

630 SIGNING MISC.: SOLAR-POWERED RECTANGULAR RAPID FLASHING BEACON (RRFB) SIGN ASSEMBLY

THIS WORK SHALL CONSIST OF FURNISHING AND INSTALLING A SOLAR POWERED RECTANGULAR RAPID FLASHING BEACON (RRFB) SIGN ASSEMBLY. THE FLASHING UNIT SHALL BE SOLAR POWERED, PEDESTRIAN ACTIVATED, AND 2-SIDED WITH TWO LED ARRAY BASED YELLOW INDICATIONS ON EACH SIDE. MULTIPLE UNITS SHALL BE WIRELESSLY CONTROLLED AND SYNCHRONIZED. THE UNIT SHALL BE COMPLIANT WITH THE MOST CURRENT OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (OMUTCD)

GENERAL REQUIREMENTS -

EACH RRFB SHALL CONSIST OF TWO RAPIDLY FLASHED RECTANGULAR-SHAPED YELLOW INDICATIONS HAVING LED ARRAY BASED LIGHT SOURCE.

EACH RRFB SHALL BE A COMPLETE ASSEMBLY, CONSISTING OF BUT NOT LIMITED TO, SIGNAGE, SIGN MOUNTING HARDWARE, INDICATIONS AND ELECTRICAL COMPONENTS (WIRING, SOLID-STATE CIRCUIT BOARDS, ETC.).

EACH RRFB SHALL CONTAIN A PEDESTRIAN INDICATION LIGHT VISIBLE TO THE PEDESTRIAN IN THE DIRECTION OF TRAVEL.

FUNCTIONAL REQUIREMENTS -

EACH RRFB SHALL UTILIZE SOLAR POWER.

EACH RRFB SHALL BE ACTIVATED BY ADA COMPLIANT ACCESSIBLE PEDESTRAIN PUSHBUTTONS.

THE RRFB SHALL BE NORMALLY DARK, SHALL INITIATE OPERATION ONLY UPON PEDESTRIAN ACTUATION, AND SHALL CEASE OPERATION AFTER A PREDETERMINED TIME LIMIT (BASED ON OMUTCD PROCEDURES).

EACH REMOTE RRFB SHALL BE WIRELESSLY ACTIVATED.

ALL RRFB LIGHT INDICATIONS SHALL BE WIRELESSLY SYNCHRONIZED (ALL LIGHTS WILL TURN ON WITHIN 120 MSEC AND REMAIN SYNCHRONIZED THROUGHOUT THE DURATION OF THE FLASHING CYCLE).

THE UNIT SHALL BE CAPABLE OF RUNNING 14 DAYS WITHOUT SUNLIGHT.

MATERIALS -

FURNISH A COMPLETE ASSEMBLY, CONSISTING OF BUT NOT LIMITED TO, SIGNAGE, SIGN MOUNTING HARDWARE, INDICATIONS, AND ELECTRICAL COMPONENTS (WIRING, SOLID-STATE CIRCUIT BOARDS, ETC.). THE RRFB ASSEMBLY INCLUDES THE FOLLOWING ITEMS:

1. RRFB INDICATIONS

- A. EACH RRFB INDICATION LENS SHALL BE A MINIMUM SIZE OF APPROXIMATELY 5" WIDE X 2" HIGH.
B. THE RRFB INDICATIONS SHALL BE ALIGNED HORIZONTALLY, WITH THE LONGER DIMENSION OF THE INDICATION HORIZONTAL. THERE SHALL BE TWO INDICATIONS ON THE FRONT AND TWO INDICATIONS ON THE BACK.
C. EACH RRFB SHALL BE SUPPLIED WITH ALL REQUIRED HARDWARE TO INSTALL ASSEMBLY. ALL EXPOSED HARDWARE SHALL BE ANTI-VANDAL.

630 SIGNING MISC.: SOLAR-POWERED RECTANGULAR RAPID FLASHING BEACON (RRFB) SIGN ASSEMBLY, CONT'D.

- D. EACH RRFB SHALL BE LOCATED BETWEEN THE BOTTOM OF THE CROSSING WARNING SIGN AND THE TOP OF THE SUPPLEMENTAL DOWNWARD DIAGONAL ARROW PLAQUE.
E. THE LIGHT INTENSITY OF THE YELLOW INDICATIONS SHALL MEET THE MINIMUM CLASS 1 SPECIFICATIONS OF SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) STANDARD J595 (DIRECTIONAL FLASHING OPTICAL WARNING DEVICES FOR AUTHORIZED EMERGENCY, MAINTENANCE, AND SERVICE VEHICLES) DATED JANUARY, 2005.
F. TO MINIMIZE EXCESSIVE GLARE DURING NIGHTTIME CONDITIONS, AN AUTOMATIC SIGNAL DIMMING DEVICE SHALL BE USED TO REDUCE THE BRILLIANCE OF THE RRFB INDICATIONS.
G. AN LED PEDESTRIAN CONFIRMATION LIGHT DIRECTED AT AND VISIBLE TO PEDESTRIANS IN THE CROSSWALK SHALL BE INSTALLED INTEGRAL TO THE RRFB OR PUSHBUTTON TO GIVE CONFIRMATION THAT THE RRFB IS IN OPERATION.
H. THE PEDESTRIAN CONFIRMATION LIGHT SHALL HAVE A MINIMUM AREA OF 0.5 SQUARE INCHES AND BE CONSPICUOUS TO PEDESTRIANS AT ALL DISTANCES FROM THE BEGINNING OF THE CONTROLLED CROSSWALK TO A POINT 10 FEET FROM THE END OF THE CONTROLLED CROSSWALK DURING BOTH DAY AND NIGHT.

2. SIGNS

- A. ALL SIGN ASSEMBLIES SHALL USE ANTI-VANDAL FASTENERS TO MOUNT COMPONENTS TO SIGN AND SIGN TO FIXTURE.
B. ACCESSIBLE PEDESTRIAN PUSHBUTTONS SIGNS SHALL BE PROVIDED AND INCLUDE THE LEGEND "PUSH BUTTON FOR WARNING LIGHT/WAIT FOR GAP IN TRAFFIC". SIGNS SHOULD BE MOUNTED ADJACENT TO OR INTEGRAL WITH EACH PEDESTRIAN PUSHBUTTON.
C. TWO SETS OF SIGNS SHALL BE REQUIRED PER UNIT FOR VIEW FROM EACH APPROACH.
D. ENSURE THE SIGN MEETS THE REQUIREMENTS OF C&MS 630.

3. CONTROL CIRCUIT

- A. THE CONTROL CIRCUIT SHALL HAVE THE CAPABILITY OF INDEPENDENTLY FLASHING UP TO TWO INDEPENDENT OUTPUTS. THE LED LIGHT OUTPUTS AND FLASH PATTERN SHALL BE COMPLETELY PROGRAMMABLE.
B. THE CONTROL CIRCUIT SHALL BE SEALED WATERTIGHT TO ELIMINATE DIRT CONTAMINATION AND ALLOW FOR SAFE HANDLING IN ALL WEATHER CONDITIONS.
C. THE LEDS SHALL BE SEALED AGAINST DUST AND MOISTURE INTRUSION AS PER THE REQUIREMENTS OF NEMA STANDARD 250-1991 FOR TYPE 4 ENCLOSURE AND TO PROTECT ALL INTERNAL LED AND ELECTRICAL COMPONENTS.

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- 4. BATTERY AND SOLAR PANELS
A. BATTERY UNIT SHALL BE A 12VDC, 35 AHR MINIMUM, SEALED GEL OR AGM LEAD ACID BATTERY. BATTERIES SHALL HAVE A WRITTEN TWO YEAR FULL REPLACEMENT WARRANTY.
B. THE SOLAR PANEL SHALL PROVIDE A MINIMUM OF 40 WATTS PEAK TOTAL OUTPUT.
C. THE SOLAR PANEL SHALL BE MOUNTED TO AN ALUMINUM PLATE AND BRACKET AT AN ANGLE OF 45 DEGREES - 60 DEGREES TO PROVIDE MAXIMUM OUTPUT.
D. ALL FASTENERS USED SHALL BE ANTI-VANDAL.
5. WIRELESS RADIO
A. RADIO CONTROL SHALL OPERATE ON A 900 MHZ FREQUENCY HOPPING SPREAD SPECTRUM NETWORK, WI-FI OR APPROVED EQUAL.
B. RADIO SHALL INTEGRATE COMMUNICATION OF RRFB CONTROL CIRCUIT TO ACTIVATE SIGN FROM PUSHBUTTON INPUT.
C. THE RADIO SHALL BE SYNCHRONIZED SO ALL OF THE REMOTE RRFB LIGHT INDICATIONS WILL TURN ON WITHIN 120 MSEC OF EACH OTHER AND REMAIN SYNCHRONIZED THROUGH-OUT THE DURATION OF THE FLASHING CYCLE.
6. ACCESSIBLE PEDESTRAIN PUSHBUTTON
A. THE PUSHBUTTON SHALL BE CAPABLE OF CONTINUOUS OPERATION OVER A TEMPERATURE RANGE OF -30 DEGREES F TO +165 DEGREES F.
B. PUSHBUTTON SHALL BE ADA COMPLIANT.
7. PEDESTAL SHAFT AND BASE - MOUNT ON A STANDARD 4.5-INCH OD ALUMINUM PEDESTAL POLE WITH BREAKAWAY BASE. A 14 FOOT POLE SHALL BE PROVIDED AND FIELD ADJUSTED AND CAPPED TO MAINTAIN THE PROPER SIGN MOUNTING HEIGHTS, UNLESS SPECIFIED OTHERWISE IN THE PLANS. POLE AND BASE MANUFACTURER SHALL BE LISTED ON ODOT'S QUALIFIED PRODUCTS LIST.

CONSTRUCTION -

THE RRFB SHALL BE ASSEMBLED AND CONSTRUCTED BY THE CONTRACTOR AS SHOWN AND SPECIFIED ON THE PLANS.

WARRANTY -

WARRANTY SHALL BE TWO YEARS FROM THE DATE OF FINAL ACCEPTANCE.

MEASUREMENT -

THE DEPARTMENT WILL MEASURE THE ITEM COMPLETE IN PLACE, INCLUDING ALL MATERIALS, TESTING, LABOR AND SOFTWARE FOR A FULLY FUNCTIONAL UNIT.

630 SIGNING MISC.: SOLAR-POWERED RECTANGULAR RAPID FLASHING BEACON (RRFB) SIGN ASSEMBLY, CONT'D.

PAYMENT -

PAYMENT WILL BE AT THE CONTRACT UNIT PRICE PER EACH FOR ITEM 630 "SIGNING MISC.: SOLAR POWERED RECTANGULAR RAPID FLASHING BEACON (RRFB) SIGN ASSEMBLY".

ITEM 608 - 4" CONCRETE WALK, ITEM 608 - 4" CONCRETE WALK, AS PER PLAN, ITEM 608 - CURB RAMP

THE QUANTITIES SHOWN ON THE CROSS SECTIONS FOR EXCAVATION AND EMBANKMENT ARE FOR INFORMATIONAL PURPOSES ONLY. EXCAVATION, EMBANKMENT, AND SUBGRADE COMPACTION ARE CONSIDERED INCIDENTAL TO THE ASSOCIATED 608 ITEM PER ODOT CMS 2023 ITEM 608 - 4" CONCRETE WALK, ITEM 608 - 4" CONCRETE WALK, AS PER PLAN, AND ITEM 608 - CURB RAMP.

ITEM 202 - WALK REMOVED AND ITEM 202 - PAVEMENT REMOVED

THE QUANTITIES SHOWN ON THE CROSS SECTIONS FOR EXCAVATION AND EMBANKMENT ARE FOR INFORMATIONAL PURPOSES ONLY. EXCAVATION AND EMBANKMENT ARE CONSIDERED INCIDENTAL TO THE ASSOCIATED 202 ITEM PER ODOT CMS 2023 ITEM 202 - WALK REMOVED AND ITEM 202 - PAVEMENT REMOVED.

DESIGN AGENCY

THE THRASHER GROUP

DESIGNER

NCT

REVIEWER

BEO 12-12-25

PROJECT ID

120042

SHEET TOTAL

P.07 144

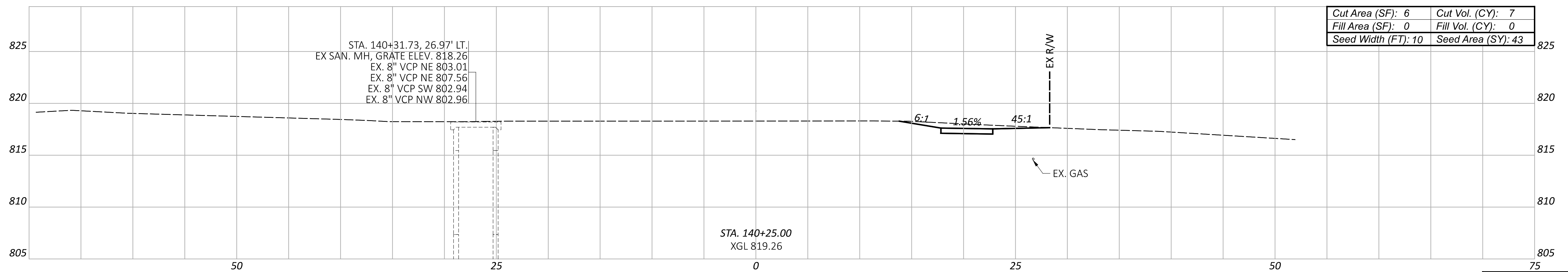
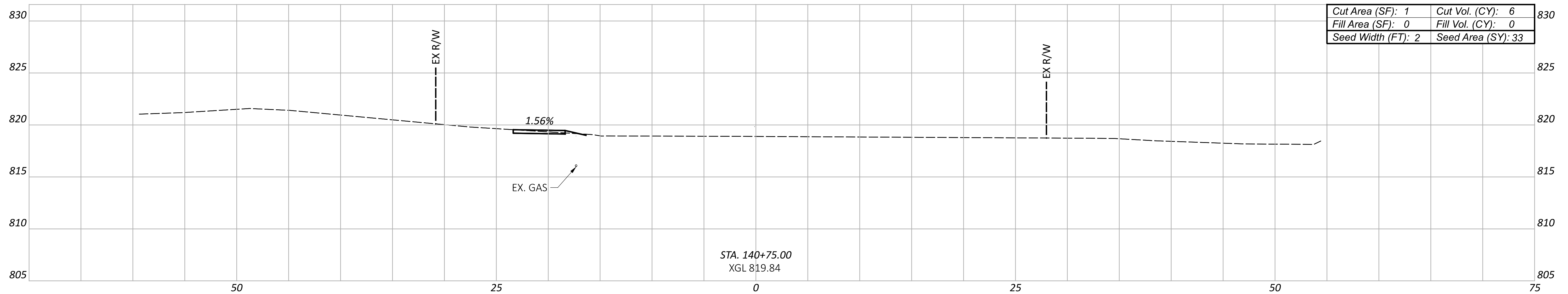
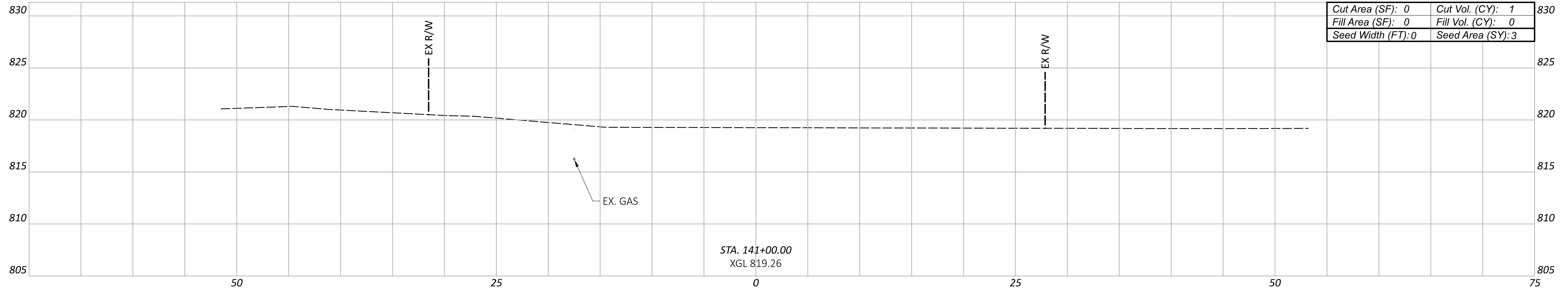
SHEET NUMBER						PART.	ITEM	ITEM	GRAND	UNIT	DESCRIPTION	SEE SHEET NO.
P.05	P.06	P.13	P.14	P.15	P.17	01/ENH	EXT	TOTAL				
											ROADWAY	
LS						LS	201	11000	LS		CLEARING AND GRUBBING	
			1,235			1,235	202	23000	1,235	SY	PAVEMENT REMOVED	P.07
		30,809				30,809	202	30000	30,809	SF	WALK REMOVED	P.07
		212				212	202	30001	212	SF	WALK REMOVED, AS PER PLAN	P.06, P.07
		7				7	202	32000	7	FT	CURB REMOVED	
		40				40	202	35100	40	FT	PIPE REMOVED, 24" DIAMETER AND UNDER	
		1				1	202	58100	1	EACH	CATCH BASIN REMOVED	
		8				8	202	58201	8	EACH	INLET REMOVED, AS PER PLAN	P.06
		3				3	202	98100	3	EACH	REMOVAL MISC.: ROCK	P.06
			1,311			1,311	204	10000	1,311	SY	SUBGRADE COMPACTION	
		36,673				36,673	608	10000	36,673	SF	4" CONCRETE WALK	P.07
		167				167	608	10001	167	SF	4" CONCRETE WALK, AS PER PLAN	P.06, P.07
		4,110				4,110	608	52000	4,110	SF	CURB RAMP	P.07
		8				8	608	53020	8	SF	DETECTABLE WARNING	
		4				4	SPECIAL	69050350	4	EACH	MAILBOX REMOVED AND RESET	P.06
											EROSION CONTROL	
353						353	659	00300	353	CY	TOPSOIL	
3,180						3,180	659	00500	3,180	SY	SEEDING AND MULCHING, CLASS 1	
159						159	659	14000	159	SY	REPAIR SEEDING AND MULCHING	
159						159	659	15000	159	SY	INTER-SEEDING	
0.43						0.43	659	20000	0.43	TON	COMMERCIAL FERTILIZER	
0.66						0.66	659	31000	0.66	ACRE	LIME	
18						18	659	35000	18	MGAL	WATER	
						15,000	832	30000	15,000	EACH	EROSION CONTROL	
											DRAINAGE	
		44				44	611	04400	44	FT	12" CONDUIT, TYPE B, 706.01 OR 706.02	
		30				30	611	04600	30	FT	12" CONDUIT, TYPE C, 706.01 OR 706.02	
		2				2	611	98470	2	EACH	CATCH BASIN, NO. 2-2B	
		1				1	611	99654	1	EACH	MANHOLE ADJUSTED TO GRADE	
		1				1	611	99690	1	EACH	MANHOLE, MISC.: HANDFORMED SHALLOW MANHOLE	P.06
											PAVEMENT	
		24				24	304	20000	24	CY	AGGREGATE BASE, 8"	
	25					25	253	01001	25	SY	PAVEMENT REPAIR, AS PER PLAN	P.06
			917			917	452	10050	917	SY	6" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC MS	
			393			393	452	12050	393	SY	8" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC MS	
											TRAFFIC CONTROL	
				4		4	625	32000	4	EACH	GROUND ROD	
				51		51	630	02100	51	FT	GROUND MOUNTED SUPPORT, NO. 2 POST	
				13		13	630	08510	13	FT	STREET NAME SIGN SUPPORT, NO. 2 POST	
				5		5	630	85100	5	EACH	REMOVAL OF GROUND MOUNTED SIGN AND REERECTION	
				5		5	630	86002	5	EACH	REMOVAL OF GROUND MOUNTED POST SUPPORT AND DISPOSAL	
				4		4	630	97700	4	EACH	SIGNING, MISC.: SOLAR POWERED RECTANGULAR RAPID FLASHING BEACON (RRFB) SIGN ASSEMBLY	P.07
				4		4	632	64020	4	EACH	PEDESTAL FOUNDATION	
	740					740	642	30001	740	FT	REMOVAL OF PAVEMENT MARKING, AS PER PLAN	P.06
					1,744	1,744	644	00620	1,744	FT	CROSSWALK LINE, 12"	
					49	49	644	20800	49	FT	YIELD LINE	
											MAINTENANCE OF TRAFFIC	
5						5	616	10000	5	MGAL	WATER	

GENERAL SUMMARY

DESIGN AGENCY	THE THRASHER GROUP
DESIGNER	NCT
REVIEWER	BEO
PROJECT ID	120042
SHEET TOTAL	P.08   144

SEEDING AREA  
TOTALS CARRIED  
TO GENERAL NOTES  
2,327 SY

EARTHWORK AREA  
TOTALS (FOR INFORMATIONAL  
PURPOSES ONLY)  
CUT VOLUME: 494 CY FILL VOLUME: 47 CY



CROSS SECTIONS - MAIN STREET  
STA. 140+25.00 TO STA. 141+00.00

TUS-PORT WASHINGTON SIDEWALKS

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DESIGN AGENCY

THE THRASHER GROUP

DESIGNER  
NCT

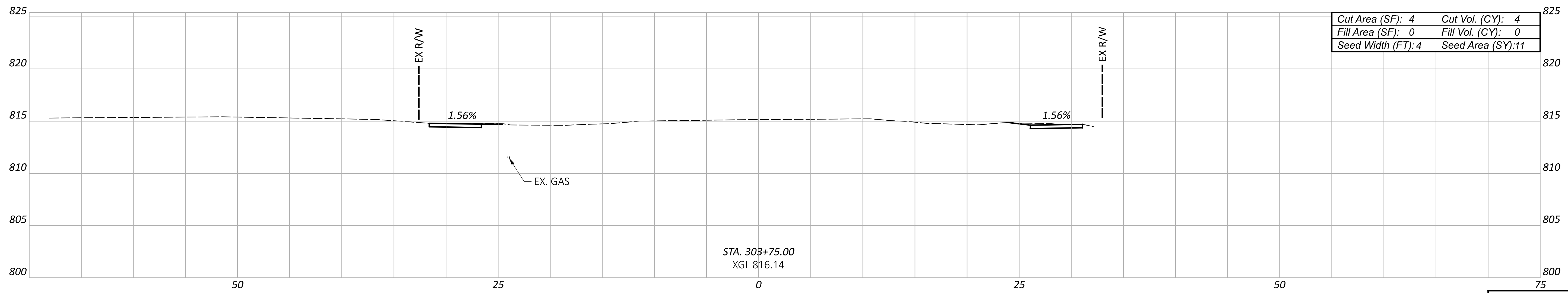
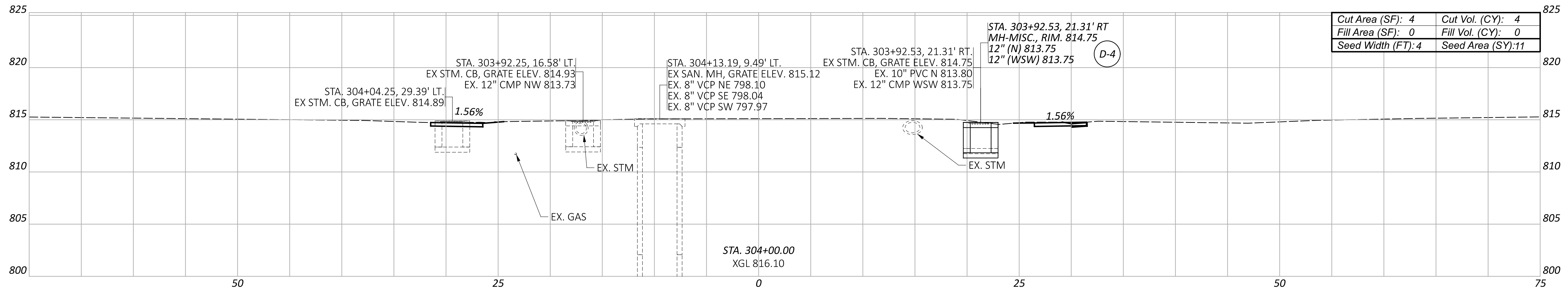
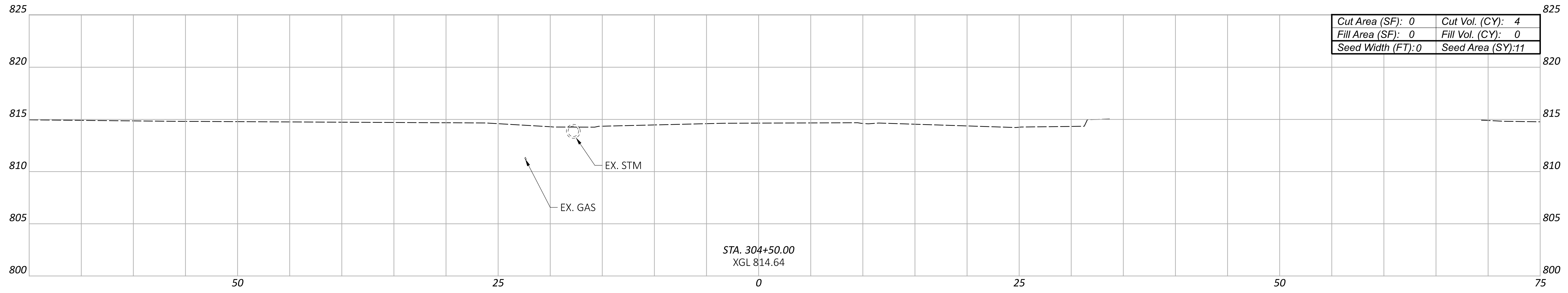
REVIEWER  
BEO 12-12-25

PROJECT ID  
120042

Sheet Totals			120042	
Seeding	Cut	Fill	SHEET	TOTAL
79	14	0	P.82	144

SEEDING AREA  
TOTALS CARRIED  
TO GENERAL NOTES  
209 SY

EARTHWORK AREA  
TOTALS (FOR INFORMATIONAL  
PURPOSES ONLY)  
CUT VOLUME: 89 CY FILL VOLUME: 1 CY



CROSS SECTIONS - ST CLAIRSVILLE STREET  
STA. 303+75.00 TO STA. 304+50.00

TUS-PORT WASHINGTON SIDEWALKS

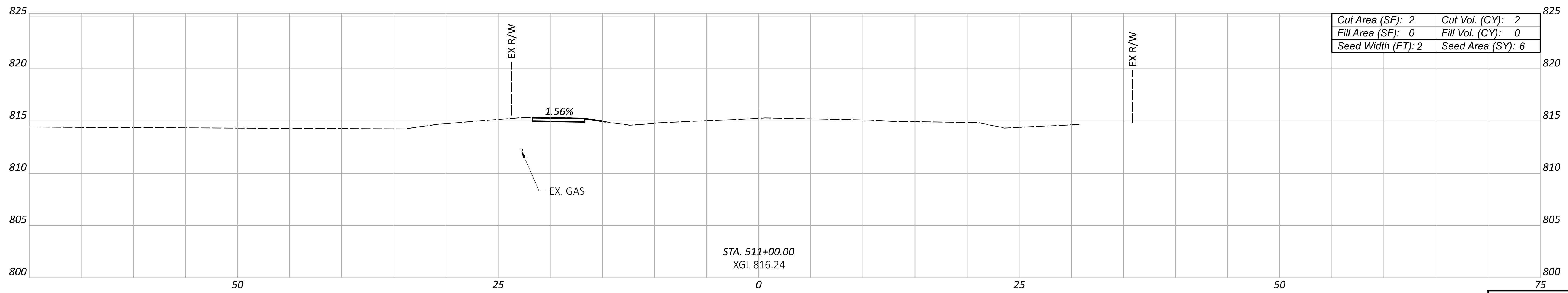
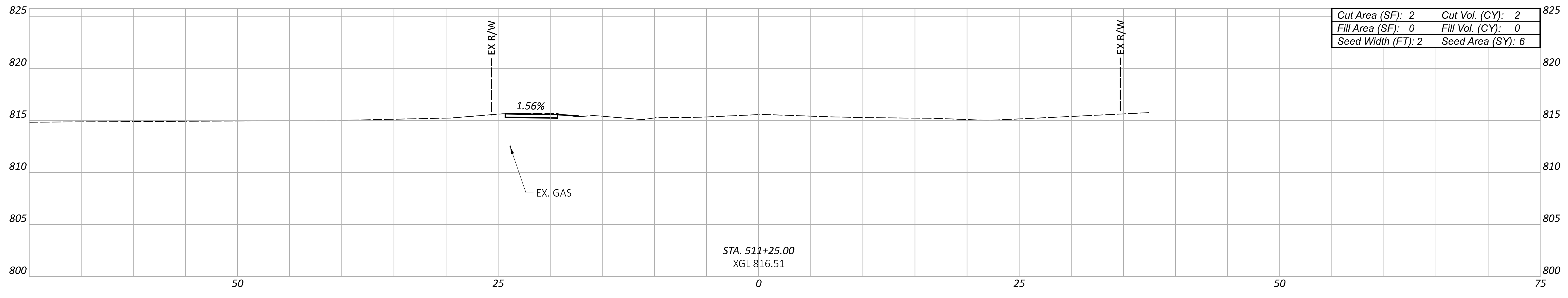
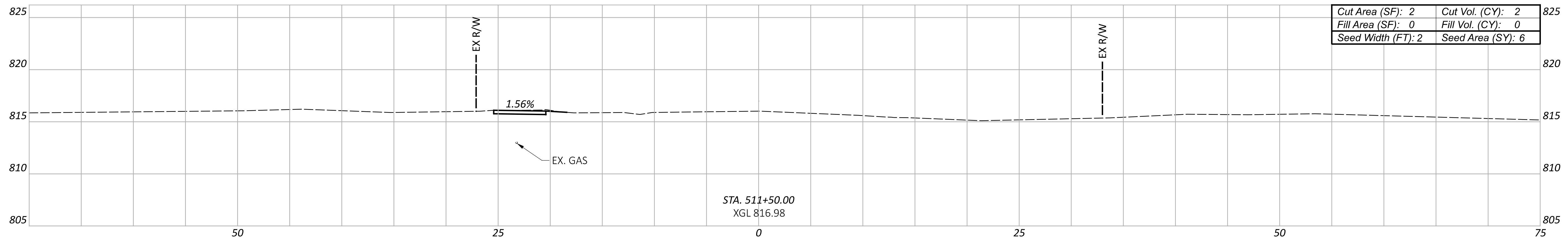
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DESIGN AGENCY  
THE THRASHER GROUP  
DESIGNER  
NCT  
REVIEWER  
BEO 12-12-25  
PROJECT ID  
120042

Sheet Totals			120042	
Seeding	Cut	Fill	SHEET	TOTAL
33	12	0	P.89	144

SEEDING AREA  
TOTALS CARRIED  
TO GENERAL NOTES  
253 SY

EARTHWORK AREA  
TOTALS (FOR INFORMATIONAL  
PURPOSES ONLY)  
CUT VOLUME: 132 CY FILL VOLUME: 1 CY



CROSS SECTIONS - ARCH STREET  
STA. 511+00.00 TO STA. 511+50.00

TUS-PORT WASHINGTON SIDEWALKS

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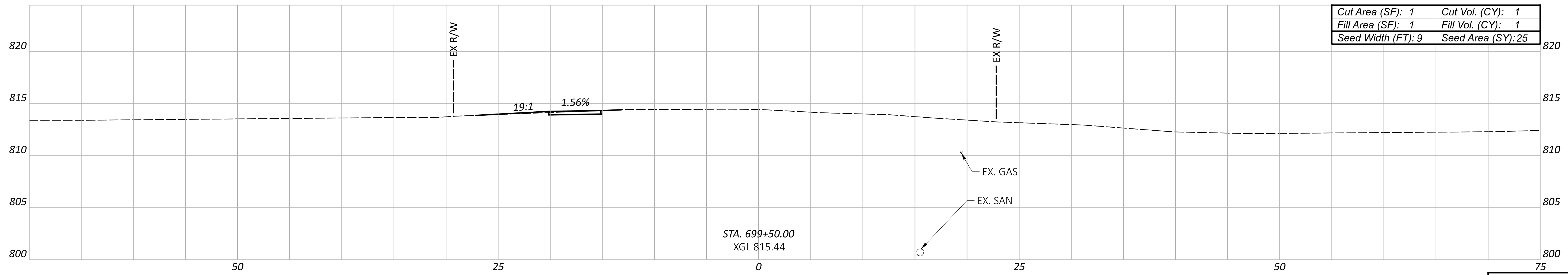
DESIGN AGENCY  
THE THRASHER GROUP  
DESIGNER  
NCT  
REVIEWER  
BEO 12-12-25  
PROJECT ID  
120042

Sheet Totals			TOTAL	
Seeding	Cut	Fill	P.104	144
18	6	0		

SEEDING AREA  
 TOTALS CARRIED  
 TO GENERAL NOTES  
 391 SY

EARTHWORK AREA  
 TOTALS (FOR INFORMATIONAL  
 PURPOSES ONLY)  
 CUT VOLUME: 29 CY FILL VOLUME: 26 CY

CROSS SECTIONS - SCHOOL STREET  
 STA. 699+50.00



Cut Area (SF): 1	Cut Vol. (CY): 1
Fill Area (SF): 1	Fill Vol. (CY): 1
Seed Width (FT): 9	Seed Area (SY): 25

Sheet Totals			120042	
Seeding	Cut	Fill	SHEET	TOTAL
25	1	1	P.111	144

DESIGN AGENCY  
 THE THRASHER GROUP

DESIGNER  
 NCT

REVIEWER  
 BEO 12-12-25

PROJECT ID  
 120042