

Rehabilitation Procedure for PREDL Corprotect Wall Liner

Step 1, 2 & 3] Preparation

- Excavate and remove the flat top slab/ concrete cone
- Power wash the manhole walls – show the gravel

Step 4] Install PREDL Corprotect Wall Liner

i) Lower the Corprotect Wall Liner supplied by Predl inside the manhole

- Mark on the Corprotect Wall Liner pieces to be cut away (elevation difference between the sides of the benching – if any, openings for inside/outside drop, openings for pipe inlet & outlet)
- Cut away marked sections on site.
- Mastic sealant is to be applied on the bottom of the Corprotect Wall Liner, so that the liner sits on the mastic inside the manhole, providing effective seal between the benching surfaces.
- The Corprotect Wall Liner should extend taller than the existing manhole, to accompany any adjustments as required on site.
- If the manhole has inside/outside drop, following options can be used to seal the opening:
- Option 1: Attach donut & sleeve (PP material without anchor teeth) piece to the outside drop opening such that the sleeve penetrates inside the incoming pipe. The donut & sleeve will be welded together in shop, and the OD of the sleeve will match the ID of the incoming pipe. Weld the donut piece to the Corprotect Wall Liner.
- Option 2: Chip away existing concrete around the opening, so that Predl Bell can be pushed inside the existing concrete wall. Attach a gasket-bell connection to the opening (concrete chipped away to allow proper alignment of the bell), and weld a donut piece (attached to the bell) to the Corprotect Wall Liner.

ii) Attach the channel-grout-supports underneath the PREDL Corprotect Wall Liner, on each pipe inverts

- The piece will be in shape of a half ring made up of resin sprayed-EPS. The piece should span the length between two inches inside the sewer pipe, to the two inches inside the Corprotect Wall Liner, and will be pushed against the Corprotect Wall Liner using (two-by-four) supports.
- Aqua plug can be used to seal the gap between the support and the inside of the pipe.



iii) Lower in 1st set of resin-sprayed EPS pouring support.

- The 1st piece will be of 10" in depth, with an opening (ring shape) to monitor possible leakage during casting grout. Each set of pouring support will be made up of two half-circle EPS supports, with plywood in the middle to push the supports against the liner walls.

Step 5) Cast grout behind the PREDL Corprotect Wall Liner**i) Pour concrete/grout between the PREDL Corprotect Wall Liner and the existing manhole structure to the level of the pouring support. Wait until the grout sets (use fast setting grout).****ii) - Lower in the remaining sets of EPS pouring supports**

- Each level will be of 3' in depth, and the supports should fill the entire space in the Corprotect Wall Liner such that the last set will partially extrude out from the existing manhole. Pour concrete/grout to the level of the top of the existing manhole.

iii) Wait until the grout sets, then remove the EPS pouring supports and the channel-grout-supports, which can be reused in rehabilitation of other manholes.**iv) Ladder rungs**

- Mark on the liner holes to be drilled for ladder rung installations (if not ordered as a part of the Corprotect Wall Liner). Drill the holes, apply epoxy on the ladder rungs, insert them into the holes, and provide seal using rubber gasket.

Step 6) Install pre-cast flat top slab/concrete cone

- Install pre-cast flat top slab/concrete cone with liner integrally cast in concrete (supplied by Predl and casted by local pre-caster), onto the manhole structure. The concrete manhole lid will be fully lined, with pre-installed telescoping lid liner with gasket connection and cover prior to the installation.

i) - Weld the flat top/cone liner to the PREDL Corprotect Wall Liner, to provide a sealing connection (if required)**Step 7) Install PREDL Telescopic Access Collar with grade rings**

*Note that when choosing type of grout or concrete, it should be suitable for thicknesses less than 1 inch, so it can fill the gaps between the liner anchors.



REHAB STEPS

STEP1 - CUT AND REMOVE EXISTING ASPHALT OR CONCRETE

STEP2 - EXCAVATE & REMOVE DIRT TO EXPOSE EXISTING MANHOLE CONE

STEP3 - REMOVE EXISTING MANHOLE FLAT TOP OR EXISTING CONE

STEP4 - INSTALL CORPROTECT (3mm YELLOW PP) WALL LINER SUPPLIED BY PREDL SYSTEMS

STEP5 - CAST GROUT BEHIND THE WALL LINER

STEP6 - INSTALL PRECAST TOP FLAT OR CONCRETE CONE-WITH LINERS INTEGRALLY CAST IN CONCRETE

STEP7 - INSTALL TELESCOPIC COLLAR WITH GRADE RINGS

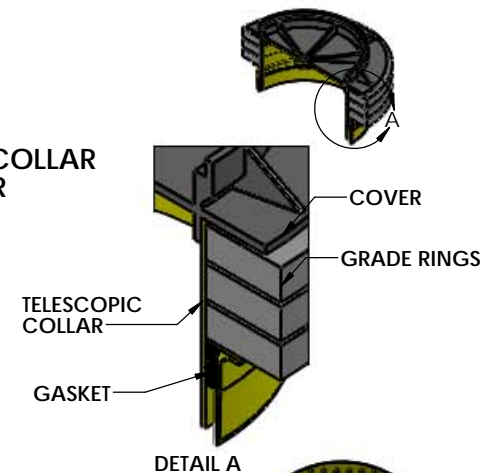
MATERIAL SPECIFICATION:

1. Polypropylene (PP-C & PP-R)

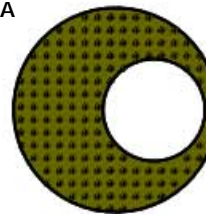
| Property | Testing Method | Unit | Typical Values PPR Concrete Protective liner |
|---|---------------------------|-------------------|--|
| Density | ISO 1183 (ASTM D 792) | g/cm ³ | 0.90 |
| Melt Flow Rate | ISO 1133 (ASTM D 1238) | g/10 min. | 0.27 (230/2, 16) |
| Heat Reversion (Dimensional Stability) | EN ISO 14632 | % | <3 (90°C/ 1.5h) |
| Tensile Stress at Yield | ISO 527 | N/mm ² | 20 |
| Elongation at Yield | ISO 527 | % | 12 |
| Elongation at Break | ISO 527 | % | 250 |
| Flexural Modulus | ISO 178 | MPa | 800 |
| FIRE CLASSIFICATION | DIN 4102/part 1 UL 94 | | B2 94-HB |
| Surface Resistivity | DIN 4102/ (ASTM D 257) | N/mm Ohm | X |
| Resistance to pull-out (Corprotect only) | SKZ test directives | t/m ² | >42 |
| Recommended Maximum Working Temperature | | °C °F | 90 194 |

REHAB COMPONENTS SUPPLIED BY PREDL SYSTEMS

- TELESCOPIC COLLAR AND LID LINER



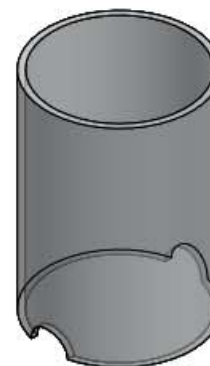
- FLAT TOP LINER OR CORE LID LINER



- WALL LINER

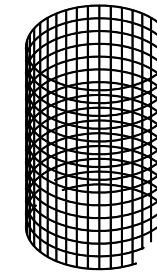


- GROUT (TO BE SUPPLIED BY OTHERS)

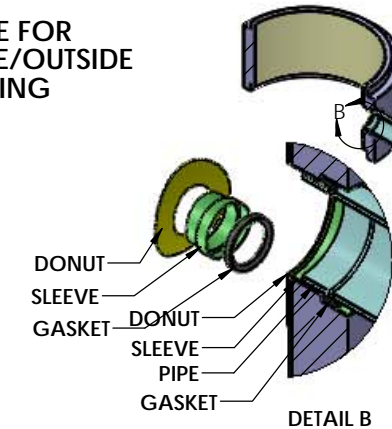


OPTIONAL

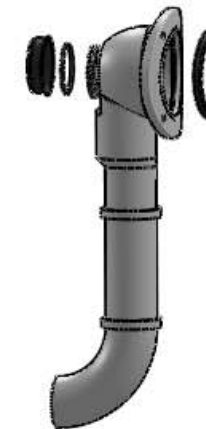
- STEEL MESH CAGE



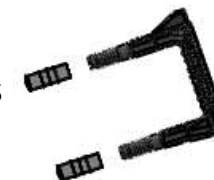
- SLEEVE FOR INSIDE/OUTSIDE OPENING



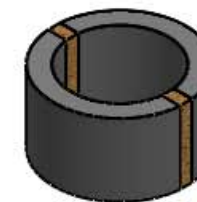
- INSIDE DROP



- LADDER RUNGS AND INSETS



- EPS POURING SUPPORT (CHANNEL)



- EPS POURING SUPPORT (MANHOLE CORE)



7520 Conrad Street
Burnaby, B.C. V5A 2H7
Phone : 604 415-9944
Fax : 604 415-9954

DRAWN BY : YW
DATE DRAWN : 5/07/2014
APPROVED :

NOTES:

- REFER TO REHABILITATION PROCEDURE FOR PREDL WALL LINER FOR COMPLETE NOTES.
- THIS GUIDE IS GENERIC IN NATURE. CONTRACTORS SHOULD CONTACT PREDL SYSTEMS FOR DETAILED SPECIFICATIONS AND PROCEDURES

REVISION NO: DATE/DESCRIPTION :

SPECIFIED FOR:

DESCRIPTION:

**PREDL SYSTEMS
MANHOLE WALL
REHABILITATION
INSTALLATION GUIDE**

SHOP DWG. NO. REV. NO.

70 **0**
WORK ORDER NUMBER:

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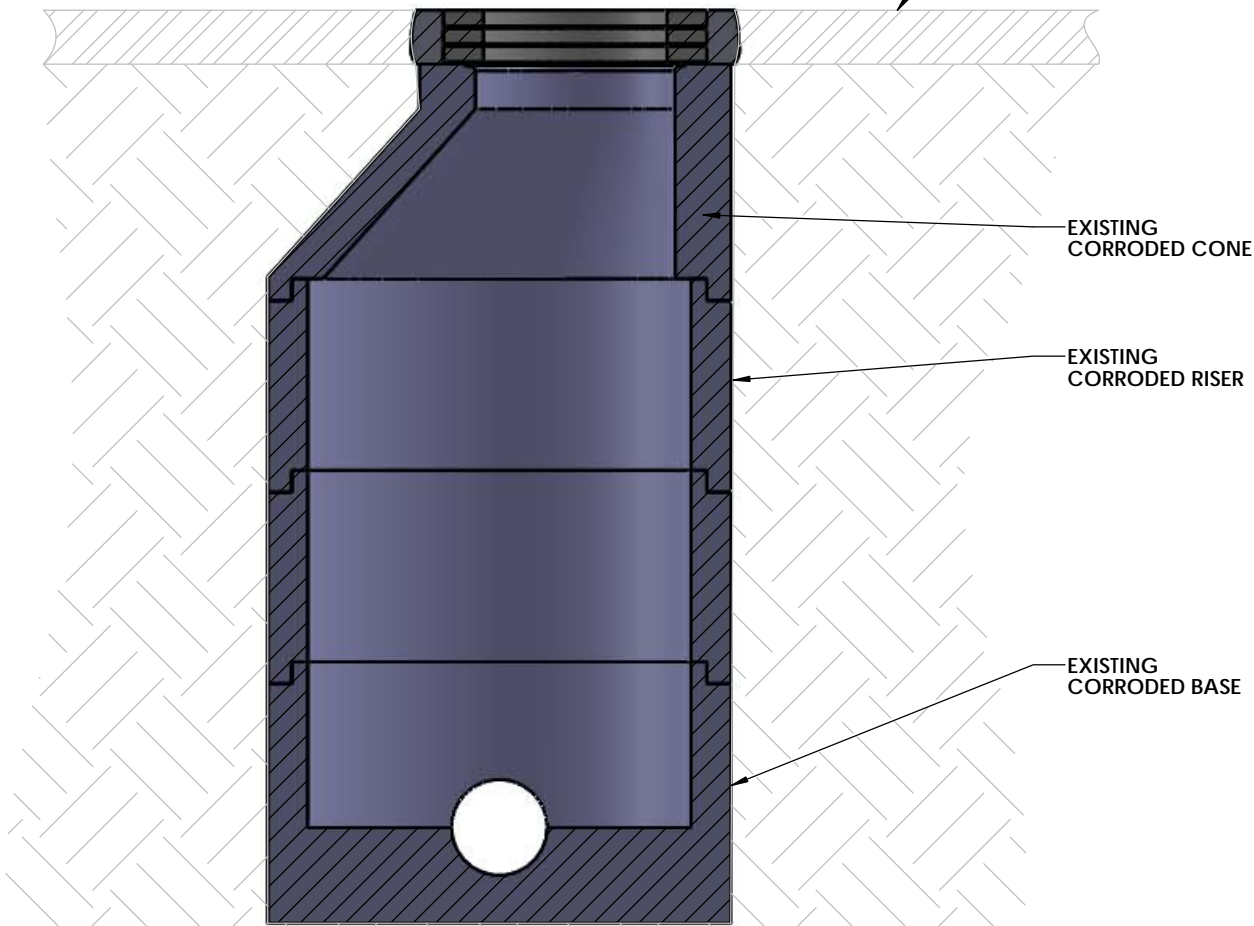
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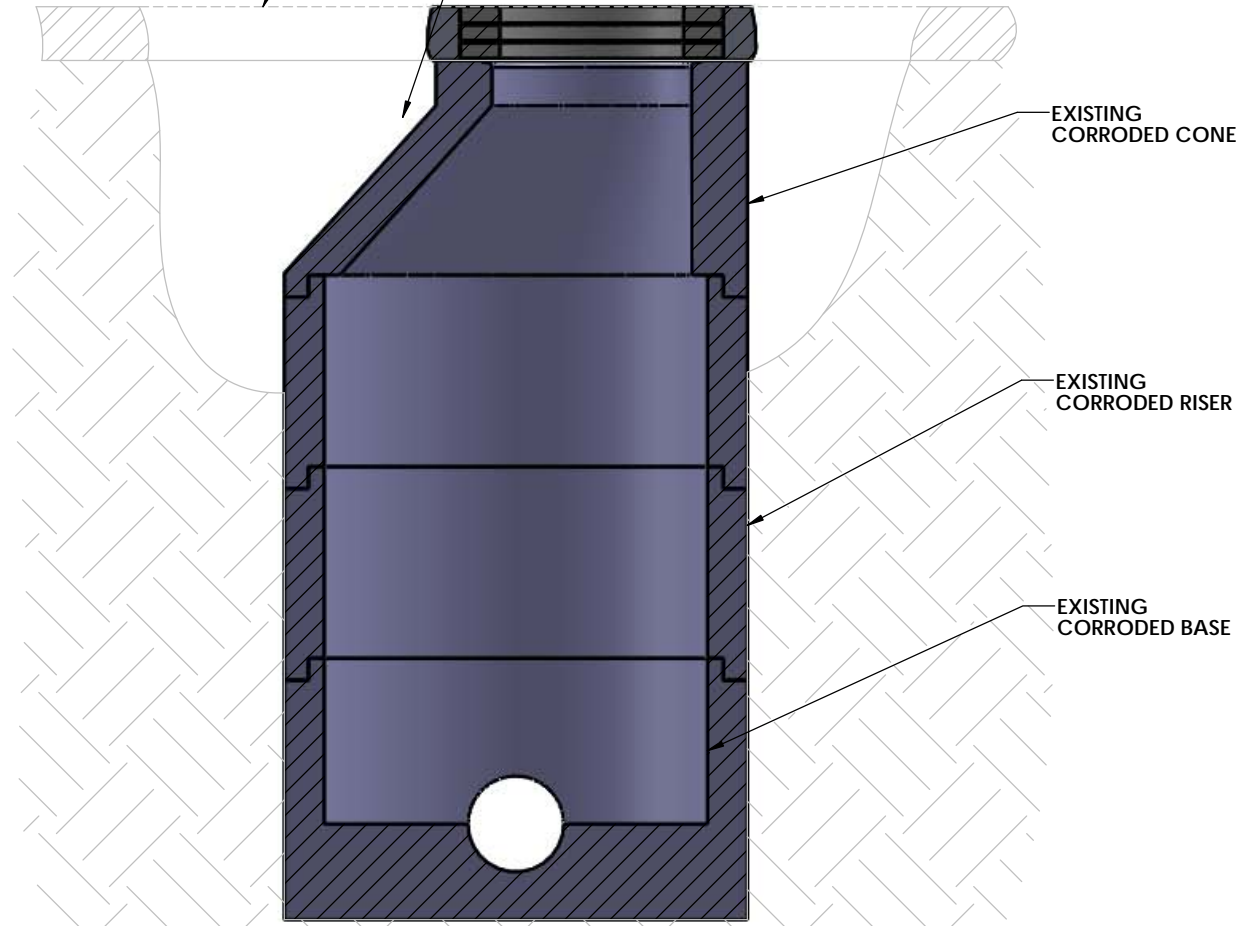
(1) CUT AND REMOVE EXISTING ASPHALT OR CONCRETE

(2) EXCAVATE & REMOVE DIRT TO EXPOSE EXISTING MANHOLE CONE

FINISH SURFACE (ASPHALT, OR CONCRETE, OR GRASS)



SECTION VIEW
 (EXISTING MANHOLE)



SECTION VIEW
 (EXISTING MANHOLE)

STEP1 - CUT AND REMOVE EXISTING ASPHALT OR CONCRETE

STEP2 - EXCAVATE & REMOVE DIRT TO EXPOSE EXISTING MANHOLE CONE

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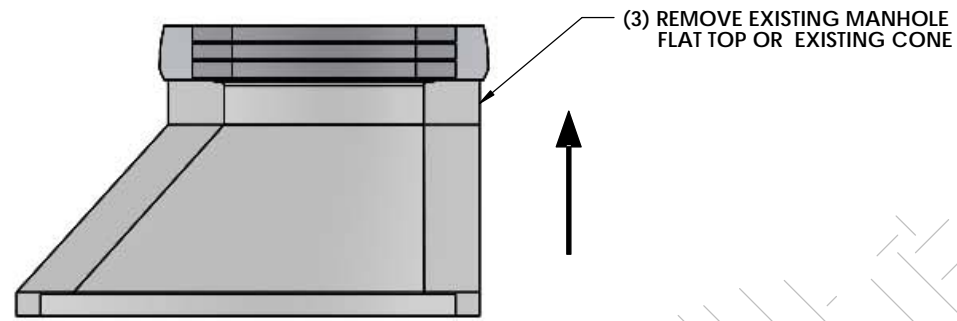
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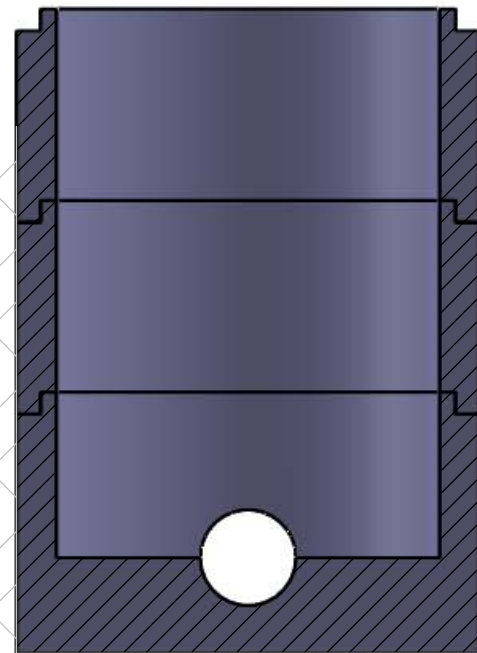
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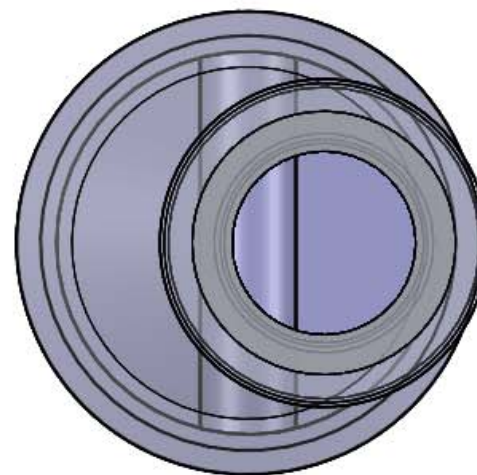


(3) REMOVE EXISTING MANHOLE FLAT TOP OR EXISTING CONE

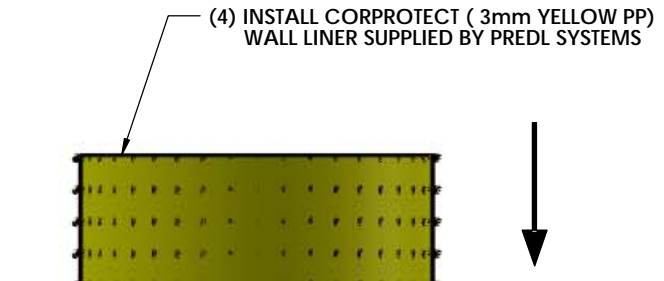


SECTION VIEW

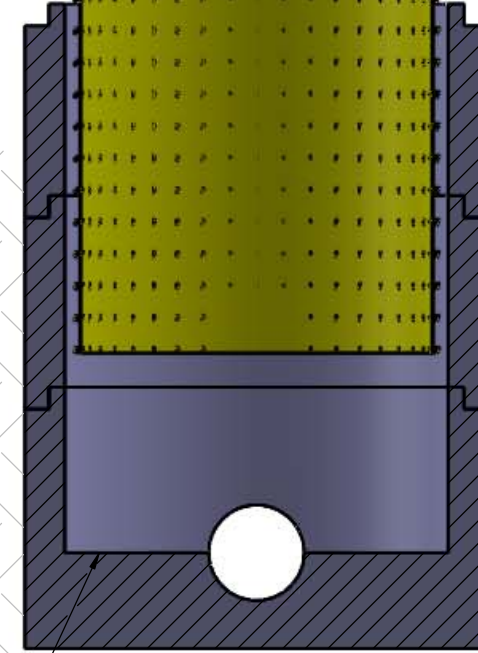
STEP3 - REMOVE EXISTING MANHOLE FLAT TOP OR EXISTING CONE



PLAN VIEW

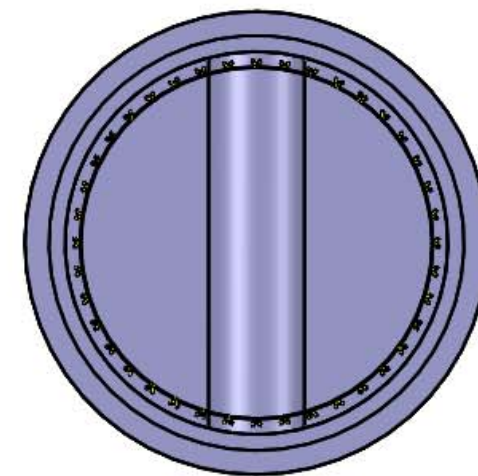


(4) INSTALL CORPROTECT (3mm YELLOW PP) WALL LINER SUPPLIED BY PREDL SYSTEMS



SECTION VIEW

STEP4 - INSTALL CORPROTECT (3mm YELLOW PP) WALL LINER SUPPLIED BY PREDL SYSTEMS



PLAN VIEW

MASTIC SEALANT TO BE APPLIED ON TO THE BENCHING TO PROVIDE COMPLETE SEAL

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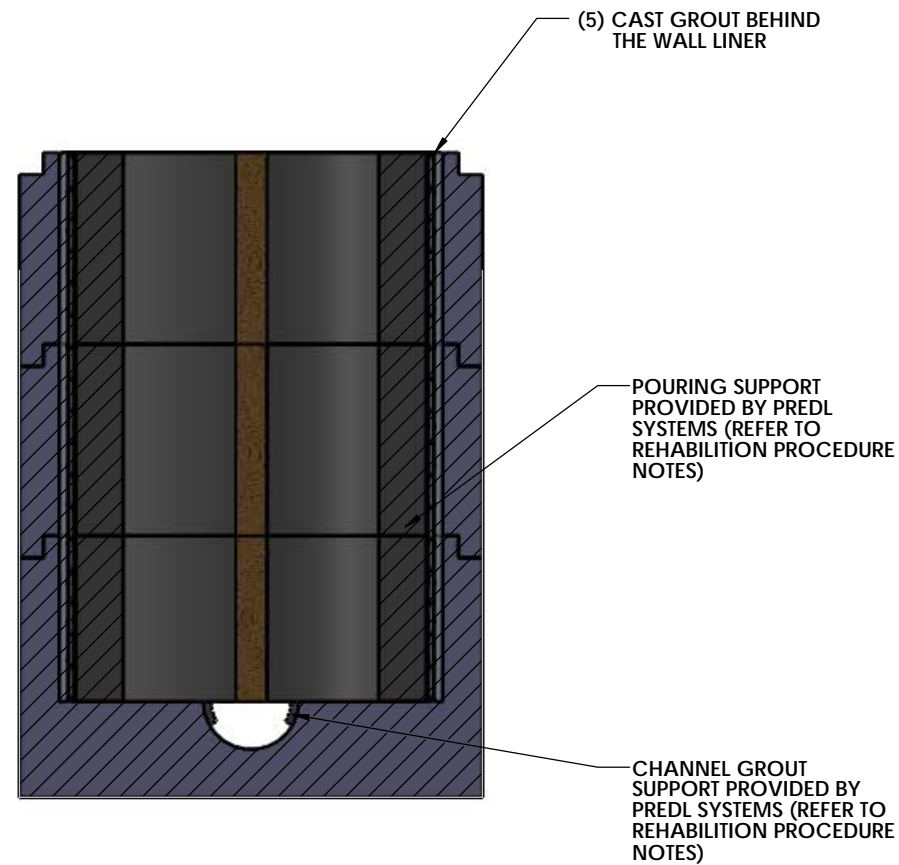
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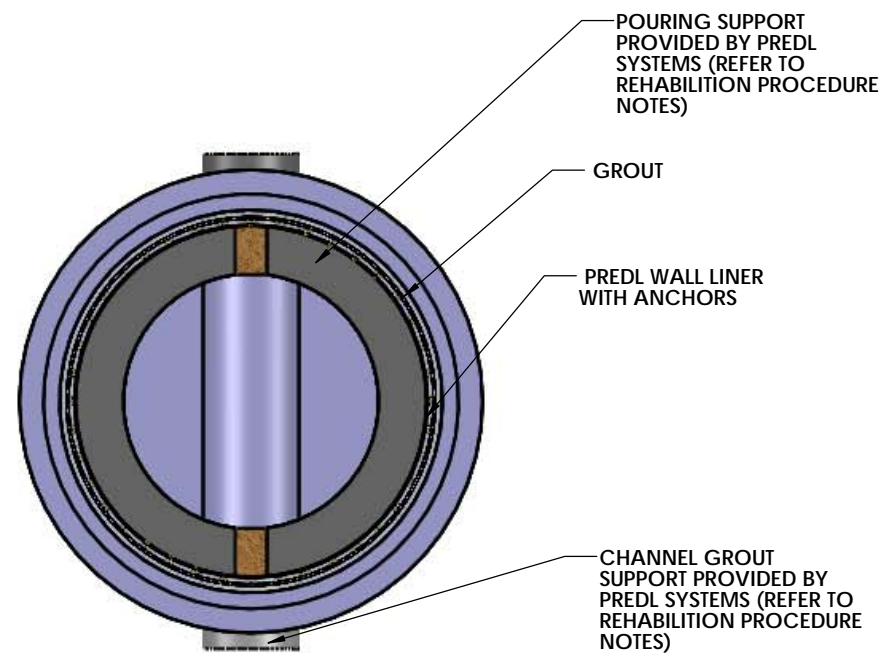
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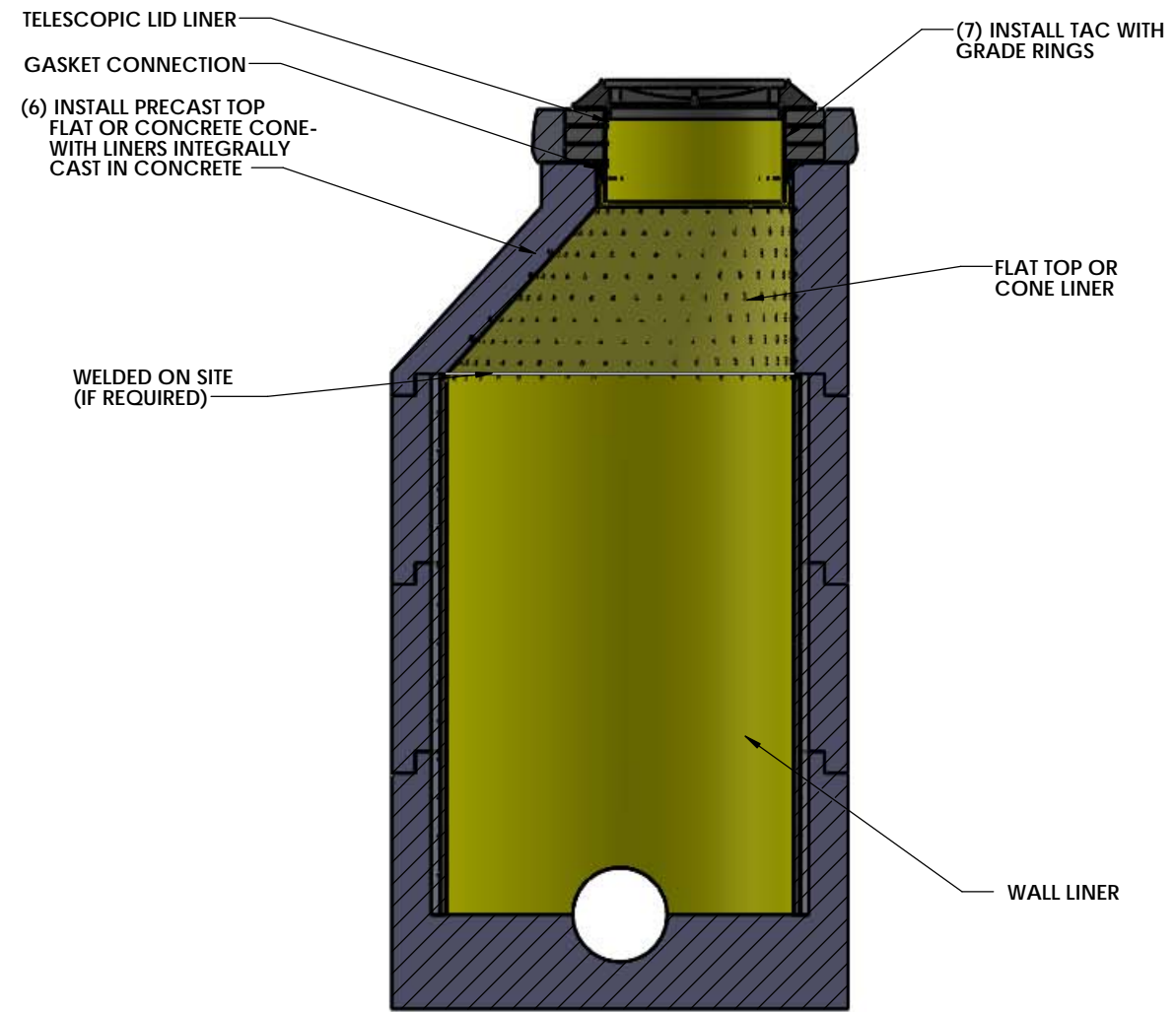


SECTION VIEW

STEP5 - CAST GROUT BEHIND THE WALL LINER



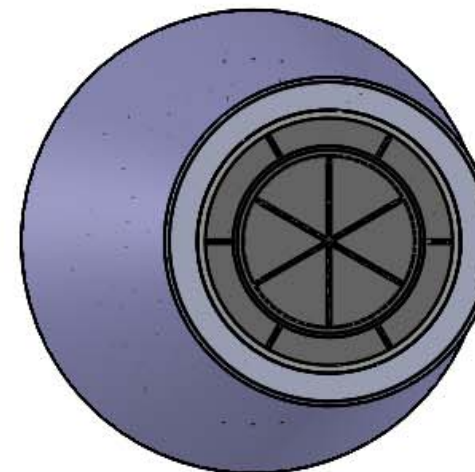
PLAN VIEW



SECTION VIEW

STEP6 - INSTALL PRECAST TOP FLAT OR CONCRETE CONE - WITH LINERS INTEGRALLY CAST IN CONCRETE

STEP7 - INSTALL TAC WITH GRADE RINGS



PLAN VIEW

DRAWN BY : YW DATE DRAWN : 4/08/2014

APPROVED :

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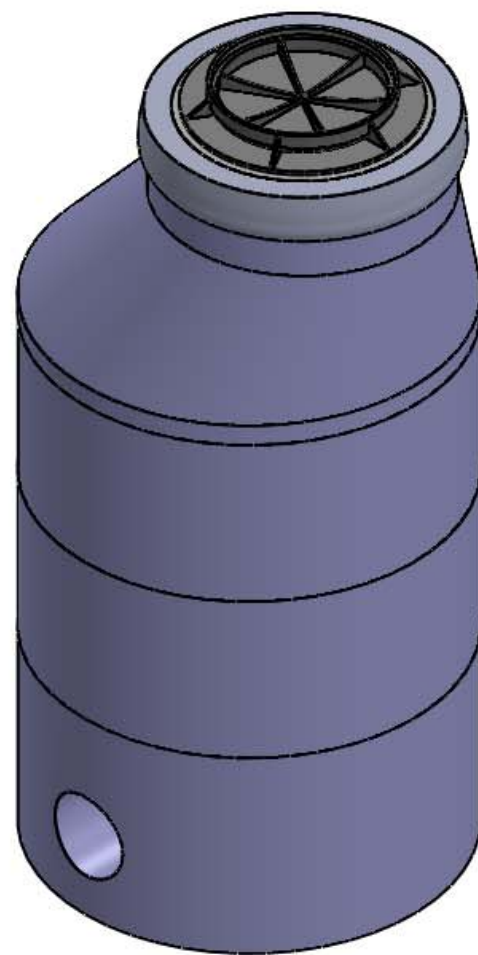
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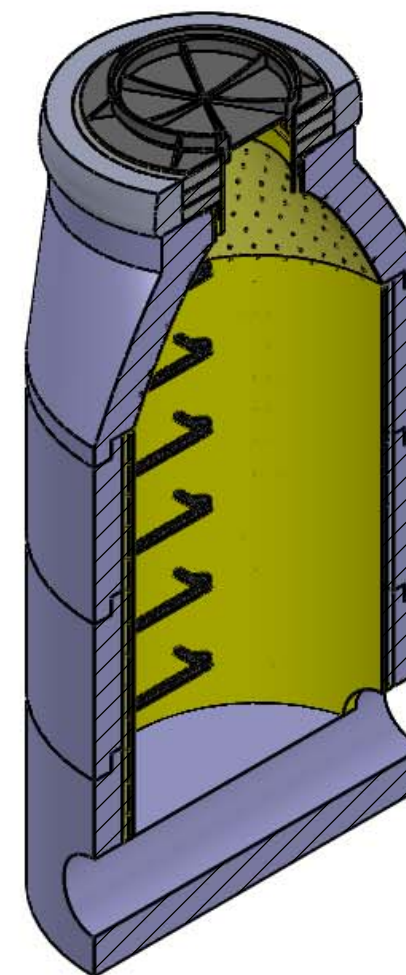
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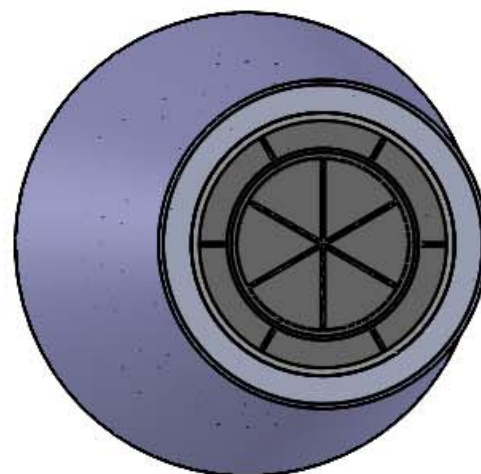
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3D ISOMETRIC VIEW



3D ISOMETRIC SECTION VIEW



PLAN VIEW