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Project LAK-20-1959
Project No. 18 0743 Sheet No. 1 of 4
Calculated By JPR Date 02/04/22
Checked By _____ Date _____
Subject Culvert @ STA. 313+72, Box Extension Walls Bars

C801 - Wall Dwls, NE Vert

A = (638.24 - 632.37) = 5.87' + (12" Embed) = 6.87' - (2½" clr.) = 6.68' ⇒ 6'-8"
B = 46" = 3'-10"
L = 9'-8" + 3'-10" = 13'-6" - (2") = 13'-4"
No. Req'd = 2 walls × 17 = 34

Class C Spire #5
= (17 × 15')/(0.8)(1.20)(1.4) = 34.3"
Inflection Point @ 0.213L = (0.213)(12' + 1') = 40.7" ⇒ 41"
41" + ½(13") - 2" = 45.5" ⇒ 46" = 3'-10" ← use

C601 Wall Dwls, F.F. Vert.

L = (638.24 - 632.37) = 5.87' + (12" Embed) = 6.87' - (2½" clr.) = 6.66' = 6'-8"
No. Req'd = 2 walls × 9 = 18

C802 - Wall Dwls, NE Vert

A = (638.24 - 636.10) = 2.14' + (12" Embed) = 3.14' + (2½" clr.) = 2.93 ⇒ 2'-11"
B = 3'-10" (see C801)
L = 2'-11" + 3'-10" = 6'-9" - (2") = 6'-7"
No. Req'd = 2 walls × 17 = 34

C602 Dwls, Wall Dwls: F.F. Vert + Centered Horz. + Extra Diagonal E.F. And Roof Slab, Centered @ Butt Jnt.

L = (638.24 - 636.10) = 2.14' + (12" Embed) = 3.14' - (2½" clr.) = 2.93' = 2'-11"
No. Req'd = 2 walls × 9 = 18
+ 2 walls × (1+1) = 4
+ 2 walls × (2×1) = 4
+ Roof Slab Butt Joint = 11
37
+ ...
+ Into Existing Cut-off Wall =

C501 - Walls, Horz.

L = 8'-6" - (3" + 3" clr.) = 8'-0"
No Req'd = 2 walls × (2×3) = 12

C502 - Walls, Horz. and Roof Slab, Longitudinal

L = 17'-6" - (2½" + 2½") = 17'-1"
No. Req'd = 2 walls × (2×2) = 8
+ (2×10) = 20
28

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Project LAR-20-19.59
Project No. 180743 Sheet No. 2 of 4
Calculated By JPR Date 02/04/22
Checked By _____ Date _____
Subject Culvert @ STA 313+72, Box Extension Roof Slab

C503 - Roof Slab, Transverse Top
Width of Ex. Roof Slab = (1'-1" + 12'-0" + 1'-1") = 14'-2"
L = 14'-2" - (2½" + 2½" clr.) = 13'-9"
No. Req'd = 10

C504 - Roof Slab, Transverse Top - Ser. of 14
Short Bar = 57" - (2½" + 3½" clr.) = 51" = 4'-3"
Long Bar = 167" - (2½" + 3½" clr.) = 161" = 13'-5"
Inc. = (161" - 51") / 13 spa. = 8.46" ⇒ 8½"

2 - Ser. of 14

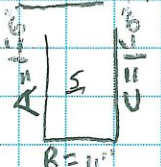
C803 - Roof Slab, Transverse Bot.
L = 14'-2" - (2½" + 2½" clr.) = 13'-9"
No. Req'd = 10

C804 - Roof Slab, Transverse Bot - Ser. of 14
(Same Length as C504 - Short Bar = 4'-3" } Inc. = 8½"
Long Bar = 13'-5" }

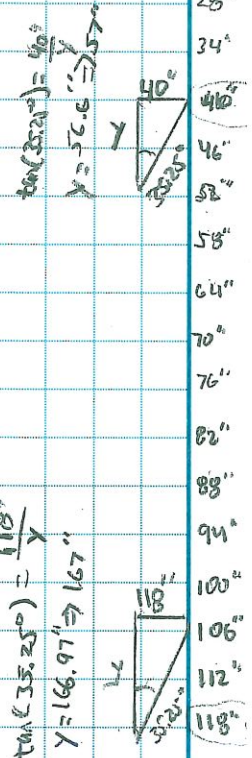
2 - Ser. of 14

C805 - Roof Slab, Fanned Bot @ Two Acute Corners
(Same Length as Horz. Leg of C810 DWLs. = 3'-10"
No. Req'd = 2 Corns x 6 = 12

C505 - Foreslope Wall Bars



A = (6" + 1'-5") = 1'-11" - (2" + 3" clr.) = 1'-6"
B = 1'-9" - (2" + 2" clr.) = 11"
L = 1'-6" + 11" + 1'-6" = 3'-11" - (½") = 3'-10½"
No. Req'd = (14'-2" ÷ cos(35.25°)) ÷ 17.35 ÷ 1.0 = 17.35 spa ⇒ 18



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Project LAK-20-19.59
Project No. 180743 Sheet No. 3 of 4
Calculated By JPR Date 6/9/22
Checked By _____ Date _____
Subject Culvert @ STA. 313+72 - Reinf. Bars

Additional steel Bars requested by ODOT (Stage 3 review, Comments #448 & #450)

#448 - ... Need a edge beam. Add Top and Bottom rebar parallel to the skewed end of the roof slab, similar to the

Shk B36 design shown in the existing plans ⇒ HBa = 8-#8 x 17'-0" Long (STR)

#450 - Add Top and Bottom rebar parallel to the skewed end within the C505 stirrup shown in Section B-B

Shk B37 to create an edge beam

C806 - Edge Beam, 4 T. & 4 B.

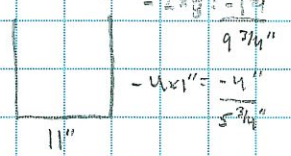
out-out roof slab = (7'-1" + 7'-1") = 14'-2", N leg skew = (14.67' ÷ cos 35°15') = 17.35'

L = 17.35' - (2"+2"(cl.)) = 17'-0"

No. Reqd: 2 x 4 = 8"

Check clearance in side C505

$\frac{5.75"}{3\ spa} = 1.92"$ gap > 1" Min. ok



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Project LAK-20-19.59
Project No. 180743 Sheet No. 4 of 4
Calculated By _____ Date 02/04/22
Checked By _____ Date 06/09/22
Subject Culvert Retrofit Bar Schedule, STA 313+72, RT

TYPE 1

CONCRETE BOX CULVERT EXTENSION

MARK	NUMBER TOTAL	LENGTH	WEIGHT	TYPE	DIMENSIONS A	B	C	D	E	R	INC.
C501	12	8'-0"	100	STR.							8½"
C502	28	17'-1"	499	STR.							
C503	10	13'-9"	143	STR.							
C504	2-SER.	4'-3"	258	STR.							
	OF	TO									
	141	13'-5"									
C505	18	3'-10"	72	5	1'-6"	11"	1'-6"				
C601	18	6'-8"	180	STR.							
C602	37	2'-11"	162	STR.							
C603	8	17'-0"	363	STR.							
C801	34	13'-4"	1210	1	6'-8"	3'-10"					
C802	34	6'-7"	598	1	2'-11"	3'-10"					
C803	10	13'-9"	367	STR.							
C804	2-SER.	4'-3"	661								
	OF	TO		STR.							
	141	13'-5"									
C805	12	3'-10"	123	STR.							8½"

TOTAL = 4,301 LBS
+337
4,638

REINFORCING NOTES:

1) ALL REINFORCING BARS SHALL BE EPOXY COATED.
2) THE BAR NUMBER IS SPECIFIED ON THE PLANS IN THE BAR MARK COLUMN. THE FIRST DIGIT INDICATES THE BAR SIZE NUMBER. FOR EXAMPLE, C501 IS A NUMBER 5 BAR. BAR DIMENSIONS ARE SHOWN OUT-TO-OUT UNLESS OTHERWISE NOTED.

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Project LAX-20_19.54

Project No. 180743 Sheet No. 1 of 3

Calculated By JPR Date 02/10/22

Checked By _____ Date _____

Subject Type C Headwall Bar Schedule, STA 313+72, RT.

X601 - Wingwall, FF. Vert.

L= 12'-5" - (2" clr.) = 12'-3"

Spaces @ 16": 22'-0" ÷ 1.33' = 16.54 ⇒ 16 spa = 17 Bars; No. = 2 walls × 17 = 34

V601 - W.W., FF Vert. Ord

A = 2'-0" + 5'-2" Lap = 7'-2" - (3" clr.) = 6'-11"

B = 1'-0"

L = 1'-0" + 6'-11" = 7'-11" - (2") = 7'-9"

Spaces @ 8": 22'-0" ÷ 0.67' = 32.8 ⇒ 32 spaces = 33 Bars; No. = 2 walls × 33 = 66

R=1'-0"

WW501 - W.W., NF Vert.

L= 12'-5" - (2" clr.) = 12'-3"

Spaces @ 18": 22'-0" ÷ 1.5' = 14.7 ⇒ 14 spaces = 15 Bars; No. = 2 walls × 15 = 30

WW502 - W.W., Horz. E.F.

L = 22'-0" - (2" + 2" clr.) = 21'-8"

Spaces @ 18": 12'-5" ÷ 1.5' = 8.28 ⇒ Spaces = 9 Bars; No. = 2 walls × (2 × 9) = 36

V601 - Ftg., Top Trans.

L = 9'-9" - (3" + 3" clr.) = 9'-3"

No. Req'd = (24 + 5) + 29 = 58

V602 - Ftg., Horz. Dwls. into Ex. Cut-off wall, Apron and Fanned Top, East Wall Ftg

L = 4'-3" + (1'-0" embed) = 5'-3" - (3" clr.) = 5'-0"

No. Req'd = 2 rows × 23 = 46 + 4 = 50

W601 - Ftg., Bot. Trans.

L = 9'-9" - (3" + 3" clr.) = 9'-3"

No. Req'd = (18 + 3) + 22 = 43

W602 - Ftg., Horz. Dwls. into Ex. Cut-off wall Bot. of Fanned Bot., East wall Ftg

L = 4'-3" + (1'-0" Embed.) = 5'-3" - (3" clr.) = 5'-0"

No. Req'd = 17 + 2 = 19

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Project LAK-20-1954

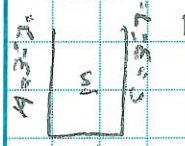
Project No. 180743 Sheet No. 2 of 3

Calculated By JPR Date 02/10/22

Checked By _____ Date _____

Subject _____

Z601 - Cut-off Wall, Vert.



A = L = (2'-0" + 2'-0") = 4'-0" - (3" + 2" clr.) = 3'-7"

B = 1'-6" - (3" + 3" clr.) = 1'-0"

L = (3'-2" + 4'-5" + 3'-2") = 7'-4" - (2 × 2") = 7'-0"

No. Req'd = 61

F501 - Cut-off wall (vert.) into Closure Slab

A = 4'-10"

A = (4'-3") ÷ cos(35.25°) = 5.20' - (2" + 2" clr.) = 4.87' ⇒ 4'-10"

B = (1'-5" + 2'-0" + 2'-0") = 5'-5" - (3" + 2" clr.) = 5'-0"

L = (5'-0" + 4'-10") = 9'-10" - (1" + 1") = 9'-8½" ⇒ 9'-9"

No. Req'd: 12

F502 - Closure Slab, Horz.

L = 17'-4½" - (2" + 2") = 17'-0½" ⇒ 17'-0"

No. Req'd = 2

F601 - Footing, T.4B. Longitudinal

Cover 61'-4½" - (3" + 3" clr.) = 60'-10" with Two Bars and 2'-11" Lap

60'-10" × ½ = 30'-5" + ½ (2'-11" Lap) = 31.88' = 31'-11"

No. Req'd: 2 × (2 × 4) = 16

Class C Splice @ 6":

(1.7 × 18")(1.20)(0.8)(1.0) = 41" = 3'-5"

Use 2-11" per 0007 Plan Insert Sheet

F602 - Cut-off wall, Longitudinal

(Same Length as F601: 31'-11")

No. Req'd: 2 × 2 = 4

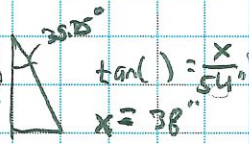
F603 - West Wall Ftg., T.4B, Longitudinal - Ser. of 4

Short L: 17'-8½" - (3" + 3" clr.) = 17'-2" = 206" = 17'-2"

Long L: (206" + 38") = 244" ⇒ 242' = 20'-2"

2 × 1 = 2 - Ser. of 4

Inc. = 36" / 3 Spcs = 12"



F604 - East Wall Ftg., T.4B., Longitudinal, - Ser. of 4

Short L: 25'-6" - (3" + 3" clr.) = 25'-0" = 300" = 25'-0"

Long L: (300" + 38") = 338" ⇒ 336" = 28'-0"

2 × 1 = 2 - Ser. of 4

Inc. = 36" / 3 Spcs = 12"

FS501 - Foreslope Wall, Horz. EF.

L = (14'-2" ÷ cos(35.25°) = 17.35' - (2" + 2" clr.) = 17'-0" No. Req'd = (2 × 1) = 2

Project LNK-20-19.54
Project No. 18C0143 Sheet No. 3 of 3
Calculated By JPR Date 2/11/22
Checked By ______ Date ______
Subject Headwall, Culvert @ STA 313+72, RT

TYPE C HEADWALL REINFORCING SCHEDULE

BAR MARK	NUMBER	LENGTH	WEIGHT	TYPE	A	B	C	D	E	R	INC.
				WINGWALLS							
X601	34	12'-3"	626	STR.							
Y601	66	7'-9"	768	1	1'-0"	6'-11"					
WW501	30	12'-3"	383	STR.							
WW502	36	21'-8"	814	STR.							
		FOOTINGS & CUTOFF WALL									
V601	58	9'-3"	806	STR.							
V602	50	5'-0"	376	STR.							
W601	43	9'-3"	597	STR.							
W602	19	5'-0"	143	STR.							
Z601	5	7'-0"	53	5	3'-7"	1'-0"	3'-7"				
F501	12	9'-9"	122	1	4'-10"	5'-0"					
F502	2	17'-0"	35	STR							
F601	16	31'-11"	767	STR							
F602	4	31'-11"	192	STR							
F603	2-SER. OF 4	17'-2" TO 20'-2"	224	STR							1'-0"
F604	2-SER. OF 4	25'-0" TO 28'-0"	318	STR							1'-0"
				FORESLOPE WALL							
FS501	2	17'-0"	35	STR							
		TOTAL =	6,259 LBS								

2,591
3,633
35

02/07/22

PATH: ODOT Home Page / Doing Business / Engineering [WORKING] / Structures / USE home / Plan Insert Sheets / BCHW 8 01-21-22 Plan Insert Sheets for Precast Concrete Box Culverts

OFFICE OF STRUCTURAL ENGINEERING

REVISION DATE 01-21-2022

GENERAL NOTES

DESIGN SPECIFICATIONS: THIS STANDARD DRAWING CONFORMS TO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 2002 AND THE ODOT BRIDGE DESIGN MANUAL.

DESIGN DATA: THE FOLLOWING DESIGN DATA IS ASSUMED:

INTERNAL ANGLE OF FRICTION OF BACKFILL SOIL, $\phi bf = 30°$
TOTAL UNIT WEIGHT OF BACKFILL SOIL = 120 PCF
INTERNAL ANGLE OF FRICTION (DRAINED), FOUNDATION SOIL, $\phi f = 30°$
UNDRAINED SHEAR STRENGTH (COHESIVE), FOUNDATION SOIL, Suf = 1500 PSF
UNIT WEIGHT OF CONCRETE = 150 PCF
SLOPE OF BACKFILL = 2:1 (TYPE A & B HEADWALLS)
HEIGHT OF LIVE LOAD SURCHARGE = 2 FT (TYPE C HEADWALLS)

CONCRETE - COMPRESSIVE STRENGTH 4000 PSI (FOOTING, WINGWALL AND FORESLOPE WALL)

REINFORCING STEEL - ASTM A615, A616, OR A617 GRADE 60 MINIMUM YIELD STRENGTH 60,000 PSI (ALL REINFORCING SHALL BE EPOXY COATED)

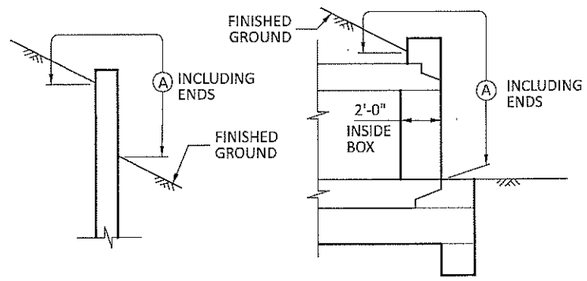
BASED ON THE ASSUMED DESIGN DATA, THE WINGWALLS ACHIEVE FACTORED BEARING RESISTANCES THAT ARE GREATER THAN THEIR RESPECTIVE BEARING PRESSURES. IF A BACKFILL MATERIAL WITH A HIGHER INTERNAL ANGLE OF FRICTION OR A LIGHTER TOTAL UNIT WEIGHT IS USED; OR IF A FOUNDATION SOIL WITH A HIGHER DRAINED INTERNAL ANGLE OF FRICTION OR A HIGHER UNDRAINED SHEAR STRENGTH IS ENCOUNTERED; THEN THE STABILITY OF THE WINGWALLS IS SATISFACTORY.

POROUS BACKFILL WITH FILTER FABRIC 1'-6" THICK SHALL BE PLACED BEHIND THE WINGWALLS ONLY AND SHALL EXTEND TO 12" BELOW THE EMBANKMENT SURFACE. GEOTEXTILE FABRIC SHALL BE PLACED BETWEEN THE POROUS BACKFILL AND REPLACED EXCAVATION ADJACENT TO THE STRUCTURE. IT SHALL TURN UNDER THE BOTTOM OF THE POROUS BACKFILL AND RETURN 6" ABOVE THE TOP ELEVATION OF THE WEEPHOLE.

WEEPHOLES SHALL BE PLACED 6" TO 12" ABOVE THE NORMAL WATER ELEVATION OR GROUND LINE AND SHALL HAVE A MAXIMUM SPACING OF 10'-0". A MINIMUM OF ONE WEEPHOLE SHALL BE PROVIDED PER WINGWALL.

PREFORMED EXPANSION JOINT FILLER: PREFORMED EXPANSION JOINT FILLER (PEJF) CONFORMING TO CMS 705.03, 1 INCH THICK, SHALL BE PLACED ABOVE THE FOOTING BETWEEN THE SIDES OF THE BOX CULVERT AND THE ENDS OF THE WINGWALLS. PAYMENT FOR MATERIALS AND INSTALLATION SHALL BE INCLUDED WITH ITEM 516 - 1" PREFORMED EXPANSION JOINT FILLER.

SEALING OF FORESLOPE WALL AND WINGWALLS: ALL EXPOSED FORESLOPE WALL AND WINGWALL CONCRETE SHALL BE SEALED WITH EPOXY-URETHANE SEALER. THE LIMITS SHALL BE AS SHOWN IN THE DIAGRAMS BELOW. PAYMENT FOR THE EPOXY-URETHANE SEALER SHALL BE PER ITEM 512 - SEALING OF CONCRETE SURFACES.



WINGWALL

FORESLOPE WALL AND PRECAST BOX (CULVERT OUTLET BEVEL SHOWN)

LIMITS OF ITEM 512-SEALING CONCRETE SURFACES

Ⓐ - SEAL ENTIRE CONCRETE SURFACE AREA

WATERPROOFING: TYPE 2 WATERPROOFING, PER CMS 512.09 AND 711.25, SHALL EXTEND VERTICALLY DOWN THE ~~ENTIRE~~ SIDES OF ~~THE PRECAST~~ WALLS ~~CULVERT SECTIONS~~ FOR ALL PORTIONS OF THE CULVERT WHICH SHALL BE IN CONTACT WITH THE BACKFILL. PAYMENT FOR THE MEMBRANE WATERPROOFING SHALL BE AT THE CONTRACT PRICE BID PER SQUARE YARD FOR ITEM 512 - TYPE 2 WATERPROOFING.

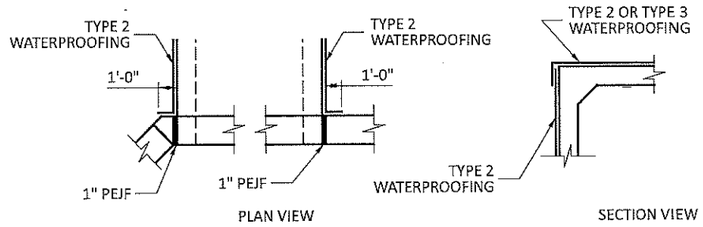
NEW CAST-IN-PLACE CONCRETE

IF PAVEMENT IS NOT PLACED DIRECTLY ON TOP OF THE CULVERT, TYPE 2 WATERPROOFING, PER CMS 512.09 AND 711.25 SHALL BE APPLIED TO THE ENTIRE TOP SURFACE OF THE ~~PRECAST CULVERT SECTIONS AND SHALL~~ EXTEND ONE FOOT VERTICALLY DOWN THE SIDES FOR ALL PORTIONS OF THE CULVERT WHICH SHALL BE IN CONTACT WITH THE BACKFILL. PAYMENT FOR THE MEMBRANE WATERPROOFING SHALL BE AT THE CONTRACT PRICE BID PER SQUARE YARD FOR ITEM 512 - TYPE 2 WATERPROOFING.

NEW CAST-IN-PLACE CONCRETE ROOF SLAB AND SHALL

IF PAVEMENT IS TO BE USED DIRECTLY ON TOP OF THE CULVERT, TYPE 3 WATERPROOFING, PER CMS 512.10 AND 711.29 SHALL BE APPLIED TO THE ENTIRE TOP SURFACE OF THE ~~PRECAST CULVERT SECTIONS AND SHALL~~ EXTEND ONE FOOT VERTICALLY DOWN THE SIDES FOR ALL PORTIONS OF THE CULVERT WHICH SHALL BE IN CONTACT WITH THE BACKFILL. PAYMENT FOR THE MEMBRANE WATERPROOFING SHALL BE AT THE CONTRACT PRICE BID PER SQUARE YARD FOR ITEM 512 - TYPE 3 WATERPROOFING.

ROOF SLAB



WATERPROOFING DETAILS

BASIS OF PAYMENT: ALL LABOR, EQUIPMENT AND INCIDENTALS REQUIRED TO CONSTRUCT THE FOOTING, CUTOFF WALL, WINGWALLS AND FORESLOPE WALL SHALL BE INCLUDED WITH ~~ITEM 511 - CLASS C CONCRETE (RET WALL/ WINGWALL INCLUDING FOOTING)~~. PAYMENT FOR REINFORCING STEEL SHALL BE INCLUDED WITH ITEM 509 - EPOXY COATED REINFORCING STEEL.

APPLICABLE 511 ITEMS LISTED IN THE ESTIMATED QUANTITIES TABLE

ESTIMATED QUANTITIES

ITEM	ITEM EXT	TOTAL	UNIT	DESCRIPTION
202	~~11000~~ 11200	LUMP		~~STRUCTURE REMOVED~~ PORTIONS OF STRUCTURE REMOVED
503	11100	LUMP		COFFERDAMS, ~~CRIBS, AND SHEETING~~ AND EXCAVATION BRACING
503	~~21100~~ 21300	LUMP		UNCLASSIFIED EXCAVATION (WINGWALL FOOTING)
509	10000	~~XX~~ 10,567	LB.	EPOXY COATED REINFORCING STEEL
511	46000	~~XX~~ 61	SQ. YD.	CLASS QC1 CONCRETE, RETAINING WALL OR WINGWALL, NOT INCLUDING FOOTING
511	46510	~~XX~~ 49	CU. YD.	CLASS QC1 CONCRETE, FOOTING
511	46610	~~XX~~ 0.5	CU. YD.	CLASS QC1 CONCRETE, HEADWALLS
512	~~33000~~ 32	~~XX~~ 50	SQ. YD.	TYPE 2 MEMBRANE WATERPROOFING
516	13600	~~XX~~ 38	SQ. FT.	1" PREFORMED EXPANSION JOINT FILLER
518	21230	LUMP		POROUS BACKFILL WITH ~~FILTER~~ FABRIC - GEOTEXTILE
~~601~~	~~11001~~		~~SQ. YD.~~	~~RIPRAP USING 6" REINFORCED CONCRETE SLAB, AS PER PLAN~~
~~611~~	~~96311~~	~~XX~~	~~LIN. FT.~~	"AS PER PLAN" ~~XX'-0" SPAN X X'-0" RISE CONDUIT, TYPE A, 706.05,~~ ~~AS PER PLAN~~
~~613~~	~~41200~~		~~CU. YD.~~	~~LOW STRENGH MORTAR BACKFILL~~
512	10100	~~XX~~ 46	SQ. YD.	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)

510 10000 182 EACH DOWEL HOLES WITH NON-SHRINK, NON-METALLIC GROUT ▲

511 47010 17 CY CLASS QC1 CONCRETE, CULVERT ▲

▲ - TO BE USED FOR EXTENDING AN EXISTING BOX CULVERT

NOTE: TOTALS CARRIED TO GENERAL SUMMARY SHEET

DESIGN AGENCY

DESIGNER

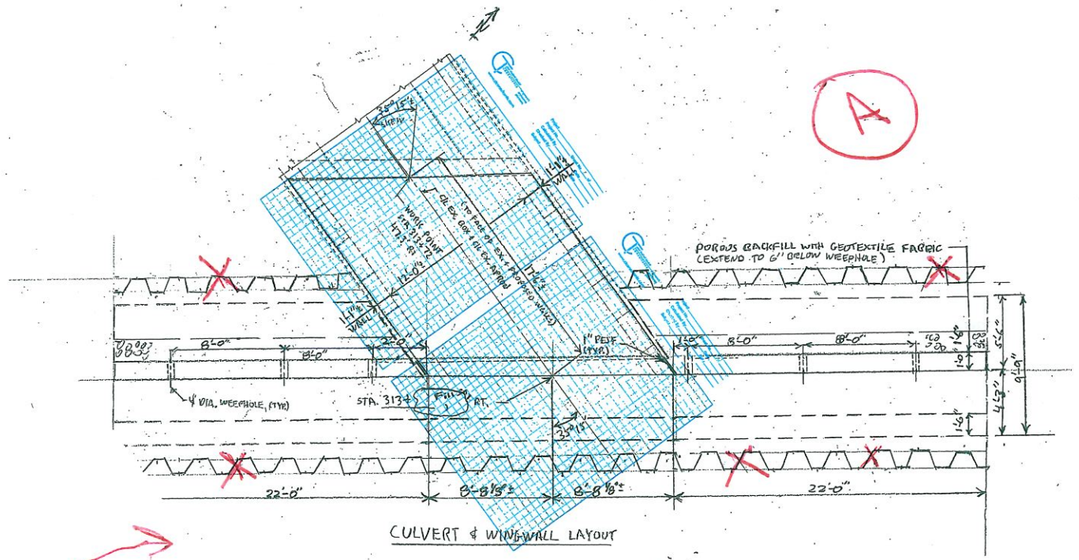
REVIEWER

PROJECT ID

SUBSET TOTAL

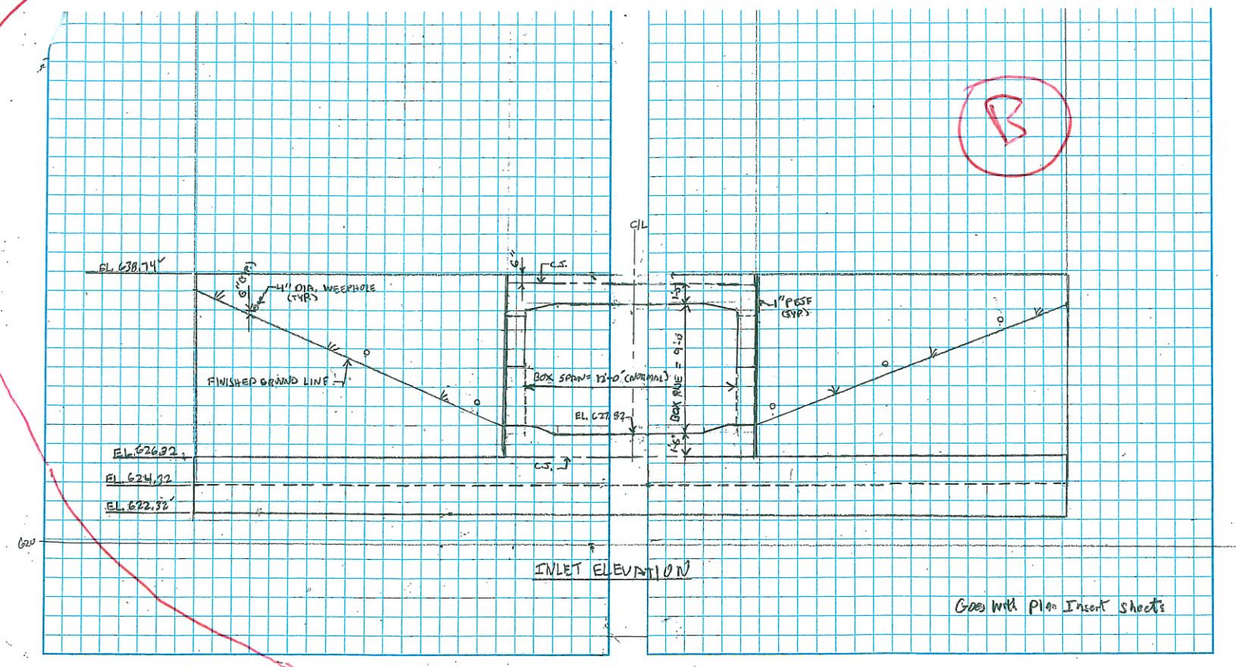
SHEET TOTAL

02/07/22



CULVERT & WINGWALL LAYOUT

INLET ELEVATION



CULVERT & WINGWALL LAYOUT

OUTLET ELEVATION

DESIGN AGENCY

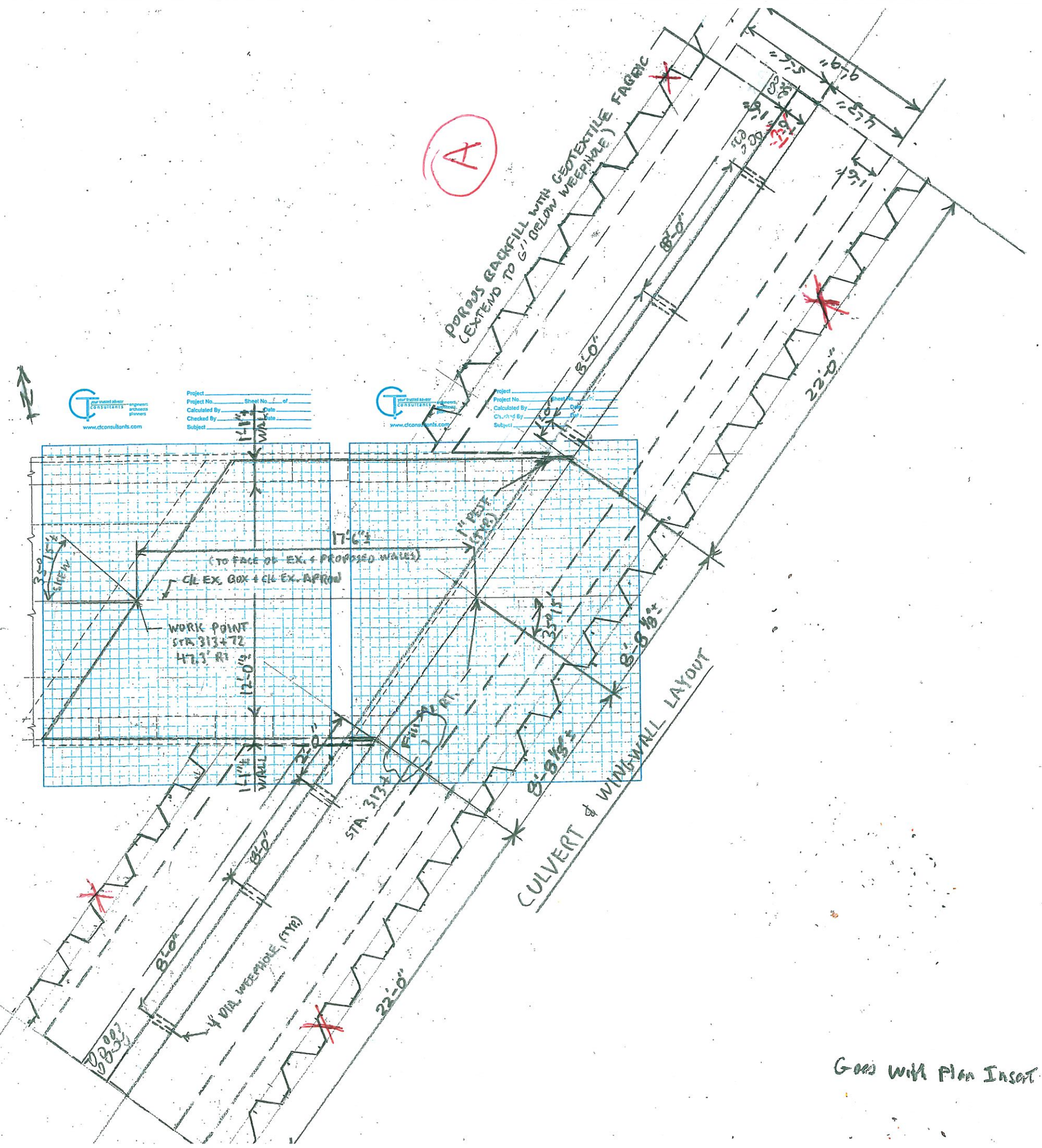
DESIGNER

REVIEWER

PROJECT ID

SUBSET TOTAL

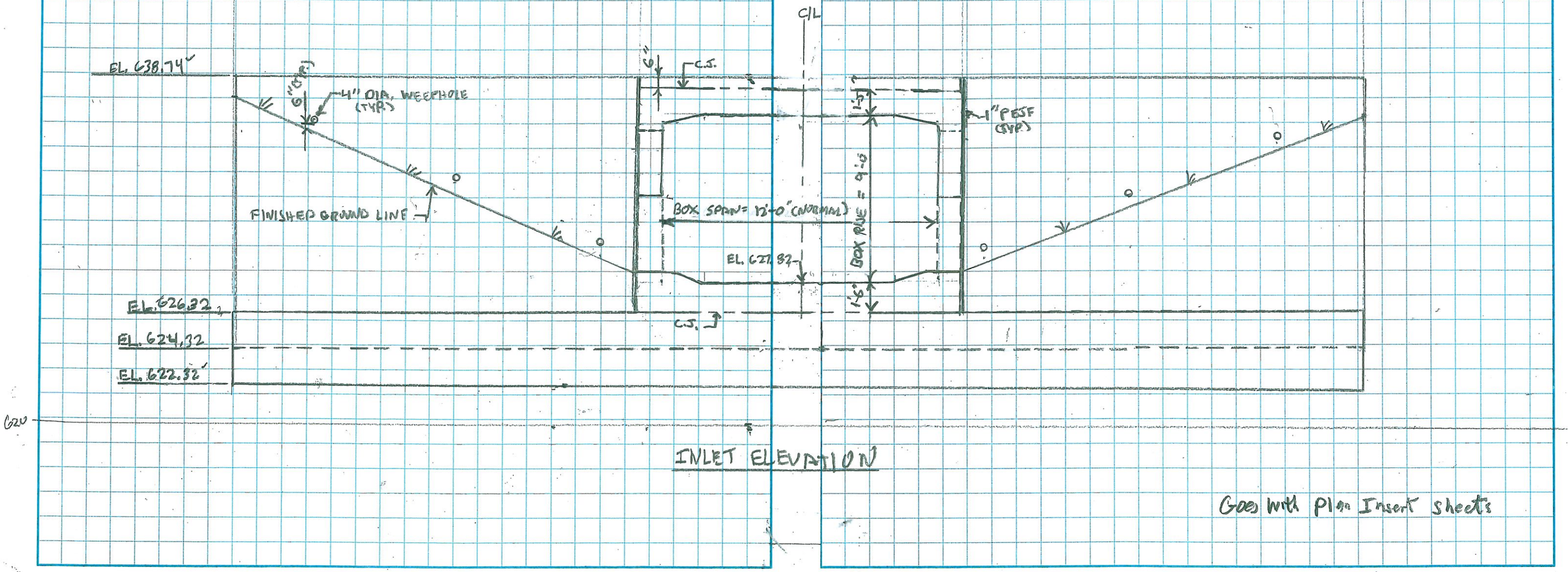
SHEET TOTAL



Goes with Plan Insert Sheets

3/16 Scale

(B)

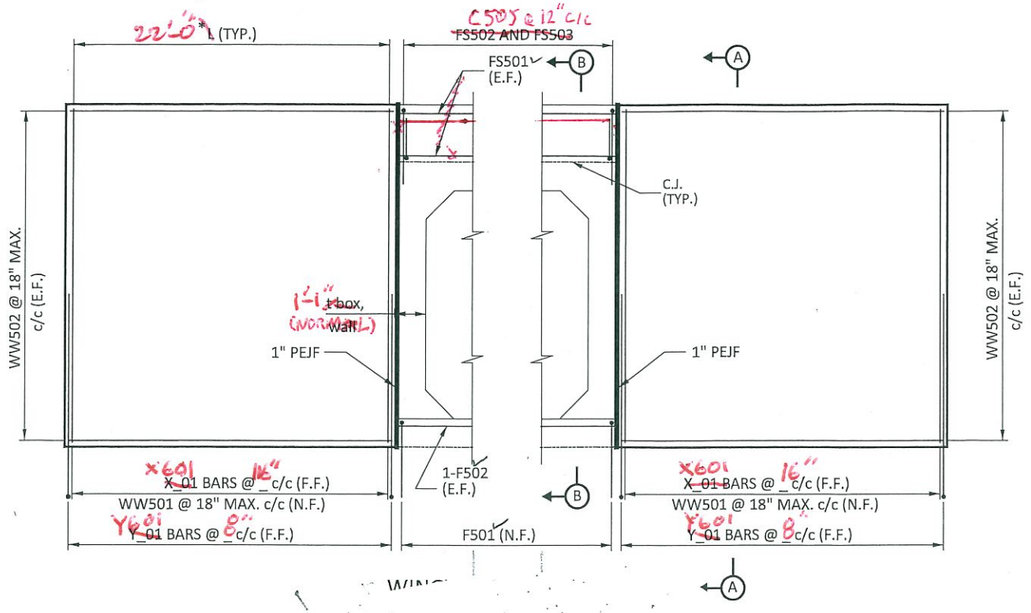


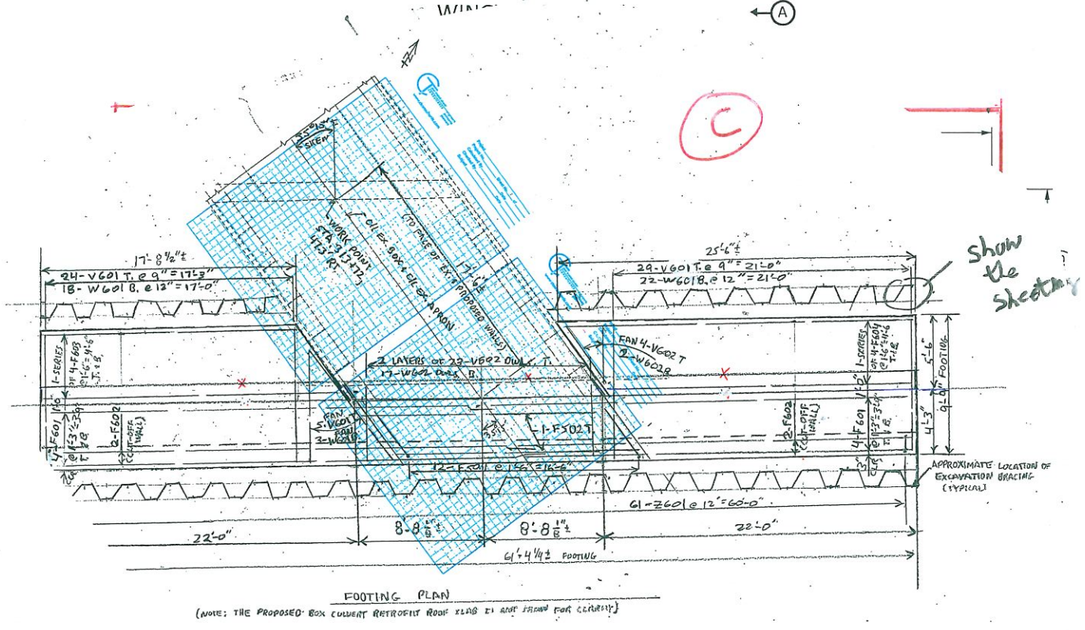
Goes with Plan Insert sheets

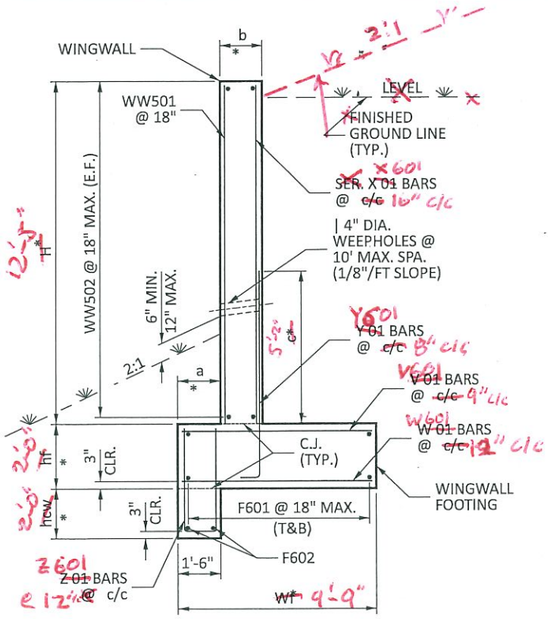
Goes with Plan Insert Sheets

3/16 Scale

02/07/22

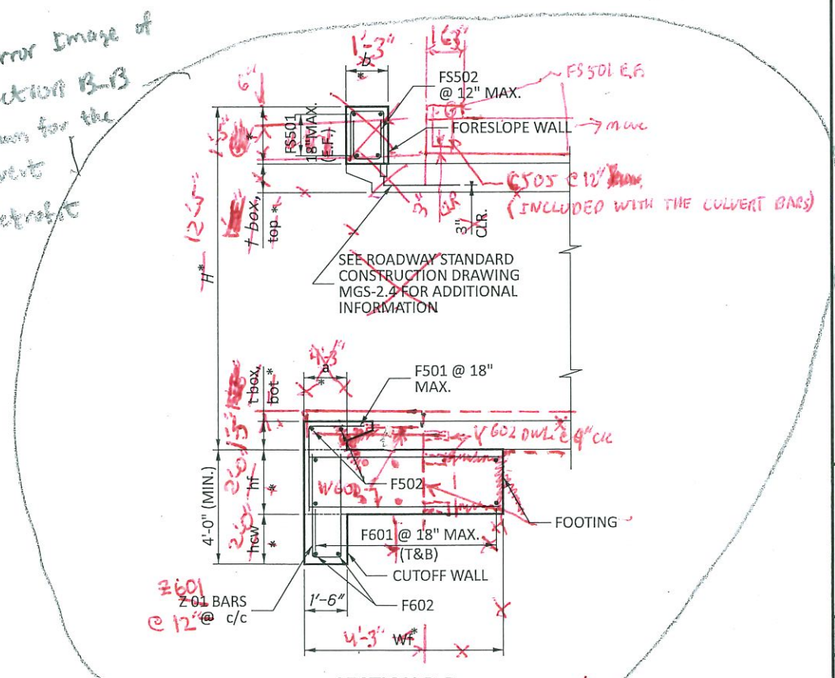






SECTION A-A
(POROUS BACKFILL NOT SHOWN FOR CLARITY)

Mirror Image of Section B-B shown for the Culvert Retrofit



SECTION B-B
(CULVERT INLET BEVEL SHOWN)

NOTES

1. FOR CULVERT LOCATION PLAN, SEE SHEET ~~xx/xx~~ 3261
2. FOR ~~PRECAST~~ CAST-IN-PLACE BOX CULVERT ~~BOX~~ CULVERT DETAILS, SEE SHEET ~~xx/xx~~
3. THE BAR SIZE NUMBER IS SPECIFIED ON THE PLANS IN THE BAR MARK COLUMN. THE FIRST DIGIT INDICATES THE BAR SIZE NUMBER. FOR EXAMPLE, WW501 IS A NO.5 BAR. BAR DIMENSIONS SHOWN ARE OUT TO OUT. ALL REINFORCING STEEL SHALL BE EPOXY COATED.
4. THE LAP SPLICE LENGTHS USED IN THESE DETAILS ARE AS FOLLOWS: 2'-5" FOR #5 BARS; 2'-11" FOR #6 BARS.

C.J.	CONSTRUCTION JOINT	N.F.	NEAR FACE
CLR.	CLEAR	SER.	SERIES
DIA.	DIAMETER	STR.	STRAIGHT
E.F.	EACH FACE	(T)	TOP
F.F.	FAR FACE	(B)	BOTTOM
MAX.	MAXIMUM	T&B	TOP AND BOTTOM
MIN.	MINIMUM	TYP.	TYPICAL
PEJF	PREFORMED EXPANSION JOINT FILLER	INC.	INCREMENT

*AN UNDERSCORE (_) OR AN ASTERISK (*) INDICATES A SPACE TO BE COMPLETED BY DESIGNER USING INFORMATION PICKED FROM THE STANDARD DRAWINGS.

OFFICE OF STRUCTURAL ENGINEERING

REVISION DATE
01-21-2022

DESIGN AGENCY

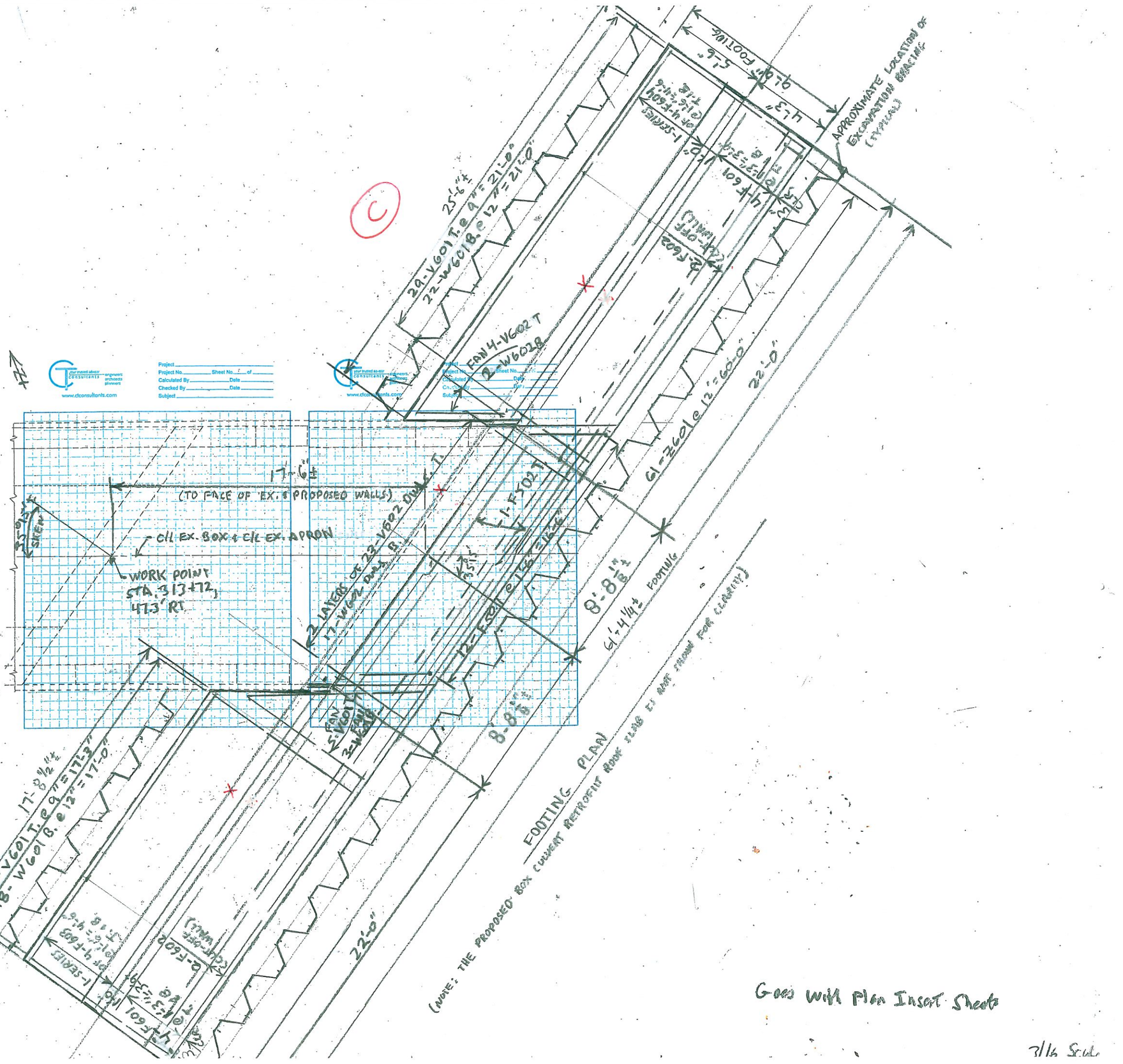
DESIGNER

REVIEWER

PROJECT ID

SUBSET TOTAL

SHEET TOTAL


(C)
APPROXIMATE LOCATIONS OF EXCAVATION BRACING (TYPICAL)
FOOTING
25'-6"±
20-V601 T.S @ 9" = 21'-0"
22-W6018 @ 12" = 21'-0"
FAN 4-VG02 T
2-W6028
2-F602
61-Z601 @ 12" = 60'-0"
22'-0"
8'-8 1/2"
61'-4 1/2" FOOTING
17'-6"±
(TO FACE OF EX. & PROPOSED WALLS)
℄ EX. BOX & ℄ EX. APRON
WORK POINT
STA. 313+72
47.3' RT
33°-0" SKEW
2 LAYERS OF 23-VP02 DWLS @ 8"
17-W601 DWLS @ 8"
12" x 8" ℄ EX. BOX = INSIDE
3'-5 1/2"
1-F702 T
24-V601 T.S @ 9" = 17'-3"
18-W6018 @ 12" = 17'-0"
17'-8 1/2"
5-FAN VG01
3-W6018
1-SERIES
2-F602
7 @ 12" = 7'-0"
22'-0"
8'-8 1/2"
FOOTING PLAN
(NOTE: THE PROPOSED BOX CULVERT RETROFIT ROOF SLABS ON APRON SHOWN FOR CLARITY)
Goes with Plan Insert Sheets
7/16 Sht

02/07/22

OFFICE OF STRUCTURAL ENGINEERING

REVISION DATE 01-21-2022

TYPE C HEADWALL REINFORCING SCHEDULE

BAR MARK	NUMBER	LENGTH	WEIGHT	TYPE	BAR TYPE DIMENSIONS A	B	C	D	E	R	INC.
				WINGWALLS							2,591
X601	34	12'-3"	626	STR.							
Y601	66	7'-9"	768	1	1'-0"	6'-11"					
WW501	30	12'-3"	383	STR.							
WW502	36	21'-8"	814	STR.							
				FOOTINGS & CUTOFF WALL							4,358
V601	58	9'-~~3"~~ 5"	~~806~~ 821	STR.							
V602	50	5'-0"	376	STR.							
W601	43	9'-~~3"~~ 5"	~~597~~ 609	STR.							
W602	19	5'-0"	143	STR.							
Z601	~~5~~ 61	~~7'-0"~~ 8'-2"	~~53~~ 749	5	3'-7"	~~1'-0"~~ 1'-5"	3'-7"				
F501	12	9'-9"	122	1	4'-10"	5'-0"					
F502	2	17'-0"	35	STR							
F601	16	31'-11"	768	STR							
F602	4	31'-11"	192	STR							
F603	2-SER.	17'-2"	224	STR							1'-0"
	OF	TO									
	4	20'-2"									
F604	2-SER.	25'-0"	318	STR							1'-0"
	OF	TO									
	4	28'-0"									
				FORESLOPE WALL							36
FS501	2	17'-0"	35	STR							
		TOTAL =	~~6,259~~ LBS								

6,985

6,985

2,591

3,673

35

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Project LNK-20-12.59
Project No. 180745 Sheet No. ___ of ___
Calculated By JPR Date 2/11/22
Checked By ___ Date ___
Subject Headwall, Culvert @ STA 313+72, RT.

INSERT ODOT BOX CULVERT REINFORCING DESIGN HERE IF SPAN > 12'.

Not Needed (12' span ≯ 12' span)

This option gives a limited check

Insert the Bar Schedule Generated from Design Data Sheet HWDD_Rebar 01-17-20 MS EXCEL Sheet (for Bar Schedules) → Input Values on Next page →

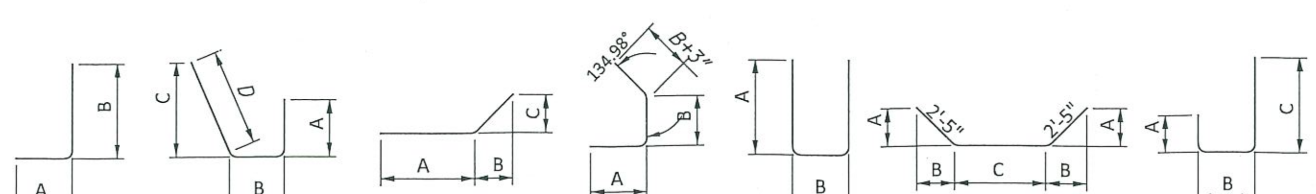
TYPE C HEADWALL then edit

← for my Bar Schedule

or

This option does not check

Copy & Paste the Bar Schedule from STA 149+38 Culvert and revise to my schedule



TYPE-1 TYPE-2 TYPE-3 TYPE-4 TYPE-5 TYPE-6 TYPE-7

DESIGN AGENCY

DESIGNER

REVIEWER

PROJECT ID

SUBSET TOTAL

SHEET TOTAL

PATH:
ODOT Home Page / Doing Business / Engineering [WORKING] / Structures / OSE Home / Design Data Sheets / HWDD- Rebar 01-17-20 MS EXCEL sheet (for bar schedules ... [TYPE C HEADWALL]

Type C Headwall: Reinforcing Schedule Calculations

If Override Option is Not Used, Leave Cell Blank *

Reference shall be made to the "Concrete Headwalls for Precast Box Culverts" Standard Drawing for headwall dimensions and reinforcing data.

Precast Box Culvert:

Span = ~~10.00 ft~~ 12.00 ft
Rise = ~~7.00 ft~~ 9.00 ft

	Default	Override *
$t_{box,wall}$ =	~~10.00 in~~	13.00 in.
$t_{box,top}$ =	~~10.00 in~~	18.00 in.
$t_{box,bot}$ =	~~10.00 in~~	17.00 in.

Wingwalls:

H = ~~10.50 ft~~ 12.42 ft.
h_1 = ~~10.50~~ ft
h_2 = ~~10.50~~ ft (h_2=h_1=H)
L_1 = ~~18.00 ft~~ 22.00 ft.
L_2 = ~~18.00~~ ft (L_2=L_1)
a = ~~3.67 ft~~ 4.25 ft.
b = 1.25 ft
c = ~~3.92 ft~~ 5.17 ft

Footing & Cutoff Wall:

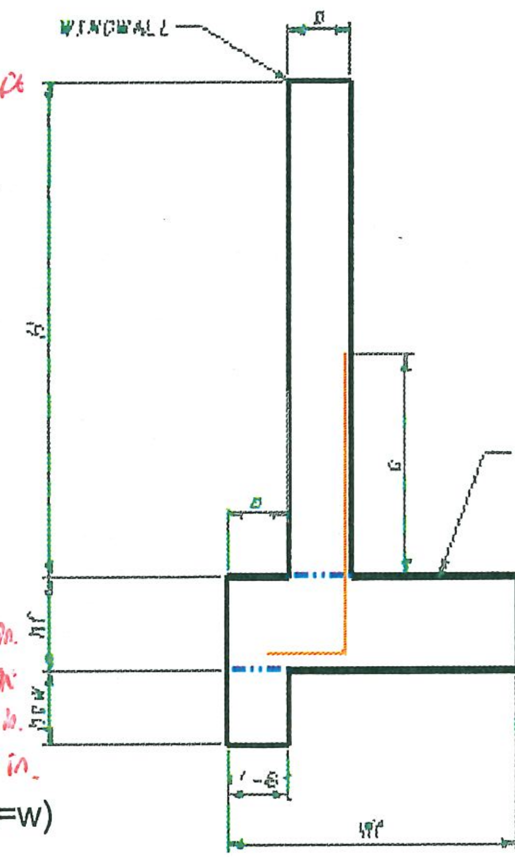
W_f = ~~8.00 ft~~ 9.75 ft
h_f = 2.00 ft
h_{cw} = 2.00 ft

Bar Size:

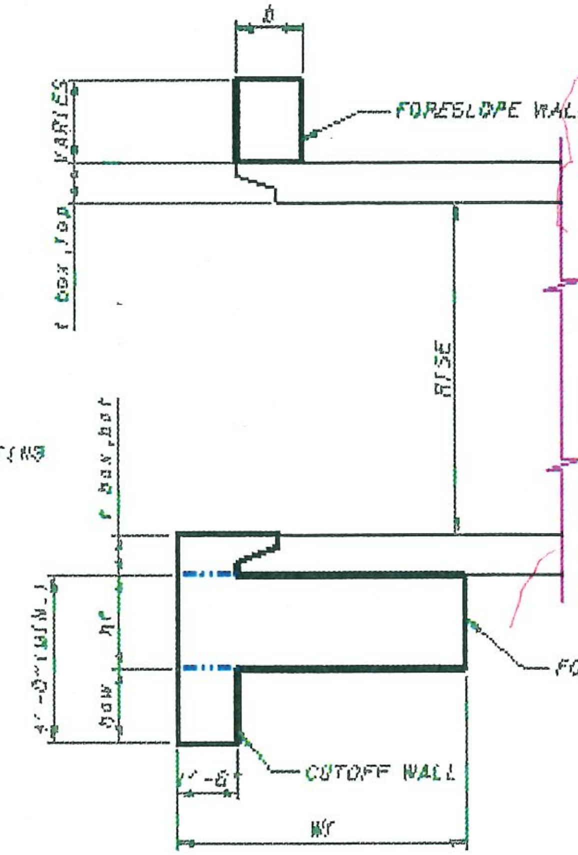
V = ~~#5~~ #6
W = ~~#5~~ #6
X = ~~#5~~ #6
Y = #6
Z = #5

Bar Spacing:

v = ~~18.00 in~~ 6.00 in.
w = ~~18.00 in~~ 9.00 in.
x = ~~18.00 in~~ 16.00 in.
y = ~~9.00 in~~ 8.00 in.
z = 18.00 in (z=w)



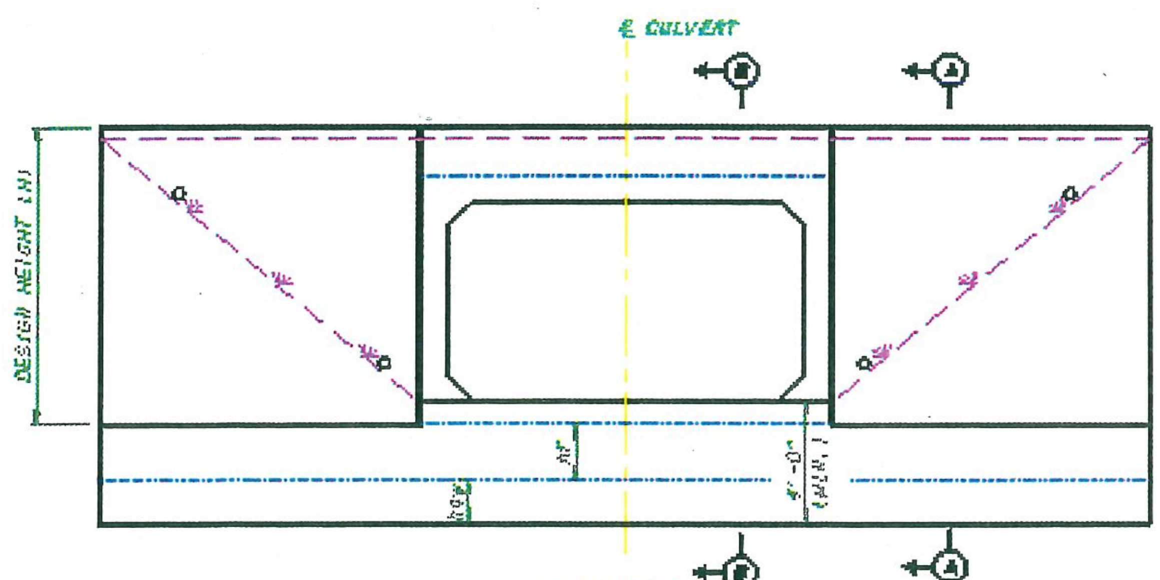
SECTION A-A



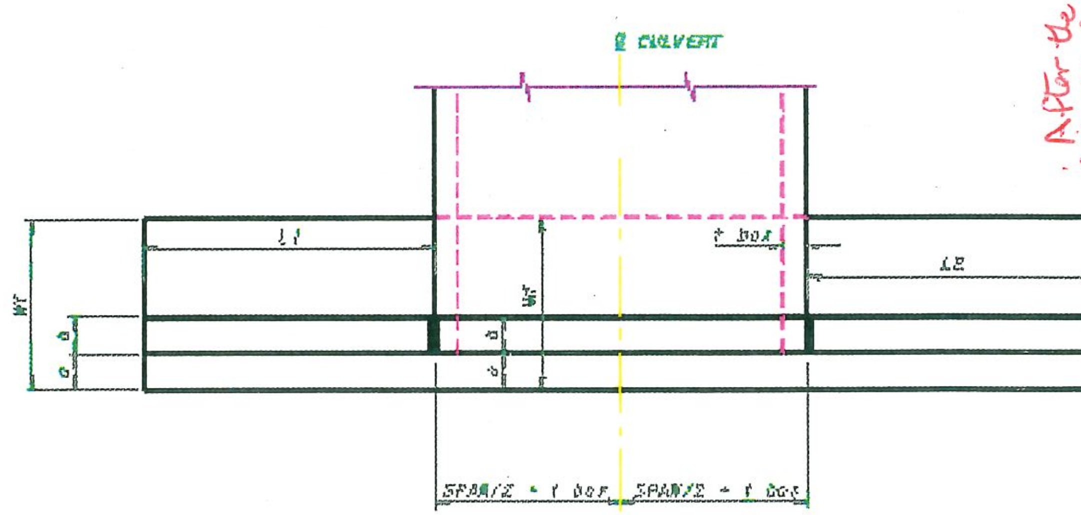
SECTION B-B

BAR MARK
X501
Y601
WW501
WW502
V501
W501
Z501
F501
F502
F601
F602
FS501
FS502
FS503

After the spreadsheet fills in the table, I will figure out the reinforcing ...



ELEVATION
TYPE C HEADWALL



PLAN
TYPE C HEADWALL

BoxCulvHWBarListCalculation_08_2021.xls

If Override Option is Not Used, Leave Cell Blank *

Culverts" Standard Drawing for headwall dimensions and reinforcing data.

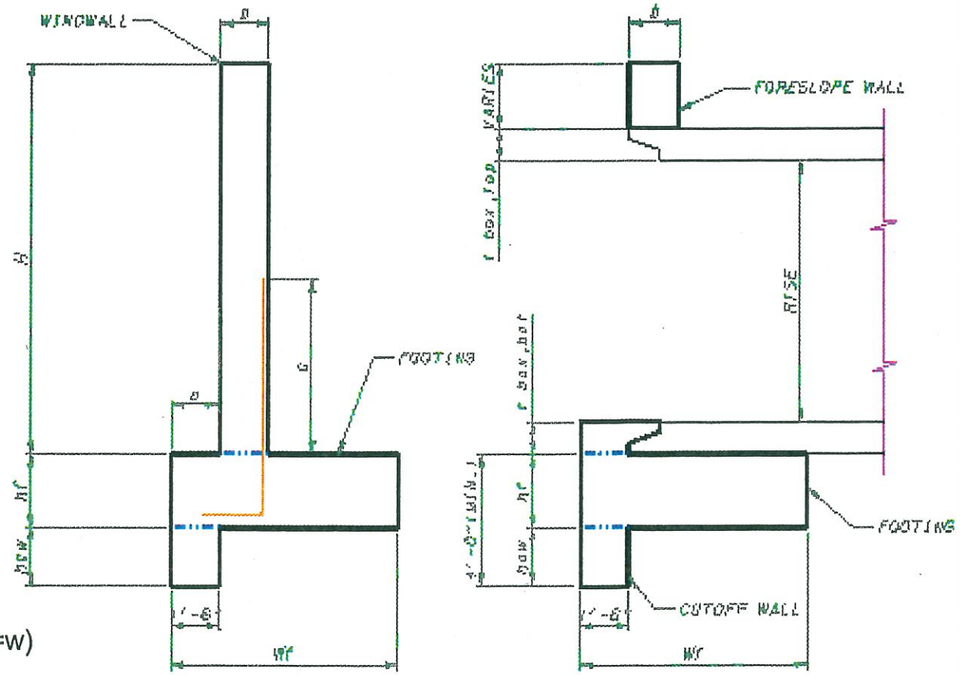
Cutoff Wall:

8.00 ft
2.00 ft
2.00 ft

#5
#5
#5
#6
#5

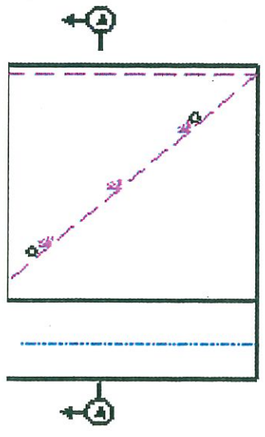
ng:

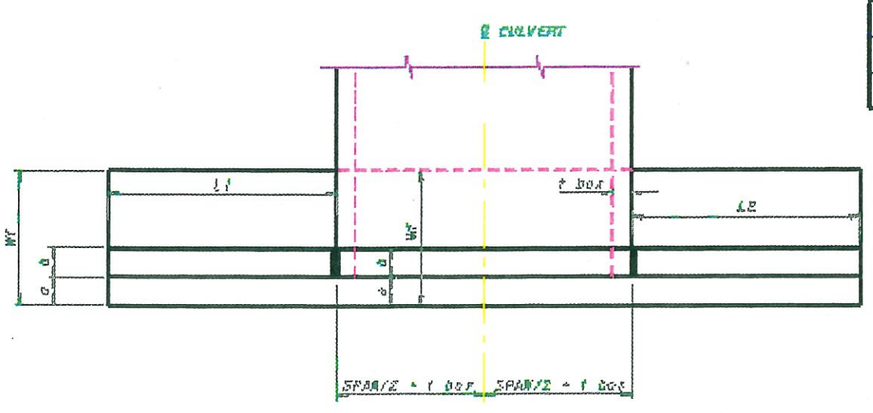
18.00 in
18.00 in
18.00 in
9.00 in
18.00 in (z=w)



SECTION A-A

SECTION B-B





PLAN
TYPE C HEADWALL

TYPE C HEADWALL REINFORCING SCHEDULE							
BAR MARK	NUMBER	LENGTH	WEIGHT (LBS.)	TYPE	BAR TYPE DIMENSIONS		
					A	B	C
WINGWALLS							
X501	26	10'- 4"	281	STR.			
Y601	50	6'- 6"	489	1	1'- 0"	5'- 8"	
WW501	26	10'- 4"	281	STR.			
WW502	32	17'- 8"	590	STR.			
FOOTING & CUTOFF WALL							
V501	33	7'- 8"	264	STR.			
W501	33	7'- 8"	264	STR.			
Z501	33	8'- 2"	282	5	3'- 7"	1'- 2"	
F501	9	6'- 1"	58	1	3'- 8"	2'- 6"	
F502	2	11'- 4"	24	STR.			
F601	28	24'- 11"	1,048	STR.			
F602	4	24'- 11"	150	STR.			
FORESLOPE WALL							
FS501	4	11'- 4"	48	STR.			
FS502	13	3'- 8"	50	5	1'- 6"	0'- 11"	
FS503	13	4'- 5"	60	7	1'- 6"	0'- 11"	2'- 3"
		TOTAL	3,889				