Agenda Item: 7.

MEMORANDUM

TO: Programs, Projects and Operations Subcommittee

FROM: Martin P. Cleveland, Construction Engineer

SUBJECT: Big Papio Channel Re-stabilization Project
(105th Street to Pacific Street)
Construction Bids

DATE: January 3, 2012

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Attached is a location map and plan sheets that show the proposed project features. The original stabilization project (gabion basket wall) was built in 1999 as part of the Big Papio Channel Project to stabilize the outside (right bank) of the Big Papio Creek low flow channel. After the 2010 high water season it was noticed that a portion (196 feet of 400 feet) of the gabion basket structure had rotated towards the creek, likely due to undercutting of the creek bank during the 2010 high water events.

HDR Engineering was hired by the District in May 2011 and has evaluated the gabion basket rotation and developed a Re-stabilization Project consisting of replacing the rotated gabions and installing a steel sheet pile wall along the creek side edge of the new and existing (non-rotated) gabions to protect the creek bank and gabion wall from future undercutting by creek erosion. The steel pile wall includes driving steel sheets down to bedrock (about 25 feet deep).

The District opened construction bids for the referenced project on December 27, 2011 that includes installing 196 linear feet of gabion wall and 414 linear feet of sheet pile wall. Enclosed are bid summary sheets. The District received 5 bids for the project. The apparent low bidder is Chas. Vrana and Son Construction Co. with a total base bid of $387,301.00 and alternate bid of $12,600.00. The Engineer's opinion of cost was $439,900.00 for the base bid and $ 6,000.00 for the alternate bid.

The alternate bid was for the removal of estimated 2000 cubic yards of sediment on the right bank of the creek, working downstream from 105th Street to Pacific Street and between the Big Papio Trail and low flow channel edge. Since 1999, high water events have deposited over 2 feet of sediment above the trail elevation and in effect made the trail the low spot on the berm and the trail is frequently covered with ponded water after rain events. The contractor will load City of Omaha dump trucks that will haul the soil to

a park soil stock pile site. City of Omaha agreed to provide dump trucks to haul the sediment material, as this will greatly enhance City's trail drainage and use.

This work will be funded via funds included in Project Maintenance General Contract Work (Account 0103591 4479). As of November 30, 2011 remaining funds in this account was $1,626,626.49. It is anticipated that this project will be completed in Fiscal Year 2012.

**It is Management's recommendation that the Subcommittee recommend to the Board of Directors that the General Manager be authorized to execute a contract for Big Papio Channel Re-stabilization Project with Chas. Vrana and Son Contruction Co., for their total base bid of $387,301 and alternate bid of $12,600.00 for a grand total cost of $399,901.**

212 MC:pb file 531 Reach 6-4A

# Summary of Bid Proposals

Project: Big Papio Creek Bank Re-stabilization Project — NRD Project No. 531A

Opening Date: December 27, 2011 — Opening Time: 10:00 a.m.

| | | | | 1 | | 2 | | 3 | | 4 | | 5 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BIDDERS NAME: | | | | ME Collins | | Vrana Const. | | Valley Corp | | Nelson & Rock | | McC, LLC | | Engineer's Opinion of Cost | |
| ITEM NO. | ITEM | QTY. | UNIT | UNIT PRICE | AMOUNT | UNIT PRICE | AMOUNT | UNIT PRICE | AMOUNT | UNIT PRICE | AMOUNT | UNIT PRICE | AMOUNT | UNIT COST | AMOUNT |
| 1 | Mobilization and Demobilization | 1 | LS | 27,690 | 27,690 | 20,000 | 20,000 | 9,707.38 | 9,707.38 | 20,000 | 20,000 | 20,000 | 20,000 | 20,945 | 20,945 |
| 2 | Erosion Control | 1 | LS | 7,185 | 7,185 | 14,400 | 14,400 | 44,484.19 | 44,484.19 | 50,000 | 50,000 | 41,000 | 41,000 | 8,200 | 8,200 |
| 3 | Sheet Pile Wall | 414 | LF | 946 | 391,644 | 685 | 283,590 | 1,272.41 | 526,777.74 | 837.50 | 346,725 | 900 | 372,600 | 800 | 331,200 |
| 4 | Gabion Wall | 196 | LF | 450 | 88,200 | 350 | 68,600 | 617.87 | 121,122.12 | 200 | 39,200 | 426.50 | 83,594 | 396 | 77,616 |
| 5 | Seeding | 0.9 | AC | 4,300 | 3870 | 790 | 711 | 26,819.24 | 24,137.32 | 10,000 | 9,000 | 27,588 | 24,829.20 | 2,100 | 1,890 |
| 6 | Total Base Bid (1 thru 5) | | | | 518,589 | | 387,301 | | 726,228.75 | | 464,925 | | 542,023.20 | | 439,900 |
| 7 | Sediment Removal (Alternate) | | | | 10,500 | | 12,600 | | 6,484.30 | | 30,000 | | 12,000 | | 6,000 |
| 8 | Grand Total (6+7) | | | X | 529,089 | X | 399,901 | X | 732,713.05 | X | 494,925 | X | 554,023.20 | X | 445,900 |
| Bid Bond (5%) Yes/No | | | | Yes | | Yes | | Yes | | Yes | | | | | |

Note: LF: Linear Feet LS: Lump Sum AC: Acre

*Apparent Low Bidder is Chas. Vrana and Son Construction Co.

46511 MC:pb file 531A

HDR ONE COMPANY | *Many Solutions*

December 5, 2012

Mr. Martin Cleveland, Construction Engineer
Papio-Missouri River Natural Resources District
8901 South 154th Street
Omaha, NE 68138-3621

RE: Big Papillion Creek at 105th & Pacific Streets Low Flow Channel Re-Stabilization
Recommendation of Contractor Award

Dear Mr. Cleveland:

Bids were received for the re-stabilization of the low flow channel along the Big Papillion Reek between 105th and Pacific Streets on December 27, 2011. Per the attached bid tabulation, five bidders submitted bids. The apparent low bid was submitted by Vrana Construction in the amount of $387,301 for the base bid. Vrana Construction also submitted the lowest bid for the base bid and the alternate sediment removal in the amount of $399,901. The apparent low bid was below the Engineer's opinion of probable construction cost of $445,900.

We recommended a contract be awarded to Vrana Construction in the total of amount of $399,901.

If you have any questions do not hesitate to contact me at (402) 399-1078.

Very truly yours,
HDR ENGINEERING, INC.

Laurie Carrette Zook

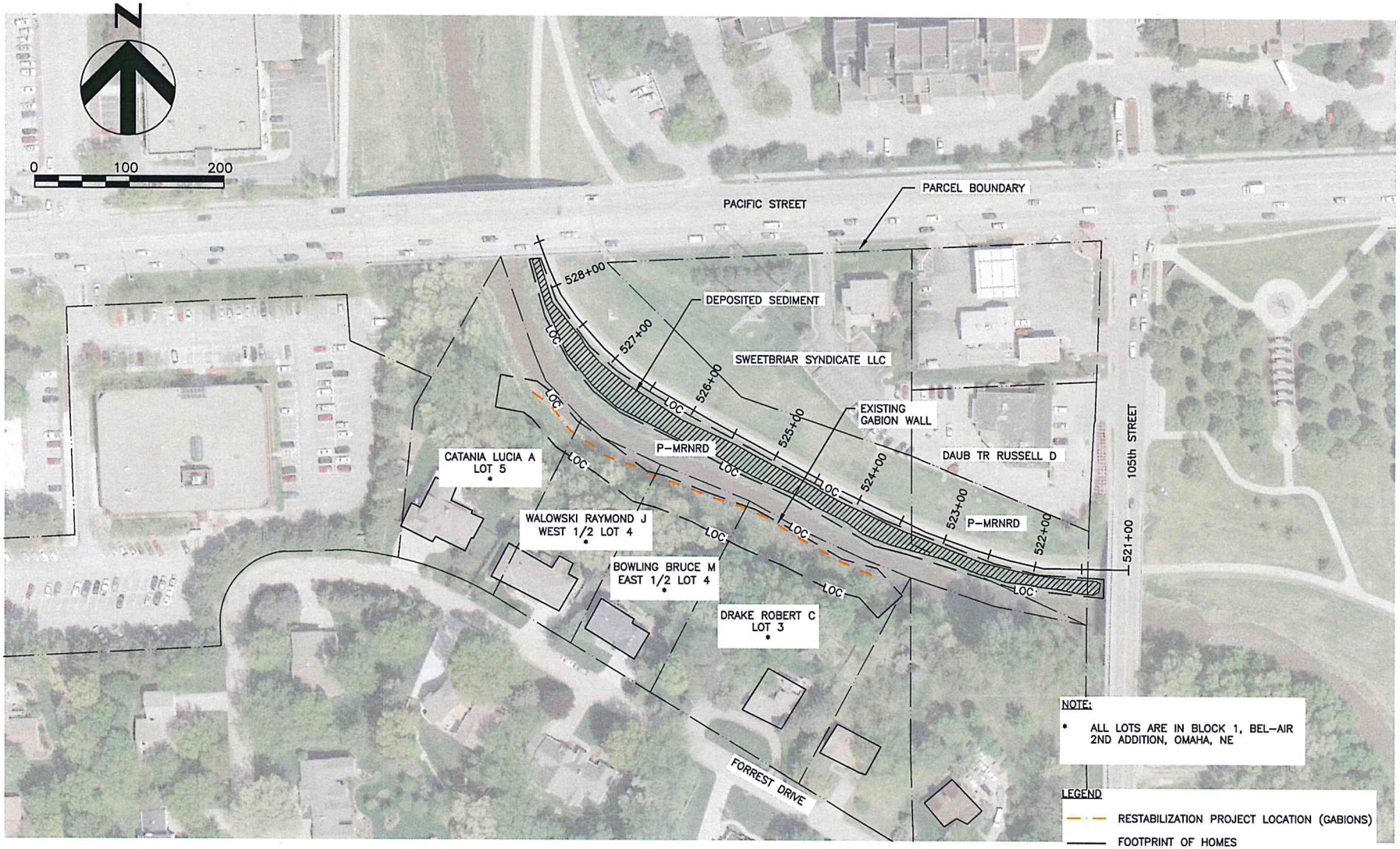
Laurie Carrette Zook, P.E.
Project Manager

Enclosure

HDR Engineering, Inc.

8404 Indian Hills Drive
Omaha, NE 68114-4098

Phone: (402) 399-1000
Fax: (402) 399-1238
www.hdrinc.com




NOTE:

* ALL LOTS ARE IN BLOCK 1, BEL-AIR 2ND ADDITION, OMAHA, NE

LEGEND

- RESTABILIZATION PROJECT LOCATION (GABIONS)
- FOOTPRINT OF HOMES
- LOC LIMITS OF CONSTRUCTION

SOURCE:
1. MAPA, DOUGLAS COUNTY, NE 2010 AERIAL
2. DOUGLAS COUNTY GIS SITE AT WWW.DCGIS.ORG/DOGIS/, WITH ADJUSTMENTS BASED ON PARTIAL LEGAL DESCRIPTIONS

EXISTING SITE PLAN

| | JSA | Date |
|---|---|---|
| Designed | | 11/2011 |
| Drawn | CMJ | 11/2011 |
| Checked | LACZ | 11/2011 |
| Approved | - | |

LOW-FLOW CHANNEL RESTABILIZATION
BIG PAPILLION CREEK
DOUGLAS COUNTY, NEBRASKA

HDR
HDR Engineering, Inc.

PAPIO - MISSOURI RIVER NATURAL RESOURCES DISTRICT

File No.
Sheet 3

Drawing No.
3

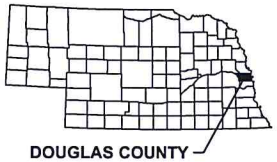
Sheet
3 of 9

# LOW-FLOW CHANNEL RESTABILIZATION
# BIG PAPILLION CREEK-
# BETWEEN PACIFIC AND 105TH STREETS
# PAPILLION CREEK WATERSHED

## DOUGLAS COUNTY, NEBRASKA

**SPONSORED BY: THE PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT**

*NEBRASKA*




**DESIGNED BY: HDR ENGINEERING, INC.**
**OMAHA, NEBRASKA**

**Final Drawings**
**December 2011**

*LOCATION MAP*

*SHEET INDEX*



| SHEET NO. | SHEET TITLE |
|---|---|
| 1 | COVER SHEET |
| 2 | GENERAL SHEET |
| 3 | EXISTING SITE PLAN |
| 4 | PROPOSED SITE PLAN AND PROFILE |
| 5 | TYPICAL SECTIONS AND DETAILS |
| 6 | TYPICAL DETAILS |
| 7 | CROSS SECTIONS (1 of 2) |
| 8 | CROSS SECTIONS (2 of 2) |
| 9 | GEOLOGICAL INFORMATION |



*THESE CONFORMED DRAWINGS WERE ORIGINALLY APPROVED AND SEALED ON DECEMBER 2, 2011 BY LAURIE CARRETTE, A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF NEBRASKA (E-6814).*

PROFESSIONAL CIVIL ENGINEER
LAURIE A. CARRETTE
E-6814
STATE OF NEBRASKA

PROJECT LOCATED
SECTIONS 21 AND 28; T 15 N; R 12 E

COVER SHEET

| | | Date |
|---|---|---|
| Designed | JSA | 11/2011 |
| Drawn | CMJ | 11/2011 |
| Checked | LAC2 | 11/2011 |
| Approved | - | |

LOW-FLOW CHANNEL RESTABILIZATION
BIG PAPILLION CREEK
DOUGLAS COUNTY, NEBRASKA

HDR
HDR Engineering, Inc.

PAPIO - MISSOURI RIVER NATURAL RESOURCES DISTRICT

File No.
Sheet 1

Drawing No.
1

Sheet
1 of 9

## LEGEND AND SYMBOLS

BOUNDARIES

| | |
|---|---|
| PARCEL BOUNDRY | ——— · · ——— |
| SEEDING AREA | ——S——S—— |
| LIMITS OF CONSTRUCTION | —— LOC —— LOC —— |

## SEQUENCING NOTES

1. INSTALL SHEET PILES BEGINNING ON UPSTREAM END OF EXISTING GABIONS.
2. CONTINUE INSTALLATION OF SHEET PILES UNTIL REACHING THE FAILED GABIONS (APPROX. STA 525+80).
3. REMOVE FAILED GABIONS.
4. INSTALL REMAINDER OF SHEET PILES TO END OF PROJECT.
5. INSTALL NEW GABIONS TO END OF PROJECT.
6. BACKFILL WALL AND REGRADE SLOPE.
7. SEED DISTURBED AREAS.

## TABLE OF QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| MOBILIZATION AND DEMOLIZATION | LUMP SUM | 1 |
| EROSION CONTROL | LUMP SUM | 1 |
| SHEET PILE WALL (25' MIN. LENGTH) | LF | 414 |
| GABION WALL | LF | 196 |
| GRANULAR FILL | TON | 485 |
| NON-WOVEN GEOTEXTILE | SY | 395 |
| BACKFILL | CY | 175 |
| SEEDING | AC | 0.9 |
| SEDIMENT REMOVAL (ALTERNATE) | LS | 1 |

## CONSTRUCTION NOTES

1. THE PROJECT INVOLVES THE RESTABILIZATION OF THE LOW-FLOW CHANNEL ALONG THE BIG PAPILLION CREEK, BETWEEN 105TH AND PACIFIC STREETS WITH A SHEET PILE TOE PROTECTION SYSTEM. THE SYSTEM CONSISTS OF SHEET PILES DRIVEN TO BEDROCK AND THE PLACEMENT OF GABIONS BEHIND THE SHEET PILES.
2. THE CONTRACTOR SHALL SUBMIT A PROPOSED CONSTRUCTION SCHEDULE TO THE ENGINEER WITHIN 15 DAYS OF NOTICE TO PROCEED. THE SCHEDULE SHALL BE UPDATED MONTHLY TO SHOW WORK COMPLETED AND TO REVISE THE PROJECT COMPLETION DATE.
3. THE CONTRACTOR SHALL SUBMIT A CONSTRUCTION WORK PLAN TO THE ENGINEER WITHIN 15 DAYS PRIOR TO COMMENCING WORK. THE WORK PLAN SHALL INCLUDE THE PROPOSED METHODS AND EQUIPMENT TO INSTALL THE SHEET PILE WALL FROM THE NORTH SIDE OF THE CREEK AND THE PROPOSED METHODS AND EQUIPMENT TO INSTALL THE GABION WALL. CONTRACTOR SHALL VERIFY THAT PROPOSED CONSTRUCTION METHOD (EQUIPMENT AND OPERATOR) WILL NOT DESTABILIZE THE EMBANKMENT SLOPE ON THE NORTH SIDE.
4. THE CONTRACTOR WILL INSPECT THE CONSTRUCTION AREA FOR THE PRESENCE OF UTILITY FACILITIES BOTH SURFACE AND SUBSURFACE, AND WILL NOTIFY THE NEBRASKA ONE CALL SYSTEM. PHONE: 1-800-331-5666
5. THE CONTRACTOR'S ACCESS POINTS TO THE SITE ARE SHOWN ON THE COVER SHEET DRAWING.
6. THE CONTRACTOR'S EQUIPMENT IS TO BE RELOCATED TO THE STAGING AREAS DURING PERIODS OF NO CONSTRUCTION ACTIVITY. LARGE EQUIPMENT THAT IS TO DIFFICULT TO RELOCATE MAY BE ALLOWED ON THE CONSTRUCTION AREA PROVIDING IT IS PARKED IN A LOCATION THAT CREATES NO HAZARD.
7. THE USE OF HEAVY EQUIPMENT (NOTHING HEAVIER THAN A SKID STEER LOADER) AND STOCKPILING OF MATERIALS ON THE SOUTH SLOPE ABOVE THE PROPOSED GABIONS AND SHEET PILES IS PROHIBITED.
8. AREAS HAVE BEEN MADE AVAILABLE FOR CONTRACTOR'S STAGING AND STORAGE. THESE AREAS ARE SHOWN ON THE COVER SHEET DRAWING. THESE AREAS SHALL BE RESTORED TO ORIGINAL CONDITION UPON COMPLETION OF USE.
9. MATERIALS TO BE SALVAGED FOR REUSE (GABION STONE FILL) SHALL BE CLEANED AND STORED IN APPROVED AREAS. DISPOSAL OF WASTE MATERIALS SHALL BE OFF-SITE AND DISPOSED OF PROPERLY.
10. CONTRACTOR SHALL ERECT TRAFFIC CONTROL DEVICES ALONG THE BIG PAPILLION CREEK RECREATION TRAIL RESTRICTING PUBLIC ACCESS WHEN THE CONTRACTOR IS PRESENT.
11. CONTRACTOR SHALL USE CARE WHEN OPERATING EQUIPMENT ALONG THE BIG PAPILLION CREEK RECREATION TRAIL. ANY DAMAGE RESULTING FROM CONSTRUCTION ACTIVITY SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
12. EXISTING TOPOGRAPHIC INFORMATION FOR THE PROJECT IS FROM FIELD SURVEYS CONDUCTED BY P-MRNRD ON NOVEMBER 2010 AND APRIL 2011. SURVEY BASED ON NATIONAL GEODETIC SURVEY DATUM.
13. THE HORIZONTAL CONTROL IS BASED ON MODIFIED STATE PLANE COORDINATES.
14. THE ENGINEER SHALL STAKE THE ALIGNMENT OF THE SHEET PILE WALL AT THE BEGINNING OF THE PROJECT. ANY RESTAKING WILL BE THE RESPONSIBILITY OF THE CONTACTOR.
15. CONTRACTOR SHALL REMOVE AND REPLACE EXISTING ROCK RIPRAP AS NECESSARY TO INSTALL SHEET PILES.
16. THE CONTRACTOR SHALL NOT DISTURB ANY AREAS BEYOND THE LIMITS OF CONSTRUCTION. ALL DISTURBED AREAS SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER, SEEDED AND COVERED WITH AN EROSION CONTROL BLANKET. A TURF REINFORCING MAT SHALL BE INSTALLED BEHIND THE NEW GABION WALL SECTION.
17. NO TREES SHALL BE CUT OR REMOVED FROM THE SITE UNLESS APPROVED BY THE ENGINEER.
18. NO EXCAVATION FOR THE GABIONS AND BACKFILL SHALL REMAIN OPEN OVERNIGHT.

PROFESSIONAL CIVIL ENGINEER
LAURIE A. CARRETTE
E-6814
STATE OF NEBRASKA

GENERAL SHEET

| | | Date |
|---|---|---|
| Designed | JSA | 11/2011 |
| Drawn | CMJ | 11/2011 |
| Checked | LACZ | 11/2011 |
| Approved | - | |

LOW-FLOW CHANNEL RESTABILIZATION
BIG PAPILLION CREEK
DOUGLAS COUNTY, NEBRASKA

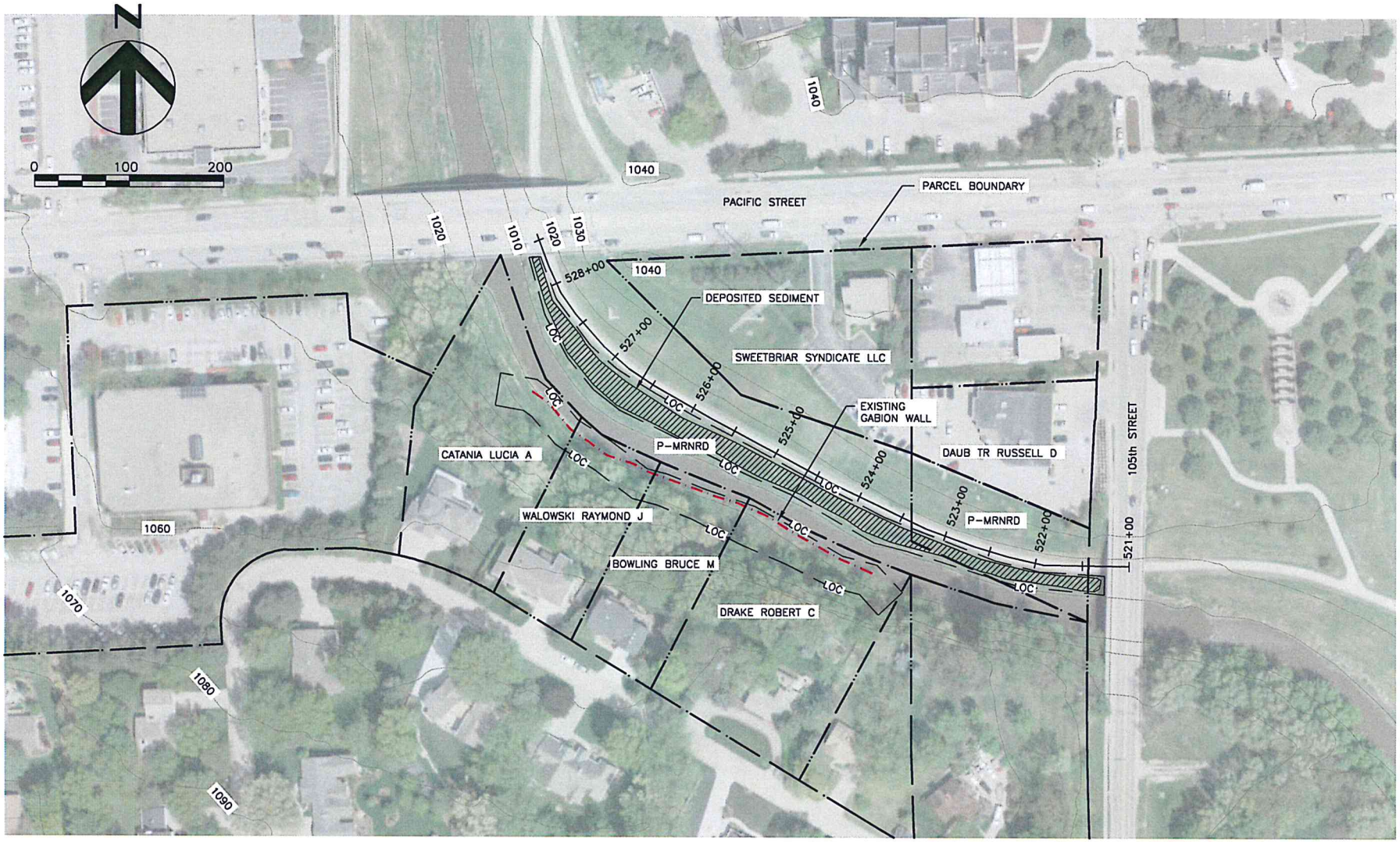
HDR
HDR Engineering, Inc.

PAPIO - MISSOURI RIVER NATURAL RESOURCES DISTRICT

File No.
Sheet 2

Drawing No.
2

Sheet
2 of 9




SOURCE: MAPA, DOUGLAS COUNTY, NE 2010 AERIAL
P-MRNRD, TOPOGRAPHIC SURVEY, NOV. 2010 AND APRIL 2011
COORDINATES ARE NAD 1983 STATE PLANE NEBRASKA FIPS 2600 FT

PROFESSIONAL CIVIL ENGINEER
LAURIE A. CARRETTE
E-6814
STATE OF NEBRASKA

EXISTING SITE PLAN

| | | Date |
|---|---|---|
| Designed | JSA | 11/2011 |
| Drawn | CMJ | 11/2011 |
| Checked | LACZ | 11/2011 |
| Approved | - | |

LOW-FLOW CHANNEL RESTABILIZATION
BIG PAPILLION CREEK
DOUGLAS COUNTY, NEBRASKA

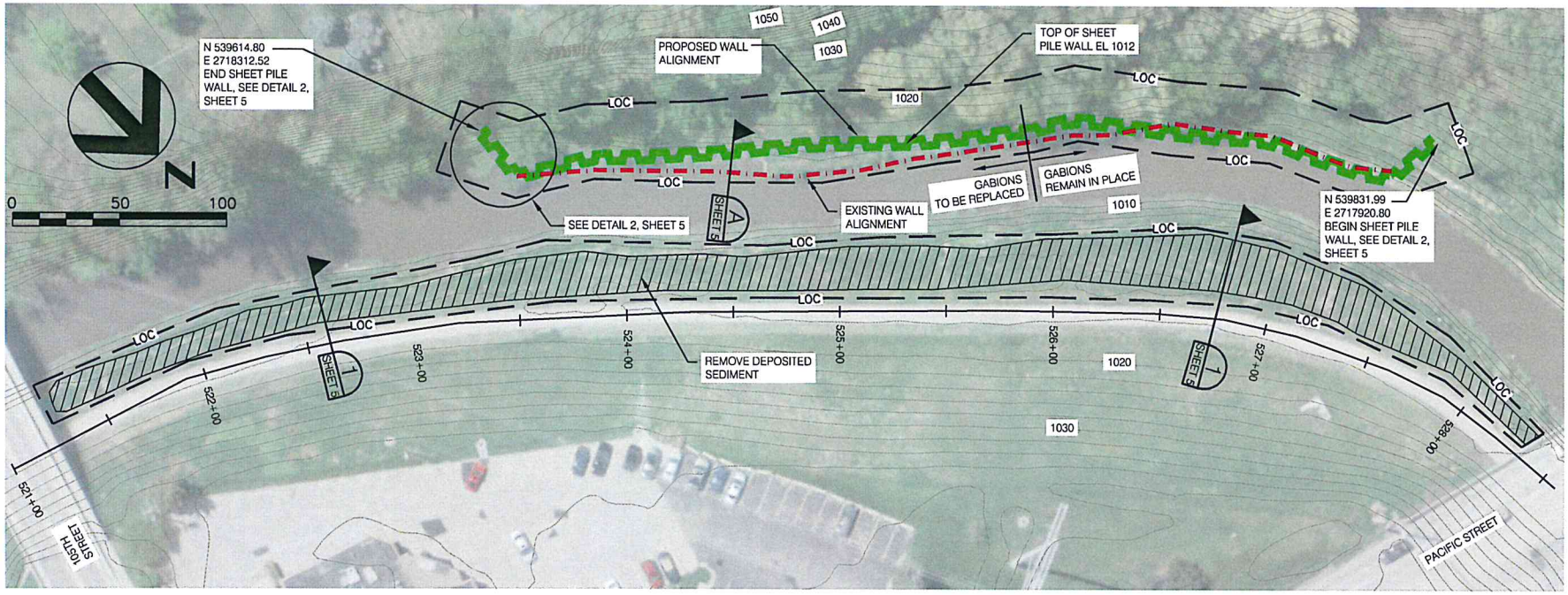
HDR
HDR Engineering, Inc.

PAPIO - MISSOURI RIVER NATURAL RESOURCES DISTRICT

File No.
Sheet 3

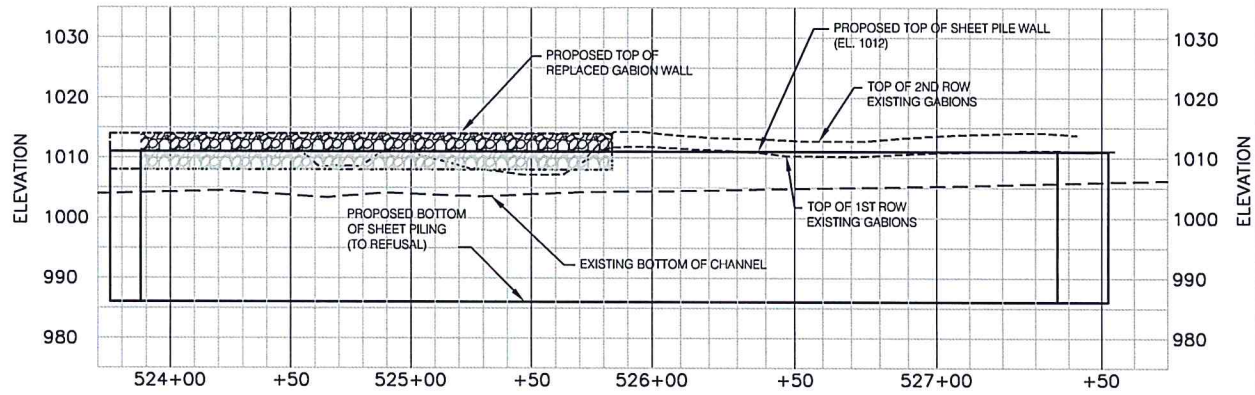
Drawing No.
3

Sheet
3 of 9




## GABIONS WITH SHEET PILE TOE PROTECTION PLAN VIEW

1" = 50'




## PROFILE ALONG FACE OF SHEET PILING

1" = 50' HORIZONTAL
1" = 20' VERTICAL

PROPOSED SITE PLAN AND PROFILE

PROFESSIONAL CIVIL ENGINEER
LAURIE A. CARRETTE
E-6814
STATE OF NEBRASKA

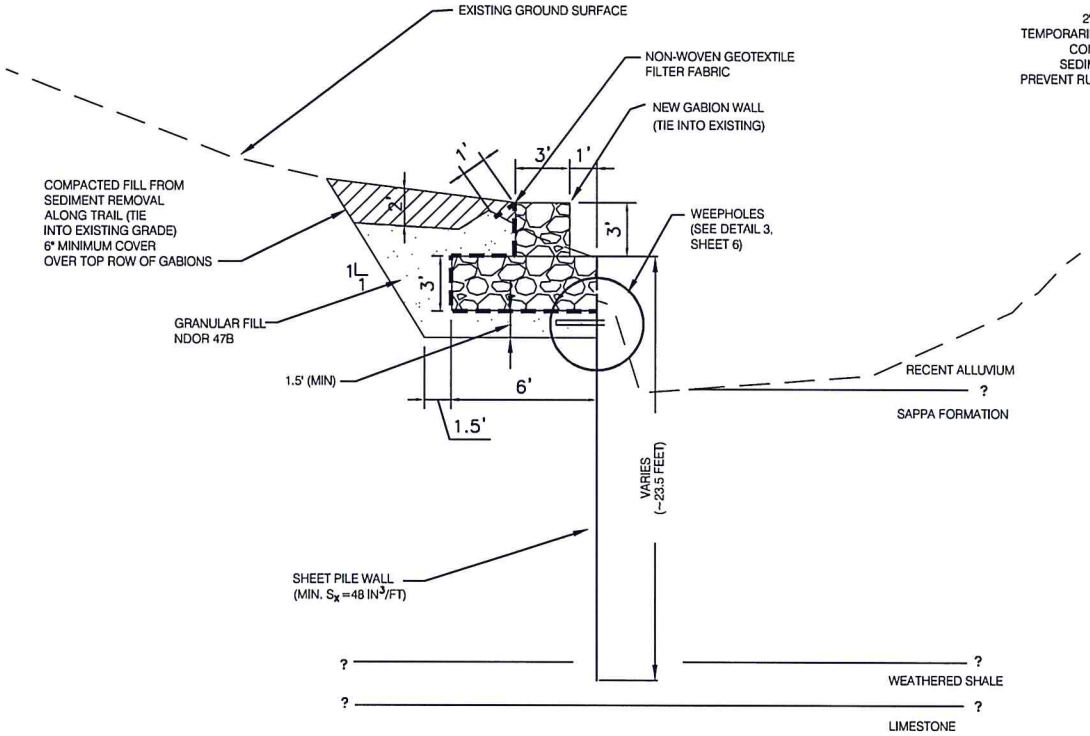
| | | Date |
|---|---|---|
| Designed | JSA | 11/2011 |
| Drawn | CMJ | 11/2011 |
| Checked | LAC2 | 11/2011 |
| Approved | - | |

LOW-FLOW CHANNEL RESTABILIZATION
BIG PAPILLION CREEK
DOUGLAS COUNTY, NEBRASKA

HDR Engineering, Inc.

PAPIO - MISSOURI RIVER NATURAL RESOURCES DISTRICT

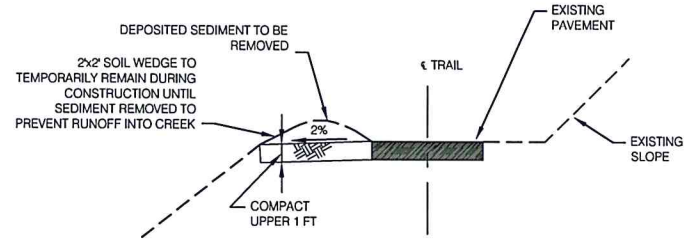
File No. Sheet 4
Drawing No. 4
Sheet 4 of 9




TYPICAL SECTION A
REPLACED GABIONS WITH
SHEET PILE TOE PROTECTION

NTS

A
SHEET 4




NOTES:

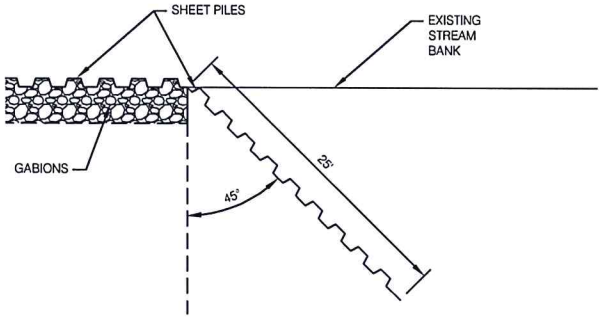
1. REMOVE SOIL DEPOSITS (APPROXIMATELY 2 FT. DEEP) FROM THE CREEKSIDE BERM ADJACENT TO THE BIG PAPIO TRAIL TO THE LOW FLOW CREEK TOP OF SLOPE FROM PACIFIC STREET TO 105TH STREET (APPROXIMATELY 700 FT. LONG). GRADE TO PROVIDE POSITIVE DRAINAGE, SEED, AND INSTALL EROSION CONTROL BLANKET. OWNER WILL PROVIDE DUMP TRUCKS TO HAUL OFF AND PROPERLY DISPOSE OF THE REMOVED MATERIAL. THE SEDIMENT REMOVAL QUANTITY IS APPROXIMATELY 1,000 CUBIC YARDS. CONTRACTOR IS RESPONSIBLE FOR TRANSPORTING REMOVED MATERIAL AS BACKFILL FOR THE GABION WALL CONSTRUCTION AS NEEDED.

2. COMPACT UPPER 1-FT OF SOIL TO BE REGRADED ALONG THE SOUTH SIDE OF TRAIL TO 90% MAX DRY DENSITY (ASTM D698) AT A MOISTURE CONTENT NECESSARY TO FACILITATE COMPACTION.

DETAIL 1
REMOVE TRAIL SEDIMENT
(LOOKING UPSTREAM)

NTS

1
SHEET 4




DETAIL 2
SHEET PILE END CONDITION

NTS

2
SHEET 4

PROFESSIONAL CIVIL ENGINEER
LAURIE A. CARRETTE
E-6814
STATE OF NEBRASKA

TYPICAL SECTIONS AND DETAILS

| | | Date |
|---|---|---|
| Designed | JSA | 11/2011 |
| Drawn | CMJ | 11/2011 |
| Checked | LAC2 | 11/2011 |
| Approved | - | - |

LOW-FLOW CHANNEL RESTABILIZATION
BIG PAPILLION CREEK
DOUGLAS COUNTY, NEBRASKA

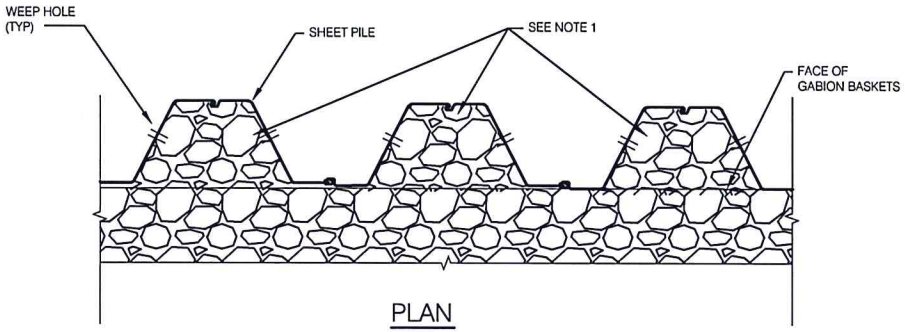
HDR
HDR Engineering, Inc.

PAPIO - MISSOURI RIVER NATURAL RESOURCES DISTRICT

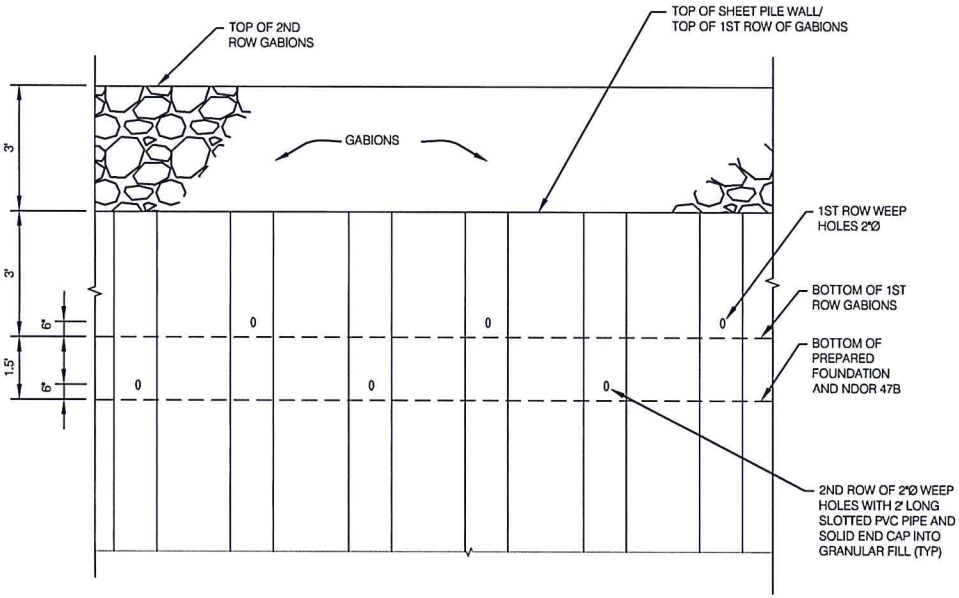
File No.
Sheet 5

Drawing No.
5

Sheet
5 of 9




PLAN




ELEVATION

DETAIL 3 - WEEP HOLES

NTS

3
SHEET 5

NOTES:

1. FILL ANNULUS SPACE BETWEEN GABIONS AND SHEETS WITH SAME STONE FILL USED TO FILL GABIONS.

TYPICAL DETAILS

| | | Date |
|---|---|---|
| Designed | JSA | 11/2011 |
| Drawn | CMJ | 11/2011 |
| Checked | LACZ | 11/2011 |
| Approved | - | |

LOW-FLOW CHANNEL RESTABILIZATION
BIG PAPILLION CREEK
DOUGLAS COUNTY, NEBRASKA

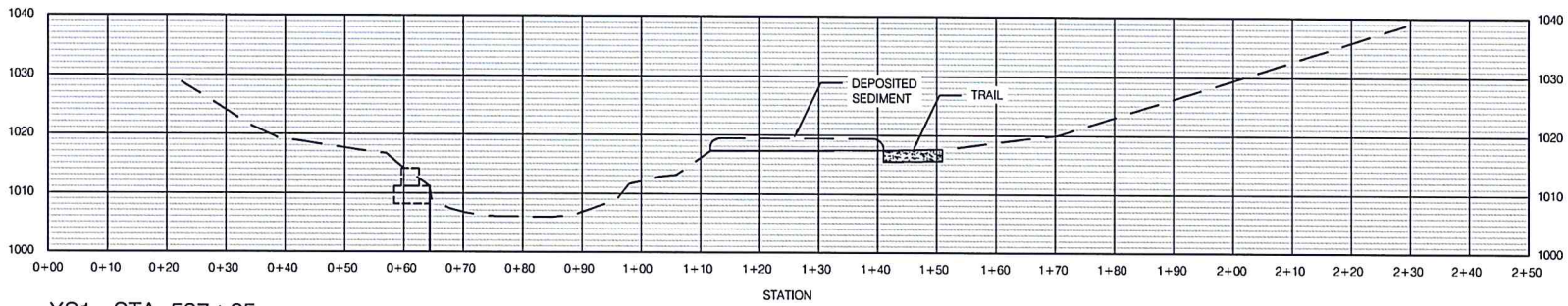
HDR
HDR Engineering, Inc.

PAPIO - MISSOURI RIVER NATURAL RESOURCES DISTRICT

File No.
Sheet 6

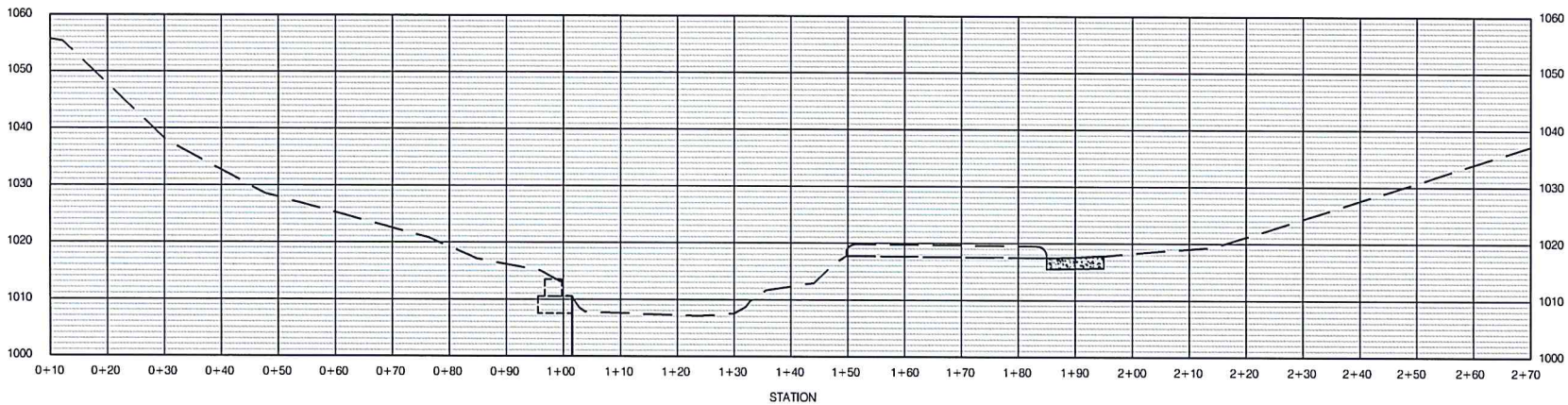
Drawing No.
6

Sheet
6 of 9




## XS1 - STA. 527+25

1:20 VERTICAL
1:20 HORIZONTAL




## XS2 - STA. 526+50

1:20 VERTICAL
1:20 HORIZONTAL

NOTES:

1. CROSS SECTIONS ARE BASED ON DTM CREATED FROM P-MRNRD TOPOGRAPHIC SURVEY CONDUCTED IN NOV. 2010 AND APR. 2011.
2. CROSS SECTIONS ARE DRAWN LOOKING UPSTREAM, RIGHT TO LEFT BANK.

PROFESSIONAL CIVIL ENGINEER
LAURIE A. CARRETTE
E-6514
STATE OF NEBRASKA

CROSS SECTIONS

| | | Date |
|---|---|---|
| Designed | JSA | 11/2011 |
| Drawn | CMJ | 11/2011 |
| Checked | LACZ | 11/2011 |
| Approved | - | |

LOW-FLOW CHANNEL RESTABILIZATION
BIG PAPILLION CREEK
DOUGLAS COUNTY, NEBRASKA

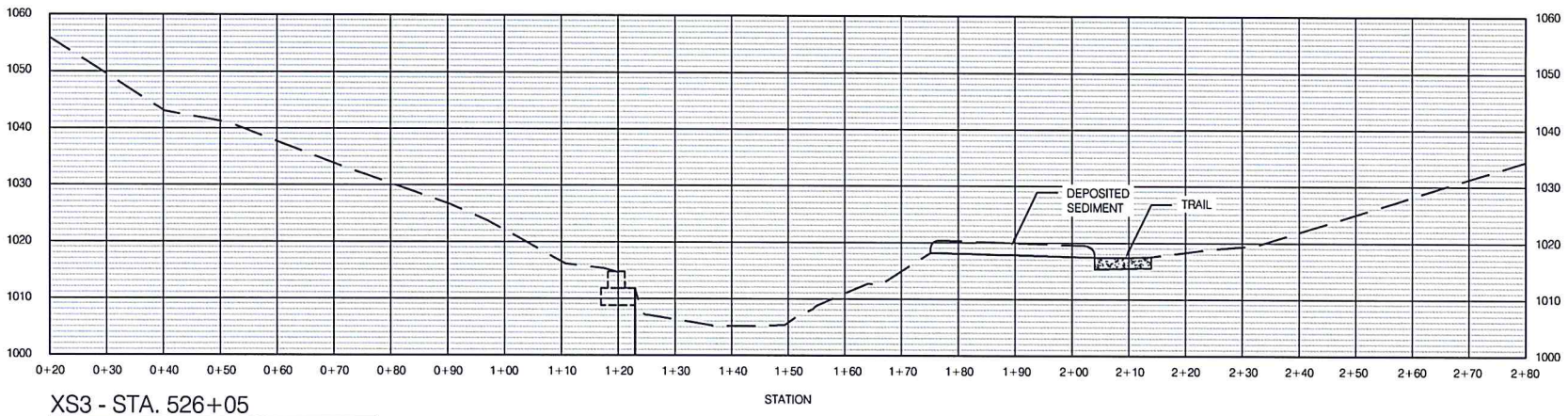
HDR Engineering, Inc.

PAPIO - MISSOURI RIVER NATURAL RESOURCES DISTRICT

File No.
Sheet 7

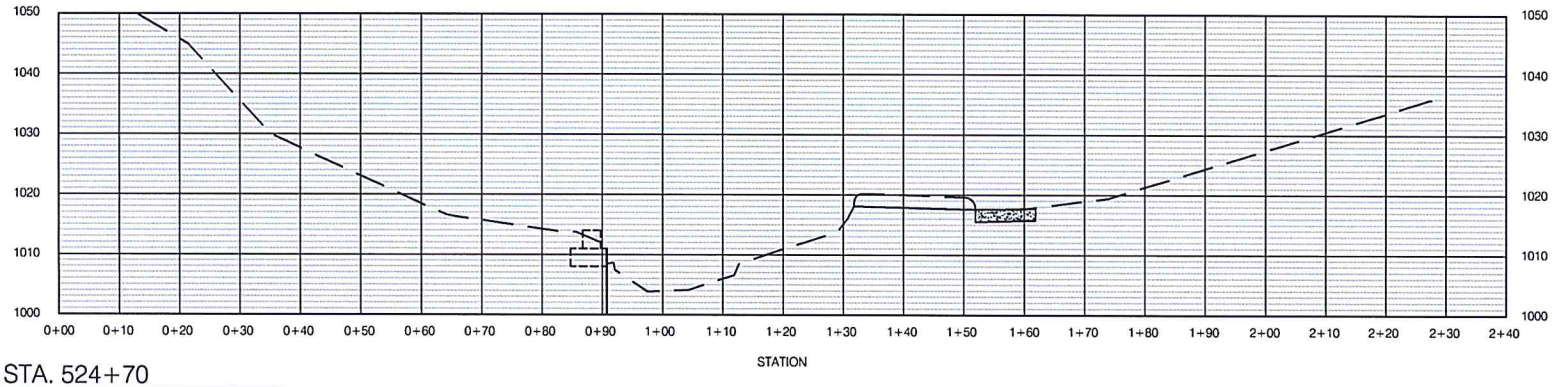
Drawing No.
7

Sheet
7 of 9




## XS3 - STA. 526+05

1:20 VERTICAL
1:20 HORIZONTAL




## XS4 - STA. 524+70

1:20 VERTICAL
1:20 HORIZONTAL

NOTES:

1. CROSS SECTIONS ARE BASED ON DTM CREATED FROM P-MRNRD TOPOGRAPHIC SURVEY CONDUCTED IN NOV. 2010 AND APR. 2011.
2. CROSS SECTIONS ARE DRAWN LOOKING UPSTREAM, RIGHT TO LEFT BANK.

PROFESSIONAL CIVIL ENGINEER
LAURIE A. CARRETTE
E-6814
STATE OF NEBRASKA

CROSS SECTIONS

| | | Date |
|---|---|---|
| Designed | JSA | 11/2011 |
| Drawn | CMJ | 11/2011 |
| Checked | LACZ | 11/2011 |
| Approved | - | |

LOW-FLOW CHANNEL RESTABILIZATION
BIG PAPILLION CREEK
DOUGLAS COUNTY, NEBRASKA

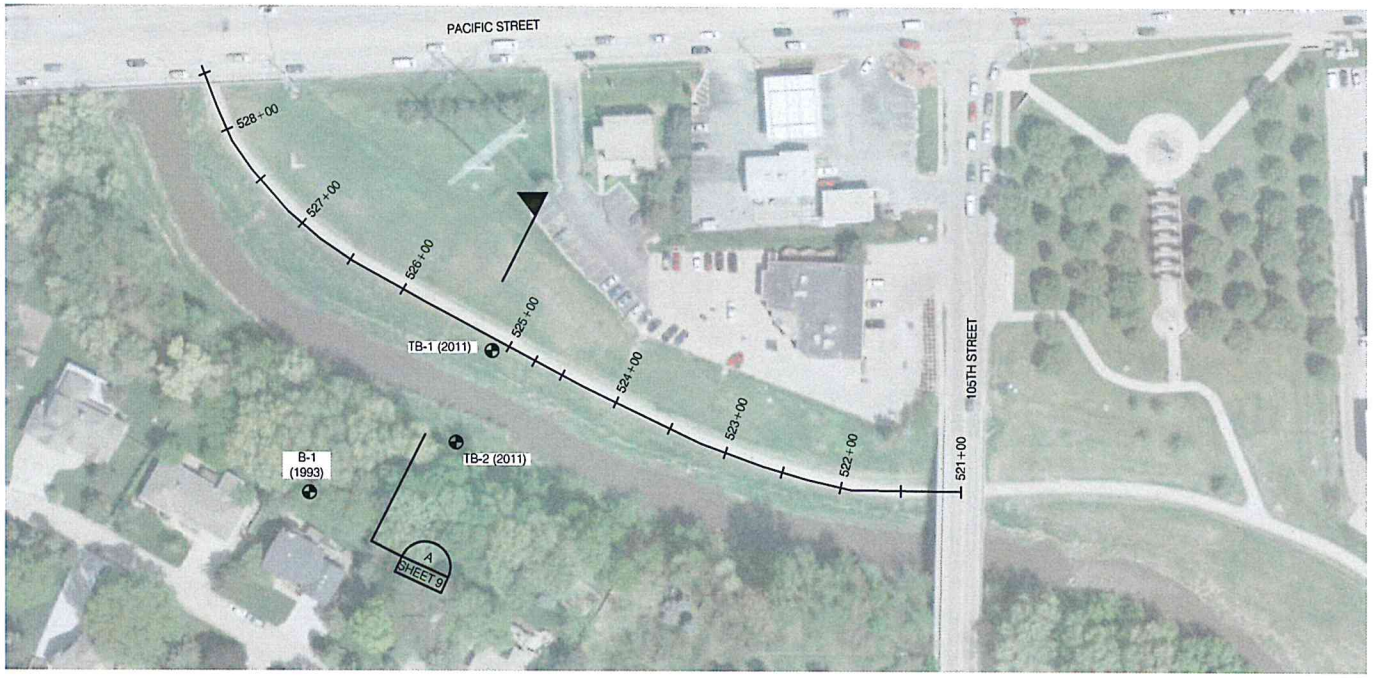
HDR Engineering, Inc.

PAPIO - MISSOURI RIVER NATURAL RESOURCES DISTRICT

File No.
Sheet 8

Drawing No.
8

Sheet
8 of 9

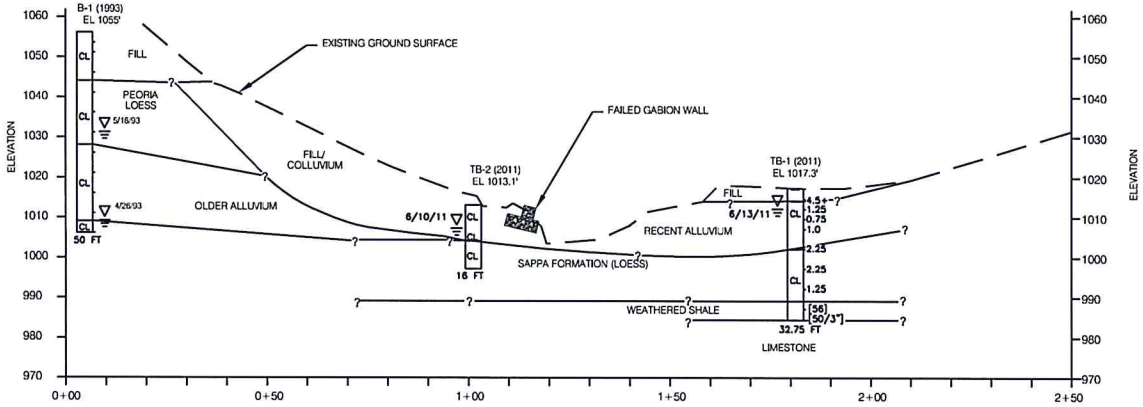



N

0 100 200

## PLAN VIEW

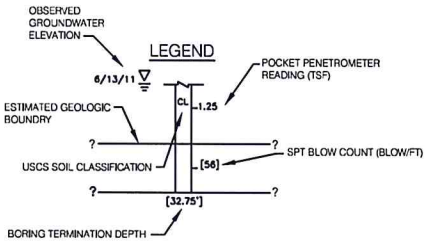
1"=100'




SCALE: 1:30 HORIZONTAL
1:30 VERTICAL

## STATION 525+50 (LOOKING UPSTREAM)

A
SHEET 9




PROFESSIONAL CIVIL ENGINEER
LAURIE A. CARRETTE
E-6814
STATE OF NEBRASKA

GEOLOGICAL INVESTIGATION

| | | Date |
|---|---|---|
| Designed | JSA | 11/2011 |
| Drawn | CMJ | 11/2011 |
| Checked | LACZ | 11/2011 |
| Approved | - | |

LOW-FLOW CHANNEL RESTABILIZATION
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File No.
Sheet 9

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9

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