



LOWER PLATTE SOUTH natural resources district

3125 Portia Street | P.O. Box 83581 • Lincoln, Nebraska 68501-3581
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Memorandum

Date: November 13, 2020
To: Urban Subcommittee
From: Jared Nelson, District Engineer
Subject: Urban Subcommittee Meeting Minutes – November 2020

The Urban Subcommittee met virtually at 5:30pm, on Thursday, November 12, 2020. Subcommittee members participating included Mike DeKalb, Karen Amen, Robert Andersen, Tom Green, Greg Osborn, Milt Schmidt, Anthony Schutz and Ray Stevens. Others participating included Board member Larry Ruth; NRD staff Paul Zillig, Dave Potter, Mike Murren, Al Langdale, Tracy Zayac and Jared Nelson; and Lindy Rogers with FYRA Engineering. Director DeKalb called the meeting to order at 5:30pm, gave a brief welcome, and reviewed the agenda. There were two items the Subcommittee took action on, an update on the Salt Creek Floodplain Resiliency Plan, and several reports as described below.

(a.) Consideration of Bids for the Salt Creek Levee Penetration Repairs (4 pipes at Salt Creek Levee) – Nelson discussed the Salt Creek Levee Penetration Repair project on the Salt Creek Levee System which addresses four pipes at various locations. Attached is a map and plansheets. He summarized the work at the four pipes as follows:

- STA 67+15 L, near Park Ave & South 1st St: Abandon 36" pipe with flowable fill
- STA 67+45 R, US, near Park Ave & Van Dorn: Slip-line existing 48" pipe with 42" pipe
- STA 67+45 R, DS, near Park Ave & Van Dorn: Abandon 42" pipe with flowable fill
- STA 131+50 L, north of West A St: Slip-line existing 54" pipe with 48" pipe

Nelson described that: FYRA has completed design & development of plans, and the District received the USACE 408 Permit, so the project was advertised for construction on October 20, 2020 to receive bid proposals. The bid opening was Tuesday afternoon, November 10, 2020. The District received six bids. H. R. Bookstrom Construction was the low bidder with a bid of \$ 230,866. The Engineer's Opinion of Cost for construction was for \$ 280,099.

Rogers described to the Subcommittee that she reviewed the bids, and did not find anything out of the ordinary other than the high bidder had a very high mobilization price. She referred to her attached letter of recommendation that the District award the project to H.R. Bookstrom.

It was moved by Andersen, seconded by Stevens, and unanimously approved by the Subcommittee to recommend that the Board of Directors approve the Bid from H. R. Bookstrom Construction in the amount of \$230,866 for the Salt Creek Levee Penetration Repairs Project.

(b.) Consideration of Deadmans Run Water Sustainability Fund (WSF) Grant Amendment #1 – Zillig discussed that last year the District received a Nebraska Water Sustainability Fund Grant (Contract No. 1169) to help fund the Deadmans Run Flood Reduction Project. He described that: At the time, the Nebraska Natural Resources Commission (WSF administrator) obligated and made available to the District \$3,293,651, of the \$5.8M requested. At that time, there was only enough funding to approve \$3,293,651 of the requested \$5,857,792 from their FY 2019-2020 funding cycle. However, the Commission elected to use their “CAP” tool to fund the remainder of the project during the next funding cycle.

Zillig went on to describe that since we’re now into a new funding cycle (FY 2020-2021), the Commission recently obligated the remaining \$2,564,141, for the Deadmans Run project, hence the amendment.

It was moved by Osborn, seconded by Stevens, and unanimously approved by the Subcommittee to recommend that the Board of Directors approve Amendment #1 to the Contract between the Nebraska Department of Natural Resources and LPSNRD for the Water Sustainability Fund Grant (WSF No. 5253), for the Deadmans Run Flood Reduction Project.

(c.) Salt Creek Floodplain Resiliency Plan – FAQ’s [NO ACTION] – Zillig described that at the November Board meeting, Olsson will give a presentation on the Salt Creek Floodplain Resiliency Plan. He mentioned the City and NRD are equal funding partners in the effort, with private entities funding the remaining one-third of the study cost. Zillig talked about how the City of Lincoln Mayor is incorporating the study into the City’s overarching Climate Action Plan. He also mentioned that the City Council will hear of the Salt Creek Resiliency Plan in December, and the Plan will be made public at that point.

Zillig referred to the attached FAQs Olsson prepared with the Plan, for Board members to review, but no Board action is needed this month. Nelson mentioned that the Mayors Draft Climate Action Plan was recently released and contains a section summarizing findings from the Resiliency Plan.

For more information on the City’s Draft Climate Action Plan, see the Mayor’s Press Release here: <https://www.lincoln.ne.gov/city/mayor/media/2020/102920.htm>

(e.) Reports. – Finally, several reports were giving to the Subcommittee by staff. First, Murren discussed the Beal Slough Stream Stabilization Project – 70th to Pine Lake, that the easements have been filed and are complete, and the USACE 404 Permit should be received soon. Then, Langdale gave an update of the USACE’s Salt Creek Levee USACE PL84-99 Repair Project and two locations are complete, and the Contractor is working through many of the USACE Punch List items still. Langdale also said that Yost completed the Charleston St Pipe Repair Project last week. Finally, Nelson described the Oak Creek Weir at 14th St Project is underway and Gana has mobilized equipment.

There being no further business the meeting adjourned at approximately 6:15 pm.

JN/jn

Enclosures;



Salt Creek Levee Repair Projects

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10 November 2020

Jared Nelson, PE
Lower Platte South NRD
3125 Portia Street
Lincoln, NE 68521

Re: Salt Creek Penetration Repair Project – Engineer’s Recommendation

Dear Jared:

The bid opening for the above-referenced project was held at the LPSNRD on 10 November 2020. Six bids were received in total with the low bid of \$230,866 received from H.R. Bookstrom Construction, Inc. of Lincoln, NE. This bid was \$49,233 below the Engineer’s Opinion of Probable Costs that totaled \$280,099. All required documents accompanied the bid. The other five bids are listed below:

General Excavating	\$268,946
MC Wells Contracting, LLC	\$293,798
M.E. Collins Contracting Co., Inc.	\$314,850
Pat Thomas Construction, Inc.	\$352,702
Nelson & Rock Contracting, Inc.	\$445,214

Your NRD has a long history of working with H.R. Bookman and they have a good reputation with your staff of being a good contractor who does good work. My recommendation is to award the project to H.R. Bookstrom Construction, Inc. and begin the contracting process upon Board approval. Please feel free to contact me if you have any questions.

Sincerely,

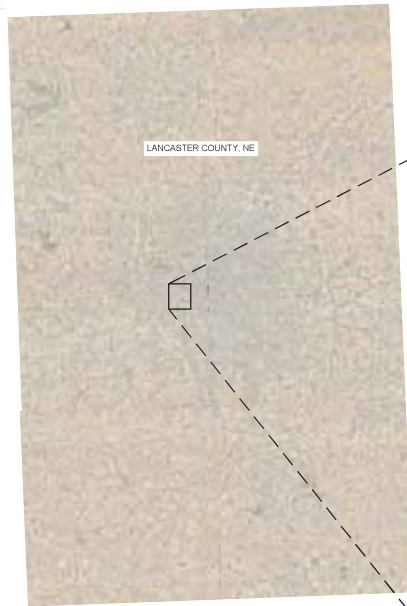
A handwritten signature in black ink that reads "Lindy Rogers". The signature is written in a cursive, flowing style.

Lindy Rogers, P.E.



LOWER PLATTE SOUTH NATURAL
RESOURCES DISTRICT

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT SALT CREEK PENETRATION REPAIRS LANCASTER COUNTY, NE



LOCATION MAP



SITE MAP
NOT TO SCALE

SHEET INDEX

- A,1 COVER SHEET
- A,2 GENERAL NOTES AND QUANTITIES
- B,1 67+15 L, 67+45 R, AND 131+50 L SITE ACCESS
- D,1 DETAILS
- D,2 DETAILS
- D,3 DETAILS
- D,4 67+15 L ABANDONMENT PLAN
- D,5 67+45 R DOWNSTREAM ABANDONMENT PLAN
- P,1 67+45 R UPSTREAM PLAN AND PROFILE
- P,2 131+50 L PLAN AND PROFILE
- S,1 SWPPP
- S,2 SWPPP
- S,3 SWPPP
- S,4 SWPPP

DESIGNED BY:



12702 WESTPORT PARKWAY, SUITE 200
OMAHA, NE 68138
402.502.7131
WWW.FYRAENGINEERING.COM

OWNER:



3125 PORTIA STREET
LINCOLN, NE 68521
402.476.2729
WWW.LPSNRD.ORG



NO.	REVISIONS	BY	DATE

COVER SHEET	2019
SALT CREEK PENETRATION REPAIRS	
LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT	
LANCASTER COUNTY, NEBRASKA	

DESIGNED BY:	_____	MGR
DRAWN BY:	_____	SAB
CHECKED BY:	_____	AMS
QA / QC BY:	_____	AMS
PROJECT NO.:	2003250	
DATE:	AUGUST 2019	

SHEET NO.
A.1

GENERAL NOTES:

- ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE 2017 CITY OF LINCOLN STANDARD SPECIFICATIONS FOR MUNICIPAL CONSTRUCTION EXCEPT AS MODIFIED BY THE DETAILED NOTES AND SPECIFICATIONS. IF A CONFLICT EXISTS BETWEEN THE CITY OF LINCOLN STANDARD SPECIFICATIONS AND THE DETAILED NOTES, THE MORE STRINGENT SPECIFICATION SHALL GOVERN.
- THE LOCATIONS OF ALL AERIAL AND UNDERGROUND UTILITY FACILITIES ARE APPROXIMATE OR MAY NOT BE INDICATED IN THESE PLANS. UNDERGROUND FACILITIES, WHETHER INDICATED OR NOT, SHALL BE LOCATED AND FLAGGED BY THE CONTRACTOR AND UTILITY COMPANIES 48 HOURS BEFORE WORK IS STARTED. VERIFY UTILITY LOCATIONS BY CONTACTING THE NEBRASKA DODGERS HOTLINE ONLINE AT WWW.BELLEVILLE.COM AND/OR CALL 800.334.6689 OR 811. THE CONTRACTOR SHALL BE REQUIRED TO NOTIFY AND COORDINATE ALL NECESSARY UTILITY SERVICE INTERRUPTIONS WITH THE OWNERS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT ALL EXISTING UTILITIES, PAVEMENT, STRUCTURES, FENCES, POLES, SIGNS, TREES, IRRIGATION LINES, SPRINKLER HEADS, SUB-DRAINS AND OTHER IMPROVEMENTS NOT DESIGNATED FOR REMOVAL. ANY DAMAGE CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR AT HIS OWNERS' EXPENSE.
- CONTOURS SHOWN ON THE PLANS ARE 2' CONTOURS FROM LIDAR AND SURVEYED DATA. ELEVATIONS CALLED OUT ON THE PLANS ARE REFERENCED TO NAVD 88 VERTICAL DATUM. HORIZONTAL CONTROL IS NAD83 NEBRASKA STATE PLANE.
- CONTRACTOR SHALL LIMIT CONSTRUCTION OPERATIONS WITHIN THE CONSTRUCTION LIMITS SHOWN ON PLANS. CONTRACTOR TO DEVELOP STAGING PLAN AND FINAL LIMITS OF CONSTRUCTION AFTER BID IS AWARDED. PLANS MUST BE APPROVED BY ENGINEER PRIOR TO CONSTRUCTION BEGINNING.
- ALL RUBBLE DEBRIS FROM CONSTRUCTION ACTIVITIES MUST BE REMOVED FROM THE SITE UPON PROJECT COMPLETION. ALL DISTURBED AREAS SHALL BE RESTORED TO ORIGINAL CONDITIONS BY SMOOTHING COMPACTED SOILS PRIOR TO FINISHED GRADING AND SEEDING AND MULCHING WITH SPECIFIED MIX AND METHODS. DISTURBED AREAS ON SLOPES 3H:1V OR GREATER SHALL RECEIVE EROSION CONTROL BLANKET.
- THE CONTRACTOR SHALL NOT ALLOW THE PONDING OF WATER WITHIN THE CONSTRUCTION AREA AT ANY TIME. MAINTAIN ALL EXISTING DRAINAGE PATTERNS.
- THE CONTRACTOR SHALL CONDUCT ALL OPERATIONS AND MAINTAIN CONSTRUCTION WORK AREA IN A SAFE MANNER IN ACCORDANCE WITH OSHA COMPLIANCE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ALL TEMPORARY MARKERS, LIGHTS, SIGNS, FLAGMEN, BARRICADES AND OTHER PROTECTIVE DEVICES CONFORMING TO THE CITY OF LINCOLN TRAFFIC CONTROL GUIDELINES. NO SEPARATE PAYMENT SHALL BE MADE FOR FURNISHING, ERECTING, AND MAINTAINING TRAFFIC CONTROL AND PROTECTIVE DEVICES. THIS SHALL INCLUDE ANY BARRICADES OR SIGNS NECESSARY FOR PROCESSION TRAIL CLOSURES.
- CONTRACTOR TO ATTEND THE PRE-CONSTRUCTION CONFERENCE WITH OWNER, ENGINEER, AND OTHER PROJECT STAKEHOLDERS.
- SNPPP TO BE IMPLEMENTED AS DESIGNED. CONTRACTOR IS RESPONSIBLE FOR CLEAN OUT AND MAINTENANCE OF ALL SNPPP ITEMS UNTIL VEGETATIVE COVER HAS BEEN SUFFICIENTLY ESTABLISHED AS DETERMINED BY THE FIELD ENGINEER OR IN ACCORDANCE WITH PERMIT. CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL DEVICES.
- CONTRACTOR MUST ADHERE TO THE REQUIREMENTS OF THE 404 PERMIT GRANTED BY THE UNITED STATES ARMY CORPS OF ENGINEERS FOR THIS PROJECT. A COPY OF THE REQUIREMENTS WILL BE PROVIDED TO THE SELECTED CONTRACTOR, OR UPON REQUEST.
- ELECTRONIC GRADING FILES AND STAKING DATA CAN BE PROVIDED UPON REQUEST FROM ENGINEER.
- THE ENGINEER/SPECTOR MUST ENSURE ALL STORM SEWER PIPE USED FOR CONSTRUCTION HAS BEEN CERTIFIED BY AMERICAN CONCRETE PIPE ASSOCIATION (ACPA). ALL PIPE MUST DISPLAY THE Q-CAST SYMBOL, TO VERIFY THE MANUFACTURER HAS MET THE ACPA'S CERTIFICATION PROGRAM. VISUAL INSPECTIONS FOR DEFECTS SHALL CONTINUE TO TAKE PLACE ON THE SITE.
- ALL STORM SEWER JOINTS SHALL BE CONSTRUCTED WITH ASTM A434 COMPACTED SOLID ORING ASTM C361 PIPE JOINTS.
- ALL NEW FLAP GATES SHALL BE HANSON. TYPE A FLAP GATES UNLESS SPECIFIED DIFFERENTLY ON THE PLANS AND PROFILE SHEETS. ALL FLAP GATES THAT REQUIRE RECONDITIONING SHALL BE REMOVED, CLEANED, PAINTED, REPAIRED, AND REINSTALLED PER THE HANSON'S SPECIFICATIONS.
- ALL NEW RCP JOINTS UNDER EMBANKMENTS SHALL BE TESTED FOR LEAKAGE BY USING A JOINT TESTER. TESTS SHOULD INCLUDE HYDROSTATIC PRESSURE TESTS ON ALL CONCRETE PIPE JOINTS UNDER LEVEES TO BE PERFORMED BY THE CONTRACTOR AFTER THE PIPE HAS BEEN BEDDED AND PRIOR TO PLACING ANY BACKFILL. JOINTS ARE REQUIRED TO WITHSTAND AN INTERNAL PRESSURE OF 13 PSIF FOR A DURATION OF 30 MINUTES PER JOINT. FAILED JOINTS WILL BE DISASSEMBLED AND ALL INTERNAL ELEMENTS WILL BE REPLACED.
- ANY SOIL BROUGHT IN FROM OFF SITE MUST BE OBTAINED FROM AN APPROVED LOCATION THAT DOES NOT AFFECT WETLANDS, TREE SPECIES, OR CULTURAL/HISTORICAL RESOURCES.
- DELINEATED WETLANDS ARE SHOWN ON THE PLANS. CONTRACTOR SHALL LIMIT ALL CONSTRUCTION ACTIVITIES FROM ENCRoACHING UPON WETLAND AREAS. EXCEPT LOCATIONS SPECIFICALLY DESIGNATED IN THE CONSTRUCTION DRAWINGS. WETLAND AREAS THAT ARE TEMPORARILY DISTURBED DUE TO CONSTRUCTION ACTIVITIES SHALL BE RESTORED AND RESEEDED WITH THE WETLAND SEEDING MIX AS DETAILED IN THE PROJECT SPECIFICATIONS. THE USE OF MATS OR OTHER MEASURES WILL BE PLACED UNDERNEATH HEAVY EQUIPMENT TO MINIMIZE SOIL DISTURBANCE IN WETLANDS.
- FLOWABLE FILL FOR ABANDONED CULVERTS SHALL BE 3000 PSI SANDED GROUT WITH A SHRINKAGE COMPENSATING ADMIXTURE (SBA (INTRAPAST N) BASF TETRAQUARD A520, OR ENGINEER APPROVED EQUAL). ALL GROUT SHALL BE PUMPED IN THE UP-SLOPE DIRECTION AND THE APPLICATION RATE MUST BE MONITORED AND INSPECTED TO ENSURE THE CULVERT HAS BEEN COMPLETELY FILLED OR THAT LARGER VOIDS AROUND THE CULVERT DO NOT EXIST. THE APPLICATION RATE FOR THE GROUT IS EXPECTED TO BE 0.3 CY PER LF OF APPLICATION FOR THE 36" DIAMETER CULVERT AND 0.5 CY PER LF OF APPLICATION FOR THE 48" DIAMETER CULVERT.
- EXCAVATED MATERIAL CAN BE PLACED IN THE DESIGNATED STOCKPILE LOCATIONS (SHOWN ON THE PLANS) FOR REUSE OR HAULIED OFF-SITE. STOCKPILED MATERIAL SHOULD NOT EXCEED 10 FT IN HEIGHT AND SHALL HAVE SLOPES OF 3H:1V MAXIMUM. STOCKPILED AREAS THAT ARE EXPECTED TO NOT BE USED WITHIN 14 DAYS SHALL BE SEEDED.
- THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY CONCRETE TRAIL, CRUSHED ROCK LEVEE TOP SURFACING, OR LEVEE GRASSSED SURFACE THAT MAY BE DAMAGED DURING THE CONTRACTOR'S USE OF THESE AREAS DURING CONSTRUCTION. REPAIR SHALL BE INCIDENTAL TO THE PROJECT.
- THE QUANTITIES SHOWN FOR SEEDING AND MULCHING INCLUDE ALL NON-PAVED AREAS WITHIN THE LIMITS OF CONSTRUCTION AND DOES NOT ACCOUNT FOR ANY AREA THAT IS DISTURBED OUTSIDE THE LIMITS OF CONSTRUCTION. DISTURBED AREAS OUTSIDE THE LIMITS OF CONSTRUCTION MUST BE RESTORED AND SEEDED AND MULCHED AND WILL BE CONSIDERED INCIDENTAL TO THE PROJECT. IN DISTURBED AREAS THAT HAVE BEEN RECENTLY FARMED, CONTRACTOR SHALL COORDINATE WITH OWNER TO DETERMINE IF SEED AND MULCH SHOULD BE PLACED.
- EROSION CONTROL IS A LUMP SUM PAYMENT. CONTRACTOR IS RESPONSIBLE FOR CLEAN OUT AND MAINTENANCE OF ALL SWPPP ITEMS AND REMOVAL ONCE ENGINEER'S APPROVAL IS PROVIDED.
- THE GRADES, ELEVATIONS, DIMENSIONS, LOCATIONS AND FIELD MEASUREMENTS OR ANY DRAWINGS OR SPECIFICATIONS ISSUED BY THE ENGINEER, OR THE WORK INSTALLED BY OTHER CONTRACTORS, ARE NOT GUARANTEED BY THE ENGINEER OR THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF ALL GRADES, ELEVATIONS, DIMENSIONS, LOCATIONS AND FIELD MEASUREMENTS. IN CASES OF THE INTERSECTION OF HIS WORK WITH EXISTING OR OTHER WORK, THE CONTRACTOR SHALL VERIFY AT THE SITE ALL DIMENSIONS RELATING TO SUCH EXISTING OR OTHER WORK. ANY ERRORS DUE TO CONTRACTOR'S FAILURE TO VERIFY ALL SUCH GRADES, ELEVATIONS, DIMENSIONS, LOCATIONS, OR FIELD MEASUREMENTS SHALL BE PROMPTLY RECTIFIED BY THE CONTRACTOR WITHOUT ANY ADDITIONAL COSTS TO THE OWNER OR EXTENSIONS OF CONTRACT TIME.
- TEMPORARY FLAP GATES, OR ENGINEER APPROVED EQUAL CLOSURE SYSTEM, SHALL BE PLACED ON EACH OPEN CULVERT AT THE END OF EVERY WORKING DAY TO ENSURE THAT THE LANDSCAPE IS PROTECTED FROM FLOODING DURING HIGH WATER EVENTS. THIS SHALL BE CONSIDERED INCIDENTAL TO OVERALL PROJECT CONSTRUCTION.
- THE EXISTING GROUND AT PIPE OUTLETS SHALL BE STRIPPED PRIOR TO ANY OUTLET GRADING AT ALL PIPE LOCATIONS.
- TRENCH BACKFILL SHALL BE COMPACTED AS SHOWN IN THE COMPACTION REQUIREMENTS TABLE (SEE SPECIFICATIONS). ALL BACKFILL SHALL BE CLASS "A" MATERIAL.
- ALL PIPE SHALL BE BEDDED IN ACCORDANCE WITH THE DETAILS SHOWN IN THE PLANS AND THE SPECIFICATIONS.
- OVER-EXCAVATION MAY BE REQUIRED AT LOCATIONS WHERE NEW PIPE IS BEING PLACED IF UNSUBSIDIARY BEDDING MATERIAL IS DISCOVERED DURING EXCAVATION. WHEN OVER-EXCAVATING FOR PENETRATION CLAYERT EXTENSIONS ON THE LANDSCAPE OF THE LEVEE, THE CONTRACTOR SHALL NOTIFY THE FIELD REPRESENTATIVE/ENGINEER IMMEDIATELY IF SAND IS ENCOUNTERED. THE CONTRACTOR WILL BE REQUIRED TO OVER-EXCAVATE AN ADDITIONAL 2 FEET UNDER THE CULVERT EXTENSION AND PLACE CLASS "A" EMBANKMENT UNDER THE CULVERT AND AN ADDITIONAL 15 FEET PAST THE LANDSCAPE EDGE OF THE CULVERT. ANY OVER-EXCAVATION THAT MAY BE REQUIRED WILL BE QUANTIFIED IN THE FIELD AND PAID AT THE BID UNIT PRICE FOR EXCAVATION.
- POSITION FLAP GATE AT SKEW ANGLE FROM VERTICAL WHEN INSTALLED, ANGLE MUST BE ROTATED IN THE UPSTREAM DIRECTION.

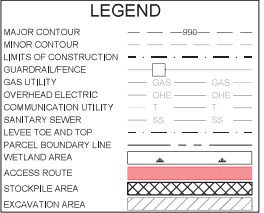
- NO GROUT SHOULD BE LEFT AT INLET OR OUTLET AFTER GROUTING PROCEDURES HAVE ENDED.
- GROUT MUST BE CONTAINED AND MUST NOT BE ALLOWED TO ENTER THE WATERWAYS UNDER ANY CIRCUMSTANCE. USE OF CATCHMENT AREAS MAY BE NECESSARY.
- EXCAVATED MATERIAL SHALL BE USED TO COVER ABANDONED CULVERTS AND ANY REMAINING MATERIAL WILL BE REQUIRED TO BE HAULIED OFF SITE.
- GROUT QUANTITIES INCLUDE EXTRA GROUT IF NECESSARY. THE QUANTITY CALLED OUT IN THE "D" SHEETS (10CY/XXX LF) IS BASED ON THE VOLUME OF THE CULVERT. THE QUANTITY LISTED IN THE SUMMARY TABLE INCLUDES EXTRA GROUT.

HDPE PIPE NOTES:

- STORM SEWER REHABILITATION USING SLEPPING METHODS SHALL FOLLOW PROJECT SPECIFICATION SECTION 02722 SITE STORM SEWERAGE SYSTEMS AND UFOS 35 01 58 SLEPPING OF EXISTING PIPE FOR LEVEE APPLICATIONS. IN THE CASE OF A CONFLICT, THE MORE STRINGENT REQUIREMENT WILL GOVERN.
- THE CONTRACTOR SHALL REHABILITATE EXISTING STORM SEWER, IN-SITU, WITH SNAP-TITE OR ENGINEER APPROVED EQUAL AT THE LOCATIONS AND SIZES SHOWN IN THE PLANS.
- ALL PIPES USED FOR IN-SITU REHABILITATION SHALL BE HIGH DENSITY POLYETHYLENE (HDPE) PIPE CONFORMING TO ASTM D3505 AND ASTM F714.
- IN-SITU REHABILITATION SHALL CONFORM TO ASTM F585 AND INDUSTRY STANDARD FOR CULVERT RELINING, AASHTO M325.
- PRIOR TO IN-SITU REHABILITATION, ALL EXISTING PIPES SHALL BE CLEANED AND JETTED IF NECESSARY.
- IN ADDITION TO THESE PLANS, THE CONTRACTOR SHALL COMPLY WITH SPECIFIC MANUFACTURER REQUIREMENTS FOR IN-SITU REHABILITATION.
- AFTER THE HDPE PIPE IS INSTALLED, THE CONTRACTOR SHALL CONSTRUCT A BULKHEAD, MADE OF LOW STRENGTH CONCRETE AT EACH END OF THE PIPE EXTENDING 12' TO 15' PAST THE END OF THE PIPE. THE CONTRACTOR SHALL CONSTRUCT PVC GROUT PORTS AT EACH END OF THE PIPE AS SHOWN IN DETAIL, 1 ON SHEET D.4.
- AFTER THE BULKHEADS HAVE BEEN CONSTRUCTED, THE CONTRACTOR SHALL GROUT THE ANNULAR SPACE BETWEEN THE HDPE PIPE AND THE HOST PIPE AS DETAILED IN THE SPECIFICATIONS.
- THE CONTRACTOR SHALL DEVELOP A GROUTING PLAN TO ENSURE THAT GROUT REACHES AND FILLS ALL ANNULAR SPACE BETWEEN THE HOST PIPE AND THE HDPE PIPE. CONTRACTOR SHALL SUBMIT GROUT PLAN TO THE ENGINEER FOR REVIEW.
- GROUT PRESSURE SHALL NOT EXCEED 2 PSI.
- PVC GROUT PORT TUBES SHALL NOT BE PERMANENTLY ATTACHED TO THE HDPE LINER PIPE.
- THE CONTRACTOR SHALL LABEL GROUT PORTS AND VENT PORTS IN THE FIELD.
- IN-SITU REHABILITATION SHALL INCLUDE ALL BULKHEADS, PORTS, INSTALLATION RAIL, HDPE PIPE AND GROUT. ALL EQUIPMENT, TOOLS AND WORK ASSOCIATED IS CONSIDERED INCIDENTAL TO SLEPPING AND GROUTING.
- PROVIDE 72 HOUR NOTICE TO THE ENGINEER PRIOR TO PLACING LINER PIPES. DO NOT PROCEED WITH SLEPPING OPERATIONS FOR PIPES THAT ARE LIKELY TO REACH GRADE OPERATION WITHIN 3 DAYS AS FORECAST BY THE NATIONAL WEATHER SERVICE. LAY OUT THE SEQUENCING OF WORK TO MINIMIZE WORK STOPPAGES AS A RESULT OF HIGH WATER. ADDITIONALLY AFTER LINER PIPE HAS BEEN PLACED, MAKE ALL REASONABLE ATTEMPTS TO GROUT THE ANNULUS PRIOR TO PARTIAL OR TOTAL SUBMERGENCE OF THE PIPE. IN THE EVENT IN WHICH HIGH WATER SUBMERGES A PORTION OF A LINED PIPE PRIOR TO ANNULAR GROUTING, CLEAN OUT THE ANNULAR SPACE USING HIGH PRESSURE WATER JETTING PRIOR TO GROUTING.

ABBREVIATIONS:

- CE - COVER ELEVATION
- CCCP - CENTRIFUGALLY CAST CONCRETE PIPE
- CIPF - CURED-IN-PLACE PIPE
- QFS - CUBIC FEET PER SECOND
- CL - CENTERLINE
- CY - CUBIC YARD
- C-C - CENTER-TO-CENTER
- CMP - CORRUGATED METAL PIPE
- DA - DIAMETER
- EL - ELEVATION
- FL - FLOWLINE
- FT - FEET
- GA - GAUGE
- HDPE - HIGH DENSITY POLYETHYLENE
- ID - INSIDE DIAMETER
- IE - INVERT ELEVATION
- IN - INCH
- LEB - POUNDS
- LF - LINEAR FEET
- MAX - MAXIMUM
- MIN - MINIMUM
- NAD83 - NORTH AMERICAN DATUM OF 1983
- NAVD 88 - NORTH AMERICAN VERTICAL DATUM OF 1988
- LPSNRD - LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT
- O.C. - ON CENTER
- R - RADIUS
- RCP - REINFORCED CONCRETE PIPE
- STA - STATION
- SY - SQUARE YARD
- SWPPP - SWAMP POLLUTION PREVENTION PLAN
- TYP - TYPICAL
- USGS - UNITED STATES GEOLOGICAL SURVEY
- MATCH EXISTING



NEBRASKA 811 (www.ne811.com) WAS CONTACTED DURING THE PRELIMINARY DESIGN PHASE OF THIS PROJECT. THE LIST OF UTILITIES BELOW WERE LISTED AS HAVING A POSSIBILITY FOR UTILITIES IN THE VICINITY OF THE PROJECT SITES. UTILITIES THAT WERE MARKED WERE SURVEYED BUT ARE SHOWN AS APPROXIMATE LOCATIONS ONLY. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL UTILITIES AS NOTED IN GENERAL NOTE #2 ON THIS SHEET.

CITY OF LINCOLN PUBLIC WORKS DEPARTMENT | **LINCOLN ELECTRIC SYSTEM**
 SANITARY ENGINEERING: 402.441.7961 | OFFICE: 402.475-4211
 WATER DISTRIBUTION: 402.441.7911

LPSNRD CONTACT
 NAME: JARED NELSON, PE
 DISTRICT ENGINEER
 LOWER PLATTE SOUTH NRD
 ADDRESS: 3125 PORTIA STREET
 LINCOLN, NE 68521
 PHONE: 402.476.2729
 EMAIL: JNELSON@LPSNRD.ORG

QUANTITIES:

SUMMARY TABLE OF QUANTITIES (ALL PENETRATIONS)						
ITEM NUMBER	ITEM DESCRIPTION	87+15 L	87+45 R	131+50 R	TOTAL QUANTITY	UNIT
1	MOBILIZATION	1	1	1	1	LS
2	PIPE CLEANING	1	1	-	1	LS
3	TRAIL/TRAFFIC CONTROL SIGNAGE	1	1	1	1	LS
4	SWPPP MEASURES	1	1	1	1	LS
5	EXCAVATION	-	292	520	812	CY
6	EMBANKMENT	-	30	25	35	CY
7	FLOWABLE FILL FOR PIPE ABANDONMENT	-	52	36	88	CY
8	REMOVE EXISTING TIMBER PILE PIPE SUPPORT	-	2	1	3	EA
9	REMOVE FLARED END SECTION FOR 48" DIA CMP	-	1	-	1	EA
10	REMOVE 48" DIA CMP	-	8	-	8	LF
11	REMOVE AND REINSTALL FLARED END SECTION FOR 48" DIA CMP	-	1	-	1	EA
12	REMOVE FLARED END SECTION FOR 54" DIA CMP	-	-	1	1	EA
13	REMOVE, RECONDITION AND REINSTALL FLAP GATE FOR 48" DIA CMP	-	1	-	1	EA
14	REMOVE, RECONDITION AND REINSTALL FLAP GATE FOR 54" DIA CMP	-	-	1	1	EA
15	REMOVE AND SALVAGE TO OWNER FLAP GATE FOR 48" DIA CMP	-	1	-	1	EA
16	GALVANIZED METAL FLARED END SECTION FOR 54" DIA CMP	-	-	1	1	EA
17	42" OD SLEPPING WITH GROUT	-	72	-	72	LF
18	48" OD SLEPPING WITH GROUT	-	-	89	89	LF
19	TYPE "C" RR/PAP	-	368	215	583	TN
20	TYPE "B" RR/PAP	-	51	65	116	TN
21	DOUBLE TIMBER PILE PIPE SUPPORT	-	1	1	2	EA
22	SEEDING	0.1	0.4	0.4	0.9	AC
23	WETLAND SEEDING	-	0.01	0.02	0.03	AC



ENGINEER'S SEAL	DATE						
BY							
REVISIONS							
NO.							

GENERAL NOTES AND QUANTITIES
 SALT CREEK PENETRATION REPAIRS
 LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT
 LANCASTER COUNTY, NEBRASKA
 2019

DESIGNED BY: _____ NCE
 DRAWN BY: _____ SAG
 CHECKED BY: _____ JMS
 G.A./G.C. BY: _____
 PROJECT NO.: 2002-1520
 DATE: AUGUST 2019



LEGEND

LIMITS OF CONSTRUCTION:

PARCEL BOUNDARY LINE:

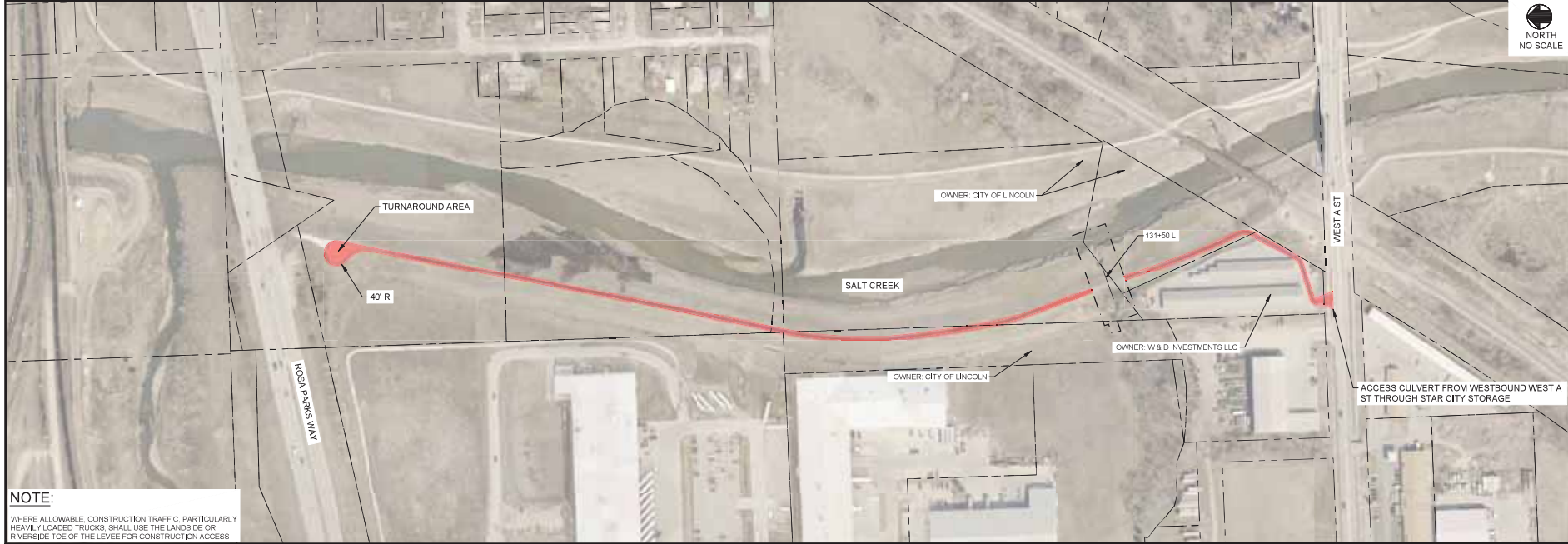
ACCESS ROUTE:

STOCKPILE AREA:

NOTE: WHERE ALLOWABLE, CONSTRUCTION TRAFFIC, PARTICULARLY HEAVILY LOADED TRUCKS, SHALL USE THE LANDSIDE OR RIVERSIDE TOE OF THE LEVEE FOR CONSTRUCTION ACCESS.



ENGINEER'S SEAL	NO.	
BY	DATE	
REVISIONS		



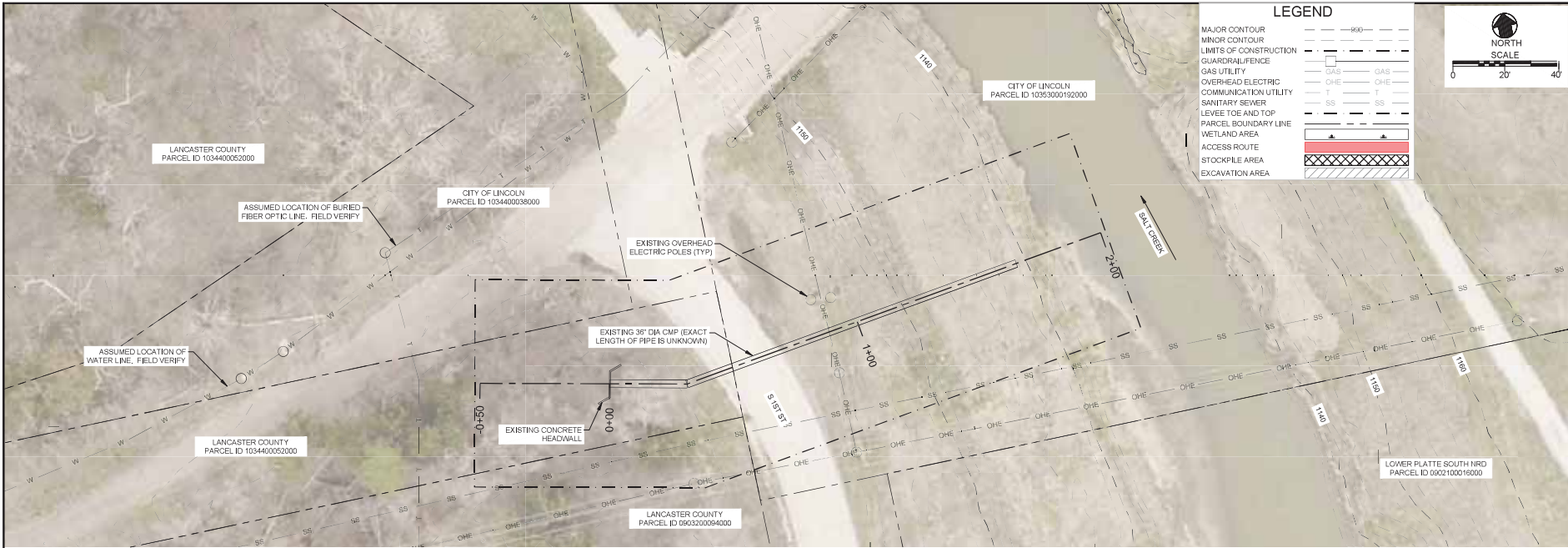
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67+15 L, 67+45 R, AND 131+50 L SITE ACCESS
 SALT CREEK PENETRATION REPAIRS
 LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT
 LANCASTER COUNTY, NEBRASKA 2019

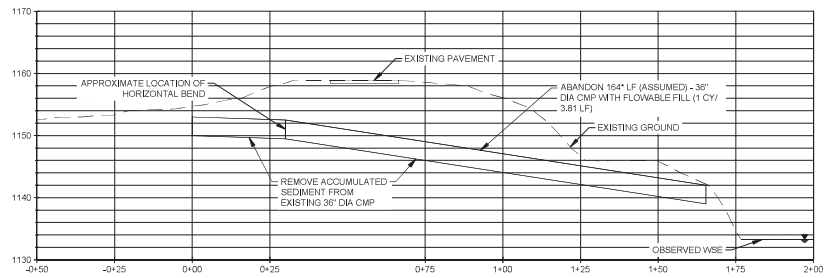
DESIGNED BY:	MCB
DRAWN BY:	SAB
CHECKED BY:	MSB
GA / GC BY:	
PROJECT NO.:	20081503
DATE:	AUGUST 2019

NOTE:
 WHERE ALLOWABLE, CONSTRUCTION TRAFFIC, PARTICULARLY HEAVILY LOADED TRUCKS, SHALL USE THE LANDSIDE OR RIVERSIDE TOE OF THE LEVEE FOR CONSTRUCTION ACCESS.

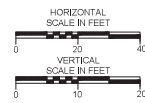
SHEET NO.
B.1



ASSUMED EXISTING 67+15 L PLAN VIEW *



ASSUMED EXISTING 67+15 L PROFILE VIEW*



NOTE:

- MIX DESIGN REPORTS FOR FLOWABLE FILL SHALL BE PROVIDED TO THE ENGINEER AT LEAST 24 HOURS IN ADVANCE OF GROUTING.
- SELECT FILL PLACEMENT EQUIPMENT AND FOLLOW PROCEDURES WITH SUFFICIENT SAFETY AND CARE TO AVOID DAMAGE TO EXISTING STRUCTURES; OPERATE EQUIPMENT AT PRESSURE THAT WILL NOT DISTORT OR IMPERIL EXISTING PENETRATION.
- CLEAN SEWER LINES AND VIDEO WITH CCTV TO IDENTIFY CONNECTIONS, OBSTRUCTIONS AND OTHER PENETRATION FEATURES. DURING PLACEMENT OF FILL, COMPENSATE FOR IRREGULARITIES IN PENETRATION, SUCH AS OBSTRUCTIONS, OPEN JOINTS, OR BROKEN PIPE TO ENSURE NO VOIDS REMAIN UNFILLED.
- REMOVE FREE STANDING WATER IN PENETRATION PRIOR TO FILL PLACEMENT.
- CONCRETE OR GROUT PUMPS MUST BE CAPABLE OF CONTINUOUS DELIVERY AT PLANNED PLACEMENT RATE.
- AT LEAST THREE TEST CYLINDERS SHALL BE OBTAINED FOR THE FLOWABLE FILL AND 56-DAY COMPRESSIVE STRENGTH SHALL BE DETERMINED.
- THE VOLUME OF FLOWABLE FILL SHALL BE RECORDED TO DEMONSTRATE THAT ALL VOIDS HAVE BEEN FILLED.
- FIELD AND PHOTO-DOCUMENTATION WILL BE COLLECTED DURING PIPING ABANDONMENT ACTIVITIES.

*THE ASSUMED EXISTING PLAN AND PROFILE SHOULD BE FIELD VERIFIED. THE OUTLET COULD NOT BE LOCATED DURING SITE INVESTIGATION. EXACT PIPE LENGTH, SLOPE, AND LOCATION OF HORIZONTAL BEND IS UNKNOWN.

FYRA
ENGINEERING

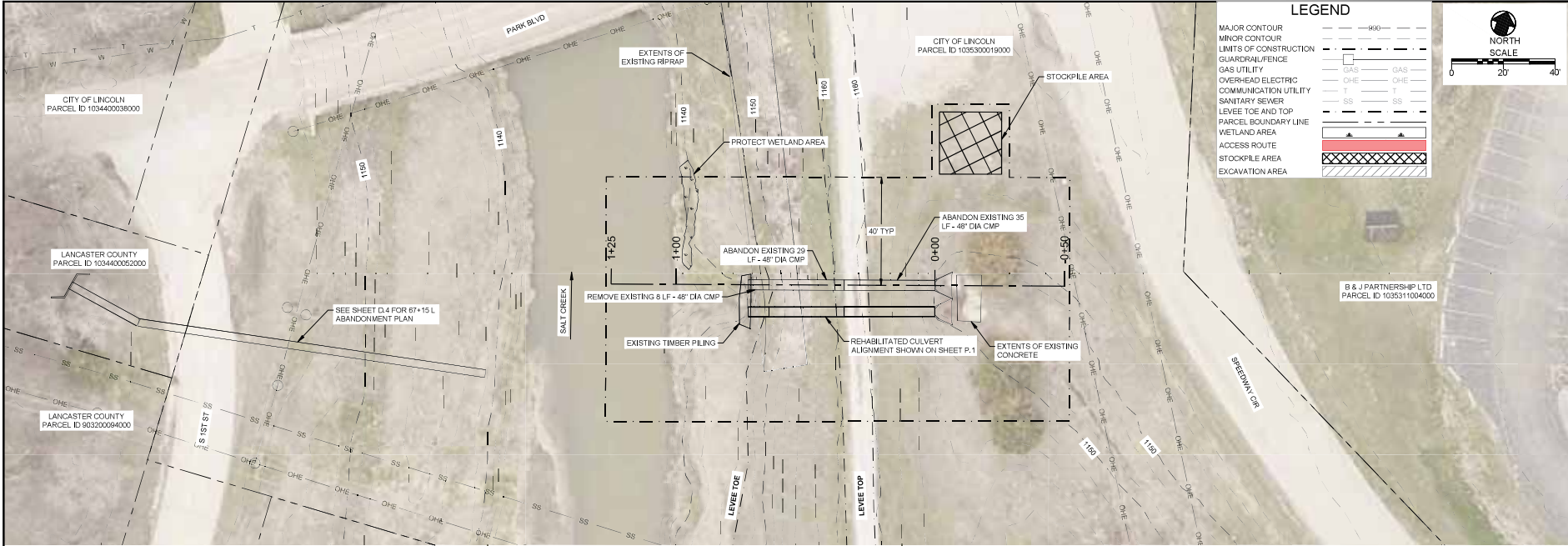
NORTH
SCALE
0 20 40

NO.	DATE	BY	REVISIONS						

67+15 L ABANDONMENT PLAN
SALT CREEK PENETRATION REPAIRS
LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT
LANCASTER COUNTY, NEBRASKA

DESIGNED BY: _____ MGC
DRAWN BY: _____ BAE
CHECKED BY: _____ JMS
QA / QC BY: _____ JMS
PROJECT NO.: 20081502
DATE: AUGUST 2018

SHEET NO.
D.4

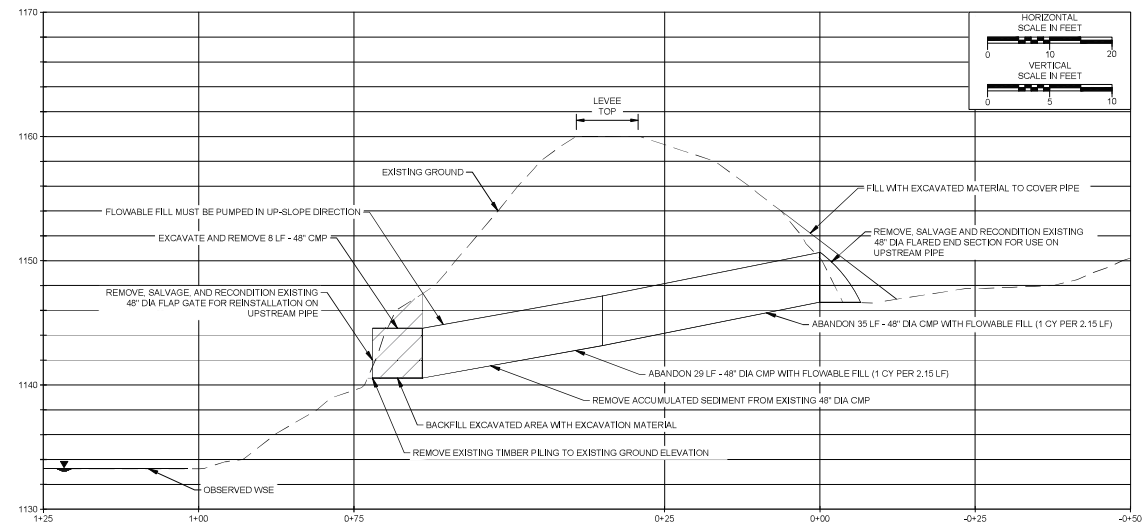


LEGEND

- MAJOR CONTOUR ----- 960
- MINOR CONTOUR ----- 960
- LIMITS OF CONSTRUCTION -----
- GUARDRAIL/FENCE -----
- GAS UTILITY ----- GAS
- OVERHEAD ELECTRIC ----- OHE
- COMMUNICATION UTILITY ----- T
- SANITARY SEWER ----- SS
- LEVEE TOE AND TOP -----
- PARCEL BOUNDARY LINE -----
- WETLAND AREA -----
- ACCESS ROUTE -----
- STOCKPILE AREA -----
- EXCAVATION AREA -----



67+45 R DOWNSTREAM PLAN VIEW



67+45 R DOWNSTREAM PROFILE VIEW

FYRA
ENGINEERING

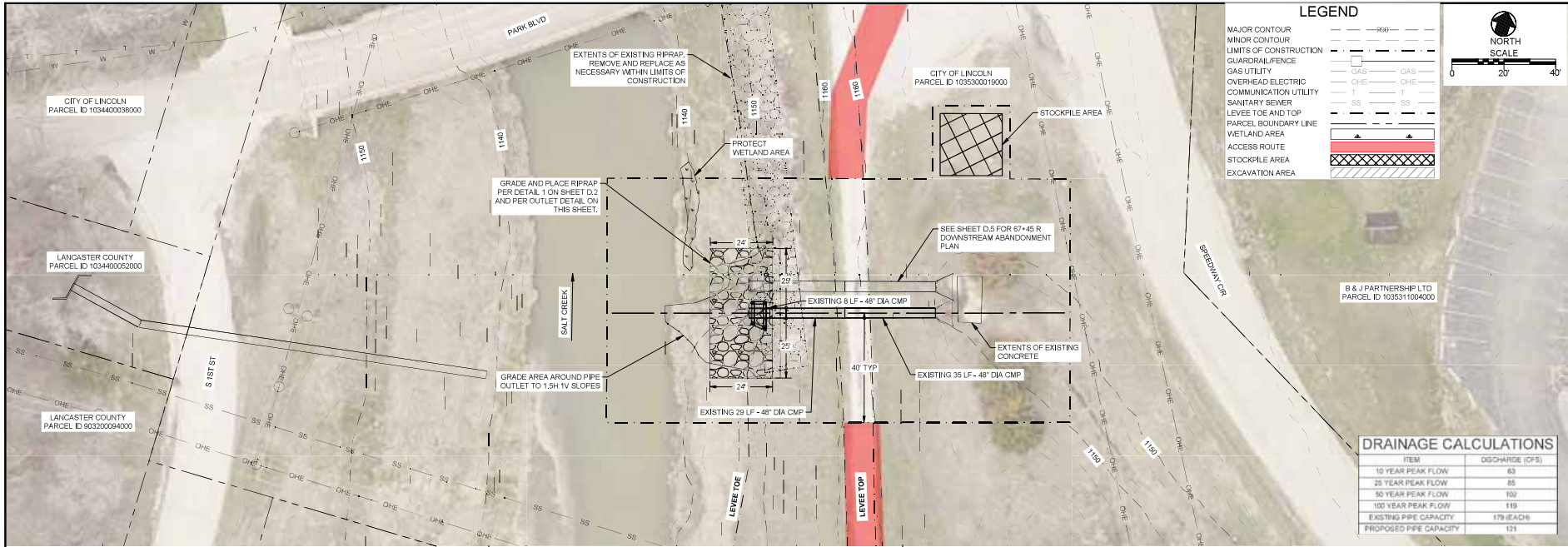
REGISTERED PROFESSIONAL ENGINEER
STATE OF NEBRASKA
NO. 0000000000

NO.	REVISIONS	DATE	BY

DESIGNED BY: MGC
 DRAWN BY: SAG
 CHECKED BY: JMS
 QA / QC BY: JMS
 PROJECT NO.: 2024-120
 DATE: AUGUST 2024

67+45 R DOWNSTREAM ABANDONMENT PLAN
 SALT CREEK PENETRATION REPAIRS
 LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT
 LANCASTER COUNTY, NEBRASKA 2019

SHEET NO.
D.5



LEGEND

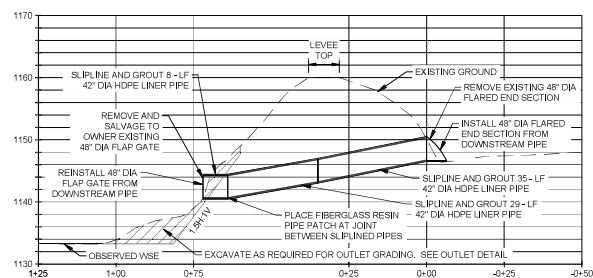
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MINOR CONTOUR	---	---
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GUARDRAIL/FENCE	□	□
GAS UTILITY	---	GAS
OVERHEAD ELECTRIC	---	OHE
COMMUNICATION UTILITY	---	T
SANITARY SEWER	---	SS
LEVEE TOE AND TOP	---	---
PARCEL BOUNDARY LINE	---	---
WETLAND AREA	---	---
ACCESS ROUTE	---	---
STOCKPILE AREA	---	---
EXCAVATION AREA	---	---



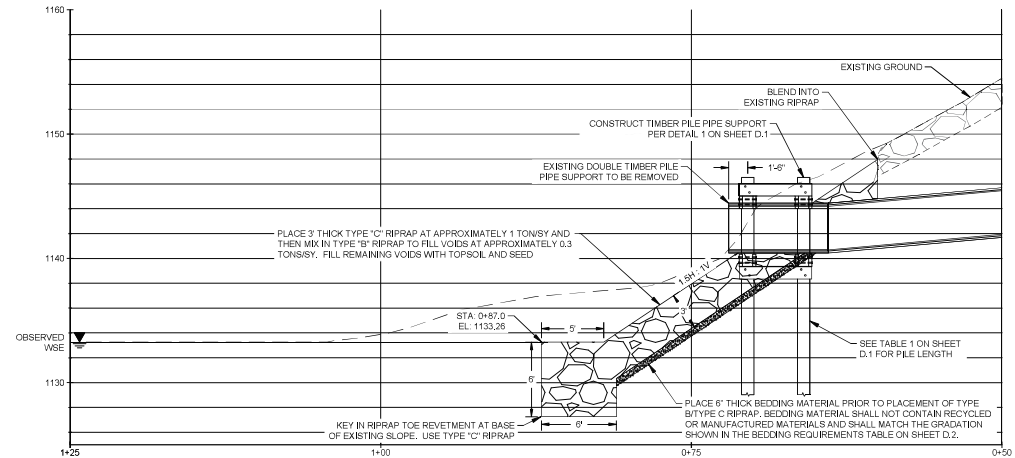
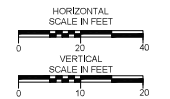
DRAINAGE CALCULATIONS

ITEM	DISCHARGE (CFS)
10 YEAR PEAK FLOW	63
25 YEAR PEAK FLOW	85
50 YEAR PEAK FLOW	100
100 YEAR PEAK FLOW	119
EXISTING PIPE CAPACITY	179 (EACH)
PROPOSED PIPE CAPACITY	121

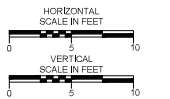
67+45 R UPSTREAM PLAN VIEW



67+45 R UPSTREAM PROFILE VIEW



67+45 R UPSTREAM OUTLET DETAIL

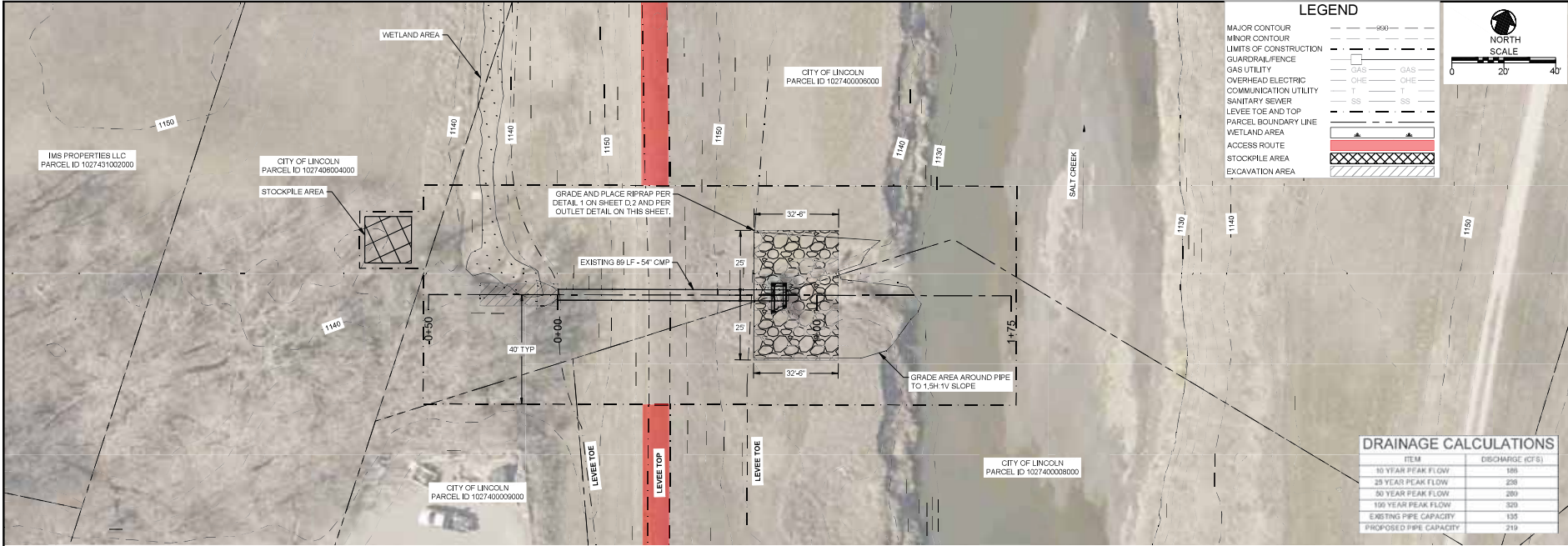


ENGINEER'S SEAL	DATE	BY
REVISIONS		
NO.		

67+45 R UPSTREAM PLAN AND PROFILE
 SALT CREEK PENETRATION REPAIRS
 LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT
 LANCASTER COUNTY, NEBRASKA
 2019

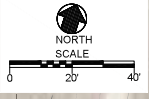
DESIGNED BY: MGR
 DRAWN BY: SBB
 CHECKED BY: JMS
 QA/QC BY: JMS
 PROJECT NO.: 2003-1520
 DATE: AUGUST 2019

SHEET NO.
P.1



LEGEND

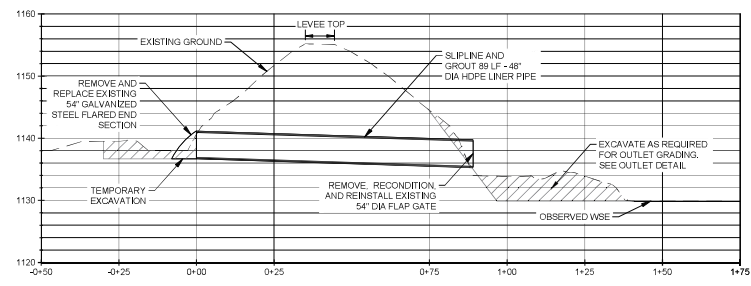
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MINOR CONTOUR	---	---	---
LIMITS OF CONSTRUCTION	- - - -	- - - -	- - - -
GUARDRAIL/FENCE	- - - -	- - - -	- - - -
GAS UTILITY	- - - -	GAS	- - - -
OVERHEAD ELECTRIC	- - - -	CHE	- - - -
COMMUNICATION UTILITY	- - - -	T	- - - -
SANITARY SEWER	- - - -	SS	- - - -
LEVEE TOE AND TOP	- - - -	- - - -	- - - -
PARCEL BOUNDARY LINE	- - - -	- - - -	- - - -
WETLAND AREA	- - - -	- - - -	- - - -
ACCESS ROUTE	- - - -	- - - -	- - - -
STOCKPILE AREA	- - - -	- - - -	- - - -
EXCAVATION AREA	- - - -	- - - -	- - - -



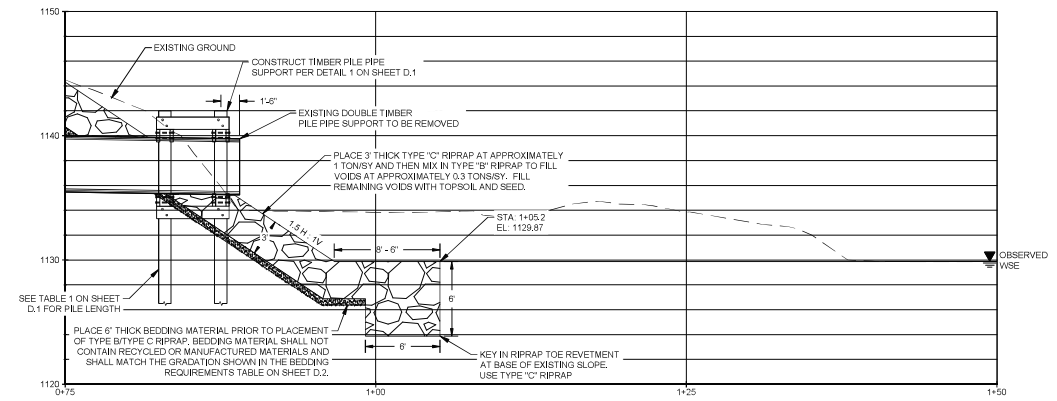
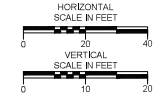
DRAINAGE CALCULATIONS

ITEM	DISCHARGE (CFS)
10 YEAR PEAK FLOW	186
25 YEAR PEAK FLOW	236
50 YEAR PEAK FLOW	280
100 YEAR PEAK FLOW	329
EXISTING PIPE CAPACITY	135
PROPOSED PIPE CAPACITY	219

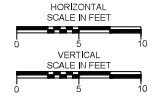
131+50 L PLAN VIEW



131+50 L PROFILE VIEW



131+50 L OUTLET DETAIL



FYRA ENGINEERING

REGISTERED PROFESSIONAL ENGINEER
STATE OF NEBRASKA
NO. 0000000000

DESIGNED BY	MDR
DRAWN BY	SAB
CHECKED BY	MSB
QA / QC BY	MSB
PROJECT NO.	2001420
DATE	AUGUST 2018

131+50 L PLAN AND PROFILE
SALT CREEK PENETRATION REPAIRS
LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT
LANCASTER COUNTY, NEBRASKA
2019

SHEET NO. **P.2**

AMENDMENT TO CONTRACT
BETWEEN THE NEBRASKA DEPARTMENT OF NATURAL RESOURCES
AND THE LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT
FOR A WATER SUSTAINABILITY FUND GRANT (WSF #5253) FOR CONSTRUCTION
OF THE
DEADMANS RUN FLOOD REDUCTION PROJECT

It is hereby agreed by the State of Nebraska, Department of Natural Resources and the Lower Platte South Natural Resources District, that the Water Sustainability Fund Grant Contract No. 1169 entered into by the parties on February 20, 2020 (Agreement), is amended to memorialize the Fiscal Year 2020-2021 grant obligation award of two million five hundred and sixty four thousand one hundred and forty one dollars and four cents (\$2,564,141.04) for Water Sustainability Fund application Number 5253. The Agreement is hereby amended as follows:

- The last WHEREAS clause is amended in its entirety as follows:
 - o WHEREAS, on October 28, 2020, the Commission took action to obligate the remainder of the Allocation or \$2,564,141.04.
- Paragraph 5C. Reimbursement is amended in its entirety as follows:
 - o C. The total amount of obligated funds under this Agreement is the total allocation of five million, eight hundred fifty-seven thousand, seven hundred ninety-two dollars and no cents (\$5,857,792.00), and is available for reimbursement by the Sponsor, subject to Paragraph 5.B. (1) and (2) immediately above. This total allocation amount includes obligations made in fiscal years 2019-2020 & 2020-2021.

The amendment shall become effective on the date hereinafter last signed.

**Lower Platte South
Natural Resources District**

**State of Nebraska,
Department of Natural Resources**

By: _____
Paul Zillig, General Manager
3125 Portia ST, PO Box 83581
Lincoln, NE 68501-3581

By: _____
Tom Riley, P.E. Director
P.O. Box 94676
Lincoln, NE 68509-4676

SALT CREEK FLOODPLAIN RESILIENCY STUDY FAQs

What is the schedule of the study?

The study is scheduled to be completed by the end of April 2020.

Does the study include updated floodplain maps?

No. A regulatory floodplain map update was not included in the scope. The Salt Creek floodplains were remapped in 2005.

Does this study have a role with the Lincoln-Lancaster County comprehensive plan like suggesting different standards with building materials?

The study will make recommendations on regulations, policy, and flood reduction measures. These recommendations may be incorporated in a general manner into future Lincoln- Lancaster Comprehensive Plan. One example may be low impact development regulations.

Is the foundation for the study based on climate change?

The purpose of study is to develop recommendations to reduce adverse impacts from flooding to life and property, based on current and future flood events. The study includes review of national floodplain best management practices and the potential impacts of a warming climate. Recommended flood control measures will be evaluated using current and future flood events.

How is a flood event defined?

- 2 year event = 50% annual chance of occurrence
- 10 year event = 10% annual chance of occurrence
- 50 year event = 2% annual chance of occurrence
- 100 year event = 1% annual chance of occurrence
- 500 year event = .2% annual chance of occurrence

What event is used for floodplain management regulations?

The 1 percent annual chance flood event is the federal, state and local regulatory flood for floodplain mapping and administration purposes.

What are other folks “skin in the game,” those not in the floodplain?

Large flood events can have devastating, community-wide impacts that go far beyond the impacts to those who were flooded. Economic damages can be a massive burden for a community, particularly one trying to recover from a flood event. Businesses can be disrupted throughout the community because of loss of rail, vehicle, or air services. Loss of power, water supply, or sanitary sewer services can impact the entire community. Loss of tax revenues can lead to budget shortfalls and disruption of future services and infrastructure investment.

Does the pace of development impact the floodplain?

The City of Lincoln adopted detention standards city-wide in the late 1990s, a No Adverse Impact (NAI) policy in 2004 for new growth areas and added storm water quality standards in 2015. These policies have been very effective at reducing the adverse impacts of developments. The NAI policy requires no increase in flood discharges downstream from the property, no backup of floodwaters on upstream properties, no loss of floodplain volume on the developed property, and treatment of runoff for more frequent events to reduce pollutant discharges to streams and lakes. A minimum stream corridor policy was also adapted in 2004, which has significantly increased the amount of natural streams in recent development projects, as well as an associated buffer area for the environment and also helps to protect neighboring properties from flooding and issues with streambank erosion.

SALT CREEK FLOODPLAIN RESILIENCY STUDY FAQs

Where does the runoff go?

Surface runoff from precipitation events in Lincoln drain to Salt Creek.

Is the current climate reflective of existing data?

Is the historical discharge-frequency record indicative of what we can expect for future discharge-frequency events? Not, necessarily. The past climate/rainfall doesn't predict the future. For example, the Technical Paper 40 (TP 40, National Weather Service) precipitation-frequency relationships were developed based on rain gage data from the 1960's or earlier. The updated data from the National Oceanic and Atmospheric Administration (NOAA) NOAA ATLAS 14 precipitation-frequency relationships were developed within the last 5 years. The additional 50 years of data shows an increase in the magnitude of the one percent annual chance (100-year) precipitation event of approximately 10 percent. The trend is an increase in the 100-year precipitation over time. If the precipitation value for a given event stayed relatively constant over time, we would call this "stationarity", this is not what the data suggests.

How often is the analysis of precipitation data updated?

As noted previously, the TP40 data was used as the standard for floodplain management for more than 50 years. It was replaced with the NOAA Atlas 14 data, which was developed approximately five years ago.

Why did flooding happen in March 2019, even though the rainfall was not as significant?

Rainfall amount and frequency do not always directly translate into flood frequency. For example, 4.7 inches of rainfall may be a 10 percent annual chance (10-year) event in the spring or summer. However, if the ground is frozen or saturated with water, less of the rain will soak into the ground and more runoff will be generated. The 4.7-inch rainfall event may create a 25-year or 50-year runoff event, if water can't infiltrate into the ground. In March 2019, we had a combination of snow, frozen or saturated ground, and rainfall that resulted in a runoff event that was between a 100-year and 500-year event in magnitude. The rain and snow alone were not sufficient to create such a large event.

What are some flood control projects Lincoln has completed?

The City of Lincoln and Lower Platte South NRD have completed many flood control projects, including the Antelope Valley Flood Control Project, the Upper Antelope Creek Flood Reduction Project, the Beal Slough Flood Reduction Project, and the ongoing Deadman's Run Flood Control Project.

What is the floodway and why is it larger in some areas?

The floodplain is the extent of the area that is inundated during a flood event. The floodplain includes shallower areas at the edges, where the flow is not as active. The floodway is the actively flowing portion of the floodplain that must be kept free from obstructions to avoid excess increases to the flood elevations due to "squeezing" the floodplain. In some locations, the active flowing portion of the floodplain is wider and, in some locations, narrower. The floodway is confined to the Salt Creek levees through the levee extents of the levees and through the use of flood storage areas landward of the levees.

How does precipitation impact design standards for detention cells, bridges, and storm drain systems?

- Detention cells are typically designed to offset (mitigate) increased runoff rates due to development for the 2-year, 10-year, and 100-year events.
- Bridges and roadway culverts are typically designed based on the level of service (how much traffic) and location. For example, a residential road in the City of Lincoln may be designed so that water doesn't overtop the structure during the 50-year event. A county road with little traffic may be designed to not overtop during a 5-year event.
- Storm drain systems are designed to convey the 5-year, or 10-year event in the infrastructure pipes. Excess flows travel along the curb and gutter of the street. Typically, the bypassed flows from larger events that don't make it in the storm drain system, are required to be contained within the roadway right-of-way.

SALT CREEK FLOODPLAIN RESILIENCY STUDY FAQs

- If the rainfall amounts associated with the design event for a detention cell, bridge or culvert for a roadway crossing, or storm drain system change, that can have an impact on the cost to replace that infrastructure. Increased precipitation amounts typically lead to increased costs for the construction and maintenance of drainage features.

If rain events increase in frequency and volume should the city look at changing standards, or flood control solutions?

This is a foundational study to examine potential future measures for floodplain management and flood control. New regulations and flood control measures may be part of the recommendations that come forward from this report; but, are not specifically being brought forward for formal approval at this time.

What is the difference between precipitation data and discharge data?

Precipitation data is recorded by rain gages and is the measure of how much rainfall occurred. Precipitation data is usually measured and reported on an hourly or daily basis. Streamflow data is the measure of how much water is flowing in the stream. Streamflow can be measured on a continuous basis and we typically use the peak annual streamflow (peak streamflow for each year of the stream gage record) to analyze extreme flood events and develop an estimate of the flows for the one percent annual chance, or 100-year, regulatory event.

What do United States Geological Survey (USGS) stream gauges measure?

Stream gages measure how much water is flowing in a stream. The measurement is reported in cubic feet per second (cfs). Stream gage data is available from USGS, USGS Current Water Data for Nebraska.

What impacts streamflow?

Generally, the amount of flow in a stream is a result of the precipitation received and the ground surface conditions in the watershed. The more impervious (paved areas, roof tops, etc.) areas there are within a watershed, the greater and quicker the amount of runoff will be generated for a given rainfall event. If soils are saturated (can't soak up any more water), or if the ground is frozen, that can also lead to more runoff.

What role does temperature play in stream discharge?

Increases in atmospheric temperature have a direct influence on precipitation. Increased precipitation leads to increased stream discharges.

What are storm water quality challenges?

Water quality is different than floodplain management but some design items offer a benefit to both. Healthy floodplain corridors and minimum buffer stream corridors that include green spaces, can help improve water quality along our streams.

What is a levee?

A man-made structure, usually an earthen embankment, designed and constructed to contain, control or divert the flow of water to reduce the risk from temporary flooding. Levees are typically built parallel to a water way, to reduce risk on the "landward" side.

Where are the levees located and what areas do they protect?

The Salt Creek levees are along either bank of Salt Creek from Calvert Street in the south to Superior Street in the north (area red below). The levees protect numerous neighborhoods, commercial, and industrial areas (area in pink). The levees also help to provide protection for critical infrastructure like the Theresa Street Wastewater Treatment Facility and the Lincoln Electric System facility along North 27th Street.

Based on NOAA Atlas 14, is there an increased risk in downtown?

All the areas protected by the Salt Creek levees are at increased risk of flooding and flood damages. This includes the areas on the west and north side of downtown Lincoln.

What are the conditions that would cause levee overtopping?

The levee generally provides protection and does not overtop for the approximate two percent annual chance (50-year) flood event. Minimal overtopping of the levees occurred during the May 2015 flood event.

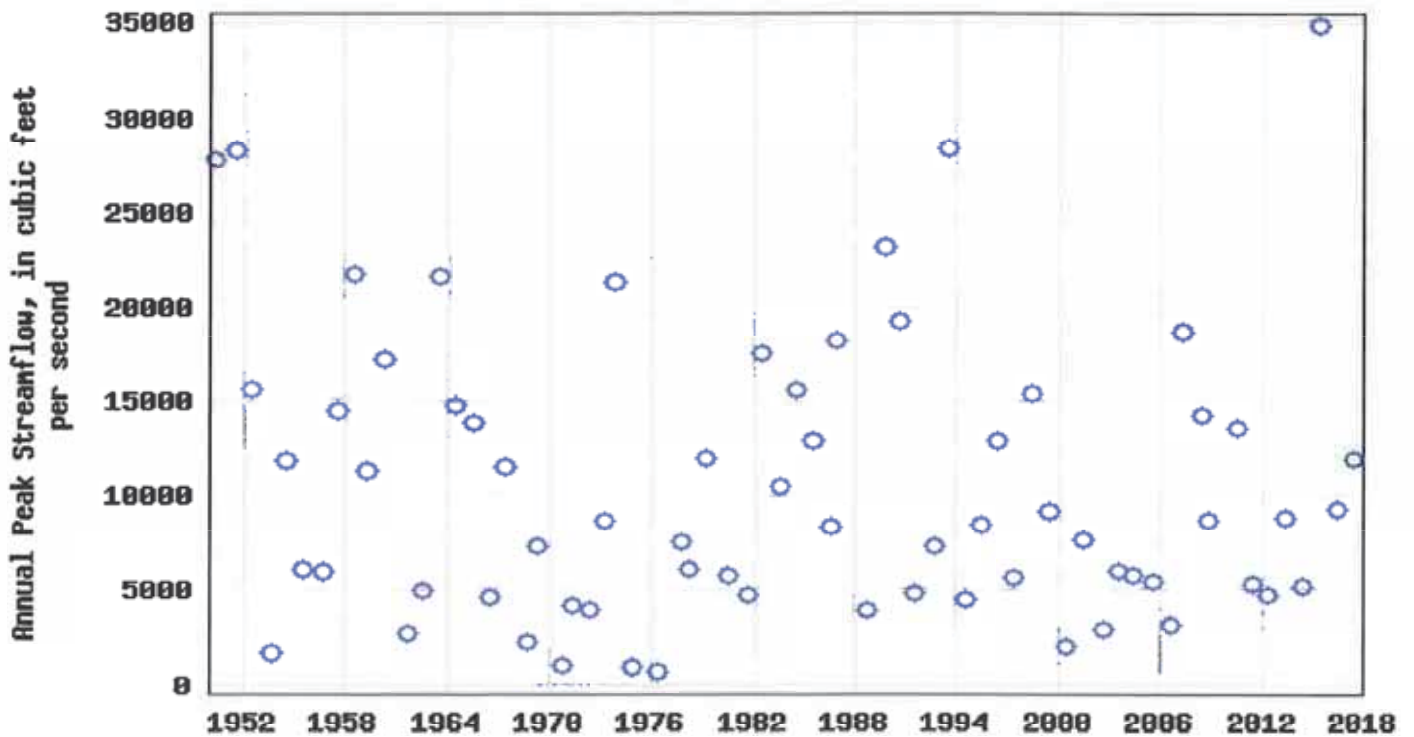
SALT CREEK FLOODPLAIN RESILIENCY STUDY **FAQS**

Since the levee system was installed in the 1960's, in the last 50 years, how many flooding events has Lincoln experienced?

According to the USGS Gage 06803500, the flows in Salt Creek at North 27th Street have exceeded the 10-year flow rate seven times since 1970. The 50-year flow rate has been equaled or exceeded three times, and the 100-year flow event was exceeded once in 2015. The flood stage flow for the gage is approximately 16,000 cfs. The peak flow rates are 18,500, 24,000, and 30,100 cfs for the 10-year, 50-year, and 100-year events, respectively.



USGS 06803500 Salt Creek at 27th Street at Lincoln, Nebr.



SALT CREEK FLOODPLAIN RESILIENCY STUDY FAQs

Are there flood control reservoirs (dams) in the Salt Creek watershed?

Salt Creek watershed has 10 large flood management dams, built by USACE and 66 smaller dams.

What does no adverse impact mean?

No Adverse Impact (NAI) means the action of one property owner does not negatively impact the flooding risk for other properties.

What is a detention area and what does it do?

Development creates more runoff due to more impervious surfaces, which causes an increase in runoff, quicker stormwater runoff to the stream, and an easier path for pollutants to get to local streams and lakes. Developments are required to maintain the runoff rates from preexisting development conditions and to account for stormwater quality discharges. Detention areas and stormwater quality areas are the areas reserved for holding stormwater, slowing it down to reduce runoff rates, and improve the downstream water quality.

Based on the new precipitation data (NOAA Atlas 14) future detention cells may need to be larger to accommodate the increased runoff that comes with larger rainfall events. The one percent annual chance flood event from Atlas 14 is approximately 10 percent larger than the precipitation used for the 100-year design storm today.

What other spaces can be used for detention?

The green space in city parks often provide flood storage as well as outlots in residential and commercial developments. One example of flood storage in a park is Wilderness Park along Salt Creek.

Why not do a project similar to Antelope Creek and widen Salt Creek so that the 1 percent annual chance flood is contained within the channel?

Since the early 1980's, when it was identified that the existing flood control project would not protect Lincoln from the 1 percent annual chance flood, the LPSNRD and the City of Lincoln have been working closely with USACE to address increasing the level of protection and structural integrity of the Salt Creek levee system. The most promising options to restore the level of protection of the levees to the 1 percent annual chance flood and potentially meet technical and economic feasibility have been evaluated as described in Section 4 of the report. Because of its probable high cost (e.g. bridge and utility replacements, taking of private property, and other items), widening the channel to accommodate the 1 percent annual chance flood below the bank elevations has not been evaluated in previous reports (see Section 4).

Why not raise the levees to contain the mapped Salt Creek floodplain between the levees?

Past studies of the Salt Creek floodplain conducted by the USACE have looked at numerous options to reduce flood damages and improve the level of protection provided by the levee system. A 1987 USACE study (described in Section 4 of the report) concluded "...that it is not economically feasible to improve the level of flood protection along the entire existing Salt Creek levee and channel project or to its original design level of protection (100-year);..." Other studies have inferred or come to the same conclusion (see Section 4).

Shouldn't there be a recommendation for the city to adopt the concept of "Sponge Cities" (i.e. use of practices to soak up water) to reduce the flow into Salt Creek to lessen flooding?

The "Sponge Cities" concept is very similar to Low Impact Development (LID). As described in Alternate

SALT CREEK FLOODPLAIN RESILIENCY STUDY FAQs

Stormwater Best Management Practices (BMP's) Guidelines, City of Lincoln, Nebraska and the Lower Platte South Natural Resources District, April 2006 (<https://www.lincoln.ne.gov/city/ltu/watershed/bmp.htm>), LID commonly incorporates numerous best management practices to achieve environmental and economic benefits. Recommendations in this study for cluster subdivisions regulations, setbacks and riparian preservation, and low impact development regulations support the "Sponge Cities" concepts. In addition to these recommendations, there are many other voluntary practices that can be implemented by the public such as the installation of rain gardens, green roofs, using pervious pavement, and amending soils to increase infiltration, reduce runoff, and improve water quality.

Typically, these practices work well in more frequent rainfall events (i.e. smaller rainfall events that occur more often) and consequently work well for the purposes of stormwater quality. However, the "Sponge Cities" concept is typically less effective for larger rainfall events because the runoff volume greatly exceeds the capacity of the LID components to hold runoff. The intensity of rainfall in larger events can also create more runoff than the LID features can infiltrate. LID will not provide significant flood control benefits unless the LID practices are done very extensively and with significantly more capacity in both existing and developing areas.

What is the data on recent rainfall events as compared to historic events? Does the data provide evidence of the future climate model proposed in this study?

The current Flood Insurance Study (FIS) for Lincoln is based on precipitation data from the U.S. Weather Bureau's Technical Paper No. 40 (TP40), which dates from 1961. More up-to-date precipitation data, through December 2012, is contained in the National Oceanic and Atmospheric Administration (NOAA) Atlas 14. The methodology used to determine future precipitation frequency estimates is described in Section 5.2.1 of the report and is referred to as Future (RCP8.5). Table 1 provides a comparison of precipitation values from TP40, Atlas 14, and Future (RCP8.5) for the 50, 10, 2, 1, and 0.2 percent annual chance precipitation events.

This data shows that the 50-, 100-, and 500-year 24-hour point precipitation values have increased since TP40 was published in 1961 and are expected to increase even more in the future. Comparisons of wettest years and other rainfall data nationwide and in the Midwest confirm this increase in rainfall values.

Table 1. Comparison of Corresponding 24-Hour Point Precipitation Values from Different Sources

Probability (percent annual chance)	Common Event Name	Total Precipitation TP40 (in)	Total Precipitation Atlas 14 (in)	Total Precipitation Future Conditions RCP 8.5 (in)
50	2-Year	3.00	3.03	3.21
10	10-year	4.69	4.47	4.83
2	50-year	6.00	6.37	6.94
1	100-year	6.68	7.31	7.97
0.2	500-year	8.18	9.75	10.73