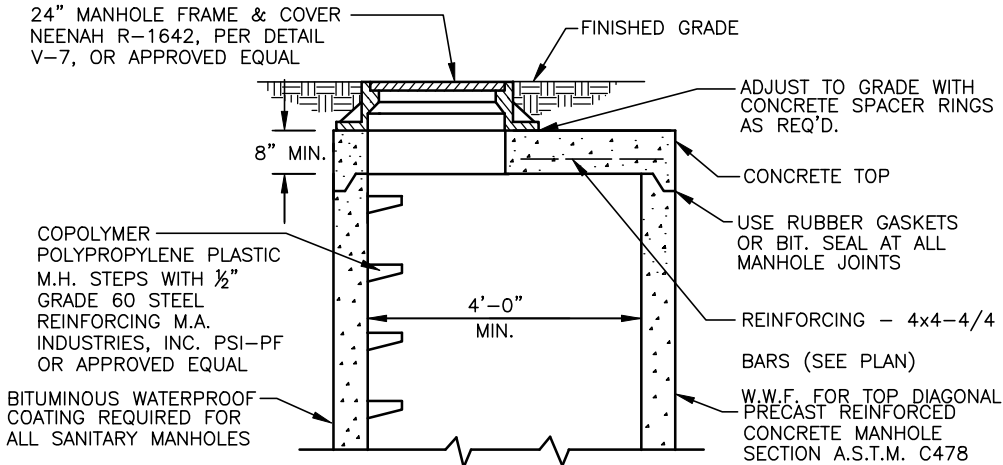


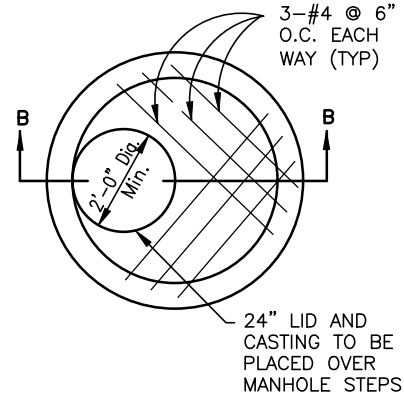
SECTION A-A
N.T.S.

DETAIL OF STANDARD MANHOLE TYPE "A" W/ 24" CASTING
D=8" THRU 27" SEWERS



SECTION B-B
N.T.S.

DETAIL OF STANDARD MANHOLE WITH RESTRICTED HEADROOM TOP AND 24" CASTING

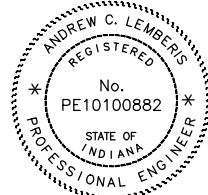


LID AND CASTING PLAN
N.T.S.

NOTES:

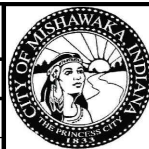
1. THIS TYPE "A" SANITARY MANHOLE WITH 24" CASTING SHALL ONLY BE USED FOR SANITARY SEWERS BOTH 27" IN DIAMETER AND SMALLER AND SEWER BURY DEPTHS 10' OR LESS.
2. WHERE DESIGNATED OR AS NEEDED, CASTING LID SHALL BE OF NON-ROCKING TYPE.
3. WHERE DESIGNATED OR AS NEEDED, PROVIDE FLOATATION COLLAR.
4. MANHOLE DIAMETER IS SHOWN AS A MINIMUM AND MAY INCREASE DUE TO LOCATION OF PIPES.
5. WHERE DESIGNATED OR AS DIRECTED, MANHOLE SHALL HAVE AN INTERIOR COATING PER SPECIFICATION SECTION V.

PREPARED BY: DLZ INDIANA, LLC



Andrew C. Lemberis
02-01-2022

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY



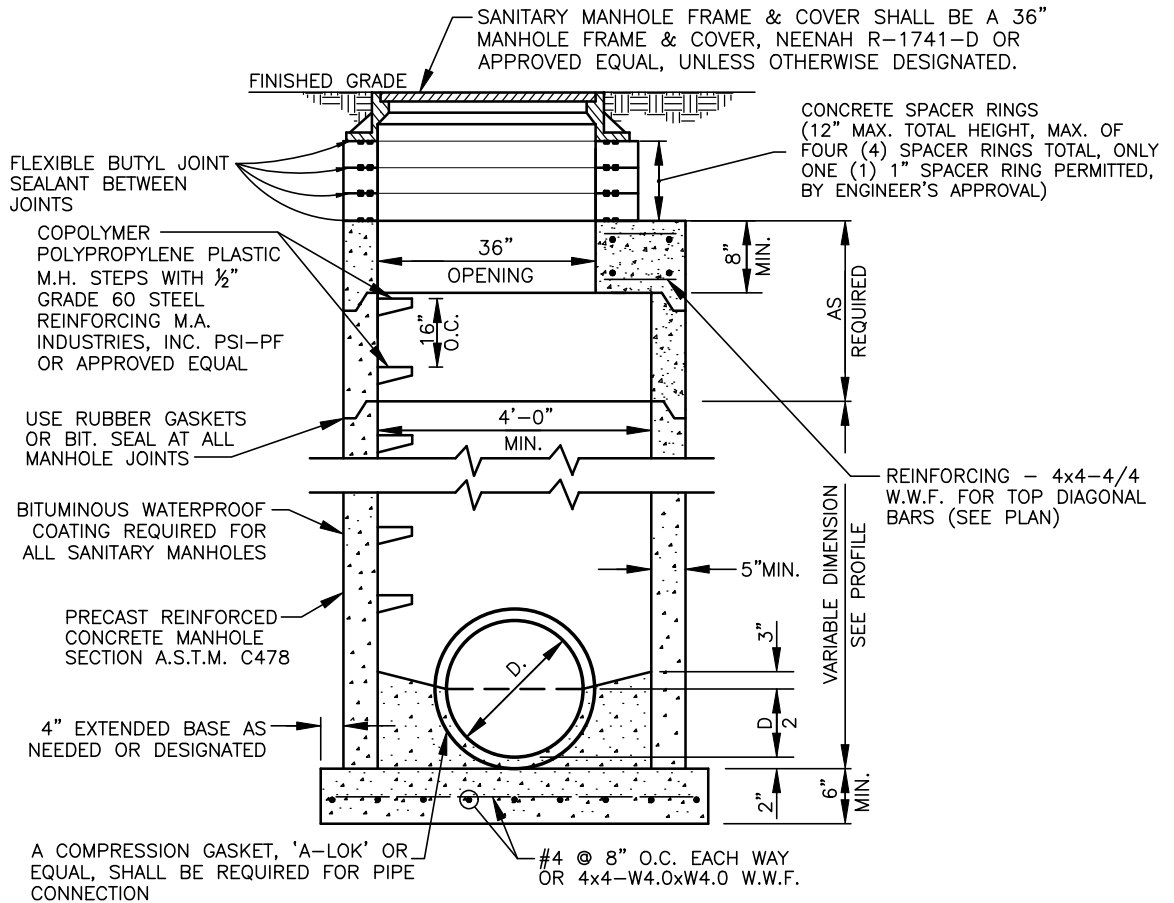
CITY OF MISHAWAKA, INDIANA

ITEM	REVISION	APPROVED DATE
	EFFECTIVE	APRIL 2007
	REVISED	MARCH 2013
	REVISED	FEBRUARY 2022

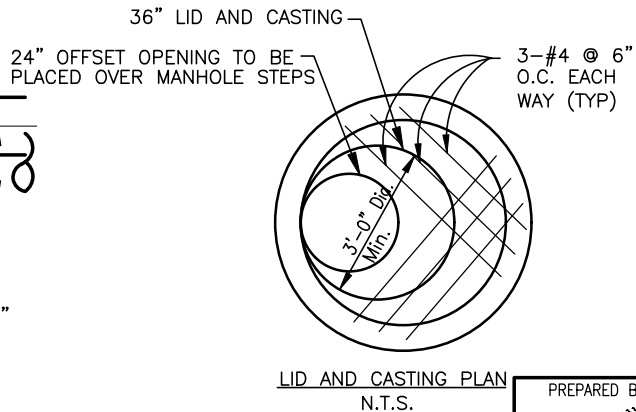
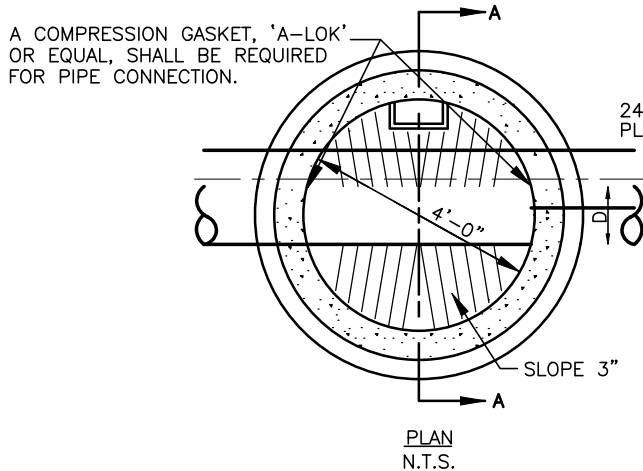
ENGINEERING STANDARDS

TYPE "A" SANITARY
MANHOLE W/ 24" CASTING

SHT. NO.
V-1



SECTION A-A
N.T.S.

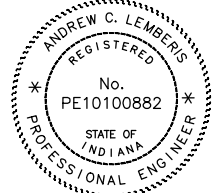


DETAIL OF STANDARD SANITARY MANHOLE TYPE "A" W/ 36" CASTING
D=8" THRU 27" SEWERS

NOTES:

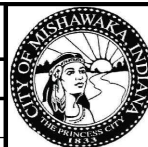
1. THIS TYPE "A" SANITARY MANHOLE WITH 36" CASTING SHALL BE USED FOR SANITARY SEWERS WITH BURY DEPTHS GREATER THAN 10' AND SEWER PIPES SMALLER THAN 30" IN DIAMETER.
2. WHERE DESIGNATED OR AS NEEDED CASTING LID SHALL BE OF NON-ROCKING TYPE.
3. WHERE DESIGNATED OR AS NEEDED PROVIDE FLOTATION COLLAR.
4. MANHOLE DIAMETER IS SHOWN AS MINIMUM AND MAY INCREASE DUE TO LOCATION OF PIPES.
5. WHERE DESIGNATED OR AS DIRECTED, MANHOLE SHALL HAVE AN INTERIOR COATING PER SPECIFICATION SECTION V.

PREPARED BY: DLZ INDIANA, LLC



Andrew C. Lemberis
02-01-2022

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY



CITY OF MISHAWAKA, INDIANA

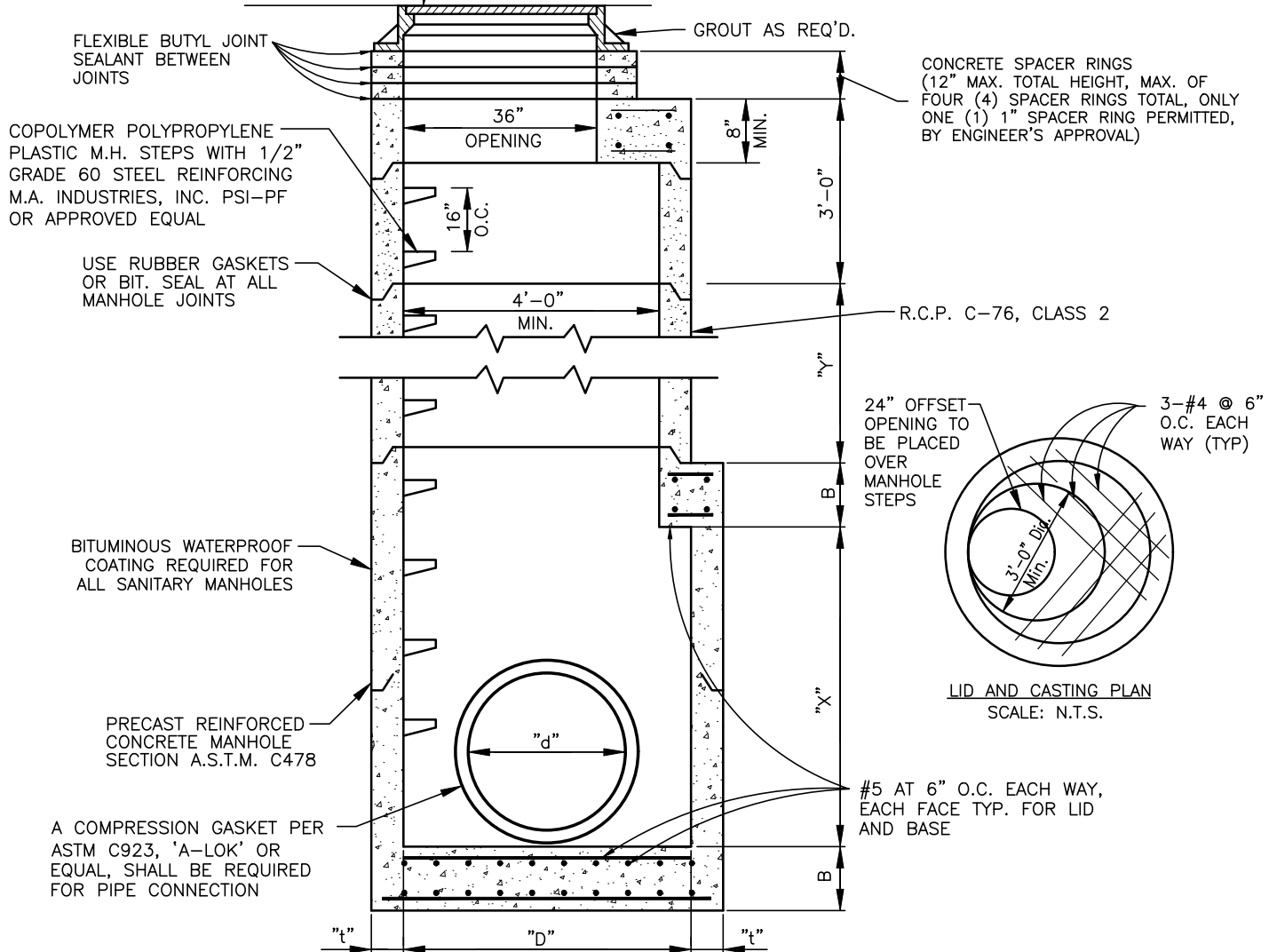
ITEM	REVISION	APPROVED DATE
	ADOPTED: NEW	FEBRUARY 2022

ENGINEERING STANDARDS

TYPE "A" SANITARY
MANHOLE W/ 36" CASTING

SHT. NO.
V-2

SANITARY MANHOLE FRAME & COVER SHALL BE A 36" MANHOLE FRAME & COVER, NEENAH R-1741-D OR APPROVED EQUAL, UNLESS OTHERWISE DESIGNATED. (USE 24" CASTING PER DETAIL V-1 WITH CITY APPROVAL ONLY.)



NOTES:

1. THIS TYPE "B" SANITARY MANHOLE SHALL BE USED FOR ALL SANITARY SEWERS 30" IN DIAMETER AND GREATER.
2. MANHOLES 72" AND SMALLER SHALL HAVE AN INTEGRALLY POURED BASE. MANHOLES 78" AND LARGER SHALL HAVE AN INTEGRALLY POURED BASE OR A WATERTIGHT GASKETED JOINT.
3. MANHOLE DIAMETER "D" REQUIREMENTS ARE MINIMUMS AND MAY INCREASE DUE TO THE LOCATIONS OF THE PIPE.
4. WHERE DESIGNATED OR AS NEEDED, CASTING LID SHALL BE OF NON-ROCKING TYPE.
5. WHERE DESIGNATED OR AS NEEDED, PROVIDE A FLOTATION COLLAR.
6. WHERE DESIGNATED OR AS DIRECTED, MANHOLE SHALL HAVE AN INTERIOR COATER PER SPECIFICATION SECTION V.

"d"	"D" MIN.	"B" MIN.	"t" MIN.	"X" MIN.	"Y"
30"	60"	8"	6"	60"	AS REQUIRED
33"	60"	8"	6"	60"	"
36"	60"	8"	6"	60"	"
42"	72"	8"	7"	72"	"
48"	72"	8"	7"	72"	"
54"	84"	10"	8"	84"	"
60"	84"	10"	8"	84"	"
66"	96"	12"	9"	96"	"
72"	96"	12"	9"	96"	"
78"	108"	12"	10"	108"	"
84"	108"	12"	10"	108"	AS REQUIRED

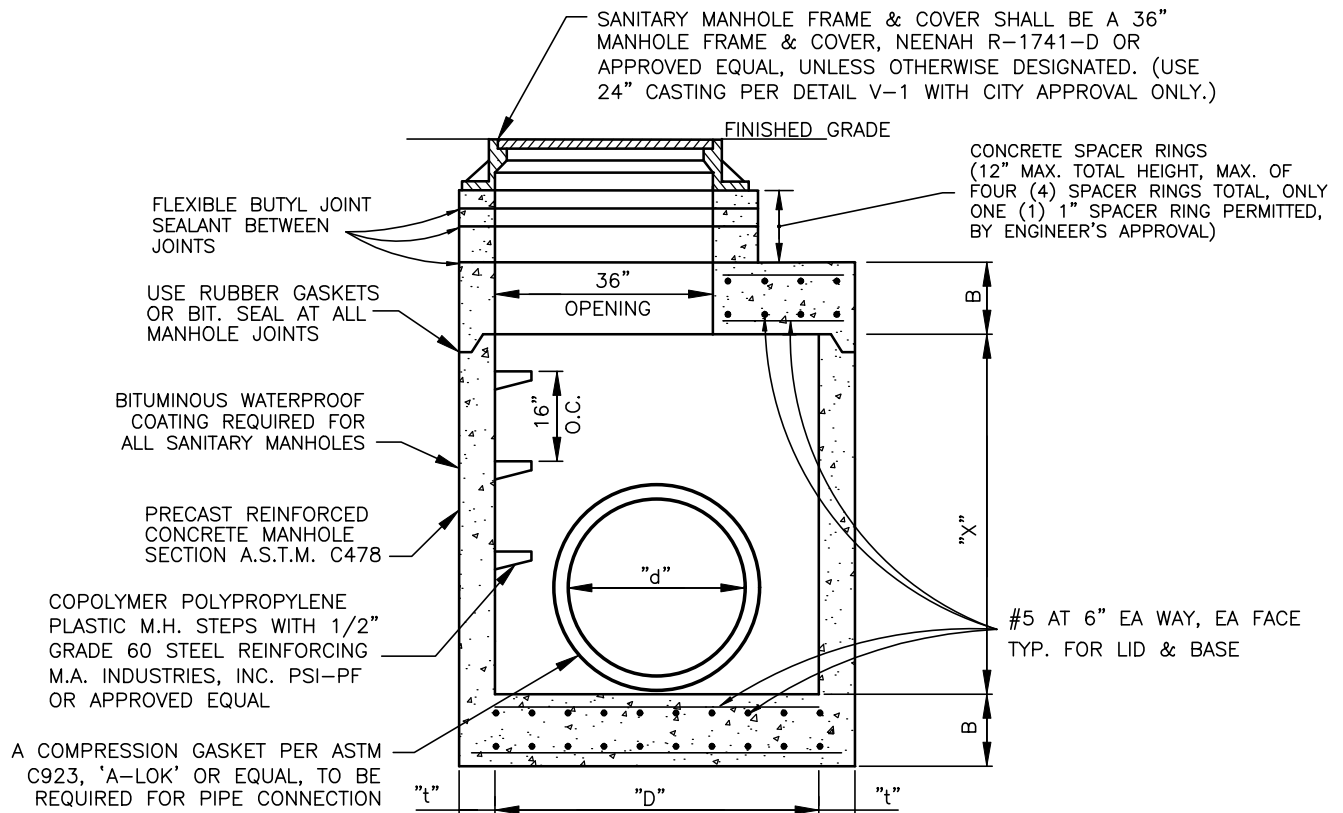
STANDARD SANITARY MANHOLE TYPE "B"
30" SEWERS AND LARGER

PREPARED BY: DLZ INDIANA, LLC

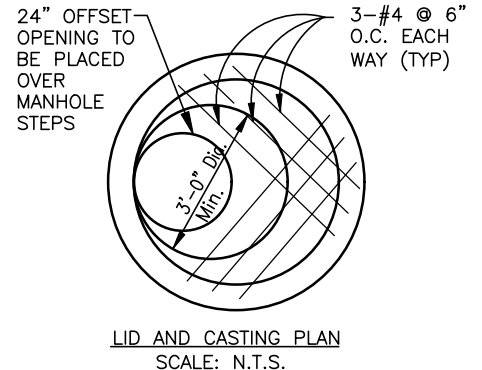
ANDREW C. LEMBERG
REGISTERED
No. PE10100882
STATE OF INDIANA
PROFESSIONAL ENGINEER

Andrew C. Lemberg
02-01-2022

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY			CITY OF MISHAWAKA, INDIANA
ITEM	REVISION	APPROVED DATE	
	EFFECTIVE	APRIL 2007	ENGINEERING STANDARDS
	REVISED	MARCH 2013	
	REVISED	FEBRUARY 2022	
			TYPE "B" SANITARY MANHOLE
			SHT. NO. V-3



"d"	"D" MIN.	"B" MIN.	"t" MIN.	"X" MIN.
30"	60"	8"	6"	60"
33"	60"	8"	6"	60"
36"	60"	8"	6"	60"
42"	72"	8"	7"	72"
48"	72"	8"	7"	72"
54"	84"	10"	8"	84"
60"	84"	10"	8"	84"
66"	96"	12"	9"	96"
72"	96"	12"	9"	96"
78"	108"	12"	10"	108"
84"	108"	12"	10"	108"



STANDARD SANITARY MANHOLE TYPE "B"
30" SEWERS & LARGER
(RESTRICTED HEADROOM)

NOTES:

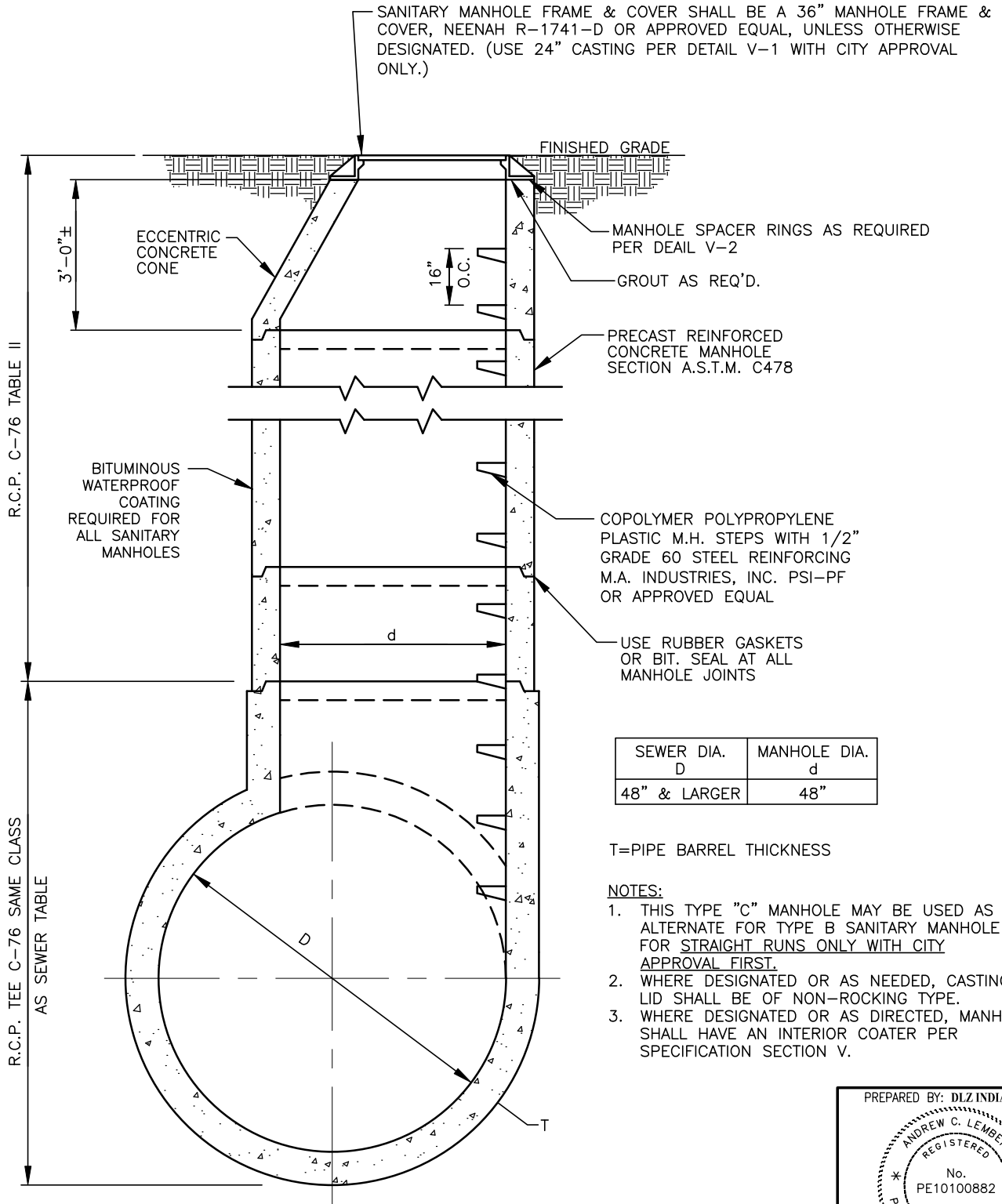
1. THIS TYPE "B" SANITARY MANHOLE SHALL BE USED FOR ALL SANITARY SEWERS 30" IN DIAMETER AND GREATER AND THAT REQUIRE A RESTRICTED HEADROOM MANHOLE.
2. MANHOLES 72" AND SMALLER SHALL HAVE AN INTEGRALLY Poured BASE. MANHOLES 78" AND LARGER SHALL HAVE AN INTEGRALLY Poured BASE OR A WATERTIGHT GASKETED JOINT.
3. MANHOLE DIAMETER "D" REQUIREMENTS ARE MINIMUMS AND MAY INCREASE DUE TO THE LOCATIONS OF THE PIPE.
4. WHERE DESIGNATED OR AS NEEDED, CASTING LID SHALL BE OF NON-ROCKING TYPE.
5. WHERE DESIGNATED OR AS NEEDED, PROVIDE A FLOTATION COLLAR.
6. WHERE DESIGNATED OR AS DIRECTED, MANHOLE SHALL HAVE AN INTERIOR COATER PER SPECIFICATION SECTION V.

PREPARED BY: DLZ INDIANA, LLC

ANDREW C. LEMBERG
REGISTERED
No. PE10100882
STATE OF INDIANA
PROFESSIONAL ENGINEER

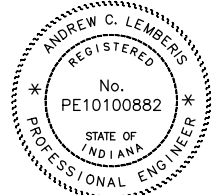
Andrew C. Lemberg
02-01-2022

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY			CITY OF MISHAWAKA, INDIANA
ITEM	REVISION	APPROVED DATE	
	EFFECTIVE	APRIL 2007	ENGINEERING STANDARDS
	REVISED	MARCH 2013	
	REVISED	FEBRUARY 2022	
TYPE "B" SANITARY MANHOLE (RESTRICTED HEADROOM)			SHT. NO. V-4



STANDARD SANITARY MANHOLE TYPE "C"
48" SEWERS & LARGER (STRAIGHT RUNS ONLY)

PREPARED BY: DLZ INDIANA, LLC



Andrew C. Lemberis
02-01-2022

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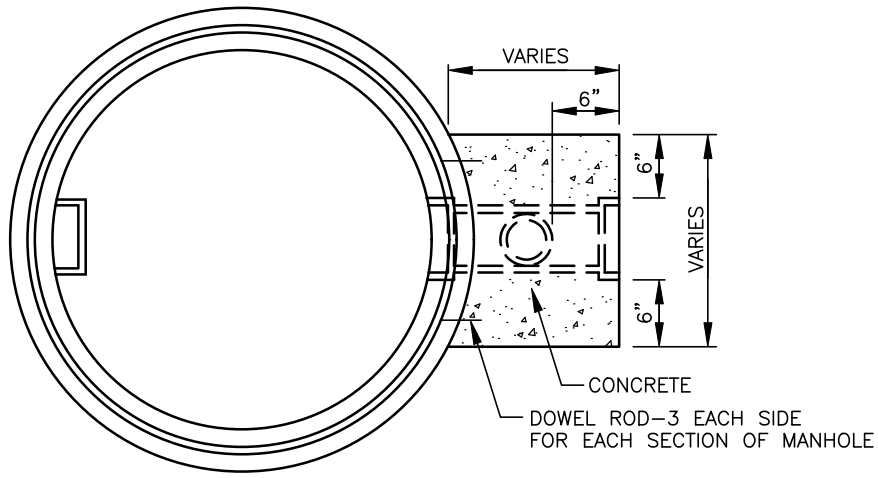
CITY OF MISHAWAKA, INDIANA

ENGINEERING STANDARDS

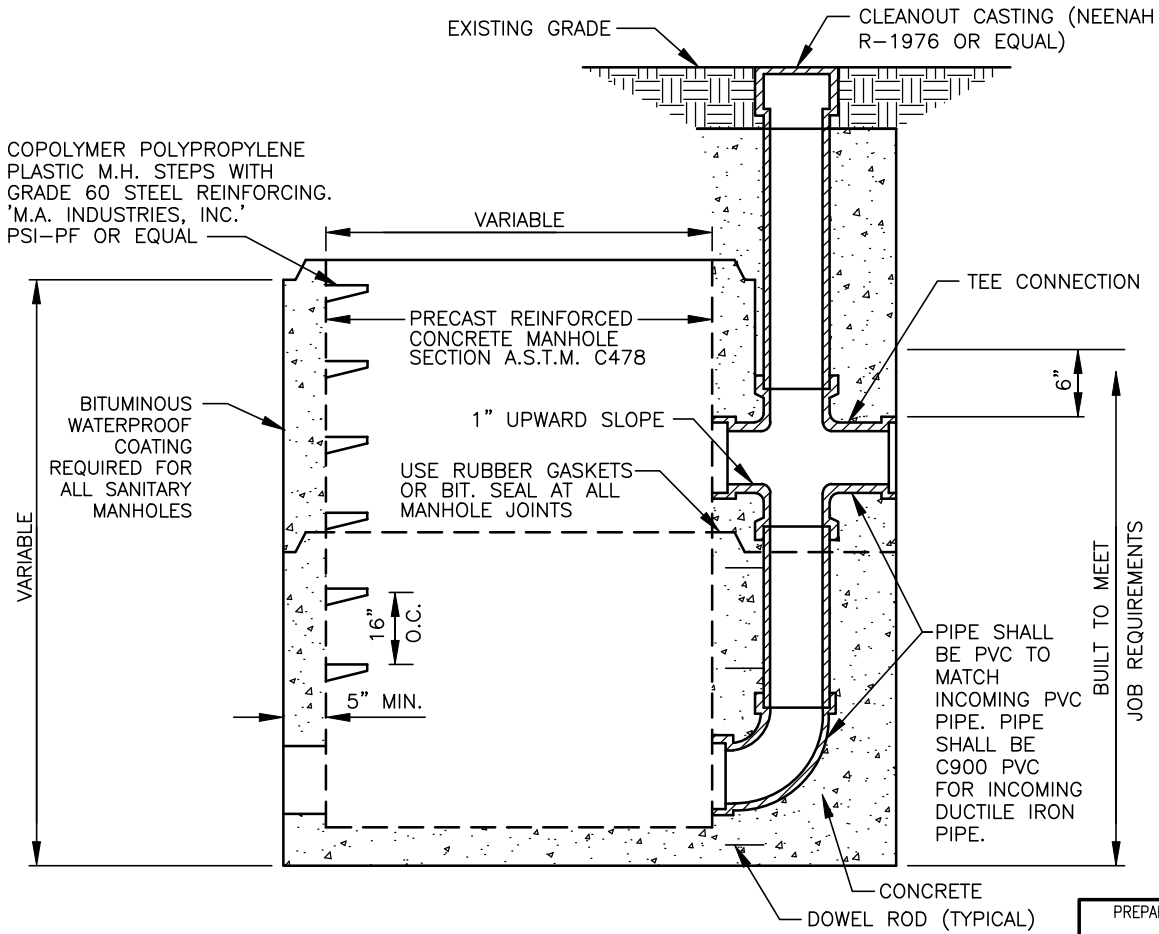
TYPE "C"
SANITARY MANHOLE

SHT. NO.
V-5

ITEM	REVISION	APPROVED DATE
	EFFECTIVE	APRIL 2007
	REVISED	MARCH 2013
	REVISED	FEBRUARY 2022



PLAN VIEW



CROSS SECTION

NOTES:

1. DROP MANHOLES SHALL BE REQUIRED FOR ANY MANHOLES WITH INCOMING PIPE INVERTS GREATER THAN 2' ABOVE MANHOLE INVERT.
2. MANHOLE SHALL CONFORM TO ASTM C-478.
3. MULTIPLE SECTION DROP-PVC PIPE SEALS WITH BELL AND SPIGOT CONNECTION.
4. ONLY PRECAST DROP MANHOLES PERMITTED.
5. SEE DETAILS V-1 THRU V-4 FOR ADDITIONAL MANHOLE DETAILS AND REQUIREMENTS.

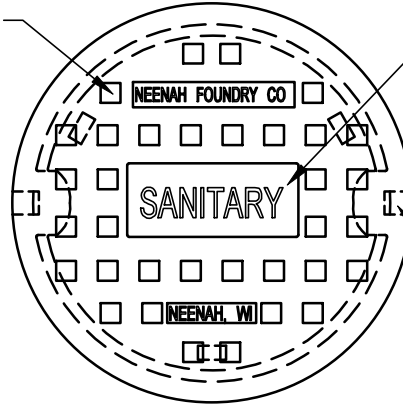
PRECAST SANITARY DROP MANHOLE

PREPARED BY: DLZ INDIANA, LLC

Andrew C. Lemberis
02-01-2022

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY				CITY OF MISHAWAKA, INDIANA	
ITEM	REVISION	APPROVED DATE		ENGINEERING STANDARDS	
	EFFECTIVE	APRIL 2007	PRECAST SANITARY DROP MANHOLE		
	REVISED	MARCH 2013			
	REVISED	FEBRUARY 2022			
				SHT. NO.	V-6

TYPE "B" INDENTED
TOP LID DESIGN



2" (51MM) RAISED LETTERS
FLUSH W/TOP SURFACE OF LID
ALTERNATE LETTERING
"STORM"
"FIBER OPTIC"
"ELECTRIC"
"WATER"
"TRAFFIC"

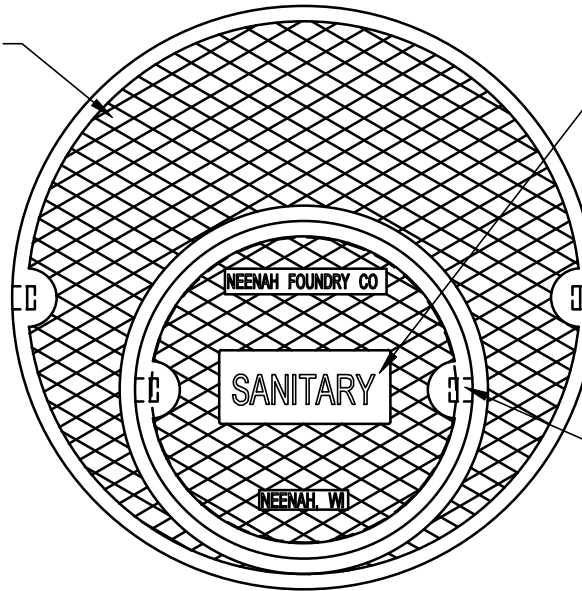
CONCEALED
PICKHOLES (TYP.)

24" MANHOLE FRAME AND COVER

NOTES:

1. MANHOLE FRAME AND COVER: NEENAH R-1642, EJIW 1045, OR APPROVED EQUAL.
2. MATERIAL: CAST GRAY IRON PER ASTM A-48, CLASS 35B.
3. ALL LIDS SHALL BE SELF-SEALING WITH A GASKET
4. IF DESIGNATED, PROVIDE A LOCKABLE LID WITH TYPE E COUNTERSUNK HEX SECURITY BOLTS.

TYPE "C" DIAMOND
TOP LID DESIGN



2" (51MM) RAISED LETTERS
FLUSH W/TOP SURFACE OF LID
ALTERNATE LETTERING
"STORM"
"FIBER OPTIC"
"ELECTRIC"
"WATER"
"TRAFFIC"

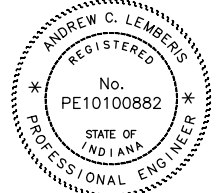
CONCEALED
PICKHOLES (TYP.)

36" MANHOLE FRAME AND COVER

NOTES:

1. MANHOLE FRAME AND COVER: NEENAH R-1741-D OR APPROVED EQUAL.
2. MATERIAL: GAST GRAY IRON PER ASTM A-48, CLASS 35B.
3. ALL LIDS SHALL BE SELF-SEALING WITH A GASKET.
4. LID TO BE PLACED WITH THE REMOVABLE CENTER LID LOCATED OVER THE MANHOLE STEPS.

PREPARED BY: DLZ INDIANA, LLC



Andrew C. Lemberis
02-01-2022

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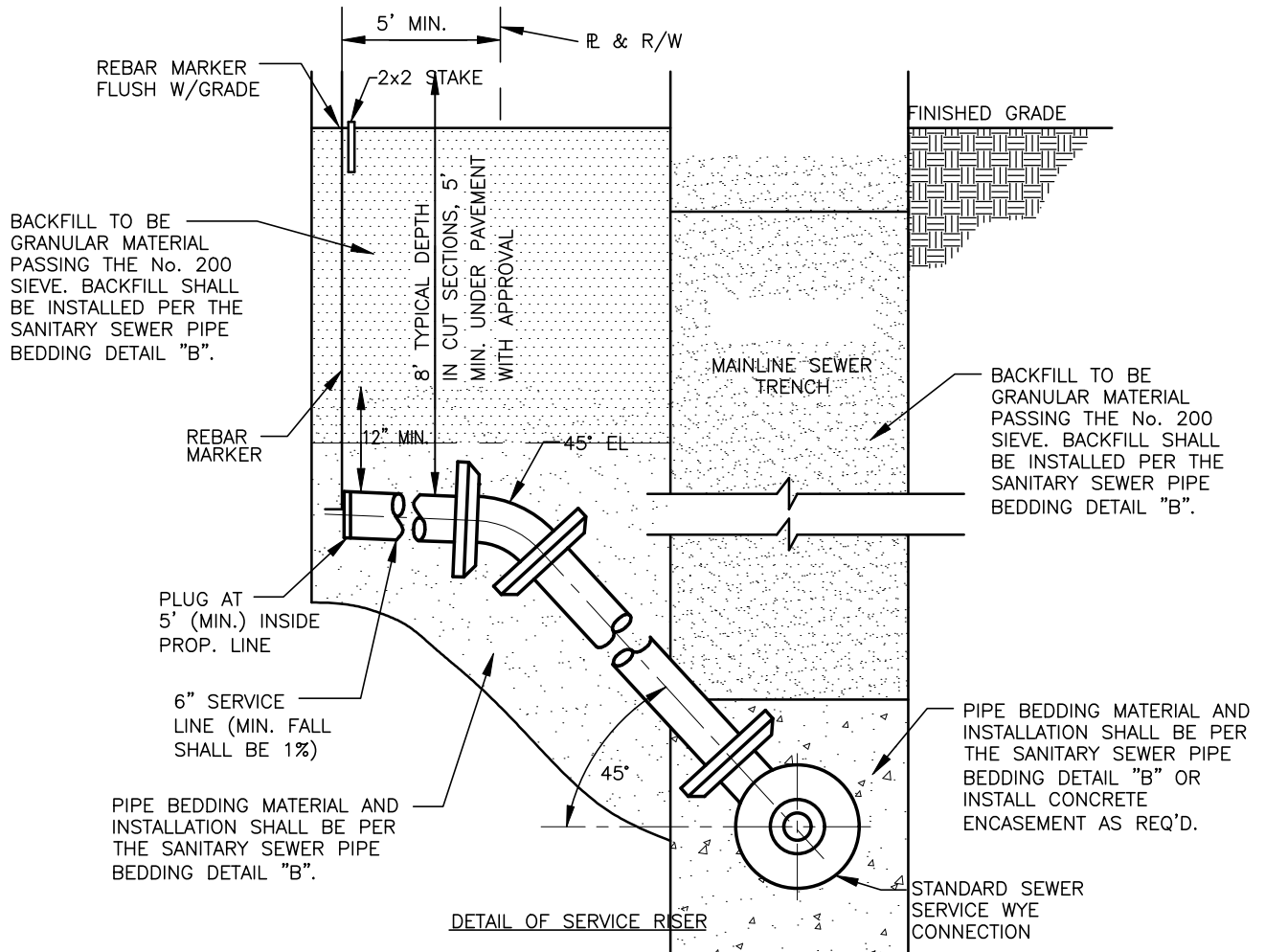
CITY OF MISHAWAKA, INDIANA

ITEM	REVISION	APPROVED DATE
	EFFECTIVE	APRIL 2007
	REVISED	MARCH 2013
	REVISED	FEBRUARY 2022

ENGINEERING STANDARDS

MISHAWAKA MANHOLE
LID DETAIL

SHT. NO.
V-7



BACK-FILL - IN STREETS, ALLEYS, SIDEWALKS OR DRIVING AREAS:
6" LAYERS, SOLIDLY TAMPED TO SUB-GRADE OF STREET BASE.

BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR

BACK-FILL - IN EASEMENT OR OPEN AREAS:
12" LAYERS SOLIDLY TAMPED.

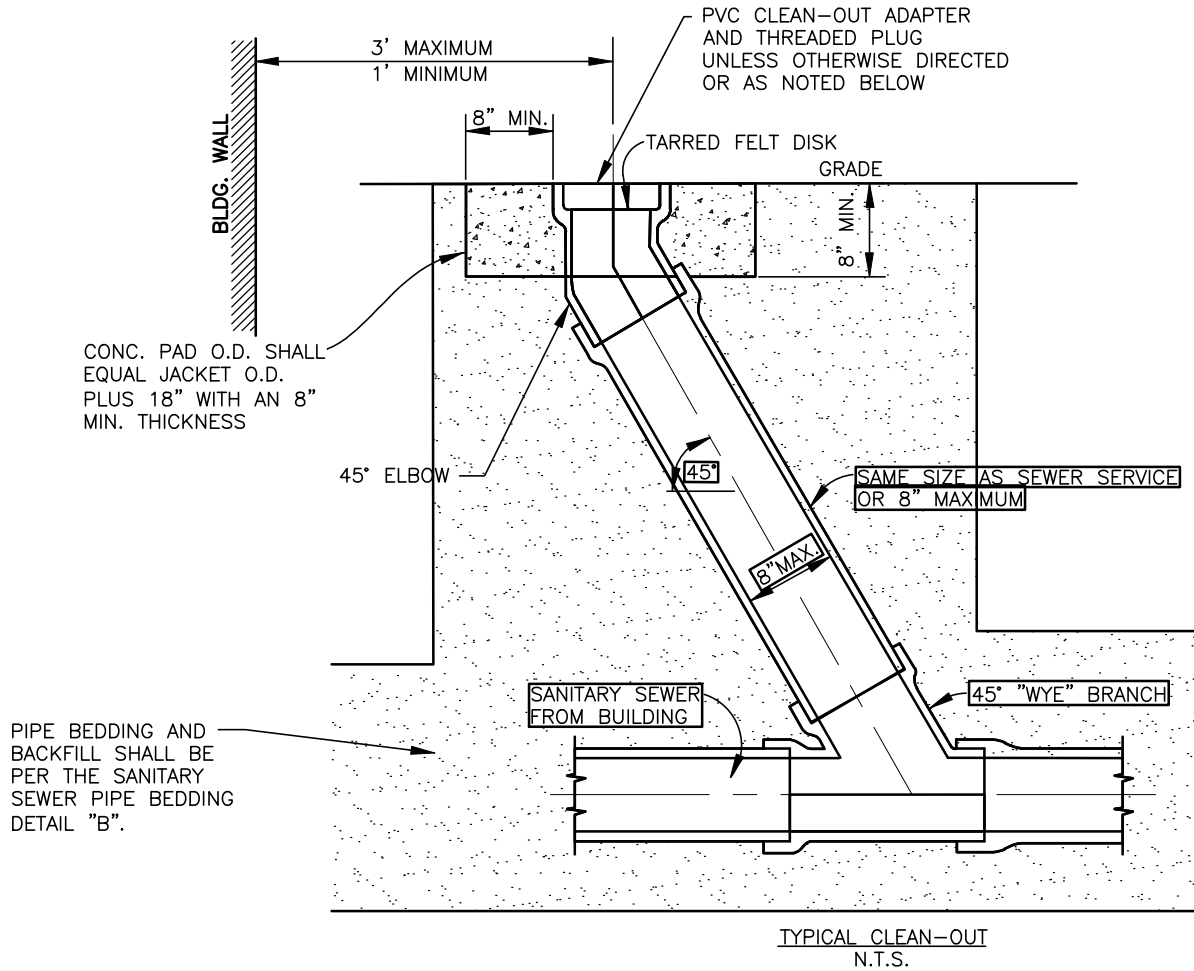
NOTES:

1. IN CUT SECTIONS OR ADJACENT PROPOSED IS FILLED WHERE THE BUILDING AT SET BACK WILL HAVE AN EXISTING GRADE ELEVATION DIFFERENCE OF 5' OR GREATER THAN STREET PROFILE GRADE, DEPTH OF SANITARY SEWER LATERAL SHALL BE RAISED TO WITHIN 8' OF EXISTING GRADE ELEVATION.
2. ALL SANITARY SEWERS SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE RECOMMENDED STANDARDS FOR WASTEWATER FACILITIES BY THE GREAT LAKES-UPPER MISSISSIPPI RIVER BOARD OF STATE AND PROVINCIAL PUBLIC HEALTH AND ENVIRONMENTAL MANAGERS. SANITARY SEWERS SHALL BE APPROVED BY THE INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT AND THE CITY OF MISHAWAKA.
3. INSTALL THE SEWER SERVICE WYE FITTING ON THE MAIN LINE BETWEEN THE 10 AND 11 O'CLOCK OR BETWEEN THE 1 AND 2 O'CLOCK LOCATIONS.
4. THE CONTRACTOR OR DEVELOPER SHALL PROVIDE THE DEPARTMENT OF ENGINEERING WITH "AS BUILT" DRAWINGS OF ALL SANITARY SEWER AND SERVICES.
5. ALL NECESSARY PERMITS FOR SERVICE CONNECTIONS TO MAIN LINE SEWERS SHALL REQUIRE A PERMIT AND TAPPING FEES PER THE CITY'S REQUIREMENTS.
6. INSTALL CLEAN-OUTS AS DESIGNATED.
7. STANDARD WYE PIPE FITTINGS SHALL BE USED FOR ALL SERVICE CONNECTIONS ON PIPES LESS THAN 18" IN DIAMETER.
8. SADDLE TAP CONNECTIONS SHALL BE INSTALLED PER DETAIL V-10 WITH ENGINEER'S APPROVAL ONLY.

PREPARED BY: DLZ INDIANA, LLC

Andrew C. Lemberis
02-01-2022

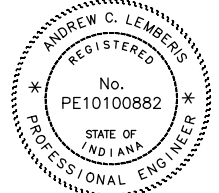
APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY				CITY OF MISHAWAKA, INDIANA	
ITEM	REVISION	APPROVED DATE		ENGINEERING STANDARDS	
	EFFECTIVE	APRIL 2007	SEWER SERVICE RISER		
	REVISED	FEBRUARY 2008			
	REVISED	MARCH 2013			
	REVISED	FEBRUARY 2022			
					SHT. NO. V-8



NOTES:

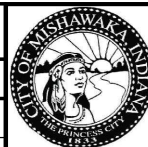
1. LOCATE CLEAN-OUT SUCH THAT PLUG IS NOT LOCATED IN SIDEWALK UNLESS DIRECTED OTHERWISE.
2. IN NON-TRAFFIC AREAS, TOP OF CLEAN-OUT SHALL REQUIRE AN ADAPTER AND A THREADED PLUG.
3. IN CONCRETE OR ASPHALT ROADWAYS, SIDEWALKS, OR TRAFFIC AREAS. CLEANOUT AND PLUG TO BE LOCATED WITHIN A CASTING. CASTING FRAME AND LID TO BE NEENAH #R-1976 OR APPROVED EQUAL. SEE DETAIL V-9A.
4. THIS DETAIL SHALL BE FOR CLEAN-OUTS ON NEW SEWER SERVICES ACCEPTED BY THE CITY FOR MAINTENANCE.
5. ALL SANITARY SEWERS SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE RECOMMENDED STANDARDS FOR WASTEWATER FACILITIES BY THE GREAT LAKES-UPPER MISSISSIPPI RIVER BOARD OF STATE AND PROVINCIAL PUBLIC HEALTH AND ENVIRONMENTAL MANAGERS. SANITARY SEWERS SHALL BE APPROVED BY THE INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT AND THE CITY OF MISHAWAKA.
6. THE CONTRACTOR OR DEVELOPER SHALL PROVIDE THE DEPARTMENT OF ENGINEERING WITH "AS BUILT" DRAWINGS OF ALL SANITARY SEWER AND SERVICES.
7. ALL NEW SERVICE CONNECTIONS TO MAIN LINE SEWERS SHALL REQUIRE A PERMIT AND TAPPING FEES PER THE CITY'S REQUIREMENTS.

PREPARED BY: DLZ INDIANA, LLC



Andrew C. Lemberis
02-01-2022

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY



CITY OF MISHAWAKA, INDIANA

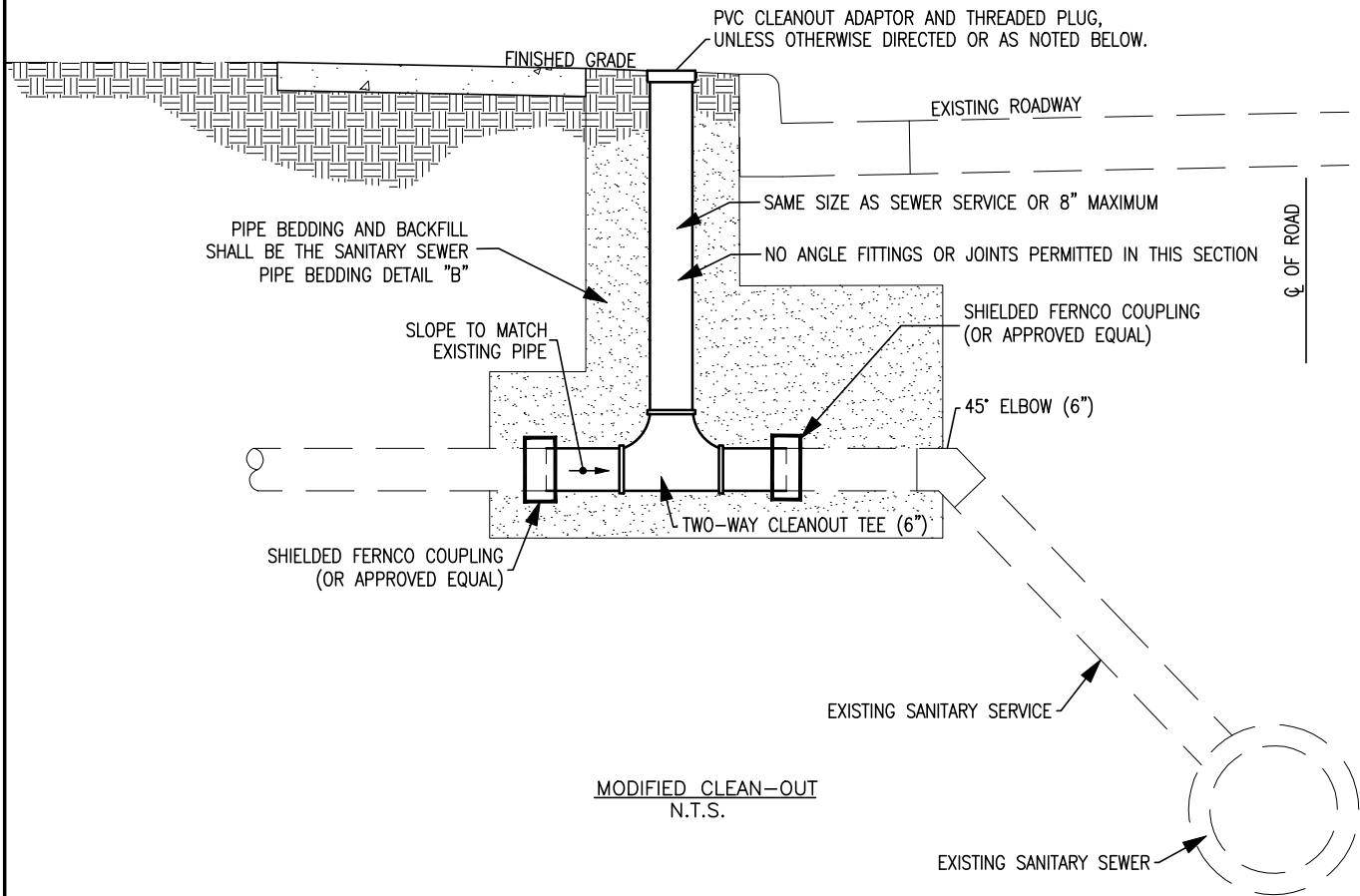
ITEM	REVISION	APPROVED DATE
	EFFECTIVE	APRIL 2007
	REVISED	FEBRUARY 2008
	REVISED	MARCH 2013
	REVISED	FEBRUARY 2022

ENGINEERING STANDARDS

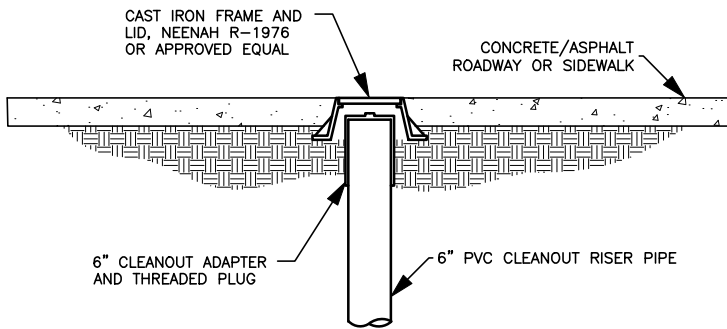
TYPICAL CLEAN-OUT

SHT. NO.

V-9



MODIFIED CLEAN-OUT
N.T.S.



ASPHALT/CONCRETE INSTALLATION
N.T.S.

NOTES:

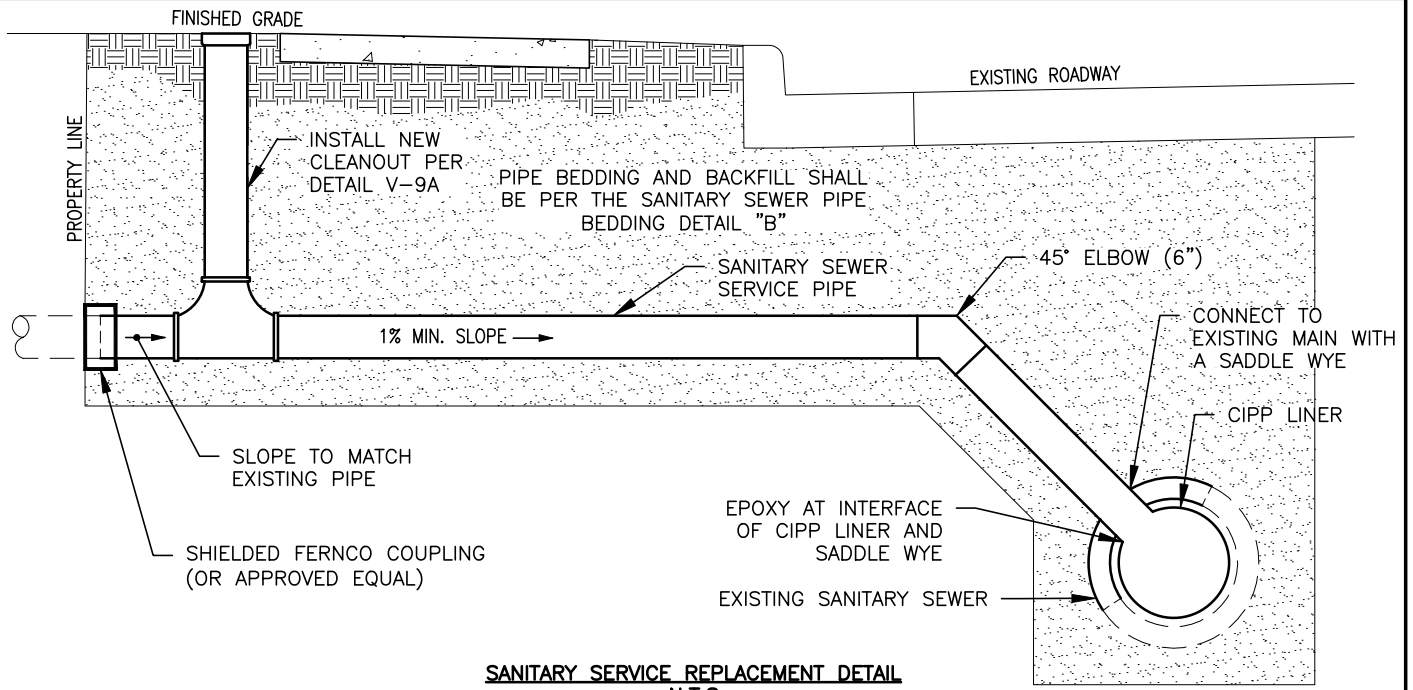
1. LOCATE CLEAN-OUT SUCH THAT PLUG IS NOT LOCATED IN SIDEWALK UNLESS DIRECTED OTHERWISE.
2. IN NON-TRAFFIC AREAS, TOP OF CLEAN-OUT SHALL REQUIRE AN ADAPTER AND A THREADED PLUG.
3. IN CONCRETE OR ASPHALT ROADWAYS/DRIVEWAYS OR SIDEWALKS, CLEANOUT AND PLUG TO BE LOCATED WITHIN A CASTING. CASTING FRAME AND LID SHALL BE NEENAH #R-1976 OR APPROVED EQUAL. SEE ASPHALT/CONCRETE INSTALLATION LAYOUT, THIS PAGE.
4. THIS DETAIL SHALL BE FOR CLEAN-OUTS INSTALLED ON EXISTING SANITARY SERVICES ONLY AS APPROVED BY THE CITY.
5. CONNECTION TO THE EXISTING SANITARY SERVICE SHALL BE WITH SHIELDED FERNCO COUPLINGS OR APPROVED EQUAL.
6. THE CONTRACTOR OR DEVELOPER SHALL PROVIDE THE DEPARTMENT OF ENGINEERING WITH "AS BUILT" DRAWINGS OF ALL SANITARY SEWER AND SERVICE REPAIRS OR MODIFICATIONS.
7. ALL NEW LATERALS INSTALLED OR REPAIRS TO SERVICE LATERALS SHALL REQUIRE A PERMIT AND MAY REQUIRE TAPPING FEES.

PREPARED BY: DLZ INDIANA, LLC

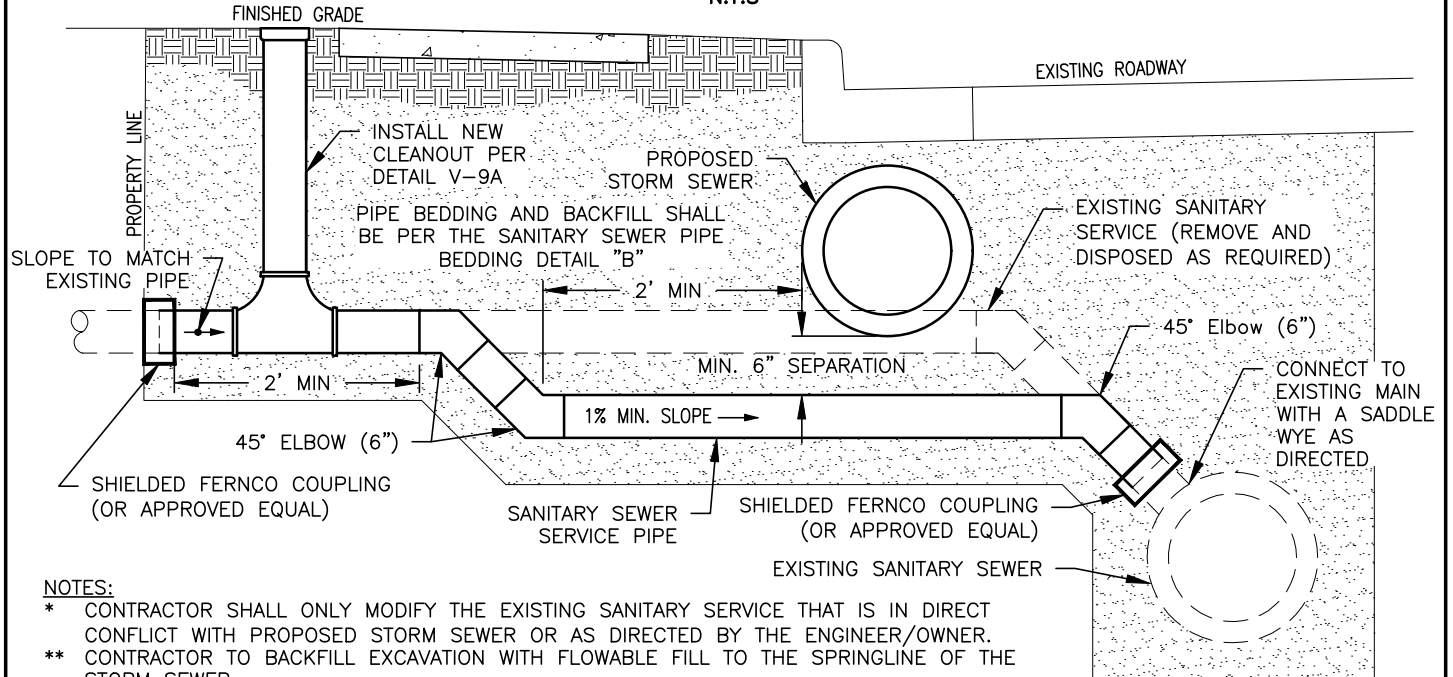


Andrew C. Lemberis
02-01-2022

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY				CITY OF MISHAWAKA, INDIANA	
ITEM	REVISION	APPROVED DATE		ENGINEERING STANDARDS	
	ADOPTED: NEW	MARCH 2013			
	REVISED	FEBRUARY 2022			
			MODIFIED CLEAN-OUT		SHT. NO. V-9A



SANITARY SERVICE REPLACEMENT DETAIL
N.T.S



SANITARY SERVICE/STORM SEWER CONFLICT DETAIL
N.T.S

NOTES:

- * CONTRACTOR SHALL ONLY MODIFY THE EXISTING SANITARY SERVICE THAT IS IN DIRECT CONFLICT WITH PROPOSED STORM SEWER OR AS DIRECTED BY THE ENGINEER/OWNER.
- ** CONTRACTOR TO BACKFILL EXCAVATION WITH FLOWABLE FILL TO THE SPRINGLINE OF THE STORM SEWER.

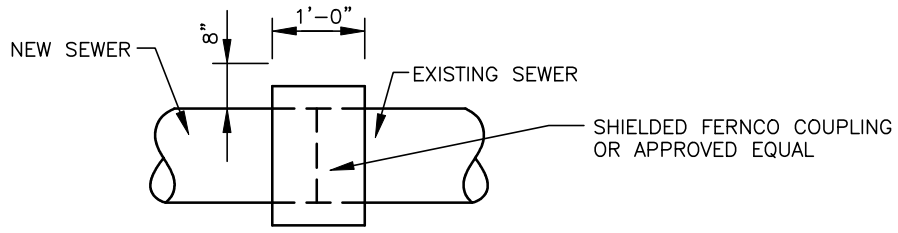
NOTES:

1. LATERAL SHALL BE REPLACED FROM THE EXISTING PIPE TRENCH LIMIT TO THE RIGHT-OF-WAY, UNLESS OTHERWISE DIRECTED.
2. WHEN POSSIBLE, CLEANOUTS SHALL BE LOCATED OUTSIDE OF THE SIDEWALK WITHIN THE RIGHT-OF-WAY.
3. CLEANOUTS SHALL BE INSTALLED PER DETAIL V-9A.
4. SANITARY LATERAL PIPE SHALL BE BEDDED PER THE SANITARY SEWER PIPE BEDDING DETAIL "B", DETAIL V-13.
5. WHEN SANITARY SERVICE PIPING IS TO BE REPLACED ALL THE WAY TO THE MAIN SEWER PIPE A SADDLE SERVICE WYE CONNECTION SHALL BE MADE PER DETAIL V-11.
6. IF THE EXISTING MAIN LINE SEWER HAS CIPP LINER, THE HOST PIPE SHALL BE REMOVED WITHIN THE LIMITS OF THE SADDLE AND AN EPOXY SHALL BE PLACED AT THE INTERFACE OF THE CIPP LINER AND THE SADDLE SERVICE WYE.

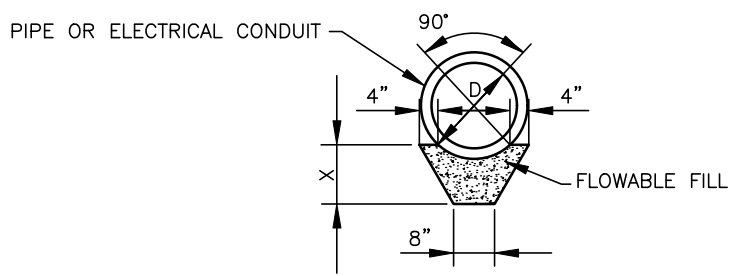
PREPARED BY: DLZ INDIANA, LLC

Andrew C. Lemberis
02-01-2022

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY				CITY OF MISHAWAKA, INDIANA	
ITEM	REVISION	APPROVED DATE		ENGINEERING STANDARDS	
	ADOPTED: NEW	FEBRUARY 2022	LATERAL REPLACEMENT DETAIL		SHT. NO. V-10



**COUPLING
FOR JOINING OLD & NEW PIPE**
N.T.S

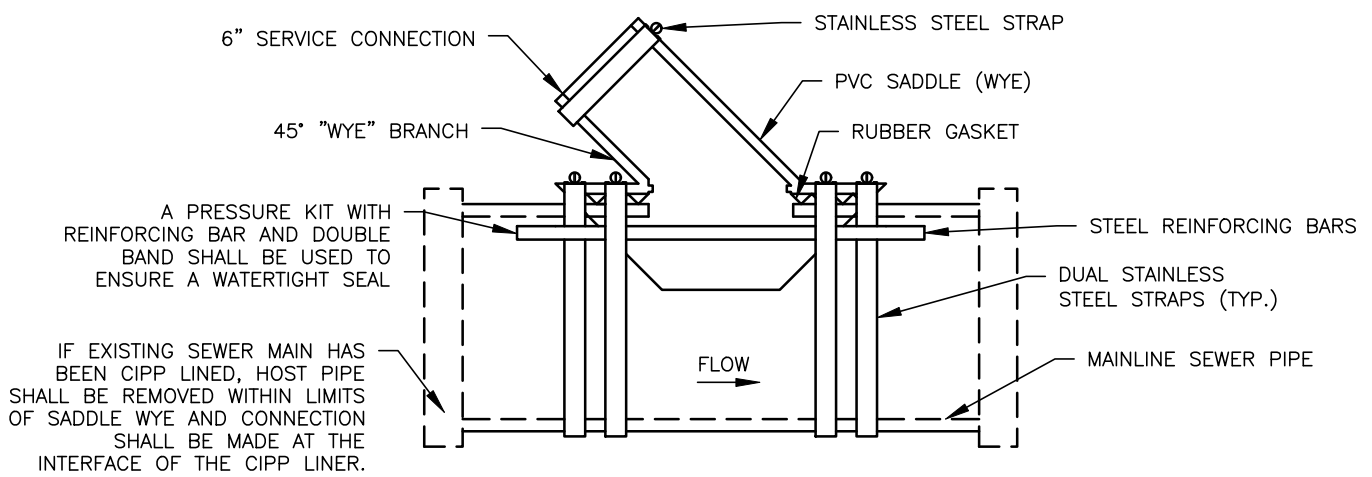


$$X = \frac{D \times L}{10}$$

X = INCHES
D = PIPE DIA. IN INCHES
L = LENGTH OF SUPPORT IN FEET
MINIMUM "X" = 7

BEARING FOR SUPPORT SHALL BE A MINIMUM OF 2 FEET ON UNDISTURBED GROUND AT EACH END

PIPE UTILITY CONFLICT DETAIL
N.T.S.



SADDLE SERVICE TAP CONNECTION
N.T.S

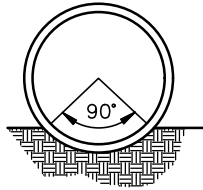
NOTES:

1. SADDLE CONNECTION ALLOWED ONLY IN SEWER MAINS LARGER THAN 12" IN DIAMETER.
2. SADDLE TAP SEWER SERVICE CONNECTION SHALL ONLY BE INSTALLED WITH ENGINEERS APPROVAL.
3. THE SADDLE TAP CONNECTION SHALL BE MADE WITH A SADDLE WYE CONNECTION.
4. INSTALL THE SADDLE WYE CONNECTION ON THE MAIN LANE BETWEEN THE 10 AND 11 O'CLOCK OR 2 AND 3 O'CLOCK LOCATION.
5. USE A 7" CORING BIT OR HOLE SAW TO CORE HOLE IN THE SEWER MAIN, MATCHING THE CONTOUR OF THE TAP SADDLE LOCATING RING.

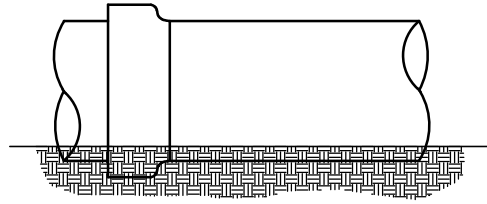
PREPARED BY: DLZ INDIANA, LLC

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02-01-2022

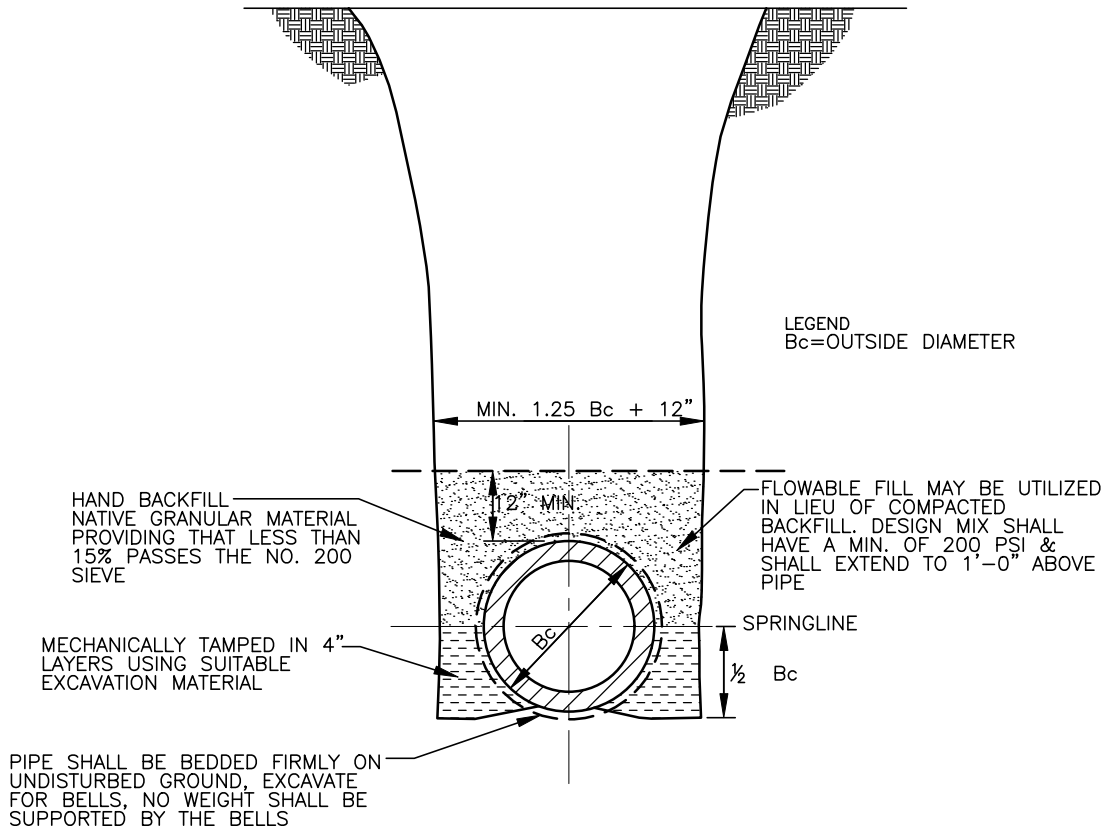
APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY				CITY OF MISHAWAKA, INDIANA	
ITEM	REVISION	APPROVED DATE		ENGINEERING STANDARDS	
	EFFECTIVE		APRIL 2007		
	REVISED		MARCH 2013		
	REVISED		FEBRUARY 2022		
				MISCELLANEOUS PIPE DETAILS	SHT. NO. V-11



THE LOWER 90 ARC OF THE BARREL OF THE PIPE SHOULD BE IN FIRM CONTACT WITH UNDISTURBED EARTH.



SMALL EXCAVATIONS SHOULD BE MADE FOR THE BELLS. THESE SHOULD BE NO LARGER THAN NECESSARY TO CLEAR THE BELL.



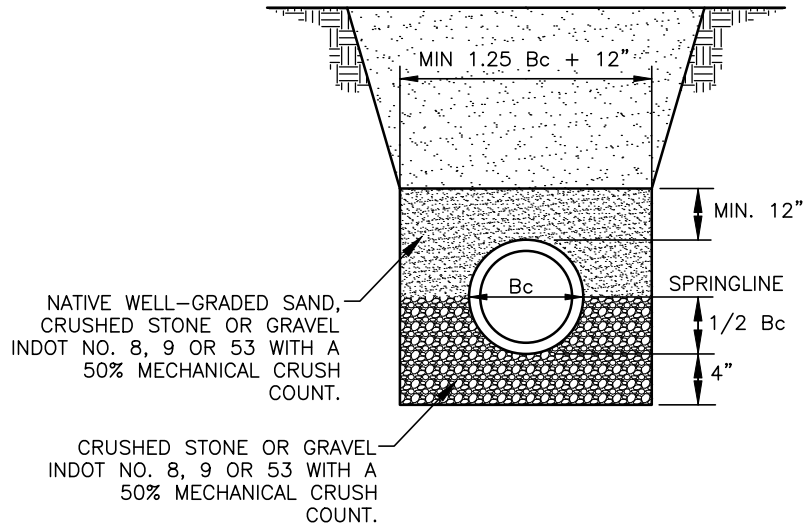
NOTES:

1. THIS BEDDING DETAIL IS NOT PERMITTED FOR THE INSTALLATION OF ANY FLEXIBLE SANITARY SEWER PIPE. REFER TO SHEET NUMBER V-13 FOR THE SANITARY SEWER PIPE INSTALLATION DETAIL FOR FLEXIBLE PIPE.
2. IF NATIVE MATERIAL IS GREATER THAN 15% PASSING THE NO. 200 SIEVE THEN BEDDING DETAIL 'B' WILL BE USED EXCLUSIVELY.
3. BACK-FILL IN STREETS, ALLEYS, SIDEWALKS, OR DRIVING AREAS SHALL BE IN 6" LAYERS, SOLIDLY TAMPED TO SUB-GRADE OF STREET BASE.
4. BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR
5. BACK-FILL IN EASEMENT OR OPEN AREAS SHALL BE IN 12" LAYERS SOLIDLY TAMPED.

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ITEM	REVISION	APPROVED DATE		ENGINEERING STANDARDS				
	EFFECTIVE	APRIL 2007	SANITARY SEWER PIPE BEDDING DETAIL "A"					
	REVISED	MARCH 2013				SHT. NO. V-12		
	REVISED	FEBRUARY 2022						



LEGEND
 Bc=OUTSIDE DIAMETER OF PIPE

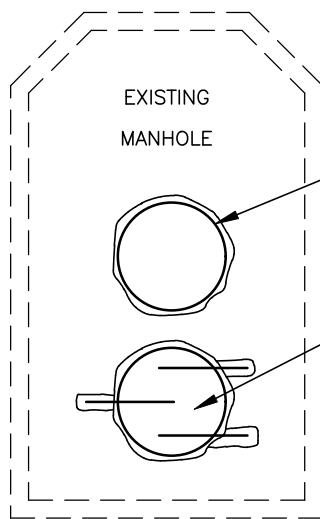
NOTES:

1. ALL BEDDING AND INITIAL BACKFILL SHALL BE INSTALLED IN 4" TO 6" BALANCED LIFTS AND MECHANICALLY TAMPED.
2. BEDDING MATERIAL SHALL BE HAND PLACED AROUND THE HAUNCH AND SIDES OF THE PIPE TO ENSURE PROPER COMPACTION AND COMPLETE FILLING OF ALL VOIDS.
3. THE MATERIALS IN AND AROUND THE PIPE HAUNCH SHALL BE COMPACTED IN PLACE BY SHOVEL SLICING DURING THE INSTALLATION.
4. BACK-FILL - IN STREETS, ALLEYS, SIDEWALKS OR DRIVING AREAS:
 - a. 6" LAYERS, SOLIDLY TAMPED TO SUB-GRADE OF STREET BASE.
 - b. BACKFILL WILL BE GRANULAR MATERIAL WITH LESS THAN 15% PASSING THE NO. 200 SIEVE.
 - c. BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR
5. BACK-FILL - IN EASEMENT OR OPEN AREAS:
 - a. 12" LAYERS SOLIDLY TAMPED.
 - b. FOR BACKFILL IN EASEMENTS OR OPEN AREAS NATIVE MATERIAL WILL BE ACCEPTABLE.
6. THIS BEDDING DETAIL SHALL BE USED FOR THE INSTALLATION OF ALL FLEXIBLE SANITARY SEWER PIPE MATERIALS.

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ITEM	REVISION	APPROVED DATE		ENGINEERING STANDARDS				
	EFFECTIVE	APRIL 2007	SANITARY SEWER PIPE BEDDING DETAIL "B"					
	REVISED	MARCH 2013				SHT. NO. V-13		
	REVISED	FEBRUARY 2022						

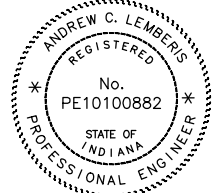


EXISTING
MANHOLE

CORE DRILL OPENING IN EXISTING MANHOLE FOR PLACEMENT OF A COMPRESSION GASKET MANHOLE BOOT 'A-LOK' PRODUCT OR APPROVED EQUAL FOR A WATER TIGHT CONNECTION TO THE NEW PIPE. ONLY IF APPROVED BY THE ENGINEER, THE PIPE MAY BE GROUTED IN PLACE BY FILLING THE ANNULAR SPACE FULL WITH NON-SHRINK GROUT, MASTER BUILDERS, MASTERFLOW 928, OR EQUAL.

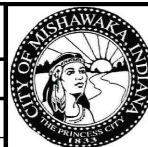
EXISTING PIPE REMOVED. EPOXY GROUT #3 DOWELS INTO EXISTING CONCRETE, WITH MASTER BUILDERS, BRUTEM AB OR EQUAL. REPAIR HOLE WITH MASTER BUILDERS, SET 45-HOT WEATHER FORMULA, IN STRICT CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS; OR EQUAL

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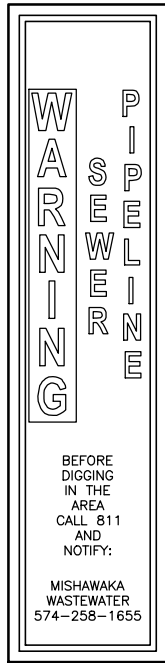
CITY OF MISHAWAKA, INDIANA

ITEM	REVISION	APPROVED DATE
	EFFECTIVE	APRIL 2007
	REVISED	FEBRUARY 2022

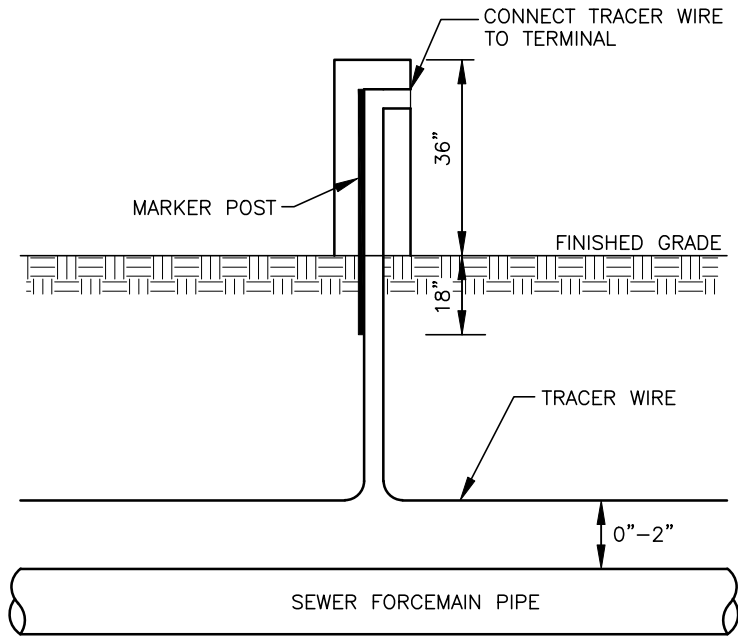
ENGINEERING STANDARDS

MANHOLE WALL REPAIR
DETAIL

SHT. NO.
V-14



DECAL DETAIL
N.T.S



PIPE MARKER DETAIL
N.T.S.

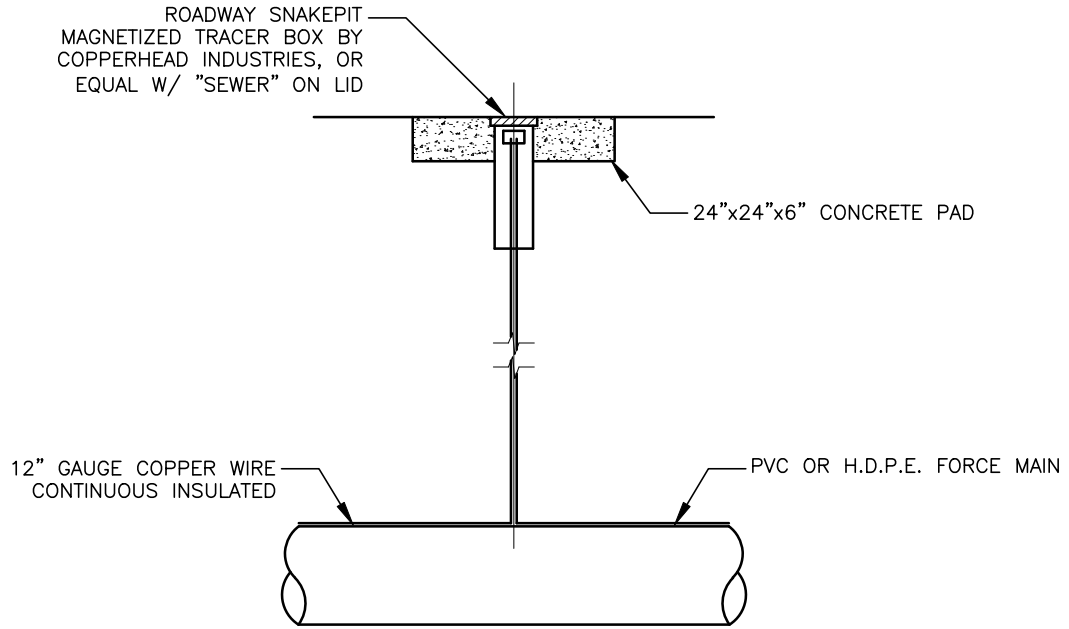
NOTES:

1. ALL FORCEMAIN PIPE SHALL BE INSTALLED WITH AN ELECTRONICALLY CONTINUOUS TYPE TW INSULATED #12 TRACING WIRE.
2. MARKERS SHALL BE PLACED AT 400 FEET INTERVALS AND ALL CHANGES IN DIRECTION. MARKERS SHALL BE RHINO 2 TERMINAL TRIVIEW TEST STATIONS PRODUCT #TVT154_B2 OR EQUAL WITH DECALS ON EACH SIDE. THE DECALS SHALL BE GREEN WITH WHITE LETTERING AND READ: "WARNING SEWER (OR OTHER UTILITY)" AND SHALL HAVE THE PHONE NUMBER OF THE MISHAWAKA WASTEWATER DEPARTMENT: 574-258-1655. THE TRACER WIRE SHALL BE CONNECTED TO THE TERMINAL IN EACH MARKER.
3. MARKERS SHALL BE INSTALLED ON ALL SEWER FORCEMAINS AND AS OTHERWISE DIRECTED BY THE CITY.
4. FORCEMAIN TRACING WIRE SHALL MAINTAIN CONNECTIVITY THROUGHOUT THE LENGTH OF THE FORCEMAIN, INCLUDING AT ANY CHANGES IN DIRECTION, STRUCTURES, AIR RELEASE VALVES, MANHOLES, PIPE MARKERS, ETC.
5. CONTRACTOR SHALL VERIFY THE CONNECTIVITY OF THE ENTIRE LENGTH OF PIPE.

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02-01-2022

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY				CITY OF MISHAWAKA, INDIANA				
ITEM	REVISION	APPROVED DATE		ENGINEERING STANDARDS				
	EFFECTIVE	APRIL 2007	PIPE MARKER DETAIL (ABOVE GRADE)					
	REVISED	MARCH 2013				SHT. NO. V-15		
	REVISED	FEBRUARY 2022						



PIPE MARKER DETAIL
N.T.S.

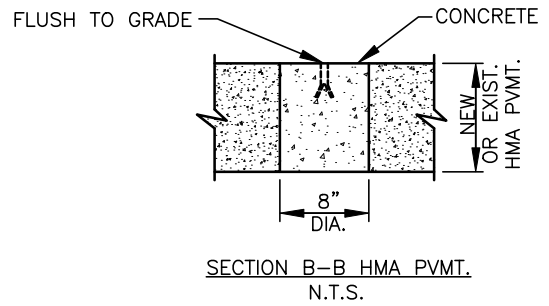
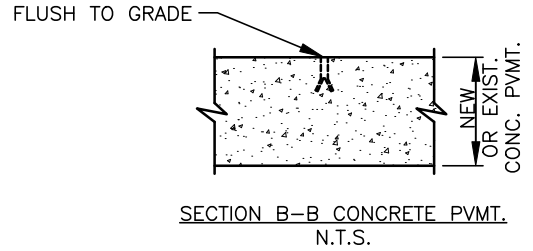
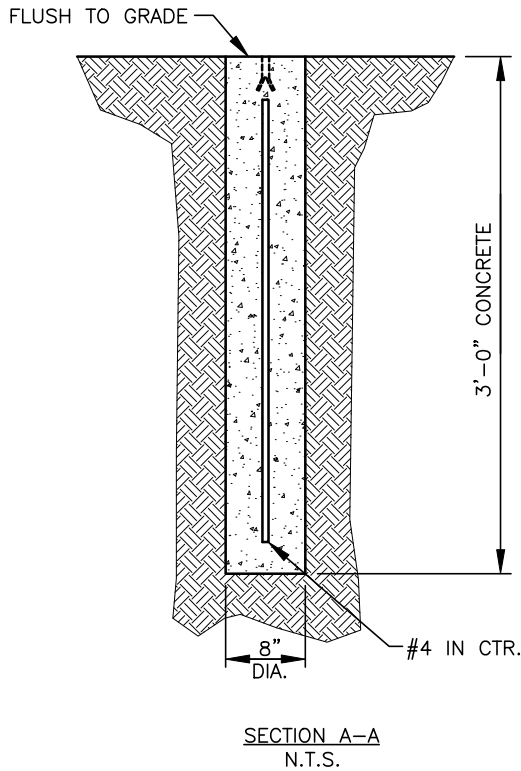
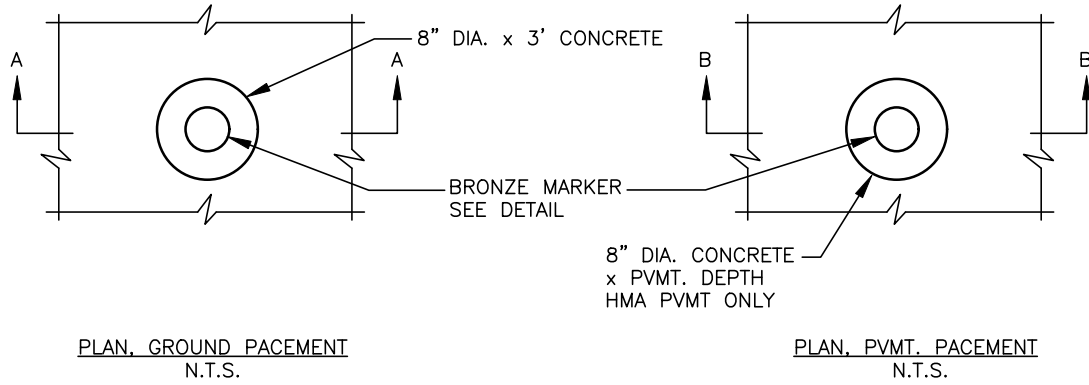
NOTES:

1. ALL FORCE MAIN PIPE SHALL BE INSTALLED WITH AN ELECTRONICALLY CONTINUOUS TYPE TW INSULATED #12 TRACING WIRE.
2. MARKERS SHALL BE PLACED AT 400 FEET INTERVALS MINIMUM AND ALL CHANGES IN DIRECTION. THE TRACER WIRE SHALL BE CONNECTED TO THE TERMINAL IN EACH MARKER.
3. FORCEMAIN TRACING WIRE SHALL MAINTAIN CONNECTIVITY THROUGHOUT THE LENGTH OF THE FORCEMAIN, INCLUDING AT ANY CHANGES IN DIRECTION, STRUCTURES, AIR RELEASE VALVES, MANHOLES, PIPE MARKERS, ETC.
4. "SEWER" SHALL BE CAST ON EACH PIPE MARKER CASTING LID.
5. POURED IN PLACE CONCRETE CASE PAD SHALL BE 24"x24"x6" W/PERIMETER REINFORCING.
6. WIRE SHALL BE TAPED AT EACH SIDE OF JOINT AND 6" O.C.
7. REFER TO DETAIL V-15B FOR PIPE MARKER DETAIL SECTIONS.
8. CONTRACTOR SHALL VERIFY THE CONNECTIVITY OF THE ENTIRE LENGTH OF PIPE.

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02-01-2022

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ITEM	REVISION	APPROVED DATE		ENGINEERING STANDARDS	
	ADOPTED: NEW	MARCH 2013	PIPE MARKER DETAIL (AT GRADE)		
	REVISED	FEBRUARY 2022			



3/4" DIA. BRONZE
MARKER BY "BERNSTEN"
CUSTOM IDENTIFICATION
PRODUCTS OR EQUAL

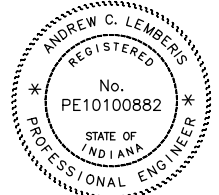


BRONZE MARKER DETAIL
N.T.S.

NOTES:

1. INSTALL MARKERS AT MINIMUM 400' INTERVALS IN DEVELOPED AREAS.
2. INSTALL BETWEEN TRACER WIRE STATIONS.
3. REFER TO DETAIL V-15A.

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02-01-2022

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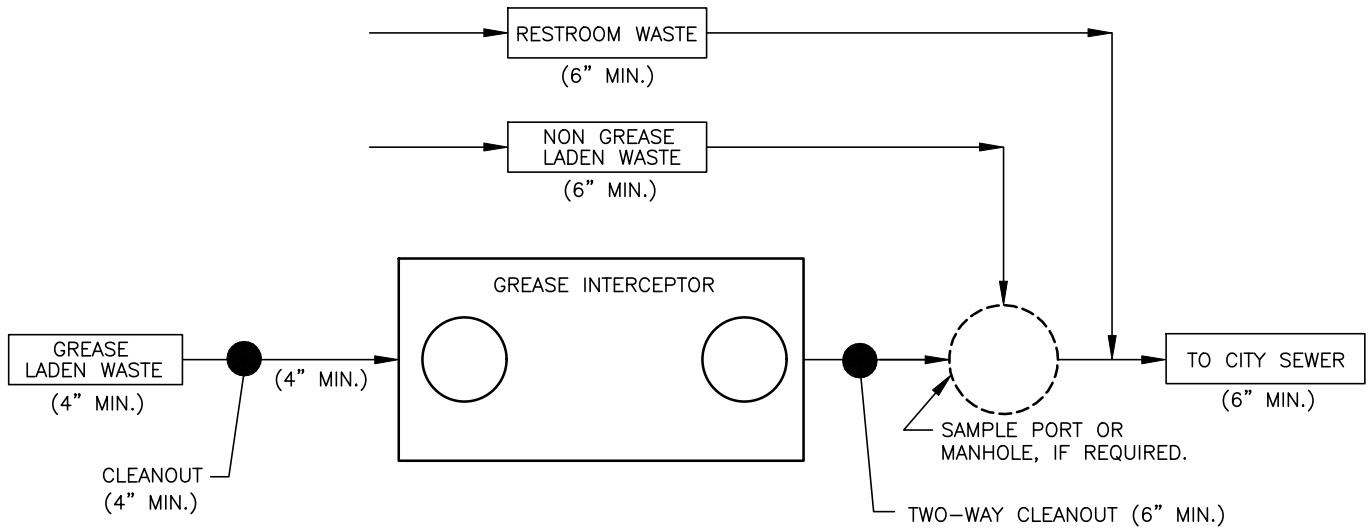
CITY OF MISHAWAKA, INDIANA

ENGINEERING STANDARDS

ITEM	REVISION	APPROVED DATE
	ADOPTED: NEW	MARCH 2013
	REVISED	FEBRUARY 2022

PIPE MARKER
DETAIL - SECTIONS

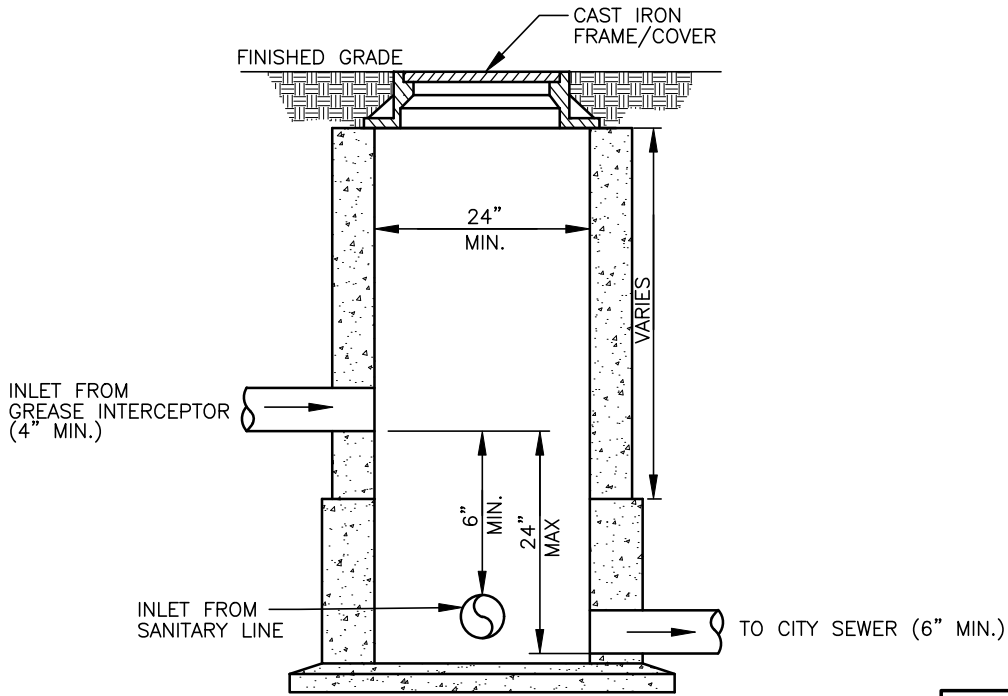
SHT. NO.
V-15B



GREASE INTERCEPTOR AND PIPE LAYOUT

NOTES:

1. ALL GREASE LADEN WASTEWATER SHALL RUN THROUGH THE GREASE INTERCEPTOR.
2. NON GREASE LADEN WASTEWATER, EXCEPT RESTROOM WASTE, MAY FLOW THROUGH THE SAMPLE PORT OR MANHOLE.
3. CLEANOUTS SHALL BE INSTALLED ON EITHER SIDE OF EVERY GREASE INTERCEPTOR.
4. A SAMPLE PORT OR MANHOLE MAY BE REQUIRED UPON THE DIRECTION OF THE MISHAWAKA DEPARTMENT OF ENGINEERING.



SAMPLE PORT OR MANHOLE PROFILE

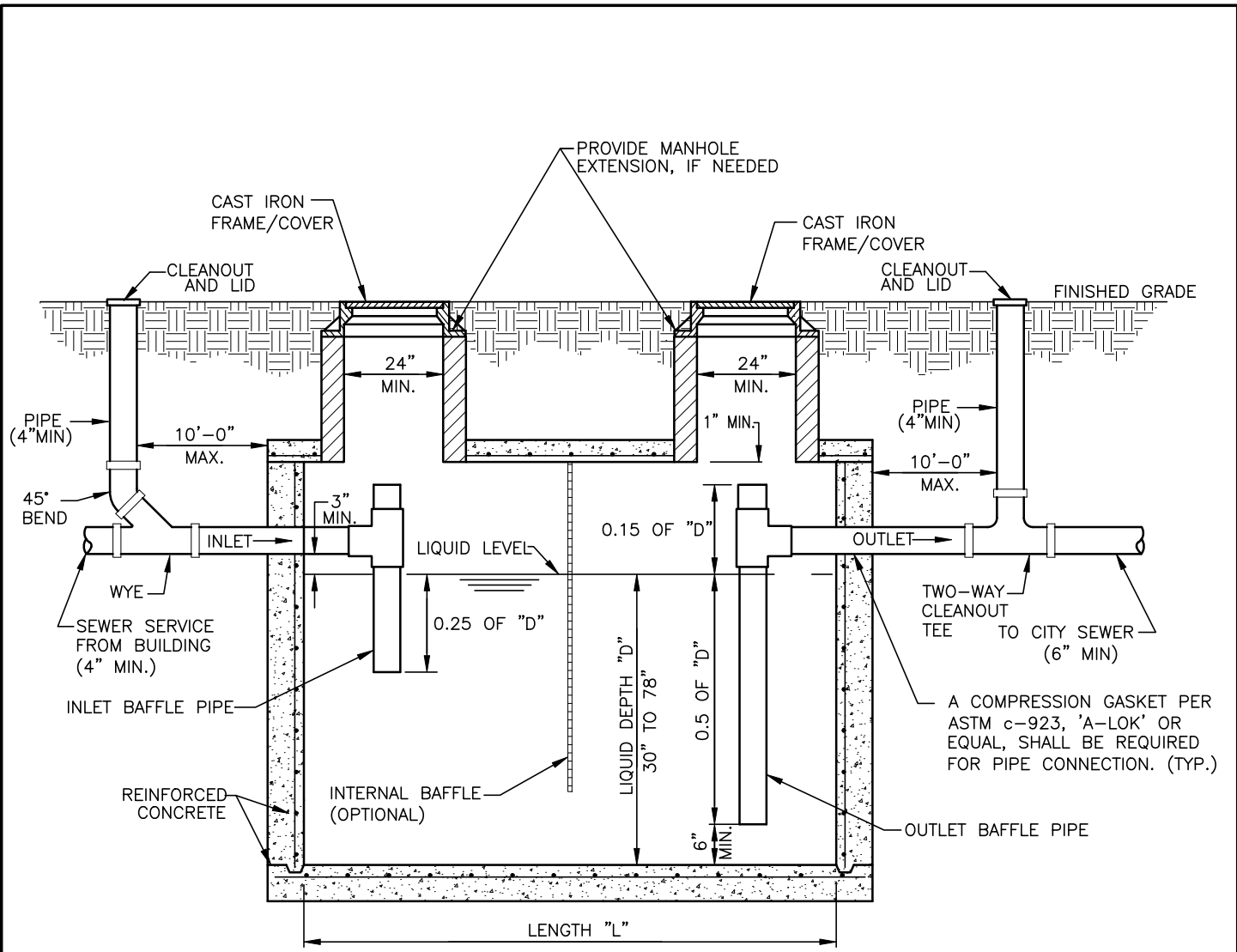
NOTES:

1. SAMPLE PORT OR MANHOLE SHALL HAVE A MINIMUM 24" DIAMETER ACCESS COVER.
2. THE GREASE INTERCEPTOR INLET PIPE SHALL HAVE A MINIMUM 6" DROP FROM INLET PIPING TO THE OUTLET PIPING.
3. THE NON GREASE LADEN WASTEWATER LINE MUST FLOW THROUGH THE BOTTOM OF THE SAMPLE PORT OR MANHOLE.
4. THE SAMPLE PORT OR MANHOLE CANNOT HOLD WATER.
5. ANY SANITARY CONNECTION TO CITY SEWER SHALL BE A 6" MINIMUM DIAMETER.
6. SAMPLE POINTS SHALL BE ACCESSIBLE TO THE CITY OF MISHAWAKA SEWER DEPARTMENT AT ALL TIMES.

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02-01-2022

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ITEM	REVISION	APPROVED DATE		ENGINEERING STANDARDS			
	EFFECTIVE	APRIL 2007	GREASE INTERCEPTOR & PIPING LAYOUT INSTALL.				
	REVISED	MARCH 2013				SHT. NO.	
	REVISED	FEBRUARY 2022				V-16	



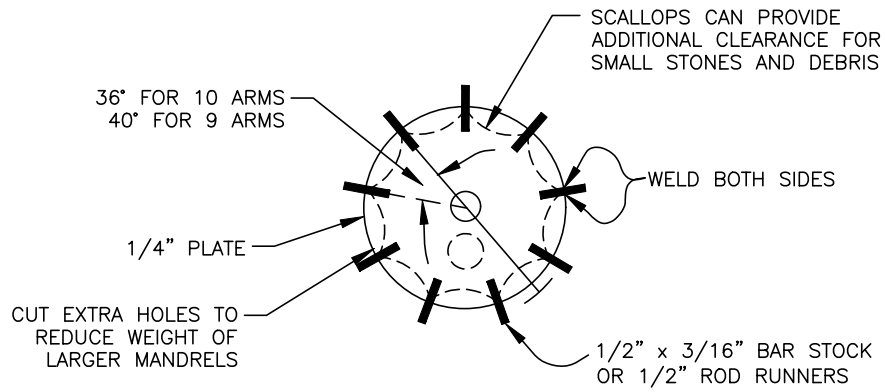
NOTES:

1. GREASE INTERCEPTOR SHALL BE A REINFORCED CONCRETE STRUCTURE.
2. GREASE INTERCEPTOR SHALL BE SIZED PER CALCULATIONS STATED IN SECTION V-12 OF THE SPECIFICATIONS.
3. GREASE INTERCEPTORS SHALL BE EQUIPPED WITH TWO (2) SETS OF 24" DIAMETER MANHOLE OPENINGS, ONE ON EITHER SIDE ABOVE THE BAFFLE PIPES.
4. INLET PIPES SHALL BE A MINIMUM OF 4" DIAMETER. OUTLET PIPES SHALL BE A MINIMUM OF 6" DIAMETER.
5. IN NON-TRAFFIC AREAS, TOP OF CLEAN-OUTS SHALL BE CAST IRON WITH A NEENAH R-4044 LID OR APPROVED EQUAL.
6. IF CLEANOUTS ARE LOCATED IN TRAFFIC AREAS, CONCRETE, OR ASPHALT THE CLEANOUT AND LID SHALL BE LOCATED WITHIN A CASTING. CASTING FRAME AND LID TO BE A NEENAH R-1976 OR APPROVED EQUAL. SEE DETAIL V-9A.
7. CAST IRON MANHOLE COVER SHALL BE WATER AND GAS SEALED.
8. CLEANOUT ON THE OUTLET SIDE OF THE GREASE INTERCEPTOR SHALL BE A TWO-WAY CLEANOUT TEE.
9. PIPE JOINTS ON THE INTERIOR OF THE GREASE INTERCEPTOR MAY BE SOLVENT WELDED. PIPE JOINTS ON THE EXTERIOR OF THE GREASE INTERCEPTOR SHALL BE GASKETED. ALL EXTERIOR SANITARY PVC PIPE SHALL BE SDR-35 OR SDR-26.

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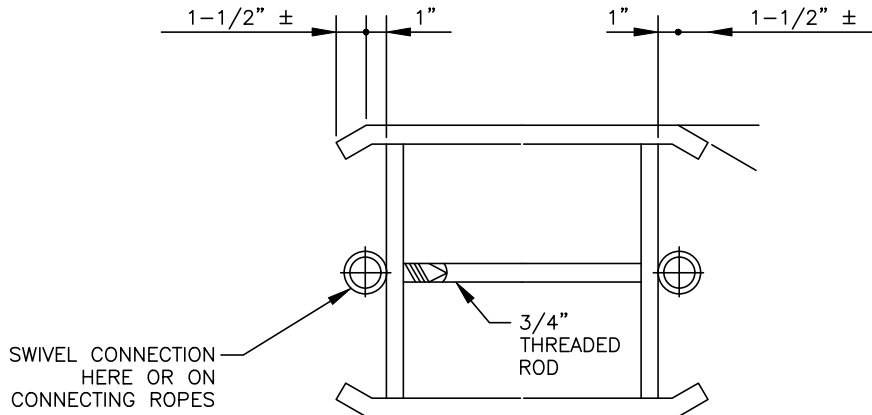
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APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY				CITY OF MISHAWAKA, INDIANA				
ITEM	REVISION	APPROVED DATE		ENGINEERING STANDARDS				
	EFFECTIVE	APRIL 2007	GREASE INTERCEPTOR DETAIL					
	REVISED	MARCH 2013				SHT. NO. V-17		
	REVISED	FEBRUARY 2022						

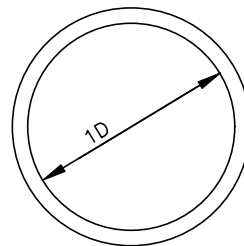


TRANSVERSE SECTION OF MANDREL

OTHER MANDREL FABRICATION IS PERMITTED IF INSPECTION IS OF EQUAL ACCURACY.



LONGITUDIAL SECTION OF MANDREL



$1D = 2R + 0.01$

END VIEW OF PROVING RING

EXAMPLE MANDREL AND PROVING RING

(FOR PVC PIPE MEETING THE FOLLOWING: ASTM D-3034 FOR SDR35 AND SDR26; ASTM F-679 FOR PS46 AND PS115; AWWA C-900 AND AWWA C-905)

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02-01-2022

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CITY OF MISHAWAKA, INDIANA

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	EFFECTIVE	APRIL 2007
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	REVISED	FEBRUARY 2022

ENGINEERING STANDARDS

MANDREL AND PROVING RING

SHT. NO.
V-18