

Engineer's Report for

Proposed Levee Improvements New Levee District

Harrison & Pottawattamie Counties, Iowa
March, 2022

Submitted by:

Bolton & Menk, Inc.
300 W McKinley St
Jefferson, IA 50129
P: 515-386-4101



Real People. Real Solutions.

Certification

Engineer's Report

for

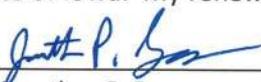
Proposed New Levee District Improvements

New Levee District
Harrison & Pottawattamie Counties, Iowa
0A1.126865

2022

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Iowa. My renewal date is December 31, 2022.

By:


Jonathan P. Rosengren, P.E.
License No. 21661

Date:

March 31, 2022



Table of Contents

I.	INTRODUCTION.....	1
A.	Scope of Work	1
B.	Location	1
II.	Investigation	1
III.	Other Regulatory Requirements.....	1
A.	National Flood Insurance Program (NFIP) – Iowa DNR Floodplain Section.....	1
B.	Clean Water Act Compliance.....	2
IV.	Proposed Work	2
A.	Alternative Route.....	3
B.	Fill Material Source.....	3
C.	Road Crossings.....	3
D.	Drainage Structures.....	3
E.	Right-of-Way Acquisition.....	4
F.	Work Limits.....	4
G.	Utilities.....	4
V.	Assessment Schedule.....	4
VI.	Discussions & Recommendations	5

Appendix

Appendix A: Benefited Lands

Appendix B: Engineer's Opinion of Probable Cost

Appendix C: Preliminary Plans

I. INTRODUCTION

A. Scope of Work

On February 24th, 2022, the Harrison and Pottawattamie County Boards of Supervisors appointed Bolton & Menk, Inc to provide a report for the establishment of a new levee district lying east of the DeSoto National Wildlife Refuge (DeSoto NWR). The board directed that the new levee be capable of providing flood protection for the private lands to the east, roughly equivalent to that provided by the Vanman Levee in northern Pottawattamie County, lying along the Missouri River. This report will describe improvements which can provide such protection.

B. Location

The lands protected by the proposed levee generally lie in the east half of Sections 23, 26 and 35 and the west half of Sections 24, 25 and 36 of Cincinnati Township (78N-45W) in Harrison County and portions of Sections 1, 2, 11 and 12 of Rockford Township (77N-45W) in Pottawattamie County. These lands total approximately 1,830 acres in the two counties. A complete list of lands found to benefit from this levee is included in Appendix A of this report.

II. Investigation

The lands proposed for inclusion in this new levee district have historically been protected from overflow by portions of the Vanman Levee and the Coulthard Levee. Both Levees were heavily damaged inside of DeSoto NWR by flooding in 2011. Flooding in 2019, which drained through the unrepairs levee breaches caused in 2011, lead to state funds being made available to both districts to repair their levee structures. Repairs to the Vanman Levee were completed in the spring of 2021. The breach in the Coulthard Levee was repaired in the fall of 2020, but to date the district has been unable to make progress in restoring the original levee elevation.

The proposed levee lies north of the Vanman Levee in Pottawattamie County and lies alongside DeSoto Lake. Due to its location, the proposed levee does not receive direct river flow. The levee will primarily protect against overflow from the lake during high river flows which bypass the flood protections west of DeSoto NWR. Research into the history of the Vanman Levee has shown a protection level of approximately 3 feet above the 100-year river flood. Because this proposed levee lies upstream of and connects to the Vanman, it is necessary that it provide a roughly equivalent protection level to prevent circumventing of the river levee protective system.

III. Other Regulatory Requirements

A. National Flood Insurance Program (NFIP) – Iowa DNR Floodplain Section

The Iowa DNR, Flood Plain Management Program will have jurisdiction to review the proposed levee improvements described in this report. The primary objective of the review is to ensure no-rise within the Missouri River regulated floodway.

The regulated floodway is a boundary calculated adjacent to the river where the entire floodplain outside of that boundary can be completely filled, forcing all water from the 100-year flood into that zone. If all the 100-year flood flow is forced into this zone, the flood elevation will not rise more than a specified vertical distance, typically 1 foot. Because of this definition, any fill within the floodway boundary must show there will be no change in

the elevation of the 100-year flood, but any fill outside of that boundary is assumed to be accounted for in the determination of the boundary.

The proposed levee lies more than 4,200 feet at the closest from the regulated floodway of the Missouri River. Because of this, the impacts on flooding of the Missouri River are already incorporated into the development of the floodway boundary. This means the floodplain permit should be relatively easy to obtain through a joint application process and certification with the county floodplain section.

This permit will be applied for this spring to ensure proper documents are in place for construction in the fall and winter of 2022.

B. Clean Water Act Compliance

The work proposed in this report will likely be reviewed by the US Army Corps of Engineers to ensure compliance with Federal Clean Water Act Section 404 regulations. The USACE will review what impacts the project will have on existing wetlands in the vicinity of the work. These impacts can include but are not limited to filling or draining.

A wetland delineation by a qualified wetland specialist, in accordance with USACE standards will be submitted to the USACE. This delineation will allow determination of project impacts and necessary work required to mitigate those impacts. This mitigation will likely consist of purchase of wetland credits from an approved wetland mitigation bank. These credits are estimated to cost approximately \$45,000 per acre. Because of the costs, it will be necessary to limit wetland impacts as much as possible. This delineation cannot be completed until later in the growing season.

IV. Proposed Work

The investigation has confirmed the need for a levee to match the protection level of the Vanman Levee south of the proposed levee. We propose the following improvements be made to provide the necessary protection.

The proposed levee will begin in the NE NE of Section 10-77-45 in Pottawattamie County, connecting to and matching the height of the Vanman Levee at that location. From that point the levee will run east along the south side of DeSoto Ave into Section 11-77-45. Where the levee crosses DeSoto Ave, a modified road section will be required to safely carry traffic over the levee and maintain road access to both Wilson Island State Park and the east entrance to DeSoto.

From DeSoto the levee will run along the west and north edges of the SW ¼ of Section 2-77-45. This field has an irrigation pivot that in two locations will ride along the side slopes of the levee. The levee slope is flat enough for this to be done, however, to minimize the deflection in the pivot two ramps will be constructed for the interior pivot wheels. From this field, the levee will run adjacent to the east shoreline of the Nobles Lake WMA operated by the State of Iowa. At the entrance to the WMA, the gravel driveway will need to be raised to allow access across the levee. At the SW corner of the SE NE of Section 35-78-45 the levee will turn north and follow the existing private lane to the top of the natural ridge in the W ½ of that section. The levee turns north along the west side of the private property in this section to 335th St. where it will turn back east to tie into the high ground. 335th St will be raised to run on top of the levee at this location.

The levee resumes north of the acreage in the SE SW of Section 26-78-45, running along the field edge along the east side of the wetland area in the old river meander at this location. At the point where the levee crosses the west line of the NW SE of Section 27-78-45 then turns north, running along the east side of the line, connecting to the Highway 30 road embankment at the north line of the NW NE of Section 23-78-45.

A. Alternative Route

Early consideration was given to an alternative route running west of Nobles Lake. That option was found less favorable by the board during a site visit in February. However, we are aware of much landowner interest in maintaining this alternate route as an option if possible. This route would have more local support, require slightly less fill material and would provide flood protection to the state-owned property at Nobles Lake. There is a risk of higher mitigation credit requirements, though the actual number of credits required will not be known until after the delineation is completed. We recommend that this option be included in the Joint Application process to determine the feasibility of this route.

The south end of the proposed levee turns to the west to meet the Vanman Levee. This section could be shortened to cross through the NE NE of Section 10 of Rockford Township to meet the Vanman Levee further south. This option could provide a path for flood waters to let out; we would need to look at the hydrologic models to determine how much benefit this alternative route could provide.

B. Fill Material Source

We have spoken with Don Brothers regarding purchase of land from which to take the fill material needed for the project on more than one occasion. The Brother's property was the source of a significant portion of the fill material used on the repairs to the Coulthard Levee in the fall of 2020. Don has indicated he is willing to consider selling additional material for the use on this proposed new levee, so long as fair compensation is made. Further study of market prices is necessary to determine compensation as land prices have been highly volatile in recent months.

C. Road Crossings

Several road crossings are necessary to carry the levee from the Vanman Levee to Highway 30. Iowa Code Section 468.106 allows the proposed levee be constructed within the existing public road rights-of-way, so long as the levee district pays for the modifications to the roadway and does not interfere with public travel thereon. After construction, maintenance of the roadway will return to the appropriate county secondary road departments.

468.106 Construction on or along highway. When a levee or drainage district shall have been established by the board and it shall become necessary or desirable that the levee, ditch, drain, or improvement shall be located and constructed within the limits of any public highway, it shall be so built as not materially to interfere with the public travel thereon.

The estimate attached to this report attempts to estimate the costs of such crossings or modifications. We will work with the county engineers of both counties to ensure satisfactory design of these crossings.

D. Drainage Structures

Several drainage ways cross the proposed levee at several locations, some draining out of the protective area, others draining in. The attached plans show several drainage structures along the length of the proposed levee to allow water to continue to flow in its natural course during non-flood periods. Flood gates on each structure will prevent flood waters from entering the district when waters raise. For those structures which flow into the protected area, a manual gate on the upstream end will be necessary to block flows. For those structures draining out, a flap gate type valve can be used to prevent backflow.

1. Nobles Lake Outlet

One special consideration is the outlet to Nobles Lake. This body of water drains to the Nobles Lake drainage ditch. We are aware of a court ruling which sets the elevation of the lake at a fixed point. Any outlet to the lake will need to take this elevation into consideration.

The outlet should also be sized to ensure the capacity is matched to that of the open ditch which must carry the water away. Additional modeling will be required to ensure any flooding is limited and manageable for the lands downstream, inside of the protective area.

E. Right-of-Way Acquisition

It is necessary that rights-of-way be acquired along the entire length of the proposed levee. We recommend a width of 80 feet be used for the majority of the project. There are areas where additional widths are necessary. No tabulation of right-of-way has been included with this report. We will submit the necessary acres and widths as an amendment to this report before the initial hearing with the landowners.

After the initial hearing, appraisers will be appointed to determine proper compensation for the lands to be taken for right-of-way. The appraisers consist of two disinterested landowners, one from each of the two counties, and the engineer. The appraisers will develop a report listing the acres to be taken and recommended compensation which will be filed with the Joint Boards of Supervisors. The Joint Board will issue notice to those landowners of lands recommended as rights-of-way. The Joint Board will consider the Appraisers report at hearing with the landowners and approve what they determine to be fair compensation. Right-of-Way is legally acquired upon approval at hearing. Landowners may appeal the price approved to district court but cannot appeal the acquisition itself.

F. Work Limits

The permanent right-of-way is not intended to be wide enough to accommodate construction activities associated with major repairs or improvements. The district will need a larger area within which to clear and grub trees, strip and stockpile topsoil and compact the levee fill. The extent of the work limits on the Levee will be finalized when the final construction plans are developed, but it will typically be out to 100 feet from the levee centerline on the side or sides in which work will be done. Landowners will also be entitled to compensation for damages in the work area outside the right-of-way. Within the permanent right-of-way, construction-related damages will not be compensated. It is recommended that whenever possible, a landowner not crop the work area and instead accept fair rent for the land. Compensation for use of and damages within the temporary work area is normally determined at the project completion hearing.

G. Utilities

Overhead power lines and other utility lines likely parallel or cross the levees at various locations. Extra care will need to be taken when working under or near these utility lines. The contractor will be responsible to use Iowa OneCall to notify utility companies and to cooperate in the locating, marking, and protection of these facilities.

V. Assessment Schedule

Funding for the proposed levee improvements is being provided in full by the State of Iowa. However, the district will require an assessment schedule be established upon which future

repairs can be assessed. If it is found during the classification process that additional lands benefit from the new levee district it is recommended that those lands be annexed and classified to ensure an equitable spread of all future maintenance.

There are two methods for classification which can be considered for this proposed district. The first is an equal per acre assessment, which is only allowable within a levee district under Iowa law. The second is assessment based upon benefits derived. This second method is preferred as it is more equitable, charging higher assessments to those lands which have more need of the levee, and lower assessments to those lands which have less need.

After establishment, the Joint Board will appoint a classification commission, which can be the same as the appraisers described above. This commission will report a recommended distribution of assessments which the Joint Board will consider at hearing. Any changes the board finds appropriate can be made at that hearing.

VI. Discussions & Recommendations

This report confirms the need for levee improvements and establishment of a new levee district for the protection of lands in Harrison and Pottawattamie Counties. The work described in this report can accomplish this need.

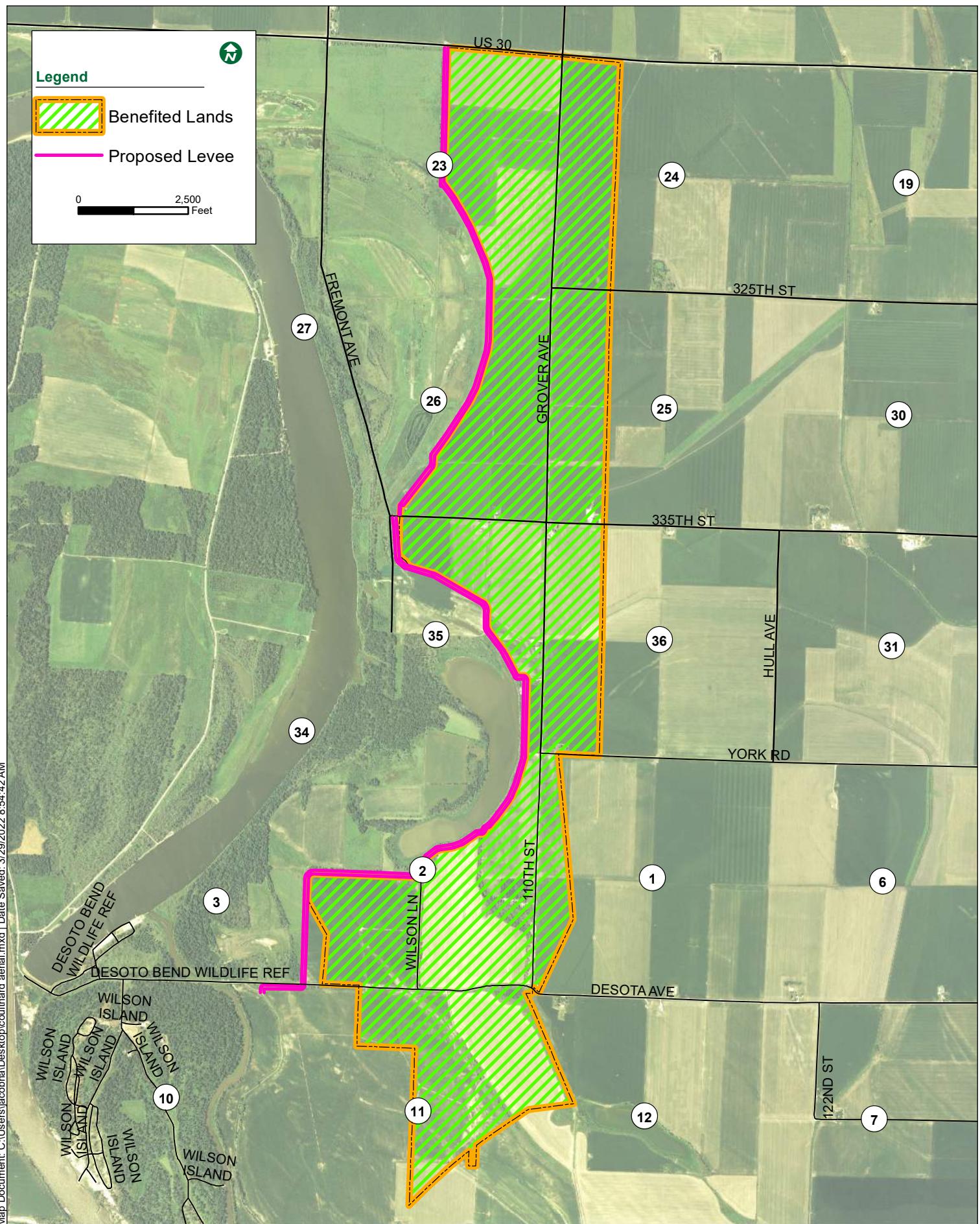
It is recommended that the Jojnt Board of the propsoed new levee district, take appropriate action, with legal guidance, to accomplish the following:

- Tentatively approve this engineer's report.
- Conduct a public hearing on the proposed improvements.
- Adopt the proposed plan, modified as deemed appropriate to satisfy the needs of the district.
- Appoint rights-of-way appraisers and Commissioners and continue hearing.
- Approve rights-of-way compensation and establish the district.
- Direct the engineer to apply for and acquire the permits and regulatory approvals necessary to complete the project as approved by the Board of Trustees.
- Direct the engineer to prepare the necessary plans and specifications and to proceed toward a bid letting.

Respectfully submitted,

Bolton & Menk, Inc.

Appendix A: Benefited Lands



**BENEFITED LANDS SCHEDULE
PROPOSED LEVEE IMPROVEMENTS
PROPOSED NEW LEVEE DISTRICT
HARRISON & POTAWATTAMIE COUNTIES, IOWA**

Deedholder	Parcel Number	S-T-R	Legal	Benefited Acres	Percent of Area
Harrison County Parcels					
Ambrose Fam Lim	420001386500000	24-78-45	NW NW	37.06	
Partnership, Robert E & Sally	420001386700000	24-78-45	SW NW	39.00	
J C/O Bob and Sally Ambrose				<hr/> 76.06	4.15%
Atwell Trust, Jay F	420001384300000	24-78-45	NW SW	39.00	
	420001384400000	24-78-45	SW SW	<hr/> 38.40	
				<hr/> 77.40	4.22%
Brothers, Donald D	420001387800000	25-78-45	PT LOT 1 SW SW	2.19	
	420001387801000	25-78-45	PT LOT 1 SW SW	34.20	
	420001388000000	36-78-45	NE COR NW NW	5.10	
	420001402300000	35-78-45	PT LOT 1 PARCEL A PT LOT 1	62.67	
	420001402301000	35-78-45	NE 1/2	2.32	
	420001402700000	35-78-45	PT LOT 7 NW 1/4	0.11	
	420001403901000	26-78-45	SE SE EX PARCEL A	<hr/> 35.30	
				<hr/> 141.89	7.74%
Coulthard, Betty J	420001398300000	23-78-45	NW NE	37.58	
	420001398400000	23-78-45	NE NE	<hr/> 37.77	
				<hr/> 75.35	4.11%
PARCEL A PT LOT 2					
Cullen, Wanda J Campbell, RI	420001408801000	35-78-45	NE SE	2.00	0.11%
Lomax Amended & Restated	420001455500000	25-78-45	NW NW	38.40	2.10%
Otto Family Farms, LLC	420001387600000	35-78-45	SE NE	32.50	
	420001402400000	35-78-45	NE NE	38.00	
		PT LOT 3 & PT S PT			
	420001402500000	35-78-45	LOT 4	13.00	
	420001408800000	35-78-45	PT LOTS 2 & 4 NE SE	<hr/> 2.00	
				<hr/> 85.50	4.67%

**BENEFITED LANDS SCHEDULE
PROPOSED LEVEE IMPROVEMENTS
PROPOSED NEW LEVEE DISTRICT
HARRISON & POTAWATTAMIE COUNTIES, IOWA**

Deedholder	Parcel Number	S-T-R	Legal	Benefited Acres	Percent of Area
Harrison County Parcels					
Papi's Family Farm I, LLC	420001434400000	26-78-45	PT LOT 1 NE NE PT LOT 4 SE SE & SW	42.13	
	420001434500000	23-78-45	SE	49.82	
	420001434700000	23-78-45	NE SE	39.00	
	420001434900000	26-78-45	PT LOT 2 NE 1/4	47.83	
				178.78	9.76%
Pennystreet Farms, Inc			LOT 3 N1/2 SE1/4 &		
	420001406800000	26-78-45	SE COR NE SW	66.60	
	420001417000000	26-78-45	PT LOT 4 SW SE	39.00	
	420001443700000	23-78-45	SW NE	38.72	
	420001443800000	23-78-45	SE NE	39.00	
	420001443900000	23-78-45	PT LOT 3 NW SE	31.95	
				215.27	11.75%
Rockford Farms Inc			NW NW EX 1 A NE		
	420001431200000	36-78-45	COR PT LOT 2 SW SW & PT LOT 3 NW SW & SW	39.00	
	420001431300000	36-78-45	SW	0.80	
	420001432200000	25-78-45	LOT 2 SW SW	0.70	
	420001432300000	36-78-45	SW NW	1.00	
	420001432400000	36-78-45	LOT 1 SW 1/4	1.30	
				42.80	2.34%
Scheffel Revocable Trust, Me					
	420001388600000	26-78-45	PT LOTS 4 & 5 SE SW	9.86	
	420001388601000	26-78-45	PT LOT 4 SE SW	0.71	
				10.57	0.58%
Soule, Steven K. Soule, Codi	420001437900000	36-78-45	PT LOT 2 SW SW & PT LOT 3 NW SW & SW		
		SW		37.20	2.03%
State Of Iowa	420001405002000	35-78-45	PT LOT 4 NE SE	0.57	0.03%
Sweeney Family, LLC	420001433000000	25-78-45	SW NW	39.00	
	420001434200000	25-78-45	NW SW	38.09	
				77.09	4.21%

**BENEFITED LANDS SCHEDULE
PROPOSED LEVEE IMPROVEMENTS
PROPOSED NEW LEVEE DISTRICT
HARRISON & POTAWATTAMIE COUNTIES, IOWA**

Deedholder	Parcel Number	S-T-R	Legal	Benefited Acres	Percent of Area
Harrison County Parcels					
Turner, Amy Jo	420001403900000	26-78-45	PARCEL A SE SE	1.79	0.10%
Harrison County Secondary Roads		0-0-0		40.00	2.18%
Total of Harrison County Lands				1098.67	59.96%
Pottawattmie County Parcels					
Calacci, Benjamin J Life Estate; 7 Kin Legado LLC, Remainder; Nolan, Elizabeth A Life Estate	774502400006	2-77-45	S132' SE SE PT NW NE COMM NE COR TH W APPROX 660' SELY TO S LINE E APPROX 340' N TO	4.00	
	774511200002	11-77-45	POB NE NE EXC .5 AC TRI	14.50	
	774511200003	11-77-45	IN NE COR	39.50	
	774511200006	11-77-45	G/L 7 IN SE NE ACCRE LT 10 NE SE	40.00	
	774511400005	11-77-45	EXC W165' G/L LT 6 NW NW EXC	11.60	
	774512100001	12-77-45	ELY 350' G/L 5 SW NW EXC ELY	5.00	
	774512100003	12-77-45	350'	20.80	
				135.40	7.39%
Kensinger, Timothy-Frances Trust; Kensinger, Mary Frances; Kensinger, Timothy Allen	774502200003	2-77-45	G/L 2 SW NE LYING S OF LAKE NW SE & E1/2 VAC	17.70	
	774502400001	2-77-45	WILSON LN ADJ SW SE & E1/2	39.00	
	774502400002	2-77-45	WILSON LN ADJ S1/2 NE SE & W OF	37.80	
	774502400004	2-77-45	DITCH N1/2 NE SE	20.75	
	774502400005	2-77-45	SE SE EXC SLY132'	33.00	
				148.25	8.09%
Martens, Robert E	774501300001	1-77-45	G/L 6	23.10	
	774501300003	1-77-45	G/L 5	12.00	
				35.10	1.92%

**BENEFITED LANDS SCHEDULE
PROPOSED LEVEE IMPROVEMENTS
PROPOSED NEW LEVEE DISTRICT
HARRISON & POTAWATTAMIE COUNTIES, IOWA**

Deedholder	Parcel Number	S-T-R	Legal	Benefited Acres	Percent of Area
Pottawattmie County Parcels					
McIntosh, Corey J;	774502200002	2-77-45	G/L 1 NE NE	18.12	
McIntosh, Lyle F; McIntosh,	774502200004	2-77-45	SE NE	37.00	
Thomas W & Linda A; Popson, Tina				55.12	3.01%
Nolan Amalgamated LLC;	774511100003	11-77-45	NE NW	39.00	
Nolan, Elizabeth A	774511200001	11-77-45	PT NW NE COMM NW COR TH E APPROX 660' SELY TO S LINE W APPROX 980' TO SW COR N TO POB	24.50	
	774511200005	11-77-45	SW NE	40.00	
	774511400001	11-77-45	NW NW SE & NW NE NW SE G/L 6	12.50	
	774511400004	11-77-45	W165' ACCRE LTS 10 & 11 NE SE	5.00	
				121.00	6.60%
Nolan, Clemencia F; Nolan Childrens Trust; Nolan, Patricia	774502400003	2-77-45	N1/2 NE SE E OF DITCH	18.25	1.00%
Nolan, Elizabeth A; Andres, Anne M Nolan; Ferraris, Katherine L Nolan; Nolan, Constance J; Nolan, James H; Shea, Margaret C Nolan; Veth, Kerry E Nolan	774511400007	11-77-45	ACCRE LT 13 SW SE	9.60	0.52%

**BENEFITED LANDS SCHEDULE
PROPOSED LEVEE IMPROVEMENTS
PROPOSED NEW LEVEE DISTRICT
HARRISON & POTAWATTAMIE COUNTIES, IOWA**

Deedholder	Parcel Number	S-T-R	Legal	Benefited Acres	Percent of Area
Nolan, Richard Joseph;	774511400002	11-77-45	PT G/L 6 NW SE	26.00	1.42%
Nolan, Elizabeth			COMM NE COR TH W330' S330' W330' S330' W660' S660' E TO SW CORACCRE LT 12 NE TO ELINE NW SE TH N TO POB		
Pottawattmie County Parcels					
Rockford Farms Inc	774501100001	1-77-45	G/L 8	16.10	
	774501100003	1-77-45	G/L 7	19.00	
				35.10	1.92%
Wagner, Frank J & Barbara M; Nolan, Elizabeth A	774502300002	2-77-45	G/L 4 NW SW	32.27	
	774502300003	2-77-45	NE SW & E605.22' SE NW LYING S OF LAKE & W1/2 VAC WILSON LN ADJ	36.44	
	774502300005	2-77-45	SW SW G/L 5	24.00	
	774502300006	2-77-45	SE SW & W1/2 VAC WILSON LN ADJ	39.00	
				131.71	7.19%
Pottawattamie County Secondary Roads		0-0-0		18.00	0.98%
Total of Pottawattamie County Lands				733.53	40.04%
Total of all Benefited Lands				1832.20	

Appendix B: Engineer's Opinion of Probable Cost

ENGINEER'S ESTIMATE

LEVEE SYSTEM ESTABLISHMENT

NEW LEVEE DISTRICT

HARRISON & POTAWATTAMIE COUNTIES IOWA

BMI PROJECT NO. OA1.126865



Real People. Real Solutions.

Date: 3/29/2022

Item No.	Item	Notes	Estimated Quantity	Unit	Unit Price	Total Amount
SECTION 1 - ZONE 1 LEVEE - NORTH OF 135TH ST						
101	TOPSOIL STRIPPING, STOCKPILE & RESPREAD		15,095	CY	\$5	\$75,474
102	EMBANKMENT CONSTRUCT		112	STA	\$600	\$67,200
103	EMBANKMENT FILL - MATERIAL TRANSPORT ONLY	1 2	69,741	CY	\$12	\$836,892
104	CORE TRENCH		20,741	CY	\$8	\$165,926
105	CLEARING & GRUBBING			LS		\$2,000
106	PERMANENT SEEDING		112	STA	\$300	\$33,600
107	FURNISH & INSTALL 36" DIAMETER RCP CULVERT w/FLAP GATE		2	EA	\$15,000	\$30,000
108	ADMINISTRATION OF SWPPP			LS		\$5,000
109	TEMPORARY STABILIZATION		13	AC	\$300	\$3,900
110	SILT FENCE, INSTALL & REMOVE		11,200	LF	\$2.50	\$28,000
111	MOBILIZATION			LS		\$62,000
						\$1,310,000
SECTION 2 - ZONE 2 LEVEE - SOUTH OF 135TH ST						
201	TOPSOIL STRIPPING, STOCKPILE & RESPREAD		26,971	CY	\$5	\$134,854
202	EMBANKMENT CONSTRUCT		172	STA	\$800	\$137,600
203	EMBANKMENT FILL - MATERIAL TRANSPORT ONLY	1 2	125,688	CY	\$12	\$1,508,252
204	CORE TRENCH		31,852	CY	\$8	\$254,815
205	CLEARING & GRUBBING			LS		\$15,000
206	PERMANENT SEEDING		172	STA	\$300	\$51,600
207	FURNISH & INSTALL 60" DIAMETER RCP CULVERT w/FLOOD GATE		1	EA	\$80,000	\$80,000
208	FURNISH & INSTALL 36" DIAMETER RCP CULVERT w/FLAP GATE		1	EA	\$15,000	\$15,000
209	ADMINISTRATION OF SWPPP			LS		\$5,000
210	TEMPORARY STABILIZATION		20	AC	\$300	\$6,000
211	SILT FENCE, INSTALL & REMOVE		17,200	LF	\$2.50	\$43,000
212	MOBILIZATION			LS		\$113,000
						\$2,364,000
SECTION 3 - DESOTO AVE CROSSING						
301	EMBANKMENT CONSTRUCT			LS		\$25,000
302	EMBANKMENT FILL - MATERIAL TRANSPORT ONLY		9,066	CY	\$15	\$135,990
303	PAVEMENT REMOVAL		733	SY	\$8.00	\$5,864.00
304	6" HMA ROAD SURFACE		182	TON	\$105.00	\$19,110.00
305	12" SUB-BASE PREP		867	SY	\$4.00	\$3,468.00
306	CLASS A GRANULAR SHOULDER MATERIAL		41	TON	\$30.00	\$1,230.00
307	MOBILIZATION			LS		\$10,000
						\$201,000
						SUBTOTAL OF SECTIONS 1 2 & 3:
						\$3,875,000
						CONSTRUCTION CONTINGENCY:
						\$387,500
						TOTAL ESTIMATED CONSTRUCTION COST:
						\$4,262,500

- NOTES:**
- 1 Fill Factor 1.35 Used
 - 2 Transport cost calculated from farm fields on Brothers & Otto Ground

ENGINEER'S ESTIMATE

LEVEE SYSTEM ESTABLISHMENT

NEW LEVEE DISTRICT

HARRISON & POTAWATTAMIE COUNTIES IOWA

BMI PROJECT NO. 0A1.126865



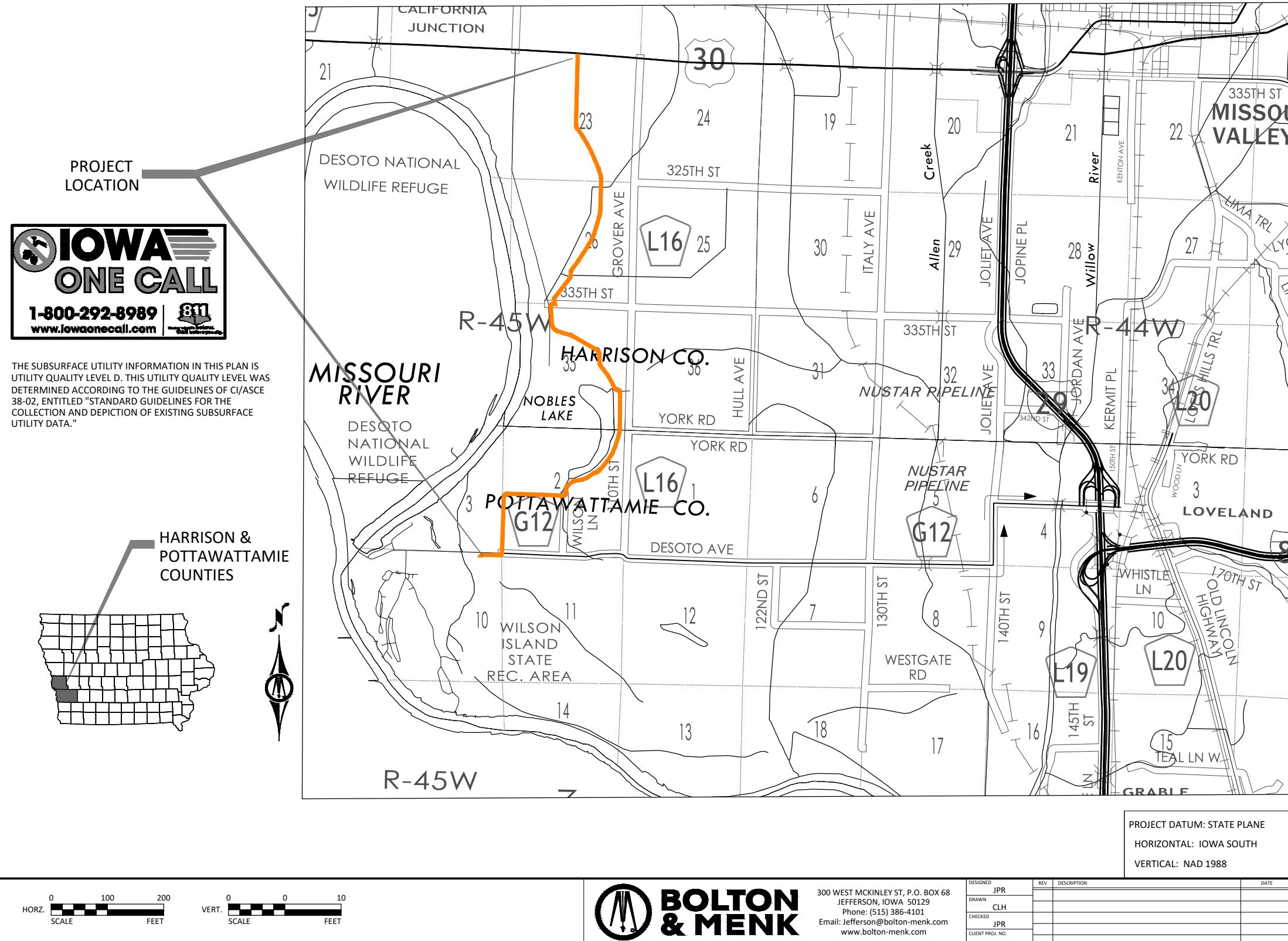
Real People. Real Solutions.

Date: 3/29/2022

Item No.	Item	Notes	Estimated Quantity	Unit	Unit Price	Total Amount
Associated Project Costs						
	RIGHT-OF-WAY ACQUISITION - 80' WIDTH					
	ZONE 1		21	AC		\$252,000
	ZONE 2		32	AC		\$384,000
	BROTHERS & OTTO BORROW EASEMENTS		26	AC		\$312,582
	WORK AREA RENTAL		100	AC		\$40,000
	OTHERS DAMAGES					\$213,100
Engineering						
	SURVEY, STUDY & REPORT THOROUGH HEARINGS					\$50,000
	WETLAND AND ENVIRONMENTAL COMPLIANCE					\$150,000
	CONSTRUCTION PLANS, SPECIFICATIONS & BID LETTING					\$75,000
	CONSTRUCTION ENGINEERING SERVICES					\$200,000
	LEGAL SERVICES, PUBLICATIONS, MAILINGS, ETC.					\$20,000
	WETLAND MITIGATION					
	ZONE 1		3	AC		\$165,000
	ZONE 2		4	AC		\$220,000
	FINANCE & INTEREST					\$84,800
ESTIMATED PROJECT COST:						\$6,428,982

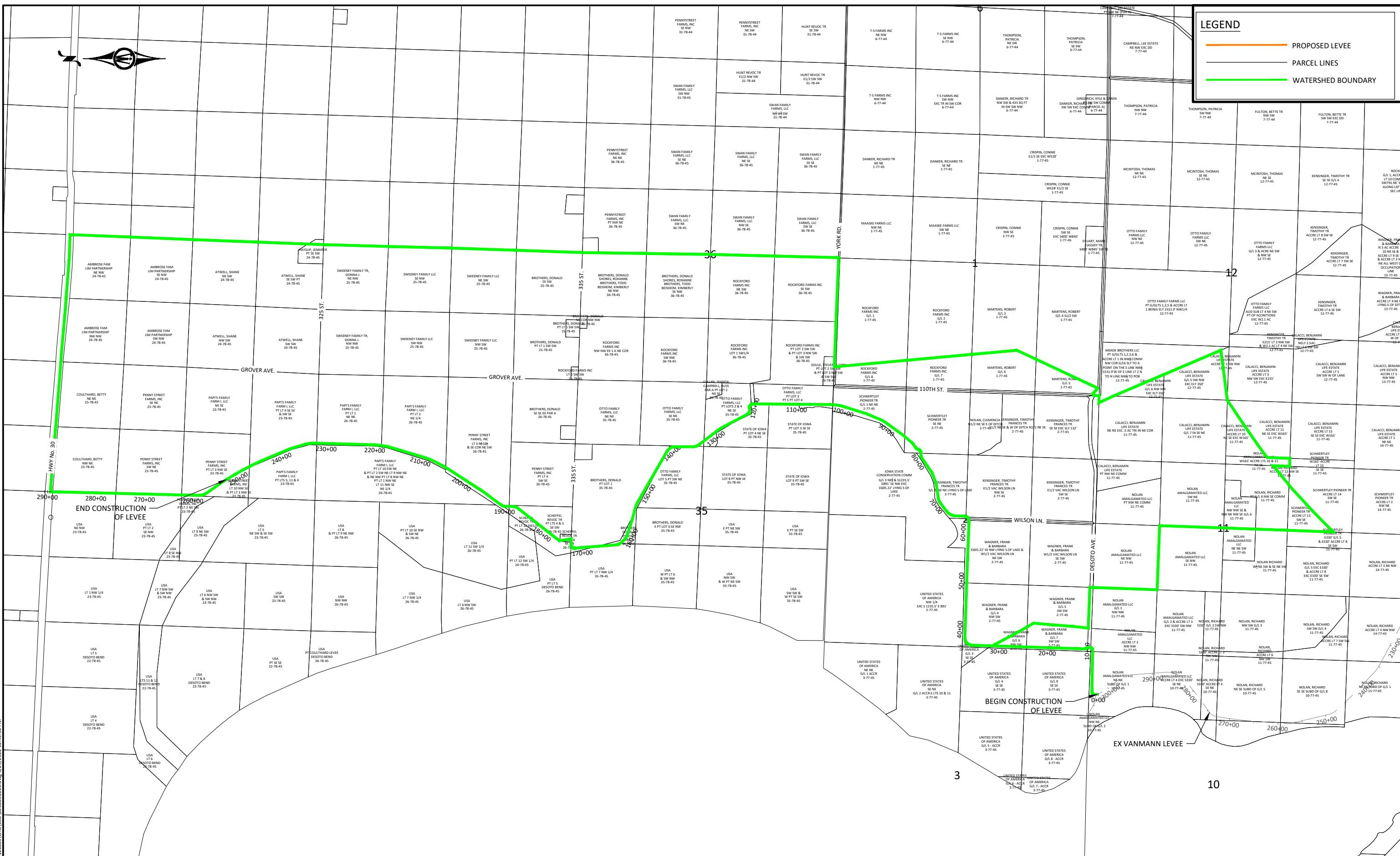
Appendix C: Preliminary Plans

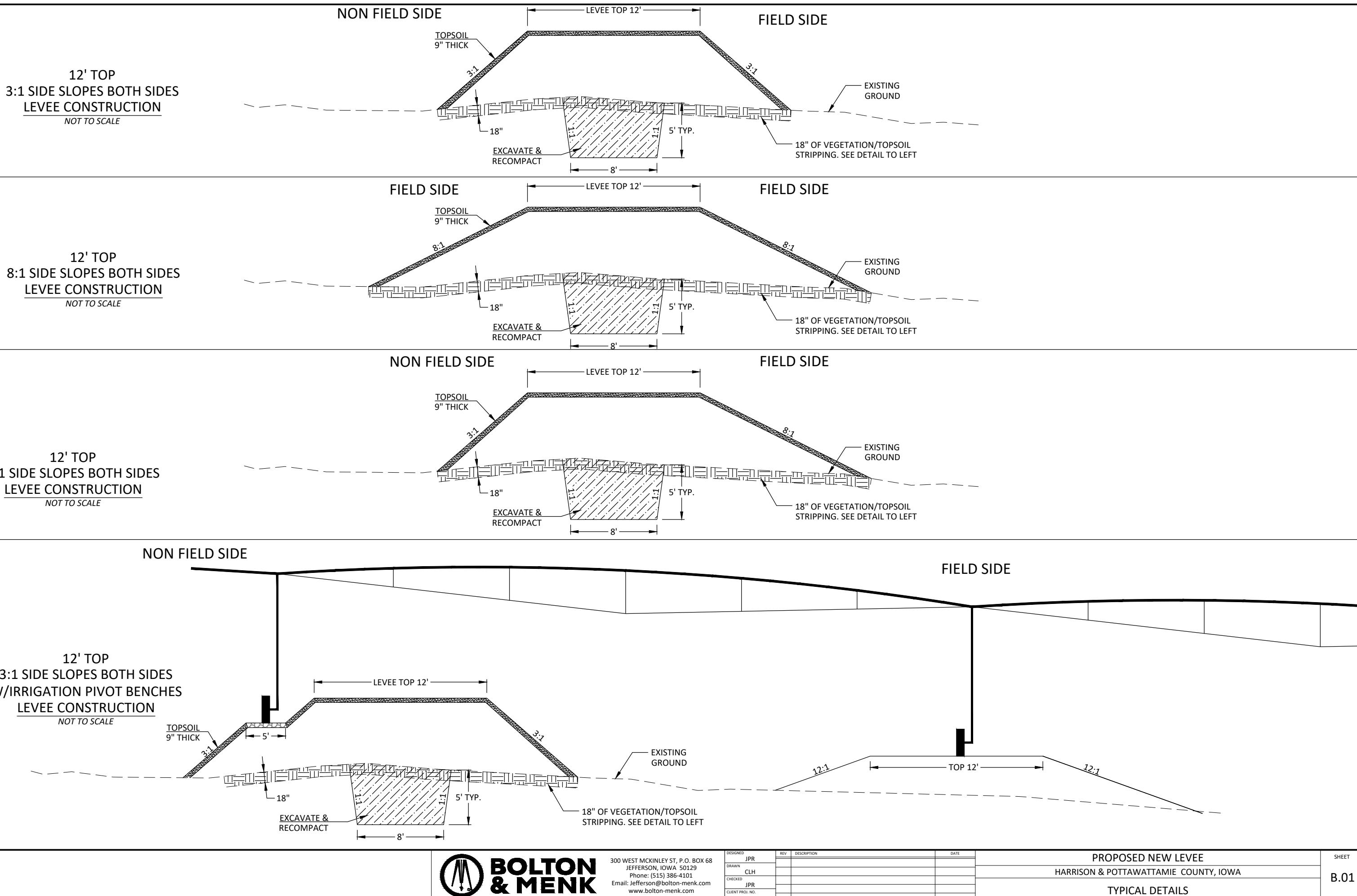
PRELIMINARY PLANS FOR
PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
2022

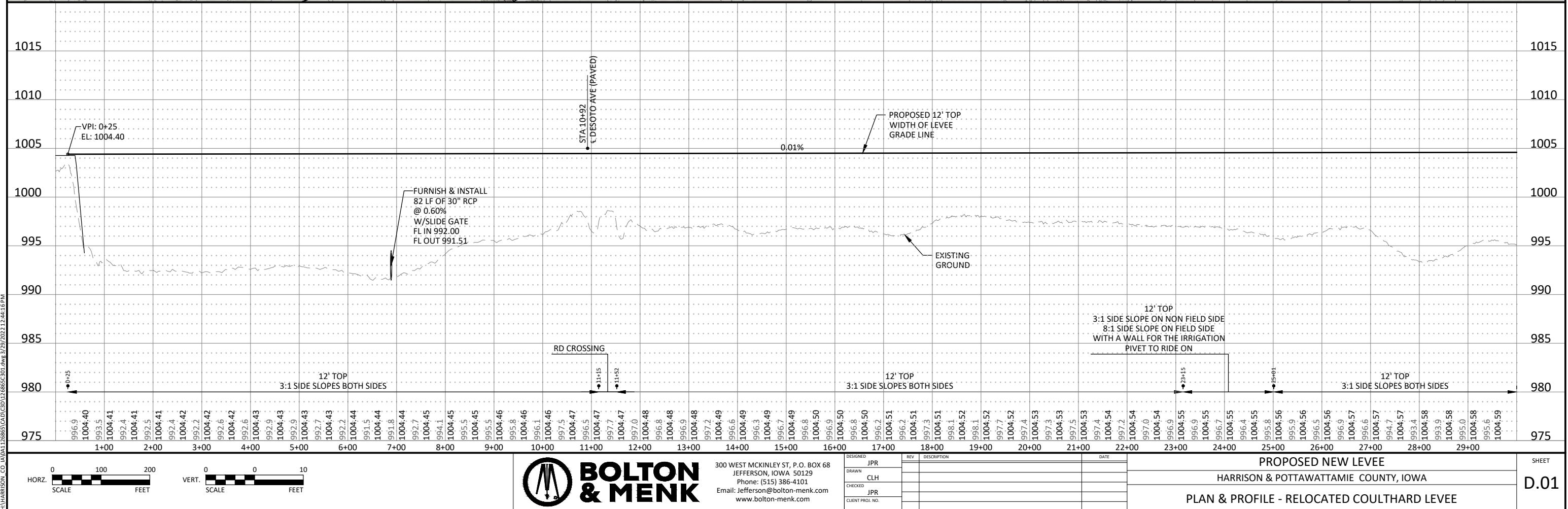
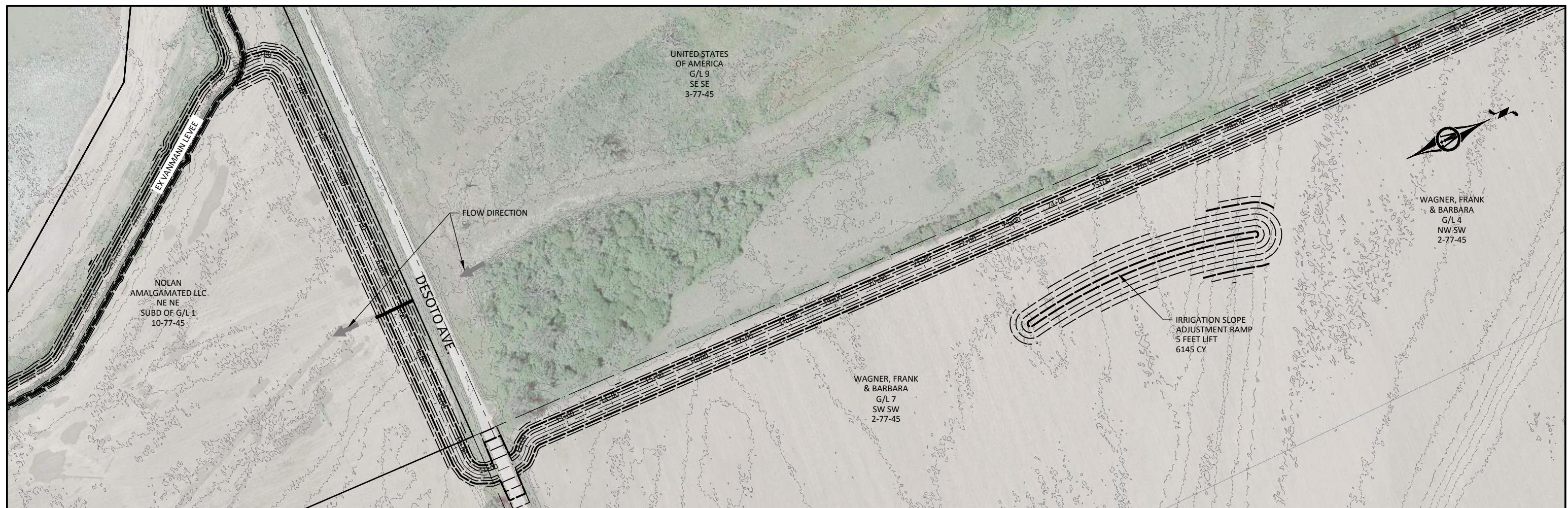


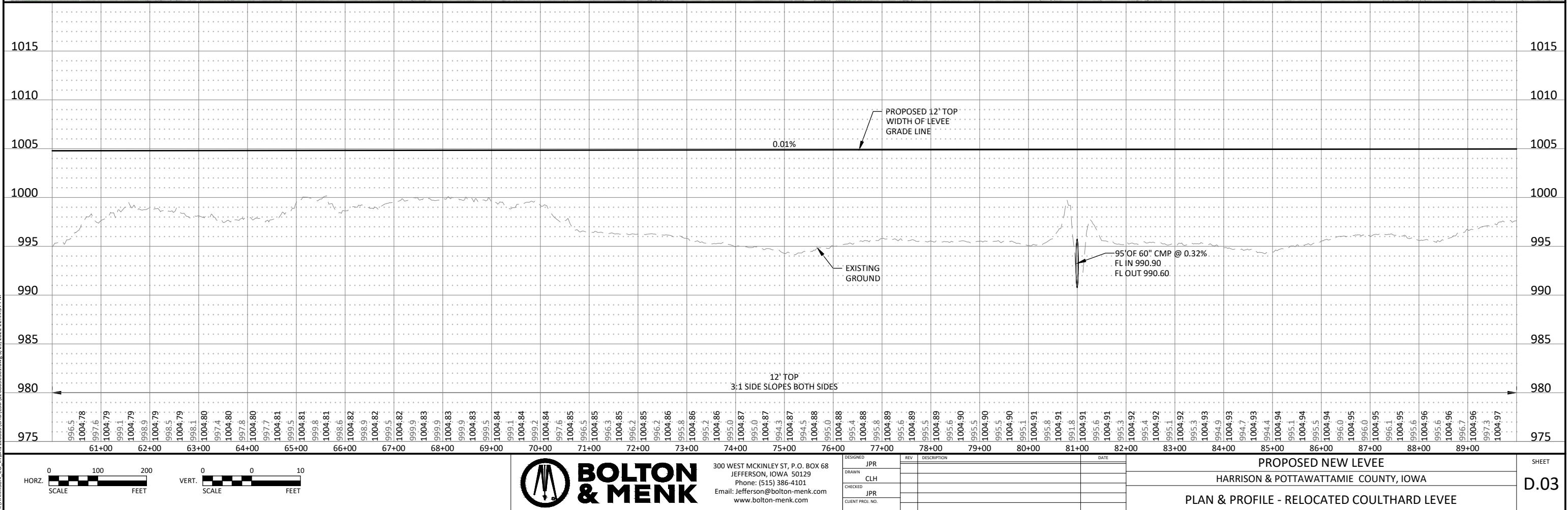
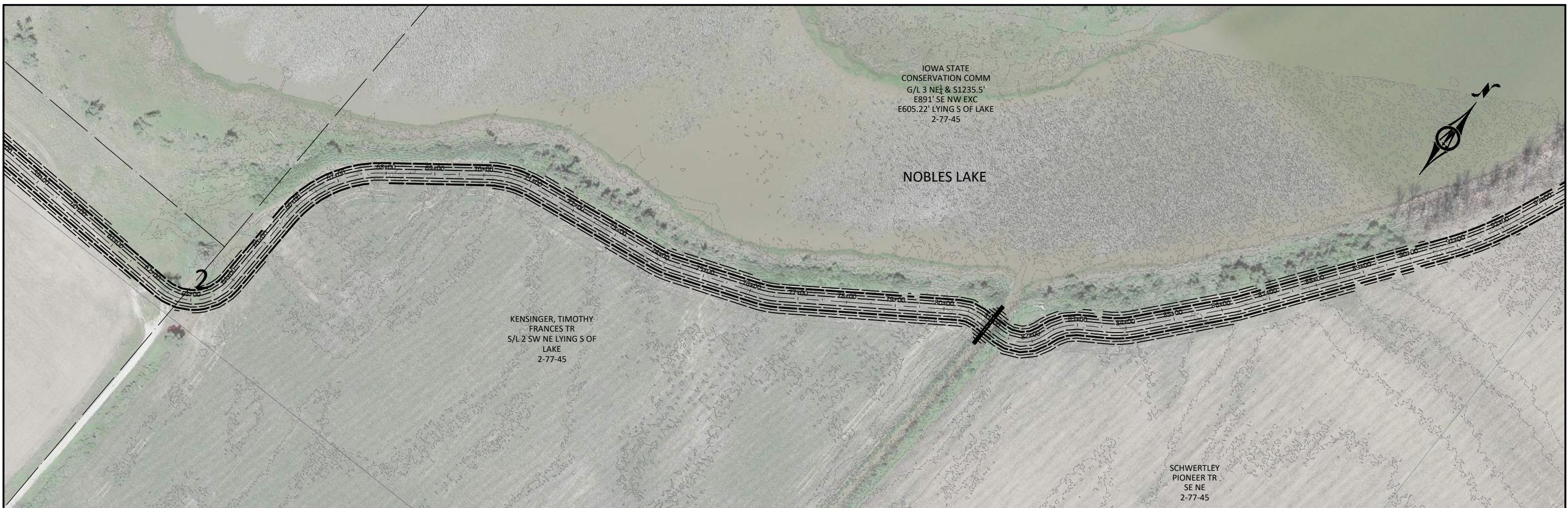
LEGEND

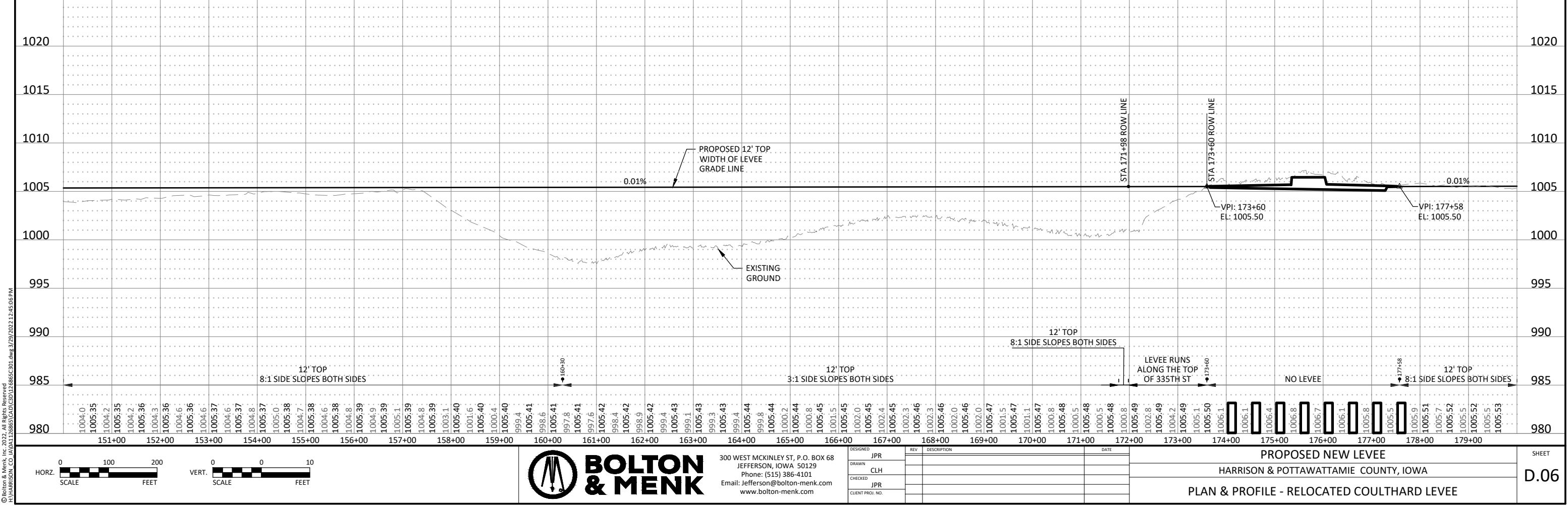
- PROPOSED LEVEE
- PARCEL LINES
- WATERSHED BOUNDARY

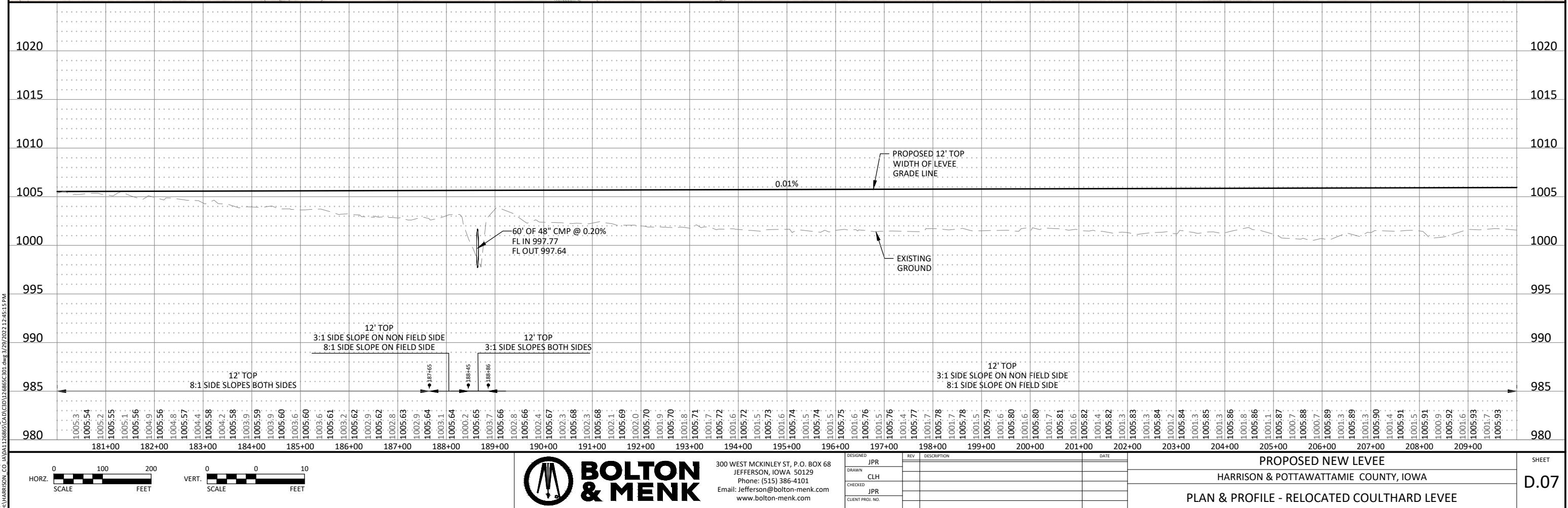
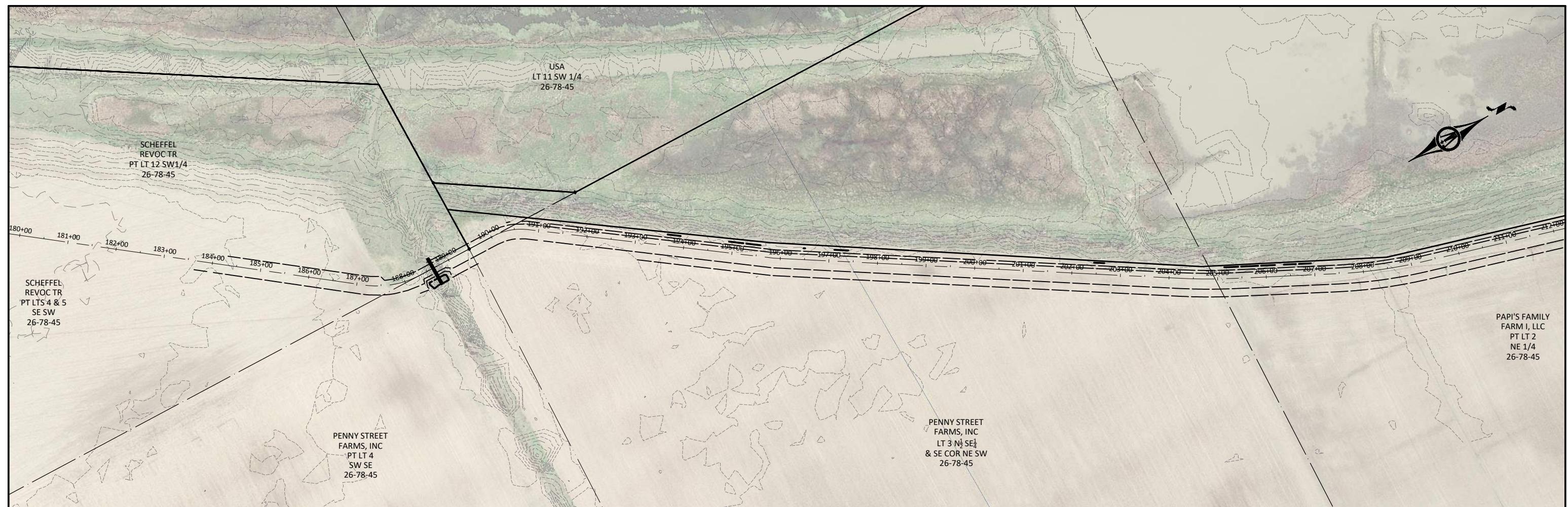


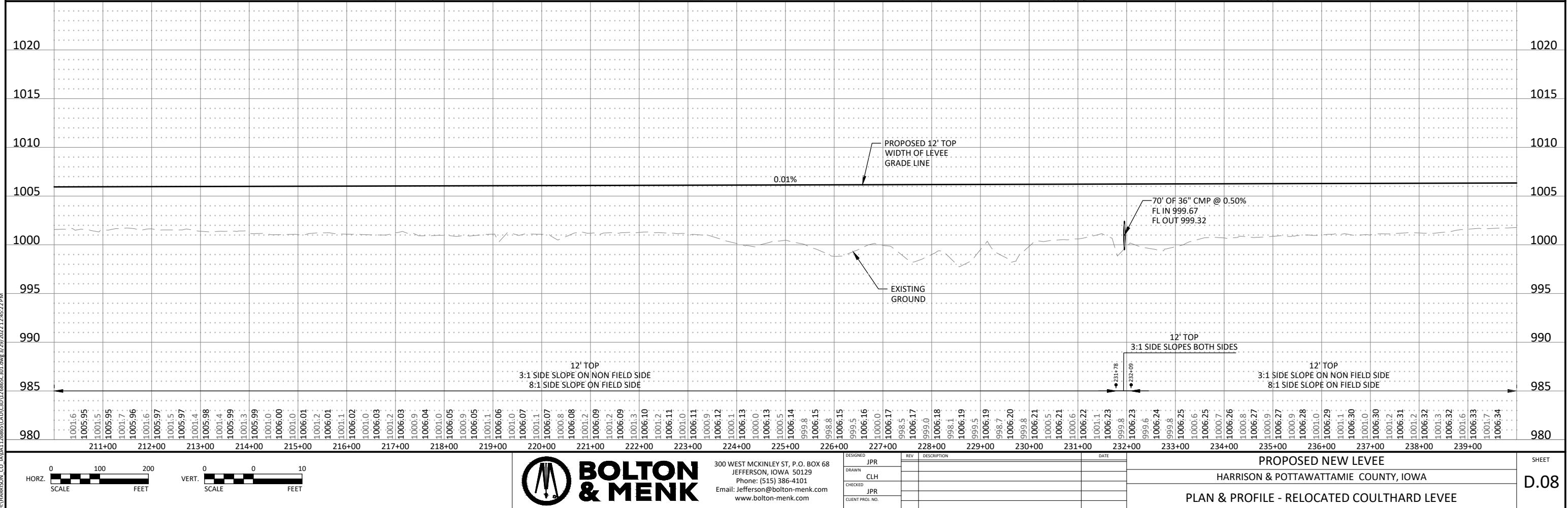


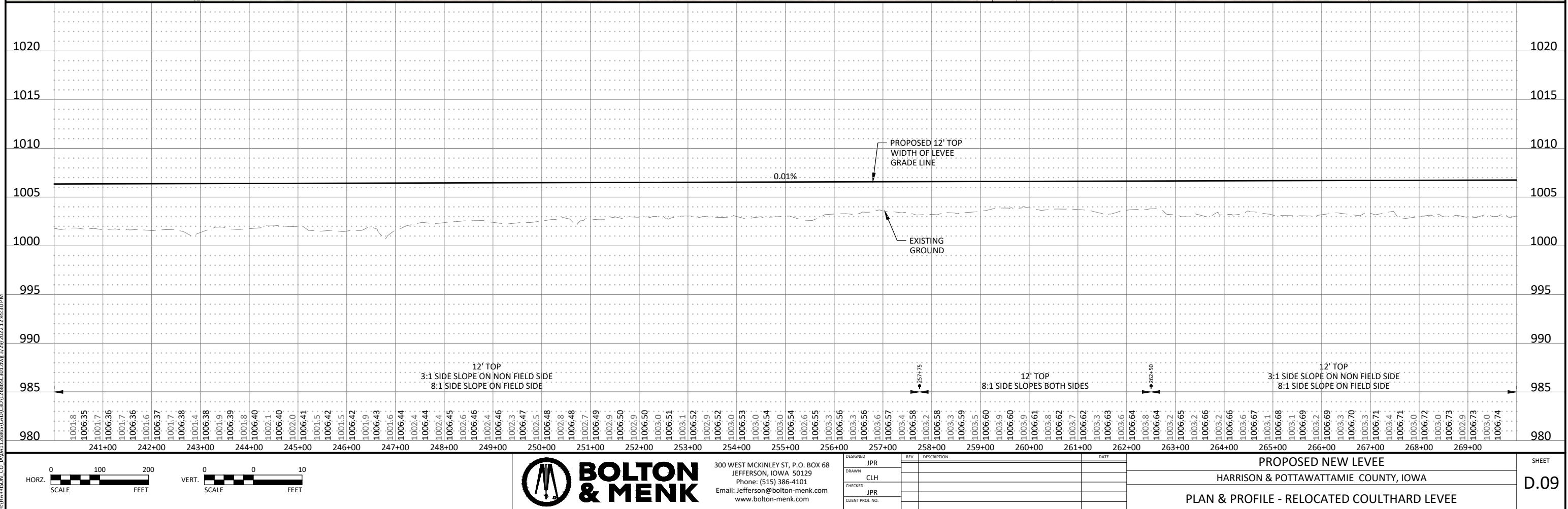






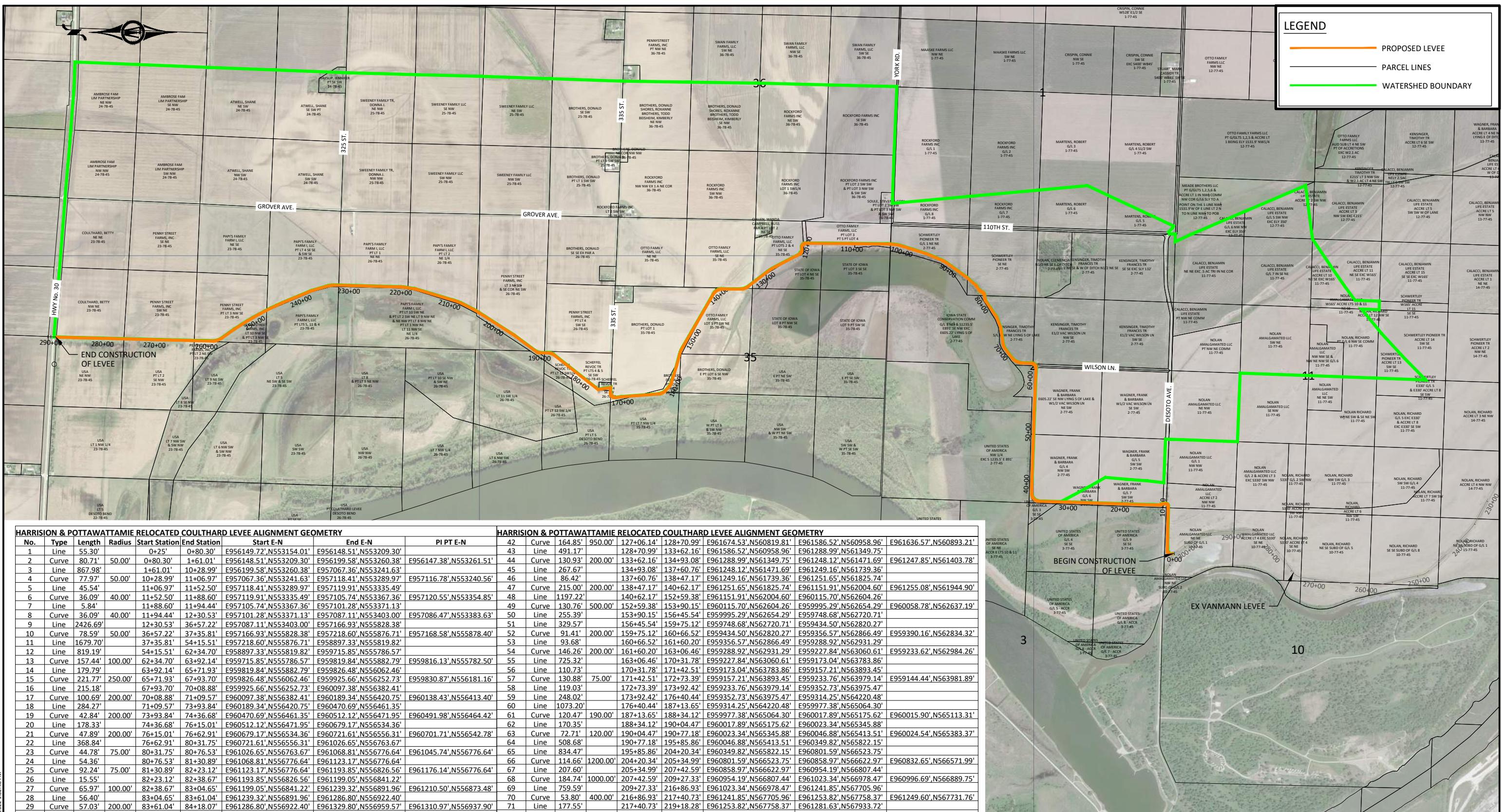


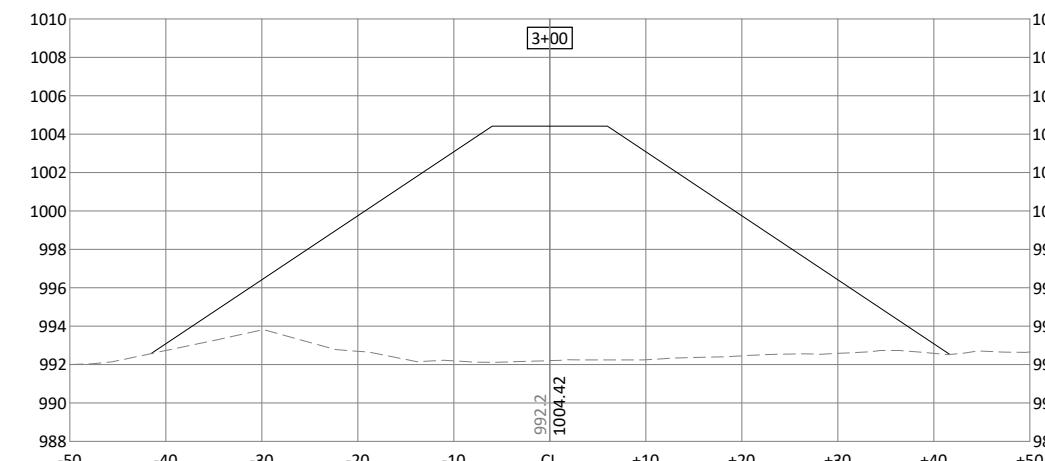
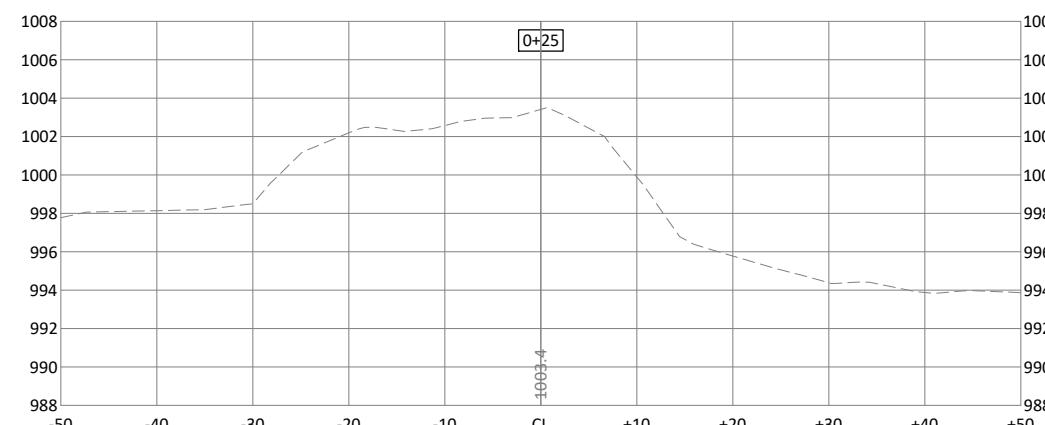
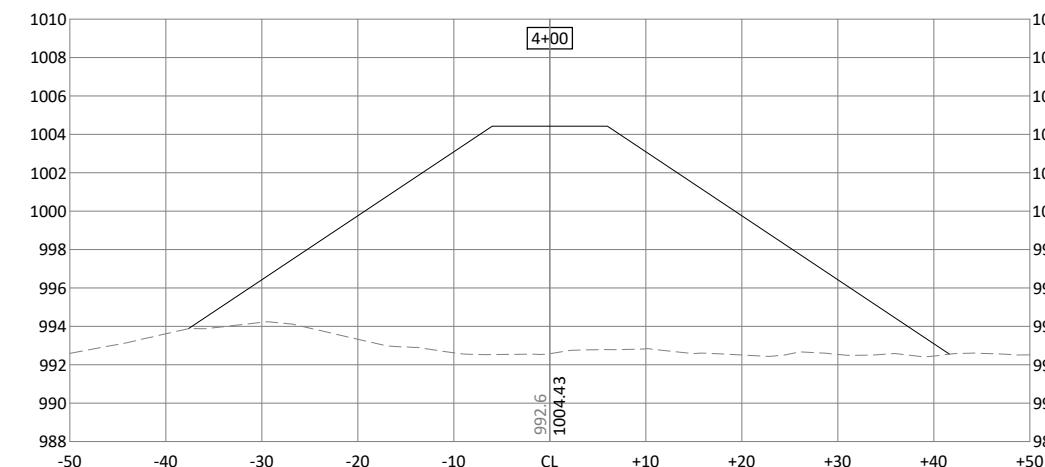
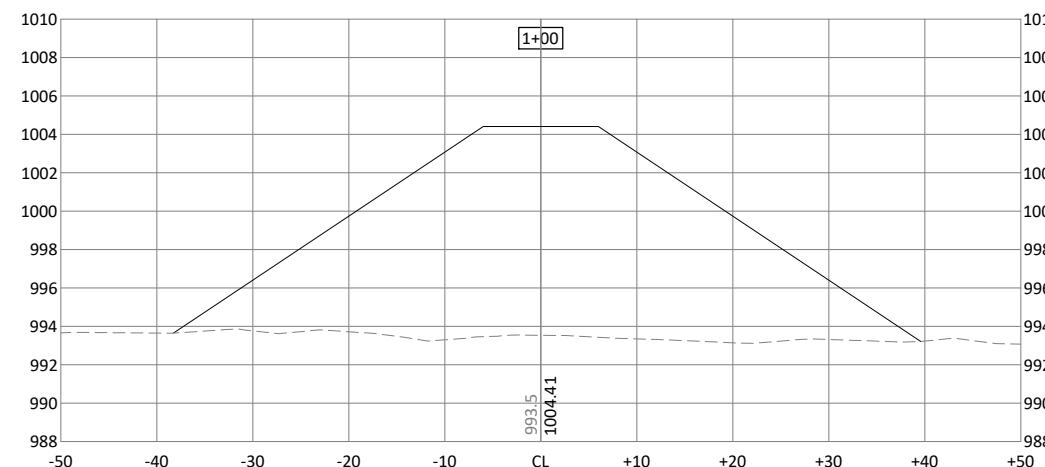
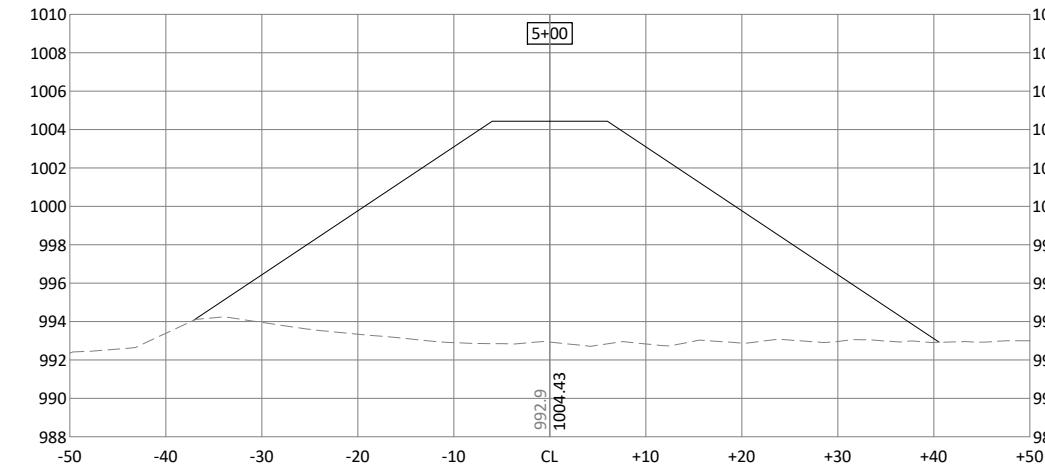
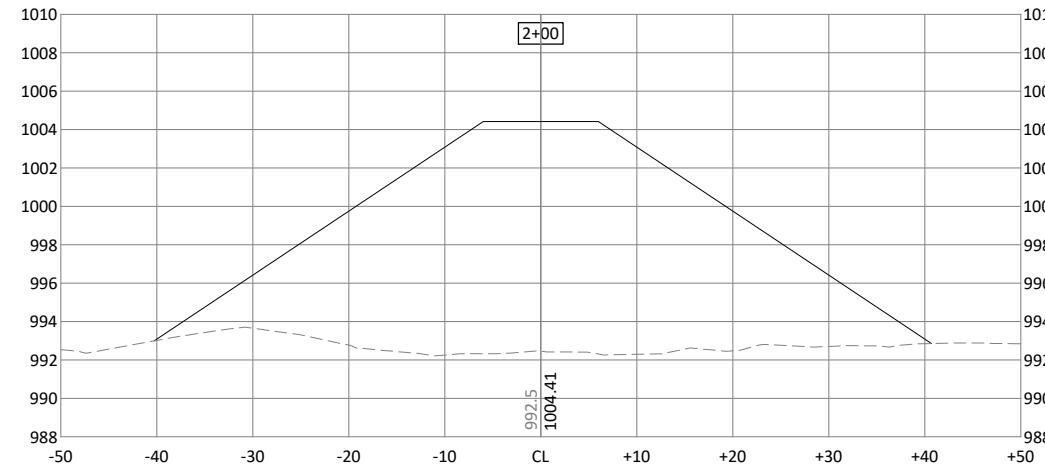




LEGEND

- PROPOSED LEVEE
- PARCEL LINES
- WATERSHED BOUNDARY





HORZ. SCALE FEET

VERT. SCALE FEET

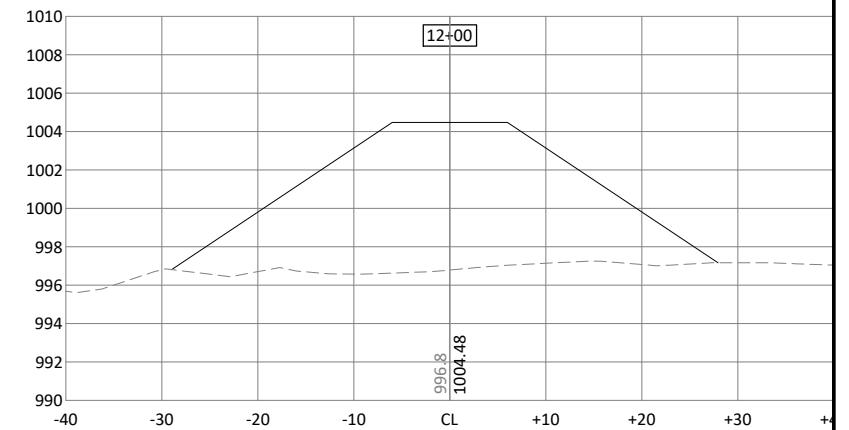
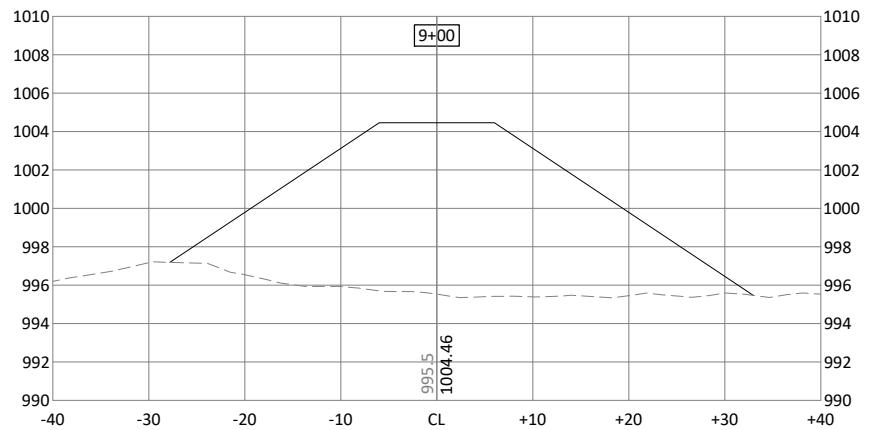
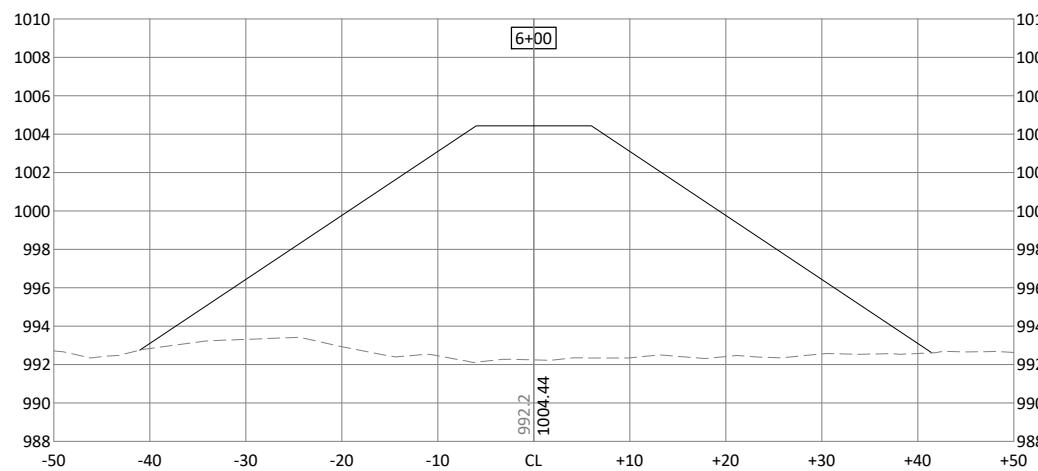
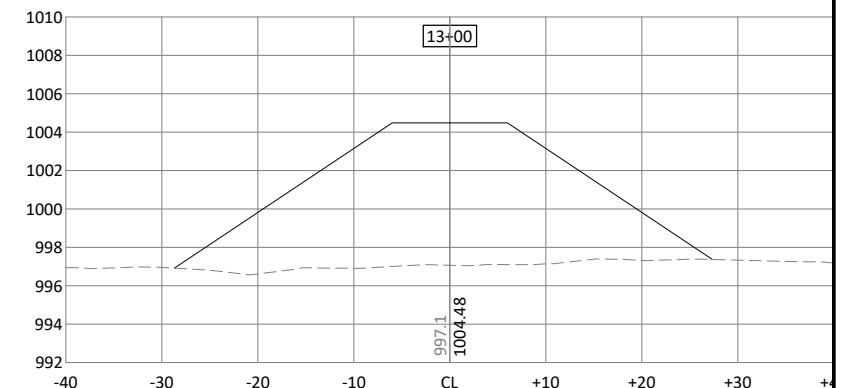
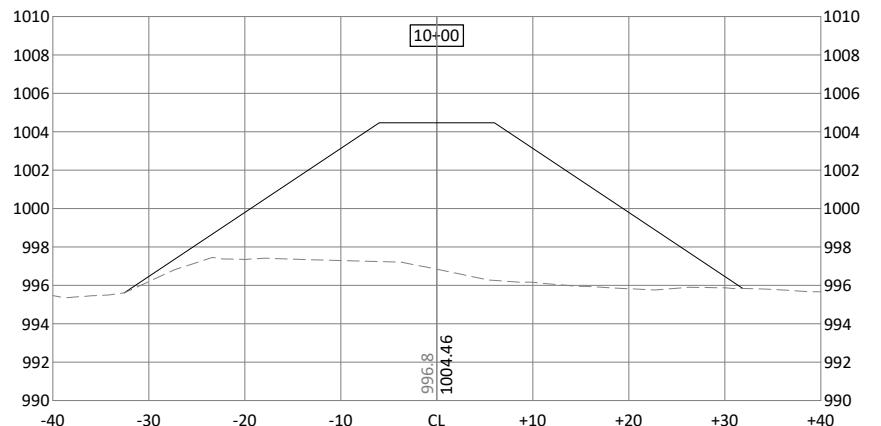
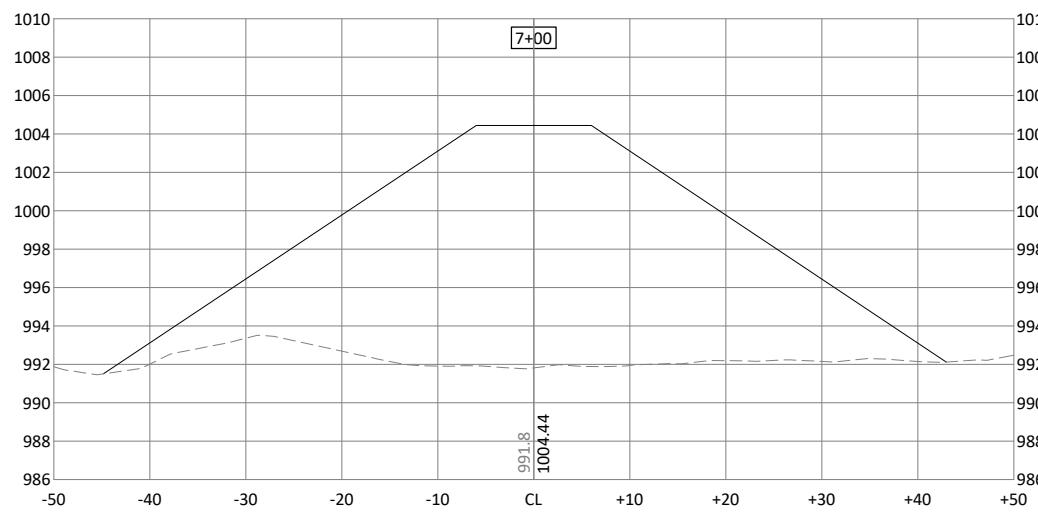
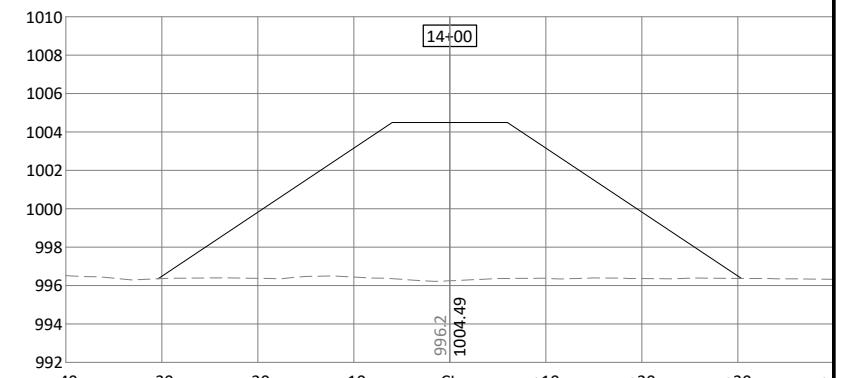
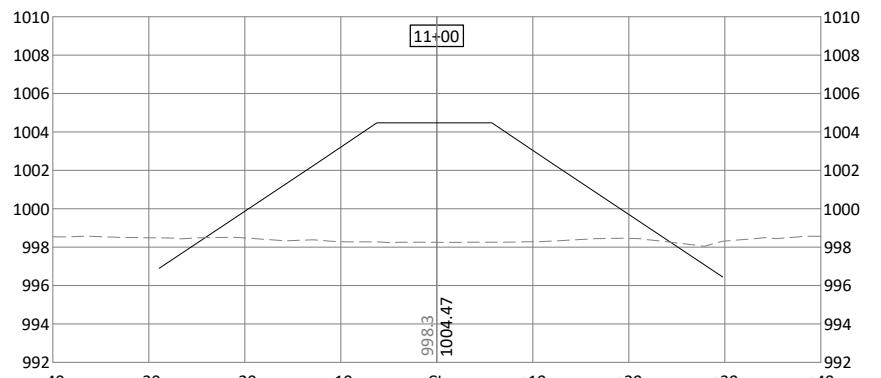
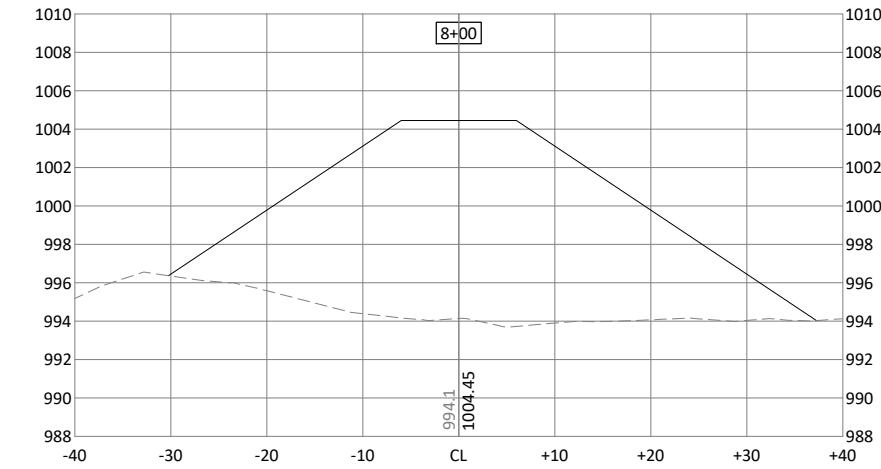


300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CLH			
CHECKED			
JPR			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED COULTHARD LEVEE

SHEET
X.01



HORZ. SCALE FEET

VERT. SCALE FEET



BOLTON
& MENK

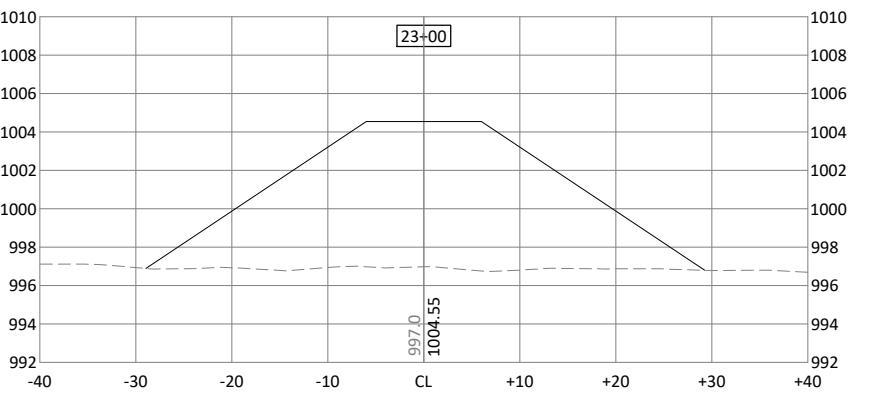
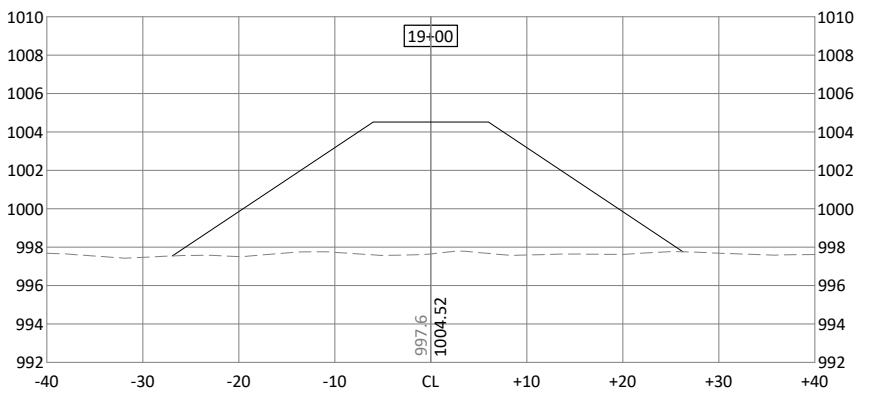
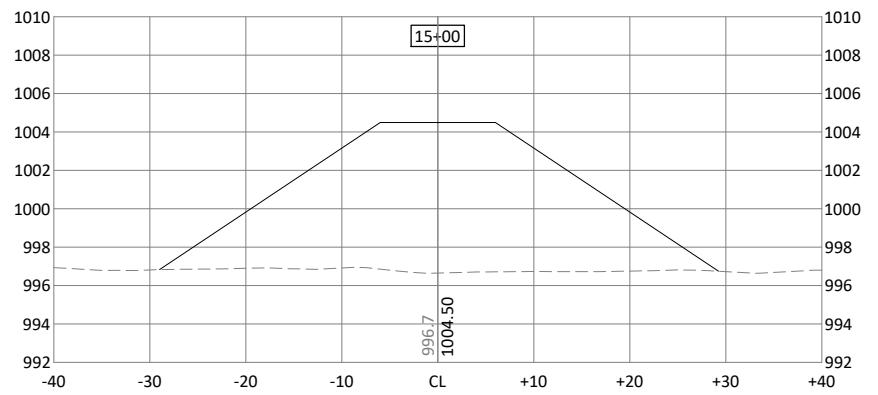
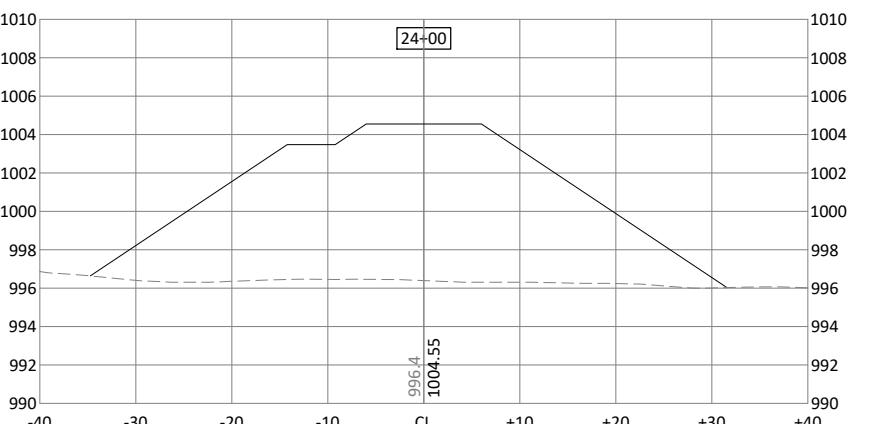
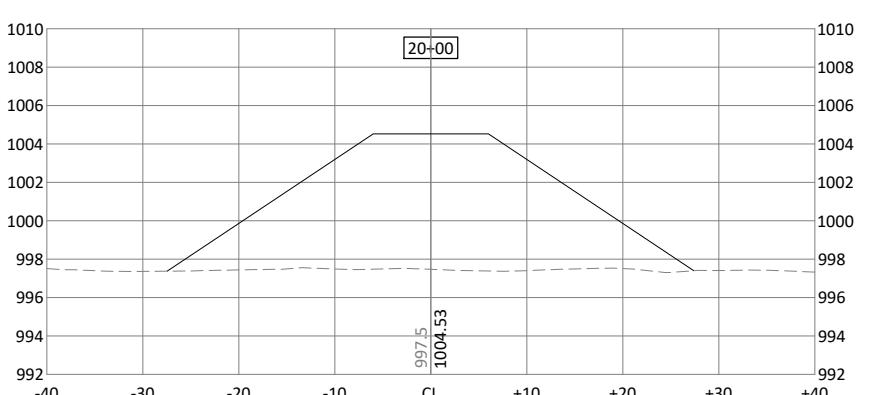
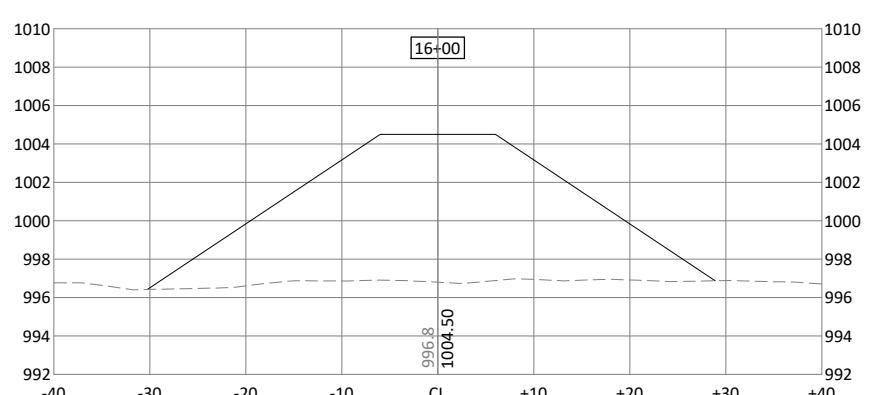
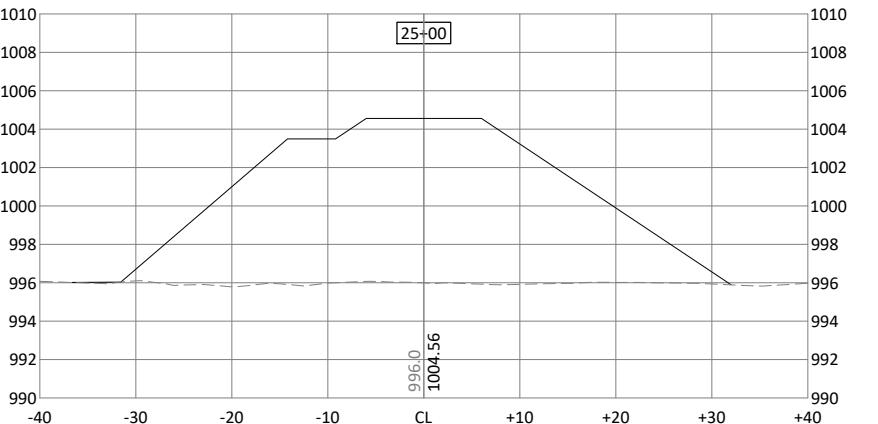
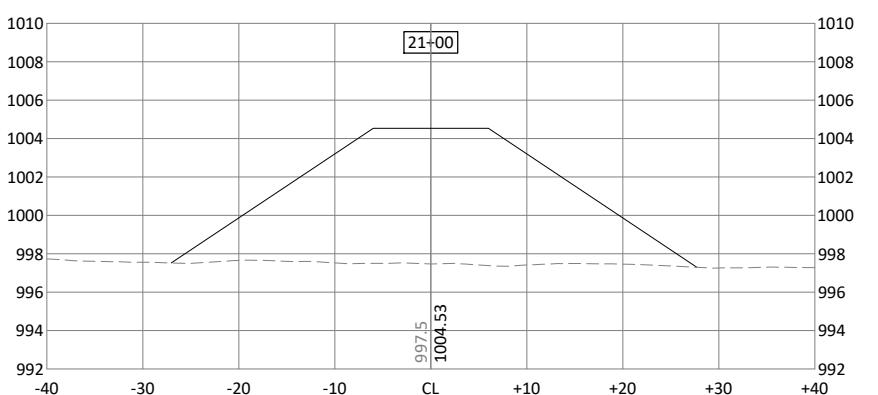
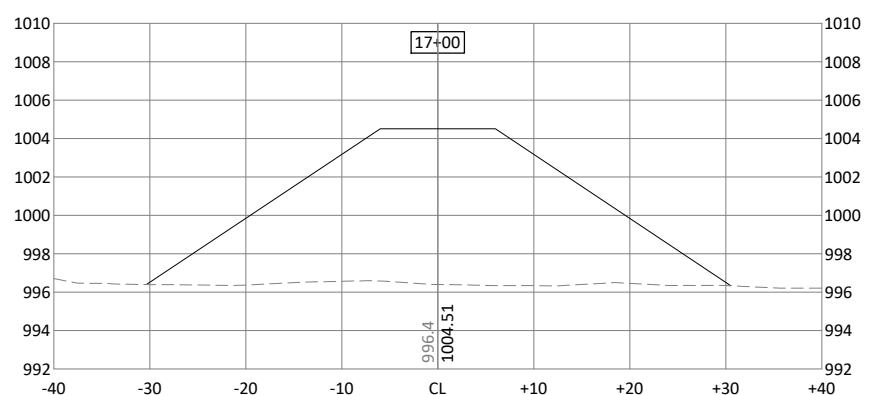
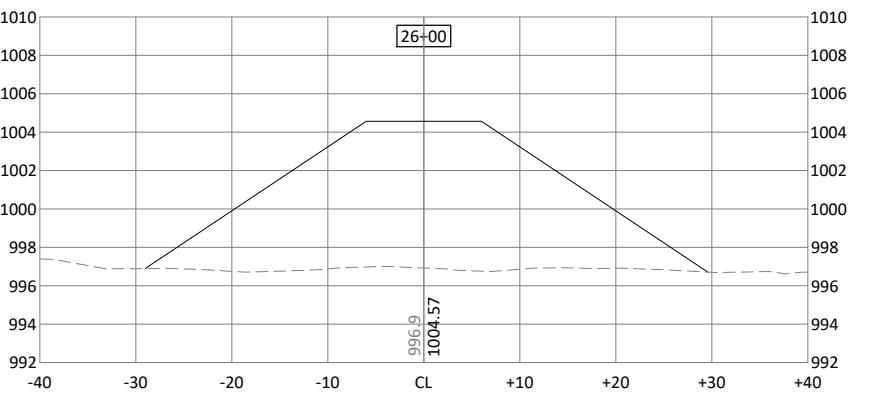
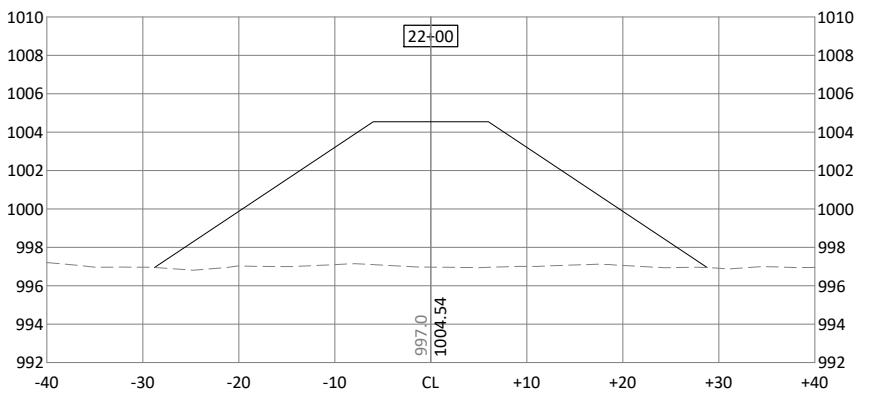
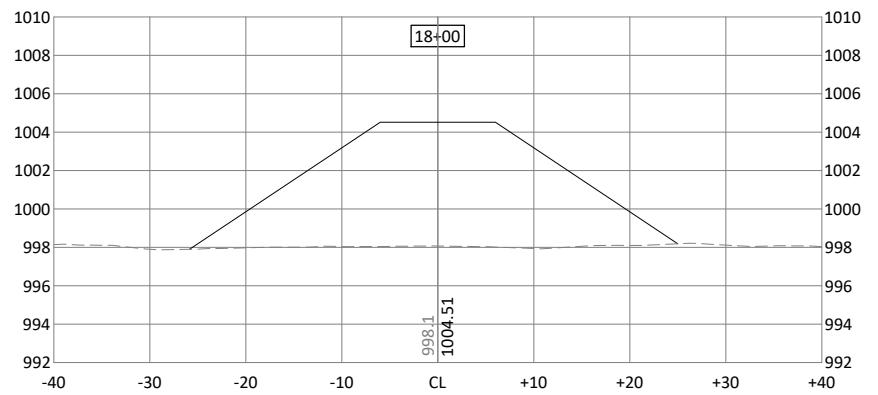
300 WEST MCKINLEY ST., P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CHECKED			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA

CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.02



©Bolton & Menk, Inc. 2022. All Rights Reserved
HARRISON CO IAOA1126885/CADC3D126865C901.dwg 3/29/2022 12:47:32 PM

©Bolton & Menk, Inc. 2022. All Rights Reserved
HARRISON CO IAOA1126885/CADC3D126865C901.dwg 3/29/2022 12:47:32 PM

HORZ. SCALE

0 5
VERT. SCALE FF



300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

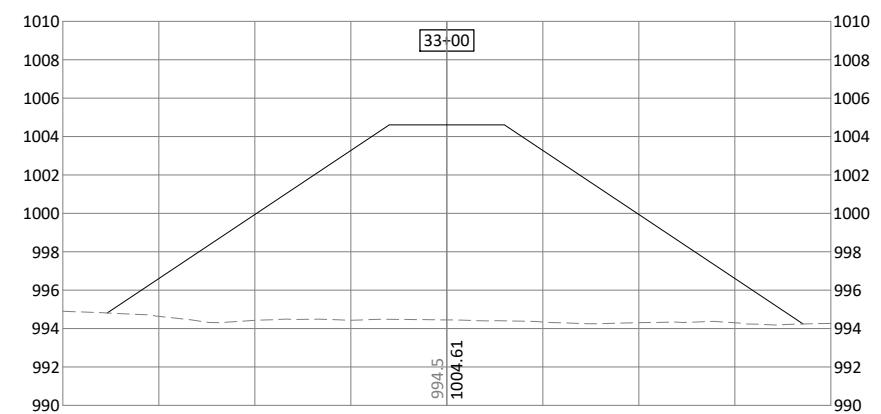
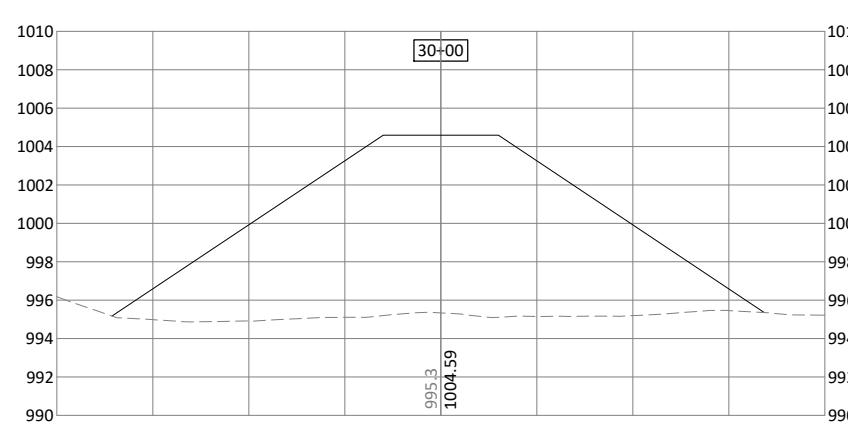
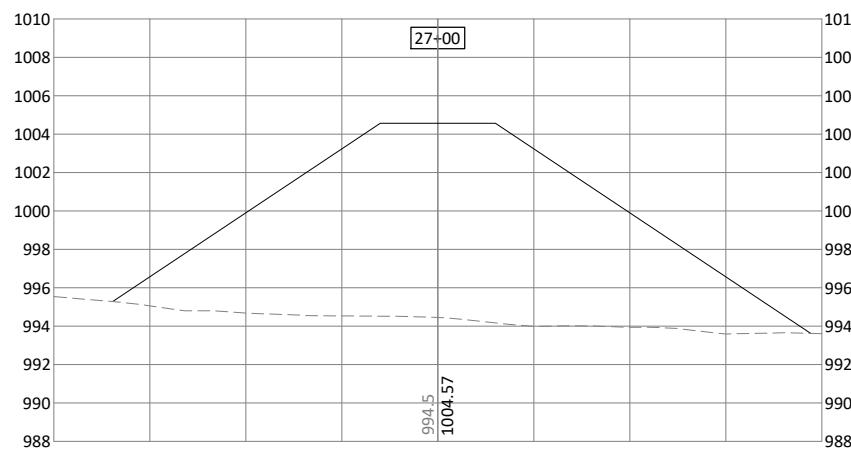
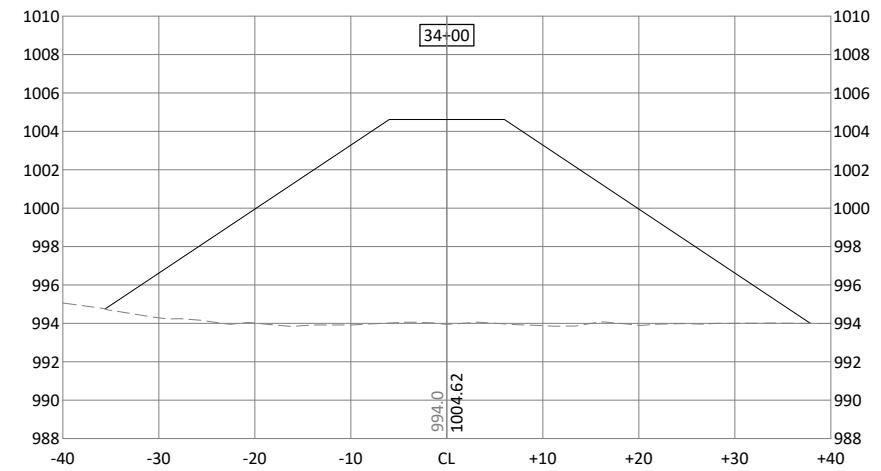
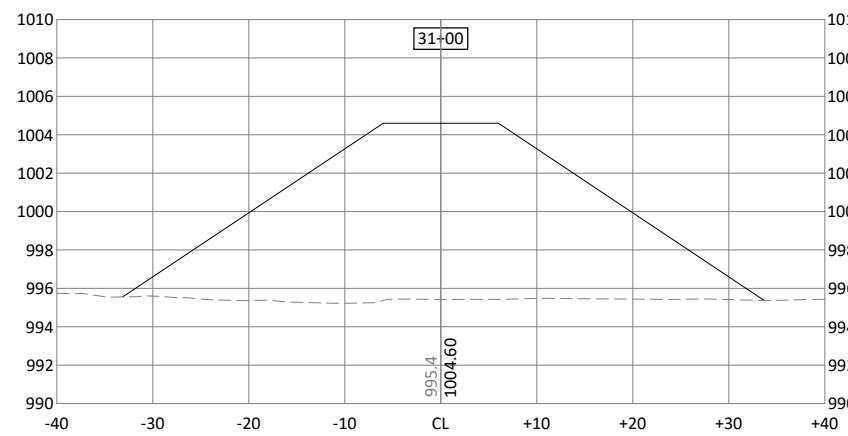
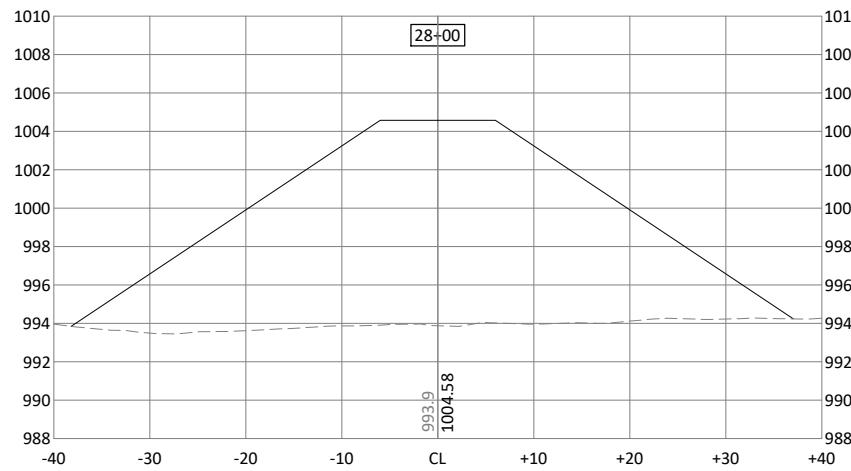
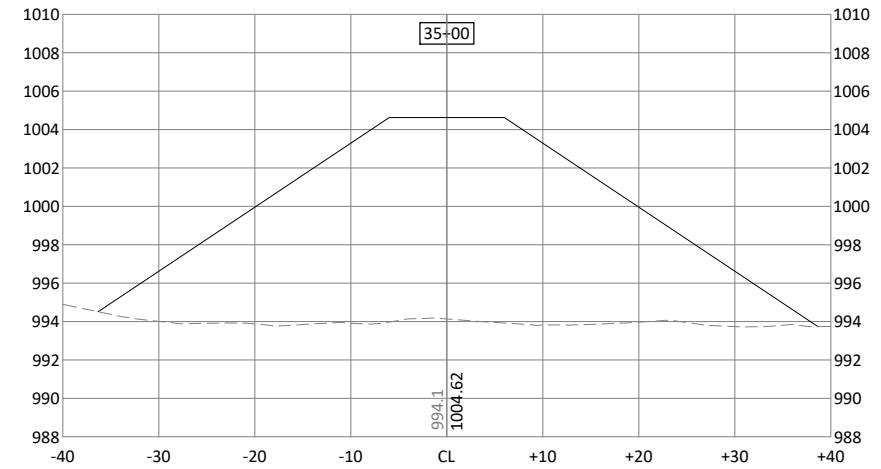
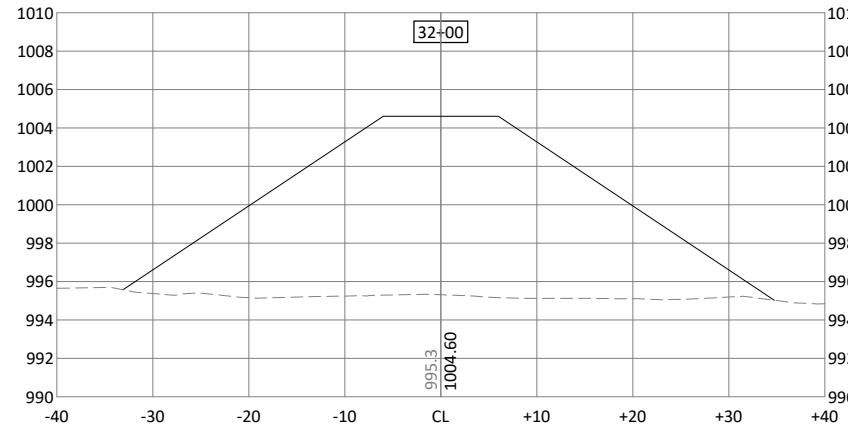
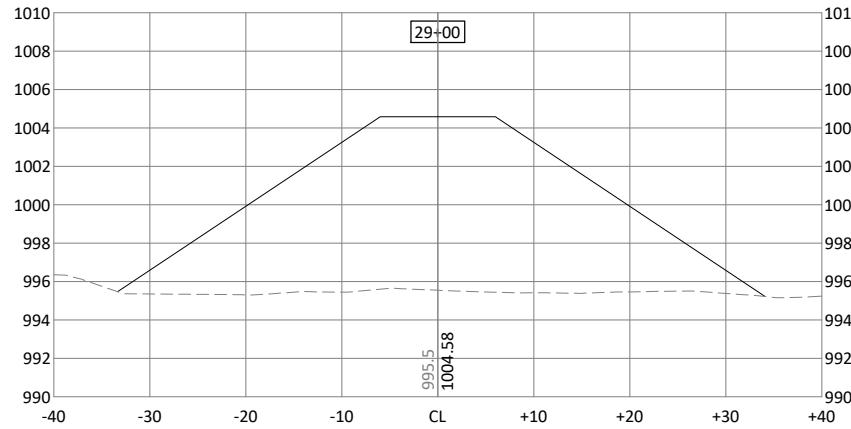
DESIGNED	JPR	REV	DI
DRAWN	CLH		
CHECKED	JPR		
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE

RISON & POTTAWATTAMIE COUNTY, IOWA

CROSS SECTIONS - RELOCATED COULTHARD LEVEE

SHEET
X.03



HORZ.
SCALE
0 100 20
FEET

VERT.
SCALE
0 5 10
FEET

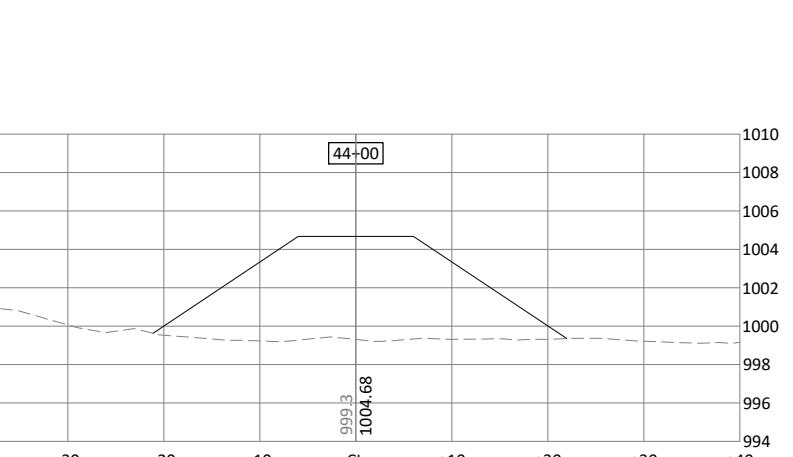
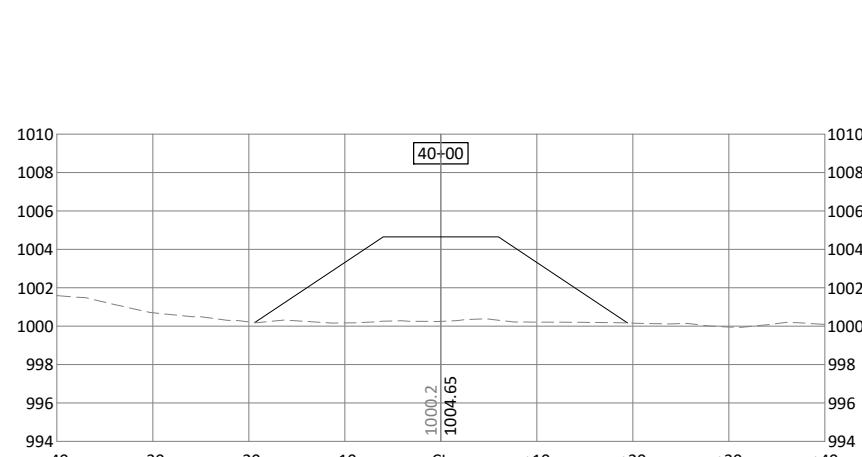
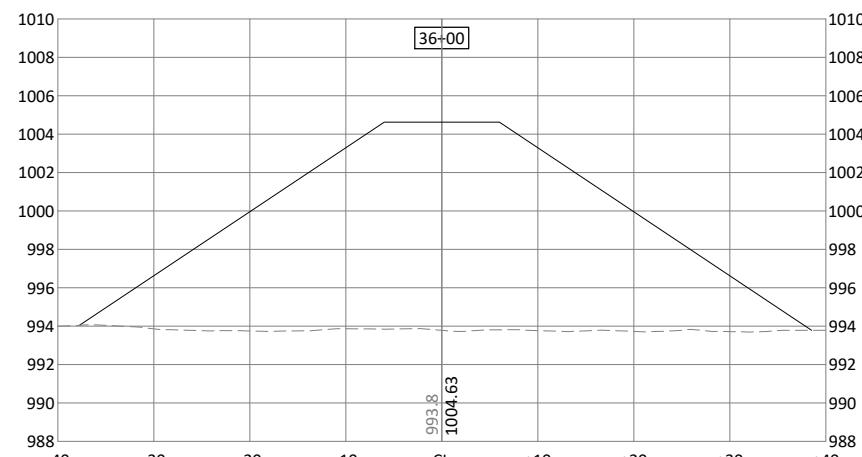
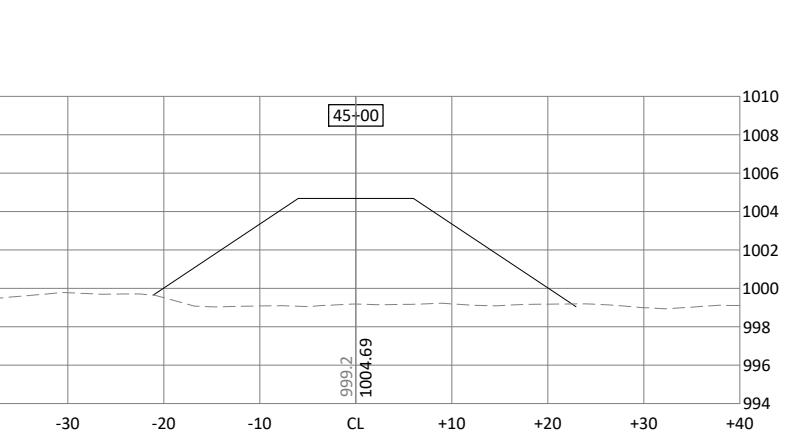
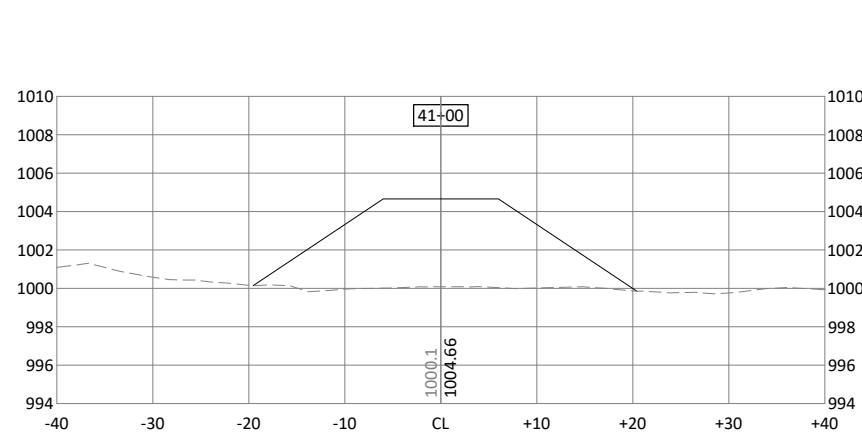
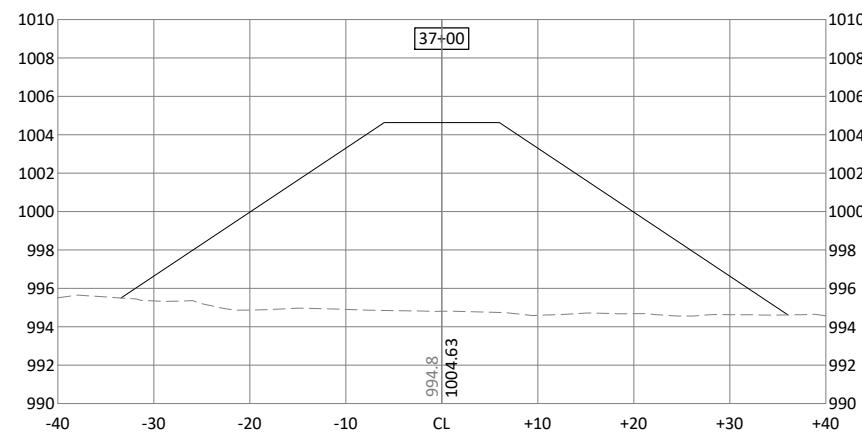
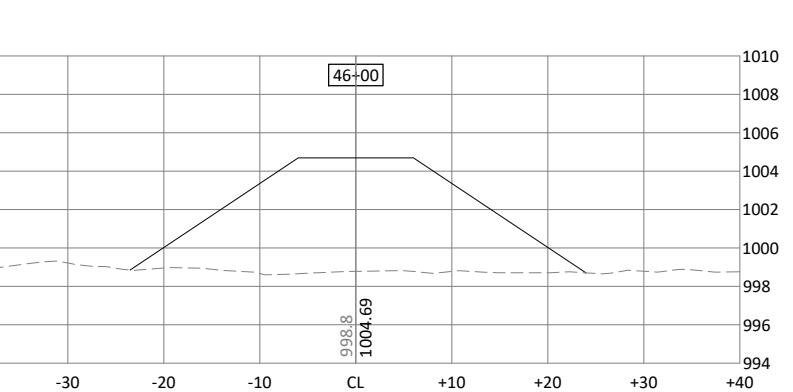
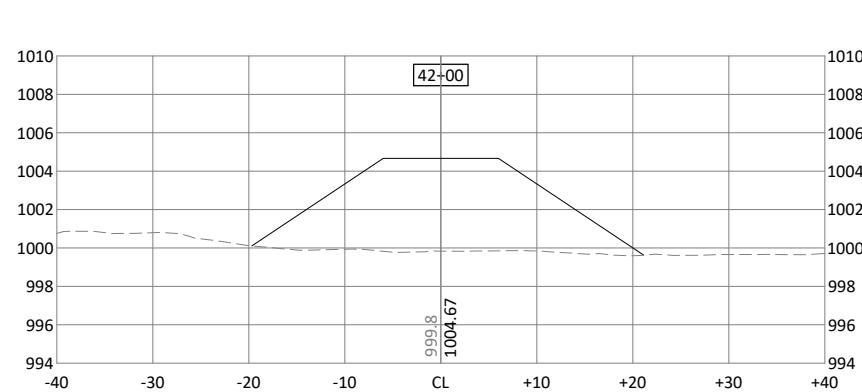
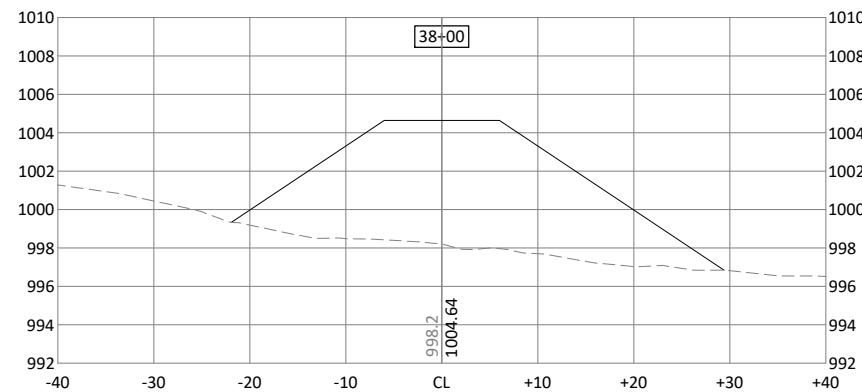
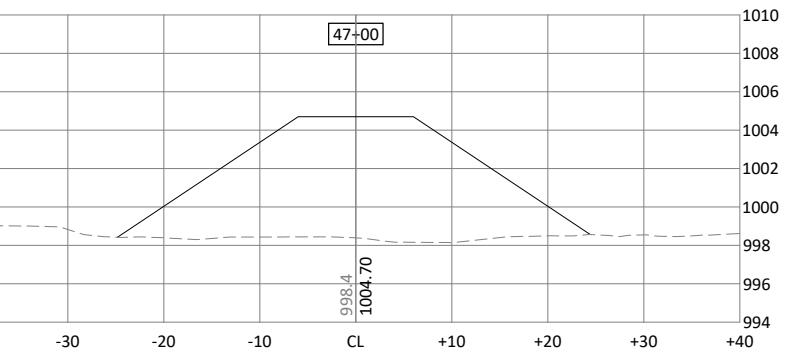
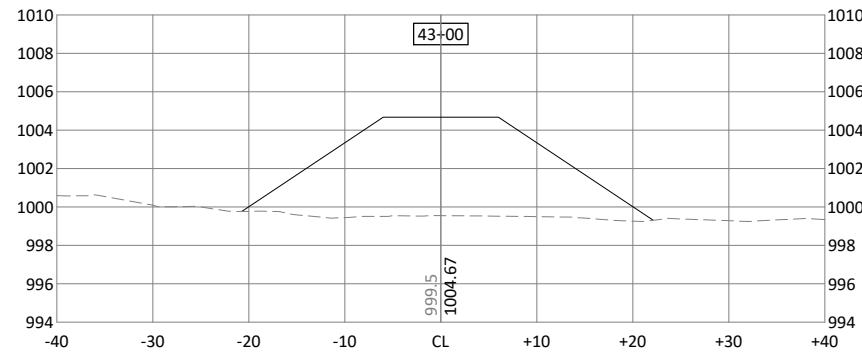
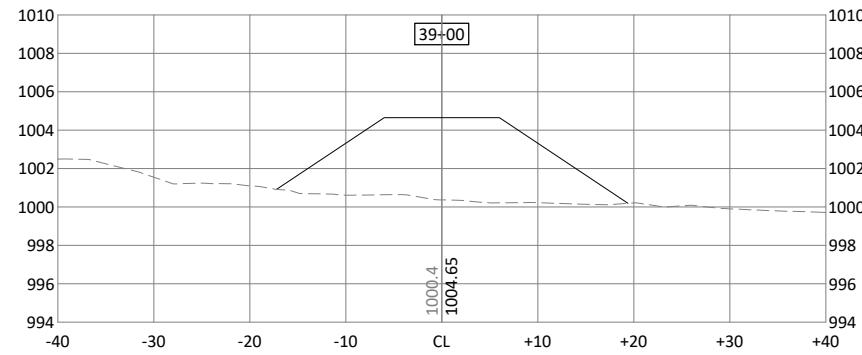


300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV	DESCRIPTION	DATE
JPR			
DRAWN			
CHECKED			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.04



HORZ
SCALE
FEET

VERT.
SCALE
FEET

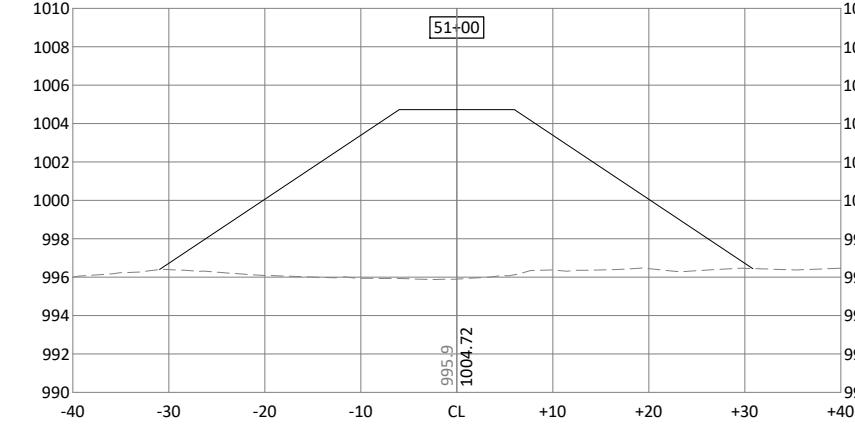
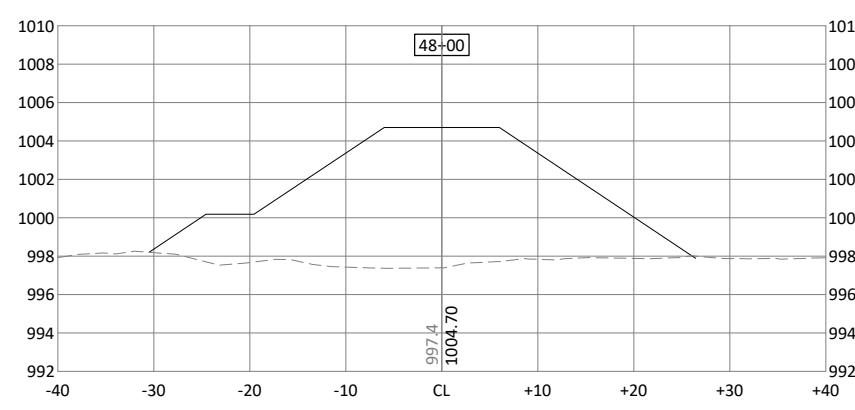
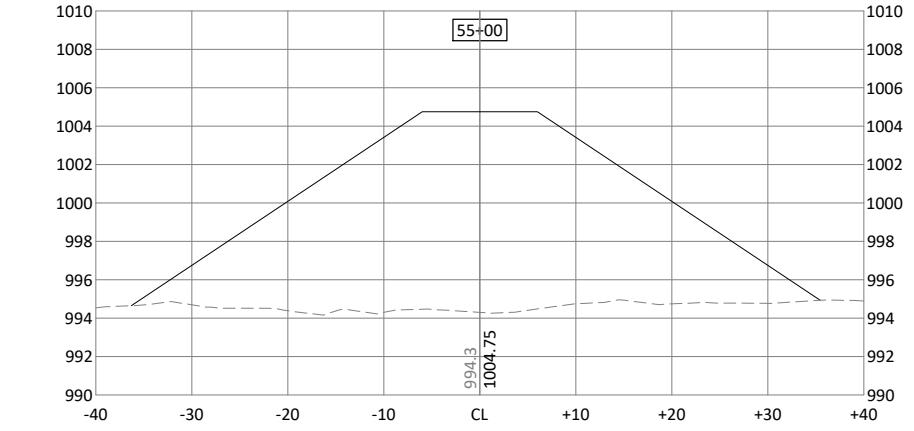
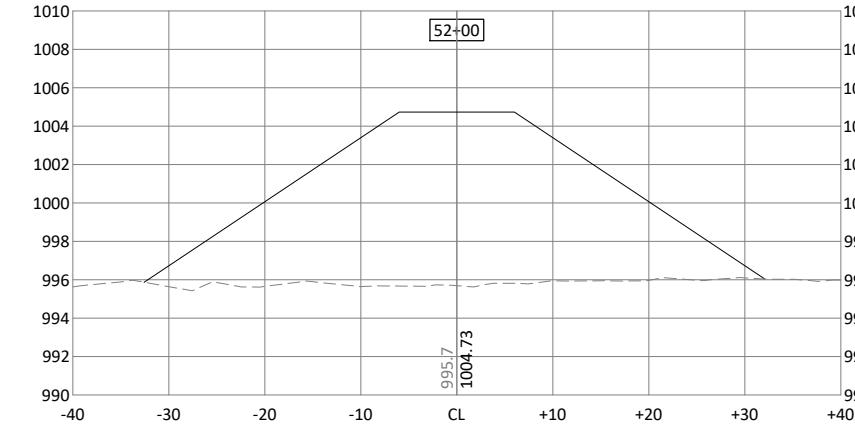
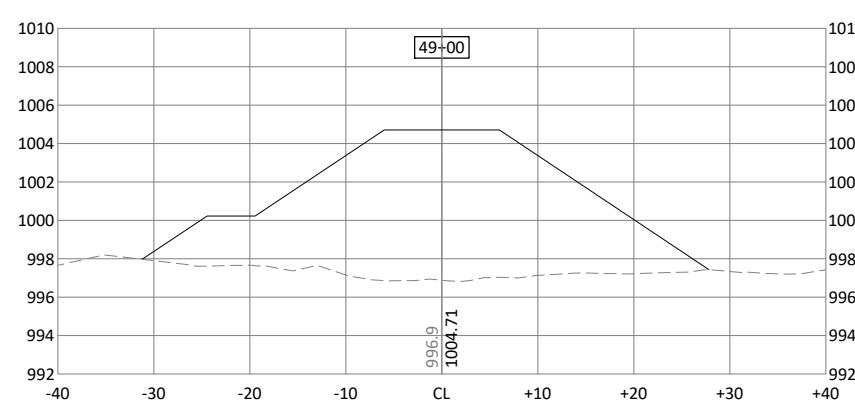
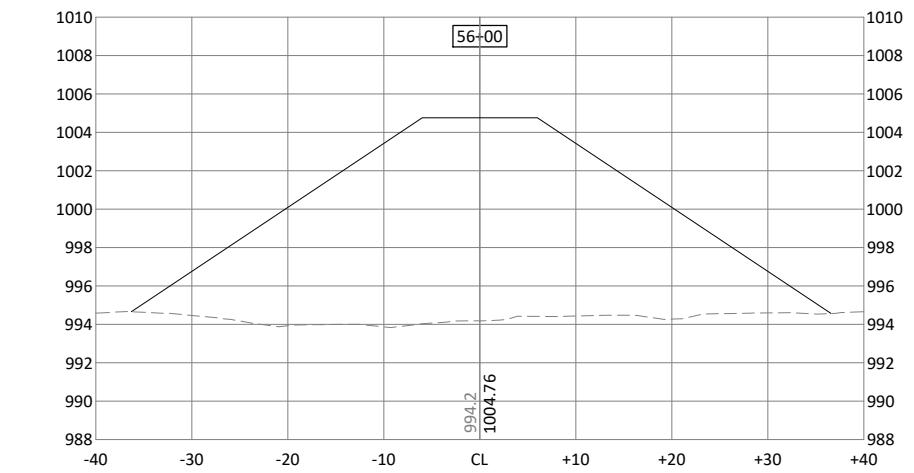
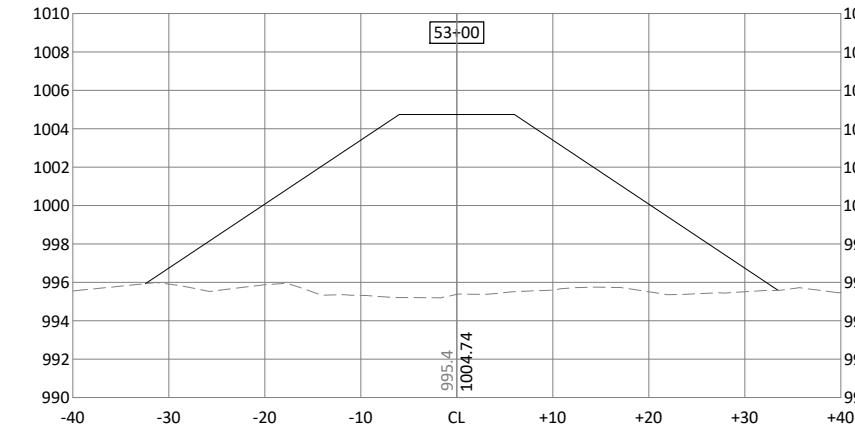
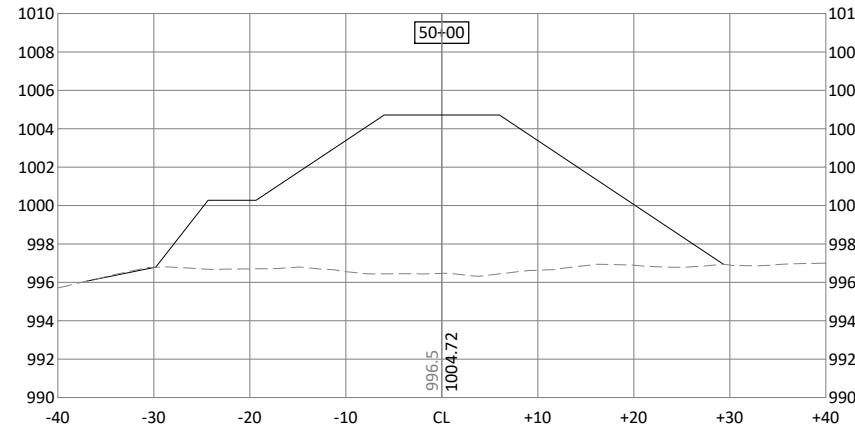


300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV	DESCRIPTION	DATE
JPR			
DRAWN			
CHECKED			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.05



HORZ.
SCALE
FEET

VERT.
SCALE
FEET

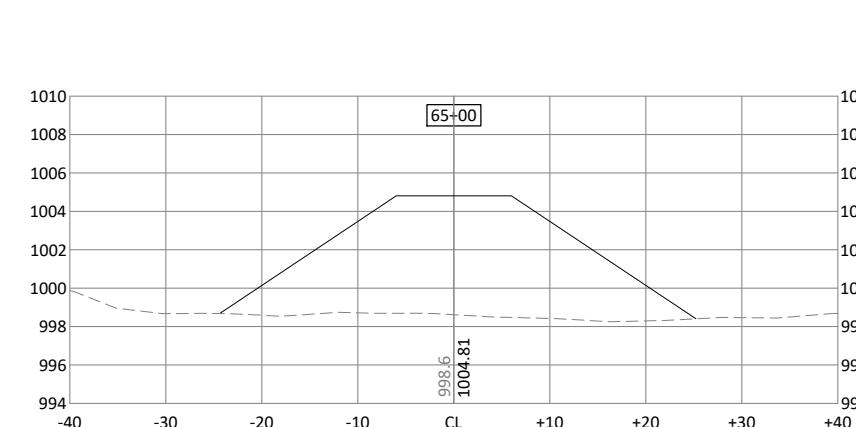
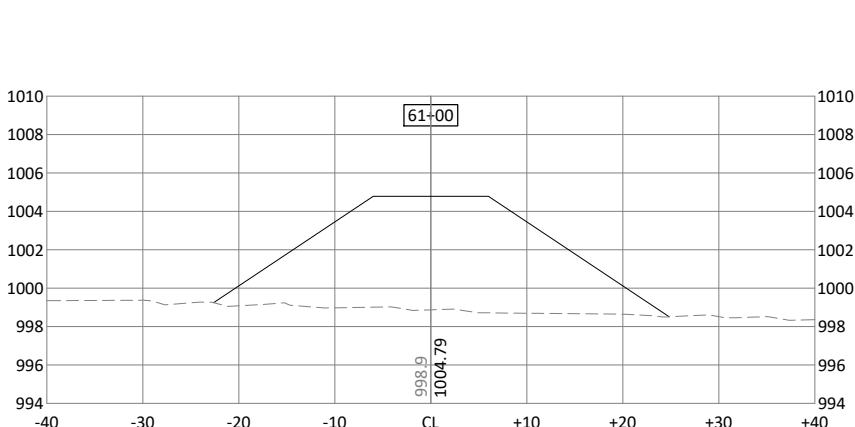
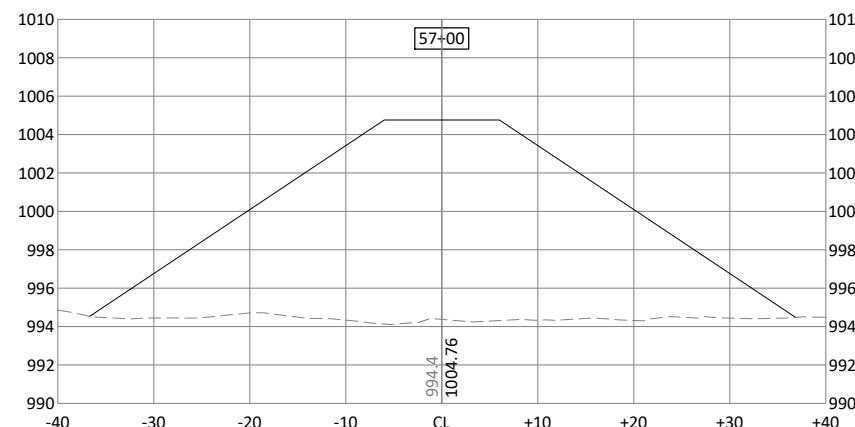
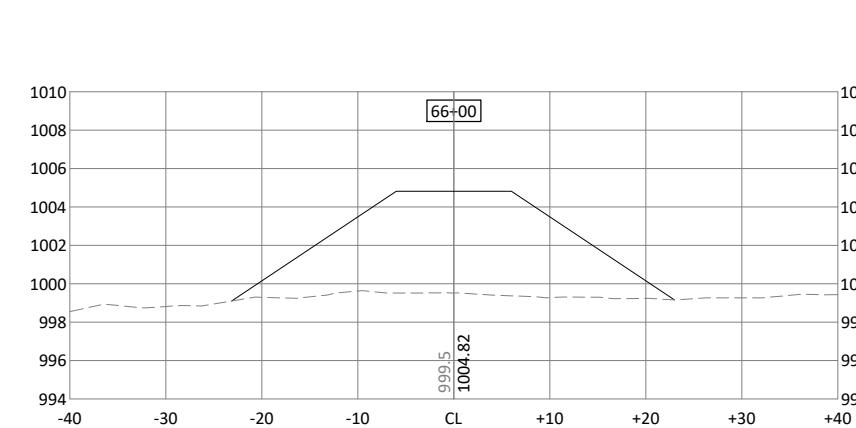
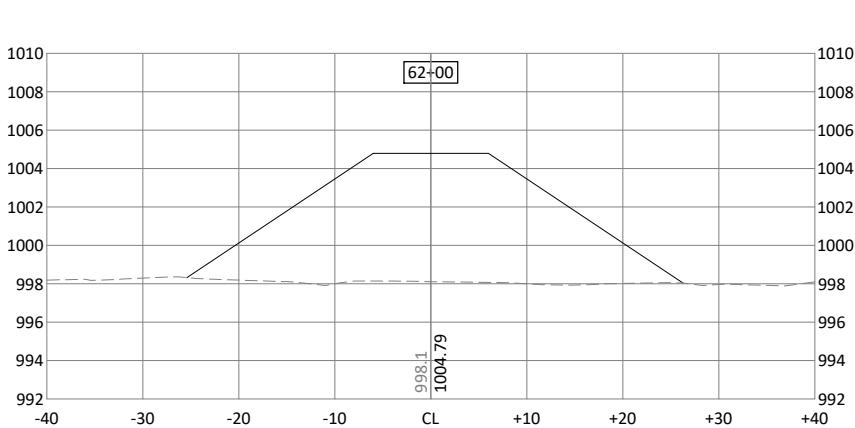
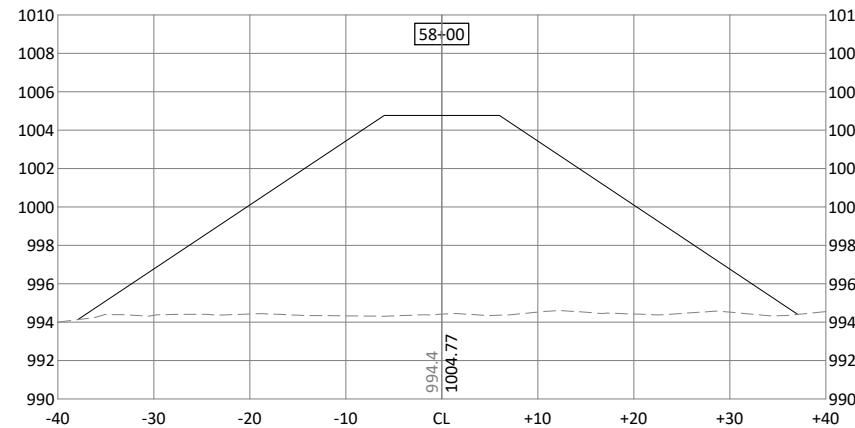
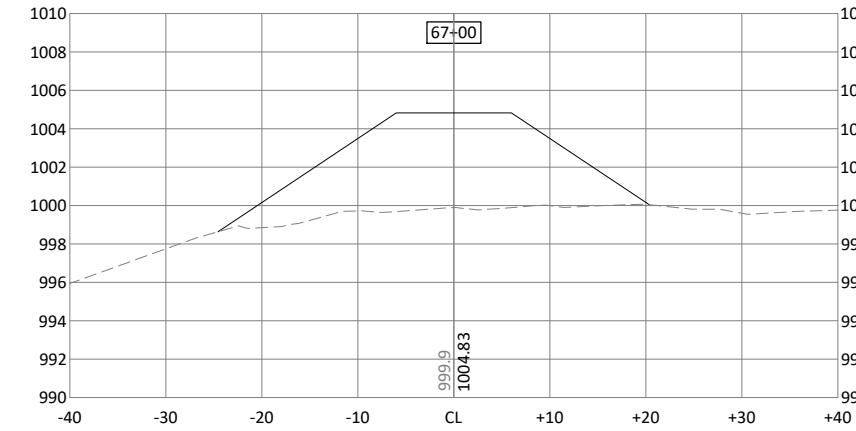
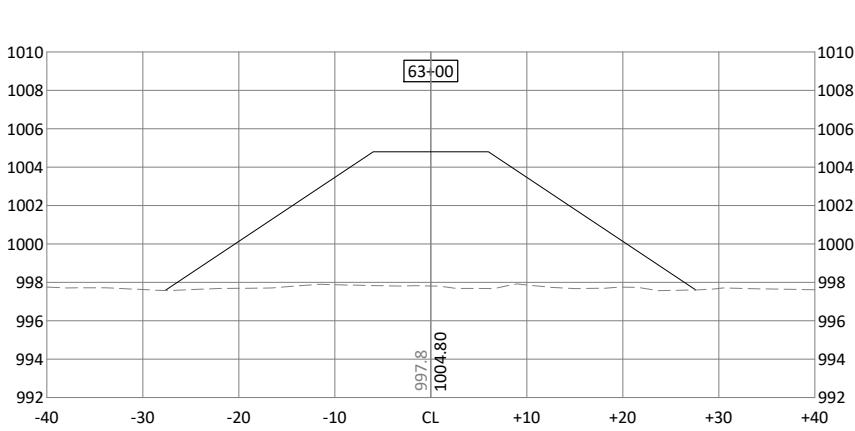
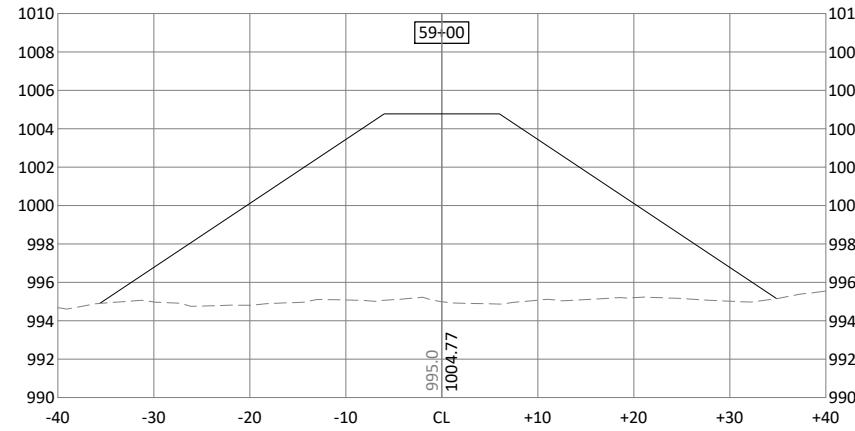
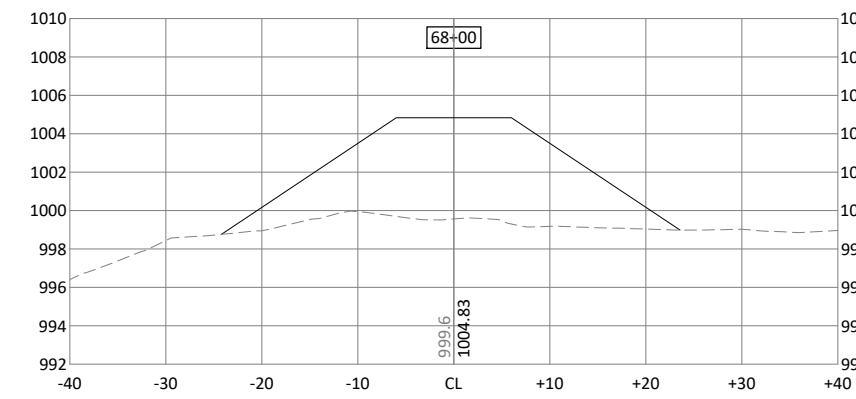
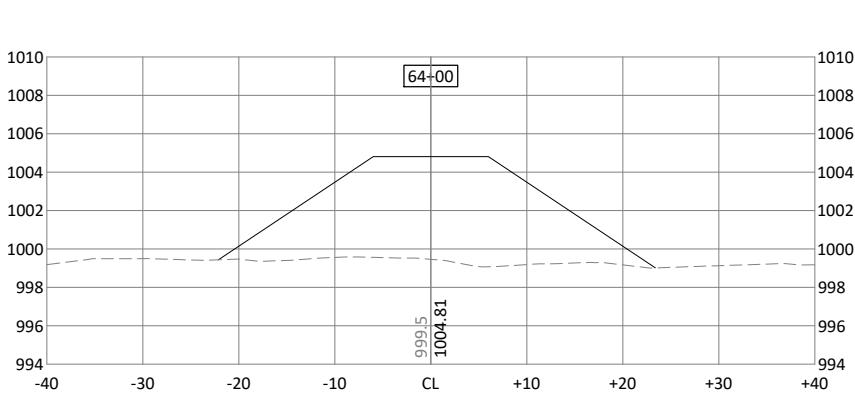
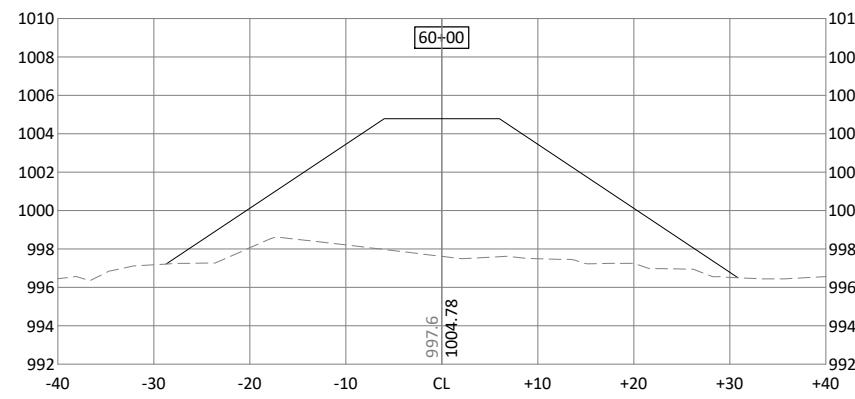


300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV	DESCRIPTION	DATE
JPR			
DRAWN			
CHECKED			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED COULTHARD LEVEE

SHEET
X.06



HORZ.
SCALE
FEET

0 100 20
VERT. SCALE FEET



300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: jefferson@bolton-menk.com
www.bolton-menk.com

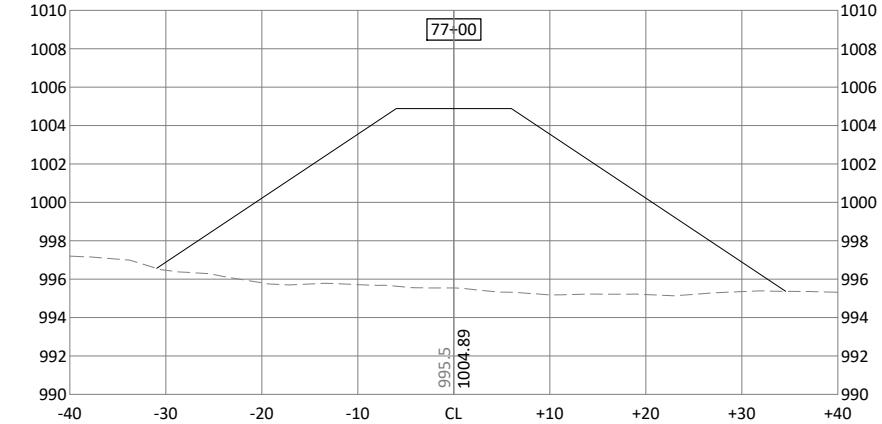
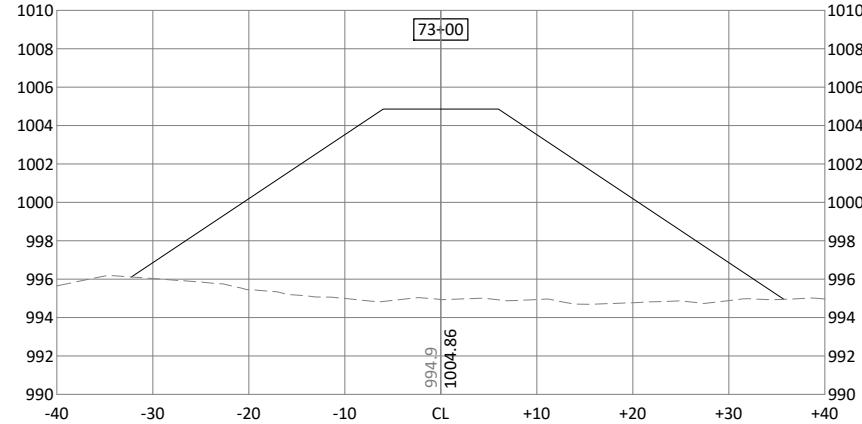
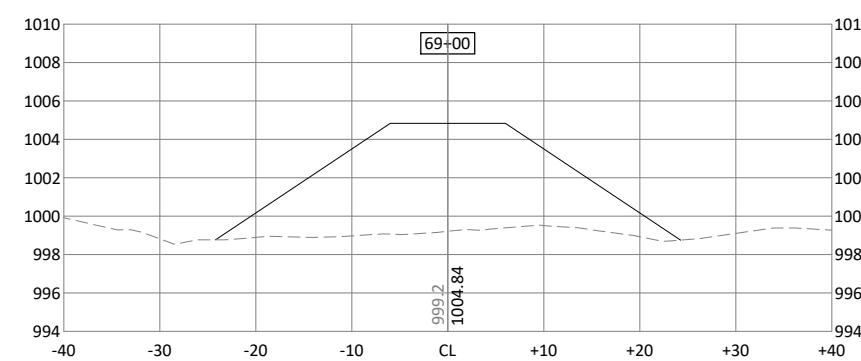
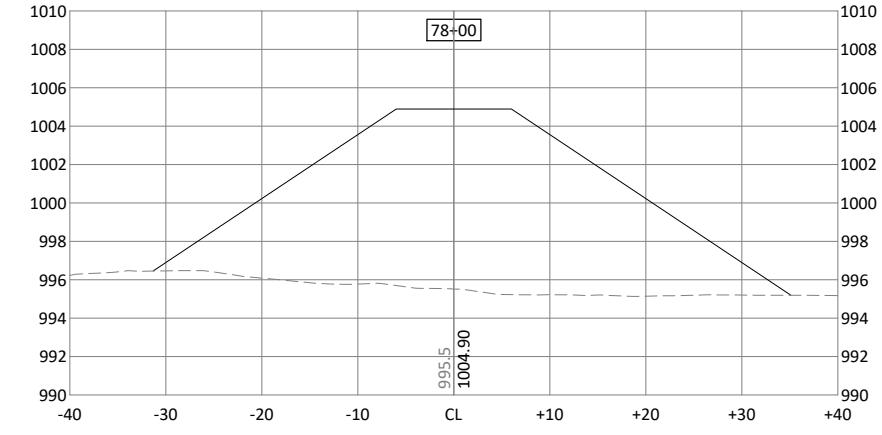
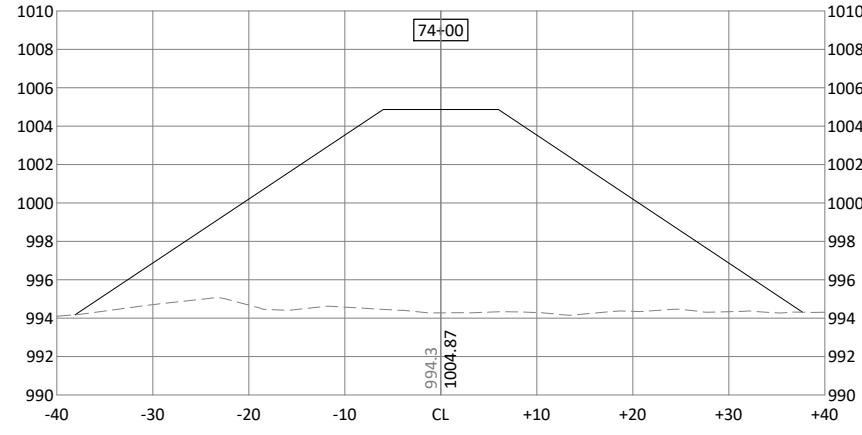
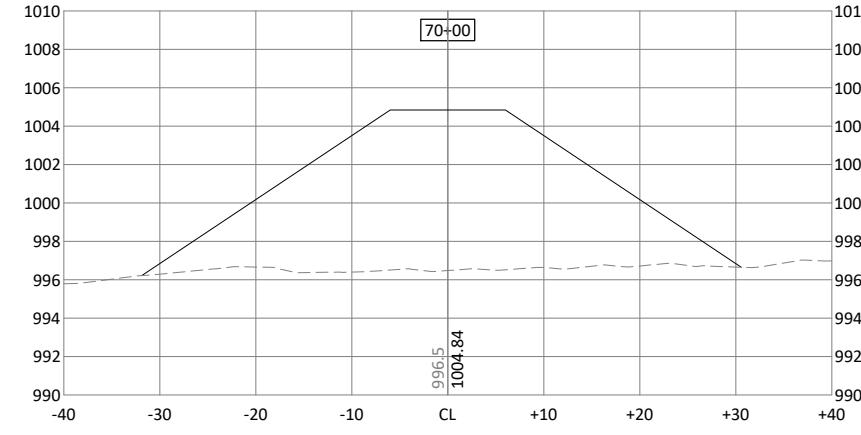
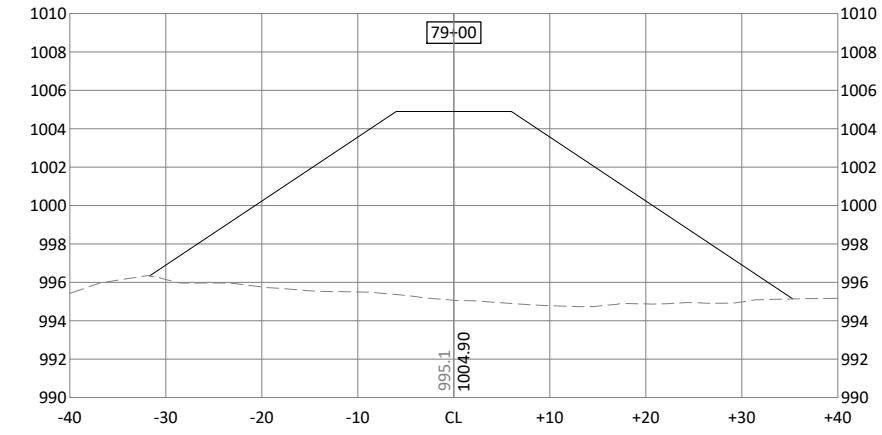
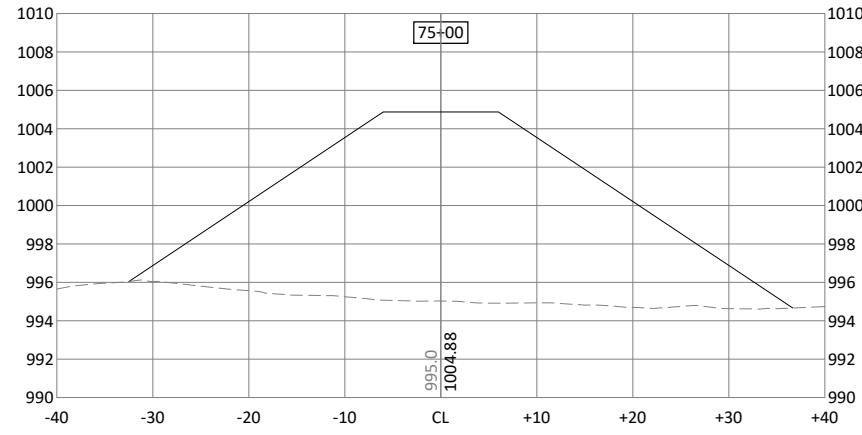
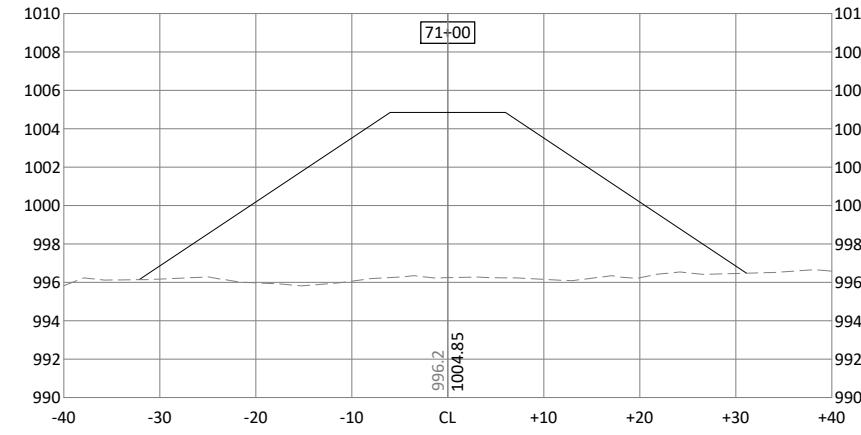
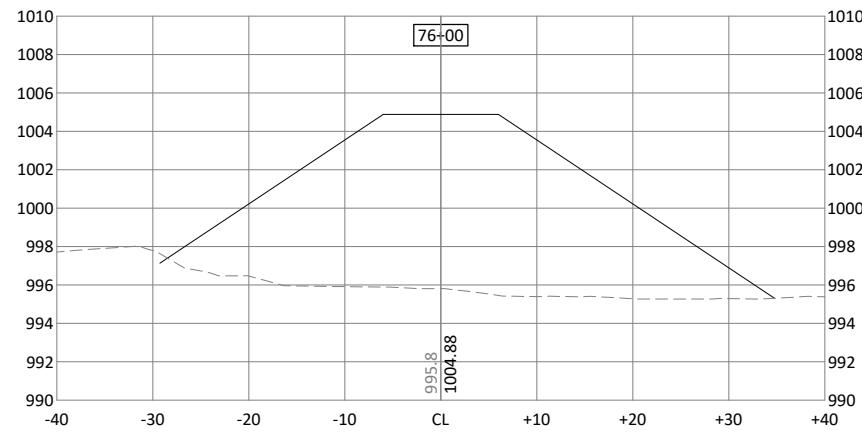
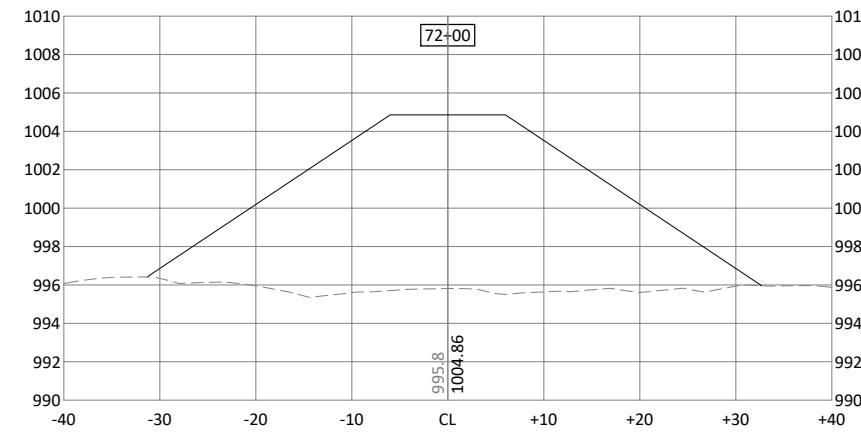
DESIGNED
DRAWN
CHECKED
CLIENT PROJ. NO.

REV
CLH
JPR

DATE

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.07



HORZ
SCALE
FEET

VERT.
SCALE
FEET



300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: jefferson@bolton-menk.com
www.bolton-menk.com

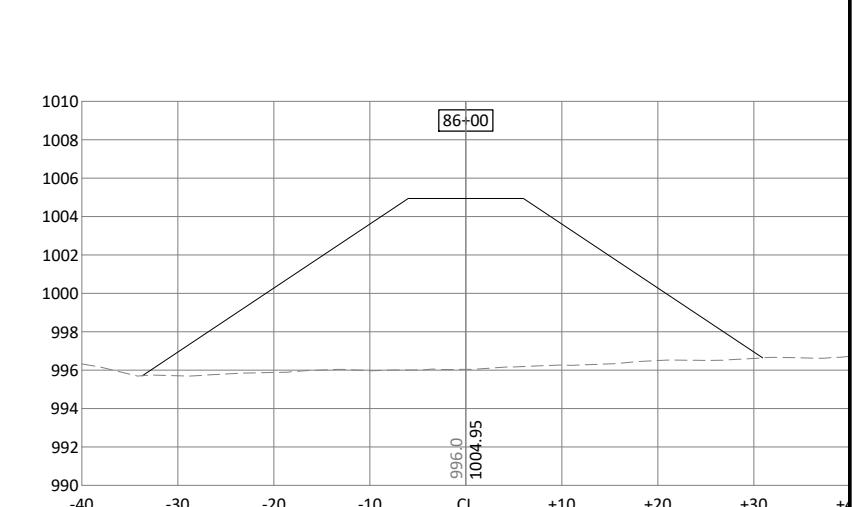
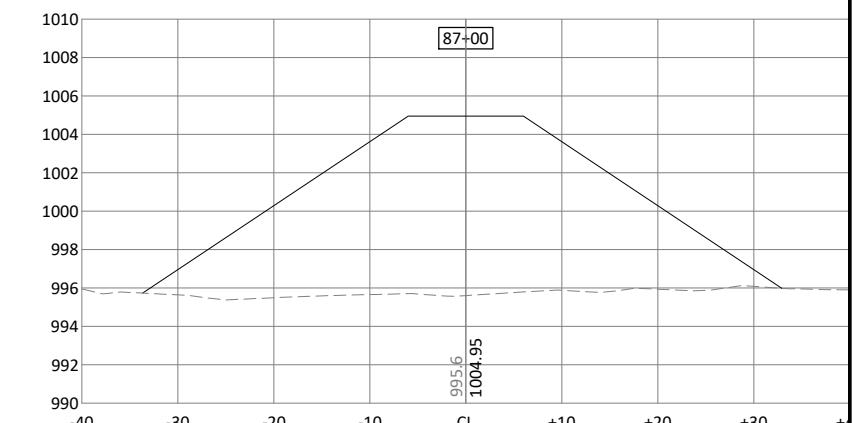
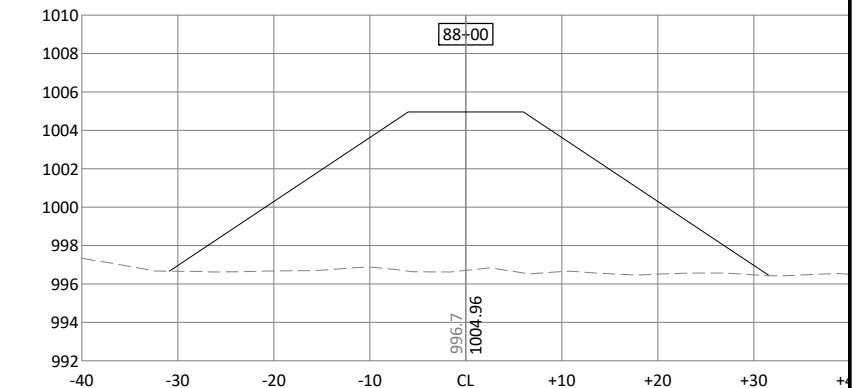
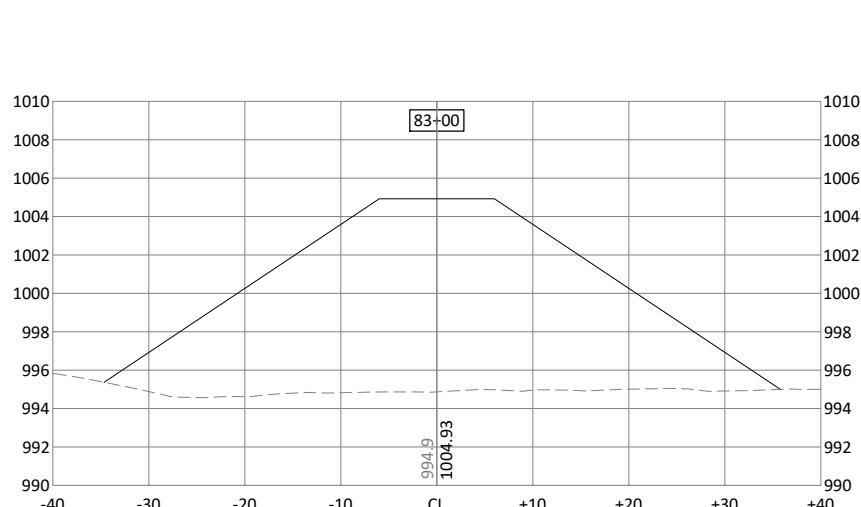
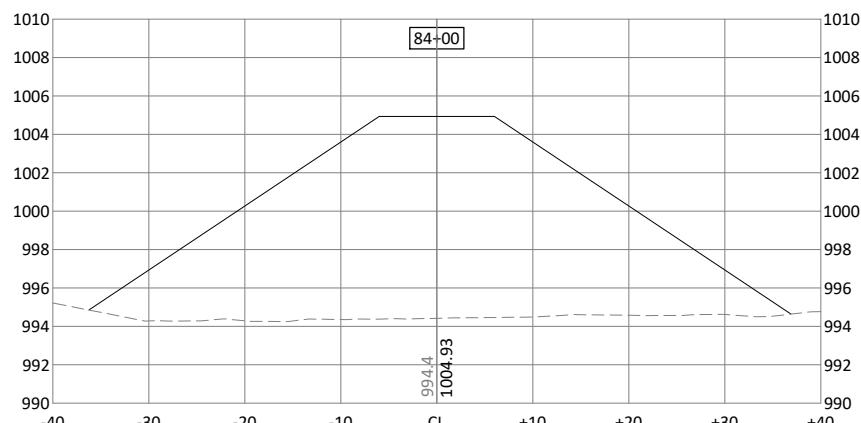
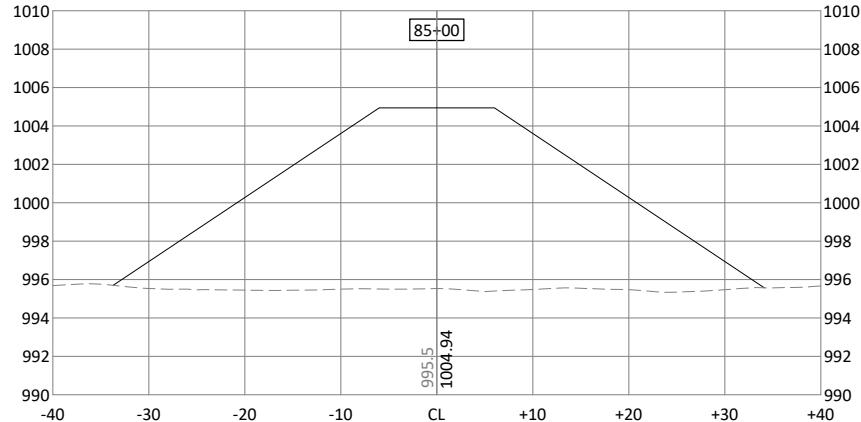
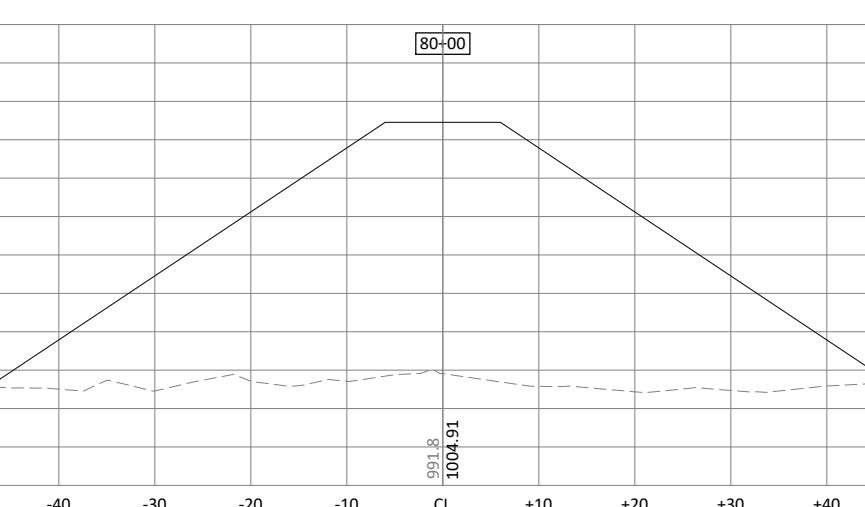
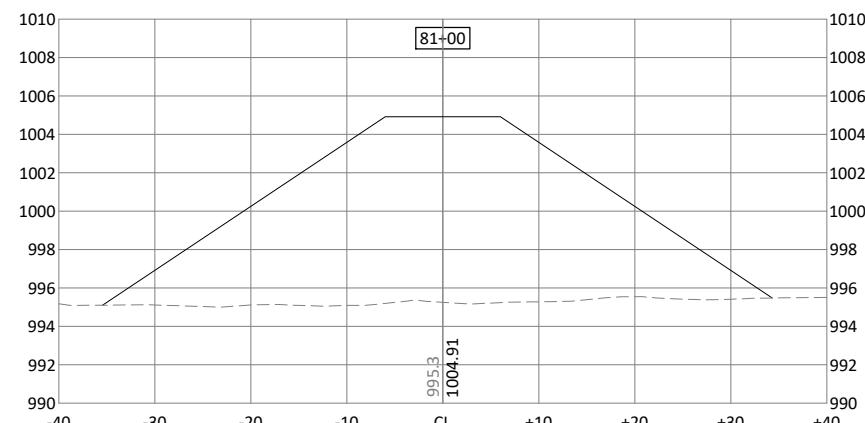
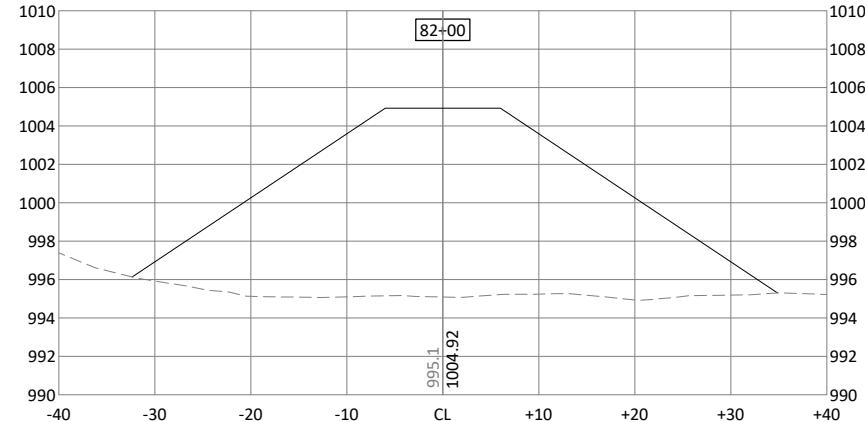
DESIGNED
DRAWN
CHECKED
CLIENT PROJ. NO.

REV
CLH
JPR

DATE

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.08



HORZ
SCALE
0 100 20
FEET

VERT.
SCALE
0 5 10
FEET



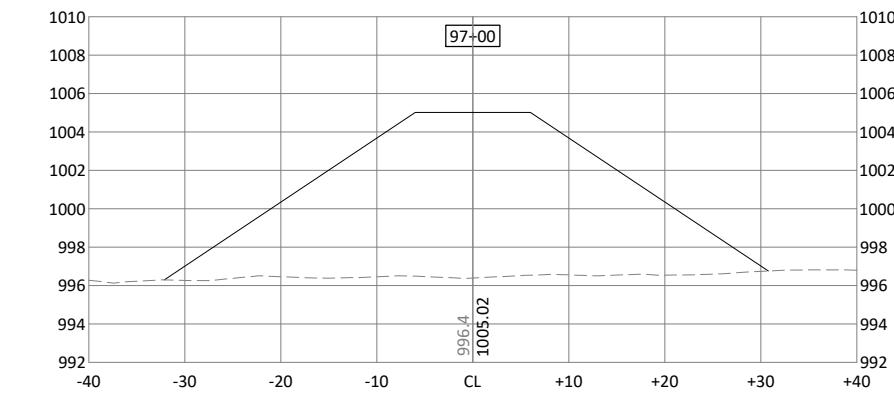
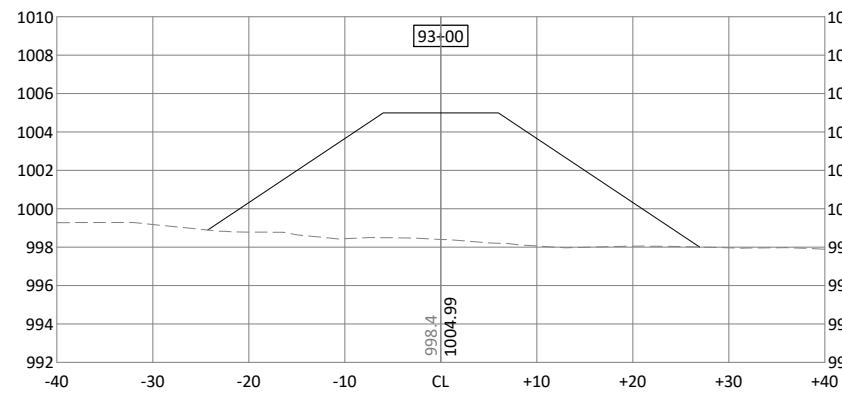
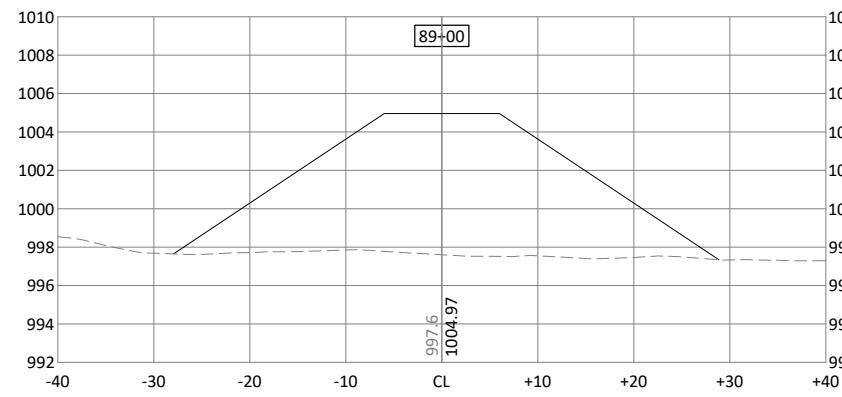
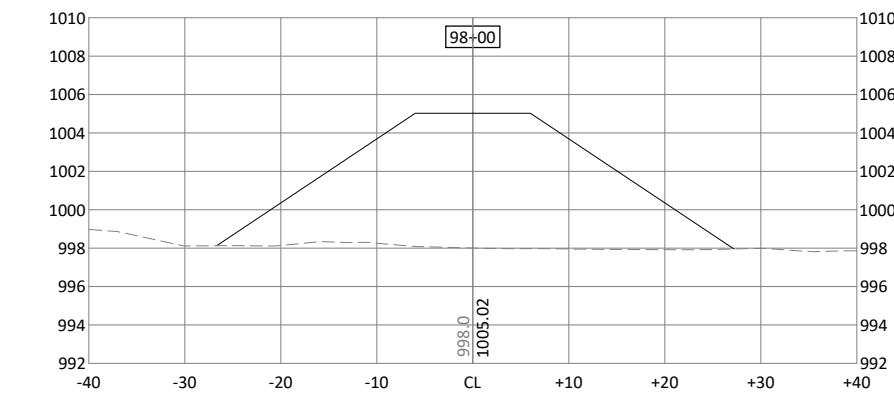
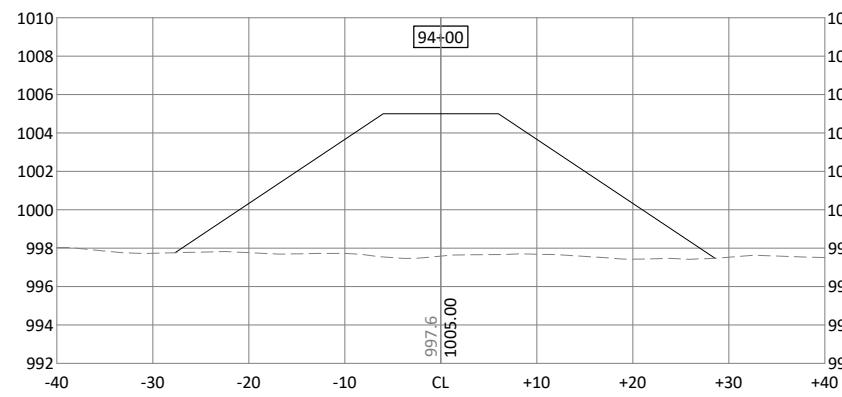
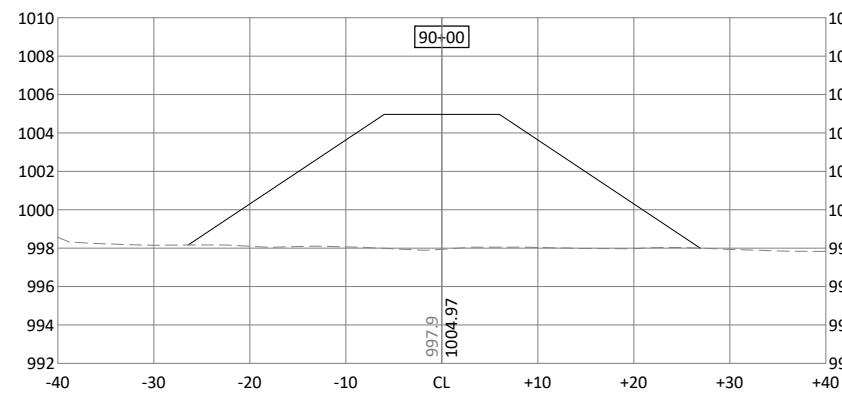
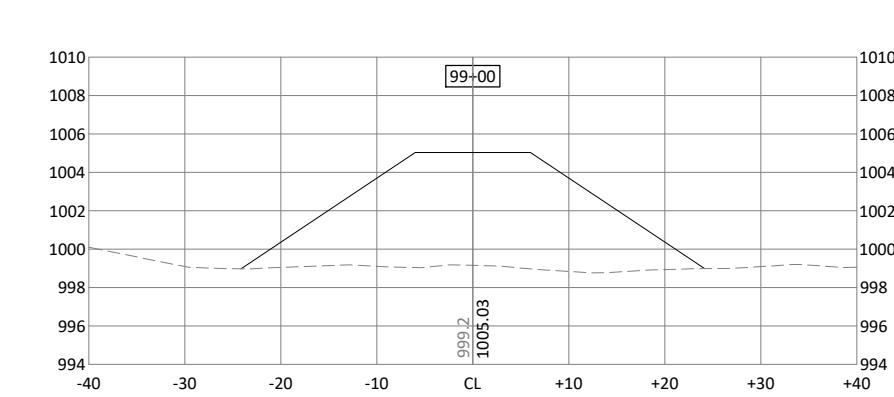
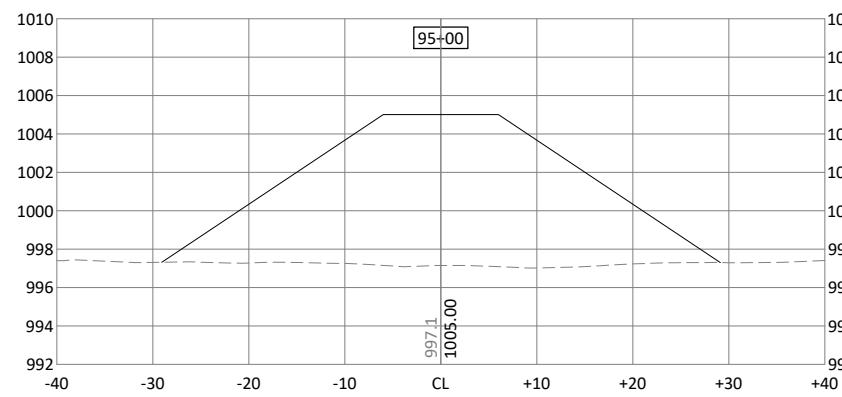
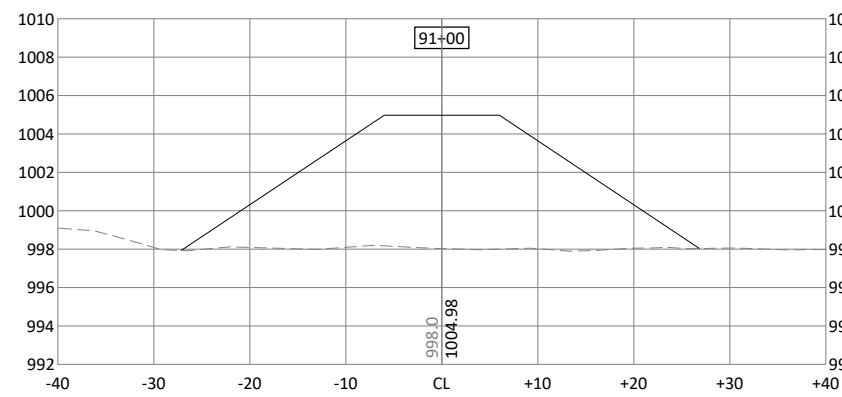
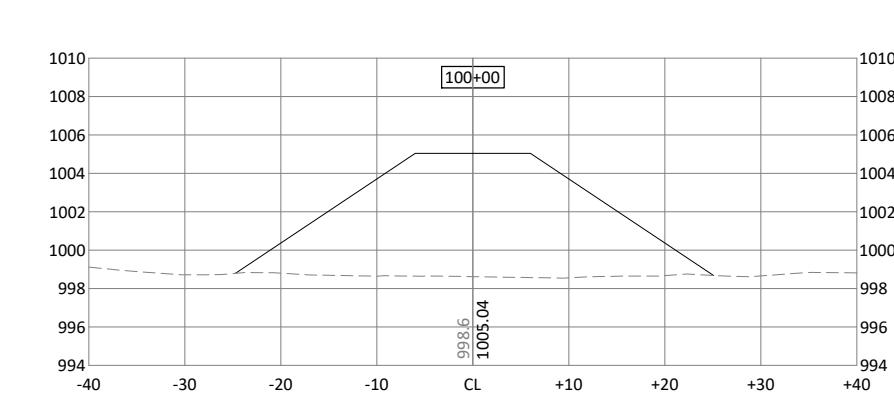
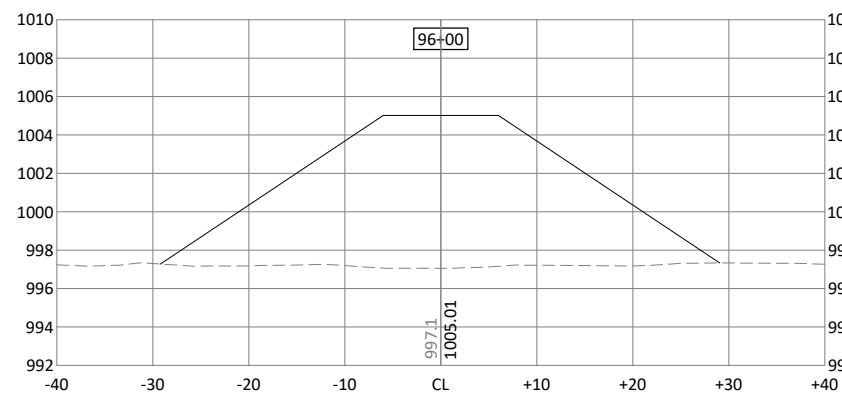
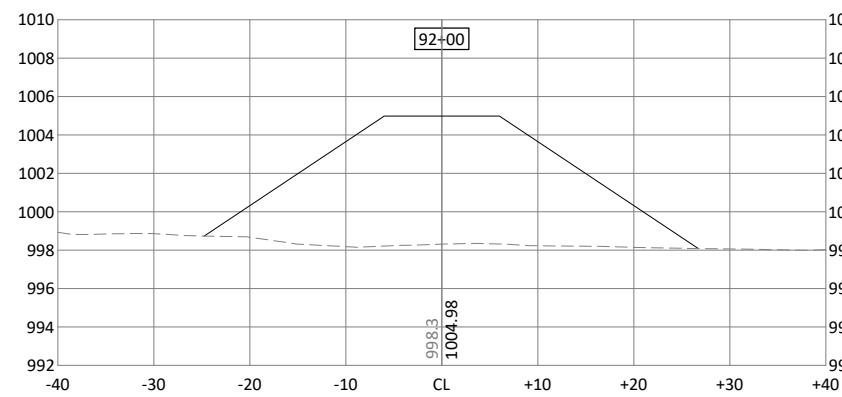
**BOLTON
& MENK**

300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CLH			
CHECKED			
JPR			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.09



HORZ.
SCALE
FEET

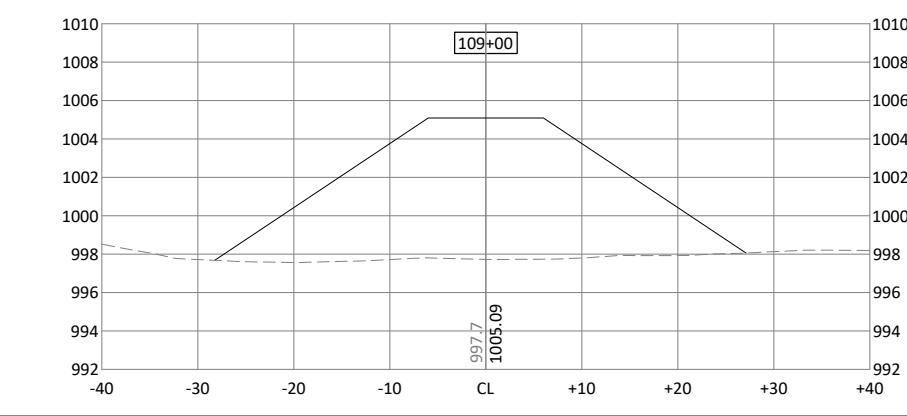
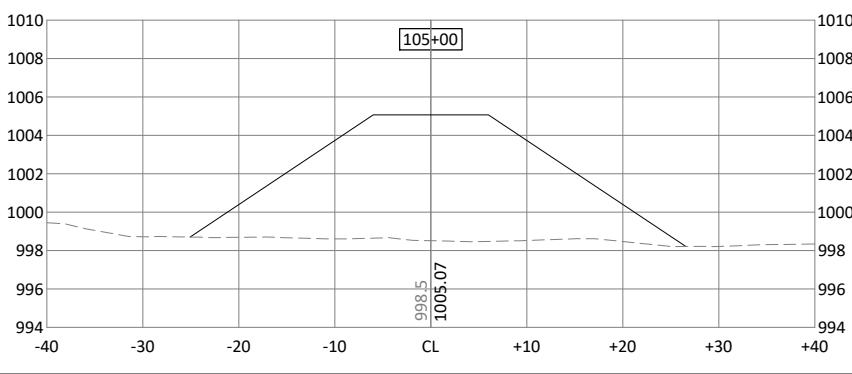
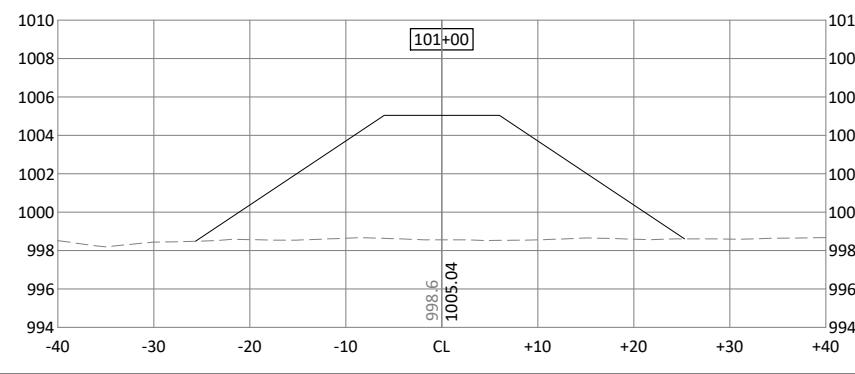
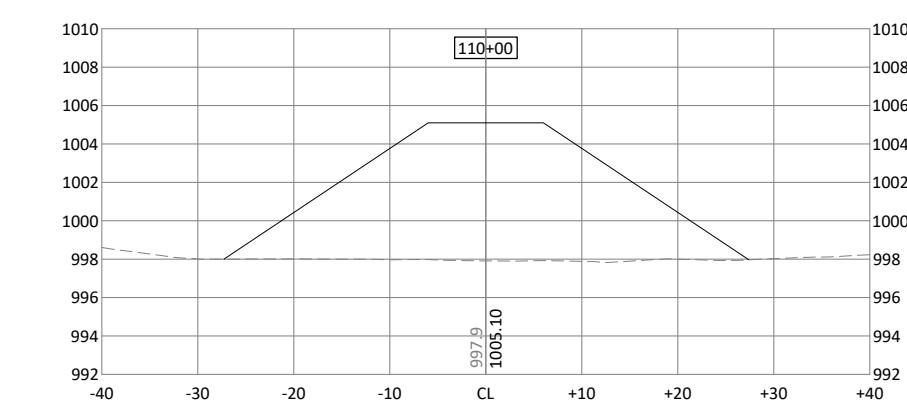
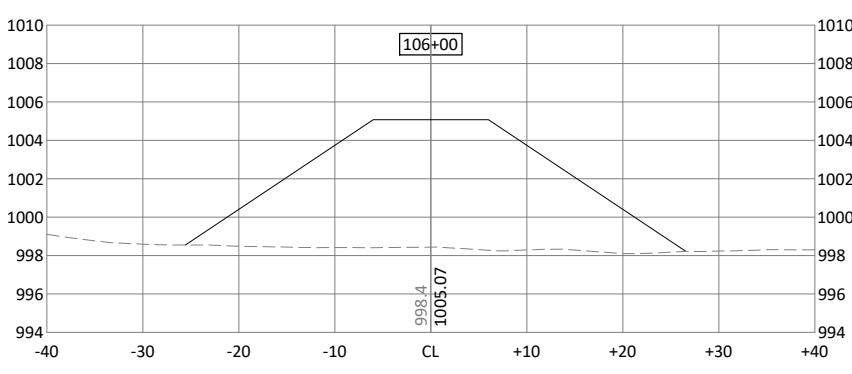
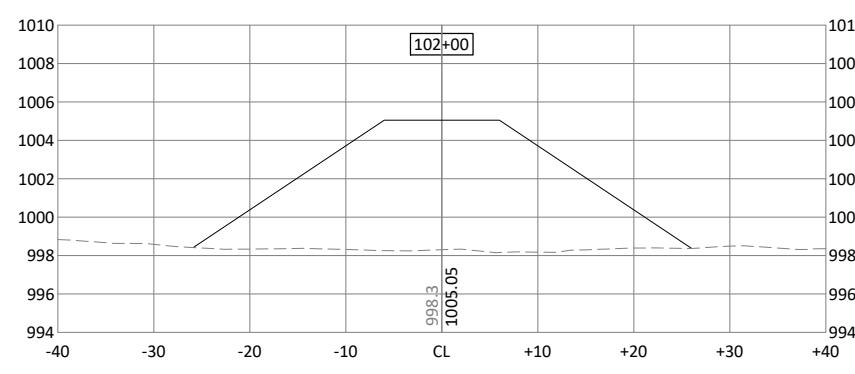
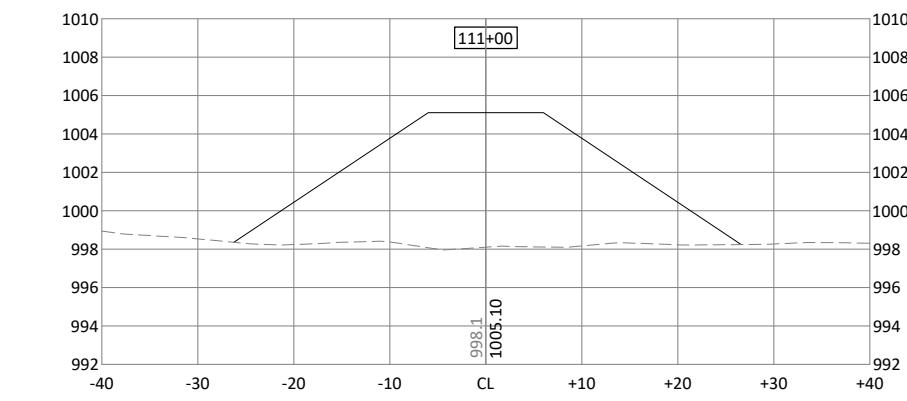
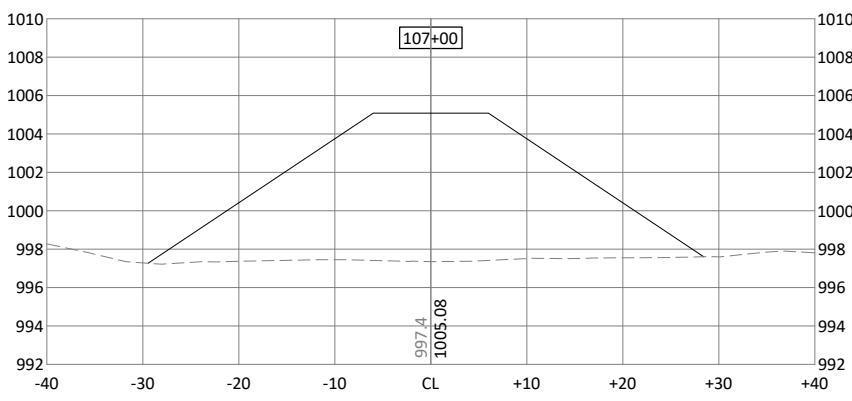
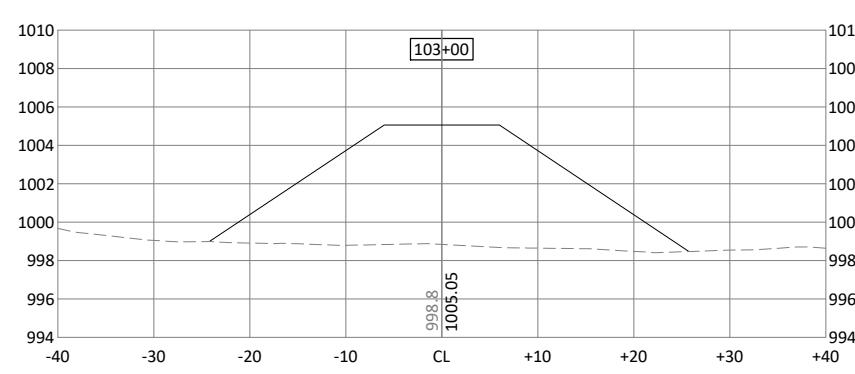
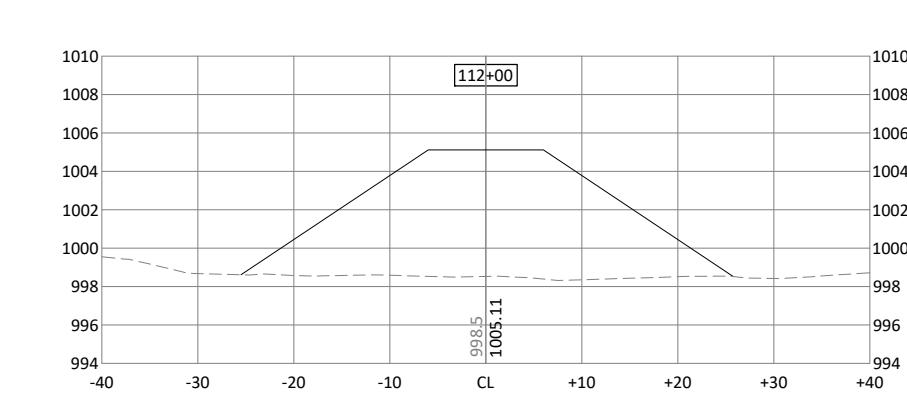
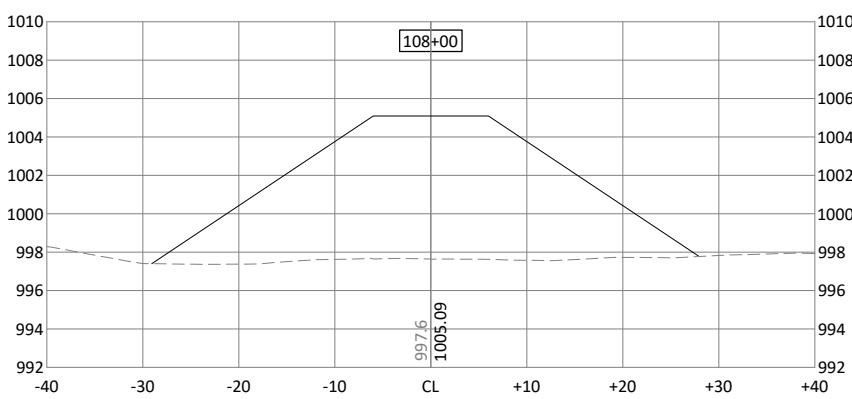
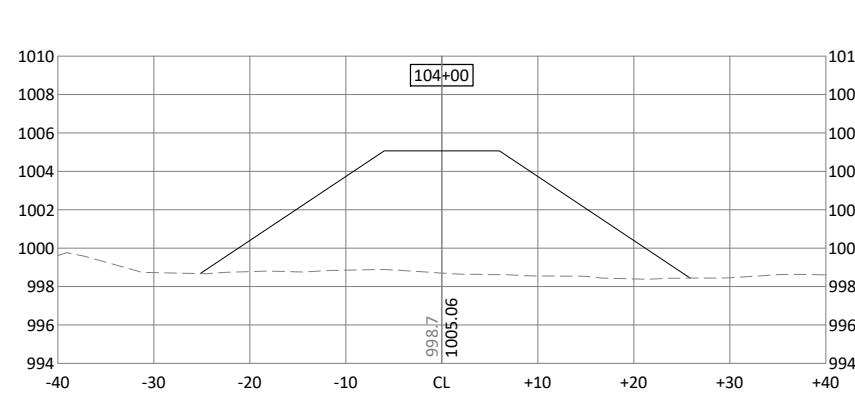
VERT.
SCALE
FEET



300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CHECKED			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE



HORZ.
SCALE
FEET

VERT.
SCALE
FEET

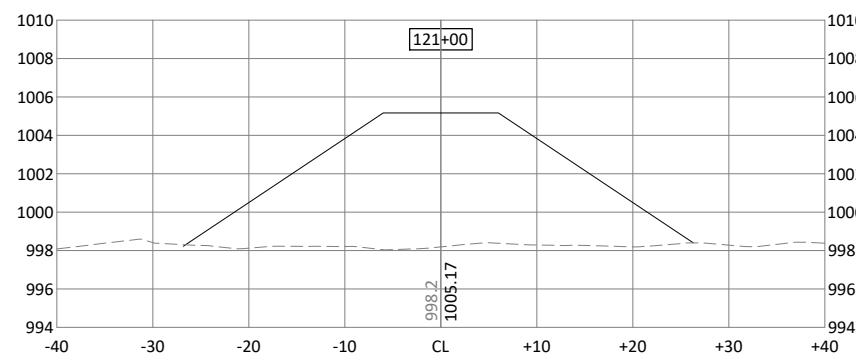
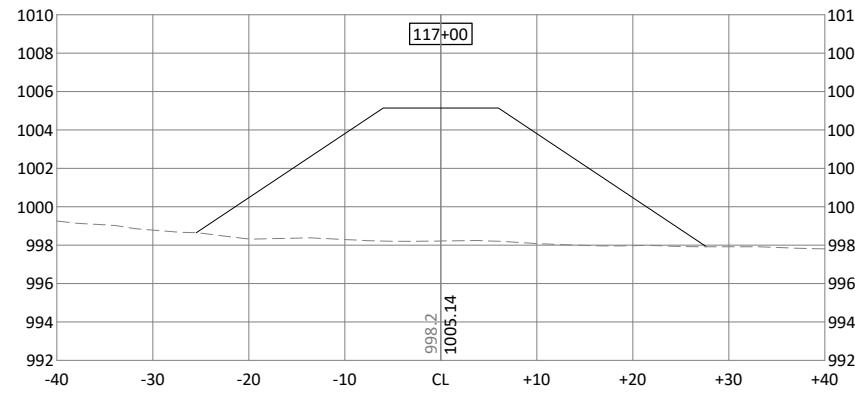
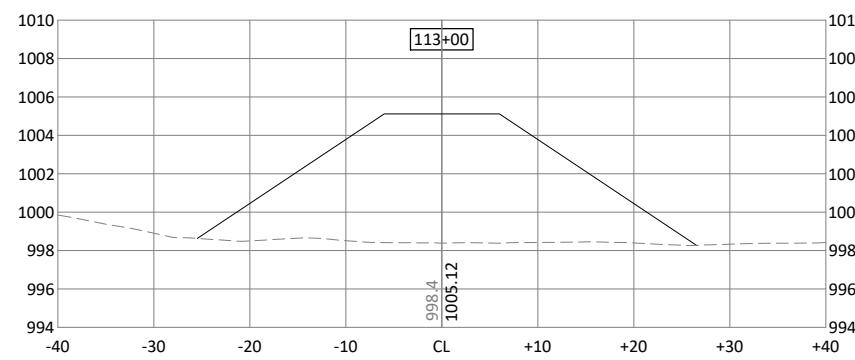
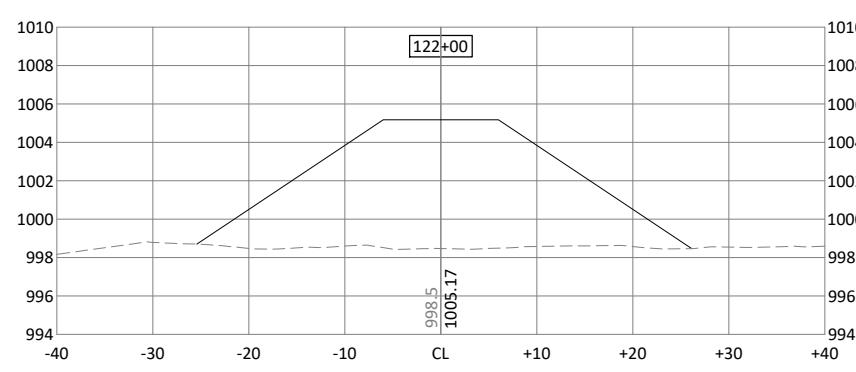
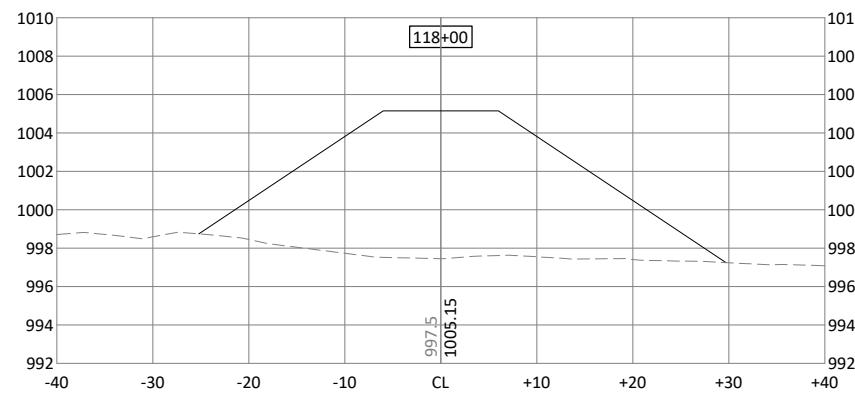
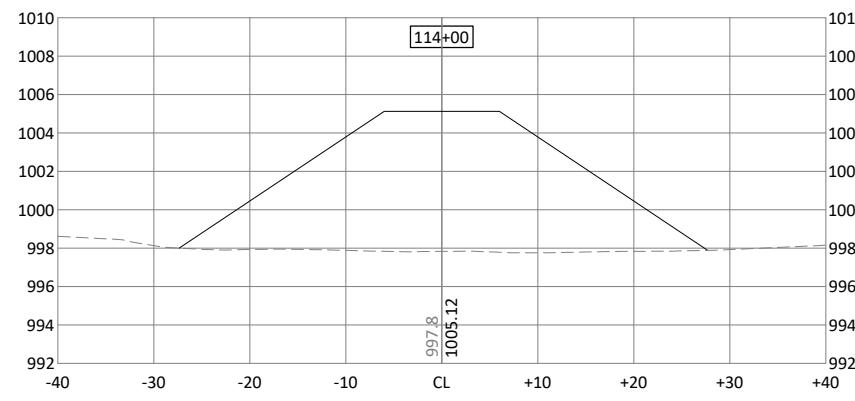
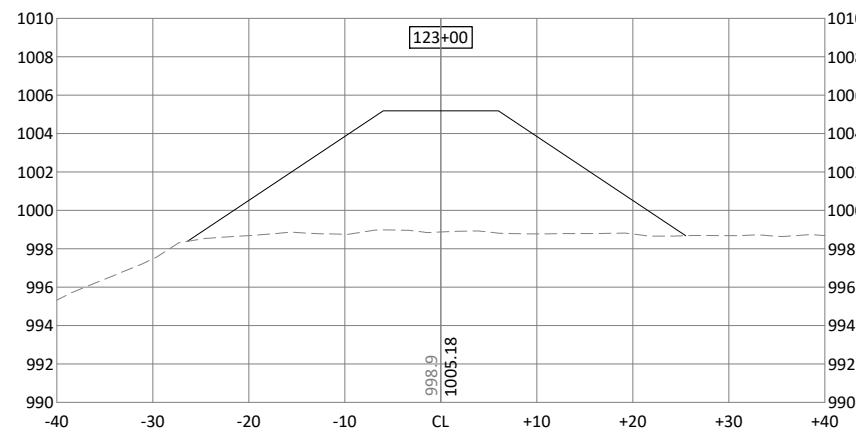
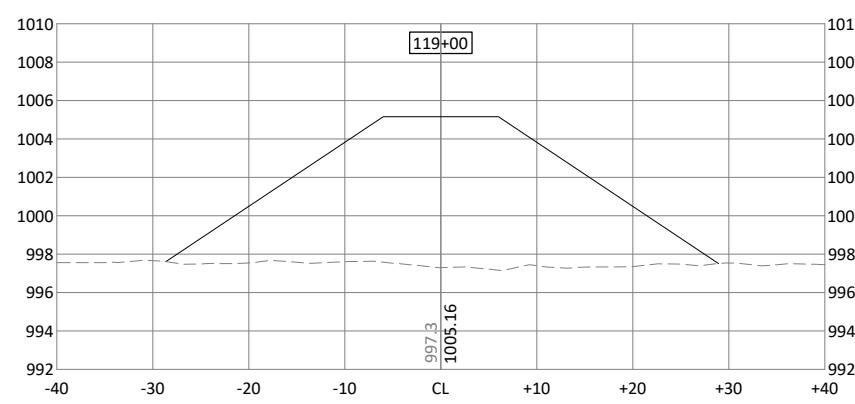
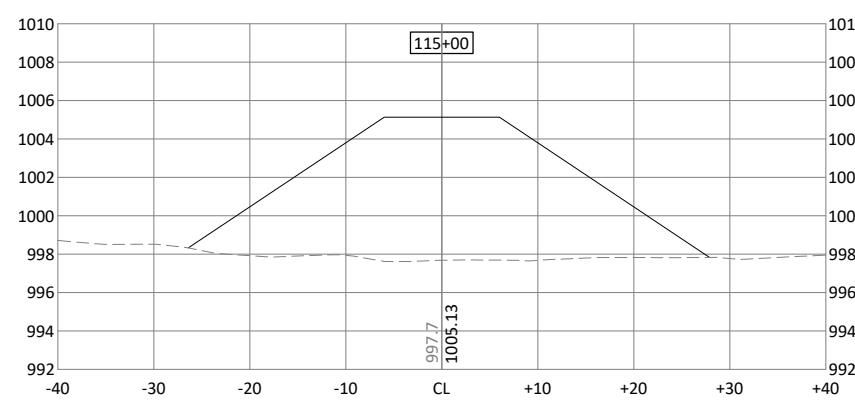
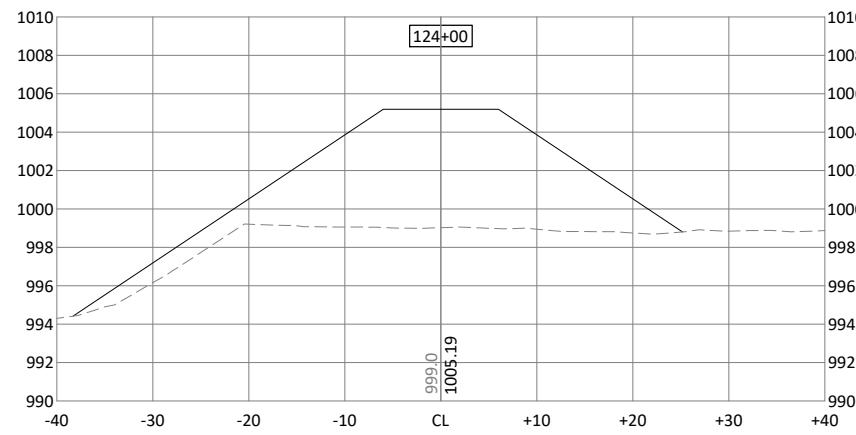
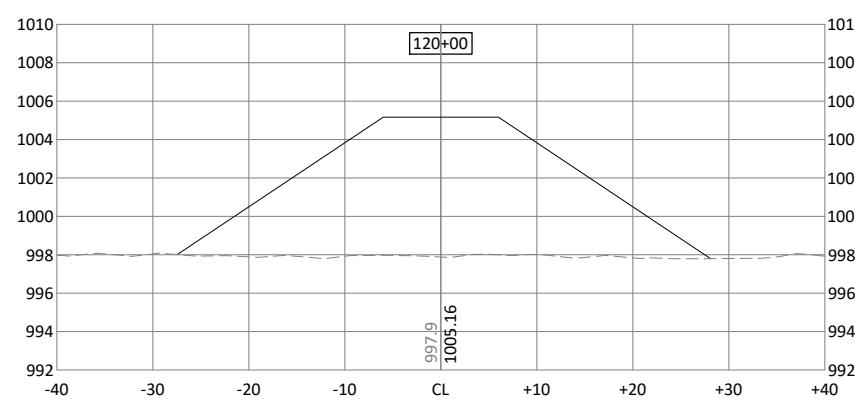
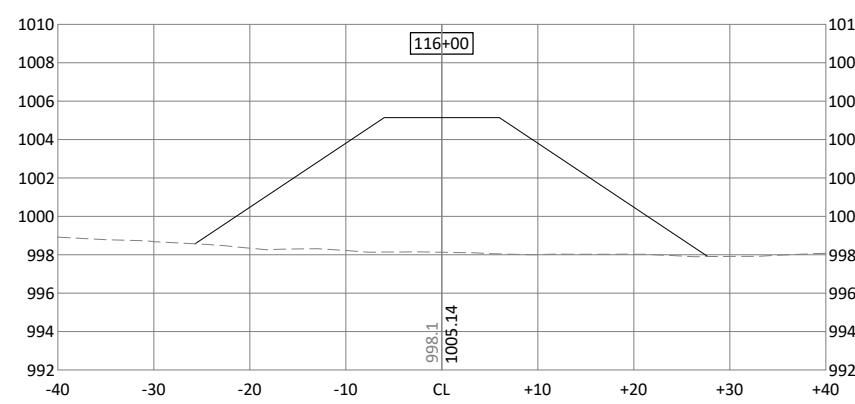


300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CLH			
CHECKED			
JPR			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.11



HORZ.
SCALE
0 100 20
FEET

VERT.
SCALE
0 5 10
FEET



300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

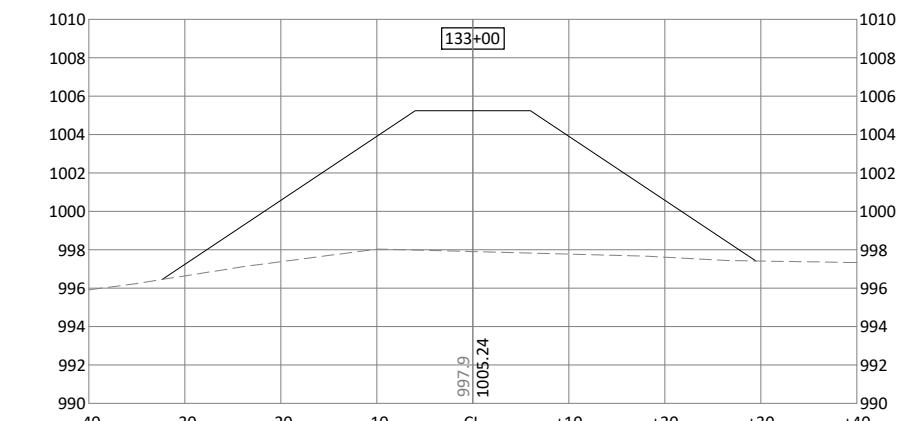
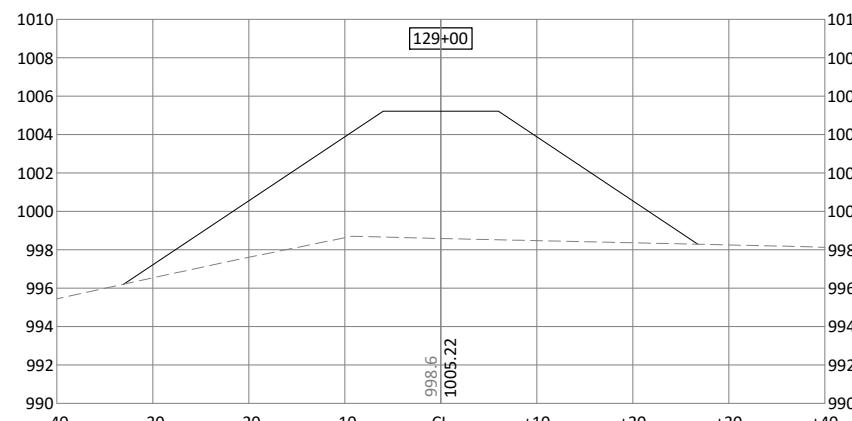
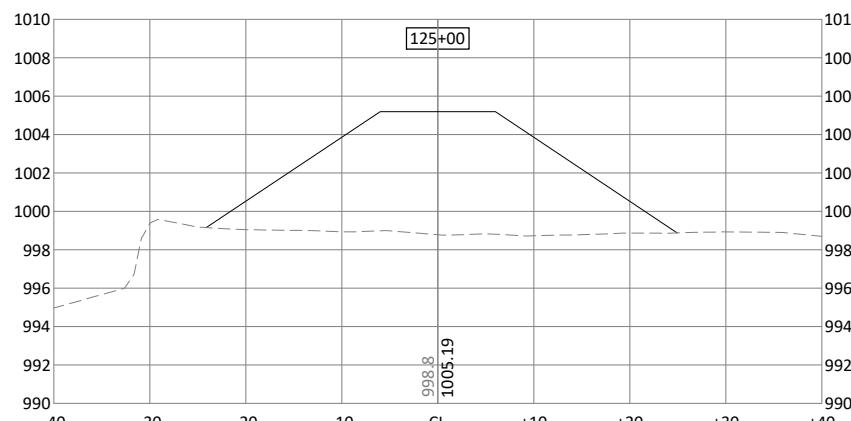
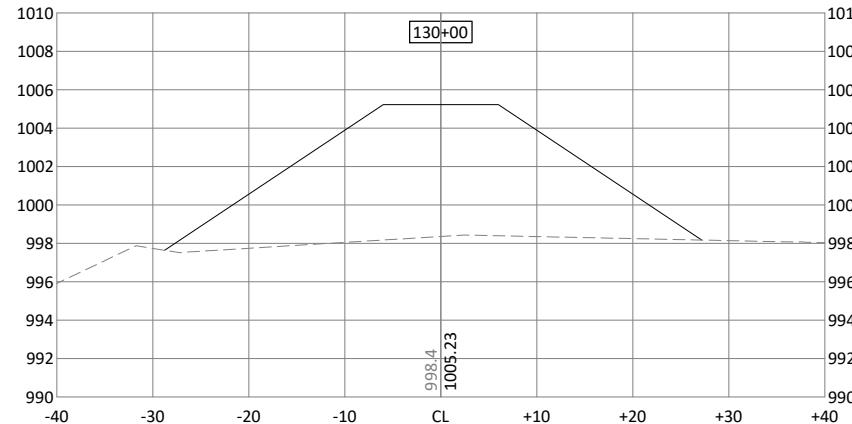
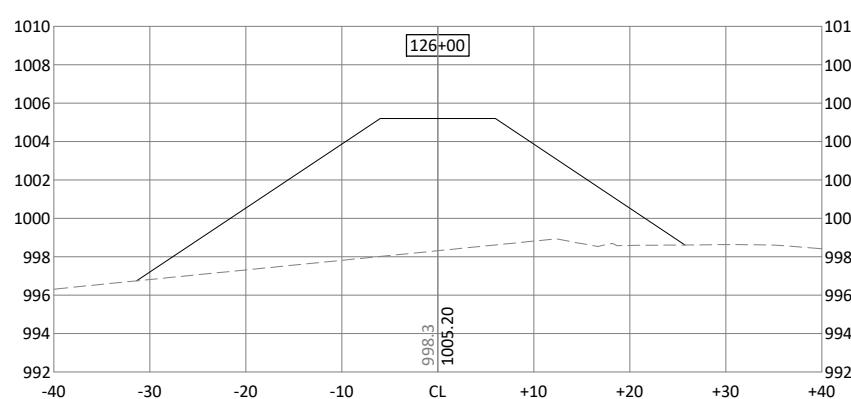
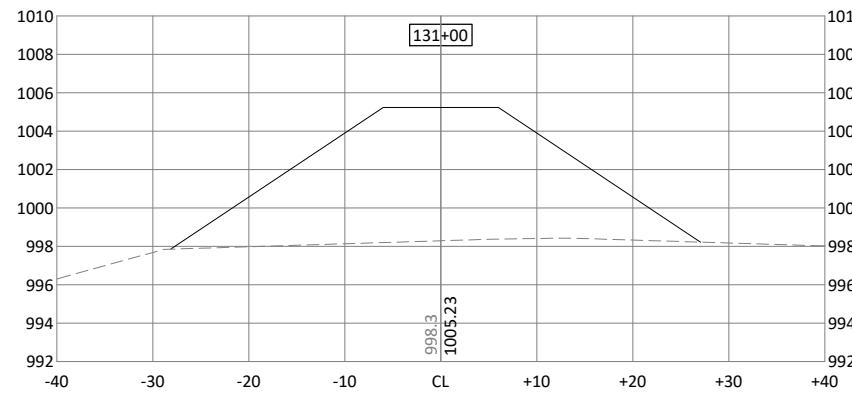
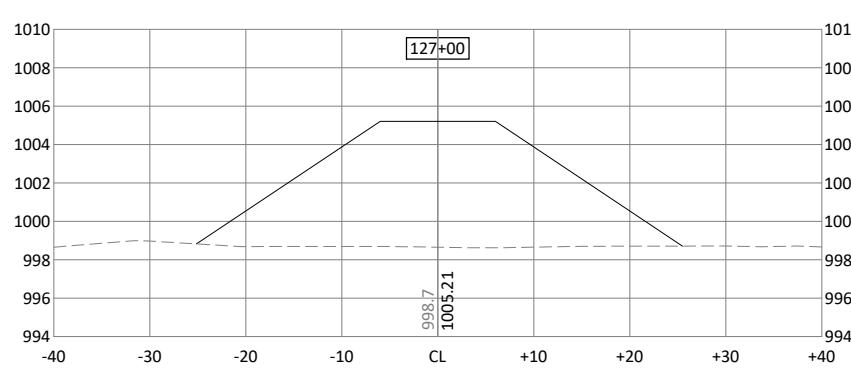
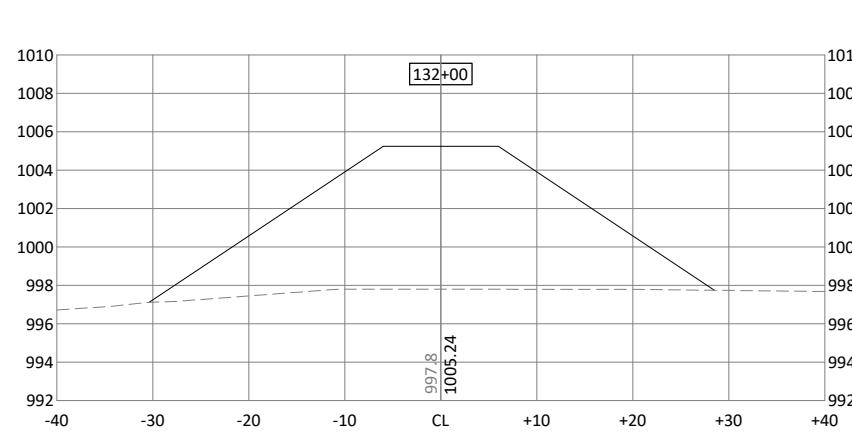
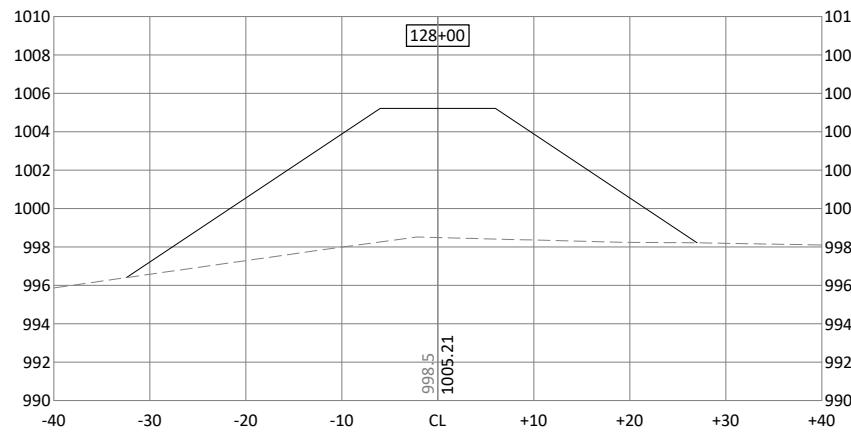
DESIGNED
DRAWN
CHECKED
CLIENT PROJ. NO.

REV
CLH
JPR

DATE

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.12



HORZ.
SCALE
FEET

VERT.
SCALE
FEET

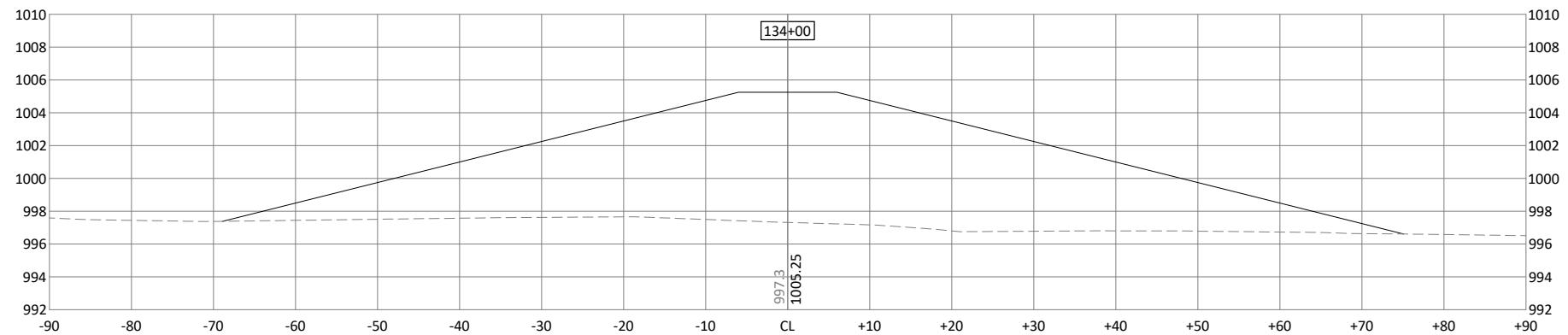
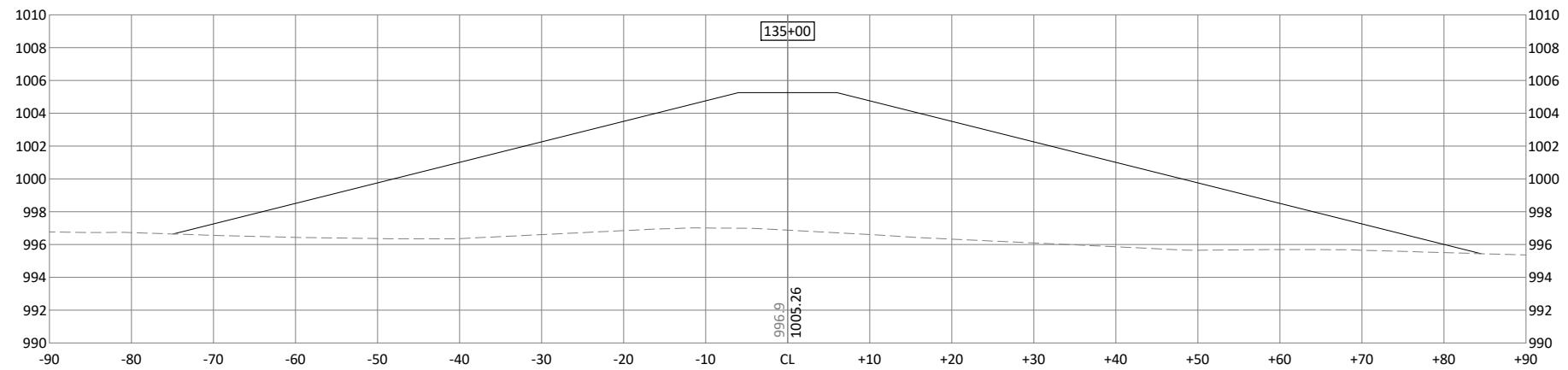
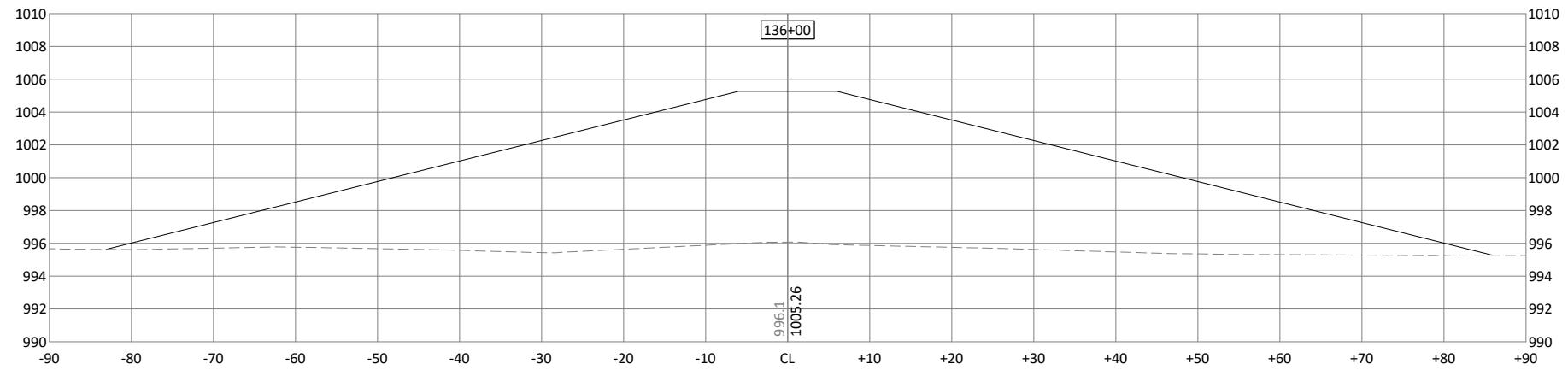
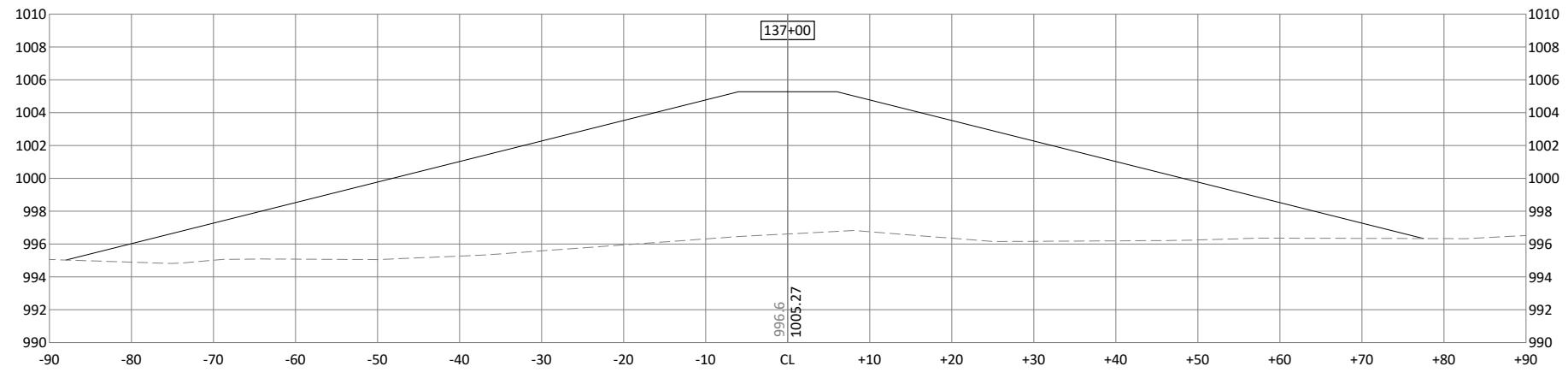


300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CLH			
CHECKED			
JPR			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.13



HORZ.
SCALE
0 100 20
FEET

VERT.
SCALE
0 5 10
FEET

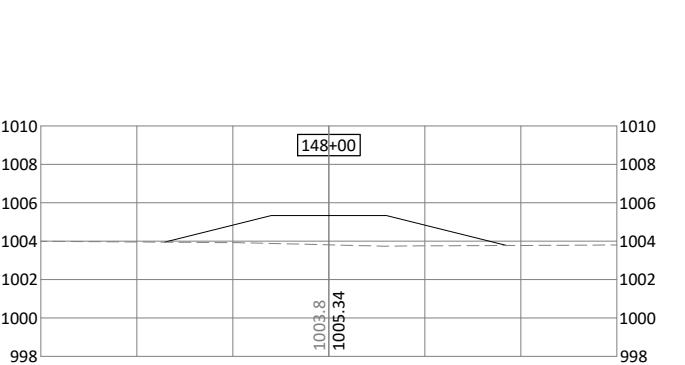
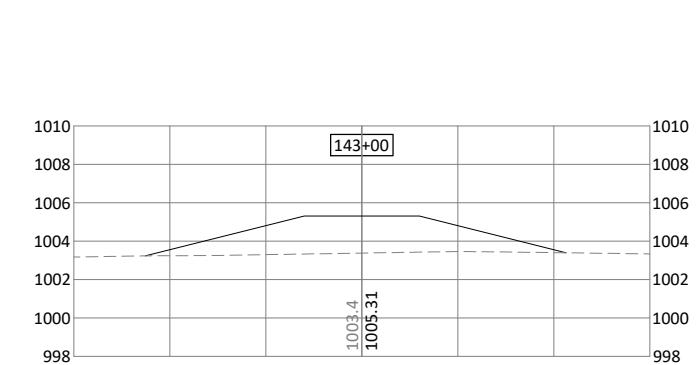
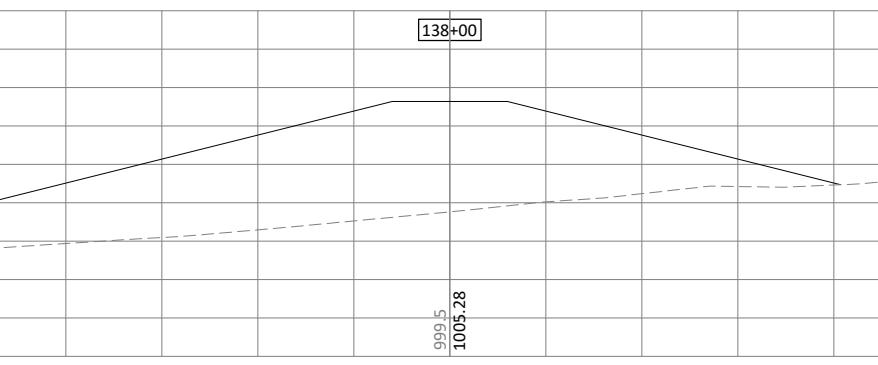
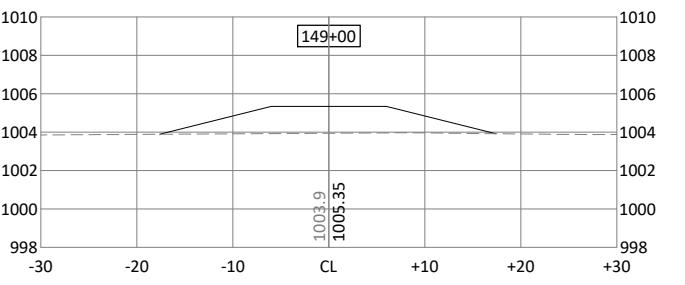
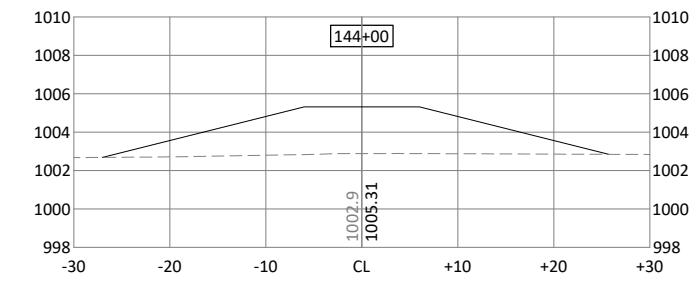
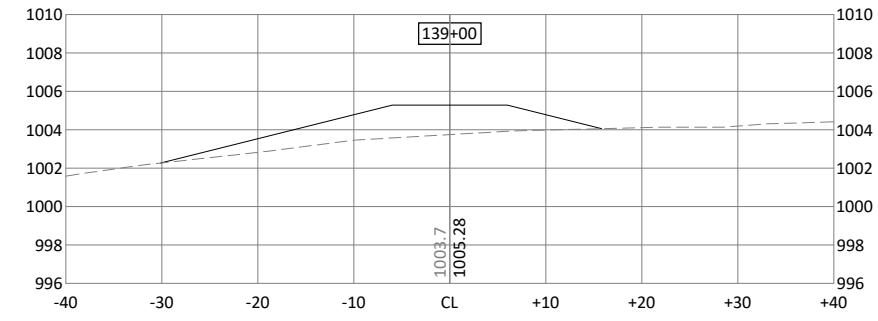
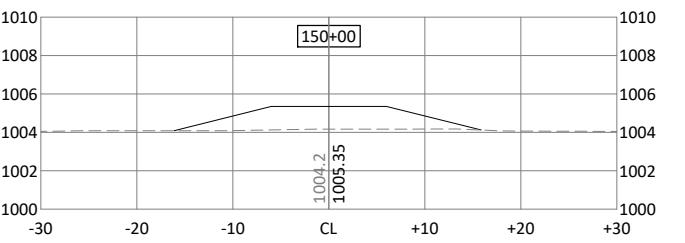
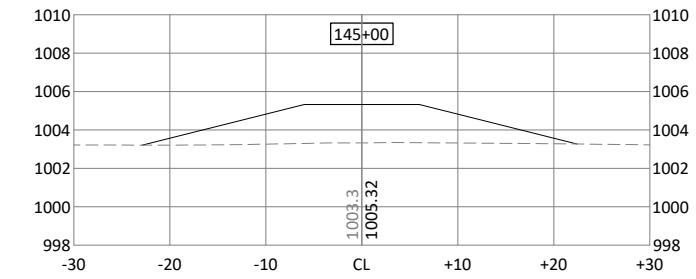
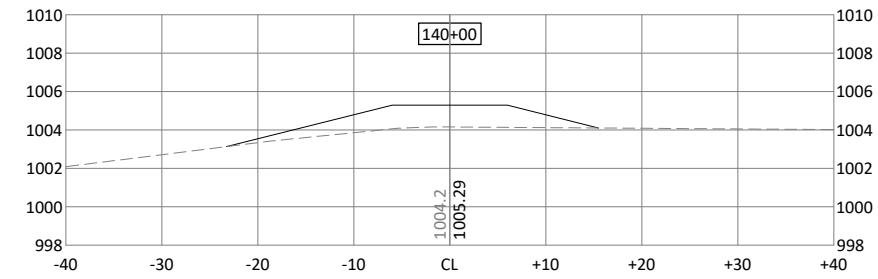
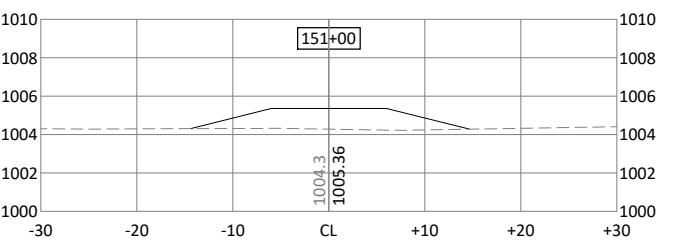
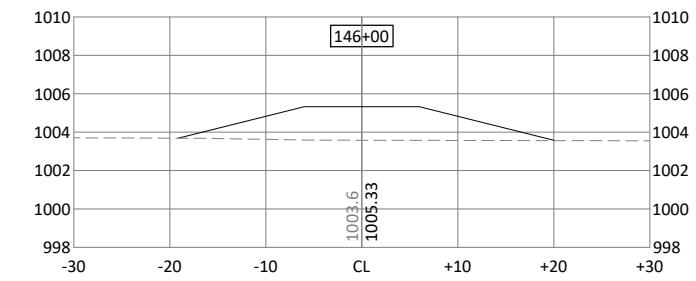
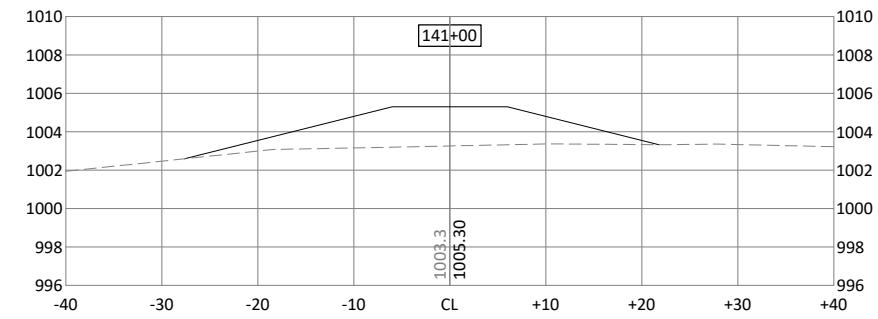
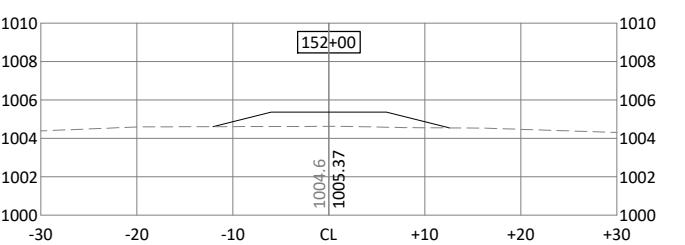
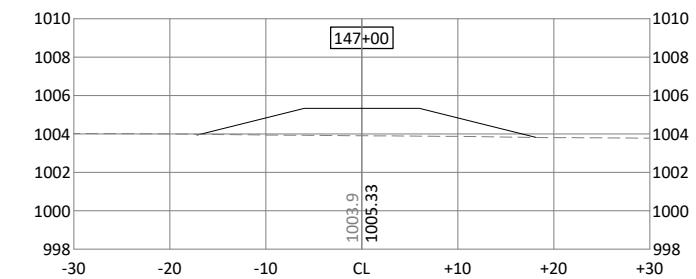
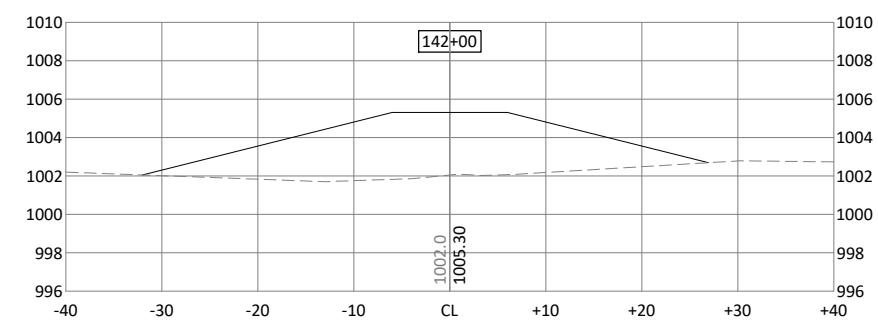


300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
DRAWN			
CHECKED			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED COULTHARD LEVEE

SHEET
X.14



HORZ.
SCALE
FEET

VERT.
SCALE
FEET



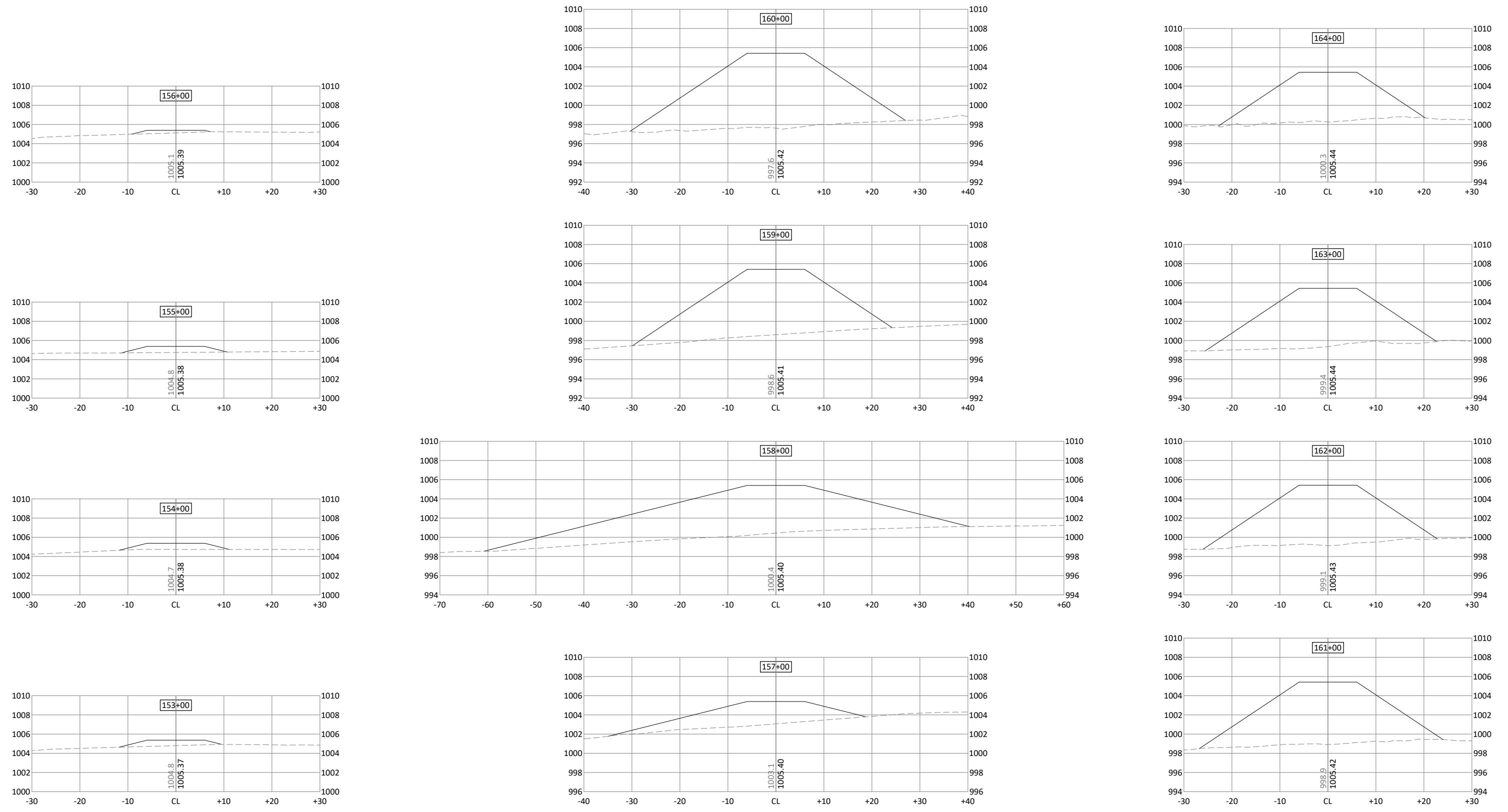
300 WEST MCKINLEY ST., P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CLH			
CHECKED			
JPR			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA

CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.15



HORZ.
SCALE
0 100 20
FEET

VERT.
SCALE
0 5 10
FEET

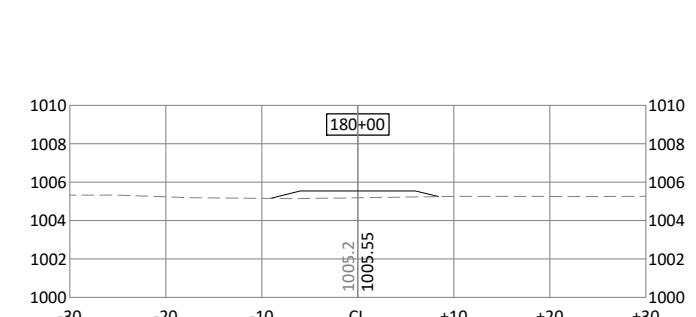
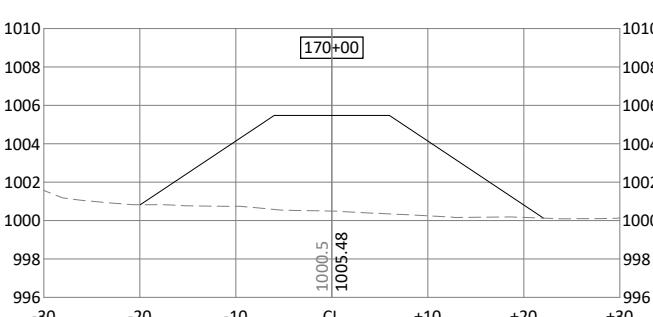
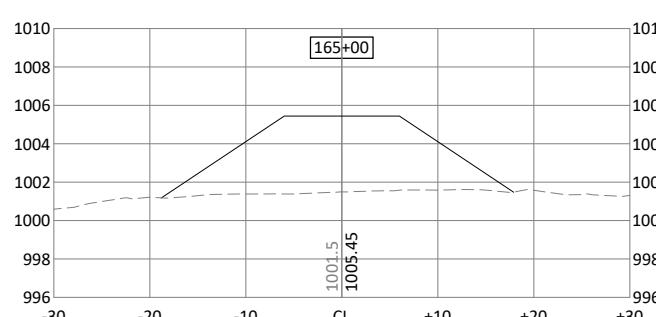
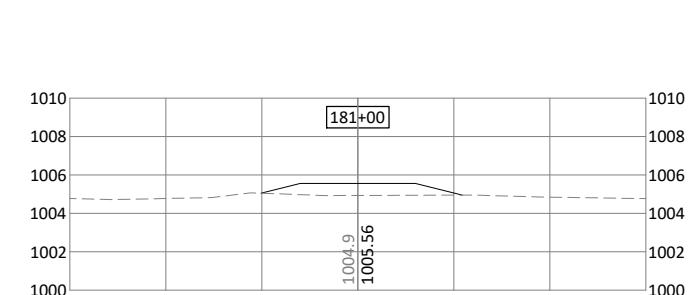
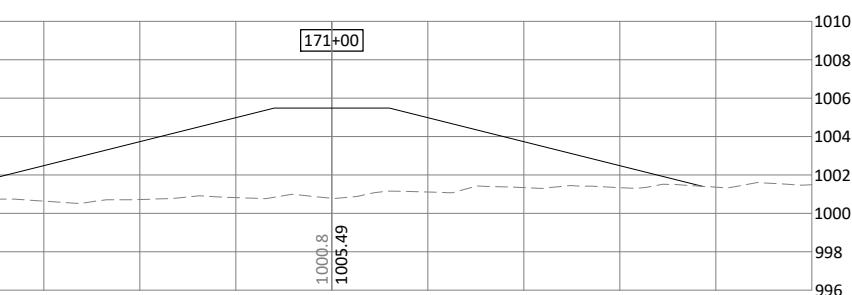
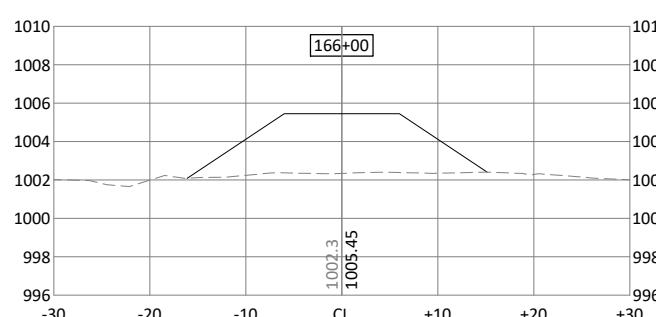
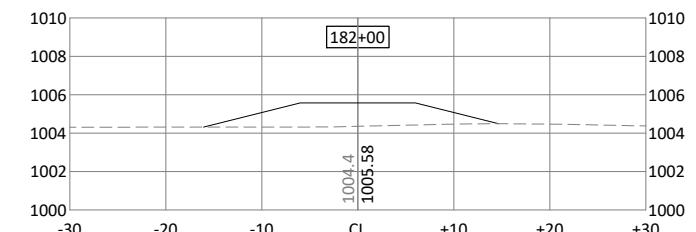
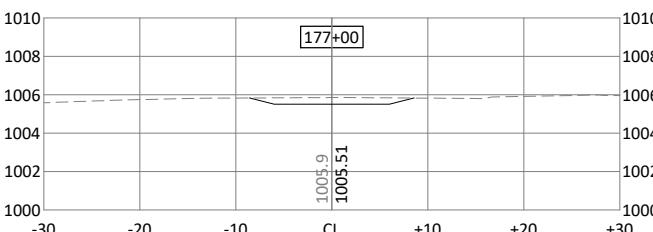
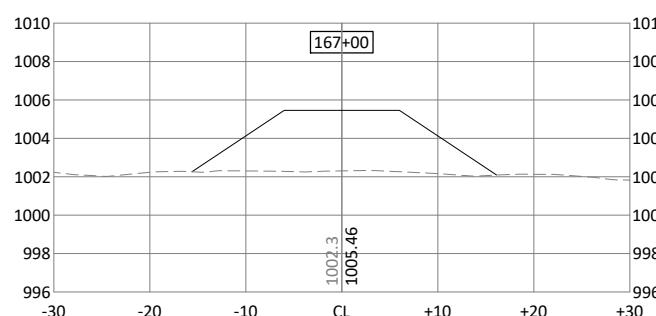
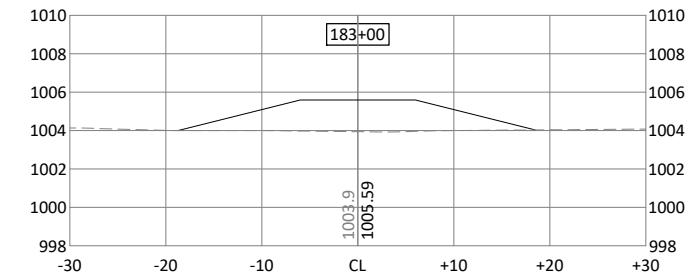
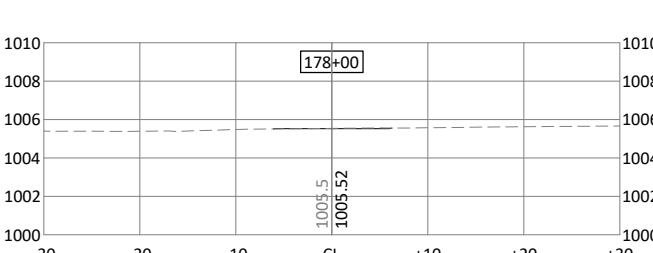
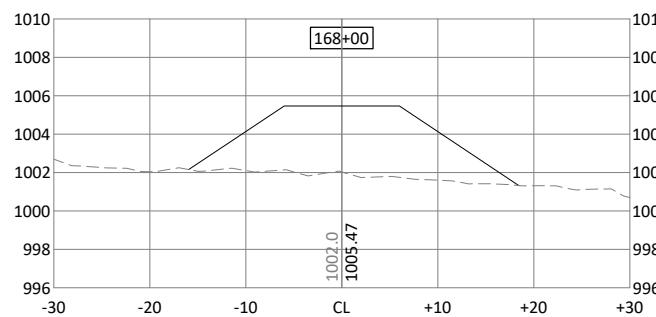
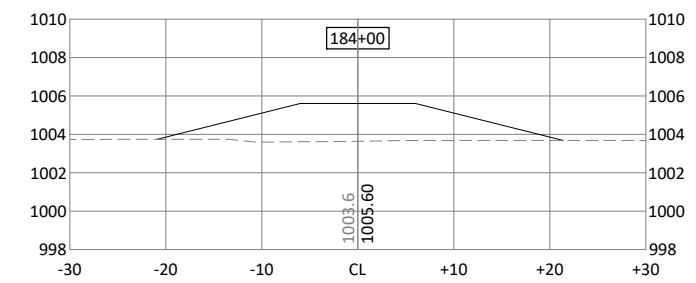
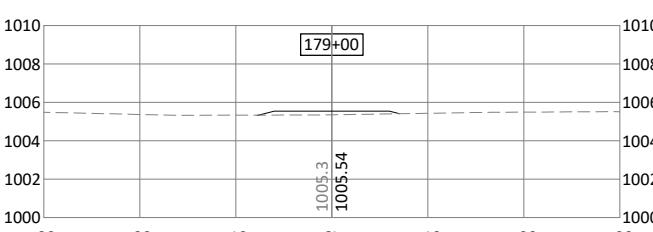
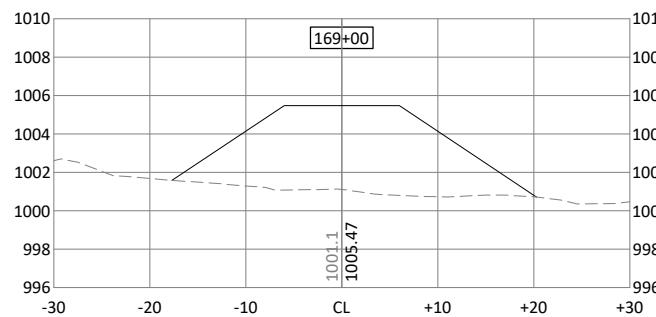


300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CLH			
CHECKED			
JPR			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.16



HORZ. VERT.
SCALE SCALE
FEET FEET

0 100 20
HORZ. VERT.
SCALE SCALE
FEET FEET



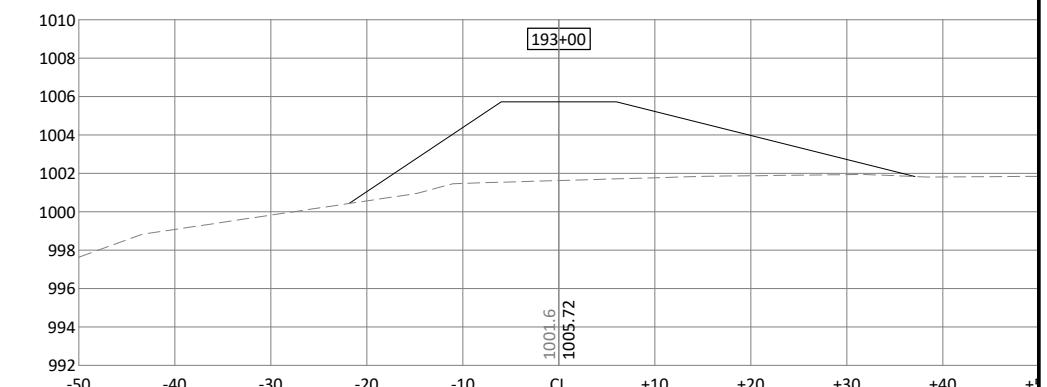
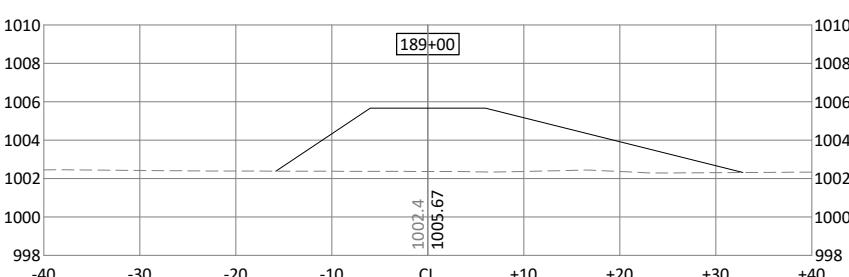
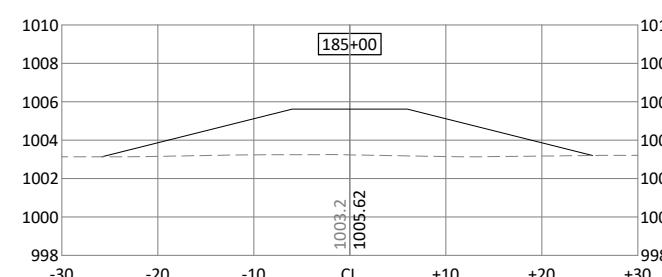
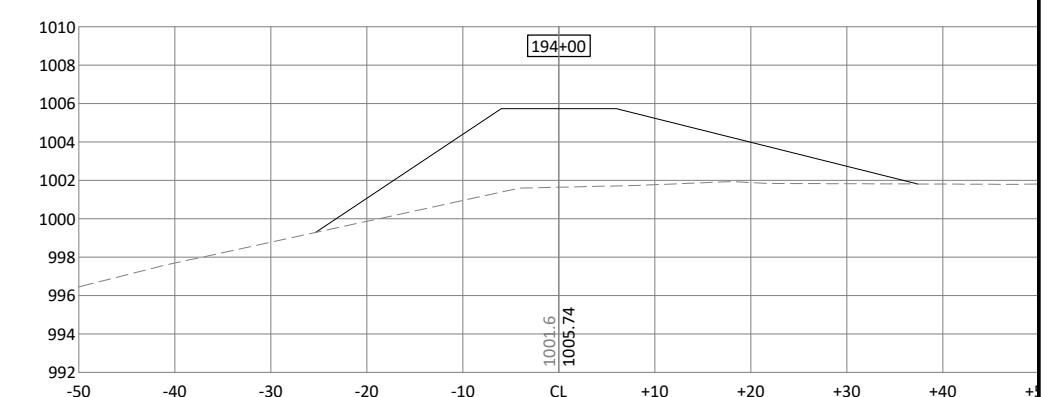
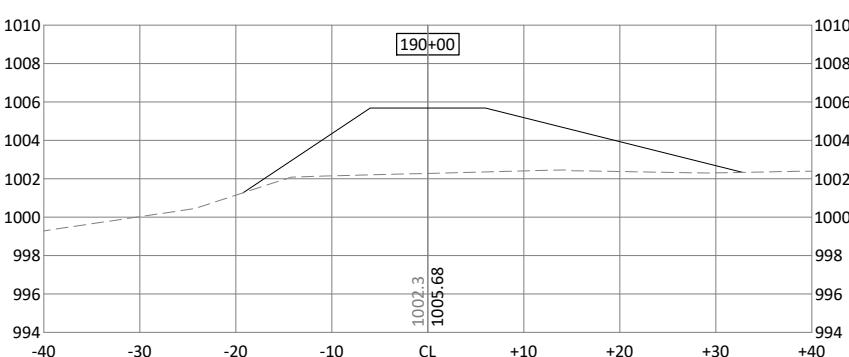
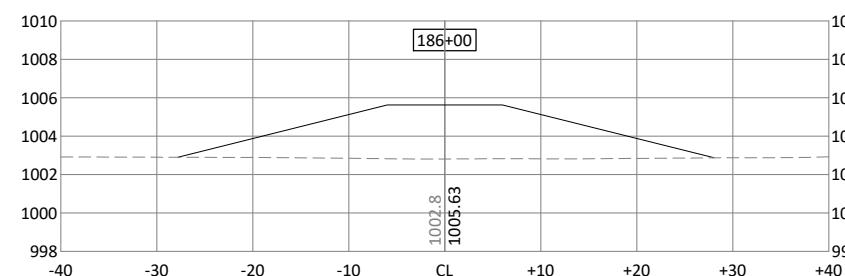
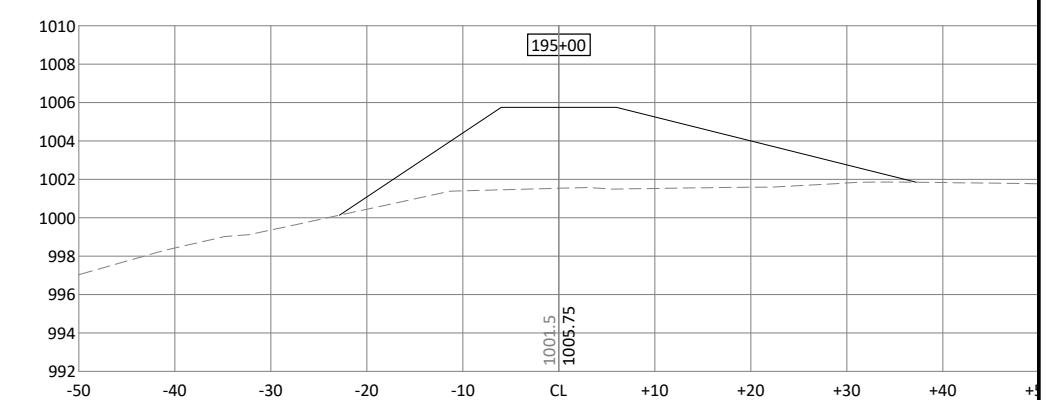
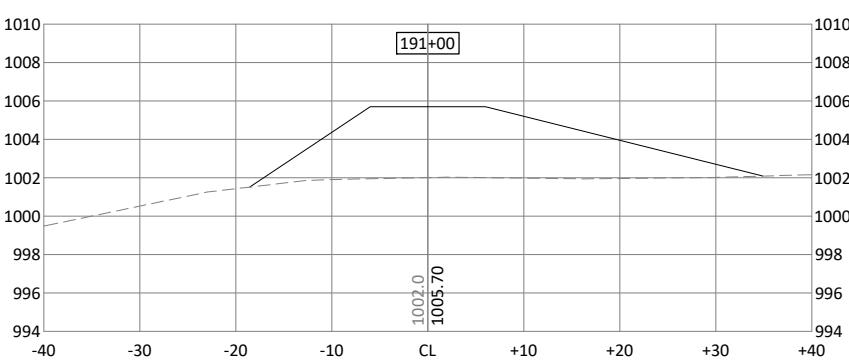
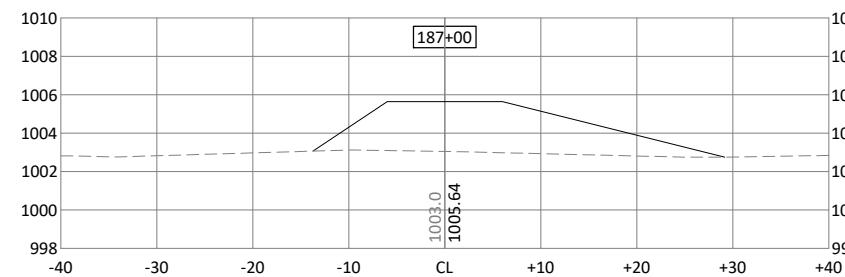
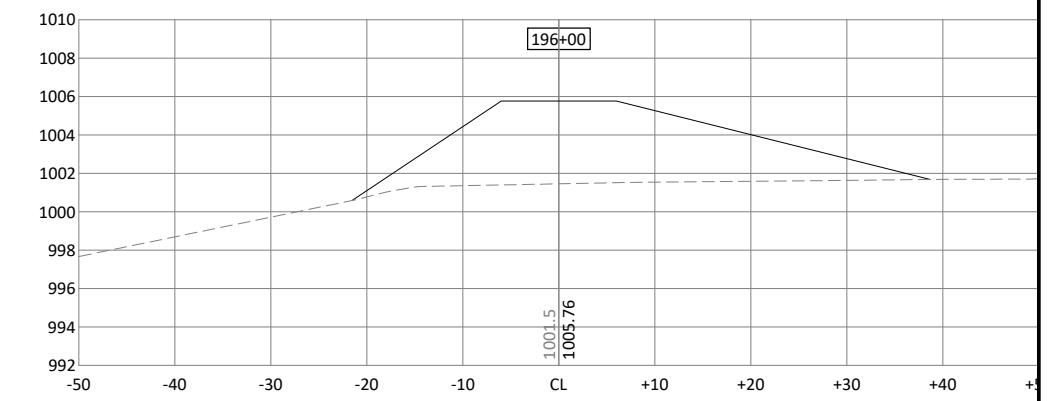
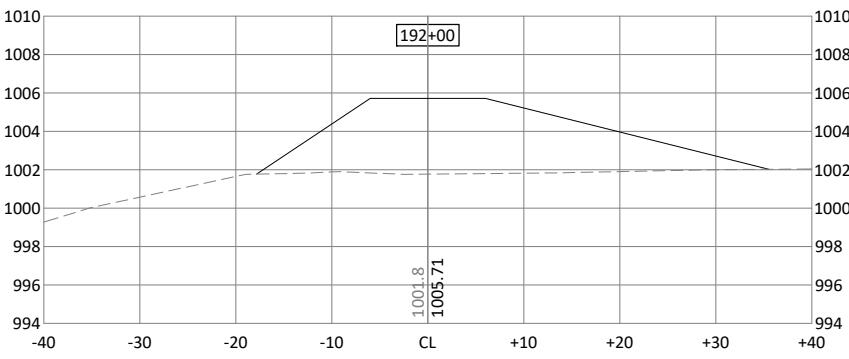
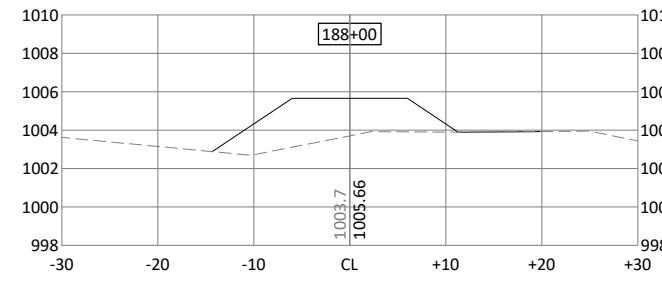
300 WEST MCKINLEY ST., P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED BY
DRAWN BY
CHECKED BY
CLIENT PROJ. NO.

REV. DATE

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.17



HORZ.
SCALE
FEET

VERT.
SCALE
FEET

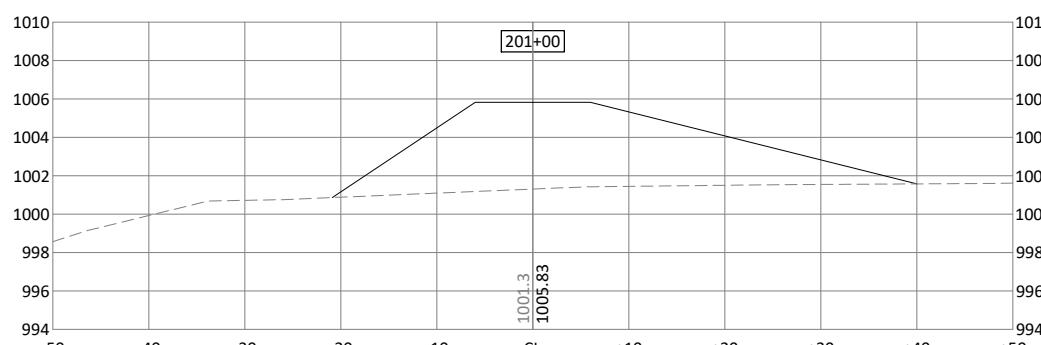
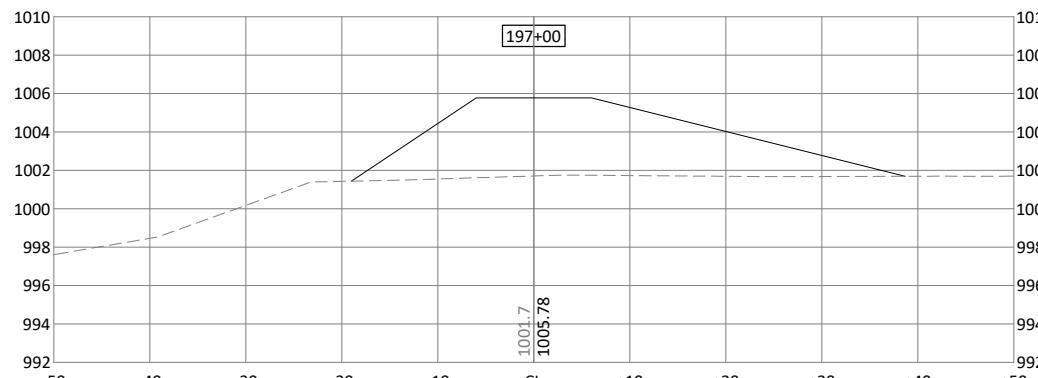
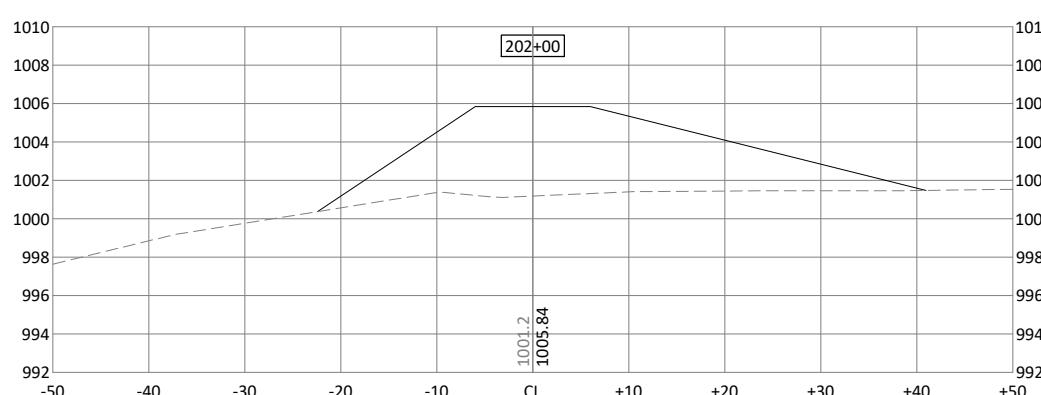
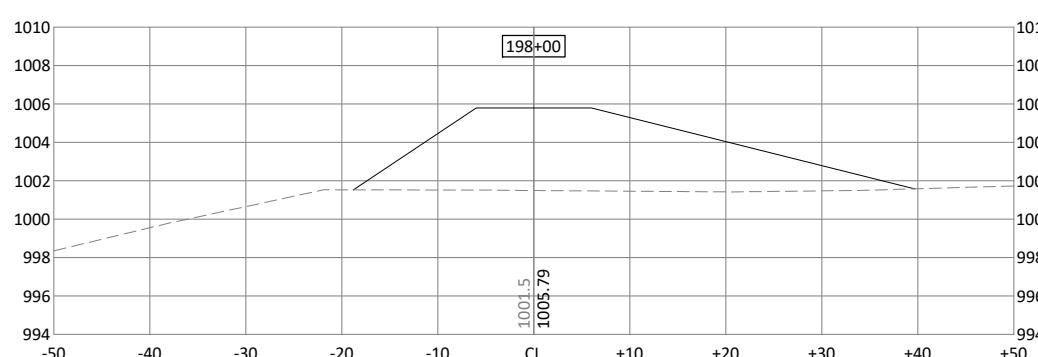
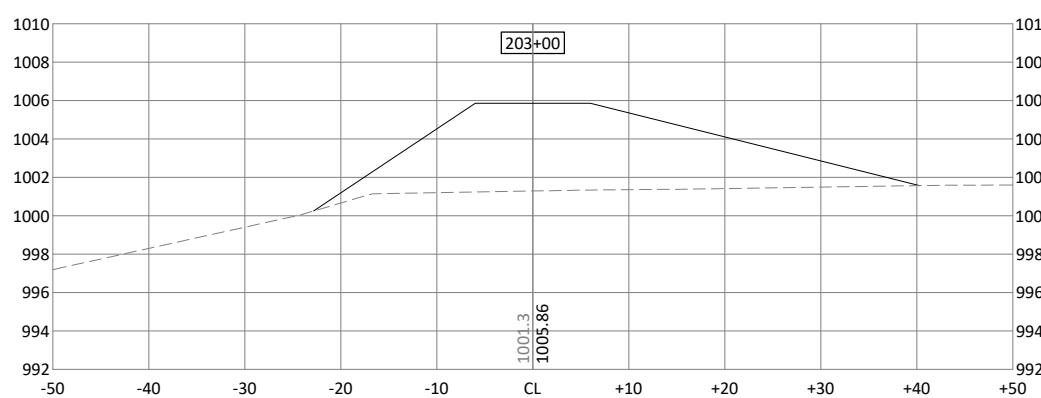
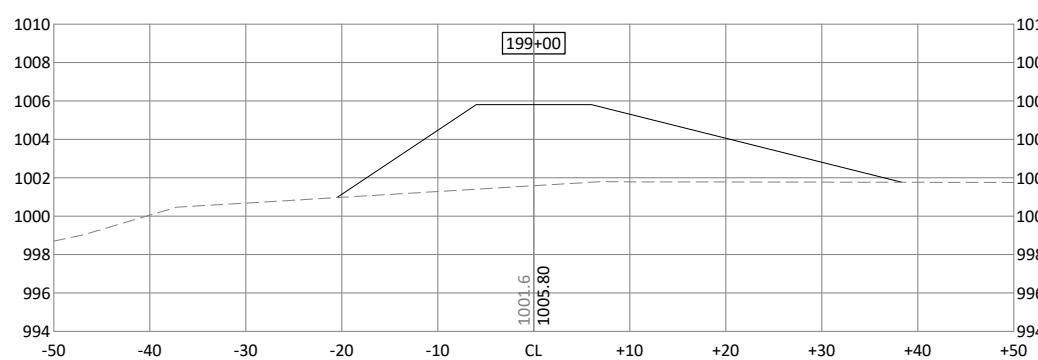
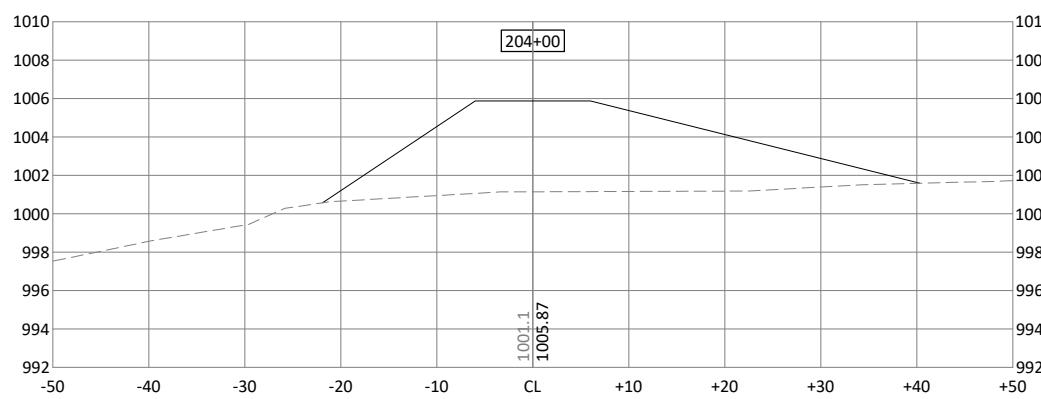
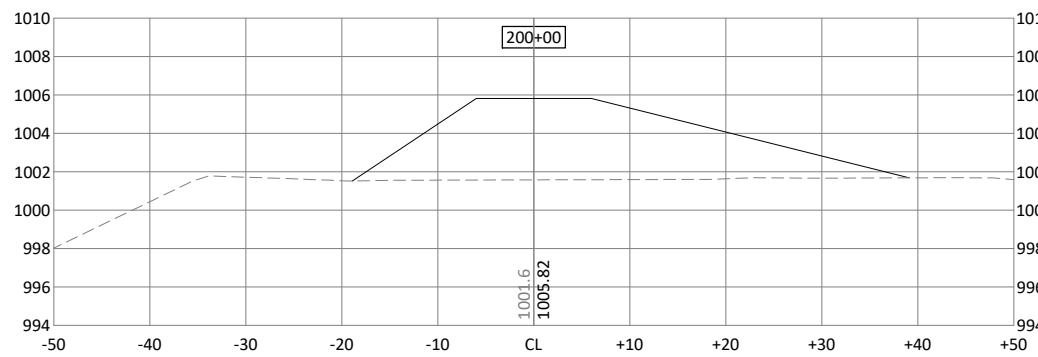


300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CHECKED			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.18



HORZ.
SCALE
FEET

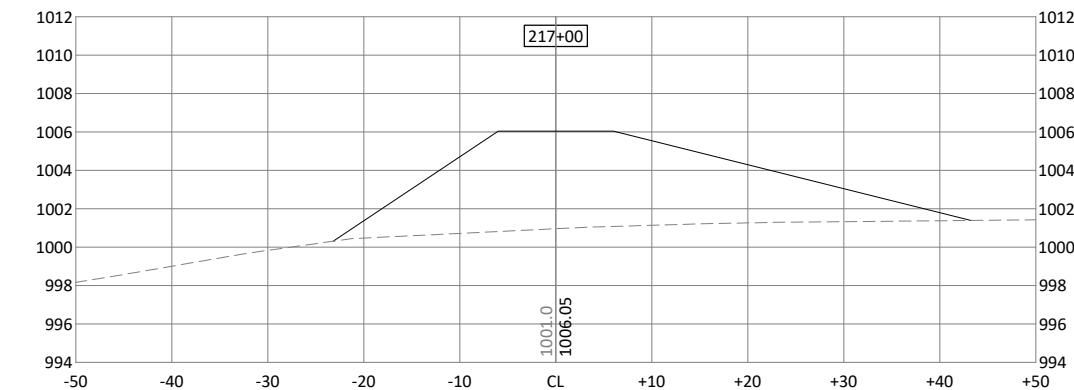
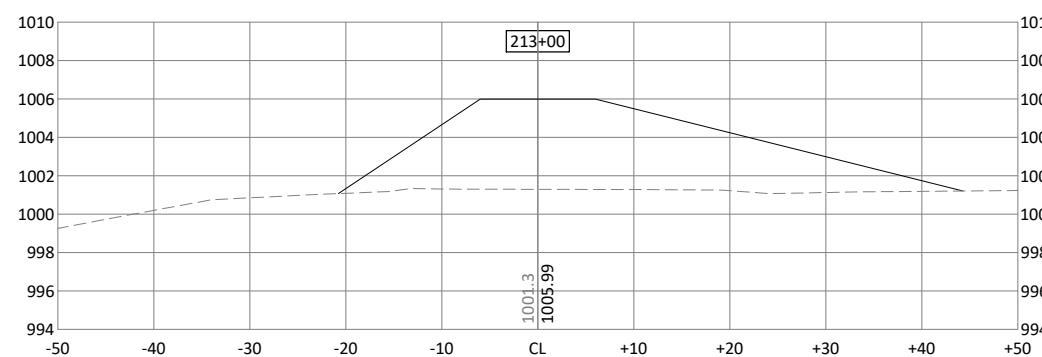
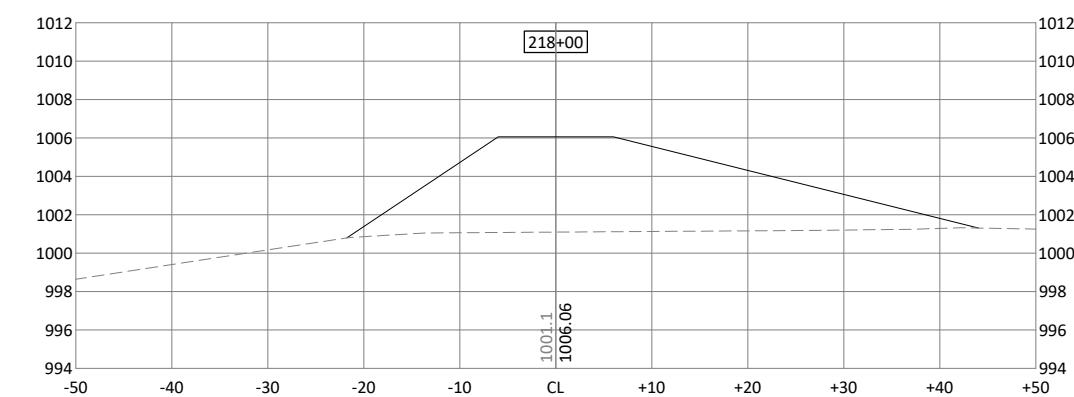
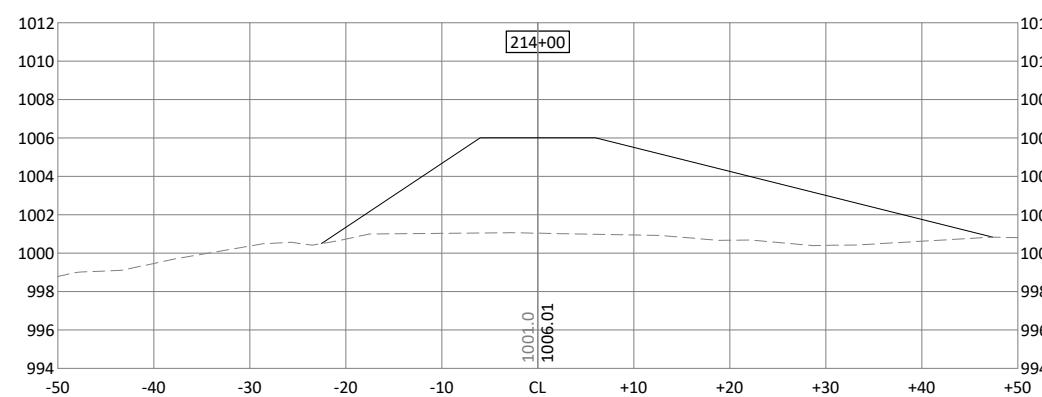
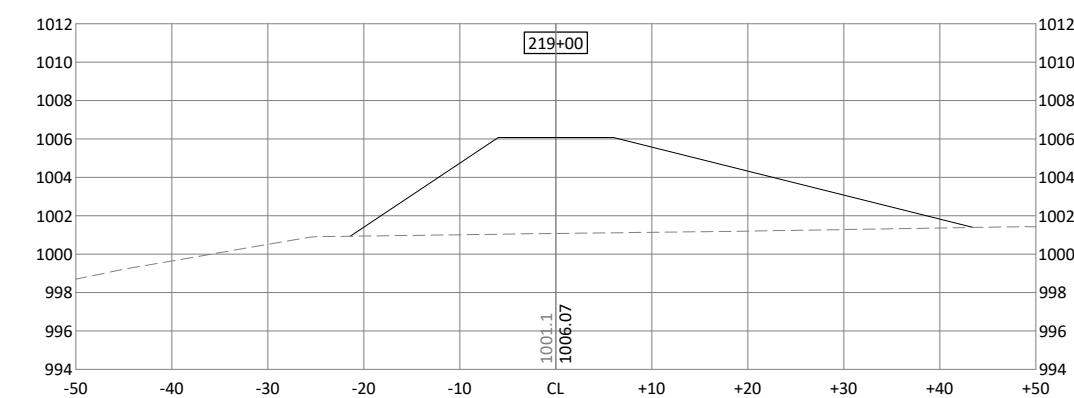
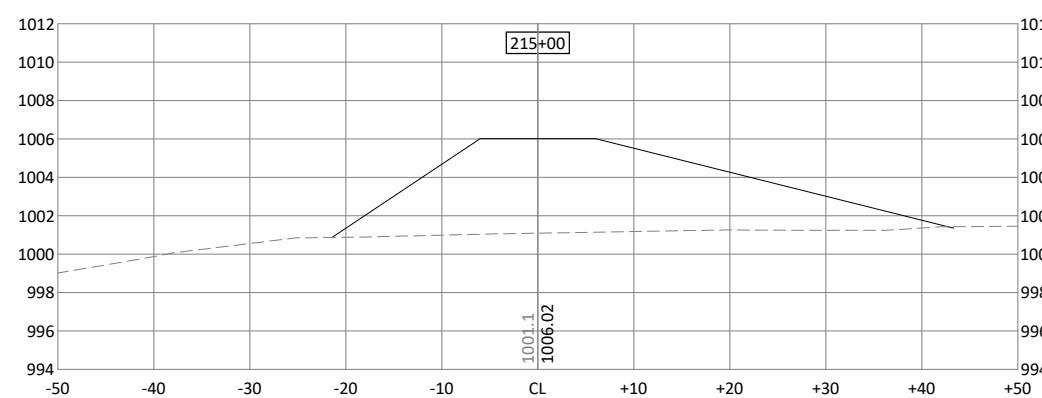
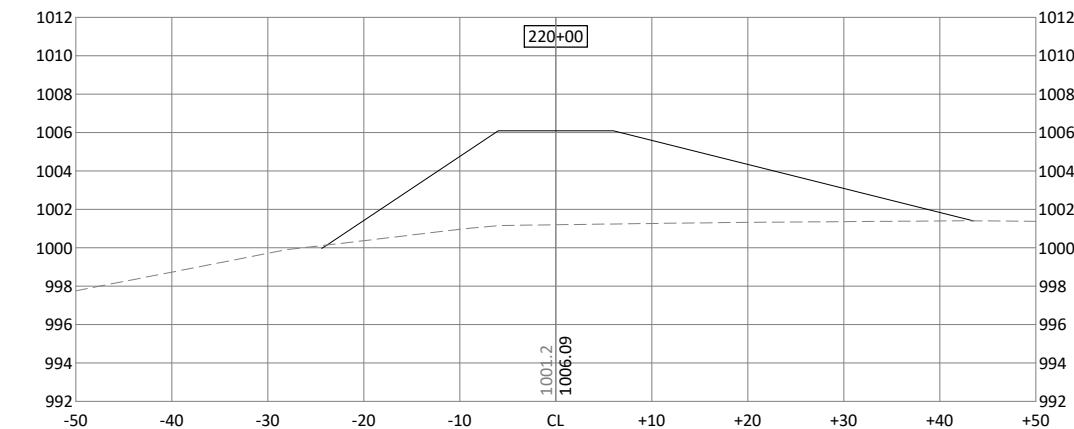
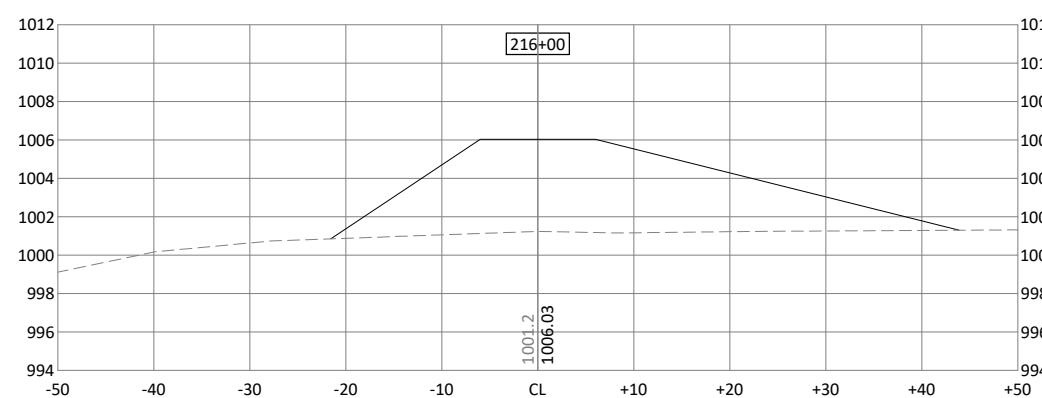
VERT.
SCALE
FEET



300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CHECKED			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE



HORZ.
SCALE
FEET

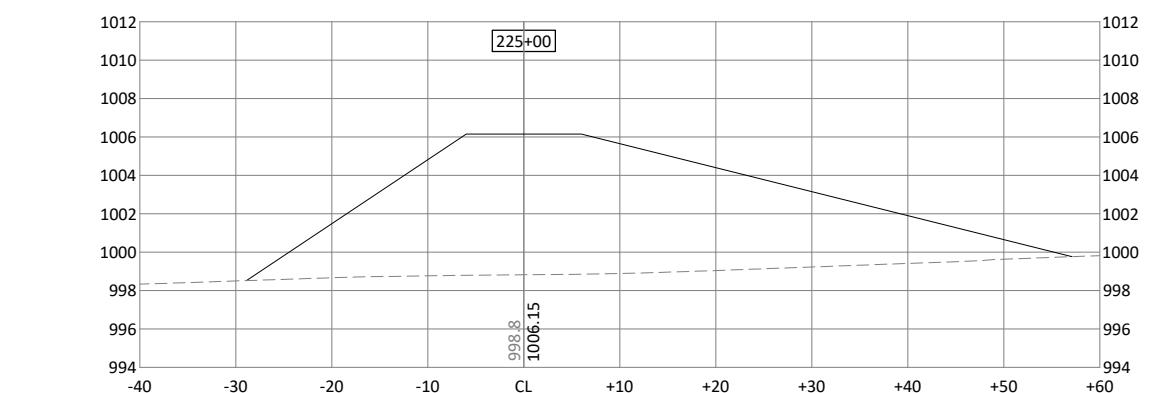
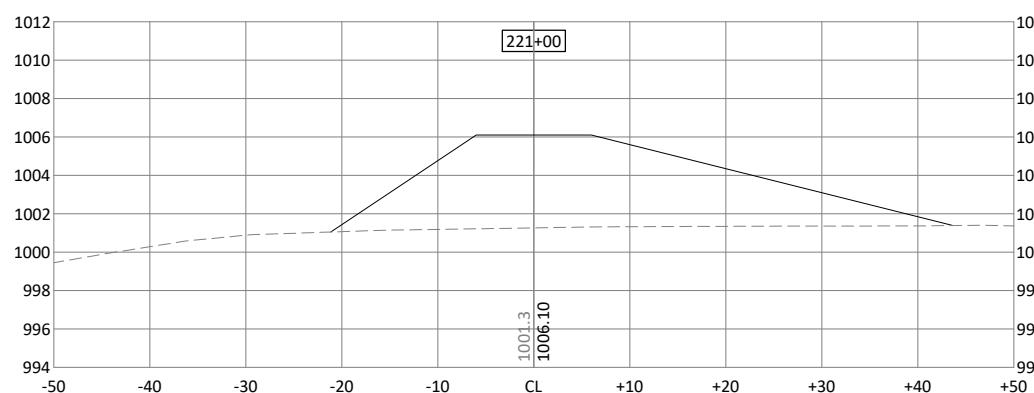
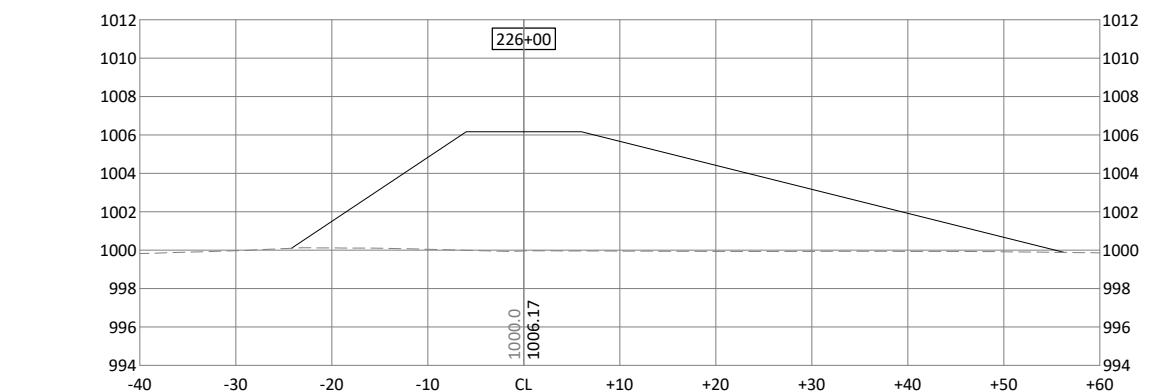
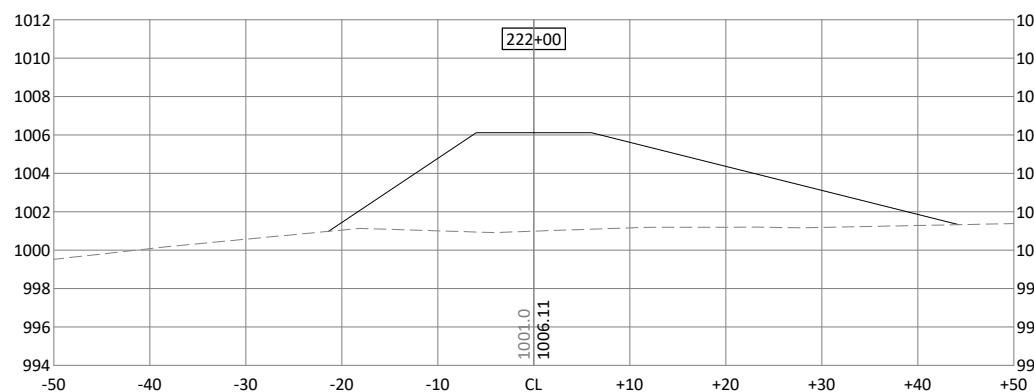
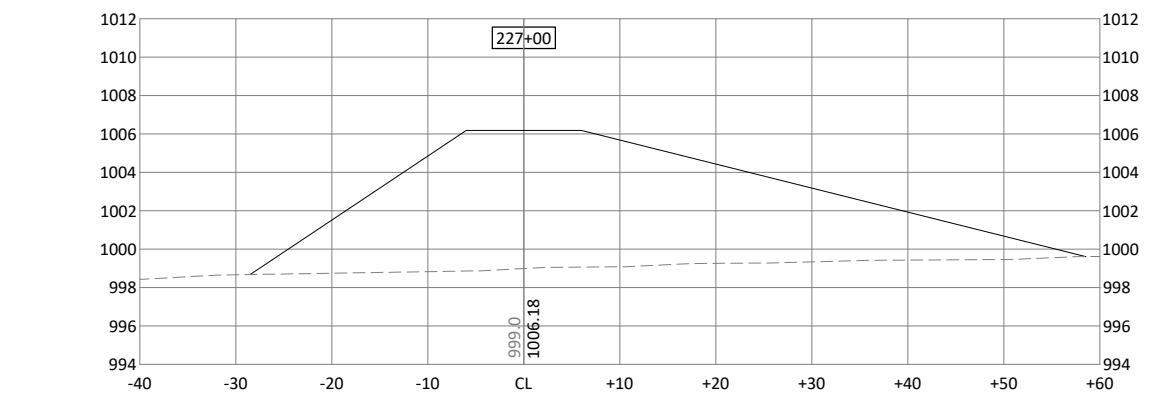
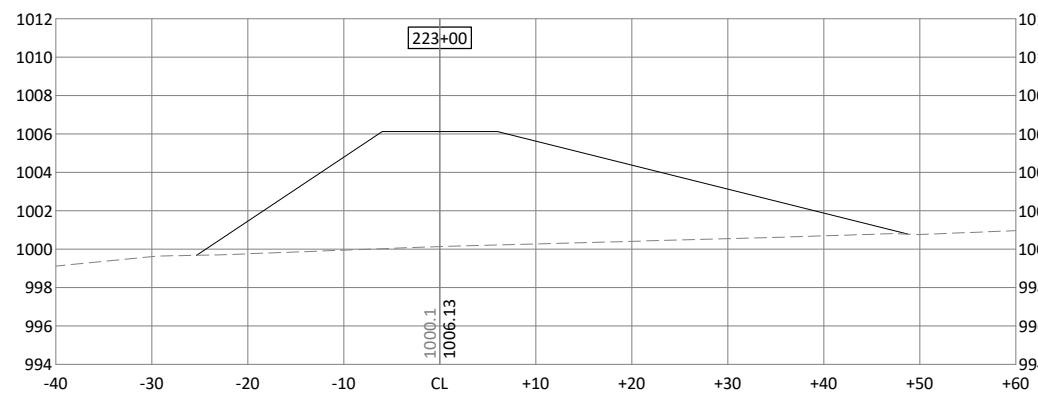
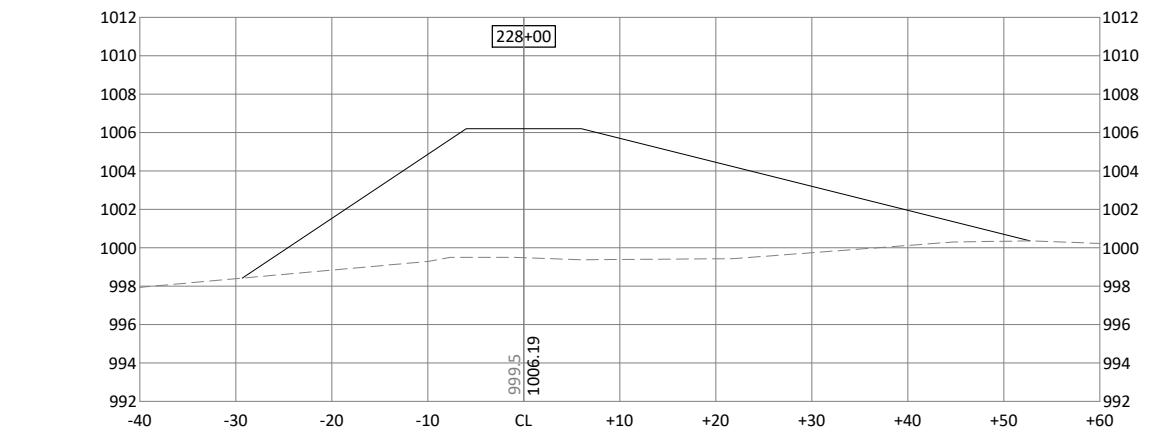
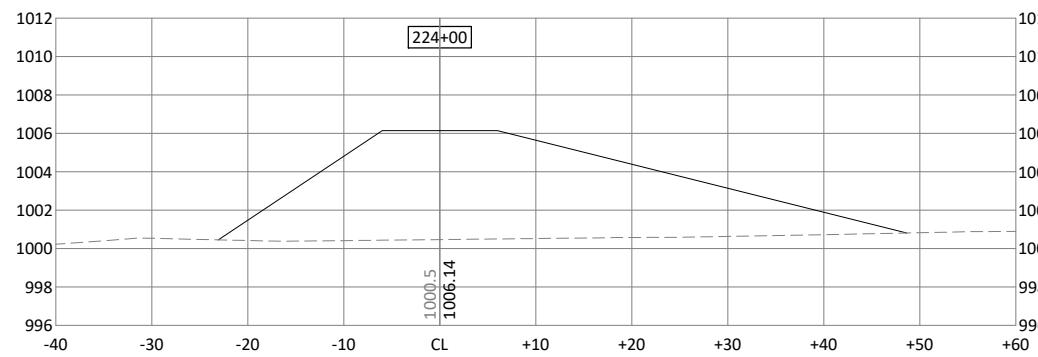
VERT.
SCALE
FEET



300 WEST MCKINLEY ST., P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CHECKED			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE



HORZ.
SCALE
FEET

VERT.
SCALE
FEET



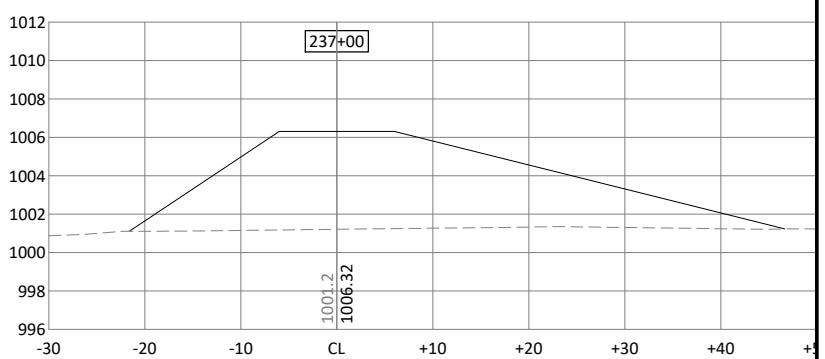
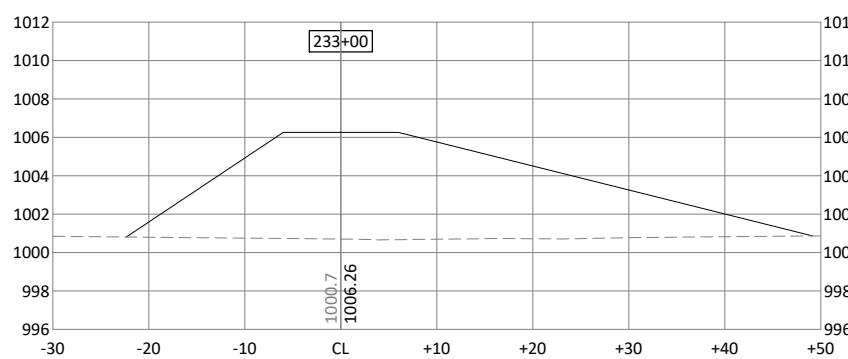
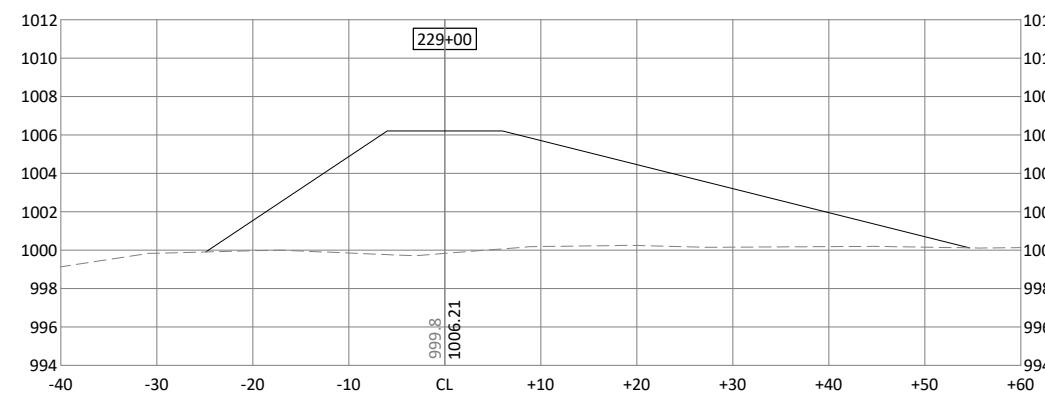
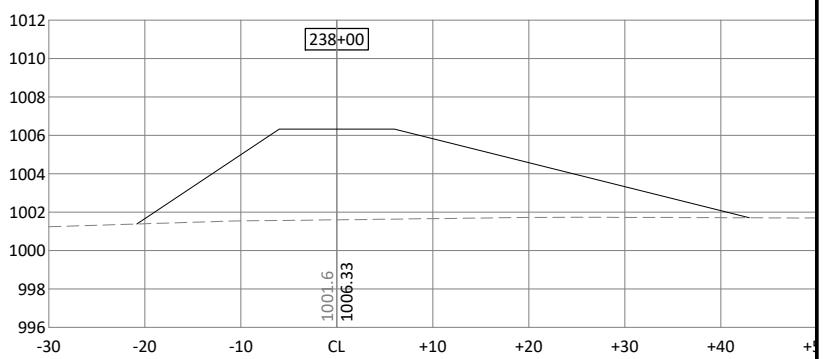
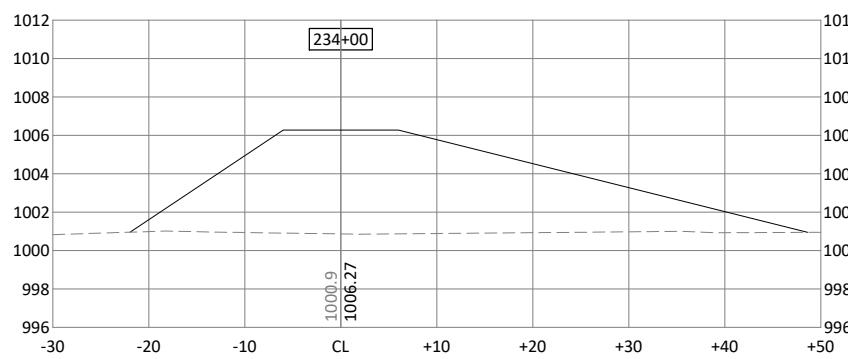
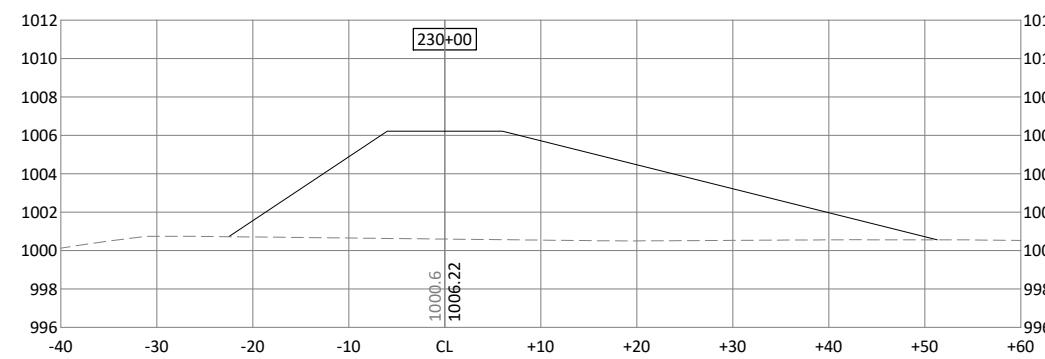
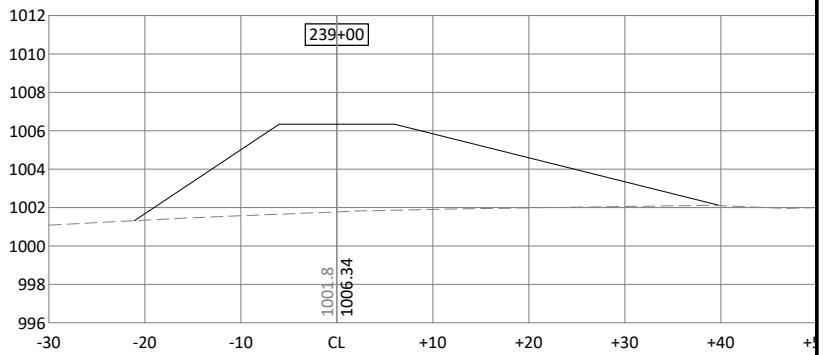
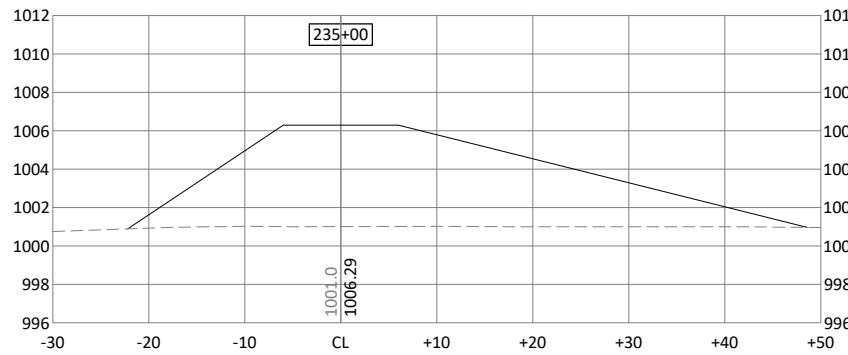
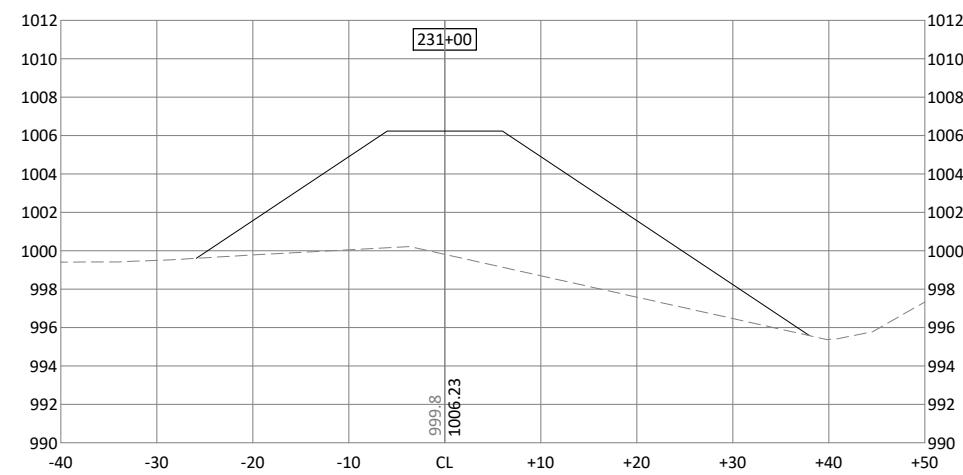
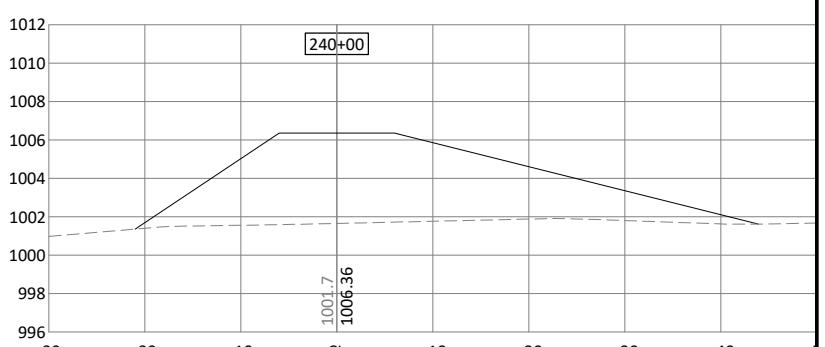
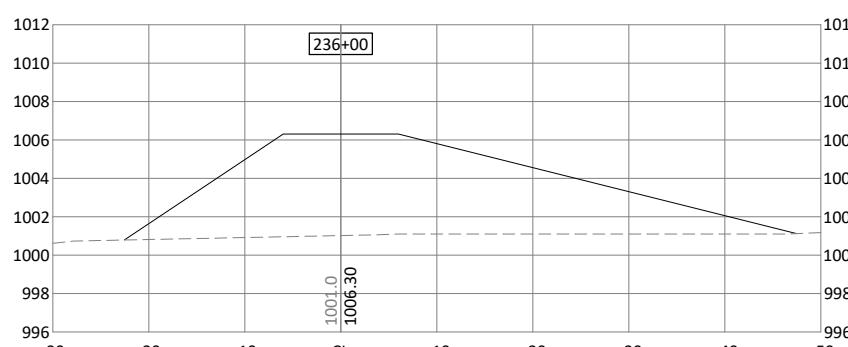
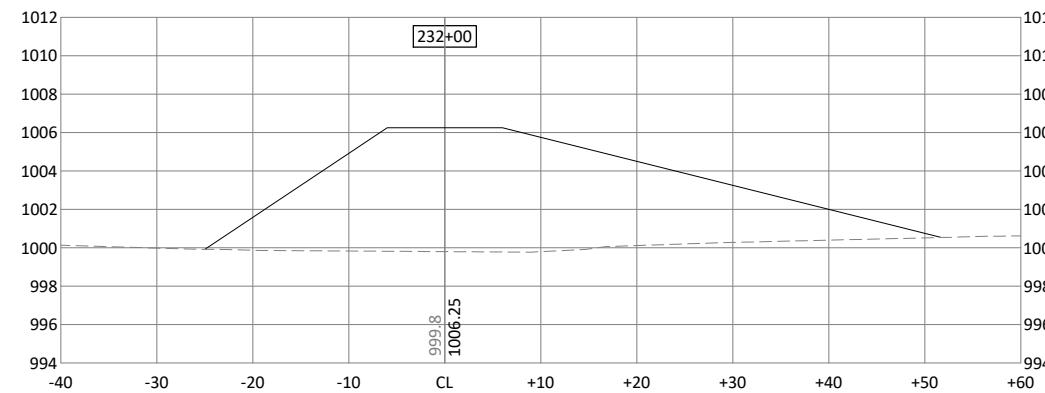
300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CHECKED			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA

CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.22



HORZ
SCALE
0 100 20
FEET

VERT.
SCALE
0 5 10
FEET



**BOLTON
& MENK**

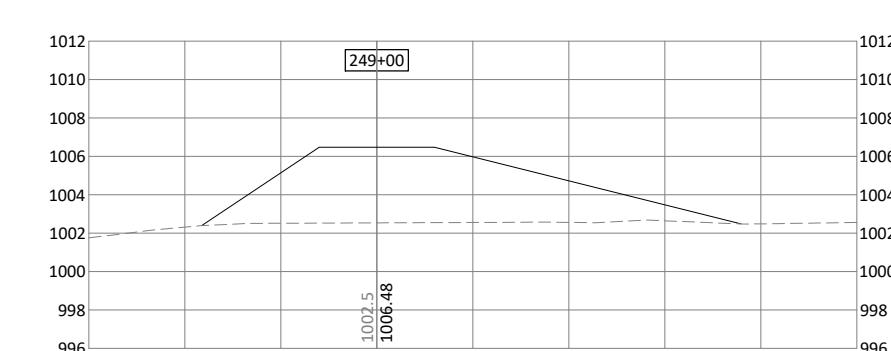
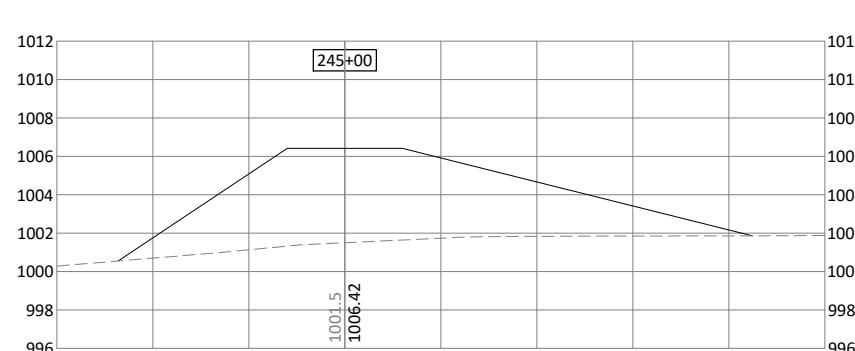
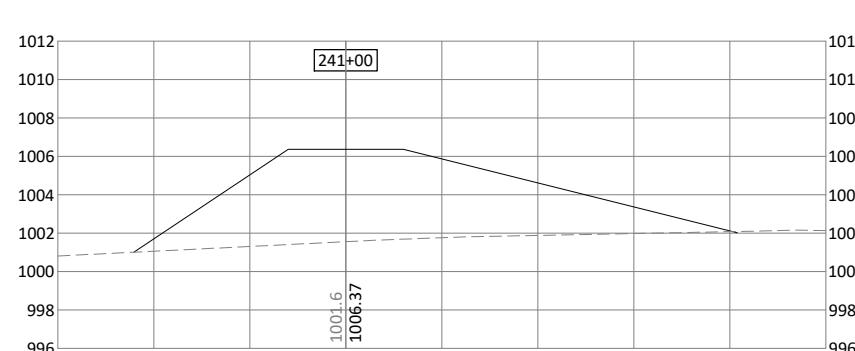
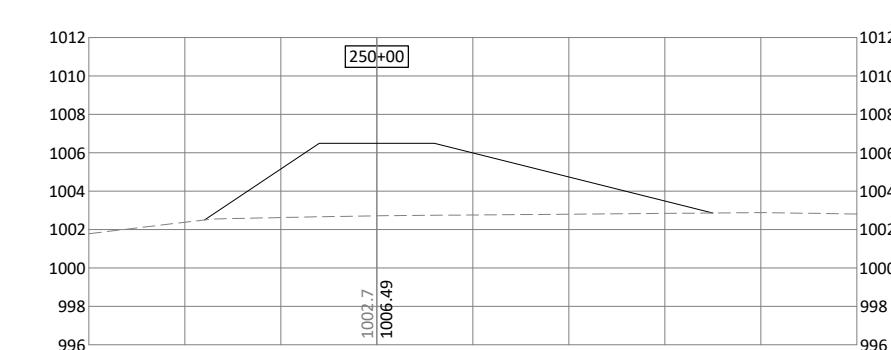
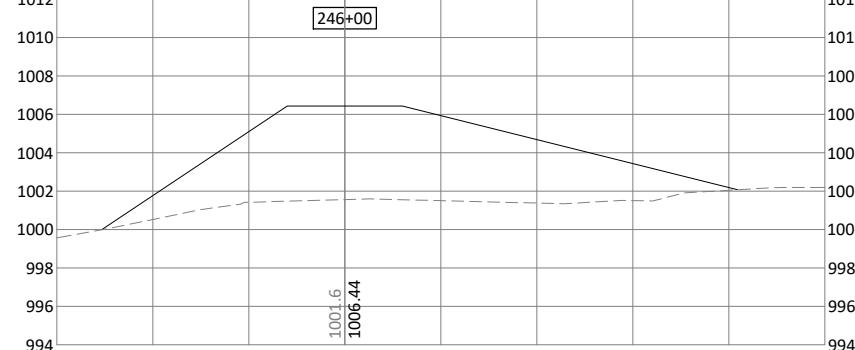
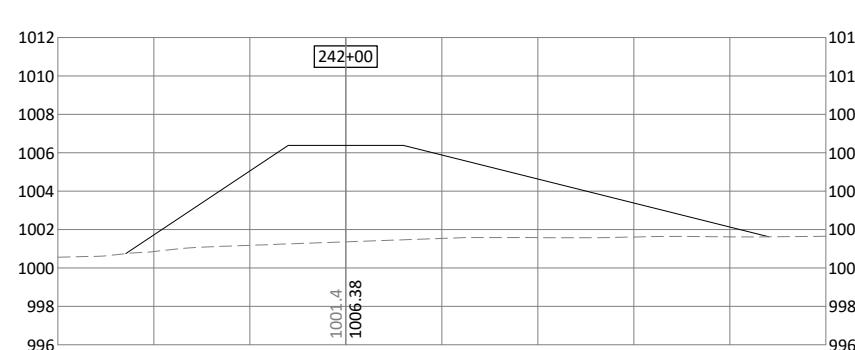
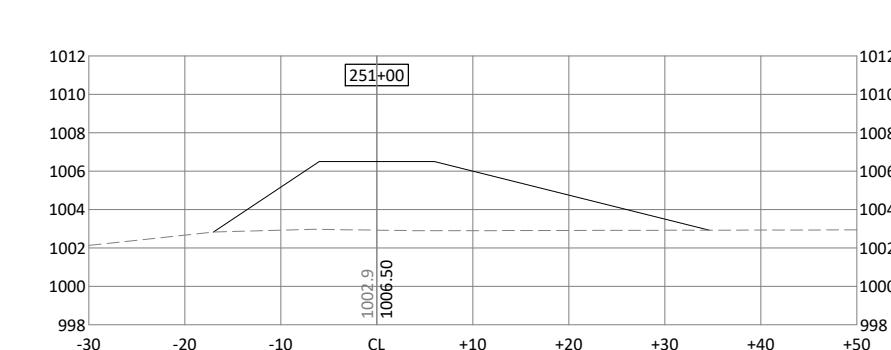
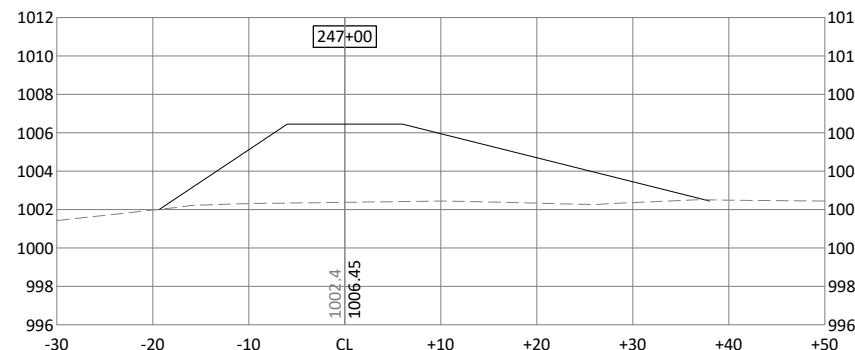
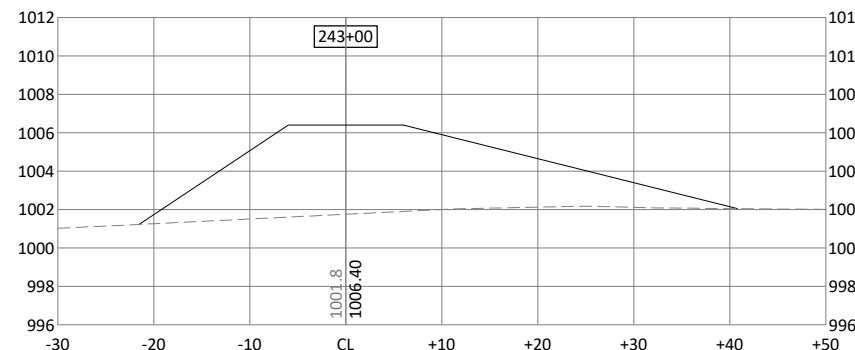
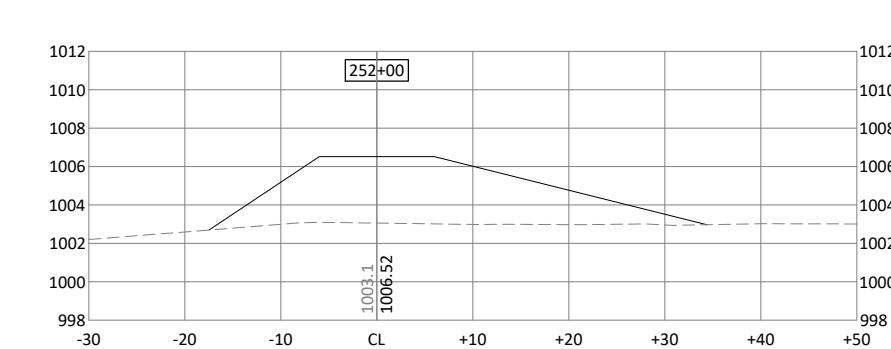
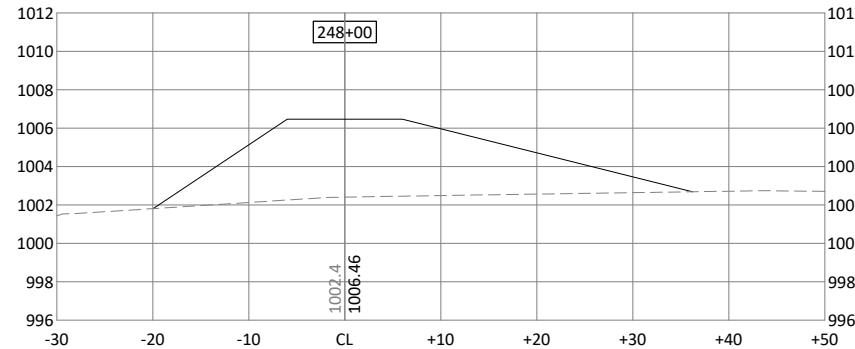
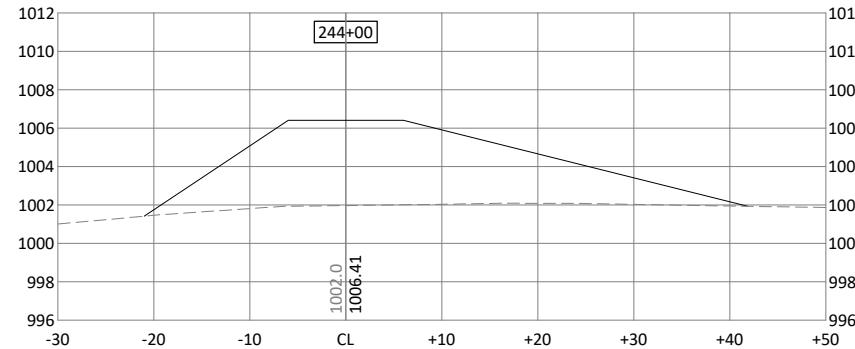
300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV	DESCRIPTION	DATE
JPR			
DRAWN			
CLH			
CHECKED			
JPR			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA

CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.23



HORZ.
SCALE
0 100 20
FEET

VERT.
SCALE
0 5 10
FEET

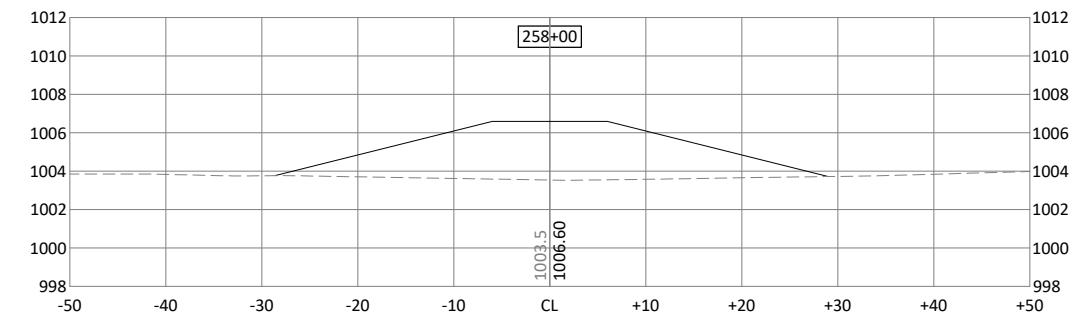
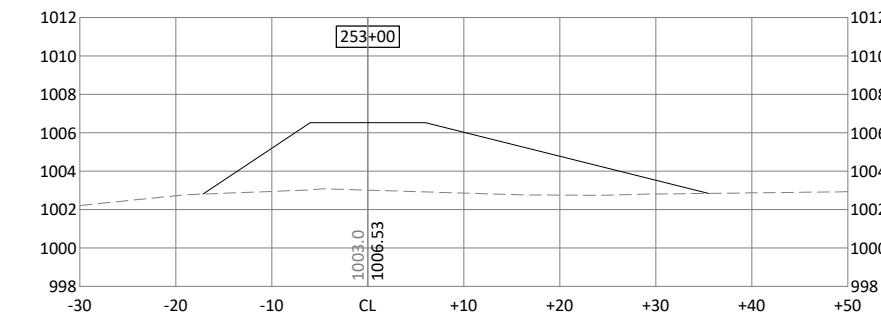
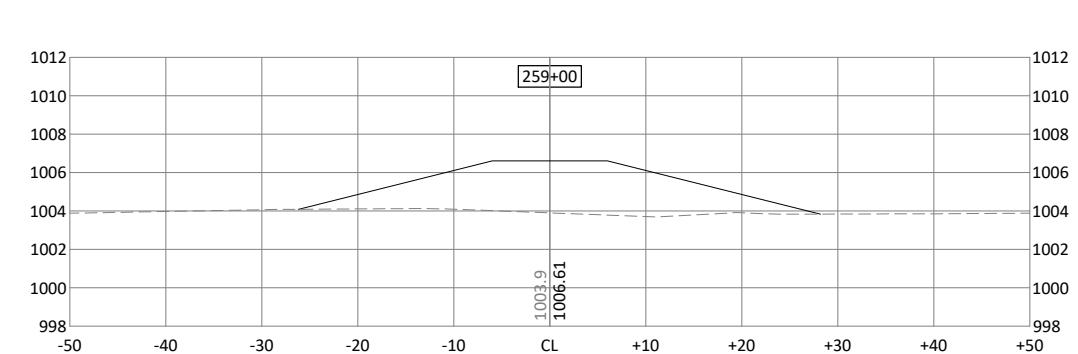
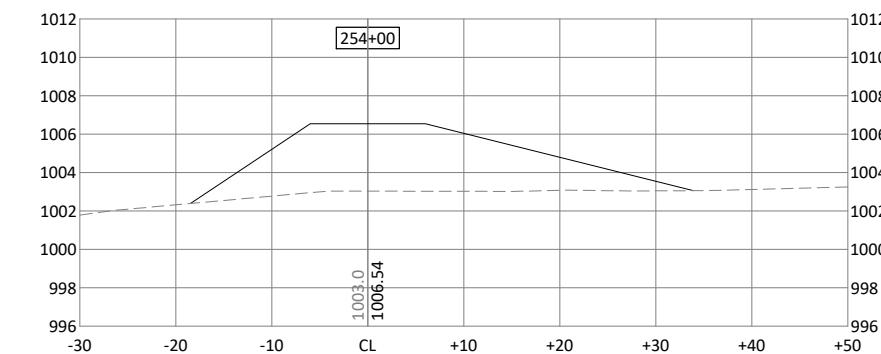
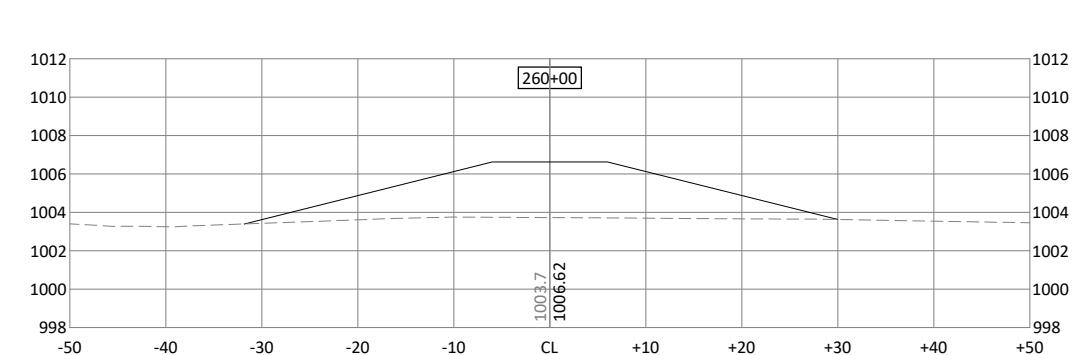
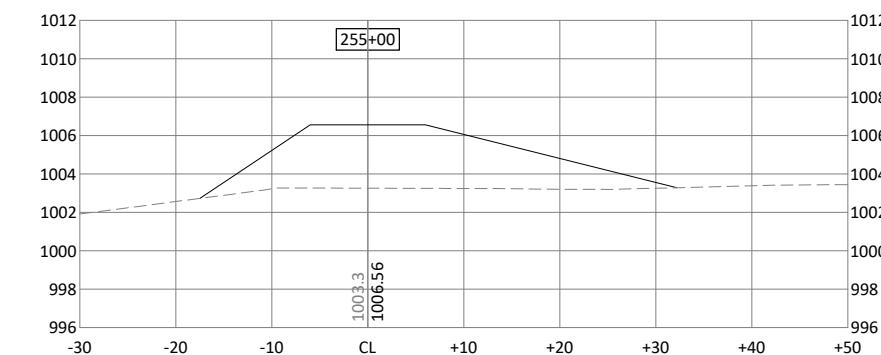
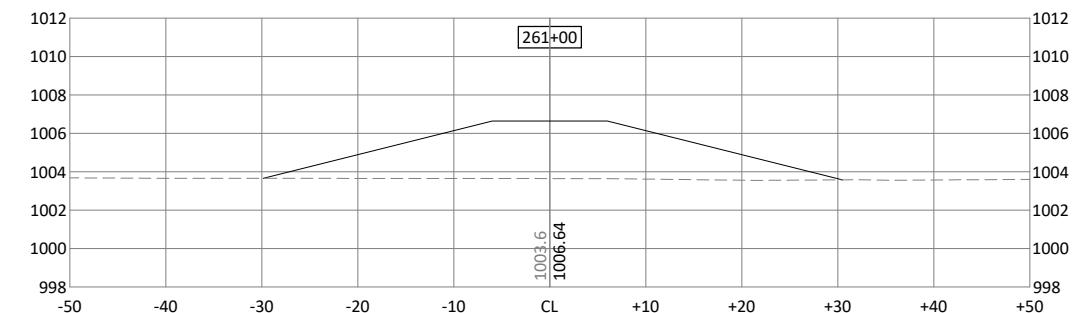
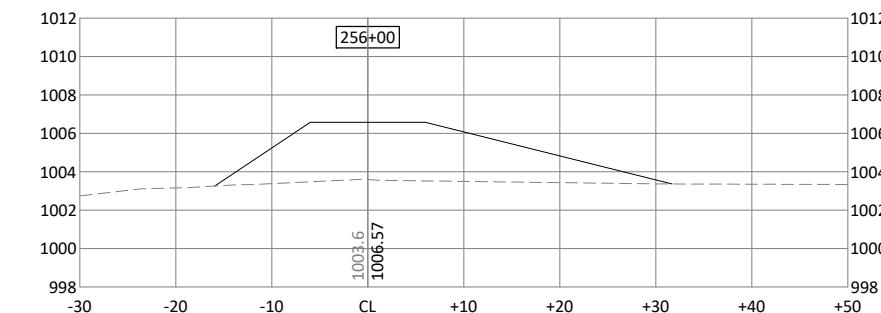
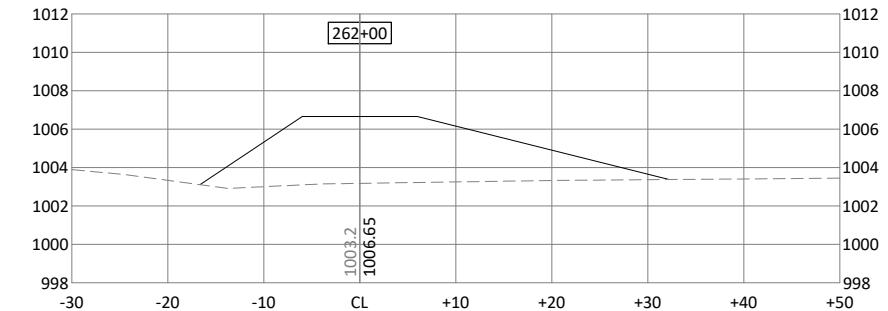
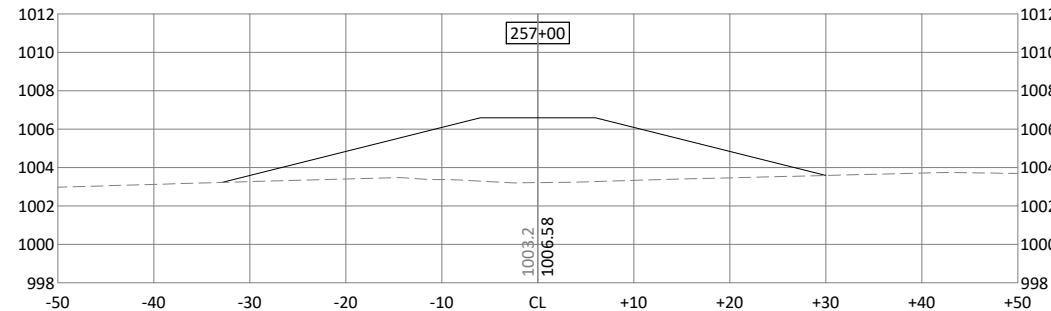


300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CHECKED			
CLH			
JPR			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.24



HORZ.
SCALE
0 100 20
FEET

VERT.
SCALE
0 5 10
FEET



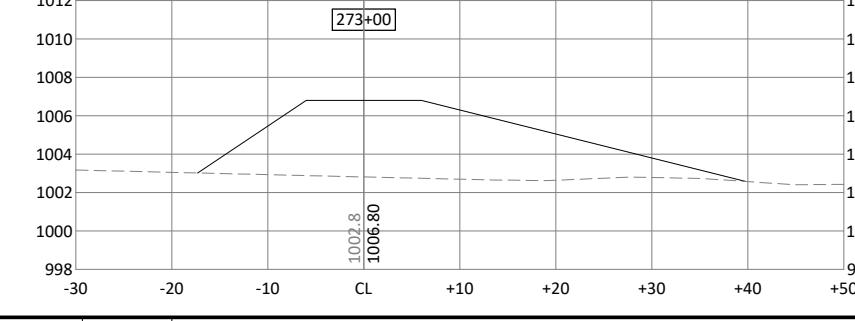
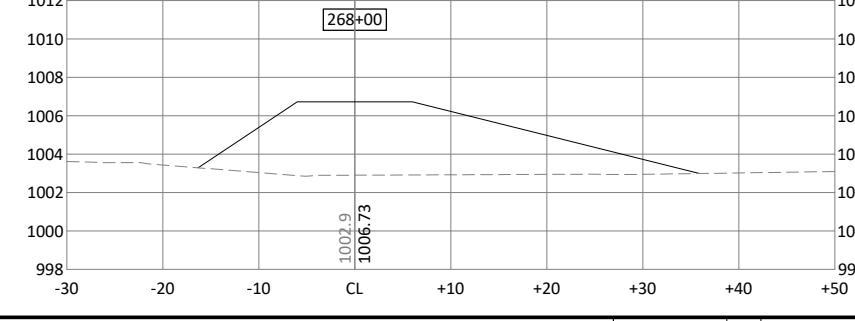
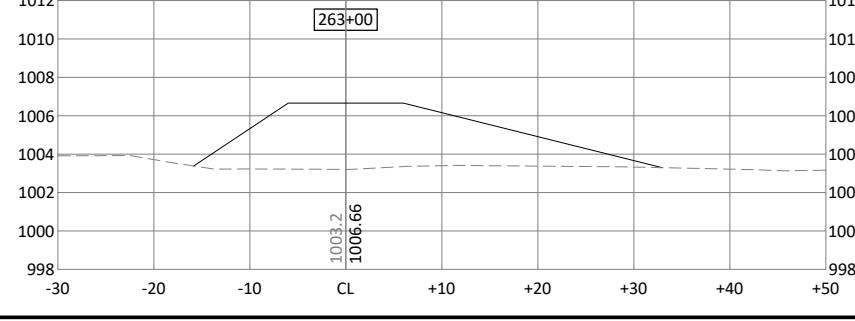
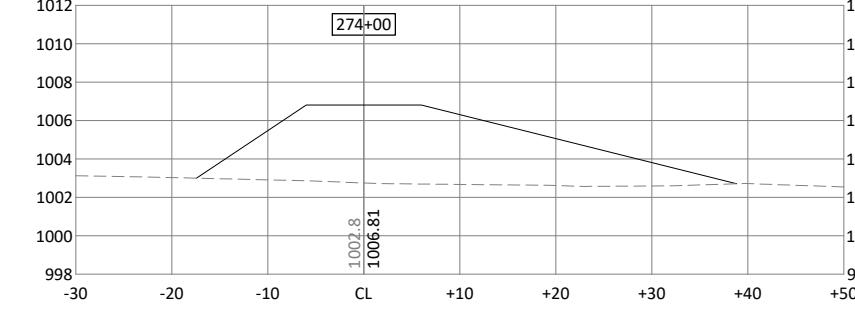
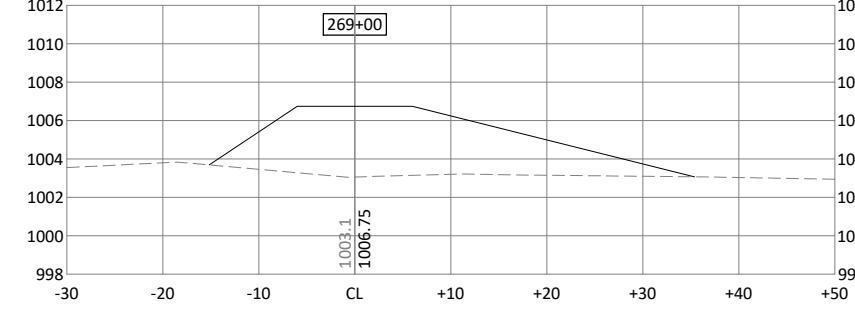
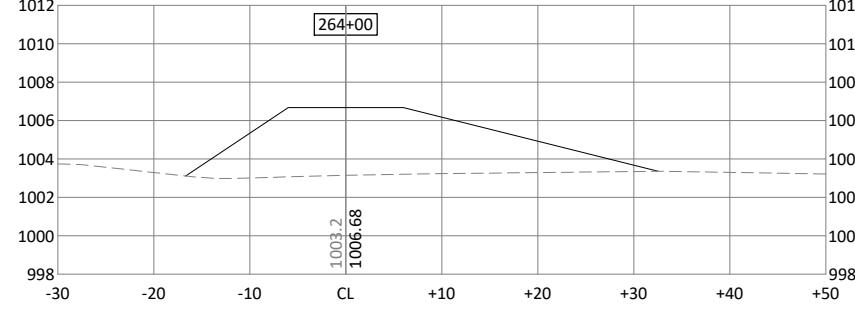
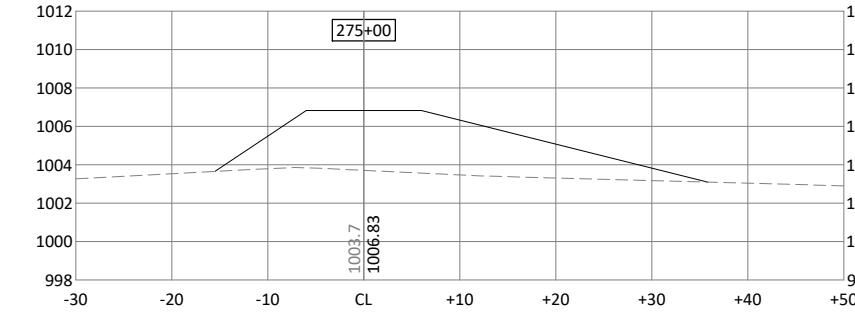
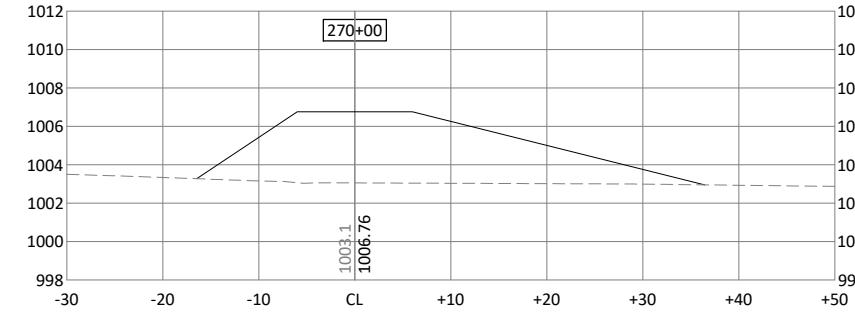
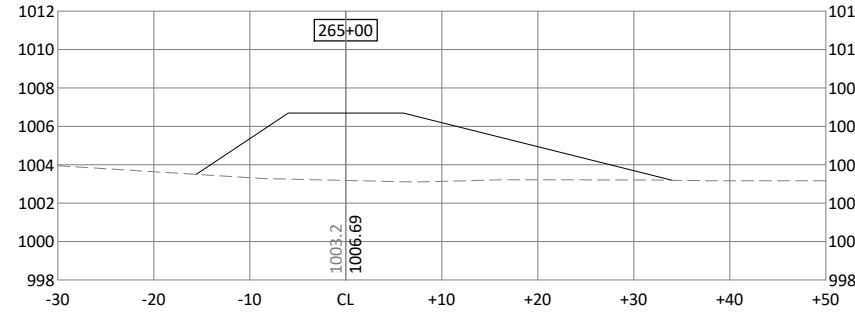
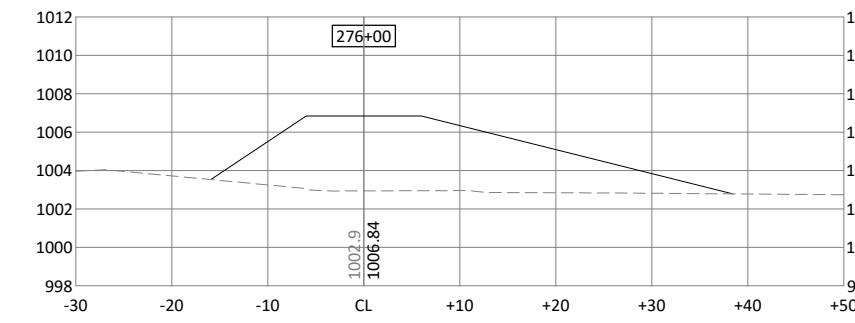
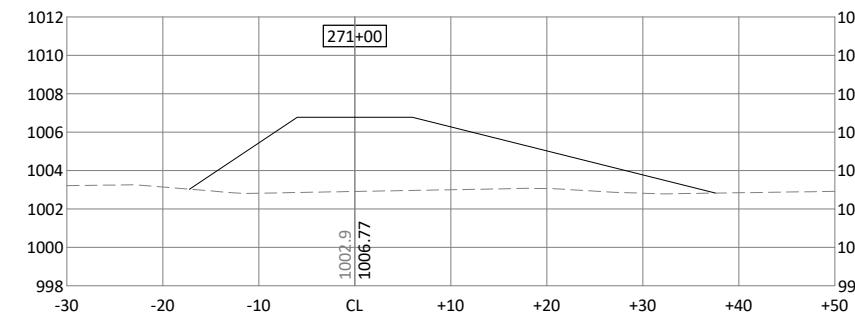
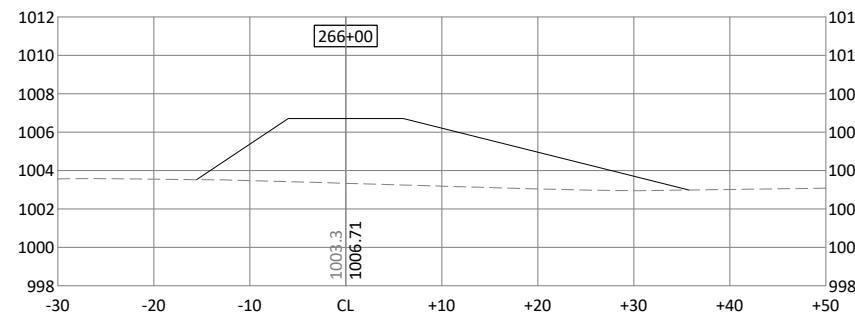
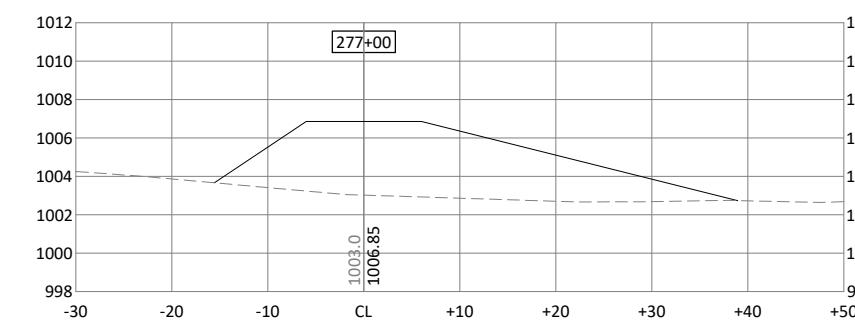
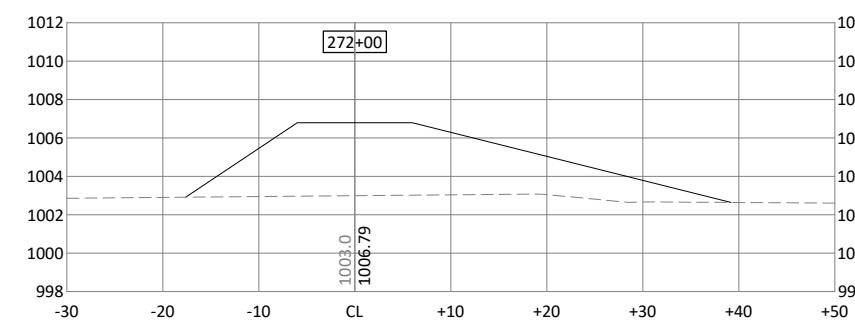
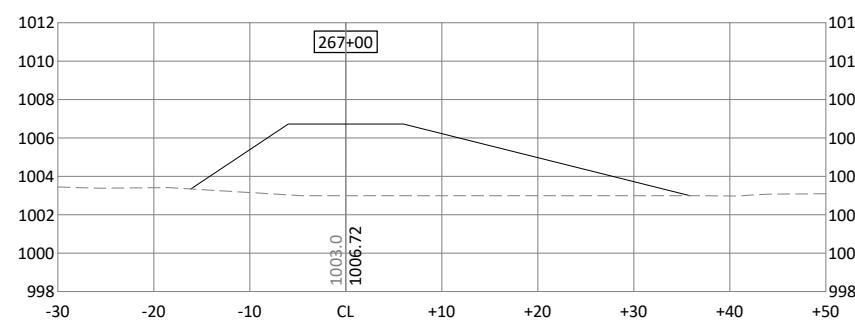
300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CLH			
CHECKED			
JPR			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA

CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.25



HORZ.
SCALE
0 100 20
FEET

VERT.
SCALE
0 5 10
FEET



300 WEST MCKINLEY ST., P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED
DRAWN
CHECKED
CLIENT PROJ. NO.

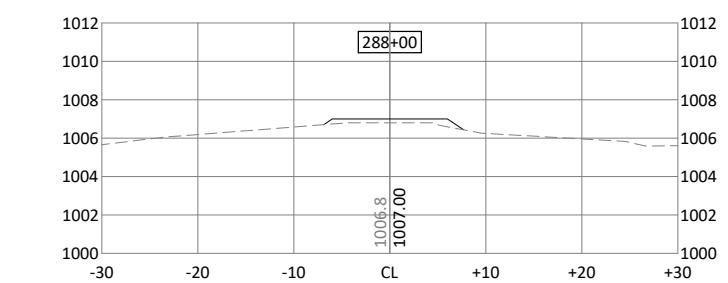
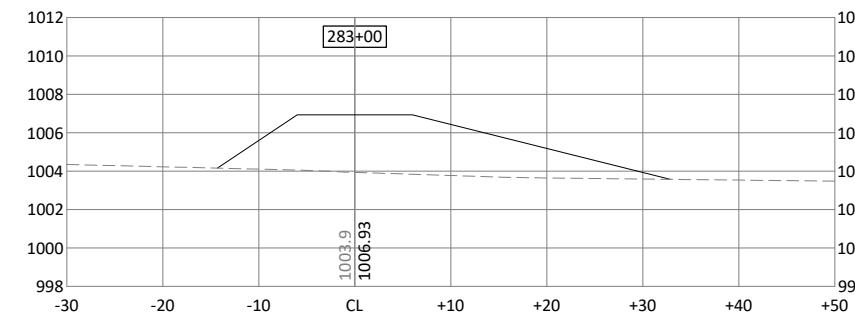
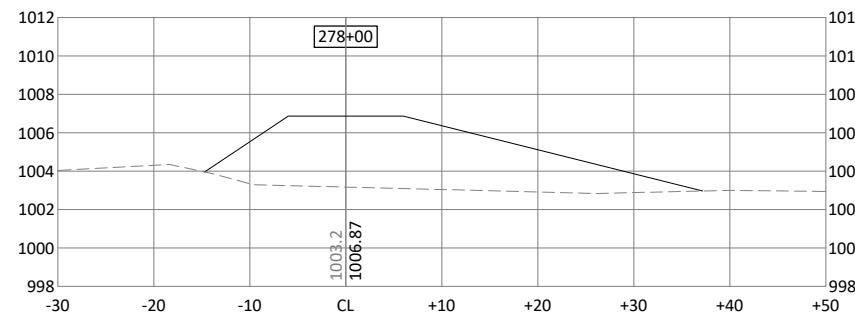
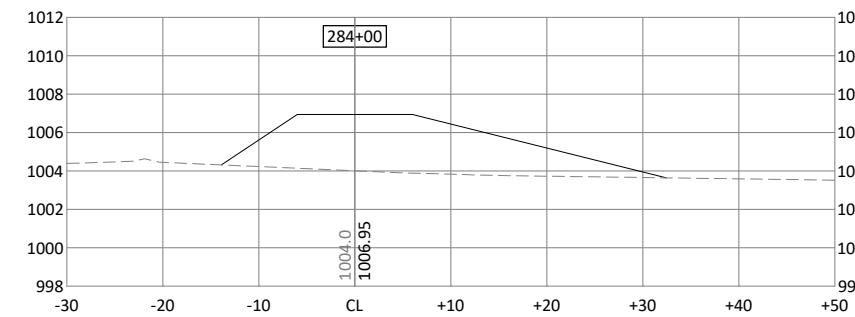
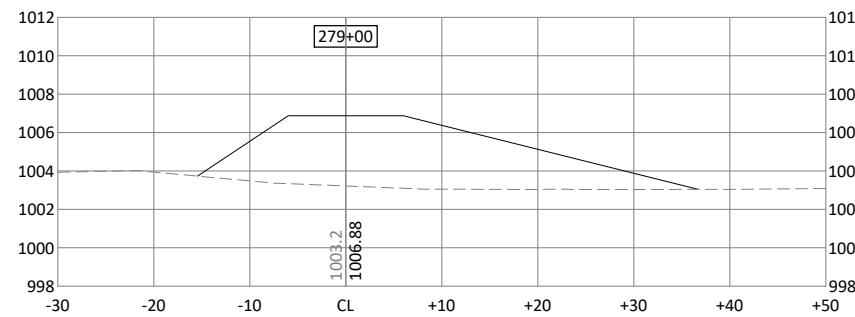
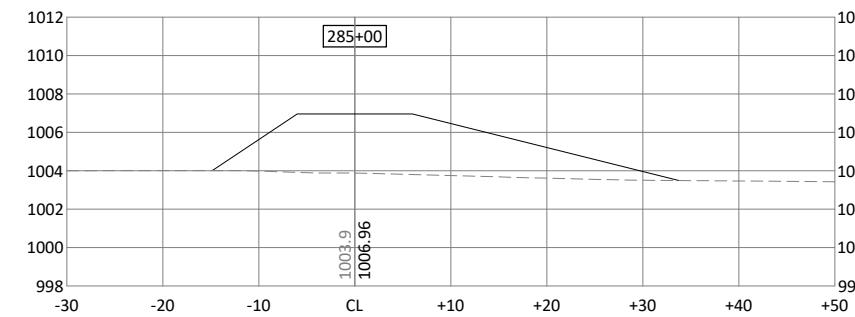
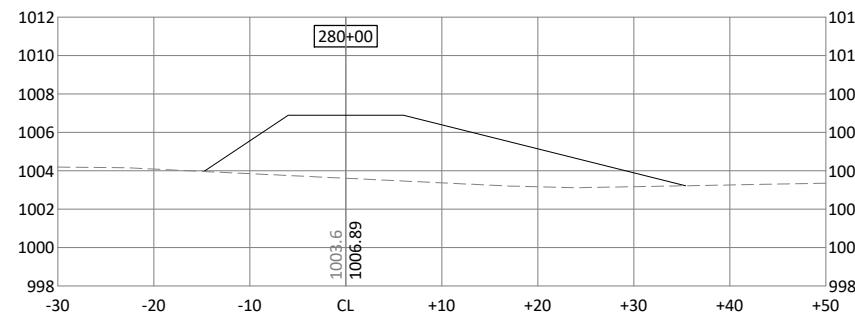
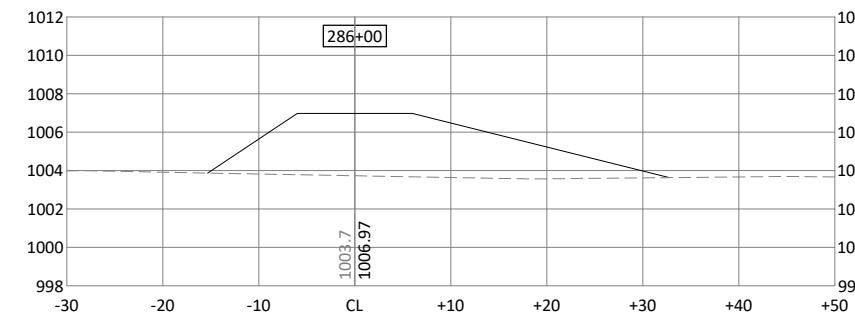
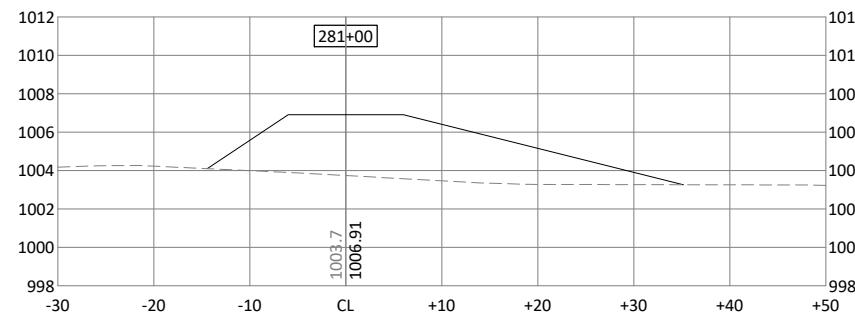
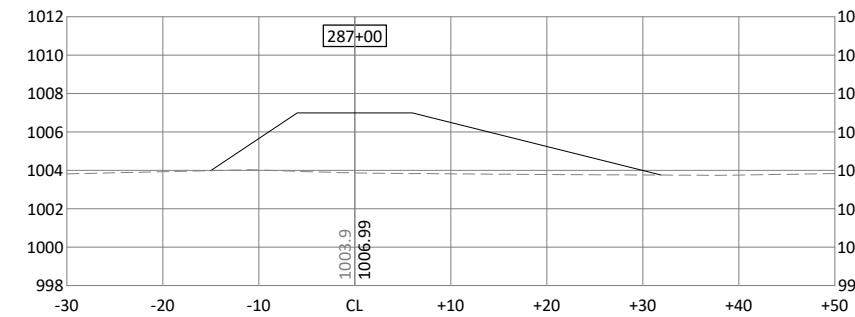
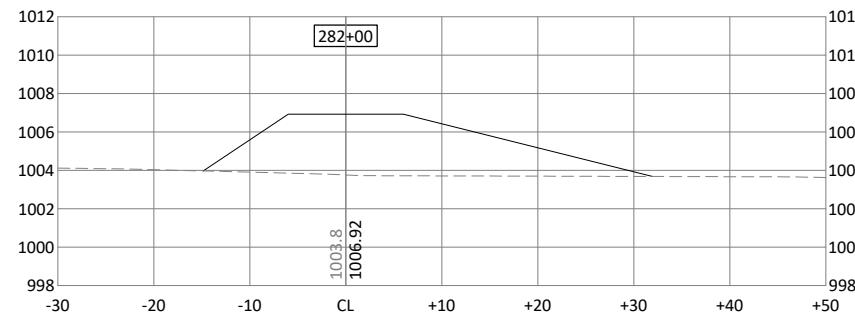
JPR
CLH
JPR

REV

DATE

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.26



HORZ.
SCALE
FEET

VERT.
SCALE
FEET



300 WEST MCKINLEY ST, P.O. BOX 68
JEFFERSON, IOWA 50129
Phone: (515) 386-4101
Email: Jefferson@bolton-menk.com
www.bolton-menk.com

DESIGNED	REV.	DESCRIPTION	DATE
JPR			
DRAWN			
CHECKED			
CLIENT PROJ. NO.			

PROPOSED NEW LEVEE
HARRISON & POTAWATTAMIE COUNTY, IOWA
CROSS SECTIONS - RELOCATED CULTHARD LEVEE

SHEET
X.27

