CITY OF LUCAS, TEXAS

RECORD DRAWINGS FOR:

WINNINGKOFF ROAD-REVERSE CURVE PAVING & DRAINAGE IMPROVEMENTS

DESIGN SPEED: 35 M.P.H.

CONTRACTOR: GROD CONSTRUCTION, LLC.
ADDRESS/PHONE NO. 889 E. ROCK ISLAND AVE.
BOYD, TEXAS 76023

CONTRACT COMPLETION DATE: MAY 29, 2018

ORIGINAL CONTRACT AMOUNT: $502,410.90
FINAL CONTRACT AMOUNT: $545,935.90

CITY COUNCIL

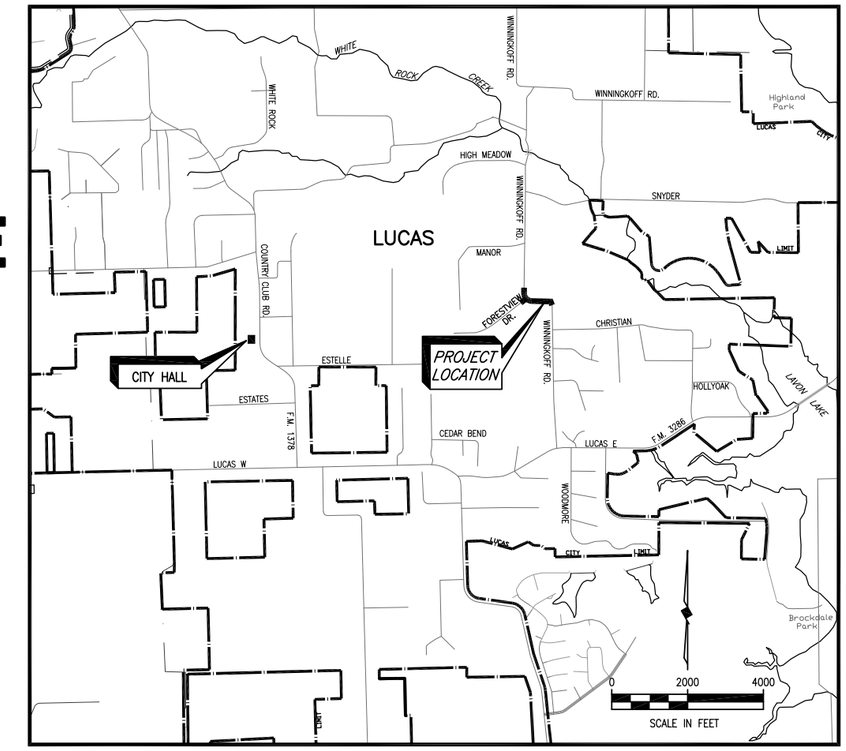
JIM OLK, MAYOR
KATHLEEN PEELE, MAYOR PRO-TEM
WAYNE MILLSAP
TIM BANEY
STEVE DUKE
PHILIP LAWRENCE
DEBBIE FISHER

CITY MANAGER

JONI CLARKE

PUBLIC WORKS DIRECTOR/CITY ENGINEER

STANTON FOERSTER, P.E.



LOCATION MAP

SHEET INDEX

PREPARED BY

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS
TBPE Firm No. 526; TBPLS Firm No. 10031800
11910 Greenville Ave., Suite 600
Dallas, Texas 75243 (214) 361-7900

June 2020

1 ADDENDUM NO. 1 – 09/01/2017
1 CHANGE ORDER NO. 1 – 12/12/2017
2 CHANGE ORDER NO. 2 – 03/05/2018
FIELD CHANGE NO. 1 – 03/26/2018
3 CHANGE ORDER NO. 3 – 04/18/2018

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BY J.T.C. *DATE* 06/10/2020

STATE OF TEXAS
JOSEPH T. GRAJEWSKI, III
104984
LICENSED PROFESSIONAL ENGINEER

8/9/17

GENERAL NOTES:

1. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE MANNER ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR HIS REPRESENTATIVE (ENGINEER). THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE WHICH MIGHT OCCUR DUE TO THE CONTRACTOR'S FAILURE TO LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
2. THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 4TH EDITION, OCTOBER 2004, ARE HEREAFTER, COLLECTIVELY REFERRED TO AS "THE STANDARD SPECIFICATIONS".
3. IN THE EVENT AN ITEM IS NOT COVERED WITHIN THESE PLANS AND SPECIFICATIONS, THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS (NCTCOG) STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION SHALL APPLY.
4. THE CONTRACTOR SHALL CONTACT THE ENGINEER SHOULD ANY DISCREPANCIES BE FOUND IN THE CONSTRUCTION PLANS AND/OR THE SPECIAL PROVISIONS. THE CONTRACTOR WILL NOT BE COMPENSATED FOR ANY WORK NOT AUTHORIZED BY THE CITY.
5. CONSTRUCTION OBSERVATION AND MATERIALS TESTING WILL BE PERFORMED BY REPRESENTATIVES OF THE OWNER, ENGINEER AND REVIEW AUTHORITIES AND AGENCIES. UNRESTRICTED ACCESS SHALL BE PROVIDED TO THESE REPRESENTATIVES AT ALL TIMES. THE CONTRACTOR IS RESPONSIBLE FOR UNDERSTANDING THE REQUIRED INSPECTIONS AND ALLOWING FOR THEM IN HIS SCHEDULE OF OPERATIONS. CONTRACTOR WILL NOT BE ALLOWED ANY ADDITIONAL CONTRACT DAYS OR COMPENSATION AS A RESULT OF HIS FAILURE TO ADEQUATELY PROVIDE FOR AUTHORIZED INSPECTIONS.
6. THE CONTRACTOR SHALL NOT PLACE FILL OR WASTE MATERIAL ON ANY PRIVATE PROPERTY WITHOUT A WRITTEN AGREEMENT WITH THE PROPERTY OWNER AND APPROVAL BY CITY. A COPY OF THIS AGREEMENT SHALL BE PROVIDED TO THE CITY.
7. TRENCH SAFETY DESIGN SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL SUBMIT A TRENCH SAFETY DESIGN PLAN, SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TEXAS, FOR REVIEW PRIOR TO THE START OF CONSTRUCTION.
8. THE CONTRACTOR SHALL PROTECT THE EXISTING TREES, BUSHES, LANDSCAPING PLANTS, SPRINKLERS, AND LAWNS UNLESS SHOWN OTHERWISE ON THE CONSTRUCTION DRAWINGS. ANY DAMAGE TO THE EXISTING TREES, BUSHES, LANDSCAPING PLANTS, SPRINKLERS, AND LAWNS CAUSED BY THE CONSTRUCTION SHALL BE REPLACED TO THE SATISFACTION OF THE PROPERTY OWNER AND THE CITY AT THE CONTRACTOR'S SOLE EXPENSE.
9. THE CONTRACTOR SHALL PROTECT ALL UNDERGROUND IRRIGATION SYSTEMS. ADJUSTMENT OR RELOCATION OF IRRIGATION SYSTEM SHALL BE INSTALLED BY AN IRRIGATOR LICENSED IN THE STATE OF TEXAS AND, IF REQUIRED, SHALL BE INCIDENTAL TO RIGHT OF WAY PREPARATION.
10. THE CONTRACTOR SHALL RESTORE ALL AREAS DISTURBED BY THE CONSTRUCTION TO THE ORIGINAL CONDITION OR BETTER. RESTORED AREAS INCLUDE BUT NOT LIMITED TO TRENCH BACKFILL, SIDE SLOPES, FENCES, IRRIGATION SYSTEMS, DRIVEWAYS, PRIVATE YARDS, SIGNS AND ROADWAYS. DISTURBED ROADWAY CLEAR ZONES SHALL BE HYDRO MULCHED, WATERED & ESTABLISHED. DISTURBED CHANNEL SIDE SLOPES SHALL BE RESTORED WITH SOLID BLOCK SOD, WATERED, FERTILIZED & ESTABLISHED. THE ESTABLISHMENT OF GRASS IN DISTURBED AREAS SHALL BE DETERMINED BY THE CITY OF PARKER.
11. TEMPORARY FENCING SHALL BE PLACED PRIOR TO ANY FENCE REMOVAL FOR CONSTRUCTION. TEMPORARY FENCING SHALL MATCH THE EXISTING FENCE. PAYMENT FOR TEMPORARY FENCE SHALL BE SUBSIDIARY TO THE REMOVAL AND REPLACEMENT OF THE FENCE.

PAVING NOTES

1. THE CONTRACTOR SHALL KEEP STREETS ADJACENT TO THE PROJECT FREE OF MUD AND DEBRIS FROM THE CONSTRUCTION.
2. CONCRETE FOR ALL STREETS SHALL BE IN ACCORDANCE WITH NCTCOG CLASS "P1" CONCRETE (4,000 P.S.I. COMPRESSIVE @ 28 DAYS MINIMUM 6 SACK MIX).
3. THE CONTRACTOR SHALL PROVIDE ACCESS TO PRIVATE PROPERTY AT ALL TIMES. DRIVEWAYS WILL BE REPLACED AS DIRECTED BY THE ENGINEER. TEMPORARY DRIVEWAYS SHALL BE CONSTRUCTED IMMEDIATELY AFTER THE CONTRACTOR HAS DISTURBED OR ALTERED THE ADJACENT PROPERTY OWNERS ACCESS TO HIS PROPERTY.
4. DRIVEWAY LOCATIONS IF ANY SHOWN ARE SUBJECT TO CHANGE TO SUIT ACTUAL FIELD CONDITIONS AT THE TIME OF CONSTRUCTION AND MAY BE SHIFTED AS DIRECTED BY THE ENGINEER.
5. DRIVEWAYS CONSTRUCTED OFF RIGHT-OF-WAY SHALL MATCH THE EXISTING DRIVE CONSTRUCTION MATERIALS, OR AS DIRECTED BY THE ENGINEER, WHERE APPLIES.
6. WHEN EXCAVATION IS REQUIRED NEXT TO A PAVEMENT LANE CARRYING TRAFFIC AND WIDENING IS NOT COMPLETED WITHIN FORTY EIGHT (48) HOURS, SUFFICIENT BACKFILL SHALL BE PLACED AGAINST THE EDGE OF PAVEMENT TO PROVIDE A USUAL 3:1 SLOPE.
7. WHERE THE CONTRACTOR DESIRES TO MOVE ANY EQUIPMENT NOT LICENSED FOR OPERATION ON PUBLIC ROADWAYS ON OR ACROSS PAVEMENT, HE SHALL PROTECT THE PAVEMENT FROM DAMAGE. ANY DAMAGE TO PAVEMENT SHALL BE REPLACED AT THE CONTRACTOR'S SOLE EXPENSE.
8. THE CONTRACTOR SHALL NOT COMMENCE WORK ON THE ROADWAY BEFORE 7:00 AM AND SHALL ARRANGE HIS WORK SO THAT NO MACHINERY OR EQUIPMENT SHALL BE CLOSER THAN 30 FEET TO THE TRAVELED ROADWAY AFTER SUNSET EXCEPT AS APPROVED BY THE ENGINEER. UNLESS OTHERWISE APPROVED BY THE CITY, WORKING HOURS SHALL BE 7AM-7PM MON.-FRI. AND 8AM-7PM ON SATURDAYS. NO WORK SHALL BE DONE ON CITY HOLIDAYS OR SUNDAYS WITHOUT WRITTEN PERMISSION FROM THE CITY.
9. WHERE PROPOSED REINFORCED CONCRETE PAVEMENT CONNECT TO EXISTING REINFORCED CONCRETE PAVEMENT, THE CONTRACTOR SHALL MATCH AT SAME TOP CONCRETE ELEVATION WITH A SMOOTH TRANSITION INCLUDING AT CONCRETE CURB CONNECTIONS. SEE LONGITUDINAL BUTT JOINT DETAIL FOR TYPICAL CONNECTION.
10. THIS PROJECT WILL NOT BE CONSIDERED COMPLETE UNTIL THE ENGINEER DETERMINES THAT ALL CURBS, PAVEMENT AND SIDEWALKS HAVE BEEN SWEPT CLEAN OF ALL DIRT AND DEBRIS.

PAVEMENT MARKINGS AND SIGNS

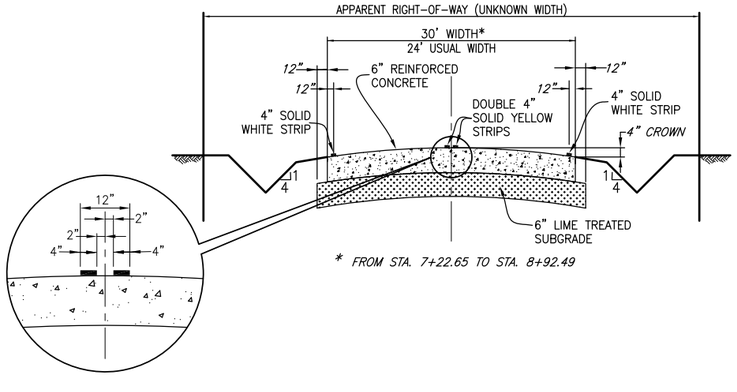
1. ALL PAVEMENT MARKINGS, SIGN MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE LATEST ADDITIONS OF THE STANDARD HIGHWAY DEPARTMENT SIGN DESIGN FOR TEXAS, THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) UNLESS NOTED OTHERWISE.
2. SIGN LOCATIONS SHOWN ON THE PLANS ARE DIAGRAMMATIC.
3. PAYMENT FOR EACH SIGN SHALL INCLUDE MOUNTING HARDWARE, THE SIGN POLE AND GROUND MOUNTING SYSTEM. ALL GROUND MOUNTED SIGNS SHALL BE GALVANIZED 12-GAUGE YIELDING BREAKAWAY GROUND MOUNTED SIGN SYSTEMS. THE SYSTEM SHALL CONSIST OF THE FOLLOWING THREE ELEMENTS:
   a) 12-FOOT LONG 2-INCH SQUARE POLES WITH HOLES
   b) 30-INCH LONG 2.25-INCH SQUARE BASE
   c) 18-INCH LONG 2.5-INCH SQUARE SLEEVE
4. SIGNS SHALL BE PLACED IN CONFORMANCE WITH THE LATEST EDITION OF TMUTCD.
5. REFLECTORIZED PAVEMENT MARKINGS SHALL BE THERMOPLASTIC, PER TXDOT STANDARD SPECIFICATIONS, ITEM 666. PAVEMENT MARKERS SHALL COMPLY WITH TXDOT STANDARD SPECIFICATIONS, ITEM 672.
6. ANY SIGNS TEMPORARILY REMOVED BY THE CONTRACTOR SHALL BE REPLACED. PAYMENT FOR THE REPLACEMENT OF SIGNS NOT CALLED OUT IN THE CONSTRUCTION PLANS AND INCLUDED IN THE BID SCHEDULE SHALL BE SUBSIDIARY TO THE PROJECT.

TRAFFIC CONTROL

1. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE TRAFFIC CONTROL DURING THE PROJECT. ALL TRAFFIC CONTROL WORK SHALL BE IN ACCORDANCE WITH THE LATEST VERSION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
2. ALL TRAFFIC CONTROL PLANS MUST BE SUBMITTED BY THE CONTRACTOR FOR REVIEW A MINIMUM OF SEVEN WORKING DAYS PRIOR TO ANTICIPATED LANE CLOSURES. THE TRAFFIC CONTROL PLAN MUST BE APPROVED BY THE CITY PRIOR TO BEGINNING CONSTRUCTION ACTIVITY. TRAFFIC CONTROL PLANS MAY BE REQUIRED ON OTHER ROADWAYS AS DETERMINED BY THE CITY OR THE ENGINEER. ALL TRAFFIC CONTROL PLANS MUST BE PREPARED BY AN INDIVIDUAL CERTIFIED IN THEIR PREPARATION IN THE STATE OF TEXAS.
3. BARRICADES AND SIGNS SHALL BE PLACED IN SUCH A MANNER AS NOT TO INTERFERE WITH SIGHT DISTANCE OF DRIVERS ENTERING THE ROADWAY OR SIDE STREETS.
4. ALL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE REMOVED AS SOON AS PRACTICAL WHEN THEY ARE NO LONGER NEEDED.

UTILITY NOTES

1. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT ALL EXISTING PUBLIC AND PRIVATE UTILITIES THROUGHOUT THE CONSTRUCTION ON THIS PROJECT. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANY FOR LINE RESPONSIBILITY AND IS LIABLE TO THESE COMPANIES FOR ANY DAMAGE CAUSED TO THEIR FACILITIES.
2. THE CONTRACTOR SHALL TAKE EXTREME CARE WHEN EXCAVATING IN THE VICINITY OF UTILITIES. THE CONTRACTOR MAY BE REQUIRED TO PROBE OR EXPOSE THESE FACILITIES. THE CONTRACTOR WILL BE RESPONSIBLE FOR DAMAGE TO THESE UTILITIES CAUSED BY THE CONTRACTOR.
3. ERECTION OF POLES AND STRUCTURES LOCATED NEAR ANY OVERHEAD OR UNDERGROUND UTILITIES SHALL BE ACCOMPLISHED USING ESTABLISHED INDUSTRY SAFETY AND UTILITY SAFETY PRACTICES.
4. THE CONTRACTOR SHALL COORDINATE WITH GCEC TO ALLOW FOR AN OPEN CUT INSTALLATION ACROSS THE PAVEMENT AT 980 WINNINGKOFF ROAD.



* FROM STA. 7+22.65 TO STA. 8+92.49

STORM WATER POLLUTION PREVENTION NOTES

1. PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL PROVIDE A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) TO THE CITY.
2. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR IMPLEMENTING ALL THE VARIOUS STORM WATER POLLUTION PREVENTION MEASURES AND SHALL BE REQUIRED TO COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL EROSION, CONSERVATION, AND SANITATION ORDINANCES.
3. IF THESE STORM WATER POLLUTION PREVENTION SYSTEMS, AS APPROVED, CANNOT CONTROL EROSION, THE SWPPP WILL BE REQUIRED TO BE REVISED AND/OR ADDITIONAL EROSION CONTROL DEVICES WILL BE REQUIRED ON SITE AT NO ADDITIONAL COST TO THE CITY.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PAYMENT OF ALL ASSOCIATED FEES, INCLUDING BUT NOT LIMITED TO THE N.O.I. (NOTICE OF INTENT) APPLICATION FEE AND WATER QUALITY FEE.
5. PERIMETER CONTROLS SUCH AS SILT CONTROL FENCE OR HAY BALES SHALL BE INSTALLED AT ALL DOWN SLOPE BOUNDARIES AND AS REQUIRED WHERE PAVEMENT REMOVAL, UTILITY CONSTRUCTION, GRADING, OR OTHER CONSTRUCTION ACTIVITIES ARE TO BE PREFORMED. THE CONTRACTOR SHALL TAKE SUCH MEASURES AT ALL TIMES TO MINIMIZE SITE TRACKING OR TRANSPORT OF SEDIMENT AND DEBRIS OFF-SITE.
6. DAMAGES TO ADJACENT PROPERTY OR TO RECEIVING WATERS CAUSED BY IMPROPERLY INSTALLED OR POORLY MAINTAINED EROSION CONTROL MEASURES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
7. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF SILT AND SEDIMENT FROM EROSION CONTROL DEVICES WHEN THE EFFECTIVENESS OF THESE MEASURES IS REDUCED, OR AS DIRECTED BY THE ENGINEER.
8. THE CONTRACTOR SHALL PROVIDE ADEQUATE PROTECTION FOR THE EXISTING AND PROPOSED STORM DRAINAGE INLETS AND PREVENT THE ENTRY OF ANY SEDIMENT OR OTHER MATERIALS INTO THE DRAINAGE SYSTEM.
9. THE CONTRACTOR SHALL NOT ALLOW ANY CONSTRUCTION DEBRIS OUTSIDE THE PROJECT BOUNDARIES. ANY DEBRIS (MUD, GRAVEL, ORGANIC MATERIAL, ETC.) THAT FALLS ONTO ADJACENT PROPERTY OR EXISTING PAVEMENT SHALL BE REMOVED IMMEDIATELY.
10. THE CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION ACTIVITIES.

DRAINAGE NOTES

1. ALL DRAINAGE PIPES SHALL INTERSECT STRUCTURES AT THE CENTERLINE OF THE STRUCTURE INSIDE WALL FACE, UNLESS NOTED OTHERWISE.
2. ALL R.C.P. AND R.C.B. BEND AND INTERSECTIONS SHALL BE CONSTRUCTED UTILIZING PRECAST 45° OR 60° BENDS, WYES, UNLESS NOTED OTHERWISE AND SHALL BE SUBSIDIARY TO R.C.P. OR R.C.B. INSTALLATION.
3. ALL STORM SEWER SHALL BE ASTM C-76, CLASS III REINFORCED CONCRETE PIPE, UNLESS NOTED OTHERWISE.
4. ALL STORM SEWER INLETS, MANHOLES & EMBEDMENT SHALL BE AS PER THE DETAILS.

TYPICAL REINFORCED CONCRETE SECTION

SCOPE OF WORK

1. REMOVE EXISTING ASPHALT PAVEMENT. EXISTING ASPHALT IS 4-INCHES TO 6-INCHES IN DEPTH.
2. PREPARE 6-INCH LIME TREATED SUBGRADE IN ACCORDANCE WITH NCTCOG ITEM 301.2 USING A MINIMUM OF 6% HYDRATED LIME AND COMPACT TO A MINIMUM OF 98% STANDARD PROCTOR AT OPTIMUM MOISTURE TO OPTIMUM PLUS 2%.
3. FURNISH AND INSTALL 6-INCH CLASS 'P1' 4000 PSI CONCRETE REINFORCED WITH NO. 4 DEFORMED BARS ON 24-INCH CENTERS.

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BY J.T.G. *DATE* 06/10/2020

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS
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STATE OF TEXAS — JOSEPH T. GRAJEWSKI, II — 104984 — LICENSED PROFESSIONAL ENGINEER — 8/9/17

CITY LUCAS, TEXAS

WINNINGKOFF ROAD

REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
GENERAL NOTES & TYPICAL SECTION

BHC PROJECT NO. 2016-108

June, 2020

SHEET NO. **2**

REVISED: 6/9/20 – TVASQUEZ

H:\Projects\Lucas\2016108 Winningkoff Road\Sheets\02-Lucas 2016108 General Notes.dwg

PLOT SCALE: 1:2 PLOT STYLE: 11x17.ctb PLOTTED BY: TROY VASQUEZ ON 6/10/2020

RONNIE W. STREBECK
VOL. 1636, PG. 680
TRACT 1
1.495 ACRES

WILLARD & KIMBERLY NOPPER
VOL. 6063, PG. 4284
2.396 ACRES

GARY D. & DEBBIE J. KIMBERLIN
VOL. 5044, PG. 4706
4.424 ACRES

RONNIE W. STREBECK
VOL. 1636, PG. 680
TRACT 2
0.269 ACRES

RICHARD HUGH & MARJORIE LYNN THOMPSON
VOL. 6063, PG. 4284
14.8294 ACRES

WINNINGKOFF RD.

FORESTVIEW DR.

MALA CT.

REMOVE BRICK SIGN AND SALVAGE "HUNTWICK" PLAQUE

REMOVE 36 L.F. EXIST. 36" C.M.P.

REMOVE 24 L.F. EXIST. 8" P.V.C. PIPE

REMOVE 43 L.F. EXIST. 24" C.M.P. & SAFETY END TREATMENTS

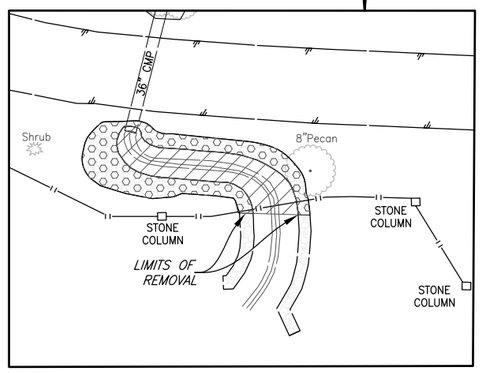
REMOVE 41 L.F. EXIST. 12" R.C.P. PIPE

SEE INSET 'A'

HORIZONTAL 0 30 60 90
SCALE IN FEET

LEGEND

- EXIST. CONC. PVMT. TO BE REMOVED (520 S.Y.)
- EXIST. H.M.A.C. TO BE REMOVED (2495 S.Y.)
- EXIST. CULVERT TO BE REMOVED
- EXIST. ROCK RIP-RAP TO BE REMOVED (60 S.Y.)
- TREE REMOVAL



INSET 'A'

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BY J.T.G. *DATE* 06/10/2020

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STATE OF TEXAS
JOSEPH T. GRAJEWSKI, III
104984
LICENSED
PROFESSIONAL ENGINEER

8/9/17

CITY LUCAS, TEXAS

WINNINGKOFF ROAD

REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
REMOVAL PLAN

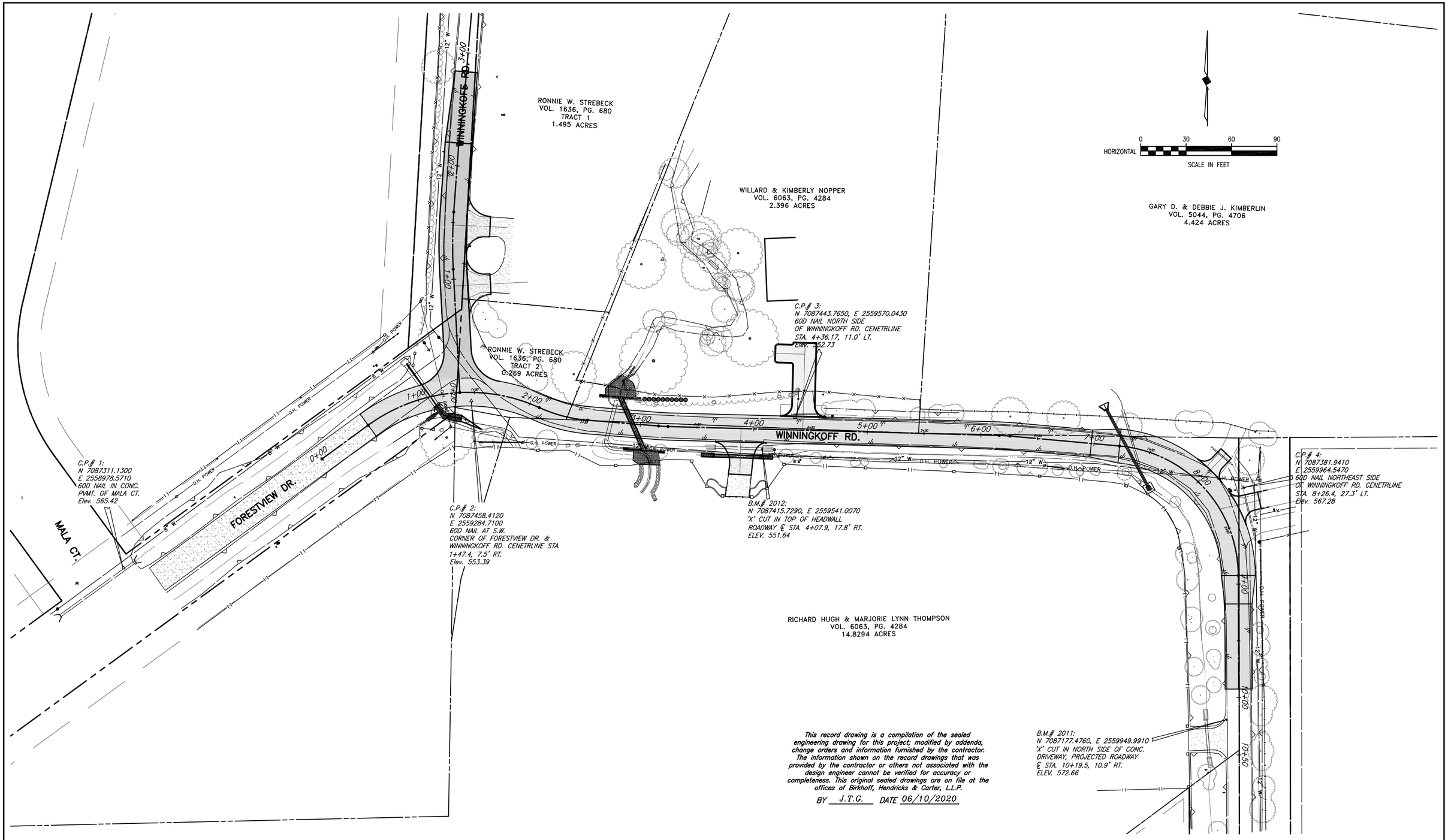
BHC PROJECT NO. 2016-108

August, 2017

SHEET NO. 3

REVISED: 6/10/20 – TVASQUEZ

H:\Projects\Lucas\2016108 Winningkoff Road\Sheets\03-Removal Sheet-01.dwg PLOT SCALE: 1:2 PLOT STYLE: 11x17.ctb PLOTTED BY: TROY VASQUEZ ON 6/10/2020



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BY J.T.G. DATE 06/10/2020

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8/9/17

CITY LUCAS, TEXAS

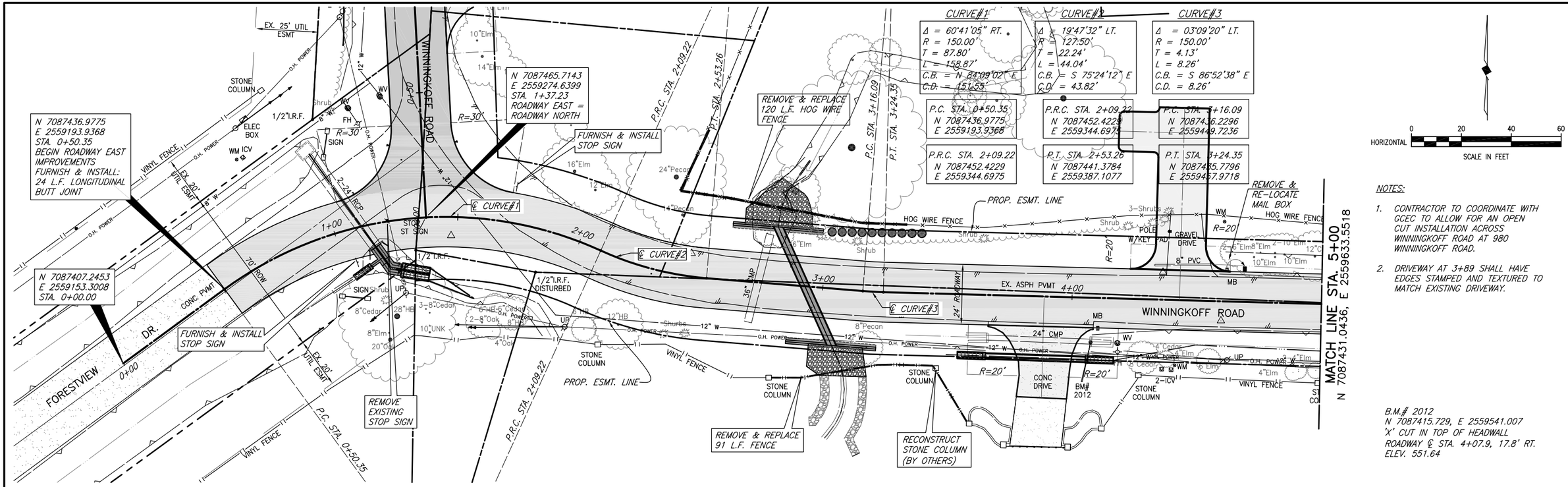
WINNINGKOFF ROAD

REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
SURVEY CONTROL POINTS

BHC PROJECT NO. 2016-108

June, 2020

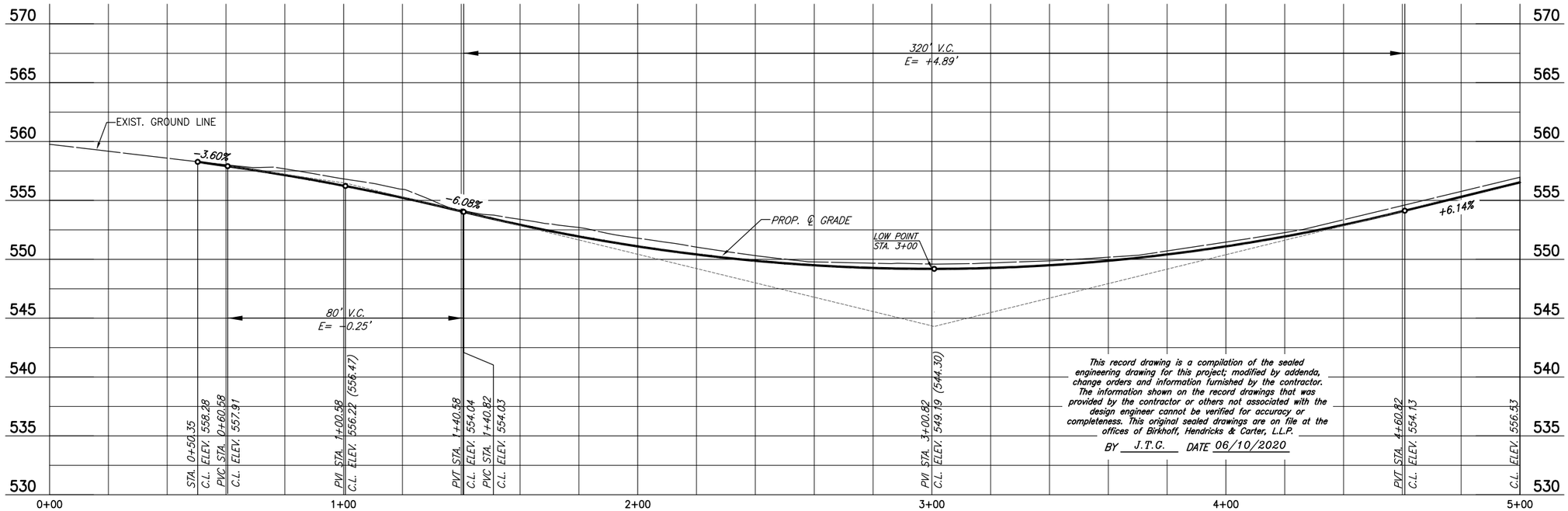
SHEET NO. 4



NOTES:

1. CONTRACTOR TO COORDINATE WITH GCEC TO ALLOW FOR AN OPEN CUT INSTALLATION ACROSS WINNINGKOFF ROAD AT 980 WINNINGKOFF ROAD.
2. DRIVEWAY AT 3+89 SHALL HAVE EDGES STAMPED AND TEXTURED TO MATCH EXISTING DRIVEWAY.

B.M.# 2012
N 7087415.729, E 2559541.007
'X' CUT IN TOP OF HEADWALL
ROADWAY ℄ STA. 4+07.9, 17.8' RT.
ELEV. 551.64



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STATE OF TEXAS · JOSEPH T. GRAJEWSKI III · 104984 · LICENSED PROFESSIONAL ENGINEER

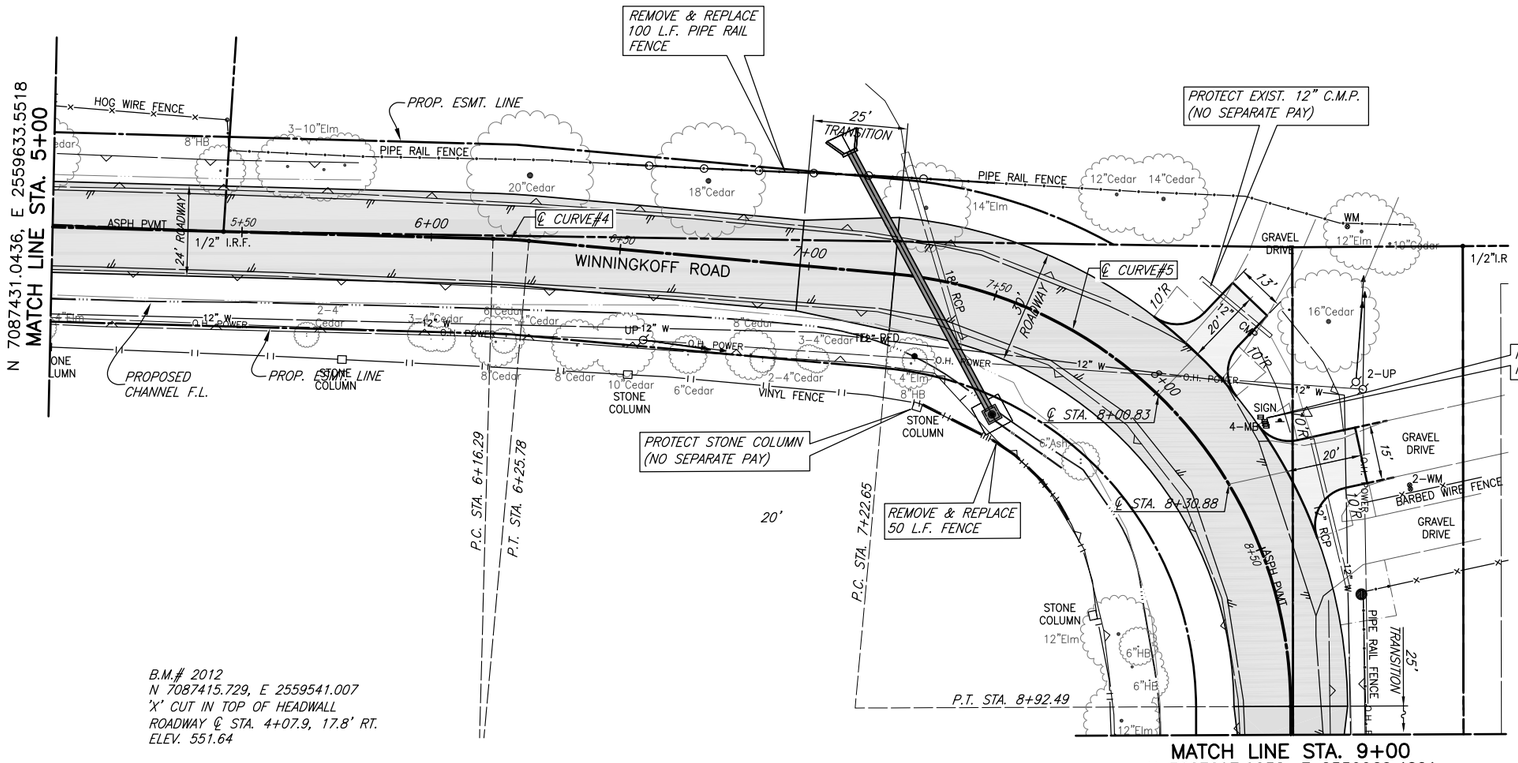
8/9/17

CITY LUCAS, TEXAS
WINNINGKOFF ROAD
REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
PLAN/PROFILE STA. 0+00 TO STA. 5+00

BHC PROJECT NO. 2016-108

June, 2020

SHEET NO. 5



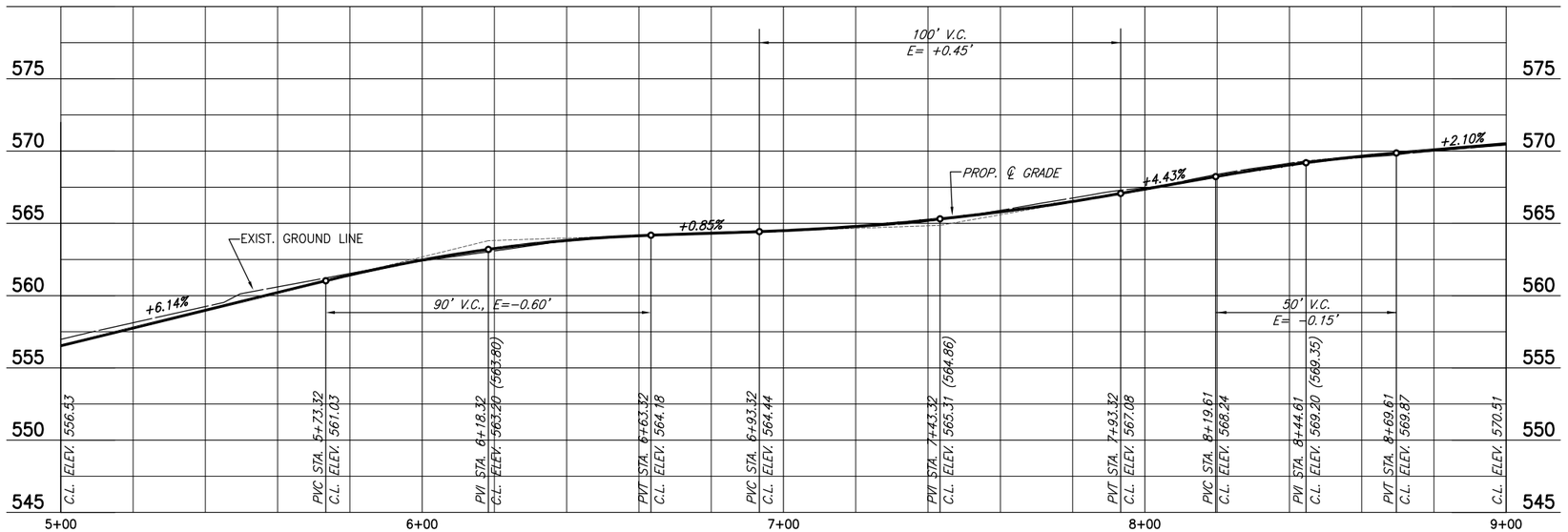
B.M.# 2012
N 7087415.729, E 2559541.007
'X' CUT IN TOP OF HEADWALL
ROADWAY ℄ STA. 4+07.9, 17.8' RT.
ELEV. 551.64

CURVE#4	CURVE#5
Δ = 03°37'29" RT.	Δ = 84°37'00" RT.
R = 150.00'	R = 115.00'
T = 4.75'	T = 104.67'
L = 9.49'	L = 169.84'
C.B. = S 86°38'33" E	C.B. = E 42°31'19" E
C.D. = 9.49'	C.D. = 154.82'
P.C. STA. 6+16.29	P.C. STA. 7+22.65
N 7087427.9079	N 7087418.6242
E 2559749.8024	E 2559855.7441
P.T. STA. 6+25.78	P.T. STA. 8+92.49
N 7087427.3523	N 7087304.5206
E 2559759.2738	E 2559960.3811

HORIZONTAL 0 20 40 60
SCALE IN FEET

TREE NOTES:

1. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN A PROTECTIVE FENCE AT DRIP LINE OF PROTECTED EXISTING TREES, BUSHES, LANDSCAPING PLANTS, SPRINKLERS AND LAWNS UNLESS NOTED OTHERWISE AS DIRECTED BY THE CITY OR THEIR REPRESENTATIVE. ANY DAMAGE TO THE EXISTING TREES, BUSHES, LANDSCAPING PLANTS, SPRINKLERS, AND LAWNS CAUSED BY CONSTRUCTION SHALL BE REPLACED TO THE SATISFACTION OF THE OWNER AT THE CONTRACTOR'S EXPENSE.
2. ALL PROTECTION MEASURES SHALL BE IN PLACE PRIOR TO COMMENCEMENT OF ANY SITE OR GRADING WORK AND REMAIN IN PLACE UNTIL ALL EXTERIOR WORK HAS BEEN COMPLETED.
3. NO TRIMMING OF TREES MAY OCCUR WITHIN THE TREE PRESERVATION FENCING LIMITS WITHOUT PRIOR CONSENT OF THE CITY



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BY J.T.C. DATE 06/10/2020

ADDENDUM NO. 1: MODIFIED NOTE 1 09/1/2017
FIELD CHANGE NO. 1: MODIFIED DRIVEWAYS @ STA. 8+01 & 8+31 03/26/2018

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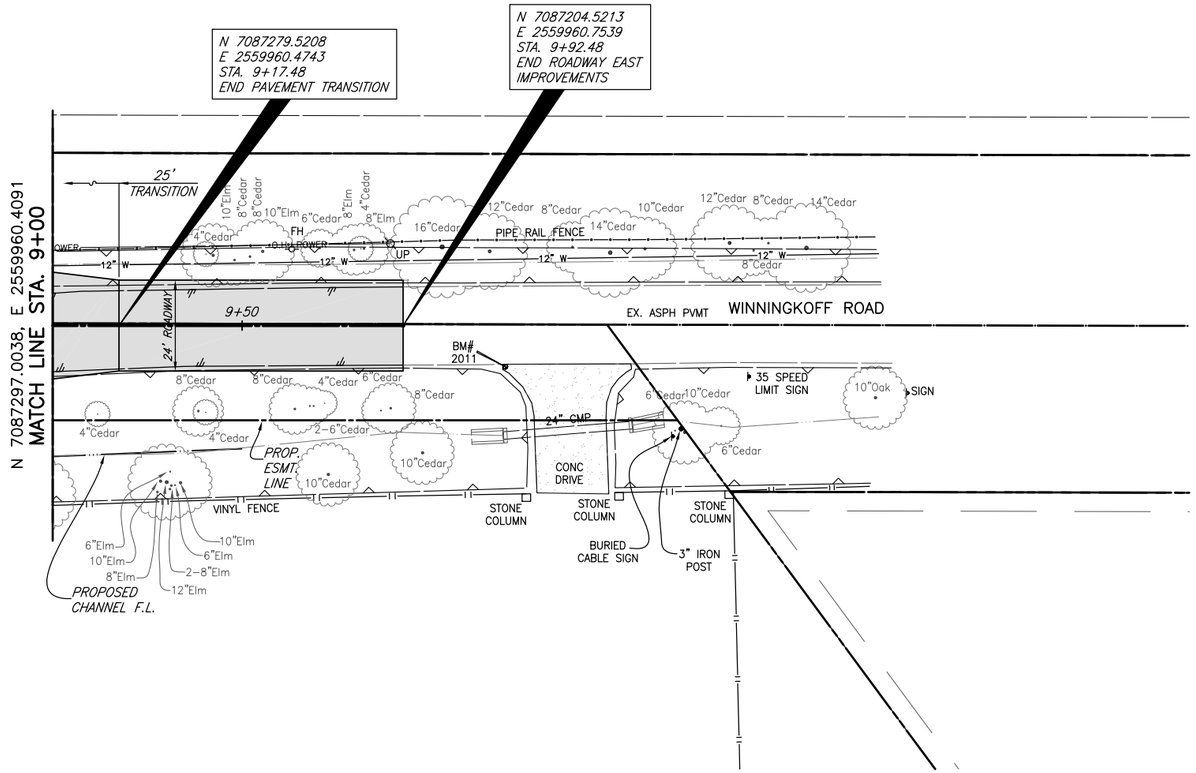
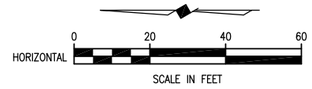
3/26/18

CITY LUCAS, TEXAS
WINNINGKOFF ROAD
REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
PLAN/PROFILE STA. 5+00 TO STA. 9+00

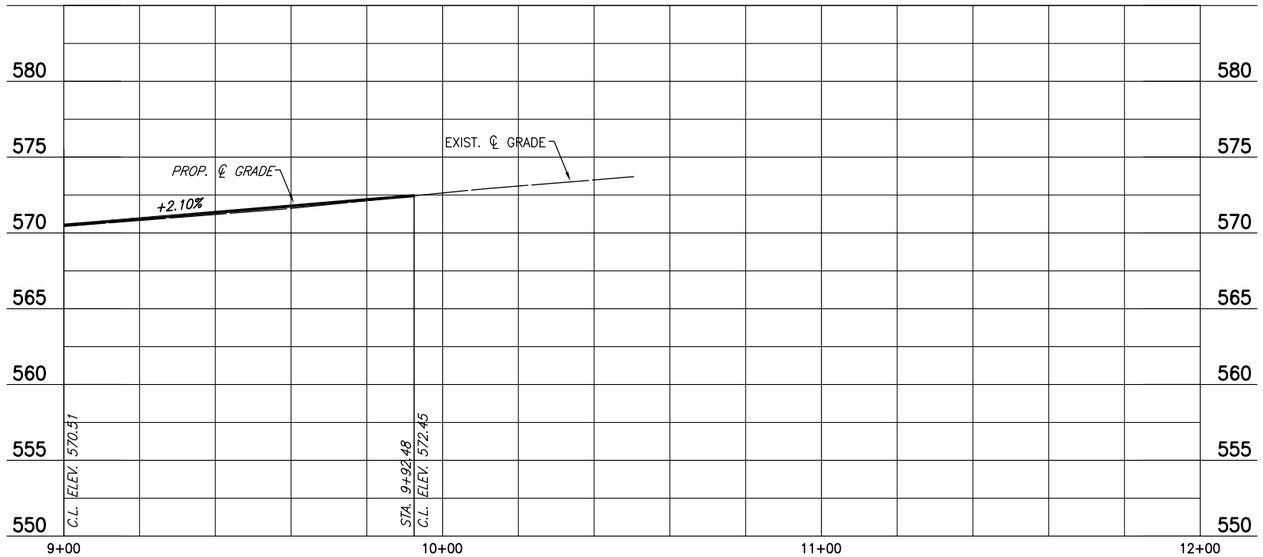
BHC PROJECT NO. 2016-108
June, 2020

SHEET NO. 6





B.M.# 2011
N 7087177.476, E 2559949.991
'X' CUT IN NORTH SIDE OF
CONC. DRIVEWAY, PROJECTED
ROADWAY ℄ STA. 10+19.5, 10.9' RT.
ELEV. 572.66



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BY J.T.C. *DATE* 06/10/2020

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CITY LUCAS, TEXAS

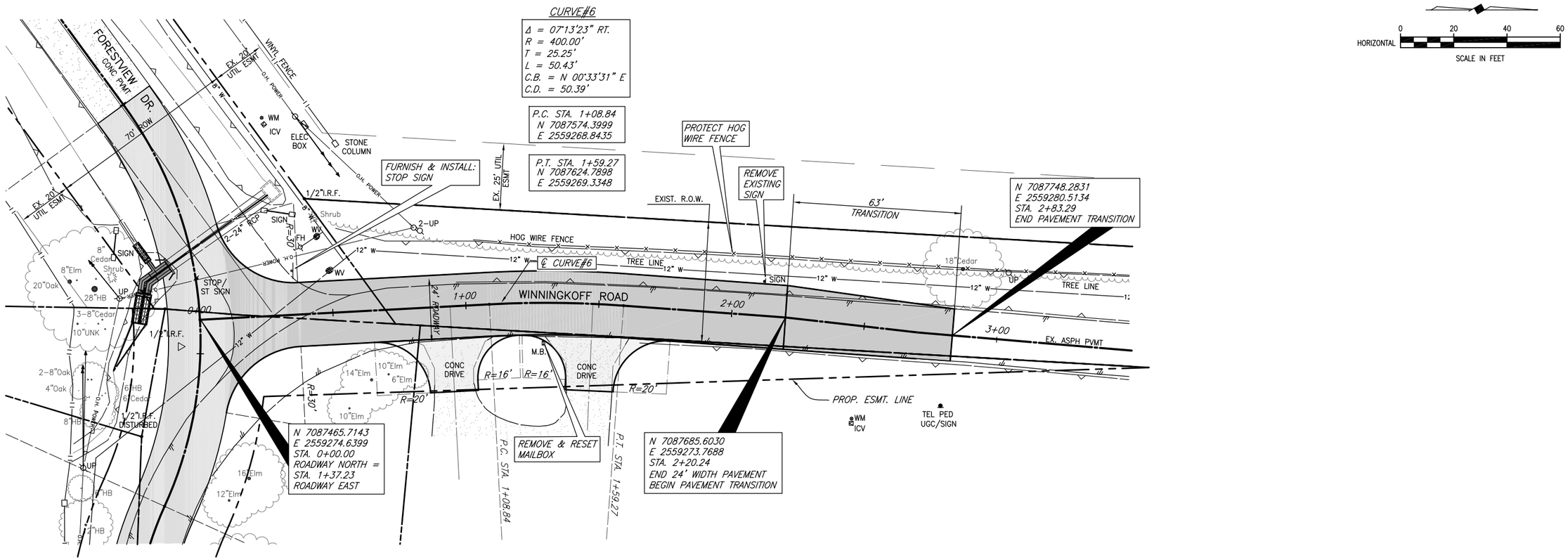
WINNINGKOFF ROAD

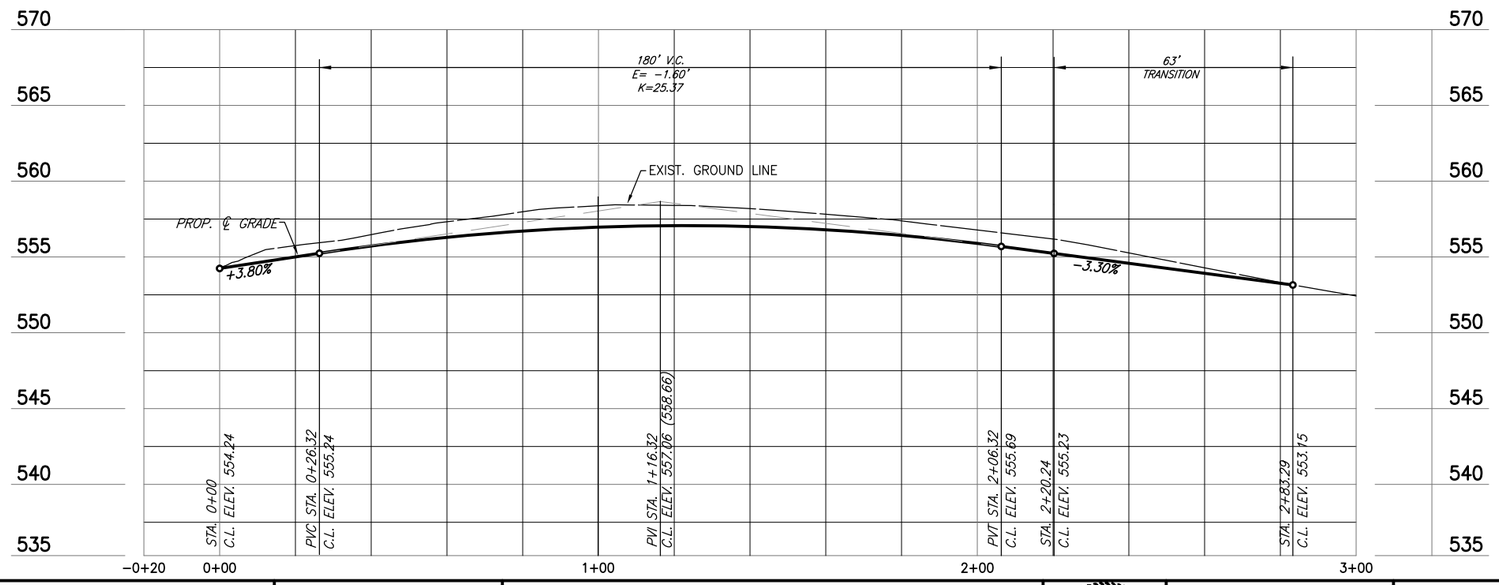
REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
PLAN/PROFILE STA. 9+00 TO STA. 9+92.48

BHC PROJECT NO. 2016-108

June, 2020

SHEET NO. **7**





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BY J.T.G. DATE 06/10/2020

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WINNINGKOFF ROAD

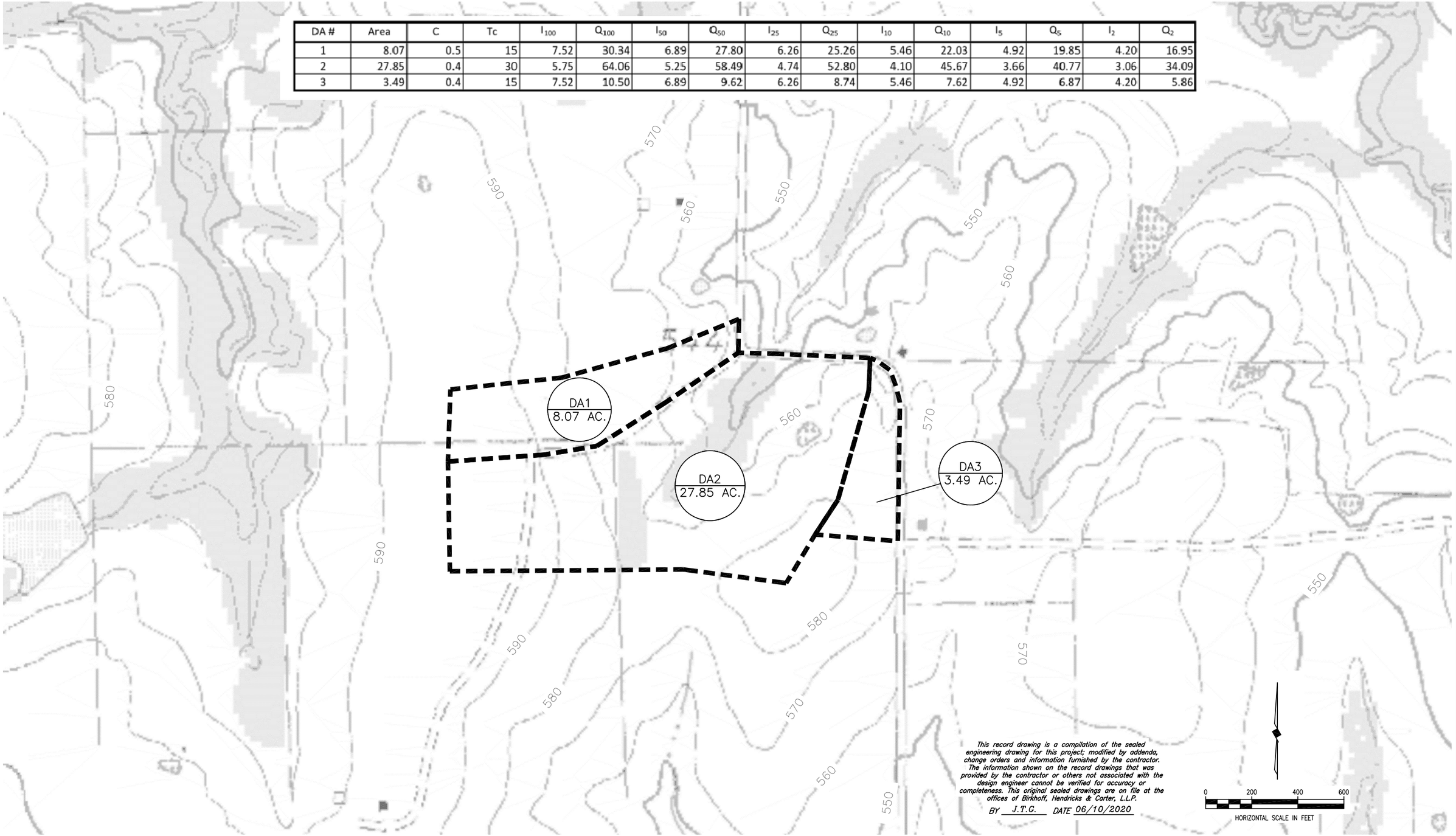
REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
PLAN/PROFILE STA. 0+00 TO STA. 2+83.29

BHC PROJECT NO. 2016-108

June, 2020

SHEET NO. **8**

DA #	Area	C	Tc	I_{100}	Q_{100}	I_{50}	Q_{50}	I_{25}	Q_{25}	I_{10}	Q_{10}	I_5	Q_5	I_2	Q_2
1	8.07	0.5	15	7.52	30.34	6.89	27.80	6.26	25.26	5.46	22.03	4.92	19.85	4.20	16.95
2	27.85	0.4	30	5.75	64.06	5.25	58.49	4.74	52.80	4.10	45.67	3.66	40.77	3.06	34.09
3	3.49	0.4	15	7.52	10.50	6.89	9.62	6.26	8.74	5.46	7.62	4.92	6.87	4.20	5.86



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CITY LUCAS, TEXAS

WINNINGKOFF ROAD

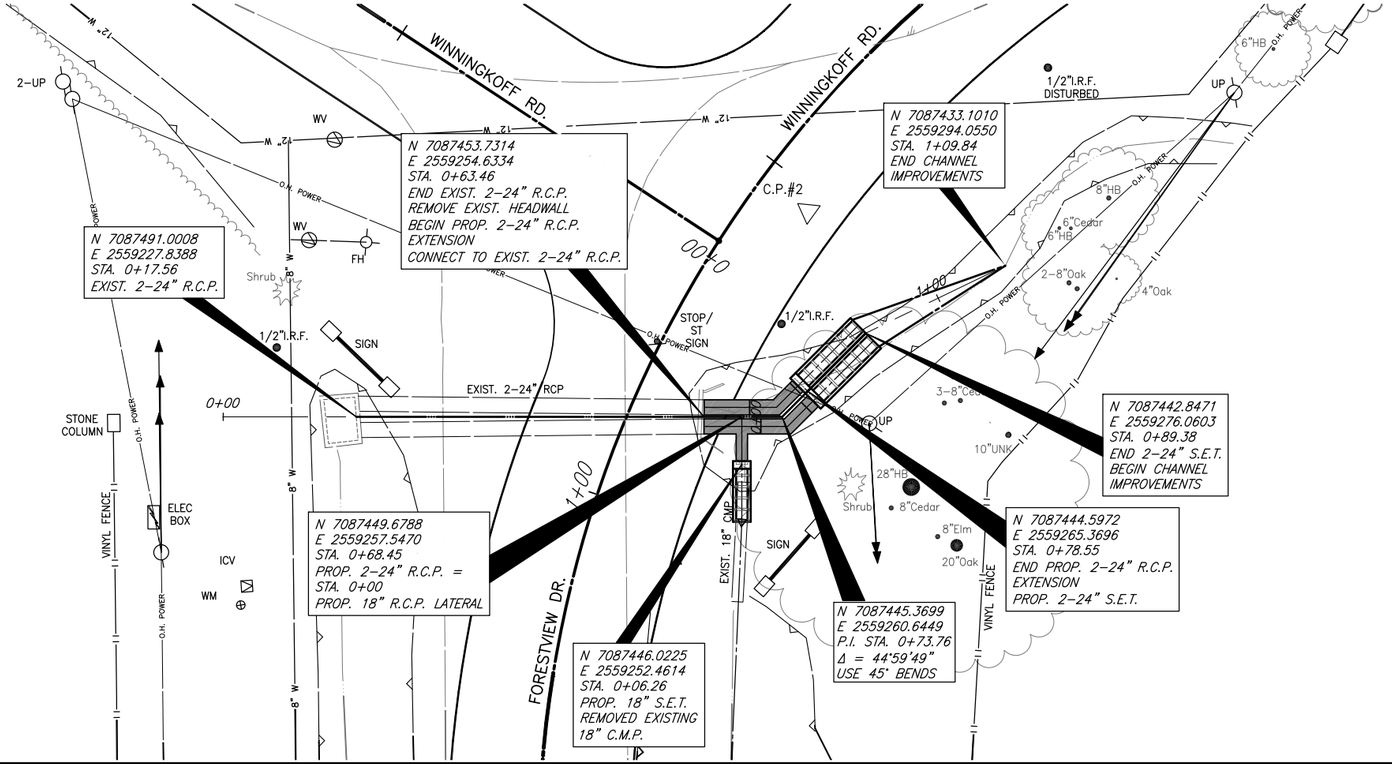
REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
DRAINAGE ARE MAP

BHC PROJECT NO. 2016-108

June, 2020

SHEET NO. 9

REVISED: 6/10/20 – TVASQUEZ H:\Projects\Lucas\2016108 Winningkoff Road\Sheets\9-Winningkoff Drainage Area Map.dwg PLOT SCALE: 1:2 PLOT STYLE: 11x17.ctb PLOTTED BY: TROY VASQUEZ ON 6/10/2020



HORIZONTAL 0 10 20 30

SCALE IN FEET

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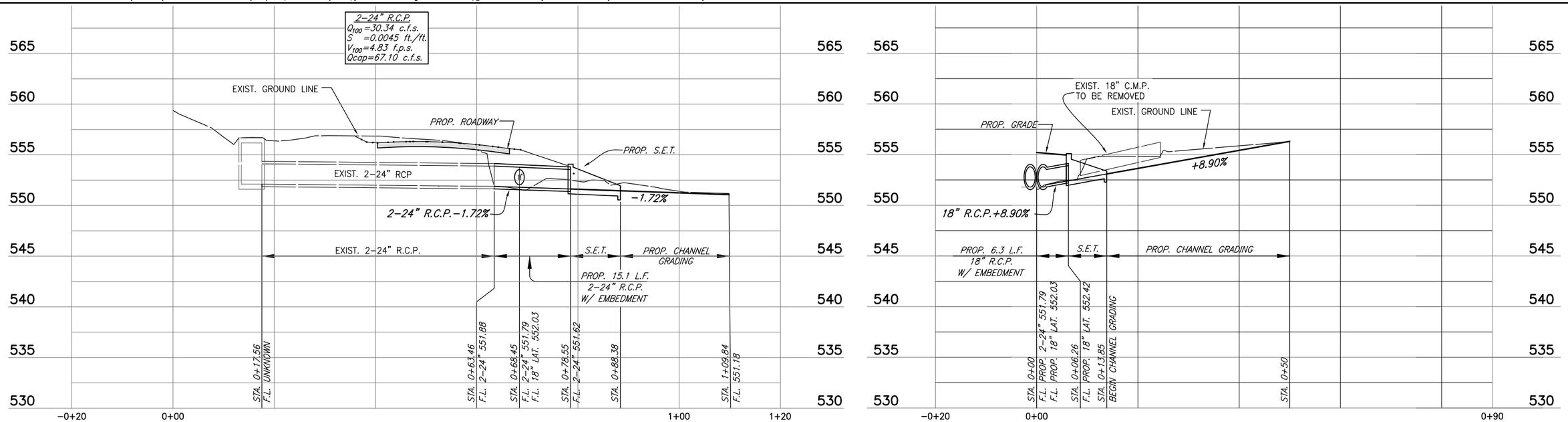
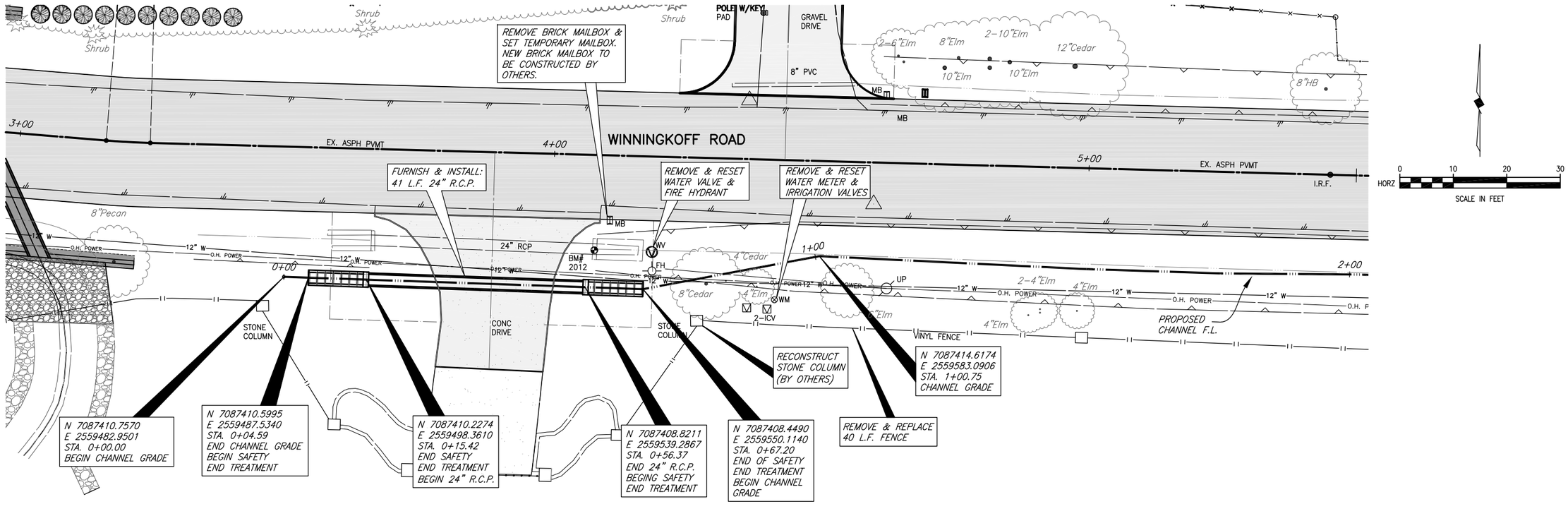
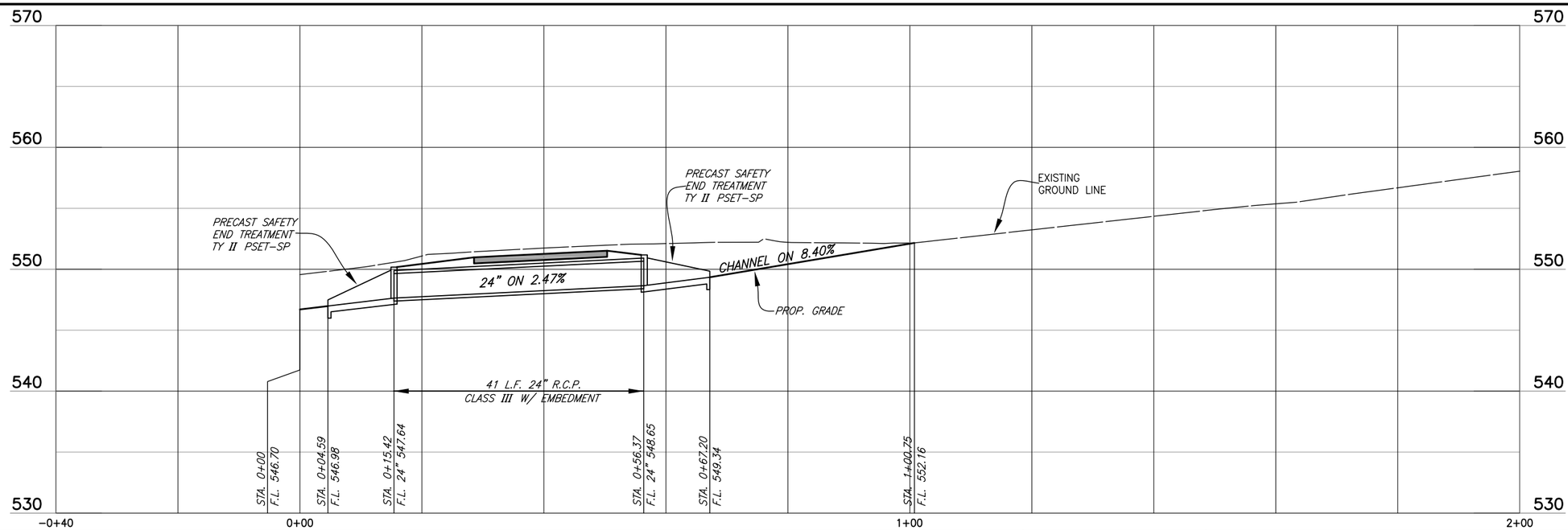
BY J.T.G. *DATE* 06/10/2020

CONTROL POINT #2
N 7087458.4120 , E 2559284.7100
60D NAIL S.W. CORNER OF
FORESTVIEW DR. & WINNINGKOFF RD.
CENTERLINE STA. 1+47.4, 7.5' RT.
ELEV. 553.39



⚠ CHANGE ORDER NO. 1 (12-12-17): ADDED S.E.T.	These plans and related specifications were prepared for construction of this specific project only. Reuse of these documents is not permitted without written authorization of Birkhoff, Hendricks & Carter, L.L.P. If this drawing is converted to an electronic file, if any discrepancy occurs between the electronic file and the Birkhoff, Hendricks & Carter, L.L.P. original document, the original document will govern in all cases.	**BIRKHOFF, HENDRICKS & CARTER, L.L.P.** PROFESSIONAL ENGINEERS TBPE Firm No. 526; TBPLS Firm No. 10031800 11910 Greenville Ave., Suite 600 Dallas, Texas 75243 (214) 361-7900	STATE OF TEXAS JOSEPH T. GRAJEWSKI, III 104984 LICENSED PROFESSIONAL ENGINEER	12|12|17	**CITY LUCAS, TEXAS** **WINNINGKOFF ROAD** **REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS** **EXISTING 2-24" CULVERT EXTENSION - PLAN/PROFILES**	BHC PROJECT NO. 2016-108 June, 2020	SHEET NO. **10 A**





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BY J.T.G. DATE 06/10/2020

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CITY LUCAS, TEXAS

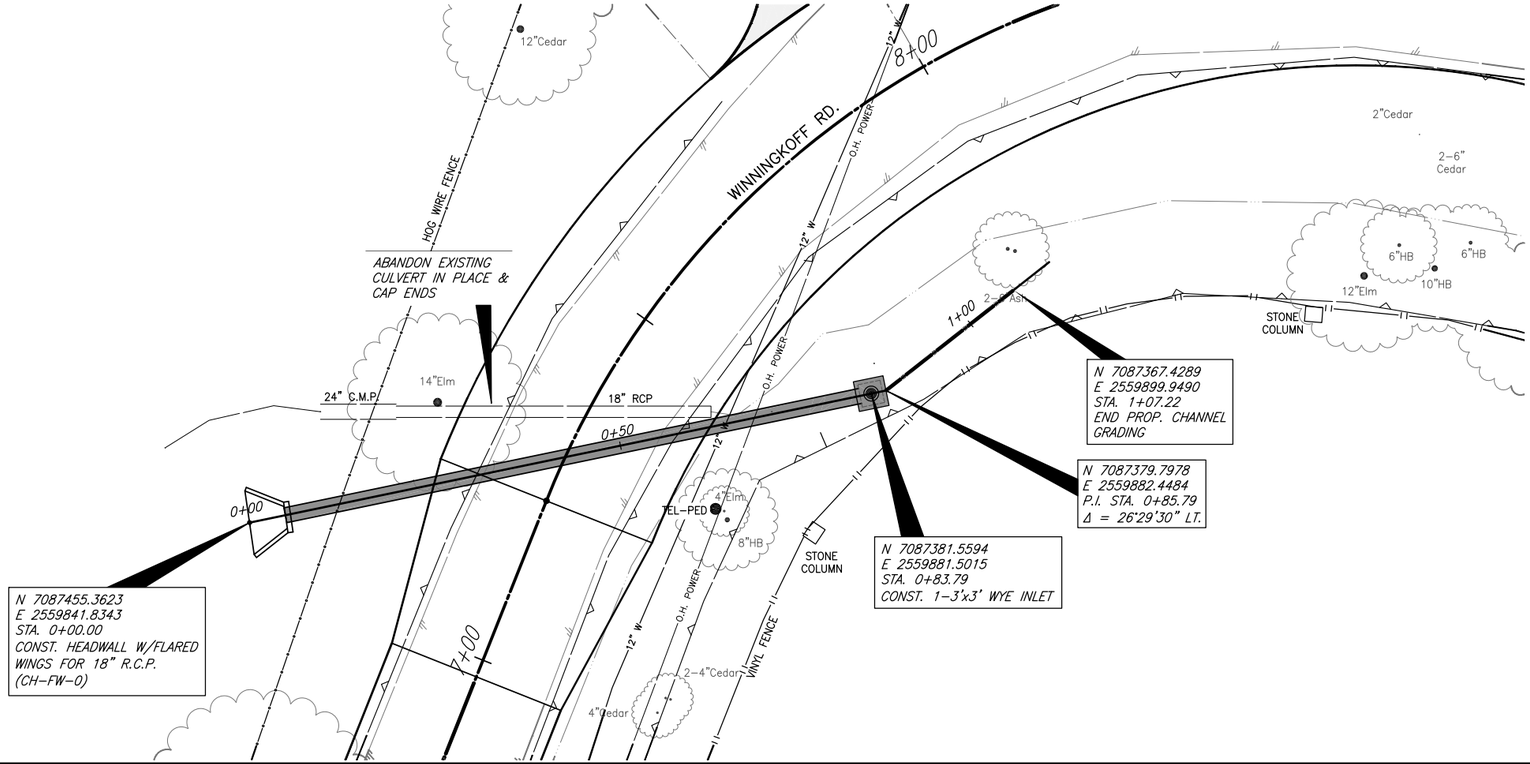
WINNINGKOFF ROAD

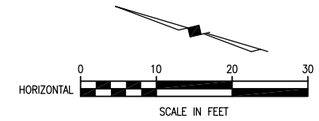
REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
PROPOSED 24" CULVERT REPLACEMENT - PLAN/PROFILE

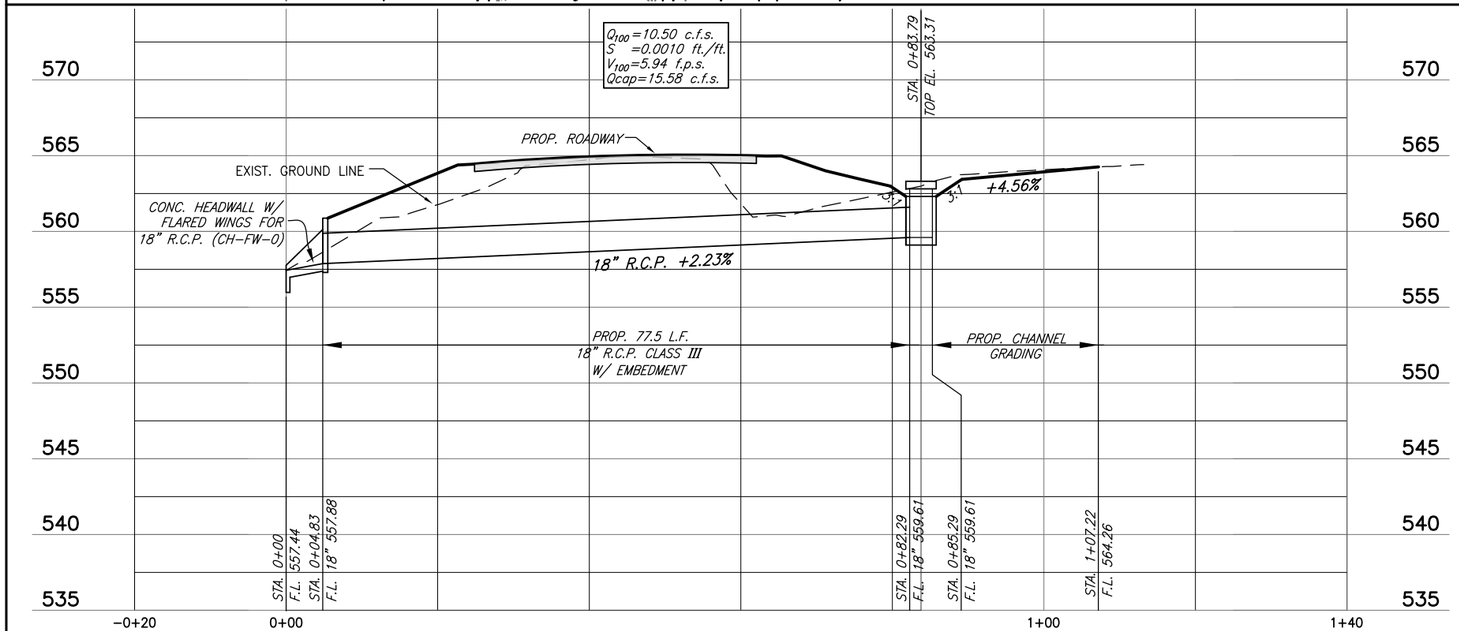
BHC PROJECT NO. 2016-108

June, 2020

SHEET NO. 11







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BY J.T.C. *DATE* 06/10/2020

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WINNINGKOFF ROAD

REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
EXISTING 24" & 18" CULVERT REPLACEMENT - PLAN/PROFILES

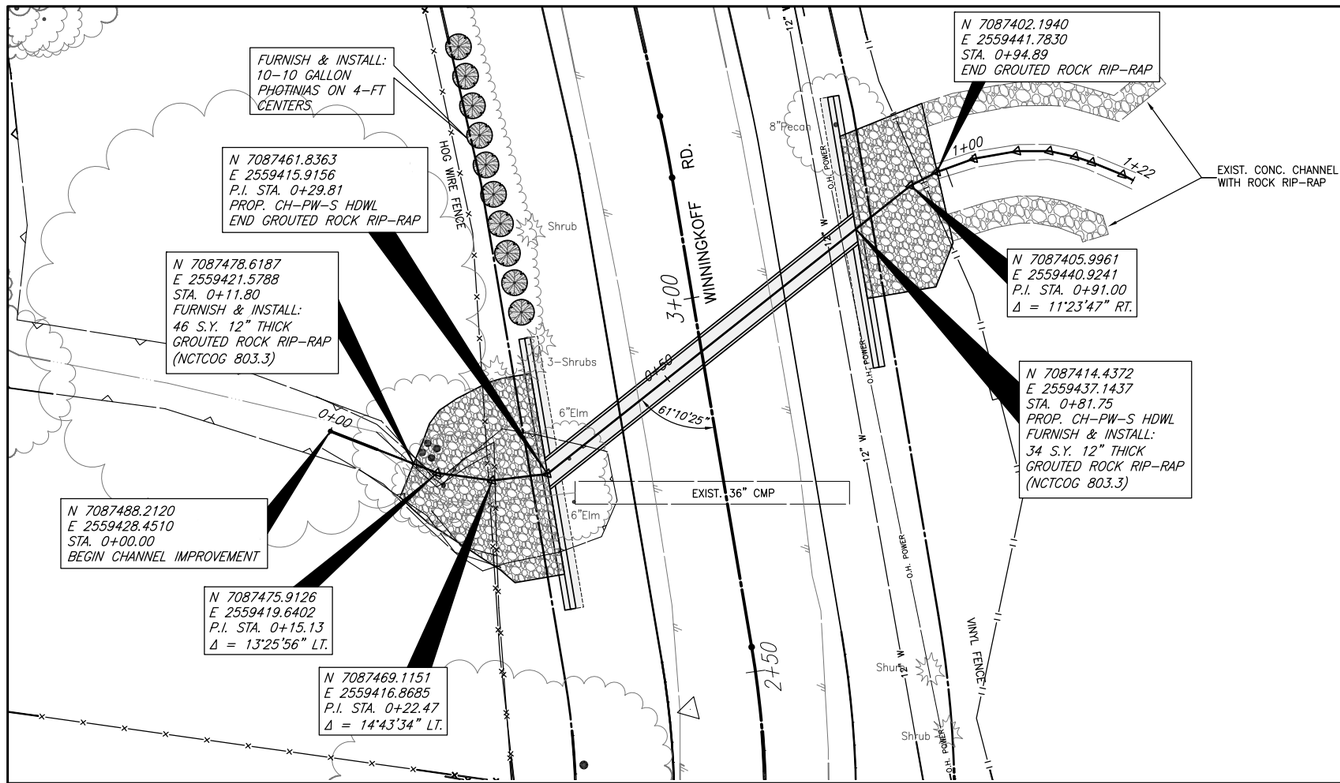
BHC PROJECT NO. 2016-108

June, 2020

SHEET NO. **12**

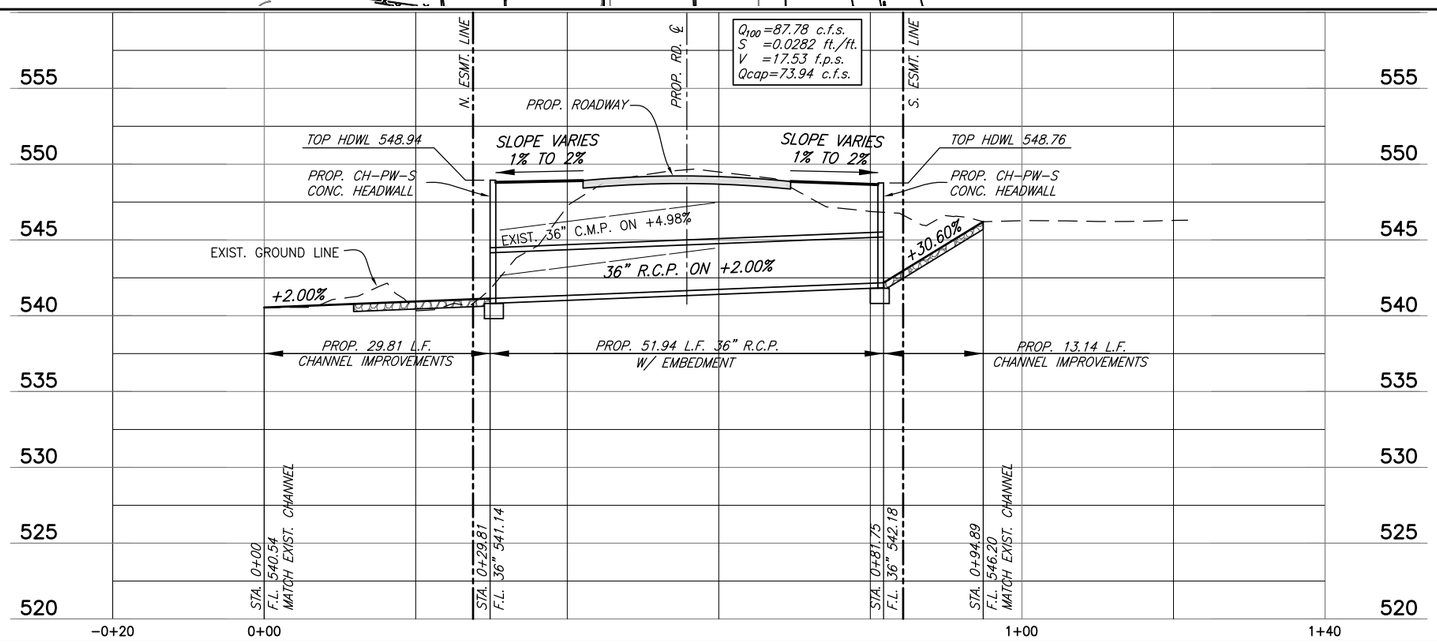
REVISED: 6/10/20 – TVASQUEZ

H:\Projects\Lucas\2016108 Winningkoff Road\Sheets\12-Winningkoff 18-24 Culvert P-P.dwg PLOT SCALE: 1:2 PLOT STYLE: 11x17.ctb PLOTTED BY: TROY VASQUEZ ON 6/10/2020



0 10 20 30
HORIZONTAL
SCALE IN FEET

CONTROL POINT #2
N 7087458.4120 , E 2559284.7100
60D NAIL S.W. CORNER OF
FORESTVIEW DR. & WINNINGKOFF RD.
CENTERLINE STA. 1+47.4, 7.5' RT.
ELEV. 553.39



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BY J.T.G. DATE 06/10/2020

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CITY LUCAS, TEXAS

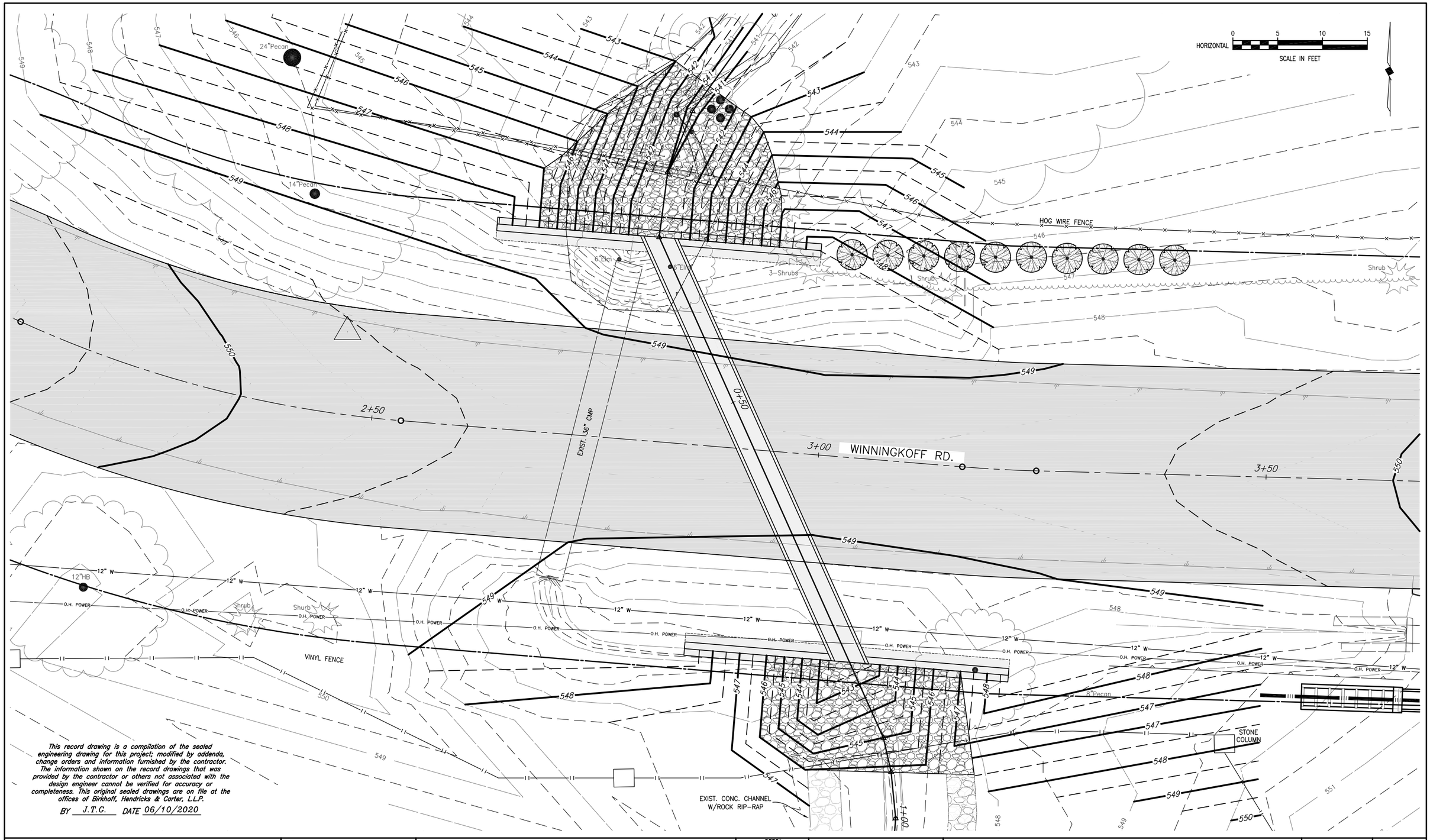
WINNINGKOFF ROAD

REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
PROPOSED 36" CULVERT WITH HEADWALLS - PLAN/PROFILE

BHC PROJECT NO. 2016-108

June, 2020

SHEET NO. 13



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WINNINGKOFF ROAD

REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
PROPOSED 36" CULVERT GRADING PLAN

BHC PROJECT NO. 2016-108

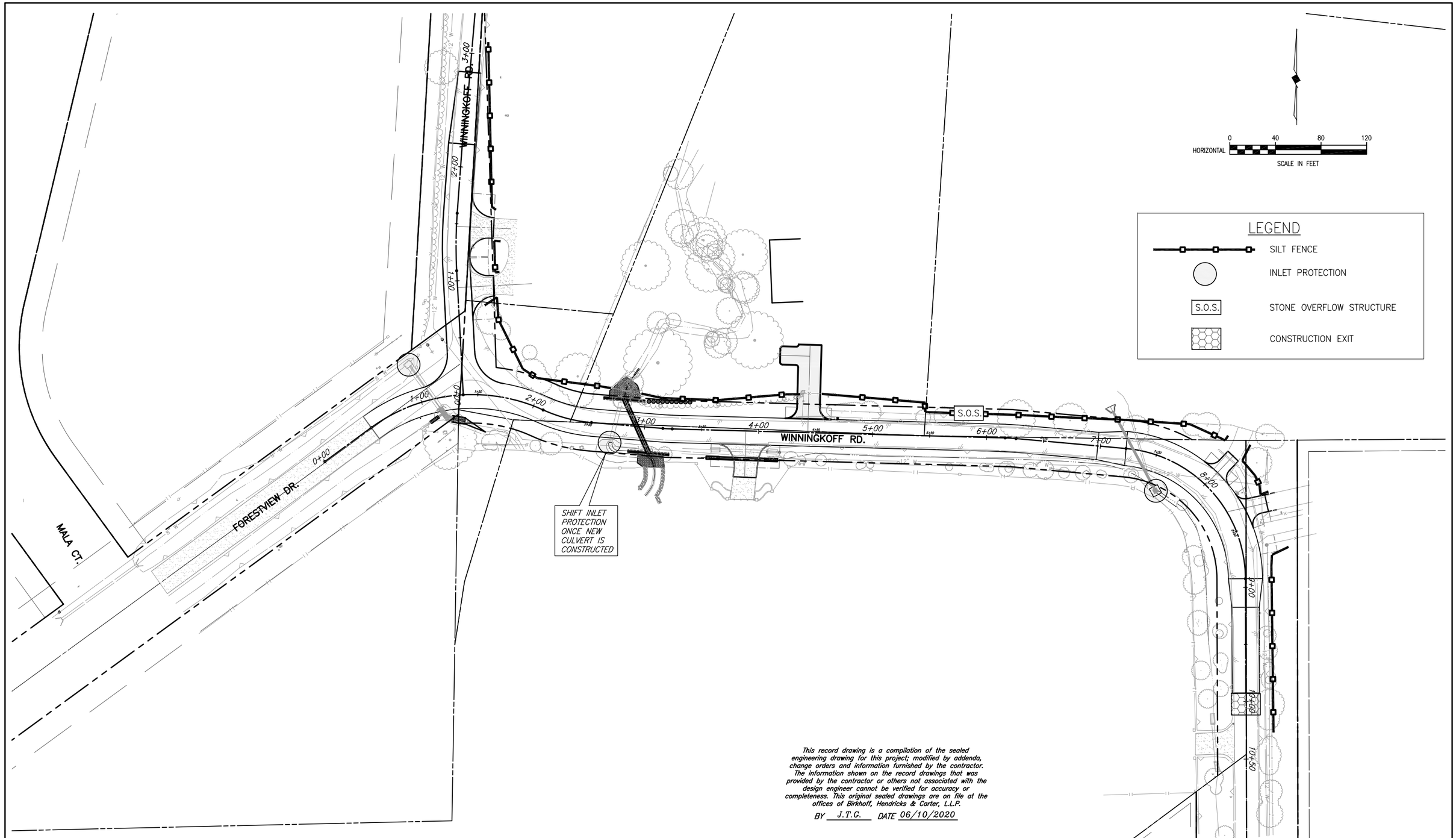
June, 2020

SHEET NO. **14**

REVISED: 6/10/20 – TVASQUEZ

H:\Projects\Lucas\2016108 Winningkoff Road\Sheets\14-Winningkoff 36 Culv Cont Plan.dwg

PLOT SCALE: 1:2 PLOT STYLE: 11x17.ctb PLOTTED BY: TROY VASQUEZ ON 6/10/2020



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BY J.T.C. *DATE* 06/10/2020

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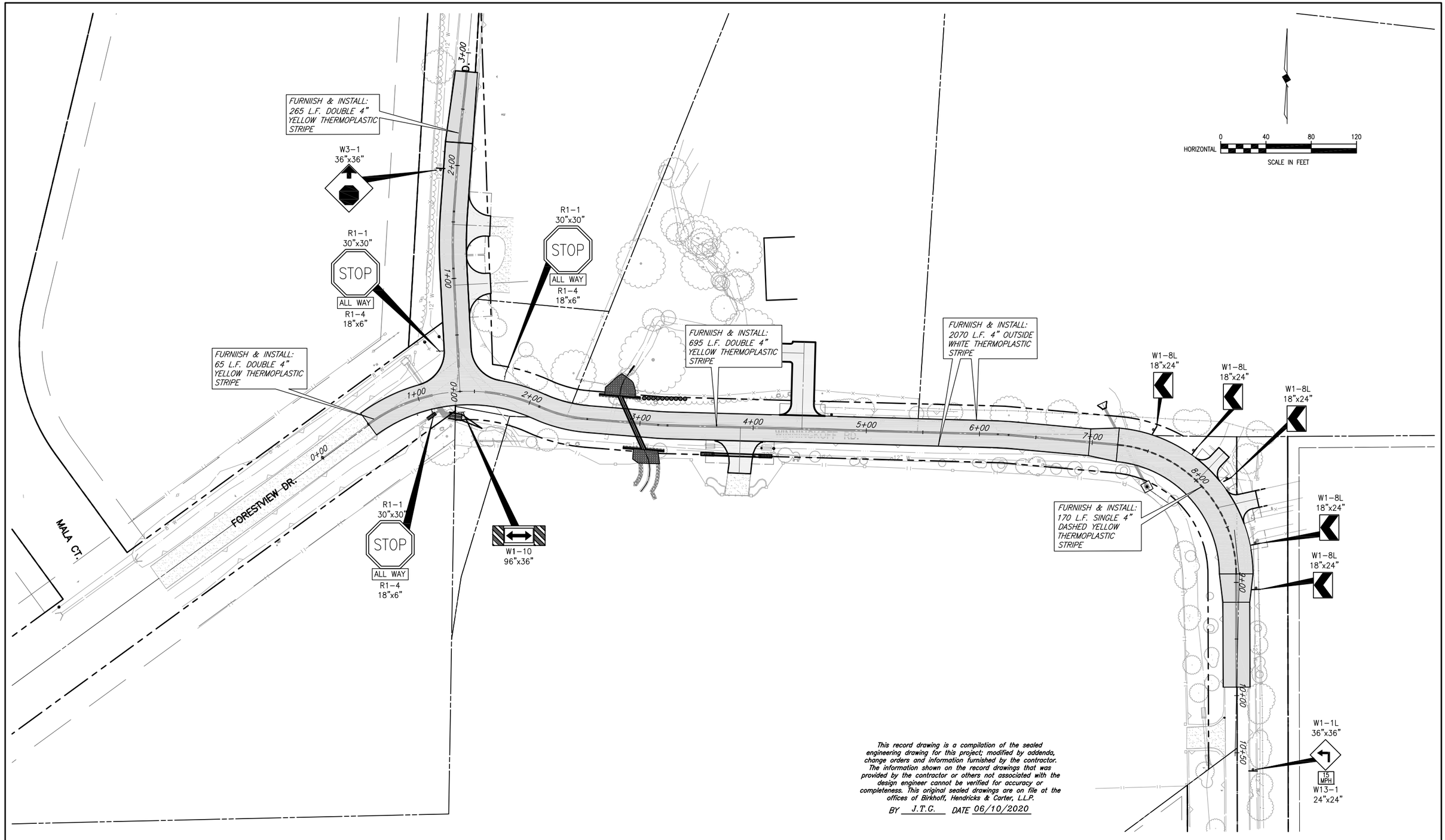
WINNINGKOFF ROAD

REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
EROSION CONTROL PLAN

BHC PROJECT NO. 2016-108

June, 2020

SHEET NO. **15**



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WINNINGKOFF ROAD

REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
STRIPING & SIGNAGE PLAN

BHC PROJECT NO. 2016-108

June, 2020

SHEET NO. **16**

REVISED: 6/10/20 – TVASQUEZ

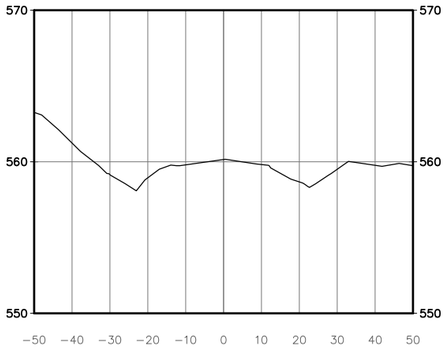
H:\Projects\Lucas\2016108 Winningkoff Road\Sheets\15-Paving Markings-01.dwg

PLOT SCALE: 1:2

PLOT STYLE: 11x17.ctb

PLOTTED BY: TROY VASQUEZ ON 6/10/2020

0+00.00



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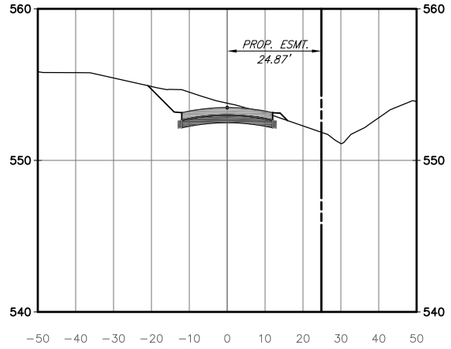

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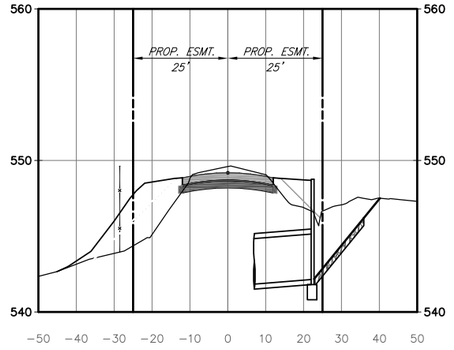
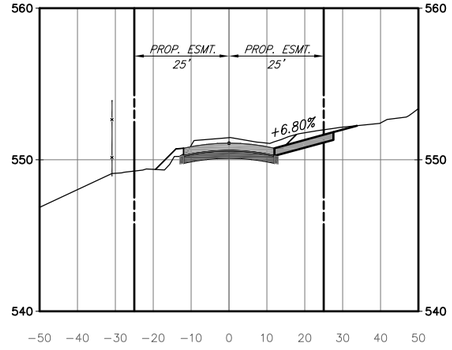


4+00.00



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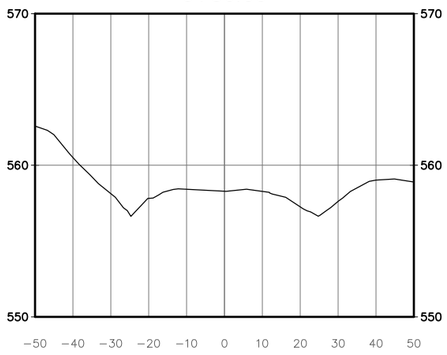
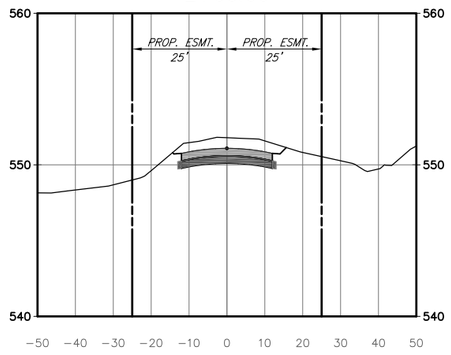


2+00.00



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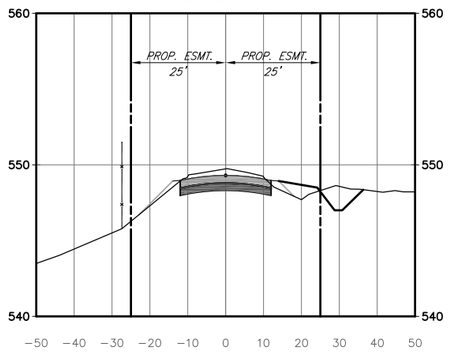
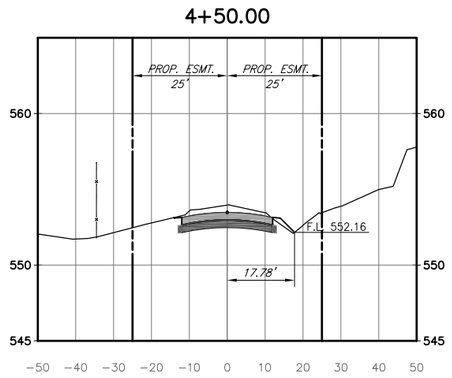


4+50.00



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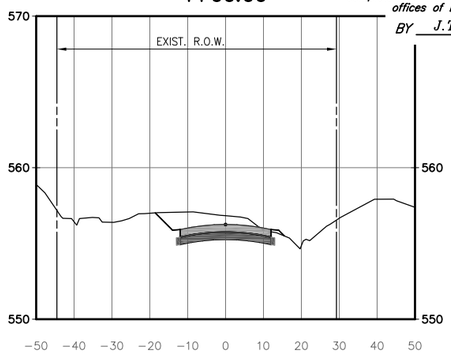

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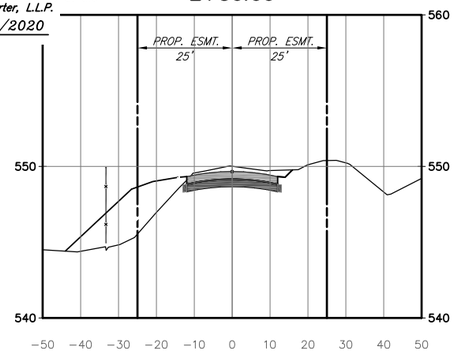
BY J.T.C. *DATE* 06/10/2020

2+50.00



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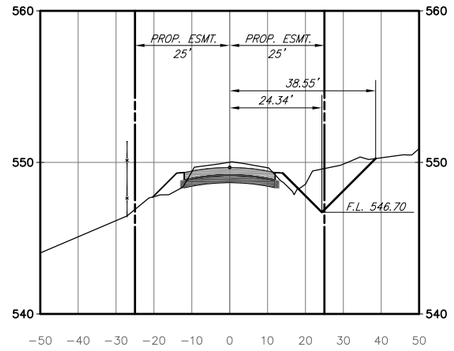

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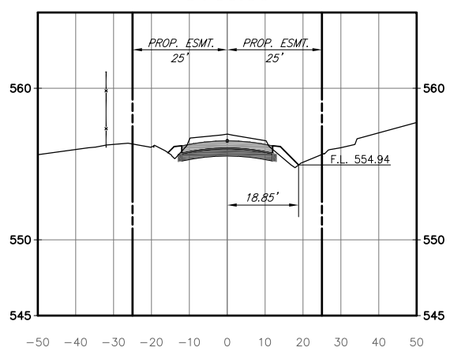

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8/9/17

CITY LUCAS, TEXAS

WINNINGKOFF ROAD

REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
WINNINGKOFF ROAD E-W CROSS SECTIONS
STA. 0+00 TO STA. 5+00

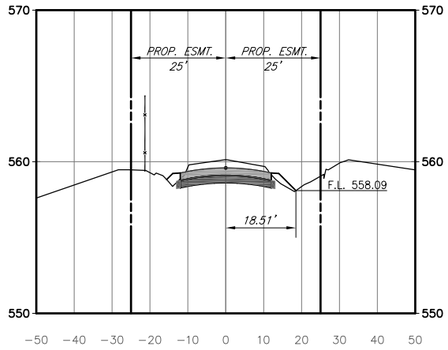
BHC PROJECT NO. 2016-108

June, 2020

SHEET NO. **17**

REVISED: 6/10/20 – TVASQUEZ H:\Projects\Lucas\2016108 Winningkoff Road\Base Drawings\Civil3D\2016108 Civil 3D.dwg PLOT SCALE: 1:2 PLOT STYLE: 11x17.ctb PLOTTED BY: TROY VASQUEZ ON 6/10/2020

5+50.00



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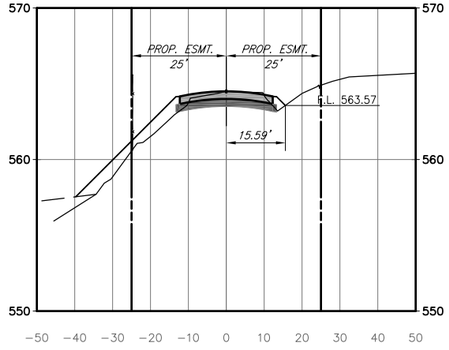

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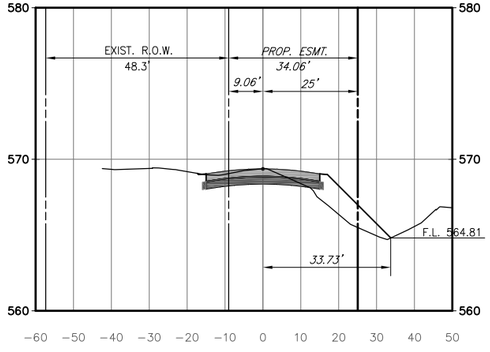
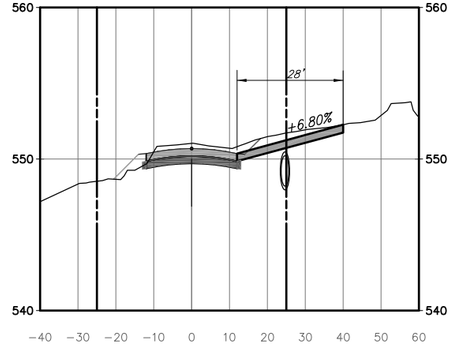


THOMPSON DRIVEWAY
3+88.82



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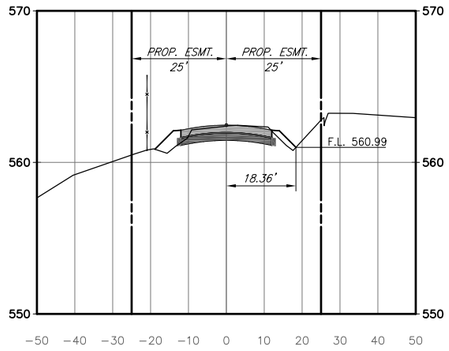

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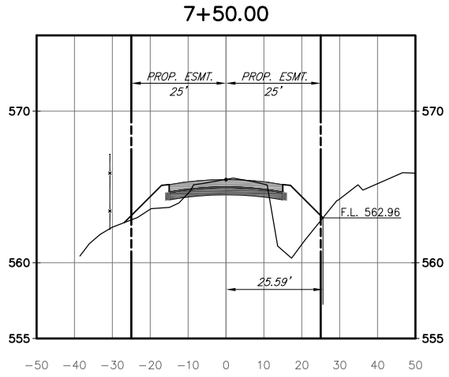
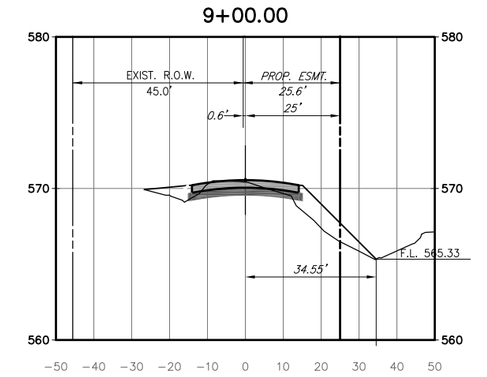
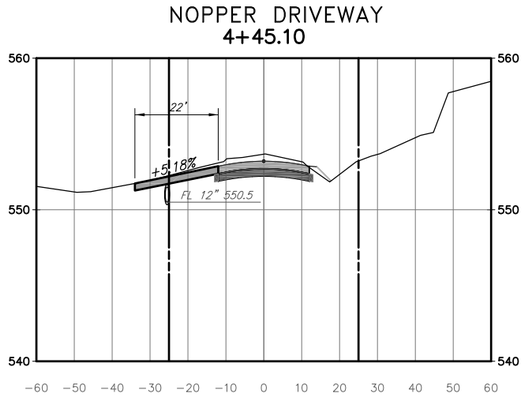


9+00.00



NOPPER DRIVEWAY
4+45.10



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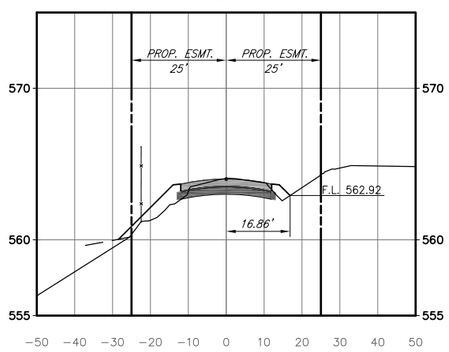

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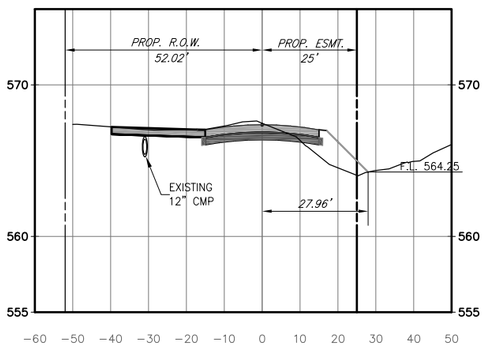

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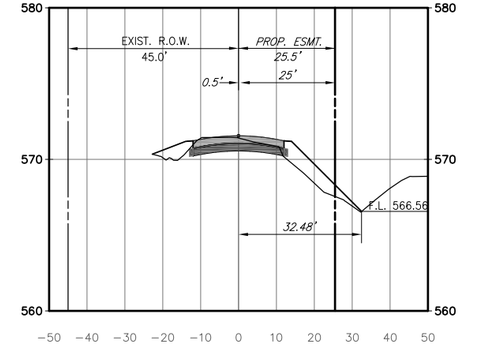

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BY J.T.G. *DATE* 06/10/2020

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8/9/17

CITY LUCAS, TEXAS

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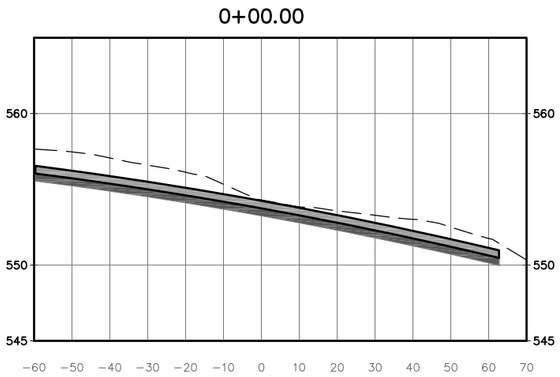
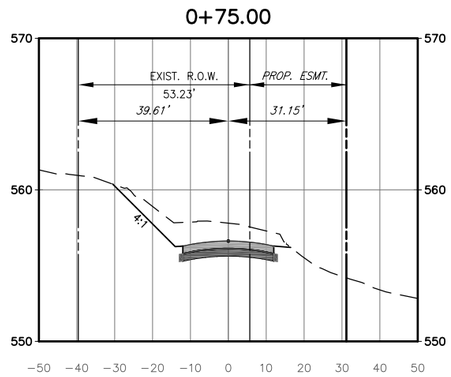
WINNINGKOFF ROAD E-W CROSS SECTIONS
STA. 5+50 TO STA. 9+50 & DRIVEWAYS

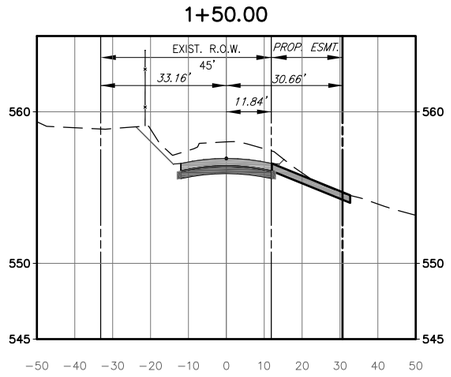
BHC PROJECT NO. 2016-108

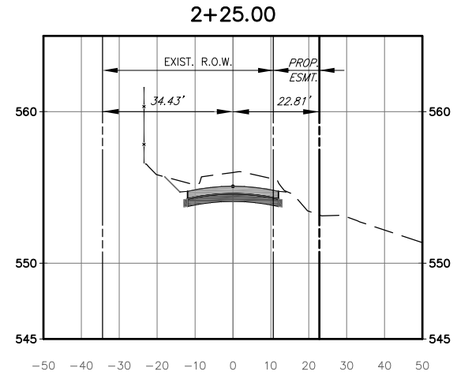
June, 2020

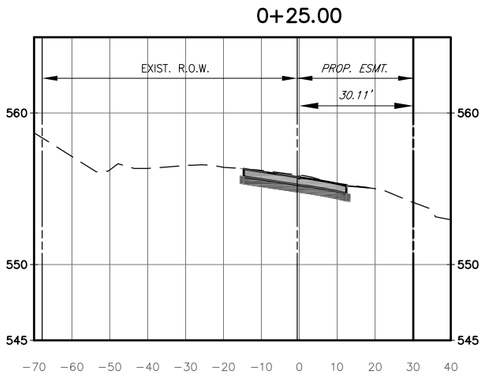
SHEET NO. **18**

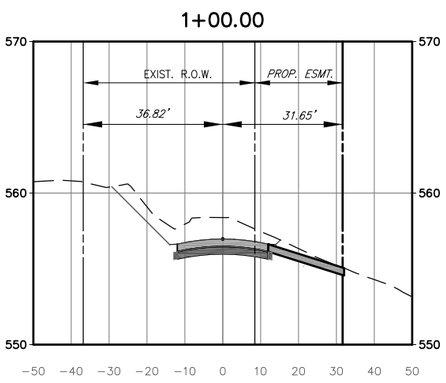


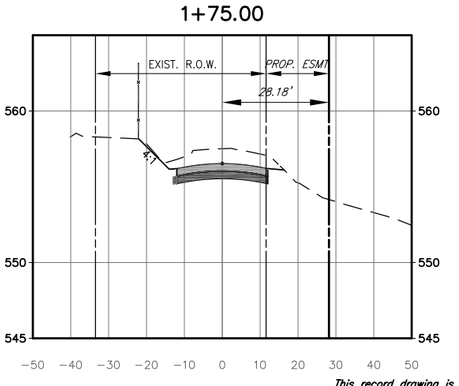


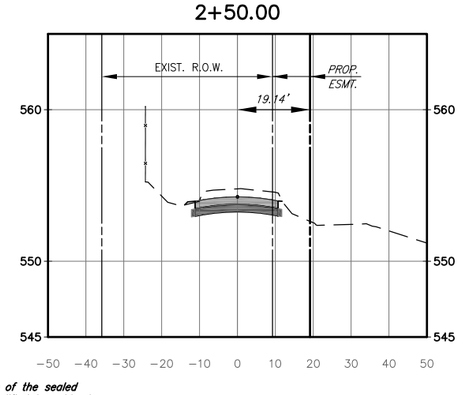


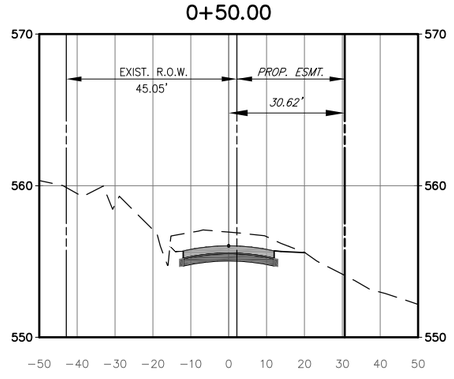


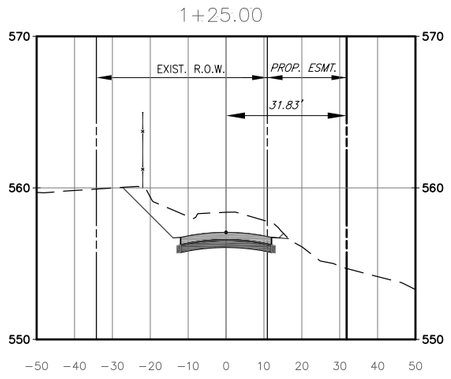


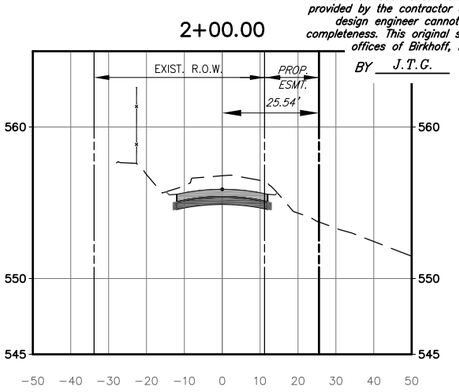


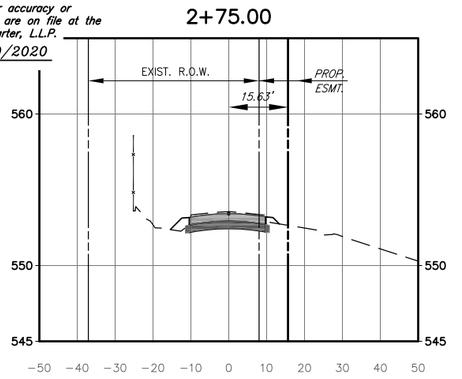












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BY J.T.G. *DATE* 06/10/2020

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8/9/17

CITY LUCAS, TEXAS

WINNINGKOFF ROAD

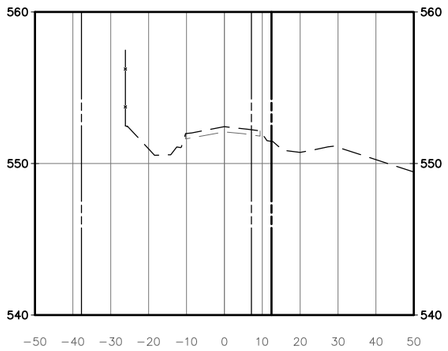
REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
WINNINGKOFF ROAD N CROSS SECTIONS
STA. 0+00 TO STA. 2+75

BHC PROJECT NO. 2016-108

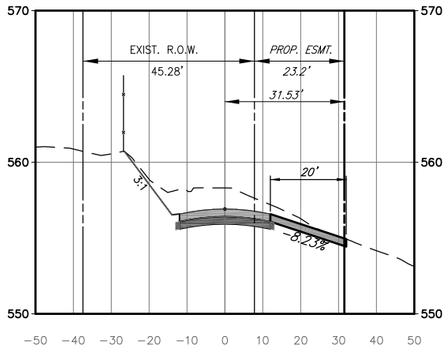
June, 2020

SHEET NO. **19**

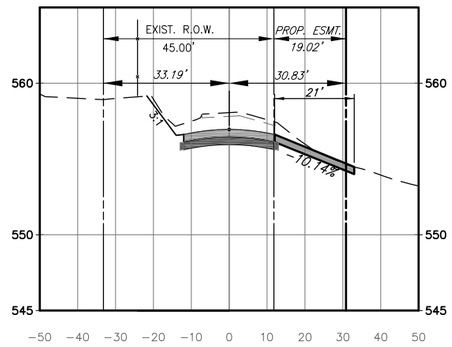
3+00.00



STREBECK S. DRIVEWAY
0+94.06



STREBECK N. DRIVEWAY
1+47.73



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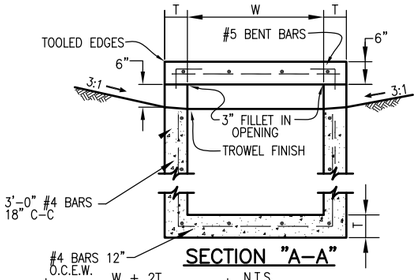
WINNINGKOFF ROAD N CROSS SECTIONS
STA. 3+00 & DRIVEWAYS

BHC PROJECT NO. 2016-108

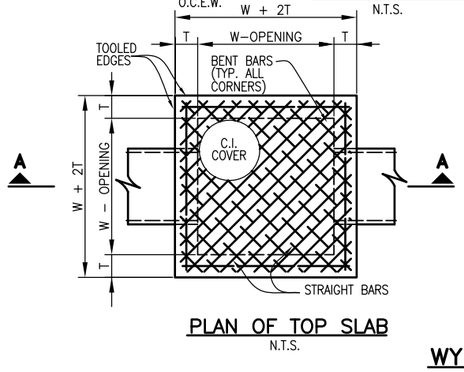
June, 2020

SHEET NO. **20**



SECTION "A–A"

N.T.S.



PLAN OF TOP SLAB

N.T.S.

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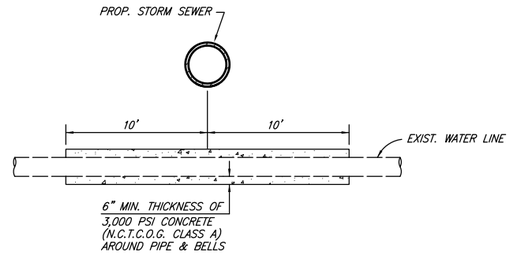
BY J.T.C. DATE 06/10/2020

NOTES

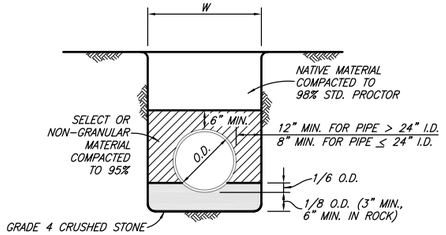
1. MATERIAL AND WORKMANSHIP SHALL CONFORM WITH THE REQUIREMENTS OF NCTCOG STANDARD SPECIFICATIONS FOR STANDARD CONCRETE MANHOLES, MINIMUM CLASS "A" CONCRETE.
2. LAYERS OF REINFORCING STEEL NEAREST THE INTERIOR AND EXTERIOR SURFACES SHALL HAVE A COVER OF 2" TO THE CENTER BARS, UNLESS OTHERWISE NOTED.
3. DEPTH OF DROP INLET FROM FINISHED GRADE TO FLOW LINE OF INLET IS VARIABLE. APPROXIMATE DEPTH WILL BE SHOWN ON PLANS AT LOCATION OF INLET.
4. ALL STANDARD DROP INLETS SHALL HAVE ONE OPENING ON EACH SIDE UNLESS OTHERWISE SHOWN ON PLANS.

INLET SIZE	T	W
2' SQUARE	7"	2'–0"
3' SQUARE	7"	3'–0"
4' SQUARE	7"	4'–0"
5' SQUARE	8"	5'–0"
6' SQUARE	9"	6'–0"

WYE INLET DETAILS

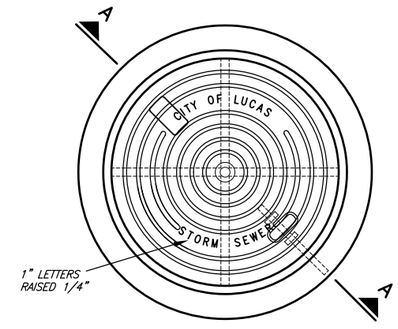


WATER LINE ENCASEMENT



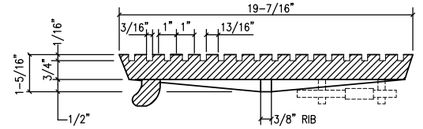
CLASS C EMBEDMENT

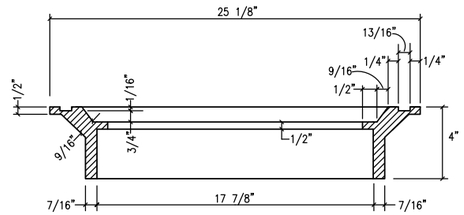
STD. STORM SEWER



NOTE: MANHOLE COVER TO INCLUDE LOCKING DEVICE

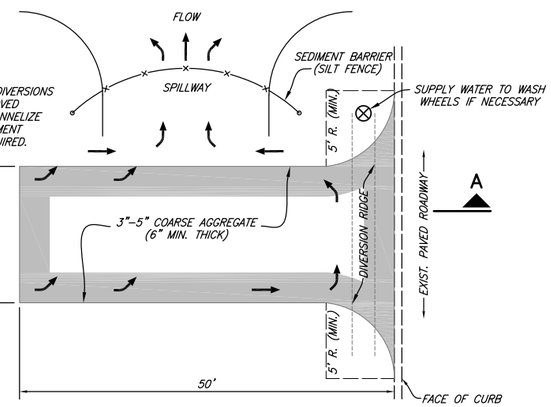
PLAN OF COVER





SECTION OF FRAME AND COVER SECTION A–A
INLET FRAME AND COVER

BASS & HAYS COVER 55#, FRAME 45# OR EQUAL

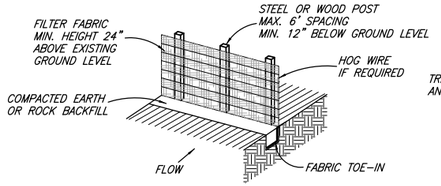


SECTION A–A

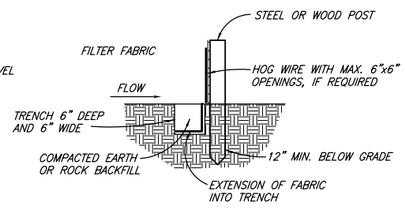
PLAN

CONSTRUCTION EXIT ROAD FOR EROSION CONTROL

NO SCALE

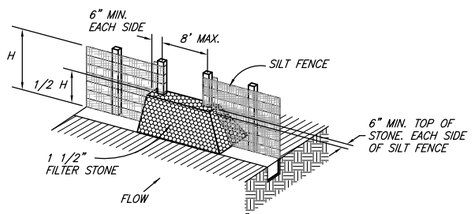


ISOMETRIC VIEW



SECTION VIEW

SILT FENCE DETAIL



STONE OVERFLOW STRUCTURE

LOCATION AS CALLED FOR IN PLANS

NOTES:

1) THE CONTRACTOR SHALL INSPECT SILT FENCE WEEKLY AND AFTER MAJOR RAIN EVENTS TO ENSURE THAT THE DEVICE IS FUNCTIONING PROPERLY AND MAINTAIN IN ACCORDANCE WITH NCTCOG.

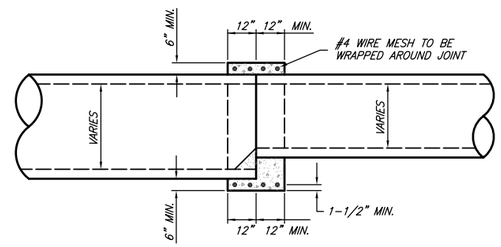
2) THE CONTRACTOR SHALL REMOVE SEDIMENT FROM BEHIND FENCE WHEN THE DEPTH OF SEDIMENT HAS BUILT UP TO ONE–THIRD THE HEIGHT OF THE FENCE ABOVE GRADE.

3) THE CONTRACTOR SHALL INSPECT THE BASE OF THE FENCE TO ENSURE THAT NO GAPS HAVE DEVELOPED AND RE–TRENCH AS NECESSARY.

4) THE CONTRACTOR SHALL INSPECT FENCE POSTS TO ENSURE THAT THEY ARE PROPERLY SUPPORTING THE FENCE. IF NECESSARY, THE CONTRACTOR SHALL RESET AND ADD POSTS.

5) IF FILTER FABRIC IS RIPPED, DAMAGED OR DETERIORATED, THE CONTRACTOR SHALL REPLACE IT IN ACCORDANCE WITH THE ORIGINAL SPECIFICATIONS AND DETAILS. (MAINTENANCE OF THE SILT FENCE SHALL BE AT THE CONTRACTORS OWN EXPENSE)

EROSION CONTROL



DETAIL OF CONCRETE COLLAR FOR R.C.P. OR CONNECTIONS

INSIDE JOINT SHALL BE CONCRETE MORTAR

⚠ CHANGE ORDER NO. 1 (12–12–17): ADDED WATERLINE ENCASEMENT DETAIL

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STATE OF TEXAS — JOSEPH T. GRAJEWSKI, III — 104984 — LICENSED PROFESSIONAL ENGINEER

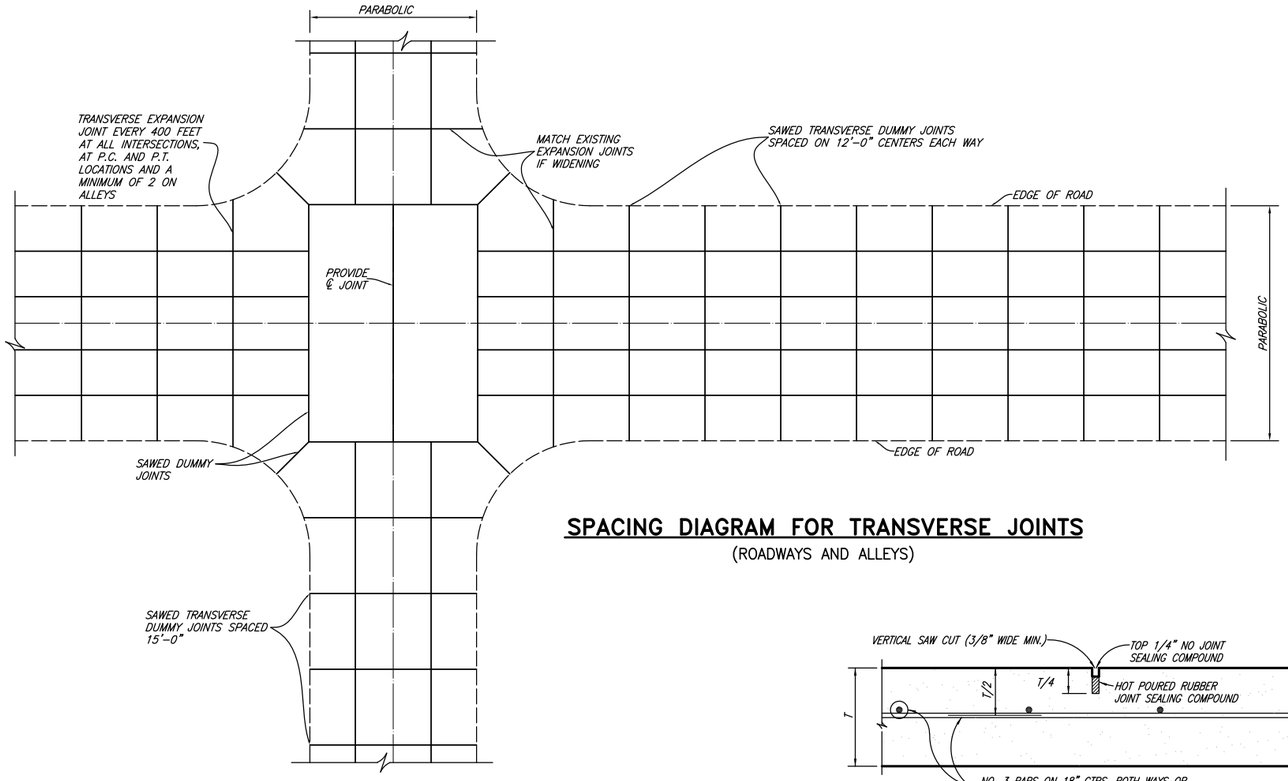
12|12|17

CITY LUCAS, TEXAS
WINNINGKOFF ROAD
REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
CONSTRUCTION DETAILS

BHC PROJECT NO. 2016-108

June, 2020

SHEET NO. **21A**

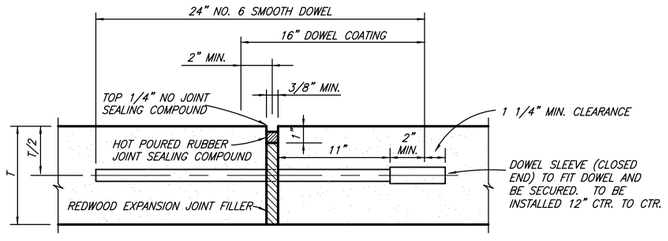


SPACING DIAGRAM FOR TRANSVERSE JOINTS

(ROADWAYS AND ALLEYS)

TRANSVERSE JOINTS SPACED 15 FT. C.-C. (MAX.)
LONGITUDINAL JOINTS SPACED 20 FT. C.-C. (MAX.)

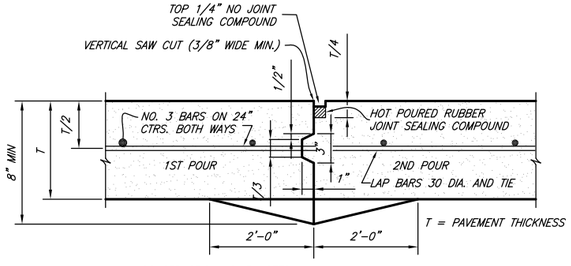
SAWED DUMMY JOINT



TRANSVERSE EXPANSION JOINT NOTES:

1. DOWELS AND REINFORCING BARS SHALL BE SUPPORTED BY AN APPROVED DEVICE.
2. TRANSVERSE EXPANSION JOINTS SHALL BE SPACED AT 400 FT. MAXIMUM AND AT ALL INTERSECTIONS.

TRANSVERSE EXPANSION JOINT

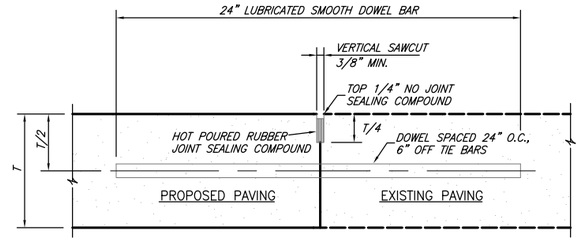


CONSTRUCTION JOINT NOTES:

1. CONTRACTOR SHALL PROTECT KEYWAY PRIOR TO SECOND POUR. IF LONGITUDINAL KEYWAY IS DAMAGED, CONTRACTOR SHALL REPAIR WITH THE USE OF LONGITUDINAL BUTT JOINT (DRILL DOWELS INTO FIRST POUR).
2. THICKENED EDGES ARE REQUIRED FOR FUTURE WIDENING ONLY.

CONSTRUCTION JOINT

NO SCALE



NOTE:

1. T-8" AND GREATER NO. 6 BAR, T-6" AND LESS NO. 5 BAR.
2. LONGITUDINAL BUTT CONSTRUCTION MAY BE UTILIZED IN PLACE OF LONGITUDINAL HINGED (KEYWAY) JOINT AT CONTRACTORS OPTION.
3. DOWEL BARS SHALL BE DRILLED INTO PAVEMENT HORIZONTALLY BY USE OF A MECHANICAL RIG. HAND DRILLING IS NOT ACCEPTABLE. PUSHING DOWEL BARS INTO GREEN CONCRETE IS NOT ACCEPTABLE. DAMAGE TO EXISTING PAVEMENT SHALL BE REMOVED BY CONTRACTOR AND JOINT CONSTRUCTED AT CONTRACTORS EXPENSE.
4. DOWEL BAR SHOWN IS IN ADDITION TO TIE BARS (12" O.C.-6" OFF DOWELS).
5. TIE BARS SHALL BE NO. 5 BAR DEFORMED. TIE BAR SHALL HAVE A LENGTH OF 24 INCHES.

LONGITUDINAL BUTT JOINT

This record drawing is a compilation of the sealed engineering drawing for this project; modified by addenda, change orders and information furnished by the contractor. The information shown on the record drawings that was provided by the contractor or others not associated with the design engineer cannot be verified for accuracy or completeness. This original sealed drawings are on file at the offices of Birkhoff, Hendricks & Carter, L.L.P.

BY J.T.G. DATE 06/10/2020

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STATE OF TEXAS — JOSEPH T. GRAJEWSKI, III — 104984 — LICENSED PROFESSIONAL ENGINEER

8/9/17

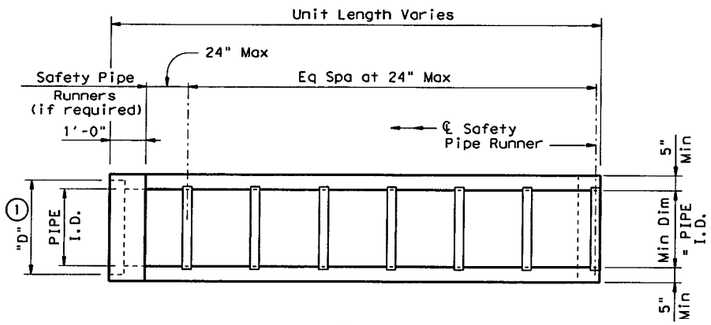
CITY LUCAS, TEXAS
WINNINGKOFF ROAD
REVERSE CURVE-PAVING & DRAINAGE IMPROVEMENTS
CONSTRUCTION DETAILS

BHC PROJECT NO. 2016-108

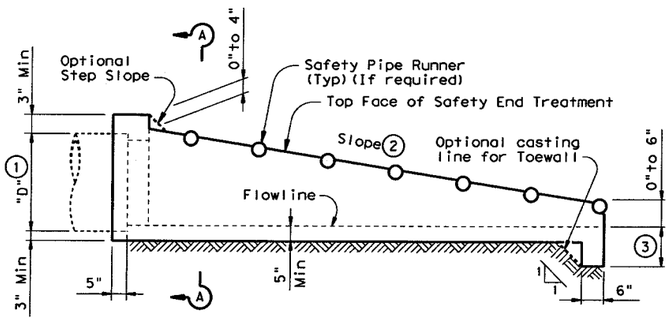
June, 2020

SHEET NO. 22

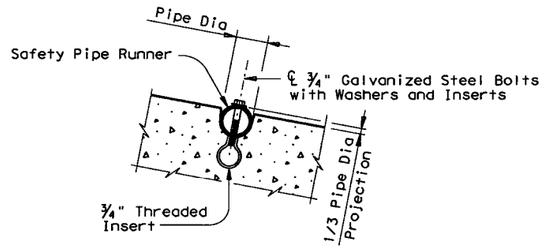
DATE:
FILE:



PLAN

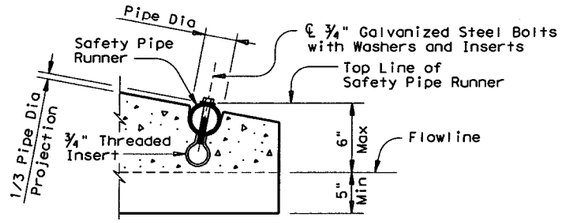


LONGITUDINAL ELEVATION

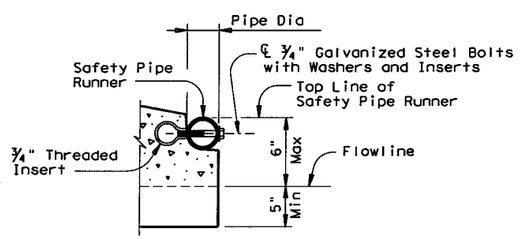


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



OPTION A



OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

PIPE I.D.	PIPE WALL "B" THICKNESS	(1) "D"	MAXIMUM SLOPE	MINIMUM LENGTH OF UNIT	PIPE RUNNERS REQUIRED		REQUIRED PIPE RUNNER SIZES		
					SINGLE PIPE	MULTIPLE PIPE	NOMINAL DIA.	O.D.	I.D.
12"	2"	17"	6:1	4'-9"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
15"	2 ¼"	20 ½"	6:1	6'-5"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
18"	2 ½"	24"	6:1	8'-0"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
24"	3"	31"	6:1	11'-3"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
30"	3 ½"	38 ½"	6:1	14'-8"	No	Yes	4" STD	4.500"	4.026"
36"	4"	45 ½"	6:1	17'-11"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	52 ½"	6:1	21'-2"	Yes	Yes	4" STD	4.500"	4.026"

(1) Dimension "D" is based on ASTM C-76, Class III, Wall "B" thickness. If any other wall thickness is used, dimension "D" must be adjusted accordingly.

(2) Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) The top 4" of void between Precast End Treatments shall be filled with concrete Riprap and shall be considered subsidiary to Safety End Treatment.

(5) Clear distance between pipes shall be adjusted to provide for the minimum distance between safety end treatments.

(6) Cement stabilized bedding and backfill shall be in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill shall be considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill shall be as directed by Engineer.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When Precast Safety End Treatment is used as a Contractor's alternate to mitered RCP, Riprap will not be required unless noted otherwise on the plans.

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Manufacture of this product shall conform to requirements of Item "Safety End Treatment" except as noted below :

A. Minimum reinforcing shall be #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6 x 6 - W12 x W12 or 5 x 5 - W10 x W10 welded wire reinforcement (WWR).

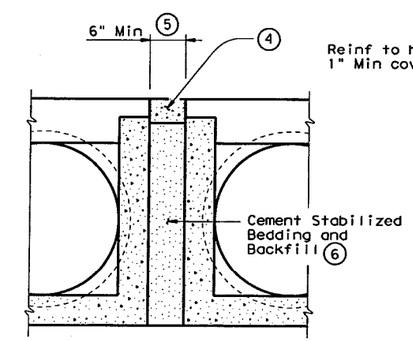
B. Concrete for precast (steel formed) sections shall be Class "C" with a minimum compressive strength of 3600 psi.

At the option and expense of the Contractor the next larger size of Safety End Treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

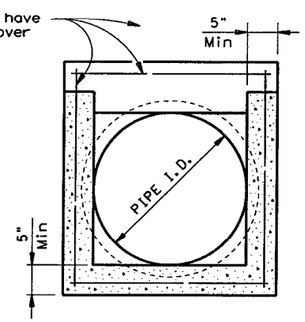
Pipe Runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Pipe Runners shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

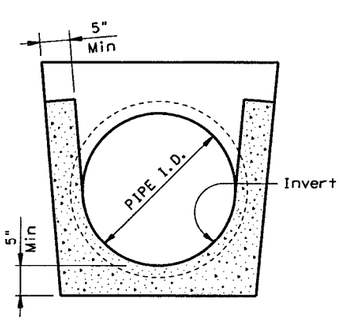
All steel components except reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.



MULTIPLE PIPE INSTALLATION

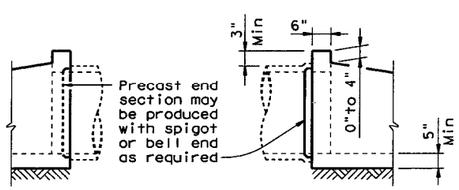


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



OPTIONAL JOINT

(Showing joint between RCP and Precast Safety End Treatment)

23

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ PARALLEL DRAINAGE

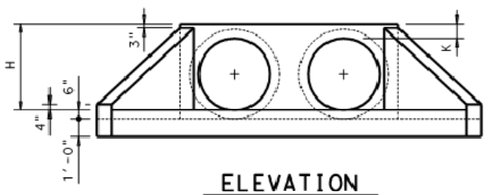
PSET-SP

FILE: psetspss.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO

DATE:
FILE:

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (4)

SLOPE	DIA OF PIPE, D	Values for one Pipe: W	X	Y	L	Reinf (Lbs)	Conc (CY) (1)	Values to be added for each addt'l Pipe: X and W	Reinf (Lbs)	Conc (CY) (1)
2:1	12"	4'- 7 1/2"	2'- 6"	2'-10"	3'- 3 1/4"	84	0.6	1'- 9"	20	0.2
	15"	5'- 5 3/4"	2'- 9 1/2"	3'- 4"	3'-10 1/4"	99	0.7	2'- 2"	24	0.3
	18"	6'- 4 1/4"	3'- 1"	3'-10"	4'- 5"	120	0.9	2'- 8"	32	0.3
	21"	7'- 2 3/4"	3'- 4 1/2"	4'- 4"	5'- 0"	137	1.1	3'- 1"	43	0.4
	24"	8'- 2 1/2"	3'- 9 1/2"	4'-10"	5'- 7"	158	1.3	3'- 7"	50	0.5
	27"	9'- 1"	4'- 1"	5'- 4"	6'- 2"	173	1.5	3'-11"	56	0.6
	30"	9'-11 1/2"	4'- 4 1/2"	5'-10"	6'- 8 3/4"	197	1.7	4'- 4"	65	0.8
	33"	10'-10"	4'- 8"	6'- 4"	7'- 3 3/4"	216	2.0	4'- 8"	71	0.9
	36"	11'- 8 1/4"	4'-11 1/2"	6'-10"	7'-10 3/4"	241	2.2	5'- 1"	81	1.0
	42"	13'- 5 1/4"	5'- 6 1/2"	7'-10"	9'- 0 1/2"	290	2.8	5'-10"	97	1.3
	48"	15'- 9"	6'- 1 1/2"	9'- 4"	10'- 9 1/4"	350	3.8	6'- 7"	117	1.7
	54"	17'- 5 3/4"	6'- 8 1/2"	10'- 4"	11'-11 1/4"	415	4.5	7'- 6"	151	2.1
	60"	19'- 2 3/4"	7'- 3 1/2"	11'- 4"	13'- 1"	469	5.3	8'- 3"	174	2.5
	66"	20'-11 1/2"	7'-10 1/2"	12'- 4"	14'- 3"	530	6.2	8'- 9"	194	2.9
	72"	22'- 8 1/2"	8'- 5 1/2"	13'- 4"	15'- 4 3/4"	587	7.1	9'- 4"	213	3.3
3:1	12"	6'- 3"	2'- 6"	4'- 3"	4'-11"	114	0.8	1'- 9"	22	0.2
	15"	7'- 5"	2'- 9 1/2"	5'- 0"	5'- 9 1/4"	133	1.1	2'- 2"	28	0.3
	18"	8'- 6 3/4"	3'- 1"	5'- 9"	6'- 7 3/4"	166	1.3	2'- 8"	37	0.5
	21"	9'- 8 3/4"	3'- 4 1/2"	6'- 6"	7'- 6"	189	1.6	3'- 1"	48	0.6
	24"	11'- 0"	3'- 9 1/2"	7'- 3"	8'- 4 1/2"	221	2.0	3'- 7"	58	0.7
	27"	12'- 2"	4'- 1"	8'- 0"	9'- 2 3/4"	245	2.3	3'-11"	67	0.8
	30"	13'- 4"	4'- 4 1/2"	8'- 9"	10'- 1 1/4"	287	2.7	4'- 4"	77	1.0
	33"	14'- 5 3/4"	4'- 8"	9'- 6"	10'-11 3/4"	310	3.1	4'- 8"	84	1.2
	36"	15'- 7 3/4"	4'-11 1/2"	10'- 3"	11'-10"	343	3.5	5'- 1"	96	1.4
	42"	17'-11 1/2"	5'- 6 1/2"	11'- 9"	13'- 6 3/4"	424	4.5	5'-10"	119	1.7
	48"	21'- 1 3/4"	6'- 1 1/2"	14'- 0"	16'- 2"	527	6.1	6'- 7"	146	2.3
	54"	23'- 5 1/2"	6'- 8 1/2"	15'- 6"	17'-10 3/4"	618	7.3	7'- 6"	186	2.9
	60"	25'- 9 1/4"	7'- 3 1/2"	17'- 0"	19'- 7 1/2"	707	8.7	8'- 3"	219	3.4
	66"	28'- 1"	7'-10 1/2"	18'- 6"	21'- 4 1/4"	797	10.1	8'- 9"	242	3.9
	72"	30'- 4 3/4"	8'- 5 1/2"	20'- 0"	23'- 1 1/4"	910	11.7	9'- 4"	272	4.4
4:1	12"	7'-10 3/4"	2'- 6"	5'- 8"	6'- 6 1/2"	144	1.1	1'- 9"	24	0.3
	15"	9'- 4"	2'- 9 1/2"	6'- 8"	7'- 8 1/2"	177	1.5	2'- 2"	32	0.4
	18"	10'- 9 1/2"	3'- 1"	7'- 8"	8'-10 1/4"	217	1.9	2'- 8"	42	0.5
	21"	12'- 2 3/4"	3'- 4 1/2"	8'- 8"	10'- 0"	254	2.3	3'- 1"	57	0.7
	24"	13'- 9 1/2"	3'- 9 1/2"	9'- 8"	11'- 2"	295	2.8	3'- 7"	67	0.9
	27"	15'- 3"	4'- 1"	10'- 8"	12'- 3 3/4"	328	3.3	3'-11"	77	1.0
	30"	16'- 8 1/4"	4'- 4 1/2"	11'- 8"	13'- 5 3/4"	379	3.8	4'- 4"	89	1.3
	33"	18'- 1 3/4"	4'- 8"	12'- 8"	14'- 7 1/2"	417	4.5	4'- 8"	101	1.4
	36"	19'- 7"	4'-11 1/2"	13'- 8"	15'- 9 1/4"	464	5.1	5'-1"	115	1.7
	42"	22'- 5 3/4"	5'- 6 1/2"	15'- 8"	18'- 1"	575	6.5	5'-10"	141	2.1
	48"	26'- 6 1/4"	6'- 1 1/2"	18'- 8"	21'- 6 3/4"	720	8.9	6'- 7"	175	2.8
	54"	29'- 5"	6'- 8 1/2"	20'- 8"	23'-10 1/4"	863	10.7	7'- 6"	226	3.6
	60"	32'- 3 3/4"	7'- 3 1/2"	22'- 8"	26'- 2"	984	12.7	8'- 3"	264	4.3
	66"	35'- 2 1/2"	7'-10 1/2"	24'- 8"	28'- 5 3/4"	1126	14.9	8'- 9"	300	4.9
	72"	38'- 1 1/4"	8'- 5 1/2"	26'- 8"	30'- 9 1/2"	1283	17.3	9'- 4"	334	5.6
6:1	12"	11'- 2"	2'- 6"	8'- 6"	9'- 9 3/4"	220	1.9	1'- 9"	28	0.4
	15"	13'- 2 1/4"	2'- 9 1/2"	10'- 0"	11'- 6 1/2"	264	2.5	2'- 2"	37	0.5
	18"	15'- 2 1/2"	3'- 1"	11'- 6"	13'- 3 1/4"	326	3.2	2'- 8"	50	0.7
	21"	17'- 2 3/4"	3'- 4 1/2"	13'- 0"	15'- 0 1/4"	381	3.9	3'- 1"	69	0.9
	24"	19'- 4 1/2"	3'- 9 1/2"	14'- 6"	16'- 9"	447	4.8	3'- 7"	80	1.2
	27"	21'- 4 3/4"	4'- 1"	16'- 0"	18'- 5 3/4"	506	5.7	3'-11"	96	1.4
	30"	23'- 5 1/4"	4'- 4 1/2"	17'- 6"	20'- 2 1/2"	587	6.7	4'- 4"	110	1.7
	33"	25'- 5 1/2"	4'- 8"	19'- 0"	21'-11 1/4"	667	7.8	4'- 8"	127	2.0
	36"	27'- 5 3/4"	4'-11 1/2"	20'- 6"	23'- 8"	727	9.0	5'- 1"	144	2.3
	42"	31'- 6 1/4"	5'- 6 1/2"	23'- 6"	27'- 1 1/2"	914	11.5	5'-10"	179	3.0
	48"	37'- 3 1/2"	6'- 1 1/2"	28'- 0"	32'- 4"	1181	15.9	6'- 7"	231	4.0
	54"	41'- 4 1/4"	6'- 8 1/2"	31'- 0"	35'- 9 1/2"	1412	19.2	7'- 6"	300	5.0
	60"	45'- 4 3/4"	7'- 3 1/2"	34'- 0"	39'- 3"	1619	22.9	8'- 3"	353	6.0



ELEVATION
Showing dimensions

(1) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(2) For vehicle safety, curbs shall project no more than 3" above finished grade. Curb heights shall be reduced, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(3) Provide a 1'-0" footing as shown where required to maintain 4" Min cover for pipes.

(4) Quantities shown are for one structure end only (one headwall).

(5) Min Length = $6" + 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right)$

Max Length = $12 \times H - 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right) - 1"$

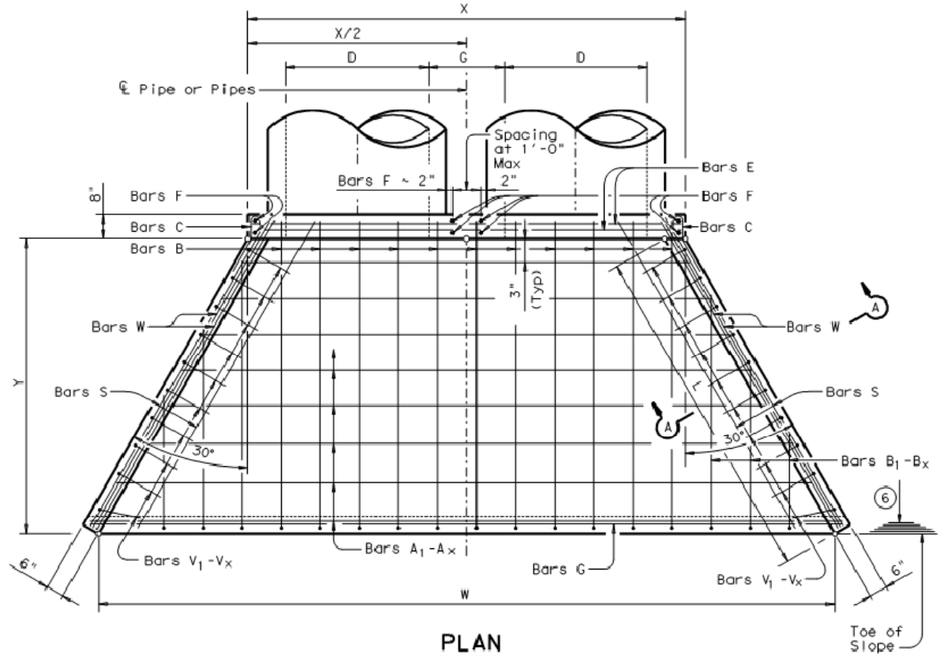
(6) Lengths of wings based on SL:1 Slope along this line.

TABLE OF REINFORCING STEEL (4)

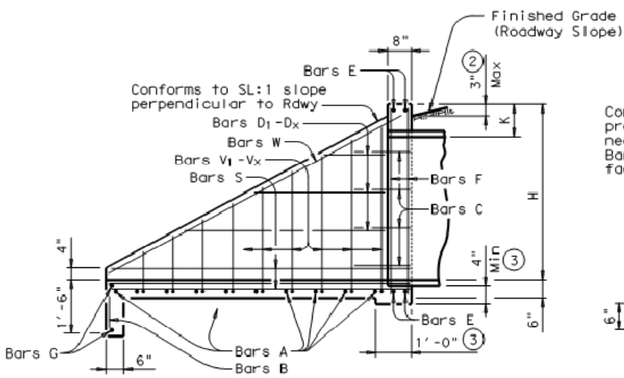
Bar	Size	Spa	No.
A	# 4	1'-0"	~
B	# 3	1'-6"	~
C	# 4	1'-0"	~
D	# 3	1'-0"	~
E	# 5	~	4
F	# 5	~	~
G	# 3	~	2
S	# 4	~	6
V	# 4	1'-0"	~
W	# 5	~	4

TABLE OF CONSTANT DIMENSIONS

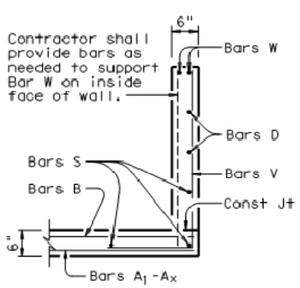
DIA OF PIPE, D	G	K	H
12"	9"	1'- 0"	2'- 0"
15"	11"	1'- 0"	2'- 3"
18"	1'- 2"	1'- 0"	2'- 6"
21"	1'- 4"	1'- 0"	2'- 9"
24"	1'- 7"	1'- 0"	3'- 0"
27"	1'- 8"	1'- 0"	3'- 3"
30"	1'-10"	1'- 0"	3'- 6"
33"	1'-11"	1'- 0"	3'- 9"
36"	2'- 1"	1'- 0"	4'- 0"
42"	2'- 4"	1'- 0"	4'- 6"
48"	2'- 7"	1'- 3"	5'- 3"
54"	3'- 0"	1'- 3"	5'- 9"
60"	3'- 3"	1'- 3"	6'- 3"
66"	3'- 3"	1'- 3"	6'- 9"
72"	3'- 4"	1'- 3"	7'- 3"



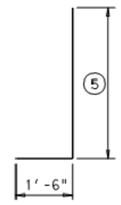
PLAN



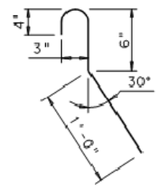
TYPICAL WING ELEVATION



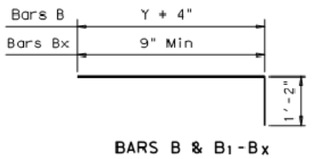
SECTION A-A



BARS V



BARS C
(2'-0" long)



BARS B & B_1-B_x

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Reinforcing steel shall be placed with the center of the outside layer of bars 2" from the surface of the concrete.

All reinforcing steel shall be Grade 60.

All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

No bridge rails of any type may be mounted directly to these culvert headwalls.

Texas Department of Transportation | Bridge Division Standard

CONCRETE HEADWALLS WITH FLARED WINGS FOR 0° SKEW PIPE CULVERTS

CH-FW-0

FILE: chfw00se.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.

REVISED: 12/11/17 – RLOWE

H:\Projects\Lucas\2016108 Winningkoff Road\Sheets\23-26-TxDot-Details.dwg

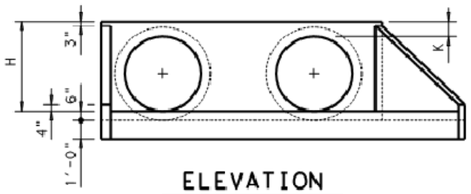
PLOT SCALE: 1:2

PLOT STYLE: 11x17.ctb

PLOTTED BY: TROY VASQUEZ ON 6/10/2020

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (4)

SLOPE	DIA OF PIPE, D	Values for one Pipe W	X	Y	L	Reinf (Lbs)	Conc (CY) (1)	Values to be added for each addt'l Pipe X and W	Reinf (Lbs)	Conc (CY) (1)
2:1	12"	3'- 3 1/2"	2'- 8 3/4"	2'-10"	3'- 3 1/4"	81	0.5	1'- 9 3/4"	20	0.2
	15"	3'-10 1/2"	3'- 0 1/4"	3'- 4"	3'-10 1/4"	93	0.6	2'- 3"	25	0.3
	18"	4'- 5 1/2"	3'- 4"	3'-10"	4'- 5"	115	0.8	2'- 9 1/4"	32	0.4
	21"	5'- 0 3/4"	3'- 7 1/2"	4'- 4"	5'- 0"	128	0.9	3'- 2 1/4"	43	0.5
	24"	5'- 9 1/4"	4'- 0 3/4"	4'-10"	5'- 7"	148	1.1	3'- 8 1/2"	51	0.6
	27"	6'- 4 1/2"	4'- 4 1/2"	5'- 4"	6'- 2"	158	1.3	4'- 0 3/4"	57	0.7
	30"	6'-11 1/2"	4'- 8"	5'-10"	6'- 8 3/4"	181	1.5	4'- 5 3/4"	67	0.8
	33"	7'- 6 1/2"	4'-11 3/4"	6'- 4"	7'- 3 3/4"	197	1.7	4'-10"	73	0.9
	36"	8'- 1 3/4"	5'- 3 1/4"	6'-10"	7'-10 3/4"	223	1.9	5'- 3 1/4"	82	1.1
	42"	9'- 3 3/4"	5'-10 1/2"	7'-10"	9'- 0 1/2"	263	2.4	6'- 0 1/2"	100	1.4
	48"	10'- 9 1/2"	6'- 5 3/4"	9'- 4"	10'- 9 1/4"	315	3.2	6'- 9 3/4"	121	1.8
	54"	11'-11 3/4"	7'- 1"	10'- 4"	11'-11 1/4"	372	3.8	7'- 9 1/4"	154	2.2
	60"	13'- 1 3/4"	7'- 8 1/4"	11'- 4"	13'- 1"	419	4.5	8'- 6 1/2"	178	2.6
	66"	14'- 4"	8'- 3 1/2"	12'- 4"	14'- 3"	475	5.3	9'- 0 3/4"	198	3.0
	72"	15'- 6 1/4"	8'-10 3/4"	13'- 4"	15'- 4 3/4"	523	6.1	9'- 8"	220	3.3
3:1	12"	4'- 1 1/4"	2'- 8 3/4"	4'- 3"	4'-11"	104	0.7	1'- 9 3/4"	23	0.2
	15"	4'-10"	3'- 0 1/4"	5'- 0"	5'- 9 1/4"	123	0.9	2'- 3"	29	0.3
	18"	5'- 7"	3'- 4"	5'- 9"	6'- 7 3/4"	152	1.1	2'- 9 1/4"	37	0.5
	21"	6'- 3 3/4"	3'- 7 1/2"	6'- 6"	7'- 6"	171	1.3	3'- 2 1/4"	49	0.6
	24"	7'- 2"	4'- 0 3/4"	7'- 3"	8'- 4 1/2"	198	1.6	3'- 8 1/2"	59	0.7
	27"	7'-11"	4'- 4 1/2"	8'- 0"	9'- 2 3/4"	219	1.9	4'- 0 3/4"	68	0.9
	30"	8'- 7 3/4"	4'- 8"	8'- 9"	10'- 1 1/4"	254	2.2	4'- 5 3/4"	79	1.0
	33"	9'- 4 1/2"	4'-11 3/4"	9'- 6"	10'-11 3/4"	274	2.5	4'-10"	86	1.2
	36"	10'- 1 1/4"	5'- 3 1/4"	10'- 3"	11'-10"	305	2.9	5'- 3 1/4"	97	1.4
	42"	11'- 7"	5'-10 1/2"	11'- 9"	13'- 6 3/4"	371	3.7	6'- 0 1/2"	122	1.8
	48"	13'- 5 3/4"	6'- 5 3/4"	14'- 0"	16'- 2"	455	4.9	6'- 9 3/4"	152	2.4
	54"	14'-11 1/2"	7'- 1"	15'- 6"	17'-10 3/4"	532	5.9	7'- 9 1/4"	190	3.0
	60"	16'- 5"	7'- 8 1/4"	17'- 0"	19'- 7 1/2"	604	7.0	8'- 6 1/2"	224	3.5
	66"	17'-10 3/4"	8'- 3 1/2"	18'- 6"	21'- 4 1/4"	687	8.1	9'- 0 3/4"	248	4.0
	72"	19'- 4 1/4"	8'-10 3/4"	20'- 0"	23'- 1 1/4"	772	9.4	9'- 8"	281	4.6
4:1	12"	4'-11"	2'- 8 3/4"	5'- 8"	6'- 6 1/2"	132	0.9	1'- 9 3/4"	26	0.3
	15"	5'- 9 1/2"	3'- 0 1/4"	6'- 8"	7'- 8 1/2"	158	1.2	2'- 3"	33	0.4
	18"	6'- 8 1/4"	3'- 4"	7'- 8"	8'-10 1/4"	194	1.5	2'- 9 1/4"	43	0.6
	21"	7'- 6 3/4"	3'- 7 1/2"	8'- 8"	10'- 0"	226	1.8	3'- 2 1/4"	57	0.7
	24"	8'- 6 3/4"	4'- 0 3/4"	9'- 8"	11'- 2"	258	2.2	3'- 8 1/2"	68	0.9
	27"	9'- 5 1/4"	4'- 4 1/2"	10'- 8"	12'- 3 3/4"	286	2.6	4'- 0 3/4"	79	1.1
	30"	10'- 4"	4'- 8"	11'- 8"	13'- 5 3/4"	327	3.0	4'- 5 3/4"	91	1.3
	33"	11'- 2 1/2"	4'-11 3/4"	12'- 8"	14'- 7 1/2"	360	3.5	4'-10"	104	1.5
	36"	12'- 1"	5'- 3 1/4"	13'- 8"	15'- 9 1/4"	403	4.0	5'- 3 1/4"	115	1.7
	42"	13'-10"	5'-10 1/2"	15'- 8"	18'- 1"	487	5.1	6'- 0 1/2"	144	2.2
	48"	16'- 2 1/4"	6'- 5 3/4"	18'- 8"	21'- 6 3/4"	602	6.8	6'- 9 3/4"	183	3.0
	54"	17'-11 1/4"	7'- 1"	20'- 8"	23'-10 1/4"	717	8.2	7'- 9 1/4"	231	3.7
	60"	19'- 8 1/4"	7'- 8 1/4"	22'- 8"	26'- 2"	812	9.8	8'- 6 1/2"	270	4.4
	66"	21'- 5 1/2"	8'- 3 1/2"	24'- 8"	28'- 5 3/4"	933	11.4	9'- 0 3/4"	305	5.0
	72"	23'- 2 1/2"	8'-10 3/4"	26'- 8"	30'- 9 1/2"	1046	13.2	9'- 8"	342	5.7
6:1	12"	6'- 6 3/4"	2'- 8 3/4"	8'- 6"	9'- 9 3/4"	188	1.4	1'- 9 3/4"	30	0.4
	15"	7'- 8 3/4"	3'- 0 1/4"	10'- 0"	11'- 6 1/2"	226	1.9	2'- 3"	40	0.5
	18"	8'-10 3/4"	3'- 4"	11'- 6"	13'- 3 1/4"	277	2.4	2'- 9 1/4"	51	0.7
	21"	10'- 0 3/4"	3'- 7 1/2"	13'- 0"	15'- 0 1/4"	328	2.9	3'- 2 1/4"	69	1.0
	24"	11'- 4 1/4"	4'- 0 3/4"	14'- 6"	16'- 9"	371	3.5	3'- 8 1/2"	83	1.3
	27"	12'- 6 1/4"	4'- 4 1/2"	16'- 0"	18'- 5 3/4"	422	4.2	4'- 0 3/4"	98	1.5
	30"	13'- 8 1/4"	4'- 8"	17'- 6"	20'- 2 1/2"	482	4.9	4'- 5 3/4"	113	1.8
	33"	14'-10 1/4"	4'-11 3/4"	19'- 0"	21'-11 1/4"	543	5.7	4'-10"	130	2.0
	36"	16'- 0 1/4"	5'- 3 1/4"	20'- 6"	23'- 8"	598	6.5	5'- 3 1/4"	145	2.4
	42"	18'- 4 1/2"	5'-10 1/2"	23'- 6"	27'- 1 1/2"	732	8.4	6'- 0 1/2"	184	3.1
	48"	21'- 6 3/4"	6'- 5 3/4"	28'- 0"	32'- 4"	936	11.4	6'- 9 3/4"	240	4.1
	54"	23'-10 3/4"	7'- 1"	31'- 0"	35'- 9 1/2"	1112	13.8	7'- 9 1/4"	303	5.2
	60"	26'- 2 3/4"	7'- 8 1/4"	34'- 0"	39'- 3"	1266	16.4	8'- 6 1/2"	358	6.2



ELEVATION
Showing dimensions

1. Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.
2. For vehicle safety, curbs shall project no more than 3" above finished grade. Curb heights shall be reduced, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
3. Provide a 1'-0" footing as shown where required to maintain 4" Min cover for pipes.
4. Quantities shown are for one structure end only (one headwall).
5. Min Length = $6" + 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right)$

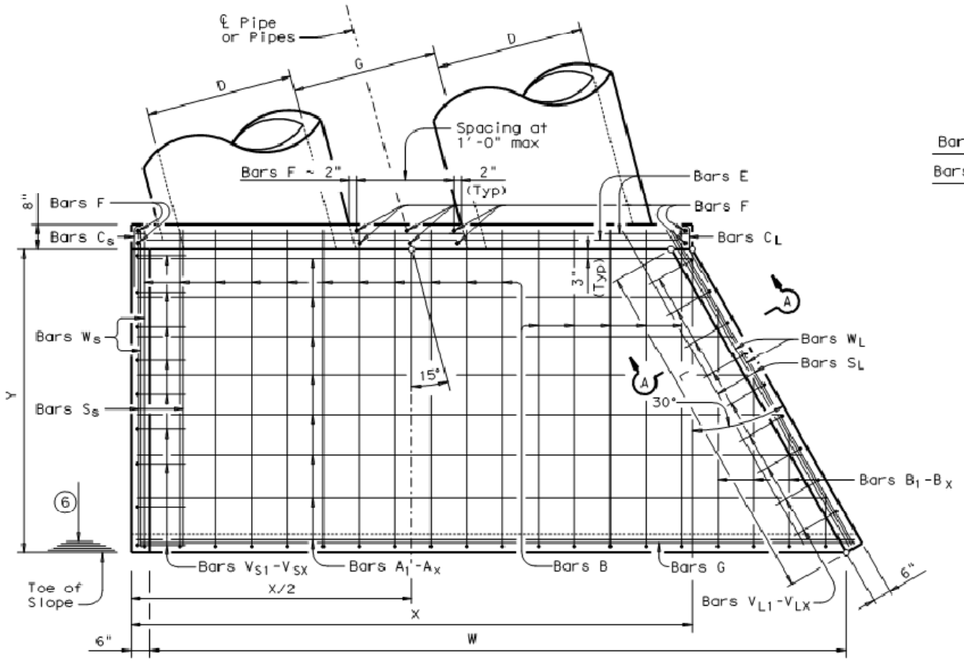
   Max Length = $12 \times H - 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right) - 1"$
6. Lengths of wings based on SL:1 Slope along this line.

TABLE OF REINFORCING STEEL (4)

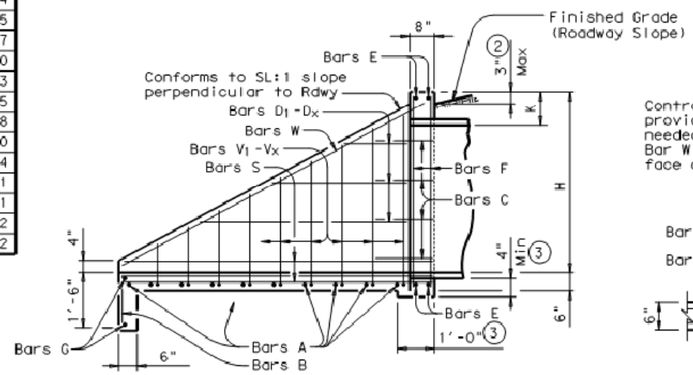
Bar	Size	Spa	No.
A	# 4	1'-0"	~
B	# 3	1'-6"	~
CL	# 4	1'-0"	~
CS	# 4	1'-0"	~
D	# 3	1'-0"	~
E	# 5	~	4
F	# 5	~	~
G	# 3	~	2
SL	# 4	~	3
SS	# 4	~	3
V	# 4	1'-0"	~
WL	# 5	~	2
WS	# 5	~	2

TABLE OF CONSTANT DIMENSIONS

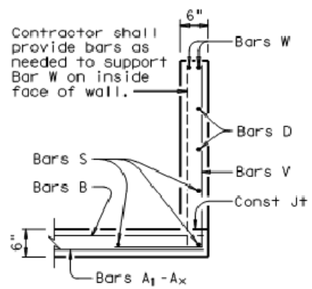
DIA OF PIPE, D	G	K	H
12"	9"	1'- 0"	2'- 0"
15"	11"	1'- 0"	2'- 3"
18"	1'- 2"	1'- 0"	2'- 6"
21"	1'- 4"	1'- 0"	2'- 9"
24"	1'- 7"	1'- 0"	3'- 0"
27"	1'- 8"	1'- 0"	3'- 3"
30"	1'-10"	1'- 0"	3'- 6"
33"	1'-11"	1'- 0"	3'- 9"
36"	2'- 1"	1'- 0"	4'- 0"
42"	2'- 4"	1'- 0"	4'- 6"
48"	2'- 7"	1'- 3"	5'- 3"
54"	3'- 0"	1'- 3"	5'- 9"
60"	3'- 3"	1'- 3"	6'- 3"
66"	3'- 3"	1'- 3"	6'- 9"
72"	3'- 4"	1'- 3"	7'- 3"



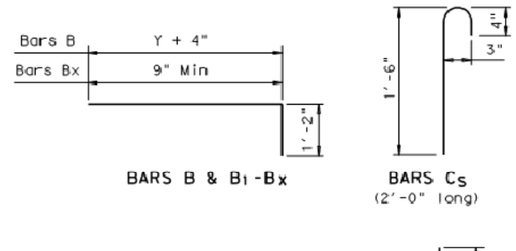
PLAN



TYPICAL WING ELEVATION

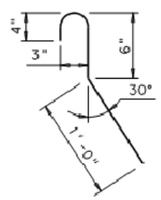


SECTION A-A

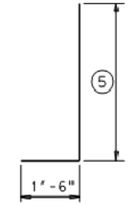


BARS B & B1-Bx

BARS CS
(2'-0" long)



BARS CL
(2'-0" long)



BARS VS & VL

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Reinforcing steel shall be placed with the center of the outside layer of bars 2" from the surface of the concrete.

All reinforcing steel shall be Grade 60.

All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

No bridge rails of any type may be mounted directly to these culvert headwalls.

Texas Department of Transportation | Bridge Division Standard

CONCRETE HEADWALLS WITH FLARED WINGS FOR 15° SKEW PIPE CULVERTS

CH-FW-15

FILE: chfw15se.dgn	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.

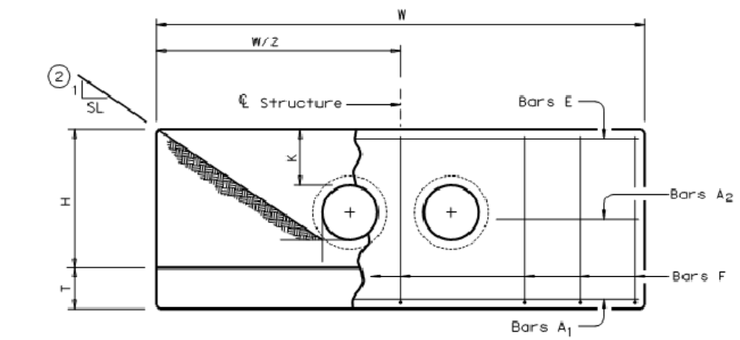
25

DATE:
FILE:

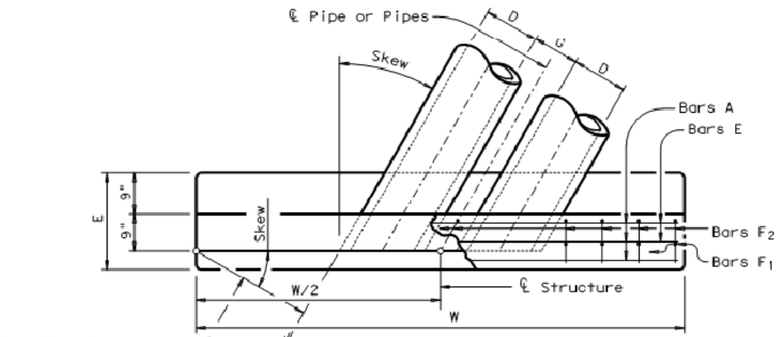
DATE:
FILE:

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (4)

SLOPE	DIA OF PIPE, D	15 Degrees						30 Degrees						45 Degrees					
		Values for one Pipe			Values to be added for each addt'l Pipe			Values for one Pipe			Values to be added for each addt'l Pipe			Values for one Pipe			Values to be added for each addt'l Pipe		
		W	Reinf (Lbs)	Conc (CY) (1)	W	Reinf (Lbs)	Conc (CY) (1)	W	Reinf (Lbs)	Conc (CY) (1)	W	Reinf (Lbs)	Conc (CY) (1)	W	Reinf (Lbs)	Conc (CY) (1)	W	Reinf (Lbs)	Conc (CY) (1)
2:1	12"	9'- 4"	124	1.1	1'- 9 3/4"	15	0.2	10'- 5"	130	1.2	2'- 0"	16	0.2	12'- 9"	159	1.5	2'- 5 3/4"	17	0.3
	15"	10'- 7"	136	1.3	2'- 3"	17	0.2	11'-10"	159	1.5	2'- 6"	18	0.2	14'- 6"	191	1.8	3'- 0 3/4"	20	0.3
	18"	11'-11"	165	1.5	2'- 9"	19	0.3	13'- 3"	174	1.7	3'- 1"	29	0.3	16'- 3"	207	2.1	3'- 9 1/4"	33	0.4
	21"	13'- 2"	203	1.9	3'- 2 1/4"	31	0.4	14'- 9"	233	2.1	3'- 6 3/4"	33	0.4	18'- 0"	276	2.6	4'- 4 1/4"	36	0.5
	24"	14'- 6"	240	2.1	3'- 8 1/4"	34	0.4	16'- 2"	251	2.4	4'- 1 3/4"	36	0.5	19'-10"	318	2.9	5'- 0 3/4"	39	0.6
	27"	15'- 9"	258	2.5	4'- 0 3/4"	38	0.5	17'- 7"	292	2.8	4'- 6 1/4"	39	0.6	21'- 7"	342	3.4	5'- 6 1/4"	44	0.7
	30"	17'- 1"	297	2.8	4'- 5 3/4"	40	0.6	19'- 1"	311	3.1	5'- 0"	42	0.6	23'- 4"	388	3.8	6'- 1 3/4"	47	0.8
	33"	18'- 5"	320	3.3	4'- 9 3/4"	43	0.6	20'- 6"	358	3.6	5'- 4 3/4"	46	0.7	25'- 1"	439	4.4	6'- 7 1/4"	51	0.9
	36"	19'- 8"	401	4.0	5'- 3"	47	0.9	21'-11"	422	4.5	5'-10 3/4"	50	0.9	26'-10"	517	5.5	7'- 2 1/4"	55	1.2
	42"	22'- 3"	476	5.0	6'- 0 3/4"	53	1.1	24'-10"	528	5.6	6'- 8 3/4"	56	1.2	30'- 5"	634	6.9	8'- 3"	76	1.4
	48"	25'-11"	577	6.6	6'- 9 3/4"	60	1.3	28'-10"	637	7.3	7'- 7 1/4"	79	1.5	35'- 4"	791	9.0	9'- 3 3/4"	88	1.8
	54"	28'- 6"	711	7.8	7'- 9"	83	1.6	31'- 9"	781	8.7	8'- 8"	87	1.8	38'-11"	958	10.7	10'- 7 1/4"	97	2.2
	60"	31'- 1"	805	9.2	8'- 6 1/4"	91	1.9	34'- 8"	881	10.2	9'- 6 1/4"	97	2.1	42'- 5"	1113	12.5	11'- 8"	124	2.6
	66"	33'- 8"	907	10.6	9'- 0 3/4"	98	2.1	37'- 6"	1028	11.8	10'- 1 1/4"	102	2.4	46'- 0"	1235	14.5	12'- 4 1/4"	132	2.9
	72"	36'- 3"	1071	12.1	9'- 8"	105	2.4	40'- 5"	1207	13.5	10'- 9 1/4"	110	2.6	49'- 6"	1446	16.6	13'- 2 1/4"	141	3.2
3:1	12"	13'- 6"	178	1.6	1'- 9 3/4"	15	0.2	15'- 0"	189	1.8	2'- 0"	15	0.2	18'- 5"	237	2.2	2'- 5 3/4"	17	0.2
	15"	15'- 3"	212	1.9	2'- 3"	17	0.2	17'- 0"	223	2.1	2'- 6"	17	0.3	20'-10"	276	2.6	3'- 0 3/4"	20	0.3
	18"	17'- 1"	231	2.3	2'- 9"	19	0.3	19'- 1"	259	2.5	3'- 1"	29	0.3	23'- 4"	318	3.1	3'- 9 1/4"	32	0.4
	21"	18'-11"	306	2.7	3'- 2 1/4"	31	0.4	21'- 1"	339	3.0	3'- 6 3/4"	33	0.4	25'-10"	413	3.7	4'- 4 1/4"	36	0.5
	24"	20'- 8"	345	3.1	3'- 8 3/4"	35	0.4	23'- 1"	384	3.5	4'- 1 3/4"	36	0.5	28'- 3"	462	4.2	5'- 0 3/4"	40	0.6
	27"	22'- 6"	376	3.7	4'- 0 3/4"	38	0.5	25'- 1"	438	4.1	4'- 6 1/4"	39	0.6	30'- 9"	522	5.0	5'- 6 1/4"	44	0.7
	30"	24'- 4"	422	4.1	4'- 5 3/4"	40	0.6	27'- 2"	466	4.6	5'- 0"	42	0.6	33'- 3"	578	5.6	6'- 1 3/4"	47	0.8
	33"	26'- 2"	476	4.8	4'-10"	43	0.6	29'- 2"	522	5.3	5'- 4 3/4"	46	0.7	35'- 9"	644	6.5	6'- 7 1/4"	51	0.9
	36"	27'-11"	590	5.9	5'- 3 1/4"	47	0.8	31'- 2"	645	6.6	5'-10 3/4"	50	0.9	38'- 2"	787	8.0	7'- 2 1/4"	56	1.2
	42"	31'- 7"	684	7.3	6'- 0 1/4"	53	1.1	35'- 3"	776	8.2	6'- 8 3/4"	56	1.2	43'- 2"	933	10.0	8'- 3"	79	1.4
	48"	36'- 9"	880	9.6	6'- 9 3/4"	61	1.3	41'- 0"	953	10.7	7'- 7 1/4"	81	1.5	50'- 2"	1166	13.1	9'- 3 3/4"	88	1.8
	54"	40'- 5"	1065	11.4	7'- 9"	85	1.6	45'- 0"	1185	12.7	8'- 8"	89	1.8	55'- 2"	1435	15.5	10'- 7 1/4"	97	2.2
	60"	44'- 0"	1224	13.3	8'- 6 1/4"	93	1.9	49'- 1"	1356	14.8	9'- 6 1/4"	96	2.1	60'- 1"	1627	18.2	11'- 8"	124	2.6
	66"	47'- 7"	1357	15.4	9'- 1"	98	2.1	53'- 1"	1497	17.2	10'- 1 1/4"	103	2.3	65'- 1"	1834	21.1	12'- 4 1/4"	130	2.9
	72"	51'- 3"	1624	17.7	9'- 8"	105	2.3	57'- 2"	1787	19.7	10'- 9 1/4"	109	2.6	70'- 0"	2210	24.1	13'- 2 1/4"	139	3.2
4:1	12"	17'- 7"	232	2.1	1'- 9 3/4"	15	0.2	19'- 8"	259	2.4	2'- 0"	16	0.2	24'- 0"	314	2.9	2'- 5 3/4"	18	0.2
	15"	19'-11"	272	2.5	2'- 3"	17	0.2	22'- 3"	301	2.8	2'- 6"	18	0.3	27'- 3"	361	3.5	3'- 0 3/4"	21	0.3
	18"	22'- 3"	313	3.0	2'- 9"	19	0.3	24'-10"	344	3.3	3'- 1"	29	0.3	30'- 5"	427	4.0	3'- 9 1/4"	32	0.4
	21"	24'- 7"	407	3.6	3'- 2 1/4"	31	0.4	27'- 5"	446	4.0	3'- 6 3/4"	33	0.4	33'- 7"	549	4.9	4'- 4 1/4"	36	0.5
	24"	26'-11"	455	4.1	3'- 8 3/4"	35	0.4	30'- 0"	499	4.5	4'- 1 3/4"	36	0.5	36'- 9"	609	5.6	5'- 0 3/4"	40	0.6
	27"	29'- 3"	514	4.8	4'- 0 3/4"	38	0.5	32'- 7"	562	5.4	4'- 6 1/4"	40	0.6	39'-11"	703	6.6	5'- 6 1/4"	43	0.7
	30"	31'- 7"	568	5.4	4'- 5 3/4"	40	0.6	35'- 3"	620	6.0	5'- 0"	42	0.6	43'- 2"	768	7.4	6'- 1 3/4"	49	0.8
	33"	33'-11"	634	6.2	4'-10"	43	0.7	37'-10"	710	7.0	5'- 4 3/4"	46	0.7	46'- 4"	848	8.5	6'- 7 1/4"	52	0.9
	36"	36'- 3"	776	7.7	5'- 3"	48	0.9	40'- 5"	868	8.6	5'-10 3/4"	49	0.9	49'- 6"	1058	10.6	7'- 2 1/4"	56	1.1
	42"	40'-11"	921	9.6	6'- 0 1/4"	53	1.0	45'- 7"	1022	10.7	6'- 8 3/4"	57	1.2	55'-10"	1262	13.1	8'- 3"	78	1.4
	48"	47'- 7"	1152	12.6	6'-10"	61	1.3	53'- 1"	1268	14.0	7'- 7 1/4"	80	1.5	65'- 1"	1579	17.2	9'- 3 3/4"	86	1.8
	54"	52'- 3"	1416	14.9	7'- 9 1/4"	86	1.6	58'- 4"	1589	16.6	8'- 8"	89	1.8	71'- 5"	1916	20.4	10'- 7 1/4"	95	2.2
	60"	56'-11"	1606	17.5	8'- 6 3/4"	92	1.9	63'- 6"	1798	19.5	9'- 6 1/4"	95	2.1	77'- 9"	2184	23.9	11'- 8"	122	2.6
	66"	61'- 7"	1811	20.2	9'- 0 3/4"	97	2.1	68'- 8"	2011	22.5	10'- 1 1/4"	101	2.4	84'- 2"	2464	27.6	12'- 4 1/4"	131	2.9
	72"	66'- 3"	2142	23.2	9'- 8"	104	2.4	73'-11"	2371	25.9	10'- 9 1/4"	108	2.6	90'- 6"	2929	31.7	13'- 2 1/4"	138	3.2
6:1	12"	25'-11"	342	3.1	1'- 9 3/4"	15	0.2	28'-10"	374	3.5	2'- 0"	16	0.2	35'- 4"	456	4.3	2'- 5 3/4"	17	0.2
	15"	29'- 3"	390	3.7	2'- 3"	17	0.2	32'- 7"	442	4.2	2'- 6"	18	0.2	39'-11"	549	5.1	3'- 0 3/4"	20	0.3
	18"	32'- 7"	459	4.4	2'- 9"	20	0.3	36'- 4"	515	4.9	3'- 1"	29	0.3	44'- 7"	629	6.0	3'- 9 1/4"	33	0.4
	21"	36'- 0"	608	5.3	3'- 2 1/4"	31	0.4	40'- 2"	660	5.9	3'- 6 3/4"	33	0.4	49'- 2"	823	7.2	4'- 4 1/4"	38	0.5
	24"	39'- 4"	672	6.0	3'- 8 3/4"	35	0.4	43'-11"	748	6.7	4'- 1 3/4"	36	0.5	53'- 9"	920	8.2	5'- 0 3/4"	42	0.6
	27"	42'- 8"	770	7.1	4'- 0 3/4"	38	0.5	47'- 8"	852	8.0	4'- 6 1/4"	41	0.5	58'- 4"	1039	9.7	5'- 6 1/4"	45	0.7
	30"	46'- 1"	839	8.0	4'- 5 3/4"	40	0.6	51'- 5"	949	8.9	5'- 0"	44	0.6	62'-11"	1154	10.9	6'- 1 3/4"	48	0.8
	33"	49'- 5"	947	9.2	4'-10"	45	0.7	55'- 2"	1040	10.3	5'- 4 3/4"	48	0.7	67'- 6"	1284	12.6	6'- 7 1/4"	50	0.9
	36"	52'-10"	1151	11.4	5'- 3"	49	0.8	58'-11"	1287	12.7	5'-10 3/4"	51	1.0	72'- 1"	1575	15.6	7'- 2 1/4"	55	1.1
	42"	59'- 6"	1365	14.2	6'- 0 1/4"	55	1.0	66'- 5"	1522	15.8	6'- 8 3/4"	57	1.2	81'- 4"	1867	19.4	8'- 3"	76	1.4
	48"	69'- 4"	1729	18.5	6'-10"	59	1.3	77'- 4"	1934	20.7	7'- 7 1/4"	79	1.5	94'- 9"	2360	25.3	9'- 3 3/4"	86	1.8
	54"	76'- 1"	2130	22.0	7'- 9 1/4"	83	1.6	84'-10"	2370	24.6	8'- 8"	87	1.8	103'-11"	2904	30.1	10'- 7 1/4"	95	2.2
	60"	82'-10"	2414	25.8	8'- 6 3/4"	90	1.9	92'- 5"	2673	28.8	9'- 6 1/4"	94	2.1	113'-2"	3286	35.3	11'- 8"	122	2.6
	66"	89'- 7"	2712	29.9	9'- 0 3/4"	96	2.1	99'-11"	3030	33.3	10'- 1 1/4"	101	2.4	122'-4"	3689	40.8	12'- 4 1/4"	130	2.9
	72"	96'- 3"	3210	34.2	9'- 8"	102	2.4	107'-5"	3572	38.2	10'- 9 1/4"	108	2.6	131'-6"	4364	46.8	13'- 2 1/4"	139	3.2

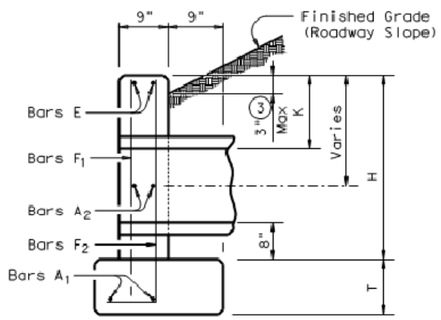


ELEVATION



PLAN OF SKEWED PIPES

Showing 30° Skew



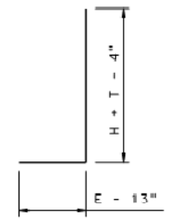
℄ SECTION

TABLE OF CONSTANT DIMENSIONS

DIA OF PIPE, D	G	K	H	T	E
12"	9"	1'- 0"	2'- 8"	9"	1'- 9"
15"	11"	1'- 0"	2'-11"	9"	1'- 9"
18"	1'- 2"	1'- 0"	3'- 2"	9"	1'- 9"
21"	1'- 4"	1'- 0"	3'- 5"	9"	2'- 0"
24"	1'- 7"	1'- 0"	3'- 8"	9"	2'- 0"
27"	1'- 8"	1'- 0"	3'-11"	9"	2'- 3"
30"	1'-10"	1'- 0"	4'- 2"	9"	2'- 3"
33"	1'-11"	1'- 0"	4'- 5"	9"	2'- 6"
36"	2'- 1"	1'- 0"	4'- 8"	1'- 0"	2'- 6"
42"	2'- 4"	1'- 0"	5'- 2"	1'- 0"	2'- 9"
48"	2'- 7"	1'- 3"	5'-11"	1'- 0"	3'- 0"
54"	3'- 0"	1'- 3"	6'- 5"	1'- 0"	3'- 3"
60"	3'- 3"	1'- 3"	6'-11"	1'- 0"	3'- 6"
66"	3'- 3"	1'- 3"	7'- 5"	1'- 0"	3'- 9"
72"	3'- 4"	1'- 3"	7'-11"	1'- 0"	4'- 0"

TABLE OF REINFORCING STEEL (4)

Bar	Size	Spa	No.
A1	# 5	~	2
A2	# 5	1'-6"	~
E	# 5	~	2
F	# 5	1'-0"	~



BARS F_2

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Reinforcing steel shall be placed with the center of the outside layer of bars 2" from the surface of the concrete.

All reinforcing steel shall be Grade 60.

All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

No bridge rails of any type may be mounted directly to these culvert headwalls.

(1) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(2) Indicated slope is perpendicular to centerline Pipe or Pipes.

(3) For vehicle safety, curbs shall project no more than 3" above finished grade. Curb heights shall be reduced, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(4) Quantities shown are for one structure end only (one headwall).

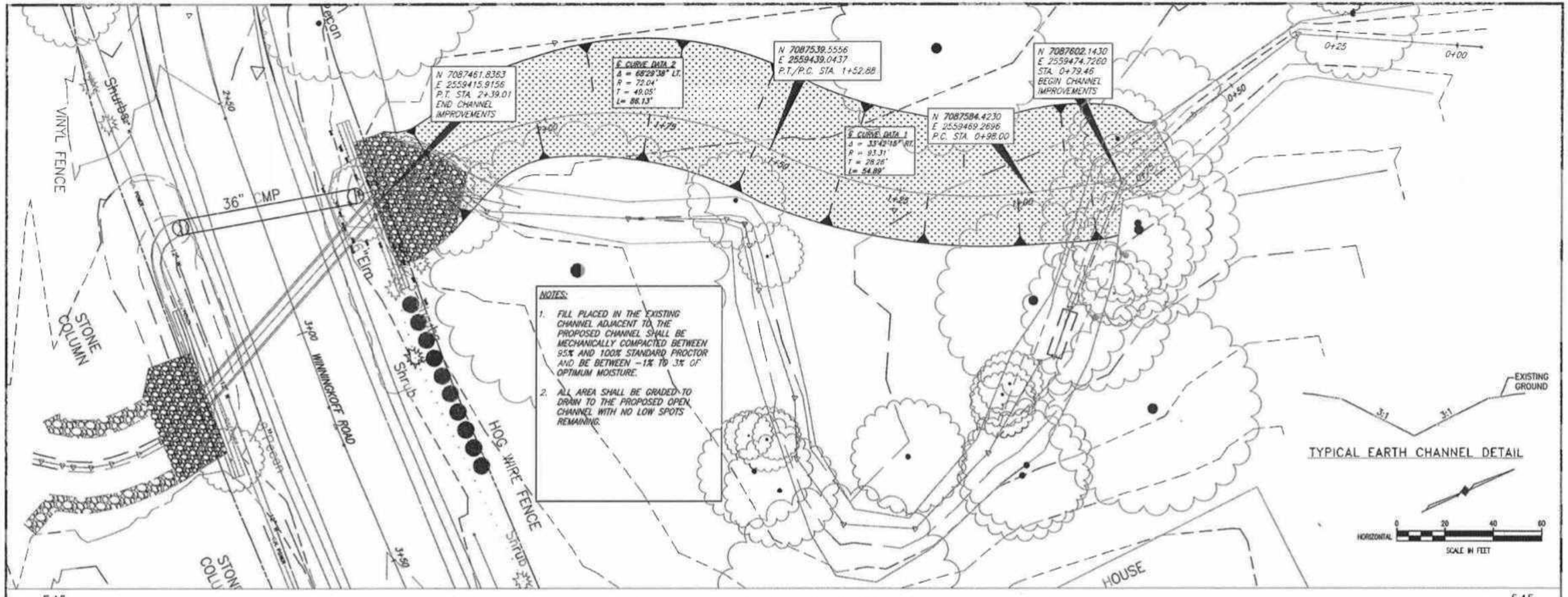
26

Texas Department of Transportation | Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR SKEWED PIPE CULVERTS

CH-PW-S

FILE: chpwsste.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2010 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.



CHANGE ORDER NO. 2: DOWNSTREAM CHANNEL REALIGNMENT 02/20/2018

Stanton W. Foerster 73464 LICENSED PROFESSIONAL ENGINEER

3-5-18

CITY LUCAS, TEXAS

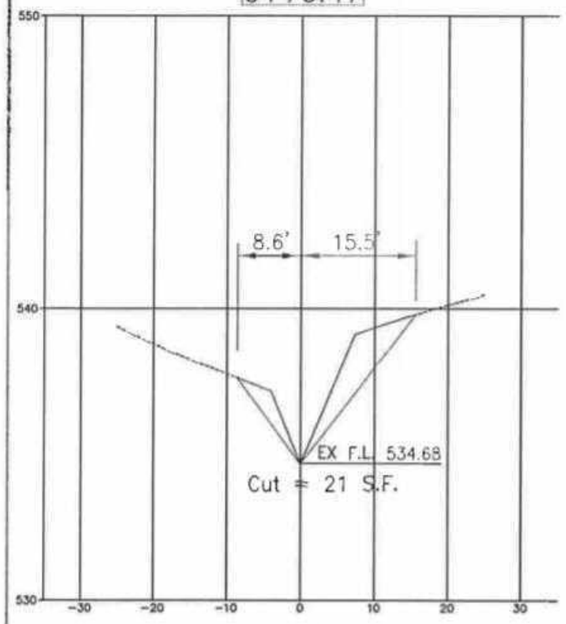
WINNINGKOFF ROAD

NOPPER TRACT CHANNEL REALIGNMENT

February, 2018

SHEET NO. 27

0+79.47



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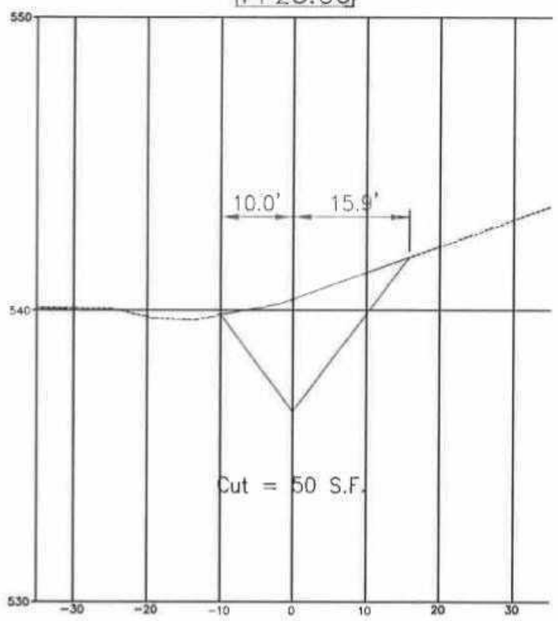

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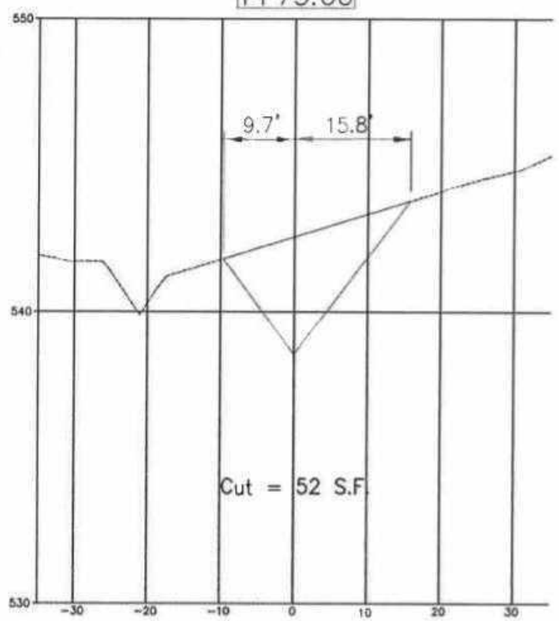

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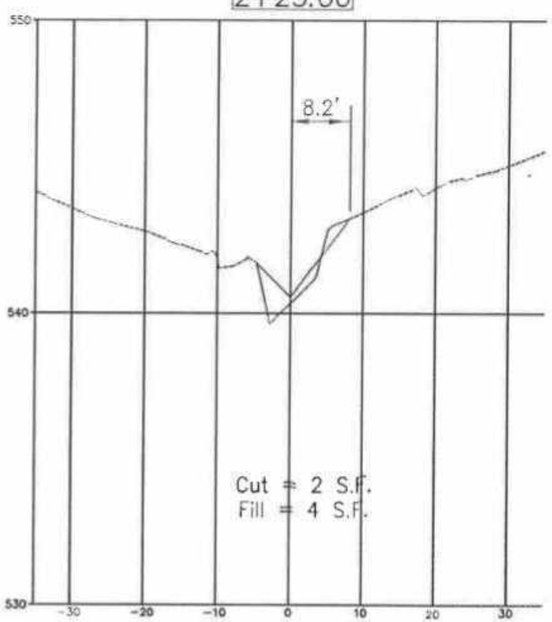

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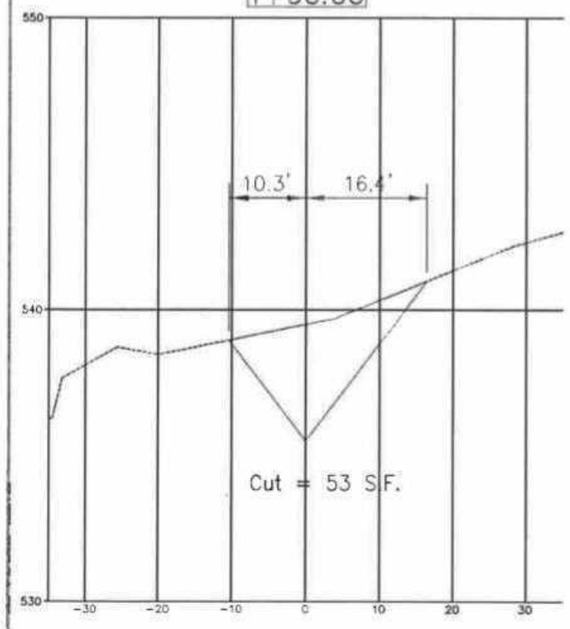

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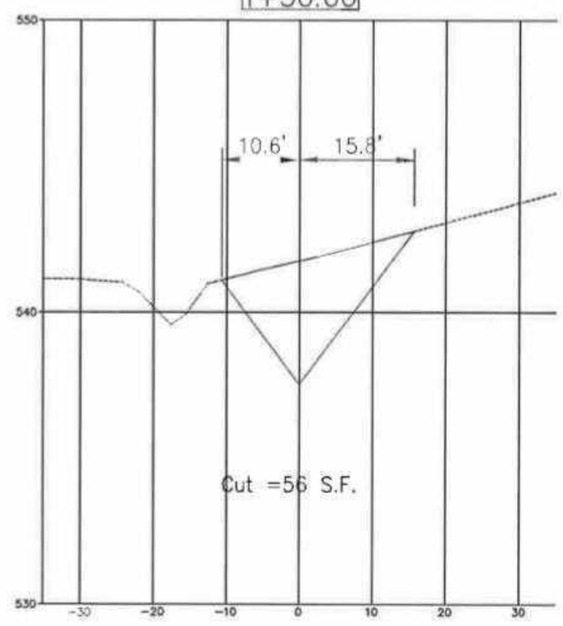

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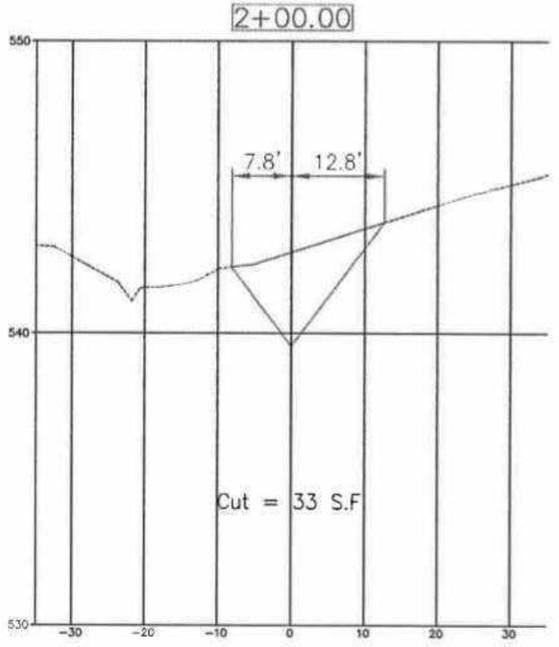

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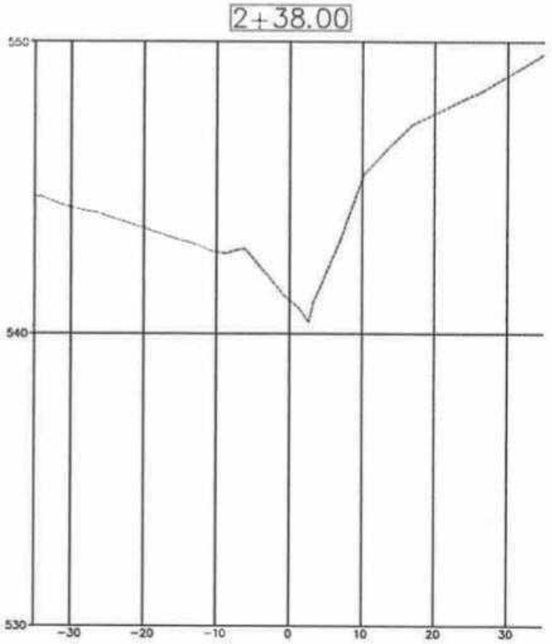


CHANGE ORDER NO. 2: DOWNSTREAM CHANNEL REALIGNMENT 02/20/2018

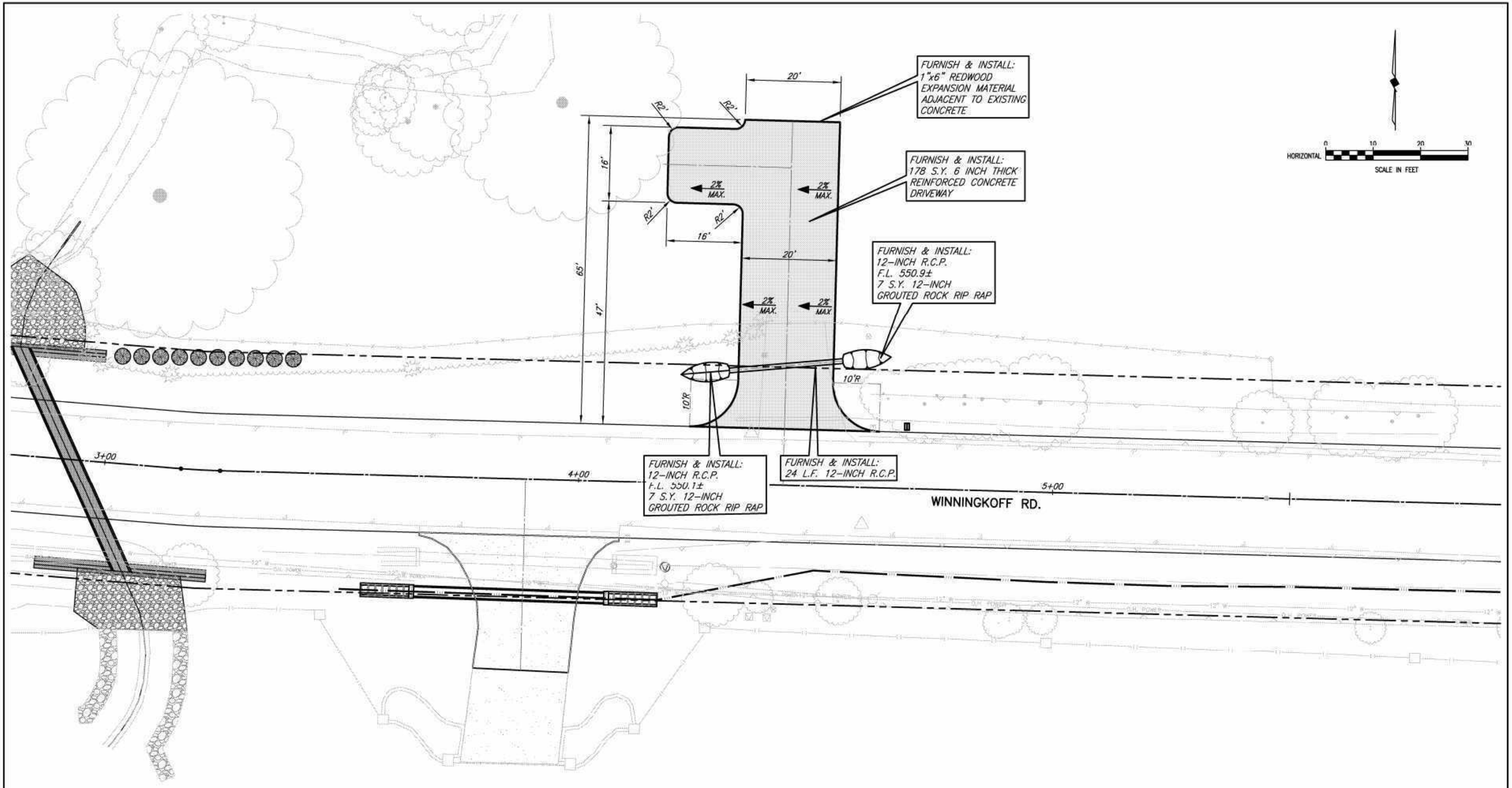
STATE OF TEXAS
Stanton W. Foerster
73484
LICENSED
PROFESSIONAL ENGINEER

S.W. Foerster PE
3-5-18

CITY LUCAS, TEXAS
WINNINGKOFF ROAD
NOPPER TRACT
CHANNEL REALIGNMENT CROSS SECTIONS

February, 2018

SHEET NO.
28



CHANGE ORDER NO. 3: NOPPER DRIVEWAY MODIFICATION 04/09/2018					**CITY OF LUCAS, TEXAS** WINNINGKOFF ROAD NOPPER TRACT DRIVEWAY IMPROVEMENTS	SHEET NO. 29