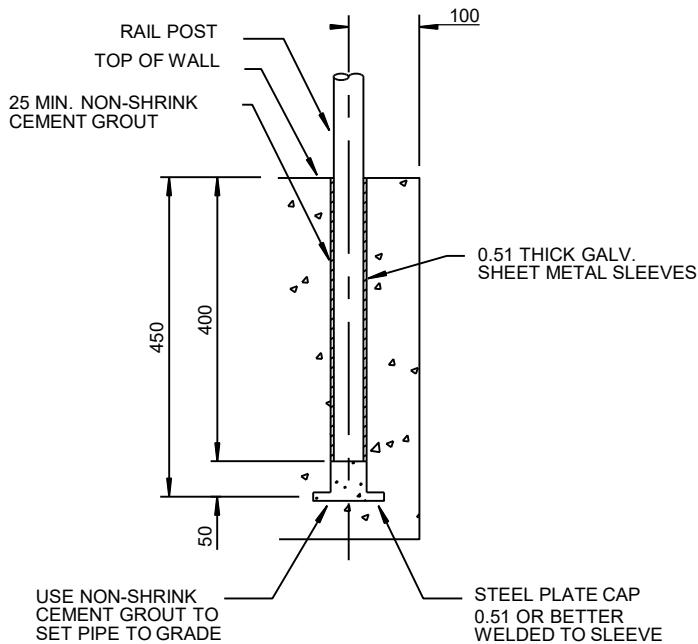
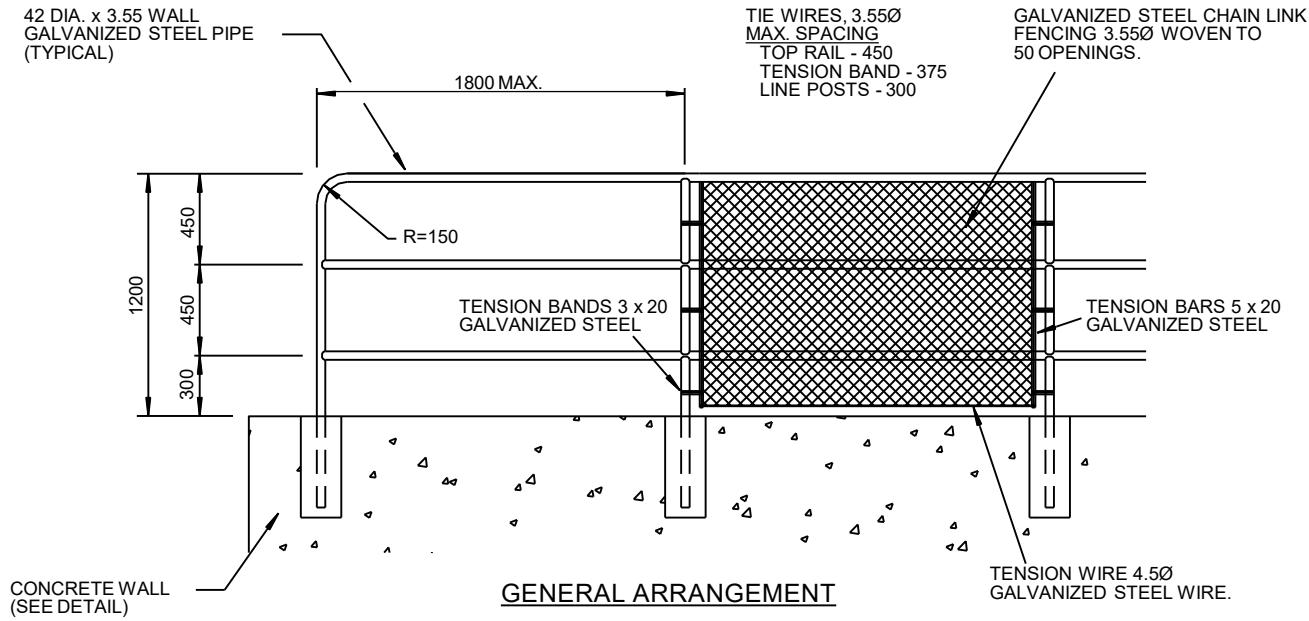
1:25

NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
3. THIS HEADWALL IS FOR DRIVEWAY CULVERTS AND HYDRANT ACCESS ONLY, UNLESS APPROVED BY CITY ENGINEER.
4. IF HORIZONTAL ANGLE BETWEEN THE DITCH FLOW AND CULVERT INLET OR OUTLET EXCEEDS 30°, THE HEADWALL WILL REQUIRE WING WALLS TO FUNNEL FLOW TO PREVENT EROSION TO WALLS OF THE DITCH. SEE DESIGN DRAWINGS FOR DETAILS.
5. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



SANDBAG HEADWALL FOR
CULVERT INLETS AND OUTLETS



CONNECTION DETAILS

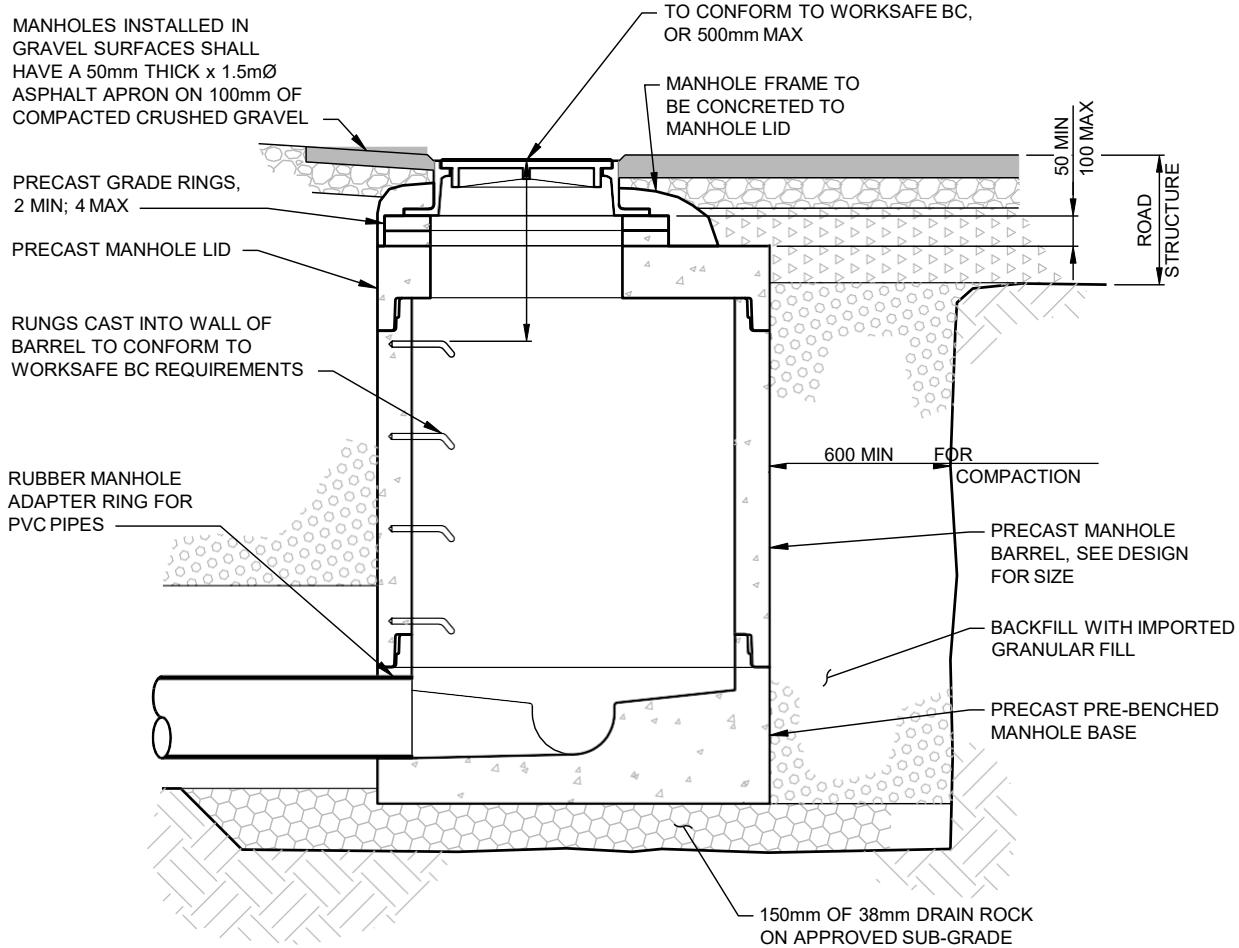
NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
3. ALL JOINTS MITRED, WELDED ALL AROUND AND GROUND SMOOTH.
4. INSTALLATION OF CHAINLINK FENCING AS REQUIRED BY THE CITY ENGINEER.
5. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



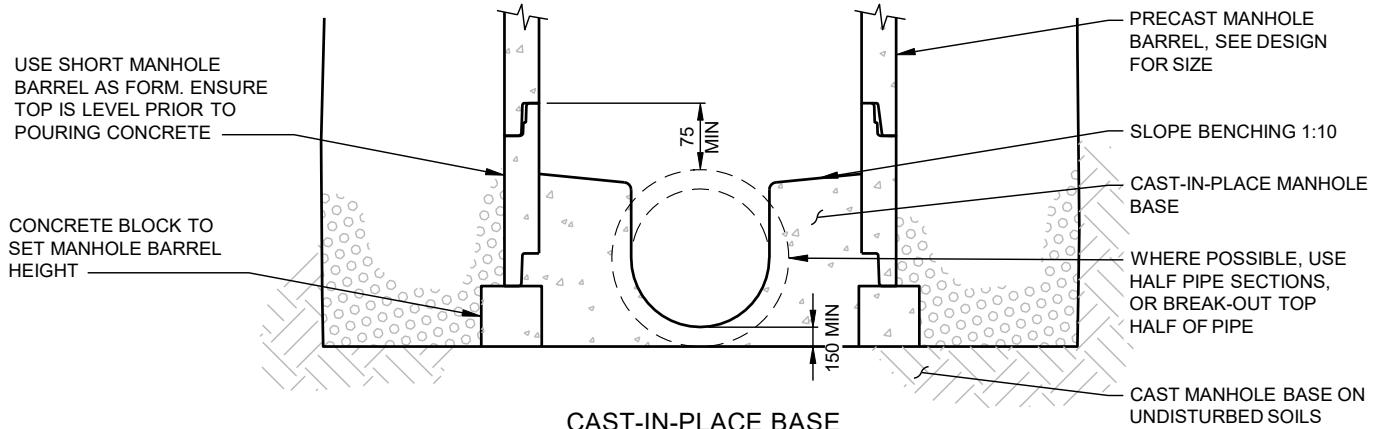
GUARD RAIL

Scale: NTS
 Created: NOV 1997
 Rev Date: NOV 2016
 Dwg No: SW-12



TYPICAL SECTION

1:25



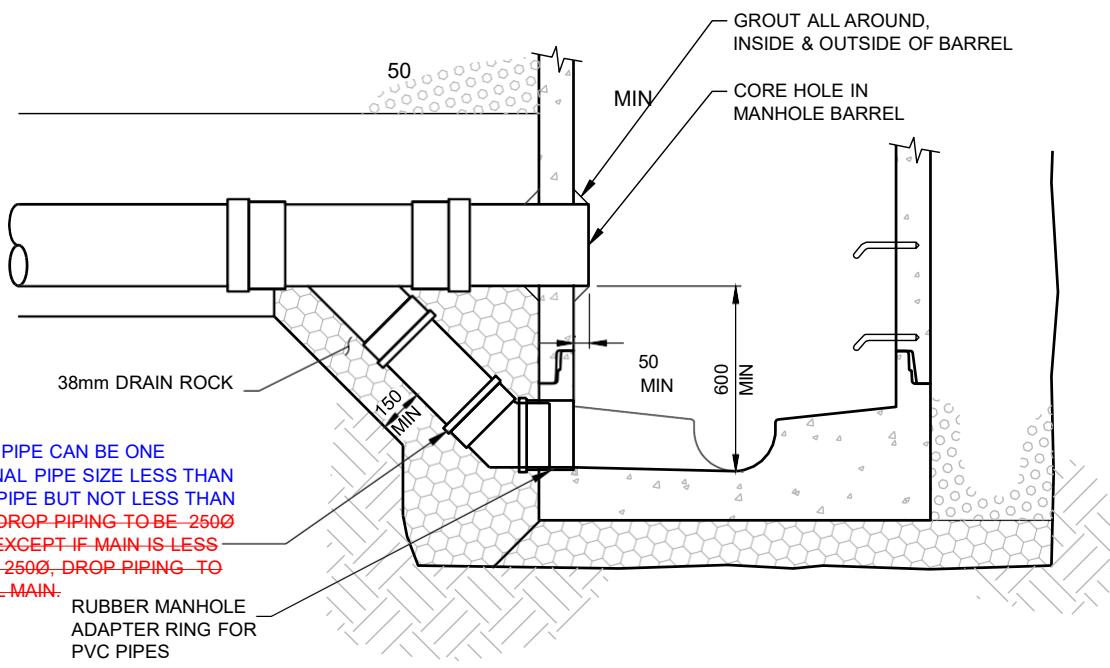
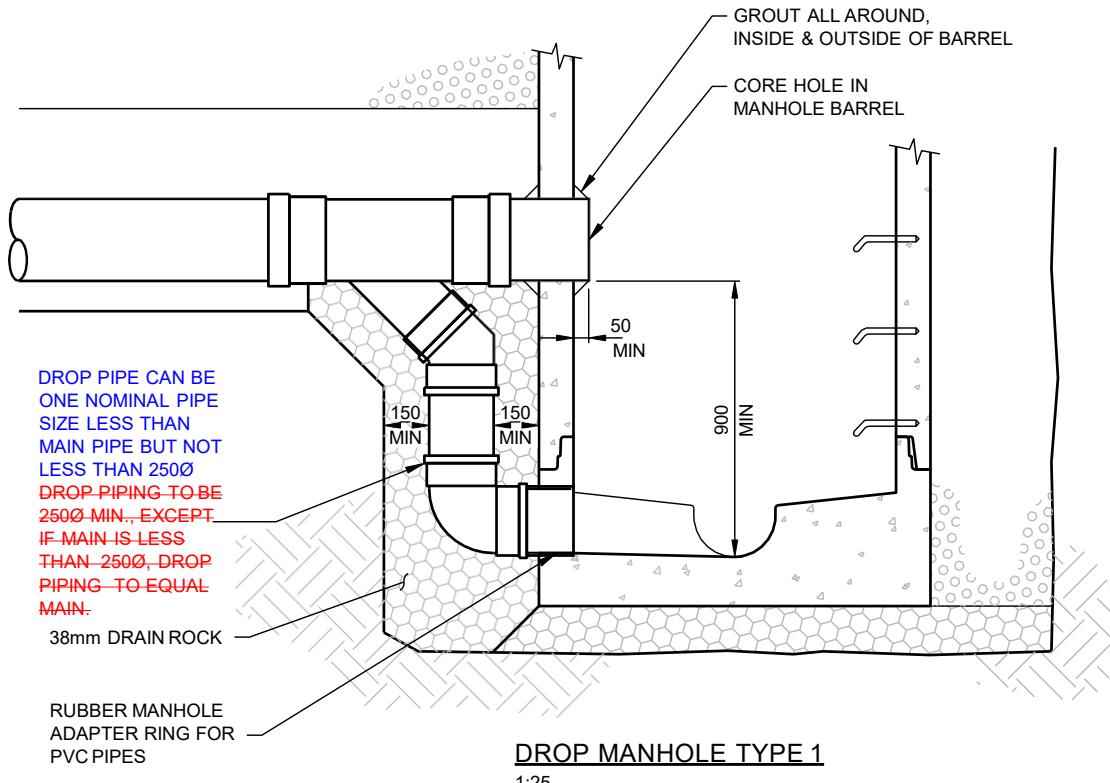
NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. FOR MANHOLE BENCHING, SEE STD DWG SW-15.
3. FOR FRAME & COVER DETAILS, SEE STD DWG SW-16.
4. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
5. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.
6. LOW PROFILE FRAMES NOT PERMITTED IN ROADS UNLESS APPROVED BY CITY ENGINEER.
7. CASTING TO BE SET FLUSH WITH TRAVELED SURFACE SUCH THAT THERE ARE NO IRREGULARITIES GREATER THAN 6mm WHEN CHECKED WITH A 3m STRAIGHT EDGE IN ANY DIRECTION.



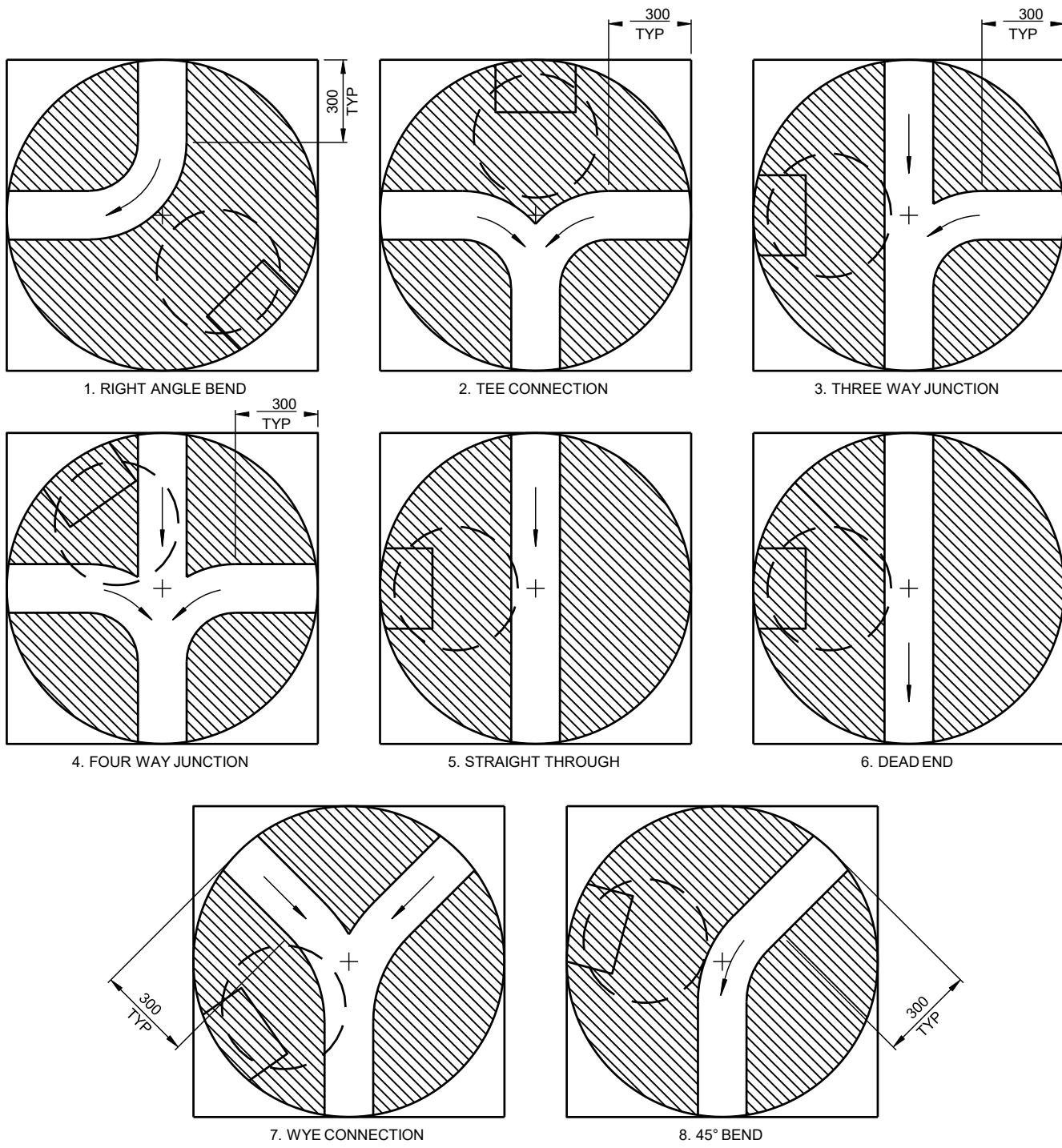
STORM MANHOLE

Scale:	1:25
Created:	FEB 2016
Rev Date:	MAY 2020
Dwg No:	SW-13



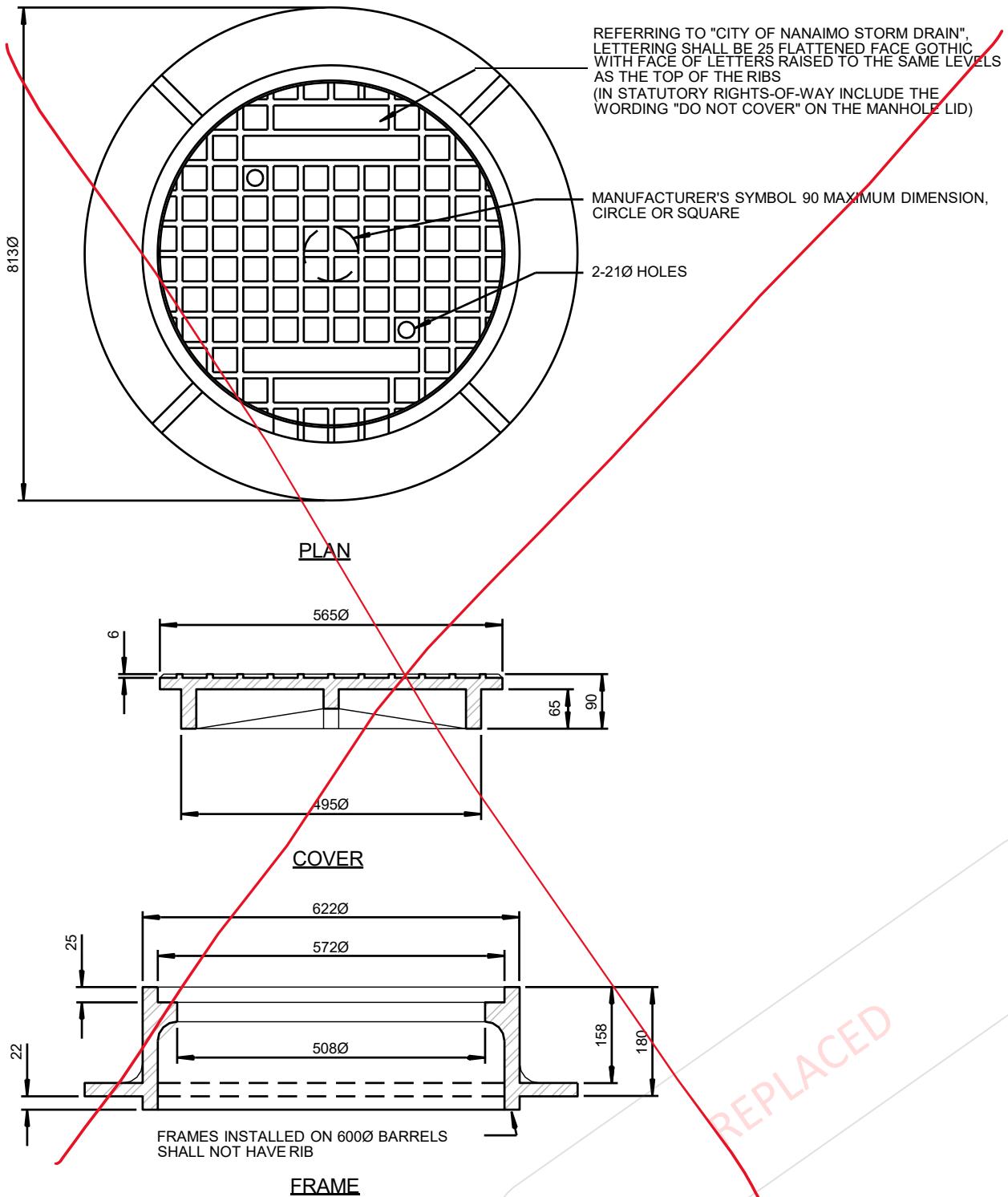
NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. FOR MANHOLE DETAILS, SEE STD DWG SW-13.
3. FOR MANHOLE BENCHING, SEE STD DWG SW-15.
4. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
5. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



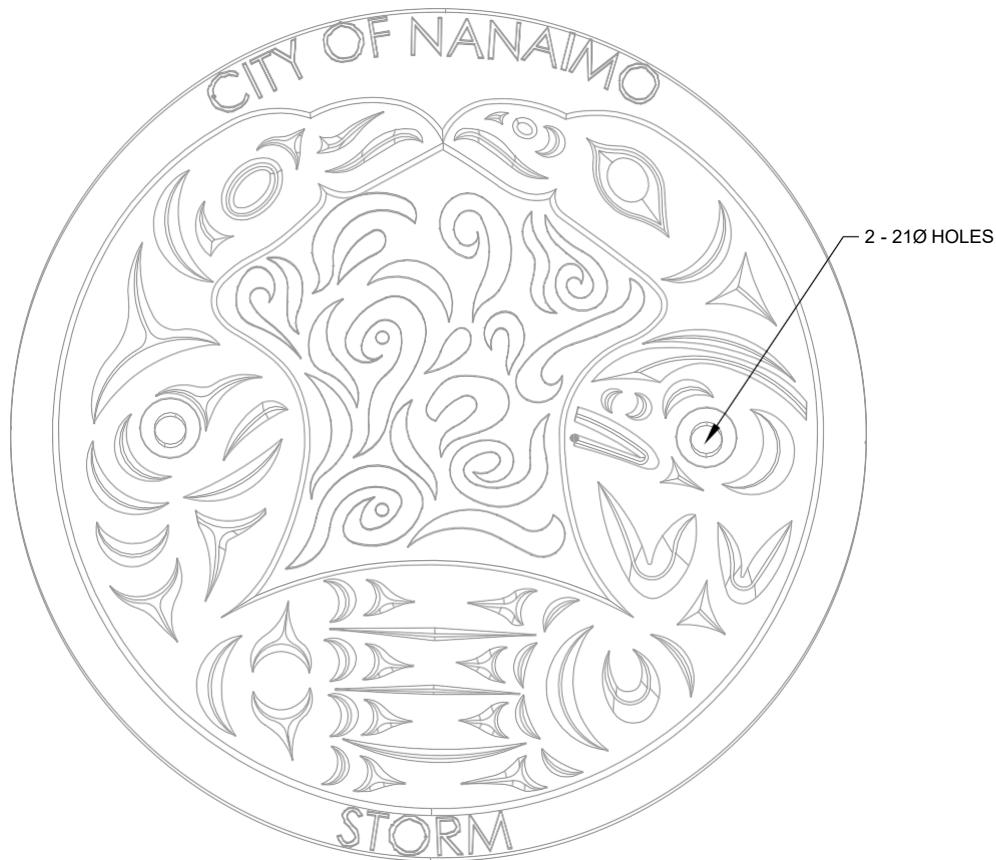
NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. FOR MANHOLE CHANNELING, REFER TO SECTION 7.49.
3. ALL CHANNELS SHALL BE FINISHED WITH A STEEL TROWEL. BENCHING (HATCHED AREAS), SHALL BE BROOM FINISHED.
4. MANHOLE COVER AND RUNG LOCATIONS SHALL BE AS SHOWN, UNLESS NOTED OTHERWISE.
5. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
6. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.

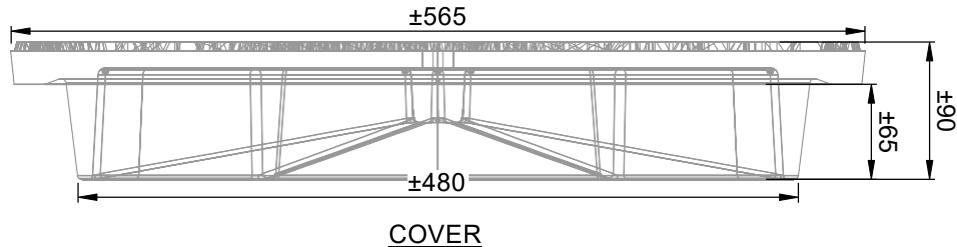


NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. CASTINGS SHALL BE CERTIFIED TO MEET CS-600 LOADING.
3. ALL BEARING SURFACES BETWEEN FRAME, COVER AND RISER RINGS SHALL BE MACHINED FOR NON-ROCKING FIT IN ALL POSITIONS. ALLOW 1.5mm RAISED FACE IN CASTINGS FOR MACHINING.
4. PAINT THE INSIDE SURFACE OF THE MANHOLE FRAME IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION WITH ENAMEL RUST PAINT. COLOUR TO BE GREEN.
5. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
6. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



PLAN



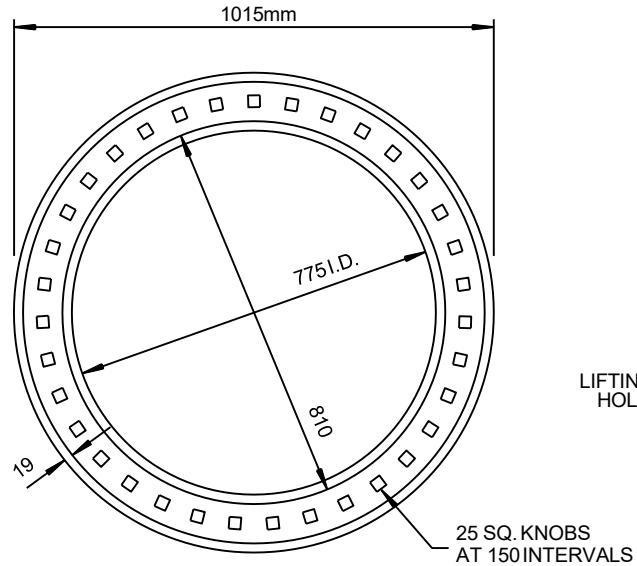
COVER

NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. CASTINGS SHALL BE CERTIFIED CS-600 LOADING.
3. ALL BEARING SURFACES BETWEEN FRAME, COVER AND RISER RINGS SHALL BE MACHINED FOR NON-ROCKING FIT IN ALL POSITIONS. ALLOW 1.5mm RAISED FACE IN CASTINGS FOR MACHINING.
4. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS WILL BE ACCEPTED FOR THIS INSTALLATION.
5. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
6. REFERRING TO "CITY OF NANAIMO STORM" LETTERING SHALL BE 25 FLATTENED FACE GOTHIC WITH FACE OF LETTERS RAISED TO THE SAME LEVELS AS THE TOP OF THE RIBS.
7. REFER TO STANDARD DRAWING SW-17 FOR FRAME AND RING.

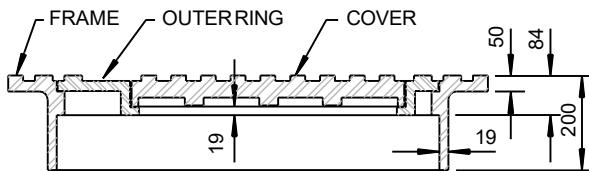


STORM MAINTENANCE MANHOLE - UTILITY
COVER SNUNEYMUXW EAGLE PATTERN
2023 - 2033

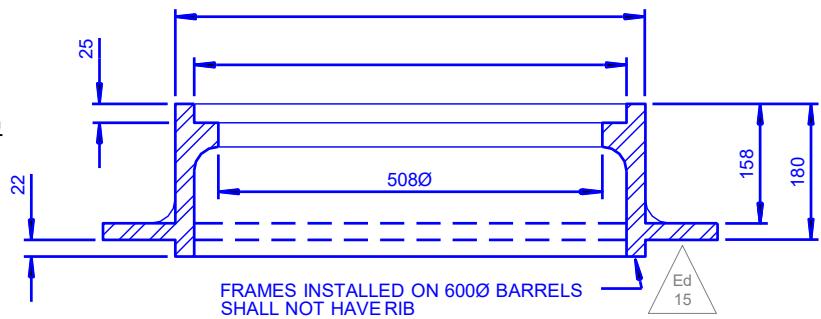


PLAN OF FRAME

PLAN OF OUTER RING



SECTION OF FRAME, RING
AND COVER



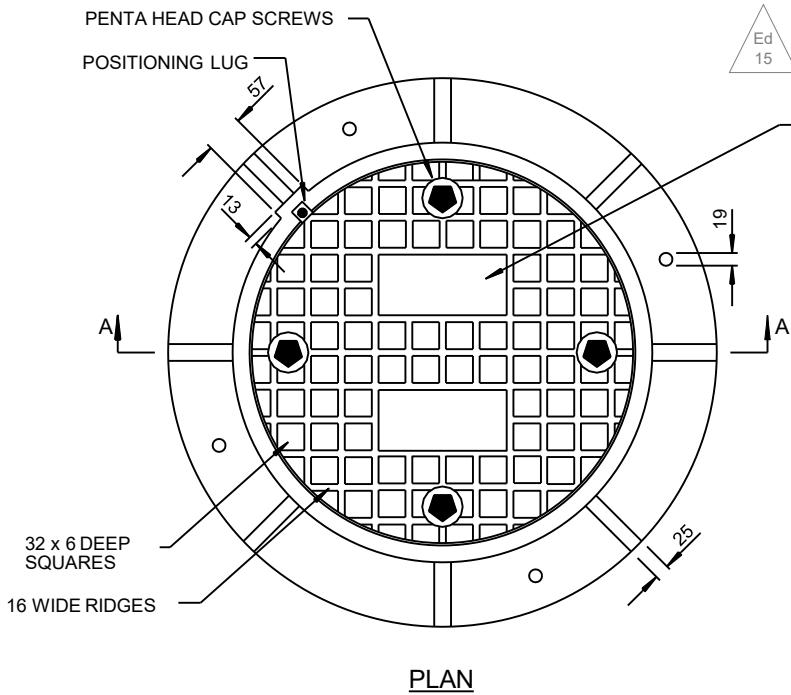
FRAME

NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. CASTINGS SHALL BE CERTIFIED TO MEET CS-600 LOADING.
3. FOR COVER LETTERING AND BOLTING REQUIREMENTS REFER TO STD. DWG. SW-16 OR SW-18 (WATERTIGHT COVER).
4. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
5. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



APPLICATION: UNITS ARE FOR USE IN AREAS WHERE FLOODING OR HIGH TIDES ARE POSSIBLE. THIS UNIT SHALL HAVE A POSITIONING LUG IN COVER FOR EASY REPLACEMENT OF CAP SCREWS AND SHALL BE EQUIPPED WITH FOUR ONLY 19Ø HOLES IN FRAME FOR ANCHOR BOLTS AS SHOWN.

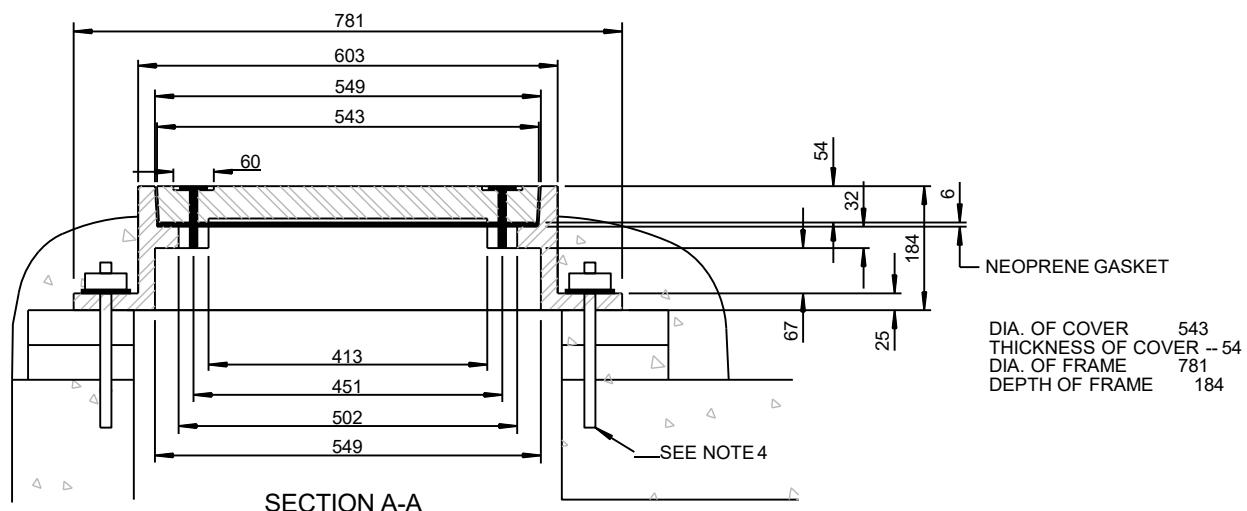


HEAVY DUTY MANHOLE COVER (SEE STD DWG S-9)
REFERRED TO "CITY OF NANAIMO-STORM-DRAIN",
LETTERING SHALL BE 25 FLATTENED FACE-GOTHIC
WITH FACE OF LETTERS RAISED TO
THE SAME LEVELS AS THE TOP OF THE RIBS
(IN STATUTORY RIGHTS-OF-WAY INCLUDE THE
WORDING "DO NOT COVER" ON THE MANHOLE LID)

WEIGHT OF UNIT SHOWN IS
FRAME = 113.4 kg
COVER = 56.7 kg

FURNISHED WITH:

- FOUR 13x57 PENTA HEAD STAINLESS STEEL CAP SCREWS TO DISCOURAGE VANDALISM.
- A 6mm THICK NEOPRENE GASKET FULLY ENCOMPASSING BOLT HOLES.
- METAL SURFACES BETWEEN FRAME AND COVER MACHINED TO ENSURE NON ROCKING FIT IN ALL POSITIONS. ALLOW 1.5 RAISED FACE IN CASTING FOR MACHINING.
- MANUFACTURE BOLT HOLES TO PERMIT INTERCHANGING OF COVERS BETWEEN FRAME UNITS.



DIA. OF COVER 543
THICKNESS OF COVER -- 54
DIA. OF FRAME 781
DEPTH OF FRAME 184

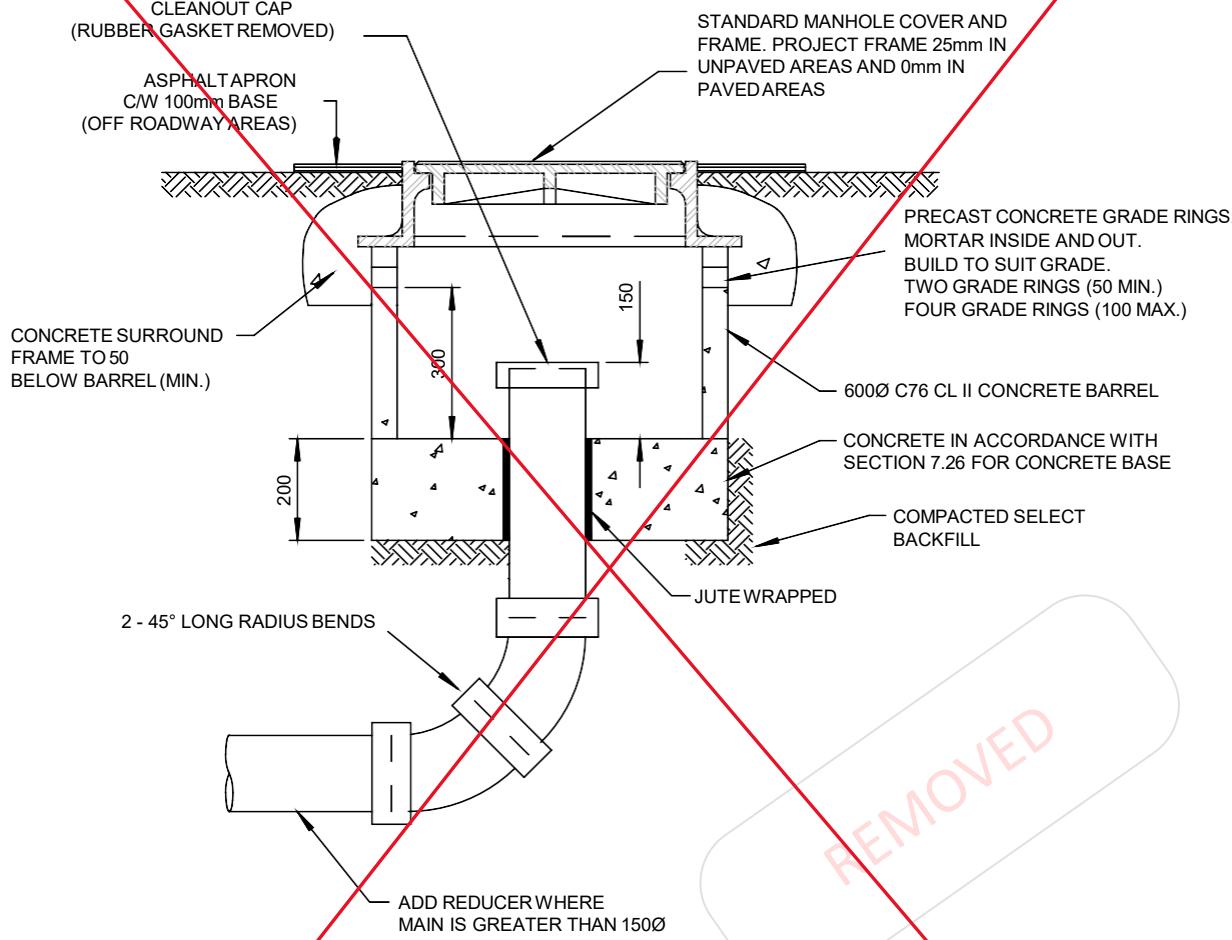
NOTES:

- THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
- CASTINGS SHALL BE CERTIFIED TO MEET CS-600 LOADING.
- PAINT THE INSIDE SURFACE OF THE MANHOLE FRAME IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION WITH ENAMEL RUST PAINT. COLOUR TO BE GREEN.
- FRAME SHALL BE SET IN MORTAR AND BOLTED TO THE MANHOLE SLAB WITH 19Ø STAINLESS STEEL BOLTS, WASHERS AND NUTS.
- THIS DRAWING TO BE READ IN ACCORDANCE WITH DRAWING SW-13.
- ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
- ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



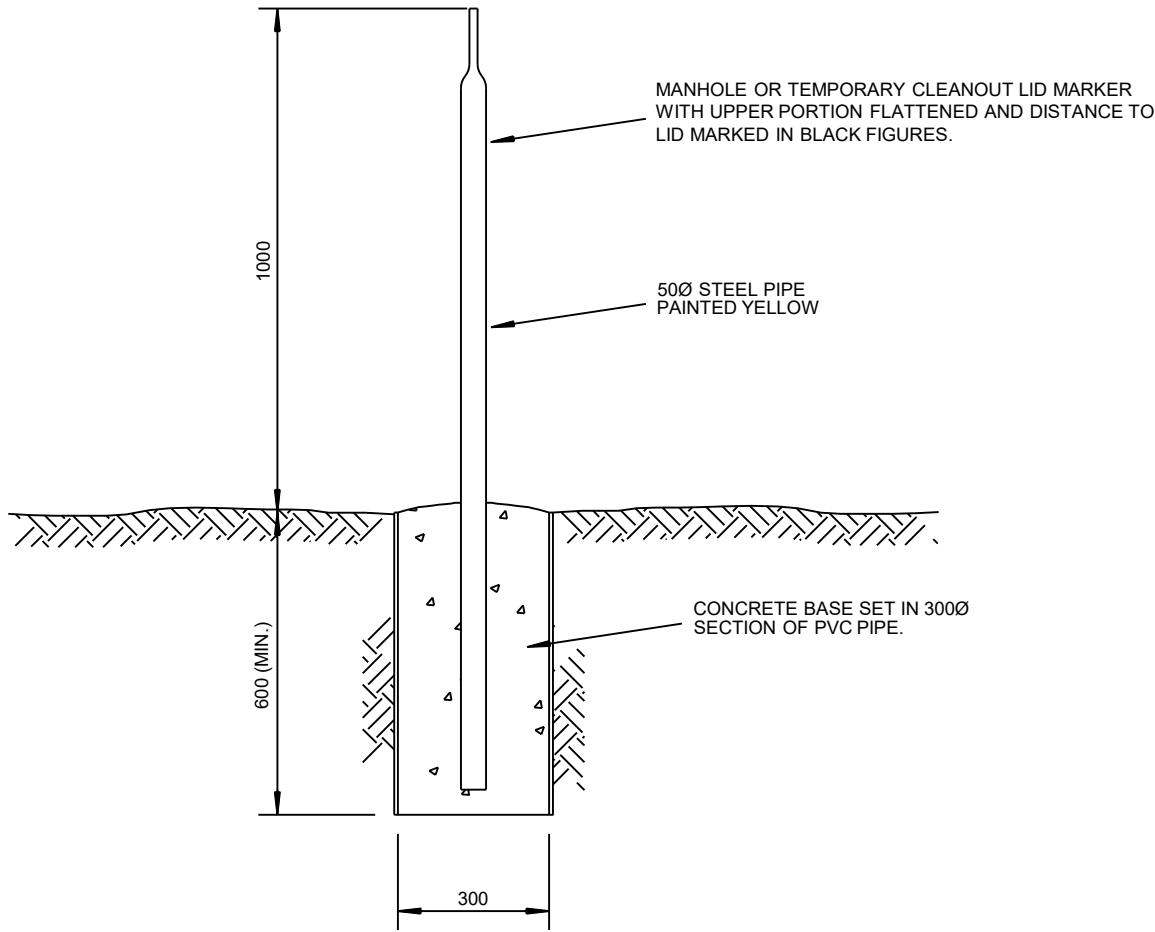
WATERTIGHT STORM MANHOLE
FRAME AND COVER

Scale: NTS
Created: MAR 2016
Rev Date: NOV-2016
Dwg No: SW-18



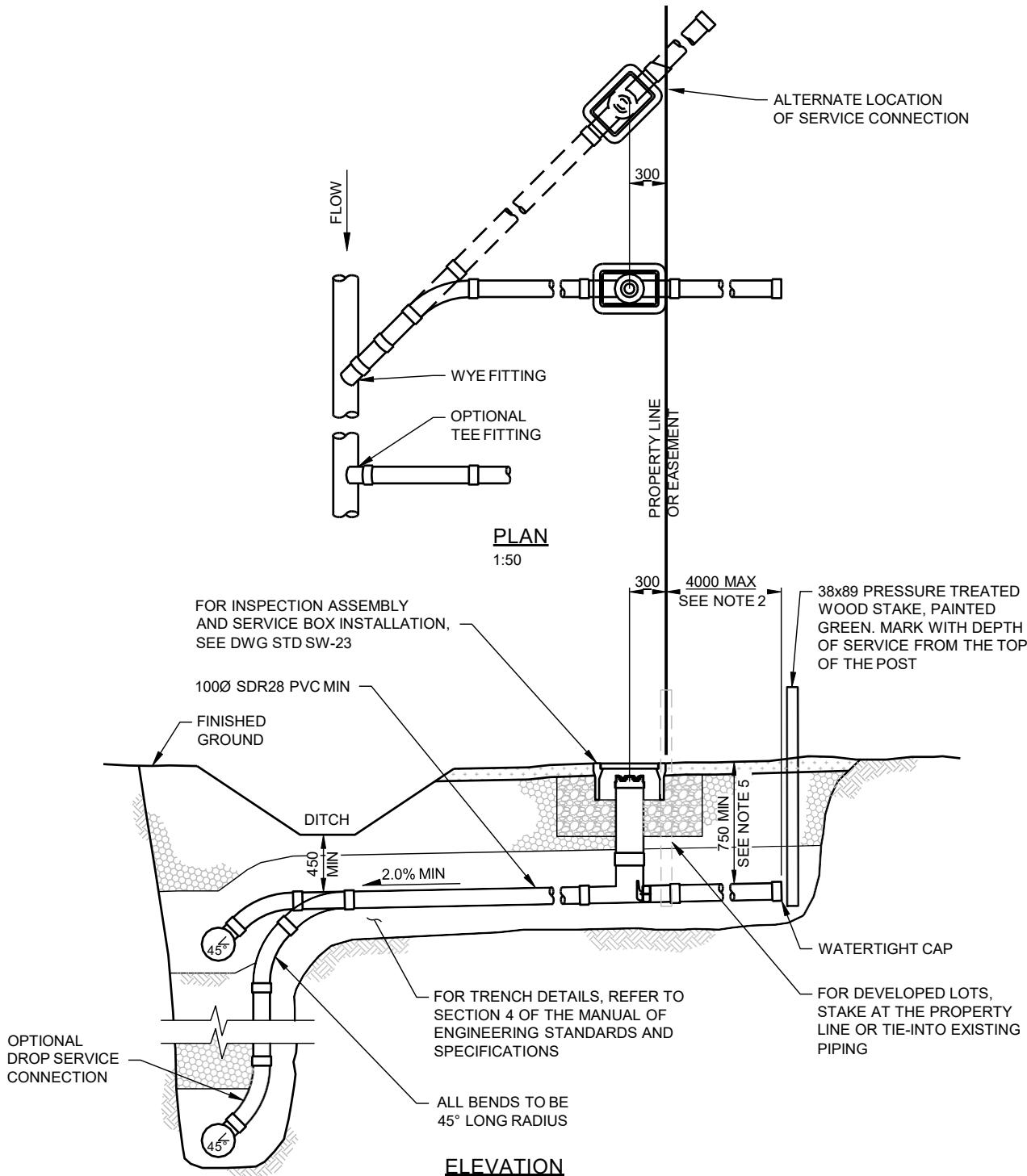
NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. TEMPORARY CLEANOUT STRUCTURES MAY ONLY BE USED AT THE DISCRETION OF THE CITY ENGINEER WHERE THERE IS DEVELOPMENT PHASING.
3. USE WHERE NO SERVICE EXTENSION IS REQUIRED.
4. FRAME AND COVER TO STD. DWG. SW-16 OR SW-18 (WATERTIGHT COVER).
5. CLEANOUT STRUCTURES LOCATED ON GRAVEL ROADS OR SHOULDER REQUIRE A 1.5m x 1.5m HOT MIX ASPHALT APRON, 50mm THICK.
6. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
7. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. FOR USE ONLY WHERE MANHOLE OR TEMPORARY CLEANOUTS ARE LOCATED OUTSIDE THE PAVED PORTION OF THE STREET.
3. THE MARKER SHALL BE LOCATED ON SITE BY THE ENGINEER WITH THE FLATTENED END AND MARKED DISTANCE FACING THE LID.
4. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.

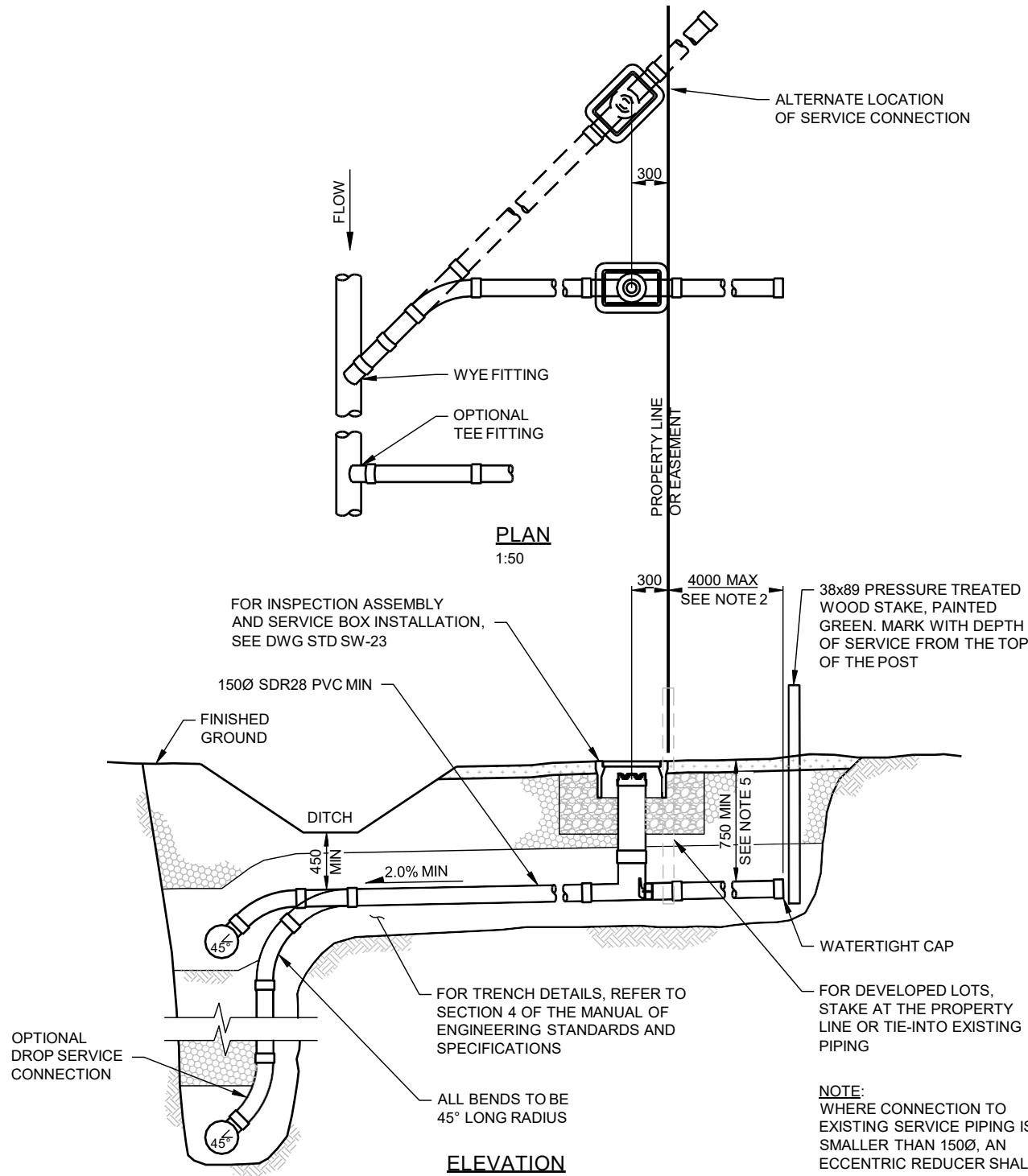


NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. WHERE DEPTH OF SERVICE AT PROPERTY LINE IS GREATER THAN 2.0m, EXTEND THE SERVICE PAST THE PROPERTY LINE EQUAL TO ITS DEPTH, TO A MAXIMUM OF 4.0m.
3. WHERE SERVICE IS INSTALLED IN ROCK, THE TRENCH IS TO EXTEND 3.0m PAST THE PROPERTY LINE.
4. STORM SEWER INSPECTION ASSEMBLY, INCLUDING PROPERTY SIDE STUB TO BE GREEN.
5. SERVICE PIPE DEPTH TO BE INSTALLED TO PROVIDE SUFFICIENT DEPTH TO SERVICE THE BASEMENT PLUMBING BY GRAVITY IN ACCORDANCE WITH THE BC PLUMBING CODE. MINIMUM COVER OF SERVICE PIPE AT PROPERTY LINE TO BE 0.75m.
6. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
7. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



GENERAL STORM SERVICE CONNECTION DETAIL
RISER AND NON-RISER TYPES

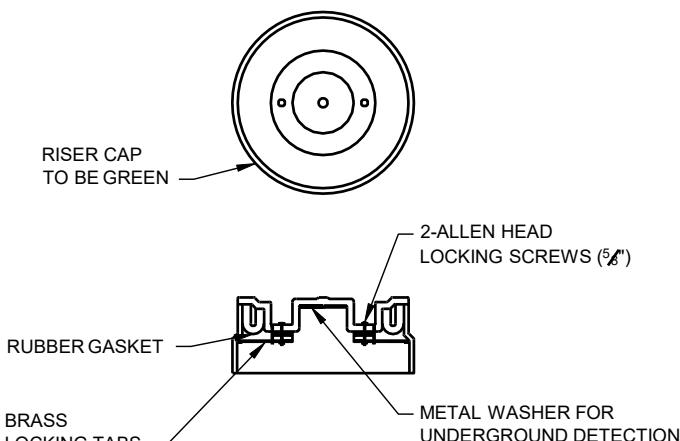
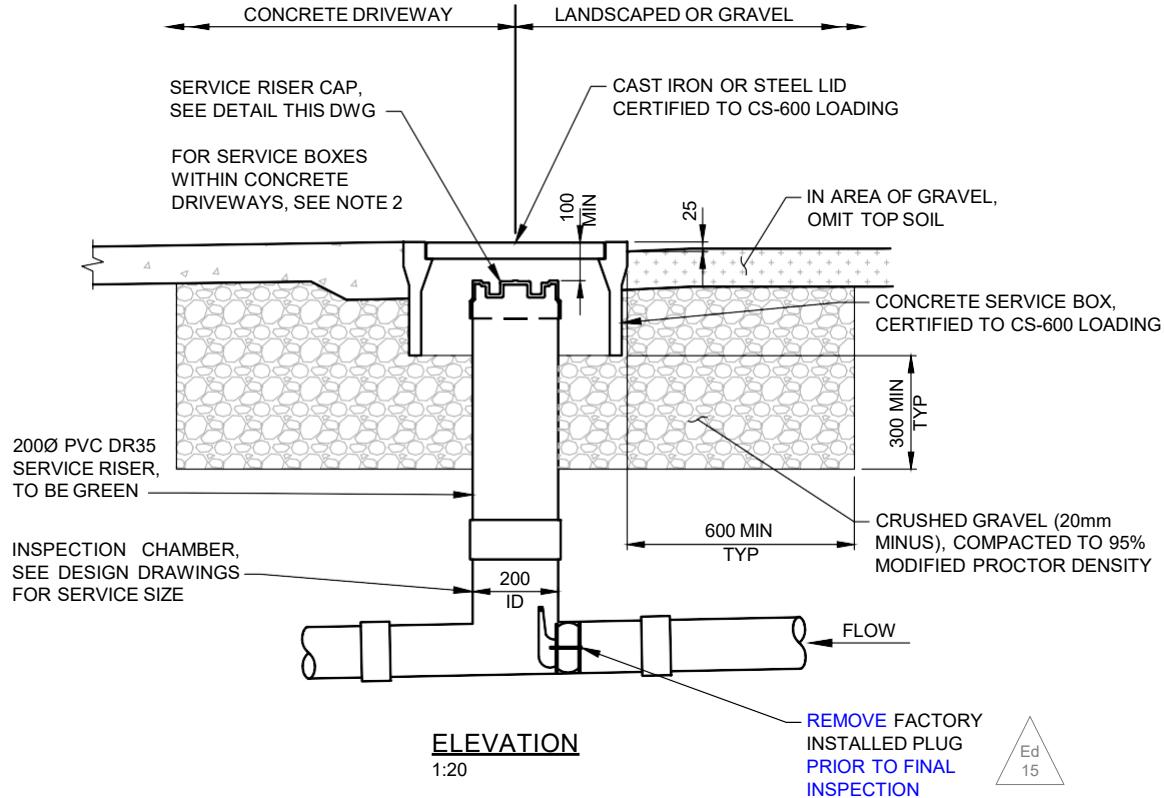


NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. WHERE DEPTH OF SERVICE AT PROPERTY LINE IS GREATER THAN 2.0m, EXTEND THE SERVICE PAST THE PROPERTY LINE EQUAL TO ITS DEPTH, TO A MAXIMUM OF 4.0m.
3. WHERE SERVICE IS INSTALLED IN ROCK, THE TRENCH IS TO EXTEND 3.0m PAST THE PROPERTY LINE.
4. STORM SEWER INSPECTION ASSEMBLY, INCLUDING PROPERTY SIDE STUB TO BE GREEN.
5. SERVICE PIPE DEPTH TO BE INSTALLED TO PROVIDE SUFFICIENT DEPTH TO SERVICE THE BASEMENT PLUMBING BY GRAVITY IN ACCORDANCE WITH THE BC PLUMBING CODE. MINIMUM COVER OF SERVICE PIPE AT PROPERTY LINE TO BE 0.75m.
6. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
7. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



COMMERCIAL AREA STORM
SERVICE CONNECTION DETAIL
RISER AND NON-RISER TYPES



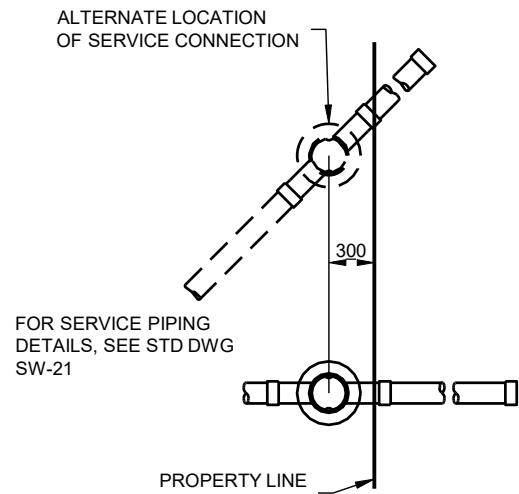
RISER CAP DETAIL
NTS

NOTES:

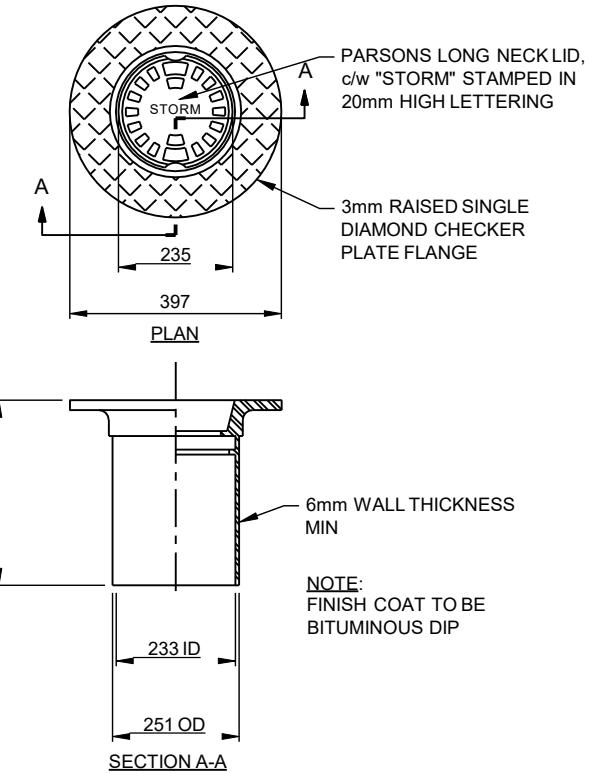
1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. WHEN SERVICE BOX IS WITHIN CONCRETE DRIVEWAY, CONCRETE ADJACENT TO THE SERVICE BOX MUST BE A MINIMUM OF 150mm THICK FOR A MINIMUM DISTANCE OF 150mm AROUND THE OUTSIDE EDGES OF THE SERVICE BOX.
3. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
4. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



STORM SERVICE BOX AND
INSPECTION ASSEMBLY INSTALLATION

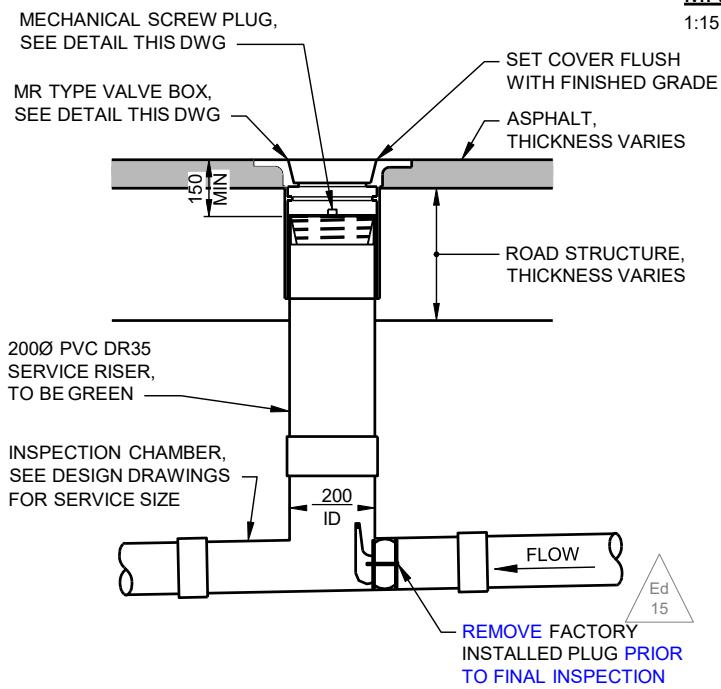


PLAN - VALVE BOX LOCATIONS
NTS



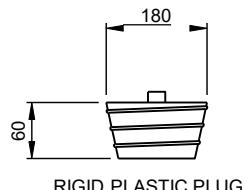
MR STYLE VALVE BOX

1:15

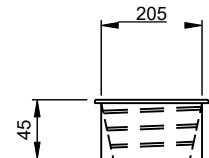


INSPECTION ASSEMBLY ELEVATION

1:20



RIGID PLASTIC PLUG



RUBBER SEALING COLLAR

MECHANICAL SCREW PLUGS

NTS

NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
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3. ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.



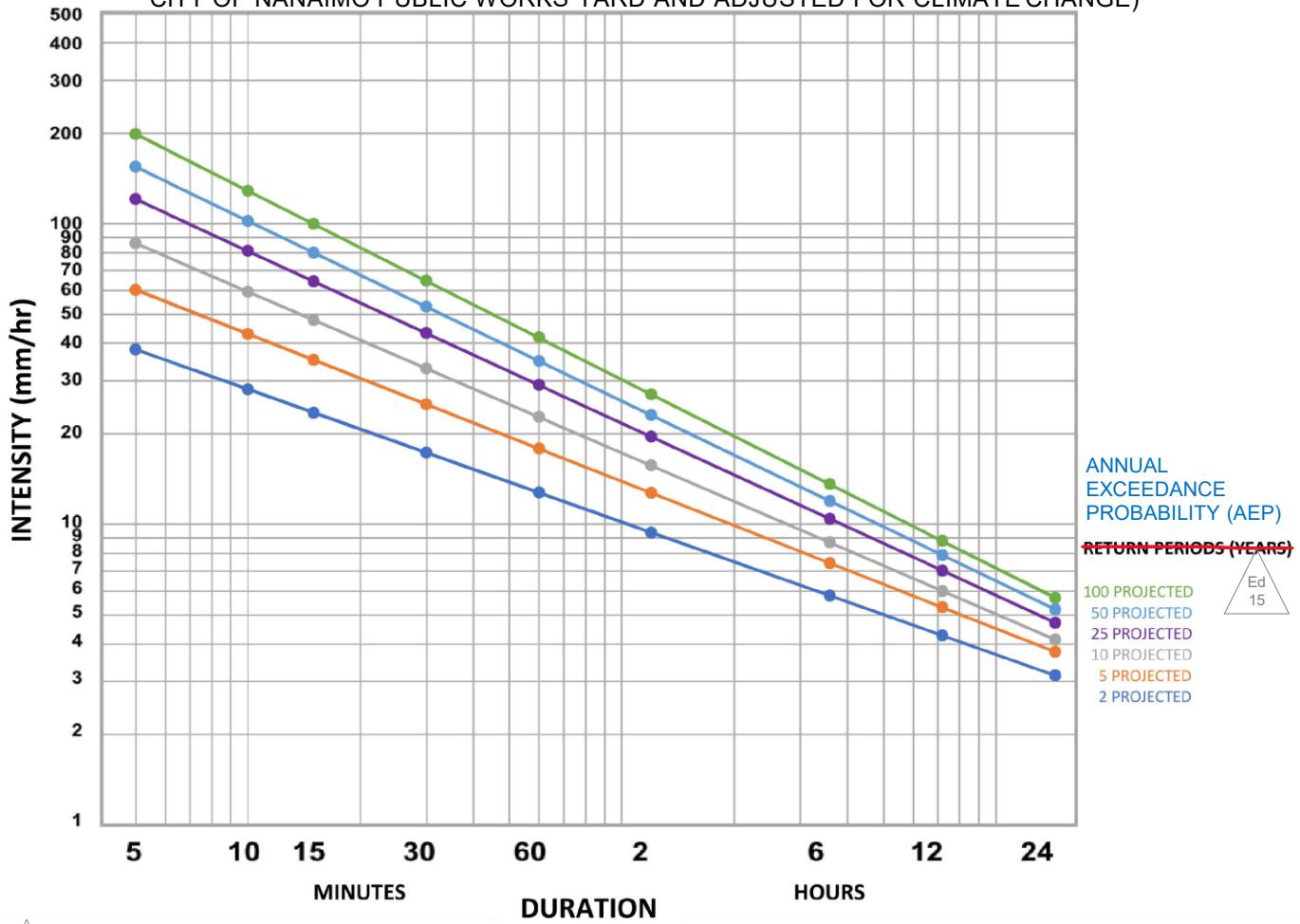
STORM SERVICE BOX AND INSPECTION ASSEMBLY
INSTALLATION IN PAVED LANES AND ROADWAYS

Scale: ASNOTED
Created: MAR 2016
Rev Date: NOV-2016
Dwg No: SW-24

Ed 15

SHORT DURATION RAINFALL INTENSITY-DURATION FREQUENCY DATA FOR NANAIMO

(BASED ON RECORDING RAIN GAUGE DATA FOR THE PERIOD 1980 - 2018 FROM CITY OF NANAIMO PUBLIC WORKS YARD AND ADJUSTED FOR CLIMATE CHANGE)



CURVE BEST-FIT PARAMETERS:

RETURN PERIOD (YR)	AEP	1:2	1:5	1:10	1:25	1:50	1:100
A		12.8	17.9	22.7	29.1	34.9	41.8
B		-0.441	-0.490	-0.536	-0.573	-0.599	-0.628

RAINFALL INTENSITIES, I (mm/hr):

T	ANNUAL EXCEEDANCE PROBABILITY					
	1:2	1:5	1:10	1:25	1:50	1:100
5 min	38.2	60.3	86.2	120.7	154.7	199.0
10 min	28.1	42.9	59.4	81.2	102.2	128.8
15 min	23.5	35.2	47.8	64.3	80.1	99.9
30 min	17.3	25.1	33.0	43.3	52.9	64.6
1 h	12.8	17.9	22.7	29.1	34.9	41.8
2 h	9.4	12.7	15.7	19.6	23.1	27.1
6 h	5.8	7.4	8.7	10.4	11.9	13.6
12 h	4.3	5.3	6.0	7.0	7.9	8.8
24 h	3.1	3.8	4.1	4.7	5.2	5.7

NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. RETURN PERIOD IS NOW EXPRESSED AS ANNUAL EXCEEDANCE PROBABILITY (AEP), THE CHANCE OF AN EVENT OCCURRING IN ANY GIVEN YEAR. FOR EXAMPLE, A 1% AEP (1:100 AEP) IS THE 100-YEAR RETURN PERIOD, AND A 20% AEP (1:5 AEP) IS THE 5-YEAR RETURN PERIOD.

CURVES BASED ON FORMULA: $I = A \times T^B$

where T = Time of Concentration (hr)
where I = Intensity (mm/hr)

NOTE:
Convert Time of Concentration to HOURS in above formula.



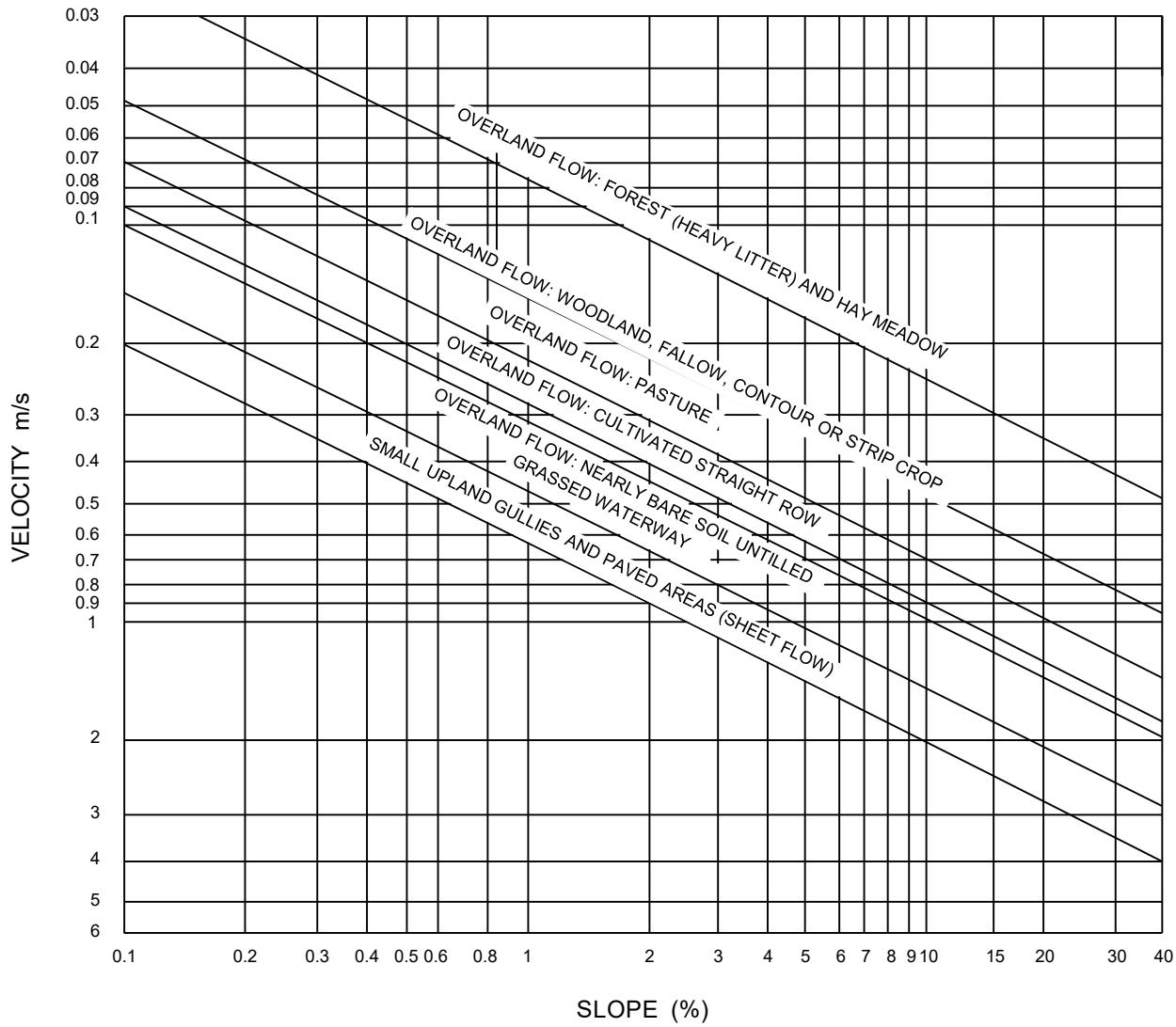
RAINFALL CURVES

Scale: NTS

Created: MAR 2016

Rev Date: MAY 2020

Dwg No: SW-25



UPLAND METHOD FOR ESTIMATING TIME OF CONCENTRATION

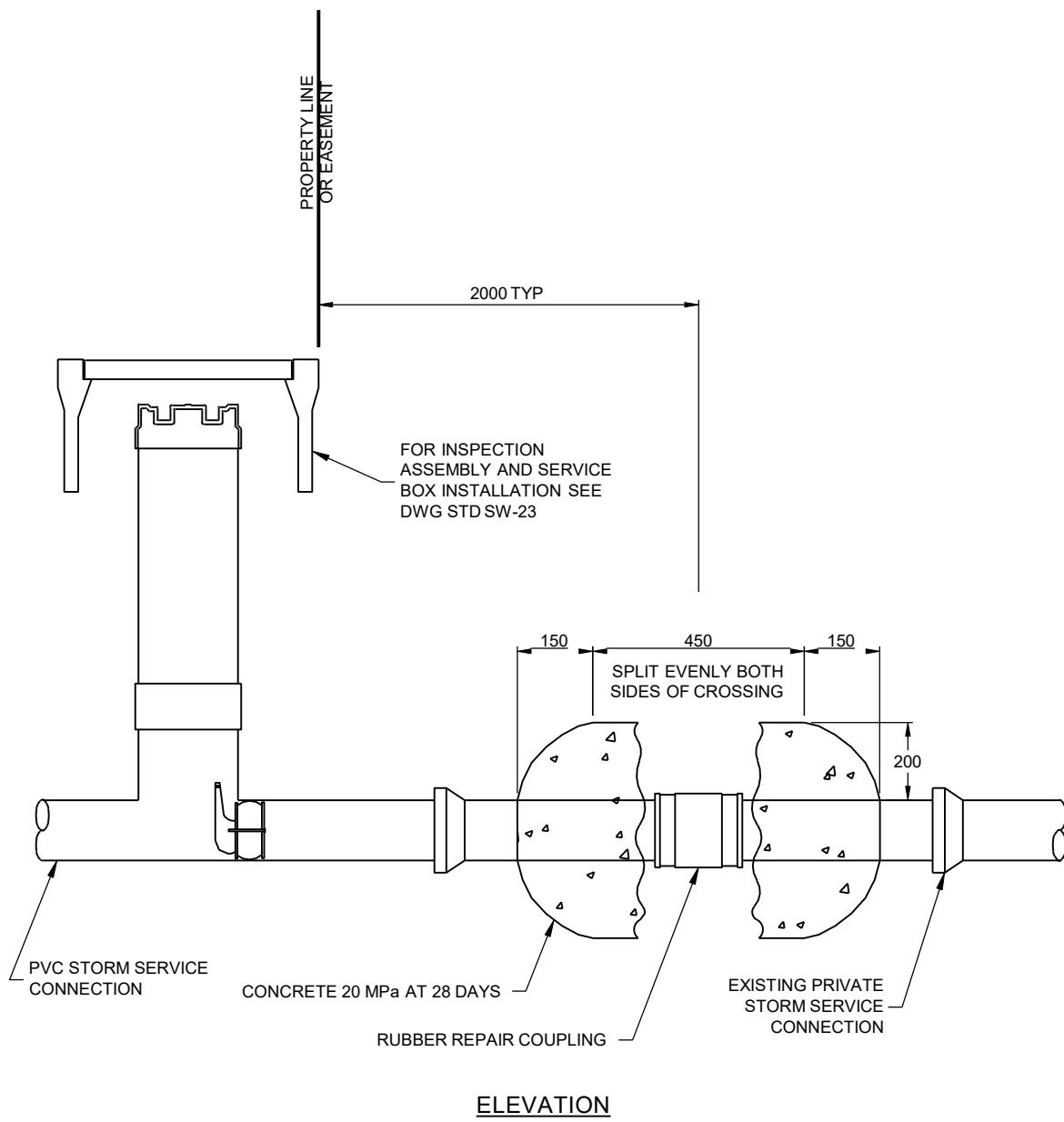
NOTES:

1. THIS DRAWING SHALL BE USED IN ACCORDANCE WITH SECTION 7.0 OF THE MANUAL OF ENGINEERING STANDARDS AND SPECIFICATIONS, LATEST EDITION.
2. THIS TABLE IS LIMITED FOR USE IN DRAINAGE BASINS UP TO 10km².
3. THIS TABLE DOES NOT MAKE ALLOWANCES FOR VARIATIONS IN SOIL TYPES AND MAY UNDERESTIMATE TIMES FOR PERMEABLE BASINS.



TIME OF CONCENTRATION TABLE

Scale: NTS
Created: NOV 2009
Rev Date: NOV 2016
Dwg No: SW-26



NOTES:

1. ONLY PRODUCTS LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
2. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SHOWN.
3. SPIGOTS IF PRESENT SHALL BE REMOVED BEFORE COUPLING IS INSTALLED.