

The diagram illustrates two cross-sectional views of a ditch or channel. The left view shows a ditch with a 2' toe wall upstream and downstream, a 4' toe wall within the flowline, and a maintenance berm on the right side. The right view shows a ditch with a 2' toe wall along the top bank, a 4' concrete slope paving w/#3 bars @ 12" o.c.e.w., and a maintenance berm on the right side. Both sections show a 2% slope and a 2' minimum toe wall.

- NOTES:
1. SEE RULES, REGULATIONS, AND GUIDELINES AS AMENDED FOR SIDE SLOPE REQUIREMENT. A GEOTECHNICAL ANALYSIS MAY BE REQUIRED.
 2. BACK SLOPE SWALES AND INTERCEPTORS ARE NOT REQUIRED FOR CONCRETE LINED SECTIONS.
 3. MAINTENANCE BERM WIDTHS VARY BASED UPON CHANNEL DEPTH AND OTHER FACTORS SEE RULES REGULATIONS, AND GUIDELINES FOR ADDITIONAL INFORMATION.
 4. 4' TOWELANDS REQUIRED IN THE BOTTOM SECTION AT UPSTREAM AND DOWNSTREAM FLOWLINE.

[illegible]

MINIMUM EXTENT OF EROSION PROTECTION	
LOCATION	DISTANCE (FT)
a	20'
b	LARGER OF 50' OR 0.75x $T_m \div \tan \theta$
c	20'

VELOCITY *	<u>ANGLE OF INTERSECTION, θ</u>	
<u>CHANNEL SECOND)</u>	<u>15° - 45°</u>	<u>45° - 90°</u>
RE	PROTECTION	PROTECTION
S	NO PROTECTION	PROTECTION
	NO PROTECTION	NO PROTECTION

* NOTE: 25-YEAR VELOCITY IN SIDE CHANNEL
ASSUMING NO BACKWATER FROM MAIN CHANNEL.

MAINTENANCE BERM

2% SLOPE

5' MIN

1 DIA

1% MIN SLOPE

4' TOE WALL

CONCRETE SLOPE PAVING
(SEE BDD4 DETAIL 2-3)

(SEE NOTE 1)

NOTES:

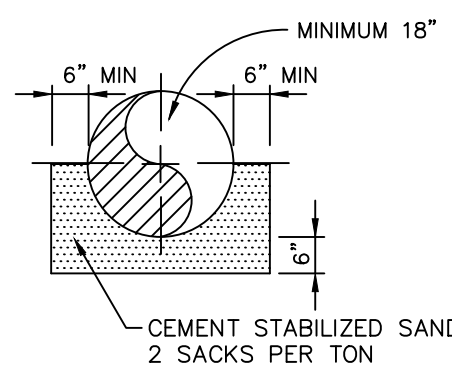
1. PROPOSED FLOWLINE OF THE PIPE OR BOX SHALL BE PLACED A MINIMUM OF 6" ABOVE EXISTING FLOW LINE OF DITCH / CHANNEL OR STATIC WATER SURFACE WHICHEVER IS HIGHER.

Diagram of a rectangular manhole with a 2' x 2' opening. The opening is reinforced with 2-#4 bars. The manhole is 8' wide and 8' high. The opening is 2' wide and 2' high. The diagram shows the manhole structure and the opening with reinforcement bars.

MODIFIED TYPE "B" BERM INLET
(HIGHWAY LOADING)
(SECTION A-A')

PIPE DIA.	SLOPE
24"	0.60%
36"	0.30%
48"	0.20%
60"	0.20%

NOTE:
OHWM—ORDINARY HIGH WATER MARK



Technical drawing of a ditch flow structure. The plan view (top) shows a rectangular structure with a circular opening. Dimensions include 8" for the width of the side sections, 1.5:1 (TYP) for the slope, and 2~#4 BARS for the reinforcement. The side view (bottom) shows a cross-section with a 3' MIN depth and a 6" width. Labels include "DITCH FLOW", "OFFSITE", and "DITCH".

Diagram illustrating the base requirements for a 18" diameter pipe. The base is 6" thick and 6" wide. The minimum distance from the pipe edge to the base edge is 6" MIN. The base is made of CEMENT STABILIZED SAND, requiring 2 SACKS PER TON.

VARIES

4'-0"

8"

8"

2'-0"

TOP OF ROADSIDE DITCH

5'-0" MAX

OFFSITE DITCH F/L

5"

2'-0"

8"

MITER PIPE AT BOTTOM OF CONCRETE PRIOR TO POUR

#3 BARS @15" O.C.E.W.

Diagram illustrating the cross-section of a detention facility. The structure is defined by a dashed line labeled "EDGE OF PAVEMENT (DITCH OR CHANNEL)" at the top and "EDGE OF PAVEMENT (DETENTION FACILITY)" at the bottom. The cross-section is divided into three vertical sections:

- Left Section:** A sloped area with a 6:1 slope, indicated by a triangle labeled "6:1 MIN.".
- Middle Section:** A flat area with a 0.5% slope, indicated by a triangle labeled "0.5% SLOPE MIN.".
- Right Section:** A sloped area with a 6:1 slope, indicated by a triangle labeled "6:1 MIN.".

Dimensions and labels on the right side of the diagram:

- DEPTH OF DITCH OR CHANNEL:** Indicated by a vertical dimension line at the top.
- 1/3 MIN. OF DEPTH (DITCH OF CHANNEL):** Indicated by a vertical dimension line below the top section.
- MAINTENANCE BERM (WIDTH VARIES):** Indicated by a vertical dimension line below the middle section.
- 1/3 MIN. OF DEPTH (DETENTION FACILITY):** Indicated by a vertical dimension line at the bottom.

A callout "SEE NOTE 4" points to the left side of the diagram.

6'-0" (6' MIN. (SEE NOTE 1)) 6'-0"

6 1 1 6

1 MIN. (SEE NOTE 1)

5 5

CONCRETE

#4 BARS @ 12" O.C.E.W.

FINISH GRADE

SEE NOTE 4.

NOTES:

1. THE 1 FOOT MINIMUM DEPTH FOR THE WEIR MAY BE REDUCED TO AN AMOUNT EQUAL TO THE PROPOSED FREEBOARD DEPTH FOR THE PROJECT IN CONFORMANCE WITH THE RULES, REGULATIONS, AND GUIDELINES AS CURRENTLY AMENDED.
2. THE PAVING THICKNESS AND REBAR PLACEMENT SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THIS DETAIL. THE ENGINEER IS RESPONSIBLE FOR DESIGNING THE PAVEMENT AND REINFORCEMENT BASED UPON THE ACTUAL SITE CONDITIONS.
3. ALL CONCRETE MUST HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.
4. 2' DEEP X 12" WIDE TOE WALL AROUND PERIMETER IS REQUIRED.

Diagram illustrating the cross-section of a detention facility. The structure is defined by the **EDGE OF PAVEMENT (DITCH OR CHANNEL)** on the left and the **EDGE OF PAVEMENT (DETENTION FACILITY)** on the right. The central area has a **0.5% SLOPE MIN.** indicated by an upward arrow. The side slopes are **8:1 MIN.**, shown with triangles on both sides. The depth requirements are specified on the right: **1/3 MIN. OF DEPTH (DITCH OF CHANNEL)** for the top section and **1/3 MIN. OF DEPTH (DETENTION FACILITY)** for the bottom section. A **MAINTENANCE BERM (WIDTH VARIES)** is located between the two depth sections.

(SEE NOTE 2)

6

1

1" MIN

(SEE NOTE 1)

1

6

FINISH GRADE

NOTES:

1. THE 1 FOOT MINIMUM DEPTH FOR THE WEIR MAY BE REDUCED TO AN AMOUNT EQUAL TO THE PROPOSED FREEBOARD DEPTH FOR THE PROJECT IN CONFORMANCE WITH THE RULES, REGULATIONS, AND GUIDELINES AS CURRENTLY AMENDED.
2. WEIR BOTTOM WIDTH SHALL BE PER ENGINEERS DESIGN RECOMMENDATION.

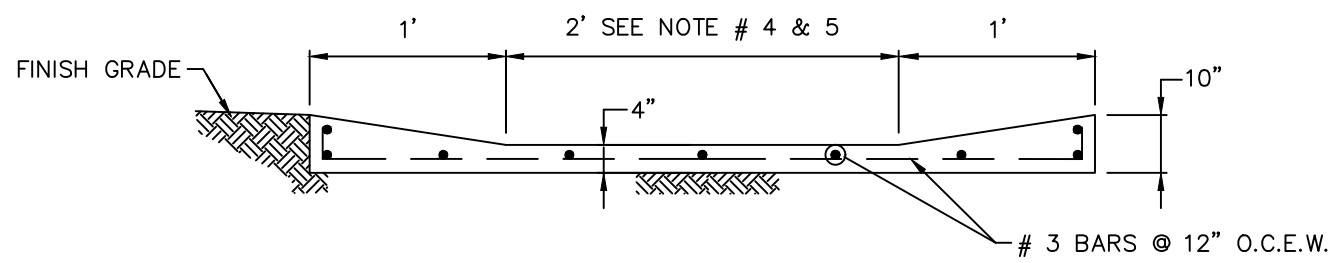
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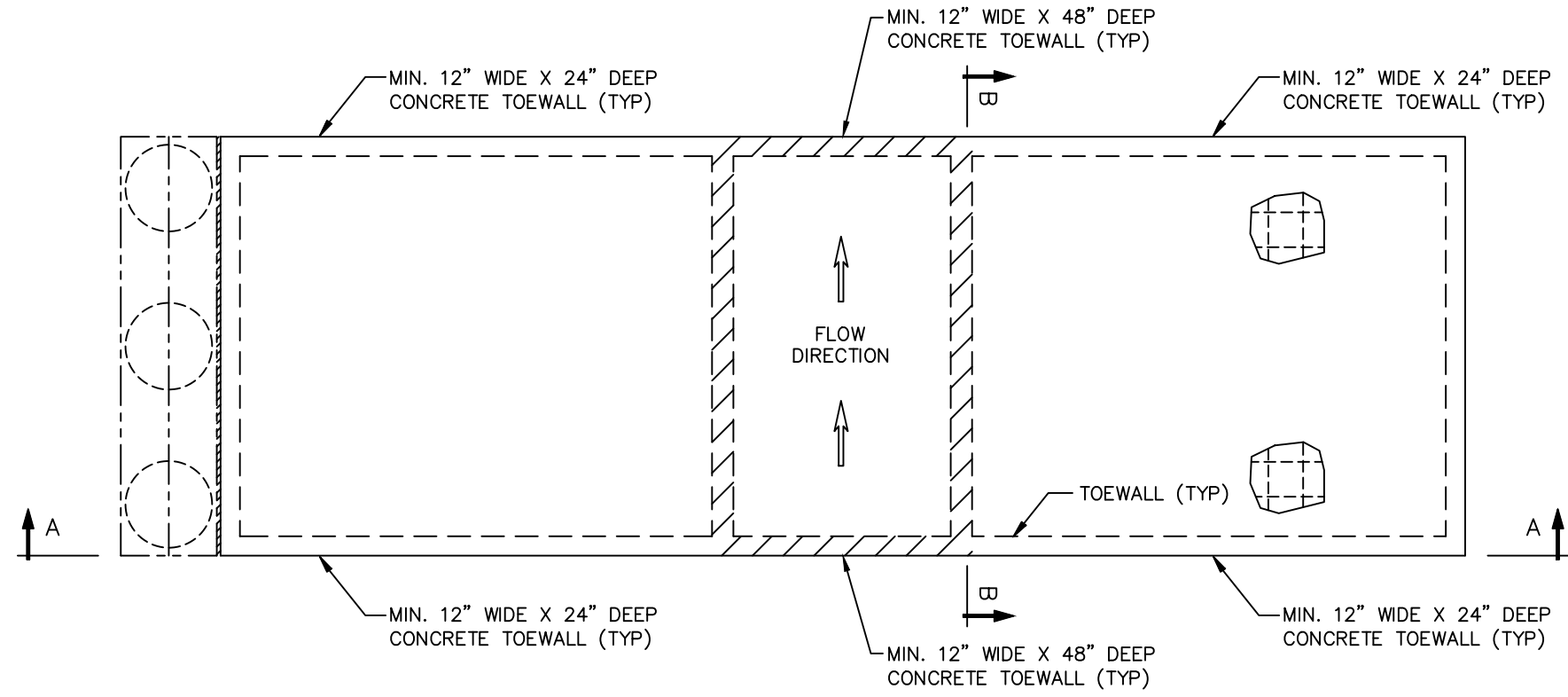
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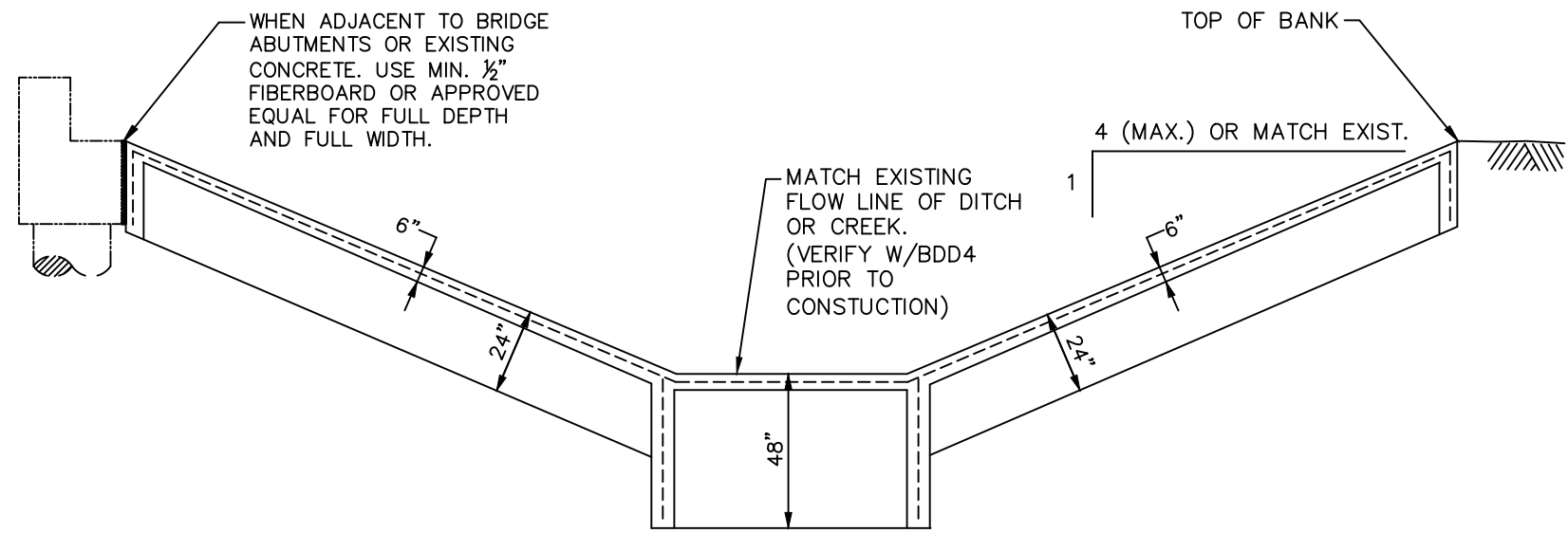


- NOTES:
1. THE DIMENSIONS SHOWN ARE THE MINIMUM REQUIRED BY THE DISTRICT.
 2. THE PAVING THICKNESS AND REBAR PLACEMENT SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THIS DETAIL. THE ENGINEER IS RESPONSIBLE FOR DESIGNING THE PAVEMENT AND REINFORCEMENT BASED UPON THE SITE CONDITIONS.
 3. ALL CONCRETE MUST HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.
 4. DESIGN ENGINEER HAS THE OPTION OF INCREASING AS DEEMED APPROPRIATE.
 5. WIDTH INCREASES WITHIN THE 15' TRANSITION AS SHOWN ON DETAILS 1-3 AND 3-3.

1
2 DETENTION BASIN CONCRETE PILOT CHANNEL

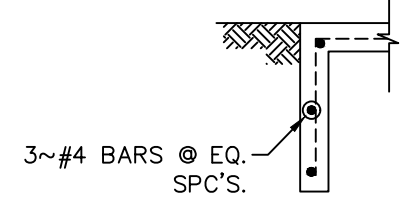


PLAN VIEW
N.T.S.

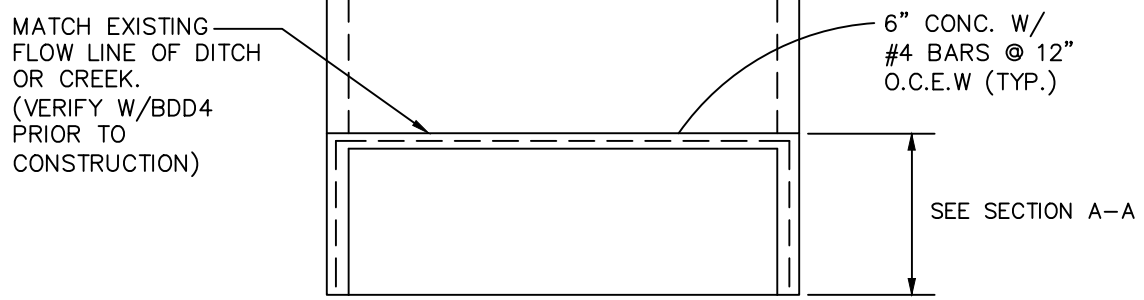


SECTION A-A

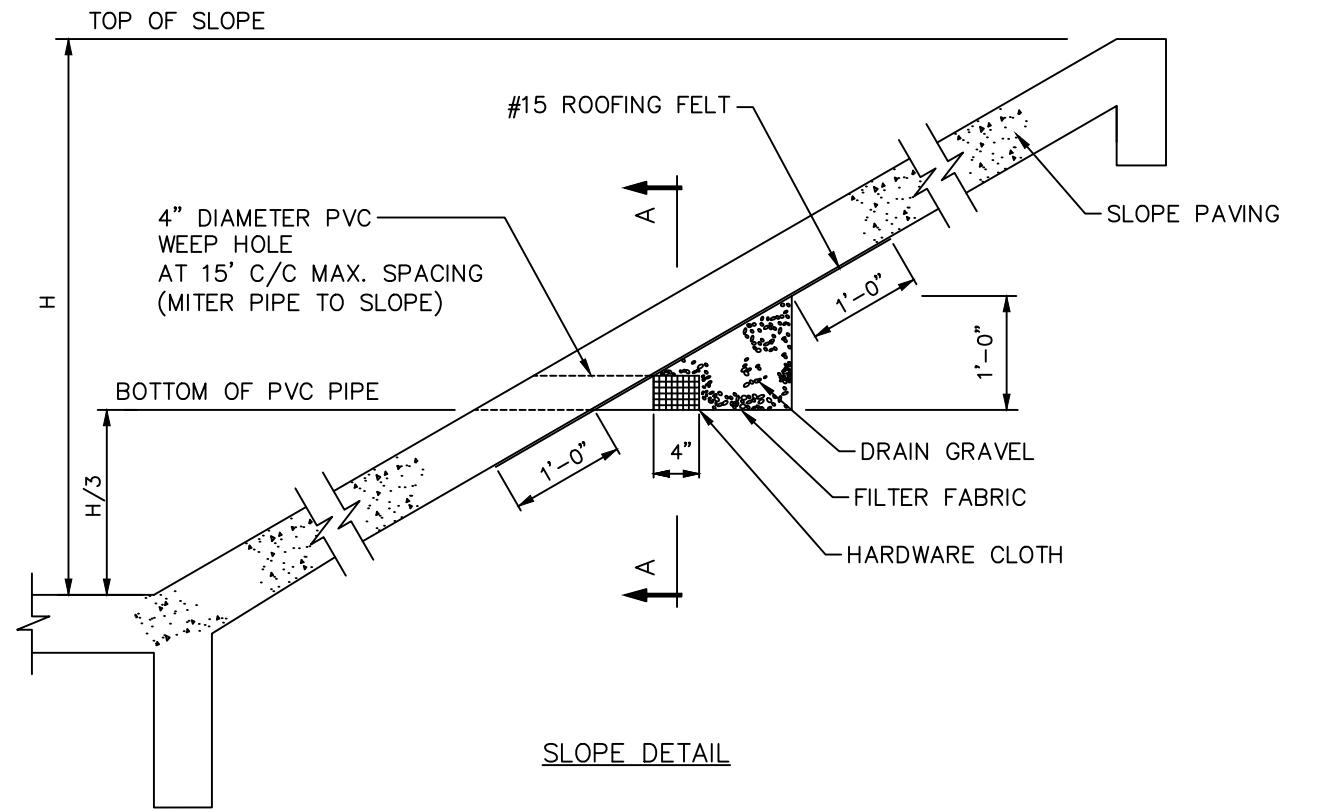
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 3. ALL CONCRETE MUST HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.
 4. MINIMUM YIELD STRENGTH OF REBAR SHALL BE #4 BARS, 60,000 PSI (GRADE 60) AND PLACED AT 12" C/C EACH WAY.
 5. FOR REQUIRED WEEP HOLE PLACEMENT. (SEE BDD4 DETAIL 3-2)



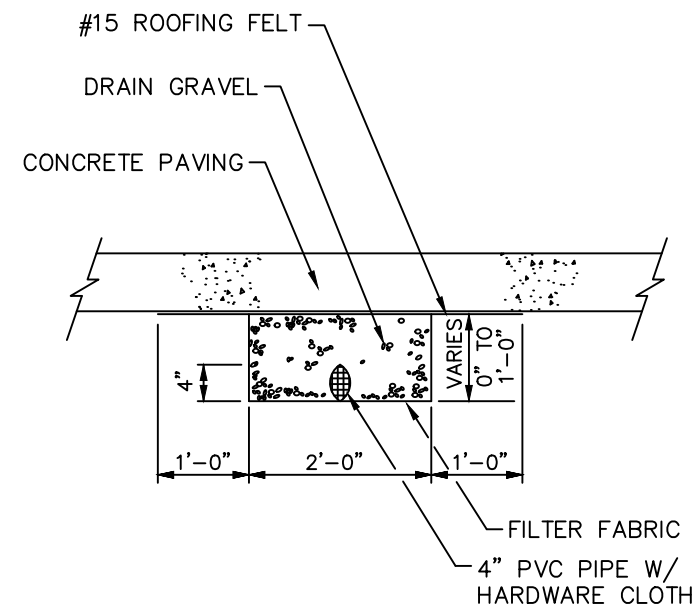
TYPICAL TOEWALL
LONGITUDINAL REBAR DETAIL



SECTION B-B



SLOPE DETAIL



SECTION A-A

SPECIFICATION FOR:

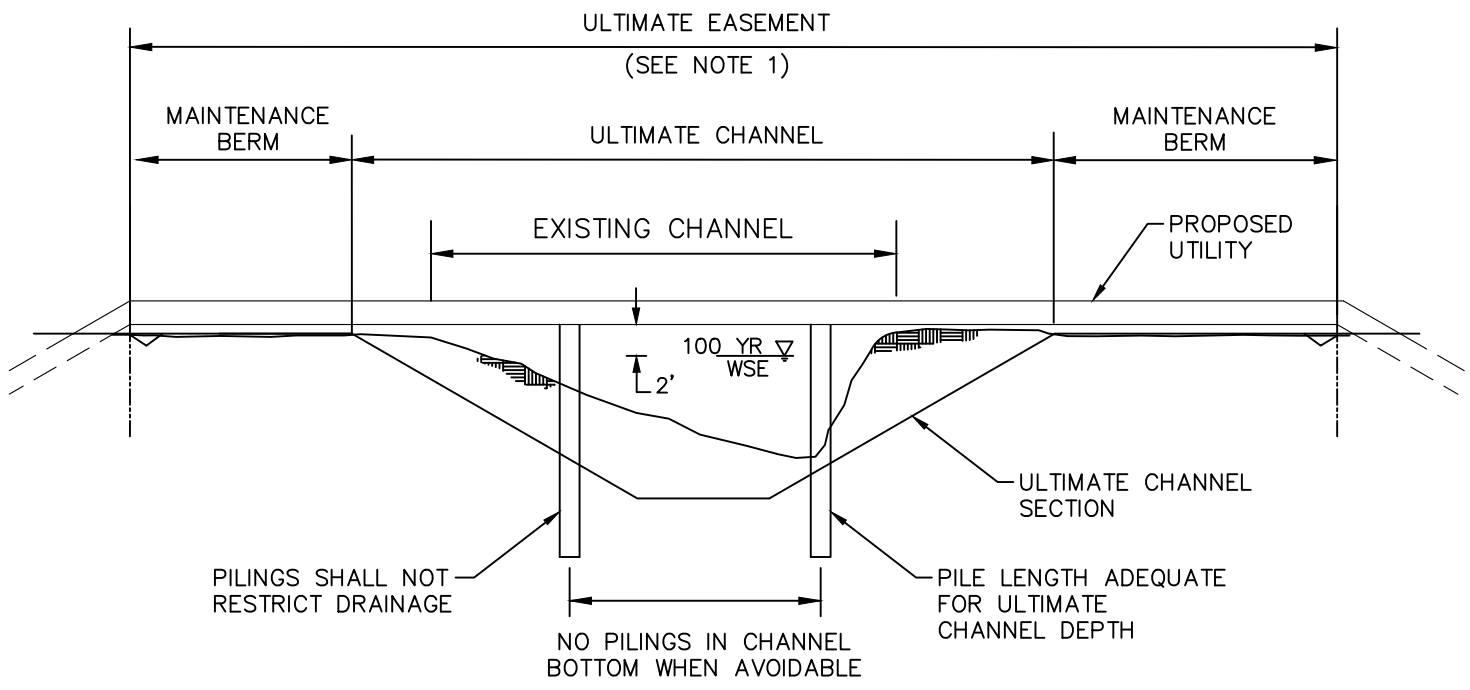
DRAIN GRAVEL	
SIEVE SIZE	% FINER
3/4"	100
3/8"	55-100
NO. 4	15-100
NO. 8	0-50
NO. 16	0-15
NO. 20	0-5
NO. 200	0-5

HARDWARE CLOTH	
MAX. WIDTH MESH OPENING	1/4"
MIN. WIDTH MESH OPENING	1/16"

FILTER FABRIC	
MAX. EQUIVALENT OPENING	NO. 70 SIEVE
MIN. EQUIVALENT OPENING	NO. 100 SIEVE

* PVC PIPE SHALL BE SCHEDULE 40.

3
2 WEEP HOLE DETAIL



- NOTES:
1. CONTACT DISTRICT FOR DEPTH AND WIDTH OF ULTIMATE CHANNEL SECTION AND THE ULTIMATE EASEMENT WIDTH.
 2. ALL NEW PIPELINE AND GAS LINES SHALL HAVE 10' MIN. DEPTH OF COVER AS MEASURED FROM THE ULTIMATE CHANNEL SECTION DEPTH THROUGHOUT THE EASEMENT / R.O.W. WIDTH. ALL OTHER NEW UTILITIES SHALL HAVE 5' MIN. DEPTH OF COVER AS MEASURED FROM THE ULTIMATE CHANNEL SECTION.
 3. ALL MANHOLES SHALL BE LOCATED OUTSIDE OF THE DISTRICT EASEMENT OR FEE STRIP.
 4. UNDERGROUND FACILITIES MUST BE IDENTIFIED WITH A PROMINENT MARKER LOCATED IMMEDIATELY OUTSIDE OF THE DISTRICT EASEMENT OR FEE STRIP.
 5. AERIAL CROSSING MUST BE CONSTRUCTED A MINIMUM OF 15' ABOVE THE GROUND FOR THE ENTIRETY OF THE ULTIMATE DRAINAGE EASEMENT WITH MINIMAL OBSTRUCTION TO THE CHANNEL AND EASEMENT/ FEE STRIP.
 6. LABEL INTERSECTING CENTERLINES OF UTILITY OR PIPELINE WITH STATE PLANE COORDINATES OR LATITUDE AND LONGITUDE.
 7. TRENCHLESS INSTALLATION ONLY.

4
2 UTILITY AND PIPELINE CROSSING OF
BDD4 DISTRICT FACILITY

NO.	DATE	REVISIONS	APP.
	01-13-23	REVISED NOTE 1 FOR CONCRETE LINED EXTREME EVENT-OVERFLOW SWALE	JDA
	05-15-23	REVISED STANDARD DETAILS	THD
	08-08-23	EFFECTIVE	JDA
	10-03-23	REVISED~ADDED DIMENSION REFERENCE SHT 3 SECTIONS A-A	THD
	10-04-23	EFFECTIVE	JDA
	10-23-23	REVISED~NOTES ON PILOT CHANNE 1-2	THD
	10-24-23	EFFECTIVE	JDA
	01-03-24	REVISED DETAIL 2-1 ~ CONCRETE LINED TRAPEZOIDAL CHANNEL SECTION	THD
	01-03-24	EFFECTIVE	JDA

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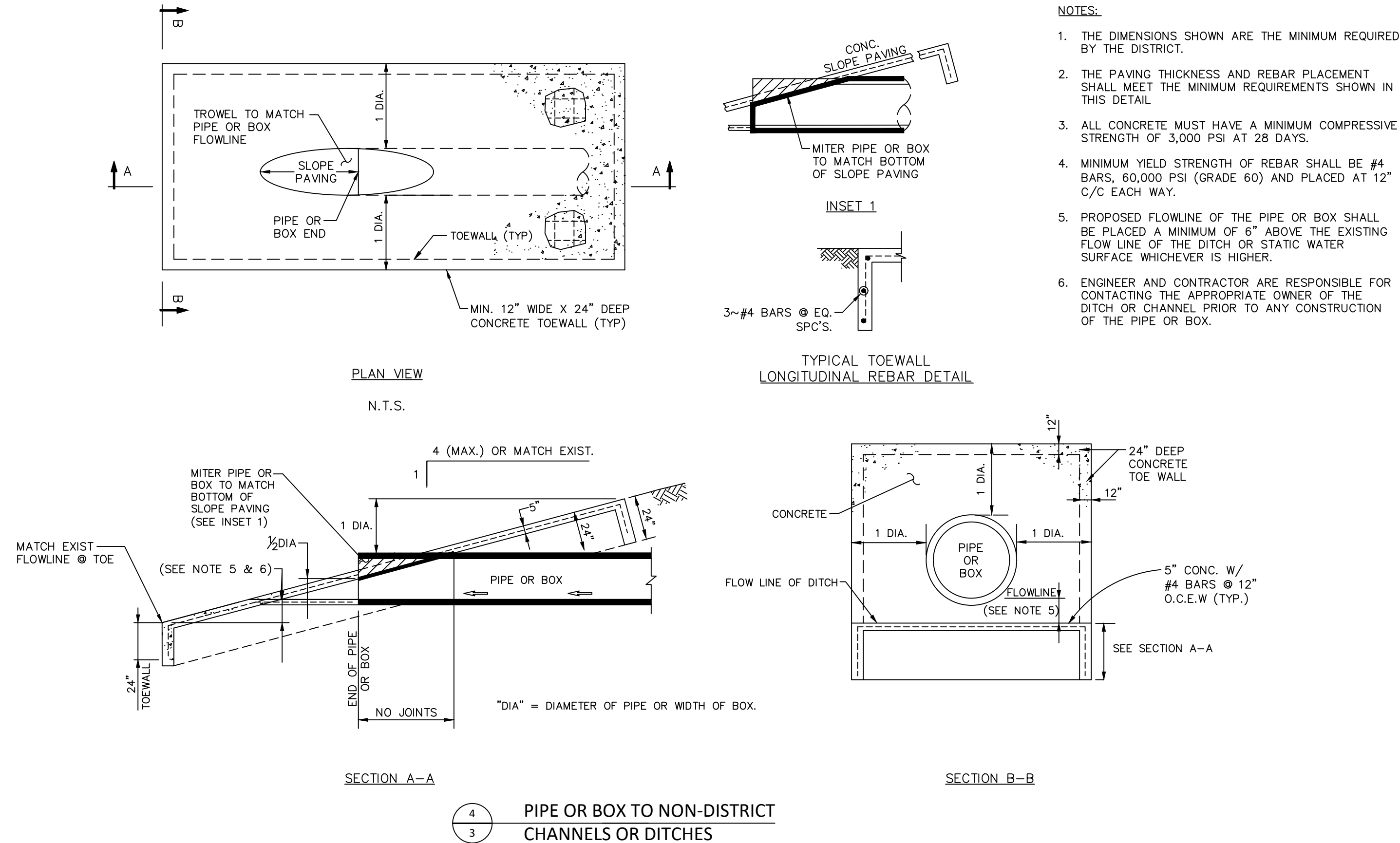
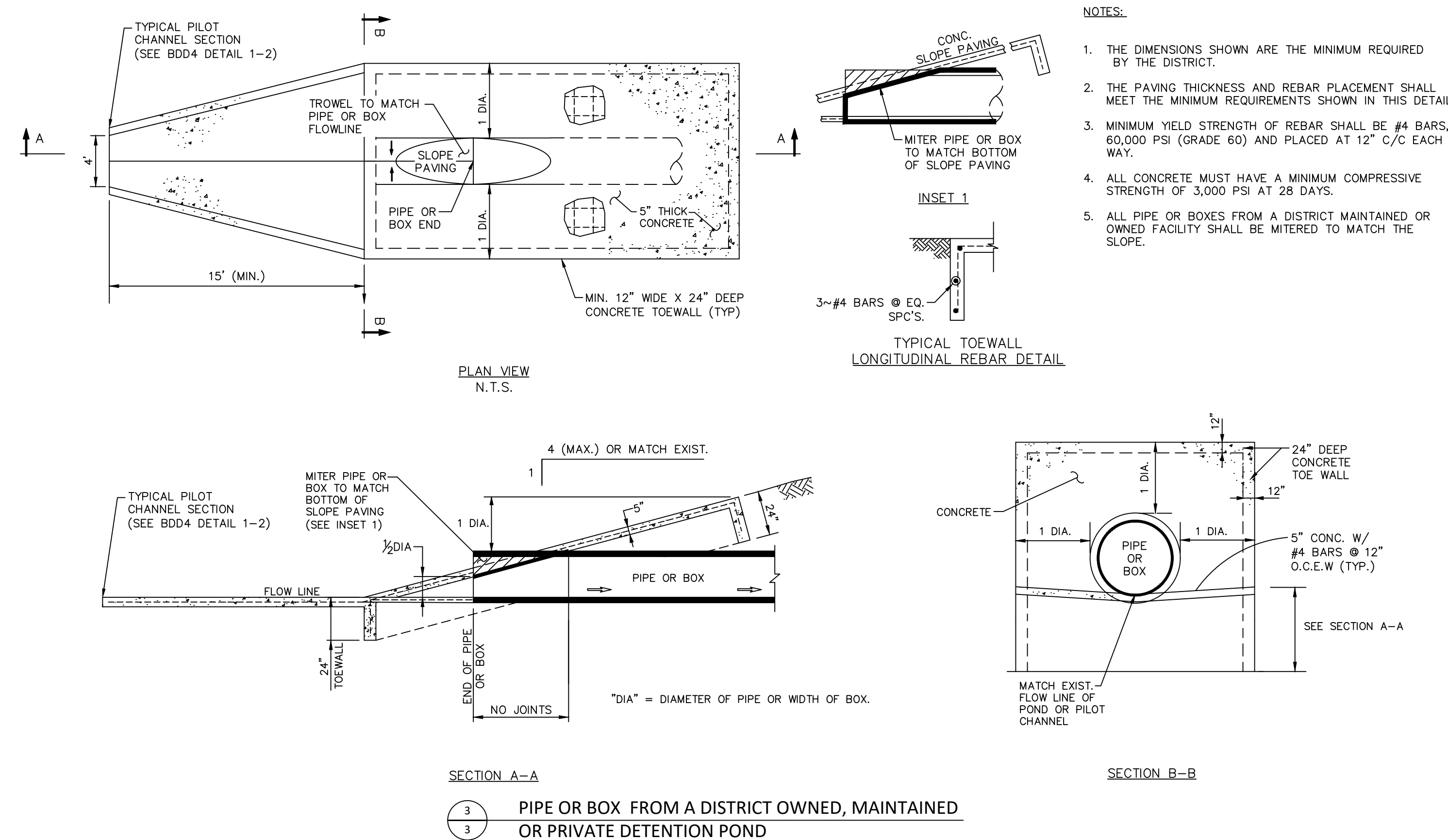
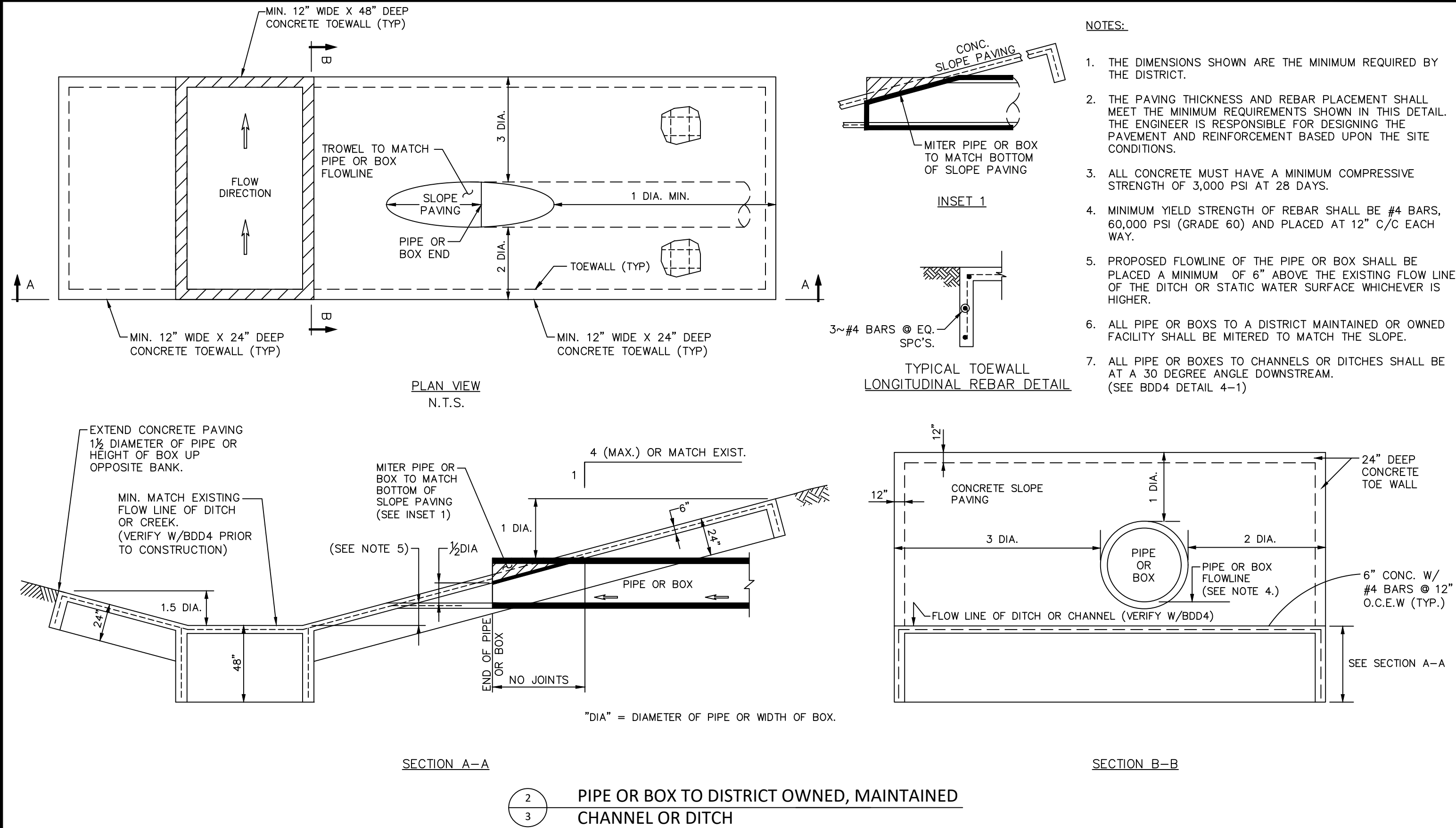
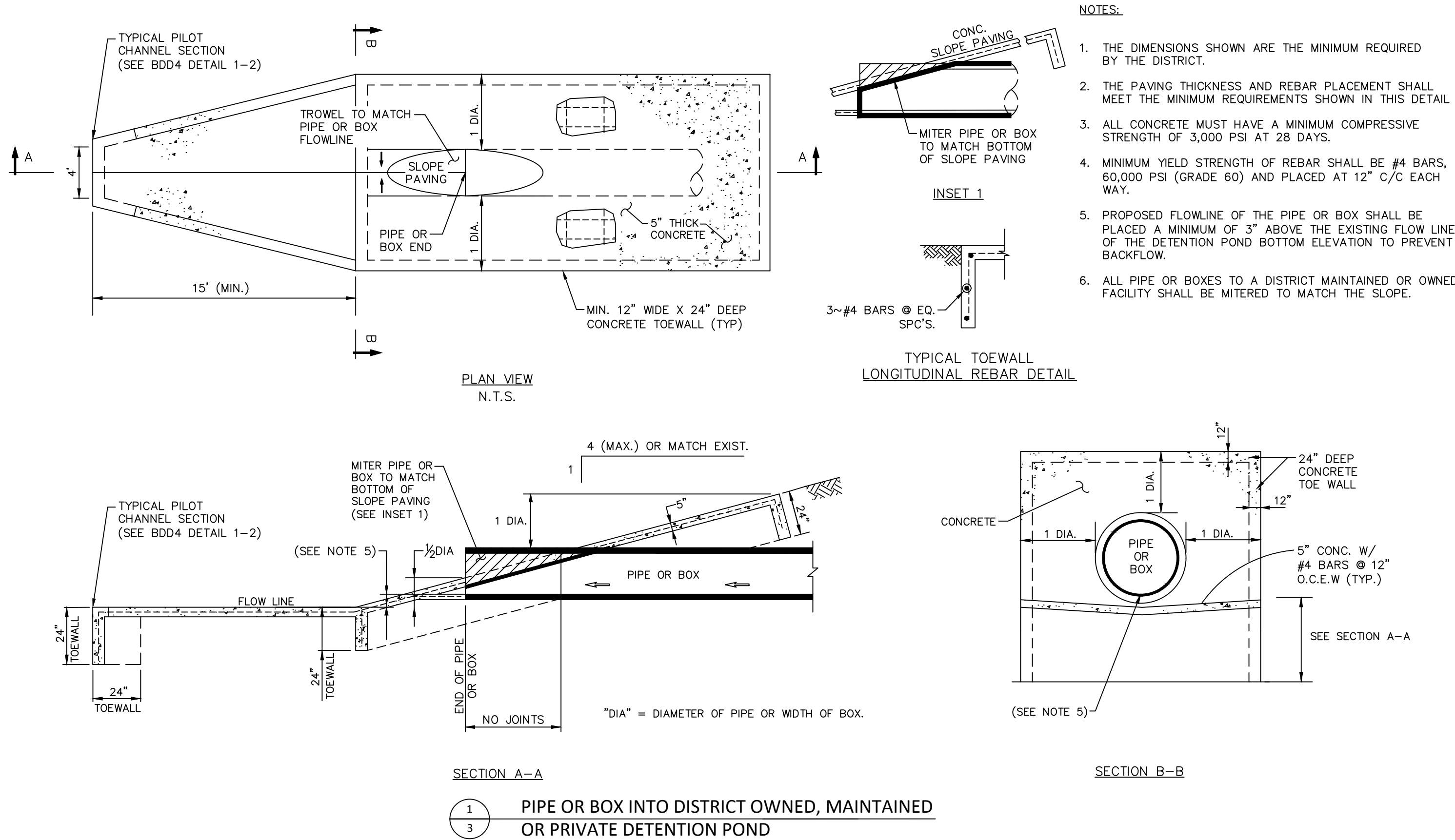
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