ADDENDUM NO. 2

DATE OF ISSUE **October 9, 2015**

DATE OF ADVERTISEMENT **September 2, 2015**

DATE OF BID OPENING **November 18, 2015**

PROJECT NO.

OPW 52494 (CSO)

Missouri River Wastewater Treatment Plant Bank Stabilization

NOTICE TO PLAN HOLDERS:

The following revisions to the contract documents, special provisions, and plans shall be acknowledged on page P-1 of the bidder's proposal.

CONTRACT DOCUMENTS, SPECIAL PROVISIONS, AND PLANS

1. **Please disregard Addendum No. 1. See the attached pages for the correct revisions.**

CITY OF OMAHA
PUBLIC WORKS DEPARTMENT BY _____ BY _____
for Project Engineer for Environmental Services Manager

ADDENDUM NO. 2

DATE OF ISSUE **September 29, 2015**

DATE OF ADVERTISEMENT **September 2, 2015**

DATE OF BID OPENING **November 18, 2015**

PROJECT NO.: **OPW 52494 – MISSOURI RIVER WASTEWATER TREATMENT PLANT BANK STABILIZATION**

NOTICE TO PLAN HOLDERS:
THE FOLLOWING CHANGES, CORRECTIONS, CLARIFICATIONS OR ADDITIONS SHALL BE MADE TO THE CONTRACT DOCUMENTS FOR THE ABOVE NAMED PROJECT AND SHALL BE BINDING AS IF INCORPORATED INTO THE ORIGINAL CONTRACT DOCUMENTS. THIS ADDENDUM SHALL BE ACKNOWLEDGED ON PAGE 00 41 13-1 ARTICLE 3.01 A OF THE BID FORM.

The following shall be revised, deleted, clarified or modified. Deletions are denoted using ~~strikethrough text~~. Additions are denoted using **bold text**.

I. GENERAL

a. At the Pre-Bid conference it was indicated that there was an expectation that prospective bidders perform Bench Scale Testing during the Bid Phase. This expectation has been removed.
b. At the Pre-Bid conference it was indicated that the prospective Bidders were to request Shelby Tube samples for their analysis by submitting a request to Dave Curran. Through this Addendum the prospective bidders shall be responsible for the collection of their own samples (if desired) for testing but must coordinate site access with Doug Simon/CH2M Project Manager, Phone: 402.609.7511 (office) or 402.541.3268 (mobile) or by email at Doug.Simon@ch2m.com.

II. PROJECT MANUAL

a. Project Manual Cover Page Change Bid Opening Date from ~~October 28, 2015~~ to **November 18, 2015**.
b. Invitation to Bid, Section 00 11 13, RECEIPT OF BIDS Second paragraph third line – Change Date from ~~October 28, 2015~~ to **November 18, 2015**.
c. Instruction to Bidders, Section 00 21 13 p. 2 Table last Geotechnical Report identified. Delete ~~Draft~~ from Geotechnical Report Title and change date from ~~7/23/15~~ to **August 21, 2015**
d. Instruction to Bidders, Section 00 21 13 p. 3. Delete Article 3.02 text in its entirety and replace with **Not Used**.
e. Agreement, Section 00 52 13 Article 4.02.A. Change date from ~~January 4, 2016~~ to **January 18, 2016**.
f. Agreement, Section 00 52 13 Article 4.02.B. Change number of days to achieve substantial completion from ~~150~~ days to **210** days and change the number of days to achieve final completion from ~~180~~ days to **240** days.

g. General Conditions, Section 00 72 13. Delete Section in its entirety and replace with the Attached General Conditions, Section 00 72 13.
h. Supplementary Conditions, Section 00 73 00 Article 5.03.C.5. Change date from ~~7/23/15~~ to **August 21, 2015** and number of pages from ~~51~~ to **68**.
i. Permits, Section 01 41 26. Article 1.1.C.1 Table. Delete ~~Clean Water Act Section 404 Nationwide Permit (NWP) No. 33~~ and replace with **Clean Water Act Individual Permit 2008-00298-WEH Amendment #2 – Deep Soil mixing for Bank Stabilization**.
j. Deep Soil Mixing – Dry Method, Section 31 32 13.13, Article 1.03 E Table footnote line 2. Delete ~~width~~ and replace with **length**.

II. PROJECT PLANS

A. Refer to Sheet 9 of 16 DEEP SOIL MIXING DETAILS. Detail 1 legend – Delete ~~D = LENGTH OF SHEAR WALL~~ and delete ~~B = LENGTH OF SHEAR WALL~~ and replace with **B = SHEAR WALL LENGTH**. Detail 2 legend – Delete ~~B = AVERAGE SHEAR WALL WIDTH~~ and replace with **b = AVERAGE SHEAR WALL WIDTH**. (A revised Drawing sheet 9 of 16 is included as an ATTACHMENT to this Addendum No. 1).

III. ATTACHMENTS

A. Copy of the pre-bid meeting notes. (6 pages),
   Pre-Bid Attendance Record (2 page)
B. General Conditions, Section 00 72 13. 007213GeneralConditions.pdf
C. OWNER OBTAINED PERMITS
   - United States Army Corps of Engineers (USACE) Clean Water Act Section 404 Individual Permit (IWP) 2008-00298-WEH Amendment #2 (2 pages)
D. Drawing sheet 9 of 16 DEEP SOIL MIXING DETAILS
E. Reference Documents
   - USACE Missouri River Post Flood Inspection Report Final Report (251 pages)
   - USACE Missouri River Bank Stabilization and Navigation Project (BSNP) O&M Manual - MR_BSNP_OM_Manual_Nov_2011.pdf consisting of Figures 2-2, 2-7, 2-8, 2-11, 2-12, 2-13, and 2-14 (7 pages)
   - Missouri River Wastewater Treatment Plant Wetland Delineation Report – Draft. MRWWTP_Wetland_Delineation_120214.pdf (84 pages)
   - Project Site Photos (5 photos)
   - Surveyed cross sections along the alignment MRWWTP_Survey_XSections.pdf.

OPW 52494 Missouri River Wastewater Treatment Plant Bank Stabilization

Pre-Bid Meeting Summary

TO:	Attendees as noted in attached Pre-Bid Meeting Sign-In Sheet	
COPY:	Tom Heinemann/PMT	Mike Kleffner/City
	Jim Theiler/City	Kent Bienlien/CH2M
	Rick Murch/City	Ron Sova/PMT
MEETING DATE:	September 10, 2015	
MEETING TIME:	1:00 – 3:00 p.m.	
VENUE:	Missouri River Wastewater Treatment Plant Operations Center (5600 S. 10th St., Omaha, NE 68107)	

The Pre-Bid Meeting Agenda is presented below. A summary of the discussion items are noted in *underlined italicized in the Discussion section following each major Agenda topic area.* Additional clarification notes incorporated into this summary that were not discussed at the Pre-Bid Meeting but are included as part of Addendum No. 1 are denoted in ***(bold italicized text)***.

1. Introductions
    a. City Project Manager: Eitan Tsabari
    b. Construction Manager: Kent Bienlien
    c. City Construction Manager: Kirk Pfeffer
    d. PMT Coordinator: Amit Shrivastava
    e. PMT Compliance Coordinator: Pat Nelson
    f. PMT CM Team Lead/Contact: Ron Sova
    g. Design Project Manager: Doug Simon
    h. Lead Designer/Contact for questions: Dave Curran

   Discussion:
   - *A copy of the list of Attendees at the Pre-Bid Meeting is attached to this meeting summary.*

2. Bid Opening Date, Place and Time (Section 00 11 13-Invitation To Bid)-Discussed by **{Doug Simon}**
   - Bid opening to be held Wednesday, October 28, 2015 at Omaha/Douglas Civic Center. Time of opening 11:00 a.m.
   - Mechanics for bid submittal see Specification Section 00 11 13-Invitation to Bid.

   Discussion:
   - *No additional discussion. (NOTE: Bid opening date is being modified through Addendum No. 1 to November 18, 2015.)*

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3. Interpretations (Section 00 21 13-Instructions to Bidders) -Discussed by **{Doug Simon}**
   - Reference Article 6.
   - Last addenda issued no later than 7 days before bid opening.
   - Questions addressed to **Dave Curran** per listed contact information.
   - Copy of the minutes for this meeting will be included in addenda.

   Discussion:
   - *No additional discussion*

4. Bidding and Contracting Requirements-Discussed by **{Heather Tippey Pierce}**
   - Bid Form (Section 00 41 13)
   - SWPPP and Environmental Allowances
   - Funds for the Project will come from the general sewer use fund.
   - Small and Emerging Businesses (SEB) (Instructions to Bidders 00 21 13). Discussion by Heather Tippey Pierce.
     - Work equivalent to a minimum of 5% of the total contract amount must be subcontracted with and self-performed by registered SEBs.
     - For questions on certification, including a listing of the SEB Program Participants, please visit the City of Omaha Human Rights and Relations website at www.cityofomaha.org/humanrights/contract-compliance or contact by telephone at (402) 444-5055
     - Bidders must complete the Participation Utilization Form & Participation Disclosure Form and submit with their bid/agreement documentation in order to be considered.
     - Failure to properly follow and meet the SEB requirements as part of the bid will result in the bid being non-responsive.
     - Failure to properly follow and meet the Economic Inclusion Plan requirements as part of the bid will result in the bid being non-responsive.

   Discussion:
   - *Individual SEB's are required to self-perform 70% of the work identified for each SEB. In other words, of the minimum 5% of the construction contract value identified to be performed by SEB's, those SEB's must self-perform 70% of the identified SEB work items.*
   - *The General Contractor must self-perform a minimum of 30% of the total contract value. (NOTE: this requirement is being removed through Addendum No. 1.)*
   - *Questions regarding SEB requirements may be directed to Heather Tippey Pierce with City of Omaha General Services.*

5. Project Overview and Coordination-Discussed by **{Doug Simon and Dave Curran}**
   - Overview of CSO Program
   - Significant sloughing of bank occurred following 2011 floods.
   - Work is in Missouri River floodplain
   - Majority of work along 1730'x30' corridor traverses through wetlands
   - Contractor to install geotextile fabric, temporary surface aggregate and timber matting from which to construct the deep soil mixing elements.
   - Dry mix method of deep soil mixing shall be used.
   - Site to be restored to pre-construction grade and wetlands restored.

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- Contractor will need to coordinate construction activities with Schedule B2 construction and on-going wastewater treatment plant operations.
- Working hours
- Site Access

Discussion:

- *Contractor to cease construction of the deep soil mixing elements (i.e. terminate binder injection and associated improvement of soil) approximately four feet below grade. Restoration of wetlands shall include reseeding of the site using native wetland seed mix. Planting of willows in the temporarily impacted forested wetland areas will be performed by others outside of this construction contract.*

6. Contract Times (Section 00 52 13-Agreement)-Discussed by **{Doug Simon and Dave Curran}**
   - Reference Article 4.
   - Notice-To-Proceed will be given on or about January 4, 2016.
   - Substantial Completion will be **150** days after Notice-To-Proceed.
   - Final Completion will be **180** days after Notice-To-Proceed.

   Discussion:

   - *No additional discussion*

7. Liquidated Damages (Section 00 52 13-Agreement) -Discussed by **{Doug Simon}**
   - Reference Article 4.3.
   - For Substantial Completion $2,200 per day.
   - For Final Completion $1,100 per day.

   Discussion:

   - *No additional discussion*

8. General Conditions (Section 00 72 13 – General Conditions) – Discussed by **{Doug Simon}**
   - Modifications to EJCDC General Conditions have been incorporated directly into the document. A redlined/track changes version will be provided upon request.

   Discussion:

   - *No additional discussion*

9. Construction Progress Schedule (Section 00 72 13-General Conditions) -Discussed by **{Doug Simon}**
   - Development of acceptable baseline schedule is part of mobilization Bid Item 1.
   - Monthly update required as part of Payment Application process.

   Discussion:

   - *No additional discussion*

10. Payments and Retainage (Section 00 52 13-Agreement) -Discussed by **{Doug Simon}**
    - Reference Article 6.
    - Retainage will be ten percent of the cost of the work completed. If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, Owner, on recommendation of Engineer, may determine that as long as the character and progress of the Work remain satisfactory to them, that no additional retainage on account of Work completed.
    - Ten percent retainage for stored materials not incorporated into the Work.

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- Upon Substantial Completion, retainage may be reduced to 125 percent of the cost the remaining work on the contract as estimated by Engineer or CM.

Discussion:

- *No additional discussion.*

11. Supplementary Reports (Section 00 73 00-Supplementary Conditions) -Discussed by **{Doug Simon and Dave Curran}**
    - Reference CD of 5 reports identified in SC 5.03 C and listed below are available for review at Issuing Office and are include on the reference CD:
        - Report dated 8/20/2011 prepared by CH2M HILL, 9191 South Jamaica Street, Englewood, Colorado, 80112-5946, entitled "OPW 51875 and 5220 – Missouri River Wastewater Treatment Plant Combined Sewer Overflow Improvements – Geotechnical Data Report" consisting of 266 pages.
        - 5.03.C.2. Report dated 6/18/13 prepared by CH2M HILL, 9191 South Jamaica Street, Englewood, Colorado, 80112-5946, entitled "OPW 51875 – Missouri River Wastewater Treatment Plan Combined Sewer Overflow Improvements – Schedule B Final Basis of Design Report: Supplemental Geotechnical Data Report" consisting of 60 pages.
        - 5.03.C.3. Report dated March 2015 prepared by STRATIGRAPHICS, The Geotechnical Data Acquisition Corporation, 26798 County T, Hillpoint, WI 53937, entitled "Piezometric Cone Penetration Tests MRWWTP-BS" consisting of 53 pages.
        - 5.03.C.4. Report dated 5/29/15 prepared by THIELE GEOTECH, INC., 13478 Chandler Road, Omaha, Nebraska 68138-3716, entitled "Draft Geotechnical Exploration Data Report, MRWWTP Instrumentation, Thiele monitoring equipment installation report" consisting of 46 pages.
        - 5.03.C.5. Report dated 7/23/15 prepared by THIELE GEOTECH, INC., 13478 Chandler Road, Omaha, Nebraska 68138-3716, entitled "Lime-Cement-Soil Mix Design Report, Missouri River Wastewater Treatment Plant" consisting of 51 pages.
    - Shelby Tube Samples during Bid period.
    - Examples of Materials Handling Plan and Environmental Protection Plan are available for review at Issuing Office and are included on the reference CD.

    Discussion:

    - *Shelby tube samples will be collected by others during the bid period and provided to prospective bidders for use in evaluating various mix designs. Prospective bidders are encouraged to provide input to Dave Curran by September 14 or 15, 2015 regarding number, depth, and sampling locations as samples will be collected in a single mobilization (NOTE: this has since been modified through Addendum No. 1 whereby prospective bidders shall be responsible for collection of their own samples (if desired) and are to coordinate site access with Doug Simon/CH2M Project Manager Phone: 402.609.7511 (office) or 402.541.3268 (mobile) or email at Doug.Simon@ch2m.com).*

12. Project Property and Easement Status-Discussed by **{Doug Simon}**
    - n/a. Project is on City property

    Discussion:

    - *No additional discussion*

13. Environmental Items Discussed by **{Pat Nelson}**
    - Permits (Section 01 41 26)

A. Environmental Overview
- Environmental overview of sites

B. Owner permits obtained or to be obtained
   1. USACE Clean Water Act Section 404 Nationwide Permit 33 or Amendment to existing Individual Permit.
   2. Amend Grading Permit
   3. Amend Construction Stormwater Permit

C. Listed Permits to be obtained by Contractor:
- None anticipated

- Environmental Allowance (Section 01 22 00 – Measurement and Payment)
- SWPPP Allowance (Section 01 22 00 – Measurement and Payment)
- Migratory Bird Treaty Act
- Temporary Environmental Protection (Section 01 35 05-Temporary Environmental Controls)

A. Environmental Protection Plan.
- Draft submitted no later than 15 days after Notice to Award.

B. Environmental Compliance Officer.

C. Traffic.

Discussion:
- *Amendment to existing Individual Permit has been obtained from the USACE.*
- *All work is outside of the Levee critical zone so a USACE Section 408 permit is not required.*

14. Survey Points Discussed by **{Doug Simon}**
- Contractor shall be responsible for laying out the Work

Discussion:
- *No additional discussion*

15. Project Meetings (Section 01 31 19-Project Meetings) Discussed by **{Doug Simon}**
- Preconstruction Conference.
- Initial Permitting and Environmental Conference.
- Preliminary Progress Schedule Review Meeting.
- Progress Meetings.
  - Weekly
- Coordination meetings with other contractors (If required).
- Final Environmental Conference

Discussion:
- *No additional discussion.*

16. Substitutions and "or Equals" (Section 00 21 13-Instructions To Bidders) Discussed by **{Doug Simon}**
Reference Article 10.
Discussion:
- *No additional discussion*

17. Materials Testing (Section 31 32 13 – Deep Soil Mixing – Dry Method) Discussed by **{Doug Simon and Dave Curran}**
- Reference Article 3.03 for Bench Scale Testing Requirements

- Reference Article 3.04 for Field Validation Program
- Reference Article 3.08 for Field Quality Control. Contractor to collect core samples. Owner/Engineer to identify core samples to be tested by an Owner procured third party testing agency.

Discussion:

- *With the extended bid period it is anticipated that prospective bidders would perform the Bench Scale Testing during the bid phase as the cost for the binding material represents a significant component of the construction cost. Contractor's in attendance noted some concerns with this expectation indicating that it requires them to incur costs to prepare estimate to meet technical specification requirements for which they are not being compensated. When asked how many strata were presented, Dave Curran responded that while it is the Bidder's responsibility to assess, he thinks there may only be one important strata with a variable moisture content. (NOTE: This has been modified through Addendum No. 1 which removes this expectation and extends the construction during to accommodate bench scale testing following contractor selection)*

18. Sales and Use Tax (Section 00 21 13-Instructions to Bidder) Discussed by **{Doug Simon}**
    - Reference Article 22.
    - Project exempt from Nebraska State Sales and Use Taxes on materials and equipment incorporated into Work.
    - City will provide Form 92 to successful contractor.

    Discussion:

    - *No additional discussion.*

19. Administration of Construction Documentations Discussed by **{Doug Simon}**
    - Covers administration of shop drawings, samples and miscellaneous submittals.
    - CSO Program Web Portal used for RFIs and Field Orders and posting of other construction documents.

    Discussion:

    - *Training on the use of the web portal and the construction documentation will be provided to the successful bidder.*

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PRE-BID MEETING SIGN-IN SHEET

OPW 52494 – MRWWTP Bank Stabilization Pre-Bid Meeting

Date: September 10, 2015 **Time:** 1:00 p.m.

Location: MRWWTP Operations Center Training Room

Attendee	Affiliation	Email	Phone
Doug Simon	CH2M	dsimon@ch2m.com	402.609.7511
FILIPPO LEONI	TREVIICOS	FLEONI@TREVIICOS.COM	785-410-0039
Taylor Oney	Kiewit	Taylor.Oney@Kiewit.com	713-294-9791
Sean Bell	Wade Trim	sbell@wadetrim.com	402-345-3900
Don Cabral	Raito Inc	donc@raitoinc.com	510 259 9900
DAVE REEL	GRAHAM	daver@grahamus.com	402-891-9651
Marty Misfeldt	Graham Const.	martym@grahamus.com	402-891-9651
Pat Nelson	PMT	pat.nelson@ch2m.com	402-609-7512
Dave Curran	CH2M	david.curran@ch2m.com	720-286-0009
Josh BRIDGES	Hawkins	jbridges@hawkins1.com	402-221-7632
Todd WANDMAN	HAWKINS	TWandman@Hawkins1.com	402 699 4717
JESSE BAUMANN	HAWKINS	JBaumann@Hawkins1.com	402-670-6864
TYSON DEKLAVS	HBI	tedeklavs@haywardbaker.com	281-610-5036
Kirk Pfeffer	City	kirk.pfeffer@cityofomaha.org	402 444 4911
JON RIEDE	CITY	jon.riede@cityofomaha.org	402-444-3915 x 125

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PRE-BID MEETING SIGN-IN SHEET

OPW 52494 – MRWWTP Bank Stabilization Pre-Bid Meeting

Date: September 10, 2015 **Time:** 1:00 p.m.

Location: MRWWTP Operations Center Training Room

Attendee	Affiliation	Email	Phone
Spring Borchardt	Hayward Baker	sborchardt@haywardbaker.com	630-339-4316
EITAN TSABARI	City	eitan.tsabari@cityofomaha.org	402.444.3915 x249
Heather Tippey Pierce	Omaha Public Works	HTPierce@cityofomaha.org	402-444-3275
Scott Aurit	PMT	scott.aurit@hdrinc.com	402-575-1617
MIKE ARENDS	CITY OF OMAHA	mike.arends@cityofomaha.org	(402) 444-3915 x203
Kim Zulliger	CH2M	Kim-Zulliger@ch2m.com	
Brian Armbrust	Bayshore Contractors	barmbrust@bayshoreusa.com	402-980-7394
Adrian Garcia	Bayshore Contractors	@garcia@bayshoreusa.com	402-305-5519

SECTION – 00 72 13 GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT
TABLE OF CONTENTS

EJCDC® C-700 (Rev. 1), Standard General Conditions of the Construction Contract.
This document is a MODIFIED version of EJCDC® C-700 (Rev. 1), Copyright © 2013 by the National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers, or is based in part on excerpts from copyrighted EJCDC documents. Additions are denoted using Bold underlined text and deletions are denoted using ~~strikeout text~~. The exceptions being in the Table of Contents where text additions are denoted using Bold text and original page numbers of Articles have not been included as strikethrough text. In addition, the numbering of the Defined Terms in Article 1.01 has also been altered.
Those portions of the text that originated in copyrighted EJCDC documents remain subject to the copyright.

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. ***Act of God*—Earthquake, lightning strike, tornado, or any other cataclysmic phenomenon of nature beyond Contractor's control causing loss, damage, or injury to the Work.**

2. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

3. ***Admixture*—Material other than water, aggregates, hydraulic cement, and fiber reinforcement used as an ingredient of concrete or mortar and added to the batch immediately before or during mixing.**

4. ***Advertisement*—Public announcement requesting services or bids for work or furnishing materials.**

5. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

6. ***Alley*—Established pedestrian and vehicle access between or behind buildings abutting a street.**

7. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

8. ***Arterial Street*—Main road, street, or avenue, primarily for through traffic, with collector roads, streets, or avenues joining it.**

9. ***Auxiliary Lane*—Portion of roadway adjoining the through traveled way for parking, speed changes, or other purposes supplementary to through traffic movement.**

10. ***Avenue*—See Street.**

11. ***Award*—Acceptance of a proposal.**

12. ***Award Date*—Date Owner notifies the successful Bidder of the award or Date of Issuance of the Notice of Award.**

13. ***Award Letter*—Letter notifying the successful Bidder of the award.**

14. ***Backfill*—Operation involving the placement and compaction of materials in a trench or excavation, or surrounding constructed improvements. Also, material(s) used in such an operation.**

15. ***Base, Base Course*—Layer(s) of designed material constructed on a subbase or subgrade to support the surface material.**

16. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

17. ***Bid Date*—Date indicated in the Contract Documents on or before which Owner must receive all proposals.**

18. ***Bid Opening*—Act of publicly declaring a portion or all of Bidder's proposal.**

19. ***Bid Time*—Time indicated in the Contract Documents on or before which Owner must receive all proposals.**

20. *Bidder*—An individual or entity that submits a Bid to Owner.

21. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

22. *Bidding Requirements*—The ~~advertisement or i~~**I**nvitation to ~~b~~**B**id, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

23. ***Blended Hydraulic Cement*—See ASTM C595, Standard Specification for Blended Hydraulic Cements.**

24. ***Bond*—A promissory note provided by a Surety.**

25. ***Borrow Material*—Material taken from the borrow pit.**

26. ***Borrow Pit*—Excavation site that provides material for use in another location.**

27. ***Borrow Site*—The source or approved material required for the construction of earthwork requirements, from locations shown in the plans or proposed by Contractor.**

28. ***Brick Pavement*—Existing brick streets.**

29. ***Calendar Day*—Every day, beginning and ending at midnight, shown on the calendar, including Sundays and holidays.**

30. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

31. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

32. ***Channel*—A natural or artificial waterway.**

33. ***City*—The municipal corporation established under the authority delegated by the Constitution of the State of Nebraska known as the City of Omaha.**

34. ***City Council*—Elected legislative body of the Mayor-Council form of government as created by the Home Rule Charter of 1956.**

35. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the

procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.

36. ***Coarse Aggregate*—Mineral aggregate or portion of a mineral aggregate that retains on a #4 sieve.**

37. ***Collector Street*—Street providing access to abutting property that collects local street traffic and feeds an arterial street.**

38. ***Combined Sewers*—Sewer pipes conveying both sanitary and storm water flows. Combined sewers shall be treated as sanitary sewers.**

39. ***Completion Date*—Specific calendar date by which either on or before Contractor must complete all Work.**

40. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

41. ***Construction Manager*—Engineer's agent at the site, acting under the supervision of the Engineer, to assist in observing the progress and quality of Work.**

42. ***Continuous Pavement*—Portion of pavement constructed during a single paving operation.**

43. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.

44. ***Contract Bond*—Security executed by Contractor or its Surety, or sureties, guaranteeing completion of the specified Work and payment of all legal debts pertaining to the Work.**

45. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

46. ***Contract Item*—Specific work unit for which the Contract provides a price.**

47. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.

48. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

49. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

50. *Cost of the Work*—See Paragraph 13.01 for definition.

51. ***County*—Administrative subdivision of the State used to designate or identify the location of the proposed Work.**

52. ***Culvert*—Structure providing an opening under any roadway excluding bridges, transverse drainage tile, or other intakes designed to aid subsurface drainage. Culverts generally are opened ended on both sides.**

53. ***Department of Roads*—Department of the State of Nebraska authorized by law to improve and maintain the State Road System.**

54. ***Detour*—A temporary official route using existing roads to divert traffic around a roadway project.**

55. ***Drainage Ditch*—Artificial open depression, excluding a roadway ditch, constructed for surface water movement.**

56. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

57. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

58. ***Embankment*—Area of fill the top of which is constructed to be higher than the surrounding surface or the original surface.**

59. *Engineer*—The individual or entity named as such in the Agreement.

60. ***Engineer's Estimate*—Estimate compiled by Engineer of predicted cost based upon past experience and available information.**

61. ***Equipment*—Machinery, tools, apparatus, and supplies necessary to preserve, maintain, construct, and complete the Work.**

62. ***Excavation*—Operation involving the removal of earth or rock.**

63. ***Excavation Limits*—Vertical and horizontal boundaries established to control the excavation process.**

64. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

65. ***Fine Aggregate*—Mineral aggregate or portion of a mineral aggregate that passes through a #4 sieve and retains on a #200 sieve.**

66. ***Foundation Rock*—Trench stabilization material consisting of three (3) inch maximum crushed rock meeting the gradation requirements of Size 2 of ASTM C33, Standard Specification for Concrete Aggregates.**

67. ***Furnished Materials*—Materials provided or made available to Contractor by Owner or other designated source at no cost to Contractor.**

68. ***Haul Road*—Traveled way designated for hauling equipment, materials, or machinery.**

69. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

70. ***Incentive/Disincentive*—A Contract provision that compensates or deducts payment to Contractor for critical Work intended to minimize interference and inconvenience to the traveling public and/or reduce construction time.**

71. ***Incidental*—Minor expense or occurrence that accompanies an item of work.**

72. ***Incidental Work*—Work performed by Contractor that is not directly paid. The cost for providing the work is included in one or more other Contract Price(s).**

73. ***Inspector*—Engineer's authorized representative assigned to make detailed inspections of the Work performed and materials furnished by Contractor.**

74. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

75. ***Letting*—The public opening and reading of bids received from Contractors for work advertised.**

76. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

77. ***Liquidated Damages*—A reduction in payment intended to compensate for expenses incurred by Owner due to Contractor's failure to complete the Work on or before the Contract date or within the authorized number of calendar days. Such amounts are not to be considered penalties.**

78. ***Lump Sum*—Bid amount for all work necessary to satisfactorily complete a Contract Item that is not directly measured.**

79. ***Major Work Item*—Work item that Contractor must complete in order to occupy or use the Project for its intended purpose.**

80. ***Materials*—Substance specified for use in the completion of the Work contained in the Contract.**

81. ***Materials Testing Manual*—Manual developed by the City that indicates the testing or inspection guidelines for the Work.**

82. ***Mayor*—Elected executive and administrative power of the City.**

83. ***Median*—Planted or paved section between two (2) or more lanes in or near the center of the street and not intended for vehicular travel.**

84. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

85. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

86. ***Notice to Bidders*—Public announcement requesting services or bids for work or furnishing materials.**

87. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

88. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

89. ***Partial Payment*—See Progress Payment.**

90. ***Pavement Repair*—Individual pavement panels or single lane widths or existing streets designated for reconstruction.**

91. ***Pavement Structure*—Pavement layer(s) constructed atop a subgrade supporting and distributing the traffic load to the roadbed.**

92. ***Paving Lane*—Full width and length of a layer of pavement constructed at a single time.**

93. ***Payment Bond*—Form of security furnished by Contractor and Surety as a guaranty that all bills and accounts for materials and labor used in the Work will be paid in full.**

94. ***Performance Bond*—Form of security furnished by Contractor and Surety as a guaranty that the Work will be completed in accordance with the terms of the Contract.**

95. ***Permanent Easement*—Strip of land within a larger area to which the property owner grants permanent right-of-access by an individual or legal entity.**

96. ***Plans*—Contract drawings or electronic digital images showing the location, character, and dimensions of the prescribed Work, including layouts, profiles, cross sections, and details.**

97. ***Pre-Approved Source*—A source that is deemed acceptable prior to the submittal of any information.**

98. ***Precast Concrete*—Conventionally reinforced (not pre-stressed) concrete products formed, cast, and cured in a casting yard and later incorporated into the Work.**

99. ***Precast Concrete Pavers*—Concrete bricks that are used in the construction of pavement surfaces (brick streets, crosswalks, etc.).**

100. ***Profile Grade*—Trace of a vertical plane intersecting the top surface of the proposed wearing surface of a road.**

101. ***Progress Payment*—Payment issued for completed portions of the Work or for materials required for the Work that are in inventory and stored on the Project or at a designated location on a specific date.**

102. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

103. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

104. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

105. ***Proposal*—Written offer to perform the Work contained in the Contract.**

106. ***Proposal Form*—Form on which formal bids are prepared and submitted.**

107. ***Proposal Guaranty*—Security furnished with a proposal guaranteeing the Bidder will enter into the Contract upon acceptance of the proposal.**

108. ***Punchlist*— List compiled near the completion of Work indicating the Work remaining and items Contractor must furnish to complete the Work contained in the Contract.**

109. ***Quality Control*—All Contractor/supplier operational techniques and activities that are performed or conducted to fulfill the Contract requirements.**

110. ***Ramp*—Connecting pavement between intersecting surfaces at a grade-separated intersection.**

111. ***Random Crack*—A single crack within a single panel of pavement less than one-eighth (⅛) inch wide.**

112. ***Rejected Proposal*—Proposal rendered invalid by Owner.**

113. *Resident Project Representative*—The authorized representative**(s)** of Engineer assigned to assist Engineer **with daily observations** at the Site. ~~As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative~~.

114. ***Resources*—Labor, equipment, and materials necessary to perform the Work contained in a Contract Bid Item or other element of Work.**

115. ***Responsive Bid*—Bid meeting all requirements in the Notice to Bidders.**

116. ***Right-of-Way*—Land, property, or interest acquired for or devoted to drainage, sewer, or transportation purposes.**

117. ***Road*—See Street.**

118. ***Roadbed*—Graded portion of a street or alley prepared as the subgrade for construction of a pavement structure and shoulders.**

119. ***Roadside*—Area adjoining the outer edge of a street.**

120. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

121. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.

122. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

123. ***Setback Line*—A line outside of the right-of-way, established by public authority, on the road side of which the erection of building or other permanent improvements is controlled.**

124. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

125. ***Shoulder*—Portion of the roadway adjacent to the traveled way that can accommodate stopped vehicles for emergency use and for lateral support of base and surface courses.**

126. ***Sidewalk*—Portion of the right-of-way constructed exclusively for pedestrian use.**

127. ***Sieve*—USA Standard Sieve, as defined in AASHTO M92, Standard Specification for Wire-Cloth Sieves for Testing Purposes.**

128. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

129. ***Slope*—Inclination of a line or surface.**

130. ***Special Provisions*—Additions, addendums, and revisions to the Standard and Supplemental Specifications applicable to an individual project.**

131. ***Specialty Items*—Contract Items requiring equipment, skills, or crafts not ordinarily associated with the types of Work in the Contract.**

132. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

133. ***Specified Starting Date*—Date upon which Work must begin.**

134. ***Sprinklers –Distribution Line*—Irrigation piping from the valve box to the sprinkler head.**

135. ***Sprinklers – Trunk Line*—Irrigation piping from the water source to the valve box, typically pressurized.**

136. ***Stabilizing or Stabilization*—Incorporation of materials into soils or aggregates to increase load-bearing capacity, firmness, and resistance to weathering or displacement.**

137. ***Standard Plan*—A Nebraska Department of Roads detailed drawing approved for repetitive use.**

138. ***Standard Plate*—A City of Omaha detailed drawing approved for repetitive use.**

139. ***Standard Specification*—City of Omaha written provisions and requirements approved for general application and repetitive use.**

140. ***State*—State of Nebraska acting through its authorized representatives.**

141. ***Street*—General term denoting a public way for purposes of vehicular travel, including the entire area within the public right-of-way.**

142. ***Structure*—Building, bridge, pipe, culvert, fence, or other item not considered part of the roadway.**

143. ***Subbase Course*—Layer(s) of specified material placed upon a subgrade to support a base or surface course.**

144. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

145. ***Subgrade*—Top layer of a roadbed upon which the pavement structure, shoulders, and curbs are constructed.**

146. ***Submittal*—Shop drawings, samples, and miscellaneous items or documents submitted by Contractor to Engineer for review. Typical submittals include, but are not limited to, product data and samples, construction schedules, material testing reports, certification letters, warranties, construction photographs, survey data, cost breakdown, permits, plans, and manufacturer installation recommendations.**

147. ***Subsidiary*—See Incidental.**

148. *Substantial Completion*—~~The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part~~

~~thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended.~~ The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof. **Unless otherwise indicated in the Contract Documents, "Substantial Completion" shall mean all items of Work have been completed and any acceptance testing requirements have been fulfilled.**

149. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner **(on the basis of Owner's evaluation)** makes an award of contract, subject to stated conditions.

150. ***Superintendent*—Representative of Contractor charged with responsibility for the Work.**

151. ***Supplemental Specification*—Approved addition or revision to the Standard Specifications.**

152. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions. **Contract Documents may or may not include Supplementary Conditions.**

153. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

154. ***Surety*—Individual or legal entity, other than Contractor, executing a bond furnished by Contractor.**

155. ***Surface Course*—Pavement structure layer(s) constructed atop all other pavement layers and designated to accommodate the traffic load.**

156. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

157. ***Temporary Easement*—Strip of land within a larger area over which the property owner grants a temporary right-of-access to an individual or legal entity.**

158. ***Temporary Pavement*—Pavement layer(s) constructed to provide a temporary service to vehicular traffic.**

159. ***Temporary Structure*—Structure required for maintaining traffic or access during the Work and dismantled upon completion of the Work.**

160. ***Testing Laboratory*—Firm designated to perform testing on any or all Work contained in the Contract.**

161. ***Traffic Control Device*—Sign, signal, marking, or device placed on, over, or adjacent to a street or highway by an authority of the public or official having jurisdiction to regulate, warn, or guide traffic.**

162. ***Traffic Control Zone*—Distance from the first advance warning sign to the point after the work area where traffic is no longer affected.**

163. ***Traffic Lane*—Portion of the traveled way designated for the movement of a single line of vehicles.**

164. ***Traveled Way*—Portion of the right-of-way designated for vehicle use, excluding shoulders and auxiliary lanes.**

165. ***Tunneling*—A general term for all methods of trenchless sewer construction.**

166. ***Unauthorized Work*—Work not contemplated by the Contract Documents and not authorized by Engineer or performed contrary to the instructions of Engineer.**

167. ***Unbalanced Proposal*—Proposal containing lump sum or unit bid items that do not reflect reasonable actual costs plus a reasonable proportionate share of Bidder's anticipated profit, overhead costs, and other indirect costs.**

168. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems **not otherwise included in the definition of Utility**.

169. ***Unit*—A calculated partition of new pavement construction for the purposes of obtaining cores to determine constructed thicknesses of the new pavement and assessment of applicable pay factors. A unit is a driving lane with a length of four-hundred forty (440) feet. A driving lane is typically twelve (12) to thirteen (13) feet in width.**

170. *Unit Price Work*—Work to be paid for on the basis of unit prices.

171. ***Unsuitable Materials*—All materials that contain debris, roots, organic, or frozen materials, stones having a maximum dimension larger than three (3) inches for the upper twelve (12) inches of fill, stones having a maximum dimension larger than six (6) inches for the remainder of the fill, or any other materials determined by Engineer to be unsuitable for providing a stable slope, embankment, backfill, or subgrade.**

172. ***Utility*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, or other such facilities or attachments, and any encasements containing such utilities, owned by a company or owner notified by the State of Nebraska's "One Call" notification system.**

173. ***Waterway*—A channel for the escape or passage of water.**

174. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

175. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

176. ***Working Drawing*—Drawing furnished by Contractor showing sufficient detailed information to build the object shown and described.**

1.02 *Terminology*

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*:

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*:

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight, **including Sundays and Holidays**.

D. *Defective*:

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

   a. does not conform to the Contract Documents; or

   b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

   c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. *Furnish, Install, Perform, Provide**, Supply***:

1. ~~The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.~~ **The word "furnish" or the word "install" or the word "perform" or the word "provide" or the word "supply", or any combination or similar directive or usage thereof, shall mean furnishing and incorporating in the Work including all necessary labor, materials, equipment, and incidentals necessary to perform the Work indicated, unless specifically limited in the context used.**

2. ~~The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.~~

3. ~~The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.~~

4. ~~If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.~~

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Contractor's Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions, **if any,** or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

C. *Evidence of Owner's Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions, **if any,** or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner ~~shall~~ **will** furnish to Contractor four printed copies of the Contract **Documents** (including one fully executed counterpart of the Agreement)~~, and one copy in electronic portable document format (PDF)~~. **Contractor shall have one copy of the Contract Documents available on the Site at all times.** Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within **14** ~~10~~ days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), **but no later than three days before the preconstruction conference,** Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract **following the format and submittal procedure described in Article 4.04**;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work **on Lump Sum bid projects** which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for

progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, **except for Work as allowed in Article 4.02,** a conference attended by Owner, Contractor, **major Subcontractors,** Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Initial Acceptance of Schedules*

A. ~~At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A.~~ **Engineer shall review the preliminary Schedule submitted in accordance with Paragraph 2.03.A within 14 days of receipt of said schedule. If the schedule is not acceptable to Engineer,** Contractor shall have an additional ~~10~~ **14** days **after receiving comments from Engineer** to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The **preliminary** Progress Schedule will be acceptable to Engineer **and become the Baseline Schedule once approved** if it provides an orderly progression of the Work to completion within the Contract Times **and meets the requirements of Paragraph 4.04**. Such ~~acceptance~~ **approval** will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

   a. **For larger or more complex projects, and with the Engineer's approval, a preliminary Progress Schedule may initially only cover the first 90 days of Work in detail with a general sequence for the remaining work. Engineer and Contractor will agree on when a complete preliminary Progress Schedule will be submitted.**

   b. **Changes to the Baseline Schedule can only be made with mutual agreement with the Engineer and will be used to compare to the Progress Schedule and subsequent updates to the Progress Schedule as noted in Paragraph 4.04.**

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the **Lump Sum** Work.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other

submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

F. ***Third Party Beneficiary Clause:*** **The parties executing this Contract specifically agree that the intent of the Contract is not to create any individual or legal entity as a third-party beneficiary. Furthermore, the Contract does not authorize any individual or legal entity not party to the Contract to maintain an action for damages under said Contract provisions.**

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, **standard plates, standard plans,** reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, **standard plate, standard plan,** reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, **standard plate, standard plan,** reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake

responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein**. Contractor shall also compare the Contract Documents**~~, particularly~~ with ~~respect to~~ **all** applicable field measurements. Contractor shall ~~promptly~~ report in writing to Engineer **within 24 hours** any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, **standard plate, standard plan,** reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall ~~promptly~~ report it to Engineer in writing **within 24 hours of discovery**. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*:

1. **Engineer shall make a determination in writing upon notification of a discrepancy. Any adjustment by Contractor without such a determination shall be at Contractor's own risk and expense.** ~~Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:~~

   ~~a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or~~

   ~~b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).~~

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will~~, with reasonable promptness,~~ render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will ~~promptly~~ give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the ~~thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the~~ day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within ~~30~~ **90** days after the Effective Date of the Contract. ~~In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.~~

4.02 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date**, except as allowed in this Article.**

B. **Tree removal and clearing and grubbing should be completed at commencement of Contract Times or prior to Contract Times commencement given the following conditions:**

1. **The Contractor shall be familiar and comply with the following statues and regulations:**

1) **Migratory Bird Treaty Act of 1918.**

2) **Threatened and Endangered Species Act of 1973**

3) **Bald and Gold Eagle Protection Action of 1940**

4) **Nebraska Nongame and Endangered Species Conservation Act of 1975**

2. **Contractor shall follow all conditions of permits obtained for the Project. If a permit is in conflict with the requirement of this specification, the permit requirements take precedence.**

3. **Dates listed in this specification are for guidance only. No active or inactive raptor nest or active nest of other migratory bird species can be disturbed or removed without Owner Approval.**

4. **Contractor, to the extent possible, shall schedule tree removal and clearing and grubbing operations to occur outside the guidance dates for the migratory bird nesting season in Nebraska with the following criteria:**

   a. ***Notice To Proceed Outside Listed Dates for Migratory Bird Nesting* - In general, if Notice to Proceed on the Contract is received between approximately July 16th and March 31st, the Contractor shall immediately perform all vegetation clearing such as tree removal, mowing, shrub cutting, and brush cutting in all areas in which active construction will occur between April 1st to July 15th of the following year, only if it is readily apparent that no migratory bird nests are in the area or if a biomonitor (a wildlife biologist with a 4 year biology degree experienced in observing birds native to the Omaha area) performs a survey of the area and determines the absence of nesting migratory birds. The purpose of this clearing is to prevent non-raptor migratory birds from nesting within the area of active construction.**

   b. ***Notice To Proceed Within Listed Dates for Migratory Bird Nesting* - In general, if Notice to Proceed on the Contract is received between approximately April 1st and July 15th, the Contractor shall employ a biomonitor to perform a bird survey of the area to determine the absence or presence of nesting migratory birds and receive clearance to proceed from them before performing all vegetation clearing such as tree removal, mowing, shrub cutting, and brush cutting in all areas in which active construction will occur between April 1st to July 15th. The purpose of this clearing is to prevent non-raptor migratory birds from nesting within the area of active construction.**

   c. ***Notice Of Award Outside Listed Dates for Migratory Bird Nesting* - In general, if Notice of Award is received prior to April 1st but Notice to Proceed is anticipated to be given after April 1st, the Owner at their option may cause to have the clearing and grubbing performed by others or the Contractor at their option may request approval to complete the work. If Owner causes to have the tree removal and/or clearing and grubbing performed by others, a Change Order will be processed for removing the Work performed from the Contract. If Contractor completes the tree removal and/or clearing and grubbing, no contract days will be assessed until the Notice to Proceed is issued.**

5. **Tree removal and clearing and grubbing must comply with the following:**

   a. **Prior to any clearing or tree removal, the Contractor and Engineer will walk the site looking for nests or evidence of migratory bird activity. If no nests or evidence of migratory bird nesting is found, the entire area shall be cleared in 72 hours. If a nesting migratory bird is discovered, or in the Engineer's opinion enough evidence exists that a migratory bird nest may be present, Contractor will employ a biomonitor to perform a migratory bird survey of the area to determine the absence or presence of nesting migratory birds. If the**

biomonitor determines that an active migratory bird nest is not present, then the entire area shall be cleared within 72 hours of being notified.

b. **Cleared vegetation must be initially cleared to a height of 4" or less prior to migratory bird nesting and be maintained to a height of 4" for the migratory bird season, or such time as the migratory birds are no longer present.**

c. **Debris resulting from vegetation clearing shall be removed and disposed within 72 hours after clearing. If the material is not removed within 72 hours, repeat the requirements of a site walk in Paragraph 4.02.B. 5.a for the areas where the debris is stockpiled.**

d. **If the Contractor, Engineer, or biomonitor determines that an active migratory bird nest(s) is present, then the area cannot be cleared or debris removed until the nest is no longer needed for migratory bird shelter and feeding, the young have fledged, or an appropriate mitigation strategy is developed, as determined by the biomonitor and Owner.**

C. **Should new or previously unknown active migratory bird, raptor, eagle, or otherwise protected bird nests or wildlife be discovered within an area in which active construction will occur prior to start of construction activity, the Owner will, in consultation with the NGPC and USFWS, attempt to mitigate such discovered protected bird nests or wildlife to continue to allow the Contractor access to construction areas in accordance with the Contractor's approved critical path schedule. Should delays or limitations of Contractor's work caused by the presence of a previously unknown protected bird nest or wildlife species result in changes to the approved critical path schedule, such days of delay may be considered for inclusion into a Change Order. No additional cost for the delay will be considered. For discovery of active nests after Contract Times commencement, the Contractor shall comply with Article 7.10.C.1.**

4.03 *Reference Points* ***and Line and Grade Stakes***

A. Owner shall provide engineering surveys to establish reference points for construction ~~which in Engineer's judgment are necessary to enable Contractor to proceed with the Work~~ **and to establish lines and grades**. **Contractor shall provide Owner 48 regular working hours' notice for construction reference points and line and grade stakes. Contractor is responsible for the Work conforming to such points and stakes.** Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points**, line and grade stakes** and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations~~, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel~~.

B. **Should Contractor, during the course of construction, damage or destroy any established property corners or reference points, such monuments shall be replaced by Owner at Contractor's sole and exclusive expense. The Owner's cost for replacement shall be deducted from the Contractor's final payment.**

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted ~~from time to time~~ **monthly, or** as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. **Failure to submit acceptable Progress Schedule updates monthly, or**

as agreed to by Engineer, may result in Owner withholding all or part of progress payments.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. **Progress Schedule Submittal Requirements:**

1. **For all contracts:**

   a. **Contractor shall use a commercially available scheduling software package, including Primavera, ProLog, SureTrak, Microsoft Project, or other software programs approved by Engineer.**

   b. **Provide Progress Schedule electronic file in software format being used to create the schedule, if requested by the Engineer.**

   c. **Submit two 11" X 17" color copies of the schedule along with a PDF file of the Progress Schedule.**

   d. **The submitted schedules shall be legible using no smaller than a 10 point font for the text on the printed page.**

   e. **Title Block: Show name of Project and Owner, OPW Number, date submitted, revision or update number, and name of scheduler. Updated Progress Schedules shall indicate data date.**

   f. **No activity duration, exclusive of those for Submittals review and product fabrication/delivery, shall be less than 1 day or more than 14 days, unless otherwise approved by the Engineer.**

   g. **Progress Schedule shall begin with the date of Notice to Proceed and conclude with the date of Final Completion showing all Milestone dates.**

   h. **Progress Schedule Float shall comply with the following:**

      1) **Float is a project resource available to both parties to meet contract Milestones and Contract Times.**

      2) **Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times are prohibited and use of float time disclosed or implied by use of alternate float-suppression techniques shall be shared to proportionate benefit of Owner and Contractor.**

      3) **Pursuant to above float-sharing requirement, no time extensions will be granted nor delay damages paid until a delay occurs which (i) impacts Project's critical path, (ii) consumes available float or contingency time, and (iii) extends Work beyond contract completion date.**

   i. **Show progress of Work to within 5 working days prior to submission.**

2. **For contracts less than $1,000,000.00, Contractor shall provide an Activities Schedule Chart (ASC). An ASC shall detail the duration of major construction activities including subcontractor, vendor and supplier activities. The requirements of an ASC are as follows:**

   a. **Chronologically sequenced bar chart establishing the critical construction operations from start to completion.**

   b. **Activity descriptions for each construction operation.**

c. **Activity duration by number of calendar days for each construction operation.**

3. **For contracts between $1,000,000 and $3,000,000, the Critical Path Method (CPM) schedule defined in Paragraph 4.04.B.4 will be used unless the Engineer agrees the project complexity does not require a CPM schedule and the ASC can be provided as defined in Paragraph 4.04.B.2.**

4. **For contracts greater than $3,000,000.00, Contractor shall provide a Progress Schedule utilizing the Critical Path Method (CPM). The CPM shall define the sequential path of activities through a network diagram from beginning to end of project which provides for the completion of the project in the least amount of time within the Contract Times. The requirements of a CPM are as follows:**

   a. **Sequence and interdependence of all construction tasks.**

   b. **Sequence and interdependence of all concurrent utility work (if any).**

   c. **Activity descriptions for each construction task.**

   d. **Activity duration by number of calendar days for each construction task.**

   e. **Early Start, Early Finish, Late Start, Late Finish dates for each construction task.**

   f. **Highlight critical path in red.**

   g. **Amount of float for each construction task.**

C. **Progress of the Work**

1. **If Contractor falls behind Baseline Schedule, the following shall apply:**

   a. **Engineer reserves the right to:**

      1) **Order Contractor to take steps deemed necessary to expedite the completion of the Work.**

      2) **Direct Contractor to submit, for approval, a recovery Schedule identifying the order of Work remaining to be completed, what concurrent operations will be taking place and the starting and completion times for each task necessary to expedite the Work. The recovery Schedule shall show the Work being completed within the current Contract Times.**

      3) **Order Contractor to submit a detailed written statement as to how Contractor intends to correct the nonperformance and return to the most current Schedule.**

2. **Contractor shall submit a recovery Schedule, for approval, whenever Contractor's progress falls behind the approved Baseline Schedule, does not meet the above-mentioned criteria, and/or when requested by Engineer. The revised Schedule shall be submitted within seven (7) days of falling behind schedule or within seven (7) days of Engineer's request. Contractor agrees that failure to submit the revised Schedule within seven (7) days shall be cause for the suspension of Progress Payments until the revised Schedule is submitted.**

3. **Actions by Contractor to expedite and complete the Work within the allowable Contract Times shall not be justification for additional compensation.**

4. **Failure to make satisfactory arrangements to adjust the Work schedule and/or make the necessary changes to expedite the progress of the Project may result in disqualification of Contractor from submitting bid proposals for future work until**

Contractor's performance and schedule demonstrate that Contractor can complete the Contract within the Contract Times.

D. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. **Requests for adjustment in Contract Times shall be submitted with documentation detailing actual delays in completion of the Work within the Contract Times.** Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
2. abnormal weather conditions;
3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*:

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible. **Contractor shall not enter upon nor use property adjacent to the Site of the Work, not under Owner control, until appropriate easements have been executed and a copy is on file at the Site. Contractor shall minimize interfering with traffic during performance of the Work. Contractor shall start the Work as required by the Contract Documents unless otherwise approved in writing by Engineer.**

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify**, defend** and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions**, if any,** identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions**, if any,** with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
2. is of such a nature as to require a change in the Drawings or Specifications; or
3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, ~~promptly~~ **within 24 hours** after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will ~~promptly~~ review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

   a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

   b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

   c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

   a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

   b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract

Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

~~3.~~**4.** Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities* ***and Utilities***

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities **and Utilities** at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities **and Utilities**, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all information and data regarding existing Underground Facilities **and Utilities** at the Site;

b. locating all Underground Facilities **and Utilities** shown or indicated in the Contract Documents as being at the Site;

c. coordination of the Work with the owners (including Owner) of such Underground Facilities **and Utilities**, during construction; and

d. the safety and protection of all existing Underground Facilities **and Utilities** at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility **or Utility** that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, ~~or was not shown or indicated with reasonable accuracy,~~ then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility **or Utility** and give written notice to that owner and to Owner and Engineer.

C. *Engineer's Review*: Engineer will promptly review the Underground Facility **or Utility** and conclude whether such Underground Facility **or Utility** was not shown or indicated in the Contract Documents, ~~or was not shown or indicated with reasonable accuracy~~; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility **or Utility** in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility **or Utility**; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility **or Utility**.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility **or Utility** in question, addressing the resumption of Work in connection with such Underground Facility **or Utility**, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Possible Price and Times Adjustments*:

1. Contractor ~~shall~~ **may** be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility **or Utility** at the Site that was not shown or indicated in the Contract Documents, ~~or was not shown or indicated with reasonable accuracy,~~ or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

   a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility **or Utility** in question;

   b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

   c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and

   d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. **An equitable adjustment in the Contract Price or the Contract Time, if any, shall be defined as, and limited to, the time, equipment and labor necessary to affect the change required to address the Underground Facility or Utility. No adjustment will be made for idle equipment or labor while addressing the Underground Facility or Utility.**

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility **or Utility** in question.

F. ***Utilities***

1. **Contractor is responsible for notifying all utility companies, pipeline owners, or other parties affected by the work. Contractor shall contact the State of Nebraska "One-Call" system for assistance in locating all utilities, pipelines, and other installations in the project. Contractor shall be responsible for coordinating the Work with all utility owners to remove and rearrange underground or overhead utilities to avoid service interruption or duplicate work by the utility owner. Contractor shall use work procedures that protect utilities or appurtenances that remain in place during construction.**

2. **Contractor agrees that Owner will not provide any additional compensation due to delays, inconvenience, or damages sustained by interference from said utilities or appurtenances or the operation of relocating said utilities.**

3. **Contractor shall notify the appropriate utility of any service interruption resulting from breakage, within the construction limits or otherwise, by Contractor's operations, and cooperate during service restoration. Contractor is responsible for correcting and/or paying for repairs for damage to utilities resulting from Contractor's operations. Contractor shall restore damaged facilities to the pre-existing condition.**

4. **Engineer will decide whether to adjust or relocate utility facilities or appurtenances found but not shown or indicated in Contract Documents. Engineer shall make any necessary arrangements with the utility owner or Contractor to perform any necessary unidentified work not indicated in the Contract Documents. Engineer will use the provisions of the Contract Documents to make compensable or non-compensable adjustments to the Contract because of revised or added work.**

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions**, if any,** identify:

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions**, if any,** with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in

any area affected thereby (except in an emergency as required by Paragraph 7.15); ~~and~~ (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing)**; and (4) continue working in other areas of the Project unless otherwise directed**. Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify**, defend** and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify**, defend** and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor

to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. **Owner shall not consider Contractor the "Generator, Owner, or Responsible Party" for any hazardous waste or hazardous material discovered in the normal performance of Work associated with this Contract, nor during the performance of any "Extra Work" unless such material has been brought to the site by Contractor.**

L. **Contractor shall maintain sole responsibility for workers' health and safety including, but not necessarily limited to, interpreting monitoring or sampling results provided by Owner or any another governmental agency, or performing Contractor's own monitoring or sampling to ensure worker health and safety.**

~~K.~~**M.** The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until ~~one year~~ **two years** after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions**, if any**, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions**, if any,** or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within ~~20~~ **28** days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions**, if any**.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, if any, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, **if any,** or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, **if any,** or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).
4. Foreign voluntary worker compensation (if applicable).
5. **The limits of liability for the insurance required by Paragraph 6.03.A shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:**
   a. **State: Statutory.**
   b. **Applicable Federal (e.g., Longshoreman's): Statutory.**
   c. **Employer's Liability:**
      1) **$500,000 each Person.**
      2) **$500,000 each Accident.**
      3) **$500,000 each Disease.**

B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
2. claims for damages insured by reasonably available personal injury liability coverage.
3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:
   a. Such insurance shall be maintained for three years after final payment.
   b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions, **if any**, or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
   a. **The limits of liability for the insurance required by Paragraph 6.03.C.2 shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:**

1) **Bodily Injury:**

i) **Each Accident: $1,000,000.**

ii) **Annual Aggregate: $1,000,000.**

2) **Property Damage:**

i) **Each Accident: $1,000,000.**

ii) **Annual Aggregate: $1,000,000.**

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

9. **Contractor's general liability insurance shall include a per project or per location endorsement, which shall be identified in the certificate of insurance provided to Owner.**

10. **The limits of liability for the insurance required by Paragraph 6.03.C shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:**

a. **General Aggregate: $2,000,000.**

b. **Products—Completed Operations Aggregate: $2,000,000.**

c. **Personal and Advertising Injury (per Person/Organization): $1,000,000.**

d. **Each Occurrence (Bodily Injury and Property Damage): $1,000,000.**

e. **Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable.**

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

1. **The limits of liability for the insurance required by Paragraph 6.03.D shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:**

a. **Bodily Injury:**

1) **Each Person: $1,000,000.**

2) **Each Accident: $1,000,000.**

b. **Property Damage:**

1) **Each Accident: $1,000,000.**

c. **Combined Single Limit of $1,000,000.**

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

1. **The limits of liability for the insurance required by Paragraph 6.03.E shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:**

   a. **General Aggregate: $2,000,000 for Contract Values $200,000 or under; $5,000,000 for Contract Values over $200,000.**

   b. **Each Occurrence: $2,000,000 for Contract Values $200,000 or under; $5,000,000 for Contract Values over $200,000.**

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions, **if any**; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, **if any**, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least ~~10~~ **14** days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

K. **With respect to all insurance required by this Paragraph 6.03, Contractor agrees to waive all rights of subrogation against Owner, Engineer, and each additional insured identified in the Supplementary Conditions, if any.**

6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

A. *Builder's Risk*: ~~Unless otherwise provided in the Supplementary Conditions,~~ Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof **including the value of Owner-furnished equipment and materials, if applicable and as provided in the Supplementary Conditions, if any,** (subject to such deductible amounts as may be provided in the Supplementary Conditions, **if any**, or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions, **if any**, to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, if any, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; **underground exposure;** debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions, **if any**. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available

under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).
5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
6. extend to cover damage or loss to insured property while in transit.
7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
8. allow for the waiver of the insurer's subrogation rights, as set forth below.
9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
10. not include a co-insurance clause.
11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
12. include performance/hot testing and start-up.
13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained **by Contractor** in accordance with this Paragraph 6.05 ~~will~~ **shall** contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least ~~10~~ **14** days prior written notice has been given **from insurance agency, agent or broker** to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance. **The insurance shall contain no**

partial occupancy restriction for partial utilization of the Project by Owner for the purpose intended.

1. **All insurance required by the Contract Documents, or by laws or regulations, shall remain in full force and effect on all phases of the Work, whether or not the Work is occupied or utilized by Owner, until all Work included in the agreement has been completed and final payment has been made.**

2. **Nothing contained in the insurance requirements shall be construed as limiting the extent of Contractor's responsibility for payment of damages resulting from Contractor's, Subcontractor's or supplier's operations under the Contract. Contractor agrees that Contractor alone shall be completely responsible for procuring and maintaining full insurance coverage as provided herein or as may be otherwise required by the Contract Documents. Any approval by Owner or Engineer shall not operate to the contrary.**

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions, **if any,** as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions, **if any,** as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within ~~15~~ **21** days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

6.08 ***Costs for Bonds and Insurance***

A. **The cost of providing bonds and insurance is incidental to the Work unless otherwise indicated in the Contract Documents.**

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. ~~At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.~~ **Contractor shall cooperate with Engineer, any Project Representatives, Construction Manager, Owner, and other contractors at all times. Contractor shall designate one competent Superintendent, employed by Contractor, to coordinate and communicate with Engineer. Superintendent shall remain on the project site at all times during the Work, regardless of the individuals or legal entities performing the Work. Superintendent shall be experienced, capable of understanding**

the plans and specifications, and have the authority to execute any order or direction given by Engineer. Superintendent is responsible for supplying any materials, equipment, labor, or other incidentals necessary to complete the Work. Engineer reserves the right to halt the work if Superintendent is not present during the Work.

7.02 *Labor; Working Hours*

A. Contractor shall provide **a sufficient amount of** competent, suitably qualified personnel to ~~survey and lay out the Work and~~ perform **the** construction **in an efficient manner, stay on schedule and complete all work** as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site. **Incompetent, incorrigible or otherwise unsuitable employees shall be dismissed from the Project by Contractor or their representatives when requested by Engineer or Owner, and such persons shall not again be permitted to return to the Work without written consent from Engineer or Owner.**

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours **(7:00 am to 6:00 pm)**, Monday through Friday. Contractor will not perform Work on a Weekend or any legal holiday. Contractor may perform Work outside regular working hours or on Weekends or legal holidays only with Owner's written consent. **Contractor shall request in writing a minimum of 14 days prior to performing any Work outside of the regular working hours.**

C. Contractor shall reimburse Owner for Owner's or Engineer's Construction Management and construction observation personnel costs for onsite personnel overtime work resulting from Contractor's overtime operations necessary to prevent delay to overall completion schedule due to Contractor's failure to maintain progress in accordance with approved Progress Schedule.

7.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

1. **Unless otherwise indicated in the Contract Documents, Contractor shall remove any existing structures that are not to remain in place. Existing structures are to remain in place until the replacement structures are complete unless such existing structures interfere with the Work. As directed by Engineer, any materials deemed fit for use elsewhere shall remain the property of Owner. Contractor shall remove such materials without damage in readily transportable sections.**

2. **Contractor shall mow all areas of the Project where vegetation growth exceeds 18 inches in height at no additional cost to Owner. Contractor shall cut such vegetation as close to the ground as possible. Contractor shall rake and remove the cuttings from the premise immediately.**

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

1. **Owner reserves the right to retain ownership of all surplus materials. As directed by Engineer, Contractor shall deliver any retained surplus materials to a designated Owner facility. Contractor shall remove and dispose of any obstructions or surplus materials encountered and not retained by Owner at no additional expense to Owner. Contractor shall thoroughly clean any pavement, walks, gutter lines, or other constructed items to remove soil or other foreign materials throughout the course of the Project as directed by Engineer.**

2. **Contractor shall remove and dispose of all discarded materials, rubbish, or debris at no additional expense to Owner, and in accordance with all Local, State, and Federal laws and regulations.**

3. **All excess materials removed from the Project Site(s) shall be disposed of at locations acceptable to Owner. Contractor shall identify in writing the location of his disposal site and provide this to Engineer at the pre-construction meeting. During the Project, Contractor shall keep Engineer informed of all disposal dates, locations, and approximate material quantity.**

4. **Contractor shall handle and store materials to preserve their quality and avoid segregation or contamination. Engineer may allow Contractor to store materials on Owner property as directed by the Contract Documents. Contractor shall restrict operations on Owner property to the areas authorized by the Engineer. Contractor shall hold and save Owner and its personnel free and harmless from any liability because of unauthorized use, trespassing, or damage to equipment or materials stored on Owner property.**

5. **Contractor may store materials or equipment within the right-of-way at locations determined by Engineer. Contractor shall restore or repair any damage to such storage areas upon completion of the Work. Contractor shall obtain any additional storage space necessary at no additional cost to Owner.**

6. **Contractor shall protect all materials, regardless of the manner of protection, at no additional cost to Owner. Contractor shall store materials covered on a hard, clean surface when directed by Engineer. Contractor may construct a temporary storage building on the Project only with written permission from Engineer. Any temporary storage installations are the property of Contractor. Contractor shall remove such installations at the completion of the Work.**

7. **Engineer reserves the right to reject any materials not conforming to the requirements of the Contract Documents. Contractor shall remove any unacceptable materials from the Project. Engineer shall cause removal of any unacceptable materials not removed by Contractor. Engineer shall deduct the cost of such removal from monies due to Contractor.**

8. **Contractor shall furnish all materials necessary to complete the Work except those materials furnished by Owner as indicated in the Contract Documents. Owner shall deliver or make available such materials as directed in the Contract Documents. Contractor shall include the cost of obtaining, handling, and placing furnished materials in the Contract Price for the related items. Contractor is responsible for all furnished materials given to Contractor by Owner. Contractor shall bear the replacement cost of furnished materials due to loss or damage not the fault of Owner.**

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

1. **Where the Work requires equipment be furnished, due to the lack of standardization of equipment as produced by the various manufacturers, it may become necessary to make minor modifications in the structures, buildings, piping, mechanical work, electrical work, accessories, controls, or other work, to accommodate the particular equipment offered. Contractor's Bid Price for any equipment offered shall include the cost of making any necessary changes subject to the approval of Engineer.**

2. **All trucks and other equipment using pavement or structures must comply with the laws governing the operation of such equipment on the streets of the City. Contractor is responsible for any damage resulting from the operations of such equipment. Special permits do not relieve Contractor of such responsibility.**

3. **Contractor must keep any vehicle transporting material clean and in proper working condition. Such vehicles must transport materials in a manner to prevent the loss of materials.**

4. **Contractor may operate pneumatic tire earth moving equipment on PCC, BST, or ACC surface or base provided the tire pressures and load on any single axle are less than or equal to 40 psi and 20,000 pounds, respectively. Contractor shall not operate any machines with metal lugs or other projections on the treads on ACC, PCC, or BST surface or base.**

5. **Engineer must approve any equipment operation on new pavement. All equipment shall maintain a horizontal distance of two (2) feet or greater from the edge of such pavement. Approval by Engineer does not relieve Contractor of liability for any damage incurred due to operation of such equipment. All equipment operating on new pavement shall move on and off the pavement using a ramp comprised of materials intended to prevent damage. The ramp shall support the equipment in a manner to prevent any impact loading on the edge of the pavement or curb.**

6. **Contractor shall obtain all necessary oversized and/or overweight permits for all equipment used on the project at no additional cost to Owner. All track-mounted equipment shall cross bridges only at a speed and location relative to centerline acceptable to Engineer.**

7. **Contractor shall position any material transfer vehicles to prevent excessive pressures on a single wheel or support. Contractor shall not operate or position any dragline, power shovel, or crane on any surface or base pavement layer.**

D. **In accordance with the provisions of Section 77-1323, Reissue Revised Statutes of Nebraska 1943, as amended, every person, partnership, association, or corporation furnishing labor or material in the repair, alteration, improvement, erection, or construction of any public improvement shall furnish a certified statement, that all equipment to be used on the Project, except that acquired since the assessment date, has been assessed for taxation for the current year, giving the County where assessed. It shall be the duty of Contractor to comply with the foregoing requirements and to assure compliance therewith by all others required to comply therewith for labor and material furnished in the performance undertaken hereunder by Contractor.**

7.04 *"Or Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor

may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

   a. in the exercise of reasonable judgment Engineer determines that:

      1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

      2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

      3) it has a proven record of performance and availability of responsive service; and

      4) it is not objectionable to Owner.

   b. Contractor certifies that, if approved and incorporated into the Work:

      1) there will be no increase in cost to the Owner or increase in Contract Times; and

      2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by ~~an approved~~ **a reviewed** Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither ~~approval~~ **review** nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

   1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that

named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

   a. shall certify that the proposed substitute item will:

      1) perform adequately the functions and achieve the results called for by the general design,

      2) be similar in substance to that specified, and

      3) be suited to the same use as that specified.

   b. will state:

      1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

      2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

      3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

   c. will identify:

      1) all variations of the proposed substitute item from that specified, and

      2) available engineering, sales, maintenance, repair, and replacement services.

   d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination. **No payment shall be made for substitute items incorporated into the Work prior to being submitted to Engineer for review and acceptance.**

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also

reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request; Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. **Contractor shall identify all major Subcontractors and Suppliers on the Bid Form.**

1. **Contractor shall self-perform with its own workforce a minimum of 30 percent of the total cost of the Contract. Purchasing of materials does not qualify as self-performing the Work.**

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid ~~or final negotiation of the terms of the Contract~~, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within ~~five~~ **7** days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. ~~If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.~~ **If Owner revokes acceptance of any Subcontractor, Supplier or other individual or entity, Contractor shall submit an acceptable substitute without an increase in Contract Price or Contract Time.**

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

P. **Small Emerging Business (SEB) subcontractors shall self-perform with its own workforce a minimum of 70 percent of the total cost of its subcontract.**

7.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify**, defend** and hold harmless Contractor, and its officers, directors, members, partners, employees, agents,

consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify**, defend** and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid ~~(or when Contractor became bound under a negotiated contract)~~. **Unless otherwise provided in the Contract Documents,** Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.09 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

B. **Owner may be exempt from payment of sales and compensating use taxes of the State of Nebraska and of cities and counties thereof on all materials to be incorporated into the Work.**

1. **Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.**

2. **Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.**

7.10 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify**, defend** and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited

to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid ~~(or after the date when Contractor became bound under a negotiated contract)~~ in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

1. **To the extent allowed by law, the Contractor shall take all appropriate measures to prevent the nesting of migratory birds in the construction area. This will include, but not be limited to, taking proactive measures to discourage migratory bird nesting activity, performing daily inspections of the site, equipment, machinery and other possible migratory bird nesting areas to ensure that migratory bird nesting activity is not occurring, and where necessary take proactive measures. Should new or previously unknown active migratory bird, raptor, eagle, or otherwise protected bird nests or wildlife be discovered within the limits of construction after start of construction, the Owner will, in consultation with the NGPC and USFWS, attempt to mitigate such discovered protected bird nests or wildlife, to continue to allow the Contractor access to construction areas in accordance with the Contractor's approved critical path schedule. If the discovered protected bird nest or wildlife activity is considered outside the Contractor's control and should delays or limitations of Contractor's work caused by the presence of a previously unknown protected bird nest or wildlife species result in changes to the approved critical path schedule, such days of delay may be considered for inclusion into a Change Order. No additional cost for the delay will be considered. For discovery of active nests prior to Contract Times commencement, the Contractor shall comply with Article 4.02.B. and 4.02.C.**

D. **While not intended to be inclusive of all Laws or Regulations for which Contractor may be responsible under Paragraph 7.10, the following Laws or Regulations are included as mandated by statute or for the convenience of Contractor:**

1. **Nebraska Fair Employment Practice Act – Sections 48-1101 et seq. of the Nebraska Statutes:**

a. **Contractor and its Subcontractors shall not discriminate against any employee or applicant for employment, to be employed in the performance of the Work under these Contract Documents, with respect to its hire, tenure, terms, conditions, or privileges of employment, because of its race, color, creed, religion, sex, marital status, sexual orientation, gender identity, national origin, age, or disability.**

7.11 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and ~~approved~~ **reviewed** Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during

construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.12 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;
2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities **and Utilities** not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions**, if any,** identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and protection shall continue until ~~such time as all the Work is completed and~~ Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

H. **Contractor shall provide for the orderly safe movement of traffic through or around the Work at all times.**

7.13 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

   a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

   b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

   c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

   d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review **and checking** of that submittal, and that Contractor approves the submittal. **Contractor's stamp or certification shall include project name, Contractor's reviewer name, and date of Contractor's approval.**

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review ~~and approval~~ of each such variation**, unless approved, Contractor will execute the Work in accordance with the Contract Documents**.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall submit **required** Shop Drawings and Samples to Engineer for review ~~and approval~~ in accordance with the accepted Schedule of Submittals. Each submittal will be **submitted with a Transmittal of Contractor's Submittal form provided by the Engineer.**

1. ***Preparation of Shop Drawings and Submittals:***

   a. **Scope of any shop drawing, submittal, and letter of transmittal shall be:**

      1) **Limited to one (1) Specification Section.**

      2) **Within one Specification Section, Contractor shall provide complete systems in one submittal package.**

      3) **Contractor shall provide all of the submittal information to the Engineer from one specification section in one submittal package, unless approved by Engineer.**

2. ***Numbering of transmittals:***

   a. **Include as prefix the Specification Section number followed by a series number, "-xx", beginning with "01" and increasing sequentially with each additional transmittal.**

   b. **If more than one (1) submittal under any Specification Section is approved by Engineer, assign consecutive series numbers to subsequent transmittal letters.**

3. ***Describing transmittal contents:***

   a. **Provide listing of each component or item in submittal capable of receiving an independent review action.**

   b. **Identify for each item:**

      1) **Manufacturer and Manufacturer's Drawing or data number.**

      2) **Contract Document tag number(s).**

      3) **Unique page numbers for each page of each separate item listed in the transmittal.**

   c. **When submitting "or-equal" items that are not the products of named manufacturers, include the words "or-equal" in the item description.**

4. ***Contractor shall not use red color for marks on transmittals.***

5. *Shop Drawings*:

   a. Contractor shall submit the **electronic file or the** number of copies required in the ~~Specifications~~ **as identified below**.

      1) **Unless specifically prohibited elsewhere in the Contract Documents, each submittal may be made in an electronic format. Electronic submittals shall consist of a single electronic file and include the transmittal cover sheet.**

      2) **Electronic submittals shall be in the Adobe Acrobat Portable Document Format (PDF). Use the latest version available at the time of execution of the Agreement. PDF files shall meet the following requirements:**

         i) **Electronic files which contain more than 10 pages shall contain internal book-marking from an index page to major sections of the document.**

         ii) **Shall be unsecured, unencrypted and not password protected.**

iii) **Allow the following actions:**

(a) **Printing.**

(b) **Assembling.**

(c) **Content copying or extraction.**

(d) **Extraction for Access.**

(e) **Commenting.**

(f) **Fitting of form fields.**

(g) **Signing.**

(h) **Creation of duplicate information.**

3) **Hard copy submittals shall consist of a minimum of four (4) copies for Engineer and up to a maximum of five (5) for the Contractor (9 total) of the entire submittal package including separate transmittal cover sheets.**

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

c. **When Shop Drawings are submitted for the purpose of showing the installation in greater detail, their review shall not excuse Contractor from requirements shown in the Contract Documents.**

d. **For-Information-Only submittals upon which Engineer is not expected to conduct review or take responsive action may be so identified in the Contract Documents.**

e. **When the Contract Documents require an engineered system to be provided by the Contractor such as an anchoring system or retaining wall, a Professional Engineer certified in the State of Nebraska must design and stamp the Shop Drawings**

6. *Samples*:

a. Contractor shall submit the **required** number of Samples required in the ~~Specifications~~ **Contract Documents**.

b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

7. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals*: Contractor shall submit other **required** submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the ~~Specifications~~ **Contract Documents and as identified below**.

1. **Submit number of required submittals specified in the Contract Documents or as identified below.**

a. **Electronic submittals shall consist of a single electronic file. Electronic submittals shall be in the Adobe Acrobat Portable Document Format (PDF) meeting the requirements of Paragraph 7.16.B.5.a.2.**

b. **Hard copy submittals shall consist of a minimum of four (4) copies for Engineer and up to a maximum of five (5) for the Contractor (9 total) of the entire submittal package including separate transmittal cover sheets.**

2. **When other submittals are submitted for the purpose of showing the installation in greater detail, their review shall not excuse Contractor from requirements shown in the Contract Documents.**

3. **Miscellaneous other submittals upon which Engineer is not expected to conduct review or take responsive action may be so identified in the Contract Documents.**

D. *Engineer's Review*:

1. Engineer will provide timely review of ~~Shop Drawings and Samples~~ **required submittals** in accordance with the **approved** Schedule of Submittals ~~acceptable to Engineer~~. Engineer's review ~~and approval~~ will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. **Contractor is responsible to field verify all dimensions, mating surfaces, and component connections to provide a proper fit.**

2. Engineer's review ~~and approval~~ will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer's review ~~and approval~~ of a separate item as such will not indicate ~~approval~~ **full review** of the assembly in which the item functions.

4. Engineer's review ~~and approval~~ of a ~~Shop Drawing or Sample~~ **required submittal** shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written ~~approval~~ **acknowledgement** of each such variation by specific written notation thereof incorporated in or accompanying the ~~Shop Drawing or Sample~~ **submittal**. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review ~~and approval~~ of ~~a Shop Drawing or Sample~~ **required submittal** shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review ~~and approval~~ of a ~~Shop Drawing or Sample~~ **required submittals**, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt **nor** review, ~~acceptance or approval~~ of ~~a Shop Drawing, Sample, or other submittal~~ **required submittals** shall result in such item**(s)** becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in ~~approved~~ **reviewed** Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

9. **Review Action:**

a. **Shop Drawings and Samples.**

1) **Items within transmittals will be reviewed for overall design intent and will receive one of the following actions:**

   i) **A - FURNISH AS SUBMITTED.**

   ii) **B - FURNISH AS NOTED.**

   iii) **C - REVISE AND RESUBMIT.**

   iv) **D - REJECTED.**

   v) **E - REVIEW NOT REQUIRED.**

b. **Submittals received will be initially reviewed to ascertain inclusion of Contractor's approval stamp or written certification. Submittals without a written certification, not stamped by the Contractor, or stamped with a stamp containing language other than that specified herein will not be reviewed for technical content and will be returned without any action.**

c. **Submittals returned with Action "A" or "B" are considered ready for fabrication and installation.**

d. **If for any reason a submittal that has an "A" or "B" Action is resubmitted, it must be accompanied by a letter defining the changes that have been made and the reason for the resubmittal.**

e. **Destroy or conspicuously mark "SUPERSEDED" all documents having previously received "A" or "B" Action that are superseded by a resubmittal.**

f. **Failure to include any specific information specified under the submittal paragraphs of the Specifications section will result in the submittal being returned to the Contractor with "C" or "D" Action.**

g. **Calculations required in individual Specification Sections will be received for information purposes only, as evidence calculations have been performed by individuals meeting specified qualifications, and will be returned stamped "E. Review Not Required" to acknowledge receipt.**

h. **Transmittals of submittals which the Engineer considers as "Not Required" submittal information, which is supplemental to but not essential to prior submitted information, or items of information in a transmittal which have been reviewed and received "A" or "B" Action in a prior submittal, will be returned with Action "E. Review Not Required."**

i. **Samples may be retained for comparison purposes.**

j. **Remove samples when directed.**

k. **Approved samples submitted or constructed, constitute criteria for judging completed work.**

l. **Finished work or items not equal to samples will be rejected.**

E. *Resubmittal Procedures*:

1. **Resubmittal Preparation:**

a. **Number with original root number and a suffix letter starting with "A" on a (new) duplicate transmittal form.**

b. **Do not increase the scope of any prior transmittal.**

c. **Account for all components of prior transmittal.**

d. **If items in prior transmittal received "A" or "B" Action code, list them and indicate "A" or "B" as appropriate.**

e. **Do not include submittal information for items listed with prior "A" or "B" Action in resubmittal.**

f. **Provide all information in one resubmittal unless approved by Engineer and indicate "Outstanding-To Be Resubmitted at a Later Date" for any prior "C" or "D" Action item not included in resubmittal.**

2. Contractor shall make corrections ~~required~~ **identified** by Engineer and shall return the required number of corrected copies of ~~Shop Drawings and submit, as required, new Samples~~ **resubmittals** for review~~ and approval~~. Contractor shall direct specific attention in writing to revisions other than the corrections ~~called for~~ **identified** by Engineer on previous submittals.

3. Contractor shall furnish required ~~submittals~~ **resubmittals** with sufficient information and accuracy to **receive an "A" or "B" Action code** ~~obtain required approval of an item with no more than three submittals~~ **for the resubmittal (second submittal)**. Engineer will record Engineer's time for reviewing a ~~fourth~~ **third** or subsequent ~~submittal~~ **resubmittal** ~~of a Shop Drawings, sample, or other item~~ **required to achieve** ~~requiring~~ **an "A" or "B" Action code** ~~approval~~, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

4. If Contractor requests a change of a previously ~~approved~~ **reviewed** submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

B. **Contractor is responsible for protecting the Work from damage due to weather or other causes until Engineer accepts the Work in writing, including any time that the Work is suspended.** Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;
5. any review ~~and approval~~ of a Shop Drawing or Sample submittal;
6. the issuance of a notice of acceptability by Engineer;
7. any inspection, test, or approval by others; or
8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify**, defend** and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional **in the State of Nebraska**, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer's review ~~and approval~~ of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review ~~and approval~~ of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

7.20 ***Value Engineering Change Proposal (VECP)***

A. The Contractor is encouraged to develop, prepare, and submit Value Engineering Change Proposals (VECPs) voluntarily. The Contractor shall share in any net savings realized from accepted VECPs, in accordance with the incentive sharing provision below.

B. These requirements apply to all proposals initiated, developed, and identified as VECPs by Contractor. To be qualified as a VECP, a proposal must be identified as a VECP at the time of its submission to Engineer.

C. Change Proposal Requests initiated by Owner or Engineer will not be considered as VECPs.

D. Contractor shall submit VECPs in writing to the Engineer with the understanding that Engineer is not required to approve them. If a VECP is accepted by Owner, an amount of 50 percent of the resultant net savings will be paid to Contractor.

E. Each VECP must result in a net cost savings without impairing essential functions and characteristics of the item(s) or of any other part of the project, including but not limited to service life, reliability, operation and maintenance costs, desired aesthetics, and safety. Net savings is calculated by subtracting Owner VECP implementation costs from the Contractor's proposed cost reduction. Owner implementation costs may include Engineering review and redesign and Owner review costs.

F. As a minimum, the following information shall be submitted with each VECP:

1. A statement that the proposal is submitted as a VECP.

2. A statement concerning the basis for the VECP and benefits to Owner. Basis and benefits statement shall include a description of the difference between the existing contract requirement and the proposed requirement, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, the effect of the change on the end item's performance, potential impact on environmental and other permits, and any pertinent objective test data.

3. **An itemized list and analysis of the Contract items and requirements that must be changed if the VECP is accepted.**

4. **A separate, detailed comparison of the estimated costs under (i) the affected portions of the existing Contract requirements and (ii) the Contract modified by the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable VECP implementation costs, including any amount attributable to subcontracts. Contractor shall use the mark ups for overhead and profit allowed by the conditions of the Contract.**

5. **Proposed specifications, specification revisions, and recommendations as to how such VECP changes are to be accomplished.**

6. **A description of additional potential costs the Owner may incur in implementing the VECP, such as test and evaluation, operating and maintenance costs, and permit requirements.**

7. **A statement indicating the time and date by which a Change Order adopting the VECP must be issued so as to obtain the maximum cost effectiveness, noting any effect on the contract completion time or delivery schedule. This statement shall include confirmation from suppliers of availability and proposed delivery dates of materials and equipment.**

8. **Designs shall be signed and sealed by a registered Professional Engineer licensed in the State of Nebraska.**

9. **Construction costs shall include as a minimum the following:**

   a. **Detailed listing of quantities of materials and equipment.**

   b. **Unit prices of materials and equipment.**

   c. **Labor hours and hourly rates for installation labor.**

   d. **Detailed listing of equipment and equipment rates used in the installation.**

   e. **Subcontract and Contractor mark ups.**

   f. **Permit fees and license costs.**

10. **Identification of any previous submissions of the VECP, including the dates submitted and previous Owner actions, if known.**

G. Engineer's Action.

1. **Engineer shall track the costs for VECP review on a time and materials cost basis. As part of the review, Engineer will estimate Owner costs associated with implementation of the proposed changes.**

2. **Engineer will provide the Owner with comments on the VECP and an estimate of Owner costs.**

3. **Engineer and Owner shall review the VECP and Engineer comments to allow the Owner to make a decision to accept or reject the VECP.**

4. **The Engineer will process VECPs expeditiously; however, it shall not be liable for any delay in acting upon a VECP.**

5. **If the VECP is not accepted, the Engineer shall notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by Owner. The Contractor shall not be reimbursed for expenditures for VECP preparation and submission, other**

than implementation costs, if the VECP is accepted. The Owner will pay for Owner's and Engineer's costs to review the first rejected VECP. For additional VECPs submitted and rejected, the Engineer and Owner will record all costs for review on a time and material basis and the Contractor will be back charged for the review costs.

H. Accepted VECPs will be processed in the same manner prescribed for any other proposal which would necessitate issuance of a Change Order. Owner may accept in whole or in part any VECP by issuing a Change Order which identifies the VECP on which it is based and made before contract performance is completed. The Owner's decision to accept or reject all or part of any VECP and the decision as to which of the sharing rates applies shall be final and not subject to the Disputes clause or otherwise subject to litigation or appeal. Owner will not be liable to Contractor for failure to accept or act upon any VECP submitted pursuant to these requirements or for any delays to the work attributable to any such proposal. The preparation, submission or consideration of a VECP does not entitle the Contractor to a schedule extension.

1. Until Owner approves a VECP by a Change Order, Contractor shall be obligated to the terms and conditions of the existing Contract. If an executed Change Order or a Work Order has not been issued by the date specified in Contractor's VECP, or another date Contractor may subsequently have specified in writing, the VECP shall be deemed rejected.

I. The Change Order effecting the necessary Contract modification will establish the net savings agreed upon, will provide for adjustment in the Contract prices, and will indicate the net savings to be equally divided between Contractor and Owner.

1. Contractor shall prepare and submit the VECP at no additional cost to Owner. Owner reserves the right to include in the VECP any conditions it deems appropriate for consideration, approval, and implementation of the VECP. Contractor's share of the net savings constitutes full compensation for designing and developing the VECP and effecting all changes pursuant to the agreement.

J. Acceptance of the VECP by Owner and performance of the Work by Contractor will not change the Contract time limit unless specifically addressed in the Change Order authorizing the VECP.

K. Owner expressly reserves the right to adopt a VECP for general use in its contracts. VECPs identical or similar to previously accepted VECPs will be eligible for consideration and compensation provided they were not previously adopted for general application by Owner. When a VECP is adopted for general use, compensation for it will be applied only to those contracts awarded and for which the subject VECP has been submitted before the date of its general adoption.

L. The following will not normally be considered acceptable VECPs:

1. Changes to basic bridge design.

2. Changes to basic pavement designs.

3. Changes requiring different right-of-way limits.

4. Requirements set by permit conditions.

M. VECPs based on prior changes to Owner contracts and/or procedures are not acceptable.

7.21 ***Request for Information***

A. **Contractor may, after exercising due diligence to locate required information, request from Engineer clarification or interpretation of the requirements of the Contract Documents. Engineer shall respond to such Contractors' requests for clarification or interpretation.**

7.22 ***Equal Employment Opportunity Clause***

A. **During the performance of this Contract, Contractor agrees as follows:**

1. **Contractor shall not discriminate against any employee or applicant for employment because of race, religion, color, creed, sex, marital status, sexual orientation, gender identity, age, disability or national origin. Contractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, sex or national origin. As used herein, the word "treated" shall mean and include, without limitation, the following: recruited, whether by advertising or by other means; compensated; selected for training, including apprenticeship; promoted; upgraded; demoted; downgraded; transferred; laid off; and terminated. Contractor agrees to and shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officers setting forth the provisions of this nondiscrimination clause.**

2. **Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of Contractor, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, creed, sex, marital status, sexual orientation, gender identity, national origin, age, or disability.**

3. **Contractor shall send to each representative of workers with which it has a collective bargaining agreement or other contract or understanding a notice advising the labor union or workers' representative of Contractor's commitments under the equal employment opportunity clause of the City and shall post copies of the notice in conspicuous places available to employees and applicants for employment.**

4. **Contractor shall furnish to the Human Rights and Relations Director all federal forms containing the information and reports required by the federal government for federal contracts under federal rules and regulations, including the information required by Sections 10-192 to 10-194, inclusive, and shall permit reasonable access to its records. Records accessible to the Human Rights and Relations Director shall be those which are related to Paragraphs 7.22.B.1 through 7.22.B.7 of this subsection and only after reasonable notice is given Contractor. The purpose of this provision is to provide for investigation to ascertain compliance with the program provided for herein.**

5. **Contractor shall take such actions with respect to any Subcontractor as Owner may direct as a means of enforcing the provisions of Paragraphs 7.22.B.1 through 7.22.B.7 herein, including penalties and sanctions for noncompliance; however, in the event Contractor becomes involved in or is threatened with litigation as the result of such directions by Owner, Owner will enter into such litigation as is necessary to protect the interests of Owner and to effectuate the provisions of this division; and, in the case of contracts receiving federal assistance, Contractor or Owner may request the United States to enter into such litigation to protect the interests of the United States.**

6. **Contractor shall file and shall cause their Subcontractors, if any, to file compliance reports with Contractor in the same form and to the same extent as required by the federal government for federal contracts under federal rules and regulations. Such**

compliance reports shall be filed with the Human Rights and Relations Director. Compliance reports filed at such times as directed shall contain information as to the employment practices, policies, programs and statistics of Contractor and their Subcontractors.

7. **Contractor shall include the provisions of Paragraphs 7.22.B.1 through 7.22.B.7 of this section, "Equal Employment Opportunity Clause," and section 10-193 in every subcontract or purchase order so that such provisions will be binding upon each Subcontractor or Supplier.**

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, ~~the~~ Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between ~~the~~ Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions**, if any,** or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
2. an itemization of the specific matters to be covered by such authority and responsibility; and
3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, **if any,** Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work at or adjacent to the Site for Owner, ~~the~~ Owner's employees, any other contractor working for Owner, or any utility owner for whom the Owner is responsible causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor ~~shall~~ **may** be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid. ~~or the final negotiation of the terms of the Contract.~~ When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify**, defend** and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at **or adjacent to** the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site **that have been utilized by Engineer in preparing the Contract Documents**.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

B. **Owner or Owner's authorized representatives shall not be liable, either personally or as employees of Owner, for any action taken in performance of their authorized duties.**

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 ***Construction Manager***

A. If Owner and Engineer have agreed that Engineer will furnish a **Construction Manager (CM), as needed** to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such ~~Resident Project Representative (RPR)~~ **CM** will be as provided in the Supplementary Conditions, **if any**, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. **CM is Engineer's agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding CM's actions. CM's dealings in matters pertaining to Contractor's work in progress shall in general be with Engineer and Contractor, keeping Owner advised as necessary. CM's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. CM shall generally communicate with Owner with the knowledge of and under the direction of Engineer. CM may, at their discretion, delegate such duties as needed to a Resident Project Representative (RPR). RPR's primary function is to**

observe the Work on a daily basis and assist the CM as directed. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions**, if any**.

B. **Duties and responsibilities of CM include:**

1. ***Schedules:*** **Review the progress schedule, schedule of Shop Drawing, Sample, and Other Submittals, and schedule of values prepared by Contractor and consult with Engineer concerning acceptability.**

2. ***Conferences and Meetings:*** **Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings, and prepare and circulate copies of minutes thereof.**

3. ***Liaison:***

   a. **Serve as Engineer's liaison with Contractor, working principally through Contractor's Superintendent, assist in providing information regarding the intent of the Contract Documents.**

   b. **Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.**

   c. **Assist in obtaining from Owner additional details or information when required for proper execution of the Work.**

4. ***Interpretation of Contract Documents:*** **Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.**

5. ***Shop Drawings, Samples, and Other Submittals:***

   a. **Record date of receipt of Samples, Shop Drawings, and other Submittals.**

   b. **Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.**

   c. **Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which CM believes that the submittal has not been reviewed by Engineer.**

6. ***Modifications:*** **Consider and evaluate Contractor's suggestions for modifications in the Contract Documents and report such suggestions, together with CM's recommendations, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.**

7. ***Review of Work and Rejection of Defective Work:***

   a. **Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.**

   b. **Report to Engineer whenever CM believes that any part of Contractor's work in progress will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or review required to be made; and advise Engineer of that part of work in progress that CM believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or review.**

8. ***Inspections, Tests, and System Startups:***

   a. **Consult with Engineer in advance of scheduled major inspections, tests, and systems startups of important phases of the Work.**

   b. **Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.**

   c. **Observe, record, and report to Engineer appropriate details relative to the test procedures and systems startups.**

   d. **Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections, and report to Engineer.**

9. ***Records:***

   a. **Maintain at the Site orderly files for correspondence, reports of job conferences, reproductions of original Contract Documents including all Change Orders, Field Orders, Change Proposal Requests, Work Change Directives, Addenda, additional Drawings issued subsequent to the execution of the Contract, Engineer's clarifications and interpretations of the Contract Documents, progress reports, Shop Drawing, Sample and Other Submittals received from and delivered to Contractor, and other Project-related documents.**

   b. **Prepare a daily report, recording Contractor's and Subcontractor's hours on the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Change Proposal Requests, Work Change Directives, or changed conditions, Site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.**

   c. **Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.**

10. ***Reports:***

    a. **Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and Schedule of Shop Drawing, Sample, and Other Submittals.**

    b. **Draft, and recommend to Engineer, proposed Change Orders, Change Proposal Requests, Work Change Directives, and Field Orders. Obtain backup material from Contractor.**

    c. **Furnish to Engineer and Owner copies of all inspection, test, and system startup reports.**

    d. **Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Constituent of Concern.**

11. ***Payment Requests:*** **Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values, for Lump Sum Work completed, materials and**

equipment delivered at the Site but not incorporated in the Work, and submission of updated Progress Schedule.

12. ***Certificates, Operation and Maintenance Manuals:*** **During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Contract Documents to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these submittals delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.**

13. ***Completion:***

    a. **Participate in a Substantial Completion inspection, assist in the determination of Substantial Completion, preparation of a punch list of items to be completed or corrected, and issuance of the Certificate of Substantial Completion.**

    b. **Participate in a final inspection in the company of Engineer, Owner and Contractor and prepare a final punch list of items to be completed and deficiencies to be remedied.**

    c. **Observe whether all items on the final punch list have been completed or corrected and make recommendations to Engineer concerning acceptance of the Work.**

C. ***Limitations of Authority of CM:*** **CM shall not:**

1. **Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).**

2. **Exceed limitations of Engineer's authority as set forth in the Agreement or the Contract Documents.**

3. **Undertake any of the responsibilities of Contractor, Subcontractors, Suppliers, or Contractor's Superintendent.**

4. **Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work unless such advice or directions are specifically required by the Contract Documents.**

5. **Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.**

6. **Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.**

7. **Accept Shop Drawing, Sample or Other submittals from anyone other than Contractor.**

8. **Authorize Owner to occupy the Project in whole or in part.**

10.04 *Rejecting Defective Work*

A. Engineer has the authority to reject Work in accordance with Article 14.

B. **The acceptance of materials or equipment by or on behalf of Owner at any time shall not preclude future rejection if they are subsequently found to be defective, inferior in quality, not equal to the material or equipment specified, or are not as otherwise represented to Engineer or Owner.**

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer's authority and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03. **Contractor acknowledges that the quantities contained in the Bid Form, unless otherwise indicated in the Contract Documents, are estimates that may vary.**

10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the **Construction Manager and** Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

   a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

   b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize ~~minor~~ changes in the Work if the changes ~~do not involve an adjustment in the Contract Price or the Contract Times and~~ are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. **The changes may include, but are not limited to, Contract item quantities; construction details; roadway, sewer, structure or facility grade or alignment; construction sequencing or phasing; or roadway restrictions and detours. Alterations will not waive or invalidate any Contract provisions.** Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall

be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. **where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed unit price and estimated quantity (subject to the provisions of Paragraph 13.03); or**

~~2.~~**3.** where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

~~3.~~**4.** where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraph~~s~~ 13.01.B.1 ~~and 13.01.B.2~~, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph**s 13.01.B.2 and** 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and

11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraph~~s~~ 13.01.A.1 **and 13.01.B.1** ~~and 13.01.A.2~~ by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction

the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled. **Supporting data shall include, but is not limited to, references to the Progress Schedule, detailed accounting of costs, and other information as required by the Contract Documents.**

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on ~~Saturday, Sunday,~~ **weekends** or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

   a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. ~~Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.~~ **Construction Equipment and Machinery:**

1) **Rentals of all construction equipment and machinery, and the parts thereof in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.**

2) **Costs for equipment and machinery owned by Contractor will be paid at a rate shown for such equipment in the current edition of RS Means Construction Cost Data. An hourly rate will be computed by dividing the monthly rates by 176.**

3) **These computed rates will include all operating costs. Costs will include the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, shall cease to accrue when the use thereof is no longer necessary for the changed Work. Equipment or machinery with a value of less than $1,000 will be considered small tools, and as such will be excluded from the cost of Work.**

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities. **Contractor shall accept payment for Work quantities that vary from Contract quantities at the original Contract Prices. Owner shall not make any allowances or adjustments due to increased expense, loss of expected reimbursement, or loss of anticipated profits resulting from alteration of the Work or unbalanced bidding. Engineer reserves the right to eliminate Contract items. Contractor may request reimbursement for all tangible costs incurred before notification of elimination. Engineer shall decide the validity of any such request.**

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item. **Work described in the Contract Documents or reasonably inferred as required for a functionally complete installation, but not identified in the listing of unit price items, shall be considered incidental to Unit Price Work listed and the cost of incidental work included as a part of the unit price.**

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

1. **The total amount earned differs from the original Contract Price by more than 25 percent; and**

~~1.~~**2.** the **final** quantity of ~~any~~ **a particular** item of Unit Price Work performed by Contractor differs ~~materially and significantly~~ **by more than 25 percent** from the estimated quantity of such item indicated in the Agreement; **and**

~~2.~~**3.** there is no corresponding adjustment with respect to any other item of Work; and

~~3.~~**4.** Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price~~, and the parties are unable to agree as to the amount of any such increase or decrease~~.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work**, including all material fabrication facilities,** at ~~reasonable~~ **all** times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05. **The methods of testing shall be as indicated in the City of Omaha Materials Testing Manual. Referenced test standards shall be the most current version available on Bid Day unless otherwise indicated in the Contract Documents. The costs of all inspections, tests, and approvals not meeting the specification requirements will be paid for by Owner but will be deducted from Contractor's Final Payment.**

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
3. by manufacturers of equipment furnished under the Contract Documents;
4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by

Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: ~~Promptly after~~ **Within 30 days of** receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines **and stipulated penalties** levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

G. **If Contractor fails to comply within 30 days of receipt of written notice of defective Work, Owner may correct such defective work in accordance with Paragraph 14.07.**

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work **other than that identified in Paragraph 14.05.B** be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); **or Owner shall be entitled to accept defective Work in accordance with Paragraph 14.04 in which case Contractor shall still be responsible for all costs associated with exposing, observing, and testing the defective Work.** ~~and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.~~

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not

be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period. **Contractor acknowledges that the quantities contained in the bid form for Unit Price Work, unless otherwise indicated in the Contract Documents, are estimates that may vary.**

B. *Applications for Payments-**Schedule of Values***:

1. At least ~~20~~ **28** days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications-**Schedule of Values***:

1. Engineer will, within ~~10~~ **14** days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. ***Progress Estimates for Payment-Unit Price Work:***

1. **Contractor may receive monthly Progress Estimates based on the quantities of Work completed during the preceding month. Engineer shall measure the quantities of Work completed and provide to Contractor for review a Progress Estimate covering the Work completed to date.**

2. **Engineer may include stored materials in the Progress Estimate designated for incorporation into the Work that:**

   a. **meet Contract Document and submittal requirements; and**

   b. **are unique items purchased expressly to be incorporated into the Work; and**

   c. **are delivered and stockpiled at the project Site or other approved location; and**

   d. **will not be incorporated into the project for more than 90 days; and**

   e. **the value of such materials amounts to more than $2,000; and**

   f. **are supported by copies of paid invoices or receipts of delivery; and**

   g. **are not living or perishable.**

3. **Owner shall reimburse Contractor for stored materials received and verified. The reimbursement value shall be 100 percent of the material cost less the retainage amount as defined in the Agreement. The reimbursement value may not exceed the appropriate portion of the value of the Contract item(s) in which incorporate such materials. The quantity of stored materials eligible for reimbursement shall not exceed the total estimated quantity required to complete the Work. Owner shall deduct any Progress Payments for eligible materials from Progress Payments for completion of the Contract item(s) in which incorporate such materials.**

4. **Payment for eligible materials shall not constitute acceptance of the materials. Contractor is responsible for any damages to or loss of stored materials until such materials are incorporated into the Work and accepted. Owner shall reimburse Contractor for all other items upon completion and acceptance of the Work.**

5. **The amount of retainage with respect to Progress Payments will be as defined in the Agreement.**

E. ***Review of Progress Estimates-Unit Price Work:***

1. **Contractor will review and confirm the quantities of Work within 7 days after receipt of each Progress Estimate. Contractor will sign and return the Progress Estimate to Engineer, or request in writing any corrections. Engineer may make necessary corrections and resubmit the Progress Estimate.**

2. **Engineer will sign and submit to Owner and recommend, in accordance with Paragraph 15.01.C, the Progress Estimate for payment. The Progress Estimate does not constitute acceptance of the Work.**

3. **Beginning with the second Progress Estimate, Contractor's signed estimate shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Progress Estimates.**

~~D.~~**F.** *Payment Becomes Due*:

4. ~~Ten~~ **Thirty** days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

~~E.~~**G.** *Reductions in Payment by Owner*:

5. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

   a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

   b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

   c. Contractor has failed to provide and maintain required bonds or insurance;

   d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

   e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

   f. the Work is defective, requiring correction or replacement;

   g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

   h. the Contract Price has been reduced by Change Orders;

   i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

   j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work**. The calculation to determine the cost for Liquidated Damages shall include, but is not limited to, the cost for Owner to administer and manage the project after the final day of the Contract including any additional days allowed and/or agreed upon by Owner and Contractor. Owner's administration and management of the project includes, but is not limited to, time and expenses of Engineer, CM(s), RPR(s), survey crew, materials testing services, administrative personnel, and all overhead and profit**;

   k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

   l. **Contractor fails to complete the Work in accordance with the Contract provisions, or the Work is not acceptable to Engineer, for Incentive/Disincentive work;**

   ~~l.~~**m.** there are other items entitling Owner to a set off against the amount recommended.

6. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor ~~immediate~~ written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and ~~promptly~~ pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall ~~promptly~~ pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor

remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

7. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph ~~15.01.C.1~~ **15.01.F.1** ~~and subject to interest as provided in the Agreement~~.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. ~~Promptly~~ **Within 14 days** after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will ~~promptly~~ make a final inspection with Owner and Contractor **within 14 days** and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment-**Schedule of Values***:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

b. consent of the surety, if any, to final payment;

c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

d. a list of all disputes that Contractor believes are unsettled; and

e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work and of Liens filed in connection with the Work.

f. **certified statement regarding payment to Workmen's Compensation and Unemployment as required by L.B. 126, enacted by the 73rd Session of the Nebraska State Legislature.**

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Application and Acceptance-**Schedule of Values***:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ~~ten~~ **14** days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. ***Final Progress Estimate for Payment-Unit Price Work:***

1. **Engineer shall measure the final quantities of Work completed and provide to Contractor for review a Final Progress Estimate.**

D. ***Review of Final Progress Estimate-Unit Price Work:***

1. **Contractor will review and confirm the final quantities of Work within 14 days after receipt of the Final Progress Estimate. Contractor will sign and return the Final Progress Estimate to Engineer, or request in writing any corrections. Engineer may make necessary corrections and resubmit the Final Progress Estimate. Contractor shall include documentation required in Paragraph 15.06.A.2.**

2. **Engineer will sign and submit to Owner and recommend the Final Progress Estimate for payment.**

~~C.~~**E.** *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

~~D.~~**F.** *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment **or the Final Progress Estimate,** and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

C. **Final payment does not preclude Owner from correcting any measure, estimate, or certificate made before or after Contract completion. Owner may recover from Contractor or Surety, or both, overpayments upheld for failure to fulfill Contract obligations. A waiver on the part of Owner of any breach of any part of the Contract is not a waiver of any other or subsequent breach. Contractor shall assume liability for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the right of Owner under any warranty or guaranty without prejudice to the terms of the Contract.**

15.08 *Correction Period*

A. If within ~~one year~~ **two years** after the date of ~~Substantial Completion~~ **Final Completion** (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall**,** ~~promptly~~ **within 30 days after receiving notice**, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;
2. correct such defective Work;
3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not ~~promptly~~ comply with the terms of Owner's written instructions **within 30 days after receiving notice**, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising

out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before ~~Substantial Completion of all the Work~~ **Final Completion**, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of ~~one year~~ **two years** after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

F. **Correction Period shall be increased from two years specified above to five years for Detectible Warning Panels and Curb Inlet Tops.**

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor ~~shall~~ **may** be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events ~~will~~ **may** constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ~~ten days~~ written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to~~:~~ **arrange a conference with Contractor and any surety to address Contractor's failure to perform the Work. The conference shall be held no later than 21 days after receipt of notice.**

1. ~~declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and~~ **If Owner, Contractor, and Surety do not agree to allow Contractor to proceed to perform the Contract, Owner may, to the extent permitted by Laws and Regulations, declare a Contractor Default and formally terminate Contractor's right to complete the Contract. Written notification of Contractor**

Default shall not be declared earlier than 28 days after Contractor and Surety have received notice of conference to address Contractor's failure to perform the Work.

2. ~~enforce the rights available to Owner under any applicable performance bond.~~ **If Contractor's services are terminated, Surety shall be obligated to take over and perform the Work. If Surety does not commence performance thereof within 21 days after date of additional written notice demanding Surety's performance of its obligations, then Owner, without process or action at law, may take over any portion of the Work and complete it as described in Section 16.02.C.3.**

3. **Neither Owner, Engineer, nor any of their respective consultants, agents, officers, directors, or employees shall be in any way liable or accountable to Contractor or Surety for the method by which the completion of the Work, or any portion thereof, may be accomplished or for the price paid therefor.**

4. **Owner, notwithstanding the method used in completing the Contract, shall not forfeit the right to recover damages from Contractor or Surety for Contractor's failure to timely complete the entire Contract. Contractor shall not be entitled to any claim for damages on account of the method used by Owner in completing the Contract.**

5. **Maintenance of the Work shall continue to be Contractor's and Surety's responsibilities as provided for in the bond requirements of the Contract Documents or any special guarantees provided for under the Contract Documents or any other obligations otherwise prescribed by law.**

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner **or Surety** proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions**, if any**; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions**, if any,** or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

C. **Notwithstanding any applicable statute of limitations, a party giving notice under Paragraph 17.01 shall commence an action within one year of giving such notice. Failure to do so shall result in the Claim being time-barred and Owner's or Engineer's action or denial shall become final and binding.**

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to **include** ~~exclude~~ the first and include the last day of such period. If the last day of any such period falls on a ~~Saturday or Sunday~~ **weekend** or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision for the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NEBRASKA REGULATORY OFFICE
8901 SOUTH 154TH STREET, SUITE 1
OMAHA, NEBRASKA 68138-3635

http://www.nwo.usace.army.mil/missions/regulatoryprogram/nebraska.aspx

August 25, 2015

Mr. Kirk Pfeffer
City of Omaha
1819 Farnam, Suite 601
Omaha, Nebraska 68183

RE: 2008-00298-WEH—Amendment #2—Deep Soil mixing for Bank Stabilization

Dear Mr.Pfeffer:

The U.S. Army Corps of Engineers (USACE) received a request on July 13, 2015, for the above reference project to temporarily impact 0.921 acres of riverine floodplain wetlands consisting of 0.367 acres of PEMA/C, 0.322 acres of PFOA, and 0.232 acres of PSSA. The USACE has reviewed the request and approves the additional temporary impacts. The permit expiration date remains the same (February 28, 2017). The below condition has been amended as follows:

17. Temporary wetland impacts include 0.921 acres of riverine floodplain wetlands consisting of 0.367 acres of PEMA/C, 0.322 acres of PFOA, and 0.232 acres of PSSA. After construction, this area will be seeded with a native wetland seed mix and woody herbaceous species, and trees will be allowed to naturally regenerate. This will also include willow cutting for tree plantings. If trees are not adequately populating the site after year 3 either containerized seedlings will be planted or cuttings will be used to restore the PSSA and PFOA wetland. Tree species will not include white mulberry. Monitoring reports of the temporary wetland impacts shall be submitted to the USACE to ensure the restored wetlands are developing properly. The restored wetlands will be monitored for a minimum of ten (10) consecutive years and reports shall be submitted by December 1 of each year. These reports shall include the following:

    a. Photographs taken at observation points showing all representative area of the sites taken at least once each year during the growing season;
    b. A list of observed plant and tree species;
    c. Monitoring reports for the restoration will be due December 1 of 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, and 2025.
    d. If the restoration is considered to be failing at any time or period after 5 years, including failure of natural tree regeneration, the permittee will undertake action, as directed by the USACE to remedy the failure.

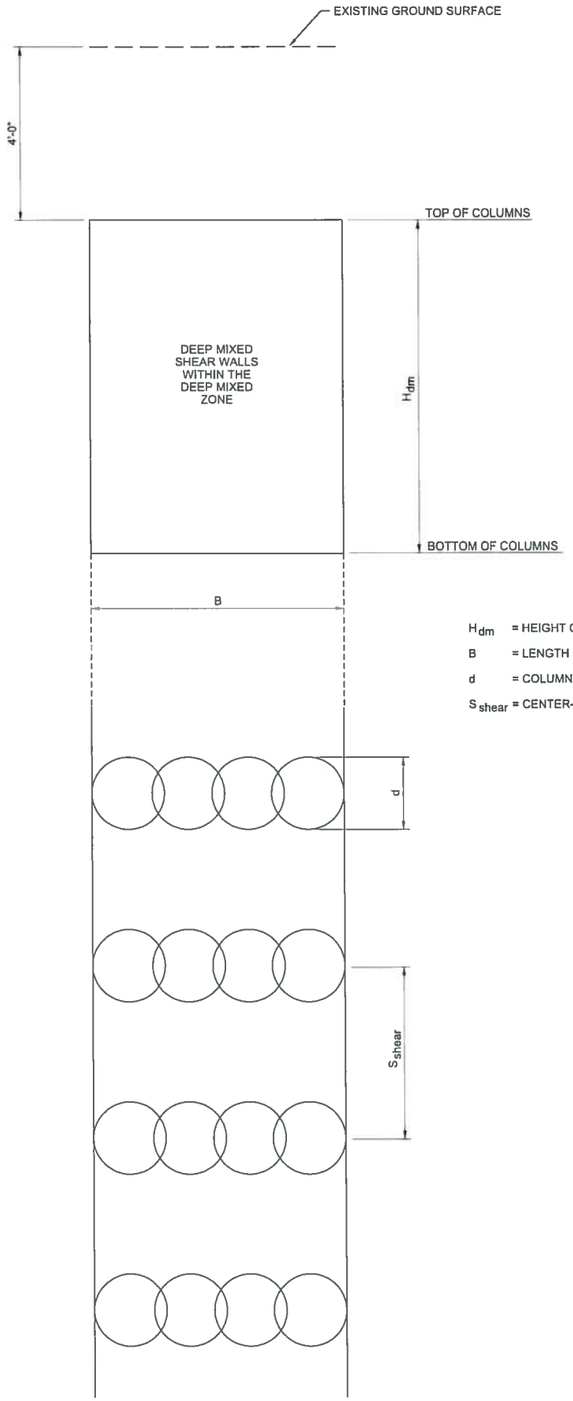
All terms and conditions of the original permit remain in full force and effect expect for the amended conditions. If you need additional time for construction, contact the Corps of Engineers at least 30 days prior to the expiration date and request an extension of time.

If you have any questions please contact Matt Wray at (402) 896-0896 and reference file number 2008-00298-WEH.

Sincerely,

John Moeschen
Nebraska State Program Manager

cc:
Eitan Tsabari (City of Omaha)
Pat Nelson (CMH2MHill)



H_{dm} = HEIGHT OF THE DEEP MIXED ZONE

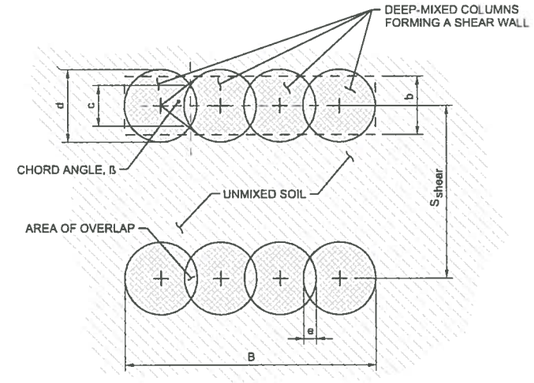
B = LENGTH OF THE SHEAR WALL

d = COLUMN DIAMETER

S_{shear} = CENTER-TO-CENTER SPACING OF SHEAR WALLS

1 TYPICAL ARRANGEMENT FOR DEEP-MIXED ZONE BENEATH AN EMBANKMENT

NTS



WHERE:

e = OVERLAP DISTANCE

ß = CHORD ANGLE IN RADIANS

c = CHORD LENGTH

b = AVERAGE SHEAR WALL WIDTH

$$a_{s,shear} = \frac{\pi d\,(1-a_e)}{4 s_{shear}\,(1-\frac{e}{d})}$$

$$a_e = \frac{\beta - \sin\beta}{\pi}$$

2 DEFINITION SKETCH FOR COLUMN OVERLAP CALCULATIONS

NTS

PROFESSIONAL CIVIL ENGINEER
CHARLES J. WINTER
E-13896
STATE OF NEBRASKA
9-28-15

NO.	DATE	REVISION	BY	APVD

DSGN	DR	CHK	APVD
D CURRAN	E ARMUO	D SIMON	D SIMON

ch2m
9191 S. JAMAICA ST.
ENGLEWOOD, CO. 80112
(303)771-0900

OPW 52494 (CSO)

MRWWTP CSO BANK STABILIZATION
CITY OF OMAHA, NEBRASKA

SITE CIVIL

DEEP SOIL MIXING DETAILS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

DATE	SEPTEMBER 2015
PROJ	199665
DWG	053BS-C-4001
SHEET	9

ISSUED FOR CONSTRUCTION

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US Army Corps of Engineers ®
Omaha District

Missouri River Post 2011 Flood Inspection & Assessment

Final Report

Prepared by:

WEST Consultants, Inc.

Missouri River Post 2011 Flood Inspection & Assessment

Final Report

3 May 2012

Contract No. W9128F-09-D-0002
Task Order No. 17

Prepared for:

U.S. Army Corps of Engineers
Omaha District
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WEST Project No. USAC001-041

EXECUTIVE SUMMARY

Sustained extreme flows on the Missouri River in 2011 severely impacted numerous Bank Stabilization and Navigation Project (BSNP) and Missouri River Recovery Program (MRRP) structures. The Omaha District has conducted several post-flood inspections and has repair efforts underway at several sites. However, a thorough inspection was required to assess the 3,500 to 4,000 potentially impacted structures.

This report provides a summary of the post-flood inspection and survey results, including a list of repair areas, recommendations concerning repair priorities, and structure repair quantity estimates.

POST-FLOOD INSPECTION AND SURVEY

The inspection was conducted from 30 January through 3 February 2012, prior to the spring runoff period and subsequent navigation season. The first day was an aerial inspection conducted by helicopter, which provided a broad overview of the project. For the remaining four days, the inspection was performed by boat, which provided the inspection team a closer view of the structures to assess areas of critical repair. The inspection covered the Missouri River from Ponca, NE (RM 753), downstream to Rulo, NE (RM 498), a distance of approximately 255 river miles.

Standard Omaha District inspection methods were followed to assess structure damage. Structure heights were related to the original elevation using the 2006 construction reference plane (CRP) and known gage stages at the time of the inspection. Start and stop points for degraded areas were collected using a handheld GPS in order to define the damaged length.

Following the field inspection and preliminary assessment of the repair areas, a survey of critical repair areas and other areas requiring more information was conducted from 12 March through 17 March 2012. Information gathered during the survey was incorporated into the final repair quantity estimates.

PRIORITY REPAIR CRITERIA AND ASSESSMENT

Repair criteria were developed based on U.S. Army Corps of Engineers (Corps) past performance rating methods and the operation and maintenance manual for the river, along with engineering judgment. The criteria were used to assign a repair priority of critical, high, medium, or low to the damaged structures.

Based on the repair assessment, 709 structures require repair, which represents approximately 18 percent of 4,000 total structures. This includes 2.4 percent deemed critical, 6.7 percent high priority, 4.7 percent medium priority, and 3.9 percent low priority. The remaining 82 percent of structures were identified as not requiring repair.

REPAIR QUANTITIES

Required rock quantities were estimated for each damaged structure. Estimated repair quantities were compared with Corps historically based empirical rates of rock usage from previous maintenance projects. Estimated repair quantities are summarized in Table ES-1.

Table ES-1. Estimated Repair Quantities (tons) by Structure Type and Priority Level

Structure Type	Critical	High	Medium	Low	TOTAL
Dike	33,193	22,716	24,568	17,734	98,211
Revetment	160,614	81,017	2,139	3,105	246,875
Kicker	51,186	29,197	214	0	80,597
L-head	10,488	49,030	872	78	60,468
Chevron	0	10,698	1,121	28	11,847
Rootless Dike	2,902	161	921	0	3,984
Reverse Sill	0	1,165	1,118	70	2,353
Vane	614	758	0	0	1,372
TOTAL	258,997	194,742	30,953	21,015	505,707

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ATTACHMENTS

Attachment A – Annotated Photographs for Critical Repair Locations
Attachment B – Repair Priority Maps
Attachment C – Field Inspection Notes
Attachment D – Survey Results including Plan/Profile Plots
Attachment E – Quality Control Report

INTRODUCTION

NEED FOR INSPECTION

Sustained extreme flows on the Missouri River in 2011 severely impacted numerous Bank Stabilization and Navigation Project (BSNP) and Missouri River Recovery Program (MRRP) structures. The Omaha District has conducted several post-flood inspections and has repair efforts underway at several sites. However, a thorough inspection was needed to assess all of the possibly impacted structures—between 3,500 and 4,000 structures in all.

INSPECTION OVERVIEW

The purpose of this post-flood inspection and assessment is to develop a comprehensive list of damaged structures with respect to the BSNP and MRRP. Not included in the inspection were Federal levees, private levees, or other river infrastructure such as bridges and water intakes.

A week-long inspection was performed, which covered the Missouri River from Ponca, NE (RM 753), downstream to Rulo, NE (RM 498), a distance of approximately 255 river miles. The inspection was conducted from 30 January through 3 February 2012, prior to the spring runoff period and subsequent navigation season. The first day was an aerial inspection conducted by helicopter, which provided a broad overview of the project. For the remaining four days, the inspection was performed by boat, which provided the inspection team a closer view of the structures to assess areas of critical repair.

Table 1 lists the areas inspected by boat and the observed stages and flows during the inspection. The inspection team included personnel from the Omaha District, WEST Consultants (WEST), and Eisenbraun & Associates (surveying subcontractor on the WEST team). Personnel are listed in Table 2.

REPORT OVERVIEW

The purpose of this report is to provide a summary of the post-flood inspection and survey results. This includes providing a list of repair areas, recommendations concerning repair priorities, and estimated rock quantities for damaged structures.

Table 1. Inspection Dates and Stages Relative to CRP

Inspection Date	Gage Location	2006 CRP	Stage (ft)	Average Discharge (cfs)	Area Inspected (River Miles)	Stage (ft) Relative to CRP
31 Jan 2012	Gavins Point	---	---	21,900	---	---
	Ponca	12.82	7.00	---	751.0 - 737.0	-6
	Sioux City	14.92	9.43	24,900	737.0 - 711.3	-5
1 Feb 2012	Gavins Point	---	---	22,000	-	---
	Sioux City	14.92	9.40	24,700	711.3 - 722.0	-5
					722.0 - 701.3	-4
	Decatur	22.11	19.31	25,600	701.3 - 680.3	-3
					680.3 - 659.0	-4
	Blair	15.57	10.67	---	659.0 - 656.3	-5
2 Feb 2012	Gavins Point	---	---	22,000	---	---
	Blair	15.57	10.66	---	656.3 - 624.0	-5
	Omaha	16.69	11.41	27,300	624.0 - 616.0	-5
					616.0 - 609.8	-4
					609.8 - 604.0	-3
					604.0 - 597.6	-2
	Plattsmouth	16.67	15.72	---	597.6 - 584.3	-1
					584.3 - 569.8	0
	Nebraska City	9.71	9.90	37,200	569.8 - 554.6	0
3 Feb 2012	Gavins Point	---	---	22,000	---	---
	Nebraska City	9.71	9.90	37,200	554.6- 542.1	0
	Brownville	24.85	25.02	38,300	542.1 - 507.4	0
	Rulo	9.25	9.06	39,300	507.4 - 498.1	0

Table 2. Damage Assessment Team (30 January to 3 February 2012)

Organization	Name
Omaha District	Dan Pridal (aerial inspection only) Jerry Tworek Alan Schmidt
WEST Consultants	Martin Teal Vicki Tripolitis
Eisenbraun & Associates	Joe Mueller*

* Did not participate in aerial inspection on 30 January

INSPECTION AND PRELIMINARY ASSESSMENT

INSPECTION APPROACH

The Missouri River post-flood inspection work was performed during low water in order to identify degraded or damaged BSNP and MRRP structures. The first day of the inspection was conducted from a helicopter flown over the entire project area, while the remaining four inspection days were conducted on the river in a survey boat. Inspection procedures follow standard Omaha District inspection methods as described in the Missouri River BSNP Operation & Maintenance (O&M) Manual (2011), Missouri River Navigation Project Design Criteria (1994), and the Repair, Evaluation, Maintenance, and Rehabilitation Research Program (REMR) performance rating method (1998).

INSPECTION PROCEDURES

The following procedures were followed to assess the post-flood BSNP and MRRP structure damage:

- Standard inspection practice is to reference the structure elevation to the current water level, which is typically done without actual surveys. A simple tape down measurement was used in limited cases; however, the pace of the inspection precluded most hand measurements. Instead, visual estimation was the predominant tool for evaluating the height or depth of any structure deficiencies. Structure height related to the 2006 construction reference plane (CRP) for known gage stages was visually estimated.

- During the inspection, the start and stop points for degraded areas were collected using a handheld GPS in order to define horizontal length.

- Top of structure height relative to CRP was estimated and compared to the assessment criteria given in Table 3. Structures deficient in height were noted as needing repair and inspection notes were prepared.

Table 3. Historic and Post 2011 Flood Maintenance Criteria, Omaha District – *Crown Elevation (ft) Relative to Construction Reference Plane*

Project	Structure Type[1]	Original (typical)	1982 Criteria		Post-flood Assessment Criteria
			Above Platte	Below Platte	
BSNP Structures	Crossing Control	+3 to +6	+2	+3	+3
	Kicker	+1 to +5	+1	+2	+3
	Stone Fill Revetment	+1 to +5	+1	+2	+3
	L-Head Revetment	0 to +3	0	+1	+3
	Dike, Concave Bend	0 to +3	+1	+2	+1
	Dike, Convex Bend	0 to +3	0	+1	+1
	Sill	-1 to -2	0 to -5	0 to -5	-2
MRRP Structures	Reverse Sill	+3	n/a	n/a	+3
	Rootless Dike	0	n/a	n/a	+3
	Chevron	0	n/a	n/a	+1

(1) Structure types are depicted in Figure 1.

MAINTENANCE CRITERIA

BSNP

The Missouri River BSNP Operation & Maintenance Manual indicates that specific maintenance criteria for the project have not been fully developed. The manual instead provides recommendations for making decisions on repair of river control structures, and provides a list of items that need to be considered during the decision making process. In addition to these recommendations and guidelines, engineering judgment is necessary to determine critical areas of damage and identification of required repairs.

The following factors should be considered when prioritizing revetment, dike, and sill maintenance. This list was used during the inspection as a general guideline for decisions regarding repair of a BSNP structure:

- Type of structure
- Location of the structure
- Extent of damage

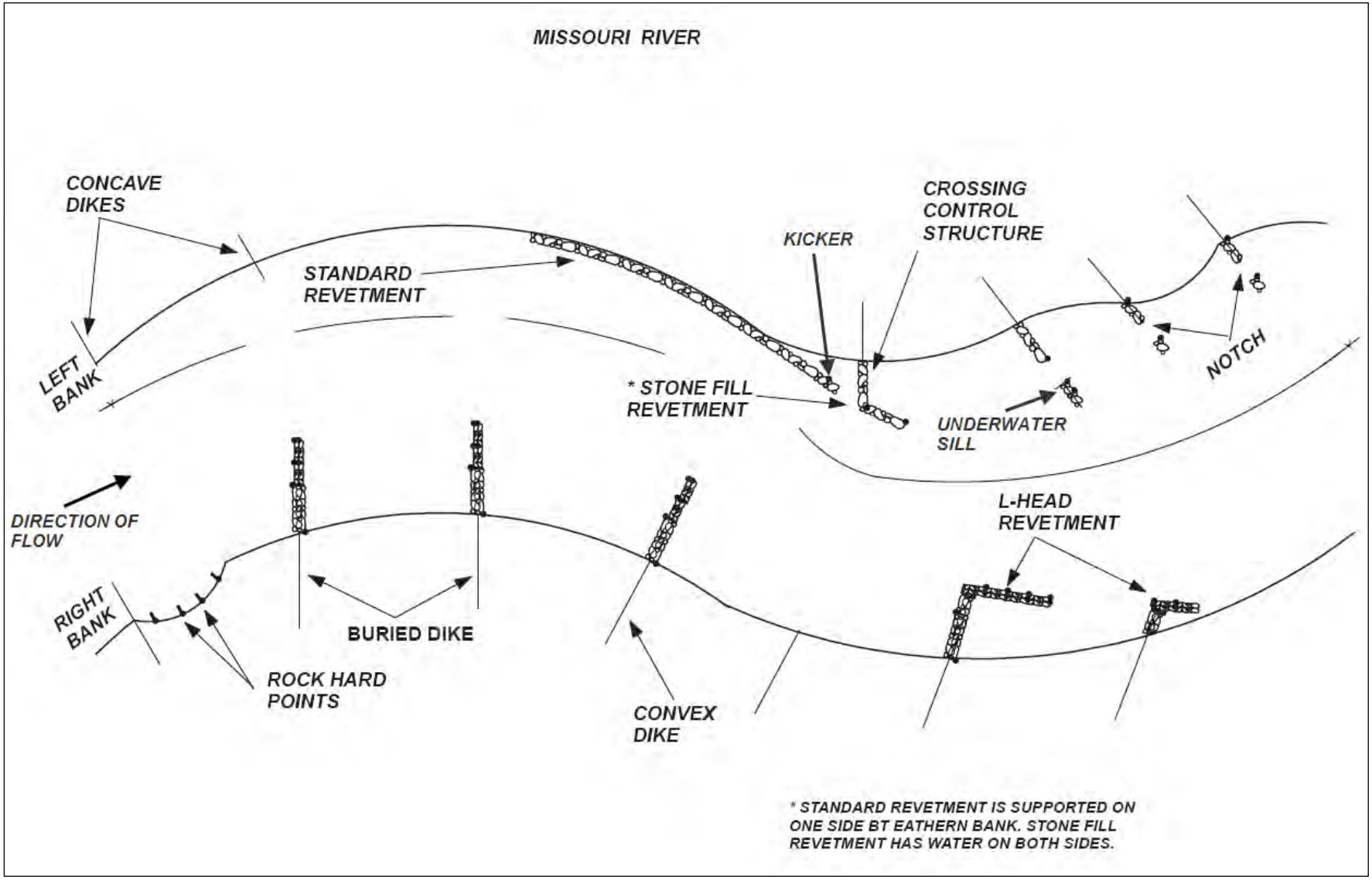


Figure 1. Missouri River Bank Stabilization Structure Types and Layout (modified from 2011 Kansas City District figure)

- Integrity of the project
- Adequacy of navigation channel
- Presence of serious bank erosion
- Environmental consequences (favorable and adverse)

In addition to the items listed above, the BSNP O&M Manual recommends the following specific criteria be used for decisions related to the repair of stone-fill dikes or stone-fill revetments:

- Serious bank erosion exists immediately adjacent to or downstream from the structure.
- Inadequate navigation channel exists adjacent to or downstream from the structure.
- The crown elevation of the structure has degraded more than 2 feet.
- The length of damage (degraded 2 feet or more) is more than 100 feet.
- More than two adjacent structures have been degraded.

According to the BSNP O&M Manual, toe trench revetments should be considered for repair when:

- The toe has subsided.
- The upper bank paving has completely eroded away.
- The upper bank paving has deteriorated to the extent that bare spots exist.
- The rock has scoured out at or about the normal navigation stage causing a shelf to develop, ultimately resulting in failure of the upper bank revetment due to subsidence.

MRRP

The Omaha District indicates that the MRRP project repair criteria are "ambiguous and site specific." However, a general guideline followed by the Omaha District is that a repair is generally required if structure damage has an impact on navigation and flood control. In addition to these general guidelines provided by the Omaha District, engineering judgment is necessary to determine critical areas of damage and whether structure repair is required.

The following list was used during the inspection as a general guideline for decisions regarding repair of MRRP structures, including chevrons, rootless dikes, and reverse sills:

- Type of structure
- Location of the structure
- Extent of damage
- Integrity of the project
- Environmental consequences (favorable and adverse)

INSPECTION DATABASE

The field inspection notes are provided as Attachment C. A Microsoft Access® database was created for efficient data entry and the ease of integration with ArcGIS data (river miles, structures database, etc.). Data from the Access database can be easily exported into Excel, if needed. River miles (1960) and structure numbers are used to identify the structures.

PRIORITY REPAIR AREAS

REPAIR PRIORITY CRITERIA

Table 4 lists the general and structure specific criteria that were used, along with engineering judgment, to assign a repair priority to each inspected structure.

CRITICAL AND HIGH PRIORITY REPAIR AREAS

Proposed critical and high priority repair areas are summarized in Table 5 and Table 6, respectively. Selected field photos and expanded descriptions are provided in Attachment A.

The repair priorities assigned for all structures are shown visually on maps provided in Attachment B and listed by river mile in the inspection database in Attachment C.

Table 4. Criteria for Assigning Repair Priority

Priority Level	General Criteria	Dike Criteria	Revetment Criteria	Kicker and L-Head Criteria	Chevron Criteria
1 - Critical	Imminent threat to safe, dependable navigation channel Jeopardizes nearby chute, dikes, revetment, or property	4' to <6' deficient, >100' long *or* ≥6' deficient, any length	Bare, ≥400' long *or* ≥4' deficient, ≥100' long	≥4' deficient, any length	
2 - High	Integrity of bank, neighboring structures, or environ. habitat is threatened May have history of failing during high water, floods, ice, etc.	4' to <6' deficient, ≤100' long *or* Flanked dike, any length	Bare, 50 to <400' long *or* ≥4' deficient, <100' long *or* 2' to <4' deficient, ≥100' long	2' to <4' deficient, any length	Missing *or* ≥1' deficient, most or all of structure
3 - Medium	Integrity of bank, neighboring structures, or environ. habitat is threatened	2' to <4' deficient, any length	Bare, 10 to <50' long *or* 2' to <4' deficient, <100' long *or* 1' to <2' deficient, ≥100' long	1' to <2' deficient, ≥100' long	≥1' deficient, half of structure
4 - Low	Neglecting these structures may cause continued deterioration, but no imminent threat	1' to <2' deficient, any length	Bare, 5' to 10' long *or* 1 to <2' deficient, <100' long	1' to <2' deficient, <100' long	
No Repair	No or minimal damage	0' to 1' deficient, any length	Small areas missing stone *or* Some visible erosion		

Sources: *REMR Management Systems – Navigation Structures*; *Missouri River BSNP Operation & Maintenance Manual*

Table 5. Critical Repair Areas and Chute/Backwater Areas of Interest

River Mile		Structure No.	Bank	Structure Type	Post-flood Assessment Deficiencies	Photo #
U/S	D/S					
750.23	n/a	835.51	L	Dike	Large hole in upstream side of dike (Estimated deficiency: 100' long x 6' high).	1
719.8	n/a	792.64	R	Dike	Omaha Creek left-bank dike degraded, needs to be rebuilt. (Estimated deficiency: 194' long x 6' high)	2
713.4	n/a	n/a	R	Chute Inlet	Glovers Point Chute inlet full of sediment.	3
711.28	n/a	n/a	R	Chute Outlet	Glovers Point Chute outlet full of sediment. Large section of chute right bank (near outlet) eroded back.	4
711.25	n/a	not avail.	R	Revetment	Large scour hole in revetment and behind bank. Corps suggested adding an effective refusal to patch revetment hole. Field measurements taken.	5
708.78	708.67	768.3	R	Revetment	Bank sloughing. Trees fallen over. (Estimated deficiency: 710' long x 4' high deficiency)	6
705.72	n/a	766.2	R	Revetment	"Hole in the Rock Backwater"-left bank of inlet missing revetment. (Estimated deficiency: 100' long x 7' high deficiency). Large sandbar at opening, connection still ok.	7
693.58	693.48	748.34	R	Revetment	Bank caved in. (Estimated deficiency: 410' long x 6' high deficiency).	8
691.63	n/a	748.13	L	Revetment	Trees down. High bank missing rock. (Estimated deficiency: 200' long x 6' high).	9
690.6	690.58	743.9	R	Revetment	Bank failure. Need to reestablish toe. (Estimated deficiency: 100' long by 6' high)	10
688.22	n/a	n/a	R	Chute Inlet	Willard Chute inlet full of sediment.	11
687.3	685.7	741.36	R	Revetment	Most of windrow rock structure degraded or missing at Lower Decatur Bend. Bank eroded back, channel widened. Corps team indicated repair design requires more than structures and will be addressed in a site specific design. (Repair quantities undefined)	12
685.7	684.9	N/A	R	Chute	Upper Louisville Bend Chute full of sediment.	13
679.81	679.79	732.25	L	Revetment	Revetment needs to be rebuilt. (Estimated deficiency: 100' long x 7' high).	14
674.04	673.87	726.93	L	Revetment	Left bank failure at Fawn Island Chute inlet. (Estimated deficiency: 150' long x 7' high).	15
673.5	n/a	726.93	L	Revetment / Chute Inlet	Fawn Island Chute outlet. Chute and revetment degraded, house threatened (bank failure). Corps will address repair in a site-specific design.	16
673.48	n/a	726.27	R	Dike	Flanked (approximate 200' gap). (Estimated repair: 200' long x 5' high)	17
670	669.53	722.7	L	Revetment	Partial/missing revetment. Several scallop holes with rootwads from flood. Corps may want to leave some gaps for habitat. Length of revetment deficiency ~2500' (conservative estimate) x 9' high. (Rock close to water surface or approximately 1 to 2' below.)	18
665.76	665.8	719.81	R	Revetment	Estimated deficiency: 270' long x 5' high).	19
662.5	n/a	713.97	R	Dike	Dike degraded. (Estimated deficiency: 100' long x 5' high).	20
660.28	n/a	709.17	L	Dike	Dike degraded Soldier Bend Backwater. (Estimated deficiency: 100' long x 6' high).	21

Table 5 (Cont'd). Critical Repair Areas and Chute/Backwater Areas of Interest

River Mile		Structure No.	Bank	Structure Type	Post-flood Assessment Deficiencies	Photo #
U/S	D/S					
657.93	657.86	708.75	R	Revetment	Sandy Point project - chutes/inlet being installed, thinned down rock. Corps field inspector did not have project details. (Estimated deficiency: 360' long x 8' high)	22
654.47	n/a	704	L	Dike	Flanked (~50' gap), dike low. (Estimated deficiency: 100' long x 4.5' high)	23
653.77	n/a	703.28	L	Rootless Dike	Estimated deficiency: 172' long x 6' high	24
653.43	n/a	702.98	L	Dike	Flanked - 50' gap between structure and bank. (Estimated deficiency: 50' long x 6' high)	25
653.11	n/a	n/a	L	Backwater	Left bank of Tyson Bend Backwater 7 to 8 ft of sediment. Right bank eroded back behind dikes along river.	26
652.47	652.42	703.25	R	Revetment	Sloughing in right bank, toe damaged. (Estimated deficiency: 300' long x 8' high)	27
650.3	650.22	700.5	L	Revetment	Just upstream of California Chute inlet (Iowa side). (Estimated deficiency: 410' long x 6' high)	28
650.11	n/a	698.67	R	Chute Inlet / Grade Control	1st California Chute inlet full of sediment. Grade control flanked at entrance (upstream side of river). (No field estimate – survey required)	29
650.02	n/a	n/a	R	Grade Control	Flanked grade control structure 1st California Chute inlet (right bank of Missouri River – downstream side of river). (No field estimate – survey required)	30
648.79	n/a	n/a	R	Chute Outlet	2nd California Chute outlet (right bank of Missouri River) - full of sand.	31
648.08	n/a	694.6	R	Revetment	Estimated deficiency: 100' long x 8' high	32
646.34	n/a	692.81	L	Dike/Sill	Sill 100' long x 3' high deficient. Dike 100' long x 6' high deficient. (Estimated deficiency: 200' long x 4.5' high)	33
645.44	n/a	691.79	L	Dike	Estimated deficiency: 200' long x 4' high	34
644.82	n/a	691.55	L	Dike	Estimated deficiency: 200' long x 4' high	35
641.86	641.66	691.41	L	Revetment	Estimated deficiency: 1050' long x 6' high	36
641.26	641.2	683.5	R	Revetment	Estimated deficiency: 320' long x 5' high	37
641.11	n/a	683.4	L	Dike	Estimated deficiency: 200' long x 4' high	38
640.82	n/a	683.1	L	Dike	Dike with notch. (Estimated deficiency: 180' long x 6' high)	39
640.27	n/a	682.85	L	Dike	Estimated deficiency: 150' long x 4' high	40
640.19	n/a	682.75	L	Dike	Estimated deficiency: 200' long x 4' high	41
640.19	639.85	682.8	R	Revetment	Large amount of material eroded from bank (damaged houses along bank). Est. deficiency: 1862' long x 5' high	42
639.84	639.63	682.55	R	Kicker	Large amount of material eroded from bank (damaged houses along bank). Est. deficiency: 1055' long x 5' high	43
639.41	n/a	682.1	R	Dike	Estimated deficiency: 100' long x 6' high	44
639.02	n/a	681.8	R	Dike	Dike completely degraded, needs to be rebuilt. (Estimated deficiency: 200' long x 6' high)	45
638.83	n/a	681.6	R	Dike	Dike degraded, needs to be rebuilt. (Estimated deficiency: 150' long x 6' high)	46
638.7	n/a	681.5	R	Dike	Estimated deficiency: 100' long x 6' high	47

Table 5 (Cont'd). Critical Repair Areas and Chute/Backwater Areas of Interest

River Mile		Structure No.	Bank	Structure Type	Post-flood Assessment Deficiencies	Photo #
U/S	D/S					
638.54	638.4	682.4	L	Kicker	Degraded. (Estimated deficiency: 820' long x 8' high)	48
638.2	n/a	681	L	Dike	Estimated deficiency: 200' long x 4' high	49
638.01	637.9	681.35	R	Revetment	Revetment degraded; eroded overbank behind structure. (Estimated deficiency: 560' long x 8' high)	50
637.98	n/a	680.8	L	Dike	Estimated deficiency: 150' long x 4' high	51
637.76	n/a	680.52	L	Dike	Estimated deficiency: 75' long x 6' high	52
637.74	n/a	n/a	L	Chute Inlet	Boyer Chute inlet full of sediment	53
637.57	n/a	n/a	R	Chute Inlet	Lower Calhoun Chute full of sediment	54
637.55	637.36	680.7	R	Revetment	Estimated deficiency: 1000' long x 5' high	55
637.36	n/a	680.7	R	Revetment	Estimated deficiency: 1000' long x 4' high	56
637.22	637.09	680.1	R	Kicker	Calhoun Chute outlet - kicker degraded. (Estimated deficiency: 680' long x 6' high)	57
636.99	n/a	679.95	R	Dike	Estimated deficiency: 100' long x 6' high	58
636	n/a	679.37	R	Rootless Dike	Estimated deficiency: 100' long x 7' high	59
635.64	n/a	679.1	R	Rootless Dike	Estimated deficiency: 100' long x 6' high	60
634.67	n/a	n/a	R	Chute Outlet	Mid-channel connection to Boyer Backwater Chute full of sediment	61
634.04	633.92	678.7	L	Kicker	Missing rock. (Estimated deficiency: 660' long x 4' high)	62
633.35	632.06	678.1	R	Revetment	Long section of bank missing rock or low. (Estimated deficiency: 1400' long x 5' high)	63
631.81	631.72	676.8	L	Revetment		64
629	n/a	673.6-A	R	Dike	Estimated deficiency: 200' long x 4' high	65
628.17	n/a	672.5	R	Dike	Estimated deficiency: 200' long x 6' high	66
622.46	n/a	666.8	R	Dike	Estimated deficiency: 200' long x 4' high	67
618.38	n/a	662.4	R	Dike	Estimated deficiency: 150' long x 4' high	68
617.8	n/a	662.3	L	Revetment	Council Bend inlet - over steepened left bank, some rock still protecting bank. (No field estimate)	69
616.45	n/a	660.4	L	Dike	Failed dike missing at pedestrian bridge. (Estimated deficiency: 100' long x 6' high)	70
611.8	n/a	655.5	L	Dike	Estimated deficiency: 200' long x 4' high	71
611.42	n/a	655.2	L	Dike	Estimated deficiency: 300' long x 4' high	72
611.29	n/a	656.9	R	Revetment	Estimated deficiency: 500' long x 4' high	73
611.05	n/a	656.9	R	Revetment	Estimated deficiency: 1500' long x 7' high	74
608.63	608.52	653.25	L	Revetment	Estimated deficiency: 600' long x 5' high	75
608.2	n/a	652.25	R	Dike	Estimated deficiency: 200' long x 5' high	76
606.97	n/a	650.8	R	Dike	Estimated deficiency: 200' long x 5' high	77
606.76	n/a	650.3	R	Dike	Estimated deficiency: 200' long x 5' high	78
606.55	n/a	649.8	R	Dike	Estimated deficiency: 250' long x 5' high	79

Table 5 (Cont'd). Critical Repair Areas and Chute/Backwater Areas of Interest

River Mile		Structure No.	Bank	Structure Type	Post-flood Assessment Deficiencies	Photo #
U/S	D/S					
606.08	n/a	649.3	R	Dike	Estimated deficiency: 200' long x 5' high	80
604.29	n/a	648.3	L	Dike	Estimated deficiency: 150' long x 4' high	81
601.65	601.62	647.6	R	Revetment	Tail end of upper revetment torn off, piles exposed. (Estimated deficiency: 200' long x 5' high)	82
595.08	594.8	638.75	R	Kicker	Separator revetment needs to be rebuilt.	83
594.43	594.08	637.9-A	R	Revetment	Estimated deficiency: 573' long x 4' high	84
594.08	593.94	637.9-A	R	Kicker	Estimated deficiency: 551' long x 4' high	85
591.97	n/a	n/a	R	Chute Outlet	Plattsmouth Chute outlet- silted up	86
589.44	n/a	n/a	R	Chute Inlet	Tobacco Chute sediment at inlet. Left bank of inlet eroded back.	87
589.33	n/a	632.95	R	Revetment	Estimated deficiency: 300' long x 4' high	88
586.26	n/a	629.89	L	L-head	Gap in dike. (Estimated deficiency: 100' long x 4' high)	89
582.28	n/a	625.88	R	Dike	Large scour hole in bank behind dike. Root damaged. (No field estimate)	90
562.5	n/a	608.78	R	Revetment	Revetment damaged near outfall of N. Table Creek.	91
562.21	562.14	608.1	R	Revetment	Revetment damaged downstream of S. Table Creek outlet.	92
562.18	n/a	608.02	R	Dike	Damaged dike along right bank of S. Table Creek.	93
555.39	n/a	n/a	R	Chute Inlet	Upper Hamburg Chute left bank (right bank of river) eroded; design objective to reduce the amount of flow and protect grade control structures. New rock at inlet in good condition.	94
554.67	554.63	600.6	L	Revetment	Breaks in revetment (some areas of bare bank).	95
553.27	n/a	598.19	L	Revetment / Chute Inlet	Left bank revetment damaged and left bank of Lower Hamburg Chute eroded. Repair revetment and continue protection around left bank of chute (estimated deficiency: 200' long x 3' high).	96
553.23	553.12	598.19	L	L-head / Chute Inlet	Lower Hamburg Chute inlet structure damaged. Right bank of chute eroded back behind structure. (Estimated deficiency: 300' long x 3' high)	97
550.91	n/a	n/a	L	Chute	Left bank levee breach of Lower Hamburg Chute (approximately 1 mile upstream of chute outlet).	98
546.3	546.1	592.81	R	L-head (revetment)	L-head degraded - upstream side of the Kansas Bend Chute inlet. (Estimated deficiency: 920' long x 2' high)	99
546.3	n/a	592.3	R	L-head (dike)	L-head degraded - upstream side of the Kansas Bend Chute inlet. (Estimated deficiency: 100' long x 2' high)	99
542.82	542.77	589.1	L	Revetment	Large amount of material eroded from bank.	100
540.02	539.76	584.6	R	Kicker	Large amount of material eroded from bank.	101
539.37	539.14	584.3	L	Revetment	Large amount of material eroded from bank.	102
529.18	n/a	n/a	R	Backwater	Langdon Bend Backwater entrance full of sediment.	103
526.04	525.72	568.1	R	L-head	L-head degraded.	104
520.61	520.55	562.1	L	Revetment	Estimated deficiency: 481' long x 3' high.	105

Table 5 (Cont'd). Critical Repair Areas and Chute/Backwater Areas of Interest

River Mile		Structure No.	Bank	Structure Type	Post-flood Assessment Deficiencies	Photo #
U/S	D/S					
520.55	520.48	562.1	L	Revetment / Inlet Control	Left bank structure at Deroin Chute inlet eroded with flanking of control dikes. Entrance is wider than it was before 2011 flooding, and continues to widen. Need to reduce flow in the chute as part of repair. (Estimated deficiency: 200' long x 3' high.)	105
520.45	520.36	561.77	L	Vane	Intermediate structure in front of Deroin Chute degraded. (Estimated deficiency: 250' long x 3' high.)	106
520.33	520.2	561.77	L	L-head	L-head degraded. Bank eroded back behind structure, inlet widened. (Estimated deficiency: 100' long x 3' high.)	107
513.15	n/a	554.9	R	Dike	Dike degraded – only piles visible.	108
505.88	505.77	546.5	R	Revetment	Bank failure behind revetment.	109

Table 6. High Priority Repair Areas

River Mile	Structure No.	Bank	Structure Type	River Mile	Structure No.	Bank	Structure Type
751.48 – 751.45	836.9	R	Revetment	662.51 – 662.48	715.9	L	Revetment
751.45 - 751.43	836.9	R	Revetment	658.97	708.05	L	Dike
751.28	836.9	R	Revetment	658.66	707.7	L	Dike
751.18	836.5	R	Revetment	658.05	707.3	L	Dike
743.43	828.4	R	Revetment	658.02 – 657.94	708.75	R	Revetment
743.38	828.4	R	Revetment	657.21	706.16	R	Reverse Sill
743.26	828.4	R	Revetment	655.3	704.7	R	Dike
727.35	802.8	L	Revetment	653.52	703.08	L	Dike
721.82	797.16	L	Dike	653.33	702.93	L	Chevron
721.15 – 721.01	797.15	R	Revetment	653.06	702.65	L	Dike
715.87	783.12	L	Chevron	652.62	702.18	L	Chevron
715.69	782.55	L	Chevron	652.08	701.84	L	Chevron
715.49	782.09	L	Chevron	651.83	701.65	L	Chevron
714.61	779.9	L	Dike/Sill	651.13	701.12	R	Dike
711.87	775.4	R	Reverse Sill	650.55	700.1	R	Dike
709.87	770.09	L	Chevron	649.11	695.83	L	Kicker
702.24	761.85	L	Dike	648.59	695.95	R	Revetment
692.73	747.4	R	Dike	647.08	693.51	L	Dike
691.6	744.95	R	Dike	646.8	693.2	L	Dike
690.67 – 690.63	743.9	R	Revetment	645.86	692.2	L	Dike
690.63	743.9	R	Revetment	645.58	691.9	L	Dike
690.56	743.9	R	Revetment	645.44 – 645.19	693.8	R	Revetment
689.75 – 689.74	"0"	R	Revetment	644.75	691.41	L	Dike
679.71 – 679.7	732.25	L	Kicker	644.15	691.2	R	Dike
678.79 – 678.78	731.9	R	Revetment	643.66	690.84	R	Dike
674.1	726.92	R	Dike	642.7	not avail.	R	Chevron
673.61	726.45	R	Dike	642.55	687.52	R	Chevron
673.54	726.93	L	Revetment	642.32	not avail.	R	Chevron
670.54 – 670.48	724.95	R	Revetment	642.28	685.42	R	Rootless Dike
666.1	718.7	L	Dike	642.14	not avail.	R	Chevron
664.67	716.2	L	Dike	641.53	683.7	L	Dike
664.0	717.1	R	Revetment	641.41	683.6	L	Dike
663.68	715.31	L	Dike	639.92	682.62	L	Dike
663.08	714.69	L	Dike	639.29	682	R	Dike
662.61 – 662.56	715.9	L	Revetment	639.15	681.9	R	Dike

Table 6 (Cont'd). High Priority Repair Areas

River Mile	Structure No.	Bank	Structure Type	River Mile	Structure No.	Bank	Structure Type
637.87	680.65	L	Dike	605.78 – 604.54	649.4	L	Revetment
636.9	679.93	R	Chevron	605.59	649.05	R	Dike
636.61	679.75	R	Chevron	604.07	648.2	L	Dike
636.28	679.55	R	Chevron	601.7 – 601.67	647.6	R	Revetment
635.9	679.31	R	Chevron	601.23	645.6	R	Revetment
635.55	679.05	R	Chevron	600.96 – 600.76	645.4	R	Revetment
635.12	678.79	R	Chevron	594.54	n/a	R	Chute Inlet
634.85	678.68	R	Chevron	587.34	630.45	R	Chevron
634.5	678.48	R	Chevron	587.12	630.26	R	Chevron
634.21	678.35	R	Chevron	586.87	630.07	R	Chevron
633.73	677.9	L	Dike	584.04	627.85	R	Revetment
633.33	677.56	L	Dike	577.88	622.95	R	Revetment
630.68	674.71	L	Dike	577.69 – 577.66	622.95	R	L-head
629.74	673.92	L	Dike	577.59	622.6	R	L-head
629.72 – 629.7	673.95	R	Revetment	576.8 – 576.76	622	R	Revetment
629.5	673.95	R	Kicker	576.64 – 576.5	621.71	R	Kicker
629.14	673.6-B	R	Dike	573.54	618.8	R	Revetment
628.9	673.3	R	Dike	572.88	618.8	R	L-head
628.78	673.25	R	Dike	572.7 – 572.53	618.8	R	Kicker
628.29	672.6	R	Dike	569.67	615.64	L	Kicker
628.05	672.35	R	Dike	566.16 – 566	612.1	R	Revetment
624.04	668.5	L	Dike	565.61	611.9	R	Revetment
621.97	666.15	R	Dike	565.2 – 565.02	611.3	R	Revetment
619.78	663.8	R	Dike	565.02 – 564.9	611.3	R	Kicker
618.91	662.8	R	Dike	562.99 – 562.88	608.9	L	Kicker
618.01	662	R	Dike	561.57	608.1	R	Revetment
617.55	661.34	R	Revetment	561.14	607.15	R	Revetment
613.47	657.5	R	Dike	560.65 – 560.63	605.55	R	L-head
613.35 – 613.26	657.7	L	Revetment	560.63	606.5	R	L-head
609.42	653.5	L	Dike	560.4 – 560.28	606.45/603.35	R	L-head
608.59	652.56	L	Dike	560.24 – 560.02	606.45/606.15	R	L-head
608.49 –608.27	653.6	R	L-head	557.08 – 556.97	602.95	L	L-head
608.13	652.2	R	Dike	556.79 - 556.71	not avail.	L	L-head
606.4	649.7	R	Dike	556.63	not avail.	L	Kicker
606.31	649.61	R	Dike	553.66	599	L	Revetment
606.23 – 606.04	649.4	L	Revetment	553.46	598.6	L	Revetment

Table 6 (Cont'd). High Priority Repair Areas

River Mile	Structure No.	Bank	Structure Type	River Mile	Structure No.	Bank	Structure Type
552.03 – 551.98	596.7	R	Revetment	530.39	572.53	R	Chevron
551.72	596.7	R	Revetment	530.15	572.23	R	Chevron
550.99	595.56	R	L-head	530.02 – 529.94	572-AB(A)	L	L-head
550.85 – 550.81	595.3	R	L-head	529.91 – 529.83	572-AB(A)	L	L-head
549.65	594.8	L	Revetment	529.65 – 529.61	571.4	L	L-head
549.38 – 549.34	593.9	L	Kicker	529.32 – 529.26	571.3	L	Revetment
549 – 549.05	593.75	R	Revetment	528.96 – 528.89	570.9	L	Kicker
548.2 – 548.09	593.75	R	Revetment	527.84	569.04	L	Dike
546.73 – 546.62	592.81	R	L-head	527.79 – 527.58	569-A/569	R	L-head
546.61 – 546.52	592.81	R	L-head	526.88 – 526.81	567.8	R	L-head
546.46 – 546.42	592.81	R	L-head	526.78 – 526.73	568.1/567.7	R	L-head
544.75 – 544.51	592.2	L	Kicker	526.62 – 526.57	568.1	R	L-head
543.6	589.9	R	Kicker	526.46	568.1	R	L-head
543.55 – 543.49	589.9	R	Kicker	526.41	568.1	R	L-head
540.43 – 540.41	584.6	R	Revetment	526.23 – 526.17	568.1/567.2	R	L-head
540.28 – 540.24	584.6	R	Revetment	526.12 – 526.09	568.1	R	L-head
540.18	584.6	R	Revetment	525.15 – 525.11	566.29	L	L-head
537.5	580.1	L	L-head	525.02 – 524.97	566/566.29	L	L-head
537.4	579.1	L	L-head	524.91 – 524.82	not avail.	L	Vane
537.27 – 537.24	579.7	L	L-head	524.74 – 524.72	565.8/566.29	L	L-head
537.17 – 537.14	580.1	L	L-head	523.78 – 523.5	565.3	L	Kicker
537.06 – 536.94	579.7/580.1	L	Kicker	523.56 – 523.51	564.6	R	Revetment
536.85 – 536.77	579.4	R	Revetment	523.38 – 523.26	564.6	R	Revetment
536.32 – 536.22	579.4	R	L-head	523.17 – 523.03	564.6	R	Revetment
535.66 – 535.56	578.25	R	Revetment	522.45 – 522.29	564.6	R	Kicker
533.5 – 533.46	577.3	L	Kicker	522.2	563.4/563.2	L	Revetment
533.42 – 533.31	577.3	L	Kicker	522.16	563.15	L	Dike
533.35 – 532.86	575.85/ 575.85-A	R	Revetment	522.16 – 522.1	563.1	L	Revetment
533.27	575.8	L	Dike	521.6	562.71	R	Dike
532.16 – 532.02	574.9	R	Revetment	521.48	562.55	R	Dike
531.91 – 531.77	574.31	R	Revetment	520.22 – 520.2	561.77	L	L-head
531.53	573.63	R	Chevron	520.13 – 520.04	561.77	L	L-head
531.37	573.53	R	Chevron	519.87	561.22	R	L-head
531.09	573.23	R	Chevron	519.54	561.19	R	Revetment
530.78	572.93	R	Chevron	519.48 – 519.46	561.19	R	Revetment
530.6	572.73	R	Chevron	519.43 – 519.4	561.19	R	Revetment

Table 6 (Cont'd). High Priority Repair Areas

River Mile	Structure No.	Bank	Structure Type
519.37 – 519.32	561.19	R	Revetment
519.24	561.2	L	Dike
519.05 – 518.9	560.7/550.5	R	Revetment
518.52	550	R	Revetment
518.26 – 518.13	559.85	R	Kicker
517.63 – 517.61	559.8	L	Kicker
517.49	559.8	L	Kicker
517.35	559.2	L	Dike
517.28	559.02	R	Revetment
516.84 – 516.77	558.55	R	L-head
516.65 – 516.63	558.5	R	L-head
516.55 – 516.51	558.4	R	L-head
516.4 – 516.27	558.3	R	L-head
516.21 – 516.15	558.1	R	L-head
516.04	558.1	R	L-head
515.95	558.1	R	L-head
515.73 – 515.49	558.35	L	Revetment
515.32	557.1	R	Dike
514.87	556.81	R	Dike
513.52 – 513.49	555.62	L	Revetment
513.48 – 513.43	555.62	L	Revetment
513.2 – 513.07	555.62	L	Revetment
513 – 512.93	555.62	L	Revetment
512.72 – 512.7	555.62	L	L-head
512.65	554.4	L	L-head
512.63 – 512.53	555.62	L	L-head
512.46	554.16	R	Dike
512.45	554.15	L	L-head
512.42	554.15	L	L-head
512.28 – 512.23	554.15	L	L-head
512.15 – 512	555.62	L	Kicker
511.16	553	R	L-head
510.81	551.75	R	L-head
510.18 – 510.11	551.2	R	L-head
508.72 – 508.67	548.71	R	L-head
508.61 – 508.55	548.65	R	L-head
508.39 – 508.33	"0"	R	L-head

River Mile	Structure No.	Bank	Structure Type
508.28 – 508.2	548.4	R	L-head
508.15 – 508.06	548.4	R	L-head
507.12 – 506.87	547.78	L	Revetment
506.78 – 506.64	547.1	L	L-head
506.51	546.85	L	L-head
506.27	546.6	L	Kicker
504.83 – 504.79	546.5	R	Revetment
504.54	546.5	R	Kicker
504.08 – 504.04	545.1	L	Revetment
502	n/a	L	Chute Inlet
501.66 – 501.62	542.88	L	Kicker
501.45 – 501.4	542.8	R	Revetment
501.14	542.8	R	Revetment
500.29 – 500.24	540.15	R	Kicker
500.24 – 500.08	540.15	R	Kicker
499.29	540.12	L	Revetment
499.23	539	L	L-head

SUMMARY OF STRUCTURES

The number of structures at each repair priority level is summarized in Figure 2. A summary by structure type is provided in Table 7. There are on the order of 4,000 BSNP and MRRP structures potentially impacted by the 2011 flood. Based on the current inspection and assessment, 709 structures require repair, which represents approximately 18 percent of 4,000 total structures. This includes 2.4 percent deemed critical, 6.7 percent high priority, 4.7 percent medium priority, and 3.9 percent low priority. The remaining 82 percent of structures were identified as not requiring repair.

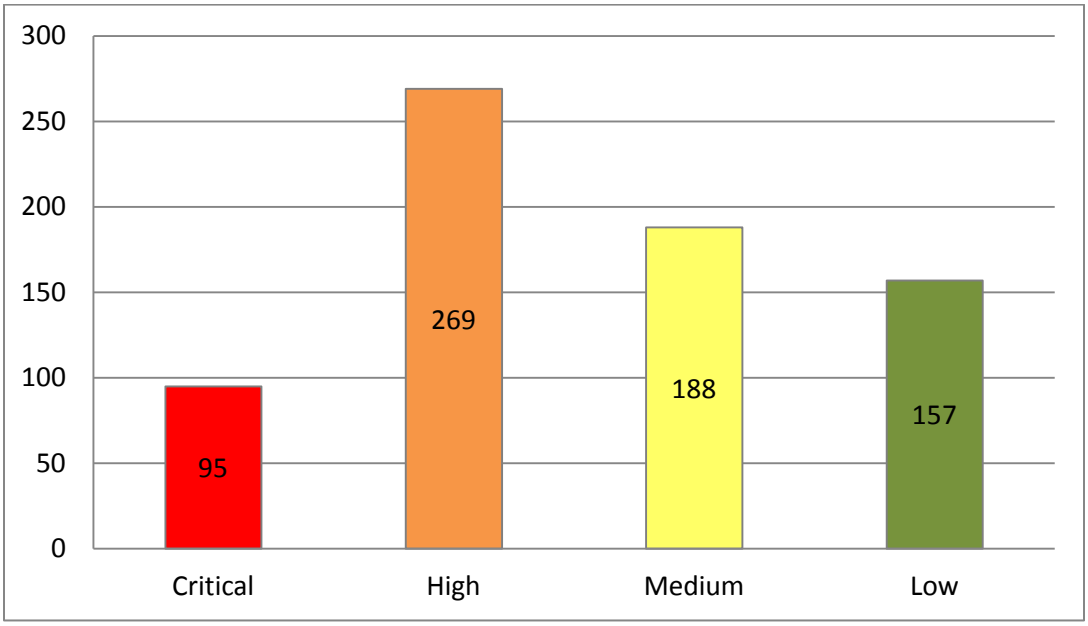


Figure 2. Number of Structures by Priority Level

Table 7. Number of Structures by Type and Priority Level

Structure Type	Critical	High	Medium	Low	Total
Dike	38	64	152	144	398
Revetment	39	78	11	10	138
Kicker	7	28	1	0	36
L-head	7	64	7	1	79
Chevron	0	31	10	1	42
Rootless Dike	3	1	5	0	9
Reverse Sill	0	2	2	1	5
Vane	1	1	0	0	2
Total	95	269	188	157	709

SURVEY OF SELECTED REPAIR AREAS

SURVEY AREAS

The survey of selected critical repair areas and other areas requiring more information was conducted from 12 March through 17 March 2012. Table 8 lists the areas surveyed, while Table 9 lists the observed stages and flows at these locations during the survey period. The survey was performed by Eisenbraun & Associates, and the two-person crew included Joe Mueller (survey crew chief and boat captain) and Paul Graesser (rod man and deck hand).

Survey sites were selected based on the following criteria:

- Rock tonnage determined from the field inspection estimates—largest areas of damage were selected
- Distribution of sites throughout the inspection area, as feasible
- Areas that were more difficult to estimate damage during the field inspection
- Difficult design locations

SURVEY METHODS AND RESULTS

SURVEY METHODS

A Trimble R8 Model 3 GNSS (Global Navigation Satellite System) receiver and TSC2 controller in WAAS (Wide Area Augmentation System) were used to acquire and record horizontal points at the beginning and end stations of selected damage areas in real-time.

Vertical points were obtained using a hand level and level rod to record elevations from the water surface to the top of a damaged structure. In addition to height and length data, crown widths of damaged dikes and peaked revetments were measured.

Table 8. Survey Sites

#	River Mile	Structure Number	Bank	Structure Type	Survey Area
1	652.47 - 652.42	703.25	R	Revetment	Tysons Bend
2	647.87, 647.75, 647.61	694.25, 694.1, 693.9	L	Dike	Desoto Bend / Downstream of Blair Bridge
3	645.44 - 645.17	693.8	R	Revetment	Desoto Bend
4	641.86 - 641.66	691.41	L	Revetment	Upper Calhoun Bend
5	640.19 - 639.63	682.8/682.55	R	Revetment / Kicker	Upper Calhoun Bend
6	637.55 - 637.36	680.7	R	Revetment	Lower Calhoun Bend
7	637.22 - 637.09	680.1	R	Kicker	Lower Calhoun Bend
8	633.35 - 632.06	678.1	R	Revetment	Upper Rockport Bend
9	631.81 – 631.72	676.8	L	Revetment	Lower Rockport Bend
10	629.72 – 629.7	673.95	R	Revetment	Lower Pigeon Creek Bend
11	617.8	662.3	L	Revetment	Council Bend
12	611.11 – 610.8	656.9	R	Revetment	Gibson Bend
13	608.49 – 608.27	653.6	R	Revetment	Gibson Bend
14	606.23 – 606.04	649.4	L	Revetment	Manawa Bend
15	605.78 - 604.54	649.4	L	Revetment	Manawa Bend
16	600.96 - 600.76	645.4	R	Revetment	Upper Bellevue Reach
17	595.08 - 594.8	638.75	R	Kicker	Papillion Bend
18	594.43 - 593.94	637.9-A	R	Revetment / Kicker	Papillion Bend
19	582.28	625.88	R	Dike	Rock Bluff Bend
20	565.2 – 564.9	611.3	R	Revetment	Lower Copeland Bend
21	560.4 - 560.02	606.45, 606.35, 606.15	R	L-head	Frazers Bend
22	557.08 – 556.97	602.95	L	L-head	Otoe Bend
23	554.67 – 554.63	600.6	L	Revetment	Upper Hamburg Bend
24	553.32 - 553.12	598.19/598	L	Revetment / L-Head	Upper Hamburg Bend
25	546.03 - 545.15	592.1, 592, 591.85, 591.52, 591.15		Dikes / Chevrons	Upper Kansas Bend
26	542.82 - 542.77	589.1	L	Revetment	Nishnabotna Bend
27	541.68 - 541.51	587.15	R	Revetment	Peru Bend
28	540.02 - 539.76	584.6	R	Kicker	Upper Sonora Bend

Table 8 (Cont'd). Survey Sites

#	River Mile	Structure Number	Bank	Structure Type	Survey Area
29	539.37 - 539.14	584.3	L	Revetment	Upper Sonora Bend
30	537.40	579.81	L	L-head	Lower Sonora Bend
31	537.27 – 537.24	580.1	L	L-head	Lower Sonora Bend
32	533.35 - 532.86	575.85/575.85-A	R	Revetment	Upper Brownville Bend
33	526.04 - 525.72	568.1	R	L-head	Aspinwall Bend
34	523.78 - 523.5	565.3	L	Kicker	Lower Morgan Bend
35	522.16 – 522.1	565.1, 563.15	L	Revetment / Dike	Lower Morgan Bend
36	520.61 - 520.48	562.1	L	Revetment / Inlet Control	Lincoln Bend
37	519.05 - 518.9	560.7, 550.5	R	L-head	Upper Deroin Bend
38	515.83	557.7	R	Dike	Hemmies Bend
39	515.73 - 515.49	558.35	L	Revetment	Hemmies Bend
40	513.2 – 513.07	555.62	L	Revetment	Hemmies Bend
41	513.15	554.9	R	Dike	Hemmies Bend
42	513	512.93	L	Revetment	Hemmies Bend
43	513.12	555.62	L	Revetment	Hemmies Bend
44	510.57	551.45	L	Dike	Upper Cottier Bend
45	507.12 - 506.87	547.78	L	Revetment	Lower Cottier Bend
46	505.88 – 505.77	546.5	R	Revetment	Upper Arago Bend
47	504.08 - 504.04	545.1	L	Revetment	Arago Bend

Table 9. Survey Inspection Dates and Stages Relative to CRP

Inspection Date	Gage Location	2006 CRP	Stage (ft)	Average Discharge (cfs)	River Miles	Stage (ft) Relative to CRP
12 March 2012	Gavins Point	---	---	22,000	---	---
	Decatur	22.11	20.04	27,500	701.3 - 680.3	-2
					680.3 – 659.0	-3
	Blair	15.57	12.34	---	659.0 – 624.0	-3
13 March 2012	Gavins Point	---	---	22,000	-	---
	Blair	15.57	12.19	---	640.2 – 624.0	-4
	Omaha	16.69	13.05	31,100	624.0 – 609.8	-4
					609.8 – 597.6	-2
14 March 2012	Gavins Point	---	---	22,000	---	---
	Omaha	16.69	12.96	30,800	609.8 – 597.6	-2
	Plattsmouth	16.67	16.27	---	597.6 – 584.3	0
					584.3 – 569.8	0
15 March 2012	Gavins Point	---	---	22,000	---	---
	Nebraska City	9.71	10.45	39,600	569.8 – 542.1	1
	Brownville	24.85	25.52	40,200	542.1 – 526.0	1
16 March 2012	Gavins Point	---	---	22,000	---	---
	Brownville	24.85	25.50	40,100	542.1 – 526.0	1
					526.0 – 507.4	0
17 March 2012	Gavins Point	---	---	22,000	---	---
	Brownville	24.85	25.41	39,700	526.0 – 507.4	0
	Rulo	9.25	9.25	40,200	507.4 – 498.1	0

SURVEY RESULTS

Attachment D includes the survey results for each site listed in Table 8. Results include the following:

- Elevation profiles for each structure relative to the 2006 CRP
- GIS data showing the location of points surveyed along each of the damaged structures
- Average crown width, where applicable
- Estimated length and average height of deficiency

Results from the survey were compared with the earlier field inspection estimates of damage. Overall, the visually estimated lengths and heights were comparable to the values obtained during the survey.

REPAIR QUANTITIES

REPAIR QUANTITY APPROACH

Required rock quantities were estimated for each damaged structure. A spreadsheet approach was used, following the efforts of the Omaha District on previous structure maintenance projects. Estimated repair quantities were compared with historically based empirical rates of rock usage.

STANDARD REVETMENTS

Repair quantities for standard revetments and L-head revetments were estimated based on a 3-ft crown width, 1V:1.5H side slope, and the height and length of deficiency/degradation. An empirical factor was added to the rock volume equation to compute reasonable quantities based on historical values.

<u>Standard Revetment Formula</u>

Eqn. 1

$$V = \frac{W * L * ([(S * H)^2 + H^2]^{\frac{1}{2}} + f)}{27}$$

where:

V = rock volume (yd^3)
W = crown width (ft)
H = height deficiency (ft)
S = side slope
L = length deficiency (ft)
f = revetment empirical factor = 1.2*H

Eqn. 2

$$Rock\ Quantity\ (tons) = V * rock\ factor * placement\ factor$$

where:

$rock\ factor$ = 1.55
$placement\ factor$ = 1.5

Eqn. 3

$$Rock\ Quantity\ (tons/ft) = \frac{Rock\ Quantity\ (tons)}{L}$$

DIKES & OTHER PEAKED STONE STRUCTURES

Repair quantities for dikes and other peaked stone structures, including stone fill revetments, chevrons, and reverse sills, were estimated using either a Corps' empirical formula or a computational method based on the trapezoidal equation. The empirical formula (Eqn. 4) is based on historical volumes of rock used for repair, while the computed method (Eqn. 5) estimates the repair quantity based on the crown width, 1V:1.5H side slopes, and the height and length of the deficiency. A typical crown width of 5 ft was used for the structure if no information was available in the Omaha District structures database.

Figure 3 shows the computed repair quantities (tons/ft) for three different crown widths: 3, 5, and 10 ft. The empirical formula (Eqn. 4), which is based on Omaha District historical maintenance, applies to lower restoration heights—up to 3.5 ft for the 3-ft crown width and 2.5 ft for the 5-ft crown width. For greater heights or larger crown widths, the computed method (Eqn. 5) was used.

<u>Empirical Formula</u>

Eqn. 4

$$Rock\ Quantity\ (tons/ft) = 0.8406 * H^{0.8517}$$

where:

H = height deficiency (ft)

<u>Computed Method (based on the Trapezoidal Equation)</u>

Eqn. 5

$$V = \frac{[W + (H * S)] * H * L}{27}$$

Eqn. 6

$$Rock\ Quantity\ (tons) = V * rock\ factor * placement\ factor$$

where:

$rock\ factor$ = 1.55
$placement\ factor$ = 1.5

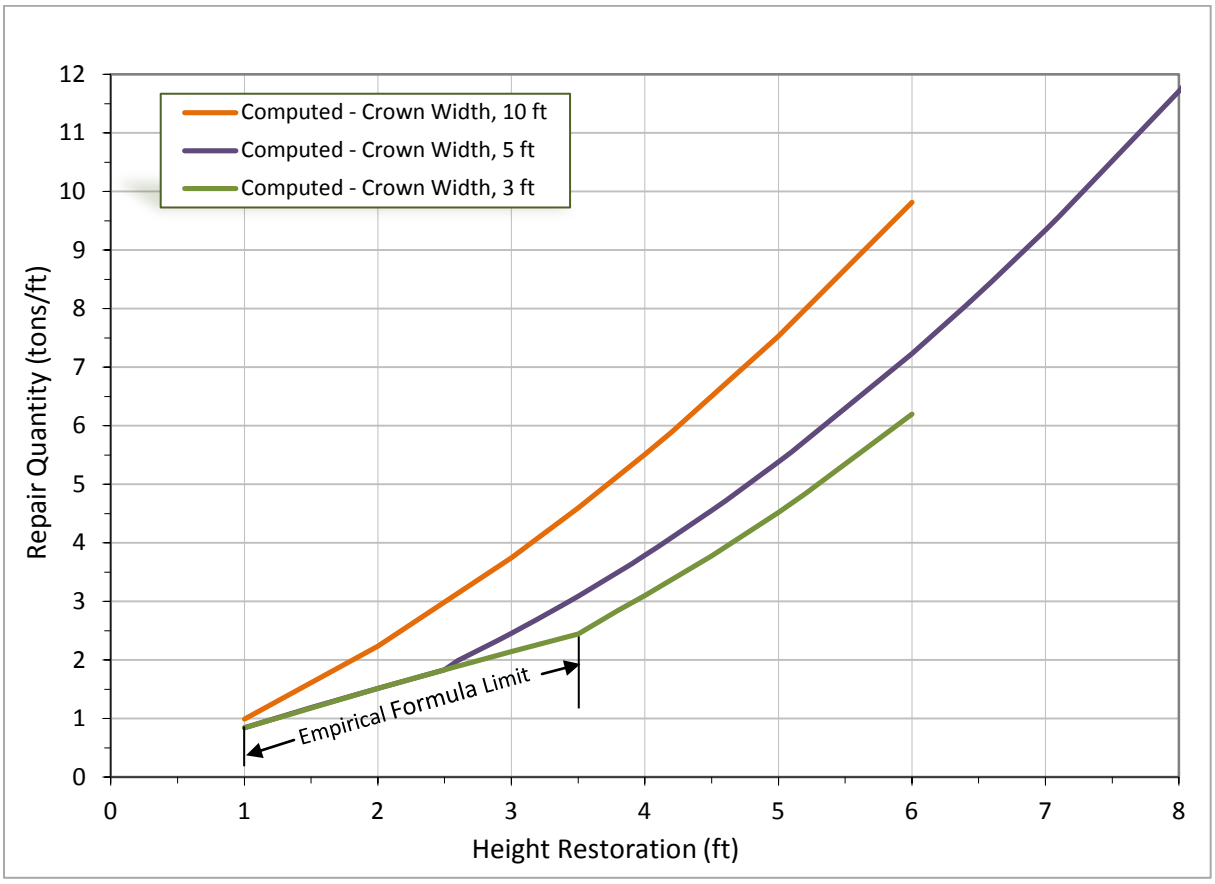


Figure 3. Repair Quantity Estimation Curves – Dikes and Other Peaked Stone Structures

COMPUTED REPAIR QUANTITIES

Estimated repair quantities are summarized in Table 10 and Figure 4. The critical and high priority repair sites together represent over 90 percent of the total rock quantity required for repair.

Table 10. Estimated Repair Quantities (tons) by Structure Type and Priority Level

Structure Type	Critical	High	Medium	Low	TOTAL
Dike	33,193	22,716	24,568	17,734	98,211
Revetment	160,614	81,017	2,139	3,105	246,875
Kicker	51,186	29,197	214	0	80,597
L-head	10,488	49,030	872	78	60,468
Chevron	0	10,698	1,121	28	11,847
Rootless Dike	2,902	161	921	0	3,984
Reverse Sill	0	1,165	1,118	70	2,353
Vane	614	758	0	0	1,372
TOTAL	258,997	194,742	30,953	21,015	505,707

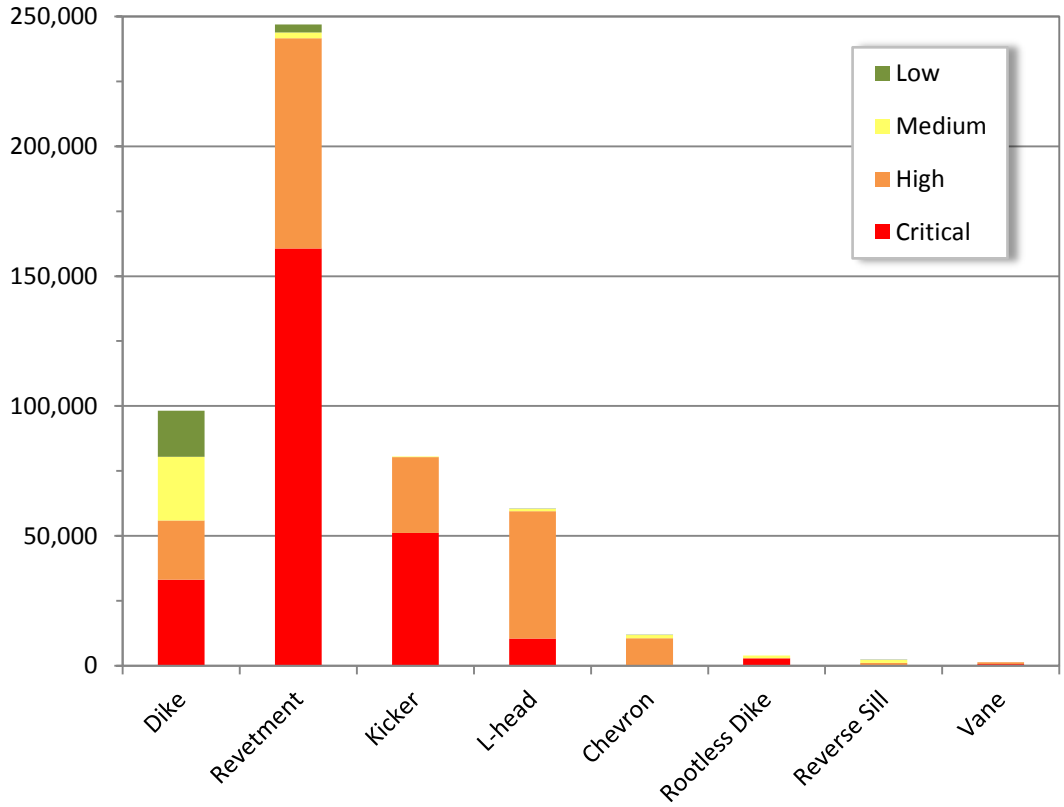


Figure 4. Computed Repair Quantities by Structure Type and Repair Priority Level

PROJECT AUTHORIZATION AND ACKNOWLEDGMENTS

PROJECT AUTHORIZATION AND TEAM

This study was performed by WEST Consultants, Inc. at the request of the U.S. Army Corps of Engineers, Omaha District, and was authorized under Contract No. W9128F-09-D-0002 (Hydraulic Engineering Services), Task Order No. 17. Table 11 lists the study team members and their roles in the study.

Table 11. Study Team Members and Responsibilities

Organization	Name	Study Role
Omaha District	Dan Pridal, P.E.	Chief of the Sediment & Channel Stabilization Section, Engineering Division; served as Alternate Point of Contact (POC); provided overall guidance to the study
	Jerry Tworek	Technical POC; low water inspection team member; provided valuable study data and direction
	Alan Schmidt	Low water inspection team member; provided guidance regarding standard inspection procedures
WEST Consultants	Martin Teal, P.E., P.H.	Lead low water inspector; Principal-in-Charge and quality control manager
	Jake Gusman, P.E.	Task order manager and technical lead
	Vicki Tripolitis, EIT	Low water inspection team member; priority repair list and repair quantities
	Kurt Baron, GISP	GIS group manager
	Sam Powvall	GIS technician
Eisenbraun & Associates	Brett Kennedy, PLS	Survey project manager
	Joe Mueller	Survey crew chief and boat captain
	Paul Graesser	Rod man and deck hand

ATTACHMENT A

FIELD PHOTOS AND DESCRIPTIONS: SELECTED CRITICAL & HIGH PRIORITY AREAS

Note: indicates surveying was performed. Post-survey results are included in the Attachment A site descriptions; therefore, river miles and dimensions may differ slightly compared to field estimates provided in Table 5 and Table 6.

Photo 1 (Structure No. 835.51)

RM 750.23

Dike (Left Bank)

Damage: Upstream side of dike damaged with large scallop hole.

Repair: Insert a bench into the scallop and fill-in eroded area.

Repair Dimensions: Approximately 100 ft long and 6 ft high.

Photo 2 (Structure No. 792.64)

RM 719.8

Dike (Right Bank)

Damage: Dike completely degraded on the left bank of Omaha Creek (right bank of the Missouri River).

Repair Dimensions: Approximately 194 ft long and 6 ft high.

Photo 3 (Structure No. N/A)

RM 713.4

Chute Inlet (Right Bank)

Damage: Glovers Point Chute inlet full of sediment (entrance blocked), culvert crossing appears destroyed.

Photo 4 (Structure No. N/A)

RM 711.28

Chute Outlet (Right Bank)

Damage: Glovers Point Chute outlet full of sediment. Right bank of inlet eroded back. Large hole behind revetment (Structure No. 773.8 – See Photo 5)

Photo 5 (Structure No. N/A)

RM 711.25

Revetment (Right Bank)

Damage: Scour behind bank and scour hole in bank.

Repair Dimensions: Corps inspection team suggested installing an effective refusal to patch revetment hole.

Repair Dimensions (revetment along Missouri River): 28 ft long and 7 ft high.

Photo 6 (Structure No. 768.3)

RM 708.78 to 708.67

Revetment (Right Bank)

Damage: Slough in bank.

Repair Dimensions: Approximately 710 ft long and 4 ft high.

Photo 7 (Structure No. 766.2)

RM 705.72

Revetment (Right Bank)

Damage: Hole in the Rock Backwater with left bank of backwater entrance missing revetment.

Repair Dimensions: Approximately 100 ft long and 7 ft high.

Photo 8 (Structure No. 748.34)

RM 693.58 to 693.48

Revetment (Right Bank)

Damage: Bank failure.

Repair Dimensions: Approximately 410 ft long and 6 ft high.

Photo 9 (Structure No. 748.13)

RM 691.63

Revetment (Left Bank)

Damage: Trees down. High bank missing rock.

Repair Dimensions: Approximately 200 ft long and 6 ft high.

Photo 10 (Structure No. 743.9)

RM 690.6 to 690.58

Revetment (Right Bank)

Damage: Bank failure. Toe needs to be reestablished.

Repair Dimensions: Approximately 100 ft long and 6 ft high.

Photo 11 (Structure No. N/A)

RM 688.22

Chute Inlet (Right Bank)

Damage: Willard Chute entrance full of sediment.

Photo 12 (Structure No. 741.36)

RM 687.3 to RM 685.7

Revetment (Right Bank)

Damage: Most of revetment degraded or missing along Lower Decatur Bend. Back side of rock refusal failed in multiple locations. Bank eroded back, channel widened. Corps team indicated repair design requires more than structures and will be addressed in a site specific design.

Repair Dimensions: Repair quantities undefined.

Photo 13 (Structure No. N/A)

RM 685.7 to 684.9

Chute (Right Bank)

Damage: Upper Louisville Bend Chute full of sediment.

Photo 14 (Structure No. 732.5)

RM 679.81 to 679.79

Revetment (Left Bank)

Damage: Needs to be rebuilt.

Repair Dimensions: Approximately 100 ft long and 7 ft high.

Photo 15 (Structure No. 726.93)

RM 674.04 to 673.87

Revetment (Left Bank)

Damage: Bank failure at Fawn Island Chute inlet. Large scour hole in left bank of inlet.

Repair Dimensions: Approximately 150 ft long and 7 ft high.

Photo 16 (Structure No. 726.93)

RM 673.5

Revetment / Chute Outlet (Left Bank)

Damage: Fawn Island Chute outlet bank failure, revetment degraded. Home threatened and private property impacted. Repair design requires more than structures and Corps will address in a site-specific design.

Repair Dimensions: Repair quantities undefined.

Photo 17 (Structure No. 726.27)

RM 673.48

Dike (Right Bank)

Damage: Flanked, approximately 200 ft gap between structure and bank.

Repair Dimensions: Approximately 200 ft long and 5 ft high.

Photo 18 (Structure No. 722.7)

RM 670 to RM 669.53

Revetment (Left Bank)

Damage: Exposed revetment, several scalloped banks due to the flooding.

Repair Dimensions: Approximately 2500 ft long and 9 ft high.

Note: Corps may want to leave gaps for habitat.

Photo 19 (Structure No. 719.81)

RM 665.76 to RM 665.8

Revetment (Right Bank)

Damage: Revetment degraded.

Repair Dimensions: Approximately 270 ft long and 5 ft high.

Photo 20 (Structure No. 713.97)

RM 662.5

Dike (Right Bank)

Damage: Structure mostly degraded.

Repair Dimensions: Approximately 100 ft long and 5 ft high.

Photo 21 (Structure No. 709.17)

RM 660.28

Dike (Left Bank)

Damage: Dike degraded at Soldier Bend Backwater (downstream side).

Repair Dimensions: Approximately 100 ft long and 6 ft high.

Photo 22 (Structure No. 708.75)

RM 657.93 to 657.86

Revetment (Right Bank)

Damage: Sandy Point Project – chute/inlet being installed. Thinned down rock. Corps field team did not have project details.

Repair Dimensions: Approximately 360 ft long and 8 ft high.

Photo 23 (Structure No. 704)

RM 654.47

Dike (Left Bank)

Damage: Flanked, dike low.

Repair Dimensions: Approximately 100 ft long and 4.5 ft high.

Photo 24 (Structure No. 703.28)

RM 653.77

Rootless Dike (Left Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 172 ft long and 6 ft high.

Photo 25 (Structure No. 702.98)

RM 653.43

Dike (Left Bank)

Damage: Flanked - 50' gap between structure and bank.

Repair Dimensions: Approximately 50 ft long and 6 ft high.

Photo 26 (Structure No. N/A)

RM 653.11

Backwater

Damage: Tyson Bend Backwater 7 to 8 ft of sediment deposited at the left bank of chute (north side). Right bank of backwater (south side) eroded back behind river left-bank dikes.

Photo 27 (Structure No. 703.25)

RM 652.47 to RM 652.42

Revetment (Right Bank)

Damage: Sloughing in right bank, toe damaged.

Repair Dimensions: Approximately 300 ft long and 8 ft high.

Photo 28 (Structure No. 700.5)

RM 650.3 to 650.22

Revetment (Left Bank)

Damage: California Chute (Iowa side) inlet damaged.

Repair Dimensions: Approximately 410 ft long and 6 ft high.

Photo 29 (Structure No. 698.67)

RM 650.11

Grade Control (Right Bank)

Damage: California Chute inlet (Nebraska side) full of sediment. Grade control structure cut in behind entrance (upstream side of inlet).

Photo 30 (Structure No. N/A)

RM 650.02

Grade Control (Right Bank)

Damage: Flanked grade control structure at the California Chute inlet (Nebraska side – downstream side of inlet).

Photo 31 (Structure No. N/A)

RM 648.79

Chute Outlet

Damage: 2nd California Chute outlet (right bank of Missouri River) full of sediment.

Photo 32 (Structure No. 694.6)

RM 648.08

Revetment (Right Bank)

Repair Dimensions: Approximately 100 ft long and 8 ft high.

Photo 33 (Structure No. 692.81)

RM 646.34

Dike/Sill (Left Bank)

Repair Dimensions: Approximately 200 ft long and 4.5 ft high.

Photo 34 (Structure No. 691.79)

RM 645.44

Dike (Left Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 200 ft long and 4 ft high.

Photo 35 (Structure No. 691.55)

RM 644.82

Dike (Left Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 200 ft long and 4 ft high.

Photo 36 (Structure No. 691.41)

RM 641.86 to RM 641.66

Revetment (Left Bank)

Damage: Revetment degraded, bank eroded back behind structure.

Repair Dimensions: Approximately 1054 ft long and 4 ft high.

Photo 37 (Structure No. 683.5)

RM 641.26 to RM 641.2

Revetment (Right Bank)

Photo looking downstream

Repair Dimensions: Approximately 320 ft long and 5 ft high.

Photo 38 (Structure No. 683.4)

RM 641.11

Dike (Left Bank)

Repair Dimensions: Approximately 200 ft long and 4 ft high.

Photo 39 (Structure No. 683.1)

RM 640.82

Dike (Left Bank)

Damage: Dike degraded.

Repair Dimensions: Dike with environmental gap. Approximately 180 ft long and 6 ft high.

Photo 40 (Structure No. 682.85)

RM 640.27

Dike (Left Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 150 ft long and 4 ft high.

Photo 41 (Structure No. 682.75)

RM 640.19

Dike (Left Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 200 ft long and 4 ft high.

Photo 42 (Structure No. 682.8)

RM 640.19 to RM 639.85

Revetment (Right Bank)

Damage: Large amount of material eroded from bank (damaged houses along bank).

Repair Dimensions: Approximately 1714 ft long and 6.6 ft high.

Photo 43 (Structure No. 682.55)

RM 639.84 to RM 639.63

Kicker (Right Bank)

Damage: Large amount of material eroded from bank (damaged houses along bank).

Repair Dimensions: Approximately 1042 ft long and 9.7 ft high.

Photo 44 (Structure No. 682.1)

RM 639.41

Dike (Right Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 100 ft long and 6 ft high.

Photo 45 (Structure No. 681.8)

RM 639.02

Dike (Right Bank)

Damage: Dike nearly all degraded.

Repair Dimensions: Approximately 200 ft long and 6 ft high.

Photo 46 (Structure No. 681.6)

RM 638.83

Dike (Right Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 150 ft long and 6 ft high.

Photo 47 (Structure No. 681.5)

RM 638.7

Dike (Right Bank)

Damage: Dike low.

Repair Dimensions: Approximately 100 ft long and 6 ft high.

Photo 48 (Structure No. 682.4)

RM 638.54 to RM 638.4

Kicker (Left Bank)

Damage: Kicker missing or completely degraded.

Repair Dimensions: Approximately 820 ft long and 8 ft high.

Photo 49 (Structure No. 681)

RM 638.2

Dike (Left Bank)

Damage: Dike rock low.

Repair Dimensions: Approximately 200 ft long and 4 ft high.

Photo 50 (Structure No. 681.35)

RM 638.01 to RM 637.9

Revetment (Right Bank)

Damage: Revetment degraded just above Boyer Chute inlet; scoured overbank behind revetment.

Repair Dimensions: Approximately 560 ft long and 8 ft high.

Photo 51 (Structure No. 680.8)

RM 637.98

Dike (Left Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 150 ft long and 4 ft high.

Photo 52 (Structure No. 680.52)

RM 637.76

Dike (Left Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 75 ft long and 6 ft high.

Photo 53 (Structure No. N/A)

RM 637.74

Chute Inlet (Right Bank)

Damage: Boyer Chute inlet (right bank of Missouri River) full of sediment.

Photo 54 (Structure No. N/A)

RM 637.57

Chute (Right Bank)

Damage: Lower Calhoun Chute full of sediment.

Photo 55 (Structure No. 680.7)

RM 637.55 to 637.36

Revetment (Right Bank)

Damage: Sections of bank missing rock or bank eroded back.

Repair Dimensions: Approximately 1028 ft long and 4.3 ft high.

Photo 56 (Structure No. 680.7)

RM 637.36

Revetment (Right Bank)

Damage: Revetment low or missing rock.

Repair Dimensions: Approximately 773 ft long and 4 ft high.

Photo 57 (Structure No. 680.1)

RM 637.22 to RM 637.09

Kicker (Right Bank)

Damage: Kicker missing or low at Calhoun Chute outlet.

Repair Dimensions: Approximately 657 ft long and 8 ft high.

Photo 58 (Structure No. 679.95)

RM 636.99

Dike (Right Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 100 ft long and 6 ft high.

Photo 59 (Structure No. 679.37)

RM 636

Rootless Dike (Right Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 100 ft long and 7 ft high.

Photo 60 (Structure No. 679.1)

RM 635.64

Rootless Dike (Right Bank)

Damage: Dike low.

Repair Dimensions: Approximately 100 ft long and 6 ft high.

Photo 61 (Structure No. N/A)

RM 634.67

Chute Outlet – Mid-Channel (Right Bank)

Damage: Mid-channel connection to Boyer Backwater Chute (right bank of Missouri River) full of sediment.

Photo 62 (Structure No. 678.7)

RM 634.04 to 633.92

Kicker (Left Bank)

Damage: Missing rock or low in some areas.

Repair Dimensions: Approximately 660 ft long and 4 ft high.

Photo 63 (Structure No. 678.1)

RM 633.35 to RM 633.06

Revetment (Right Bank)

Damage: Long section of bank missing rock or low, just downstream of Boyer Chute outlet.

Repair Dimensions: Approximately 1567 ft long and 4.7 ft high.

Photo 64 (Structure No. 676.8)

RM 631.81 to RM 631.72

Revetment (Left Bank)

Damage: Revetment degraded.

Repair Dimensions: Approximately 507 ft long and 4.1 ft high.

Photo 65 (Structure No. 673.6-A)

RM 629

Dike (Right Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 200 ft long and 4 ft high.

Photo 66 (Structure No. 672.5)

RM 628.17

Dike (Right Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 200 ft long and 6 ft high.

Photo 67 (Structure No. 666.8)

RM 622.46

Dike (Right Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 200 ft long and 4 ft high.

Photo 68 (Structure No. 662.4)

RM 618.38

Dike (Right Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 150 ft long and 4 ft high.

Photo 69 (Structure No. 662.3)

RM 617.8

Chute Inlet (Left Bank)

Damage: Left-bank revetment of Missouri River missing rock or low near inlet of Council Bend Chute. At inlet, over steepened bank, bank scoured/eroded on left side of chute entrance.

Repair Dimensions: Approximately 556 ft long and 8 ft high.

Photo 70 (Structure No. 660.4)

RM 616.45

Dike (Left Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 100 ft long and 6 ft high.

Photo 71 (Structure No. 655.5)

RM 611.8

Dike (Left Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 200 ft long and 4 ft high.

Photo 72 (Structure No. 655.2)

RM 611.42

Dike (Left Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 300 ft long and 4 ft high.

Photo 73 (Structure No. 656.9)

RM 611.29

Revetment (Right Bank)

Repair Dimensions: Approximately 500 ft long and 4 ft high.

Photo 74 (Structure No. 656.9)

RM 611.11 to RM 610.8

Revetment (Right Bank)

Damage: Revetment degraded.

Repair Dimensions: Approximately 1710 ft long and 6.8 ft high.

Photo 75 (Structure No. 653.25)

RM 608.63 to RM 608.52

Revetment (Left Bank)

Damage: Revetment low.

Repair Dimensions: Approximately 600 ft long and 5 ft high.

Photo 76 (Structure No. 652.25)

RM 608.2

Dike (Right Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 200 ft long and 5 ft high.

Photo 77 (Structure No. 650.8)

RM 606.97

Dike (Right Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 200 ft long and 5 ft high.

Photo 78 (Structure No. 650.3)

RM 606.76

Dike (Right Bank)

Damage: Dike completely degraded.

Repair Dimensions: Approximately 200 ft long and 5 ft high.

Photo 79 (Structure No. 649.8)

RM 606.55

Dike (Right Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 250 ft long and 5 ft high.

Photo 80 (Structure No. 649.3)

RM 606.08

Dike (Right Bank)

Damage: Dike degraded.

Repair Dimensions: Approximately 200 ft long and 5 ft high.

Photo 81 (Structure No. 648.3)

RM 604.29

Dike (Left Bank)

Damage: Dike degraded, piles exposed.

Repair Dimensions: Approximately 150 ft long and 4 ft high.

Photo 82 (Structure No. 647.6)

RM 601.65 to RM 601.62

Revetment (Right Bank)

Damage: Tail end of upper revetment structure torn off, piles exposed.

Repair Dimensions: Approximately 200 ft long and 5 ft high.

Photo 83 (Structure No. 638.75)

RM 595.08 to RM 594.8

Kicker (Right Bank)

Photo looking downstream at Platte River outlet

Damage: Separator revetment needs to be rebuilt.

Repair Dimensions: Approximately 1120 ft long and 3.2 ft high.

Photo 84 (Structure No. 637.9-A)

RM 594.43 to RM 594.08

Revetment (Right Bank)

Damage: Revetment degraded, bank eroded.

Repair Dimensions: Approximately 1800 ft long and 1.6 ft high.

Photo 85 (Structure No. 637.9-A)

RM 594.08 to RM 593.94

Kicker (Right Bank)

Damage: Kicker degraded, bank eroded.

Repair Dimensions: Approximately 769 ft long and 3.5 ft high.

Photo 86 (Structure No. N/A)

RM 591.97

Chute Outlet (Right Bank)

Damage: Plattsmouth Chute exit full of sediment.

Photo 87 (Structure No. N/A)

RM 589.44

Chute Inlet (Right Bank)

Damage: Tobacco Chute inlet full of sediment. Entrance is eroded on left bank.

Photo 88 (Structure No. 632.95)

RM 589.33

Revetment (Right Bank)

Repair Dimensions: Approximately 300 ft long and 4 ft high.

Photo 89 (Structure No. 629.89)

RM 586.26

L-Head (Left Bank)

Damage: Gap in L-head dike.

Repair Dimensions: Approximately 100 ft long and 4 ft high.

Photo 90 (Structure No. 625.88)

RM 582.28

Dike (Right Bank)

Damage: Large scour hole in bank behind dike. Root structure damaged.

Repair Dimensions: Approximately 178 ft long and 7 ft high.

Photo 91 (Structure No. 608.78)

RM 562.5

Revetment (Right Bank)

Damage: Opening at North Table Creek outfall – revetment damaged at culvert.

Repair Dimensions: Approximately 125 ft long and 3 ft high.

Photo 92 (Structure No. 608.1)

RM 562.21 to RM 562.14

Revetment (Right Bank)

Damage: Revetment damaged downstream of South Table Creek outlet.

Repair Dimensions: Approximately 410 ft long and 3 ft high.

Photo 93 (Structure No. 608.02)

RM 562.18

Dike (Right Bank)

Damage: Damaged dike along right bank of South Table Creek.

Repair Dimensions: Approximately 135 ft long and 1 ft high.

Photo 94 (Structure No. N/A)

RM 555.39

Chute Inlet (Right Bank of River)

Damage: Upper Hamburg Chute inlet left-bank eroded.

Inspection notes: Corps team indicated repair objective to reduce amount of flow and protect grade control structures.

Repair Dimensions: Repair quantities undefined.

Photo 95 (Structure No. 600.6)

RM 554.67 to RM 554.63

Revetment (Left Bank)

Damage: Breaks in revetment (some areas of bare bank).

Repair Dimensions: Approximately 228 ft long and 4.6 ft high.

Photo 96 (Structure No. 598.19)

RM 553.32 to 553.27

Revetment (Left Bank)

Damage: Left bank revetment of Missouri River damaged. Left bank of Lower Hamburg Chute eroded.

Inspection Notes: Repair revetment, and protect bank of chute entrance.

Repair Dimensions: Approximately 205 ft long and 3 ft high.

Photo 97 (Structure No. 598.19/598)

RM 553.23 to 553.12

L-head (Left Bank)

Damage: Lower Hamburg Chute inlet structure damaged. Right bank of chute inlet widened and eroded back behind L-head structure.

Repair Dimensions: Approximately 438 ft long and 1.8 ft high (revetment); 167 ft long and 1.5 ft high (dike).

Photo 98 (Structure No. N/A)

RM 550.91

Chute (Left Bank)

Damage: Breach in right bank of chute. Right bank levee has significant erosion.

Inspection Notes: Corps team indicated repair design requires more than structures and will be addressed in a site-specific design.

Repair Dimensions: Repair quantities undefined.

Photo 99 (Structure No. 592.81/592.3)

RM 546.3 to RM 546.1

L-Head (Right Bank)

Damage: Last L-head in series on the upstream side of the Kansas Bend Chute inlet – degraded/submerged.

Repair Dimensions: Approximately 920 ft long by 2 ft high (revetment portion), and 100 ft long by 2 ft high (dike portion).

Photo 100 (Structure No. 589.1)

RM 542.82 to RM 542.77

Revetment (Left Bank)

Damage: Large amount of material eroded from bank.

Repair Dimensions: Approximately 326 ft long by 11 ft high.

Photo 101 (Structure No. 584.6)

RM 540.02 to 539.76

Kicker (Right Bank)

Damage: Large amount of material eroded from bank.

Repair Dimensions: Approximately 1615 ft long by 5.1 ft high.

Photo 102 (Structure No. 584.3)

RM 539.37 to 539.14

Revetment (Left Bank)

Damage: Large amount of material eroded from bank.

Repair Dimensions: Approximately 1207 ft long by 6.4 ft high.

Photo 103 (Structure No. N/A)

RM 529.18

Backwater (Right Bank)

Damage: Sediment deposition in Langdon Bend Backwater entrance.

Photo 104 (Structure No. 568.1)

RM 526.04 to RM 525.72

L-head (Right Bank)

Damage: L-head degraded.

Repair Dimensions: Approximately 1623 ft long by 4.1 ft high.

Photo 105 (Structure No. 562.1)

RM 520.61 to RM 520.48

Revetment / Inlet Control (Left Bank)

Damage: Revetment and inlet control dike degraded at Deroin Chute inlet. Left-bank of chute inlet eroded and widedened since flood.

Repair: Need to reduce flow in the chute.

Repair Dimensions: Approximately 273 ft long by 5.7 ft high (revetment); 390 ft long by 6.4 ft high (Inlet control).

Photo 106 (Structure No. 561.77)

RM 520.45 to RM 520.36

Vane (Left Bank)

Damage: Intermediate structure in front of Deroin Chute degraded.

Repair Dimensions: Approximately 250 ft long and 3 ft high.

Photo 107 (Structure No. 561.77)

RM 520.33 to RM 520.2

L-head (Left Bank)

Damage: Approximately 50' of rock missing off the end of the L-head near the dike/revetment vertex. Several gaps in structure require repair. Riverbank eroded and widened at inlet. Grade control structure flanked along right-bank of inlet.

Repair Dimensions: Approximately 100 ft long and 3 ft high.

Photo 108 (Structure No. 554.9)

RM 513.15

Dike (Right Bank)

Damage: Rebuild (only piles visible).

Repair Dimensions: Approximately 118 ft long and 4 ft high.

Photo 109 (Structure No. 546.5)

RM 505.88 to RM 505.77

Revetment (Right Bank)

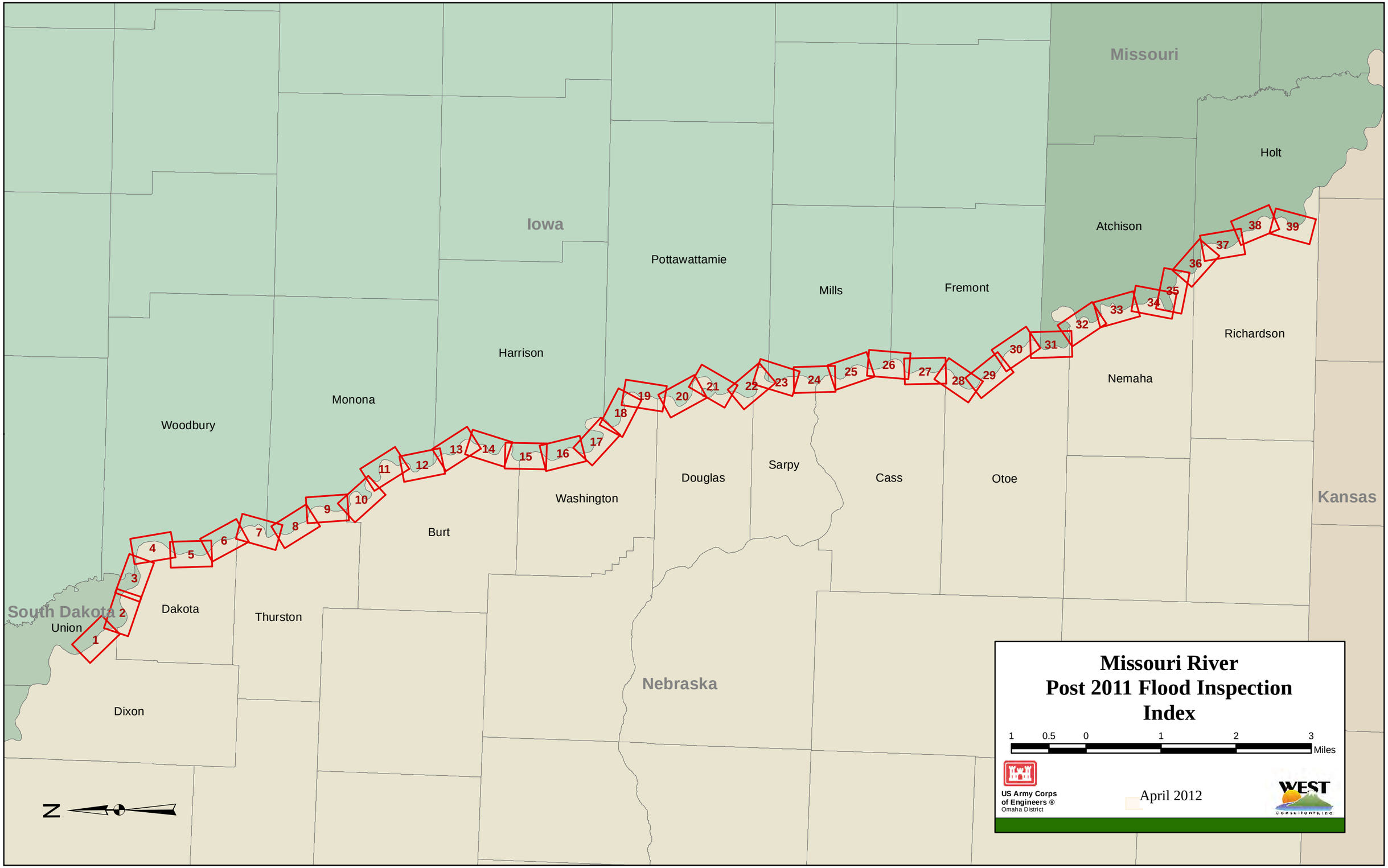
Damage: Bank failure behind revetment. Revetment degraded.

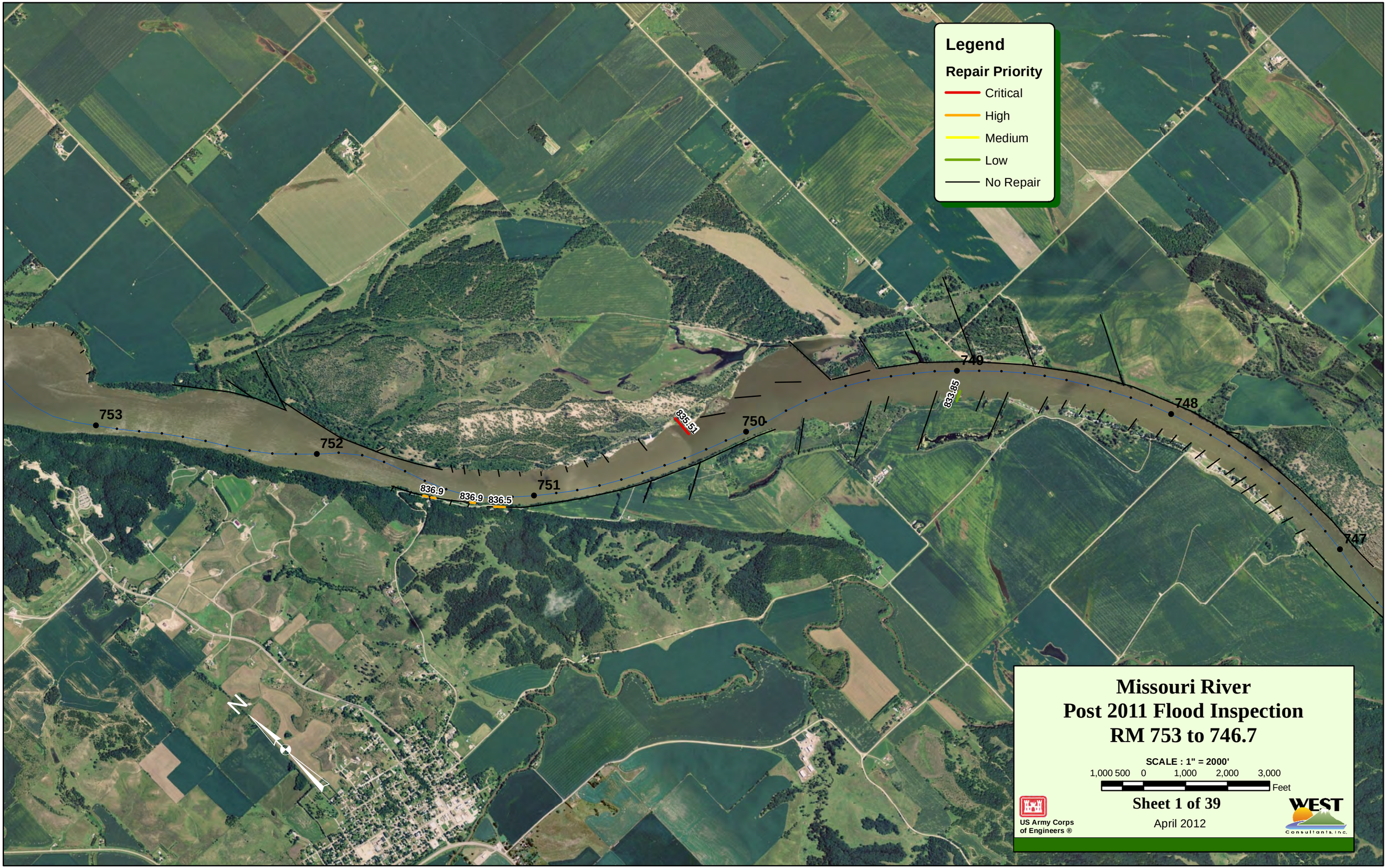
Repair Dimensions: Approximately 653 ft long and 2.3 ft high.

ATTACHMENT B

MAPS SHOWING STRUCTURES NEEDING REPAIR (SHEETS 1–39)

Note: Structures requiring repair are identified by structure number and have been color-coded based on the repair priority level. Only the damaged portion of each revetment is highlighted on the maps; highlighted dikes may include more than just the damaged portion. Omaha District aerial images from 2006 are shown on the map sheets, along with 1960 river miles.


Missouri River
Post 2011 Flood Inspection Index
1 0.5 0 1 2 3
Miles
US Army Corps of Engineers ®
Omaha District
April 2012
WEST Consultants, Inc.
Missouri
Iowa
Nebraska
Kansas
South Dakota
Holt
Atchison
Richardson
Nemaha
Otoe
Cass
Sarpy
Douglas
Washington
Burt
Pottawattamie
Mills
Fremont
Harrison
Monona
Woodbury
Dakota
Union
Thurston
Dixon
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
N


Legend
Repair Priority
Critical
High
Medium
Low
No Repair
753
752
751
750
749
748
747
835.51
833.85
836.9
836.9
836.5
N
Missouri River
Post 2011 Flood Inspection
RM 753 to 746.7
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 1 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
748
747
746
745
744
743
742
741
740
828.4
828.4
N
Missouri River
Post 2011 Flood Inspection
RM 748 to 739.5
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 2 of 39
April 2012
US Army Corps
of Engineers ®
WEST
Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
740
739
738
737
736
735
734
733
0
Big Sioux River
N
Missouri River
Post 2011 Flood Inspection
RM 740.3 to 733
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 3 of 39
April 2012
US Army Corps
of Engineers ®
WEST
Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Floyd River Old Channel
Floyd River
730
729
731
728
732
727
807.45
802.8
733
726
734
N
Missouri River
Post 2011 Flood Inspection
RM 734.1 to 725.2
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 4 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
726
801.19
801.19
725
799.8
724
723
722
797.16
721
797.15
720
792.64
Pigeon Creek Ditch
Omaha Creek
N
Missouri River
Post 2011 Flood Inspection
RM 726.2 to 719.2
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 5 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
718
717
719
716
714
715
720
783.12
782.55
782.09
779.9
792.64
Omaha Creek
N
Missouri River
Post 2011 Flood Inspection
RM 720.1 to 713.5
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 6 of 39
April 2012
US Army Corps
of Engineers ®
WEST
Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
712
711
713
714
715
710
709
708
707
775.4
775.1
775
774.9
772
771.8
771.6
771.4
777.6
779.9
770.09
769.85
768.3
774.55
Glovers Backwater
Glovers Point Chute
Right bank of outlet - large scour hole
Connection to backwater silted in at high flows, ~45,000 cfs (Corps inspection Nov. 2011)
Inlet and chute full of sediment
N
Missouri River
Post 2011 Flood Inspection
RM 715 to 706.7
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 7 of 39
April 2012
US Army Corps of Engineers ®
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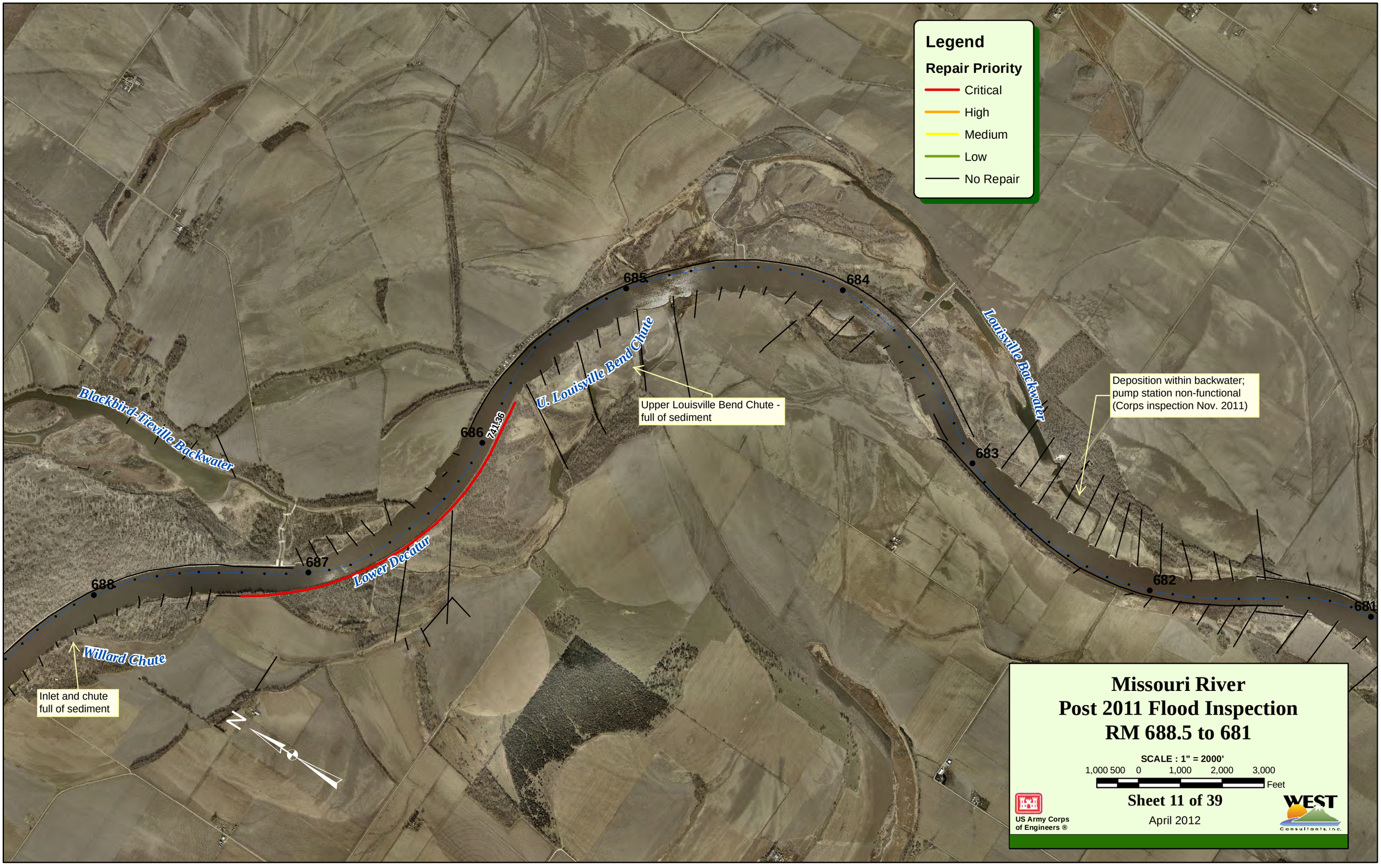
Legend
Repair Priority
Critical
High
Medium
Low
No Repair
707
706
705
704
703
702
701
766.2
761.85
Hole in the Rock Backwater
Large sandbar at backwater entrance;
damaged revetment at left bank
N
Missouri River
Post 2011 Flood Inspection
RM 707.5 to 700.4
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 8 of 39
April 2012
US Army Corps
of Engineers ®
WEST
Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
699
700
698
Blackbird Creek
697
696
695
701
702
N
Missouri River
Post 2011 Flood Inspection
RM 702 to 694.4
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 9 of 39
April 2012
US Army Corps
of Engineers ®
WEST
Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Blackbird-Tieville Backwater
Blackbird-Tie
Willard Chute
Inlet and chute full of sediment
Elm Creek
695
694
693
692
691
690
689
688
748.4
748.34
747.4
749.13
744.95
743.9
743.9
N
Missouri River
Post 2011 Flood Inspection
RM 695.2 to 687.6
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 10 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.


Legend
Repair Priority
Critical
High
Medium
Low
No Repair
685
684
683
682
681
686
687
688
741.36
U. Louisville Bend Chute
Upper Louisville Bend Chute - full of sediment
Louisville Backwater
Deposition within backwater; pump station non-functional (Corps inspection Nov. 2011)
Blackbird-Tieville Backwater
Lower Decatur
Willard Chute
Inlet and chute full of sediment
N
Missouri River
Post 2011 Flood Inspection
RM 688.5 to 681
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 11 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Chute and revetment degraded at inlet
Fawn Island
726.93
674
726.93
726.92
675
676
677
678
679
680
681
732.25
731.9
N
Missouri River
Post 2011 Flood Inspection
RM 681.8 to 673.8
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 12 of 39
April 2012
US Army Corps of Engineers ®
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Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Chute and revetment degraded at inlet
Fawn Island Chute
Large scour hole at chute outlet - home threatened
Monona Harrison Ditch
Three Rivers
Little Sioux River
674
673
672
671
670
669
668
667
666
726.93
726.93
726.93
726.92
726.45
726.27
722.7
724.95
721.55
721.4
721.31
721.21
721.1
721.05
720.8
720.6
N
Missouri River
Post 2011 Flood Inspection
RM 674.6 to 666
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 13 of 39
April 2012
US Army Corps of Engineers ®
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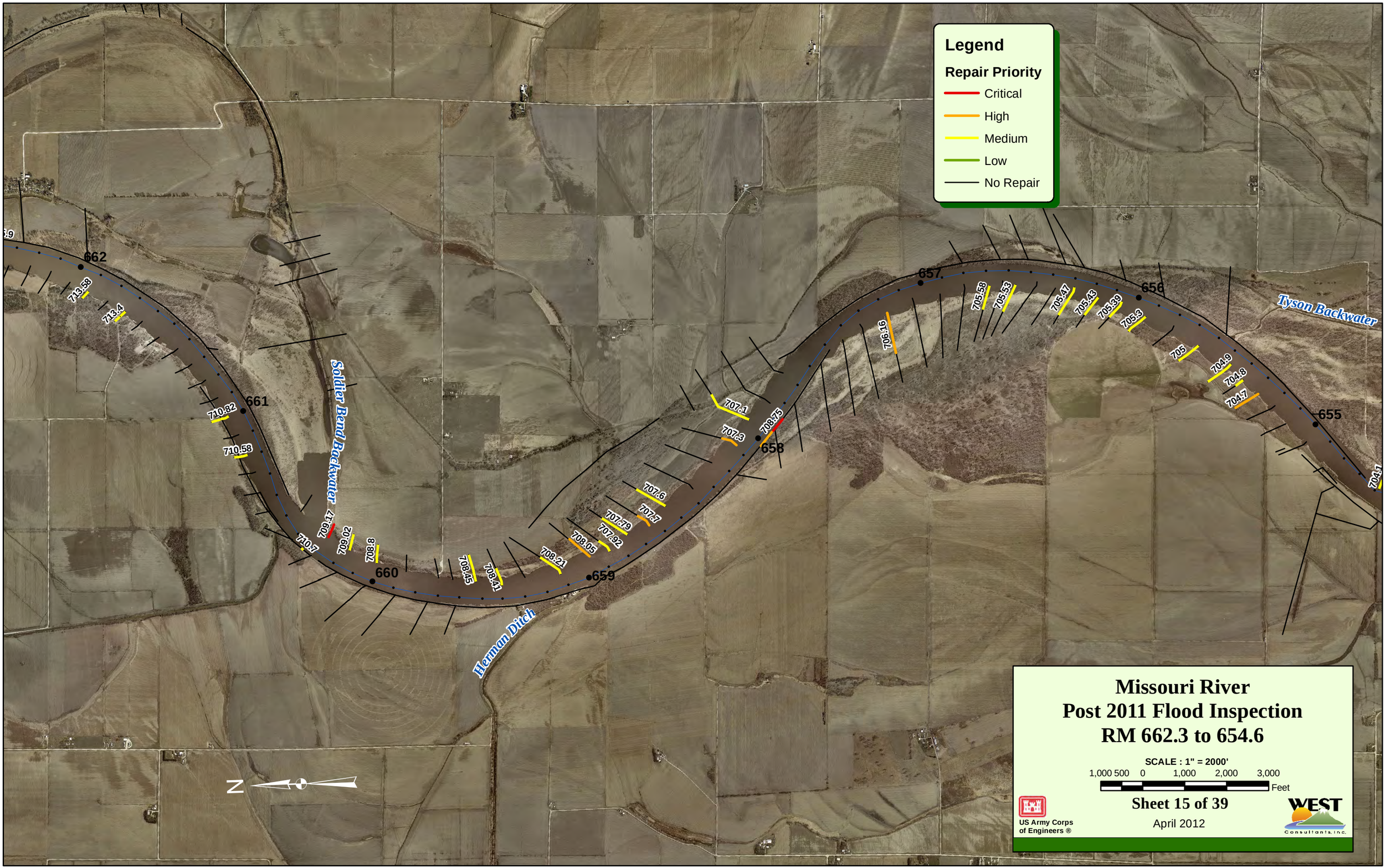
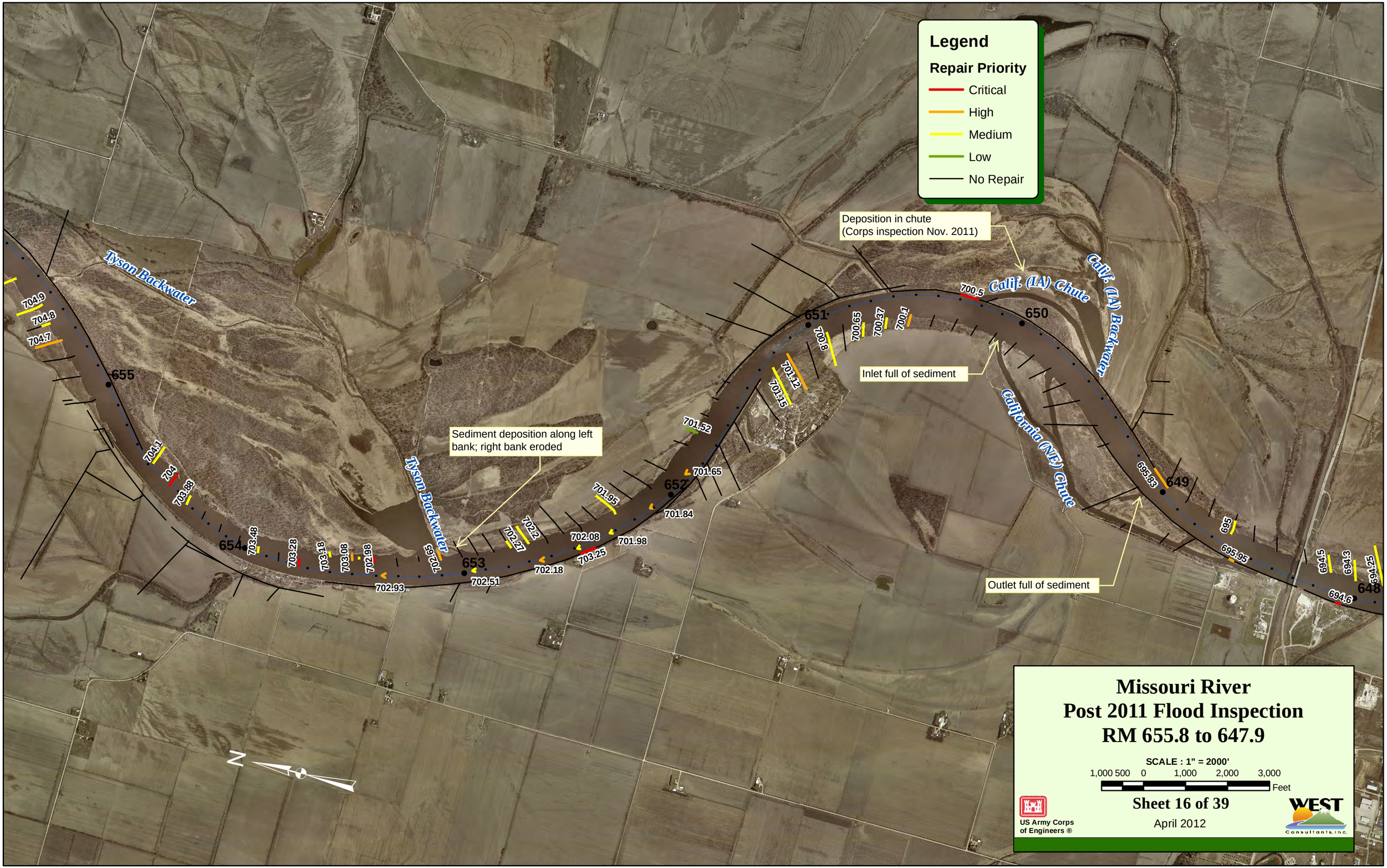
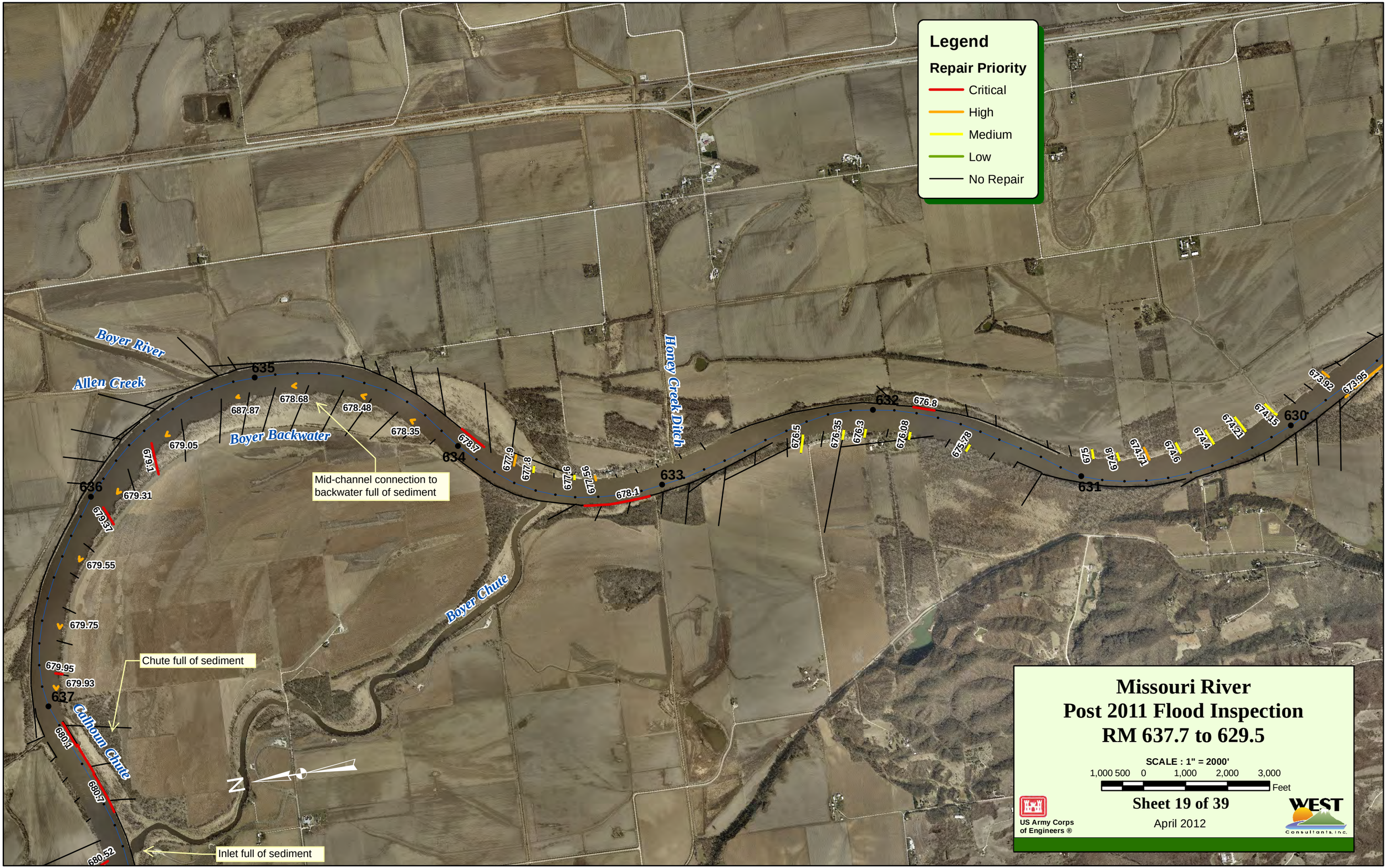
Legend
Repair Priority
Critical
High
Medium
Low
No Repair
668
667
666
665
664
663
662
721.21
721.1
721.05
720.8
720.6
719.4
719
718.7
718.4
718.21
718.11
719.81
717.6
717.5
717.25
717
716.36
716.2
716.1
716
715.91
715.7
717.1
715.31
714.69
713.97
715.9
715.9
713.58
713.4
Soldier River
Bullard Bend Backwater
Tekamah Ditch
Some sediment deposition in backwater; upstream revetment degraded - flow through onto private property (Corps inspection Nov. 2011)
N
Missouri River
Post 2011 Flood Inspection
RM 668.3 to 661.6
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 14 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.


Legend
Repair Priority
Critical
High
Medium
Low
No Repair
662
661
660
659
658
657
656
655
713.58
713.4
710.82
710.58
710.7
709.01
709.01
708.8
708.45
708.41
708.21
708.05
707.92
707.79
707.7
707.6
707.3
707.1
708.75
706.16
705.58
705.53
705.47
705.43
705.39
705.3
705
704.9
704.8
704.7
704.1
Soldier Bend Backwater
Herman Ditch
Tyson Backwater
N
Missouri River
Post 2011 Flood Inspection
RM 662.3 to 654.6
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 15 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.


Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Deposition in chute
(Corps inspection Nov. 2011)
Inlet full of sediment
Sediment deposition along left bank; right bank eroded
Outlet full of sediment
Tyson Backwater
Calif. (IA) Chute
Calif. (IA) Backwater
California (NE) Chute
Tyson Backwater
655
654
653
652
651
650
649
648
704.9
704.8
704.7
704.1
704
703.88
703.48
703.28
703.18
703.08
702.98
702.93
702.65
702.51
702.27
702.2
702.18
702.08
703.25
701.98
701.95
701.84
701.65
701.52
701.15
701.12
700.8
700.65
700.37
700.1
700.5
695.83
695
695.95
694.6
694.5
694.3
694.25
N
Missouri River
Post 2011 Flood Inspection
RM 655.8 to 647.9
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 16 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Missouri River
Post 2011 Flood Inspection
RM 649.8 to 641.8
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 17 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.
N
Long Creek
649
648
647
646
645
644
643
642
695.95
695
694.5
694.3
694.25
694.1 A/B
694.6
693.9
693.81
693.6
693.51
693.69
693.35
693.2
693.15
692.81
692.27
692.2
691.9
691.79
693.8
691.76
691.71
691.55
691.41
691.37
691.36
691.35
691.2
691.41
691
690.84
690.72
690.32
689.62
688.72
687.52
685.42

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
687.52
685.42
642
691.41
683.7
683.6
683.5
683.4
641
683.1
683
682.95
682.9
682.85
682.75
682.7
682.62
682.8
640
682.49
682.55
682.1
682
681.9
681.8
681.6
681.5
639
682.4
681
680.9
680.8
680.65
680.52
638
681.35
680.7
680.1
637
679.95
679.93
679.75
679.55
679.37
679.31
679.1
679.05
636
Calhoun Chute
Chute full of sediment
Inlet full of sediment
Boyer Chute
N
Missouri River
Post 2011 Flood Inspection
RM 642.7 to 635.5
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 18 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.


Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Boyer River
Allen Creek
Boyer Backwater
Honey Creek Ditch
Boyer Chute
Calhoun Chute
Mid-channel connection to backwater full of sediment
Chute full of sediment
Inlet full of sediment
635
634
633
632
631
630
636
637
687.87
678.68
678.48
678.35
678.7
677.9
677.8
677.6
677.59
678.1
676.8
676.5
676.35
676.3
676.08
675.78
675
674.79
674.71
674.6
674.4
674.21
674.15
673.92
673.95
679.05
679.1
679.31
679.37
679.55
679.75
679.95
679.93
680.1
680.7
680.52
N
Missouri River
Post 2011 Flood Inspection
RM 637.7 to 629.5
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 19 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.

Missouri River
Post 2011 Flood Inspection
RM 630.3 to 621.3

SCALE : 1" = 2000'

1,000 500 0 1,000 2,000 3,000 Feet

Sheet 20 of 39

April 2012

US Army Corps of Engineers ®

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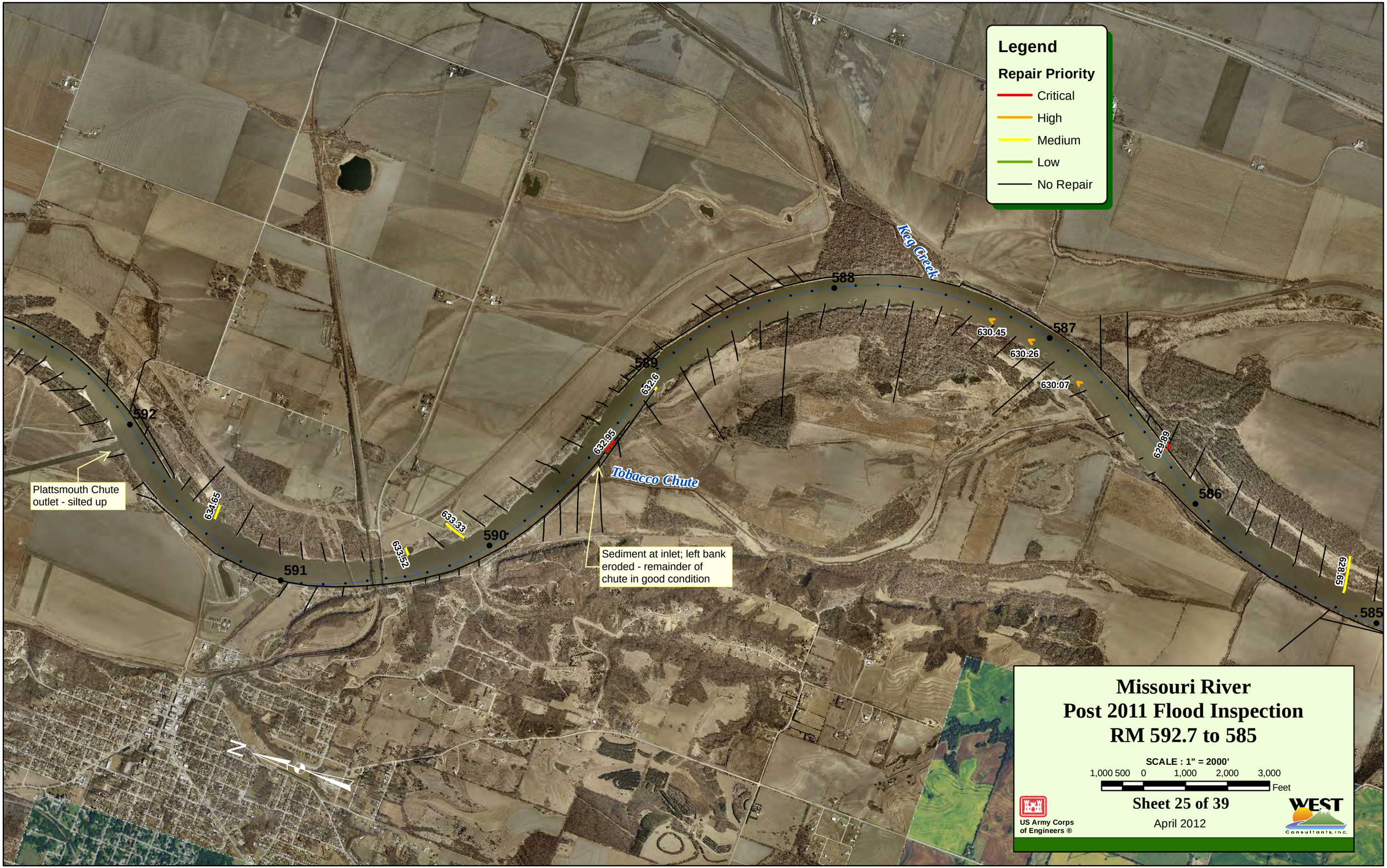
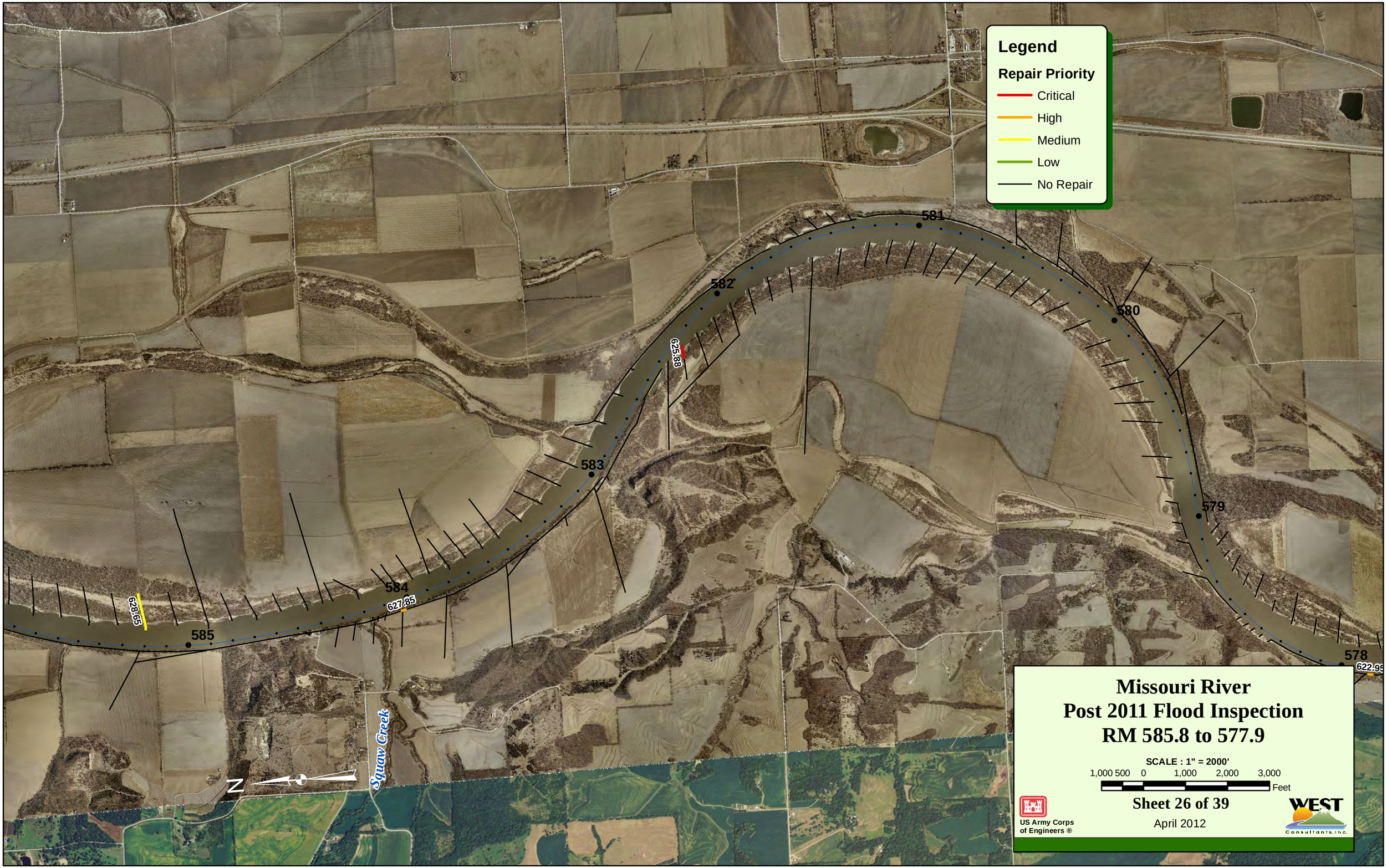
Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Over steepened/scoured left bank of chute inlet
Council Bend Chute
620
619
618
617
616
615
614
621
622
623
663.97
663.8
663.7
663.6
663.2
662.8
662.7
662.6
662.5
662.4
662.2
662
662.3
661.6
661.34
660.4
659.39
659.79
664.49
664.41
664.31
664.77
664.9
665.08
665.38
666.15
666.8
667
667.1
667.2
Missouri River
Post 2011 Flood Inspection
RM 623.2 to 613.9
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 21 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Indian Creek
Mosquito Creek
614
613
612
611
610
609
608
607
606
604
603
657.93
657.9
657.88
657.5
657.7
657.1
657
656.2
655.5
655.2
655
656.9
656.9
654.65
654.2
653.85
653.5
653.26
653.25
652.56
652.25
652.2
650.8
650.3
649.8
649.7
649.61
649.4
649.3
649.05
649.4
648.3
648.2
N
Missouri River
Post 2011 Flood Inspection
RM 614.7 to 601.8
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 22 of 39
April 2012
US Army Corps
of Engineers ®
WEST
Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Mosquito Creek
606
605
604
603
602
601
600
599
608
649.4
649.3
649.61
649.7
649.8
650.3
650.8
649.05
649.4
648.3
648.2
647.6
645.6
645.4
645.3
646.3
652.2
652.25
653.6
652.56
653.25
N
Missouri River
Post 2011 Flood Inspection
RM 608.9 to 598.2
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 23 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
598
597
596
595
594
593
592
636.9
637.9A
638.75
Papillion Creek
Platte River
Goose Lake
Plattsmouth Chute
Some sediment deposition at chute inlet
Silted up at outlet
N
Missouri River
Post 2011 Flood Inspection
RM 598.9 to 591.8
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 24 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.


Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Keg Creek
Tobacco Chute
588
587
589
592
591
590
586
585
630.45
630.26
630.07
632.6
632.95
629.89
634.65
633.33
633.52
628.95
Plattsmouth Chute outlet - silted up
Sediment at inlet; left bank eroded - remainder of chute in good condition
N
Missouri River
Post 2011 Flood Inspection
RM 592.7 to 585
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 25 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.


Legend
Repair Priority
Critical
High
Medium
Low
No Repair
581
582
580
583
579
584
585
578
625.88
628.65
627.85
622.95
Squaw Creek
N
Missouri River
Post 2011 Flood Inspection
RM 585.8 to 577.9
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 26 of 39
April 2012
US Army Corps
of Engineers ®
WEST
Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
579
578
577
576
575
574
573
622.95
622.95
622.6
622
621.71
621.5
621.4
620.8
620.7
620.41
619.8
618.29
618.8
618.8
618.8
617.6
617.52
Rakes Creek
Ervine Creek
Plum Creek
N
Missouri River
Post 2011 Flood Inspection
RM 579.3 to 572.1
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 27 of 39
April 2012
US Army Corps
of Engineers ®
WEST
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Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Walnut Creek
East Chute
West Chute
Weeping Water Creek
565
566
567
568
569
570
571
572
573
610.6
611.3
611.9
612.1
613.4
614.7
614.85
615.3
615.64
615.55
616
616.55
617.52
617.6
618.8
618.8
N
Missouri River
Post 2011 Flood Inspection
RM 573.2 to 564.8
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 28 of 39
April 2012
US Army Corps of Engineers ®
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Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Missouri River
Post 2011 Flood Inspection
RM 566.6 to 559.8
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 29 of 39
April 2012
US Army Corps of Engineers ®
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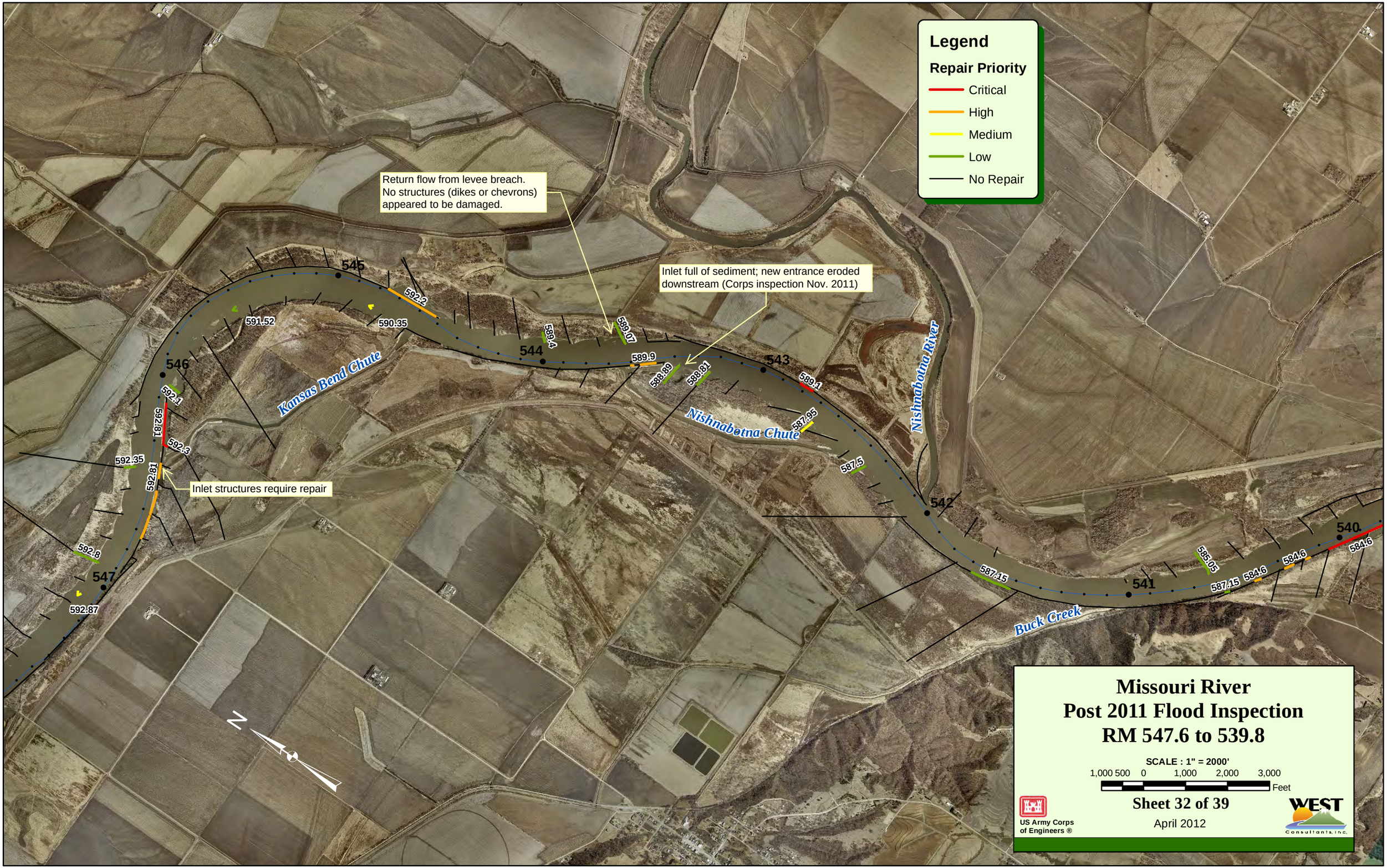
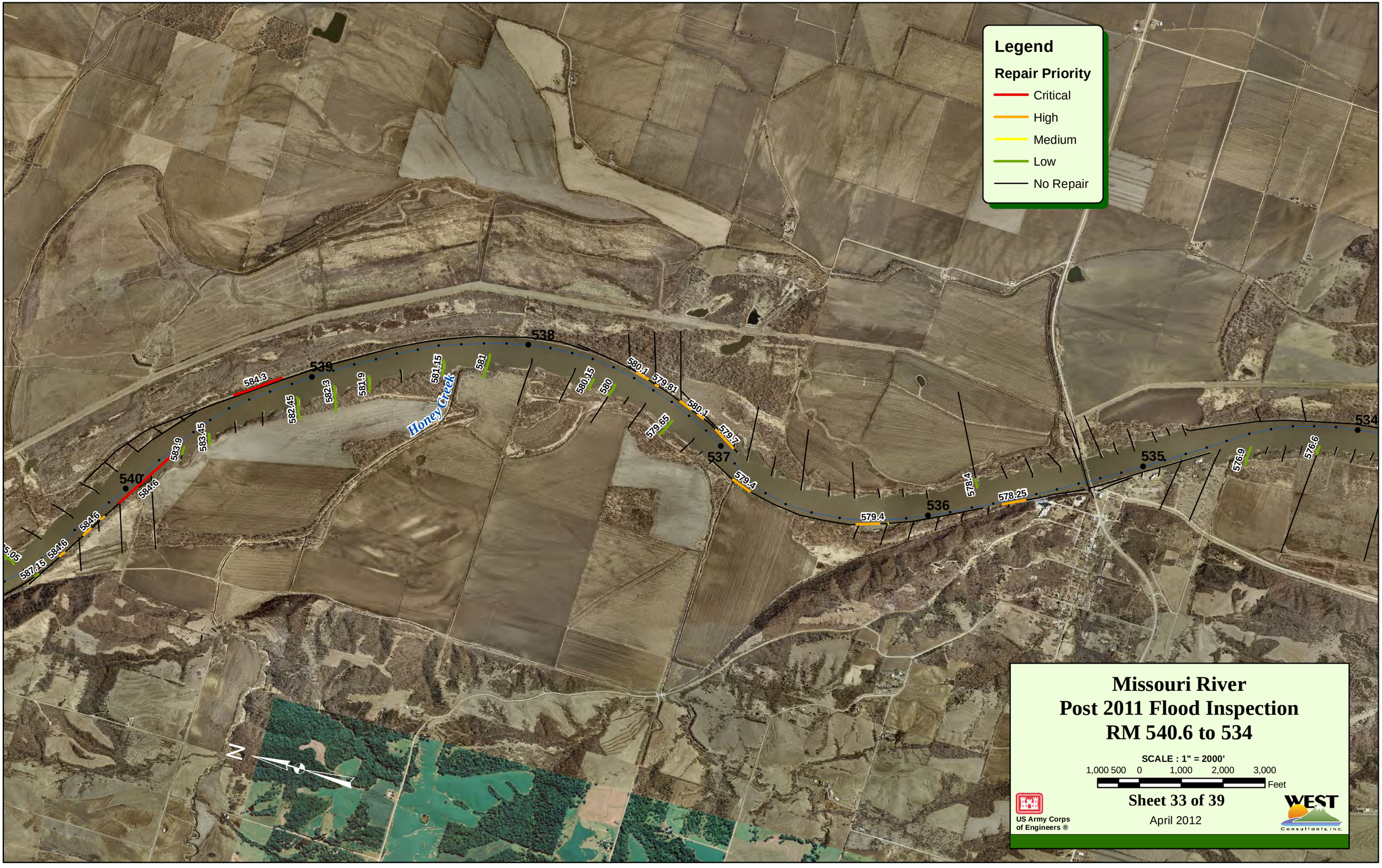
Walnut Creek
North Table Creek
South Table Creek
Horse Creek
565
564
563
562
561
560
566
611.3
610.6
610.35
610.2
610.41
609.9
609.7
609.55
609.45
608.9
608.7
608.78
608.07
608.1
608.02
607.15
606.6
606.4
606.45
606.35
606.15
605.85
605.55
606.5
612.1
611.9

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
559
558
557
556
555
554
560
Fourmile Creek
Inlet left bank - eroded
Upper
N
Missouri River
Post 2011 Flood Inspection
RM 560.8 to 553.7
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 30 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Breach in left bank chute levee
(~1 mile upstream of chute outlet)
Lower Hamburg Backwater (not shown on map) - Connection to chute altered - widening may be occurring (Corps inspection Nov. 2011)
Lower Hamburg Chute
Upper Hamburg Chute
554
553
552
551
550
549
548
547
546
600.3
599
598.6
598.53
598.19
598
597.5-C
596.7
596.7
596.01
595.56
595.3
594.6
594.25
594.15
594.8
593.9
593.8
593.6
593.75
593.75
593.75
592.87
592.8
592.35
592.87
592.65
592.3
592.1
N
Missouri River
Post 2011 Flood Inspection
RM 554.7 to 545.9
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 31 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.


Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Return flow from levee breach. No structures (dikes or chevrons) appeared to be damaged.
Inlet full of sediment; new entrance eroded downstream (Corps inspection Nov. 2011)
Inlet structures require repair
Kansas Bend Chute
Nishnabotna Chute
Nishnabotna River
Buck Creek
547
546
545
544
543
542
541
540
592.87
592.8
592.35
592.81
592.3
592.81
592.1
591.52
590.35
592.2
589.4
589.07
589.9
588.89
588.81
589.1
587.95
587.5
587.15
585.05
587.15
584.6
584.6
584.6
N
Missouri River
Post 2011 Flood Inspection
RM 547.6 to 539.8
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 32 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.


Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Honey Creek
540
539
538
537
536
535
534
584.3
583.9
583.45
582.45
582.3
581.9
581.15
581
580.15
580
580.1
579.81
580.1
579.7
579.65
579.4
579.4
578.4
578.25
576.9
576.6
584.6
584.6
584.6
587.15
N
Missouri River
Post 2011 Flood Inspection
RM 540.6 to 534
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 33 of 39
April 2012
US Army Corps
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Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Deroin Creek
Langdon Backwater
Little Nemaha River
Sediment deposition at backwater entrance.
525
526
527
528
529
530
531
532
533
534
565.75
565.8
566.29
565.9
566.29
566
566.29
566.3
566.63
566.7
566.9
568.1
567.2
568.1
568.1
567.7
568.1
567.8
568.4
569A
569
569.04
570A(B)
569.69
570.9
571.3
571.4
572
572
572.23
572.53
572.73
572.93
573.23
573.53
573.63
574.31
574.9
574.9
574.7
574.96
575.11
575.55
575.8
577.3
575.85A
575.85
576.01
576.09
576.2
576.6
576.9
N
Missouri River
Post 2011 Flood Inspection
RM 534.7 to 524.7
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 34 of 39
April 2012
US Army Corps of Engineers ®
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Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Langdon Backwater
Sediment deposition at backwater entrance.
Deroin Creek
Rock Creek
530
529
528
527
526
525
524
523
522
521
572.53
572.23
572
572
571.4
571.3
570.9
569.69
570A(B)
569.04
569
568A
568.4
568.1
568.1
568.1
568.1
567.8
567.7
567.2
566.7
566.63
566.3
566
566.29
566.29
565.8
565.9
565.75
565.4
565.2
565
565.3
564.6
564.45
564.1
564.6
563.8
563.7
564.6
563.4
563.2
563.15
565.1
563.29
563
562.71
562.55
562.31
562.1
561.77
N
Missouri River
Post 2011 Flood Inspection
RM 530.4 to 519.9
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 35 of 39
April 2012
US Army Corps of Engineers ®
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Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Inlet eroded with flanking of left bank control dikes; chute has migrated toward the levee toe (Corps inspection Nov. 2011)
Mill Creek
Deroin Chute
515
516
517
518
519
520
521
562.71
562.55
562.31
562.1
561.77
561.77
561.5
561.22
561.2
561.19
550.5
550
559.85
559.55
559.45
559.8
559.8
559.2
559
558.7
558.8
558.55
558.3
558.4
558.3
558.1
558.1
558.35
557.7
557.5
557.3
557.1
556.98
556.87
556.81
556.41
556.26
N
Missouri River
Post 2011 Flood Inspection
RM 521.7 to 514.2
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 36 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Tarkio River
515
514
513
512
511
510
509
508
N
Missouri River
Post 2011 Flood Inspection
RM 515.1 to 507.7
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 37 of 39
April 2012
US Army Corps of Engineers ®
WEST Consultants, Inc.

Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Tarkio River
503
504
505
506
507
508
502
501
543.1
544.25
544.5
544.61
546.5
546.5
542.88
542.88
542.75
542.8
542.8
547.78
547.1
546.85
546.6
546.5
547.9
547.97
548.61
548.71
548.65
548.4
584.4
0
Rush Bottoms Chute (not shown on map) - inlet widening with some deposition
N
Missouri River
Post 2011 Flood Inspection
RM 508.8 to 500.7
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 38 of 39
April 2012
US Army Corps of Engineers ®
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Legend
Repair Priority
Critical
High
Medium
Low
No Repair
Rush Bottoms Chute
Winnebago Creek
500.
501
498
499
540.15
539.8
540.12
539
538.75
538.72
542.8
542.8
N
Missouri River
Post 2011 Flood Inspection
RM 501.4 to 498
SCALE : 1" = 2000'
1,000 500 0 1,000 2,000 3,000
Feet
Sheet 39 of 39
April 2012
US Army Corps
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ATTACHMENT C

INSPECTION NOTES & ASSESSMENT DATABASE

Note: Under the Repair Type column, "revet" refers to the standard revetment calculation, while "dike" refers to the calculation for dikes and other peaked stone structures, including stone fill revetments, chevrons, and reverse sills.

Missouri River Post 2011 Flood Inspection Notes and Assessment (Jan/Feb 2012)

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	751.48	751.45	Revetment R **836.9**	9 100	3	Revet	698 tons 7.0 tons/ft	☐	Thin rock ~100. (Originally noted as low priority in field.)
High	751.45	751.43	Revetment R **836.9**	9 110	3	Revet	768 tons 7.0 tons/ft	☐	
High	751.28		Revetment R **836.9**	9 50	3	Revet	349 tons 7.0 tons/ft	☐	Section of bank missing rock.
High	751.18		Revetment R **836.5**	2 250	3	Revet	388 tons 1.6 tons/ft	☐	Large area missing rock ~2' rock high deficiency, about 200 ft long.
Critical	750.23		Dike L **835.51**	6 100	5	Dike	723 tons 7.2 tons/ft	☐	Upstream side of dike blown out - needs repair. Downstream side ok. Big hole on upstream face approximately 100' long x 6' high deficient. Repair suggestion: insert a bench into the scallop hole.
No Repair	749.26		Dike R **834.2**				tons tons/ft	☐	
Low	749		Dike R **833.85**	6 50	5	Dike	362 tons 7.2 tons/ft	☐	Missing rock at nose. Field estimate 50 ft out x 6 ft high x crown width.
No Repair	745.15		Dike L **829**				tons tons/ft	☐	Landowner observed hole through dike. Not concerned, but look at aerials. Got out of boat to look, but no obvious signs of flanking or damage.
High	743.43		Revetment R **828.4**	9 90	3	Revet	628 tons 7.0 tons/ft	☐	Just downstream of yellow house, concrete ramp, concrete & tire debris.
High	743.38		Revetment R **828.4**	9 75	3	Revet	524 tons 7.0 tons/ft	☐	Missing rock.
No Repair	743.31		Revetment R **828.4**				tons tons/ft	☐	Toe missing some rock, but noted as low priority in the field.

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	743.26	Revetment R **828.4**	9 50	3	Revet	349 tons 7.0 tons/ft	☐	Trees on top. For quantity, bank is about 20' high. 2 ft thick rock for repair. Near boat access.
No Repair	742.69	Revetment R **828.4**				tons tons/ft	☐	Looks like an access point -- too small for a project. Structure ok.
No Repair	740.55	Dike R **815.4**				tons tons/ft	☐	Maybe some degradation at nose, may need to add some rock.
No Repair	739.81	Dike R **814.7**				tons tons/ft	☐	Notch design? (Office check: dike should have an environmental gap). *Next few structures with notches too - so most likely a design feature.
No Repair	739.64	Dike R **814.6**				tons tons/ft	☐	Notch - but not sure if it should be there (check in office). If supposed to be notched, then structure is ok.
No Repair	737.85	Revetment R				tons tons/ft	☐	Scalloped effect along bank. Harvested rock to use in other places. No concern-bank protected.
No Repair	736.43	Dike L **811.9**				tons tons/ft	☐	Part of crown is washed down (couple of dips). Eroding backside. 10' width on top crown. Downstream gap.
Medium	735.78	Revetment R **Not avail.**	2 50	3	Revet	78 tons 1.6 tons/ft	☐	Dip in bank. (Office check: assumed 50' x 2' from photo. No structure number? Corps database indicates "0" as the structure number.)
No Repair	733.68	Dike R **808.8**				tons tons/ft	☐	Length of spur probably ok, but height may not be ok. May have lost about 1.5' on dike. Original design slope may be into the water. *Keep an eye on for future reference. Probably not a concern might not need repair. (see photo - structure looks ok)
No Repair	733.5	Revetment L **809**				tons tons/ft	☐	Sand pushed over the bank obscuring view of rock (approximate RM 334.5 to 732.8).
No Repair	732.76	Revetment L				tons tons/ft	☐	Sand and old sandbags pushed over bank just before bridge.
No Repair	732.6	Revetment R **807.95**				tons tons/ft	☐	Sandbags over the edge obscuring the view, difficult to determine if repairs needed but looks like underlying structure is sound.

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	732.27	Revetment R **807.45**	9 40	3	Revet	279 tons 7.0 tons/ft	☐	Missing rock same dimensions as waypoint #4. Some piling, timber crib wall, just before bridge. (Office check: From photos, does not appear as if much rock is missing. Mostly covered with sand.)
Low	732.16	Revetment R **807.45**	9 40	3	Revet	279 tons 7.0 tons/ft	☐	Over steepened (or cut in bank) in front of Kahill's - some piles exposed (*need to estimate quantities). Estimated length of deficiency 40 ft. Bank is about 20' high, but for quantities use 9' above today's water surface.
No Repair	732.06	Revetment R **Not avail.**				tons tons/ft	☐	Hole in bank downstream of Marina Inn ~50 wide, bank is ~15 tall. *Need to estimate quantities. Not very thick rock, small repair, fill in, material still w/in the structure, broken concrete and wood piles. (Office check: This section doesn't appear to have Corps revetment on plans - no structure number, and not clear on map. See photo - looks like a minor repair or no repair.)
No Repair	731.98	Revetment R **Not avail.**	9 100			tons tons/ft	☐	Hole in revetment in front of the YMCA (*Waypoint is slightly off - latitude/longitude in database is from the photo position). (Office check: Note: This section doesn't appear to have Corps revetment on plans - no structure number, and not clear on map. Rock may have been added by others?)
No Repair	728.02	Dike R **803.15**				tons tons/ft	☐	Some rock missing on crown-no field measurement; no stop. Waypoint taken in the middle of river just ahead of dike.
No Repair	727.44	Revetment L **802.8**				tons tons/ft	☐	Small rock.
High	727.35	Revetment L **802.8**	9 100	3	Revet	698 tons 7.0 tons/ft	☐	Scallop feature, some distress/failure.
No Repair	726.25	Dike L **801.23**				tons tons/ft	☐	Scalloped, but not eroding behind revetment/dike.
Low	725.81	Revetment R **801.19**	9 100	3	Revet	698 tons 7.0 tons/ft	☐	Scallop with rock and trees.
No Repair	725.56	Revetment R **801.19**				tons tons/ft	☐	Small amount of rock treatment is needed below the ramp.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	725.52	724.48	Revetment R **801.19**	2 160	3	Revet	248 tons 1.6 tons/ft	☐	Toe needs rock, ~200' length. Area just downstream of rock covered with sand.
No Repair	724.66		Dike L **800.05**				tons tons/ft	☐	Notched dike or not? Check sheets. Bottom of notch ~6' above WS.
Medium	724.34		Dike/Sill L **799.8**	2 70	5	Dike	106 tons 1.5 tons/ft	☐	Dike & sill. Bring sill up about 2'. 70' long. 2' vertical deficient
No Repair	722.38		Dike R **797.8**				tons tons/ft	☐	Wide separation (gap) between dike and bank - no repair.
High	721.82		Dike L **797.16**	6 40	5	Dike	289 tons 7.2 tons/ft	☐	Turbulence around piles removed rock. 6' high x 40' long.
No Repair	721.35		Dike L **796.4**				tons tons/ft	☐	Structure could use touchup.
High	721.15	721.01	Revetment R **797.15**	9 710	3	Revet	4,957 tons 7.0 tons/ft	☐	Slumps in back, sections missing rock. Length 9' x length of bank. (Office check: Photos show some areas of missing rock, or thinned areas.)
Critical	719.8		Dike R **792.64**	6 194	5	Dike	1,403 tons 7.2 tons/ft	☐	Dike gone, needs to be rebuilt. Omaha Creek left bank dike gone. Get quantities from Corps or plans. (Office Check: total structure length from pdf files = 194', includes a 30' root).
No Repair	719.28		Dike L **790.9**				tons tons/ft	☐	Piling exposed. Looks like could have been an L-head revetment but the L part is only piling. (Corps map shows the structure being a left-bank dike.)
No Repair	718.64		Dike R **788.7**	1 40			tons tons/ft	☐	40' x 1' x 20' Need rock - a little low. No repair needed. (Dikes only need to be 5' above today's water surface).
No Repair	717.69		Dike R **786.5**				tons tons/ft	☐	Note: Waypoint 56 ok. Looks low - may be a tapering dike. Most likely ok.
High	715.87		Chevron L **783.12**	3.5 120	3	Dike	293 tons 2.4 tons/ft	☐	Low and not symmetric. Should be at 5'. Riverside low 4 ft and landside low 3 ft x 60 ft each side (Weighted average).

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	715.69	Chevron L **782.55**	3 75	3	Dike	161 tons 2.1 tons/ft	☐	
High	715.49	Chevron L **782.09**	3.5 120	3	Dike	293 tons 2.4 tons/ft	☐	Riverside low 4 ft and landside low 3 ft x 60 ft each side.
No Repair	714.68	None L				tons tons/ft	☐	Wide scallop hole in left bank - ok.
High	714.61	Dike/Sill L **779.9**	5 70	5	Dike	377 tons 5.4 tons/ft	☐	Blown out. Dike flanked & cut through. Sill cut through too. 5' x 30' missing rock (gap between bank). Tie back into bank about 40' and 5' deficient height, need width from aerial.
Critical *Glovers Point Chute*	713.4	Chute Inlet R				tons tons/ft	☐	Glovers Point Chute inlet full of sediment (entrance blocked with sediment deposition), culvert crossing appears destroyed.
Medium *Glovers Point Chute*	713.33	Dike R **777.6**	2 106	5	Dike	161 tons 1.5 tons/ft	☐	Glovers Point Chute inlet. Dike structure about 3' above WSE. Dike 2' low x length.
High	711.87	Reverse Sill R **775.4**	4 113	10	Dike	623 tons 5.5 tons/ft	☐	Sill about 3' above WS. Dike ok. Close to 5' above WS. (same as waypoint 69 - deleted) (Office check: Sill crown width = 10'; length from pdf file appears to be 113 ft)
Medium	711.67	Reverse Sill R **775.1**	3.5 225	10	Dike	1,034 tons 4.6 tons/ft	☐	Sill about 4' above WS (front structure). Both detached from bank. Dike about 2' above WS. Both detached from bank. Length of sill about 125'; space between sill and dike about 50'; length of dike about 40'; about 60' gap between dike and bank. Deficiencies: sill 125'x3'; dike 2x40+5x60.
Medium	711.58	Dike R **775**	2 117	5	Dike	177 tons 1.5 tons/ft	☐	Add 2'. (Office check: measured in GIS, length of structure from 2006 aerial image).
Low	711.48	Reverse Sill R **774.9**	2 46	5	Dike	70 tons 1.5 tons/ft	☐	Same as waypoint 67 (duplicate deleted from database). Sill 5' above WS; dike about 4' above WS; space between dike and sill ~50'; space between dike (gap in dike) about 15'. Tied into bank. Deficiency: sill 2' low x length; dike 1' low x length. (Office: Separated into sill portion and dike. Dike portion notched - 20' environmental gap. Length measured using 2006 Corps image.)

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	711.48	Dike R **774.9**	1 33	5	Dike	28 tons 0.8 tons/ft	☐	Sill 5' above WS; dike about 4' above WS; space between dike and sill ~50'; space between dike (gap in dike) about 15'. Tied into bank. Deficiency: sill 2' low x length; dike 1' low x length. (Office: Separated into sill portion and dike. Dike portion notched - 15' environmental gap. Length measured using 2006 Corps image.)
No Repair *Glovers Point Chute*	711.3	Rootless Dike R **773.8**				tons tons/ft	☐	Structure at Glovers Point outlet looks like stand alone. Structure ok. (Office Check: Modified dike with notch, and reverse sill).
Critical *Glovers Point Chute*	711.28	Chute Outlet R				tons tons/ft	☐	Exit chute. Glovers Point full of sediment. Right bank of Glovers Point exit chute eroded back. About 100' wide scour hole on right bank of Glovers Point outlet. May need survey team to get additional points, especially within Glovers Point chute where inspection team could not get to.
Critical *Glovers Point Chute*	711.25	Revetment R **Not avail.**	7 28	5	Revet	253 tons 9.1 tons/ft	☐	Scour behind bank and scour hole in bank. Hole about 28' feet wide (see drawings). Repair: rebuild revetment up 7', for design use 1:1.3 side slope. Put in effective refusal. Patch hole in revetment.
Medium	710.95	Dike R **772**	1 40	5	Dike	34 tons 0.8 tons/ft	☐	Flanked about 1' low. 40' gap between bank and dike - Corps inspection crew indicated it may be ok to leave as habitat, but officially should be considered a repair.
Low	710.86	Dike R **771.8**	1 133	5	Dike	112 tons 0.8 tons/ft	☐	About 1' low. (Office check: measured in GIS, length of line from bank out).
Medium	710.76	Dike R **771.6**	1 70	5	Dike	59 tons 0.8 tons/ft	☐	70' gap between dike and bank (may leave for habitat). Add 1'.
Low	710.65	Dike R **771.4**	1 70	5	Dike	59 tons 0.8 tons/ft	☐	Still tied to bank. Add 1'. (Office check: measured in GIS, length of line from bank out).
High	709.87	Chevron L **770.09**	2 150	3	Dike	228 tons 1.5 tons/ft	☐	First Chevron in series a about 2' low.
Medium	709.76	Rootless Dike L **769.85**	2 75	5	Dike	114 tons 1.5 tons/ft	☐	2' low. (Assumed 75' length). (Office check: No obvious structure number at this location for a rootless dike. Corps spreadsheet indicates a chevron at this location. Corps database for chevrons does not show a chevron at this location. Used the closed dike structure number.)

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	709.17		Revetment R **774.55**	7 30	3	Revet	163 tons 5.4 tons/ft	☐	Bare spot (small).
Critical	708.78	708.67	Revetment R **768.3**	4 710	5	Revet	3,672 tons 5.2 tons/ft	☐	Slough in bank. Trees fallen over. About 4 ft height deficient. Looks like turbulence took the rocks off from behind.
Critical *Hole in the Rock Chute*	705.72		Revetment R **766.2**	7 100	5	Revet	905 tons 9.1 tons/ft	☐	Hole in the Rock Chute - left bank of backwater entrance missing revetment. Large sandbar at opening.
No Repair	704.79		Dike L **764.4**				tons tons/ft	☐	Debris hung up on nose. Ok.
No Repair	704.24		Dike L **764.22**				tons tons/ft	☐	Notched dike gapped. Ok.
No Repair	703.84		Revetment R **765.1**				tons tons/ft	☐	Small rock loss riverside at end. But ok.
High	702.24		Dike L **761.85**	4 60	5	Dike	227 tons 3.8 tons/ft	☐	Degraded dike or sill? Need to check plans. (Notes from office: plans indicate a "stone fill dike" with environmental gap added, no indication of a sill added; length measured in GIS from 2006 aerial image minus 20 ft, estimated height from field photo - assumed about 1' above WSE).
No Repair	699.33		Sill R				tons tons/ft	☐	Sill. Ok.
No Repair	698.02		Revetment L **759.2**				tons tons/ft	☐	Old cut for a marina. Ok. Ottis Henderson Marina opening in revetment.
No Repair	695.4		Sill L **749.7**	1			tons tons/ft	☐	Two sills at about water level so about 1' low. But not a project or no repair required. One sill located at way point 90 and the second sill located just upstream.
Low	693.77		Sill L **748.4**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	30' gap between sill and dike, sill at 2' above WS (therefore about 1' low). Sill ragged and needs repair. (Office check: length of sill taken from Corps 0701 pdf files).
Critical	693.58	693.48	Revetment R **748.34**	6 410	5	Revet	3,180 tons 7.8 tons/ft	☐	Start 93. End 94. Bank caved. Take up to what Revetment should be 6'.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	692.73		Dike R **747.4**	4 75	5	Dike	284 tons 3.8 tons/ft	☐	Dike appears detached from bank (or bank blow out?). PDF files do not show an environmental gap, dike total length (with root) should be 93'. Dike needs to be built bank up and tied into bank - or Corps may want to leave for habitat purposes. Estimated length from field photos - engineering judgement.
Critical	691.63		Revetment L **748.13**	6 200	5	Revet	1,551 tons 7.8 tons/ft	☐	Trees down. High bank missing rock. Need about 200' of rock.
High	691.6		Dike R **744.95**	4 30	5	Dike	114 tons 3.8 tons/ft	☐	Corps request: check photos if dike is too low at notch. (Office Check: 20' environmental gap not noticeable in photos. Dike appears low, and missing rock. Piles exposed.)
High	690.67	690.63	Revetment R **743.9**	6 50	3	Revet	233 tons 4.7 tons/ft	☐	Bank failure. Way point 96 to 104 (separated in database). Need to reestablish toe.
High	690.63		Revetment R **743.9**	6 50	3	Revet	233 tons 4.7 tons/ft	☐	Need to reestablish toe (bank failure).
Critical	690.6	690.58	Revetment R **743.9**	6 100	5	Revet	776 tons 7.8 tons/ft	☐	Need to reestablish toe (bank failure), field estimate approximately 40 ft. (Corps suggested no survey needed at RM 690.6 revetment indicating "final rock placement will depend more on how the rock aligns itself at the toe - instead of a tight survey.")
High	690.57		Revetment R **743.9**	6 30	3	Revet	140 tons 4.7 tons/ft	☐	Waypoint 103 slightly upstream of structure. Need to rebuild toe.
Medium	690.42		Revetment R **743.9**	6 20	3	Revet	93 tons 4.7 tons/ft	☐	
No Repair	689.78		Revetment R				tons tons/ft	☐	New rock (previously repaired).
High	689.75	689.74	Revetment R **Not avail.**	6 120	3	Revet	559 tons 4.7 tons/ft	☐	Add rock to the toe (bring up to 6'); low priority. (Office check: Corps database indicates "0" as the structure number.)
Critical *Willard Chute*	688.22		Chute Inlet R				tons tons/ft	☐	Willard Chute entrance full of sediment. Chute mostly full of sediment.

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No Repair	687.75		Dike R **741.6**					tons tons/ft	☐	Degraded dikes for habitat - all ok.
Critical	687.3	685.7	Revetment R **741.36**		3			tons tons/ft	☐	Lower Decatur revetment. Windrow rock section. How much of the windrow is missing? Corps inspection team indicated that Corps will come up with a new design. Try to determine how much of the original windrow revetment remains. We saw a portion of it at waypoint 111. The windrow revetment appeared to be set back approximately 175 ft. Most of the windrow rock was not seen.
Critical *U. Louisville Bend Chute*	685.7	684.9	Chute R					tons tons/ft	☐	Upper Louisville Bend Chute full of sediment - chute is non-existent. Roots of dikes appear exposed in current aerials, and 2006 aerials.
Critical	679.81	679.79	Revetment L **732.25**	7 100	5	Revet	905 9.1	tons tons/ft	☐	Needs repair. High/critical priority. Need to be rebuilt.
High	679.71	679.7	Kicker L **732.25**	3 65	3	Dike	139 2.1	tons tons/ft	☐	Bring up to elevation. On average add about 3' to this gap.
High	678.79	678.78	Revetment R **731.9**	7 75	3	Revet	407 5.4	tons tons/ft	☐	75' feet of bank. Build to 7 feet.
No Repair	678.44		Revetment R **731.9**					tons tons/ft	☐	Trees fell (slide). Rock still there. Trees protecting the bank.
No Repair	675.4	674.8	Revetment R **728.05**					tons tons/ft	☐	Right overbank behind revetment deeply eroded. Revetment along bank appeared ok, but aerial photos show root exposed (structure number 727.8, and 727.4). At approximate RM 675.23, an approximate 60 ft gap in revetment - maybe owner put in, and ok? (Office check: gap in bank not shown ind pdf files, but shown in 2006 Corps aerial images).
High	674.1		Dike R **726.92**	5 60	5	Dike	323 5.4	tons tons/ft	☐	60 feet of the dike needs to brought up.
Critical *Fawn Island Chute*	674.04	673.87	Revetment L **726.93**	7 150	5	Revet	1,358 9.1	tons tons/ft	☐	About 150' of left bank inlet requires rock (within Fawn Island inlet - bank failure). Grade control structure appeared ok.

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Low	673.87	673.82	Revetment L **726.93**	1 200	3	Revet	155 0.8	tons tons/ft	☐	Just upstream of red house. Low priority. Low in places. (Office: No height deficiency given in field - assumed about 1' average over the 200' length of missing rock.)
High	673.61		Dike R **726.45**	5 200	5	Dike	1,076 5.4	tons tons/ft	☐	Flanked. 200' gap.
High	673.54		Revetment L **726.93**	7 75	3	Revet	407 5.4	tons tons/ft	☐	Gap needs to be rebuilt.
Critical *Fawn Island Chute*	673.5		Chute Outlet/Re L					tons tons/ft	☐	Fawn Island Chute outlet. Red house aligned with last dike in the chute. Chute and revetment degraded, house threatened (bank eroded). (Corps indicated they will address in a site-specific design.)
Critical	673.48		Dike R **726.27**	5 200	5	Dike	1,076 5.4	tons tons/ft	☐	Flanked. 200' space between structure and bank. Survey team may need to check depth of gap.
No Repair	670.99		Revetment R **724.95**					tons tons/ft	☐	Opening okay. Owner put cut in bank.
High	670.54	670.48	Revetment R **724.95**	2 160	3	Dike	243 1.5	tons tons/ft	☐	Bring up on average 2'; bank blow out - bank eroded behind revetment.
Critical	670	669.53	Revetment L **722.7**	9 2500	5	Revet	29,089 11.6	tons tons/ft	☐	Exposed revetment, several scallops due to the flood, some of the scallops ok with rootwads for habitat; build up revetment; might want to leave some gaps for habitat, but also maintain navigation channel; conservative estimate - entire length - but note that Corps may want to leave some gaps for habitat; partial revetment and missing revetment in some areas; assume will create revetment at old alignment, rock close to WS or in some places 1' or 2' below WS so assume 9' total height.
Medium	668.86		Dike R **721.55**	3 100	5	Dike	245 2.5	tons tons/ft	☐	Dikes in series low.
No Repair	668.66		Dike R **721.49**	1.5				tons tons/ft	☐	No repair.
Medium	668.49		Dike R **721.4**	3 100	5	Dike	245 2.5	tons tons/ft	☐	Dikes in series low.

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Medium	668.33	Dike R **721.31**	3 200	5	Dike	491 tons 2.5 tons/ft	☐	Dikes in series low.
Medium	668.16	Dike R **721.21**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	Dikes in series low.
Low	668.02	Dike R **721.1**	1.5 100	5	Dike	119 tons 1.2 tons/ft	☐	Dikes in series low.
Medium	667.8	Dike R **721.05**	2 100	5	Dike	152 tons 1.5 tons/ft	☐	Dikes in series low.
Medium	667.72	Dike R **720.8**	2 100	5	Dike	152 tons 1.5 tons/ft	☐	Dikes in series low.
Medium	667.56	Dike R **720.6**	2 150	5	Dike	228 tons 1.5 tons/ft	☐	Dikes in series low.
No Repair	667.37	Dike/Sill R **720.5**				tons tons/ft	☐	Dike/sill - ok.
No Repair	666.56	Dike R **719.55**	1 100			tons tons/ft	☐	Dikes in series low. About 1' low - ok.
Low	666.4	Dike L **719.4**	1.5 100	5	Dike	119 tons 1.2 tons/ft	☐	Dikes in series low. About 1.5' low.
Medium	666.12	Dike L **719**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	waypoint taken just downstream of structure.
High	666.1	Dike L **718.7**	4 100	5	Dike	379 tons 3.8 tons/ft	☐	Dikes in series low.
Low	666	Dike L **718.4**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	Dikes in series low.
Medium	665.76	Dike L **718.21**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	Dikes in series low.

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Critical	665.76 665.8	Revetment R **719.81**	5 270	5	Revet	1,745 tons 6.5 tons/ft	☐	Average 5' need to bring up.
Medium	665.66	Dike L **718.11**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	Dikes in series low.
Medium	665.48	Dike L **717.6**	2.5 30	5	Dike	55 tons 1.8 tons/ft	☐	Dikes in series low.
Medium	665.37	Dike L **717.5**	2.5 30	5	Dike	55 tons 1.8 tons/ft	☐	Dikes in series low.
Medium	665.25	Dike L **717.25**	2 30	5	Dike	46 tons 1.5 tons/ft	☐	Dikes in series low.
Medium	665.14	Dike L **717**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	Dikes in series low.
Low	664.79	Dike L **716.36**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	Dikes in series low.
High	664.67	Dike L **716.2**	4 100	5	Dike	379 tons 3.8 tons/ft	☐	Dikes in series low.
Medium	664.6	Dike L **716.1**	2 30	5	Dike	46 tons 1.5 tons/ft	☐	Dikes in series low.
Medium	664.5	Dike L **716**	2.5 75	5	Dike	138 tons 1.8 tons/ft	☐	Dikes in series low.
Medium	664.33	Dike L **715.91**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	Dikes in series low.
Medium	664.16	Dike L **715.7**	3 75	5	Dike	184 tons 2.5 tons/ft	☐	
High	664.0	Revetment R **717.1**	7 50	3	Revet	272 tons 5.4 tons/ft	☐	50' gap in right bank revetment.

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	663.68	Dike L **715.31**	4 50	5	Dike	189 tons 3.8 tons/ft	☐	
High	663.08	Dike L **714.69**	4 50	5	Dike	189 tons 3.8 tons/ft	☐	Gap in dike. (Office check: Structure 715.4 does not show an environmental gap or notch added.)
High	662.61 662.56	Revetment L **715.9**	3.5 300	3	Dike	733 tons 2.4 tons/ft	☐	Average 3.5 ft height deficient. Bank eroded behind revetment (see aerial photos/movie); root exposed (structure number 714).
High	662.51 662.48	Revetment L **715.9**	3.5 170	3	Dike	415 tons 2.4 tons/ft	☐	Average 3.5 ft height deficient. Bank eroded behind revetment (see aerial photos/movie).
Critical	662.5	Dike R **713.97**	5 100	5	Dike	538 tons 5.4 tons/ft	☐	Rock pretty much all gone.
Low	662.38	Revetment L **715.9**	2 20	3	Revet	31 tons 1.6 tons/ft	☐	Small repair.
Medium	661.9	Dike R **713.58**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
Medium	661.74	Dike R **713.4**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	
Medium	661.03	Dike R **710.82**	3.5 50	5	Dike	154 tons 3.1 tons/ft	☐	
Medium	660.82	Dike R **710.58**	2.5 30	5	Dike	55 tons 1.8 tons/ft	☐	
No Repair *Soldier Bend Backwater*	660.45	Backwater Inlet L **709.44**				tons tons/ft	☐	Soldier Bend Backwater opening appeared ok or free of sediment. (See waypoint 181 for structure repair).
Medium	660.35	Revetment R **710.7**	3 75	3	Revet	175 tons 2.3 tons/ft	☐	
Critical *Soldier Bend Backwater*	660.28	Dike L **709.17**	6 100	5	Dike	723 tons 7.2 tons/ft	☐	Opening (inlet/outlet) of Soldier Bend Backwater.

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Medium	660.15		Dike L **709.02**	3.5 100	5	Dike	309 tons 3.1 tons/ft	☐	Several dikes in series low.
Medium	660		Dike L **708.8**	2.5 100	5	Dike	183 tons 1.8 tons/ft	☐	Several dikes in series low.
Medium	659.53		Dike L **708.45**	3 40	5	Dike	98 tons 2.5 tons/ft	☐	Several dikes in series low.
Medium	659.41		Dike L **708.41**	3 80	5	Dike	196 tons 2.5 tons/ft	☐	Several dikes in series low.
Medium	659.14		Dike L **708.21**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	Several dikes in series low.
High	658.97		Dike L **708.05**	5 100	5	Dike	538 tons 5.4 tons/ft	☐	Several dikes in series low.
Medium	658.87		Dike L **707.92**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	Several dikes in series low.
Medium	658.74		Dike L **707.79**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	Several dikes in series low.
High	658.66		Dike L **707.7**	4 75	5	Dike	284 tons 3.8 tons/ft	☐	Several dikes in series low.
Medium	658.52		Dike L **707.6**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	Several dikes in series low.
No Repair	658.37		Dike L **707.5**				tons tons/ft	☐	Several dikes in series low. Minor fill.
High	658.05		Dike L **707.3**	6 50	5	Dike	362 tons 7.2 tons/ft	☐	Several dikes in series low.
High	658.02	657.94	Revetment R **708.75**	3 420	3	Revet	977 tons 2.3 tons/ft	☐	Average of 3' of rock u/s of project area required for repair x length between waypoints.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Critical	657.93	657.86	Revetment	8	5	Revet	3,723 tons	☐	Sandy point, project - chutes/inlet being installed, thinned down rock. Corps field inspector did not have project details.
Sandy Point Chute			R **708.75**	360			10.3 tons/ft		
Medium	657.92		Dike	3	5	Dike	123 tons	☐	
			L **707.1**	50			2.5 tons/ft		
No Repair	657.84		Dike				tons	☐	
			L **707**				tons/ft		
No Repair	657.33		Dike/Sill				tons	☐	Standard sill. Same as waypoint 203.
			R **706.3**				tons/ft		
No Repair	657.31		Sill				tons	☐	
			R **706.3**				tons/ft		
High	657.21		Reverse Sill	6	5	Dike	543 tons	☐	Corps team indicated the structure does not need to be tied into bank.
			R **706.16**	75			7.2 tons/ft		
No Repair	657.13		Dike/Sill				tons	☐	Waypoint slightly downstream of structure. Gap between structure and bank - ok.
			R **706**				tons/ft		
Medium	656.66		Dike	3	5	Dike	123 tons	☐	Reverse sill ok, dike repair 3' x 50' Corps team indicated the structure does not need to be tied into bank.
			R **705.58**	50			2.5 tons/ft		
Medium	656.55		Dike	3	5	Dike	123 tons	☐	Sill ok, dike low.
			R **705.53**	50			2.5 tons/ft		
No Repair	656.39		Dike				tons	☐	Start Feb. 2.
			R **705.49**				tons/ft		
Medium	656.3		Dike/Sill	3	5	Dike	123 tons	☐	Reverse sill ok, dike repair 3 x 50, detached ok.
			R **705.47**	50			2.5 tons/ft		
Medium	656.21		Dike	3	5	Dike	245 tons	☐	
			R **705.43**	100			2.5 tons/ft		
Medium	656.13		Dike	3	5	Dike	368 tons	☐	
			R **705.39**	150			2.5 tons/ft		

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Medium	655.95	Dike R **705.3**	2 75	5	Dike	114 tons 1.5 tons/ft	☐	
No Repair	655.82	Dike R **705.2**				tons tons/ft	☐	
Medium	655.67	Dike R **705**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	
Medium	655.5	Dike R **704.9**	2 100	5	Dike	152 tons 1.5 tons/ft	☐	
Medium	655.41	Dike R **704.8**	3 75	5	Dike	184 tons 2.5 tons/ft	☐	
High	655.3	Dike R **704.7**	4 75	5	Dike	284 tons 3.8 tons/ft	☐	
No Repair	655.2	Dike R **704.62**				tons tons/ft	☐	Check if notched - if notched, ok (Checked in office - environmental gap 20 ft wide).
Medium	654.59	Dike L **704.1**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
Critical	654.47	Dike L **704**	4.5 100	5	Dike	455 tons 4.6 tons/ft	☐	6 x 50 - gap - 3 x 50 - (Office note: NOT sure if photo for waypoint 221 goes with 222 - not matching up. Weighted average for height deficiency.)
Medium	654.33	Dike L **703.88**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	Get length from plans. (Office check: Corps pdf files indicate 20' x 6' notch; length taken from Corps structure database in GIS).
No Repair	654.16	Chevron L **703.73**				tons tons/ft	☐	Chevron ok (not on map).
Medium	653.92	Dike L **703.48**	3 200	5	Dike	491 tons 2.5 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
No Repair	653.8	Dike L **703.38**				tons tons/ft	☐	
Critical	653.77	Rootless Dike L **703.28**	6 172	5	Dike	1,244 tons 7.2 tons/ft	☐	Rootless dike or chevron? 20' long and 2' high visible out of water. Check plans. (Office check: rootless dike; measured length using structure line in GIS).
Medium	653.53	Dike L **703.18**	3 200	5	Dike	491 tons 2.5 tons/ft	☐	Two dikes near this location require 3' x 200'.
High	653.52	Dike L **703.08**	4 100	3	Dike	310 tons 3.1 tons/ft	☐	
Medium	653.47	Rootless Dike L **Not avail.**	3 75	10	Dike	281 tons 3.7 tons/ft	☐	3' out of water 75' long.
Critical	653.43	Dike L **702.98**	6 50	5	Dike	362 tons 7.2 tons/ft	☐	50' gap between structure and bank. Dike appears ok, but need to fill in gap.
High	653.33	Chevron L **702.93**	4.5 150	3	Dike	567 tons 3.8 tons/ft	☐	Chevron missing. Landslide 3 x 75, riverside 6 x 75. (Used weighted average for height deficiency).
No Repair	653.19	Dike L **702.78**				tons tons/ft	☐	Bank eroded behind dike - maybe a rootless dike? 1st outflanked - separation dike. (Office note: Historic Google Earth image appears to be a rootless dike).
Critical *Tyson Bend Backwater*	653.11	Backwater L				tons tons/ft	☐	Tyson Bend Backwater 7 to 8 ft of sediment deposited at the left bank of chute (north side). Right bank of backwater (south side) eroded back behind river left-bank dikes.
High *Tyson Bend Backwater*	653.06	Dike L **702.65**	4 50	5	Dike	189 tons 3.8 tons/ft	☐	Tyson Bend Backwater dike.
Medium	652.94	Chevron L **702.51**	4 50	3	Dike	155 tons 3.1 tons/ft	☐	Landslide degraded 50 x 4, waterside ok.
No Repair	652.79	Chevron L **702.31**				tons tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	652.76		Dike L **702.27**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
No Repair	652.73		Rootless Dike L				tons tons/ft	☐	
Medium	652.69		Dike L **702.2**	2 50	10	Dike	112 tons 2.2 tons/ft	☐	
High	652.62		Chevron L **702.18**	5 150	3	Dike	678 tons 4.5 tons/ft	☐	Degraded.
No Repair	652.58		Dike L **702.15**				tons tons/ft	☐	
No Repair	652.54		Dike L				tons tons/ft	☐	
Critical	652.47	652.42	Revetment R **703.25**	8 300	5	Revet	3,103 tons 10.3 tons/ft	☑	Lots of sloughing right bank, about 500' of bank needs repair, some rock, need to rebuild toe from WS between waypoint 247 d/s and 248 u/s.
No Repair	652.45		Dike L **702.05**				tons tons/ft	☐	
Medium	652.45		Chevron L **702.08**	3 75	3	Dike	161 tons 2.1 tons/ft	☐	Landslide low.
Medium	652.28		Chevron L **701.98**	2 75	3	Dike	114 tons 1.5 tons/ft	☐	Riverside
Medium	652.26		Dike L **701.95**	5 100	5	Dike	538 tons 5.4 tons/ft	☐	Dike looks ok 100' x 5' if solid dike, if not 100'x5' notch. (Office check: no environmental gap, but unclear if a sill is located in front of the dike. Changed to medium priority based on photo/engineering judgment.)
High	652.08		Chevron L **701.84**	5 150	3	Dike	678 tons 4.5 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
No Repair	651.92	Dike L **701.7**				tons tons/ft	☐	
High	651.83	Chevron L **701.65**	3 50	3	Dike	107 tons 2.1 tons/ft	☐	Riverside 50 x 3 landside ok.
No Repair	651.8	Dike L **701.59**				tons tons/ft	☐	
Low	651.73	Dike L **701.52**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	Low on tip.
No Repair	651.62	Dike L **701.51**				tons tons/ft	☐	
No Repair	651.53	Dike L **701.43**				tons tons/ft	☐	
Medium	651.26	Dike R **701.15**	2 50	10	Dike	112 tons 2.2 tons/ft	☐	
High	651.13	Dike R **701.12**	4 100	10	Dike	551 tons 5.5 tons/ft	☐	
No Repair	651.01	Dike R **701**				tons tons/ft	☐	
Medium	650.94	Dike R **700.8**	2 100	10	Dike	224 tons 2.2 tons/ft	☐	
No Repair	650.84	Dike R **700.7**				tons tons/ft	☐	
Medium	650.77	Dike R **700.65**	3 50	10	Dike	187 tons 3.7 tons/ft	☐	
Medium	650.66	Dike R **700.37**	3 30	10	Dike	112 tons 3.7 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	650.55		Dike R **700.1**	4 50	10	Dike	276 tons 5.5 tons/ft	☐	
No Repair	650.43		Dike R **699.54**				tons tons/ft	☐	
Critical *California Chute*	650.3	650.22	Revetment L **700.5**	6 410	5	Revet	3,180 tons 7.8 tons/ft	☐	Just u/s of the Iowa side of the California Chute inlet. Revetment requires repair, grade control looks to be at WS -5' about where it should be.
No Repair	650.19		Dike R **699.05**	5 150			tons tons/ft	☐	Some rock, but mostly missing.
Critical *California Chute*	650.11		Chute Inlet R **698.67**				tons tons/ft	☐	Nebraska side California Chute (right bank of Missouri River) sedimented in; u/s side where grade control cut in behind; flanked Nebraska side of California Chute, lots of sediment in chute. Survey team should check rock elevations upstream of the inlet.
Critical *California Chute*	650.02		Grade Control R				tons tons/ft	☐	Flanked Nebraska side of 1st California Chute, lots of sediment in chute; grade control d/s end of Cal. Chute Nebraska side - right bank; sediment at entrance.
No Repair	649.86		Dike R **698.11**	5 200			tons tons/ft	☐	
No Repair *California Chute*	649.75		Dike R **697.81**				tons tons/ft	☐	Can't see control structure due to sand; u/s side of Nebraska side of the 2nd California Chute inlet completely full of sediment; two total inlets on NE side with 3 outlets.
No Repair	649.65		Dike R **697.76**	6 200			tons tons/ft	☐	
No Repair	649.55		Dike R **697.71**	4 125			tons tons/ft	☐	
High	649.11		Kicker L **695.83**	3 400	3	Dike	857 tons 2.1 tons/ft	☐	
No Repair *California Chute*	649.01		Dike L **695.3**				tons tons/ft	☐	Across from NE side California Chute outlet (1st of three outlets for the chute - on right bank of Missouri River).

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
No Repair	648.89	Dike L **695.25**				tons tons/ft	☐	
Critical *California Chute*	648.79	Chute Outlet R				tons tons/ft	☐	1st and 2nd Nebraska side California Chute outlets (right bank of Missouri River) - full of sand.
Medium	648.63	Dike L **695**	2 50	10	Dike	112 tons 2.2 tons/ft	☐	
High *California Chute*	648.59	Revetment R **695.95**	3 100	3	Revet	233 tons 2.3 tons/ft	☐	3rd Nebraska side California Chute outlet (right bank of Missouri River) - still a little backwater; right-bank of Missouri River - revetment damaged at chute outlet 3 x 100 u/s side
Medium	648.16	Dike L **694.5**	2 50	10	Dike	112 tons 2.2 tons/ft	☐	
Critical	648.08	Revetment R **694.6**	8 100	5	Revet	1,034 tons 10.3 tons/ft	☐	
Medium	648.03	Dike L **694.3**	2 50	10	Dike	112 tons 2.2 tons/ft	☐	
Medium	647.87	Dike L **694.25**	2 50	10	Dike	112 tons 2.2 tons/ft	☑	Big scallop on d/s side of dike (large section of bank eroded).
Medium	647.75	Dike L **694.1-A/B**	2 30	5	Dike	46 tons 1.5 tons/ft	☑	
Medium	647.61	Dike L **693.9**	2 33	5	Dike	50 tons 1.5 tons/ft	☑	Flanked or notched. Windrow located near dike - ok. (Office check: 20 ft environmental gap.)
Medium	647.49	Dike L **693.81**	6 50	10	Dike	491 tons 9.8 tons/ft	☐	Left dike with sill ok, if not a sill then 6 x 50'. (Office check - dike with a 20' environmental gap.)
No Repair	647.35	Dike L **693.7**				tons tons/ft	☐	

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	647.22	Dike L **693.6**	3 50	10	Dike	187 tons 3.7 tons/ft	☐	
High	647.08	Dike L **693.51**	5 75	10	Dike	565 tons 7.5 tons/ft	☐	Might be notched, gap needs to be filled in. (Office check - no indication of an environmental gap from pdf files.)
No Repair	646.98	Dike L **693.4**				tons tons/ft	☐	
Medium	646.89	Dike L **693.35**	3 50	10	Dike	187 tons 3.7 tons/ft	☐	
High	646.8	Dike L **693.2**	6 50	10	Dike	491 tons 9.8 tons/ft	☐	Flanked 50' x 6' to fill in gap.
Medium	646.71	Dike L **693.15**	3 50	10	Dike	187 tons 3.7 tons/ft	☐	
No Repair	646.61	Dike L **693.05**				tons tons/ft	☐	
No Repair	646.47	Dike L **692.93**				tons tons/ft	☐	Ok, big scallop hole behind structure.
Critical	646.34	Dike/Sill L **692.81**	4.5 200	5	Dike	911 tons 4.6 tons/ft	☐	Sill 3x length; dike repair 6'x100'. (Office check: PDF files 100' length for sill. Weighted average.)
No Repair	646.22	Dike L **692.65**				tons tons/ft	☐	Ok.
Medium	645.98	Sill L **692.27**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	Sill repair; dike ok.
High	645.86	Dike L **692.2**	4 100	10	Dike	551 tons 5.5 tons/ft	☐	
No Repair	645.71	Dike L **692.1**				tons tons/ft	☐	Lots of debris.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	645.58		Dike L **691.9**	5 100	10	Dike	753 tons 7.5 tons/ft	☐	
Critical	645.44		Dike L **691.79**	4 200	10	Dike	1,102 tons 5.5 tons/ft	☐	
High	645.44	645.17	Revetment R **693.8**	3.2 1382	3	Revet	3,431 tons 2.5 tons/ft	☑	Waypoint 309 u/s, 310 d/s at creek entrance, revetment looks low, long stretch, build up about 2'.
Medium	645.28		Dike L **691.76**	3 50	10	Dike	187 tons 3.7 tons/ft	☐	Notched or flanked? 3x100'. (Office check - environmental gap 20 ft, assumed 3x50' deficiency from photos with gap.)
Medium	645.16		Dike L **691.71**	3 250	10	Dike	936 tons 3.7 tons/ft	☐	
No Repair	644.98		Dike L **691.61**				tons tons/ft	☐	
Critical	644.82		Dike L **691.55**	4 200	10	Dike	1,102 tons 5.5 tons/ft	☐	
High	644.75		Dike L **691.41**	4 100	10	Dike	551 tons 5.5 tons/ft	☐	
Medium	644.65		Dike L **691.38**	2 100	10	Dike	224 tons 2.2 tons/ft	☐	
Medium	644.57		Dike L **691.37**	2 50	10	Dike	112 tons 2.2 tons/ft	☐	
Medium	644.48		Dike L **691.36**	2 50	10	Dike	112 tons 2.2 tons/ft	☐	
High	644.15		Dike R **691.2**	4 50	10	Dike	276 tons 5.5 tons/ft	☐	
No Repair	643.99		Dike R **691.15**				tons tons/ft	☐	

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	643.92	Revetment L **691.41**	3 100	3	Revet	233 tons 2.3 tons/ft	☐	Revetment low; sediment over rock.
Low	643.82	Dike R **691**	2 50	10	Dike	112 tons 2.2 tons/ft	☐	Missing some rock at end; notched dike.
High	643.66	Dike R **690.84**	4 50	10	Dike	276 tons 5.5 tons/ft	☐	
Medium	643.51	Dike R **690.72**	3 50	10	Dike	187 tons 3.7 tons/ft	☐	
No Repair	643.3	Dike R **690.48**				tons tons/ft	☐	
Medium	643.16	Rootless Dike R **690.32**	3 30	5	Dike	74 tons 2.5 tons/ft	☐	
Medium	643.02	Rootless Dike R **689.62**	3 150	5	Dike	368 tons 2.5 tons/ft	☐	Missed waypoint for a rootless dike between waypoint 324 and 325 (3' x 150' repair required).
Medium	642.89	Chevron R **688.72**	6 20	3	Dike	124 tons 6.2 tons/ft	☐	20' gap landslide, Corps inspection team indicated new rock put on top.
No Repair	642.81	Rootless Dike R **688.42**				tons tons/ft	☐	
High	642.7	Chevron R **Not avail.**	2 150	3	Dike	228 tons 1.5 tons/ft	☐	
No Repair	642.57	Rootless Dike R **687.22**				tons tons/ft	☐	
High	642.55	Chevron R **687.52**	2 150	3	Dike	228 tons 1.5 tons/ft	☐	
No Repair	642.45	Rootless Dike R **686.62**				tons tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	642.32		Chevron R **Not avail.**	2.5 110	3	Dike	202 tons 1.8 tons/ft	☐	Riverside 6 x 30, landside 2 x 75. (Weighted average.)
High	642.28		Rootless Dike R **685.42**	5 30	5	Dike	161 tons 5.4 tons/ft	☐	
High	642.14		Chevron R **Not avail.**	6 150	3	Dike	930 tons 6.2 tons/ft	☐	
Critical	641.86	641.66	Revetment L **691.41**	4 1054	5	Dike	3,993 tons 3.8 tons/ft	☑	6 x 1000 or more - check GPS; aerial photos show bank eroded back behind structure.
High	641.53		Dike L **683.7**	4 50	10	Dike	276 tons 5.5 tons/ft	☐	
High	641.41		Dike L **683.6**	4 50	3	Dike	155 tons 3.1 tons/ft	☐	
Critical	641.26	641.2	Revetment R **683.5**	5 320	5	Revet	2,069 tons 6.5 tons/ft	☐	5' x GPS points build up revetment.
No Repair	641.25		Dike L **683.47**				tons tons/ft	☐	
Critical	641.11		Dike L **683.4**	4 200	5	Dike	758 tons 3.8 tons/ft	☐	
No Repair	641		Boat Ramp L				tons tons/ft	☐	Wilson Island Rec. Area - boat ramp.
Critical	640.82		Dike L **683.1**	6 180	5	Dike	1,302 tons 7.2 tons/ft	☐	Check if dike or sill. (Office check: pdf file indicates stone fill dike with 20' environmental gap; subtracted 20' from field estimate for gap.)
Medium	640.59		Dike L **683**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	

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Medium	640.48		Dike L **682.95**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	
Medium	640.39		Dike L **682.9**	2 60	5	Dike	91 tons 1.5 tons/ft	☐	
Critical	640.27		Dike L **682.85**	4 150	5	Dike	568 tons 3.8 tons/ft	☐	
Critical	640.19	639.85	Revetment R **682.8**	6.6 1714	5	Dike	14,514 tons 8.5 tons/ft	☑	Get length, average 5'; large blow out area (damaged houses along bank).
Critical	640.19		Dike L **682.75**	4 200	5	Dike	758 tons 3.8 tons/ft	☐	Check if sill. (Office check: pdf files indicate stone fill dike with 10' crown - no gap indicated.)
Medium	640.08		Dike L **682.7**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	
High	639.92		Dike L **682.62**	4 100	5	Dike	379 tons 3.8 tons/ft	☐	
Critical	639.84	639.63	Kicker R **682.55**	9.7 1042	5	Dike	17,016 tons 16.3 tons/ft	☑	Average deficiency 5' high.
Medium	639.74		Dike L **682.49**	3 75	5	Dike	184 tons 2.5 tons/ft	☐	
No Repair	639.55		Dike R **682.25**				tons tons/ft	☐	Gone with lots of trees, no repair.
Critical	639.41		Dike R **682.1**	6 100	5	Dike	723 tons 7.2 tons/ft	☐	
High	639.29		Dike R **682**	4 100	5	Dike	379 tons 3.8 tons/ft	☐	
High	639.15		Dike R **681.9**	4 100	5	Dike	379 tons 3.8 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Critical	639.02		Dike R **681.8**	6 200	5	Dike	1,447 tons 7.2 tons/ft	☐	Dike gone; needs to build back up.
Critical	638.83		Dike R **681.6**	6 150	5	Dike	1,085 tons 7.2 tons/ft	☐	Dike gone; needs to build back up.
Critical	638.7		Dike R **681.5**	6 100	5	Dike	723 tons 7.2 tons/ft	☐	
Critical	638.54	638.4	Kicker L **682.4**	8 820	5	Dike	9,603 tons 11.7 tons/ft	☐	Kicker gone, 8x length use GPS points.
Critical	638.2		Dike L **681**	4 200	5	Dike	758 tons 3.8 tons/ft	☐	Low point.
Medium	638.1		Dike L **680.9**	2 100	5	Dike	152 tons 1.5 tons/ft	☐	
Critical	638.01	637.9	Revetment R **681.35**	8 560	5	Dike	6,558 tons 11.7 tons/ft	☐	368 u/s, 8x length right revetment; scoured overbank.
Critical	637.98		Dike L **680.8**	4 150	5	Dike	568 tons 3.8 tons/ft	☐	
High	637.87		Dike L **680.65**	4 75	5	Dike	284 tons 3.8 tons/ft	☐	
Critical	637.76		Dike L **680.52**	6 75	5	Dike	543 tons 7.2 tons/ft	☐	
Critical *Boyer Chute*	637.74		Chute Inlet R				tons tons/ft	☐	Boyer Chute inlet full of sediment.
Critical *Lower Calhoun Chute*	637.57		Chute Inlet R				tons tons/ft	☐	Lower Calhoun Chute inlet full of sediment.
Critical	637.55	637.36	Revetment R **680.7**	4.3 1028	5	Revet	5,715 tons 5.6 tons/ft	☑	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Critical	637.36		Revetment R **680.7**	4 773	5	Revet	3,998 tons 5.2 tons/ft	☑	
Critical *Calhoun Chute*	637.22	637.09	Kicker R **680.1**	8 657	5	Dike	7,694 tons 11.7 tons/ft	☑	Exit Calhoun Chute. Kicker gone or low, average 6' rock.
Critical	636.99		Dike R **679.95**	6 100	5	Dike	723 tons 7.2 tons/ft	☐	
No Repair	636.98		Rootless Dike R	3			tons tons/ft	☐	3 to 4 ft out of water-ok.
High	636.9		Chevron R **679.93**	3 150	3	Dike	321 tons 2.1 tons/ft	☐	
No Repair	636.69		Rootless Dike R **679.79**				tons tons/ft	☐	
High	636.61		Chevron R **679.75**	3 150	3	Dike	321 tons 2.1 tons/ft	☐	
No Repair	636.35		Rootless Dike R **679.6**				tons tons/ft	☐	Note: left bank (waypoint 384) revetment covered in mud.
High	636.28		Chevron R **679.55**	6 150	3	Dike	930 tons 6.2 tons/ft	☐	
Critical	636		Rootless Dike R **679.37**	7 100	5	Dike	934 tons 9.3 tons/ft	☐	About 1' out of water.
High	635.9		Chevron R **679.31**	4 150	3	Dike	465 tons 3.1 tons/ft	☐	
No Repair	635.73		Rootless Dike R **679.25**				tons tons/ft	☐	

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Critical *Boyer Backwater*	635.64	Rootless Dike R **679.1**	6 100	5	Dike	723 tons 7.2 tons/ft	☐	Northend structure of Boyer Backwater 2' out of water. (Office check: Modified dike - length assumed). Flanking of Boyer Backwater inlet structure (Corps inspection team asked to note after survey boat passed - no photo) - (Office check - structure at inlet appears to be a rootless dike. Assumed this is the same structure Corps team was referring to. Structure was originally a standard dike, but modified as part of the MRRP project to a rootless dike.)
High	635.55	Chevron R **679.05**	4 150	3	Dike	465 tons 3.1 tons/ft	☐	Sedimented in 4 x 150.
No Repair	635.41	Rootless Dike R **679**				tons tons/ft	☐	
No Repair	635.19	Rootless Dike R				tons tons/ft	☐	
High	635.12	Chevron R **678.87**	6 150	3	Dike	930 tons 6.2 tons/ft	☐	At water level - need to rebuild.
No Repair	635.02	Rootless Dike R **678.79**				tons tons/ft	☐	
No Repair	634.89	Rootless Dike R **678.75**				tons tons/ft	☐	
High	634.85	Chevron R **678.68**	4 150	3	Dike	465 tons 3.1 tons/ft	☐	
Critical *Boyer Backwater Chute*	634.67	Chute Outlet R				tons tons/ft	☐	Mid channel connection to Boyer Backwater Chute full of sediment.
No Repair	634.58	Rootless Dike R **678.5**				tons tons/ft	☐	
High	634.5	Chevron R **678.48**	3 150	3	Dike	321 tons 2.1 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
No Repair	634.3		Rootless Dike R **678.4**				tons tons/ft	☐	A little ragged.
High	634.21		Chevron R **678.35**	3 150	3	Dike	321 tons 2.1 tons/ft	☐	
Critical	634.04	633.92	Kicker L **678.7**	4 660	5	Dike	2,501 tons 3.8 tons/ft	☐	402 u/s (left kicker) - 403 d/s, missing rock, average 4' over length from GPS points.
High	633.73		Dike L **677.9**	4 100	5	Dike	379 tons 3.8 tons/ft	☐	
Medium	633.61		Dike L **677.8**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	
No Repair	633.51		Chute Outlet R **677.71**				tons tons/ft	☐	Outlet appears mostly free of sediment (from aerials).
Medium	633.43		Dike L **677.6**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
Critical *Boyer Chute*	633.35	633.06	Revetment R **678.1**	4.7 1567	5	Revet	9,522 tons 6.1 tons/ft	☑	Looks 5' low between day mark (RM 632.8) and Boyer Chute outlet.
High	633.33		Dike L **677.56**	4 100	5	Dike	379 tons 3.8 tons/ft	☐	
No Repair	633.25		Dike L				tons tons/ft	☐	
No Repair	633.13		Dike L				tons tons/ft	☐	
No Repair	633.1		Dike L **677.34**				tons tons/ft	☐	
No Repair	632.48		Dike L **677**				tons tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	632.33		Dike R **676.5**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	
Medium	632.14		Dike R **676.35**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	
Medium	632.02		Dike R **676.3**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	
Critical	631.81	631.72	Revetment L **676.8**	4.1 507	5	Revet	2,687 tons 5.3 tons/ft	☑	Left bank only see rock going up bank about 3' (should be 8' above WS in this section), rest covered with sand.
Medium	631.8		Dike R **676.08**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
No Repair	631.63		Dike R **675.84**				tons tons/ft	☐	
Medium	631.53		Dike R **675.78**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
No Repair	631.08		Dike L **675.2**				tons tons/ft	☐	
Medium	630.95		Dike L **675**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
Medium	630.85		Dike L **674.8**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	3'x50' if notched. (Office check - environmental gap 20' long with "Sap"?)
High	630.68		Dike L **674.71**	4 100	5	Dike	379 tons 3.8 tons/ft	☐	
Medium	630.52		Dike L **674.6**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	Between waypoint 425 and 426
Medium	630.38		Dike L **674.4**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	630.19		Dike L **674.21**	3 75	5	Dike	184 tons 2.5 tons/ft	☐	
Medium	630.05		Dike L **674.15**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	
No Repair	629.95		Dike L **674.05**				tons tons/ft	☐	
No Repair	629.83		Dike L **673.94**				tons tons/ft	☐	
High	629.74		Dike L **673.92**	4 50	5	Dike	189 tons 3.8 tons/ft	☐	
High	629.72	629.7	Revetment R **673.95**	6 79	3	Revet	368 tons 4.7 tons/ft	☑	4' rock visible; 2006 Corps aerial shows small gap in bank, but field map does not show a gap.
High	629.5		Kicker R **673.95**	3 500	3	Dike	1,071 tons 2.1 tons/ft	☐	Need to build up.
No Repair	629.34		Dike R				tons tons/ft	☐	
High	629.14		Dike R **673.6-B**	4 50	5	Dike	189 tons 3.8 tons/ft	☐	(Office check: waypoint 435 and 436 same structure numbers, but looks like two different dikes in aerial image with overlap).
Critical	629		Dike R **673.6-A**	4 200	5	Dike	758 tons 3.8 tons/ft	☐	(Office check: waypoint 435 and 436 same structure numbers, but looks like two different dikes in aerial image with overlap).
High	628.9		Dike R **673.3**	5 100	5	Dike	538 tons 5.4 tons/ft	☐	4'x50' for dike and 6 x 50 to fill in gap (weighted average).
High	628.78		Dike R **673.25**	4 75	5	Dike	284 tons 3.8 tons/ft	☐	
Medium	628.71		Dike R **673.15**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	628.51	Dike R **672.9**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
No Repair	628.41	Dike R **672.8**				tons tons/ft	☐	Little low.
High	628.29	Dike R **672.6**	4 100	5	Dike	379 tons 3.8 tons/ft	☐	
Critical	628.17	Dike R **672.5**	6 200	5	Dike	1,447 tons 7.2 tons/ft	☐	
High	628.05	Dike R **672.35**	4 100	5	Dike	379 tons 3.8 tons/ft	☐	
Medium	627.94	Dike R **672.27**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
Medium	627.85	Dike R **672.21**	3 30	5	Dike	74 tons 2.5 tons/ft	☐	
No Repair	627.48	Kicker L **671.9**				tons tons/ft	☐	Some low areas.
Medium	627.41	Dike L **671.8**	3 75	5	Dike	184 tons 2.5 tons/ft	☐	
Medium	627.35	Dike L **671.7**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
Medium	627.19	Dike L **671.61**	3 20	5	Dike	49 tons 2.5 tons/ft	☐	
Medium	627.05	Dike L **671.5**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	
No Repair	626.92	Dike L **671.36**				tons tons/ft	☐	

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
No Repair	626.74	Dike L **671.05**				tons tons/ft	☐	
No Repair	626.41	Dike L **670.75**				tons tons/ft	☐	At bridge.
Medium	626.28	Dike L **670.6**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
Medium	626.13	Dike L **670.5**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
Medium	625.98	Dike L **670.32**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	Between waypoint 456 and 457.
No Repair	625.81	Dike L **670.2**				tons tons/ft	☐	
No Repair	625.61	Dike L **670.01**				tons tons/ft	☐	
No Repair	625.43	Dike L **669.85**				tons tons/ft	☐	
Medium	625.23	Dike L **669.7**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	Upstream and downstream bank eroded.
No Repair	625.04	Dike L **669.5**				tons tons/ft	☐	Covered with sand.
Medium	624.94	Dike L **669.4**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	Under electric lines.
No Repair	624.85	Dike L **669.3**				tons tons/ft	☐	
Medium	624.67	Dike L **669.1**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	Dip slightly near bank.

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	624.47	Dike L **668.9**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
No Repair	624.27	Dike L **668.7**				tons tons/ft	☐	
High	624.04	Dike L **668.5**	4 50	5	Dike	189 tons 3.8 tons/ft	☐	
No Repair	623.85	Dike L **668.35**				tons tons/ft	☐	
Medium	622.83	Dike R **667.2**	3 30	5	Dike	74 tons 2.5 tons/ft	☐	
Medium	622.71	Dike R **667.1**	3 30	5	Dike	74 tons 2.5 tons/ft	☐	
Medium	622.6	Dike R **667**	3 30	5	Dike	74 tons 2.5 tons/ft	☐	
Critical	622.46	Dike R **666.8**	4 200	5	Dike	758 tons 3.8 tons/ft	☐	
No Repair	622.3	Dike R **666.58**				tons tons/ft	☐	Flat but high end.
High	621.97	Dike R **666.15**	4 100	5	Dike	379 tons 3.8 tons/ft	☐	
No Repair	621.59	Dike R **665.7**				tons tons/ft	☐	
Medium	621.31	Dike R **665.38**	3 30	5	Dike	74 tons 2.5 tons/ft	☐	
Medium	621.07	Dike R **665.08**	3 30	5	Dike	74 tons 2.5 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	620.94	Dike R **664.9**	3 75	5	Dike	184 tons 2.5 tons/ft	☐	
Medium	620.82	Dike R **664.77**	3 75	5	Dike	184 tons 2.5 tons/ft	☐	Two dips.
Medium	620.54	Dike R **664.49**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
Medium	620.44	Dike R **664.41**	3 30	5	Dike	74 tons 2.5 tons/ft	☐	
Medium	620.33	Dike R **664.31**	3 30	5	Dike	74 tons 2.5 tons/ft	☐	
Medium	620.03	Dike R **663.97**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
No Repair	619.9	Dike R **663.9**				tons tons/ft	☐	
High	619.78	Dike R **663.8**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	Outflanked.
Medium	619.69	Dike R **663.7**	3 30	5	Dike	74 tons 2.5 tons/ft	☐	
Medium	619.55	Dike R **663.6**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
Medium	619.27	Dike R **663.2**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
No Repair	619.04	Dike R **662.9**				tons tons/ft	☐	Mostly buried.
High	618.91	Dike R **662.8**	4 100	5	Dike	379 tons 3.8 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	618.74	Dike R **662.7**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	
Medium	618.6	Dike R **662.6**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	
Medium	618.48	Dike R **662.5**	3 200	5	Dike	491 tons 2.5 tons/ft	☐	
Critical	618.38	Dike R **662.4**	4 150	5	Dike	568 tons 3.8 tons/ft	☐	
No Repair	618.28	Dike R **662.31**				tons tons/ft	☐	
Medium	618.18	Dike R **662.2**	3 150	5	Dike	368 tons 2.5 tons/ft	☐	Just after bridge.
High	618.01	Dike R **662**	5 100	5	Dike	538 tons 5.4 tons/ft	☐	
Critical *Council Bend Chute*	617.8	Chute Inlet/Rev L **662.3**	8 556	5	Revet	5,751 tons 10.3 tons/ft	☑	Council Bend Chute control structure ok (at inlet); over steepened bank at inlet; some rock still protecting bank, but scoured/eroded on left bank of inlet - see Corps notes for MRRP last inspection. Survey team - inaccessible, high bank at 10 ft, no visible rock. Survey length of 556 ft, assumed 1 additional ft to rebuild toe. (Office check: Unclear of structure number. Only revetment shown at this location before chute created.)
Medium	617.67	Dike R **661.6**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	
High	617.55	Revetment R **661.34**	4 60	3	Revet	186 tons 3.1 tons/ft	☐	4x60 to fill in low point with rock, behind revetment eroded bank.
Critical	616.45	Dike L **660.4**	6 100	5	Dike	723 tons 7.2 tons/ft	☐	GPS full points, D-L failed dike missing about 300', at pedestrian bridge.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	614		Dike R **657.93**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	(Near waypoint C377).
Medium	613.9		Dike R **657.9**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	(Near waypoint C377).
Medium	613.8		Dike R **657.88**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	(Near waypoint C377).
High	613.47		Dike R **657.5**	4 20	5	Dike	76 tons 3.8 tons/ft	☐	
High	613.35	613.26	Revetment L **657.7**	1 468	3	Dike	393 tons 0.8 tons/ft	☐	Just u/s of daymarker 613.1 revetment low or missing rock; bank eroded behind structure; about a 70' gap in revetment to bring up 7 ft, but an overall average of 1 ft high deficient by 468 ft long.
Medium	613.2		Dike R **657.1**	3 75	5	Dike	184 tons 2.5 tons/ft	☐	Just u/s of RM 613.1 (between waypoint C379 and C380).
Medium	613.05		Dike R **657**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	
Medium	612.57		Dike L **656.2**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	Just u/s of bridge.
Critical	611.8		Dike L **655.5**	4 200	5	Dike	758 tons 3.8 tons/ft	☐	
Critical	611.42		Dike L **655.2**	4 300	5	Dike	1,137 tons 3.8 tons/ft	☐	
Critical	611.29		Revetment R **656.9**	4 500	5	Revet	2,586 tons 5.2 tons/ft	☐	
Medium	611.23		Dike L **655**	2 100	5	Dike	152 tons 1.5 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Critical	611.11	610.8	Revetment R **656.9**	6.8 1710	5	Revet	15,033 tons 8.8 tons/ft	☑	- outlet u/s to about waypoint 387 or 388 - power line tower - culverts to power line crossing
Medium	610.82		Dike L **654.65**	2 200	5	Dike	303 tons 1.5 tons/ft	☐	
Medium	610.35		Dike L **654.2**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	Two waypoints taken at same location.
Medium	609.84		Dike L **653.85**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	
High	609.42		Dike L **653.5**	5 100	5	Dike	538 tons 5.4 tons/ft	☐	
Medium	609.21		Dike L **653.26**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	
No Repair	608.93		Dike L **652.9**				tons tons/ft	☐	
Critical	608.63	608.52	Revetment L **653.25**	5 600	5	Revet	3,879 tons 6.5 tons/ft	☐	
High	608.59		Dike L **652.56**	5 30	5	Dike	161 tons 5.4 tons/ft	☐	
No Repair	608.49		Dike L **652.53**				tons tons/ft	☐	Low (no repair).
High	608.49	608.27	L-head R **653.6**	5.2 1239	3	Dike	5,992 tons 4.8 tons/ft	☑	Field notes indicated deficiency: 5' high x 700' long, but pdfs and 2006 aerials indicate a gap at this location in the revetment. (Separated revetment portion from kicker - waypoint 405 for revetment and 406 for kicker.)
Critical	608.2		Dike R **652.25**	5 200	5	Dike	1,076 tons 5.4 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	608.13		Dike R **652.2**	5 100	5	Dike	538 tons 5.4 tons/ft	☐	
No Repair	607.59		Dike R **651.7**				tons tons/ft	☐	
Critical	606.97		Dike R **650.8**	5 200	5	Dike	1,076 tons 5.4 tons/ft	☐	In between piles.
Critical	606.76		Dike R **650.3**	5 200	5	Dike	1,076 tons 5.4 tons/ft	☐	
Critical	606.55		Dike R **649.8**	5 250	5	Dike	1,345 tons 5.4 tons/ft	☐	
High	606.4		Dike R **649.7**	5 50	5	Dike	269 tons 5.4 tons/ft	☐	
High	606.31		Dike R **649.61**	5 100	5	Dike	538 tons 5.4 tons/ft	☐	
High	606.23	606.04	Revetment L **649.4**	2.3 1036	3	Revet	1,848 tons 1.8 tons/ft	☑	Left bank needs about 4' of rock in front of power plant - no length given (near waypoint C416).
Critical	606.08		Dike R **649.3**	5 200	5	Dike	1,076 tons 5.4 tons/ft	☐	Right bank across from power plant - right dike 200'x5' (between waypoint C415 and C416).
No Repair	605.95		Dike R **649.25**				tons tons/ft	☐	
High	605.78	604.54	Revetment L **649.4**	2.4 6965	3	Revet	12,967 tons 1.9 tons/ft	☑	Just d/s of Mosquito Creek and power plant to waypoint C420; add 2' entire length (see drawing on notes); approximately 500' subtracted for scallop hole. Survey team indicated structure has some sand built up over the rock.
High	605.59		Dike R **649.05**	5 100	5	Dike	538 tons 5.4 tons/ft	☐	

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Critical	604.29		Dike L **648.3**	4 150	5	Dike	568 tons 3.8 tons/ft	☐	
High	604.07		Dike L **648.2**	4 50	5	Dike	189 tons 3.8 tons/ft	☐	
No Repair	602.78		Dike L **647.1**				tons tons/ft	☐	
High	601.7	601.67	Revetment R **647.6**	2 175	3	Revet	272 tons 1.6 tons/ft	☐	Bring up 2' by length.
Critical	601.65	601.62	Revetment R **647.6**	5 200	5	Revet	1,293 tons 6.5 tons/ft	☐	Tail end of upper revetment. Structure torn off, piles exposed; repair should focus on d/s structures. Restore dike & revetment. Several openings or gaps in bank (no repair - as designed).
Medium	601.62		L-head R **647.6**	4 80	5	Revet	414 tons 5.2 tons/ft	☐	L-head revetment.
High	601.23		Revetment R **645.6**	2 200	3	Revet	310 tons 1.6 tons/ft	☐	Right revetment blow-out in bank at Haworth Park, Bellevue.
High	600.96	600.76	Revetment R **645.4**	3.1 1123	3	Revet	2,701 tons 2.4 tons/ft	☑	Near Haworth Park boat ramp; right revetment blown out, old piling exposed. Rest of the bank is high enough, but behind the revetment is blown out.
No Repair	600.43		Dike R **644.7**				tons tons/ft	☐	
Medium	600.16		Dike R **644.3**	2 100	5	Dike	152 tons 1.5 tons/ft	☐	
Medium	599.67		Revetment L **645.3**	3 50	3	Revet	116 tons 2.3 tons/ft	☐	Small gap - raise about 3'x50' length.
No Repair	598		Kicker R				tons tons/ft	☐	Gap in kicker - ok.

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No Repair	595.75		Dike L **638.6**				tons tons/ft	☐	Notched or not? (Office check: 20' environmental gap.)
Critical	595.08	594.8	Kicker R **638.75**	3.2 1120	5	Dike	3,024 tons 2.7 tons/ft	☑	Separator revetment - right bank - needs to be rebuilt to the end. (WEST used the survey estimates, plus added 411 ft after reviewing the 2006 aerials. We assumed the end of the kicker was missing, and the survey team ended where they last saw rock.)
High *Plattsmouth Chute*	594.54		Chute Inlet R				tons tons/ft	☐	Plattsmouth Chute inlet; some sedimentation in chute entrance.
Critical	594.43	594.08	Revetment R **637.9-A**	1.6 1800	5	Dike	2,258 tons 1.3 tons/ft	☑	Right bank revetment degraded, bank eroded. (Office: Split waypoint C448 and C449 into revetment and kicker structures.)
Critical	594.08	593.94	Kicker R **637.9-A**	3.5 769	5	Dike	2,376 tons 3.1 tons/ft	☑	Right bank kicker degraded, bank eroded.
Medium	593.5		Reverse Sill R **636.9**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	Located about 3 or 4 structures downstream from right-bank kicker. Check plans for sizing. (Sill requires repair, but no dimensions provided in field).
No Repair	592.38		Dike R **635.7**				tons tons/ft	☐	Corps degraded dike so ok for habitat - they intentionally removed rock so OK.
Critical *Plattsmouth Chute*	591.97		Chute Outlet R				tons tons/ft	☐	Plattsmouth Chute exit - silted up.
Medium	591.43		Dike L **634.65**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	
Medium	590.35		Dike L **633.52**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	Assumed dike - detached from bank - check - if rootless dike, then ok. (Office check: 20' environmental notch - no indication of a rootless dike anywhere in the data.)
Medium	590.08		Dike L **633.33**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	
Critical *Tobacco Chute*	589.44		Chute Inlet R				tons tons/ft	☐	Tobacco chute - sediment at inlet. Previous Corps notes: entrance is eroded on left bank, remainder of chute in good condition, scour hole downstream of old quarry in chute.

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Critical	589.33	Revetment R **632.95**	4 300	5	Revet	1,551 tons 5.2 tons/ft	☐	
Medium	588.98	Kicker R **632.6**	3 100	3	Dike	214 tons 2.1 tons/ft	☐	(Office: Noted as rootless dike in the field, but appears to be part of the kicker structure.)
High	587.34	Chevron R **630.45**	2 150	3	Dike	228 tons 1.5 tons/ft	☐	Assume 3 chevrons in this section, did not see or submerged (RM 587.34, 587.12, 586.87) - need 2'.
High	587.12	Chevron R **630.26**	2 150	3	Dike	228 tons 1.5 tons/ft	☐	Assume 3 chevrons in this section, did not see or submerged (RM 587.34, 587.12, 586.87) - need 2'.
High	586.87	Chevron R **630.07**	2 150	3	Dike	228 tons 1.5 tons/ft	☐	Assume 3 chevrons in this section, did not see or submerged (RM 587.34, 587.12, 586.87) - need 2'.
Critical	586.26	L-head L **629.89**	4 100	5	Revet	517 tons 5.2 tons/ft	☐	L-head dike gap.
No Repair *Tobacco Chute*	586.26	Chute Outlet R				tons tons/ft	☐	Tobacco Chute outlet.
Medium	585.22	Dike L **628.65**	2 125	5	Dike	190 tons 1.5 tons/ft	☐	
No Repair	584.69	Dike L **628.1**				tons tons/ft	☐	
High	584.04	Revetment R **627.85**	3 100	3	Revet	233 tons 2.3 tons/ft	☐	
No Repair	582.3	Dike R **625.88**				tons tons/ft	☐	
Critical	582.28	Dike R **625.88**	7 178	5	Dike	1,663 tons 9.3 tons/ft	☑	Right bank hole (see aerials) behind dike. Structure root damaged - bank blown out.
No Repair	580.44	Revetment L **624.69**				tons tons/ft	☐	Left revetment missing some rock.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
No Repair	579.14		None R				tons tons/ft	☐	Right bank blowout but no structures to repair.
No Repair	578.98		Revetment L **624.1**				tons tons/ft	☐	Left bank revetment.
High	577.88		Revetment R **622.95**	3 100	3	Revet	233 tons 2.3 tons/ft	☐	
High	577.69	577.66	L-head R **622.95**	2 240	5	Dike	364 tons 1.5 tons/ft	☐	
High	577.59		L-head R **622.6**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	Base sheared off - tie L-head back into the bank.
No Repair	577.25		Dike L **622.19**				tons tons/ft	☐	
High	576.8	576.76	Revetment R **622**	2 200	3	Revet	310 tons 1.6 tons/ft	☐	479 u/s - 480 d/s average 2'; revetment overtopped downstream of Lake Wakonda.
High	576.64	576.5	Kicker R **621.71**	2 760	3	Dike	1,153 tons 1.5 tons/ft	☐	481 u/s - 482 d/s average 2' guess about 700' of rock.
Medium	576.44		Dike R **621.5**	2 100	5	Dike	152 tons 1.5 tons/ft	☐	
Low	576.28		Dike R **621.4**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	Several points at same spot just d/s of dike.
Low	575.68		Dike R **620.8**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	Added - no way point.
Low	575.51		Dike R **620.7**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	(and one more just u/s no way pt)
No Repair	575.24		Dike R **620.3**				tons tons/ft	☐	(Office check - 20 ft gap installed)

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	575.04		Dike R **620.11**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Medium	574.8		Dike R **619.8**	2 200	5	Dike	303 tons 1.5 tons/ft	☐	
High	573.54		Revetment R **618.8**	3 100	3	Revet	233 tons 2.3 tons/ft	☐	
Low	573.24		Dike L **618.29**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Medium	572.93		L-head R **618.8**	2 50	3	Revet	78 tons 1.6 tons/ft	☐	
High	572.88		L-head R **618.8**	2 200	5	Revet	517 tons 2.6 tons/ft	☐	L-head revetment.
High	572.7	572.53	Kicker R **618.8**	3 940	3	Dike	2,014 tons 2.1 tons/ft	☐	Average 3' length.
Low	572.27		Dike R **617.6**	1 125	5	Dike	105 tons 0.8 tons/ft	☐	
Medium	572.11		Dike R **617.52**	2 200	5	Dike	303 tons 1.5 tons/ft	☐	
No Repair	571.7		Revetment L				tons tons/ft	☐	Checked left bank cut at Percival (RM 571.1) - Corps inspection crew indicated "ok."
No Repair	571.7		Dike R **617.2**				tons tons/ft	☐	
No Repair	571.56		Dike R **617.11**				tons tons/ft	☐	
No Repair	570.98		Dike R				tons tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	570.89		Dike R **616.55**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
No Repair	570.53		Dike R **616.2**				tons tons/ft	☐	
Low	570.29		Dike R **616**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	569.83		Dike R **615.55**	1 200	5	Dike	168 tons 0.8 tons/ft	☐	
High	569.67		Kicker L **615.64**	2 200	3	Dike	303 tons 1.5 tons/ft	☐	
Low	569.55		Dike L **615.3**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
No Repair	569.33		Revetment R				tons tons/ft	☐	Right bank some bare spots along the bank, but ok.
Low	569.02		Dike L **614.85**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	568.72		Dike L **614.7**	1 200	5	Dike	168 tons 0.8 tons/ft	☐	
Low	567.09		Revetment R **613.4**	3 100	3	Revet	233 tons 2.3 tons/ft	☐	No repair - ok; Right revetment just u/s of 516 (no photo).
High	566.16	566	Revetment R **612.1**	3 850	3	Revet	1,978 tons 2.3 tons/ft	☐	Average 3' for length.
High	565.61		Revetment R **611.9**	2 50	3	Revet	78 tons 1.6 tons/ft	☐	Way pt. just u/s of revetment (MARKED AS HIGH PRIORITY - see photo - appears section mostly gone).
High	565.2	565.02	Revetment R **611.3**	1.2 960	3	Revet	894 tons 0.9 tons/ft	☑	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	565.02	564.9	Kicker R **611.3**	3.8 607	3	Dike	1,728 tons 2.8 tons/ft	☑	3' average.
Low	564.84		Dike R **610.6**	1 300	5	Dike	252 tons 0.8 tons/ft	☐	
Low	564.55		Dike R **610.35**	1 200	5	Dike	168 tons 0.8 tons/ft	☐	
Low	564.4		Dike R **610.2**	1 150	5	Dike	126 tons 0.8 tons/ft	☐	
Low	564.28		Dike R **610.11**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	564.03		Dike R **609.9**	1 150	5	Dike	126 tons 0.8 tons/ft	☐	
Low	563.86		Dike R **609.7**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	Rebuild to +1
Low	563.76		Dike R **609.55**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	563.63		Dike R **609.45**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
High	562.99	562.88	Kicker L **608.9**	3 650	3	Dike	1,393 tons 2.1 tons/ft	☐	3' x distance.
Low	562.82		Dike L **608.7**	1 350	5	Dike	294 tons 0.8 tons/ft	☐	
Critical	562.5		Revetment R **608.78**	3 125	5	Revet	485 tons 3.9 tons/ft	☐	Opening at outfall - revetment got chewed off right revetment at culvert - North Table Creek; GPS position taken from photo. (Corps team indicated Stations 22+05 to 23+30 requires about 1.5 ton/ft repair).

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	562.22		Dike L **608.07**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Critical	562.21	562.14	Revetment R **608.1**	3 410	5	Revet	1,590 tons 3.9 tons/ft	☐	Mouth of creek (536) to waypoint 537; need average of 3' height. Right bank eroded.
Critical	562.18		Dike R **608.02**	1 135	5	Dike	113 tons 0.8 tons/ft	☐	Dike along right bank of S. Table Creek, number 608.02, Corps identified as critical priority - "Dike was 109' long, build up and extend upstream about 25 ft."
High	561.57		Revetment R **608.1**	3 100	3	Revet	233 tons 2.3 tons/ft	☐	
High	561.14		Revetment R **607.15**	3 300	3	Revet	698 tons 2.3 tons/ft	☐	
No Repair	561		Revetment R				tons tons/ft	☐	Near RM 561 and waypoint C540: up & down river areas of missing rock - however, some areas should be bare.
High	560.65	560.63	L-head R **605.55**	3 150	5	Dike	368 tons 2.5 tons/ft	☐	3 x length - right bank L-heads.
High	560.63		L-head R **606.5**	3 100	5	Revet	388 tons 3.9 tons/ft	☐	L-head revetment.
Low	560.5		Dike L **606.6**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Medium	560.44		Dike L **606.4**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	
High	560.4	560.28	L-head R **606.45/606.3**	2.6 844	5	Dike	1,682 tons 2.0 tons/ft	☑	
High	560.24	560.02	L-head R **606.45/606.1**	2.5 1291	5	Dike	2,368 tons 1.8 tons/ft	☑	Average 2.5 ft - L-head.

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	559.93	Dike R **605.85**	1 147	5	Dike	124 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	559.82	Dike R **605.8**	1 172	5	Dike	145 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	559.7	Dike R **605.65**	1 160	5	Dike	134 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	559.58	Dike R **605.5**	1 193	5	Dike	162 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	559.4	Dike R **605.34**	1 162	5	Dike	136 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	559.32	Dike R **605.25**	1 163	5	Dike	137 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	559.21	Dike R **605.17**	1 171	5	Dike	144 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	559.08	Dike R **605.1**	1 198	5	Dike	166 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	558.91	Dike/Sill R **604.91**	1 256	5	Dike	215 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out - includes sill?)
Low	558.73	Dike R **604.71**	1 140	5	Dike	118 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	558.55	Dike R **604.6**	1 350	5	Dike	294 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out. Corps PDF file indicates sill at this location.)

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	558.43	Dike R **604.4**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	558.32	Dike R **604.2**	1 196	5	Dike	165 tons 0.8 tons/ft	☐	add foot to design (submerged) some may be more submerged - we assumed at WS - All need to be rebuilt. (Office check: measured in GIS, length of line from bank out)
Low	558.19	Dike R **604.1**	1 96	5	Dike	81 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	558.05	Dike R **603.9**	1 258	5	Dike	217 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.))
Low	557.9	Dike R **603.8**	1 142	5	Dike	119 tons 0.8 tons/ft	☐	add foot to design (submerged) some may be more submerged - we assumed at WS - All need to be rebuilt. (Office check: measured in GIS, length of line from bank out)
Low	557.76	Dike R **603.75**	1 264	5	Dike	222 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	557.64	Dike R **603.7**	1 204	5	Dike	171 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	557.53	Dike R **603.5**	1 172	5	Dike	145 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	557.42	Dike R **603.2**	1 192	5	Dike	161 tons 0.8 tons/ft	☐	Add foot to design (submerged) some may be more submerged - we assumed at WS - all need to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	557.31	Dike R **603.12**	1 192	5	Dike	161 tons 0.8 tons/ft	☐	A small portion of the dike is tied into bank ~20'; (Office check: length from GIS measurement is 212', subtract 20 ft that is tied into the bank, so total repair length = 192 ft)
Low	557.19	Dike R **603.05**	1 155	5	Dike	130 tons 0.8 tons/ft	☐	A small portion of the dike is tied into bank ~20'. (Office check: length from GIS measurement is 175', subtract 20 ft that is tied into the bank, so total repair length = 155 ft.)
No Repair	557.08	Revetment L **602.95**				tons tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	557.08	556.97	L-head L **602.95**	2.3 563	3	Revet	1,004 tons 1.8 tons/ft	☑	
Low	557.07		Dike R **602.82**	1 185	5	Dike	156 tons 0.8 tons/ft	☐	A small portion of the dike is tied into bank ~20'. (Office check: length from GIS measurement is 205', subtract 20 ft that is tied into the bank, so total repair length = 185 ft.)
Low	556.93		Dike R **602.61**	1 181	5	Dike	152 tons 0.8 tons/ft	☐	Completely submerged - get length from plans. (Office check: measured in GIS, length of line from bank out.)
Low	556.86		Dike R **602.55**	1 160	5	Dike	134 tons 0.8 tons/ft	☐	Completely submerged - get length from plans. (Office check: measured in GIS, length of line from bank out.)
High	556.79	556.71	L-head L **Not avail.**	2 410	3	Revet	636 tons 1.6 tons/ft	☐	
Low	556.72		Dike R **602.5**	1 167	5	Dike	140 tons 0.8 tons/ft	☐	Completely submerged - get length from plans. (Office check: measured in GIS, length of line from bank out.)
High	556.63		Kicker L **Not avail.**	3 1000	3	Dike	2,143 tons 2.1 tons/ft	☐	(Office check: No number provided for kicker, but dike within bank at this location is 602.2.)
No Repair	556.5		Dike L **602.1**				tons tons/ft	☐	
Critical *Upper Hamburg Chute*	555.39		Chute Inlet R				tons tons/ft	☐	Right bank of Missouri River. Upper Hamburg Chute inlet left-bank eroded (see notes drawing) design objective: (1) reduce the amount of flow and (2) protect grade control structure. Note: There is new rock at Hamburg chute inlet - rock looks good. SEE Corps notes from Nov. 2011 inspection.
Low	555.23		Dike L **600.81**	1 285	5	Dike	240 tons 0.8 tons/ft	☐	1 x look at plans; submerged. (Office check: measured in GIS, length of line from bank out.)
Medium	555.08		Revetment R **600.79**	1 200	3	Revet	155 tons 0.8 tons/ft	☐	
No Repair	554.99		Dike R **600.8**	1 50			tons tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Critical	554.67	554.63	Revetment L **600.6**	4.6 228	5	Dike	1,075 tons 4.7 tons/ft	☑	Breaks in left Revet (some areas of bare bank).
No Repair	554.62		Kicker L **600.6**				tons tons/ft	☐	Some low sections.
Medium	554.6		Chevron R **600.3**	1 150	3	Dike	126 tons 0.8 tons/ft	☐	At WS look at plans not sure what it was - maybe a chevron? (Office Check: chevron at this location)
No Repair	553.78		Revetment L				tons tons/ft	☐	Near waypoint C595 and C596 - no repair required.
High	553.66		Revetment L **599**	3 100	3	Revet	233 tons 2.3 tons/ft	☐	
Medium	553.6		Chevron R **598.53**	1 150	3	Dike	126 tons 0.8 tons/ft	☐	
High	553.46		Revetment L **598.6**	3 150	3	Revet	349 tons 2.3 tons/ft	☐	
Critical *Lower Hamburg Chute*	553.32	553.27	Revetment L **598.19**	3 205	5	Revet	795 tons 3.9 tons/ft	☑	Lower Hamburg Chute inlet (left bank of the Missouri River) - see photos and Corps notes from Nov. 2011 inspection; continue protection around bank left bank of Missouri River and Lower Hamburg Chute inlet (see notes drawing) on upstream side of chute inlet. Left bank of chute entrance eroded. WEST survey team indicated area was inaccessible, high bank at 10+ ft, no visible rock.
Critical *Lower Hamburg Chute*	553.23	553.21	L-head L **598**	1.5 167	5	Dike	198 tons 1.2 tons/ft	☐	L-head - dike portion.
Critical *Lower Hamburg Chute*	553.21	553.12	L-head L **598.19**	1.8 438	5	Dike	607 tons 1.4 tons/ft	☑	250' length between GPS points + 50' for L-head portion into bank - Lower Hamburg Chute inlet right bank (downstream side of chute). Left bank of Missouri River eroded back behind entrance structure (L-head structure). L-head - revetment portion. (Office check: 2006 aerials show large scour hole at this location. Gap shown in Corps pdf files.)

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
No Repair	552.58		Dike L **597.5**	1 50			tons tons/ft	☐	
Medium	552.35		Chevron L **597.5-C**	1 75	3	Dike	63 tons 0.8 tons/ft	☐	Riverside low.
No Repair *Upper Hamburg Chute*	552.2		Chute Outlet R				tons tons/ft	☐	Upper Hamburg Chute (outlet). Right bank of the Missouri River - Upper Hamburg Chute outlet. Notes on map - "meandering out, aligned like the channel use to be." (See inspection notes from Nov. 2011 inspection.)
High	552.03	551.98	Revetment R **596.7**	2 250	3	Revet	388 tons 1.6 tons/ft	☐	2' ave.
High	551.72		Revetment R **596.7**	2 200	3	Revet	310 tons 1.6 tons/ft	☐	
Medium	551.7		Chevron L **596.01**	1 75	3	Dike	63 tons 0.8 tons/ft	☐	Landside.
No Repair	551.4		Revetment R				tons tons/ft	☐	Right gap in bank - OK (on map as a gap).
No Repair	551.35		Chevron L **595.61**				tons tons/ft	☐	
Medium	551.09		L-head R **595.56**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	Small gap.
High	550.99		L-head R **595.56**	2 100	5	Revet	259 tons 2.6 tons/ft	☐	Small section.
Critical *Lower Hamburg Chute - O*	550.91		Chute L				tons tons/ft	☐	Breach in left bank of Lower Hamburg Chute approximately 1 mile upstream of chute outlet. Left bank levee blew out (see drawing in notes).
High	550.85	550.81	L-head R **595.3**	2 240	5	Dike	364 tons 1.5 tons/ft	☐	Average 2' x distance.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
No Repair	550.74		Chute				tons tons/ft	☐	Grade control structure (point taken in chute).
Lower Hamburg Chute - O									
No Repair	550.65		Chute				tons tons/ft	☐	In chute - supposed to be 5' over grade control - appeared ok.
Lower Hamburg Chute - O									
No Repair	550.62		Chute Outlet L				tons tons/ft	☐	Lower Hamburg Chute outlet (left bank of Missouri River). Steered boat into chute past grade control structure about 1/8 of a mile into chute.
Lower Hamburg Chute									
Low	550.25		Dike R **594.6**	1 172	5	Dike	145 tons 0.8 tons/ft	☐	1 x pull length from plans. (Office check: measured in GIS, length of line from bank out.)
Low	549.92		Dike R **594.25**	1 217	5	Dike	182 tons 0.8 tons/ft	☐	1 x plans. (Office check: measured in GIS, length of line from bank out.)
Low	549.84		Dike R **594.15**	1 167	5	Dike	140 tons 0.8 tons/ft	☐	1 x plans. (Office check: measured in GIS, length of line from bank out.)
High	549.65		Revetment L **594.8**	3 150	3	Revet	349 tons 2.3 tons/ft	☐	
No Repair	549.5		Dike R **593.84**				tons tons/ft	☐	
High	549.38	549.34	Kicker L **593.9**	3 250	3	Dike	536 tons 2.1 tons/ft	☐	
Low	549.2		Dike L **593.8**	1 250	5	Dike	210 tons 0.8 tons/ft	☐	
High	549	549.05	Revetment R **593.75**	3 200	3	Revet	465 tons 2.3 tons/ft	☐	Within the area of waypoint C627 and C628.
No Repair	548.91		Vane L **593.64**				tons tons/ft	☐	(Office check - marked as flanked, but because it's a "vane", it probably should not be tied into the bank.)

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	548.78		Dike L **593.6**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
No Repair	548.5		Chevron L **593.44**				tons tons/ft	☐	
No Repair	548.33		Revetment R **593.75**				tons tons/ft	☐	
High	548.2	548.09	Revetment R **593.75**	3 560	3	Revet	1,303 tons 2.3 tons/ft	☐	
Low	547.96		Revetment R **593.75**	3 50	3	Revet	116 tons 2.3 tons/ft	☐	50' or less.
Medium	547.1		Chevron L **592.87**	1 75	3	Dike	63 tons 0.8 tons/ft	☐	Landside.
Low	546.92		Dike L **592.8**	1 164	5	Dike	138 tons 0.8 tons/ft	☐	1 x plans. (Office check: measured in GIS, length of line from bank out.)
High	546.73	546.62	L-head R **592.81**	3 560	5	Dike	1,374 tons 2.5 tons/ft	☐	
High	546.61	546.52	L-head R **592.81**	3 560	5	Dike	1,374 tons 2.5 tons/ft	☐	L-Head right
High	546.46	546.42	L-head R **592.81**	2.6 335	5	Dike	668 tons 2.0 tons/ft	☐	L-head distance from C644 to C645 is 210' x 3' high deficient; for the bank portion of the structure 125' long and 2' high (see notes - drawing) - (gap); Corps placed a rock pile at the end of the structure. (Weighted average.)
Low	546.46		Dike L **592.35**	1 121	5	Dike	102 tons 0.8 tons/ft	☐	1 x plan. (Office check: measured in GIS, length of line from bank out.)
No Repair *Kansas Bend Chute*	546.4		Chute Inlet R				tons tons/ft	☐	Kansas Bend Chute inlet (see inspection notes from Nov. 2011 inspection)

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Critical	546.3	546.1	L-head	2	5	Revet	2,379 tons	☐	Last L-head found in series at the inlet of the Kansas Bend Chute (Revetment #592.81, dike #592.3).
Kansas Bend Chute			R **592.81**	920			2.6 tons/ft		
Critical	546.3		L-head	2	5	Dike	152 tons	☐	Last L-head found in series at the inlet of the Kansas Bend Chute (Revetment #592.81, dike #592.3).
Kansas Bend Chute			R **592.3**	100			1.5 tons/ft		
Low	546.03		Dike	3.9	5	Dike	550 tons	☑	No repair - gap 100' - not supposed to tie in so OK.
			R **592.1**	151			3.6 tons/ft		
No Repair	545.94		Dike				tons	☑	
			R **592**				tons/ft		
No Repair	545.75		Chevron				tons	☑	Only one side of dike accessible during site survey.
			R **591.85**				tons/ft		
Low	545.5		Chevron	1	3	Dike	28 tons	☑	Some rock missing.
			R **591.52**	33			0.8 tons/ft		
No Repair	545.15		Chevron				tons	☑	
			R **591.15**				tons/ft		
Medium	544.8		Chevron	1	3	Dike	126 tons	☐	
			R **590.35**	150			0.8 tons/ft		
High	544.75	544.51	Kicker	2	3	Dike	1,942 tons	☐	
			L **592.2**	1280			1.5 tons/ft		
No Repair	544.56		Chute Outlet				tons	☐	Kansas Bend Chute outlet (right bank of the Missouri River); (see notes drawing) exit Chute OK.
Kansas Bend Chute			R				tons/ft		
No Repair	544.41		Dike				tons	☐	
			L **589.82**				tons/ft		
Low	543.99		Dike	1	5	Dike	84 tons	☐	
			L **589.4**	100			0.8 tons/ft		

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
No Repair	543.69		n/a L				tons tons/ft	☐	Return flow from the levee breach above the Nishnabotna River. No structures (dikes or chevrons) appeared to be damaged (see photos and Corps Nov. 2011 and Jan 2012 notes).
Low	543.62		Dike L **589.07**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
High *Nishnabotna Chute*	543.6		Kicker R **589.9**	5 50	3	Dike	226 tons 4.5 tons/ft	☐	Nishnabotna Chute inlet.
High	543.55	543.49	Kicker R **589.9**	2 350	3	Dike	531 tons 1.5 tons/ft	☐	Average 2'.
Low	543.4		Dike R **588.89**	1 150	5	Dike	126 tons 0.8 tons/ft	☐	
Low	543.25		Dike R **588.81**	1 75	5	Dike	63 tons 0.8 tons/ft	☐	Right dike? gap about 75'. (Office check - does not appear to be notched.)
No Repair	542.9		Chevron R **588.45**				tons tons/ft	☐	
Critical	542.82	542.77	Revetment L **589.1**	11 326	5	Revet	4,636 tons 14.2 tons/ft	☑	3' blow out.
Medium	542.7		Rootless Dike R **587.95**	1 100	3	Dike	84 tons 0.8 tons/ft	☐	Noted as a chevron in the field, but no chevron in Corps database at this location. Instead - there should be a modified dike (changed from chevron in current database to rootless dike).
Low	542.36		Dike R **587.5**	1 75	5	Dike	63 tons 0.8 tons/ft	☐	(See notes drawing.) Check if sill or dike notch? 50' gap between bank and dike and 25' gap between dike and sill. (Office check - pdf indicates a stone fill dike, and no gap.)
No Repair	542.02		Kicker L				tons tons/ft	☐	Kicker at mouth of Nishnabotna River.
No Repair	541.73		Dike L **587**	1 50			tons tons/ft	☐	Waypoint taken just d/s of structure.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	541.68	541.51	Revetment R **587.15**	1.2 986	3	Revet	918 tons 0.9 tons/ft	☑	
Low	540.62		Dike L **585.05**	1 207	5	Dike	174 tons 0.8 tons/ft	☐	1 x plans. (Office check: measured in GIS, length of line from bank out.)
Low	540.57		Revetment R **587.15**	3 100	3	Revet	233 tons 2.3 tons/ft	☐	Areas missing rock.
High	540.43	540.41	Revetment R **584.6**	3 140	3	Revet	326 tons 2.3 tons/ft	☐	
High	540.28	540.24	Revetment R **584.6**	2 220	3	Revet	341 tons 1.6 tons/ft	☐	
High	540.18		Revetment R **584.6**	2 100	3	Revet	155 tons 1.6 tons/ft	☐	
Critical	540.02	539.76	Kicker R **584.6**	5.1 1615	5	Dike	8,972 tons 5.6 tons/ft	☑	Big blow out area. Survey team indicated that the average crown width can not be determined due to the depth of the water.
Low	539.68		Dike R **583.9**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	539.53		Dike R **583.45**	1 169	5	Dike	142 tons 0.8 tons/ft	☐	1 x check length in plans. (Office check: measured in GIS, length of line from bank out.)
Critical	539.37	539.14	Revetment L **584.3**	6.4 1207	5	Revet	9,987 tons 8.3 tons/ft	☑	Big blowout area.
Low	539.15		Dike R **582.45**	1 196	5	Dike	165 tons 0.8 tons/ft	☐	Missing - needs to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	538.93		Dike R **582.3**	1 173	5	Dike	145 tons 0.8 tons/ft	☐	1 x plans. (Office check: measured in GIS, length of line from bank out.)

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	538.75		Dike R **581.9**	1 217	5	Dike	182 tons 0.8 tons/ft	☐	Needs to be rebuilt. (Office check: measured in GIS, length of line from bank out.)
Low	538.4		Dike R **581.15**	1 236	5	Dike	198 tons 0.8 tons/ft	☐	1 x plans. (Office check: measured in GIS, length of line from bank out; pdf indicates dike/sill; for quantities assumed only dike repair.)
Low	538.21		Dike R **581**	1 292	5	Dike	245 tons 0.8 tons/ft	☐	1 x plans. (Office check: measured in GIS, length of line from bank out; pdf indicates dike/sill; for quantities assumed only dike repair.)
Low	537.62		Dike R **580.15**	1 202	5	Dike	170 tons 0.8 tons/ft	☐	1 x plans (Office check: measured in GIS, length of line from bank out)
Low	537.58		Dike R **580**	1 200	5	Dike	168 tons 0.8 tons/ft	☐	1 x plans. (Office check: measured in GIS, length of line from bank out; pdf indicates dike/sill; for quantities assumed only dike repair.)
High	537.5		L-head L **580.1**	2 300	5	Dike	455 tons 1.5 tons/ft	☐	
High	537.4		L-head L **579.81**	6 55	5	Dike	398 tons 7.2 tons/ft	☑	Needs to be tied back into bank.
High	537.27	537.24	L-head L **579.7/580.1**	2.9 313	5	Dike	731 tons 2.3 tons/ft	☑	Outflanked needs to be tied back into bank.
Low	537.23		Dike R **579.65**	1 150	5	Dike	126 tons 0.8 tons/ft	☐	1 x needs to be rebuilt. (Office check: measured in GIS, length of line from bank out; pdf indicates dike/sill; for quantities assumed only dike repair.)
High	537.17	537.14	L-head L **580.1**	3 150	5	Dike	368 tons 2.5 tons/ft	☑	3 x length
No Repair	537.12		Dike R **579.6**				tons tons/ft	☐	
High	537.06	536.94	Kicker L **579.7/580.1**	3 600	3	Dike	1,286 tons 2.1 tons/ft	☐	3 x length

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	536.85	536.77	Revetment R **579.4**	3 480	3	Revet	1,117 tons 2.3 tons/ft	☐	3' x length
High	536.32	536.22	L-head R **579.4**	2 540	5	Dike	819 tons 1.5 tons/ft	☐	
Medium	536.18		L-head R **579.4**	3 30	5	Dike	74 tons 2.5 tons/ft	☐	Gap.
Low	535.74		Dike L **578.4**	1 90	5	Dike	76 tons 0.8 tons/ft	☐	1 x length. (Office check: measured in GIS, length of line from bank out; pdf indicates dike/sill; for quantities assumed only dike repair.)
High	535.66	535.56	Revetment R **578.25**	2 550	3	Revet	853 tons 1.6 tons/ft	☐	
No Repair	534.89	534.76	Kicker R **577.35**				tons tons/ft	☐	Right revet kicker with gap - Corps indicated gap (2x650') was installed at the owner's request, so no repair required.
Low	534.51		Dike R **576.9**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	534.15		Dike R **576.6**	1 145	5	Dike	122 tons 0.8 tons/ft	☐	Submerged or missing. (Office check: measured in GIS, length of line from bank out.)
Low	533.82		Dike R **576.2**	1 104	5	Dike	87 tons 0.8 tons/ft	☐	Submerged or missing. (Office check: measured in GIS, length of line from bank out.)
Low	533.54		Dike R **576.09**	1 144	5	Dike	121 tons 0.8 tons/ft	☐	Submerged or missing. (Office check: measured in GIS, length of line from bank out.)
High	533.5	533.46	Kicker L **577.3**	3 170	3	Dike	364 tons 2.1 tons/ft	☐	
Low	533.43		Dike R **576.01**	1 160	5	Dike	134 tons 0.8 tons/ft	☐	Missing. (Office check: measured in GIS, length of line from bank out.)

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	533.42	533.31	Kicker L **577.3**	2 640	3	Dike	971 tons 1.5 tons/ft	☐	
High	533.35	532.86	Revetment R **575.85/ 575.8**	2 2672	3	Dike	4,053 tons 1.5 tons/ft	☑	Revetment blow out.
High	533.27		Dike L **575.8**	1 205	5	Dike	172 tons 0.8 tons/ft	☐	Missing (just d/s of kicker). (Office check: measured in GIS, length of line from bank out.)
Low	533.08		Dike L **575.55**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	
Low	532.81		Dike L **575.11**	1 164	5	Dike	138 tons 0.8 tons/ft	☐	Missing. (Office check: measured in GIS, length of line from bank out.)
Low	532.62		Dike L **574.96**	1 180	5	Dike	151 tons 0.8 tons/ft	☐	Missing. (Office check: measured in GIS, length of line from bank out.)
Low	532.54		Dike L **574.7**	1 215	5	Dike	181 tons 0.8 tons/ft	☐	Missing. (Office check: measured in GIS, length of line from bank out.)
Medium	532.32		Revetment R **574.9**	3 80	3	Revet	186 tons 2.3 tons/ft	☐	
High	532.16	532.02	Revetment R **574.9**	3 780	3	Dike	1,671 tons 2.1 tons/ft	☐	3' average.
High	531.91	531.77	Revetment R **574.31**	3 780	3	Dike	1,671 tons 2.1 tons/ft	☐	
High	531.53		Chevron R **573.63**	1 150	3	Dike	126 tons 0.8 tons/ft	☐	Just downstream of waypoint C746. Missing 8 Chevrons. Assume submerged add 1' to length (150' total). Corps indicated this area was the old test site to create habitat using structures. (Note: Six chevron quantities accounted for without waypoint, and two accounted for using waypoints C747 and C748.)
High	531.37		Chevron R **573.53**	1 150	3	Dike	126 tons 0.8 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	531.09		Chevron R **573.23**	1 150	3	Dike	126 tons 0.8 tons/ft	☐	
High	530.78		Chevron R **572.93**	1 150	3	Dike	126 tons 0.8 tons/ft	☐	
High	530.6		Chevron R **572.73**	1 150	3	Dike	126 tons 0.8 tons/ft	☐	
High	530.39		Chevron R **572.53**	1 150	3	Dike	126 tons 0.8 tons/ft	☐	
High	530.15		Chevron R **572.23**	1 150	3	Dike	126 tons 0.8 tons/ft	☐	
High	530.02	529.94	L-head L **572-AB(A)**	3 410	5	Dike	1,006 tons 2.5 tons/ft	☐	
High	529.91	529.83	L-head L **572-AB(A)**	2 440	5	Dike	667 tons 1.5 tons/ft	☐	
High	529.65	529.61	L-head L **571.4**	2 180	5	Dike	273 tons 1.5 tons/ft	☐	Left L-head revetment. (Office Check: no structure number provided for the revetment portion of the L-head.)
High	529.32	529.26	Revetment L **571.3**	2 290	3	Revet	450 tons 1.6 tons/ft	☐	
Critical *Langdon Bend Backwater*	529.18		Backwater R				tons tons/ft	☐	Langdon Bend Backwater - right bank of Missouri River; sediment deposition in backwater entrance.
High	528.96	528.89	Kicker L **570.9**	2 410	3	Dike	622 tons 1.5 tons/ft	☐	L- revetment kicker.
No Repair	528.6		Dike L **570-A**				tons tons/ft	☐	
Low	528.45		Dike L **569.69**	1 225	5	Dike	189 tons 0.8 tons/ft	☐	Missing. (Office check: measured in GIS, length of line - unclear if structure should be tied into the bank.)

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	528.11		Dike L **570-A(B)**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	Missing tip.
No Repair	528.06		Revetment R **571**				tons tons/ft	☐	Looks about 1' low, but consistent low priority.
High	527.84		Dike L **569.04**	1 112	5	Dike	94 tons 0.8 tons/ft	☐	Missing. (Office check - length measured in GIS using Corps 2006 aerial image.)
High	527.79	527.58	L-head R **569/569-A**	3 700	5	Dike	1,718 tons 2.5 tons/ft	☐	L-head at the Little Nemaha River outlet (downstream side of outlet).
Low	527.42		Dike L **568.4**	1 288	5	Dike	242 tons 0.8 tons/ft	☐	Missing. (Office check: measured in GIS, length of line from bank out.)
Medium	527.38	527.24	Revetment R **Not avail.**	1 780	3	Revet	605 tons 0.8 tons/ft	☐	Revetment low. (Office check: No structure number provided in Corps database, but structure can be seen in 2006 Corps aerial image.)
High	526.88	526.81	L-head R **567.8**	3 380	5	Dike	933 tons 2.5 tons/ft	☐	200' gap from bank.
High	526.78		L-head R **567.7**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	Split L-head into revetment and dike. Dike length deficiency = 100' (or 100' gap from bank - flanked).
High	526.78	526.73	L-head R **568.1**	3 283	5	Dike	695 tons 2.5 tons/ft	☐	Split L-head into revetment and dike. Revetment length deficiency = 283', should be calculated as dike, but different crown width.
High	526.62	526.57	L-head R **568.1**	3 230	5	Revet	892 tons 3.9 tons/ft	☐	(Office: Two structure numbers, one for the dike, and one for the revetment portion of the L-head.)
High	526.46		L-head R **568.1**	2 100	5	Revet	259 tons 2.6 tons/ft	☐	
High	526.41		L-head R **568.1**	3 100	5	Revet	388 tons 3.9 tons/ft	☐	At day marker RM 526.4.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	526.23	526.17	L-head R **568.1**	2 271	5	Dike	411 tons 1.5 tons/ft	☐	280' waypoint length, raise 2'. Gap between structure and bank about 50' and need to raise up 3'.
High	526.23		L-head R **567.2**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	Separated dike portion of L-head from revetment portion (different structure numbers, but both should be calculated as a dike).
High	526.12	526.09	L-head R **568.1**	2 180	5	Revet	465 tons 2.6 tons/ft	☐	150' waypoint length, raise 2'. Gap between structure and bank about 30' and need to raise up 2'. Total length 180'.
Critical	526.04	525.72	L-head R **568.1**	4.1 1623	5	Dike	6,389 tons 3.9 tons/ft	☑	Last right L-head.
Low	525.61		Dike R **566.7**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	525.56		Dike R **566.63**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Medium	525.37		Dike R **566.3**	1 135	5	Dike	113 tons 0.8 tons/ft	☐	Missing. (Office check: pdf file indicates 20' environmental gap - length subtracted from structure length given in pdf.)
High	525.15	525.11	L-head L **566.29**	3 210	5	Dike	515 tons 2.5 tons/ft	☐	
High	525.02	524.97	L-head L **566/566.29**	3 270	5	Revet	1,047 tons 3.9 tons/ft	☐	
High	524.91	524.82	Vane L **Not avail.**	2 500	5	Dike	758 tons 1.5 tons/ft	☐	Vane? Or L-head?
Low	524.91		Dike R **565.9**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
High	524.74	524.72	L-head L **565.8/566.29**	3 140	5	Dike	344 tons 2.5 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	524.72		Dike R **565.75**	1 97	5	Dike	82 tons 0.8 tons/ft	☐	Missing. (Office check: measured in GIS, length of line from bank out.)
No Repair	524.56		Dike R **565.6**				tons tons/ft	☐	
Low	524.34		Dike R **565.4**	1 106	5	Dike	89 tons 0.8 tons/ft	☐	1 x length. (Office check: measured in GIS, length of structure from 2006 aerial image.)
Low	524.15		Dike R **565.2**	1 140	5	Dike	118 tons 0.8 tons/ft	☐	1 x length. (Office check: measured in GIS, length of structure from 2006 aerial image.)
Low	523.95		Dike R **565**	1 135	5	Dike	113 tons 0.8 tons/ft	☐	1 x length. (Office check: measured in GIS, length of structure from 2006 aerial image.)
High	523.78	523.5	Kicker L **565.3**	3.4 1399	5	Dike	4,137 tons 3.0 tons/ft	☑	Left /Kicker
High	523.56	523.51	Revetment R **564.6**	3 270	3	Revet	628 tons 2.3 tons/ft	☐	
Low	523.43		Dike L **564.45**	1 300	5	Dike	252 tons 0.8 tons/ft	☐	
High	523.38	523.26	Revetment R **564.6**	2.5 670	3	Dike	1,229 tons 1.8 tons/ft	☐	
High	523.17	523.03	Revetment R **564.6**	2 730	3	Revet	1,133 tons 1.6 tons/ft	☐	
Low	523.03		Dike L **564.1**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	522.78		Dike L **563.8**	1 200	5	Dike	168 tons 0.8 tons/ft	☐	
Low	522.67		Dike L **563.7**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	522.45	522.29	Kicker R **564.6**	3 830	3	Dike	1,778 tons 2.1 tons/ft	☐	
Low	522.22		Dike R **563.29**	1 200	5	Dike	168 tons 0.8 tons/ft	☐	
High	522.2		Revetment L **563.4/563.2**	3 500	3	Dike	1,071 tons 2.1 tons/ft	☐	Left bank near small stream outlet - upstream side of outlet (see notes drawing) at the Yellow House Daybeacon (RM 522.4 on marker).
High	522.16		Dike L **563.15**	1 131	3	Dike	110 tons 0.8 tons/ft	☑	Waypoint length measurement = 230' + 200' at bank inlet (downstream side of inlet along left bank of the Missouri River) = 430 ft total length.
High	522.16	522.1	Revetment L **565.1**	3.5 276	5	Dike	853 tons 3.1 tons/ft	☑	Waypoint length measurement = 230' + 200' at bank inlet (downstream side of inlet along left bank of the Missouri River) = 430 ft total length.
Low	522.09		Dike R **563**	1 150	5	Dike	126 tons 0.8 tons/ft	☐	
No Repair	521.97		Dike R **562.95**				tons tons/ft	☐	
High	521.6		Dike R **562.71**	3 300	5	Dike	736 tons 2.5 tons/ft	☐	Not attached - bank blew out need to tie back into bank.
High	521.48		Dike R **562.55**	3 600	5	Dike	1,473 tons 2.5 tons/ft	☐	Not attached - bank blew out need to tie back into bank.
Medium	521.05		Dike R **562.31**	1 160	5	Dike	134 tons 0.8 tons/ft	☐	Missing. (Office check: measured in GIS, length of line from bank out.)
Critical	520.61	520.55	Revetment L **562.1**	5.7 273	5	Revet	2,012 tons 7.4 tons/ft	☑	Revetment at Deroin Chute inlet; survey team indicated crown width could not be determined.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Critical	520.55	520.48	Revetment	6.4	5	Dike	3,138 tons	☑	Left bank control dike/revetment at Deroin Chute inlet. Chute entrance eroded with flanking of left bank control dikes (notes Nov. 2011 inspection - see additional repair notes). Chute has migrated toward the levee toe. Notes 2012 inspection: Entrance is wider than it was before 2011 flooding, and continues to widen. Corps inspection team indicated need to discuss internally how to reduce the flow in the channel. (Survey team indicated crown width could not be determined.)
Deroin Chute			L **562.1**	390			8.0 tons/ft		
Critical	520.45	520.36	Vane	3	5	Dike	614 tons	☐	Intermediate structure in front of Deroin Chute inlet.
Deroin Chute			L **561.77**	250			2.5 tons/ft		
No Repair	520.38		Grade Control				tons	☐	Grade control OK.
			L				tons/ft		
Critical	520.33	520.2	L-head	3	5	Dike	245 tons	☐	Corps team indicated: 40' off the end of the L-head before it starts d/s - several gaps in the L-head. Marked as critical because at chute entrance - and bank eroded back/chute widened.
Deroin Chute			L **561.77**	100			2.5 tons/ft		
High	520.22	520.2	L-head	3	5	Dike	344 tons	☐	Gap in the L-head.
			L **561.77**	140			2.5 tons/ft		
High	520.13	520.04	L-head	2	5	Dike	728 tons	☐	Gap in the L-head.
			L **561.77**	480			1.5 tons/ft		
Low	519.95		Dike	1	5	Dike	42 tons	☐	
			L **561.5**	50			0.8 tons/ft		
High	519.87		L-head	3	10	Revet	1,164 tons	☐	L-head revetment.
			R **561.22**	150			7.8 tons/ft		
No Repair	519.74		L-head				tons	☐	A little low just u/s of RM 519.7 Nemaha County Daybeacon.
			R				tons/ft		
High	519.54		Revetment	2.5	3	Dike	367 tons	☐	
			R **561.19**	200			1.8 tons/ft		
High	519.48	519.46	Revetment	3	3	Dike	236 tons	☐	3'
			R **561.19**	110			2.1 tons/ft		

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	519.43	519.4	Revetment R **561.19**	2 190	3	Dike	288 tons 1.5 tons/ft	☐	2'
High	519.37	519.32	Revetment R **561.19**	2 280	3	Dike	425 tons 1.5 tons/ft	☐	2'
High	519.24		Dike L **561.2**	1 455	5	Dike	382 tons 0.8 tons/ft	☐	Missing. (Dike is angled d/s - refer to Corps 2006 aerial image.)
High	519.05	518.9	L-head R **550.5**	3.5 754	3	Dike	1,842 tons 2.4 tons/ft	☑	3' missing revetment. (Office: No structure number, so used closest d/s number.)
No Repair	519	518.8	Hard Points L **560.6**				tons tons/ft	☐	D/S RM 519 couldn't see hard pts (between RM 519 to 518.8 - approximate).
No Repair	518.72		Revetment R **550.5**				tons tons/ft	☐	Low but small section ok.
No Repair	518.63		Dike L **560.3**				tons tons/ft	☐	
High	518.52		Revetment R **550**	3 100	3	Revet	233 tons 2.3 tons/ft	☐	
No Repair	518.3		Boat Ramp R				tons tons/ft	☐	Underside of ramp falling out - Indian cave boat ramp
High	518.26	518.13	Kicker R **559.85**	2 780	3	Dike	1,183 tons 1.5 tons/ft	☐	2'
Low	517.91		Dike R **559.55**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	517.74		Dike R **559.45**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	
High	517.63	517.61	Kicker L **559.8**	3 110	3	Dike	236 tons 2.1 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	517.49		Kicker L **559.8**	2 100	3	Dike	152 tons 1.5 tons/ft	☐	
High	517.35		Dike L **559.2**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	Gap at bank.
High	517.28		Revetment R **559.02**	3 200	3	Revet	465 tons 2.3 tons/ft	☐	
Low	517.18		Dike L **559**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	516.99		Dike L **558.7**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	
High	516.84	516.77	Revetment R **558.8**	3 360	10	Revet	2,793 tons 7.8 tons/ft	☐	
High	516.65		L-head R **558.3**	3 50	5	Dike	123 tons 2.5 tons/ft	☐	80 ft length between waypoints + 50 ft at bank = 130 ft total x 3' high deficient.
High	516.65	516.63	L-head R **558.55**	3 80	10	Revet	621 tons 7.8 tons/ft	☐	80 ft length between waypoints + 50 ft at bank = 130 ft total x 3' high deficient.
High	516.55	516.51	L-head R **558.4**	3 280	5	Revet	1,086 tons 3.9 tons/ft	☐	230 ft length between waypoints + 50 ft at bank = 280 ft total x 3' high deficient.
No Repair *Deroin Chute*	516.5		Chute Outlet L				tons tons/ft	☐	Deroin Chute outlet.
High	516.4	516.27	L-head R **558.3**	2.5 750	5	Dike	1,376 tons 1.8 tons/ft	☐	700 ft length between waypoints and 2.5' low; bank portion 50' x 3' low (weighted average).
High	516.21	516.15	L-head R **558.1**	3 925	5	Dike	2,270 tons 2.5 tons/ft	☐	800 ft length between waypoints + 125 ft at bank = 925 ft total x 3' high deficient.
High	516.04		L-head R **558.1**	2 100	5	Revet	259 tons 2.6 tons/ft	☐	Gap in right L-head.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	515.95		L-head R **558.1**	2 100	3	Dike	152 tons 1.5 tons/ft	☐	Gap in right L-head.
Medium	515.83		Dike R **557.7**	2.3 250	5	Dike	427 tons 1.7 tons/ft	☑	About to be outflanked right dike; need plans. (Estimated length of flanked section from Corps 2006 aerial image.)
High	515.73	515.49	Revetment L **558.35**	3.8 1108	3	Revet	3,266 tons 2.9 tons/ft	☑	Should be a gap for the creek outlet. (Office check: Measured using Google Earth - subtracted creek outlet.)
Low	515.67		Dike R **557.5**	1 200	5	Dike	168 tons 0.8 tons/ft	☐	
Low	515.5		Dike R **557.3**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
High	515.32		Dike R **557.1**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	Flanked all else good.
Low	515.15		Dike R **556.98**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	515.01		Dike R **556.87**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	
High	514.87		Dike R **556.81**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	Need to take back up to bank (few gaps at back-flanked).
Medium	514.55		Dike R **556.41**	1 150	5	Dike	126 tons 0.8 tons/ft	☐	Missing. (Office check: measured in GIS, length of line from bank out.)
No Repair	514.38		Dike R **556.34**				tons tons/ft	☐	
Low	514.31		Dike R **556.26**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	
Low	514.03		Dike R **555.8**	1 125	10	Dike	124 tons 1.0 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	513.63		Dike R **555.37**	1 100	8	Dike	84 tons 0.8 tons/ft	☐	
High	513.52	513.49	Revetment L **555.62**	3 170	3	Dike	364 tons 2.1 tons/ft	☐	Left L-head revetment.
Low	513.5		Dike R **555.35**	1 100	10	Dike	99 tons 1.0 tons/ft	☐	
High	513.48	513.43	Revetment L **555.62**	2 250	3	Dike	379 tons 1.5 tons/ft	☐	Left L-head revetment (same struct w/gap).
Low	513.26		Dike R **555**	1 100	10	Dike	99 tons 1.0 tons/ft	☐	
High	513.2	513.07	Revetment L **555.62**	1.9 663	3	Revet	977 tons 1.5 tons/ft	☑	
Critical	513.15		Dike R **554.9**	4.2 118	10	Dike	696 tons 5.9 tons/ft	☑	Rebuild (only piles visible). (Office check: measured in GIS, length of line from bank out.)
High	513	512.93	Revetment L **555.62**	2 335	3	Revet	520 tons 1.6 tons/ft	☑	At Mile marker 513.
High	512.72	512.7	L-head L **555.62**	3 130	3	Revet	303 tons 2.3 tons/ft	☐	Left L-head revetment.
High	512.65		L-head L **554.4**	2 300	3	Dike	455 tons 1.5 tons/ft	☐	Left L-head revetment. (Dimensions noted for dike portion of L-head.)
High	512.63	512.53	L-head L **555.62**	2 550	3	Dike	834 tons 1.5 tons/ft	☐	Left L-head revetment. (Dimensions noted for revetment portion of L-head.)
High	512.46		Dike R **554.16**	1 50	10	Dike	50 tons 1.0 tons/ft	☐	Flanked.
High	512.45		L-head L **554.15**	3 200	3	Dike	429 tons 2.1 tons/ft	☐	Left L-head revetment.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	512.42		L-head L **554.15**	2 100	3	Dike	152 tons 1.5 tons/ft	☐	Left L-head revetment.
Low	512.37		Dike R **554**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	
High	512.28	512.23	L-head L **554.15A**	3 260	3	Dike	557 tons 2.1 tons/ft	☐	Left L-head revetment.
High	512.15	512	Kicker L **555.62**	3 770	3	Dike	1,650 tons 2.1 tons/ft	☐	
Low	512.12		Dike R **553.85**	1 45	5	Dike	38 tons 0.8 tons/ft	☐	Could be detached - small rock pile, check plans. (Office check: pdf files indicate an attached dike 45' long -- minus root.)
Low	511.61		Dike L **553.4**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	
High	511.16		L-head R **553**	3 100	3	Revet	233 tons 2.3 tons/ft	☐	
High	510.81		L-head R **551.75**	2 100	3	Dike	152 tons 1.5 tons/ft	☐	
Low	510.61		L-head R **551.5**	2 50	3	Revet	78 tons 1.6 tons/ft	☐	Few low points.
Low	510.57		Dike L **551.45**	1.5 90	5	Dike	107 tons 1.2 tons/ft	☑	Only piles visible; need to build back up rock.
Low	510.36		Dike L **551.35**	1 200	5	Dike	168 tons 0.8 tons/ft	☐	
Medium	510.27		L-head R **551.3**	2 50	3	Revet	78 tons 1.6 tons/ft	☐	No number in Corps database provided for revetment portion of L-head. Structure number provided is for dike portion.
High	510.18	510.11	L-head R **551.2**	2 380	3	Dike	576 tons 1.5 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Medium	510.04		L-head R **551.1**	2 50	3	Revet	78 tons 1.6 tons/ft	☐	No number in Corps database provided for revetment portion of L-head. Structure number provided is for dike portion.
Low	509.94		Dike L **551**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	
Low	509.58		Dike L **550.25**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	509.24		Dike L **549.7**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	
Low	509.13		Dike L **549.55**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	509.04		Dike L **549.4**	1 50	5	Dike	42 tons 0.8 tons/ft	☐	
Low	508.88		Dike L **549**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
High	508.72	508.67	L-head R **548.71**	2 280	3	Dike	425 tons 1.5 tons/ft	☐	
High	508.61	508.55	L-head R **548.65**	3 300	4	Dike	643 tons 2.1 tons/ft	☐	
Low	508.46		Dike L **548.61**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
High	508.39	508.33	L-head R **Not avail.**	2 390	4	Dike	592 tons 1.5 tons/ft	☐	Just u/s from Fargo Daybeacon. (Office check: Corps database indicates "0" as the structure number.)
High	508.28	508.2	L-head R **548.4**	2 480	4	Dike	728 tons 1.5 tons/ft	☐	430 ft between waypoints and low 2 ft + 50 ft gap between structure and bank and 3 ft low. (Weighted average.)
High	508.15	508.06	L-head R **548.4**	2 480	3	Dike	728 tons 1.5 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
Low	507.89		Dike R **547.97**	1 200	5	Dike	168 tons 0.8 tons/ft	☐	
Low	507.68		Dike R **547.9**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
High	507.12	506.87	Revetment L **547.78**	4.5 1350	3	Dike	5,100 tons 3.8 tons/ft	☑	Big blow out; bank deteriorated. (See Google Earth images and aerials - looks like windrow rock design.)
High	506.78	506.64	L-head L **547.1**	3 420	3	Revet	977 tons 2.3 tons/ft	☐	(Office check: only dike portion of the L-head given a structure number in Corps database. Revetment portion identified as "0".)
High	506.51		L-head L **546.85**	2 500	3	Revet	776 tons 1.6 tons/ft	☐	(Office check: only dike portion of the L-head given a structure number in Corps database. Revetment portion identified as "0".)
High	506.27		Kicker L **546.6**	3 150	3	Dike	321 tons 2.1 tons/ft	☐	(Office check: only dike portion of the kicker given a structure number in Corps database. Revetment portion identified as "0".)
Critical	505.88	505.77	Revetment R **546.5**	1.2 653	5	Revet	1,013 tons 1.6 tons/ft	☑	Corps identified as high priority "critical" revetment at RM 505.9 to 505.82 during 26 Jan inspection.
No Repair	505.87		Dike L **546.2**	1 50			tons tons/ft	☐	
No Repair	504.95		Dike L **545.6**				tons tons/ft	☐	
No Repair	504.9		Revetment R				tons tons/ft	☐	2 openings OK - right revetment at Barnhouse Daybeacon.
High	504.83	504.79	Revetment R **546.5**	3 210	3	Revet	489 tons 2.3 tons/ft	☐	
High	504.54		Kicker R **546.5**	2 100	4	Dike	152 tons 1.5 tons/ft	☐	Gap in structure.
Low	504.08		Dike R **544.61**	1 100	3	Dike	84 tons 0.8 tons/ft	☐	

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	504.08 504.04	Revetment L **545.1**	7.1 301	5	Dike	2,880 tons 9.6 tons/ft	☑	Blow out.
Low	503.83	Dike R **544.5**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
Low	503.55	Dike R **544.25**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	
No Repair	503.05	Dike R **543.9**	1 50			tons tons/ft	☐	
No Repair	502.71	Dike R **543.61**				tons tons/ft	☐	
No Repair	502.57	Dike R **543.51**	1 50			tons tons/ft	☐	
No Repair	502.39	Dike R **543.4**	1 50			tons tons/ft	☐	
Medium	502.3	L-head L **542.88**	2 50	3	Dike	76 tons 1.5 tons/ft	☐	
No Repair	502.24	Dike R **543.25**	1 50			tons tons/ft	☐	
No Repair	502.04	Dike R **543.05**	1 50			tons tons/ft	☐	
High *Rush Bottoms Chute*	502	Chute Inlet L				tons tons/ft	☐	Rush Bottoms Chute inlet (Nov. 2011 notes - Inlet widening with some deposition in the inlet area.
Medium	501.78	Revetment L **542.88**	3 75	3	Revet	175 tons 2.3 tons/ft	☐	Gap - was going to be the original inlet.
No Repair	501.76	Revetment L **542.88**				tons tons/ft	☐	Still rock; left bank.

Repair Priority	1960 RM U/S and D/S		Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
High	501.66	501.62	Kicker L **542.88**	3 230	3	Dike	493 tons 2.1 tons/ft	☐	
Medium *Rush Bottom Chute*	501.58		Dike L **542.75**	1 150	5	Dike	126 tons 0.8 tons/ft	☐	Dike at Rush Bottom Chute inlet.
High	501.45	501.4	Revetment R **542.8**	3 430	3	Revet	1,001 tons 2.3 tons/ft	☐	
High	501.14		Revetment R **542.8**	3 200	3	Revet	465 tons 2.3 tons/ft	☐	
High	500.29	500.24	Kicker R **540.15**	3 260	3	Dike	557 tons 2.1 tons/ft	☐	Gaps.
High	500.24	500.08	Kicker R **540.15**	2 830	3	Dike	1,259 tons 1.5 tons/ft	☐	Gaps.
Low	499.97		Dike R **539.8**	1 200	5	Dike	168 tons 0.8 tons/ft	☐	
No Repair	499.56		Dike R **539.17**	1 50			tons tons/ft	☐	
Medium	499.36		Revetment L **540.12**	2 50	5	Dike	76 tons 1.5 tons/ft	☐	
High	499.29		Revetment L **540.12**	3 100	5	Dike	245 tons 2.5 tons/ft	☐	
High	499.23		L-head L **539**	2 100	3	Dike	152 tons 1.5 tons/ft	☐	
Low	499.06		Dike L **538.75**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	To fill in gaps.
Low	498.96		Dike L **538.72**	1 100	5	Dike	84 tons 0.8 tons/ft	☐	To fill in gaps.

Repair Priority	1960 RM U/S and D/S	Description Type/Bank/No.	Deficiency (ft) Height/Length	Repair Crown/ Top Width (ft)	Repair Type	Repair Quantity (estimated)	Survey	Field Inspection Notes/Damage Description
No Repair	498.6	Chute Outlet				tons	☐	Rush Bottom Chute outlet.
Rush Bottom Chute		L				tons/ft		

ATTACHMENT D

SURVEY RESULTS
INCLUDING PLAN/PROFILE PLOTS

Note: Unless noted otherwise, Omaha District aerial images from 2006 are shown in the plan view figures.

Structure No. 703.25 (RM 652.47 to 652.42)

Critical Repair

Site Information

Survey Location: Tysons Bend

Structure Type: Revetment

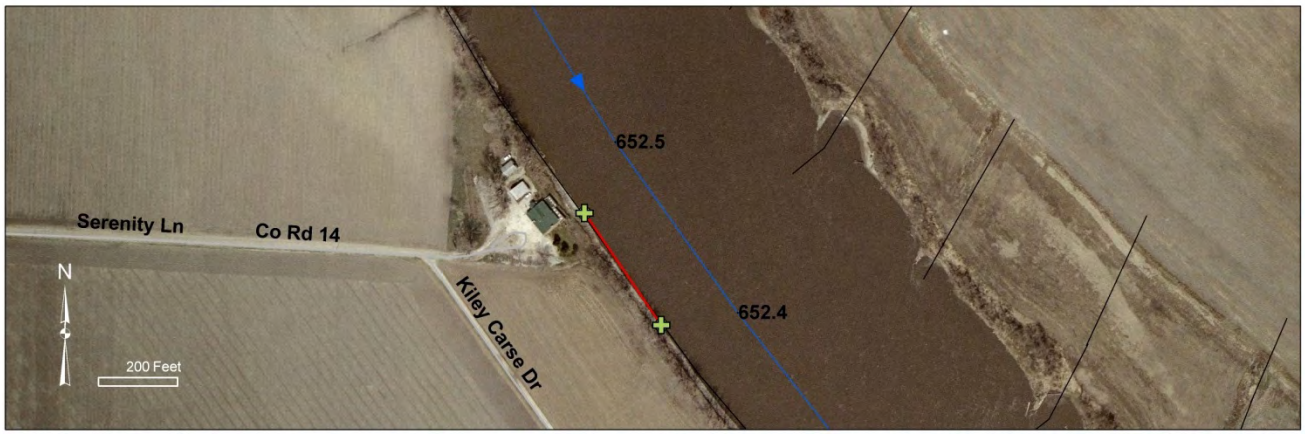
Bank: Right

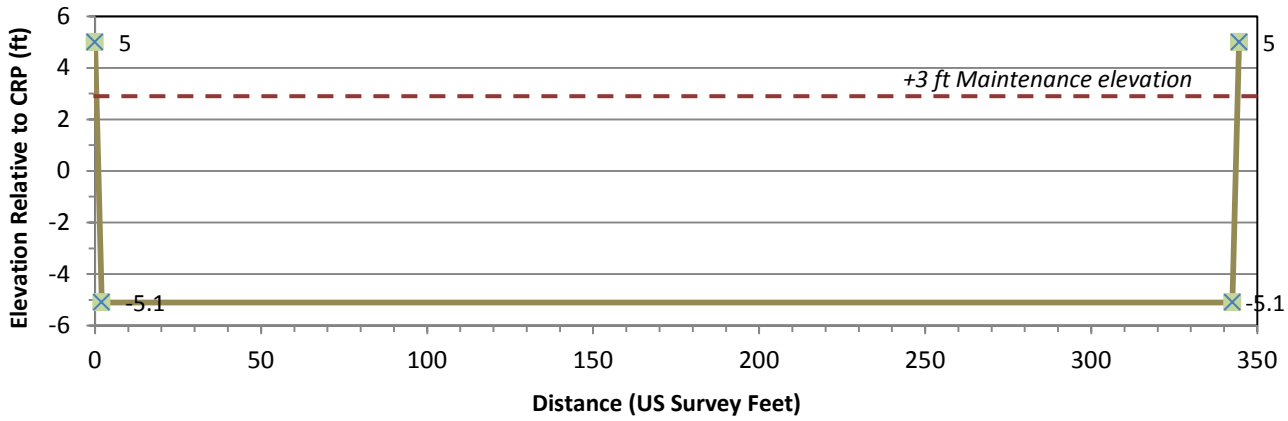
Survey Data

Stage Relative to CRP: - 3 ft

Length of Deficiency: 345 ft

Avg. Height of Deficiency: 8 ft





Structure No. 694.25 (RM 647.87)

Medium Priority Repair

Site Information

Survey Location: Desoto Bend - downstream of Blair Bridge

Structure Type: Dike (notched)

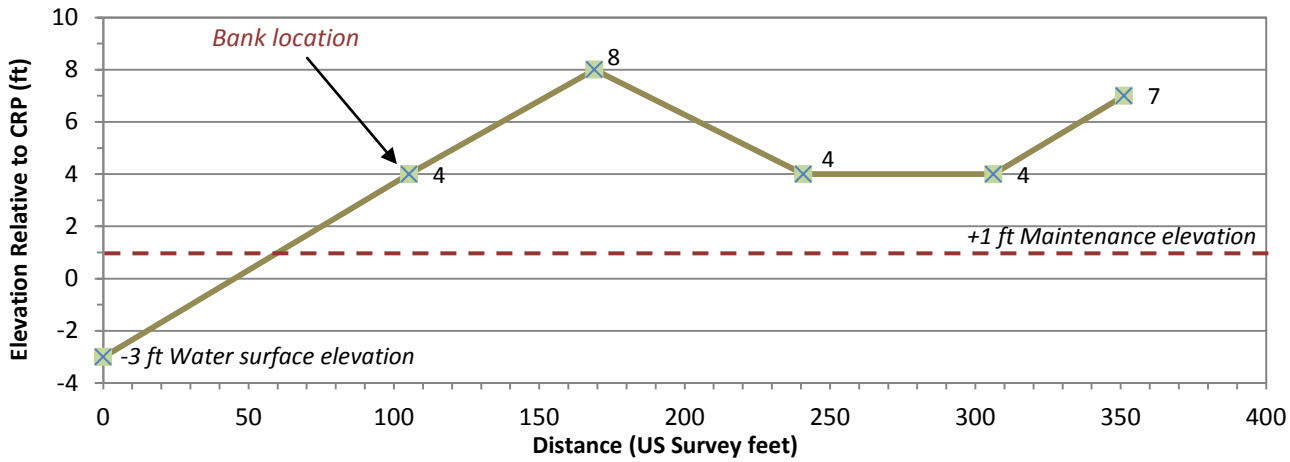
Bank: Left

Survey Data

Stage Relative to CRP: - 3 ft

Length of Deficiency: 50 ft

Avg. Height of Deficiency: 2 ft



Structure No. 694.1-A/B (RM 647.75)

Medium Priority Repair

Site Information

Survey Location: Desoto Bend - downstream of Blair Bridge

Structure Type: Dike

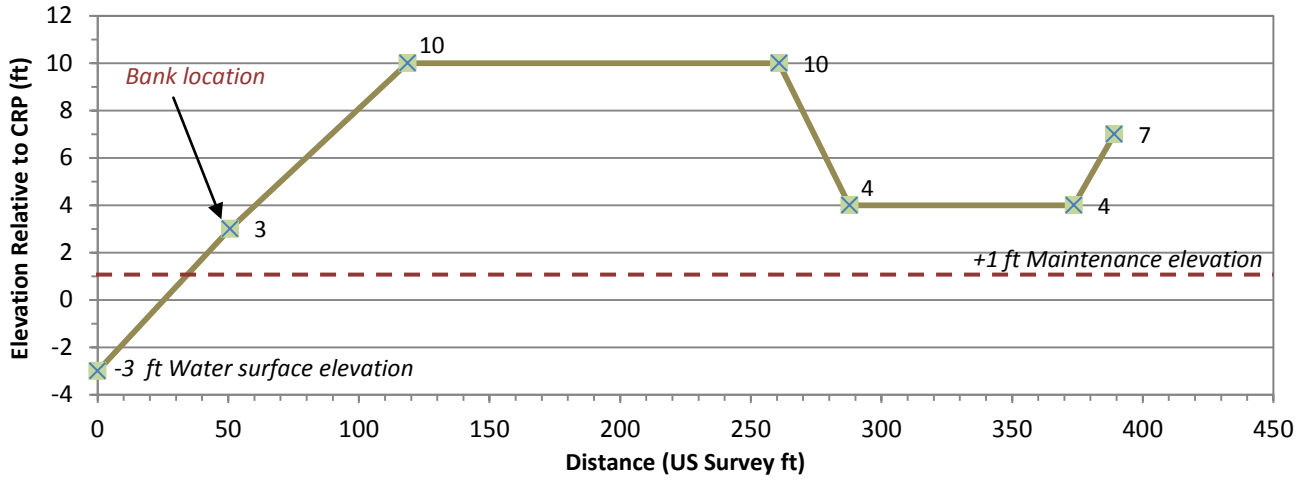
Bank: Left

Survey Data

Stage Relative to CRP: - 3 ft

Length of Deficiency: 30 ft

Avg. Height of Deficient : 2 ft



Structure No. 693.9 (RM 647.61)

Medium Priority Repair

Site Information

Survey Location: Desoto Bend - downstream of Blair Bridge

Structure Type: Dike (notched)

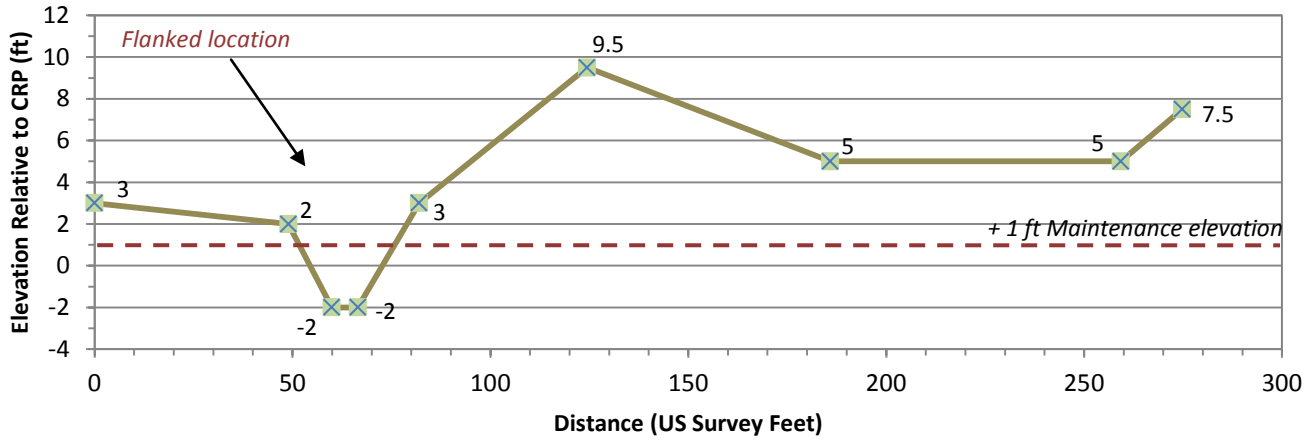
Bank: Left

Survey Data

Stage Relative to CRP: - 3 ft

Length of Deficiency: 33 ft

Avg. Height of Deficiency: 2 ft



Structure No. 693.8 (RM 645.44 to 645.17)

High Priority Repair

Site Information

Survey Location: Desoto Bend

Structure Type: Revetment

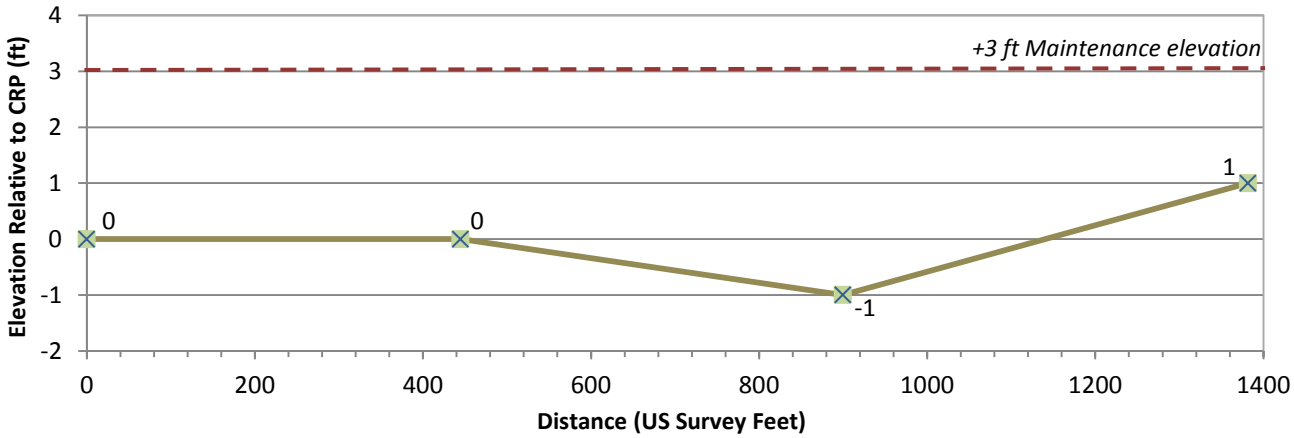
Bank: Right

Survey Data

Stage Relative to CRP: - 3 ft

Length of Deficiency: 1382 ft

Avg. Height of Deficiency: 3.2 ft



Structure No. 691.41 (RM 641.86 to 641.66)

Critical Repair

Site Information

Survey Location: Upper Calhoun Bend

Structure Type: Revetment

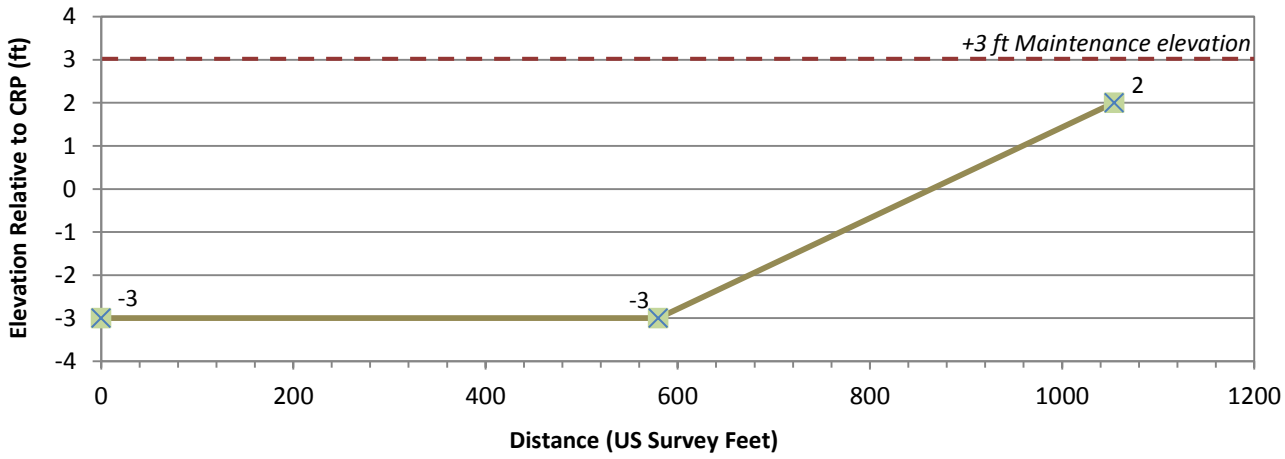
Bank: Left

Survey Data

Stage Relative to CRP: - 3 ft

Length of Deficiency: 1054 ft

Avg. Height of Deficiency: 4.9 ft



Structure No. 682.8/682.55 (RM 640.19 to 639.63)

Critical Repair

Site Information

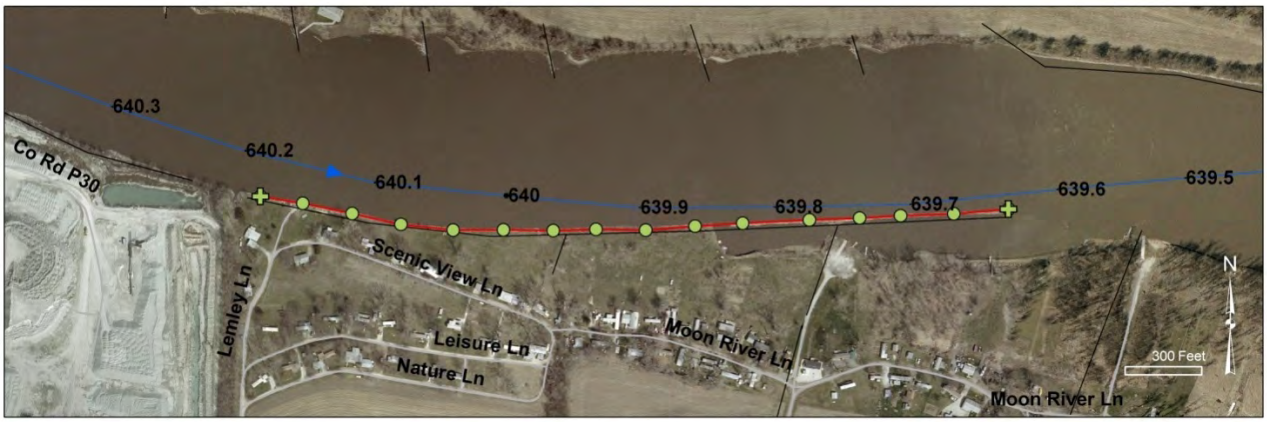
Survey Location: Upper Calhoun Bend
Structure Type: Revetment / Kicker
Bank: Right

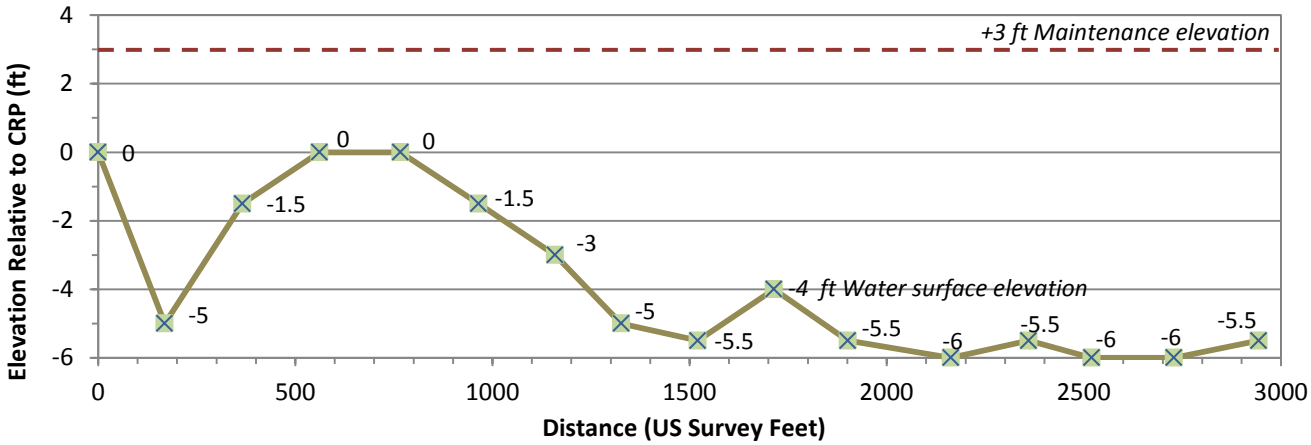
Survey Data

Stage Relative to CRP: -4 ft

Revetment:
Length of Deficiency: 1714 ft
Avg. Height of Deficiency: 6.6 ft

Kicker:
Revetment Length of Deficiency: 1042 ft
Avg. Height of Deficiency: 9.7 ft
Average Crown Width: 8 ft





Structure No. 680.7 (RM 637.55 to 637.36)

Critical Repair

Site Information

Survey Location: Lower Calhoun Bend

Structure Type: Revetment

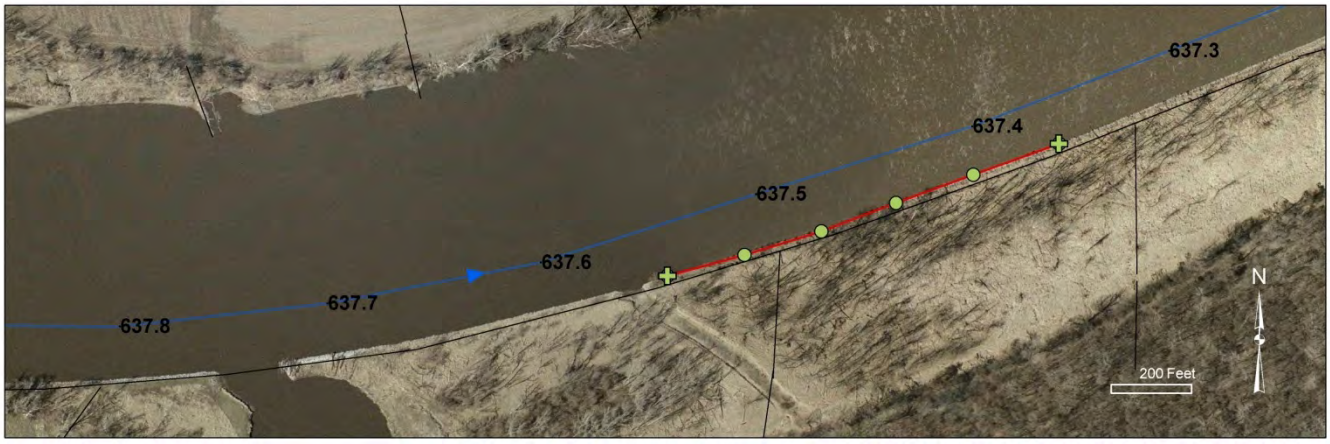
Bank: Right

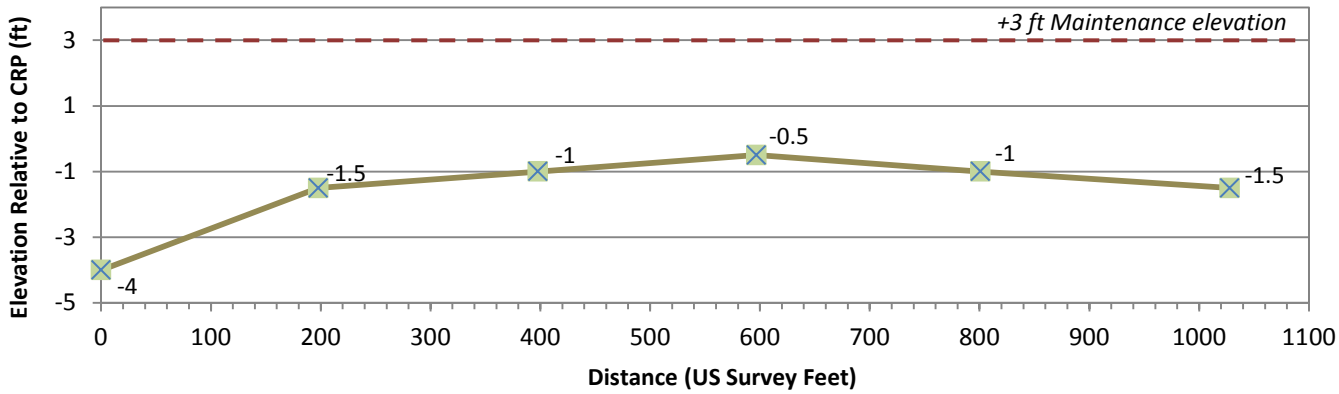
Survey Data

Stage Relative to CRP: - 4 ft

Length of Deficiency: 1028 ft

Avg. Height of Deficiency: 4.3 ft





Structure No. 680.1 (RM 637.22 to 637.09)

Critical Repair

Site Information

Survey Location: Lower Calhoun Bend

Structure Type: Kicker

Bank: Right

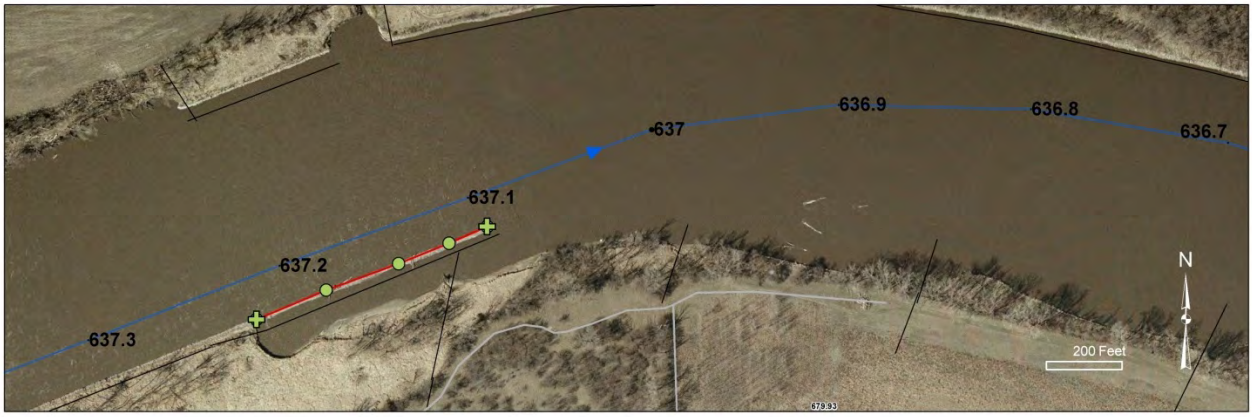
Survey Data

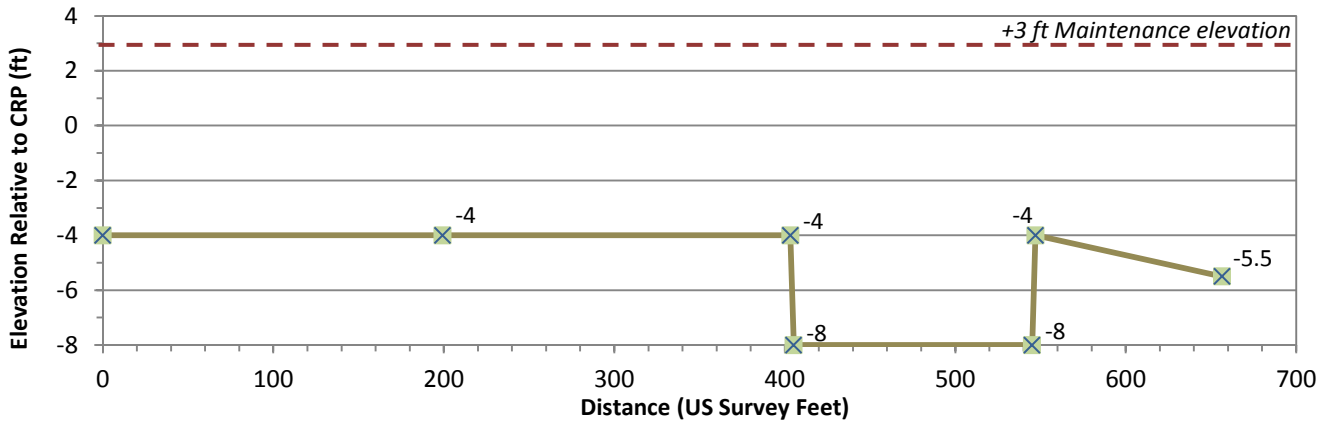
Stage Relative to CRP: - 4 ft

Length of Deficiency: 657 ft

Avg. Height of Deficiency: 8 ft

Average Crown Width: 7 ft





Structure No. 678.1 (RM 633.35 to 633.06)

Critical Repair

Site Information

Survey Location: Upper Rockport Bend

Structure Type: Revetment

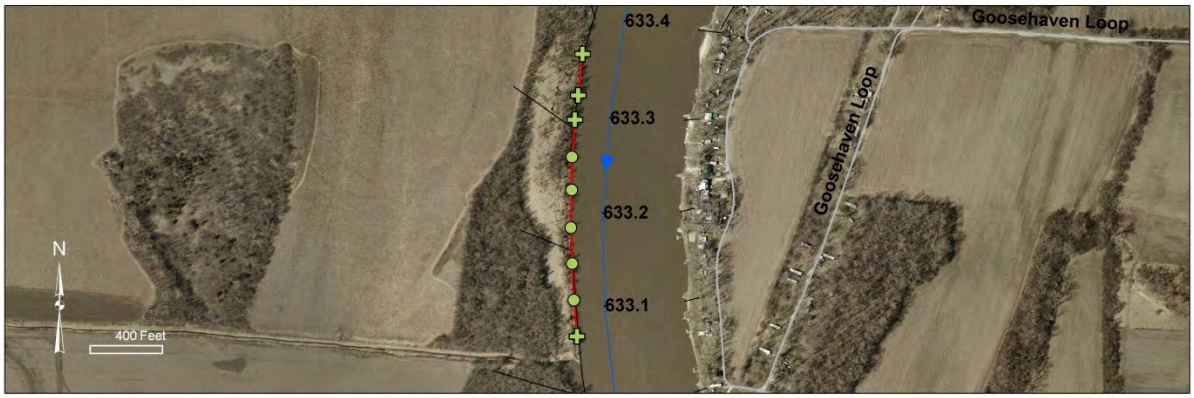
Bank: Right

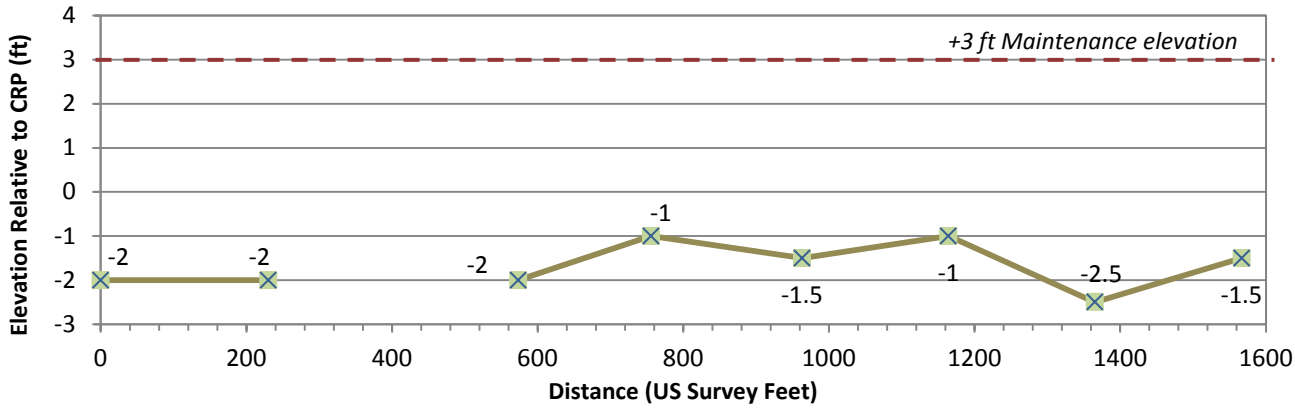
Survey Data

Stage Relative to CRP: - 4 ft

Length of Deficiency: 1567 ft

Avg. Height of Deficiency: 4.7 ft





Structure No. 676.8 (RM 631.81 to 631.72)

Critical Repair

Site Information

Survey Location: Lower Rockport Bend

Structure Type: Revetment

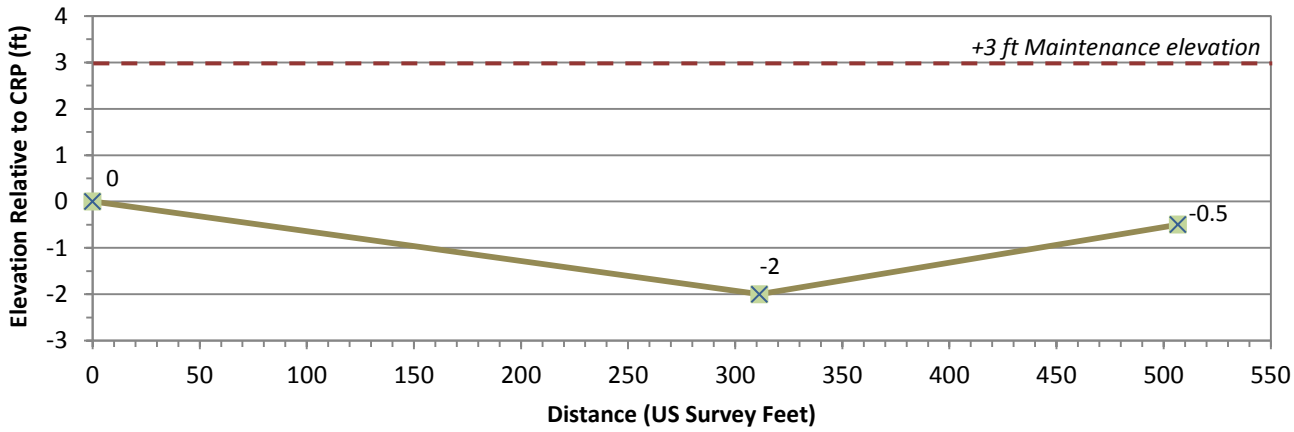
Bank: Left

Survey Data

Stage Relative to CRP: - 4 ft

Length of Deficiency: 507 ft

Avg. Height of Deficiency: 4.1 ft



Structure No. 673.95 (RM 629.72 to 629.7)

High Priority Repair

Site Information

Survey Location: Lower Pigeon Creek Bend

Structure Type: Revetment

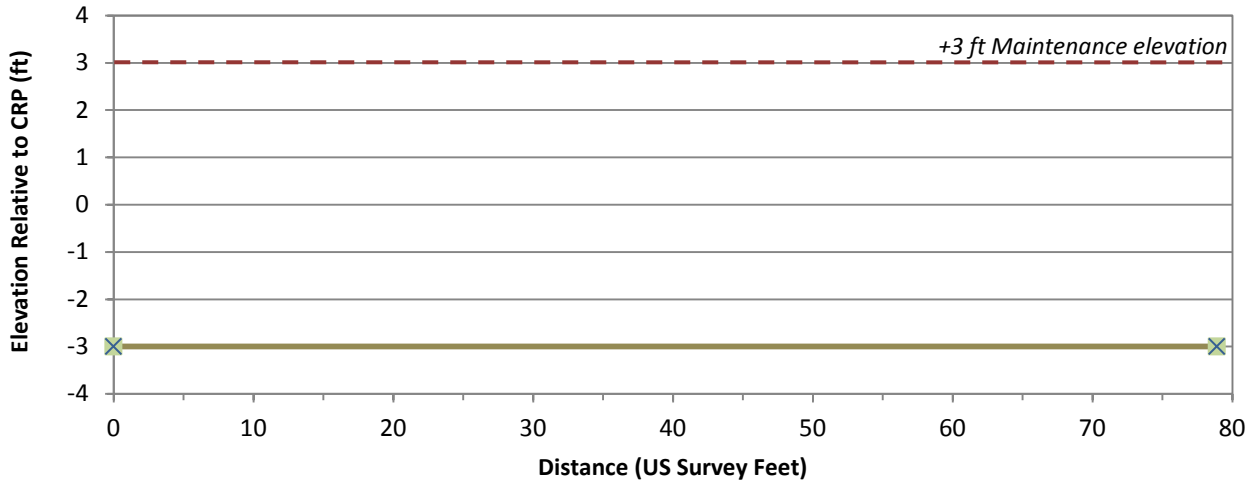
Bank: Right

Survey Data

Stage Relative to CRP: - 4 ft

Length of Deficiency: 79 ft

Avg. Height of Deficiency: 6 ft



Structure No. 662.3 (RM 617.8)

Critical Repair

Site Information

Survey Location: Council Bend

Structure Type: Revetment

Bank: Left

Survey Data

Stage Relative to CRP: - 4 ft

Length of Deficiency: 556 ft

Avg. Height of Deficiency: 8 ft

(assumed 1 ft to rebuild toe)

Survey Notes:

- Inaccessible
- High bank at 10 ft
- No visible rock

Site inaccessible – no vertical measurements taken

Structure No. 656.9 (RM 611.11 to 610.8)

Critical Repair

Site Information

Survey Location: Gibson Bend

Structure Type: Revetment

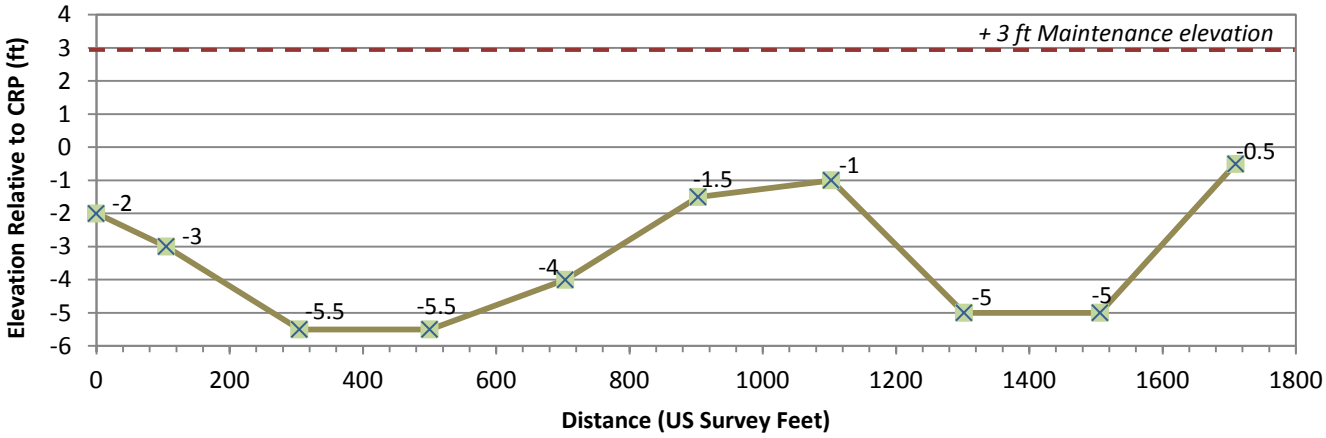
Bank: Right

Survey Data

Stage Relative to CRP: - 4 ft

Length of Deficiency: 1710 ft

Avg. Height of Deficiency: 6.6 ft



Structure No. 653.6 (RM 608.49 to 608.27)

High Priority Repair

Site Information

Survey Location: Gibson Bend

Structure Type: L-head / Kicker

Bank: Right

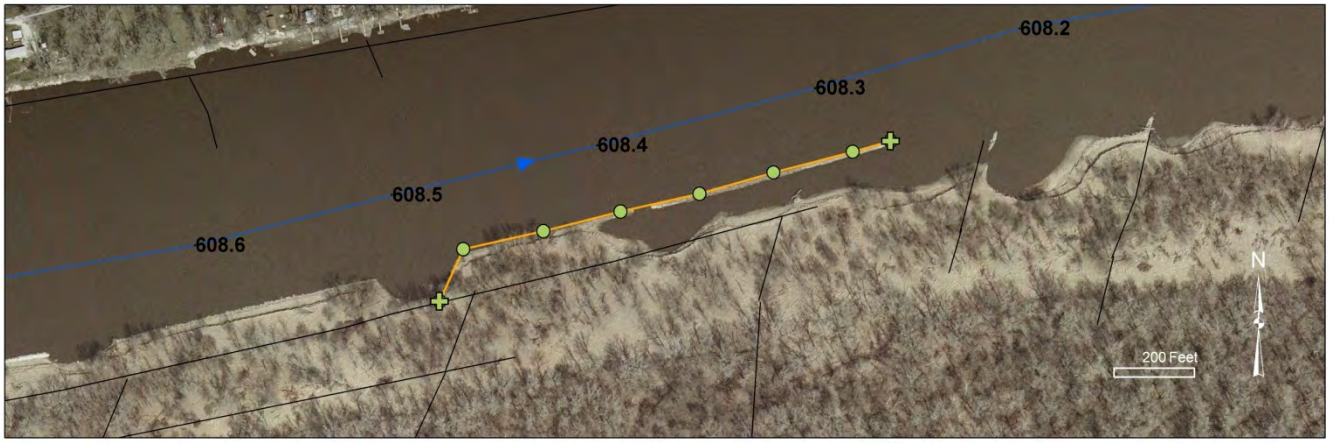
Survey Data

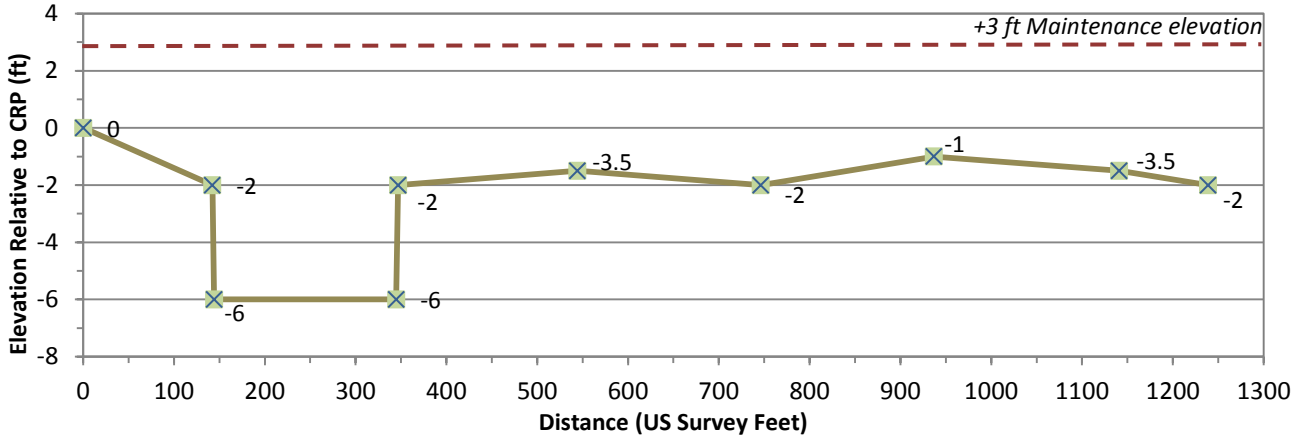
Stage Relative to CRP: - 2 ft

Length of Deficiency: 1239 ft

Avg. Height of Deficiency: 5.2 ft

Average Crown Width: 10 ft





Structure No. 649.4 (RM 606.23 to 606.04)

High Priority Repair

Site Information

Survey Location: Manawa Bend

Structure Type: Revetment

Bank: Left

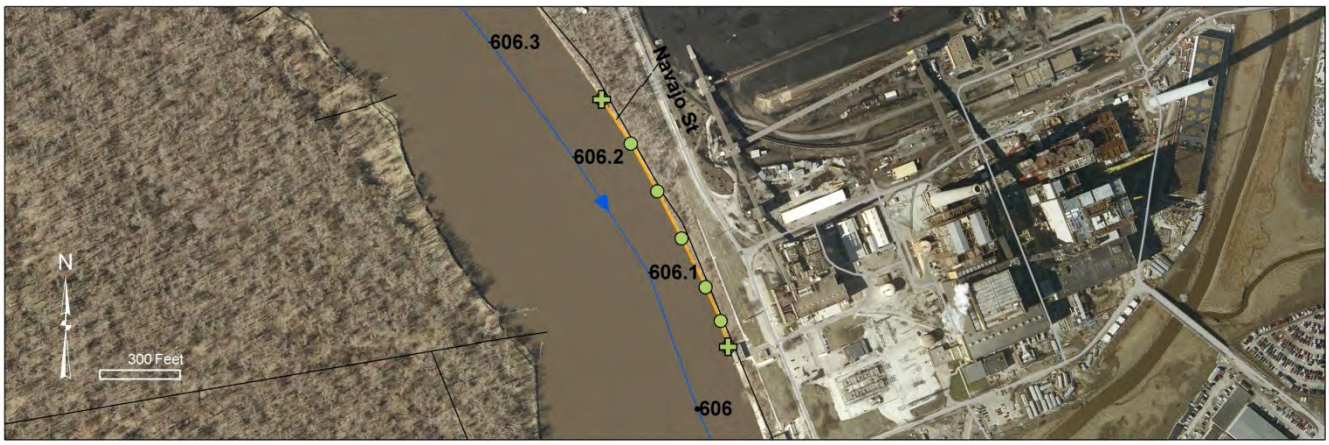
Survey Data

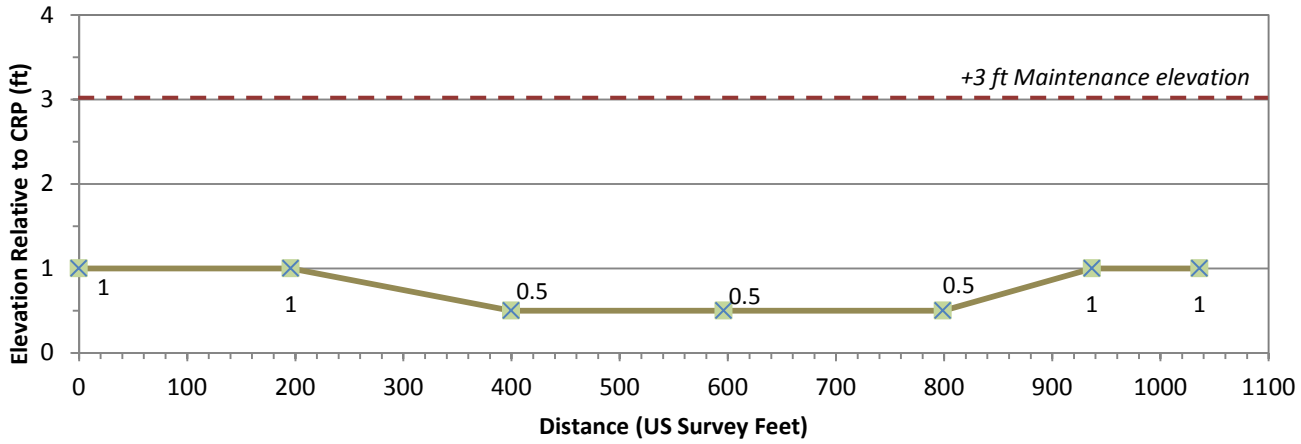
Stage Relative to CRP: - 2 ft

Length of Deficiency: 1036 ft

Avg. Height of Deficiency: 2.3 ft

Survey Notes: Structure has some sand built up over the rock.





Structure No. 649.4 (RM 605.78 to 604.54)

High Priority Repair

Site Information

Survey Location: Manawa Bend

Structure Type: Revetment

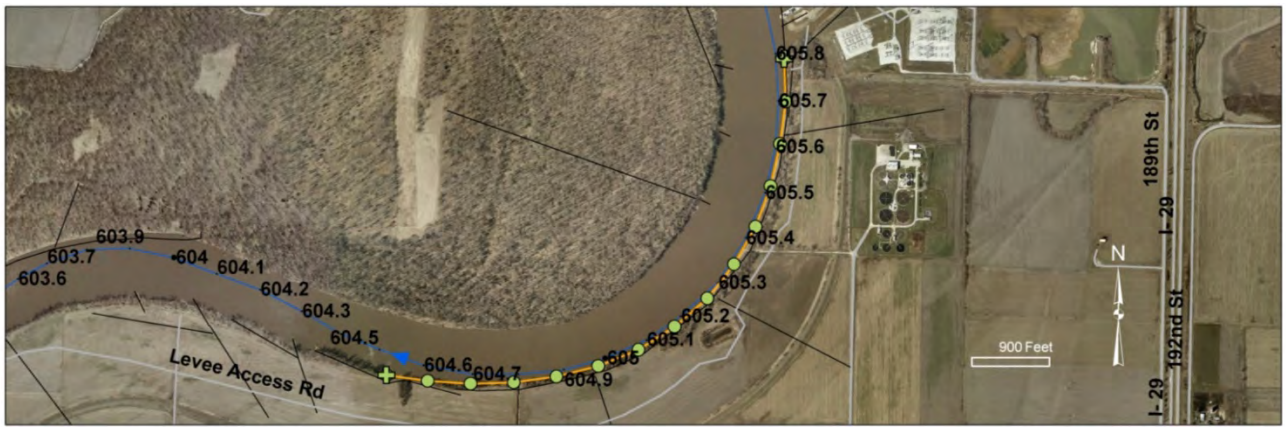
Bank: Left

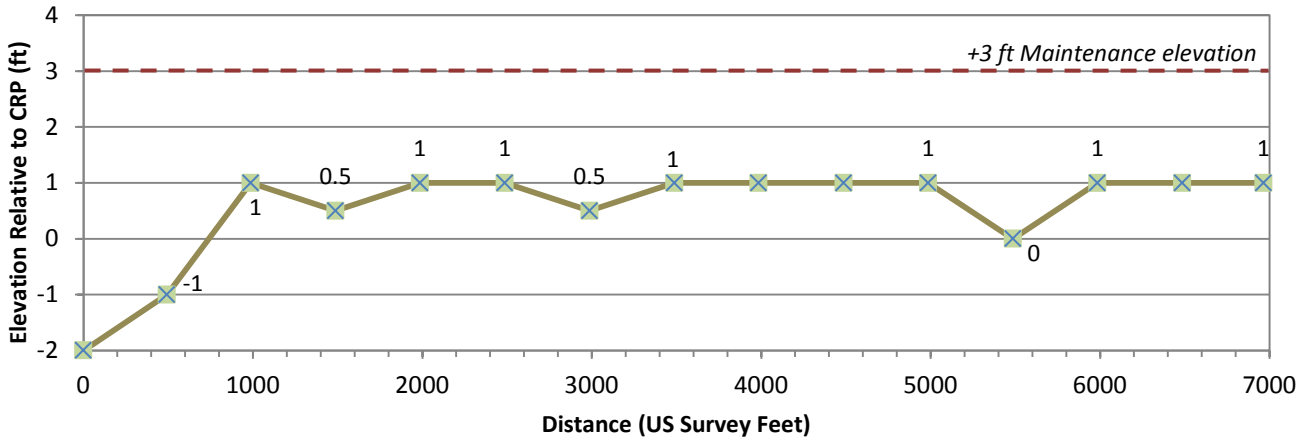
Survey Data

Stage Relative to CRP: - 2 ft

Length of Deficiency: 6965 ft

Avg. Height of Deficiency: 2.4 ft





Structure No. 645.4 (RM 600.96 to 600.76)

High Priority Repair

Site Information

Survey Location: Upper Bellevue Reach

Structure Type: Revetment

Bank: Right

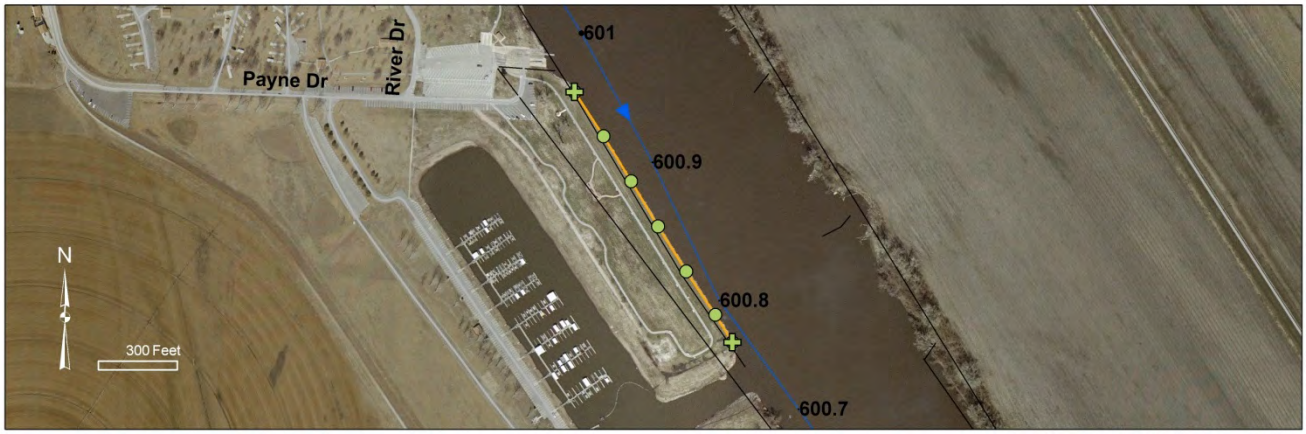
Survey Data

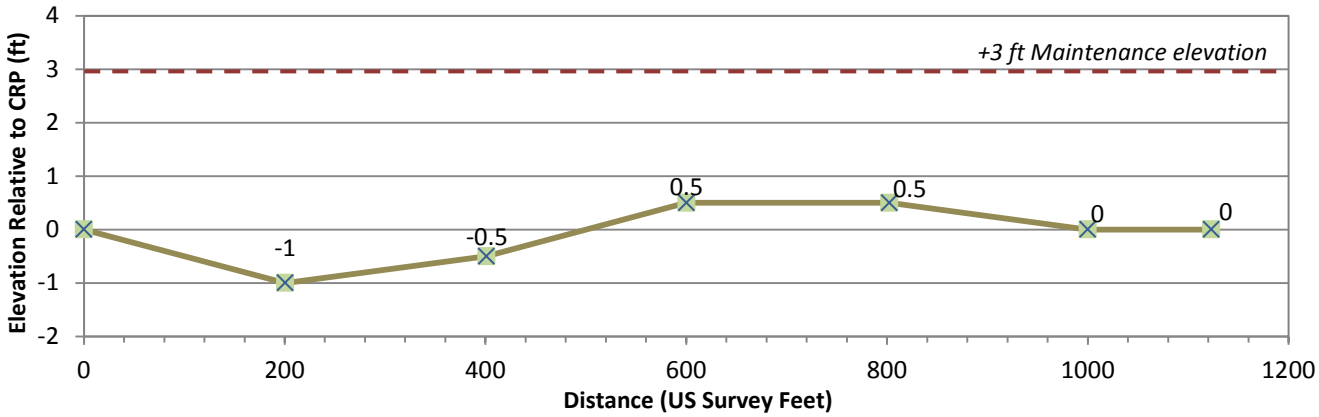
Stage Relative to CRP: - 2 ft

Length of Deficiency: 1123 ft

Avg. Height of Deficiency: 3.1 ft

Average Crown Width: 11 ft





Structure No. 638.75 (RM 595.08 to 594.8)

High Priority Repair

Site Information

Survey Location: Papillion Bend

Structure Type: Kicker

Bank: Right

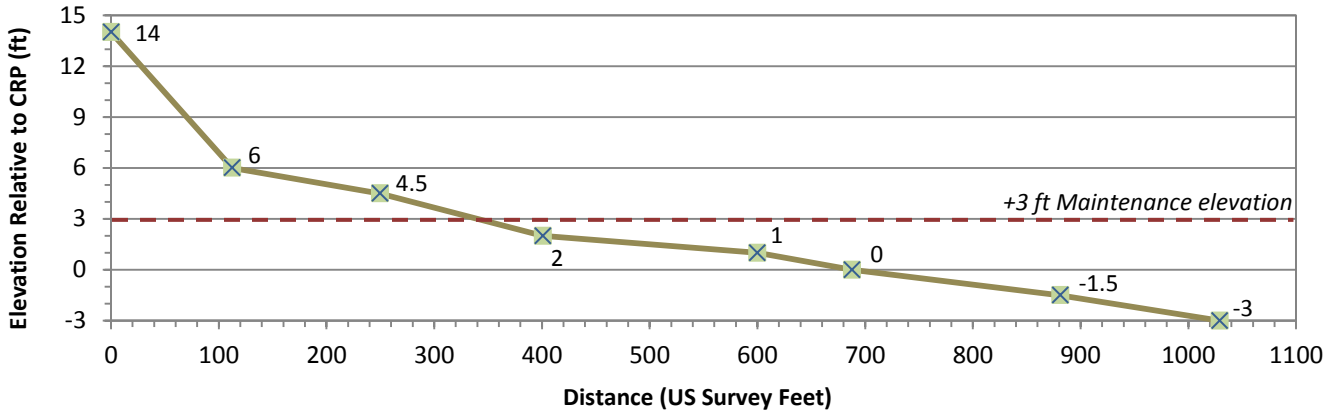
Survey Data

Stage Relative to CRP: 0 ft

Length of Deficiency: 1120 ft

Avg. Height of Deficiency: 3.2 ft

Average Crown Width: 16 ft



Structure No. 637.9-A (RM 594.43 to 593.94)

Critical Repair

Site Information

Survey Location: Papillion Bend

Structure Type: Revetment / Kicker

Bank: Right

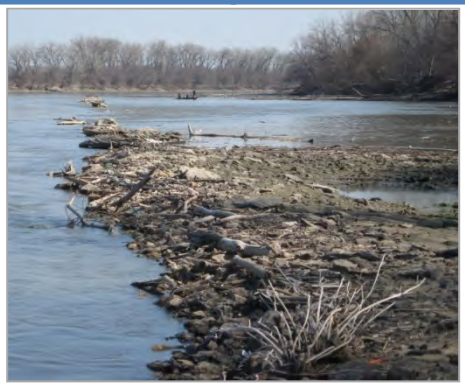
Survey Data

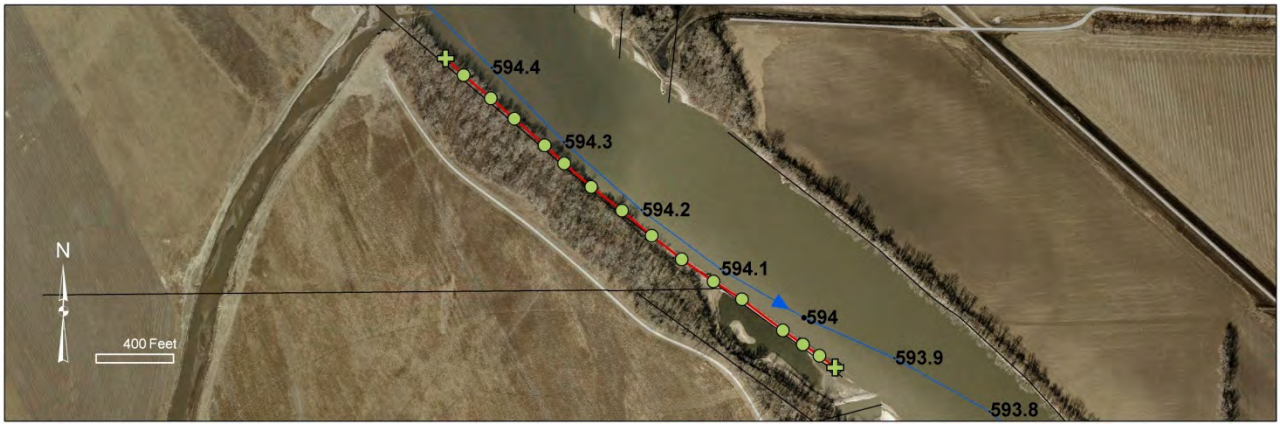
Stage Relative to CRP: 0 ft

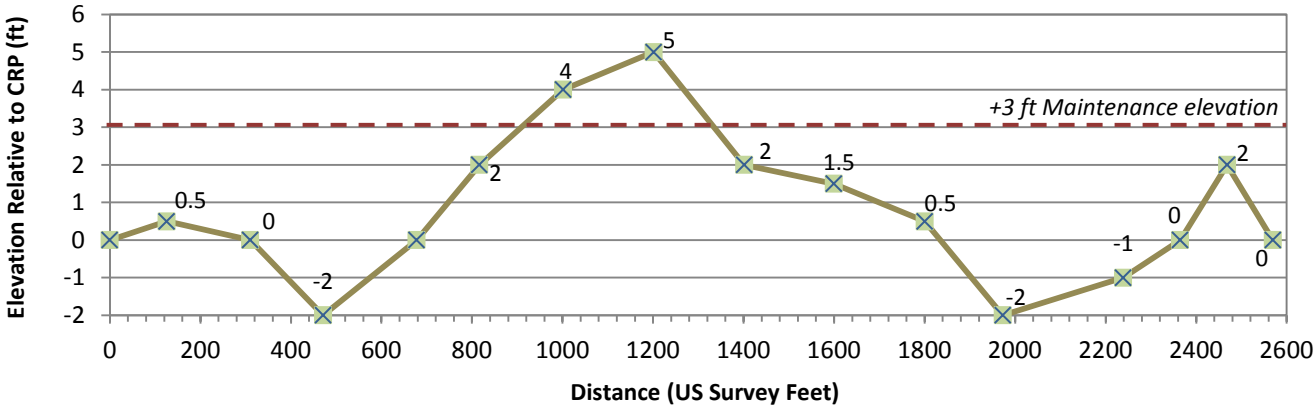
Revetment:
Length of Deficiency: 1800 ft
Avg. Height of Deficiency: 1.6 ft

Kicker:
Length of Deficiency: 769 ft
Avg. Height of Deficiency: 3.5 ft

Average Crown Width: 6 ft







Structure No. 625.88 (RM 582.28)

Critical Repair

Site Information

Survey Location: Rock Bluff Bend

Structure Type: Dike

Bank: Right

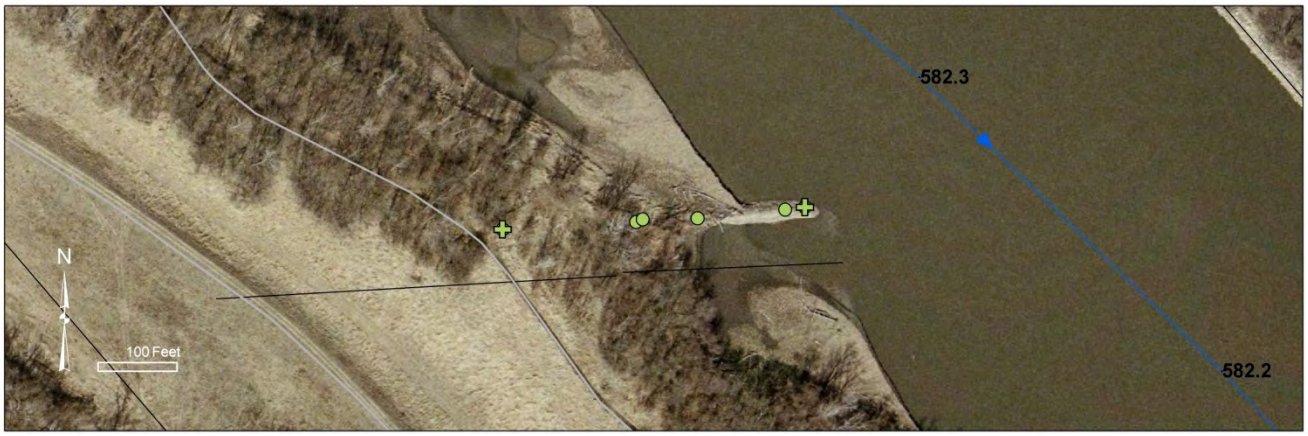
Survey Data

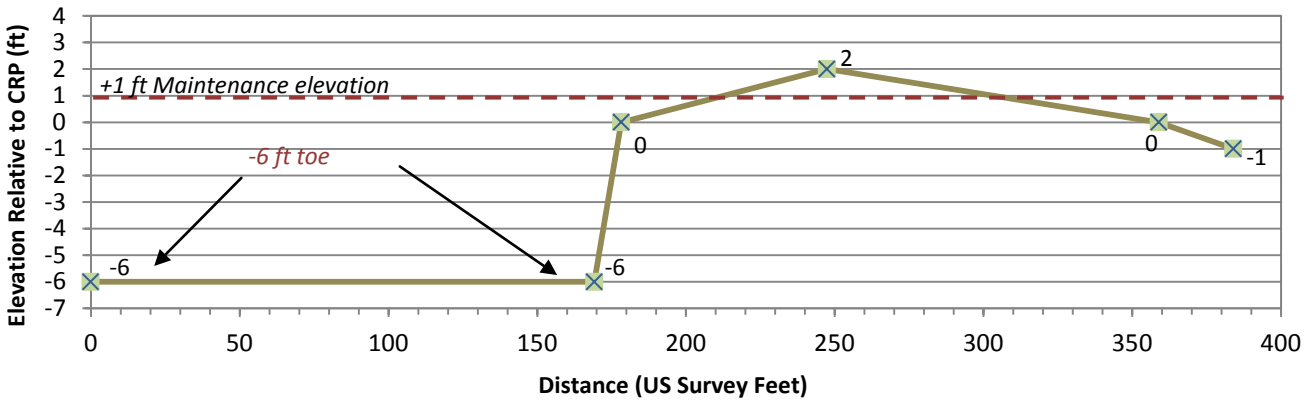
Stage Relative to CRP: 0 ft

Length of Deficiency: 178 ft

Avg. Height of Deficiency: 7 ft

Average Crown Width: 8 ft





Structure No. 611.3 (RM 565.2 to 564.9)

High Priority Repair

Site Information

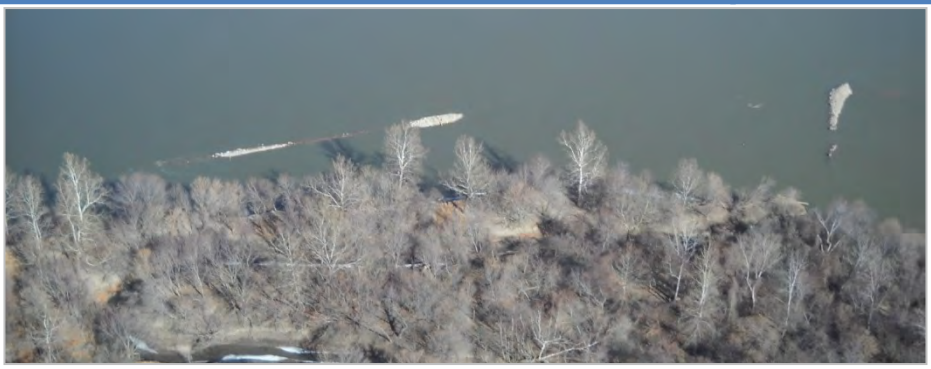
Survey Location: Lower Copeland Bend
Structure Type: Revetment / Kicker
Bank: Right

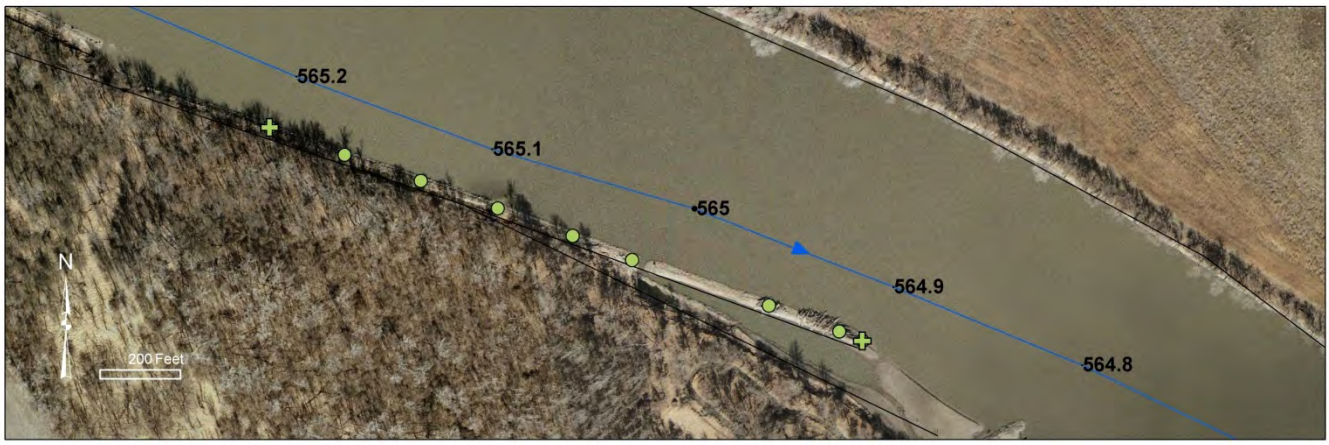
Survey Data

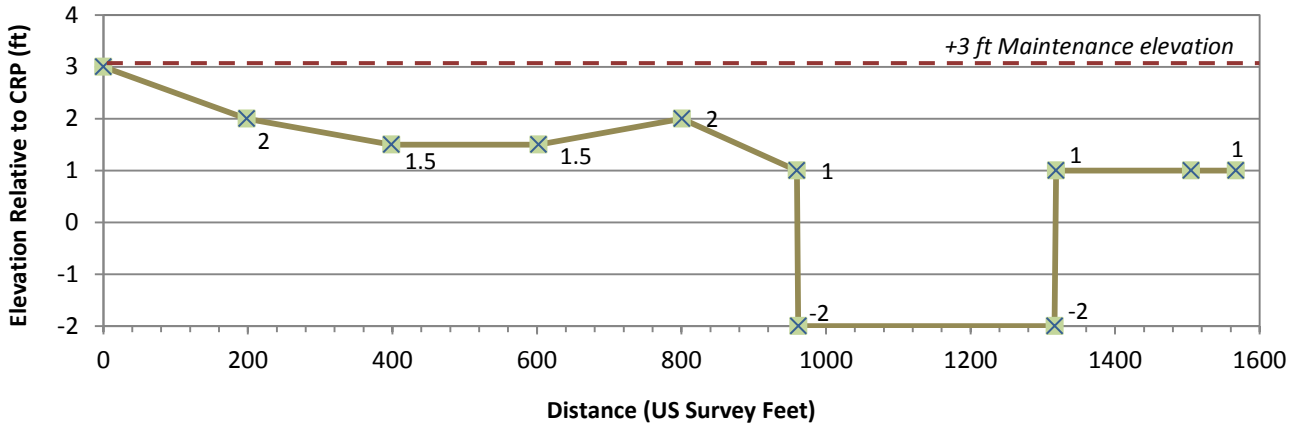
Stage Relative to CRP: +1 ft

Revetment:
Length of Deficiency: 960 ft
Avg. Height of Deficiency: 1.2 ft

Kicker:
Length of Deficiency: 607 ft
Avg. Height of Deficiency: 3.8 ft
Average Crown Width: 12 ft







Structure No. 606.45/606.35 (RM 560.4 to 560.28)

High Priority Repair

Site Information

Survey Location: Frazers Bend

Structure Type: L-head

Bank: Right

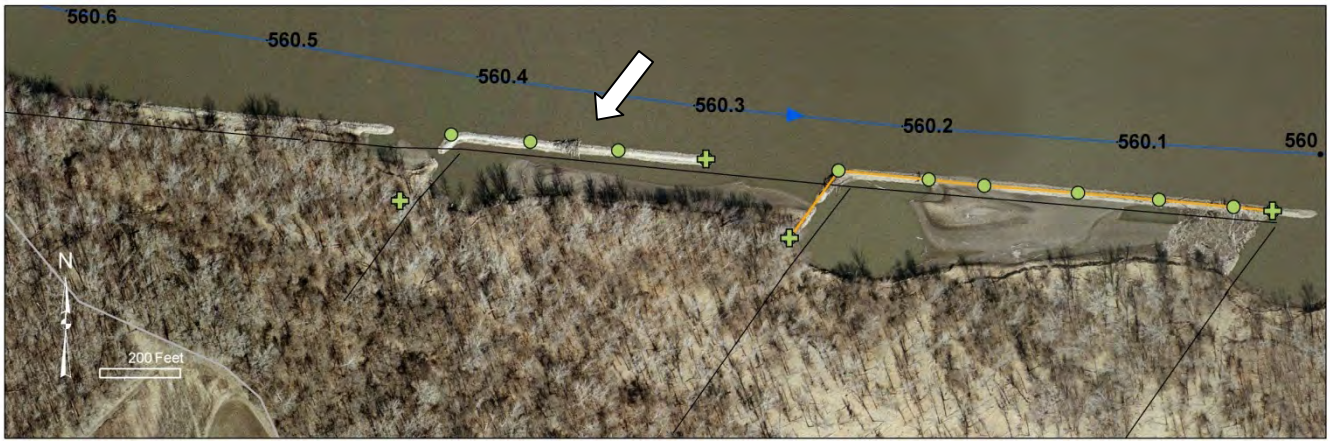
Survey Data

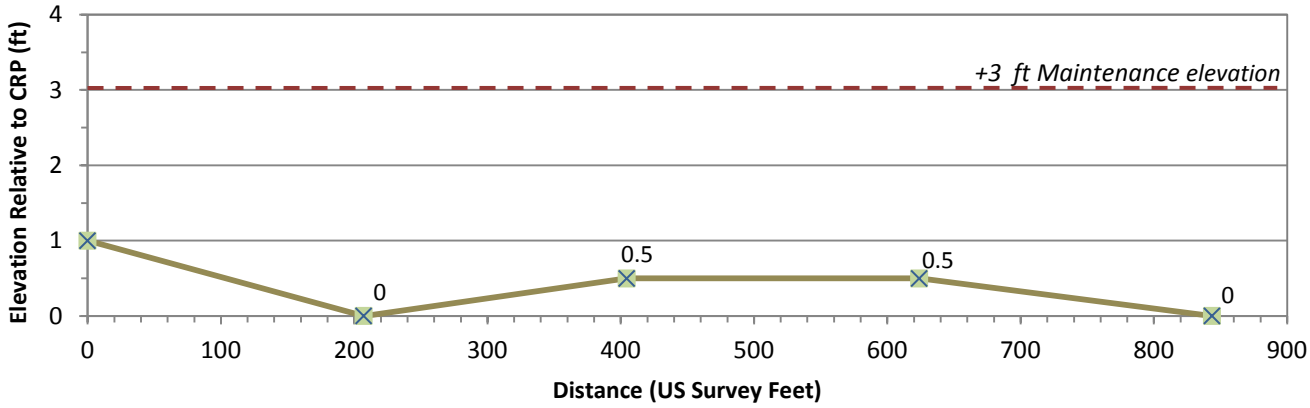
Stage Relative to CRP: +1 ft

Length of Deficiency: 844 ft

Avg. Height of Deficiency: 2.6 ft

Average Crown Width: 7 ft





Structure No. 606.45/606.15 (RM 560.24 to 560.02)

High Priority Repair

Site Information

Survey Location: Frazers Bend

Structure Type: L-head

Bank: Right

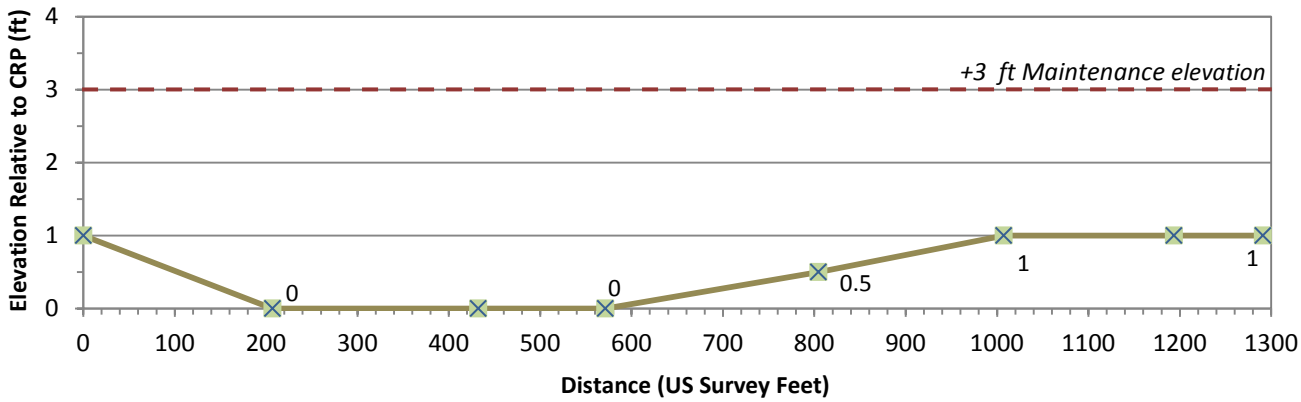
Survey Data

Stage Relative to CRP: +1 ft

Length of Deficiency: 1291 ft

Avg. Height of Deficiency: 2.5 ft

Average Crown Width: 6 ft



Structure No. 602.95 (RM 557.08 to 556.97)

High Priority Repair

Site Information

Survey Location: Otoe Bend

Structure Type: L-head

Bank: Left

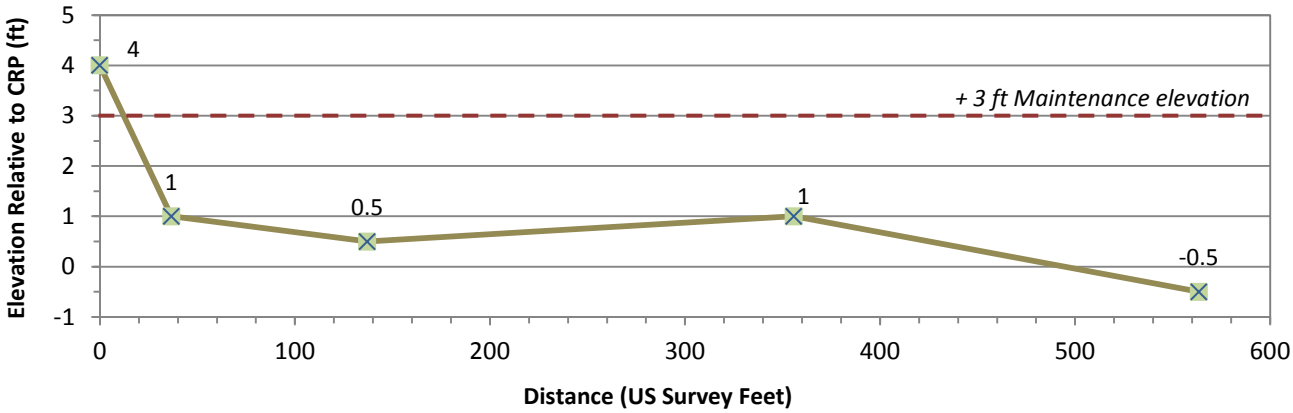
Survey Data

Stage Relative to CRP: +1 ft

Length of Deficiency: 563 ft

Avg. Height of Deficiency: 2.3 ft

Average Crown Width: 6 ft



Structure No. 600.6 (RM 554.67 to 554.63)

Critical Repair

Site Information

Survey Location: Upper Hamburg Bend

Structure Type: Revetment

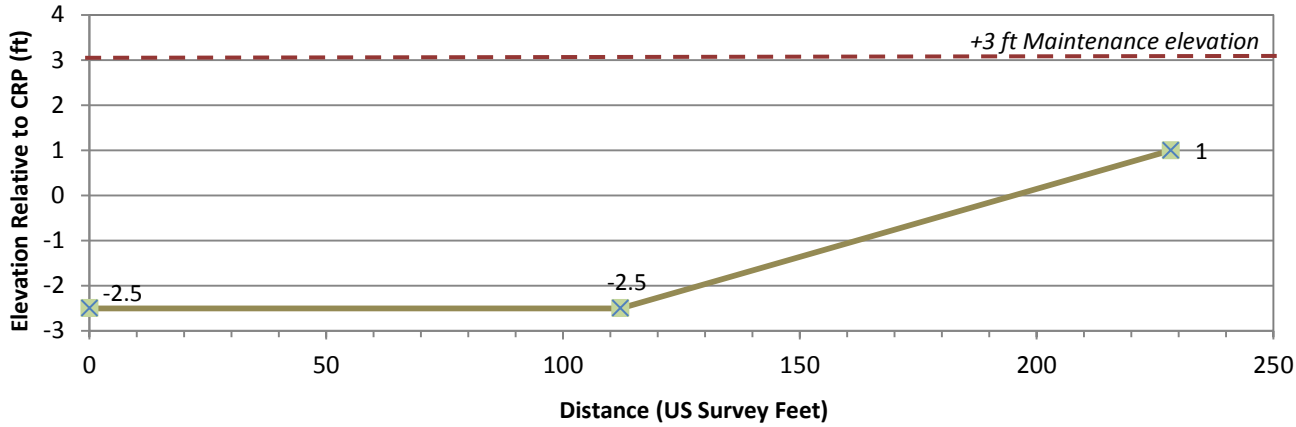
Bank: Left

Survey Data

Stage Relative to CRP: +1 ft

Length of Deficiency: 228 ft

Avg. Height of Deficiency: 4.6 ft



Structure No. 598.19/598 (RM 553.32 to 553.12)

Critical Repair

Site Information

Survey Location: Upper Hamburg Bend
Structure Type: L-head
Bank: Left

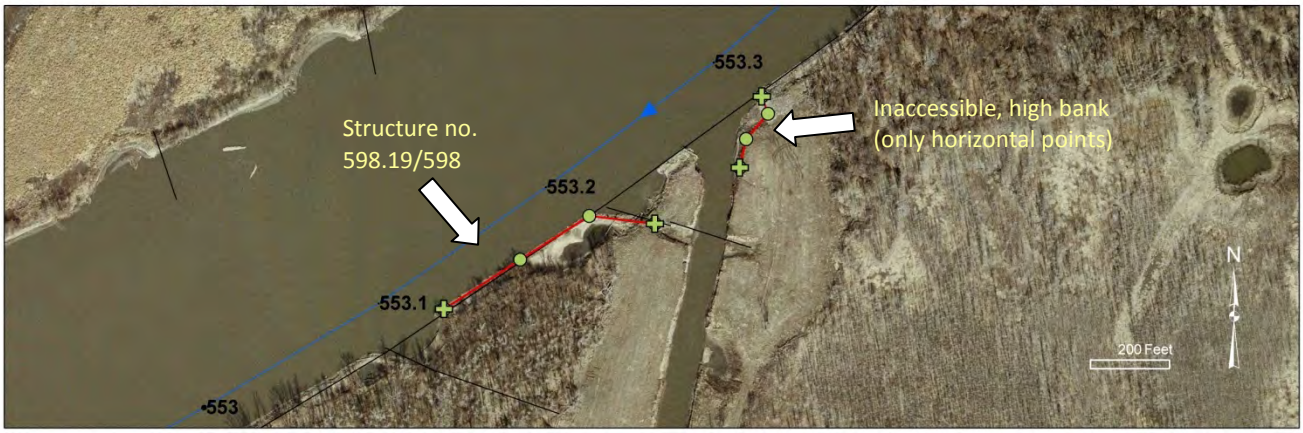
Survey Data

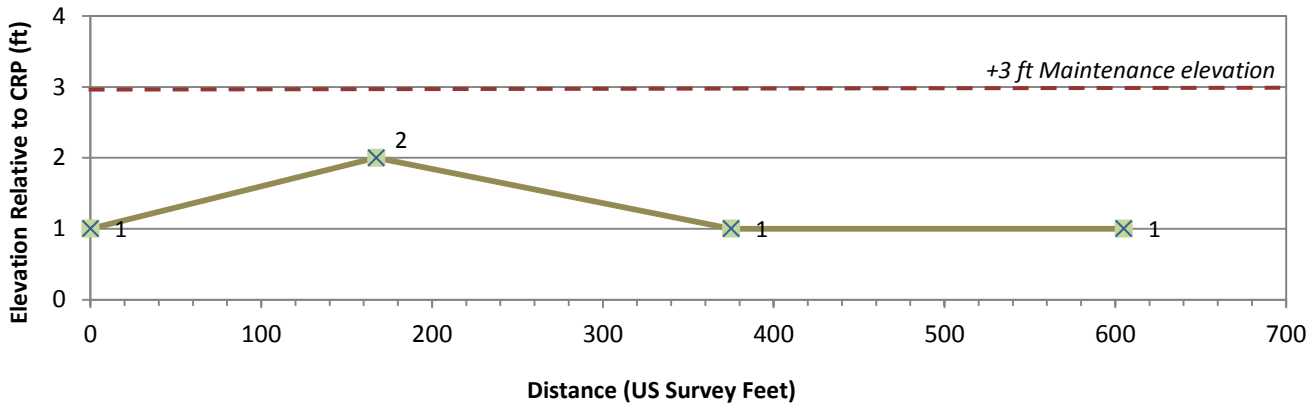
Stage Relative to CRP: +1 ft

L-head Revetment (598.19):
Revet. Length of Deficiency: 438 ft
Avg. Height of Deficiency: 1.8 ft
Average Crown Width: 12 ft

L-head Dike (598):
Length of Deficiency: 167 ft
Avg. Height of Deficiency: 1.5 ft
Average Crown Width: 12 ft

Survey Notes: RM 553.32 to 553.27 (598.19) inaccessible, high bank at +10 ft, no visible rock. Length of deficiency, 205 ft.





Structure No. 592.1 (RM 546.03)

Low Priority Repair

Site Information

Survey Location: Upper Kansas Bend

Structure Type: Dike

Bank: Right

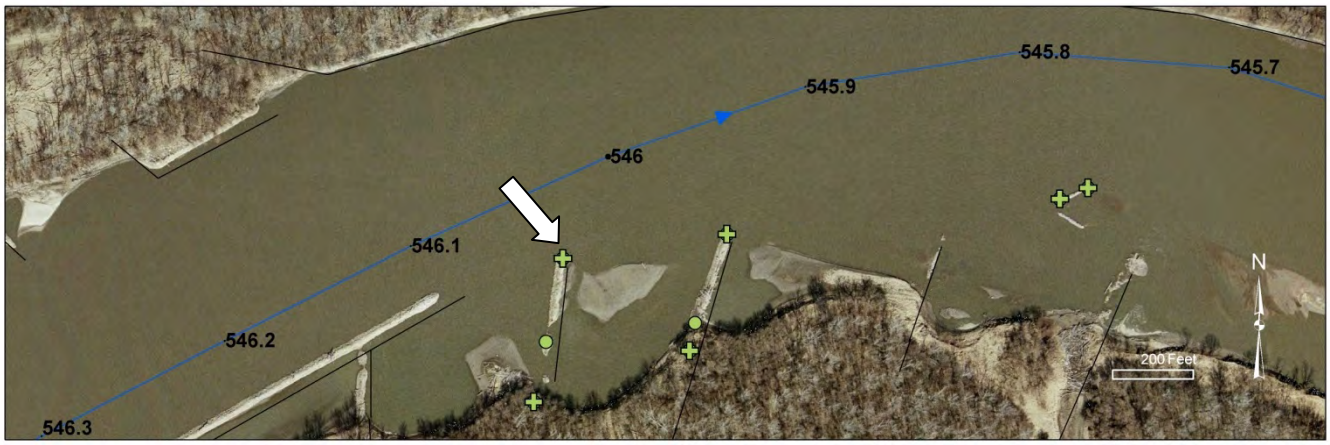
Survey Data

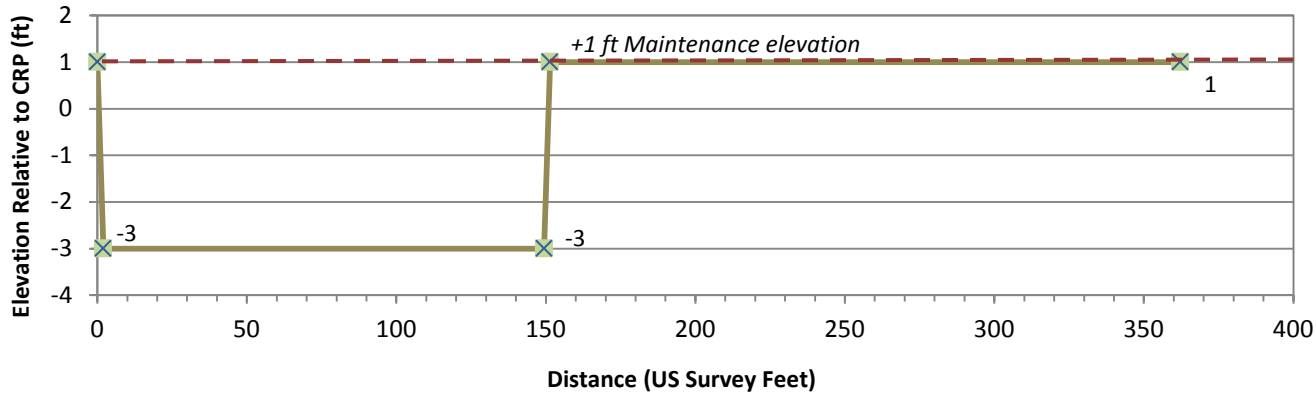
Stage Relative to CRP: +1 ft

Length of Deficiency: 151 ft

Avg. Height of Deficiency: 3 ft

Average Crown Width: 8 ft





Structure No. 592 (RM 545.94)

No Repair

Site Information

Survey Location: Upper Kansas Bend

Structure Type: Dike

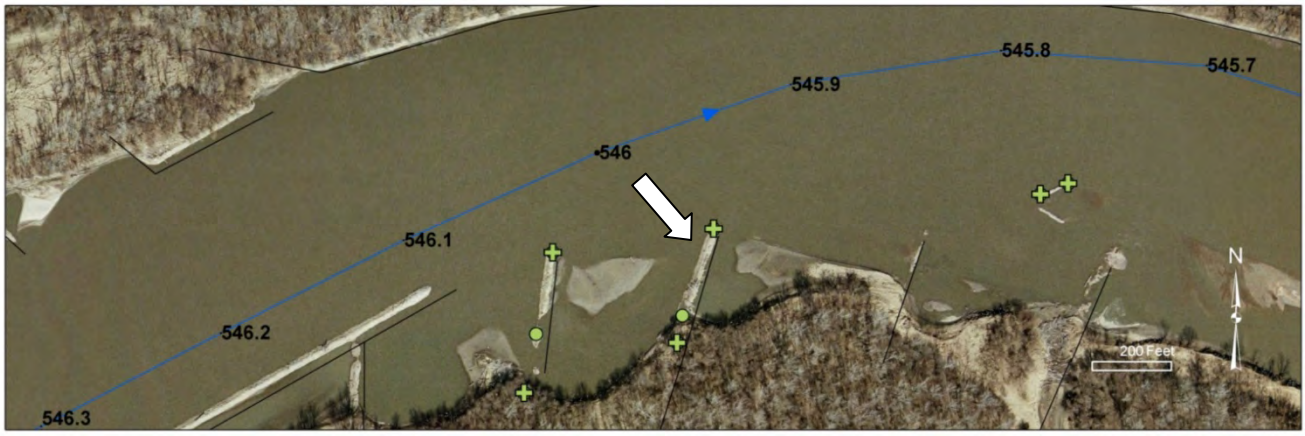
Bank: Right

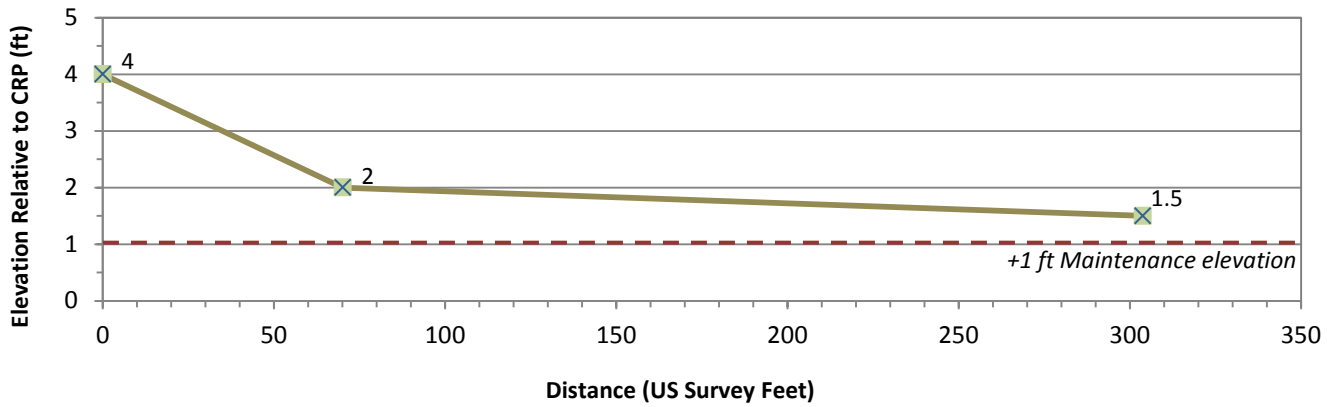
Survey Data

Stage Relative to CRP: +1 ft

Length of Deficiency: N/A

Avg. Height Deficiency: N/A





Structure No. 591.85 (RM 545.75)

No Repair

Site Information

Survey Location: Upper Kansas Bend

Structure Type: Chevron

Bank: Right

Survey Data

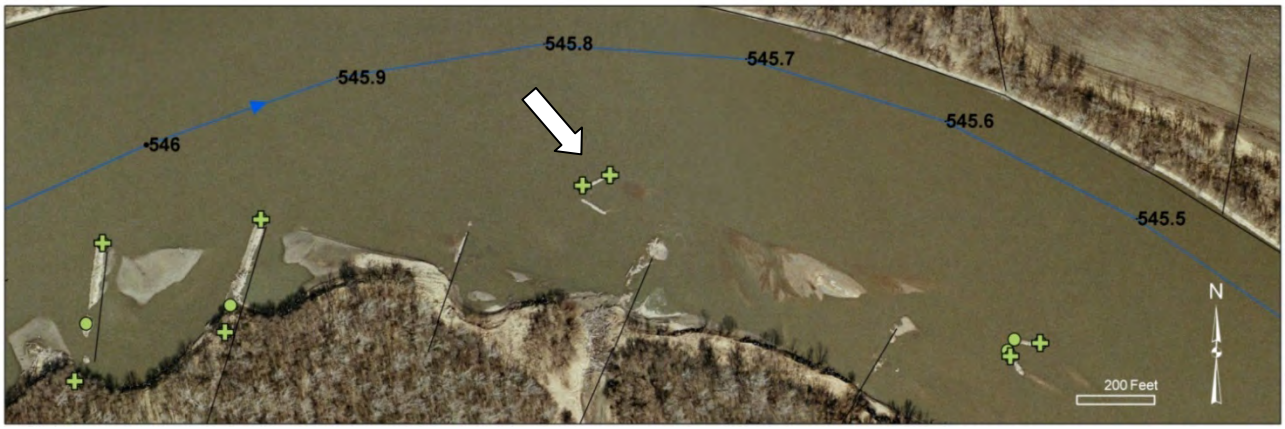
Stage Relative to CRP: +1 ft

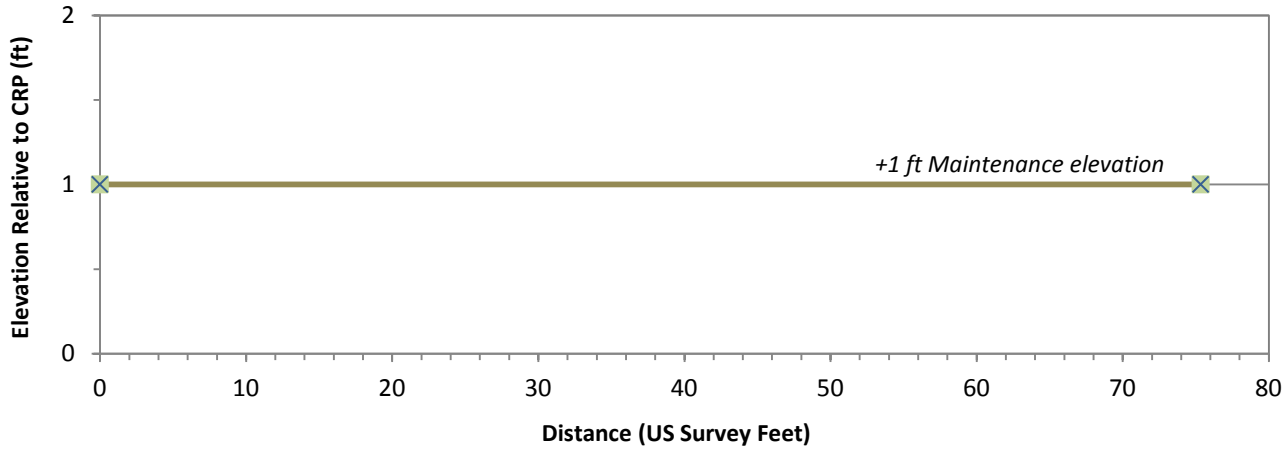
Length of Deficiency: N/A

Avg. Height of Deficiency: N/A

Average Crown Width: 6 ft

Survey Notes: Only one side of structure accessible.





Structure No. 591.52 (RM 545.5)

Low Priority Repair

Site Information

Survey Location: Upper Kansas Bend

Structure Type: Chevron

Bank: Right

Survey Data

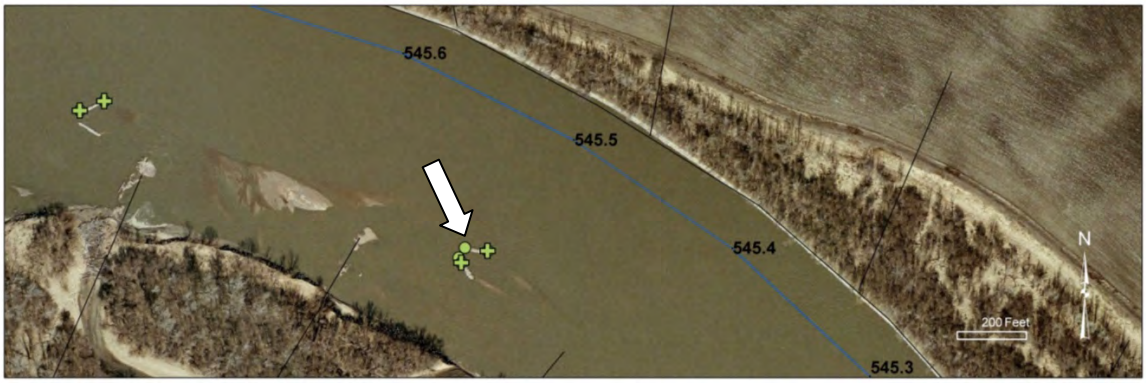
Stage Relative to CRP: +1 ft

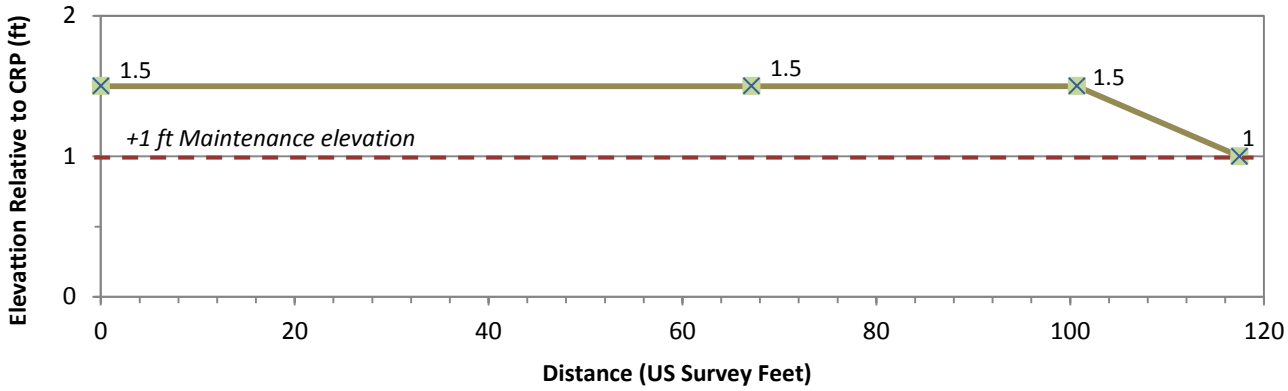
Length of Deficiency: 33 ft

Avg. Height of Deficiency: 1 ft

Average Crown Width: 6 ft

Survey Notes: Some rock missing





Structure No. 591.15 (RM 545.15)

No Repair

Site Information

Survey Location: Upper Kansas Bend

Structure Type: Chevron

Bank: Right

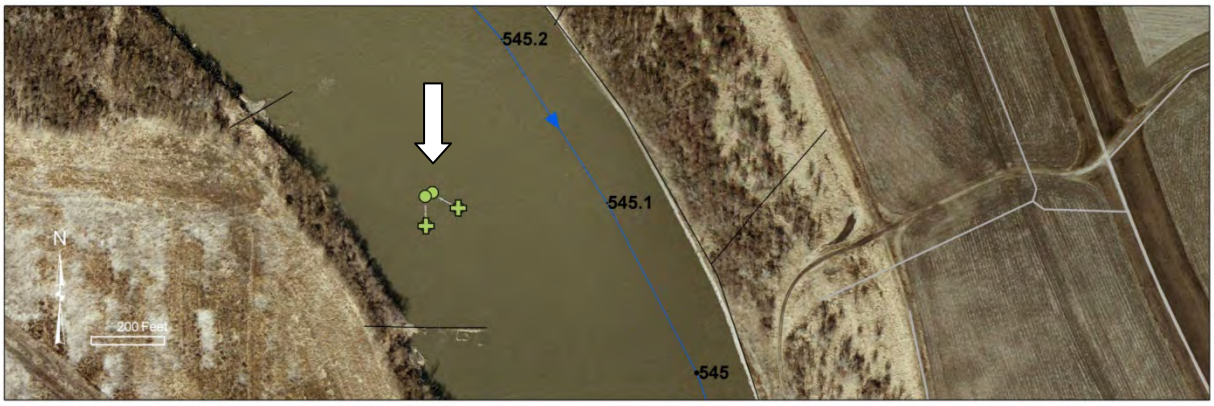
Survey Data

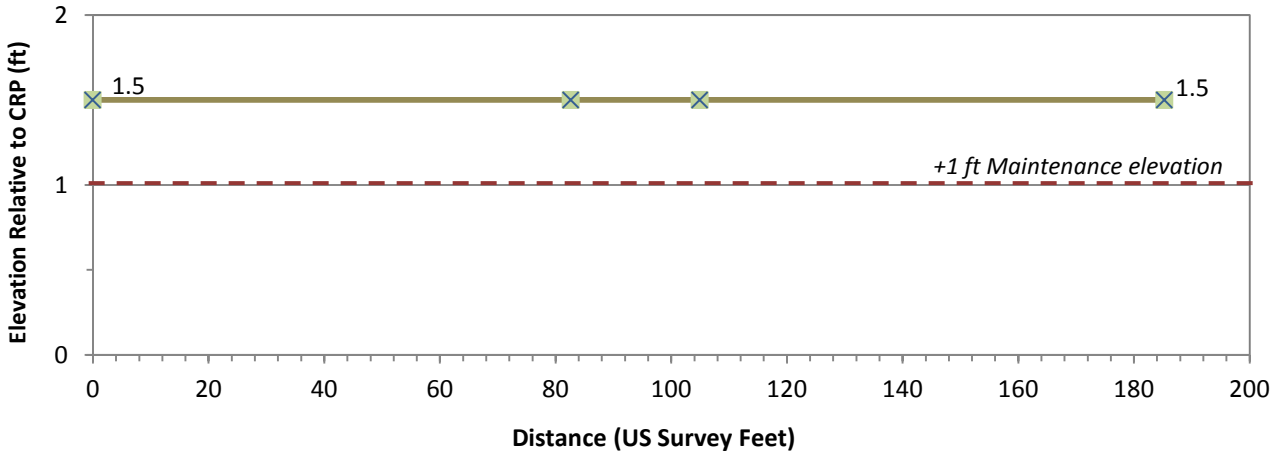
Stage Relative to CRP: +1 ft

Length of Deficiency: N/A

Avg. Height of Deficient: N/A

Average Crown Width: 6 ft





Structure No. 589.1 (RM 542.82 to 542.77)

Critical Repair

Site Information

Survey Location: Nishnabotna Bend

Structure Type: Revetment

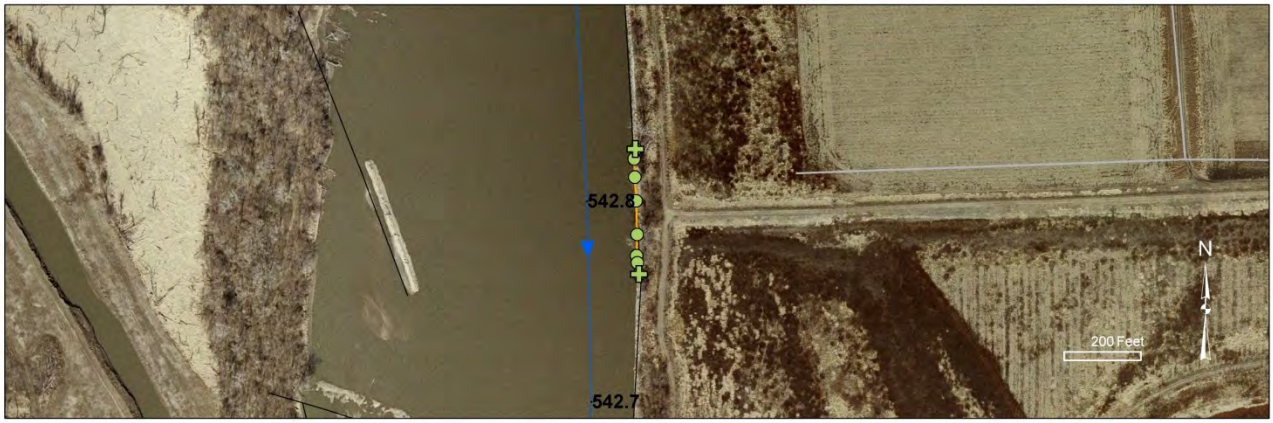
Bank: Left

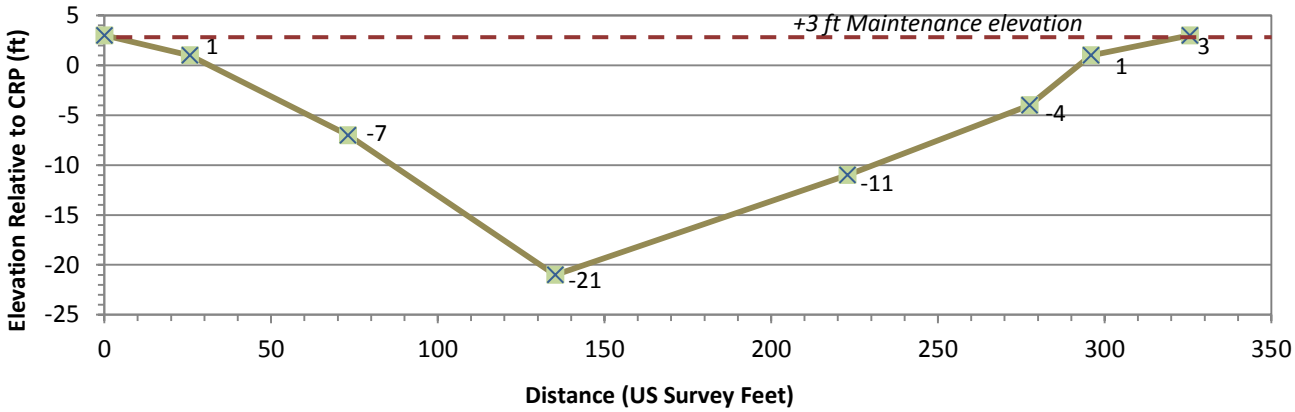
Survey Data

Stage Relative to CRP: +1 ft

Length of Deficiency: 326 ft

Avg. Height of Deficiency: 11 ft





Structure No. 587.15 (RM 541.68 to 541.51)

Low Priority Repair

Site Information

Survey Location: Peru Bend

Structure Type: Revetment

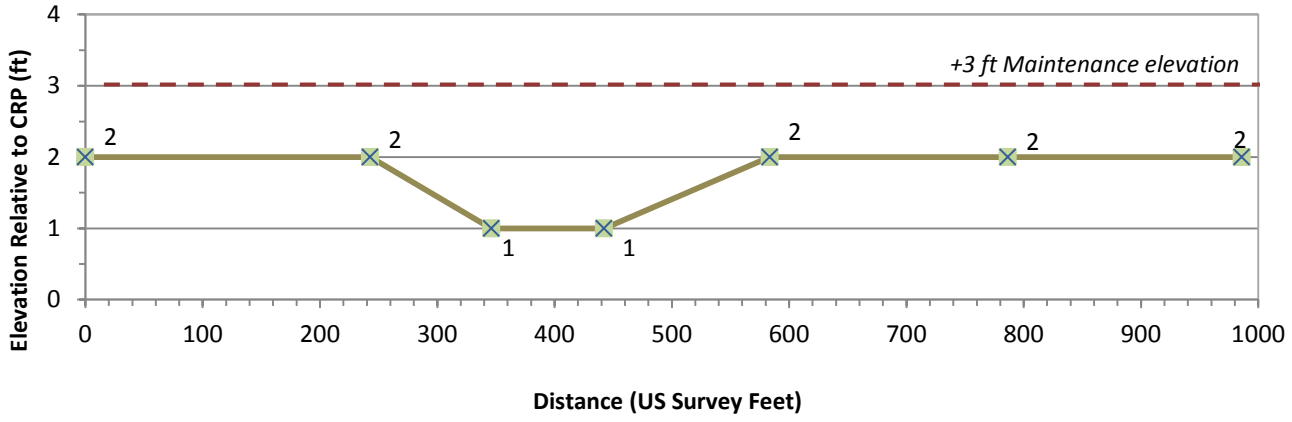
Bank: Right

Survey Data

Stage Relative to CRP: +1 ft

Length of Deficiency: 986 ft

Avg. Height of Deficiency: 1.2 ft



Structure No. 584.6 (RM 540.02 to 539.76)

Critical Repair

Site Information

Survey Location: Upper Sonora Bend

Structure Type: Kicker

Bank: Right

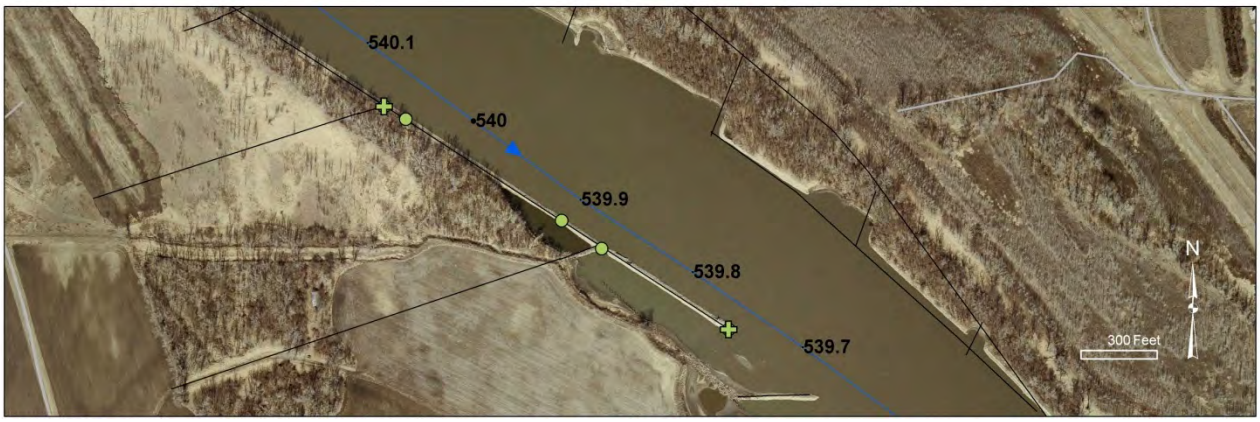
Survey Data

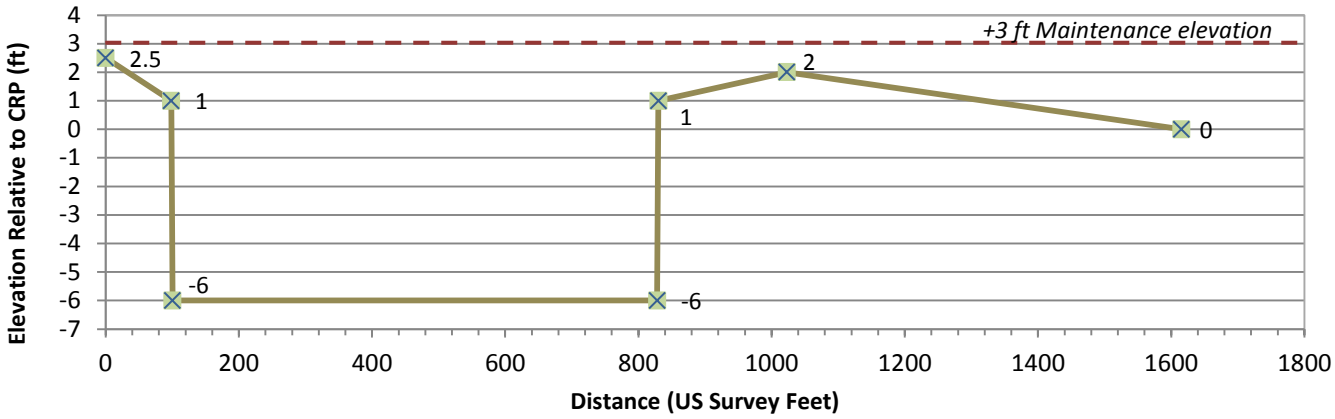
Stage Relative to CRP: +1 ft

Length of Deficiency: 1615 ft

Avg. Height of Deficiency: 5.1 ft

Survey Notes: Average crown width could not be determined due to the depth of the water.





Structure No. 584.3 (RM 539.37 to 539.14)

Critical Repair

Site Information

Survey Location: Upper Sonora Bend

Structure Type: Revetment

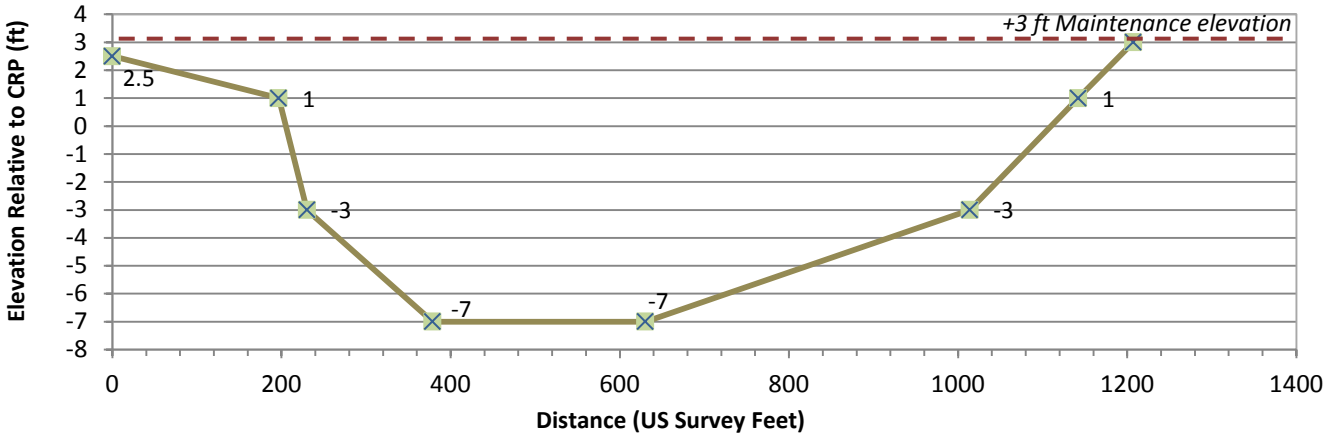
Bank: Left

Survey Data

Stage Relative to CRP: +1 ft

Length of Deficiency: 1207 ft

Avg. Height of Deficiency: 6.4 ft



Structure No. 579.81 (RM 537.40)

High Priority Repair

Site Information

Survey Location: Lower Sonora Bend

Structure Type: L-head

Bank: Left

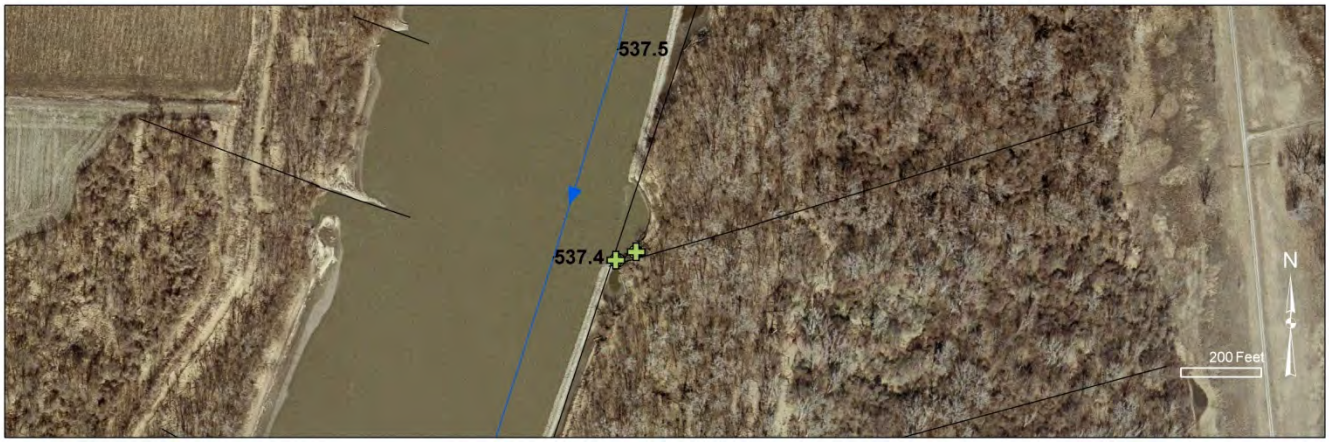
Survey Data

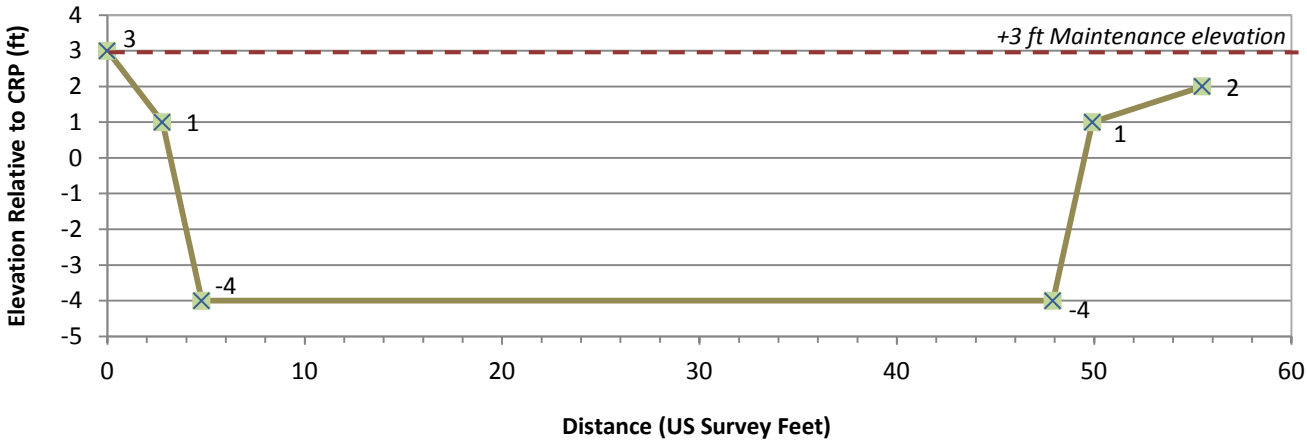
Stage Relative to CRP: +1 ft

Length of Deficiency: 55 ft

Avg. Height of Deficiency: 6 ft

Average Crown Width: 6 ft





Structure No. 580.1 (RM 537.27 to 537.24)

High Priority Repair

Site Information

Survey Location: Lower Sonora Bend

Structure Type: L-head

Bank: Left

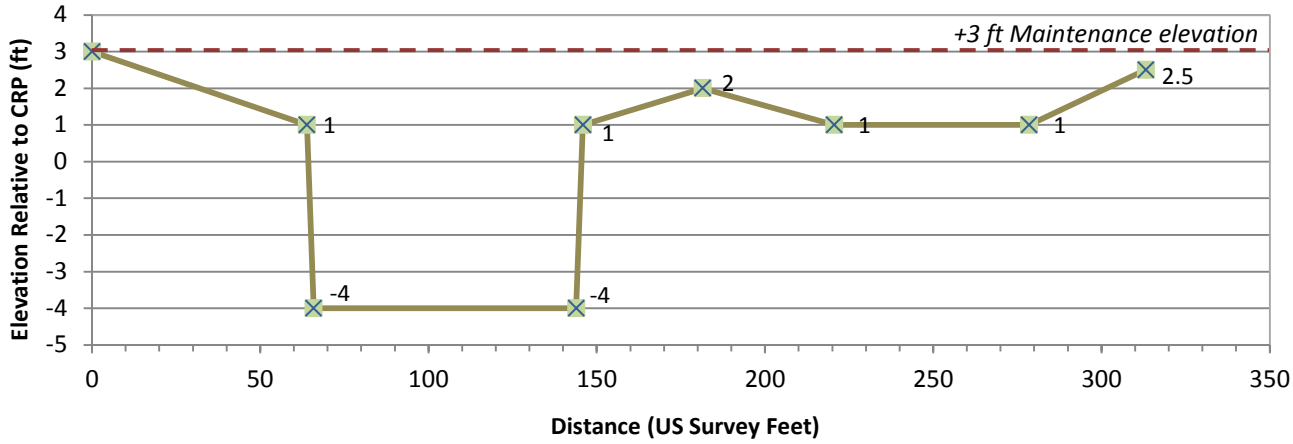
Survey Data

Stage Relative to CRP: +1 ft

Length of Deficiency: 313 ft

Avg. Height of Deficiency: 2.9 ft

Average Crown Width: 6 ft



Structure No. 575.85/575.85-A (RM 533.35 to 532.86)

High Priority Repair

Site Information

Survey Location: Upper Brownville Bend

Structure Type: Revetment

Bank: Right

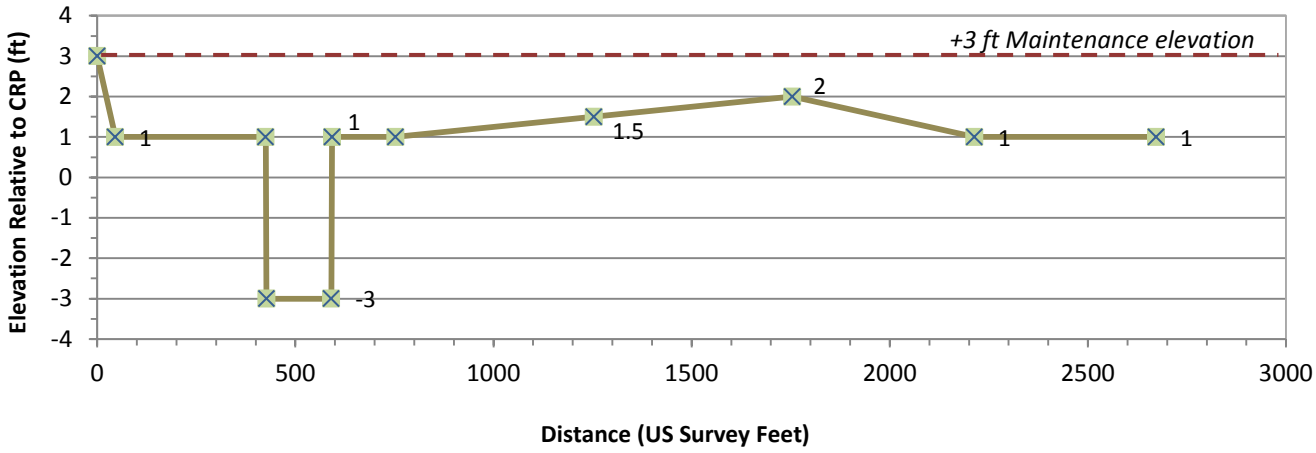
Survey Data

Stage Relative to CRP: +1 ft

Length of Deficiency: 2672 ft

Avg. Height of Deficiency: 2 ft

Average Crown Width: 7 ft



Structure No. 568.1 (RM 526.04 to 525.72)

Critical Repair

Site Information

Survey Location: Aspinwall Bend

Structure Type: L-head

Bank: Right

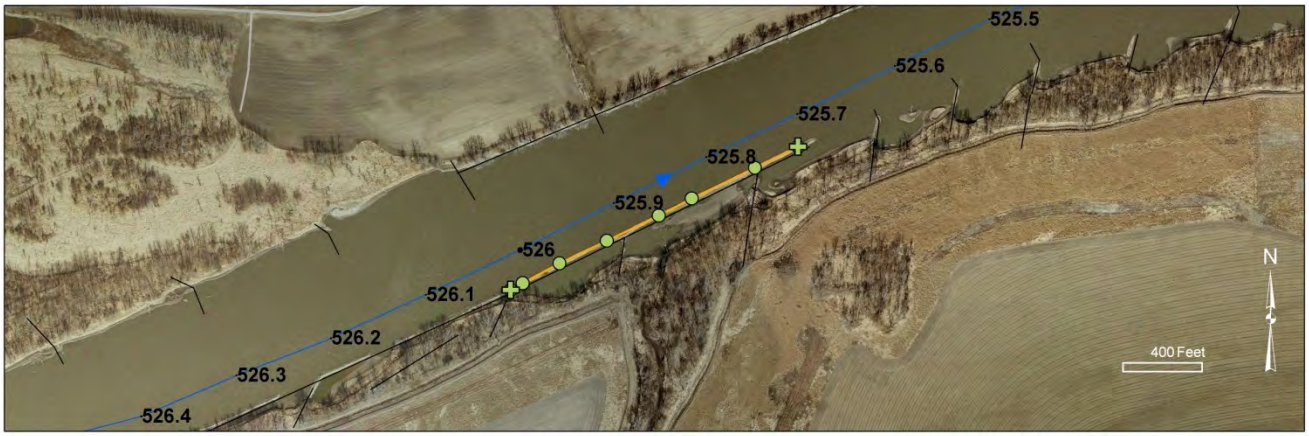
Survey Data

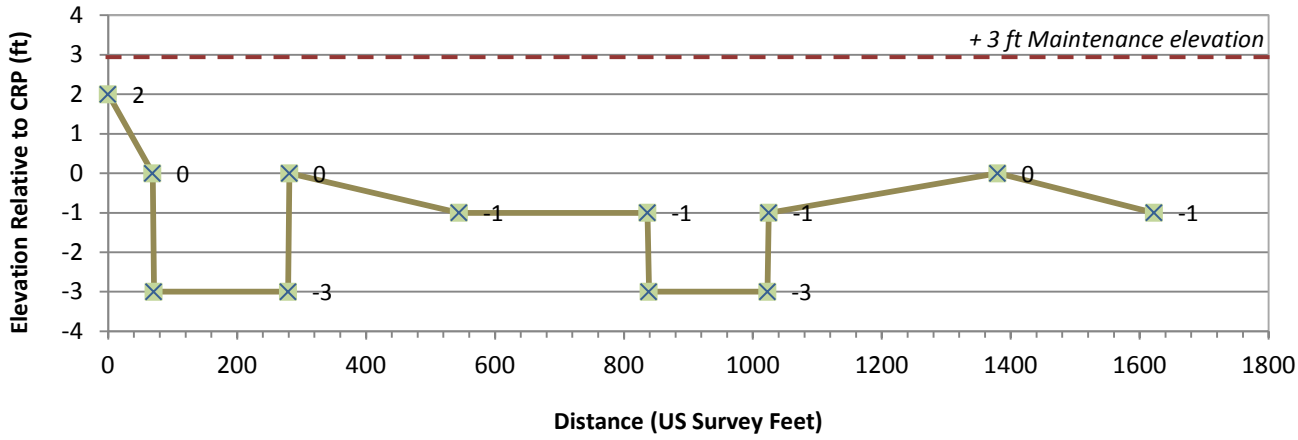
Stage Relative to CRP: 0 ft

Length of Deficiency: 1623 ft

Avg. Height of Deficiency: 4.1 ft

Average Crown Width: 7 ft





Structure No. 565.3 (RM 523.78 to 523.5)

High Priority Repair

Site Information

Survey Location: Lower Morgan Bend

Structure Type: Kicker

Bank: Left

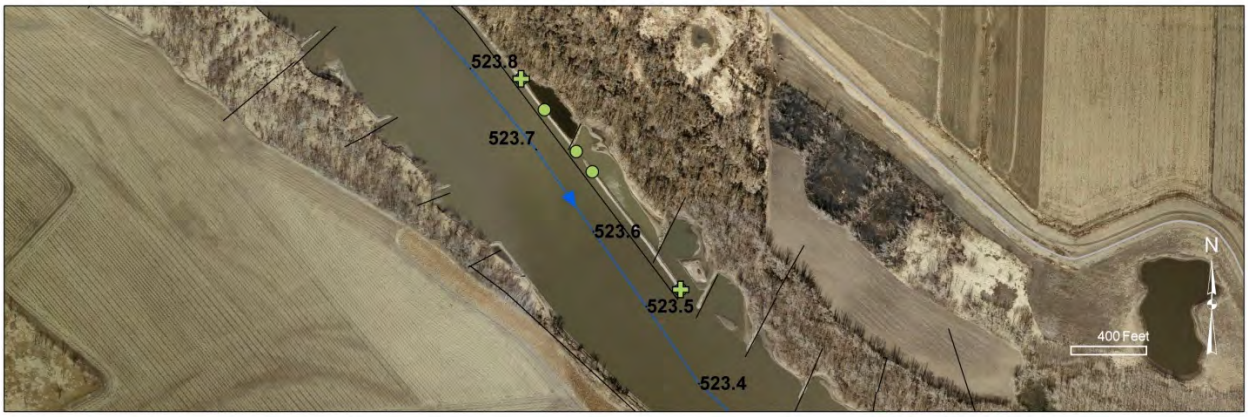
Survey Data

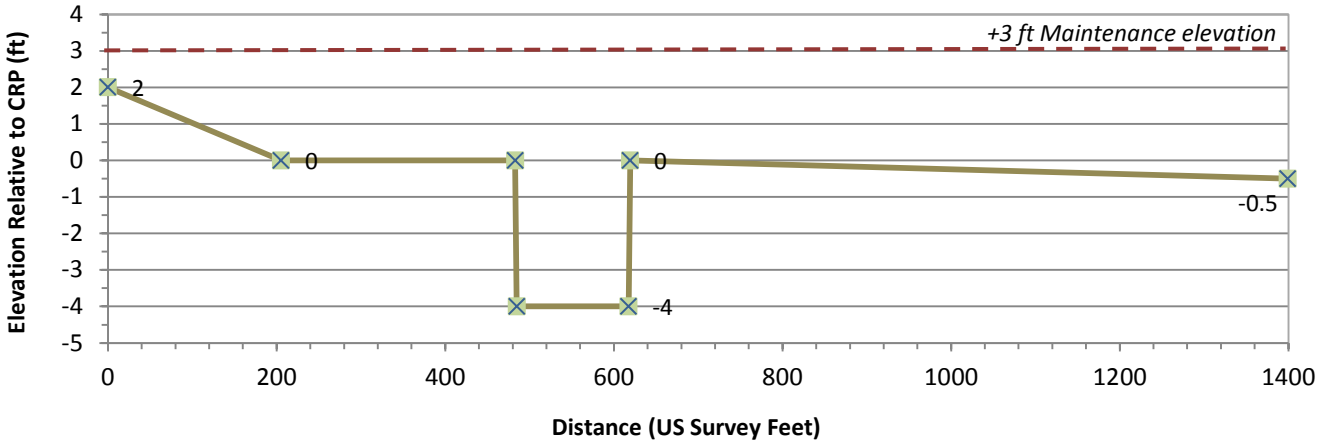
Stage Relative to CRP: 0 ft

Length of Deficiency: 1399 ft

Avg. Height of Deficiency: 3.4 ft

Average Crown Width: 8 ft





Structure No. 565.1/563.15 (RM 522.16 to 522.1)

High Priority Repair

Site Information

Survey Location: Lower Morgan Bend

Structure Type: Revetment / Dike

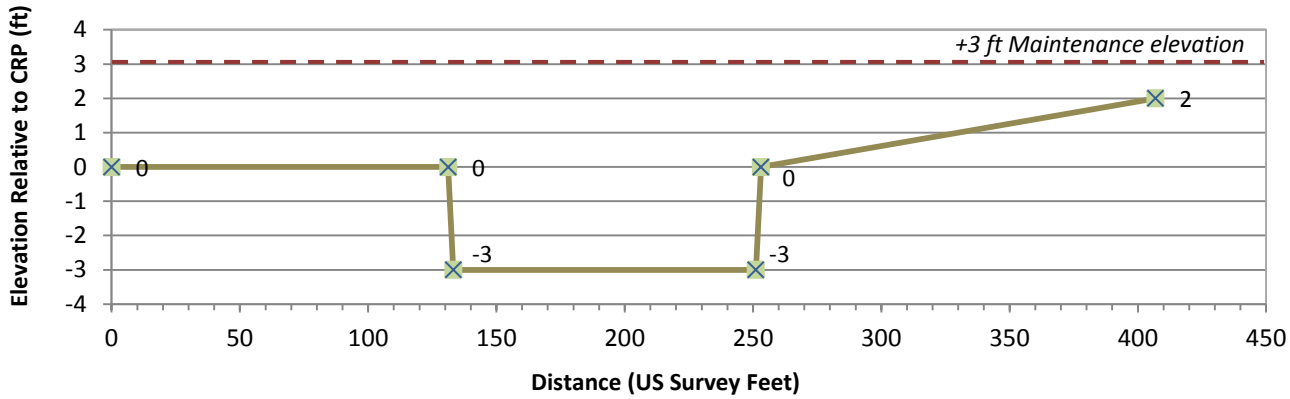
Bank: Left

Survey Data

Stage Relative to CRP: 0 ft

Revetment (565.1):
Length of Deficiency: 276 ft
Avg. Height of Deficiency: 3.5 ft
Average Crown Width: 6 ft

Dike (563.15):
Avg. Height of Deficiency: 1 ft
Length of Deficiency: 131 ft
Average Crown Width: 6 ft



Structure No. 562.1 (RM 520.61 to 520.48)

Critical Repair

Site Information

Survey Location: Lincoln Bend

Structure Type: Revetment

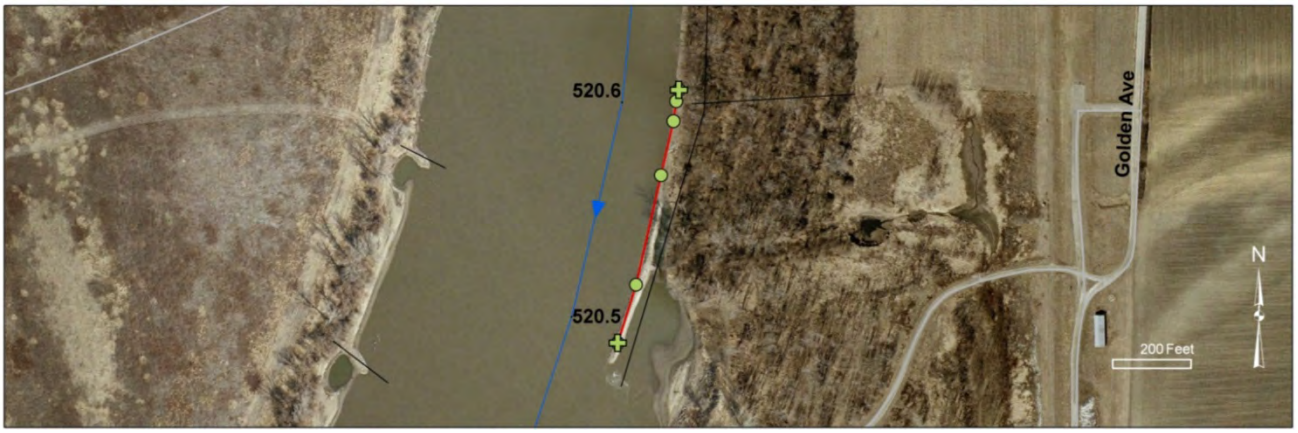
Bank: Left

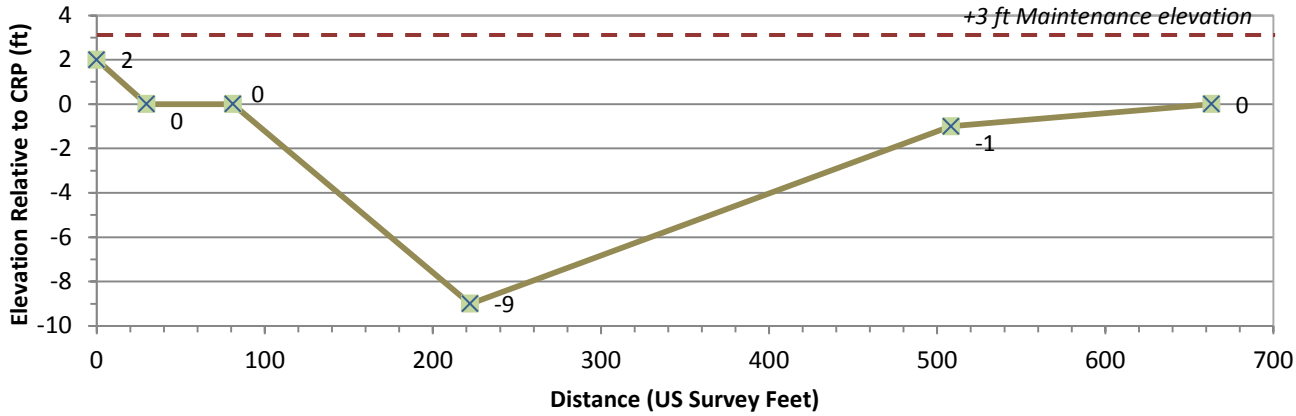
Survey Data

Stage Relative to CRP: 0 ft

Standard Revetment:
Length of Deficiency: 273 ft
Avg. Height of Deficiency: 5.7 ft

Stone-filled Revetment:
Avg. Height of Deficiency: 6.4 ft
Revet. Length of Deficiency: 390 ft
Average Crown Width: Inaccessible





Structure No. 560.7/550.5 (RM 519.05 to 518.9)

High Priority Repair

Site Information

Survey Location: Upper Deroin Reach

Structure Type: L-head

Bank: Right

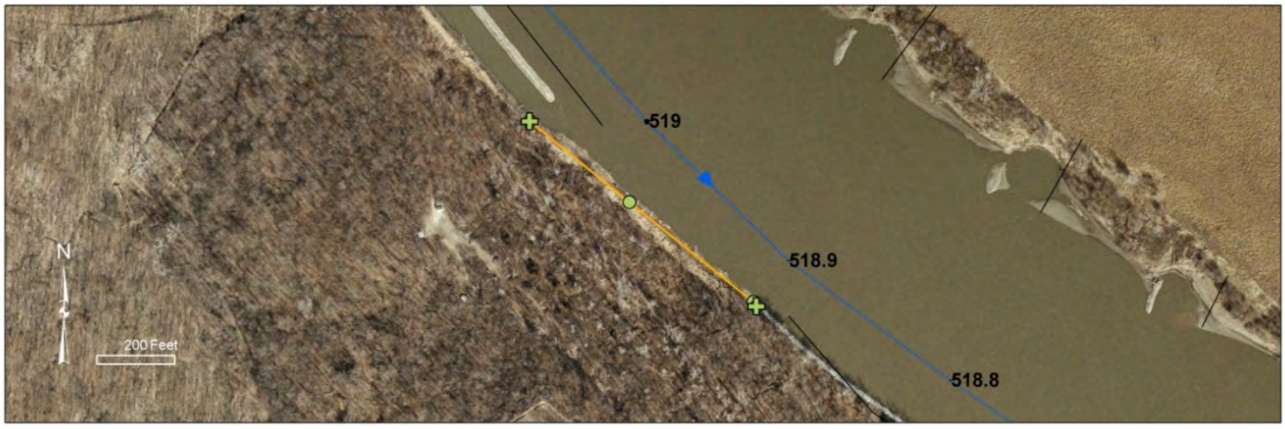
Survey Data

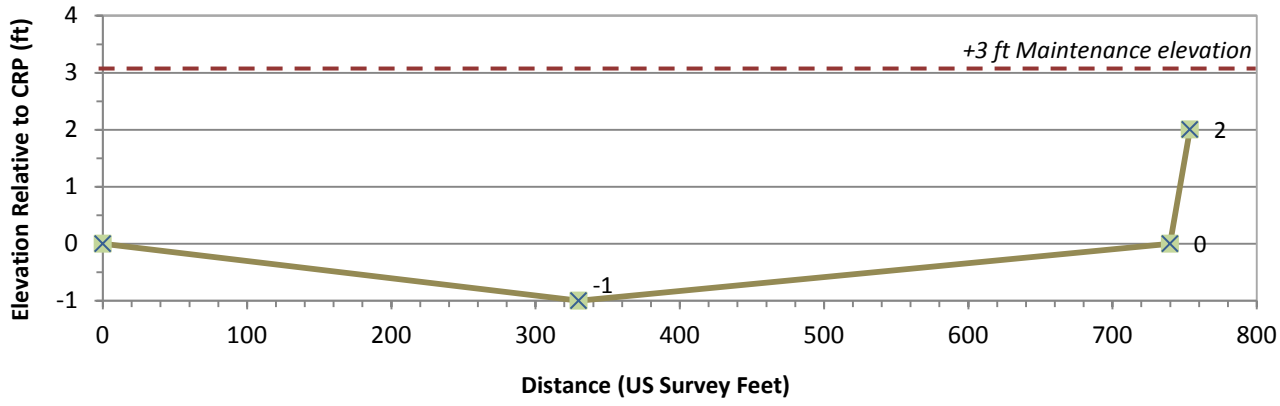
Stage Relative to CRP: 0 ft

Length of Deficiency: 754 ft

Avg. Height of Deficiency: 3.5 ft

Note – Does not look like a structure should be there from the 2006 aerial, and there is no structure number. Applied the closest downstream structure number.





Structure No. 557.7 (RM 515.83)

Medium Priority Repair

Site Information

Survey Location: Hemmies Bend

Structure Type: Dike

Bank: Right

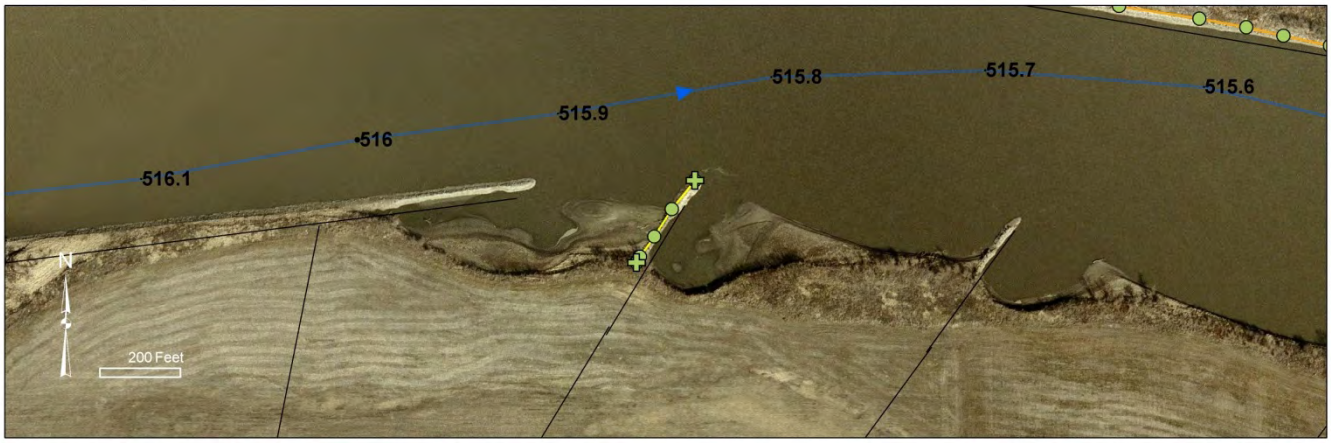
Survey Data

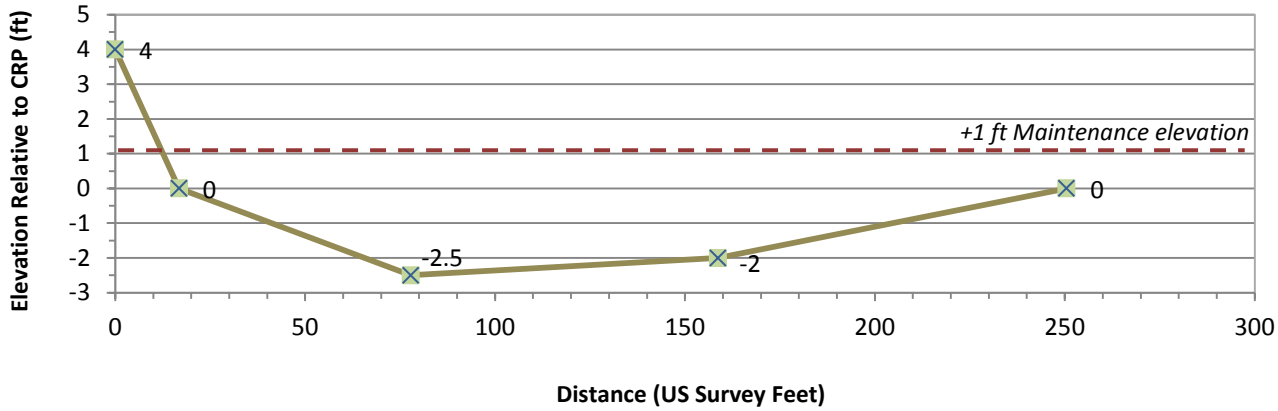
Stage Relative to CRP: 0 ft

Length of Deficiency: 250 ft

Avg. Height of Deficiency: 2.3 ft

Average Crown Width: 6 ft





Structure No. 558.35 (RM 515.73 to 515.49)

High Priority Repair

Site Information

Survey Location: Hemmies Bend

Structure Type: Revetment

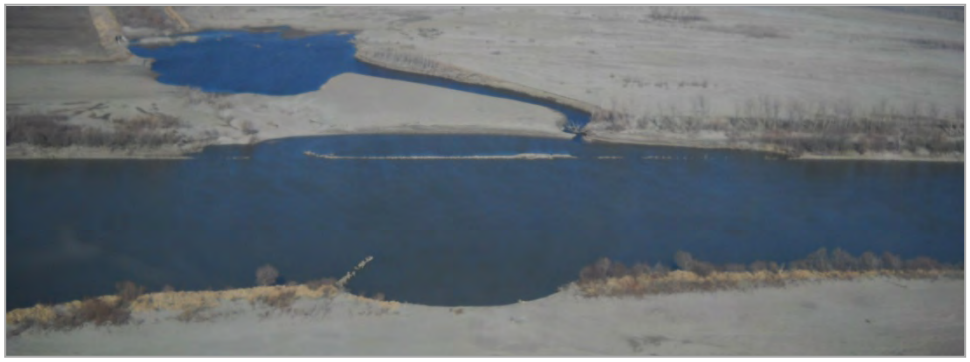
Bank: Left

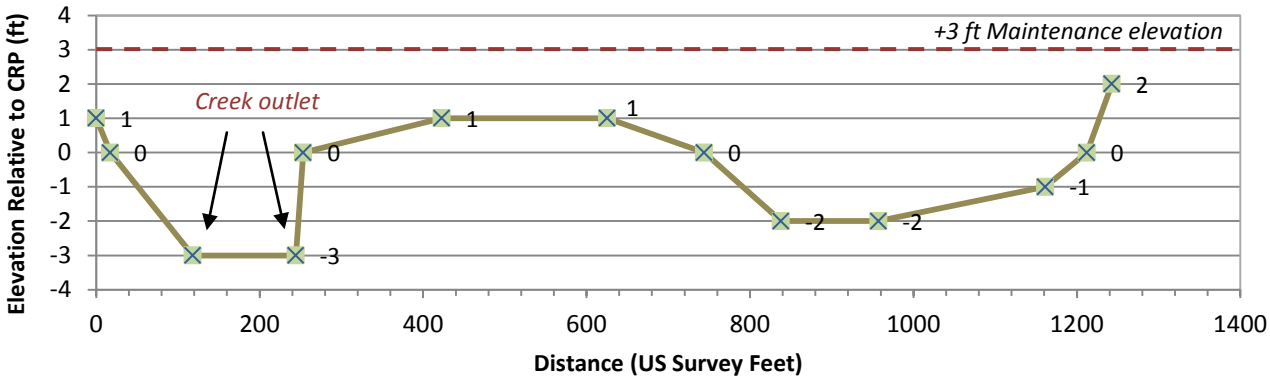
Survey Data

Stage Relative to CRP: 0 ft

Length of Deficiency: 1108 ft

Avg. Height of Deficiency: 3.8 ft





Structure No. 555.62 (RM 513.2 to 513.07)

High Priority Repair

Site Information

Survey Location: Hemmies Bend

Structure Type: Revetment

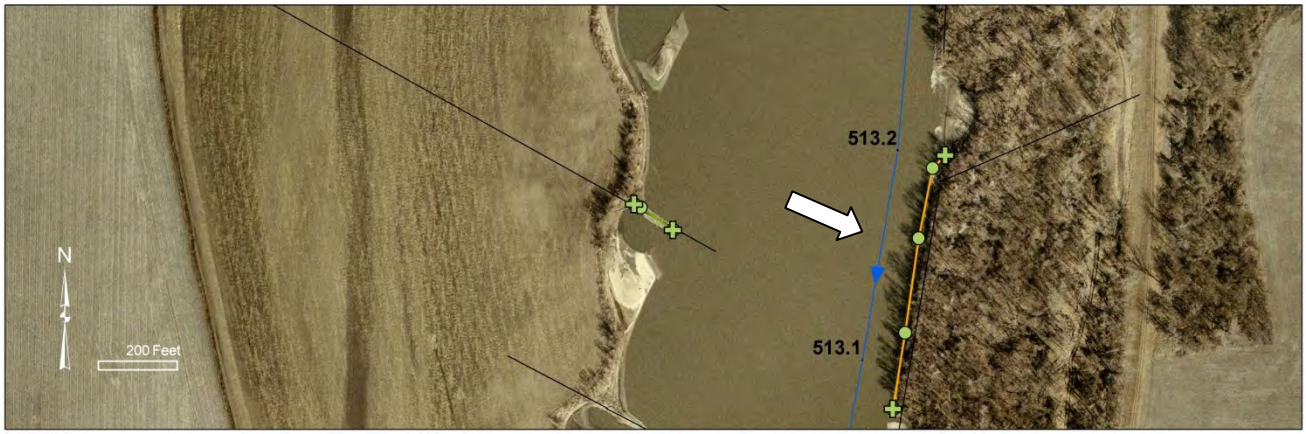
Bank: Left

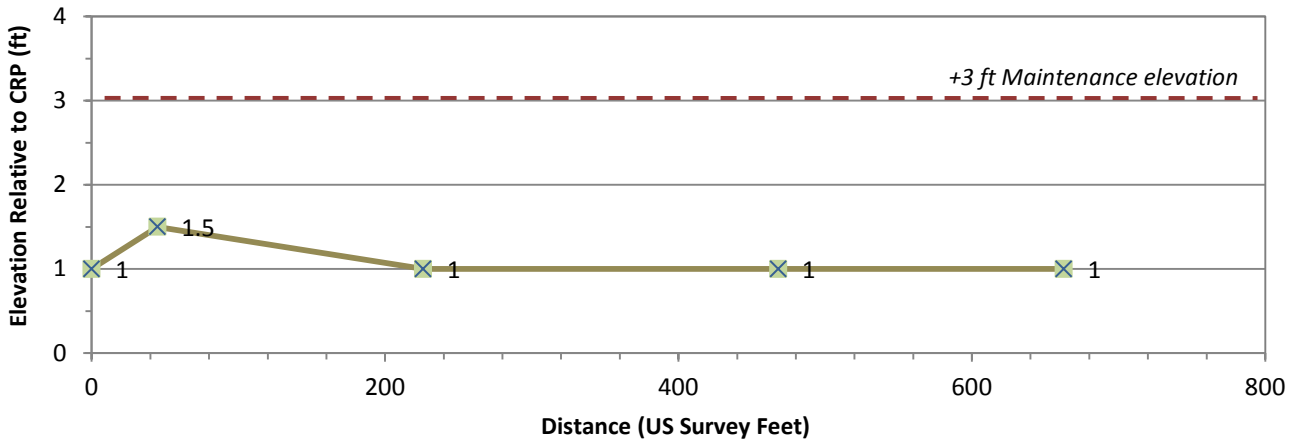
Survey Data

Stage Relative to CRP: 0 ft

Length of Deficiency: 663 ft

Avg. Height of Deficiency: 1.9 ft





Structure No. 554.9 (RM 513.15)

Critical Repair

Site Information

Survey Location: Hemmies Bend

Structure Type: Dike

Bank: Right

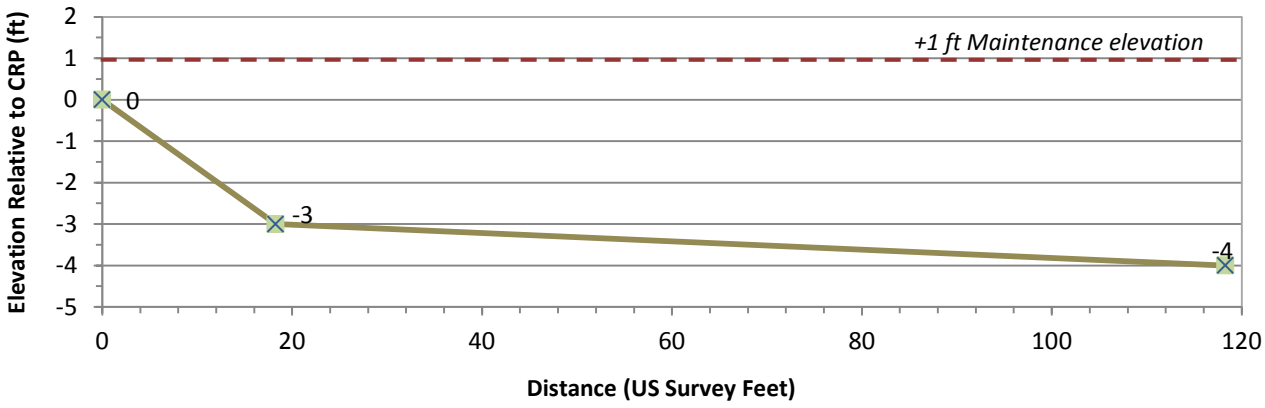
Survey Data

Stage Relative to CRP: 0 ft

Length of Deficiency: 118 ft

Avg. Height of Deficiency: 4.2 ft

Average Crown Width: Inaccessible



Structure No. 555.62 (RM 513 to 512.93)

High Priority Repair

Site Information

Survey Location: Hemmies Bend

Structure Type: Revetment

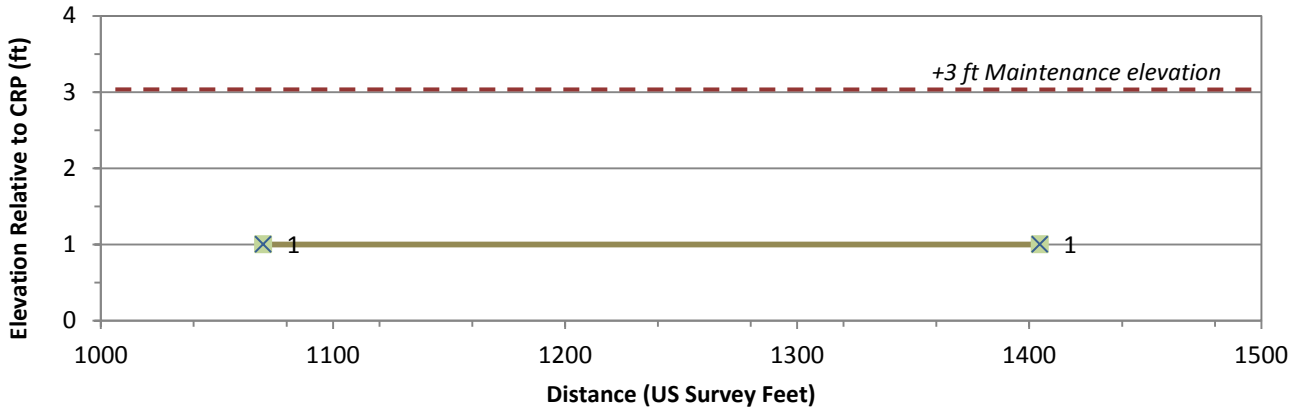
Bank: Right

Survey Data

Stage Relative to CRP: 0 ft

Length of Deficiency: 335 ft

Avg. Height of Deficiency: 2 ft



Structure No. 551.45 (RM 510.57)

Low Priority Repair

Site Information

Survey Location: Upper Cottier Bend

Structure Type: Dike

Bank: Left

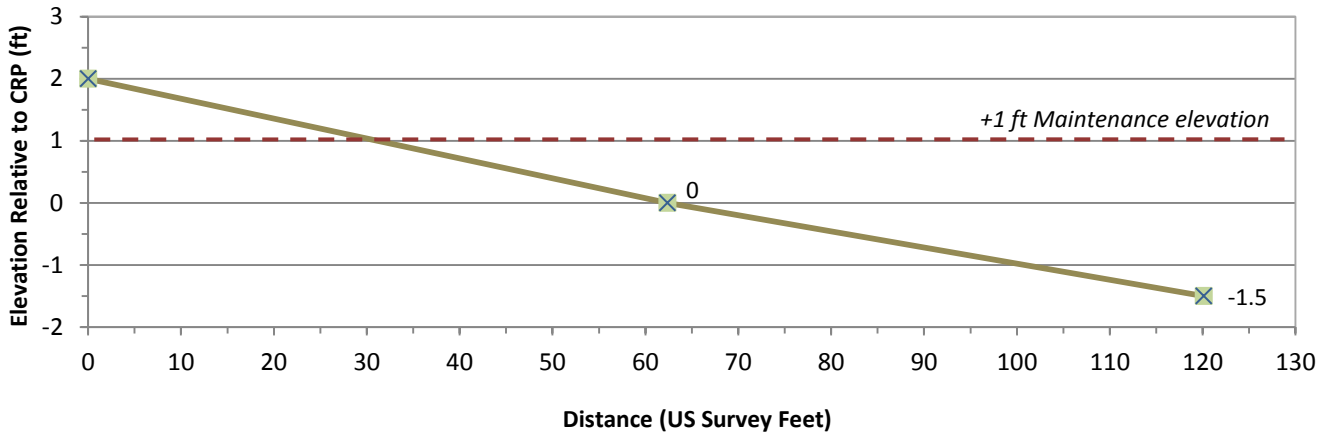
Survey Data

Stage Relative to CRP: 0 ft

Length of Deficiency: 90 ft

Avg. Height of Deficiency: 1.5 ft

Average Crown Width: 6 ft



Structure No. 547.78 (RM 507.12 to 506.87)

High Priority Repair

Site Information

Survey Location: Lower Cottier Bend

Structure Type: Revetment

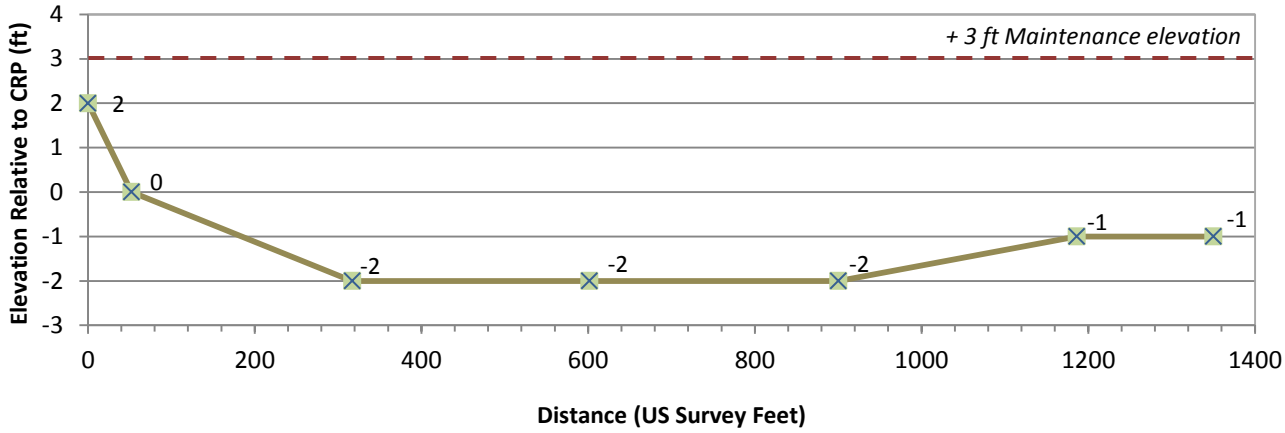
Bank: Left

Survey Data

Stage Relative to CRP: 0 ft

Length of Deficiency: 1350 ft

Avg. Height of Deficiency: 4.5 ft



Structure No. 546.5 (RM 505.88 to 505.77)

Critical Repair

Site Information

Survey Location: Upper Arago Bend

Structure Type: Revetment

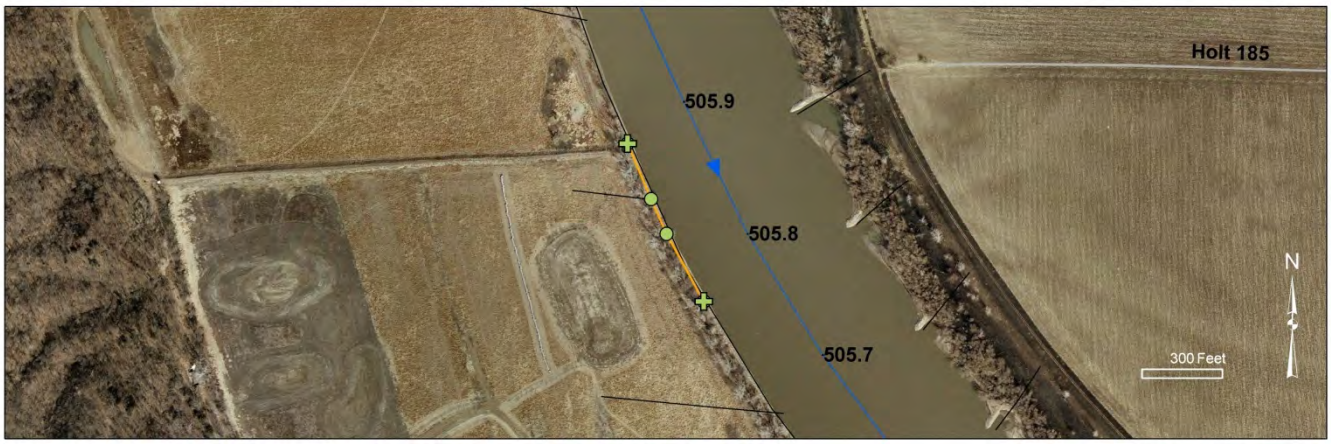
Bank: Right

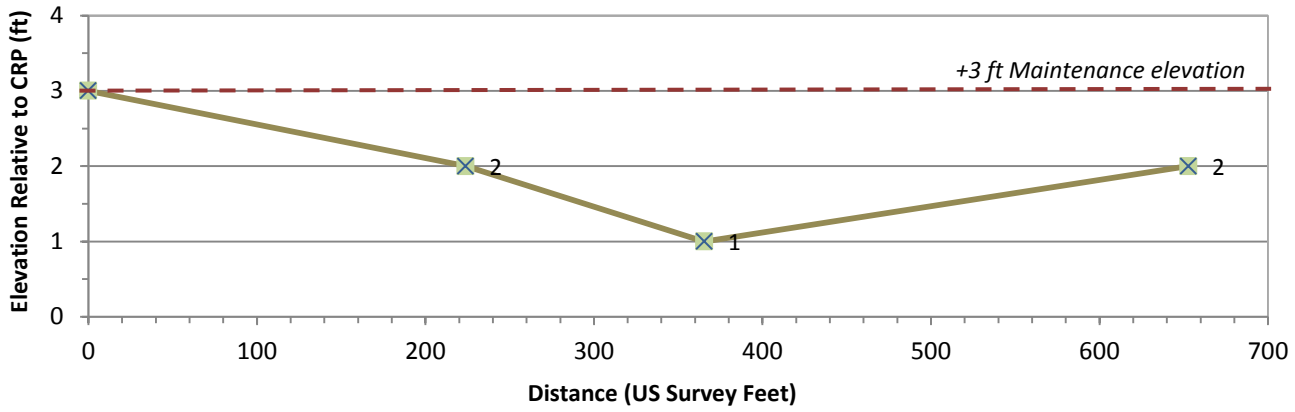
Survey Data

Stage Relative to CRP: 0 ft

Length of Deficiency: 653 ft

Avg. Height of Deficiency: 1.2 ft





Structure No. 545.1 (RM 504.08 to 504.04)

High Priority Repair

Site Information

Survey Location: Arago Bend

Structure Type: Revetment

Bank: Left

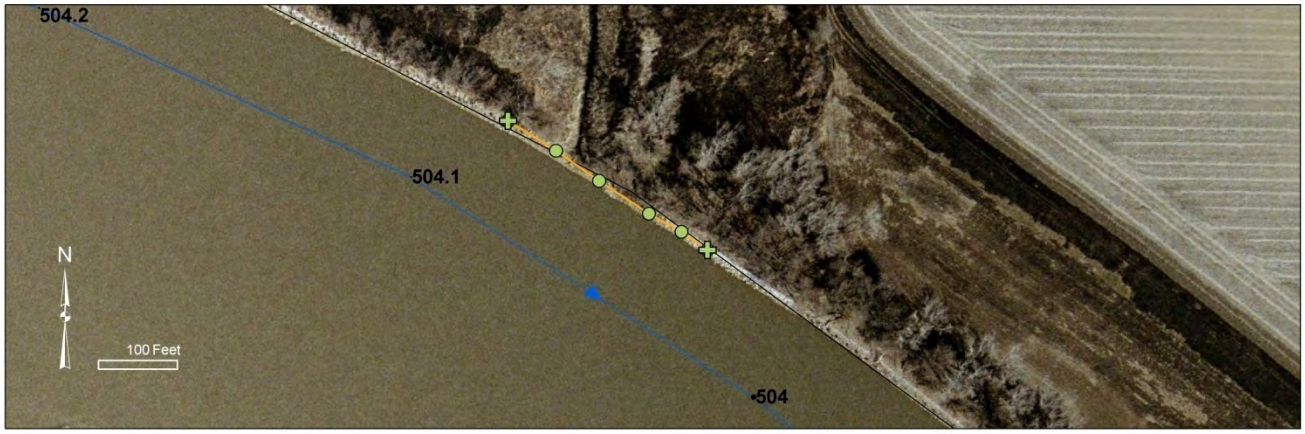
Survey Data

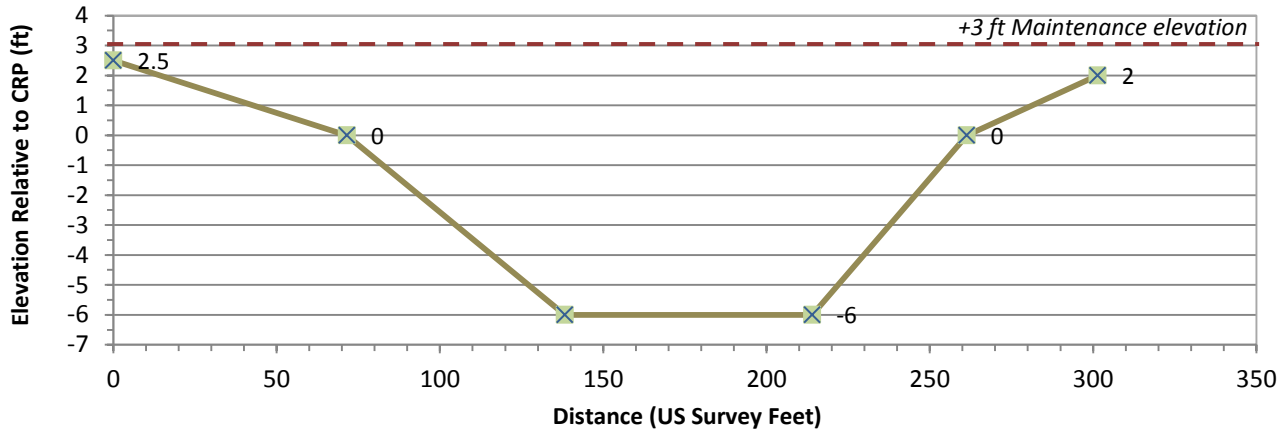
Stage Relative to CRP: 0 ft

Length of Deficiency: 301 ft

Avg. Height of Deficiency: 5.2 ft

Average Crown Width: 8 ft





ATTACHMENT E

QUALITY CONTROL REPORT

QUALITY CONTROL REPORT AND CERTIFICATION

Missouri River Post Flood Inspection and Assessment

Contract No. W9128F-09-0002
Task Order No. 17

Prepared for

U.S. Army Corps of Engineers
Omaha District

2 May 2012

Prepared by:

WEST CONSULTANTS, INC.
11440 W. Bernardo Court, Suite 360
San Diego, CA 92127
(858) 487-9378

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QUALITY CONTROL REPORT

Missouri River Post Flood Inspection and Assessment
Proposed Task Order No. 17

I. INTRODUCTION

A. Name of Project

Missouri River Post Flood Inspection and Assessment

B. Consultant

This project is being performed by WEST Consultants, Inc., San Diego, California (Architect-Engineer or A-E), for the U.S. Army Corps of Engineers, Omaha District. Eisenbraun & Associates is the survey subconsultant to WEST Consultants.

C. Members of Development Team and Areas of Expertise

<u>WEST Consultants, Inc.</u>

Martin J. Teal, P.E., P.H., D.WRE
Principal-in-Charge, Field Inspection Team Leader
Areas of Expertise: River Engineering, development and application of hydraulic and sediment models, providing training in hydraulic, hydrologic, and sediment transport modeling and analysis, review of technical reports, and quality assurance concepts.

Jake Gusman, P.E., D.WRE
Task Order Manager
Areas of Expertise: Development and application of hydraulic models, hydrologic model development, sediment and scour analysis, sediment/debris yield, and floodplain management.

Vicki Tripolitis
Hydraulic Engineer, Field Inspection Team
Areas of Expertise: Stream restoration design, stream stability, hydraulic modeling, sediment analysis, erosion control, and stormwater management.

Kurt Baron, GISP
GIS Specialist
Areas of Expertise: Development of hydrologic and hydraulic models, Geographic Information Systems (GIS)

Sam Powvall
GIS Technician
Areas of Expertise: Geographic Information Systems (GIS)

D. Members of Independent Technical Review Team and Areas of Expertise

WEST Consultants, Inc.

Martin J. Teal, P.E., P.H., D.WRE
Quality Assurance Manager
Areas of Expertise: River Engineering, development and application of hydraulic and sediment models, providing training in hydraulic, hydrologic, and sediment transport modeling and analysis, review of technical reports, and quality assurance concepts.

E. Summary of Engineers and Reviewers by Task

Provided in the table below is a summary of the hydraulic engineers and the independent review for each of the major study tasks.

Study Task	Hydraulic Engineers/Survey Team	WEST Reviewer	Review Completion Date*
Inspection Brief	Jake Gusman, P.E. Vicki Tripolitis	Martin Teal, P.E., P.H.	09 Feb 2012
Interim Report	Jake Gusman, P.E. Vicki Tripolitis	Martin Teal, P.E., P.H.	27 Feb 2012
Survey of Critical Repair Areas	Eisenbraun & Associates	Jake Gusman, P.E. Vicki Tripolitis	5 April 2012
Draft Report	Jake Gusman, P.E. Vicki Tripolitis	Martin Teal, P.E., P.H.	16 April 2012
Final Report	Jake Gusman, P.E. Vicki Tripolitis	Martin Teal, P.E., P.H.	2 May 2012

* Includes major review dates; supervisory and other in-progress reviews are not listed.

II. QUALITY CONTROL CERTIFICATION

The products included with this deliverable were completed and reviewed in accordance with our Company's Quality Control Plan that is on file with the Omaha District's Project Manager. All applicable design checks, interdisciplinary checks and quality control reviews have been completed by the designated designers and reviewers as stated in the Quality Control Plan. Our company believes this product is in compliance with all applicable criteria and the stated scope of work. Incomplete work will be added to this product at no additional cost to the government.

Martin J. Teal, P.E., P.H.
Principal-in-Charge
Quality Assurance Manager

Jake Gusman, P.E.
Task Order Manager

Certification Date: 2 May 2012

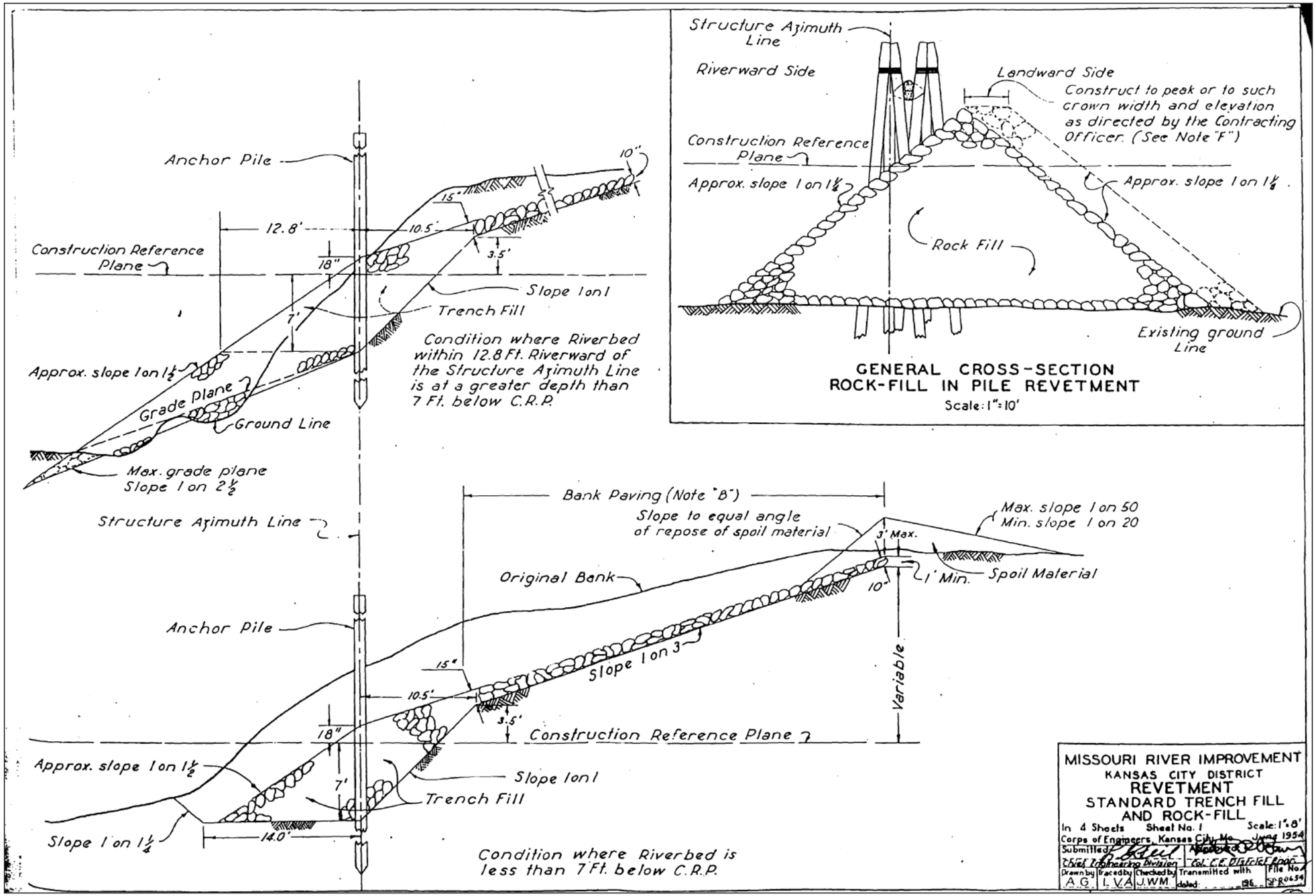

Figure 2-2. Revetment – Standard Trench Fill and Rock Fill

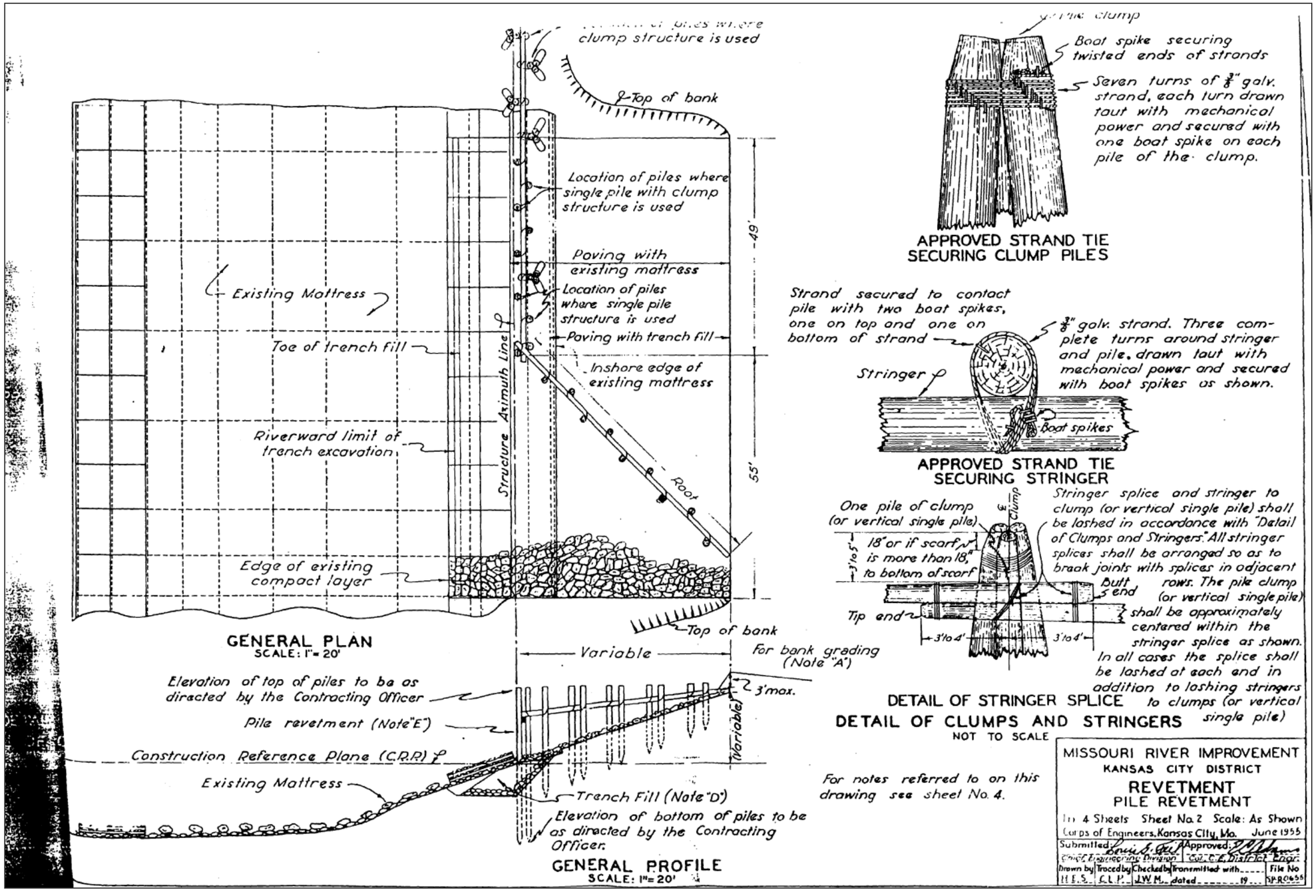

Figure 2-7. Pile Revetment

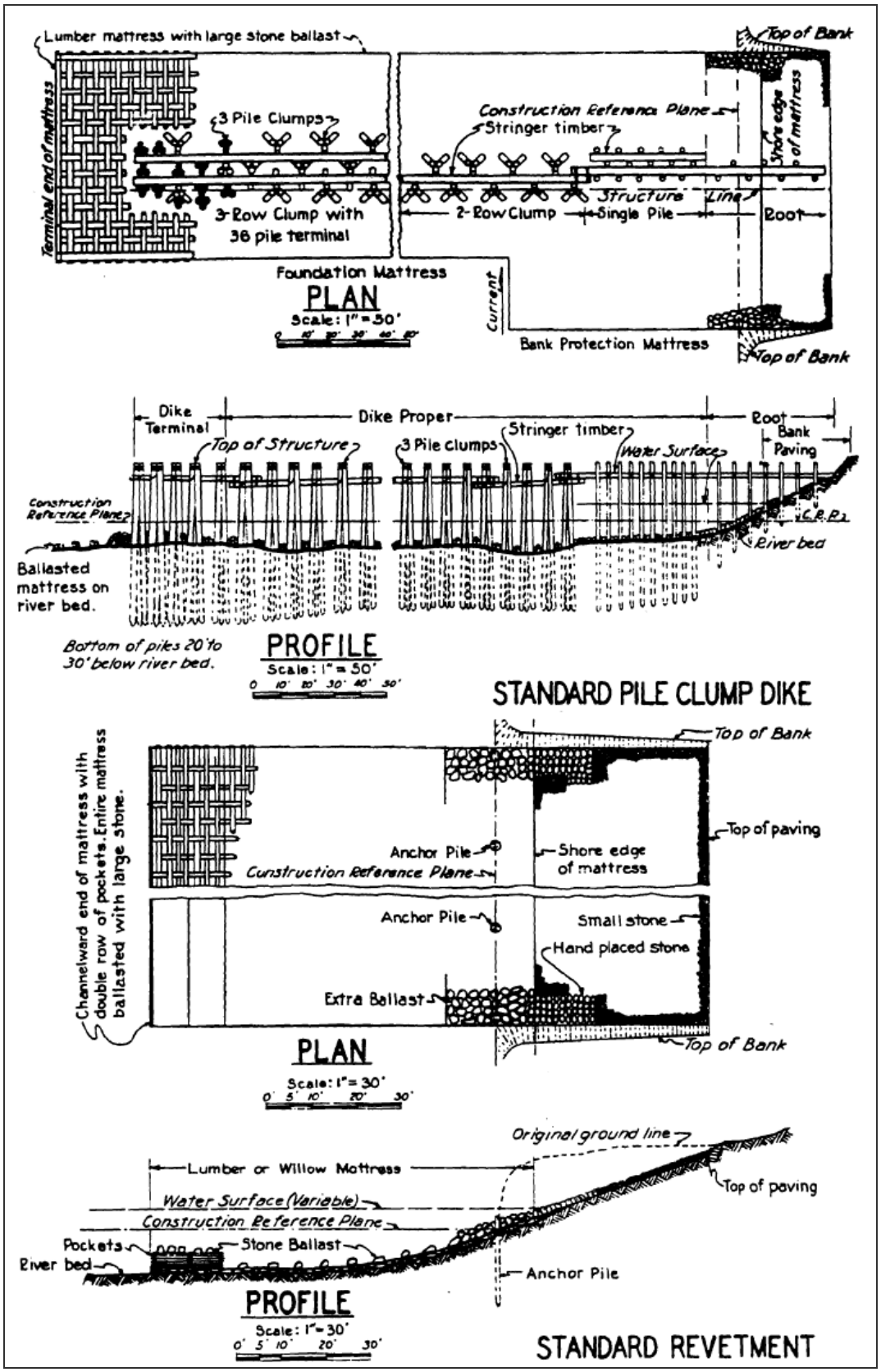

Figure 2-8. Standard Revetment

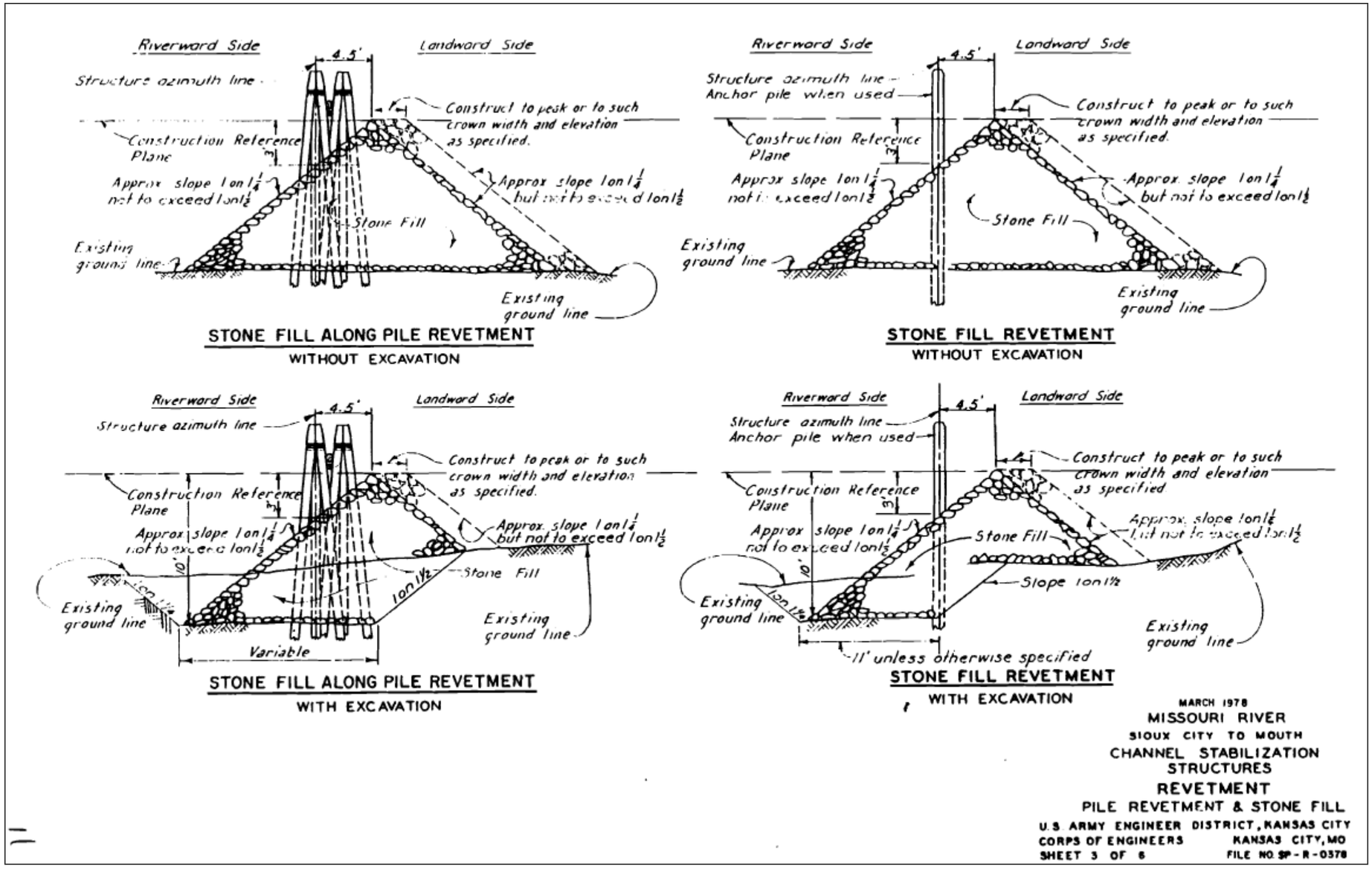

Figure 2-11. Pile Revetment & Stone Fill (Missouri River Sioux City to Mouth: Sheet 3 of 6)

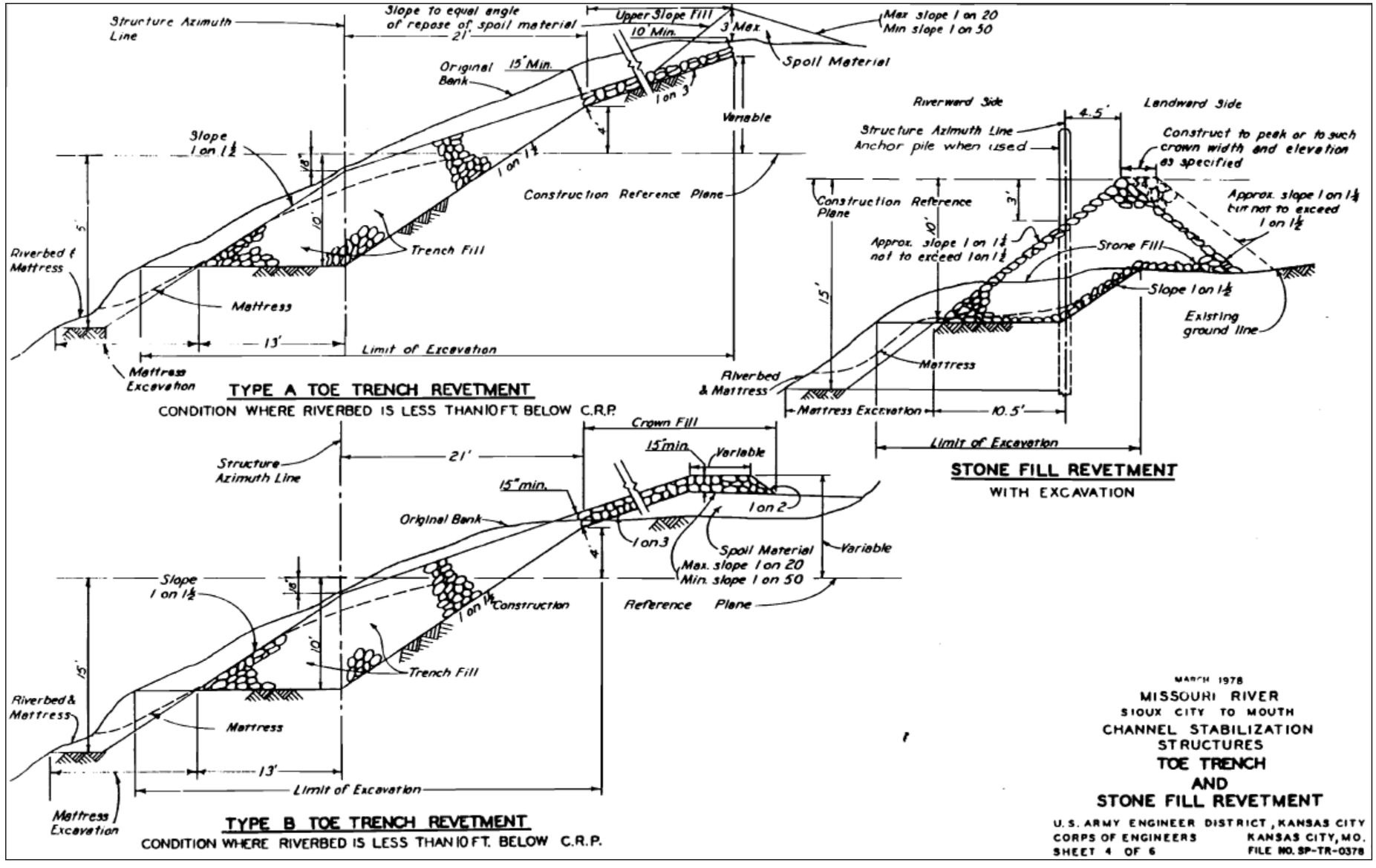

Figure 2-12. Toe Trench and Stone Fill Revetment (Missouri River Sioux City to Mouth: Sheet 4 of 6)

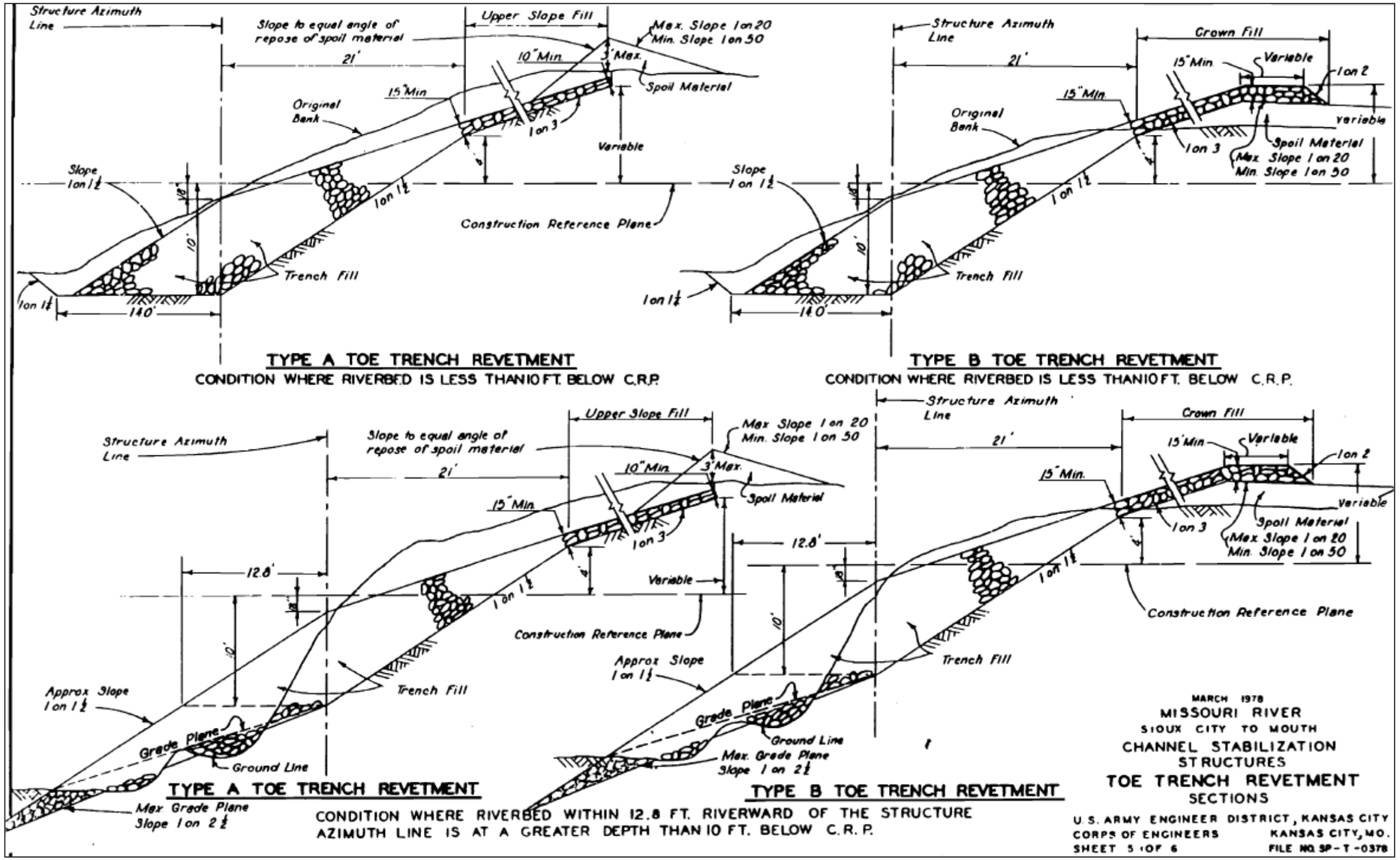

Figure 2-13. Toe Trench Revetment Sections (Missouri River Sioux City to Mouth: Sheet 5 of 6)

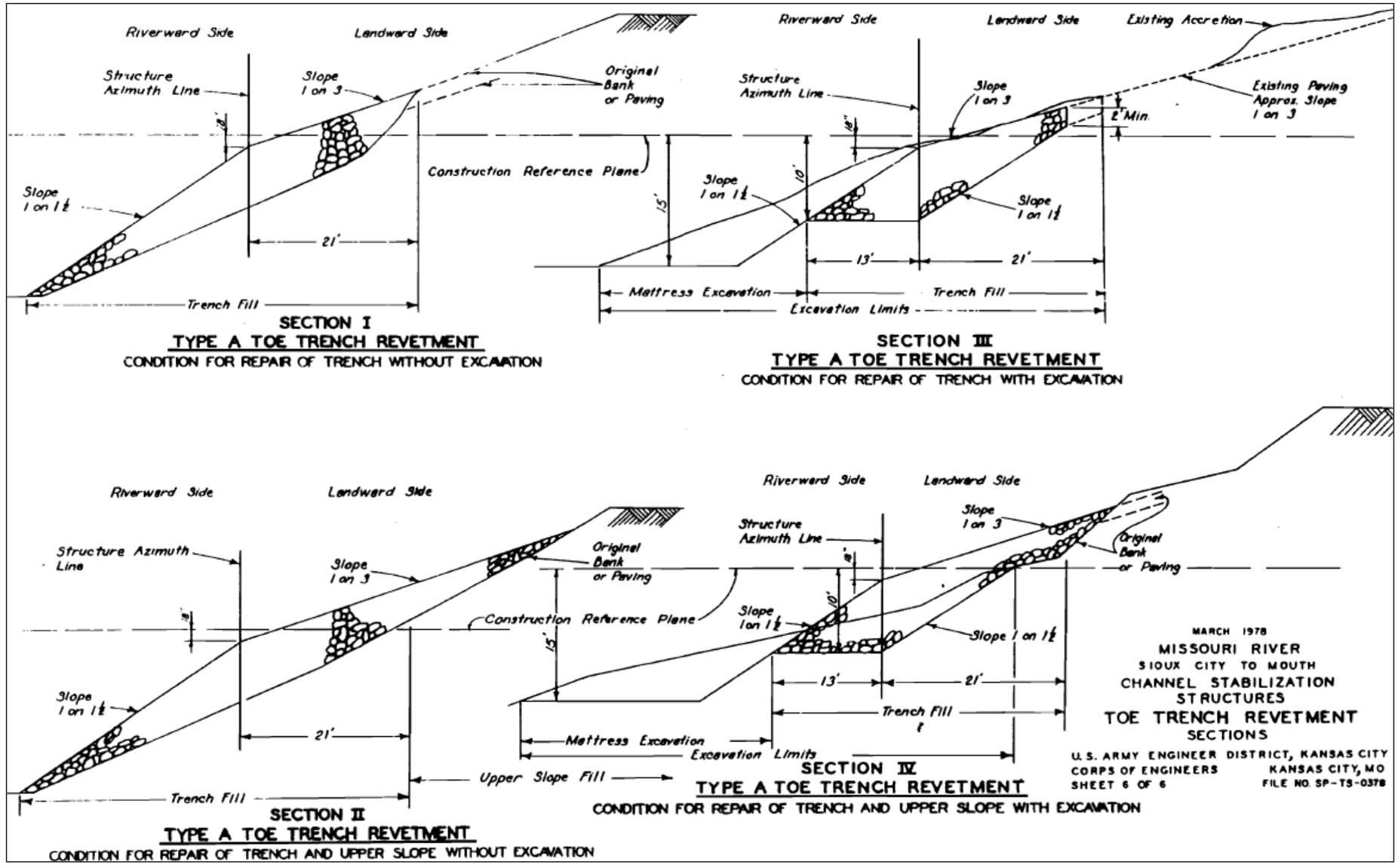

Figure 2-14. Toe Trench Revetment Sections – Type A (Missouri River Sioux City to Mouth: Sheet 6 of 6)

TECHNICAL MEMORANDUM

Missouri River Wastewater Treatment Plant Wetland Delineation Report - DRAFT

TO: Pat Nelson- PMT Compliance Team Lead

FROM: Ben Fisher- PMT

Amy Hammontree- PMT

DATE: November 2014

Introduction and Background

On behalf of the City of Omaha, Nebraska (the City), members of the Combined Sewer Overflow (CSO) Program Management Team (PMT) performed wetland delineations near the Missouri River Wastewater Treatment Plant (MRWWTP) (Figure 1 – Project Location) in late 2014 to supplement the wetland delineation completed on October 2012, and to support permitting efforts for future site development. The Study Area for the supplemental wetland delineations was defined to the north by the southern boundary of the parking/staging area, to the south by an existing fence line, and to the east by the Missouri River. To the west, the Study area boundary was generally defined by the existing silt fence construction boundary. North of Sample Point S-14, the silt fence boundary extended west of areas already delineated and permitted for wetland impacts in 2012. Therefore the western Study Area boundary from this point north was defined by the eastern edge of the original 2012 wetland delineation boundary (Figure 2 – Aquatic Resources).

Wetland Delineation Methodology

Members of the PMT conducted aquatic resource delineations (including wetlands and streams) at the MRWWTP (Project area) on September 12, 2014. The Project area was revisited on October 16, 2014 by members of the PMT to address additional resource areas and to confirm the boundaries of wetlands by providing additional sample points. Both aquatic resource delineations were conducted in accordance with the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Environmental Laboratory, August 2010).

Prior to field delineations, a desktop survey was conducted using National Wetlands Inventory (NWI) maps, U.S. Department of Agriculture Natural Resources Conservation Service (USDA NRCS) hydric soils coverage, the National Hydrography Dataset (NHD), and USDA NRCS color aerial photographs to identify possible waters of the U.S. and areas historically prone to wetland development.

Based on field observations, a “Wetland Determination Data Form – Midwest Region” was completed for each sample point. These forms are presented in Appendix A. The 2014 National Wetland Plant List (Midwest Region) (Lichvar et al., 2014) was used to determine wetland indicator status of vegetation noted in the Wetland Determination Data Forms. Sample points and wetland boundaries were mapped in the field using global positioning system (GPS) technology and were classified according to Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al., December 1979) and Nebraska Wetland Subclass. Potential waterways were also

identified and are summarized in this report. Lastly, photographs of each sample point were taken to document existing conditions. Photographic documentation of observed aquatic resources is included in Appendix B.

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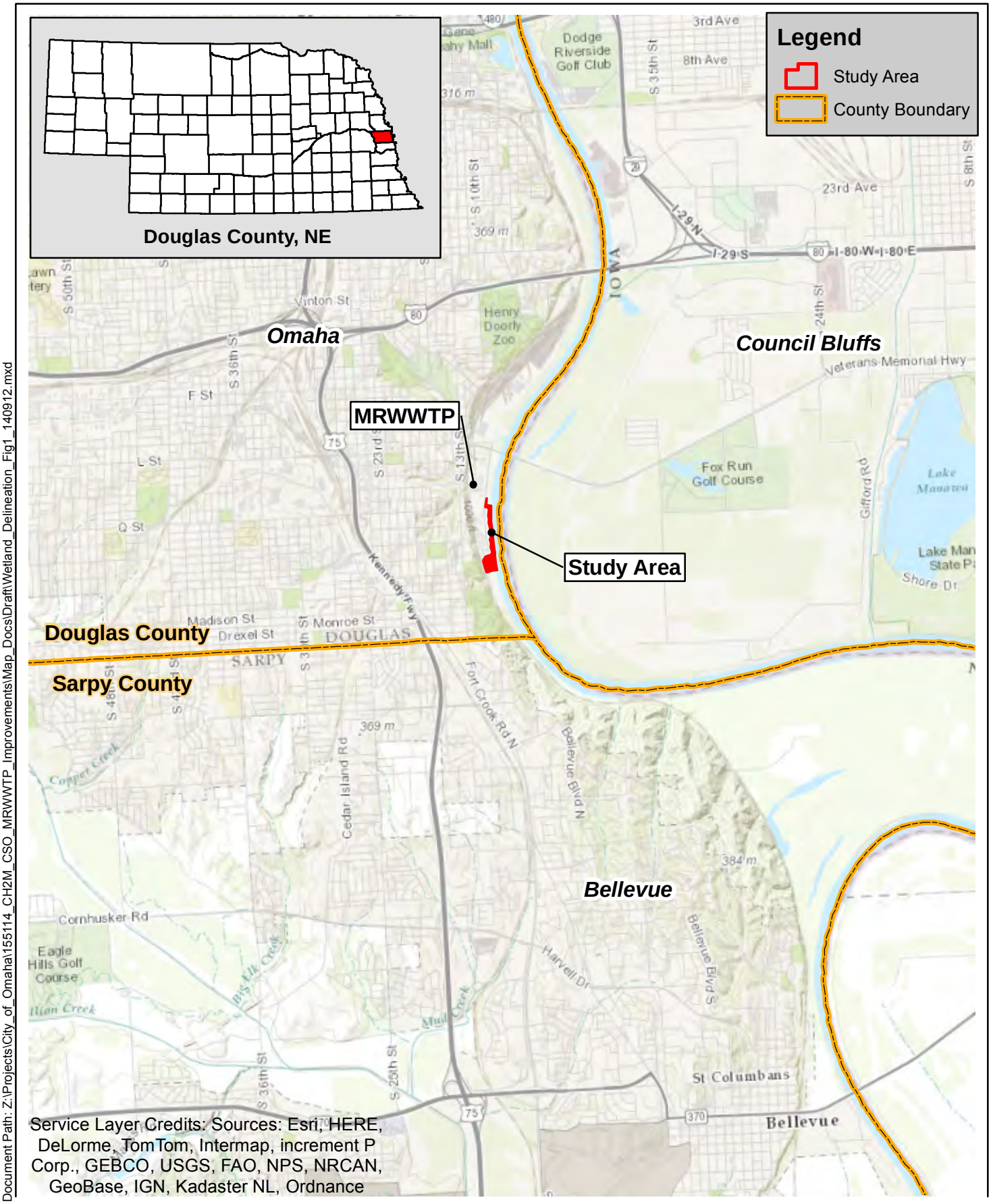

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Miles

Project Location

City of Omaha
Missouri River Wastewater Treatment Plant
Wetland Delineation Report

CSO! Clean Solutions for Omaha

DATE
November 2014

FIGURE
1

Wetland Delineation Results

During the September and October, 2014 wetland delineation, a total of 29 sample locations were analyzed for wetland criteria in accordance with the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region. See Appendix A for Wetland Data Forms and Figure 2 for sample point and wetland locations. Within the Study Area, the field delineation identified palustrine emergent (PEM), palustrine scrub-shrub (PSS), and palustrine forested (PFO) wetlands, as classified in Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al., December 1979). Total wetland acreage within the Study Area is 8.54 acres. Table 1 provides a summary of the delineated wetlands.

Table 1. Delineated Wetlands

Sample Point[1]	Photo No.	Wetland Classification (Cowardin[2] | Nebraska Subclass)	Area[3] (acre)
S-01	1	PEMA/PEMC | Riverine Floodplain	0.02
S-03, S-05, S-08, S-13, & S-17	3,5,8,13,17	PEMA/PEMC | Riverine Floodplain	0.72
S-10	10	PEMA/PEMC | Riverine Floodplain	0.01
S-12	12	PSSA | Riverine Floodplain	0.02
S-14 & S-16	14, 16	PSSA | Riverine Floodplain	0.27
S-19	19	PSSA | Riverine Floodplain	0.13
S-20a	20a	PFOA | Riverine Floodplain	0.35
S-20b[4]	20b	PFOA | Riverine Floodplain	0.27
S-22	22	PSSA | Riverine Floodplain	0.11
S-23 & S-24	23, 24	PEMA/PEMC | Riverine Floodplain	0.30
S-25	25	PEMA/PEMC | Riverine Floodplain	2.30
S-26, S-27, & S-29	26, 27, 29	PFOA | Riverine Floodplain	4.04
Total wetland area			8.54

Notes:
1 Sample Points not listed in the table did not meet wetland criteria.
2 PEMA/PEMC = Palustrine Emergent Temporarily/Seasonally Flooded Wetland; PSSA = Palustrine Scrub-Shrub Temporarily Flooded Wetland; PFOA = Palustrine Forested Temporarily Flooded Wetland.
3 Area represents the total area delineated and in no way represents any measure of wetland impact.
4 No wetland data form is provided for S-20b; the forested wetland displayed similar indicators of hydrophytic vegetation and wetland hydrology as S-20a.

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Emergent (PEMA/PEMC) Wetlands

3.35 acres of emergent (PEMA/PEMC) wetlands were delineated within the Study Area. These wetlands displayed a monotypic herbaceous layer, with the emergent wetlands located north of WOUS-1 dominated by reed canarygrass (*Phalaris arundinacea*) and the wetlands south of WOUS-1 dominated by wild cucumber (*Echinocystis lobata*). The observed soil profiles of the emergent wetlands were predominately silt loam or sand and displayed redox features within 12-inches of the surface. In addition, the soil profiles often displayed oxidized rhizospheres along living roots (primary indicator of wetland hydrology) in areas that were dominated by reed canarygrass. The hydrology of the emergent wetlands is heavily influenced by the Missouri River and indicators of wetland hydrology included geomorphic position, meeting the FAC-Neutral Test (dominance of hydrophytic vegetation), surface soil cracks, and the presence of oxidized rhizospheres along living roots.

Scrub-Shrub (PSSA) Wetlands

Within the Study Area, 0.53 acre of scrub-shrub (PSSA) wetland were delineated. The scrub-shrub wetlands were dominated by eastern cottonwood (*Populus deltoides*) and sandbar willow (*Salix interior*). The herbaceous stratum of the scrub-shrub wetlands was dominated by reed canarygrass. Similar to the emergent wetlands, the scrub-shrub wetlands displayed soil profiles with sand or silt textures and redox features within 12-inches of the soil surface. Wetland hydrology indicators of the scrub-shrub wetlands were primarily secondary indicators; including surface soil cracks, geomorphic position, and meeting the FAC-Neutral Test. In some area, the soil profile displayed oxidized rhizospheres along living roots.

Forested (PFOA) Wetlands

The majority of the Study Area consists of forested (PFOA) wetland (4.66 acres), with the area south of WOUS-1 consisting primarily of forested wetland. The tree stratum of the forested wetlands was dominated by black willow (*Salix nigra*), hackberry (*Celtis occidentalis*), and eastern cottonwood. The observed soil profile of the forested wetlands consisted primarily of silt loam and clay loam textures with redox features observed within 12-inches of the soil surface. Wetland hydrology indicators of the forested wetlands was predominately geomorphic position and meeting the FAC-Neutral Test; however, in areas located directly adjacent to the Missouri River, water-stained leaves and surface soil cracks were also observed.

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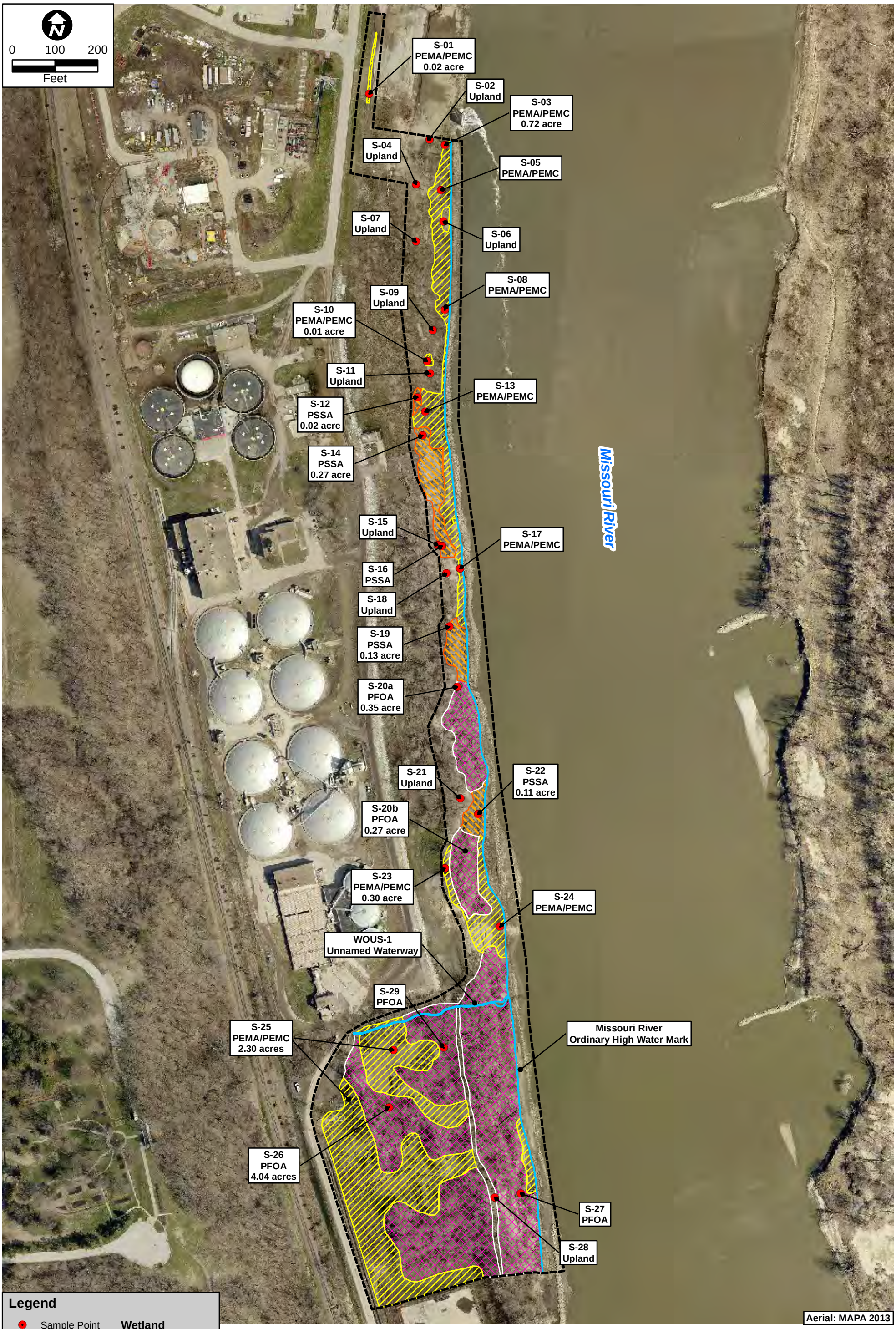

CSO! Clean Solutions for Omaha

Aquatic Resources ***DRAFT***

City of Omaha - Missouri River Wastewater Treatment Plant
Wetland Delineation Report

DATE November 2014

FIGURE 2

Defined Channels

The Missouri River defines the eastern boundary of the Study Area, and the location of the ordinary high water mark (OHWM) of the Missouri River was documented using GPS. The Missouri River is considered a Traditionally Navigable Water and falls under the jurisdiction of the Corps of Engineers. Any activity affecting navigable waters is regulated by USACE under Section 10 of the Rivers and Harbors Act of 1899, and the placement of fill material below the OHWM is regulated by USACE under Section 404 of the Clean Water Act. Several characteristics of an OHWM were observed, including the presence of litter/debris, destruction of terrestrial vegetation, defined bed and bank, and deposition. It should be noted that the OHWM mapped in the field and displayed on Figure 2 does not represent the construction reference plane (CRP) of the Missouri River. The 735 miles of the Missouri River from Sioux City, Iowa to its confluence with the Mississippi River near St. Louis, Missouri has been channelized to support a self-scouring navigation channel and other authorized purposes. As such, traditional means of determining OHWM including litter/debris line, destruction of terrestrial vegetation etc. are not applicable. Rather, the USACE uses the CRP. The CRP is defined as a plane that slopes in a streamwise direction at a water-surface elevation profile equal to the flow 75 percent of the time during the navigation season (April 1- December 1). It is used by the USACE as a low-flow construction reference elevation and the elevation of the CRP is periodically adjusted by the USACE to account for degradation and changes in the flow duration curve. The elevation of the CRP should be obtained from the USACE prior to any construction activities that may encroach on the Missouri River.

In addition to the Missouri River, an unnamed tributary of the Missouri River was documented near the southern extent of the Study Area (labeled as WOUS-1). The unnamed tributary was previously documented in the 2012 wetland delineation (characterized as Drainage B) and displayed indicators of an ordinary high water mark (see Appendix C – Waters of the U.S. Data Form).

Bibliography

Cowardin, et al. December 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. U.S. Department of the Interior, Washington D.C.

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Environmental Laboratory. August 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0). U.S. Army Corps of Engineers Research and Development Center, Vicksburg, Mississippi.

Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42

USDA NRCS. October 29, 2009. Soil Survey Geographic (SSURGO) database for Douglas County, Nebraska. Fort Worth, Texas. URL:http://SoilDataMart.nrcs.usda.gov/

Appendix A – Wetland Determination Data Forms: Midwest

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WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-01

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 03 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2061575567 Long: -95.9298180911435 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is an emergent wetland located in an isolated depression at the base of the roadway embankment. The area was dominated by hydrophytic vegetation and displayed indicators of hydric soil and wetland hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	55	Y	FACW
Echinochloa crus-galli	15	N	FACW
Helianthus annuus	10	N	FACU
Ambrosia artemisiifolia	5	N	FACU
Melilotus officinalis	5	N	FACU
Panicum capillare	5	N	FAC
Setaria pumila	5	N	FAC
	100	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	70	x 2 =	140
FAC species	10	x 3 =	30
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	100 (A)		250 (B)

Prevalence Index = B/A= 2.50

Hydrophytic Vegetation Indicators:

X Rapid Test for Hydrophytic Vegetation

X Dominance Test > 50%

X Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by hydrophytic vegetation.

SOIL

Sampling Point: S-01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 6	10YR 3 / 1	100					SILTY CLAY LOAM	
6 to 18	10YR 4 / 2	95	7.5YR 4/6	5	C	M	CLAY LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:
The observed soil profile displayed a depleted matrix within 12 inches of the surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is located in a concave position in the landscape and is dominated by hydrophytic vegetation; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-02

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 03 T 14N R 13E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): Convex

Slope(%): 0 Lat: 41.2059163826263 Long: -95.9293073802434 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
The area characterized by this data form is an upland area located near the bank of the Missouri River. The area is dominated by a scrub-shrub layer of eastern cottonwood but fails to display indicators of hydric soil or wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	50	Y	FAC
	50	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Digitaria sanguinalis	25	Y	FACU
Erigeron canadensis	25	Y	FACU
	50	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	50	x 3 =	150
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	100 (A)		350 (B)

Prevalence Index = B/A= 3.50

Hydrophytic Vegetation Indicators:

____ Rapid Test for Hydrophytic Vegetation

____ Dominance Test > 50%

____ Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
The scrub-shrub layer is dominated by eastern cottonwood; however, the herbaceous stratum is dominated by upland vegetation. The area fails to meet hydrophytic vegetation criteria.

SOIL

Sampling Point: S-02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 12	10YR 6 / 1	100					SAND	
12 to 18	10YR 6 / 2	90	7.5YR 4/6	10	C	M	SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
The observed soil profile was a sandy matrix with redox concentrations observed below 12 inches. Hydric soil criteria is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
There are not indicators of wetland hydrology. The area is located in a slightly elevated position and fails to display a dominance of hydrophytic vegetation.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-03

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 03 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2058062841798 Long: -95.9291954647175 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is an emergent wetland located near the bank of the Missouri River. The area is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum (Plot size: 30 Ft)			
Populus deltoides	5	Y	FAC
	5	=Total Cover	
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	5	Y	FAC
	5	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	65	Y	FACW
Erigeron canadensis	10	N	FACU
Urtica dioica	10	N	FACW
Carex lasiocarpa	5	N	OBL
Solidago canadensis	5	N	FACU
	95	=Total Cover	
Vine Stratum (Plot size: 30 Ft)			
Vitis riparia	5	Y	FACW
	5	=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	80	x 2 =	160
FAC species	10	x 3 =	30
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	110 (A)		255 (B)

Prevalence Index = B/A= 2.32

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by reed canary grass. Hydrophytic vegetation criteria is met.

SOIL

Sampling Point: S-03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 4	10YR 5 / 2	100					LOAMY SAND	
4 to 18	10YR 4 / 2	85	7.5YR 4/6	15	C	M	LOAMY SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:
The observed soil profile was dominated by a sandy matrix and displayed redox concentrations within 6-inches of the soil surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	____	
Water Table Present?	Yes ____	No X	Depth (inches):	____	
Saturation Present?	Yes ____	No X	Depth (inches):	____	

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Oxidized rhizospheres were observed in the soil profile and the area is dominated by hydrophytic vegetation; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-04

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): Convex

Slope(%): 0 Lat: 41.2055630473303 Long: -95.9294567061081 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: PFOA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
The area characterized by this data form is an upland area located west of the wetland described by S-05. The area failed to display indicators of hydric soil or wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum (Plot size: 30 Ft)			
Populus deltoides	10	Y	FAC
Salix nigra	10	Y	OBL
Morus rubra	5	Y	FACU
	25	=Total Cover	
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	10	Y	FAC
	10	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Digitaria sanguinalis	30	Y	FACU
Erigeron canadensis	20	Y	FACU
Panicum virgatum	10	N	FAC
Cenchrus longispinus	5	N	UPL
Setaria faberi	5	N	FACU
	70	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	60	x 4 =	240
UPL species	5	x 5 =	25
Column Totals:	105 (A)		365 (B)

Prevalence Index = B/A= 3.48

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- ____ Dominance Test > 50%
- ____ Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
The area fails to meet hydrophytic vegetation criteria.

SOIL

Sampling Point: S-04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 22	10YR 5 / 2	100					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
The observed soil profile displayed a sandy matrix and no indictors of hydric soil were observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is located in a convex position in the landscape and does not meet the FAC-Neutral Test. There are no indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-05

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2055194458604 Long: -95.9292486729519 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is an emergent wetland located near the western bank of the Missouri River. The area is dominated by emergent hydrophytes and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	50	Y	FACW
Carex atherodes	20	Y	OBL
Eupatorium altissimum	15	N	UPL
Erigeron canadensis	10	N	FACU
Solidago canadensis	10	N	FACU
	105	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	50	x 2 =	100
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	15	x 5 =	75
Column Totals:	105 (A)		275 (B)

Prevalence Index = B/A= 2.62

Hydrophytic Vegetation Indicators:

X Rapid Test for Hydrophytic Vegetation

X Dominance Test > 50%

X Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by emergent hydrophytes. Hydrophytic vegetation criteria is met.

SOIL

Sampling Point: S-05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 12	10YR 3 / 2	80	7.5YR 4/6	20	C	M	SILTY CLAY LOAM	
12 to 18	10YR 4 / 3	85	7.5YR 4/6	15	C	M	SANDY LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☑ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
The observed soil profile displayed redox features near the surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is located in a depression near the Missouri River and is dominated by emergent hydrophytes; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-06

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): Convex

Slope(%): 0 Lat: 41.2053174765748 Long: -95.9292383898223 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
The area characterized by this data form is an upland area located within the emergent wetland characterized by S-03 and S-05. The area is elevated above the surrounding wetland and fails to display indicators of hydrophytic vegetation or wetland hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Erigeron canadensis	40	Y	FACU
Eupatorium altissimum	20	Y	UPL
Phalaris arundinacea	10	N	FACW
Setaria faberi	10	N	FACU
	80	=Total Cover	
Vine Stratum (Plot size: 30 Ft)			
Echinocystis lobata	10	Y	FACW
	10	=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	0	x 3 =	0
FACU species	50	x 4 =	200
UPL species	20	x 5 =	100
Column Totals:	90 (A)		340 (B)

Prevalence Index = B/A= 3.78

Hydrophytic Vegetation Indicators:

____ Rapid Test for Hydrophytic Vegetation

____ Dominance Test > 50%

____ Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
The area fails to meet hydrophytic vegetation criteria.

SOIL

Sampling Point: S-06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 8	10YR 5 / 2	100					SAND	
8 to 16	10YR 3 / 1	90	7.5YR 4/6	10	C	M	CLAY LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
The observed soil profile displayed a sand layer on top of a mineral soil layer with redox concentrations. The sand layer could have been deposited from a past flood event.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is elevated above the surrounding wetland and is dominated by upland vegetation; there are no indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-07

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): Convex

Slope(%): 0 Lat: 41.205197604296 Long: -95.9294795465374 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: PFOA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
The area characterized by this data form is an upland forested area located west of the wetland described by S-03, -05, and -08. The area fails to display indicators of hydric soil or wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum (Plot size: 30 Ft)			
Salix nigra	40	Y	OBL
	40	=Total Cover	
Shrub Stratum (Plot size: 15Ft)			
Salix interior	10	Y	FACW
	10	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Digitaria sanguinalis	60	Y	FACU
Erigeron canadensis	20	Y	FACU
	80	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	80	x 4 =	320
UPL species	0	x 5 =	0
Column Totals:	130 (A)		380 (B)

Prevalence Index = B/A= 2.92

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- ____ Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (Include photo numbers here or on a separate sheet.)
The tree stratum is dominated by hydrophytic vegetation; however, the herbaceous stratum is dominated by upland vegetation. The area meets the prevalence index.

SOIL

Sampling Point: S-07

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 24	10YR 5 / 2	100					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
The soil profile was a sand matrix with no indicators of hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	____	No	X	Depth (inches):	_____
Water Table Present?	Yes	____	No	X	Depth (inches):	_____
Saturation Present?	Yes	____	No	X	Depth (inches):	_____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
There are no indicators of wetland hydrology. The area is located in a slightly elevated position.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-08

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2047525973218 Long: -95.9292625819673 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is an emergent wetland located near the west bank of the Missouri River. The area is dominated by emergent hydrophytes and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum (Plot size: 30 Ft)			
Salix amygdaloides	5	Y	FACW
	5	=Total Cover	
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	85	Y	FACW
Eupatorium altissimum	15	N	UPL
	100	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	90	x 2 =	180
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	15	x 5 =	75
Column Totals:	105 (A)		255 (B)

Prevalence Index = B/A= 2.43

Hydrophytic Vegetation Indicators:

X Rapid Test for Hydrophytic Vegetation

X Dominance Test > 50%

X Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by emergent hydrophytes.

SOIL

Sampling Point: S-08

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 6	10YR 5 / 2	100					SAND	
6 to 18	10YR 3 / 1	90	7.5YR 4/6	10	C	M	CLAY LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:
The observed soil profile displayed the Redox Dark Surface indicator.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is located in a depression adjacent to the Missouri River and is dominated by emergent hydrophytes; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-09

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): Convex

Slope(%): 0 Lat: 41.2046239804378 Long: -95.9293745582055 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
The area characterized by this data form is an upland forest located south of the wetland characterized by S-03, -05, and -08. The area fails to display indicators of wetland hydrology and does not meet hydrophytic vegetation criteria.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum (Plot size: 30 Ft)			
Acer saccharinum	5	Y	FACW
Fraxinus pennsylvanica	5	Y	FACW
	10	=Total Cover	
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	15	Y	FAC
	15	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Erigeron canadensis	40	Y	FACU
Digitaria sanguinalis	30	Y	FACU
Solidago canadensis	20	Y	FACU
Verbascum thapsus	5	N	UPL
	95	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	15	x 3 =	45
FACU species	90	x 4 =	360
UPL species	5	x 5 =	25
Column Totals:	120 (A)		450 (B)

Prevalence Index = B/A= 3.75

Hydrophytic Vegetation Indicators:

____ Rapid Test for Hydrophytic Vegetation

____ Dominance Test > 50%

____ Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
The area fails to meet hydrophytic vegetation criteria.

SOIL

Sampling Point: S-09

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 4	10YR 5 / 2	100					SAND	
4 to 22	10YR 4 / 2	90	7.5YR 4/6	10	C	M	LOAMY SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
The observed soil profile displayed a sandy matrix and redox concentrations within 6-inches of the surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
There are no indicators of wetland hydrology. The area is located in a slightly elevated position and fails to meet the FAC-Neutral test.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-10

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2044267091409 Long: -95.9294318588446 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is a small depression that is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Persicaria pensylvanica	80	Y	FACW
Phalaris arundinacea	10	N	FACW
Solidago canadensis	10	N	FACU
	100	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	90	x 2 =	180
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	100 (A)		220 (B)

Prevalence Index = B/A= 2.20

Hydrophytic Vegetation Indicators:

X Rapid Test for Hydrophytic Vegetation

X Dominance Test > 50%

X Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by pinkweed; hydrophytic vegetation criteria is met.

SOIL

Sampling Point: S-10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 4	10YR 5 / 2	100					SAND	
4 to 24	10YR 5 / 2	90	7.5YR 4/6	10	C	M	SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:
The observed soil profile displayed a sandy matrix with redox concentrations within 6 inches of the surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is located in a depression and is dominated by hydrophytic vegetation; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-11

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): Convex

Slope(%): 0 Lat: 41.2043481338017 Long: -95.9294141244136 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
The area characterized by this data form is an upland area adjacent to the wetland described by S-10. The area fails to display indicators of hydric soil and wetland hydrology and is dominated by upland vegetation.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum (Plot size: 15Ft)			
Salix interior	2	N	FACW
	2	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Digitaria sanguinalis	40	Y	FACU
Erigeron canadensis	20	Y	FACU
Solidago canadensis	15	N	FACU
Helianthus annuus	10	N	FACU
Verbascum thapsus	10	N	UPL
Ambrosia artemisiifolia	5	N	FACU
	100	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	2	x 2 =	4
FAC species	0	x 3 =	0
FACU species	90	x 4 =	360
UPL species	10	x 5 =	50
Column Totals:	102 (A)		414 (B)

Prevalence Index = B/A= 4.06

Hydrophytic Vegetation Indicators:

____ Rapid Test for Hydrophytic Vegetation

____ Dominance Test > 50%

____ Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by upland vegetation.

SOIL

Sampling Point: S-11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 2	10YR 4 / 2	100					SILT LOAM	
2 to 24	10YR 5 / 2	100					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
There are no indicators of hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is located in a slightly elevated position and is dominated by upland vegetation; no indicators of wetland hydrology were observed.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-12

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): Convex

Slope(%): 0 Lat: 41.2041992946656 Long: -95.9295278483381 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is a scrub-shrub wetland located adjacent to the emergent wetland characterized by S-13. The area is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum (Plot size: 15Ft)			
Salix interior	60	Y	FACW
	60	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Eupatorium altissimum	20	Y	UPL
Solidago canadensis	15	Y	FACU
Phalaris arundinacea	10	N	FACW
	45	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	70	x 2 =	140
FAC species	0	x 3 =	0
FACU species	15	x 4 =	60
UPL species	20	x 5 =	100
Column Totals:	105 (A)		300 (B)

Prevalence Index = B/A= 2.86

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- ____ Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by Salix interior; the area meets the prevalence index.

SOIL

Sampling Point: S-12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 4	10YR 4 / 2	100					SAND	
4 to 18	10YR 4 / 1	80	7.5YR 4/6	20	C	M	SANDY LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:
The observed soil profile was a sandy soil with redox concentrations observed within 6-inches of the surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	____
Water Table Present?	Yes ____	No X	Depth (inches):	____
Saturation Present?	Yes ____	No X	Depth (inches):	____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
When observing the soil profile, oxidized rhizospheres along living roots were observed within 12-inches of the soil surface; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-13

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2041039885804 Long: -95.9294694118853 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is an emergent wetland located adjacent to the Missouri River. The area displays indicators of hydric soil and wetland hydrology and is dominated by reed canary grass.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	70	Y	FACW
Lythrum salicaria	10	N	OBL
Solidago canadensis	10	N	FACU
Verbena hastata	10	N	FACW
	100	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	80	x 2 =	160
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	100 (A)		210 (B)

Prevalence Index = B/A= 2.10

Hydrophytic Vegetation Indicators:

X Rapid Test for Hydrophytic Vegetation

X Dominance Test > 50%

X Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by hydrophytic vegetation.

SOIL

Sampling Point: S-13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 16	10YR 4 / 2	90	7.5YR 4/6	10	C	M	LOAMY SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
The observed soil profile displayed a sandy matrix with redox concentrations within 6 inches of the surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	____	X	____
Water Table Present?	____	X	____
Saturation Present?	____	X	____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is located in a depression and is dominated by hydrophytic vegetation; in addition, oxidized rhizospheres were observed in the soil profile.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-14

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2039518133279 Long: -95.9295026090084 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is a scrub-shrub wetland located adjacent to the emergent wetland described by S-13. The area is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	20	Y	FAC
Salix nigra	20	Y	OBL
Salix interior	5	N	FACW
	45	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	85	Y	FACW
Persicaria pensylvanica	10	N	FACW
Solidago canadensis	5	N	FACU
	100	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	100	x 2 =	200
FAC species	20	x 3 =	60
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	145 (A)		300 (B)

Prevalence Index = B/A= 2.07

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by hydrophytic vegetation.

SOIL

Sampling Point: S-14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 5	10YR 5 / 2	100					SAND	
5 to 16	10YR 5 / 2	90	7.5YR 4/6	10	C	M	LOAMY SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:
The observed soil profile displayed a sandy matrix with redox concentrations within 6 inches of the surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is dominated by hydrophytic vegetation and oxidized rhizospheres were observed in the soil profile.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-15

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): Convex

Slope(%): 0 Lat: 41.2032459088831 Long: -95.9294145990134 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
The area characterized by this data form is an upland area located adjacent to the wetland characterized by S-16. The area is slightly elevated above the adjacent wetland. The area fails to display indicators of hydric soil or wetland hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	25	Y	FAC
Fraxinus pennsylvanica	20	Y	FACW
	45	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Eupatorium altissimum	40	Y	UPL
Solidago canadensis	30	Y	FACU
Phalaris arundinacea	10	N	FACW
	80	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	25	x 3 =	75
FACU species	30	x 4 =	120
UPL species	40	x 5 =	200
Column Totals:	125 (A)		455 (B)

Prevalence Index = B/A= 3.64

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- ____ Dominance Test > 50%
- ____ Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
The area fails to meet hydrophytic vegetation criteria.

SOIL

Sampling Point: S-15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 18	10YR 5 / 2	100					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
The observed soil profile was primarily sand with no indicators of redoximorphic features.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
There are no indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-16

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2032385070127 Long: -95.9293795898142 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is a scrub-shrub wetland that is also characterized by S-14. The area is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	20	Y	FAC
Salix interior	20	Y	FACW
Salix nigra	5	N	OBL
	45	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	80	Y	FACW
Persicaria pensylvanica	10	N	FACW
Solidago canadensis	5	N	FACU
	95	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	110	x 2 =	220
FAC species	20	x 3 =	60
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	140 (A)		305 (B)

Prevalence Index = B/A= 2.18

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by hydrophytic vegetation.

SOIL

Sampling Point: S-16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 18	10YR 5 / 1	85	7.5YR 4/6	15	C	M	SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
The observed soil profile was predominately sand and displayed redox features near the soil surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	____	X	____
Water Table Present?	____	X	____
Saturation Present?	____	X	____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Oxidized rhizospheres were observed in the soil profile and the area is dominated by hydrophytic vegetation; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-17

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Toe of Slope Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.203089185402 Long: -95.9292360064393 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is an emergent wetland located along the bank of the Missouri River. The area is dominated by emergent hydrophytes and displays indicators of hydric soil and wetland hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	90	Y	FACW
Cyperus esculentus	5	N	FACW
Echinochloa crus-galli	5	N	FACW
	100	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A= 2.00

Hydrophytic Vegetation Indicators:

X Rapid Test for Hydrophytic Vegetation

X Dominance Test > 50%

X Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by emergent hydrophytes.

SOIL

Sampling Point: S-17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 12	10YR 3 / 1	85	7.5YR 4/6	15	C	M	SILT LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
The observes soil profile displayed redox features near the soil surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	____	X	____
Water Table Present?	____	X	____
Saturation Present?	____	X	____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Oxidized rhizospheres where observed in the soil profile and the area is dominated by hydrophytic vegetation; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-18

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): Convex

Slope(%): 0 Lat: 41.2030618773613 Long: -95.9293534510194 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
The area characterized by this data form is an upland area located near the bank of the Missouri River. The area fails to display indicators of hydric soil or wetland hydrology and is dominated by upland vegetation.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	15	Y	FAC
Fraxinus pennsylvanica	10	Y	FACW
	25	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Digitaria sanguinalis	60	Y	FACU
Erigeron canadensis	25	Y	FACU
Thlaspi arvense	15	N	FACU
	100	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	15	x 3 =	45
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Totals:	125 (A)		465 (B)

Prevalence Index = B/A= 3.72

Hydrophytic Vegetation Indicators:

____ Rapid Test for Hydrophytic Vegetation

____ Dominance Test > 50%

____ Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
The area fails to meet hydrophytic vegetation criteria.

SOIL

Sampling Point: S-18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 24	10YR 5 / 2	100					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
The observed soil profile displayed a sandy matrix; however, no redox concentrations were observed. Hydric soil criteria is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
There are no indicators of wetland hydrology. The area is dominated by upland vegetation and is located in a slightly elevated position along the bank of the Missouri River.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-19

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2027208650437 Long: -95.9293516440494 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is a scrub-shrub wetland located along the bank of the Missouri River. The area is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum (Plot size: 15Ft)			
Fraxinus pennsylvanica	20	Y	FACW
Populus deltoides	20	Y	FAC
Salix nigra	5	N	OBL
	45	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	85	Y	FACW
Persicaria lapathifolia	10	N	FACW
Urtica dioica	5	N	FACW
	100	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	120	x 2 =	240
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	145 (A)		305 (B)

Prevalence Index = B/A= 2.10

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by hydrophytic vegetation.

SOIL

Sampling Point: S-19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 6	10YR 4 / 1	90	7.5YR 4/6	10	C	M	LOAMY SAND	
6 to 18	10YR 5 / 2	90	7.5YR 4/6	10	C	M	SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:
The observed soil profile displayed a sandy matrix with redox concentrations observed throughout the profile.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	____
Water Table Present?	Yes ____	No X	Depth (inches):	____
Saturation Present?	Yes ____	No X	Depth (inches):	____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area displays three secondary indicators and one primary indicator of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-20a

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.202331367307 Long: -95.9293077086212 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is a forested wetland located along the bank of the Missouri River. The area is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum (Plot size: 30 Ft)			
Salix nigra	80	Y	OBL
Populus deltoides	5	N	FAC
	85	=Total Cover	
Shrub Stratum (Plot size: 15Ft)			
Fraxinus pennsylvanica	40	Y	FACW
Populus deltoides	10	Y	FAC
	50	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	50	Y	FACW
Populus deltoides	10	N	FAC
Bidens vulgata	5	N	FACW
Cyperus esculentus	5	N	FACW
Fraxinus pennsylvanica	5	N	FACW
	75	=Total Cover	
Vine Stratum (Plot size: 30 Ft)			
Vitis riparia	5	Y	FACW
	5	=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across all Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	110	x 2 =	220
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	215 (A)		375 (B)

Prevalence Index = B/A= 1.74

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by hydrophytic vegetation.

SOIL

Sampling Point: S-20a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 6	10YR 4 / 1	85	7.5YR 4/6	15	C	M	SILTY CLAY LOAM	
6 to 18	10YR 5 / 2	100					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:
The observed soil profile displayed a depleted matrix with redox concentrations.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	____	
Water Table Present?	Yes ____	No X	Depth (inches):	____	
Saturation Present?	Yes ____	No X	Depth (inches):	____	

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is located near the bank of the Missouri River with extensive surface soil cracks. Wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-21

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): Convex

Slope(%): 0 Lat: 41.2016159478376 Long: -95.9293264118728 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
The area characterized by this data form is an upland area located in an elevated position west of the wetland described by S-22. The area fails to display indicators of hydric soil or wetland hydrology and is dominated by upland vegetation.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum (Plot size: 30 Ft)			
Fraxinus pennsylvanica	2	N	FACW
	2	=Total Cover	
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	5	Y	FAC
	5	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Digitaria sanguinalis	40	Y	FACU
Erigeron canadensis	20	Y	FACU
Fraxinus pennsylvanica	5	N	FACW
Phalaris arundinacea	5	N	FACW
	70	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	12	x 2 =	24
FAC species	5	x 3 =	15
FACU species	60	x 4 =	240
UPL species	0	x 5 =	0
Column Totals:	77 (A)		279 (B)

Prevalence Index = B/A= 3.62

Hydrophytic Vegetation Indicators:

____ Rapid Test for Hydrophytic Vegetation

____ Dominance Test > 50%

____ Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
The area fails to display indicators of hydrophytic vegetation.

SOIL

Sampling Point: S-21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 24	10YR 5 / 2	100					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
The observed soil profile displayed a sandy matrix with no indicators of hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
There are no indicators of wetland hydrology; the area is located in an elevated position and is dominated by upland vegetation.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-22

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.201510272353 Long: -95.9291802465329 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is a scrub-shrub wetland located along the western bank of the Missouri River. The area is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	20	Y	FAC
Salix interior	20	Y	FACW
	40	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	30	Y	FACW
	30	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	70 (A)		160 (B)

Prevalence Index = B/A= 2.29

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by hydrophytic vegetation.

SOIL

Sampling Point: S-22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 12	10YR 3 / 2	90	7.5YR 4/6	10	C	M	SILT LOAM	
12 to 18	10YR 4 / 2	80	2.5YR 3/6	20	C	M	SILT LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:
The observed soil profile displayed redox features throughout the soil sample; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area displayed surface soil cracks, oxidized rhizospheres, water-stained leaves, and the area was dominated by hydrophytic vegetation; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-23

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.201171616415 Long: -95.9294841634481 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is an emergent wetland located adjacent to the forested wetland described by S-20. The area is dominated by emergent hydrophytes and displays indicators of hydric soil and wetland hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Persicaria pensylvanica	80	Y	FACW
Phalaris arundinacea	20	Y	FACW
	100	=Total Cover	
Vine Stratum (Plot size: 30 Ft)			
Echinocystis lobata	20	Y	FACW
	20	=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	120	x 2 =	240
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	120 (A)		240 (B)

Prevalence Index = B/A= 2.00

Hydrophytic Vegetation Indicators:

X Rapid Test for Hydrophytic Vegetation

X Dominance Test > 50%

X Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by hydrophytic vegetation.

SOIL

Sampling Point: S-23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 18	10YR 4 / 2	80	7.5YR 4/6	20	C	M	SILT LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☑ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
The observed soil profile displayed redox features near the soil surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	____	X	____
Water Table Present?	____	X	____
Saturation Present?	____	X	____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Oxidized rhizospheres were observed in the soil profile and the area is dominated by hydrophytic vegetation; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-24

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Toe of Slope Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2039518133279 Long: -95.9295026090084 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: PFOC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is an emergent wetland located along the western bank of the Missouri River. The area is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	15	Y	FAC
	15	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	70	Y	FACW
Rumex crispus	15	N	FAC
Cyperus esculentus	5	N	FACW
	90	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	75	x 2 =	150
FAC species	30	x 3 =	90
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	105 (A)		240 (B)

Prevalence Index = B/A= 2.29

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area displays a dominance of hydrophytic vegetation.

SOIL

Sampling Point: S-24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 12	10YR 3 / 2	60	7.5YR 4/6	20	C	M	SILTY CLAY LOAM	Mixed Matrix
0 to 12	10YR 3 / 1	20					SILTY CLAY LOAM	Mixed Matrix

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:
The observed soil profile displayed redox features near the soil surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Water-stained leaves, surface soil cracks, and oxidized rhizospheres were observed; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-25

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.20078264892 Long: -95.9290408445272 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is an emergent wetland located in a low-lying area south of WOUS-1. The area is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Urtica dioica	15	Y	FACW
	15	=Total Cover	
Vine Stratum (Plot size: 30 Ft)			
Echinocystis lobata	85	Y	FACW
	85	=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A= 2.00

Hydrophytic Vegetation Indicators:

X Rapid Test for Hydrophytic Vegetation

X Dominance Test > 50%

X Prevalence Index ≤ 3.0

____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by hydrophytic vegetation.

SOIL

Sampling Point: S-25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 18	10YR 2 / 1	95	7.5YR 4/6	5	C	M	SILT LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
The observed soil sample displayed redox features near the soil surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	____	No	X	Depth (inches):	____
Water Table Present?	Yes	____	No	X	Depth (inches):	____
Saturation Present?	Yes	____	No	X	Depth (inches):	____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is located in slight depression adjacent to the Missouri River and the area is dominated by hydrophytic vegetation; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-26

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2030618773613 Long: -95.9293534510194 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is a forested wetland located adjacent to the emergent wetland characterized by S-25. The area is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum (Plot size: 30 Ft)			
Celtis occidentalis	40	Y	FAC
Morus rubra	30	Y	FACU
	70	=Total Cover	
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	20	Y	FACW
Urtica dioica	20	Y	FACW
	40	=Total Cover	
Vine Stratum (Plot size: 30 Ft)			
Echinocystis lobata	50	Y	FACW
	50	=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	90	x 2 =	180
FAC species	40	x 3 =	120
FACU species	30	x 4 =	120
UPL species	0	x 5 =	0
Column Totals:	160 (A)		420 (B)

Prevalence Index = B/A= 2.63

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by hydrophytic vegetation.

SOIL

Sampling Point: S-26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 14	10YR 2 / 1	85	7.5YR 4/6	15	C	M	SILT LOAM	
14 to 18	10YR 3 / 2	100					COARSE SAND	Cobble/gravel dominated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:
The observed soil profile displayed redox features near the soil surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Oxidized rhizopheres were observed in the soil profile and the area is dominated by hydrophytic vegetation; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 10/16/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-27

Investigators: Ben Fisher Amy Hammontree Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Toe of Slope Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2000238930861 Long: -95.9299955495303 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: PFOA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is a forested wetland located adjacent to the Missouri River. The area is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum (Plot size: 30 Ft)			
Populus deltoides	30	Y	FAC
	30	=Total Cover	
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	50	Y	FAC
	50	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Phalaris arundinacea	40	Y	FACW
	40	=Total Cover	
Vine Stratum (Plot size: 30 Ft)			
Echinocystis lobata	40	Y	FACW
	40	=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	80	x 2 =	160
FAC species	80	x 3 =	240
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	160 (A)		400 (B)

Prevalence Index = B/A= 2.50

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by hydrophytic vegetation.

SOIL

Sampling Point: S-27

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 6	10YR 2 / 1	95	7.5YR 4/6	5	C	M	CLAY LOAM	
6 to 18	10YR 5 / 2	100					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☑ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:
The observed soil profile was a sediment deposition over a sand layer. Redox features were observed near the soil surface; hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	____
Water Table Present?	Yes ____	No X	Depth (inches):	____
Saturation Present?	Yes ____	No X	Depth (inches):	____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area displayed surface soil cracks, oxidized rhizospheres, and a dominance of hydrophytic vegetation; wetland hydrology criteria is met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-28

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Terrace Local Relief (concave, convex, none): Convex

Slope(%): 0 Lat: 41.1990490945999 Long: -95.9292078221696 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: PFOA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
The area characterized by this data form is an upland area located west of the wetland described by S-27. The area appears to be an elevated sand deposit. The area fails to display indicators of hydric soil or wetland hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum (Plot size: 15Ft)			
Populus deltoides	5	Y	FAC
	5	=Total Cover	
Herb Stratum (Plot size: 6 Ft)			
Digitaria sanguinalis	60	Y	FACU
Erigeron canadensis	10	N	FACU
Phalaris arundinacea	5	N	FACW
Setaria pumila	5	N	FAC
	80	=Total Cover	
Vine Stratum (Plot size: 30 Ft)			
Echinocystis lobata	10	Y	FACW
	10	=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	10	x 3 =	30
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	95 (A)		340 (B)

Prevalence Index = B/A= 3.58

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test > 50%
- ____ Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (Include photo numbers here or on a separate sheet.)
The area is dominated by hydrophytic vegetation.

SOIL

Sampling Point: S-28

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 24	10YR 5 / 2	100		0			SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☑ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
The observed soil profile displayed a sandy matrix with no indicators of redox concentrations; hydric soil criteria is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):		
Water Table Present?	Yes ____	No X	Depth (inches):		
Saturation Present?	Yes ____	No X	Depth (inches):		

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is located in a slightly elevated position and fails to meet the FAC-Neutral Test. Wetland hydrology criteria is not met.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Omaha-MRWWTP City/County: Douglas County Sampling Date: 9/12/2014

Applicant/Owner: City of Omaha State: NE Sampling Point: S-29

Investigators: Ben Fisher Alex Fischer Section, Township, Range S 10 T 14N R 13E

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave

Slope(%): 0 Lat: 41.2000248285256 Long: -95.9295668317421 Datum: NAD 1983

Soil Map Unit Name: Urban land-Udorthents-Judson complex NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
The area characterized by this data form is a forested wetland located south of WOUS-1 and east of the emergent wetland described by S-25. The area is dominated by hydrophytic vegetation and displays indicators of hydric soil and wetland hydrology.

VEGETATION– Use scientific names of plants.

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum (Plot size: 30 Ft)			
Celtis occidentalis	40	Y	FAC
Morus rubra	5	N	FACU
	45	=Total Cover	
Shrub Stratum			
Herb Stratum			
Vine Stratum (Plot size: 30 Ft)			
Echinocystis lobata	100	Y	FACW
	100	=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	40	x 3 =	120
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	145 (A)		340 (B)

Prevalence Index = B/A= 2.34

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ____ Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (Include photo numbers here or on a separate sheet.)
The area was dominated by a vine that covered the entire ground surface and also some of the tree stratum. Hydrophytic vegetation criteria is met.

SOIL

Sampling Point: S-29

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc [2]	Texture	Remarks
0 to 6	10YR 3 / 1	100					SILT LOAM	
6 to 18	10YR 4 / 2	90	7.5YR 4/6	10	C	M	SILTY CLAY LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ Dark Surface (S7)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
The observed soil profile displayed a depleted matrix with redox concentrations. Hydric soil criteria is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☑ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surf. (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	_____	
Water Table Present?	Yes ____	No X	Depth (inches):	_____	
Saturation Present?	Yes ____	No X	Depth (inches):	_____	

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The area is located in a depression and is dominated by hydrophytic vegetation; wetland hydrology criteria is met.

Appendix B – Site Photographs

CSO! Program Office: Central Park Plaza, 222 S. 15TH St., Suite 1406S, Omaha, NE 68102
(402) 341-0235 • webmail@omahacso.com • www.omahacso.com

Photo 1. **S-01.** Emergent wetland located west of the parking/storage area. Orientation north.

Photo 2. S-02. Upland area located northwest of the wetland characterized by S-03. Orientation northwest.

Photo 3. S-03. Emergent wetland located along the west bank of the Missouri River. Orientation south.

Photo 4. S-04. Upland forested area west of emergent wetland characterized by S-03 and S-05. Orientation north.

Photo 5. S-05. View of the upland/wetland boundary near S-05. Orientation south.

Photo 6. S-06. Small upland area within the emergent wetland characterized by S-03 and S-05. Orientation north.

Photo 7. S-07. Upland forested area west of the emergent wetland described by S-03 and S-05. Orientation southwest.

Photo 8. S-08. Emergent wetland located along the bank of the Missouri River. Orientation north.

Photo 9. S-09. Upland area adjacent to the wetland characterized by S-08. Orientation southwest.

Photo 10. S-10. Emergent wetland located in isolated depression west of the Missouri River. Orientation north.

Photo 11. S-11. Upland area adjacent to the wetland described by S-10. Orientation south.

Photo 12. S-12. Scrub-shrub wetland adjacent to the emergent wetland characterized by S-13. Orientation northwest.

Photo 13. S-13. Emergent wetland located along the western bank of the Missouri River. Orientation north.

Photo 14. S-14. Scrub-shrub wetland located west of the emergent wetland described by S-13 and S-17. Orientation south.

Photo 15. S-15. Upland area adjacent to scrub-shrub wetland characterized by S-14 and S-16. Orientation northwest.

Photo 16. S-16. Scrub-shrub wetland located west of emergent wetland characterized by S-17. Orientation west.

Photo 17. S-17. Emergent wetland located along the western bank of the Missouri River. Orientation north.

Photo 18. S-18. Upland area adjacent to the emergent wetland characterized by S-17. Orientation south.

Photo 19. S-19. Scrub-shrub wetland south of S-17 and adjacent to forested wetland described by S-20. Orientation south.

Photo 20a. S-20a. Forested wetland situated along the bank of the Missouri River. Orientation southeast.

Photo 20b. S-20b. Forested wetland situated along the bank of the Missouri River, south of the forested wetland characterized by S-20a. Orientation southeast.

Photo 21. S-21. Upland area located along the western boundary of S-20 and S-22. Orientation south.

Photo 22. S-22. Scrub-shrub wetland located directly adjacent to the Missouri River. Orientation south.

Photo 23. S-23. Emergent wetland located south of S-22 and adjacent to forested wetland. Orientation south.

Photo 24. S-24. Emergent wetland located along the western bank of the Missouri River. Orientation south.

Photo 25. S-25. Emergent wetland located south of WOUS-1 and adjacent to forested wetland (S-26 and S-29). Orientation south.

Photo 26. S-26. Forested wetland located south of WOUS-1. Orientation east.

Photo 27. S-27. Forested wetland located along the western bank of the Missouri River. Orientation southeast.

Photo 28. S-28. Upland area that is elevated above the surrounding wetlands and appears to be a sand deposit from a past flood event. Orientation south.

Photo 29. S-29. Forested wetland south of WOUS-1. Orientation south.

Appendix C – Waters of the U.S. Data Form

CSO! Program Office: Central Park Plaza, 222 S. 15TH St., Suite 1406S, Omaha, NE 68102
(402) 341-0235 • webmail@omahacso.com • www.omahacso.com

WATERS OF THE U.S. DETERMINATION DATA FORM - *DRAFT*

Project/Site: MRWWTP	Date: 9/12/2014
Applicant/Owner: City of Omaha	County: Douglas
Investigator: Ben Fisher and Alex Fischer	State: NE
Details of Stream Crossing:	PLSS: Sec.03, T14N, R13E
	Coord.: 41.200283, -95.929405
	ID: WOUS-1
Is this watercourse named? ☐ Yes ☑ No	
Name(s): Unnamed	
Are wetlands associated with this watercourse? ☑ Yes ☐ No	

Physical Characteristics of the Ordinary High Water Mark

☑ Defined Bed And Bank	☑ Presence Of Litter/Debris	☐ Shelving
☐ Natural Line Impressed On Bank	☐ Presence Of Wrack Lines	☑ Scour
☐ Sediment Sorting	☑ Vegetation Matted Down, Bent, Or Absent	☐ Deposition
☐ Changes In Character Of Soil	☐ Leaf Litter Disturbed Or Washed Away	☐ Water Staining
☐ Destruction Of Terrestrial Vegetation	☐ Multiple Observed Flow Events	☐ Change In Plant Community

Remarks: The drainage characterized by this data form is an unnamed tributary to the Missouri River. The drainage displayed several indicators of an Ordinary High Water Mark. The drainage coveys flow to the Missouri River and forested wetlands are associated with the drainage.

Hydrologic Data

Flow regime:

- ☐ Perennial flow
- ☑ Intermittent flow
- ☐ Ephemeral flow

Data sources: The drainage is unmapped by NHD

Direct observation

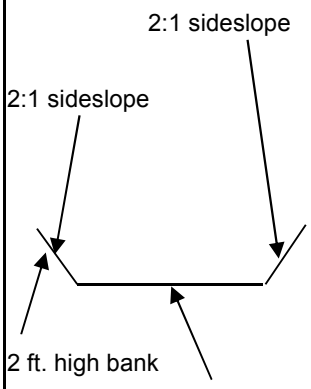
- ☐ Gaging Station:
- ☐ Other:

Indirect knowledge

- ☐ USGS mapping:
- ☐ USDA mapping: --
- ☐ Other:

Site Sketch/Photo

Typical Channel X Section
(facing upstream)



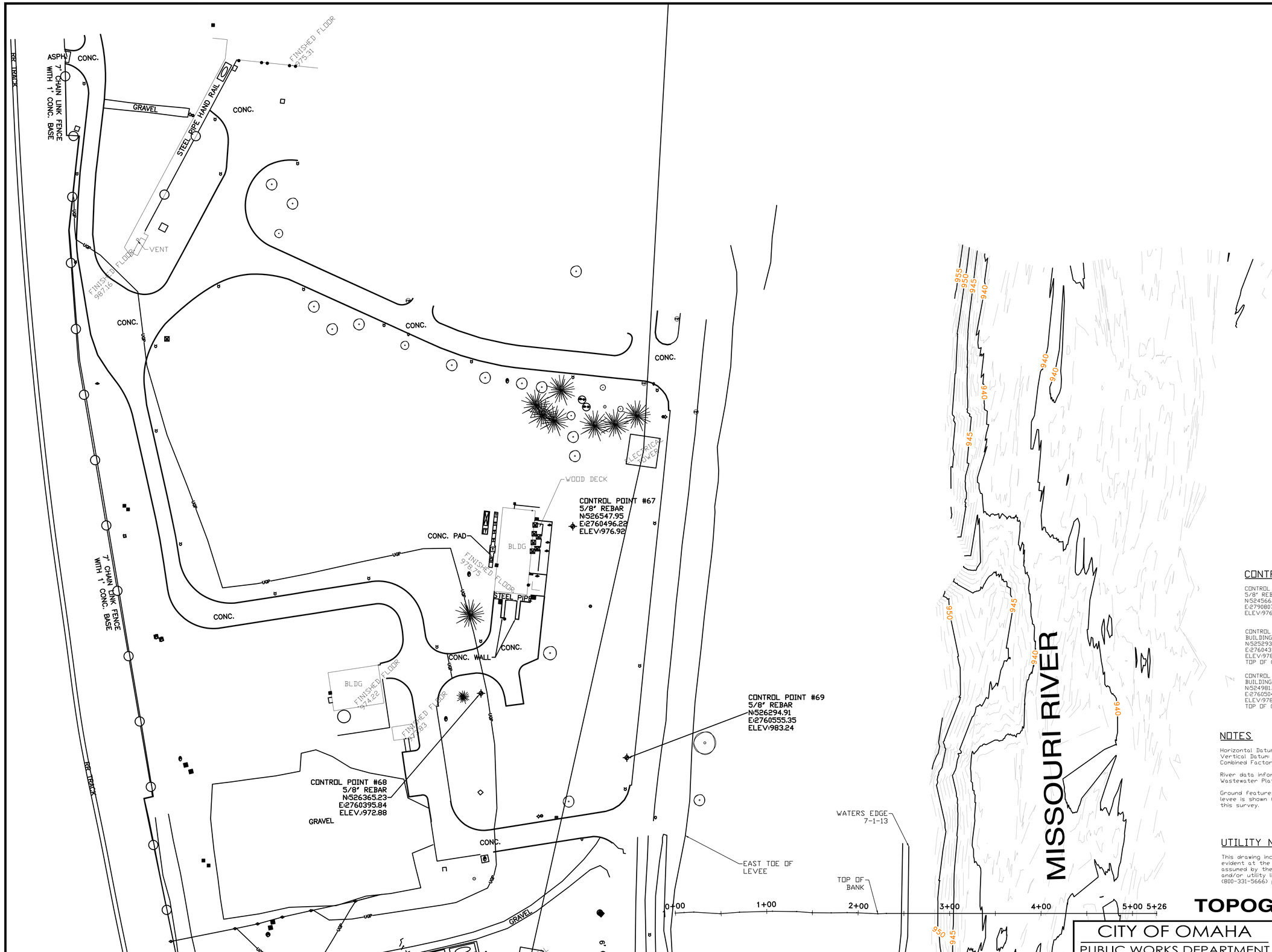
Southern end of the MRWWTP Bank Stabilization Alignment looking north

Southern end of the MRWWTP Bank Stabilization Alignment looking north

Looking South along the alignment from a point south of CSO 102 Outfall

Looking South along the alignment from a point south of CSO 102 Outfall

Near CSO 102 Outfall



N

50 25 0 50

GRAPHIC SCALE : FEET

LEGEND

- BUILDING OVERHANG
- OHP — OVERHEAD POWER
- UGP — UNDERGROUND POWER
- FISSURE EDGES
- A/C
- GRATE INLET
- POWER POLE
- INFORMATION SIGN
- LIGHT POLE
- MANHOLE
- WATER VALVE
- FIRE HYDRANT
- POWER MANHOLE
- POWER PULLBOX
- RISER TELEPHONE
- UNIDENTIFIED RAISER
- GUARD POST
- GAS METER
- SPRINKLER BOX
- POWER RAISER
- POWER TRANSFORMER
- GAS VENT
- CLEANOUT
- FUEL CAP
- VENT FUEL
- VALVE WATER CURB STOP
- UNIDENTIFIED VALVE
- GAS VALVE
- PULLBOX UNIDENTIFIED
- BUILDING COLUMN
- WATER METER
- EYE WASH STATION
- GAS VALVE CURB STOP
- FLAG POLE
- FLARED END SECTION
- SHUT OFF WHEEL
- DECIDUOUS TREE
- PINE TREE
- BUSH

CONTROL POINTS

CONTROL POINT #61 5/8" REBAR N:524566.23 E:2790807.07 ELEV:976.30	CONTROL POINT #69 5/8" REBAR N:526294.91 E:2760555.35 ELEV:983.24	CONTROL POINT #67 5/8" REBAR N:526547.95 E:2760496.22 ELEV:976.92
CONTROL POINT BUILDING CORNER #1 N:525293.93 E:2760433.90 ELEV:978.29 TOP OF CONCRETE	CONTROL POINT #66 5/8" REBAR N:526053.50 E:2760275.68 ELEV:986.62	CONTROL POINT #68 5/8" REBAR N:526365.23 E:2760395.84 ELEV:972.88
CONTROL POINT BUILDING CORNER #2 N:524981.85 E:2760504.49 ELEV:978.22 TOP OF CONCRETE	CONTROL POINT #HV1 3/4" PT N:524407.59 E:2760484.28 ELEV:976.05	CONTROL POINT #HV1000 CHISLED X N:525688.21 E:2760325.81 ELEV:978.66

NOTES

Horizontal Datum: NE State Plane, NAD 83, Modified to Ground.
Vertical Datum: NGVD 29
Combined Factor: 0.99962746947

River data information provided by US Army Corps of Engineers Wastewater Plat revetment project dated May 9, 2013.

Ground features & spot elevation information west of east toe of levee is shown for graphical representation only & was not a part of this survey.

UTILITY NOTES

This drawing includes observed evidence of services and utilities evident at the time of survey only. No responsibility or liability is assumed by the surveyor for the failure to show any buried service and/or utility lines even though they may exist. Contact 'One Call' (800-331-5666) prior to any excavation on this site.

TOPOGRAPHIC SURVEY

CITY OF OMAHA
PUBLIC WORKS DEPARTMENT

OPW 51875

SHEET 1 / 6

FILENAME: L:\Engineering\06063.49\SURVEY\DRAWINGS\0663-49MRWWTP.dwg
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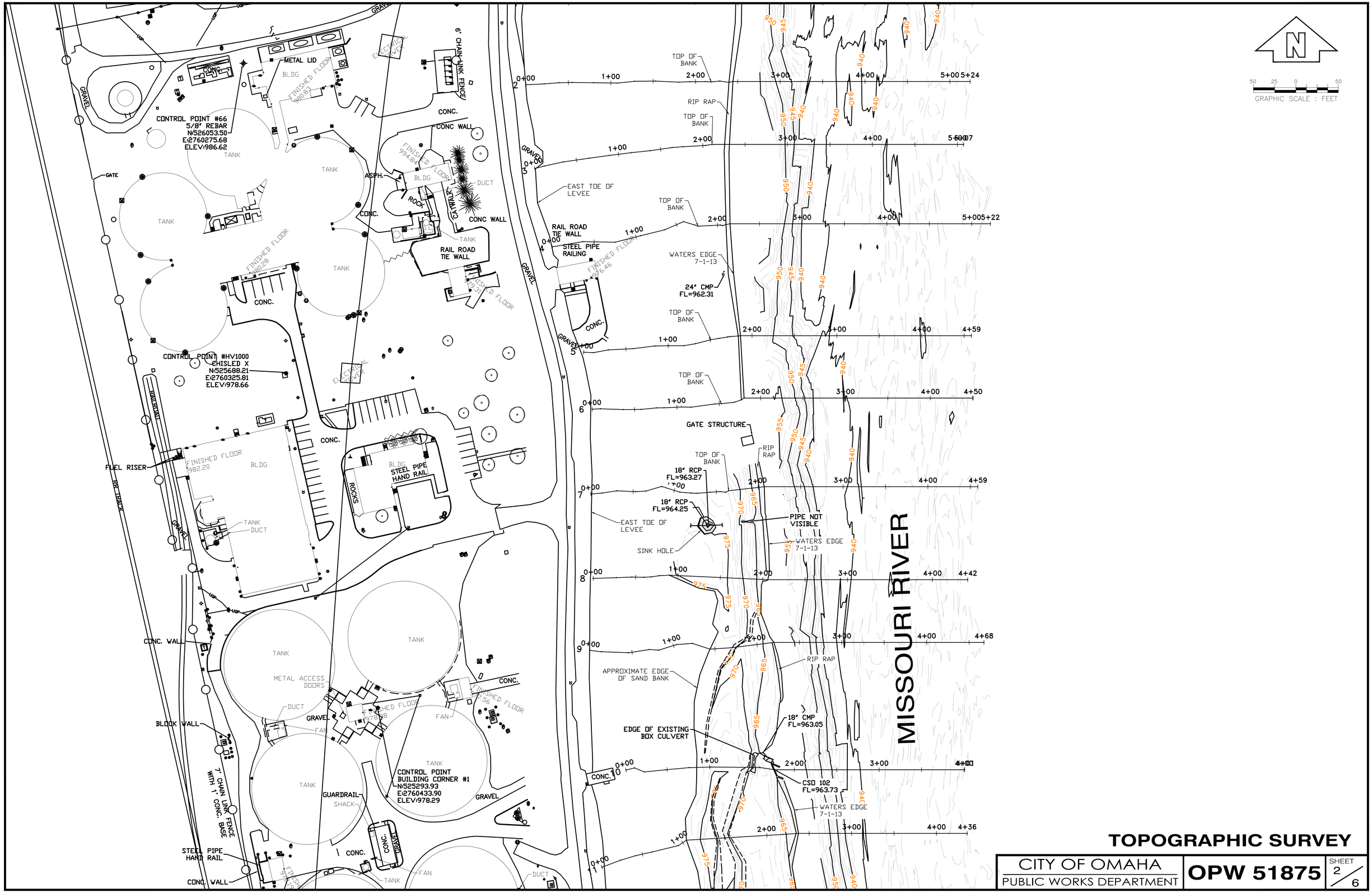

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TOPOGRAPHIC SURVEY

CITY OF OMAHA PUBLIC WORKS DEPARTMENT	OPW 51875	SHEET 2 / 6

TOPOGRAPHIC SURVEY

CITY OF OMAHA PUBLIC WORKS DEPARTMENT	OPW 51875	SHEET 3/6

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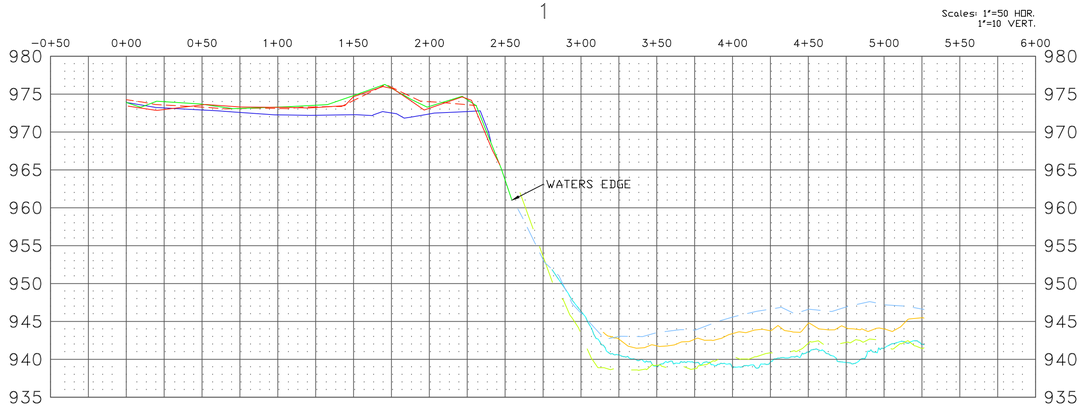

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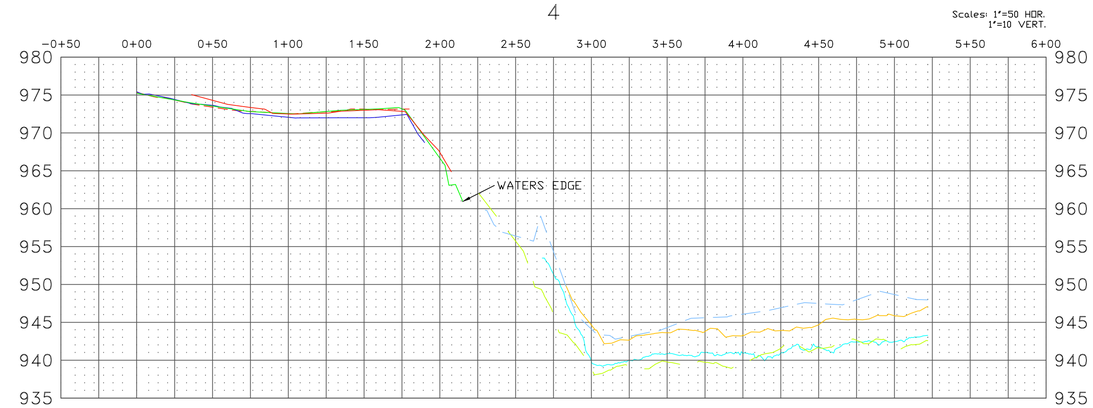

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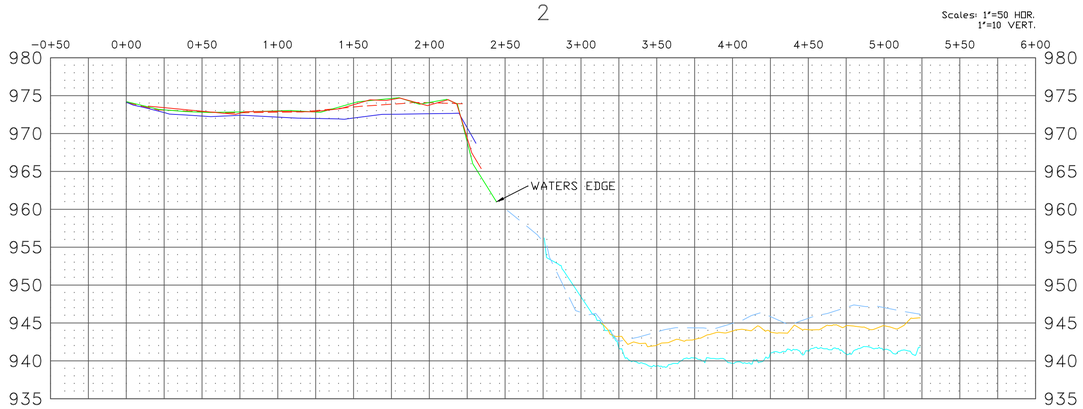

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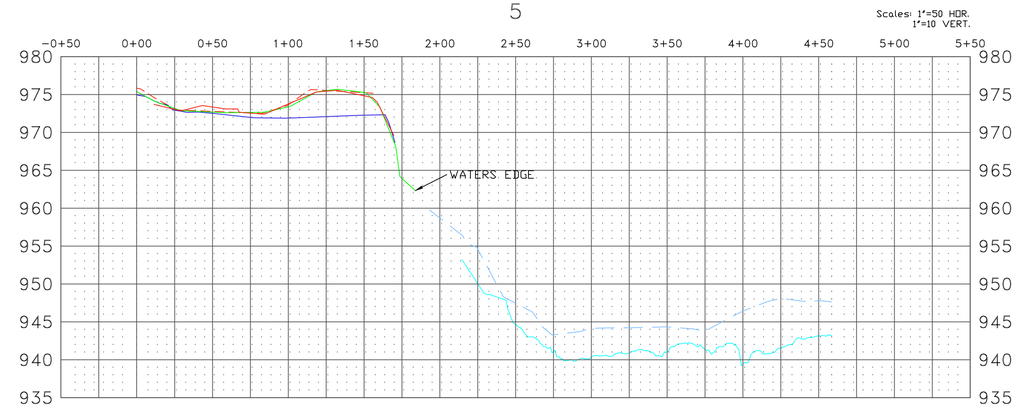

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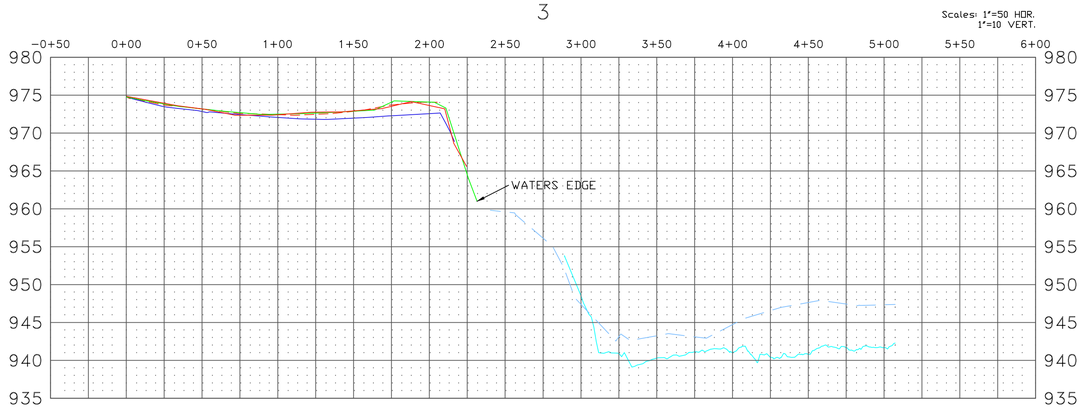

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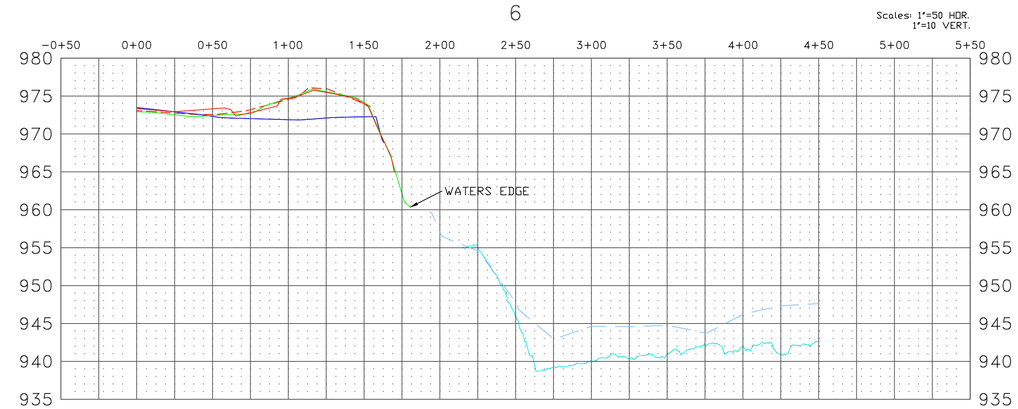

LEGEND

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- MAY 2013 CORPS OF ENGINEERS SURFACE
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- SEPTEMBER 2014 SURFACE

TOPOGRAPHIC SURVEY

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SHEET 4/6

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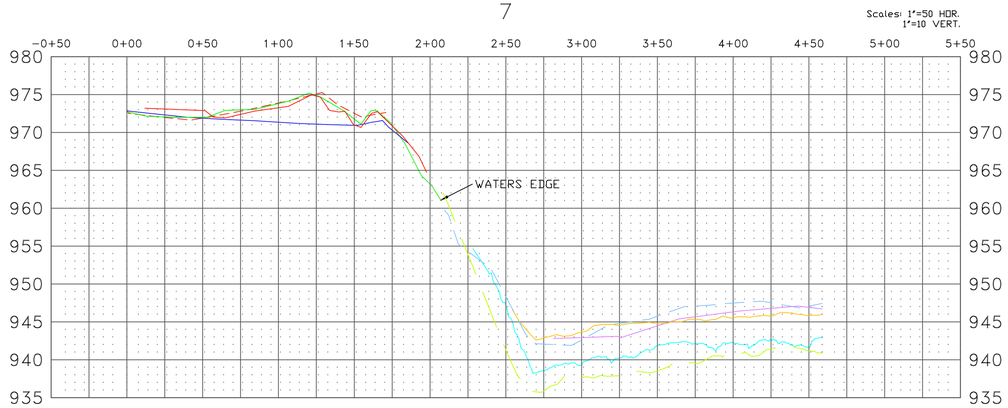

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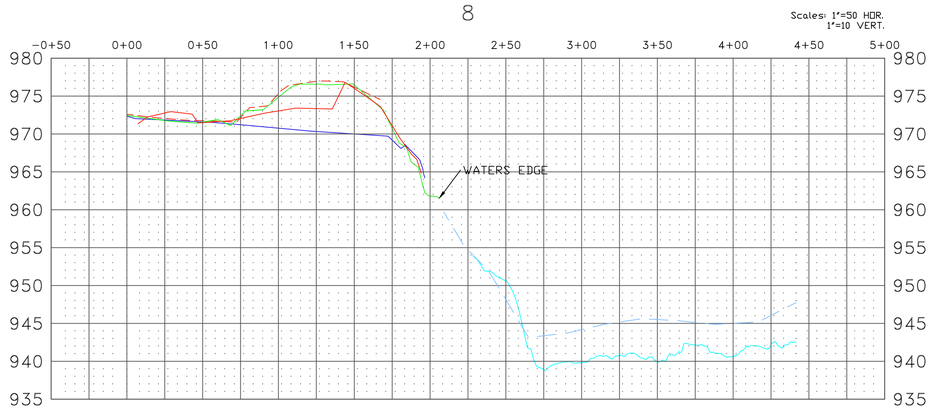

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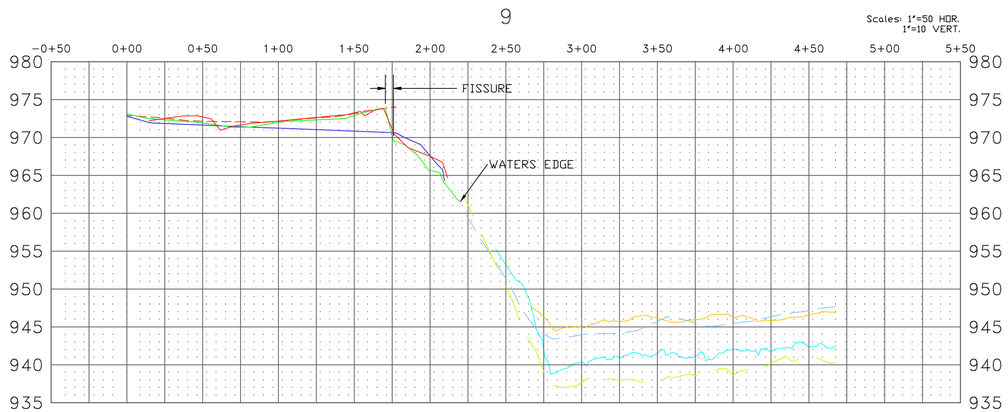

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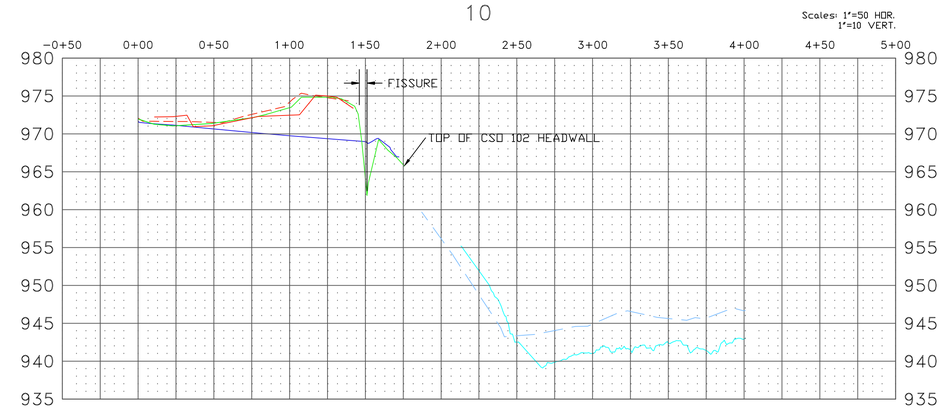

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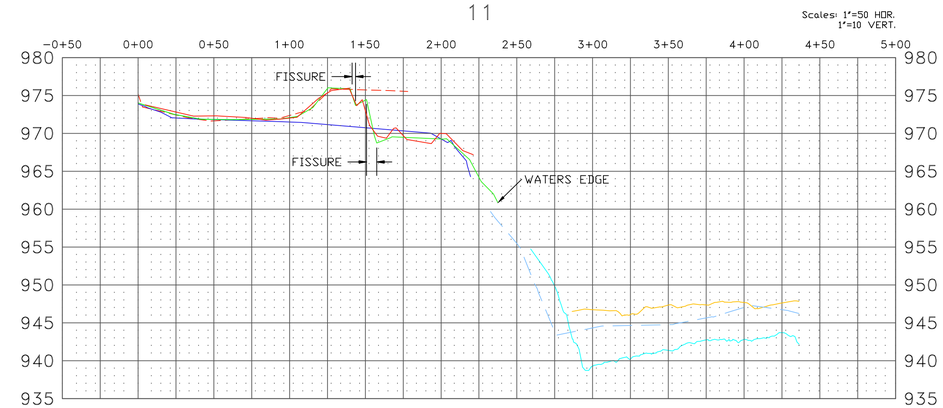

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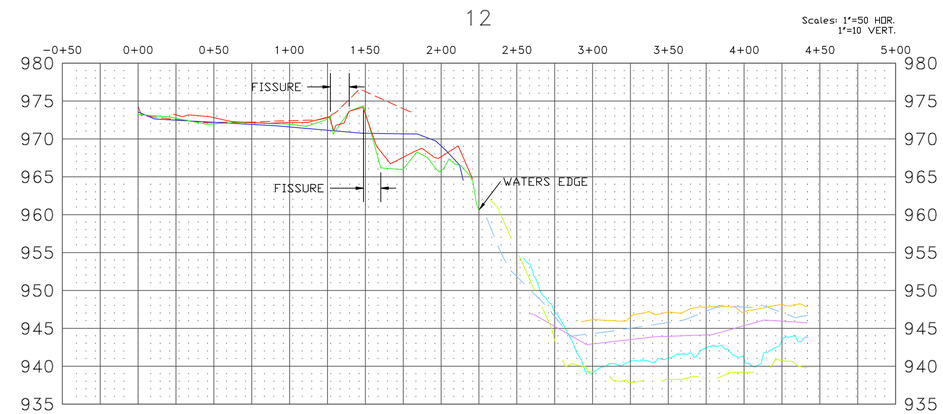

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SHEET 5/6

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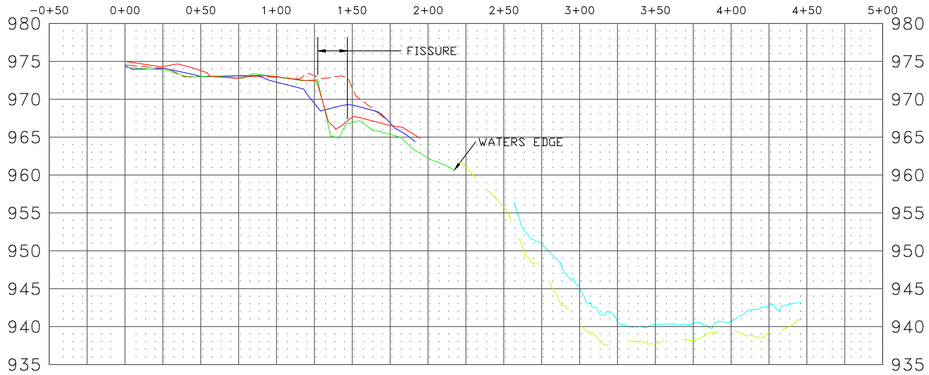
1"=10 VERT.



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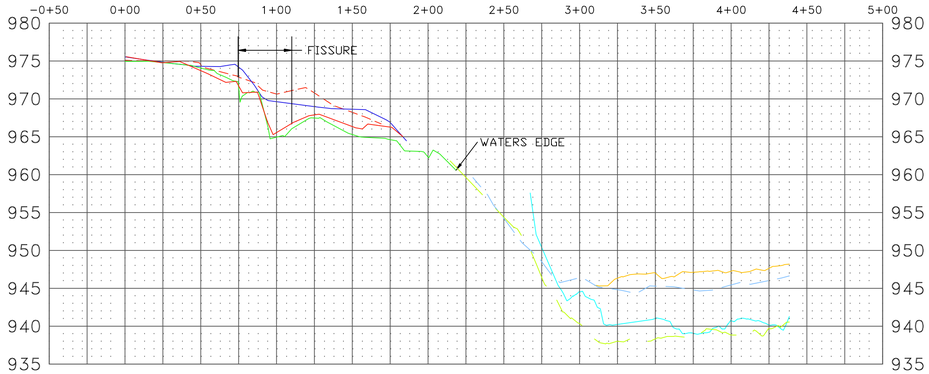

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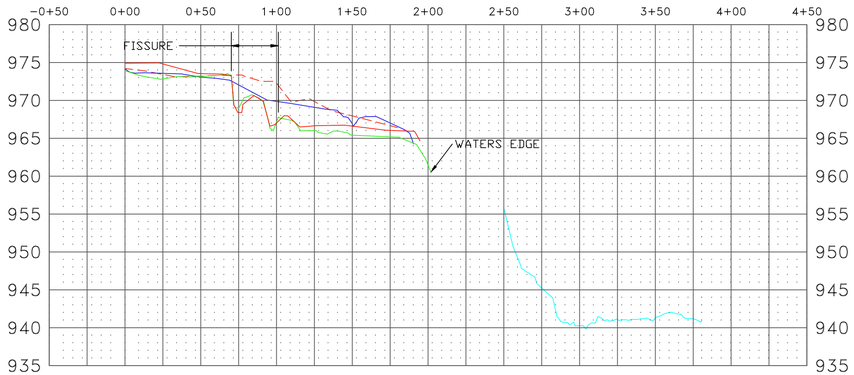

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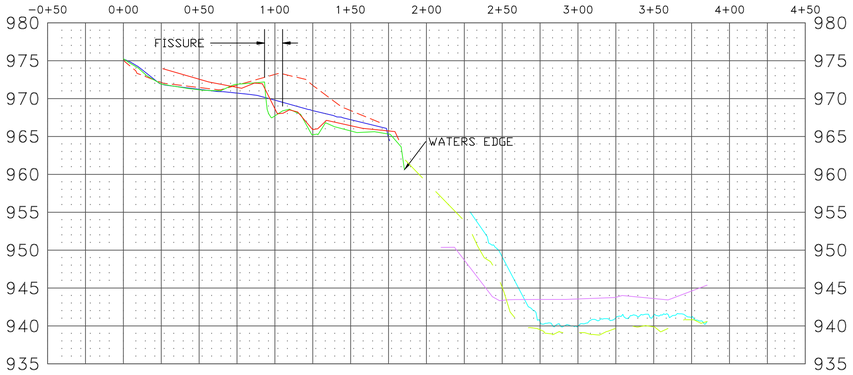

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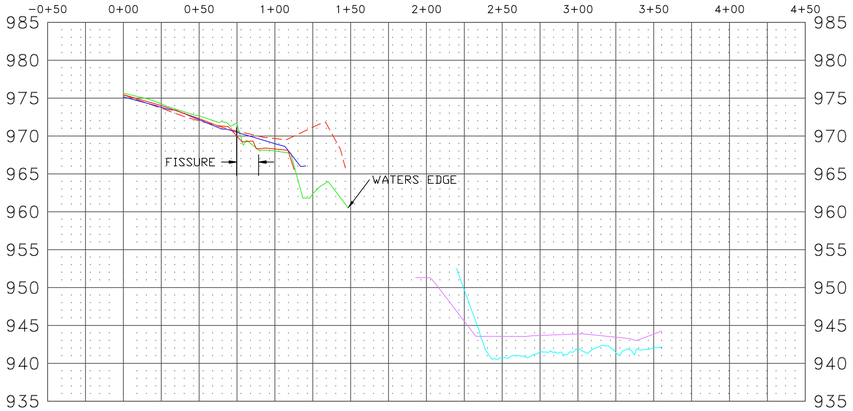

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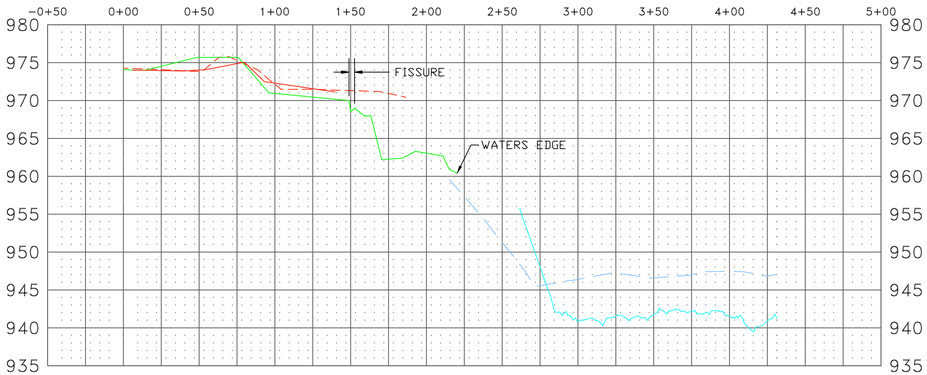

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