REQUEST FOR BIDS

Upper Iowa River Flood Reduction Project

UI-BID-002

Winneshiek County, IA

Due:

2:00 PM

June 4, 2020

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UI-BID-002

WINNESHIEK COUNTY, IOWA

PUBLIC NOTICE: ADVERTISEMENT FOR BIDS
Winneshiek County, Iowa

The County of Winneshiek is seeking bids for the following project:

Construction of flood reduction projects in the Upper Iowa River Watershed- UI-BID-002

Project Location and Information:
This project consists of 7 structures on agricultural land within the Upper Iowa River Watershed in Winneshiek County.

Plans and Specifications Will be Available May 20, 2020 at 2:00 PM at/from the Offices of:
Winneshiek Soil and Water Conservation District
2296 Oil Well Rd
Decorah, IA, 52101

Electronic copies of the bid packet are available at Isqft.com and at upperiowariver.org

Questions regarding the bid packet can be sent to Paul Berland at pberland@northeastiowarcd.org or by phone at 563-864-7112.

Pre-Bid Meeting:
A Pre-Bid Meeting will be held Wednesday May 27, 2020 @ 9:30 AM at the Winneshiek Soil and Water Conservation District Office, 2296 Oil Well Road, Decorah, IA 52101. Engineers will be in attendance and site visits will occur dependent upon weather conditions.

Time and Place for Filing Sealed Proposals:
Sealed bids will be received from qualified contractors at the Northeast Iowa RC&D office, 101 E. Greene St., PO Box 916 Postville, IA 52162 until **June 4, 2020 at 2:00 PM.**

Time and Place Sealed Proposals Will be Opened and Considered:
Bids will be opened and tabulated at Northeast Iowa RC&D office at 2:05 PM on June 4, 2020 for consideration by the Winneshiek County Board of Supervisors at its meeting on June 8, 2020.

Section 3 Requirements
A. The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

B. The parties to this contract agree to comply with HUD's regulations in 24 CFR part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.

C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

D. The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 135.

E. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 135.

F. Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

G. With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

<u>Section 3 Businesses are encouraged to respond to this proposal.</u> A Section 3 business is a business that is:

51% owned by Section 3 residents*

Whose permanent, full-time staff is comprised of at least 30% Section 3 residents*

Has committed 25% of the dollar amount of its subcontracts to Section 3 businesses

*A Section 3 resident is defined as a public housing resident or someone with a household income that is less than 80% of the area median income.
Businesses that believe they meet the Section 3 criteria are encouraged to register as a Section 3 Business through HUD's website:
https://portalapps.hud.gov/Sec3BusReg/BRegistry/RegisterBusiness

BID INSTRUCTIONS & AWARD PROCEDURE

Please complete all documents properly. Failure to complete and sign all documents with respect to the requirements listed below may cause your bid not to be read.

This bid letting involves two (2) separate bid packets identified as Packet A and Packet B. Packet A consists of 1 structure location, Packet B consists of 3 structure locations.

For each of the packets being bid upon, bidder should complete the following documents. Each bid packet must be submitted in separate envelopes labeled as such:

UI-BID-002, Packet A
UI-BID-002, Packet B

BID BOND

i. The bid security in the amount of five percent (5%) of the total bid price shall be in the form of a cashier's check, a certified check, or a bank money order drawn on a FDIC insured bank in Iowa or drawn on a FDIC insured bank chartered under the laws of the United States; or a certified share draft drawn on a credit union in Iowa or chartered under the laws of the United States; or a bid bond executed by a corporation authorized to contract as a surety in Iowa or satisfactory to the County of Winneshiek, hereinafter called the "Jurisdiction".

ii. The bid bond must be submitted using the Bid Bond Form. All signatures on the bid bond must be original signatures in ink; facsimile (fax) of any signature on the bid bond is not acceptable.

PROPOSAL SUBMISSION

i. The proposal shall be submitted in a sealed envelope properly identified as the Proposal with the project title from above and the name and address of the bidder. Proposals shall be delivered to Northeast Iowa RC&D, 101 E. Greene Street, P.O. Box 916, Postville, IA 52162 at or before 2:00 P.M., local time on June 4, 2020. It is the sole responsibility of the bidder to see that its proposal is delivered prior to the time for opening bids, along with the appropriate bid security sealed in the separate envelope identified as Bid Security or Bid Bond. Proposals received after the bid receipt deadline will be returned to the bidder unopened and will not be considered.

ii. The following documents shall be completed, signed and returned in a separate Proposal envelope for each packet bid upon. The bid cannot be read if these documents are omitted from the Proposal envelope.

   a. **UI-BID-002 BID FORM:** Signatures must be in original ink

   b. **UI-BID-002 BID SCHEDULE** the Bidder must provide the Unit Price, the Amount, the Division Subtotals and the Grand Total Bid. In case of discrepancy, the Unit Price governs. The quantities shown on the

Proposal are approximate only, but are considered sufficiently adequate for the purpose of comparing bids. The Jurisdiction shall only use the Grand Total Bid for comparison of the bids.

c. **Intent to Comply with Section 3 Requirements Form**

SPECIAL NOTE ON BID INSTRUCTIONS

i. The bidding process consists of two (2) separate packets for the construction of 4 flood control structures in packets of 1 and 3 structures, respectively. Bids for each packet should reflect the total cost to construct all of the structures in said packet. The Jurisdiction will enter into two (2) contracts for the construction of the structures and will not sub-divide the projects beyond the 2 packet division. The contractor awarded each contract may elect to hire sub-contractors, but will do so at their own desire and will be required to fulfill requirements and provisions related to sub-contracting.

ii. The bidder may bid on more than one packet. Each packet must be bid separately. If the bidder is the apparent low responsive and responsible bidder on Packet A upon opening, bidder may elect to withdraw submitted bid for Packet B prior to opening of said packet without forfeiture of Bid Bond.

iii. Bidders may be awarded more than one packet upon bid opening if they are the apparent low responsive and responsible bidder for more than one packet.

iv. The bidder should be sure to read and understand all required federal provisions, wage rate determinations, bonding requirements, contract requirements, labor standards and bid packet materials prior to submitting a bid.

AWARD PROCEDURE

i. The Jurisdiction reserves the right to reject any bids, and to accept in whole or in part the bid which in the judgment of the bid evaluators is the lowest, most responsive and responsible bid. The Jurisdiction, reserves the right to reject any and all bids, to waive technicalities or irregularities and to enter into such contract as it shall deem to be in the best interests of the County.

PACKET A: UI-BID-002 BID FORM

Submitting Firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Authorized Representative (print):_____

Authorized Representative Signature:_____

Date: _____ Email:_____

Phone: _____

Our/My bid, as shown in the Grand Bid Total from the Bid Schedule for Packet A submitted is

$ _____.

The correct summation of actual bid tabulation figures will supersede any amounts shown on this page.

CERTIFICATIONS: By signing this form, the bidder certifies that they have read and understand all bid packet items related to this solicitation, including, but not limited to, contract language, bonding requirements, federal provisions, wage rate determination, labor standards, reporting and records maintenance and construction specifications.

FIRM PRICING. Offered prices shall remain firm for a minimum of 30 days after the due date of this solicitation unless indicated otherwise. Accepted prices shall remain firm for the duration of the contract.

ADDENDA (It is the Bidder's responsibility to check for issuance of any addenda). The authorized representative herby acknowledges receipt of the following addenda:

Addenda Number _____ Date _____ Addenda Number _____ Date _____

Addenda Number _____ Date _____ Addenda Number _____ Date _____

PACKET B: UI-BID-002 BID FORM

Submitting Firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Authorized Representative (print):_____

Authorized Representative Signature:_____

Date: _____ Email:_____

Phone: _____

Our/My bid, as shown in the Grand Bid Total from the Bid Schedule for Packet B submitted is

$ _____.

The correct summation of actual bid tabulation figures will supersede any amounts shown on this page.

CERTIFICATIONS: By signing this form, the bidder certifies that they have read and understand all bid packet items related to this solicitation, including, but not limited to, contract language, bonding requirements, federal provisions, wage rate determination, labor standards, reporting and records maintenance and construction specifications.

FIRM PRICING. Offered prices shall remain firm for a minimum of 30 days after the due date of this solicitation unless indicated otherwise. Accepted prices shall remain firm for the duration of the contract.

ADDENDA (It is the Bidder's responsibility to check for issuance of any addenda). The authorized representative herby acknowledges receipt of the following addenda:

Addenda Number _____ Date _____ Addenda Number _____ Date _____

Addenda Number _____ Date _____ Addenda Number _____ Date _____

UI-BID-002 BID SCHEDULE: PACKET A

UPPER IOWA RIVER WATERSHED

SITE:UI-013-CLAYTON
IOWA

BID SCHEDULE

ITEM NO.	WORK OR MATERIAL	SPEC. NO.	QUANT	UNIT	UNIT PRICE	AMOUNT
1	Site Clearing, Prep & Waste Disposal	1	1	Job	$ _____	$ _____
2	Structure and Channel Seeding	6	1.7	Acres	$ _____	$ _____
3	Buffer Seeding	6	2.7	Acres	$ _____	$ _____
4	Mobilization and Demobilization	8	1	Job	$ _____	$ _____
5	Over-excavation, Core Trench Undercut	21	435	Cu. Yds	$ _____	$ _____
6	Earthfill, Embankment and Core Trench Fill(P)	23	15,255	Cu. Yds	$ _____	$ _____
7	Earthfill, Pond Liner (P)	23	5,910	Cu. Yds	$ _____	$ _____
8	Topsoil, Strip Salvage, and Respread (P)	26	2,900	Cu. Yds	$ _____	$ _____
9	PVC PIPE, 6"	45	90	Lin. Ft	$ _____	$ _____
10	Corrugated Metal Pipe, 42"	51	153	Lin. Ft	$ _____	$ _____
11	Riprap, Class 'E' w/ Geotextile Fabric	61 & 95	76	Ton	$ _____	$ _____
12	3" Roadstone	61 & 95	175	Ton	$ _____	$ _____
13	48" CMP Riser with Trash Rack	620	1	LS	$ _____	$ _____
14	Resilient Wedge Gate Valve, 6"	620	1	LS	$ _____	$ _____

PACKET A GRAND TOTAL BID ..... $ _____

Firm: _____

Signature: _____

UI-BID-002 BID SCHEDULE: PACKET B

UPPER IOWA RIVER WATERSHED

SITE: **UI-011-BEARD**
IOWA

BID SCHEDULE

ITEM NO.	WORK OR MATERIAL	SPEC. NO.	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	1	Job	$ _____	$ _____
2	Clearing & Grubbing	1	1	Job	$ _____	$ _____
3	Excavation - Core Trench	21	1096	Cu. Yds.	$ _____	$ _____
4	Earthfill - including stripping	23	11155	Cu. Yds.	$ _____	$ _____
5	Topsoil, Strip, Salvage and Respread	26	606	Cu. Yds	$ _____	$ _____
6	Pipe, Appurtenances and Installation w/ rip rap outlet protection	45 61	120	Lin. Ft.	$ _____	$ _____
7	Seeding - Critical Area	6	1	acre	$ _____	$ _____
8	Seeding - Pasture	6	3	acre	$ _____	$ _____
9	Seeding - Native	6	2	acre	$ _____	$ _____
10	Fence - Woven Wire	92	915	Feet	$ _____	$ _____
11	Fence - 4 Strand Barb Wire	92	260	Feet	$ _____	$ _____
12	Fence - Gate (12ft)	92	2	Each	$ _____	$ _____
13	Waterline Installed/hydrant	45	185	Feet	$ _____	$ _____

TOTAL BID - BEARD SITE .....$ _____

UPPER IOWA RIVER WATERSHED

SITE: **UI-033-HAGEMAN**
IOWA

BID SCHEDULE

ITEM NO.	WORK OR MATERIAL	SPEC. NO.	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	1	Job	$ _____	$ _____
2	Earthwork/Basin	23	2100	Cu. Yds.	$ _____	$ _____
3	12" SDR21 PVC	45	151	Lin. Ft.	$ _____	$ _____
4	Canopy and animal/trash guard		1.0	No.	$ _____	$ _____
5	Rip Rap Outlet Protection	61	1	Job	$ _____	$ _____
6	Seeding	6	1	Acres	$ _____	$ _____

TOTAL BID -HAGEMAN SITE .....$ _____

UPPER IOWA RIVER WATERSHED

SITE: **UI-026-29-STORTZ**
IOWA

BID SCHEDULE

ITEM NO.	WORK OR MATERIAL	SPEC. NO.	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	1	Job	$ _____	$ _____
2	Clearing & Grubbing	1	1	Job	$ _____	$ _____
3	Seeding (Critical area)	6	1.5	Acres	$ _____	$ _____
4	Seeding Cover Crop	6	6.0	Acres	$ _____	$ _____
5	Native Prairie Seeding	6	2	Acres	$ _____	$ _____
6	Herbicide Treatment		8.1	Acres	$ _____	$ _____
7	Earthwork Waterway Shaping	412	900	Cu Yds.	$ _____	$ _____
8	Compacted Earthfill/Basins	23/638	4500	Cu Yds.	$ _____	$ _____
9	Rip Rap Outlet Protection	61	2	Job	$ _____	$ _____
10	6" SDR21 PVC	620	200	Lin. Ft.	$ _____	$ _____
11	6" Intakes installed		2	No.	$ _____	$ _____
12	8" PVC Outlet Pipe w/animal guard		2	No.	$ _____	$ _____

TOTAL BID -STORTZ SITE .....$ _____

UI-BID-002: PACKET B

SITES:
UPPER IOWA RIVER WATERSHED

BID SCHEDULE
SUMMATION OF BIDS : PACKET B

TOTAL BID, BEARD SITE..... $ _____

TOTAL BID, HAGEMAN SITE ..... $ _____

TOTAL BID, STORTZ SITE ..... $ _____

SUMMATION OF BIDS

PACKET B GRAND TOTAL BID ..... $ _____

Firm: _____

Signature: _____

BID BOND

KNOW ALL BY THESE PRESENTS:
That we, _____, as Principal, and _____, as Surety, are held and firmly bound unto Winneshiek County, Iowa, as Obligee, (hereinafter referred to as "the Jurisdiction"), in the penal sum of five percent (5%) of the total bid price $_____, lawful money of the United States, for which payment said Principal and Surety bind themselves, their heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

WHEREAS, the Principal is submitting a sealed proposal to the Jurisdiction for the purpose of entering into a contract for the following project;

Upper Iowa River Flood Reduction Project – Bid Packet 2 (13-NDRI-009). UI-BID-002

NOW, THEREFORE, if said proposal by the Principal be accepted, and the Principal shall enter into a contract with Jurisdiction in accordance with the terms of such proposal, including the provision of insurance and of a bond as may be specified in the contract documents, with good and sufficient surety for the faithful performance of such contract, for the prompt payment of labor and material furnished in the prosecution thereof, and for the maintenance of said improvements as may be required therein, then this obligation shall become null and void; otherwise, the Principal shall pay to the Jurisdiction the full amount of the bid bond, together with court costs, attorney's fees, and any other expense of recovery.

Signed and sealed this _____day of _____, 20__.

SURETY:	PRINCIPAL:
_____	_____
Surety Company	Bidder
By_____	By_____
Authorized Surety Representative	Signature
_____	_____
Name (Print/Type)	Name (Print/Type)
_____	_____
Address, City, State, Zip	Address, City, State, Zip

INTENT TO COMPLY WITH SECTION 3 REQUIREMENTS

(To be provided with procurement documents and returned with all submitted bids)

Section 3 of the Housing and Urban Development Act of 1968 [12 U.S.C. 1701u and 24 CFR Part 135] is HUD's legislative directive for providing preference to low-income residents of the local community (regardless of race or gender), and the businesses that substantially employ these persons, for new employment, training and contracting opportunities resulting from HUD-funded projects. The regulations seek to ensure that low- and very low- income persons, and the businesses that employ these individuals, are notified about the expenditure of HUD funds in their community and encouraged to seek opportunities, if created.

A Section 3 resident is defined as a public housing resident or someone with a household income that is less than 80% of the area median income.

A Section 3 business is defined as a business that is:

51% owned by Section 3 residents

Whose permanent, full-time staff is comprised of at least 30% Section 3 residents**

Has committed 25% of the dollar amount of its subcontracts to Section 3 businesses

Note: If your business meets the definition of a Section 3 business, you may register as a Section 3 Business through HUD's website here:
https://portalapps.hud.gov/Sec3BusReg/BRegistry/RegisterBusiness

Businesses who self-certify that they meet one of the regulatory definitions of a Section 3 business will be included in a searchable online database. The database can be used by agencies that receive HUD funds, developers, contractors, and others to facilitate the award of covered construction and non-construction contracts to Section 3 businesses.

Please complete the following:

1. If awarded a contract for this CDBG funded project, do you anticipate hiring new employees to complete the project? (Hiring would be specific to this project)

   ☐ Yes ☐ No If yes, please estimate the number of employees to be hired:_____

2. Is your business a Section 3 Business? ☐ Yes ☐ No

3. Is the bidder willing to consider hiring Section 3 residents for future employment opportunities that are a direct result of this CDBG funded project?

   ☐ Yes ☐ No

4. Is the bidder willing to consider subcontracting with Section 3 Businesses for this project?

   ☐ Yes ☐ No

I understand that this contracting opportunity is subject to HUD Section 3 requirements (24 CFR Part 135). I have read and understand the Section 3 requirements as generally described above and presented in the Section 3 contract language included in the procurement documents for this project. If awarded a contract, the business commits to following Section 3 requirements, as they apply to this project. If awarded a contract for this project, the business agrees to provide reports to (insert City/County) on Section 3 efforts and accomplishments.

Name of Contractor/Subcontractor	Address
Print Name	Title
Signature	Date

UI-BID-002 Wage Rates

"General Decision Number: IA20200081 01/03/2020

Superseded General Decision Number: IA20190081

State: Iowa

Construction Types: Heavy and Highway

Counties: Adair, Adams, Allamakee, Appanoose, Audubon, Benton, Black Hawk, Boone, Bremer, Buchanan, Buena Vista, Butler, Calhoun, Carroll, Cass, Cedar, Cerro Gordo, Cherokee, Chickasaw, Clarke, Clay, Clayton, Clinton, Crawford, Dallas, Davis, Decatur, Delaware, Des Moines, Dickinson, Dubuque, Emmet, Fayette, Floyd, Franklin, Fremont, Greene, Grundy, Guthrie, Hamilton, Hancock, Hardin, Harrison, Henry, Howard, Humboldt, Ida, Iowa, Jackson, Jasper, Jefferson, Johnson, Jones, Keokuk, Kossuth, Lee, Linn, Louisa, Lucas, Lyon, Madison, Mahaska, Marion, Marshall, Mills, Mitchell, Monona, Monroe, Montgomery, Muscatine, O'Brien, Osceola, Page, Palo Alto, Plymouth, Pocahontas, Polk, Pottawattamie, Poweshiek, Ringgold, Sac, Shelby, Sioux, Story, Tama, Taylor, Union, Van Buren, Wapello, Warren, Washington, Wayne, Webster, Winnebago, Winneshiek, Woodbury, Worth and Wright Counties in Iowa.

EXCLUDES SCOTT COUNTY

HEAVY AND HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020

SUIA2019-001 10/18/2017

	Rates	Fringes
Carpenter & Piledrivermen		
ZONE 1	$ 27.92	13.28
ZONE 2	$ 26.03	13.38
ZONE 3	$ 26.03	13.38
ZONE 4	$ 25.55	10.80
ZONE 5**	$ 24.45	9.20
CONCRETE FINISHER		
ZONE 1	$ 27.50	7.10
ZONE 2	$ 27.50	7.10
ZONE 3	$ 27.50	7.10
ZONE 4	$ 24.85	6.10
ZONE 5	$ 23.80	6.10
ELECTRICIAN (STREET AND HIGHWAY LIGHTING AND TRAFFIC SIGNALS)		
ZONE 1, 2, AND 3	$ 24.45	6.50
ZONE 4	$ 23.15	6.50
ZONE 5	$ 21.00	6.50
IRONWORKER (SETTING OF STRUCTURAL STEEL)		
ZONE 1	$ 30.50	10.70
ZONE 2	$ 28.41	10.70
ZONE 3	$ 28.41	11.00
ZONE 4	$ 26.35	9.50
ZONE 5**	$ 24.50	9.05
LABORER		
ZONE 1, 2 AND 3		
GROUP A	$ 23.15	9.18
GROUP AA	$ 25.53	9.18
GROUP B	$ 21.30	9.18
GROUP C	$ 18.22	9.18
ZONE 4		
GROUP A	$ 20.82	8.63
GROUP B	$ 19.50	8.63
GROUP C	$ 16.62	8.63
ZONE 5		
GROUP A	$ 21.32	7.18
GROUP B	$ 18.82	7.18
GROUP C	$ 17.97	7.18
POWER EQUIPMENT OPERATOR		
ZONE 1		
GROUP A	$ 31.75	14.55
GROUP B	$ 30.20	14.55
GROUP C	$ 27.70	14.55
GROUP D	$ 27.70	14.55
ZONE 2		
GROUP A	$ 31.05	14.55

GROUP B.....$ 29.45 14.55
GROUP C.....$ 26.90 14.55
GROUP D.....$ 26.90 14.55
ZONE 3
GROUP A.....$ 29.05 23.30
GROUP B.....$ 27.25 23.30
GROUP C.....$ 26.25 23.30
GROUP D.....$ 26.25 23.30
ZONE 4
GROUP A.....$ 30.55 11.65
GROUP B.....$ 29.41 11.65
GROUP C.....$ 27.33 11.65
GROUP D.....$ 27.33 11.65
ZONE 5
GROUP A.....$ 27.37 9.60
GROUP B.....$ 26.33 9.60
GROUP C.....$ 24.60 9.60
GROUP D.....$ 23.60 9.60

TRUCK DRIVER (AND PAVEMENT
MARKING DRIVER/SWITCHPERSON)
ZONE 1.....$ 23.85 10.85
ZONE 2
.....$ 23.85 10.85
ZONE 3.....$ 23.85 10.85
ZONE 4.....$ 23.85 6.65
ZONE 5
.....$ 21.90 6.65

ZONE DEFINITIONS
ZONE 1 The Counties of Polk, Warren, and Dallas for all Crafts, and Linn County Carpenters only.
ZONE 2 The Counties of Dubuque for all Crafts and Linn County for all Crafts except Carpenters.
ZONE 3 The Cities of Burlington, Clinton, Fort Madison, Keokuk, and Muscatine (and abutting municipalities of any such cities).
ZONE 4 Story, Black Hawk, Cedar, Jasper, Jones, Jackson, Louisa, Madison, and Marion Counties; Clinton County (except the City of Clinton), Johnson County, Muscatine County (except the City of Muscatine), the City of Council Bluffs, Lee County and Des Moines County.
ZONE 5 All areas of the state not listed above.

LABORER CLASSIFICATIONS - ALL ZONES
GROUP AA - {Skilled pipelayer (sewer, water and conduits) and tunnel laborers; asbestos abatement worker} (Zones 1, 2 and 3).

GROUP A - Carpenter tender on bridges and box culverts; curb machine (without a seat); deck hand; diamond & core drills; drill operator on air tracs, wagon drills and similar drills; form setter/stringman on paving work; gunnite nozzleman; joint sealer kettleman; laser operator; powderman tender; powderman/blaster; saw operator; {pipelayer (sewer, water, and conduits); sign erector*; tunnel laborer; asbestos abatement worker (Zones 4 and 5)}, sign erector.

GROUP B - Air, gas, electric tool operator; barco hammer; carpenter tender; caulker; chain sawman; compressor (under 400 cfm); concrete finisher tender; concrete processing materials and monitors; cutting torch on demolition; drill tender; dumpmen; electric drills; fence erectors; form line expansion joint assembler; form tamper; general laborer; grade checker; handling and placing metal mesh, dowel bars, reinforcing bars and chairs; hot asphalt laborer; installing temporary traffic control devices; jackhammerman; mechanical grouter; painter (all except stripers); paving breaker; planting trees, shrubs and flowers; power broom (not self-propelled); power buggyman; rakers; rodman (tying reinforcing steel); sandblaster; seeding and mulching; sewer utility topman/bottom man; spaders; stressor or stretcherman on pre or post tensioned concrete; stringman on re/surfacing/no grade control; swinging stage, tagline, or block and tackle; tampers; timberman; tool room men and checkers; tree climber; tree groundman; underpinning and shoring caissons over twelve feet deep; vibrators; walk behind trencher; walk behind paint stripers; walk behind vibrating compactor; water pumps (under three inch); work from bosun chair.

GROUP C - Scale weigh person; traffic control/flagger, surveillance or monitor; water carrier.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS - ALL ZONES
GROUP A - All terrain (off road) forklift; asphalt breakdown roller (vibratory); asphalt laydown machine; asphalt plant; asphalt screed; bulldozer (finish); central mix plant; concrete pump; crane; crawler tractor pulling scraper; directional drill (60,000 (lbs) pullback and above); dragline and power shovel; dredge engineer; excavator (over cu. yd.); front end loader (4 cy and over); horizontal boring machine; master mechanic; milling machine (over 350 hp); motor grader (finish); push cat; rubber tired backhoe (over cu. yd.); scraper (12 cu. yd. and over or finish); Self-propelled rotary mixer/road reclaimer; sidebroom tractor; slipform portland concrete paver; tow or push boat; trenching machine (Cleveland 80 or similar)
.
GROUP B - Articulated off road hauler, asphalt heater/planer; asphalt material transfer vehicle; asphalt roller; belt loader or similar loader; bulldozer (rough); churn or rotary drill; concrete curb machine; crawler tractor pulling ripper, disk or roller; deck hand/oiler; directional drill (less than 60,000 (lbs) pullback); distributor; excavator (1/2 cu. yd. and under); form riding concrete paver; front end loader (2 to less than 4 cu. yd.); group equipment greaser; mechanic; milling machine (350 hp. and less); paving breaker; portland concrete dry batch plant; rubber tired backhoe (1/2 cu. yd. and under); scraper (under 12 cu. yd.); screening, washing and crushing plant (mobile, portable or stationary); shoulder machine; skid loader (1 cu. yd. and over); subgrader or trimmer; trenching machine; water wagon on compaction.

GROUP C - Boom & winch truck; concrete spreader/belt placer; deep wells for dewatering; farm type tractor (over 75 hp.) pulling disc or roller; forklift; front end loader (under 2 cu. yd.); motor grader (rough); pile hammer power unit; pump (greater than three inch diameter); pumps on well points; safety boat; self-propelled roller (other than asphalt); self-propelled sand blaster or shot blaster, water blaster or striping grinder/remover; skid loader (under 1 cu. yd.); truck mounted post driver.

GROUP D - Boiler; compressor; cure and texture machine; dow box; farm type or utility tractor (under 75 hp.) pulling disk, roller or other attachments; group greaser tender; light plants; mechanic tender; mechanical broom; mechanical heaters; oiler; pumps (under three inch diameter); tree chipping machine; truck crane driver/oiler.

** CARPENTERS AND PILEDRIVERMEN, or IRONWORKERS (ZONE 5)
Setting of structural steel; any welding incidental to bridge or culvert construction; setting concrete beams.

* ADDED CRAFT - SIGN ERECTOR

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date

for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION
"

PERFORMANCE AND PAYMENT BOND

KNOW ALL BY THESE PRESENTS:

That we,_____ as Principal (hereinafter the “Contractor” or “Principal” and _____, as Surety are held and firmly bound unto the County of Winneshiek, Iowa (hereinafter referred to as “the Jurisdiction”) and to all persons who may be injured by any breach of any of the conditions of this Bond in the penal sum of_____Dollars($_____) lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, legal representatives and assigns, jointly or severally, firmly by these presents.

The conditions of the above obligations are such that whereas said Contractor entered into a contract with the Jurisdiction, bearing date the day of _____, 2020 (hereinafter the “Contract”) wherein said Contractor undertakes and agrees to construct the following described improvements: Upper Iowa River Flood Reduction Project – Bid Packet 2 (13-NDRI-009) UI-BID-002, unless modified herein, and to faithfully perform all the terms and requirements of said Contract within the time therein specified, in a good and workmanlike manner, and in accordance with the Contract Documents.

It is expressly understood and agreed by the Contractor and Surety in this bond that the following provisions are a part of this Bond and are binding upon said Contractor and Surety, to-wit:

1. PERFORMANCE: The Contractor shall well and faithfully observe, perform, fulfill and abide by each and every covenant, condition and part of said Contract and Contract Documents, by reference made a part hereof, for the above referenced improvements, and shall indemnify and save harmless the Jurisdiction from all outlay and expense incurred by the Jurisdiction by reason of the Contractor’s default of failure to perform as required. The Contractor shall also be responsible for the default or failure to perform as required under the Contract and Contract Documents by all its subcontractors, suppliers, agents, or employees furnishing materials or providing labor in the performance of the Contract.

2. PAYMENT: The Contractor and the Surety on this Bond are hereby agreed to pay all just claims submitted by persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the performance of the Contract on account of which this Bond is given, including but not limited to claims for all amounts due for labor, materials, lubricants, oil, gasoline, repairs on machinery, equipment and tools, consumed or used by the Contractor or any subcontractor, wherein the same are not satisfied out of the portion of the contract price which the Jurisdiction is required to retain until completion of the improvement, but the Contractor and Surety shall not be liable to said persons, firms, or corporations unless the claims of said claimants against said portion of the contract price shall have been established as provided by law. The Contractor and Surety hereby bind themselves to the obligations and conditions set forth in Chapter 573, Code of Iowa, which by this reference is made a part hereof as though fully set out herein.

3. GENERAL: Every Surety on this Bond shall be deemed and held bound, any contract to the contrary notwithstanding, to the following provisions:

A. To consent without notice to any extension of time to the Contractor in which to perform the Contract;

B. To consent without notice to any change in the Contract or Contract Documents, which thereby increases the total contract price and the penal sum of this bond, provided that all such changes do not, in the aggregate, involve an increase of more than twenty percent of the total contract price, and that this bond shall then be released as to such excess increase; and

C. To consent without notice that this Bond shall remain in full force and effect until the Contract is completed, whether completed within the specified contract period, within an extension thereof, or within a period of time after the contract period has elapsed and the liquidated damage penalty is being charged against the Contractor.

The Contractor and every Surety on the bond shall be deemed and held bound, any contract to the contrary notwithstanding, to the following provisions:

D. That no provision of this Bond or of any other contract shall be valid which limits to less than five years after the acceptance of the work under the Contract the right to sue on this Bond.

E. That as used herein, the phrase “all outlay and expense” is not to be limited in any way, but shall include the actual and reasonable costs and expenses incurred by the Jurisdiction including interest, benefits and overhead where applicable. Accordingly, “all outlay and expense” would include but not be limited to all contract or employee expense, all equipment usage or rental, materials, testing, outside experts, attorney’s fees (including overhead expenses of the Jurisdiction’s staff attorneys), and all costs and expenses of litigation as they are incurred by the Jurisdiction. It is intended the Contractor and Surety will defend and indemnify the Jurisdiction on all claims made against the Jurisdiction on account of Contractor’s failure to perform as required in the Contract and Contract Documents, that all agreements and promises set forth in the Contract and Contract Documents, in approved change orders, and in this Bond will be fulfilled, and that the Jurisdiction will be fully indemnified so that it will be put into the position it would have been in had the Contract been performed in the first instance as required. In the event the Jurisdiction incurs any “outlay and expense” in defending itself with respect to any claim as to which the Contractor or Surety should have provided the defense, or in the enforcement of the promises given by the Contractor in the Contract, Contract Documents, or approved change orders, or in the enforcement of the promises given by the Contractor and Surety in this Bond, the Contractor and Surety agree that they will make the Jurisdiction whole for all such outlay and expense, provided that the Surety’s obligation under this bond shall not exceed 125% of the penal sum of this bond.

In the event that any actions or proceedings are initiated with respect to this Bond, the parties agree that the venue thereof shall be Howard County, State of Iowa. If legal action is required by the Jurisdiction to enforce the provisions of this Bond or to collect the monetary obligation incurring to the benefit of the Jurisdiction, the Contractor and the Surety agree, jointly and

severally, to pay the Jurisdiction all outlay and expense incurred therefore by the Jurisdiction. All rights, powers, and remedies of the Jurisdiction hereunder shall be cumulative and not alternative and shall be in addition to Surety for any amount guaranteed hereunder whether action is brought against the Contractor or whether Contractor is joined in any such action or actions or not.

NOW THEREFORE, the condition of this obligation is such that if said Principal shall faithfully perform all the promises of the Principal, as set forth and provided in the Contract, in the Contract Documents, and in this Bond, then this obligation shall be null and void, otherwise it shall remain in full force and effect.

When a word, term, or phrase is used in this Bond, it shall be interpreted or construed first as defined in this Bond, the Contract, or the Contract Documents; second, if not defined in the Bond, Contract, or Contract Documents, it shall be interpreted or construed as defined in applicable provisions of the Iowa Code; third, if not defined in the Iowa Code, it shall be interpreted or construed according to its generally accepted meaning in the construction industry; and fourth, if it has no generally accepted meaning in the construction industry, it shall be interpreted or construed according to its common or customary usage.

Failure to specify or particularize shall not exclude terms or provisions not mentioned and shall not limit liability hereunder. The Contract and Contract Documents are hereby made a part of this Bond.

Witness our hands this day of _____, 2020

SURETY:	PRINCIPAL:
_____	_____
Surety Company	Bidder
By_____	By_____
Authorized Surety Attorney in Fact Officer	Signature
_____	_____
Name (Print/Type)	Name (Print/Type)
_____	_____
Address, City, State, Zip	Address, City, State, Zip

NOTE: All signatures on this performance and payment bond must be original signatures in ink; copies or facsimile of any signature will not be accepted. This bond must be sealed with the Surety's raised, embossing seal. The Certificate or Power of Attorney accompanying this bond must be valid on its face and sealed with the Surety's raised, embossing seal.

CONTRACT AGREEMENT

THIS AGREEMENT made and entered into this __ day of _____, by and between the County of Winneshiek, Iowa (hereinafter referred to as the **COUNTY**) and _____. (hereinafter referred to as the **CONTRACTOR**) WITNESSES THAT:

WHEREAS, the COUNTY and the CONTRACTOR are desirous of entering into a contract to formalize their relationship, and

WHEREAS, pursuant to Title I of the Housing and Community Development Act of 1974, as amended, the Iowa Economic Development Authority (IEDA) is authorized by the federal Department of Housing and Urban Development (HUD) to provide State Community Development Block Grant Program funds (hereinafter referred to as CDBG funds) to units of local government selected to undertake and carry out certain programs and projects in compliance with all applicable local, state, and federal laws, regulations and policies, and

WHEREAS, IEDA submitted an application for funds from HUD under the Disaster Relief Appropriations Act, 2013, Public Law 113-2, for the Community Development Block Grant National Disaster Resilience (CDBG-NDR) competition on behalf of the Recipient and the Recipient
agreed to abide by the application terms and conditions; and

WHEREAS, IEDA received funds under the Disaster Relief Appropriations Act, 2013. (Public Law 113-2) under the CDBG-NDR program; and

WHEREAS, Winneshiek County has been awarded a contract (13-NDRI-009) through IEDA for a grant of federal funds from HUD under the Disaster Relief Appropriations Act, 2013, Public Law 113-2; and

WHEREAS, CONTRACTOR submitted a bid for construction and has been selected to provide construction services for the project(s) identified in the bid packet,

WHEREAS, the Scope of Work included in this contract is authorized as part of the COUNTY's approved CDBG project, and

WHEREAS, it would be beneficial to the COUNTY to utilize the CONTRACTOR as an independent entity to accomplish the Scope of Work as set forth herein and such endeavor would tend to best accomplish the objectives of the local CDBG project;

WITNESSETH: That for and in consideration of the mutual covenants herein contained, the parties hereto agree with each other as follows:

CONTRACT AMOUNT: As outlined in the CONTRACTOR'S bid submitted 06/04/2020 (herein as Attachment), the cost of services shall not exceed $ _____.

I. GENERAL CONDITIONS

1. Time of Performance:

   Time is of the essence in this project. The COUNTY is obligated to issue a written Proceed Order within ten (10) days from the acceptance of the CONTRACTOR'S Proposal. If the Proceed Order is not received by the CONTRACTOR, the CONTRACTOR has the option of withdrawing his or her Quote and Proposal.

The CONTRACTOR shall commence work in a timely manner upon issuance of the Proceed Order and only after a pre-construction meeting where the engineer and labor standards officer are present.

The CONTRACTOR shall achieve substantial completion by December 31, 2020.

Prior to, or at Contract execution, CONTRACTOR must provide: a) performance bond on the part of the CONTRACTOR for 100 percent of the contract price. A ‘‘performance bond’ is one executed in connection with a contract to secure fulfillment of all the CONTRACTOR’S obligations under such contract; and b) payment bond on the part of the CONTRACTOR for 100 percent of the contract price. A ‘‘payment bond’ is one executed in connection with a contract to assure payment as required by law of all persons supplying labor and material in the execution of the work provided for in the contract

2. Contract:

The Contract consists of the:

a. COUNTY’S Request for Bids (Attachment A)

b. Written bid response submitted by CONTRACTOR (Attachment B)

c. CONTRACTOR’S Payment and Performance Bond in the amount of $_____

d. County Board of Supervisor Approval of the Contract

e. Notice to Proceed

3. Services:

The CONTRACTOR shall provide the work as outlined in the COUNTY’s Request for Bids as outlined in the CONTRACTOR’S proposal.

4. Payment:

Payment under this Contract shall be progress payments and shall be made based on the work completed and invoiced. Payments will generally be made within 45 days of receipt of the invoice upon approval by the COUNTY Board of Supervisors. Invoices shall be directed to the Project Administrator:

Paul Berland
Northeast Iowa RC&D
101 E. GREENE ST., P.O. Box 916 Postville, IA 52162

5. Access and Maintenance of Records:

The contractor must maintain all required records for five years after final payments are made and all other pending matters are closed.
At any time during normal business hours and as frequently as is deemed necessary, the contractor shall make available to the Iowa Economic Development Authority, the State Auditor, the General Accounting Office, and the Department of Housing and Urban Development, for their examination, all of its records pertaining to all matters covered by this contract and permit these agencies to audit, examine, make excerpts or transcripts from such records, contract, invoices, payrolls, personnel records, conditions of employment, and all other matters covered by this contract..

6. Relationship:

The relationship of the CONTRACTOR to the COUNTY shall be that of an independent CONTRACTOR rendering professional services. The CONTRACTOR shall have no authority to

execute contracts or to make commitments on behalf of the COUNTY and nothing contained herein shall be deemed to create the relationship of employer and employee or principal and agent between the COUNTY and the CONTRACTOR.

7. Suspension, Termination, and Close Out:

If the CONTRACTOR fails to comply with the terms and conditions of this contract, the COUNTY may pursue such remedies as are legally available, including but not limited to, the suspension or termination of this contract in the manner specified herein:

a. Suspension - If the CONTRACTOR fails to comply with the terms and conditions of this contract, or whenever the CONTRACTOR is unable to substantiate full compliance with provisions of this contract, the COUNTY may suspend the contract pending corrective actions or investigation, effective not less than seven (7) days following written notification to the CONTRACTOR or its authorized representative. The suspension will remain in full force and effect until the CONTRACTOR has taken corrective action to the satisfaction of the COUNTY and is able to substantiate its full compliance with the terms and conditions of this contract. No obligations incurred by the CONTRACTOR or its authorized representative during the period of suspension will be allowable under the contract except:

(1) Reasonable, proper and otherwise allowable costs which the CONTRACTOR could not avoid during the period of suspension;

(2) If upon investigation, the CONTRACTOR is able to substantiate complete compliance with the terms and conditions of this contract, otherwise allowable costs incurred during the period of suspension will be allowed; and

(3) In the event all or any portion of the work prepared or partially prepared by the CONTRACTOR is suspended, abandoned or otherwise terminated, the COUNTY shall pay the CONTRACTOR for work performed to the satisfaction of the COUNTY, in accordance with the percentage of the work completed.

b. Termination for Cause – If the CONTRACTOR fails to comply with the terms and conditions of this contract and any of the following conditions exists:

(1) The lack of compliance with the provisions of this contract were of such scope and nature that the COUNTY deems continuation of the contract to be substantially detrimental to the interests of the COUNTY;

(2) The CONTRACTOR has failed to take satisfactory action as directed by the COUNTY or its authorized representative within the time period specified by same;

(3) The CONTRACTOR has failed within the time specified by the COUNTY or its authorized representative to satisfactorily substantiate its compliance with the terms and conditions of this contract; then,

The COUNTY may terminate this contract in whole or in part, and thereupon shall notify the CONTRACTOR of termination, the reasons therefore, and the effective date, provided such effective date shall not be prior to notification of the CONTRACTOR. Notification will be by certified letter and may be in effect immediately. After this effective date, no charges incurred under any terminated portions of the Scope of Work are allowable.

c. Termination for Other Grounds – This contract may also be terminated in whole or in part:

(1) By the COUNTY, with the consent of the CONTRACTOR, or by the CONTRACTOR with the consent of the COUNTY conditions of termination, including effective date and in case of termination in part, that portion to be terminated;

(2) The COUNTY may terminate this contract at any time giving at least ten (10) days notice in writing to the CONTRACTOR. If the contract is terminated for convenience of the COUNTY as provided herein, the CONTRACTOR will be paid for time provided and expenses incurred up to the termination date.

8. Changes, Amendments, Modifications:

The COUNTY may, from time to time, require changes or modifications in the Scope of Work to be performed. Such changes, including any decrease or increase in the amount of compensation, which are mutually agreed upon by the COUNTY and the CONTRACTOR shall be incorporated in written amendments to this contract.

9. Personnel:

The CONTRACTOR represents that he/she has, or will secure at his/her own expense, all personnel and/or sub-contractors required in order to perform under this contract. Such personnel or sub-contractors shall not be employees of, or have any contractual relationship to, the COUNTY.

All services required hereunder will be performed by the CONTRACTOR, or under his/her supervision and all personnel, whether employee or sub-contractor, engaged in the work shall be fully qualified and shall be authorized or permitted under federal, state and local law to perform such services.

10. Assignability:

The CONTRACTOR shall not assign any interest on this contract, and shall not transfer any interest on this contract (whether by assignment or notation), without prior written consent of the COUNTY thereto; provided, however, that claims for money by the CONTRACTOR from the COUNTY under this contract may be assigned to a bank, trust company, or other financial institution without such approval. Written notice of any such assignment or transfer shall be furnished promptly to the COUNTY by the CONTRACTOR.

11. Reports and Information:

The CONTRACTOR, at such times and in such forms as the COUNTY may require, shall furnish the COUNTY such periodic reports as it may request pertaining to the work or services undertaken pursuant to this contract, the costs and obligations incurred or to be incurred in connection therewith, and any other matters covered by this contract.

12. Copyright:

No report, maps or other documents produced in whole or in part under this contract shall be subject of an application for copyright by or on behalf of the CONTRACTOR.

13. Compliance with Local Laws:

The CONTRACTOR shall comply with all applicable laws, ordinances and codes of the state and local government and the CONTRACTOR shall save the COUNTY harmless with respect to any damages arising from any tort done in performing any of the work embraced by this contract.

II. CIVIL RIGHTS:

1. CONTRACTOR agrees to comply with the following laws and regulations:
   a. Title VI of the Civil Rights Act of 1964 (P.L. 88-352)

      States that no person may be excluded from participation in, denied the benefits of, or subjected to discrimination under any program or activity receiving Federal financial assistance on the basis of race, color, or national origin.

   b. Title VIII of the Civil Rights Act of 1968 (Fair Housing Act), as amended
   c. Iowa Civil Rights Act of 1965 (Iowa Code Chapter 216 and Iowa Code Chapter 19B.7)

      This Act mirrors the Federal Civil Rights Act.

   d. Section 109 of Title I of the Housing and Community Development Act of 1974, as amended (42 U.S.C. 5309)

      Provides that no person shall be excluded from participation in, denied the benefits of, or subjected to discrimination on the basis of race, color, national origin, sex, age, or handicap under any program or activity funded in part or in whole under Title I of the Act.

   e. The Age Discrimination Act of 1975, as amended (42 U.S.C. 1601 et seq.)

      Provides that no person on the basis of age, be excluded from participation in, be denied the benefits of or be subjected to discrimination under any program or activity receiving Federal financial assistance.

   f. Section 504 of the Rehabilitation Act of 1973, as amended (P.L. 93-112, 29 U.S.C. 794)

      Provides that no otherwise qualified individual shall solely by reason of his/her handicap be excluded from participation in, be denied the benefits of, or be discriminated against under any program or activity receiving Federal financial assistance.

   g. Americans with Disabilities Act (P.L. 101-336, 42 U.S.C. 12101-12213)

      Provides comprehensive civil rights to individuals with disabilities in the areas of employment, public accommodations, state and local government services, and telecommunications.

   h. Section 3 of the Housing and Urban Development Act of 1968, as amended (12 U.S.C. 1701u)

      The purpose of section 3 of the Housing and Urban Development Act of 1968 (12 U.S.C. 1701u) (section 3) is to ensure that employment and other economic opportunities generated by certain HUD financial assistance shall, to the greatest extent feasible, and consistent with existing Federal, State and local laws and regulations, be directed to low- and very low-income persons, particularly those who are recipients of government assistance for housing, and to business concerns which provide economic opportunities to low- and very low-income persons.

   i. Federal Executive Order 11063, as amended by Executive Order 12259.

III. Federal Executive Order 11246, as amended, by Federal Executive Order 11357

Provides that no one be discriminated in employment.

During the performance of this contract, CONTRACTOR agrees as follows:

a. CONTRACTOR will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. CONTRACTOR will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. CONTRACTOR agrees to post in conspicuous places, available to

employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

b. CONTRACTOR will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

c. CONTRACTOR will send to each labor union or representative of workers with which they has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of CONTRACTOR's commitments under Section 202 of the Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

d. CONTRACTOR will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

e. CONTRACTOR will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

f. In the event of CONTRACTOR's non-compliance with the nondiscrimination clause of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part and CONTRACTOR may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

g. CONTRACTOR will include the provisions of Paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. CONTRACTOR will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for noncompliance. **Provided, however**, that in the event CONTRACTOR becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency; CONTRACTOR may request the United States to enter into such litigation to protect the interests of the United States.

IV. HOUSING AND URBAN DEVELOPMENT ACT OF 1968 (Section 3)

1. The work to be performed under this contract is on a project assisted under a program providing direct Federal financial assistance from the Department of Housing and Urban Development and is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701 u. Section 3 requires that to the greatest extent feasible, opportunities for training and employment be given lower income residents of the project area and contracts for work in connection with the project be awarded to business concerns which are located in, or owned in substantial part by persons residing in the area of the project.

   a. The parties to this contract will comply with the provisions of said Section 3 and the regulations issued pursuant thereto by the Secretary of Housing and Urban Development set forth in 24 CFR Section 3, and all applicable rules and orders of the Department issued there under prior to the execution of this contract. The parties to this contract certify and agree that they are under no contractual or other disability that would prevent them from complying with these requirements.

b. CONTRACTOR will send to each labor organization or representative of workers with which they has a collective bargaining agreement or other contract or understanding if any, a notice advising said labor organization or workers' representative of their commitments under this Section 3 clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment or training.

c. CONTRACTOR will include this Section 3 clause in every subcontract; for work in connection with the project and will, at the direction of the applicant for or recipient of Federal financial assistance, take appropriate action pursuant to the Subcontract upon finding that the subcontractor is in violation of regulations issued by the Secretary of Housing and Urban Development, 24 CFR Section 3. CONTRACTOR will not subcontract with any subcontractor where it has notice or knowledge that the latter has been found in violation of regulations under 24 CFR Section 3 and will not let any subcontract unless the subcontractor has first provided it with a preliminary statement of ability to comply with the requirements of these regulations.

d. Compliance with the provisions of Section 3, the regulations set forth in 24 CFR Section 3, and all applicable rules and orders of the Department issued there under prior to the execution of the contract, shall be a condition of the Federal financial assistance provided to the project, binding upon the applicant or recipient for such assistance, its successors, and assigns. Failure to fulfill these requirements shall subject the applicant or recipient, its contractors and subcontractors, its successors, and assigns to those sanctions specified by the grant or loan agreement or contract through which Federal assistance is provide, and to such sanctions as are specified by 24 CFR Section 135.135.

e. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 135.

f. Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

g. With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

V. CERTIFICATION REGARDING GOVERNMENT-WIDE RESTRICTION ON LOBBYING:

1. CONTRACTOR certifies, to the best of their knowledge and belief that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the CONTRACTOR, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee, or an employee of a Member of Congress in connection with this Federal contract, grant, loan or cooperative agreement, CONTRACTOR shall complete and submit

Standard Form-LLL, “Disclosure Form to Report Federal Lobbying” in accordance with its instruction.

c. CONTRACTOR shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure."

V. CLEAN AIR AND WATER ACTS COMPLIANCE: (APPLIES TO CONTRACTS ABOVE $100,000)

In addition to the preceding provisions, contracts in excess of $100,000 shall require compliance with the following laws and regulations:
Section 306 of the Clean Air Acts (42 U.S.C. 1857(h)).
Section 508 of the Clean Water Act (33 U.S.C. 1368).
Executive Order 11738. *Providing administration of the Clean Air and Water Acts*

Clean Air and Water Acts - required clauses:

This clause is required in all third-party contracts involving projects subject to the Clean Air Act (42 U.S.C. 1857 et seq.), the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.), and the regulations of the Environmental Protection Agency with respect to 40 CFR Part 15, as amended. It should also be mentioned in the bid document.

During the performance of this contract, the CONTRACTOR agrees as follows:

1. CONTRACTOR will certify that any facility to be utilized in the performance of any nonexempt contract or subcontract is not listed on the Excluded Party Listing System pursuant to 40 CFR 32.

2. CONTRACTOR agrees to comply with all the requirements of Section 114 of the Clean Air Act, as amended, (42 U.S.C. 1857c-8) and Section 308 of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1318) relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in said Section 114 and Section 308, and all regulations and guidelines issued thereunder.

3. CONTRACTOR agrees that as a condition for the award of the contract, prompt notice will be given of any notification received from the Director, Office of Federal Activities, Environmental Protection Agency, indicating that a facility utilized or to be utilized for the contract is under consideration to be listed on the Excluded Party Listing System.

4. CONTRACTOR agrees that it will include or cause to be included the criteria and requirements in Paragraph (1) through (4) of this section in every nonexempt subcontract and require every subcontractor to take such action as the Government may direct as a means of enforcing such provisions.

VI. STANDARDS AND POLICIES RELATING TO ENERGY EFFICIENCY

Pub. L. 94-163, 89 Stat. 871

Mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

VII. NOTICE OF AWARDING AGENCY REQUIREMENTS AND REGULATIONS PERTAINING TO REPORTING

The Contractor must provide information as necessary and as requested by the Iowa Economic Development Authority for the purpose of fulfilling all reporting requirements related to the CDBG program.

VIII. COMPREHENSIVE PROCUREMENT GUIDELINE: RECOVERED MATERIALS

The CONTRACTOR agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not limited to the regulatory provisions of 40 CFR Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

IX. FEDERAL LABOR STANDARDS PROVISIONS

U.S. Department of Housing And Urban Development Office of Labor Relations

Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A.1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section l(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

(ii)(a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)
2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.
3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section l(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section l(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)
(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at *http://www.dol.gov/esa/whd/forms/wh347instr.htm* or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)
(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is
correct and complete;
(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;
(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).
(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant ',to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.
(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of... influencing in any way the action of such Administration... makes, utters or publishes any statement knowing the same to be false... shall be fined not more than $5,000 or imprisoned not more than two years, or both."
11. Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.
B. Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable where the amount of the prime contract exceeds $100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.
(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.
(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in sub paragraph (1) of this paragraph.
(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.
(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.
C. Health and Safety. The provisions of this paragraph C are applicable where the amount of the prime contract exceeds $100,000.
(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.
(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.
(3) The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions

X: IN WITNESS WHEREOF, the COUNTY and the CONTRACTOR have executed this contract agreement as of the date and year last written below.

COUNTY OF WINNESHIEK	CONTRACTOR
By: _____	By: _____
Title: _____	Title: _____
Date: _____	Date: _____

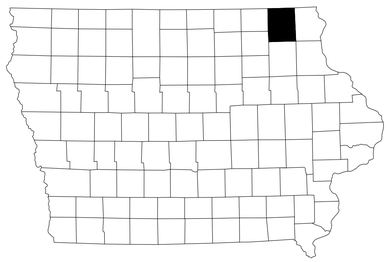
Upper Iowa River Flood Reduction Project

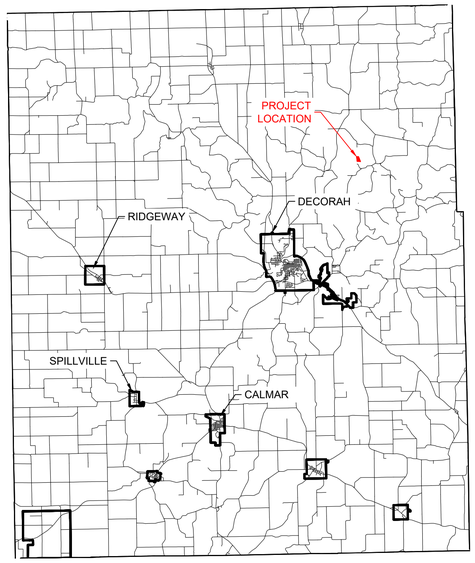
UI-BID-002

Packet A Project Plans and Designs

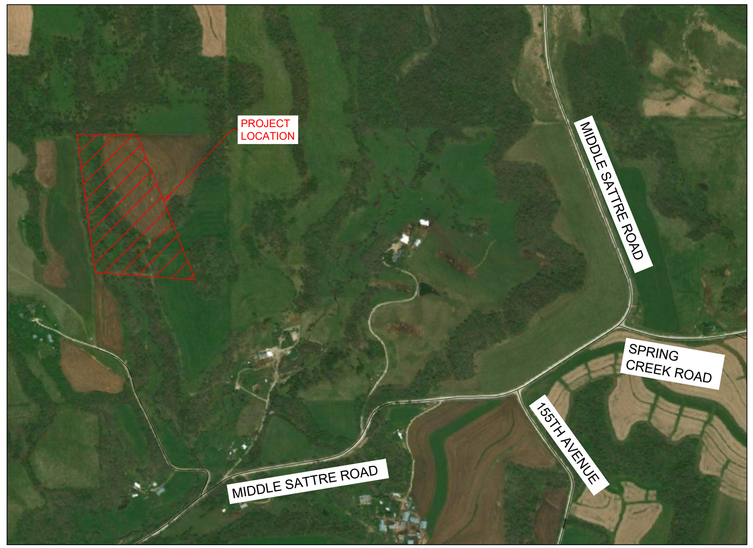
UPPER IOWA RIVER WMA
UI - 013 - CLAYTON POND
WINNESHIEK COUNTY, IA

STATE OF IOWA





WINNESHIEK COUNTY



CONTACT INFORMATION:

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SHIVE-HATTERY, INC
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WEST DES MOINES, IOWA 50266
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FX: (515) 223-0622

LAND OWNER
JESSE CLAYTON
3035 MIDDLE SATTRE ROAD
DECORAH, IA 52101
PHONE: (563) 419-9289

WATERSHED COORDINATOR
MATT FRANA
2296 OIL WELL ROAD
DECORAH IOWA, 52101
PH: (563) 382-4352

Sheet List Table

IOWA WATERSHED APPROACH

Upper Iowa River Watershed Management Authority

IOWA ONE CALL
1-800-292-8989
www.iowaonecall.com
811 Know what's below. Call before you dig.

CIVIL ENGINEER

LICENSED PROFESSIONAL ENGINEER
LUKE T. MONAT
22610
IOWA

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT DESCRIBED BELOW WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

Signature: Luke Monat 5/18/2020 Date

Printed or typed name: LUKE MONAT
License Number: 22610
My License Renewal Date is: DECEMBER 31, 2020

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UPPER IOWA RIVER WMA
UI - 013 - CLAYTON POND
WINNESHIEK COUNTY, IA

PRELIMINARY - NOT FOR CONSTRUCTION

DRAWN: AJH
APPROVED: LTM
ISSUED FOR: 100% DESIGN
DATE: 2020-05-19
PROJECT NO: 4185190
FIELD BOOK: ---
CLIENT NO: ---

COVER SHEET

C000

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ESTIMATED PROJECT QUANTITIES:

ITEM NO.	ITEM DESCRIPTION	SPEC. NO.	UNIT	BID QUANTITY	AS-BUILT QUANTITY
1	SITE CLEARING, PREPARATION, & WASTE DISPOSAL	IA-1	LS	1	
2	STRUCTURE & CHANNEL SEEDING	IA-6	AC	1.7	
3	BUFFER SEEDING	IA-6	AC	2.7	
4	MOBILIZATION & DEMOBILIZATION	1A-8	LS	1	
5	OVER-EXCAVATION, CORE TRENCH UNDERCUT	IA-21	CY	435	
6	EARTHFILL, EMBANKMENT AND CORE TRENCH FILL (P)	IA-23	CY	15,255	
7	EARTHFILL, POND LINER (P)	IA-23	CY	5,910	
8	TOPSOIL, STRIP SALVAGE, AND RESPREAD (P)	IA-26	CY	2,900	
9	PVC PIPE, 6"	IA-45	LF	90	
10	CORRUGATED METAL PIPE, 42"	IA-51	LF	153	
11	RIPRAP, CLASS 'E' WITH GEOTEXTILE FABRIC	IA-61 & IA-95	TON	76	
12	3" ROADSTONE	IA-61 & IA-95	TON	175	
13	48" CMP RISER WITH TRASH RACK	IA-620	LS	1	
14	RESILIENT WEDGE GATE VALVE, 6"	IA-620	LS	1	

POND PARAMETERS:

PARAMETER	QUANTITY	UNITS
TOTAL DRAINAGE AREA	253.1	ACRES
POND SURFACE AREA	1.43	ACRES
PROPOSED WATERSHED TO POND RATIO	177:1	NA
MAXIMUM POOL DEPTH	14	FEET
NORMAL POOL ELEVATION	978	FEET
TOP OF DAM EMBANKMENT	989.5	FEET
PERMANENT POOL STORAGE VOLUME	7.3	ACRE-FEET
STORAGE VOLUME AT TOP OF DAM	36.52	ACRE-FEET
10-YEAR PRE DEVELOPED DISCHARGE (Q10-PRE)	262.14	CFS
10-YEAR POST DEVELOPED DISCHARGE (Q10-POST)	123.82	CFS
10-YEAR DISCHARGE REDUCTION	52.77	%
50-YEAR PRE DEVELOPED DISCHARGE (Q50-PRE)	541.73	CFS
50-YEAR POST DEVELOPED DISCHARGE (Q50-POST)	171.27	CFS
50-YEAR DISCHARGE REDUCTION	68.38	%

GENERAL NOTES:

1. THE LOCATIONS OF UTILITY MAINS, STRUCTURES AND SERVICE CONNECTIONS PLOTTED ON THIS DRAWING ARE APPROXIMATE ONLY AND WERE OBTAINED FROM RECORDS MADE AVAILABLE TO SHIVE-HATTERY, INC. THERE MAY BE OTHER EXISTING UTILITY MAINS, STRUCTURES AND SERVICE CONNECTIONS NOT KNOWN TO SHIVE-HATTERY, INC. AND NOT SHOWN ON THIS DRAWING. THE VERIFICATION OF EXISTENCE OF, AND THE DETERMINATION OF THE EXACT LOCATION OF, UTILITY MAINS, STRUCTURES AND SERVICE CONNECTIONS SHALL BE THE RESPONSIBILITY OF THE CONSTRUCTION CONTRACTOR(S).
2. IOWA CODE 480, UNDERGROUND FACILITIES INFORMATION, REQUIRES VERBAL NOTICE TO IOWA ONE-CALL 1-800-292-8989, NOT LESS THAN 48 HOURS BEFORE EXCAVATING, EXCLUDING WEEKENDS AND HOLIDAYS.
3. THE MEANS OF THE WORK AND THE SAFETY OF THE CONTRACTOR'S EMPLOYEES ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.
4. NO WORK SHALL BE PERFORMED BEYOND THE PROJECT LIMITS WITHOUT PRIOR AUTHORIZATION FROM THE OWNER'S REPRESENTATIVE.
5. REPLACE ANY PROPERTY MONUMENTS REMOVED OR DESTROYED BY CONSTRUCTION. MONUMENTS SHALL BE SET BY A LAND SURVEYOR REGISTERED TO PRACTICE IN THE STATE OF IOWA.
6. ALL DEBRIS AND TRASH ENCOUNTERED DURING CONSTRUCTION WITHIN THE PROJECT LIMITS, OR DIRECTED BY THE ENGINEER, SHALL BE PROPERLY DISPOSED OF.
7. CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION DE-WATERING THAT IS REQUIRED AT NO ADDITIONAL COST TO THE OWNER. DEWATERING SHALL BE CONDUCTED IN ACCORDANCE WITH NRCS SPECIFICATION IA-11.
8. REPAIR OR REPLACE DAMAGE TO EXISTING FACILITIES (TILE, UTILITIES, FENCES, ETC.) DESIGNATED TO REMAIN, AT NO ADDITIONAL EXPENSE TO THE OWNER. ALL AREAS DISTURBED BY CONSTRUCTION, INCLUDING STAGING AREAS AND HAUL ROUTES, ARE TO BE REWORKED TO THEIR EXISTING CONDITIONS AND SEEDED AT NO ADDITIONAL COST TO THE DIVISION IF OUTSIDE OF PROJECT LIMITS AND NOT APPROVED BY ENGINEER.
9. WORK WHICH DOES NOT CONFORM TO THE REQUIREMENTS OF THE CONTRACT WILL BE CONSIDERED UNACCEPTABLE. UNACCEPTABLE WORK, WHETHER THE RESULT OF POOR WORKMANSHIP, USE OF DEFECTIVE MATERIALS, DAMAGE THROUGH CARELESSNESS OR ANY OTHER CAUSE, FOUND TO EXIST PRIOR TO THE FINAL ACCEPTANCE OF THE WORK, SHALL BE REMOVED AND REPLACED IN AN ACCEPTABLE MANNER, AS REQUIRED BY THE OWNER AT THE CONTRACTOR'S EXPENSE.
10. WORK DONE CONTRARY TO THE INSTRUCTIONS OF THE OWNERS REPRESENTATIVE, WORK DONE BEYOND THE LINES SHOWN ON THE PLANS OR ANY EXTRA WORK DONE WITHOUT AUTHORITY WILL NOT BE PAID FOR.
11. A SHRINKAGE FACTOR OF 20% WAS ESTIMATED FOR THIS PROJECT. THE CONTRACTOR SHALL MAKE CHANGES IN EARTHWORK AS NEEDED TO ADJUST FOR INACCURACIES INHERENT WITH ESTIMATING THE SHRINKAGE FACTOR. THESE CHANGES SHALL ONLY BE MADE AFTER CONSULTATION AND APPROVAL BY THE ENGINEER.
12. CONTOURS AND SPOT ELEVATIONS SHOWN ARE TO FINISHED GRADE.
13. THE CONTRACTOR SHALL KEEP ALL ROADS OPEN TO THROUGH TRAFFIC AT ALL TIMES.
14. ALL WORK WITHIN THE PUBLIC RIGHT OF WAY SHALL BE COORDINATED WITH THE GOVERNING AUTHORITY AND SHALL BE DONE IN ACCORDANCE WITH THEIR STANDARDS.
15. SUBMIT MANUFACTURER'S CERTIFICATION AND MATERIAL DATA FOR ALL MATERIALS DELIVERED TO THE PROJECT SITE AS REQUESTED BY THE OWNERS REPRESENTATIVE.
16. CONSTRUCTION SURVEY STAKING WILL BE PAID FOR BY THE OWNER AND PROVIDED BY THE ENGINEER. CONTROL POINTS WILL BE SET FOR USE WITH GPS CONTROLLED GRADING, IF DESIRED. CONTRACTOR SHALL PRESERVE STAKES TO THE EXTENT FEASIBLE. ANY RE-STAKING COSTS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL WORK SHALL BE PER PER NRCS SPECIFICATIONS UNLESS STATED OTHERWISE IN THE PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL VISIT AND INSPECT THE PROJECT AREA AND THOROUGHLY FAMILIARIZE THEMSELVES WITH THE ACTUAL JOB CONDITIONS PRIOR TO THE START OF WORK. FAILURE TO VISIT THE SITE DOES NOT RELIEVE THE CONTRACTOR FROM PERFORMING THE WORK IN ACCORDANCE TO THE PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND CONTRACT.
19. ALL WORK SHALL CONFORM TO AND BE CONDUCTED IN ACCORDANCE WITH ALL APPLICABLE CODES AND ORDINANCES.
20. SITE ACCESS ROUTES AND PARKING SHALL BE DETERMINED/APPROVED BY THE LANDOWNER.
21. IF A CULTURAL RESOURCE IS IDENTIFIED DURING CONSTRUCTION, CONTRACTORS SHALL IMMEDIATELY HALT ALL WORK AND NOTIFY SHIVE-HATTERY. WORK MAY NOT RECOMMENCE UNTIL THE SITE IS CLEARED BY THE STATE HISTORIC PRESERVATION OFFICE.
22. CONTRACTOR SHALL MANAGE AND REPAIR EROSION AND SEDIMENT CONTROL THROUGHOUT THE PROJECT. THE CONTRACTOR SHALL HAVE MATERIALS EQUIPMENT AND LABOR AVAILABLE ON A DAILY BASIS TO INSTALL AND MAINTAIN EROSION CONTROL FEATURES IN ORDER TO COMPLY WITH FEDERAL, STATE, AND LOCAL REGULATION. THIS SHALL BE INCIDENTAL TO THE PROJECT.
23. PROJECT COORDINATES AND ELEVATIONS ARE NAD83, NAVD88, IOWA NORTH STATE PLANE COORDINATES (1401), US SURVEY FEET.
24. NEITHER SHIVE-HATTERY NOR THE UPPER IOWA RIVER WMA GUARANTEE THIS PRACTICE TO FILL WITH OR MAINTAIN A CONSISTENT POOL OF WATER.

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UPPER IOWA RIVER WMA

UI - 013 - CLAYTON POND
WINNESHIEK COUNTY, IA

PRELIMINARY - NOT FOR CONSTRUCTION

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ISSUED FOR: 100% DESIGN
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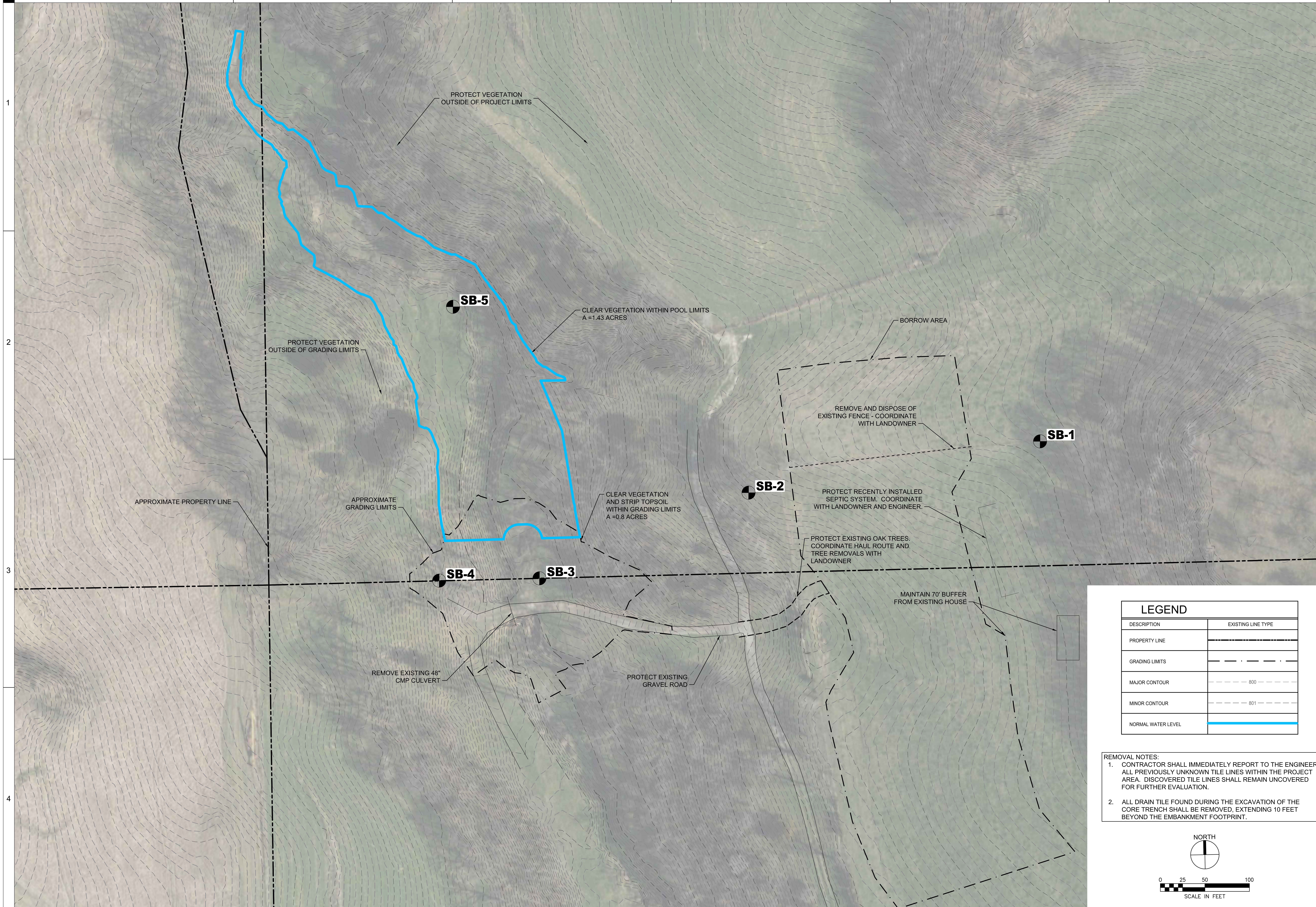
CLIENT NO: ---

PROJECT QUANTITIES & NOTES

C001



LEGEND

DESCRIPTION	EXISTING LINE TYPE
PROPERTY LINE	
GRADING LIMITS	
MAJOR CONTOUR	800
MINOR CONTOUR	801
NORMAL WATER LEVEL	

REMOVAL NOTES:

1. CONTRACTOR SHALL IMMEDIATELY REPORT TO THE ENGINEER ALL PREVIOUSLY UNKNOWN TILE LINES WITHIN THE PROJECT AREA. DISCOVERED TILE LINES SHALL REMAIN UNCOVERED FOR FURTHER EVALUATION.
2. ALL DRAIN TILE FOUND DURING THE EXCAVATION OF THE CORE TRENCH SHALL BE REMOVED, EXTENDING 10 FEET BEYOND THE EMBANKMENT FOOTPRINT.

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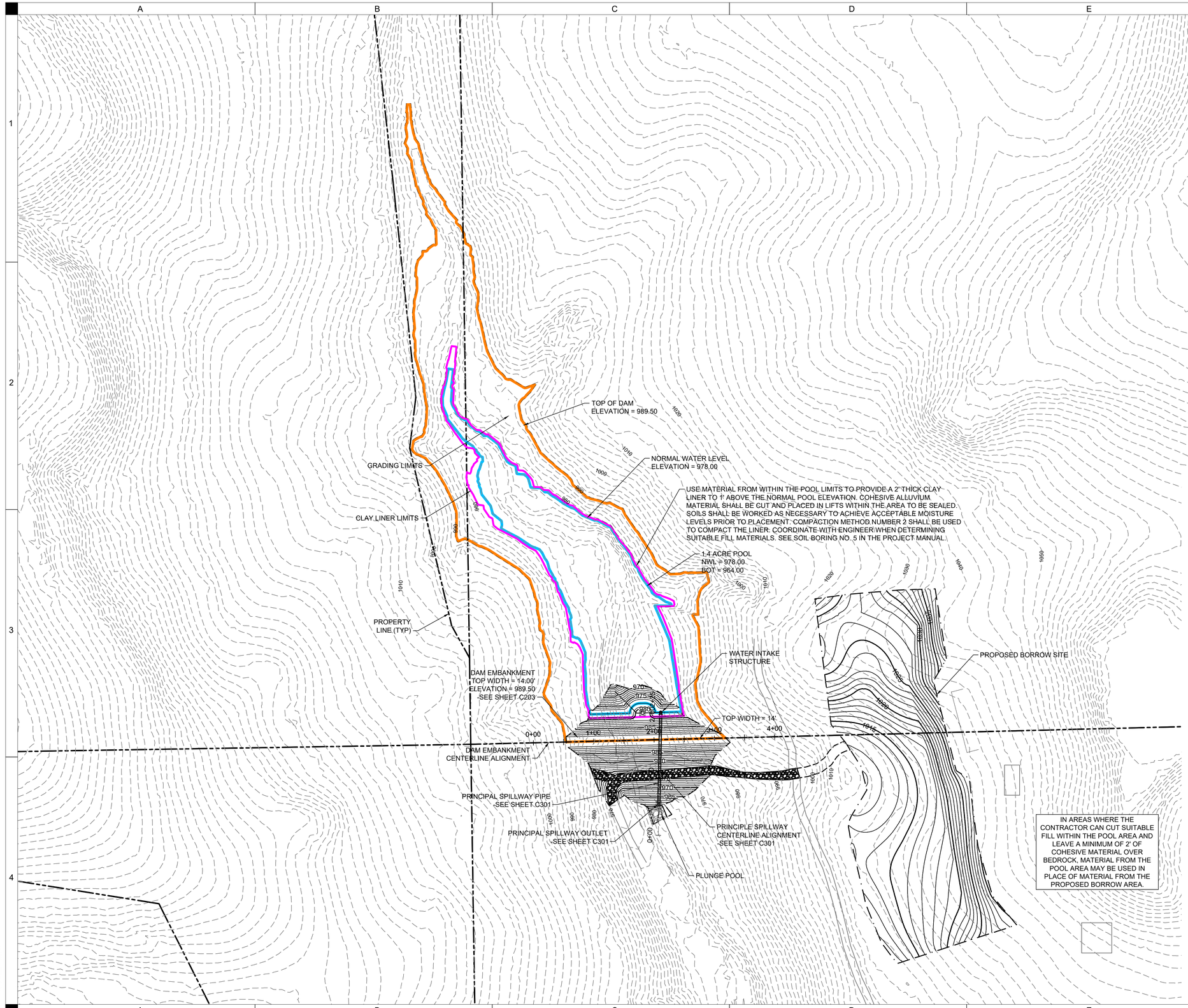
EXISTING CONDITIONS AND REMOVALS PLAN

CD01



LEGEND	
DESCRIPTION	PROPOSED LINE TYPE
TOP OF DAM ELEVATION	
NORMAL WATER ELEVATION	
PRINCIPAL SPILLWAY	
RIP RAP	
WATER LEVELING STRUCTURE	
GRADING LIMITS	
MAJOR CONTOUR	800
MINOR CONTOUR	801
FENCE	

NOTES:

1. STRIP AND STOCKPILE 6" OF TOPSOIL FOR ENTIRE AREA WITHIN GRADING LIMITS. RESPREAD 6" OF TOPSOIL IN ALL STRIPPED AREAS OUTSIDE OF THE PERMANENT POOL.
2. MAXIMUM SIDE SLOPES OF ALL EXCAVATED AREAS TO BE 3:1 OR FLATTER.
3. SEED EMBANKMENT TOP AND ALL SLOPES STEEPER THAN 4:1 WITH STRUCTURE AND CHANNEL SEED MIX. SEED ALL OTHER AREAS WITH BUFFER SEED MIX. SEE SHEET C601 FOR SEEDING PLAN.

IN AREAS WHERE THE CONTRACTOR CAN CUT SUITABLE FILL WITHIN THE POOL AREA AND LEAVE A MINIMUM OF 2' OF COHESIVE MATERIAL OVER BEDROCK, MATERIAL FROM THE POOL AREA MAY BE USED IN PLACE OF MATERIAL FROM THE PROPOSED BORROW AREA.

NORTH

0 40 80 160
SCALE IN FEET

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OVERALL GRADING PLAN

C201

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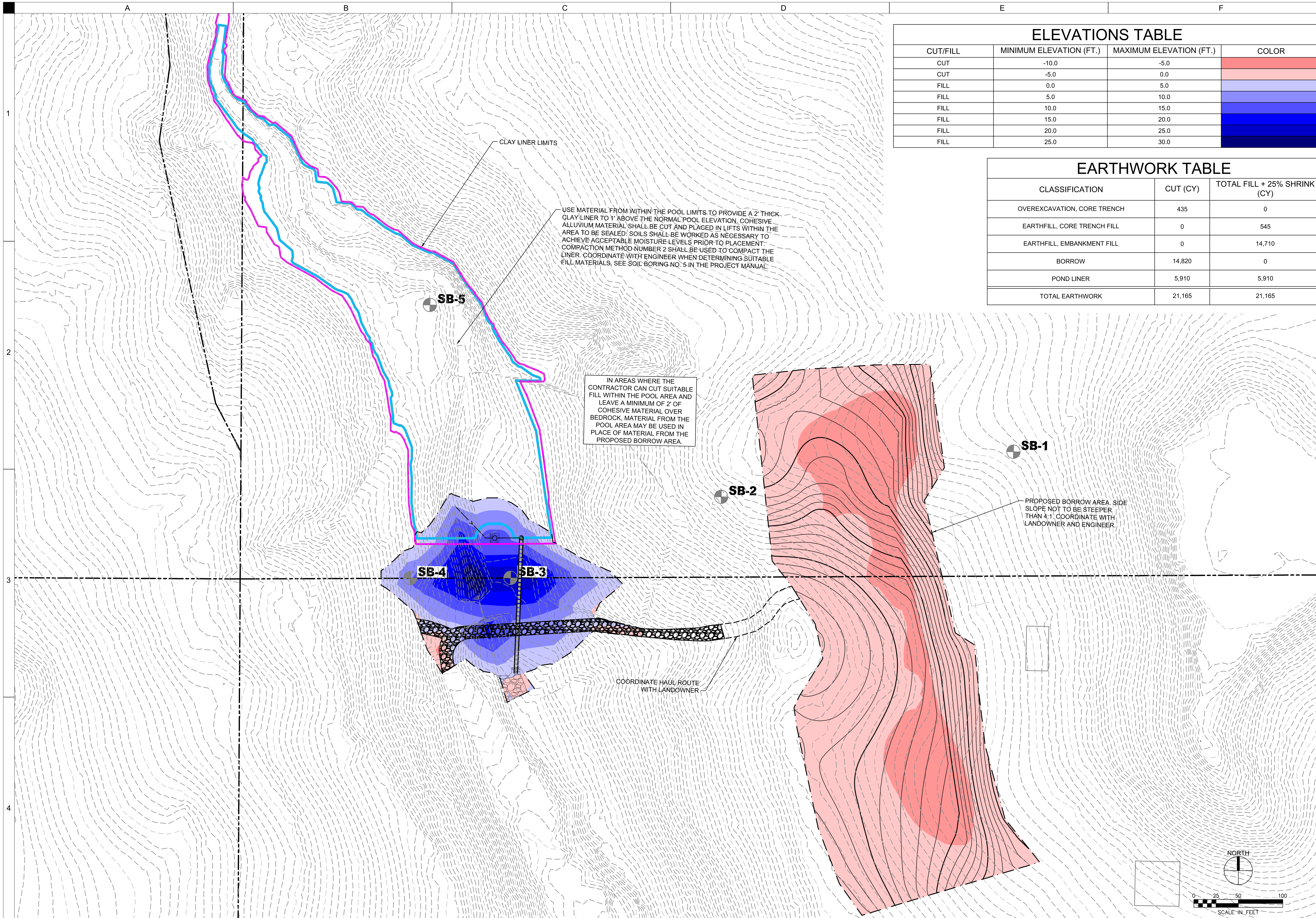
CLAY LINER LIMITS
USE MATERIAL FROM WITHIN THE POOL LIMITS TO PROVIDE A 2' THICK CLAY LINER TO 1' ABOVE THE NORMAL POOL ELEVATION. COHESIVE ALLUVIUM MATERIAL SHALL BE CUT AND PLACED IN LIFTS WITHIN THE AREA TO BE SEALED. SOILS SHALL BE WORKED AS NECESSARY TO ACHIEVE ACCEPTABLE MOISTURE LEVELS PRIOR TO PLACEMENT. COMPACTION METHOD NUMBER 2 SHALL BE USED TO COMPACT THE LINER. COORDINATE WITH ENGINEER WHEN DETERMINING SUITABLE FILL MATERIALS, SEE SOIL BORING NO. 5 IN THE PROJECT MANUAL.
SB-5
IN AREAS WHERE THE CONTRACTOR CAN CUT SUITABLE FILL WITHIN THE POOL AREA AND LEAVE A MINIMUM OF 2' OF COHESIVE MATERIAL OVER BEDROCK, MATERIAL FROM THE POOL AREA MAY BE USED IN PLACE OF MATERIAL FROM THE PROPOSED BORROW AREA.
SB-1
SB-2
PROPOSED BORROW AREA. SIDE SLOPE NOT TO BE STEEPER THAN 4:1. COORDINATE WITH LANDOWNER AND ENGINEER.
SB-4
SB-3
COORDINATE HAUL ROUTE WITH LANDOWNER
NORTH
0 25 50 100
SCALE IN FEET

ELEVATIONS TABLE

CUT/FILL	MINIMUM ELEVATION (FT.)	MAXIMUM ELEVATION (FT.)	COLOR
CUT	-10.0	-5.0	
CUT	-5.0	0.0	
FILL	0.0	5.0	
FILL	5.0	10.0	
FILL	10.0	15.0	
FILL	15.0	20.0	
FILL	20.0	25.0	
FILL	25.0	30.0	

EARTHWORK TABLE

CLASSIFICATION	CUT (CY)	TOTAL FILL + 25% SHRINK (CY)
OVEREXCAVATION, CORE TRENCH	435	0
EARTHFILL, CORE TRENCH FILL	0	545
EARTHFILL, EMBANKMENT FILL	0	14,710
BORROW	14,820	0
POND LINER	5,910	5,910
TOTAL EARTHWORK	21,165	21,165

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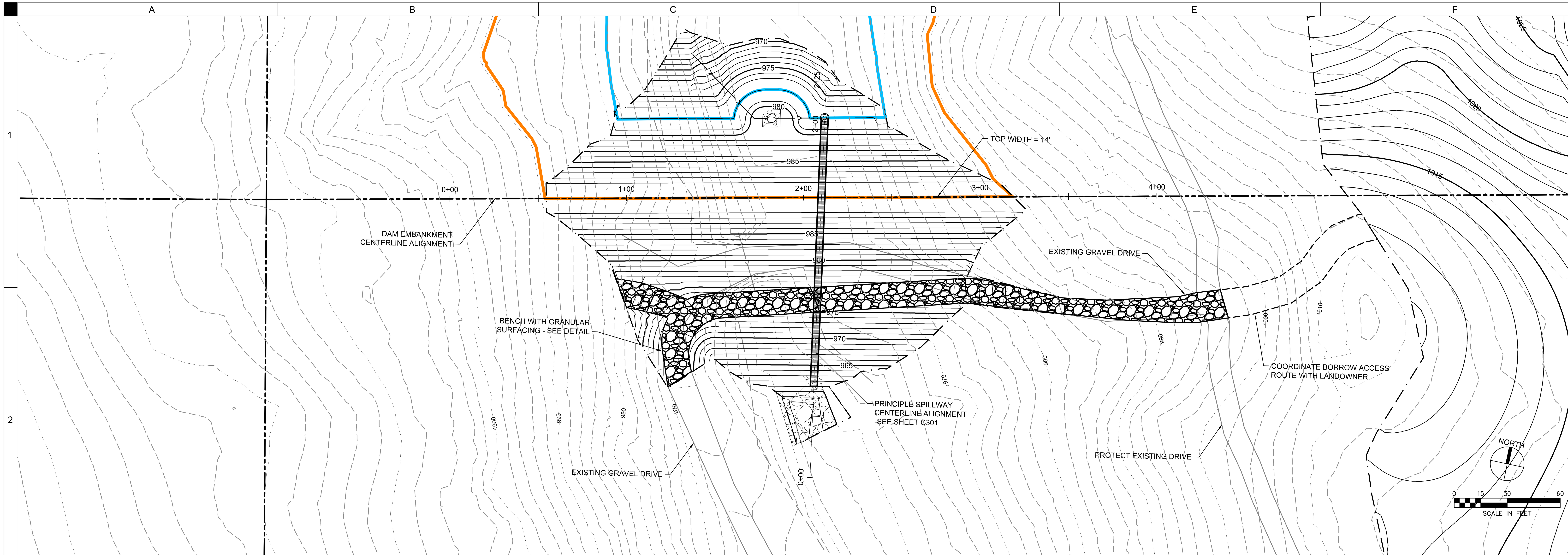
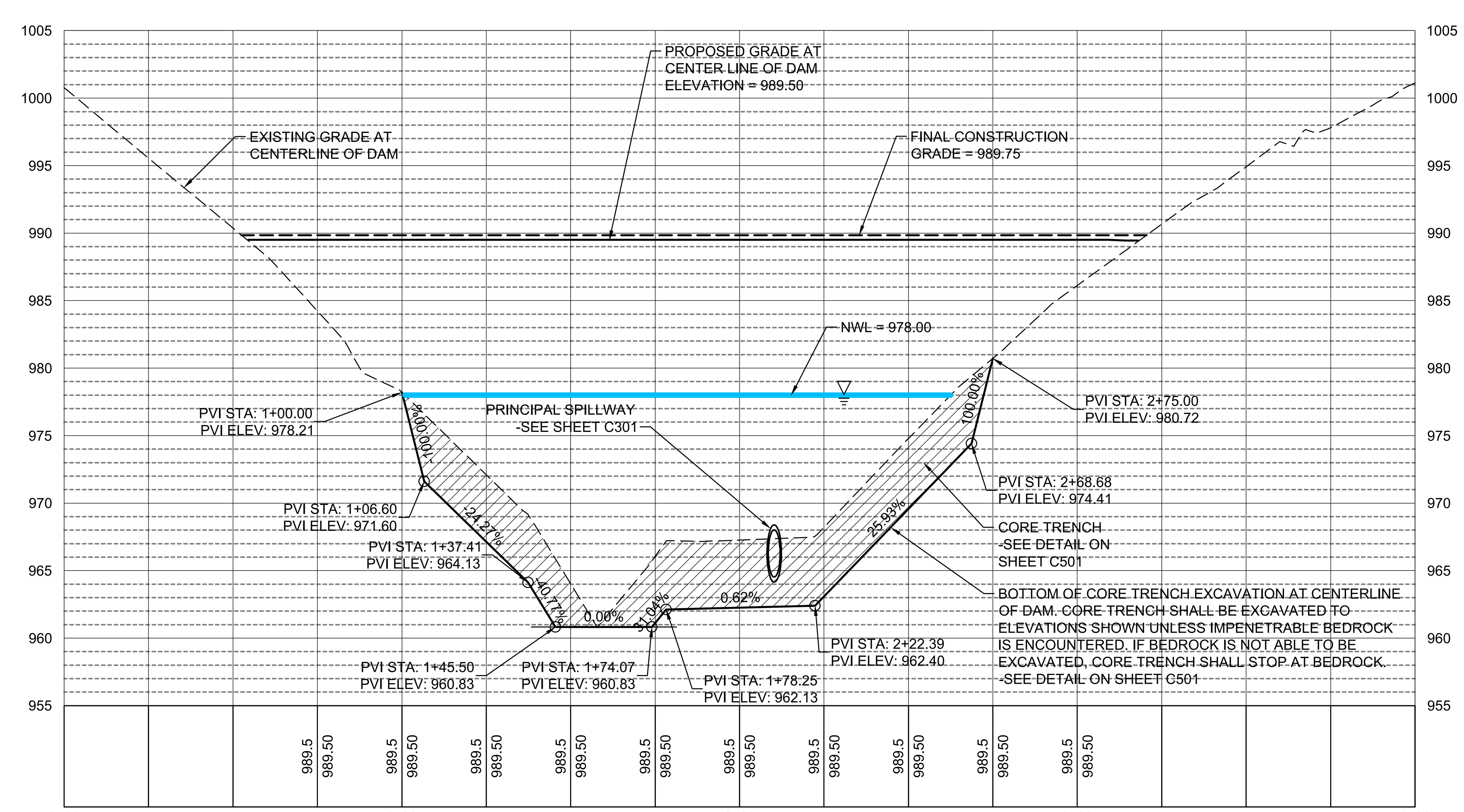
CUT-FILL PLAN

C202





EMBANKMENT GRADING NOTES:

1. DAM EMBANKMENT TO BE OVERBUILT BY A MINIMUM OF 3 INCHES TO ACCOUNT FOR SETTLING.

   EMBANKMENT HEIGHT = 29.0 FEET
   FINAL CONSTRUCTION GRADE = 989.75
   PROPOSED GRADE = 989.50

2. TOP SOIL SHALL NOT BE PLACED BACK IN CORE TRENCH.

3. EMANKMENT AND CORE TRENCH FILL SHALL BE PLACED AND COMPACTED IN 6" LIFTS, MAXIMUM.

VERTICAL SCALE:
0 3.75 7.5 15
SCALE IN FEET

HORIZONTAL SCALE:
0 15 30 60
SCALE IN FEET

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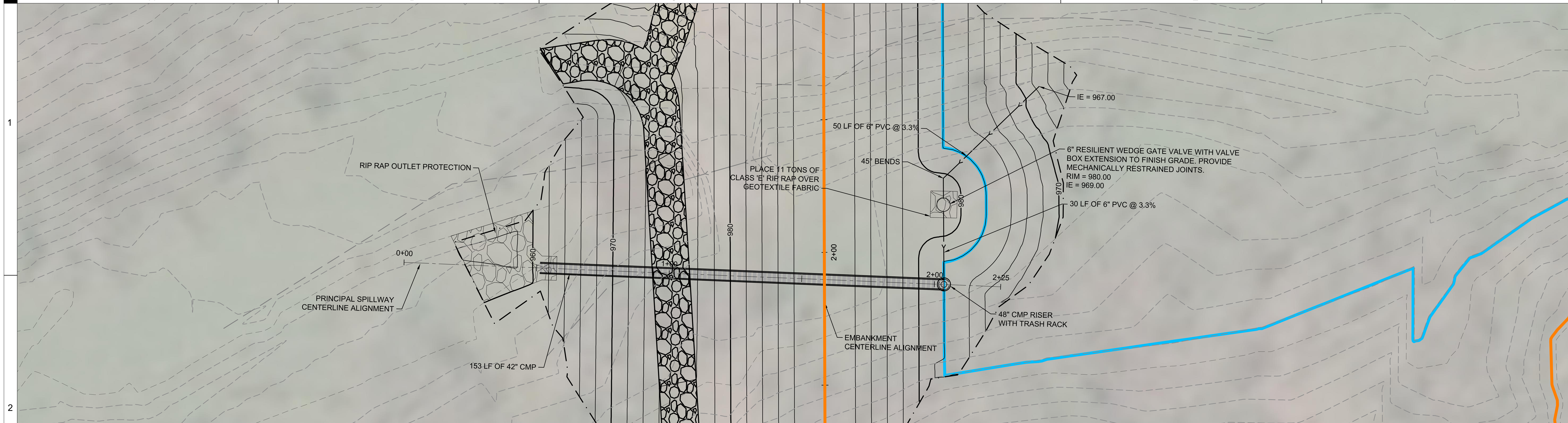
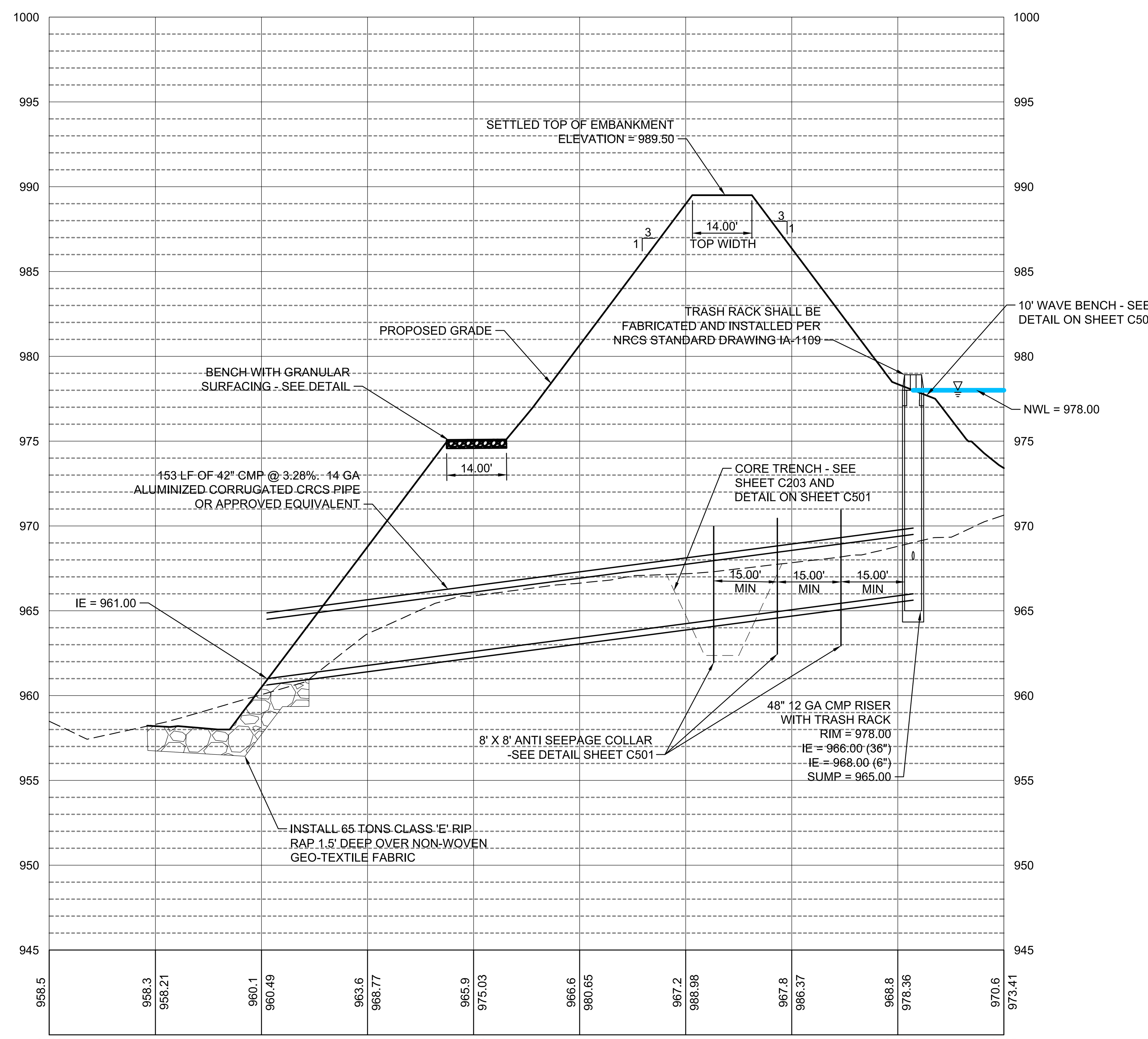
DAM EMBANKMENT PLAN AND PROFILE

C203





NORTH

0 10 20 40
SCALE IN FEET

VERTICAL SCALE:
0 2.5 5 10
SCALE IN FEET

HORIZONTAL SCALE:
0 10 20 40
SCALE IN FEET

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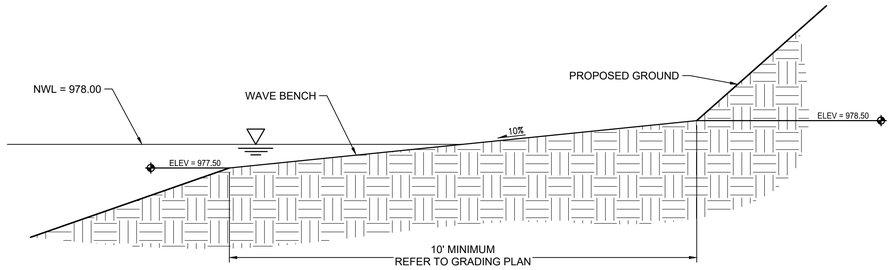
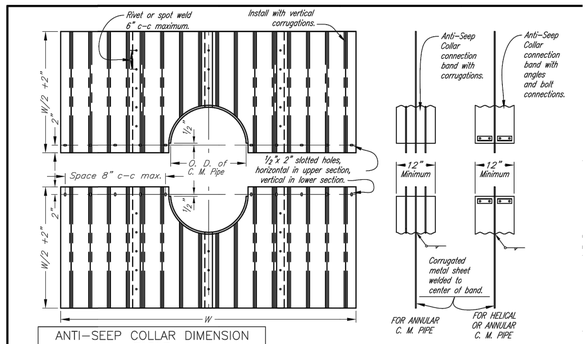
PRINCIPAL SPILLWAY PLAN AND PROFILE

C301



4 WAVE PROTECTION BENCH AT NWL
NOT TO SCALE



ANTI-SEEP COLLAR DIMENSION TABLE		
Pipe Diam.	No. Used	W (inches)
42"	3	96"

*Anti-Seep Collar dimensions shown may be increased to allow fabrication from standard size sheets.

Anti-Seep Collars for 18" to 48" corrugated metal pipe to be connected with two ½" diameter rods with tank lugs.

Anti-Seep Collars for 8" to 15" corrugated metal pipe to be connected with angles riveted or spot welded to band and connected with bolts.

Materials and Fabrication Requirements

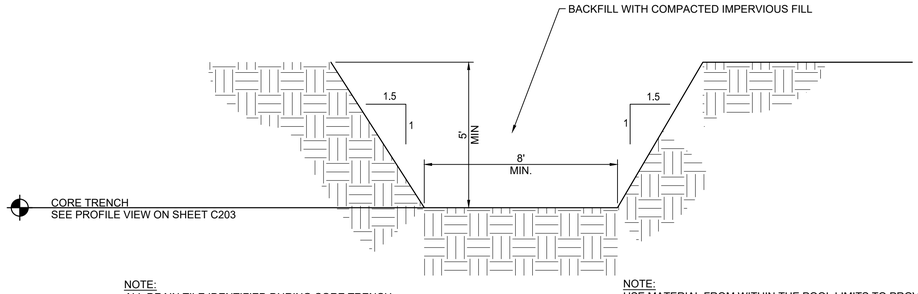
1. *Materials and fabrication shall be in accordance with Construction Specification 51A or IA 51 and the following:*
   - *A. Sheet material for the anti-seep collar and connection bands shall conform to the requirements specified for the pipe material itself.*
   - *B. The anti-seep collar sheets shall be corrugated as specified for the spillway pipe.*
   - *C. The anti-seep collar and connection bands shall be of equal thickness. They may be the next thickness lighter than that of the pipe to which attached, but not lighter than nominal 16 gage nor heavier than nominal 12 gage.*
   - *D. Metal sheets shall be fastened together to form anti-seep collar halves with either rivets or resistance spot welds as specified for fabrication of pipe; and as shown on this drawing.*
   - *E. Anti-seep collar connection bands shall be as shown on this drawing. Bands with annular corrugations shall be corrugated as specified for annular pipe. Bands with helical corrugations shall be corrugated as specified for helical pipe.*
   - *F. Connection angles and connection bolts shall be as specified for coupling bands except,*
     - *(1) The length of each angle shall be ½ the band width minus 1".*
     - *(2) 4 bolts (2 each side) are required.*
     - *(3) Integral formed flanges instead of angles may be used on 6", 8", 10" and 12" diameter helical pipe anti-seep collar connection bands.*
   - *G. Connection rods with lugs shall be used where specified on this drawing. The rods shall be made from structural quality steel and shall be galvanized. The lug may be standard tank type or other commercial type.*
   - *H. The anti-seep collar halves shall be welded to the connection band as shown on this drawing. All welds shall be treated as specified for "Repair of Damaged Coatings".*
   - *I. The anti-seep collar halves shall be slotted as shown on this drawing for connecting together with ⅜" diameter bolts. The bolts shall be of quality equal to the connection bolts and shall be galvanized or cadmium plated.*
2. *Shop assemble match and mark anti-seep collar halves.*
3. *Apply heavy coating of bituminous mastic or ⅛" x 7" neoprene gasket between anti-seep collar halves to produce watertight joints. Bituminous mastic shall also be applied between the connecting band and pipe to produce a watertight connection.*

STANDARD DWG. IA-1223

ANTI-SEEP COLLAR FOR 6" TO 48" DIA. C. M. PIPE

DATE July 2008 | SHEET 1 OF 1

3 CORRUGATED METAL ANTI-SEEPAGE COLLAR
NOT TO SCALE

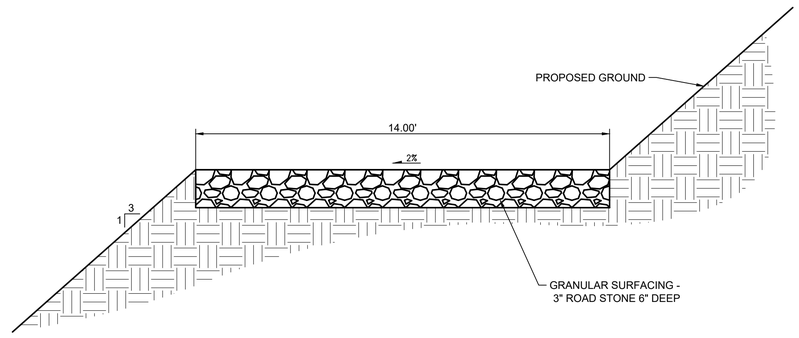


NOTE:
ALL DRAIN TILE IDENTIFIED DURING CORE TRENCH EXCAVATION TO BE RECORDED. REMOVE DRAIN TILES IN THEIR ENTIRETY FROM EMBANKMENT FOOTPRINT

NOTE:
PROJECT ENGINEER TO VERIFY THAT CORE TRENCH EXCAVATION TERMINATES IN SUITABLE SOILS PRIOR TO BACKFILLING.

NOTE:
USE MATERIAL FROM WITHIN THE POOL LIMITS TO PROVIDE A 2' THICK CLAY LINER TO 1' ABOVE THE NORMAL POOL ELEVATION. COHESIVE ALLUVIUM MATERIAL SHALL BE CUT AND PLACED IN LIFTS WITHIN THE AREA TO BE SEALED. SOILS SHALL BE WORKED AS NECESSARY TO ACHIEVE ACCEPTABLE MOISTURE LEVELS PRIOR TO PLACEMENT. COMPACTION METHOD NUMBER 2 SHALL BE USED TO COMPACT THE LINER. COORDINATE WITH ENGINEER WHEN DETERMINING SUITABLE FILL MATERIALS. SEE SOIL BORING NO. 5 IN THE PROJECT MANUAL.

2 TYPICAL CORE TRENCH SECTION
NOT TO SCALE



1 BENCH WITH GRANULAR SURFACING
NOT TO SCALE

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CONSTRUCTION DETAILS

C501

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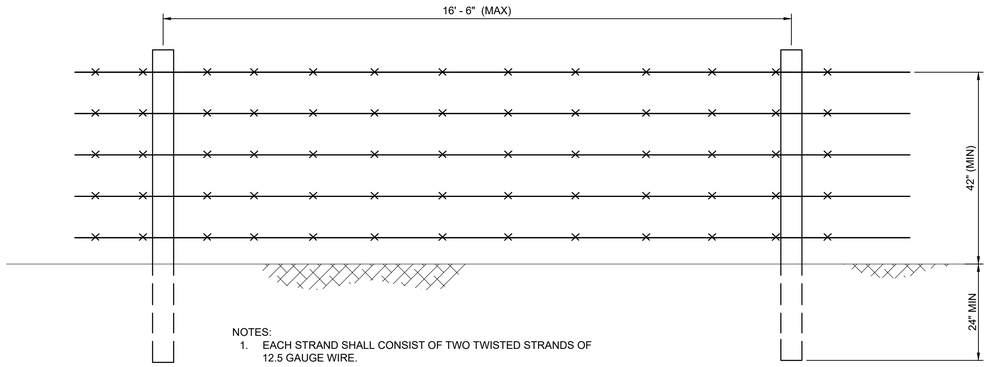
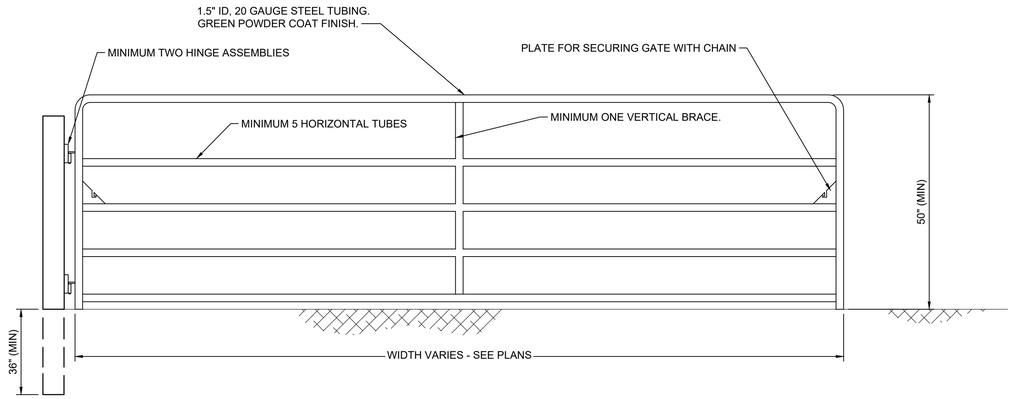


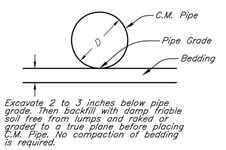
NOTES:
1. EACH STRAND SHALL CONSIST OF TWO TWISTED STRANDS OF 12.5 GAUGE WIRE.
2. BARBS SHALL BE TWO POINT AND SPACED EVENING AT 4" ON CENTER INTERVALS.
3. ALL WODEN POSTS SHALL BE TREATED PER IA-92.
4. FENCING MATERIALS, DIMENSIONS, AND SPECIFICATIONS SHALL CONFORM TO NRCS STANDARD 382 AND NRCS SPECIFICATION IA-92.

4 STANDARD BARBED WIRE FENCE, 5-STRAND
NOT TO SCALE

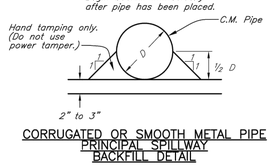


NOTES:
1. GATE END BRACING SHALL SINGLE H BRACE BE IN ACCORDANCE WITH NRCS SPECIFICATION IA-92 AND SHALL BE INSTALLED AT EACH SIDE OF THE GATE.

2 STANDARD FENCE CATTLE GATE
NOT TO SCALE

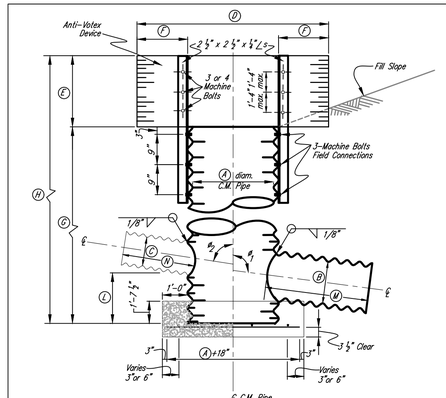


CORRUGATED OR SMOOTH METAL PIPE
PRINCIPAL SPILLWAY
BEDDING DETAIL

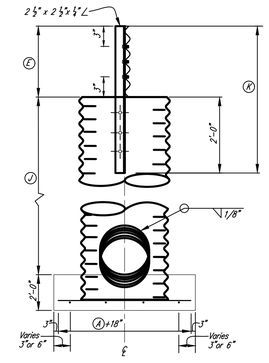


CORRUGATED OR SMOOTH METAL PIPE
PRINCIPAL SPILLWAY
BACKFILL DETAIL

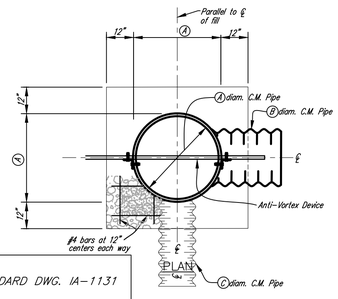
3 RIGID PIPE BACKFILL
NOT TO SCALE



SECTION ON CENTERLINE



REAR ELEVATION



Notes:
All holes for bolts shall be 9/16" diam.
Vertical inlet to be shop fabricated. After welding, damaged coatings shall be repaired as specified in Construction Specification 51.
Minimum (M) Dimension
B=36" M=2'-1½"
B=36" M=4'-1½"
Minimum (N) Dimension
N=2'-1½"

OPTIONAL (C) FABRICATION	C1	C2
Diameter, Inches		
Sheet Thickness		
Corrugations		
Position O'clock (B=12:00)		
(L)		
Ø2 Degrees–Angles		
Slope in ft./ft.		

DETAILS OF INLET
Not to Scale

TABLE–DIMENSIONS AND MATERIAL	
	Dimensions
(A)	48"
(B)	42"
(C)	6"
(D)	6'–0"
(E)	1'–6"
(F)	1'–0"
(G)	14'–7½"
(H)	16'–1½"
(J)	13'–0"
(K)	3'–6"
(L)	1'–7½"
(M)	4'–1½"
(N)	2'–1½"
Sheet Thickness for (A) diam.	
Corrugations for (A) diam.	
Sheet Thickness for (B) diam.	
Corrugations for (B) diam.	
Sheet Thickness for (C) diam.	
Corrugations for (C) diam.	
Sheet Thickness for Anti–Vortex Device	
Corrugations for Anti–Vortex	
MATERIAL ITEMS	QUANTITY REQUIRED
2 ½" x 2 ½" x ¼" L s x (K) Galv.	2
(D) x (E) Corr. Metal Sheets Galv.	1
½" x 1 ¼" Steel Cadmium Plated Mach. Bolts	
½" Steel Split Lockwashers	
½" Steel Cadmium Plated Nuts	
0 Degrees–Angles Ø1 / Ø2	
Slope of (B) diam. pipe in ft./ft.	
Slope of (C) diam. pipe in ft./ft.	

VERTICAL INLET BASE QUANTITIES				
Dimension (in.) (A)	Concrete Cu. Yd.	Steel Reinforcement #4 Bar		
		Length Each Bar	Number of Bars	Total Weight Pounds
48"	2.67	5'–6"	12	44.1

STANDARD DWG. IA–1131
DATE Oct. 2012 | PAGE 1 OF 1

1 48" CMP RISER
NOT TO SCALE

Dsgn
Designed
Drawn
Checked
Approved

DETAILS OF CORRUGATED METAL PIPE VERTICAL INLET WITH ANTI–VORTEX DEVICE

United States Department of Agriculture
Natural Resources Conservation Service

File No.
Drawing No.
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UPPER IOWA RIVER WMA
UI - 013 - CLAYTON POND
WINNESHIEK COUNTY, IA

PRELIMINARY - NOT FOR CONSTRUCTION

DRAWN: AJH
APPROVED: LTM
ISSUED FOR: 100% DESIGN
DATE: 2020-05-19
PROJECT NO: 41851190
FIELD BOOK: --
CLIENT NO: --

CONSTRUCTION DETAILS

C502

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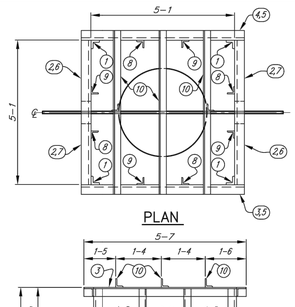
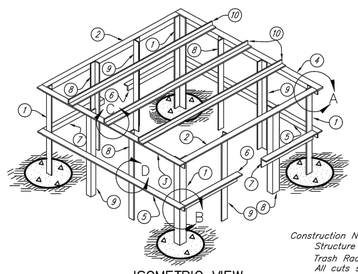
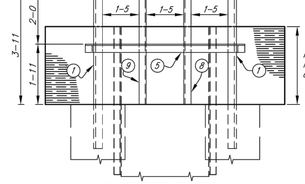
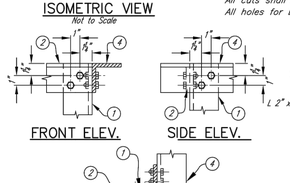


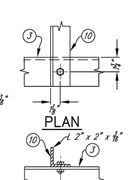


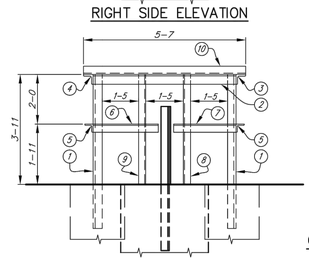
BILL OF MATERIALS			LENGTHS
Mark	Quantity	Item	48" Diam.
1	4	∠'s 3"x3"x⅜"	4-11
2	2	"	5-1
3	1	"	5-7
4	1	"	5-7
5	2	∠'s 2"x2"x⅛"	5-5
6	2	"	2-3
7	2	"	2-3
8	4	"	3-11
9	4	"	3-11
10	3	"	5-7
	46	½" ø Machine Bolts w/Lock Washers and Hex. Nuts	0-1½
		Concrete _ _ _ _ _ 0.6 Cu.Yd.	

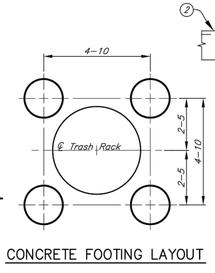
Construction Notes:
Structure is symmetrical about ℄.
Trash Rack to be fabricated of steel angles, bolted together with ½" diam. machine bolts.
All cuts shall be saw cuts.
All holes for bolts shall be 1/16 inch larger than bolt diam.

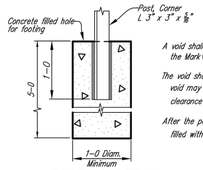










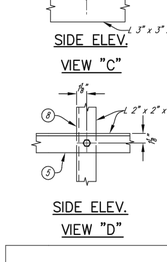


A void shall be formed in the concrete footings to receive the Mark (1) posts.

The void shall be one foot deep. The cross section of the void may be triangular, rectangular or circular with ½" clearance between the concrete and the Mark (1) posts.

After the posts are installed, the remaining voids shall be filled with bituminous mastic.

Not to Scale



STANDARD DWG. IA-1109

DATE Oct. 2012 | PAGE 1 OF 1

Date
Designed
Drawn
Checked
Approved

United States Department of Agriculture
Natural Resources Conservation Service

File No.
Drawing No.
Sheet of

DETAILS OF TRASH RACK FOR 48" C.M. PIPE VERTICAL INLET

1 TRASH RACK
NOT TO SCALE

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4125 Westown Pkwy, Suite 100 | West Des Moines, Iowa 50266
515.223.8104 | www.shive-hattery.com
Iowa | Illinois | Indiana

UPPER IOWA RIVER WMA

UI - 013 - CLAYTON POND
WINNESHIEK COUNTY, IA

PRELIMINARY - NOT FOR CONSTRUCTION

DRAWN: AJH
APPROVED: LTM
ISSUED FOR: 100% DESIGN
DATE: 2020-05-19
PROJECT NO: 41851590
FIELD BOOK: --
CLIENT NO: --

CONSTRUCTION DETAILS

C503

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BUFFER SEEDING AREA
AREA = 2.8 ACRES

SEEDING LIMITS DO NOT
EXTEND BELOW PROPOSED
NORMAL WATER LEVEL

STRUCTURE SEEDING AREA
AREA = 1.7 ACRES

0+00 1+00 2+00 3+00 4+00

LEGEND

DESCRIPTION	PROPOSED LINE TYPE
TOP OF DAM ELEVATION	
NORMAL WATER ELEVATION	
PRINCIPAL SPILLWAY	
RIP RAP	
WATER LEVELING STRUCTURE	
GRADING LIMITS	
MAJOR CONTOUR	800
MINOR CONTOUR	801
STRUCTURE AND CHANNEL SEEDING	
BUFFER SEEDING	

NORTH

0 25 50 100
SCALE IN FEET

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UPPER IOWA RIVER WMA

UI - 013 - CLAYTON POND
WINNESHIEK COUNTY, IA

DRAWN: AJH
APPROVED: LTM
ISSUED FOR: 100% DESIGN
DATE: 2020-05-19
PROJECT NO.#185190
FIELD BOOK: ---
CLIENT NO.: ---

SEEDING PLAN

C601

SUPPLEMENTAL SPECIFICATIONS
UPPER IOWA RIVER WMA
UI-013-CLAYTON

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Luke Monat — 5/18/2020

Signature **Date**

Printed or typed name: Luke T. Monat, P.E.
License Number: 22610
My license renewal date is: 12-31-2020

Pages, Sheets, or Divisions covered by this Seal:
Supplemental Specifications

EXPLANATION

A. The purpose of this Section of the Specifications is to provide supplemental information which is required to complete the Standard Construction Specifications and to set forth supplementary requirements, modifications and/or deletions which are required to make the whole of the Construction Specifications project specific.

C. Where there is any variance between the Standard Construction Specifications and these Supplemental Specifications, the Supplemental Specifications shall take precedence.

D. Where any section of the Standard Construction Specifications is modified, or any Paragraph, Sub-paragraph or Clause thereof is changed or deleted by these Supplemental Specifications, the unaltered provisions of that Section, Paragraph, Sub-paragraph or Clause in the Standard Construction Specifications shall remain in effect. Unless these Supplemental Specifications make specific reference to the modification or deletion of a Paragraph, Sub-paragraph or Clause in the Standard Construction Specifications, no changes are intended, and paragraphs contained in these Supplemental Specifications are intended only to supplement, amplify, or clarify said Standard Construction Specifications.

CONTENTS

IA-1 SITE PREPARATION

A. Measurement and Payment

1. Compensation for Site Clearing, Preparation, & Waste Disposal (Bid Item 1) shall be made on a lump sum basis. Any work item described in the contract documents but not explicitly listed in the bid schedule will be included in the lump sum payment for the item of work to which it is made subsidiary. Such items and bid items to which they are made subsidiary are identified in the Items of Work and Construction Details section of this specification.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. Items of Work and Construction Details

1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    a. Bid Item 1-Site Clearing, Preparation, & Waste Disposal
        (1) This item will consist of the removal and proper off-site disposal of all woody growth within the construction area. Trees may also be burned and buried onsite in an owner and engineer approved location and manner. Disposal shall be completed in accordance with IA-5 Pollution Control.
        (2) This item will consist of the removal and proper off-site disposal of all refuse and debris encountered on grade in areas being graded or seeded.

IA-3 STRUCTURE REMOVAL

A. Measurement and Payment

1. Compensation for any work item described in the contract documents but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and bid items to which they are made subsidiary are identified Items of Work and Construction Details section of this specification.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. Items of work and Construction Details

1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    a. Subsidiary Item, Field Tile Removal
        (1) No separate payment will be made for removal of field tile located during excavation of the core trench or general grading activities. Any field tile encountered within the project grading limits shall be removed by the contractor.
        (2) Tiles encountered within the pool area should be daylighted at the normal pool elevation if possible.

IA-5 POLLUTION CONTROL

A. Measurement and Payment

1. Compensation for any work item described in the contract documents but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and bid items to which they are made subsidiary are identified Items of Work and Construction Details section of this specification.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. Items of Work and Construction Details

1. Items of work to be performed in conformance with the specification and the construction details therefore are:
    a. Subsidiary Item, Sediment Filters
        (1) This item consists of all work to install, maintain and remove sediment filters for the project. Sediment filters to be removed once vegetation is established.
        (2) No separate payment will be made for sediment filters. Compensation for this item will be incidental to other items of work.
        (3) Contractor shall perform all construction activities in a manner that will minimize water pollution, air pollution, and soil erosion. Sediment filters shall be placed as needed where off-site erosion could occur.
    b. Subsidiary Item, Pollution Control
        (1) This item will consist of applying and performing all construction activities in a manner that will minimize water pollution, air pollution and soil erosion and shall be completed in compliances with all state, local and federal regulations.
        (2) No separate payment will be made for Pollution Control. Compensation for this item will be incidental to other items of work.

IA-6 SEEDING AND MULCHING FOR PROTECTIVE COVER

A. Measurement and Payment

1. For items of work for which specific prices are established in the contract each area treated is measured and the area calculated to the nearest 0.1 acre.

2. Payment for seeding is made at the contract unit price per acre for the designated treatment, which will constitute full compensation for completion of the work.

B. Items of Work and Construction Details

1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    a. Seeding, Structure and Channel Mix (Bid Item 2)
        (1) This item will consist of seeding the embankment, terrace flowlines, ditches, all concentrated flow paths, and any area steeper than 4:1 (H:V).
        (2) All seed must be cleaned and weed free. Seeding rates are expressed in bulk pounds per acre. Seed quality shall not drop below 70% Pure Life Seed (PLS) where PLS = (% germination + % dormant seed) times % purity.
        (3) Seed mix shall be 25.0 lbs./ac Smooth Bromegrass.
        (4) Prepare a firm seedbed for all planting methods:
            (a) If the land was in soybeans, no additional tillage is required. If the land was in corn or other vegetation, till all areas to be seeded by disking or other approved methods; thoroughly loosen and pulverize the soil to a depth of three (3) inches. This may require multiple passes of the disk or other approved equipment. If the land was used for pasture and has a smooth surface, the preparation in non-disturbed areas to be seeded shall include mowing any vegetation taller than 12 inches and applying a burn down herbicide, such as glyphosate, at the labeled rates to emergent growth 2 to 4 weeks after mowing. After the vegetation has died, the area shall be disked as needed to thoroughly loosen and pulverize the soil to a depth of three (3) inches. If emergent growth occurs again prior to seeding, the area shall receive a second application of herbicide. Seeding shall not occur until the existing vegetation has died. If the pasture has a rough surface that would negatively impact the seeding, the area shall be thoroughly disked and the cultipacked prior to seeding.
            (b) After the disking operation, and prior to seed application, firm the seedbed with a cultipacker or similar piece of equipment.
        (5) Fertilizer shall be applied on the entire seeding area at the following rate:
            (a) Nitrogen: 30 lbs./acre
            (b) Phosphorus (P2O5): 30 lbs./acre
            (c) Potassium (K2O): 40 lbs./acre
        (6) Straw much shall be applied at a rate of 2 tons per acre.

(7) Seeding will be completed during the follow seeding periods
- Spring: March 1 to May 15
- Summer: August 1 to September 15
- Fall: November 15 to freeze up

(8) Sow seeds with the contour using a grassland or rangeland drill set for the specified seeding rates. The drill shall be equipped with double coulter furrow openers. The drill shall be subject to acceptance by Engineer. Overlap each successive seeding pass to ensure complete coverage.

(9) For seeding occurring in the spring, contractor shall ensure the seedbed remains moist until plant establishment. Moisture may be maintained during dry conditions through regular watering. Consult the engineer for recommended moisture control methods. Seeding should occur when rain is in the forecast when possible. Failure to make a good faith effort to maintain moisture may result in re-seeding by the Contractor at no additional expense to the Owner.

(10) If seeding is completed during the spring seeding period, a companion crop of oats shall be seeded at ½ bushel per acre.

(11) Plant seed using a drill between ¼ and ½ inch deep

(12) Broadcasting by centrifugal-type or hydroseeder broadcasters, or by hand shall also be allowed in areas no accessible to drills or other equipment. Once broadcast, the seed must be covered with soil to a depth no greater than one half (1/2) inch by means of hand rakes or other approved methods.

(13) Upon completion of the seeding operation, cultipack the seedbed to provide a positive seed-soil contact. If the drill seeder is equipped with an approved cultipacker or press wheels, separate operations shall not be necessary. The type of cultipacker / seeder to be used shall be subject to acceptance by Engineer.

(14) Measurement and payment will be based on the area successfully seeded.

b. Seeding, Buffer Seed Mix (Bid Item 3)

(1) This item will consist of seeding buffer areas with slope shallower than 4:1 and as shown in the drawings.

(2) All seed must be cleaned and weed free. Seeding rates are expressed in bulk pounds per acre. Seed quality shall not drop below 70% Pure Life Seed (PLS) where PLS = (% germination + % dormant seed) times % purity.

(3) Seed mix shall be as specified in the buffer seed mix table:

SEEDING PLAN (NRCS FORM CPA-4) **Buffer Seeding Mix**			
Scientific name	Common name	lbs. or oz./acre PLS	
Grasses			
Andropogon gerardii	Big bluestem	1.1	lbs.
Bouteloua curtipendula	Sideoats grama	1	lbs.
Elymus canadensis	Canada wildrye	0.75	lbs.
Panicum virgatum	Switchgrass	0.25	lbs.
Schizachyrium scoparium	Little bluestem	0.75	lbs.
Sorghastrum nutans	Indiangrass	0.8	lbs.
Sporobolus asper	Rough dropseed	0.2	lbs.
Forbs			
Amorpha canascens	Lead plant	1.2	oz.
Asclepias incarnata	Swamp milkweed	1	oz.
Asclepias tuberosa	Butterfly milkweed	1	oz.
Astragalus canadensis	Canada milkvetch	0.5	oz.
Chamaecrista fasciculata	Partridge pea	16	oz.
Dalea purpurea	Purple prairie clover	4.5	oz.
Desmodium canadense	Showy tick trefoil	5	oz.
Echinacea pallida	Pale purple coneflower	3	oz.
*Helenium autumnale**	Sneezeweed	0.05	oz.
Heliopsis helianthoides	Ox-eye sunflower	6	oz.
Lespedeza capitata	Roundheaded bushclover	2	oz.
Liatris pycnostachya	Prairie blazingstar	1.5	oz.
Monarda fistulosa	Wild bergamot	0.5	oz.
Oligoneuron rigidum	Stiff goldenrod	1	oz.
*Penstemon digitalis**	Foxglove penstemon	0.25	oz.
Ratibida pinnata	Yellow coneflower	2.25	oz.
Rudbeckia hirta	Black-eyed Susan	3.75	oz.
Symphyotrichum novae-angliae	Smooth blue aster	0.25	oz.
Tradescantia ohiensis	Ohio spiderwort	0.5	oz.
Zizia aurea	Golden Alexanders	1	oz.
* Very small seed. Do not bury; scatter on soil surface.			

(4) Prepare a firm seedbed for all planting methods:

(a) If the land was in soybeans, no additional tillage is required. If the land was in corn or other vegetation, till all areas to be seeded by disking or other approved methods; thoroughly loosen and

pulverize the soil to a depth of three (3) inches. This may require multiple passes of the disk or other approved equipment. If the land was used for pasture and has a smooth surface, the preparation in non-disturbed areas to be seeded shall include mowing any vegetation taller than 12 inches and applying a burn down herbicide, such as glyphosate, at the labeled rates to emergent growth 2 to 4 weeks after mowing. After the vegetation has died, the area shall be disked as needed to thoroughly loosen and pulverize the soil to a depth of three (3) inches. If emergent growth occurs again prior to seeding, the area shall receive a second application of herbicide. Seeding shall not occur until the existing vegetation has died. If the pasture has a rough surface that would negatively impact the seeding, the area shall be thoroughly disked and the cultipacked prior to seeding.

(b) After the disking operation, and prior to seed application, firm the seedbed with a cultipacker or similar piece of equipment.

(5) Fertilizer shall be applied on the entire seeding area at the following rate:
   (a) Nitrogen: 30 lbs./acre
   (b) Phosphorus (P2O5): 30 lbs./acre
   (c) Potassium (K2O): 40 lbs./acre

(6) No mulch shall be applied.

(7) Seeding will be completed during the follow seeding periods:
   - Spring: March 1 to May 15
   - Fall: November 15 to freeze up

(8) For seeding occurring in the Spring seeding period, scarification of the seed must be completed by the seed provider.

(9) Sow seeds using a broadcast seeder at the specified rates.

(10) If seeding is completed during the spring seeding period, a companion crop of oats shall be seeded at ½ bushel per acre.

(11) Broadcasting by centrifugal-type or hydroseeder broadcasters, or by hand shall also be allowed in areas no accessible to other equipment.

(12) Upon completion of the seeding operation, lightly cultipack the seedbed to provide a positive seed-soil contact. The type of cultipacker / seeder to be used shall be subject to acceptance by Engineer.

(13) Measurement and payment will be based on the area successfully seeded.

IA-8 MOBILIZATION AND DEMOBILIZATION

A. Measurement and Payment

1. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

2. Initial payment of 50% of the contract price will be made in the first pay application after mobilization of the contractor's equipment to the project site and commencement of the project work has started. Final payment of the remaining 50% of the contract price will be made in the pay application following when the project is considered substantially complete by the Engineer.

B. Items of Work and Construction Details

1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    a. Mobilization & Demobilization (Bid Item 4)
        (1) This item shall consist of mobilizing and demobilizing personnel and equipment to and from the project location in preparation to perform the work within the scope of this contract.
        (2) Any work that is necessary to provide access to the site including, but not limited to, grading, access road construction, temporary culverts, and clearing shall be included in this item. When construction is completed access areas will be restored, as close as practical, to its original condition unless approval is obtained from the Engineer and the landowner.
        (3) Any fence removed for access and /or to provide work area shall be salvaged if practical or replaced with same or like materials as approved by the engineer and in accordance with specification IA-92. Removal or salvage shall be completed in accordance with IA-3 and IA-5.
        (4) The Contractor shall exercise caution to minimize the amount of damage caused by the grading and clearing operations.
        (5) Portable toilets shall be provided at the construction site and used for the sanitary facilities. Toilets must be removed upon completion of the work.
        (6) This item shall not include transportation of personnel, equipment and operating supplies within the work limits areas of this contract.
        (7) Payment will constitute full compensation for related subsidiary items.

IA-9 SUBSURFACE DRAIN INVESTIGATION, REMOVAL, AND REPAIR

A. MEASUREMENT AND PAYMENT

1. Compensation for any work item described in the contract documents but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and bid items to which they are made subsidiary are identified Items of Work and Construction Details section of this specification.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. ITEMS OF WORK AND CONSTRUCTION DETAILS

1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    a. Subsidiary Item, Drainage Tile Investigation and Removal
        (1) Any drainage tiles encountered within the project area shall be traced to the upstream inlet or practice boundary, whichever is encountered first in accordance with this specification.
        (2) This item shall consist of the excavation necessary to locate and remove all tile under the embankment, to remove tile at the other tile locations shown on the plans and locate the field tile lines in the practice. This item shall also consist of backfilling tile trenches if required.
        (3) This item does not include the additional excavation required to excavate the embankment core trench. Excavation of the core trench is covered under specification IA-21, Excavation.
        (4) This item does not include the additional tile removal that occurs as part of the proposed project earthwork. Tile removal occurring in these areas is made subsidiary to specification IA-21, Excavation.
        (5) The extent of tile investigation and removal shall be as required to locate and extend tiles as shown on the plans.
        (6) The investigation should reveal where the tile crosses the embankment footprint or where it is located if it does not cross the embankment footprint.
        (7) Removal shall be completed in accordance with IA-3 and IA-5.

IA-11 REMOVAL OF WATER

A. MEASUREMENT AND PAYMENT

1. Compensation for any work item described in the contract documents but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and bid items to which they are made subsidiary are identified Items of Work and Construction Details section of this specification.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. Items of Work and Construction Details

1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    a. Subsidiary Item, Dewatering
        (1) This item shall include all costs to divert, pump, dam or other means to control water run-on, run-off, and accumulation within the construction site.
        (2) No separate or additional payment will be made for control or removal of water from the project location. Compensation for this item shall be subsidiary to other work items.

IA-21 EXCAVATION

A. Measurement and Payment

1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section. Items of Work and Construction Details.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. Items of Work and Construction Details

1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    a. Over-Excavation, Core Trench Undercut (Bid Item 5)
        (1) This item will consist of excavating the core trench as shown in the plans and construction details. Payment will be made on the actual quantity completed and accepted. Core trench length may vary depending on the soils encountered. Core trench must terminate in suitable soils as determined by the Engineer.
        (2) Fill for the core trench shall be paid for on the actual quantity basis under Bid Item 6.
        (3) Measurement and payment for Core Trench Undercut shall be on an actual cubic yard basis.
    b. Subsidiary Item, Excavation for Earthfill
        (1) This item will consist of the excavation of material in locations shown on the plans for use as Earthfill. All excavation required for the project will be balanced onsite, unless otherwise noted, in areas designated as Earthfill.
        (2) No separate payment will be made for excavation.
        (3) Compensation for this item will be included in the payment for Earthfill Embankment and Core Trench Fill (Bid Item 6)

IA-23 EARTHFILL

A. Measurement and Payment

1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. Items of Work and Construction Details

1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    a. Earthfill, Embankment and Core Trench Fill (Bid Item 6)
        (1) This item shall consist of excavating, placing, and compacting the earthfill necessary to construct the embankment and adjacent fill areas and backfill of the core trench excavation as shown on the plans.
        (2) Earthfill approved soil material shall be taken from excavation and designated borrow areas unless other areas are approved by the engineer.
        (3) Compaction shall be Method 2 unless otherwise noted on the plans.
        (4) Rocks larger than 6" shall be removed prior to compaction.
        (5) Measurement and payment for Earthfill, Embankment and Core Trench Fill shall be on a plan “P” cubic yard basis. Plan basis, designated with a “P” in the proposal means that the plan quantity listed in the proposal will be used to measure and pay for the bid item regardless of the actual quantity.
        (6) A 25% shrinkage factor was used to determine the plan quantity.
    b. Earthfill, Pond Liner (Bid Item 7)
        (1) This item shall consist of excavating, placing, and compacting the earthfill necessary to construct a 2.0’ thick impermeable liner as shown on the plans.
        (2) Earthfill approved soil material shall be taken from within the area designated on the plans unless other areas are approved by the engineer.
        (3) Compaction shall be Method 2 unless otherwise noted on the plans.
        (4) Rocks larger than 6" shall be removed prior to compaction.
        (5) Measurement and payment for Earthfill, Pond Liner shall be on a plan “P” cubic yard basis. Plan basis, designated with a “P” in the proposal means that the plan quantity listed in the proposal will be used to measure and pay for the bid item regardless of the actual quantity.
        (6) A 25% shrinkage factor was used to determine the plan quantity, based on use of cohesive Alluvium and Colluvium soils within the designated area.

c. Subsidiary Item, Backfill Required Excavation

(1) This item shall consist of backfilling the areas excavated to install other components related to the project such as piping or structures and to locate and remove the tile line.

(2) Compaction adjacent to the structures shall be as indicated above. All other compaction shall be Method 1 or equivalent.

(3) No separate payment will be made for Backfill of Structure Excavation. Compensation for this item will be included in payment for Corrugated Metal Pipe, Water Control Structure, Riser Inlet Structure, Tile Investigation and Removal, and Corrugated Plastic Tubing Tile Drains if applicable.

IA-26 TOPSOILING

A. Measurement and Payment

1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. Items of Work and Construction Details

1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    a. Topsoil, Strip, Salvage and Re-spread (Bid Item 8)
        (1) This item will consist of stripping, salvaging, stockpiling and spreading salvaged (stockpiled) topsoil as the surface layer of all excavations and earth fills that will be disturbed as shown on the drawings.
        (2) All other areas being excavated or receiving fill should be stripped of the top six (6) inches of topsoil and stockpiled.
        (3) A minimum six (6) inch layer of topsoil shall be applied to all disturbed areas that will be seeded and the bottom of the pool area prior to project seeding.
        (4) Measurement and payment for top soiling shall be on a plan "P" cubic yard basis. Plan basis, designated with a "P" in the proposal, means that the plan quantity listed in the proposal will be used to measure and pay for the bid item regardless of the actual quantity.

IA-45 Plastic Pipe

A. Measurement and Payment

1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. Items of Work and Construction Details

1. Items of work to be performed in accordance with this specification and the construction details therefore are:
    a. 6" C900 PVC Outlet Pipe (Bid Item 9):
        (1) This item will consist of furnishing and installing the C900 PVC pipe and rodent guard.
        (2) The C900 Pipe shall meet AWWA C900.
        (3) Pipe materials with recycled content that meet AWWA C900 specifications are preferred and should be used where feasible. Postconsumer Content of 5 to 15% and total recoverable materials of 25-100% is recommended if available. Engineer may request information regarding recycled content of pipe materials for review.
        (4) Pressure rating shall be DR18 or better.
        (5) Gaskets shall meet ASTM F477 and joints shall meet ASTM D3139.
        (6) Coupling bands, anti-seep collars, hood inlet, repair of damage coatings, and other appurtenances are subsidiary to this item and shall not warrant separate payment.
        (7) Rodent Guards shall be internally mounted galvanized bar type rodent guard appropriately sized for the pipe.

IA-51 CORRUGATED METAL PIPE CONDUITS

A. Measurement and Payment

1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. Items of Work and Construction Details

1. Items of work to be performed in accordance with this specification and the construction details therefore are:
    a. Corrugated Metal Pipe, 42" (Bid Item 10):
        (1) This item will consist of furnishing and installing the corrugated metal pipe outlet including anti-seepage collars and rodent guard.
        (2) The corrugated metal pipe shall be 14-gauge aluminum coated with annular or helical corrugations as noted on the drawings.
        (3) Pipe materials with recycled content that meet ASTM A 760 and A 929 for the specified size of pipe are preferred and should be used where feasible. Post-consumer Steel Content of 15 to 70% and total recoverable steel material of 25-100% is recommended if available. Engineer may request information regarding recycled content of pipe materials for review.
        (4) Coupling bands, anti-seep collars, repair of damage coatings, and other appurtenances are subsidiary to this item and shall not warrant separate payment.
        (5) Rodent Guards shall be internally mounted galvanized bar type rodent guard appropriately sized for the pipe.
    b. 48" CMP Riser with Trash Rack (Bid Item 13):
        (1) This item will consist of furnishing and installing the corrugated metal pipe riser as shown on the drawings.
        (2) The corrugated metal pipe shall be 12 gage aluminum coated with annular or helical corrugations unless otherwise noted on the drawings.
        (3) Pipe materials with recycled content that meet ASTM A 760 and A 929 for the specified size of pipe are preferred and should be used where feasible. Post-consumer Steel Content of 15 to 70% and total recoverable steel material of 25-100% is recommended if available. Engineer may request information regarding recycled content of pipe materials for review.
        (4) Coupling bands, anti-seep collars, repair of damage coatings, metal fabrication, trash rack, anti-vortex device, and other appurtenances are subsidiary to this item and shall not warrant separate payment.

IA-61 LOOSE ROCK RIPRAP

A. Measurement and Payment

1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. Items of Work and Construction Details

1. Items of work to be performed in accordance with this specification and the construction details therefore are:
    a. Class E Revetment stone (Bid Item 11):
        (1) This item shall consist of procurement and placement of rip-rap or revetment stone as shown on the drawings
        (2) Rip-Rap Materials shall meet Iowa DOT Section 4130 Class E Revetment.
        (3) Alternative materials, including natural field stone, may be substituted in place of rip-rap if the size, shape, and quantity is approved by the Engineer. Field stone may be sourced locally by the contractor or from the project landowner. Substitution requests shall be submitted to the Engineer and include photos showing the relative size and quantity of stone to be used.
        (4) Measurement and payment shall be on an actual per ton basis of stone installed. Weigh tickets shall be provided to the Engineer.
        (5) Subsidiary Item - Geotextile Fabric, IA-95
            (a) Geotextile shall be installed under all rip rap as shown on the drawings.
            (b) No separate payment will be made for geotextile.
    b. 3” Roadstone (Bid Item 12):
        (1) This item shall consist of procurement and placement of 3” roadstone as shown on the drawings
        (2) Alternative materials may be substituted in place of 3” road stone if the size, shape, and quantity is approved by the Engineer. Substitution requests shall be submitted to the Engineer.
        (3) Measurement and payment shall be on an actual per ton basis of stone installed. Weigh tickets shall be provided to the Engineer.

IA-81 Metal Fabrication and Installation

A. Measurement and Payment

1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. Items of Work and Construction Details

1. Items of work to be performed in accordance with this specification and the construction details therefore are:
    a. Subsidiary Item- Metal and Metal Fabrication
        (1) This item will consist of furnishing and installing all steel and aluminum shown on the drawings.
        (2) No separate payment will be made for Steel, aluminum or metal fabrication. Payment for this item will be considered subsidiary to the following Bid Items:
            (a) Bid Item 10 (Corrugated Metal Pipe, 42")
            (b) Bid Item 13 (48" CMP Riser with Trash Rack).

IA-95 GEOTEXTILE

A. Measurement and Payment

1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

B. Items of Work and Construction Details

1. Items of work to be performed in accordance with this specification and the construction details therefore are:
    a. Subsidiary Item - Geotextile Fabric
        (1) This item shall consist of furnishing and placing geotextile on all earth surfaces that contact the rock riprap or roadstone as shown on the drawings.
        (2) Geotextile shall be Class I, nonwoven.
        (3) The geotextile shall be placed with the long dimension parallel to the channel.
        (4) Geotextile shall not be measured and shall be considered subsidiary to Rock Riprap bid items.
        (5) No additional payment will be made for geotextile.

TABLE 2. REQUIREMENTS FOR NONWOVEN GEOTEXTILES

Property	Test Method	Class I	Class II	Class III	Class IV [3/]
Tensile strength (pounds) [1/]	ASTM D 4632 grab test	180 minimum	120 minimum	90 minimum	115 minimum
Elongation at failure (%) [1/]	ASTM D 4632	≥ 50	≥ 50	≥ 50	> 50
Puncture (pounds)	ASTM D 4833	80 minimum	60 minimum	40 minimum	40 minimum
Ultraviolet light (% residual tensile strength)	ASTM D 4355 150-hr exposure	70 minimum	70 minimum	70 minimum	70 minimum
Apparent opening size – AOS	ASTM D 4751	As specified max. # 40 [2/]	As specified max. # 40 [2/]	As specified max. # 40 [2/]	As specified max. # 40 [2/]
Permittivity sec^{-1}	ASTM D 4491	0.70 minimum	0.70 minimum	0.70 minimum	0.10 minimum

1/ Minimum average roll value (weakest principal direction). 2/ U.S. standard sieve size

3/ Heat-bonded or resin bonded geotextile may be used for classes III and IV. They are particularly well suited to class IV. Needle punched geotextiles are required for all other classes.

IA-620 UNDERGROUND OUTLET

A. Measurement and Payment

1. For items of work for which specific unit prices are established in the contract, the length of pipe will be computed to the nearest foot along the centerline of pipe and shall include the length of the aprons. Payment will be made to constitute full payment for all labor, materials, equipment, and all other items necessary and incidental to the completion of the work.

2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work

B. Items of Work and Construction Details

1. Corrugated Metal Pipe, 42" (Bid Item 10):
    a. This item will consist of furnishing and installing the outlet pipe and fittings as shown on the plans.
    b. Installation shall include anti-seepage collars and rodent guard as shown on plans and as additionally specified in IA-51.
    c. Linear foot measurement and payment will constitute full compensation for this bid item as related subsidiary items.
2. 48" CMP Riser with Trash Rack (Bid Item 13):
    a. This item will consist of furnishing and installing the riser and fittings as shown on the plans.
    b. Installation shall include metal fabrication and trash rack as shown on plans and as additionally specified in IA-51.
3. Resilient Wedge Gate Valve, 6" (Bid Item 14):
    a. This item will consist of furnishing and installing the resilient wedge gate valve and fittings as shown on the plans. A valve wrench shall also be furnished
    b. Installation shall include valve box, extensions, lid, and any other necessary appurtenances. The valve box lid shall be painted blue.

END OF UI-013-CLAYTON SUPPLEMENTAL SPECIFICATIONS

Upper Iowa River Flood Reduction Project

UI-BID-002

Packet B Project Plans and Designs

Beard Project Summary

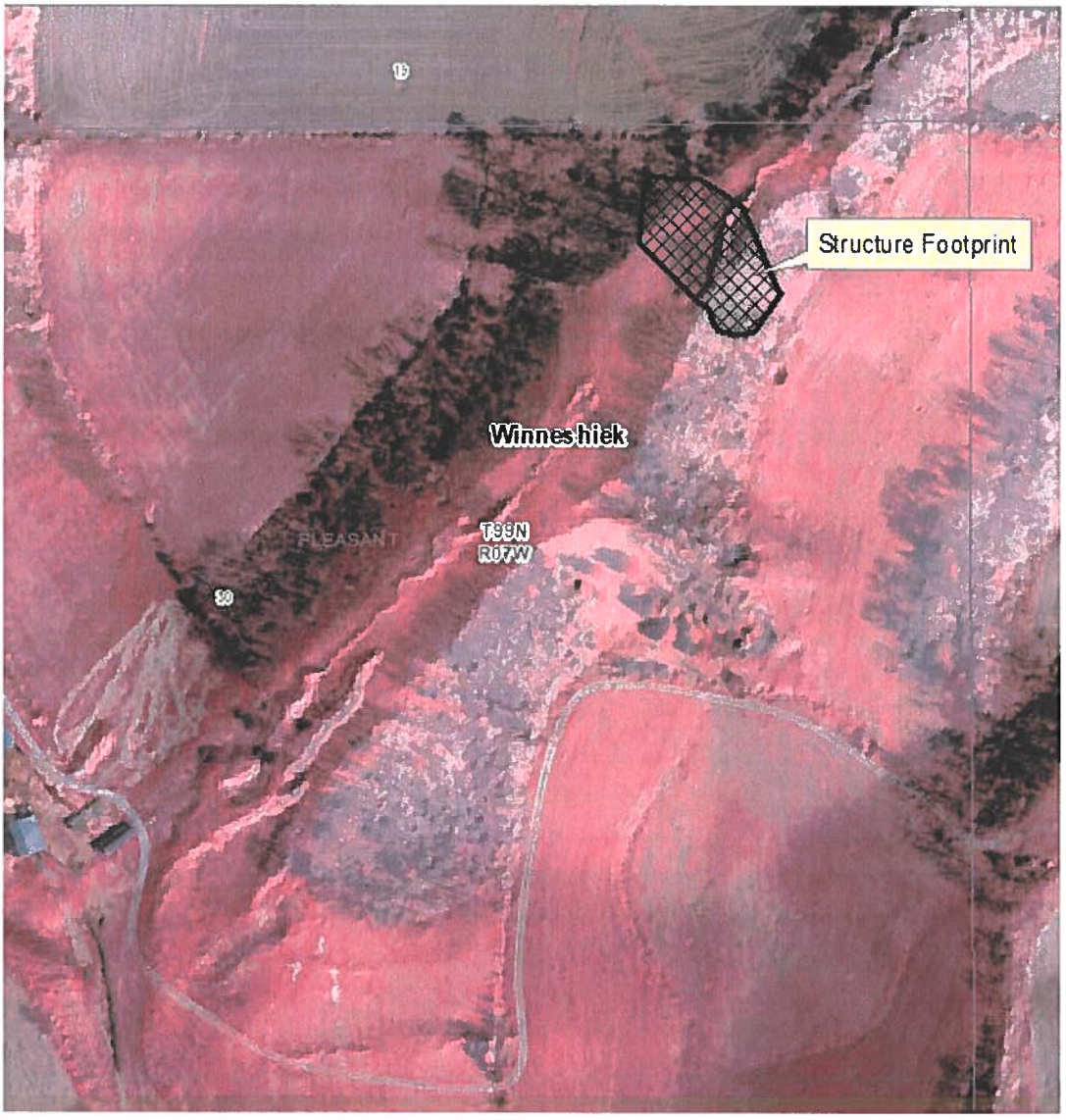
UI-011-BEARD (Grade Stabilization Structure/Pond)

Assistance by: Matt Frana - UIR Watershed Project Coordinator ***Date:*** 6/4/19

Project Location: Sec 30, T99N R07W, Pleasant Township

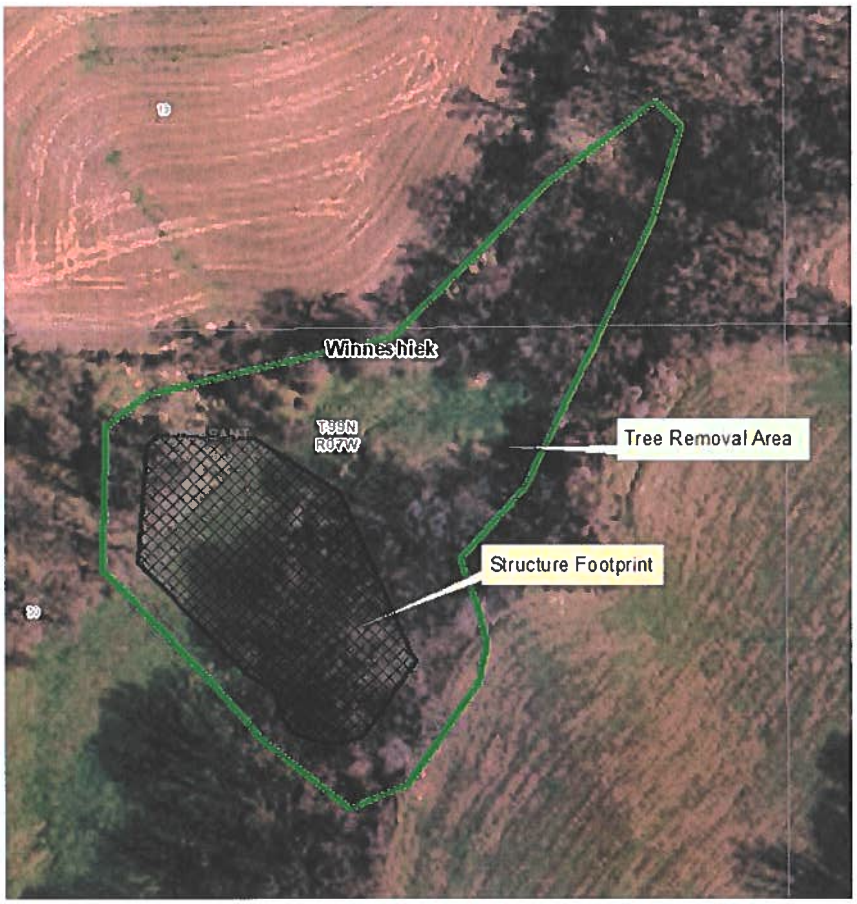
Project Objective: To slow water moving through farm after heavy rain events to prevent erosion.

Background:Landowners Tom and Maren Beard had expressed that after heavy rain events water flows quickly through their pasture and cropland, contributing to erosion issues. In an effort to combat these concerns a grade stabilization structure (pond) will be constructed to slow and store water after heavy rain events. Pool area will also back up water onto neighbor's property (Harry Bigler). Harry is on board with the project and willing to agree to an easement to do so.

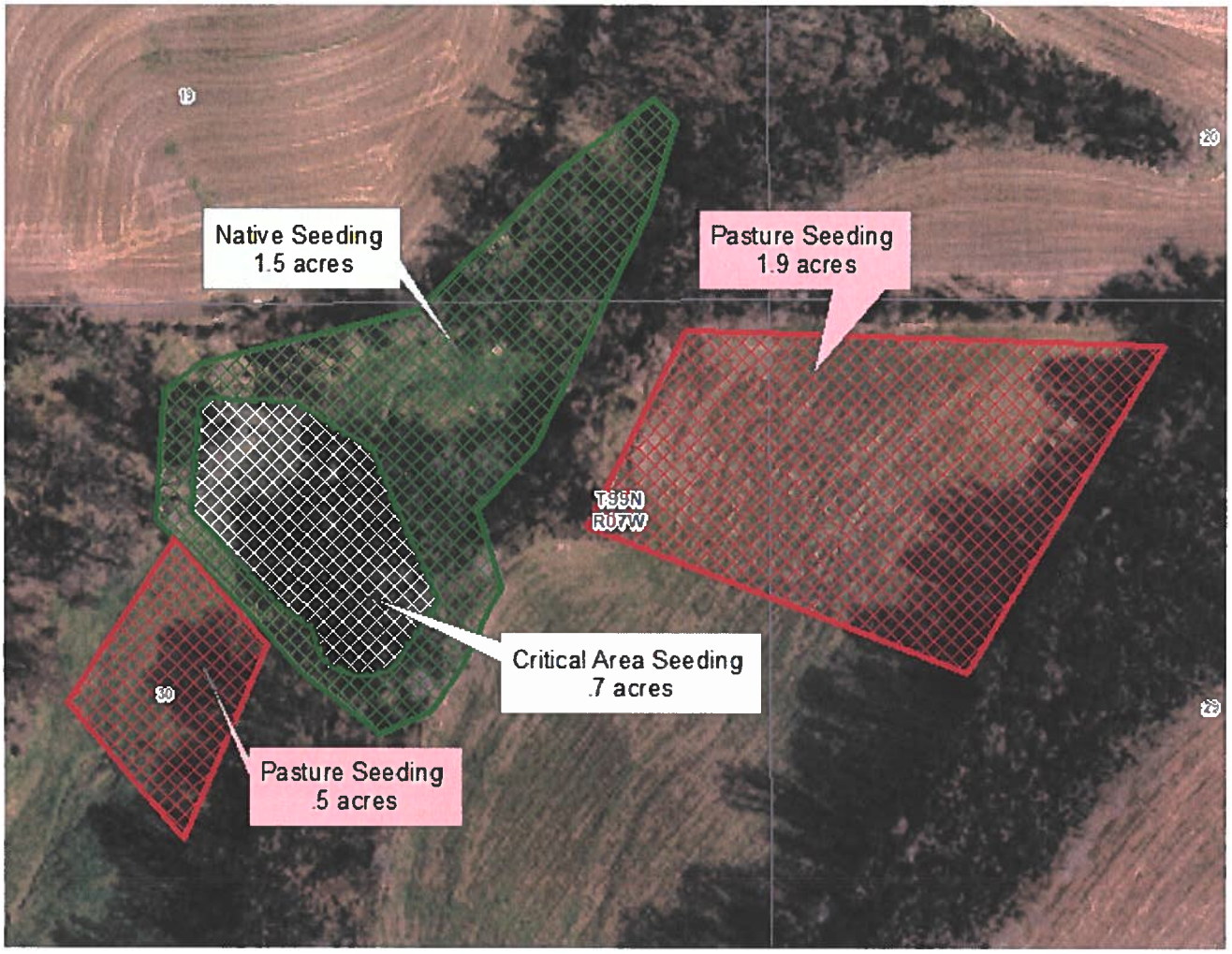


Project Plan: A grade stabilization structure (pond) will be constructed in the drainageway that will slow the flow of water, reducing damages after heavy rain events. It will be designed to have a permanent pool of water, but it is thought due to the soil types and lack of consistent flow of water that a full permanent pool will typically not be present.

A hydrant will also be installed that can utilize stored water from the pond for watering livestock. The designed project will control 82 drainage acres and reduce water flow by 94%. Prior to construction trees in the permanent pool area and within 25ft of the structure footprint will have to be removed.

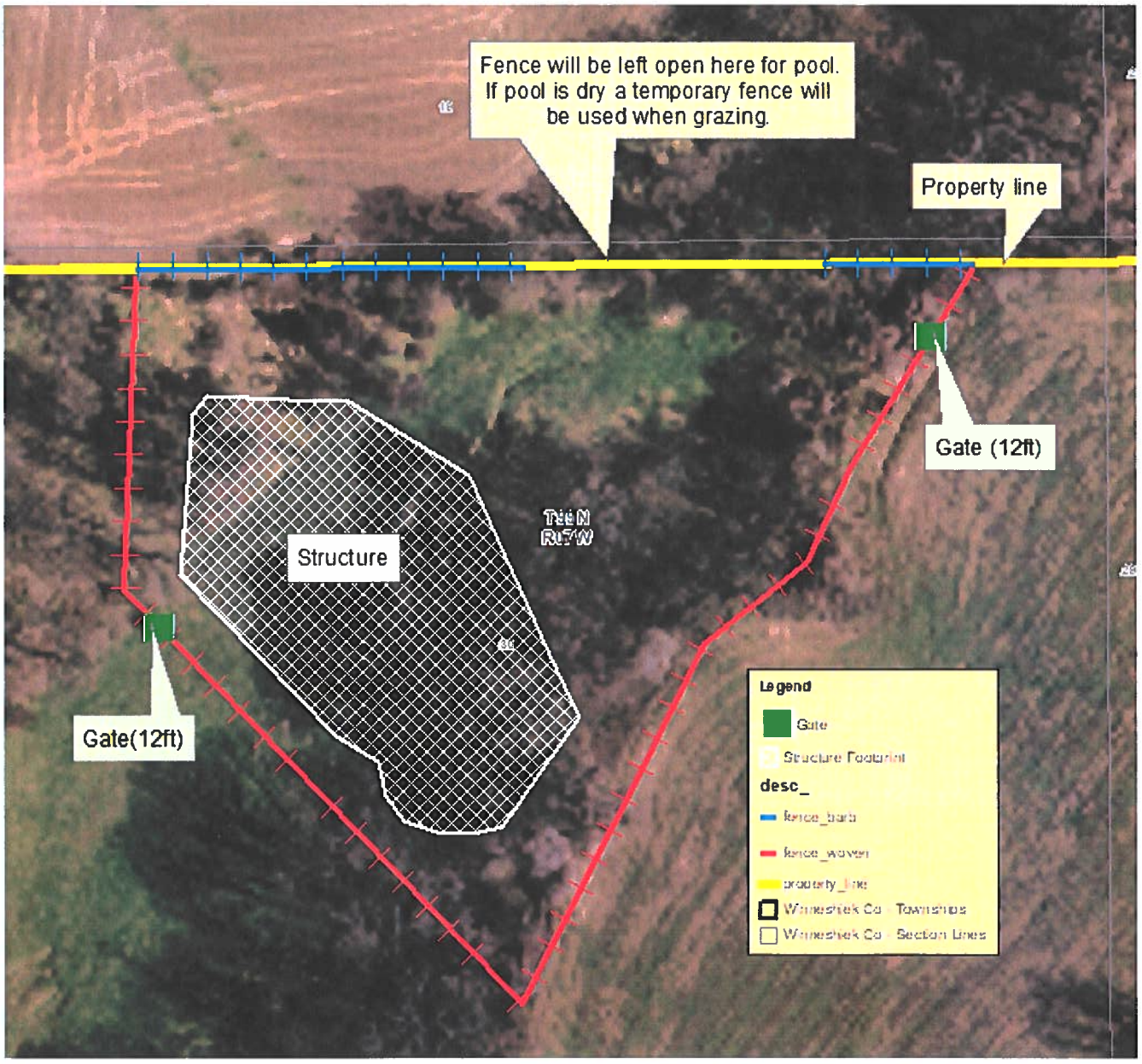


After construction, the grade stabilization structure footprint will be seeded with prescribed seed mix for critical areas on the structure. A native prairie seed mix will be planted in the pool area and around the structure. This will help filter sediment and nutrients entering the pool area while enhancing wildlife habitat on the property. Borrow/fill areas will be reseeded to a pasture mix suitable for the Beard's livestock needs. Since the raise organic sheep, they want to insure the seed mix meets organic standards. See seeding plans for prescribed seed mixes and recommended seeding methods.



The pool and structure will have to be fenced off from livestock. This is to prevent damage to the project and insure longevity. A portion of the fence (915ft) will be 8x42x12 mesh fence (ideal for sheep) with a strand of barb wire on top. The fence along the property line will be four-strand barb wire (260ft). Fence will stop at the permanent pool line. This is to avoid having to clean out or fix after a heavy rain event.

The site can be flash grazed to control vegetation, weeds, and trees. Fenced off areas should only be grazed for no more than a couple days at a time. If at the time they plan to graze the pool is dry, temporary fence can be put up to prevent livestock from going on neighbor's property. Two 12ft gates will be installed for access into the project area.



Beard Structure

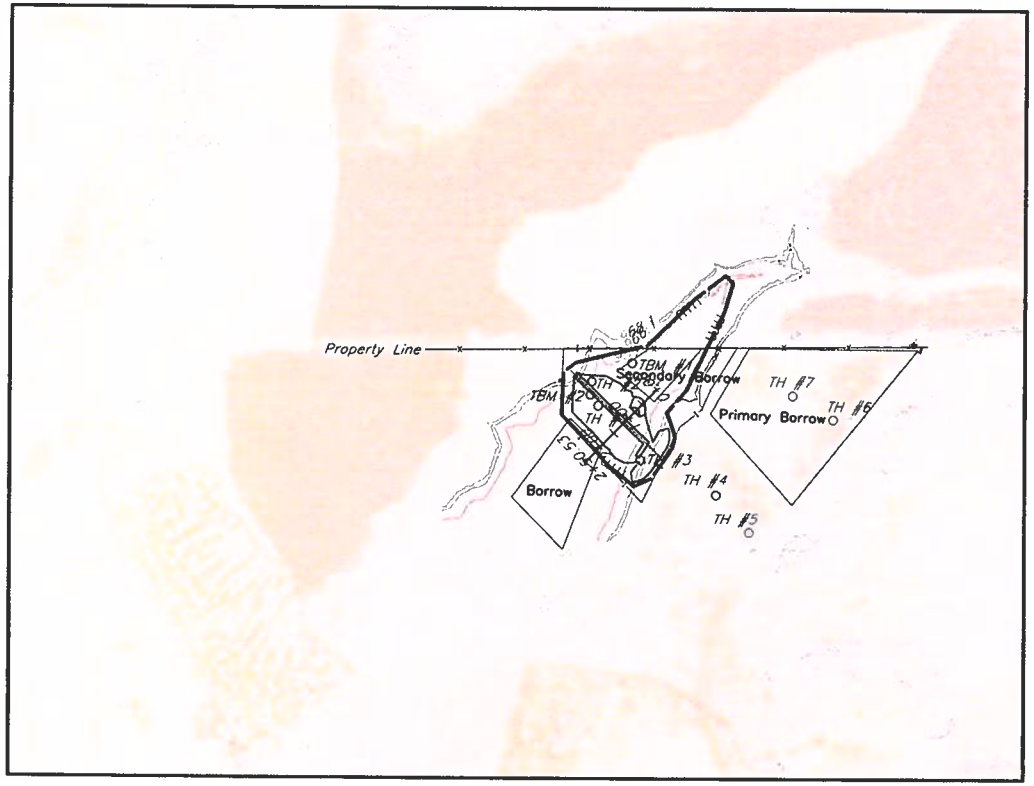
May 8, 2019

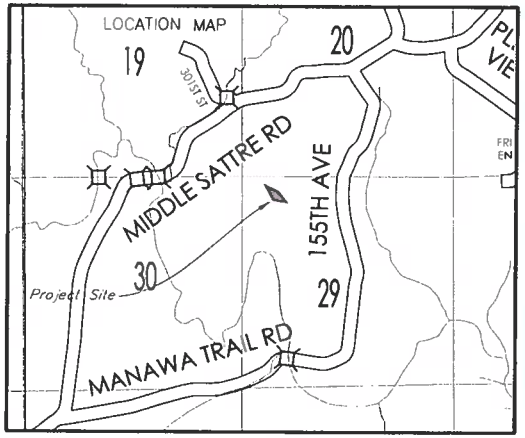
Item No.	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
Cost-shared Expenses						
5	**Topsoil, Strip, Salvage and Respread**	IA-26	606	cu. Yd.	$2.10	$1,272.60
4	**Compacted Earthfill**	IA_23	11155	cu. Yd.	$3.50	$39,042.50
3	**Core Trench Excavation**	IA-21	1096	cu. Yd.	$2.00	$2,192.00
6	**Pipe, Appurtenances and Installation**	IA-45	120	feet	$35.60	$4,272.00
	including Rip Rap Outlet Protection	IA-61				
7	**Seeding** *Critical Area*	IA-6	1	acres	$300.00	$300.00
8	*Pasture*	IA-6	3	acres	$300.00	$900.00
9	*Native*	IA-6	2	acres	$400.00	$800.00
10	**Fence** *Woven*	IA-92	915	feet	$4.00	$3,660.00
11	*Barb*	IA-92	260	feet	$3.00	$780.00
12	*Gate (12ft)*	IA-92	2	ea	$125.00	$250.00
13	**Waterline(installed w/apurtences)**	IA-45	185	feet	$2.70	$499.50
	also attach IA-5					
					Total	$53,968.60
					Landowner Cost (10%)	$5,396.86
Other Expenses						
1	**Mobilization & Demobilization**	IA-1	1	job	$600.00	$600.00
2	**Site Clearing, Preperation & Waste Disposal**	IA-1	1	job	$4,000.00	$4,000.00
					Total	$4,600.00
					Grand Total	**$58,568.60**

If a cultural resource is identified during construction, stop immediately and notify the local Natural Resources Conservation Service office.

Contractor is required to follow Iowa One Call law. IowaOneCall.com or Call 811
Ticket # _____

NRCS does not guarantee that this structure will fill and/or remain filled with water to the principal spillway crest elevation.





Section 29 T99N R7W

Index of Sheets

The following Construction Specifications are part of this plan:

IA-1	Site Preparation
IA-5	Pollution Control
IA-6	Seeding and Mulching for Cover
IA-11	Removal of Water
IA-21	Excavation
IA-23	Earthfill
IA-26	Topsoiling
IA-45	Plastic (PVC, PE) Pipe
IA-92	Fences

Items of Work

Work or Material	Spec No.	Unit	Estimated Quantity
Clearing and Grubbing	IA-1	Job	1
Excavation Common – Core Trench	IA-21	Cu. Yd.	1096
Earthfill – including Stripping	IA-23	Cu. Yd.	11155
12" PVC Pipe w/ Hooded Inlet	IA-45	Lin. Ft.	120
5' x 5' Anti-Seep Collars @ 25' Spacing		Each	3
FENCE Woven Wire	IA-92	Feet	915
FENCE 4 Strand Barb	IA-92	Feet	260
Water Line/Hydrant	IA-45	Feet	185

BENCH MARK

NO.	ELEV.	DESCRIPTION
TBM 1	953.61	2"x2" Wood Hub 118' upstream of dam CL, 36' right of FL
TBM 2	950.14	2"x2" Wood Hub 10' downstream of dam CL, 97' right of FL

Date: 2/19
Designed Moylce 2/19
Drawn Moylce 4/9/19
Checked Dave Mellick 5/8/19
Approved

Site View
Beard Structure

Job Class III

Winneshiek County, IA
Upper Iowa River Watershed Project

USDA United States Department of Agriculture
Natural Resources Conservation Service

File No.
Drawing No.
4/25/19 3:52 PM
Sheet 1 of 6

Bill of Materials

– 11155 cu. yds. compacted earth fill which includes the main fill, core trench, and auxiliary spillway dike.

–120 ft of 12" PVC pipe with Canopy Inlet

–Pipe appurtenances to be in accordance with IA–45 Plastic (PVC, PE) Pipe. Pipe options include: ASTM D2241 SDR 21 OR AWWA C900 Class 165. An end cap may be cut to specifications and used as canopy inlet. (See Canopy Inlet Drawning)

–(3) 5' x 5' anti–seep collars. Anti–seep callars can consist of a butyl rubber membrane, and shall have heavy duty wood shroming with stainless steel bands to ensure a water tight connection between the collar and the PVC pipe.

–Pipe connections: All connections shall be bell and gasket. Do not solvent weld. Install the bell at the upstream end.

–915' 42" woven Wire Fence
260' 4 Strand Barb Wire Fence

–185' 2" PE Plastic Pipe(Water Line) with Frost Free Hydrant

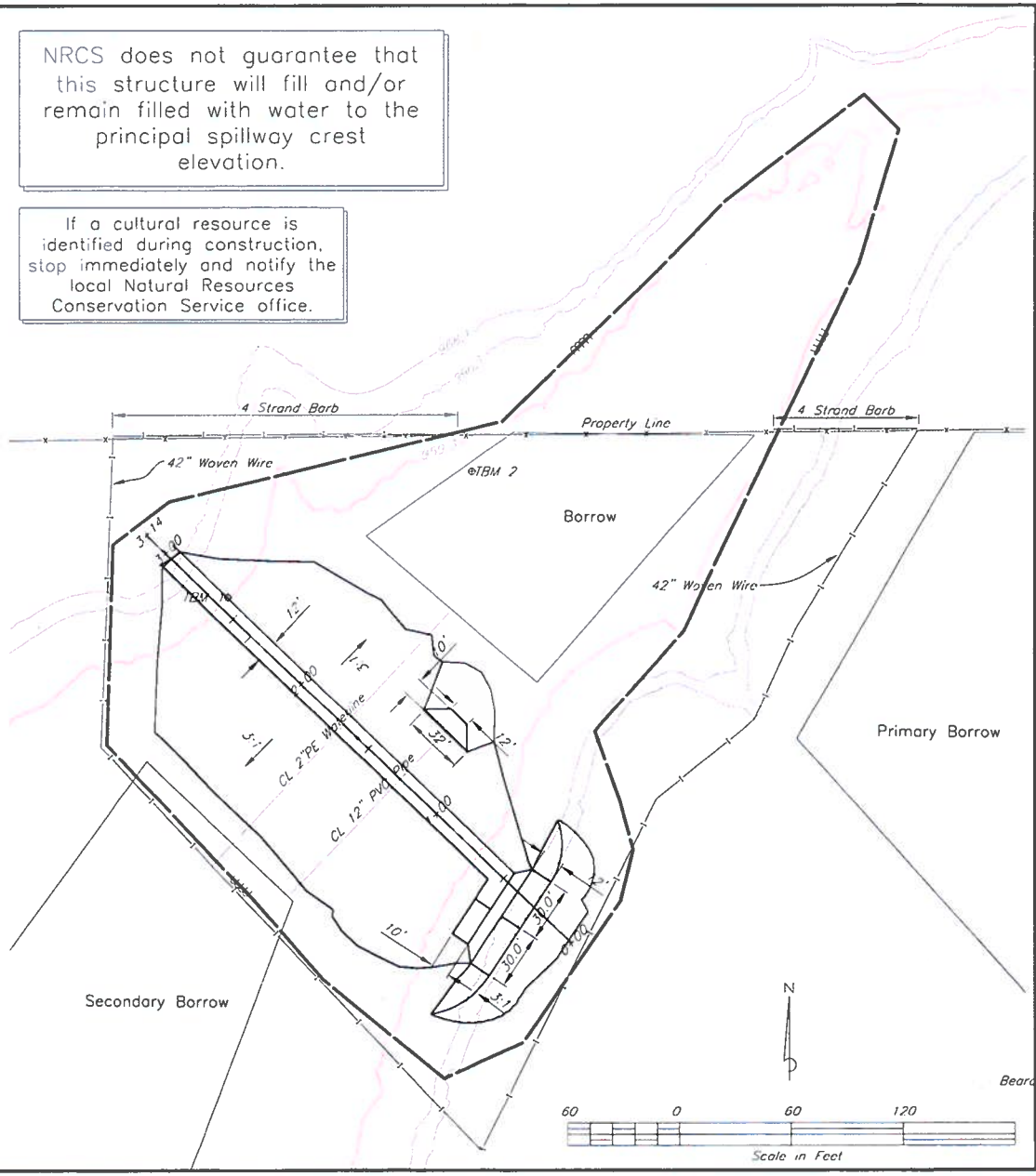
NOTES:

1. If excavation in core trench cuts into any gravelly, weathered material, it shall be removed down to the bedrock surface in order to prevent potential seepage.
2. Borrow above the pool elevation shall maximize areas that are flatter than 8:1. Borrow below the pool elevation shall be 3:1 or flatter.
3. Two feet of soil shall remain over bedrock in borrow area.
4. Borrow shall not be taken from pool until the hill borrow area is exhausted. A minimum of 4 feet of cover shall remain over bedrock in the pool.
5. All rock 6 inches or greater and any foreign material is not allowed in the earth fill dam. Any rock 6 inches or greater shall be placed with rip rap rock in the pipe outlet area to dissipate the water force.
6. PVC Pipe Connections: Shall be bell and gasket. Do not solvent weld. Install the bell at the upstream end.

BENCH MARK		
NO.	ELEV.	DESCRIPTION
TBM 1	953.61	2"x2" Wood Hub 118' upstream of dam CL, 36' right of FL
TBM 2	950.14	2"x2" Wood Hub 10' downstream of dam CL, 97' right of FL

NRCS does not guarantee that this structure will fill and/or remain filled with water to the principal spillway crest elevation.

If a cultural resource is identified during construction, stop immediately and notify the local Natural Resources Conservation Service office.



Designed Moyloe 3/19
Drawn Moyloe 3/19
Checked Dave Mellick 4/9/19
Approved

PLAN VIEW
Beard Structure
Job Class III
Winneshiek County, IA
Upper Ia. River Watershed Project

United States Department of Agriculture
Natural Resources Conservation Service

File No.
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Drawing No.
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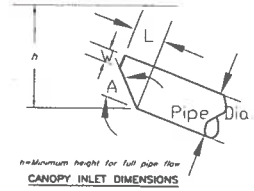
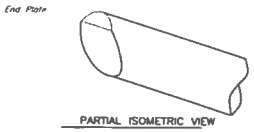
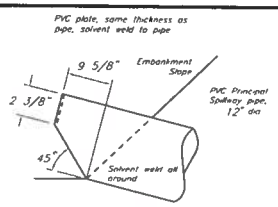
Sheet 2 of 6



CANOPY INLET DIMENSIONS



PARTIAL ISOMETRIC VIEW



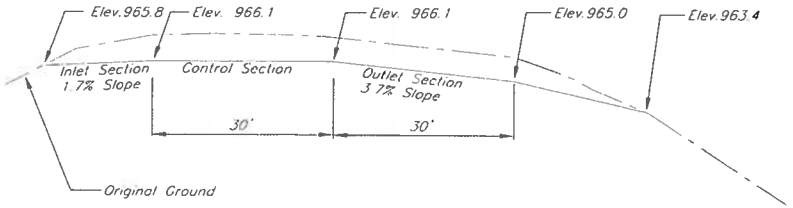
Pipe Diam. in	Pipe Grade #	W in	L in	A Deg	h ft
6	0-5	1 1/8	3 1/4	56	0.9
	5.1-15	1 1/4	4 3/4	45	0.9
	15.1-25	1 5/8	6 5/8	33	0.9
	25.1-32	2 1/8	7 3/4	22	0.9
8	0-5	1 1/2	4 3/8	56	1.2
	5.1-15	1 5/8	6 3/8	45	1.2
	15.1-25	2 1/8	8 3/4	33	1.2
	25.1-32	2 3/4	10 1/8	22	1.2
10	0-5	1 7/8	5 3/8	56	1.5
	5.1-15	2	8	45	1.5
	15.1-25	2 5/8	11	33	1.5
	25.1-32	3 1/2	13	22	1.5
12	0-5	2 1/4	6 1/2	56	1.8
	5.1-15	2 3/8	9 5/8	45	1.8
	15.1-25	3 1/4	13 1/4	33	1.8
	25.1-32	4 1/4	15 3/8	27	1.8

STANDARD DWG IA-1214
DATE June 2008 | PAGE 1 OF 1

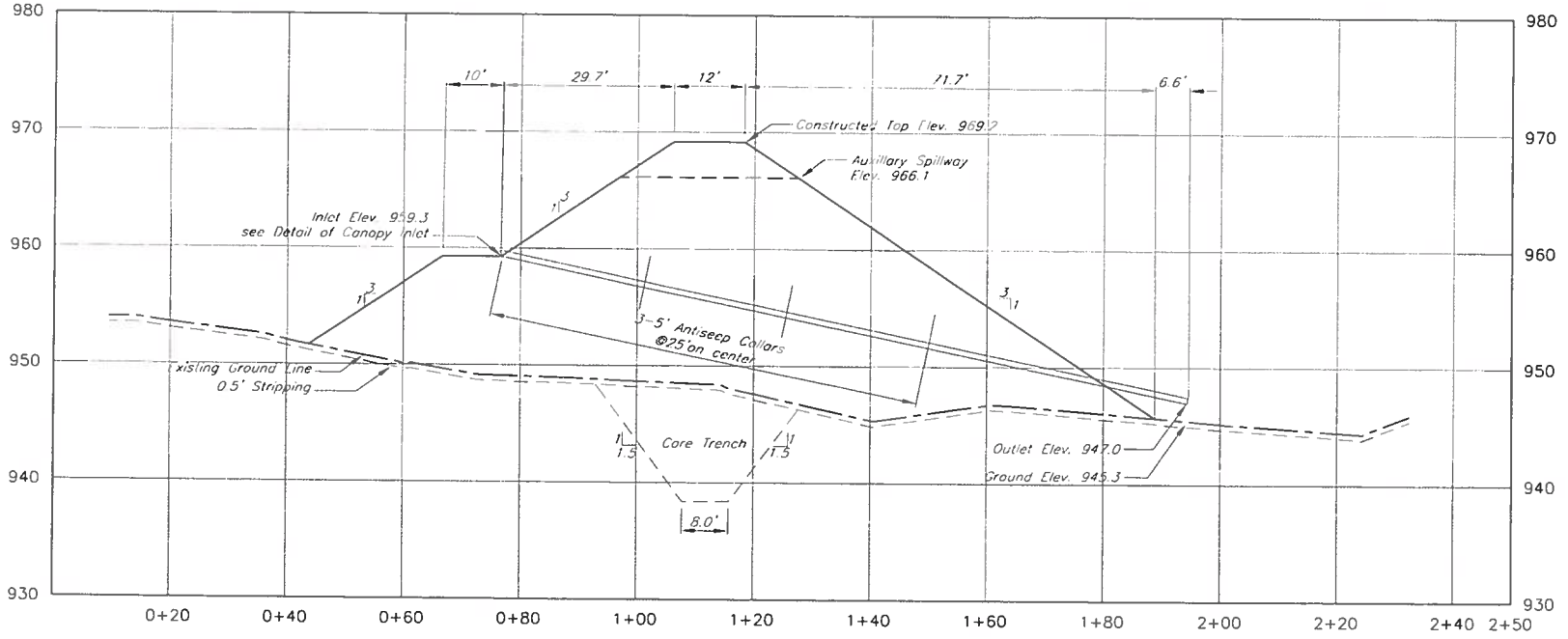
DETAIL OF CANOPY INLET

NOTES

1. Pressure rated PVC pipe shall conform to ASTM D-2241. Schedule 40 and 80 PVC shall confrom to ASTM D-1785.
2. Pipe material designation shall be PVC 1120 or 1220.
3. The longest section of pipe in the installation shall be 20 feet.
4. PVC pipe shall be joined by:
   a. Double gasketed couplings capable of resisting 160 psi pressure. Minimum length of coupling shall be 7.8" for 6" diameter, 8.2" for 8" diameter, 9.1" for 10" diameter, and 10" for 12" diamter.
   b. Single gasketed joint with minimum joint length beyond gasket of 2"
5. PVC welding solvent must be formulated for the intended use to produce a weld of maximum strength.
6. Non-buried sections (i.e. inlet and outlet) of non-ultraviolet (UV) protected PVC pipe shall be painted with a heavily pigmented, exterior water base latex paint. The latex paint must be thickly applied as an opaque coating on the pipe and fittings that have been well cleaned and very lightly sanded. No painting is required for UV protected PVC pipe.



PROFILE ALONG CENTERLINE AUXILIARY SPILLWAY



SECTION ALONG CENTERLINE OF PRINCIPL SPILLWAY

Date 3/19
Designed Moyloe 3/19
Drawn Moyloe
Checked Dave Mellick 5/19
Approved

GENERAL LAYOUT
Beard Structure
Job Class III
Winneshiek County, IA
Upper Ia River Watershed Project

USDA United States Department of Agriculture
Natural Resources Conservation Service

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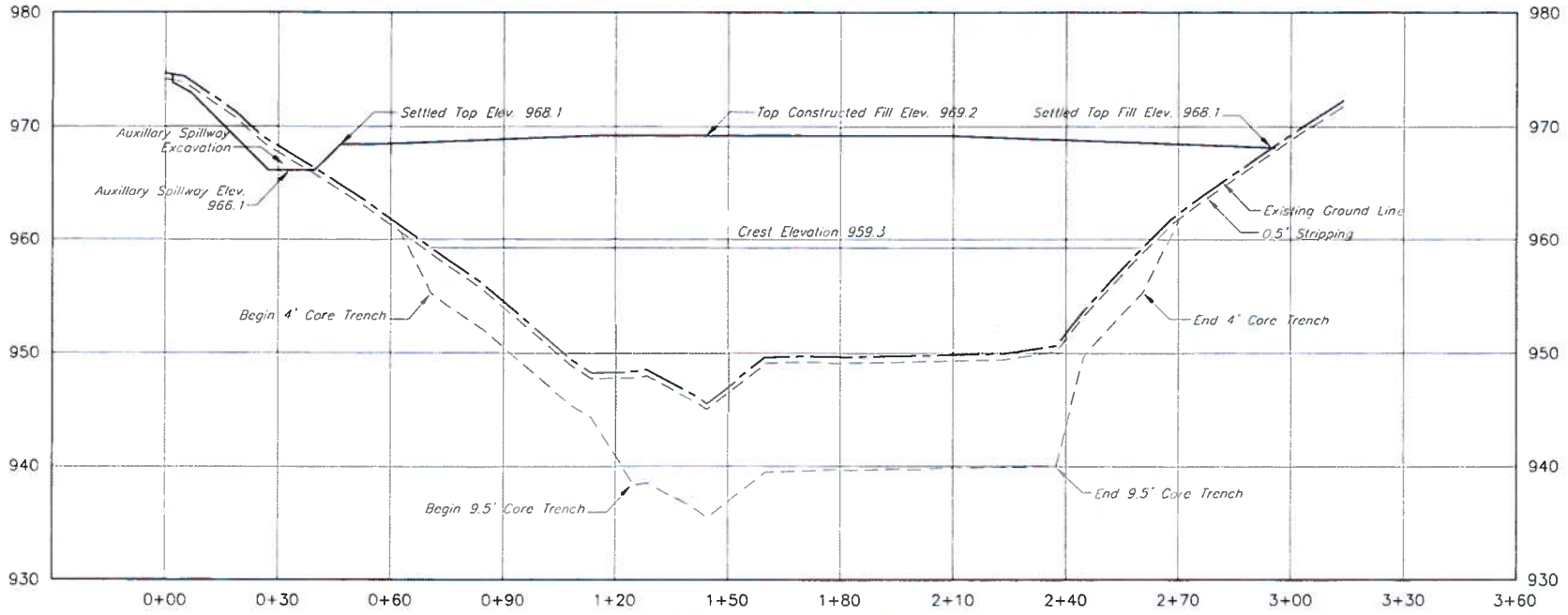
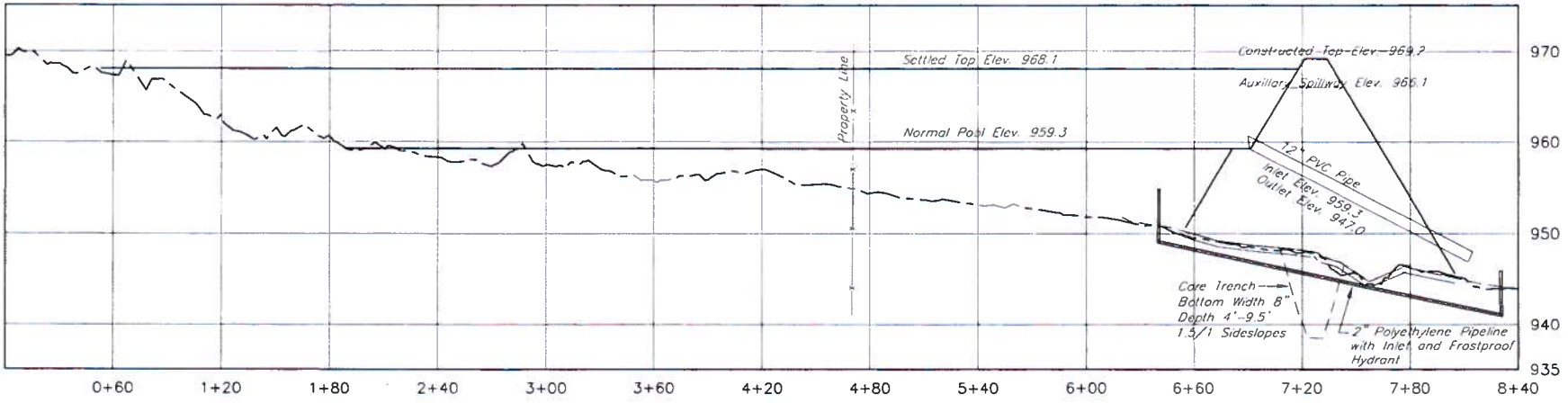


CROSS SECTION ON CENTERLINE OF FILL



GULLY PROFILE

Date 4/19
Designed Moylae 4/19
Drawn Moylae
Checked Dave Mellick 5/19
Approved

CROSS SECTION/GULLY PROFILE
Beard Structure

Job Class III

Winneshiek County, IA

Upper Ia. River Watershed Project

USDA United States Department of Agriculture
Natural Resources Conservation Service

File No.

Drawing No.

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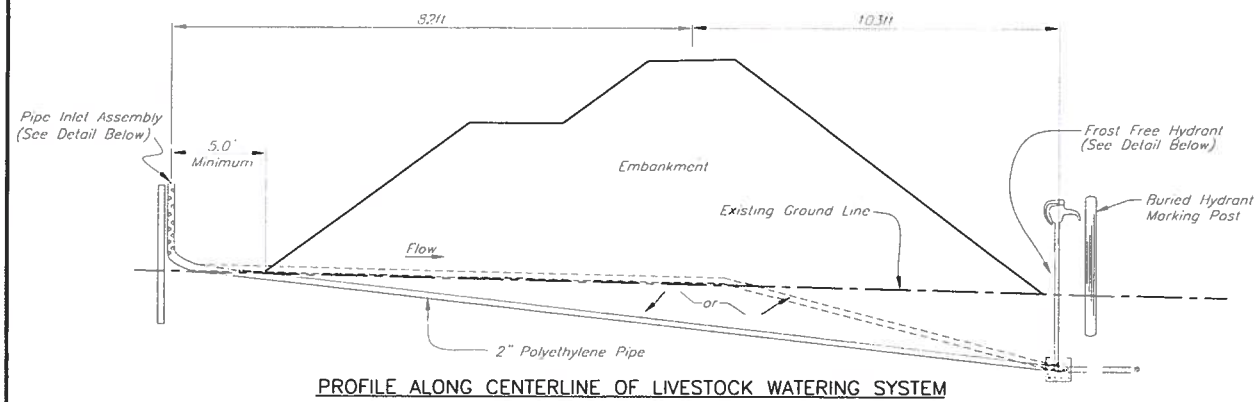
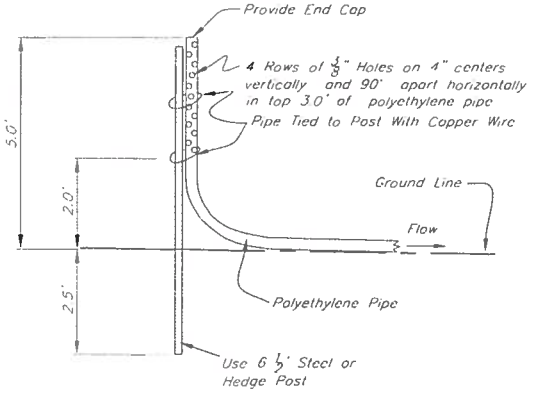
Sheet 4 of 6

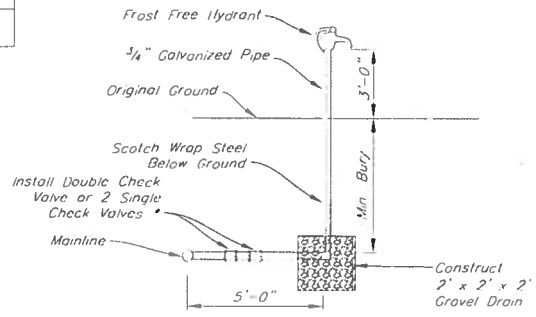


PROFILE ALONG CENTERLINE OF LIVESTOCK WATERING SYSTEM

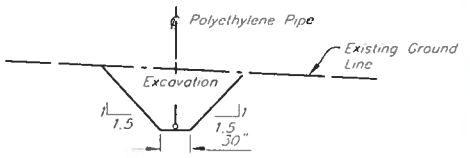
ASTM D2239; Polyethylene (PE) Plastic Pipe Nominal Dia.(s): 1.25", 1.5" and 2"	Maximum Allowable Pipe Cover
SIDR 11.5	16 ft
SIDR 9	24 ft
SIDR 7	35 ft



PIPE INLET ASSEMBLY DETAIL



TYPICAL HYDRANT INSTALLATION



TYPICAL PIPELINE TRENCH DETAIL

-NOTES-

1. A minimum 6 feet of pipeline cover shall be maintained throughout the entire pipeline installation.
2. Pipeline grade may vary under the embankment as long as the grade remains positive and minimum pipe cover is maintained.
3. Pipeline installation is shown as perpendicular to pond centerline of fill. Location will be as shown on the construction plans (Plan View).
4. Locate the inlet assembly in a location that risk of sedimentation inundation is minimized while still positioned to provide the minimum amount of water pressure head needed to facilitate the system demands.
5. No pipe joints shall be allowed under the fill.
6. Earth fill adjacent to the pipe shall be hand tamped under the embankment.
7. Prior to backfilling, the livestock watering system shall be approved by NRCS.
8. Any continuation of the livestock pipeline downstream of the valve box shall be designed in accordance with the Pipeline (516) standard criteria and detailed on a separate page.
9. Landowner may substitute an equivalent length steel post in lieu of the 4 inch diameter wooden marking post.

BILL OF MATERIALS
1 ea. Pipe Inlet Assembly
185 Lin. Ft. 2" diam. Polyethylene Pipe
(ASTM D2239 PE2708, PE3608, PE4608 or PE4710 SIDR 9)
1 ea. Frost Free Hydrant Assembly and Marking Post

LIVESTOCK WATERING HYDRANT

NOT TO SCALE

Date 4/19
Designed Moyloe 4/19
Drawn Moyloe 5/19
Checked Dave McWick
Approved

LIVESTOCK PIPELINE w/Hydrant
THROUGH AN EARTHEN EMBANKMENT
Beard Structure

USDA United States Department of Agriculture
Natural Resources Conservation Service

File No.
Drawing No.
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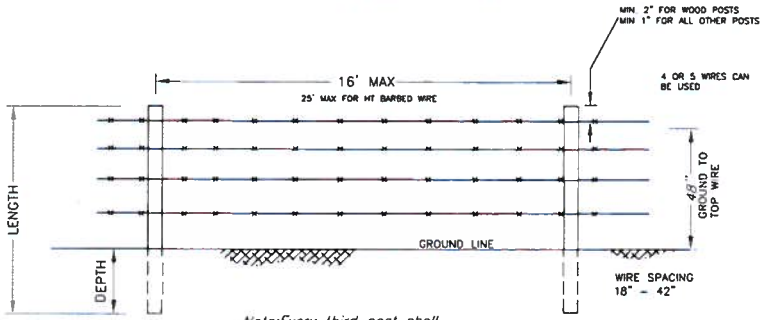
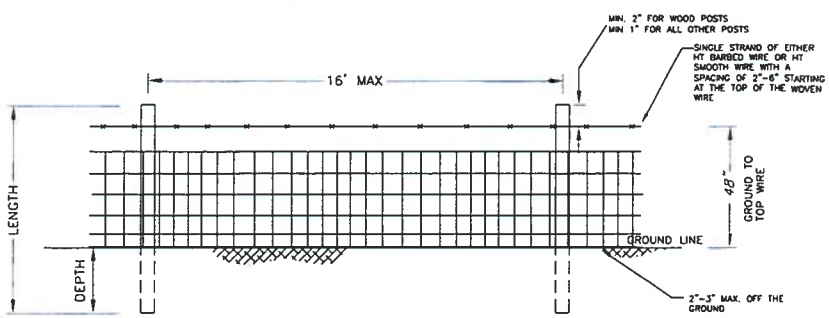
Sheet 5 of 6

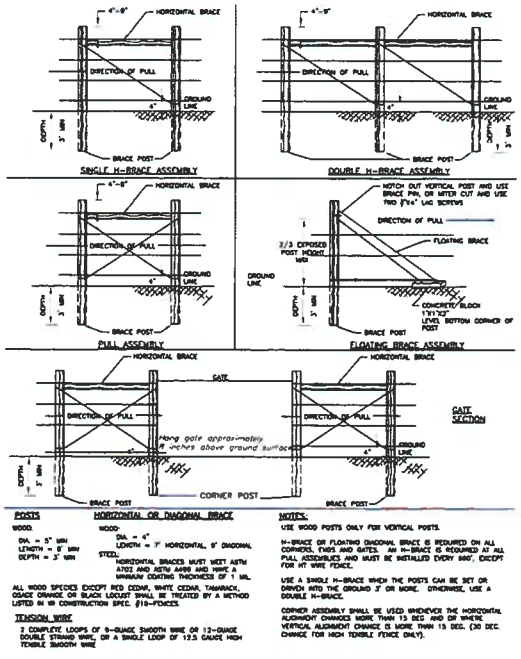
STANDARD BARBED WIRE FENCE



Note:Every third post shall be a 5" diameter post

STANDARD WOVEN WIRE FENCE





Barbed wire fences shall have a minimum of 4 wires for farm borders. A minimum of three wires shall be used for interior fencing, cross fencing, or excluding livestock from special areas such as wildlife area, forested tracts or other special use areas. Wires shall be spaced approximately an equal distance apart. The top wire shall be at least 42 inches high and 2 inches below the top on wood posts and 1 inch below the top on steel posts. The bottom wire shall be 18 inches or less above the ground level. Wire shall be spaced no more than 12 inches apart. Each barbed wire shall consist of 2 twisted strands of either 12 ½ gauge wire or 15 ½ gauge high tensile strength wire. The barbs shall be either 2-point barbs on approximately 4 inch centers or 4-point barbs on approximately 5 inch centers. Wire shall be stretched and attached after the posts are properly set and backfilled. Attach wire to the side of the post closest to the livestock, except on corners and curves where the wire should be placed on the outside of the corner or curve. Top and bottom strands of woven wire shall be a minimum of 12 ½ gauge. Wire for intermediate strands shall be 14 1/3 gauge or heavier. Fences with woven wire 32 inches or less in height shall have at least 2 barbed wires above the woven wire spaced 8 to 12 inches apart. Fences constructed with woven wire higher than 32 inches shall have at least 1 barbed wire 8 to 12 inches above the woven wire. The base of the woven wire shall be placed near the ground surface. The top wire shall be at least 42 inches above the ground level and 2 inches below the top of wood posts and 1 inch below the top of steel posts. All wire shall be galvanized. . Wire shall be stretched and attached after the posts are properly set and backfilled. Attach wire to the side of the post closest to the livestock, except on corners and curves where the wire should be placed on the outside of the corner or curve.

Staples shall be 9 gauge steel or heavier with a minimum length of 1 ½ inches for soft woods and a minimum length of 1 inch for close grained hardwoods. Drive staples diagonal to the grain of the wood and at a slight downward angle. Space should be left between the staple and the post to permit free movement of the wire. Wires may be attached to steel posts by use of manufacturer's clips or by 14 gauge galvanized wire twisted at least two turns. All wooden posts (except red cedar, Osage orange, or black locust) shall be treated with pentachlorophenol, creosote, or chromated copper arsenate (CCA) by a method that ensures complete penetration of the sapwood. At least half of the diameter of red cedar shall be heartwood. Quality of treated wood shall provide sufficient strength and quality to last for the expected life of the fence. All corner posts, gate posts, end posts, pull posts and brace posts normally shall be wood with sufficient length for the construction of at least a 42 inch high fence and permit setting the post at least 36 inches deep. Earth backfill shall be thoroughly tamped. On areas where soil depth is restricted to less than 36 inches, additional anchors or deadman applied against the direction of pull may be needed. Wood posts shall have a minimum top diameter of 5 inches. A 2-½ inch steel pipe with appropriate bracing or set in concrete of sufficient depth also may be used. Reinforced concrete or metal posts of equivalent strength may be substituted if they have suitable means of attaching wires and braces.

The maximum spacing of line posts shall be one rod (16.5 feet). Wood line posts shall have a 3 inch top (2 ½ inch for Osage orange). Wood line posts shall have a minimum length of 6 ½ feet and shall be set or driven to a minimum depth of 24 inches where conditions permit. When posts are set, earth backfill shall be thoroughly tamped. Steel line posts shall weigh not less than 1.33 pounds per foot and shall have a steel anchor plate securely fastened to the plate. The posts shall be "T", "U", or "Y" shaped and have corrugations, knobs, studs, or grooves suitable for fastening fencing to the posts. Steel posts shall be rolled from high carbon steel and shall have a protective coating; either galvanized by the hot dip process, painted with one or more coats of high grade weather resistant paint for steel, or enameled and baked. Steel line posts shall be at least 6 feet in length and shall be set in the ground a minimum of 20 inches. Steel posts shall be used as line posts at least once every 6 rods (99 feet) to act as a ground for lightning protection. End bracing will be installed at locations where the fence ends and on both sides of gate openings. Corner bracing should be installed where fence alignment changes 15 degrees or more. Bracing is required at all corner, gate, pull and end assemblies in a fence. The brace member shall be the equivalent of a wood post with at least a 3 ½ inch diameter at the top or standard weight 2 inch diameter galvanized steel pipe. The brace shall be at least 3 feet above the ground and at least 8 inches below the top of the post. The brace member shall be 6 to 8 feet in length. A brace wire consisting of 2 complete loops of 9 gauge smooth wire, 2 loops of barbed wire or a single loop of 12 ½ gauge high tensile strength wire shall be installed. "H" braces or angle braces as shown in figure 3 will be used in standard fences. Pull post assemblies consisting of three posts with braces shall be installed in straight reaches of fence at intervals 660 feet (40 rods), at any point where the vertical angle described by two adjacent reaches of wire is upward and exceeds 10 percent and at the beginning and end of each curve. For a narrow ditch or draw crossing with slopes steeper than 8 feet horizontal to 1 foot vertical, the fence shall be anchored with a concrete anchor weighing at least 150 pounds and buried with at least 18 inches of cover or a commercial screw-in type metal anchor 5 inches in diameter and not less than 48" long to position the fence to the contour of the ditch or draw. Wire gates shall be made of the same materials as used for the fence. Panel or tube type gates shall be equivalent in quality to the fencing material and shall be fitted with at least two hinges and a latch or galvanized chain for fastening.

Date 5/19
Designed Moyloe 5/19
Drawn Moyloe 5/8/19
Checked Dave McNeill
Approved

Fence Detail Beard Structure

Winneshiek County, IA

Upper Iowa River Watershed Project

USDA United States Department of Agriculture
Natural Resources Conservation Service

File No. FENCE.dwg

Drawing No.

5/8/19 3:18 PM
Sheet 6 of 6

Post Construction Seeding and Vegetation Establishment Plan
UI-011-BEARD

The seeding and establishment of vegetation at the site post construction is the responsibility of the project contractor. After the new seeding is successfully established, continued maintenance will be the responsibility of the landowner.

There will be 3 different seedings completed on this site. **Landowner is an organic farmer. Ensure all seeding and establishment methods used meet organic standards.**

1) **Criterial Area Seeding:** This is the seeding mix/method that will be used for the structure itself. The goal of this seeding is to quickly establish vegetation on the structure to prevent erosion or damage to structure. Refer to Critical area seeding plan and job sheet for prescribed seed mix and planting methods. This area will typically be fenced off from livestock but may be flash grazed periodically to control trees and weeds on structure.

2) **Pasture Seed Mix:** This seeding method/mix will be used on the disturbed/borrow areas outside of the fenced off area and used as pasture. The mix was requested by the landowner to pasture livestock. Follow establishment methods outlined in the Critical Area Planting Job Sheet. **Consult landowner prior to planting to ensure establishment methods are compliant with organic certification.**

3) **Native Seed Mix**: To be used around the structure and pool area. A diverse mix of natives will enhance wildlife habitat for the site. Refer to seeding plans and Conservation Cover Job Sheet for seed mix and instructions on establishment.

   Notes for seeding/establishment:

   a. For convince seed mixes were based off Iowa Pheasants Forever (PF) seed mixes, but are NOT required to order seed through PF. For this project we are combining two mixes (CP42 Leopold #2 Pollinator and Leopold Grass Bump Up) to ensure adequate establishment over a variety of land types. If prescribed seed mix species are not available when ordering, please contact Matt Frana (Upper Iowa Watershed Project Coordinator) to modify seeding plan to ensure it meets project goals.

   b. Seeding dates to plant include:
      i. April 1st – July 1st
      ii. November 15th – March 1st (Dominant)

      If construction is completed, but timing is not right to plant natives, use temporary seeding of oats (3bu/ac) to cover ground until natives can planted. Based on current timeline projects, natives will likely be seeded this fall as a dormant seeding. Dormant seeding should be done after frost has settled, but before snow has accumulated.

   c. Best planting methods use a native no-till drill. Broadcast with light incorporation or cultipacking is also acceptable. Refer Conservation Cover Job Sheet and Iowa Native Prairie Planting Guide for more info on seeding and establishment.

   d. Plan on keeping the native prairie seeding mowed the 1st year to a height of around 6-8 inches to help better establish prairie. Also recommend burning every 3-5 years to maintain heath and prevent tree establishment.

Structure (Critical Area) Seeding Plan

Name Beard Date 6/6/2019

Tract No. 6222
Field No. 8555
Contract No UI-011-BEARD

Type of Seeding: Critical area

Prepared by Matt Frana

Seeding Percent Pure Live Seed=(% Germination + Hard Seed) * % Purity
100

Critical area

Enter Acres: 3

Species	Acres	% of full rate	Pounds Per Acre of Pure Live Seed (PLS)*		Total Needed	
Timothy	3	20	2.0	Pounds	6.00	Pounds
Red clover	3	25	4.0	Pounds	12	Pounds
Smooth Brome	3	50	12.5	Pounds	38	Pounds
Orchardgrass	3	20	2.0	Pounds	6	Pounds
				Pounds		Pounds
Oats	3		3	Bushels	9.0	Bushels
Fertilizer & Lime						
Lime (ECCE)		Lbs/Ac				
Nitrogen		Lbs/Ac				
Phosphate (P205)		Lbs/Ac				
Potash (K20)		Lbs/Ac				

Seeding will be completed: Other 3 — August 1st-September 15th OR Novemeber 15th - freeze

Additional Seeding Criteria: **Seeding plan will be used on the stucture footprint (critical area).**

If area can't be seeded prior to Sept 15th only plant oats. For the rest of the seed mix, wait and do a dormant seeding

(Novemeber 15th - freeze) and increase rate by 1.5x.

CONSULT LANDOWNER prior to planting to insure seeding methods meet **ORGANIC standards.**

Refer to Critical Area Planting Jobsheet for additional seeding and establishment recommendations.

Seeding was completed according to the above requirements on: _____
(Date)

By: _____ _____
(Signature) **(Date)**

Certified by: _____ **Date:** _____

Pasture Seeding Plan

Name Beard Date 6/6/2019

Tract No. 6222
Field No. 8555
Contract No UI-011-BEARD

Type of Seeding: Pasture

Prepared by Matt Frana

Seeding Percent Pure Live Seed=(% Germination + Hard Seed) * % Purity
100

Critical area

Enter Acres: 3

Species	Acres	% of full rate	Pounds Per Acre of Pure Live Seed (PLS)*		Total Needed	
Timothy	3	20	2.0	Pounds	6.00	Pounds
Red clover	3	25	4.0	Pounds	12	Pounds
Alfalfa	3	40	8.0	Pounds	24	Pounds
Orchardgrass	3	20	2.0	Pounds	6	Pounds
				Pounds		Pounds
Oats	3		3	Bushels	9.0	Bushels
Fertilizer & Lime						
Lime (ECCE)		Lbs/Ac				
Nitrogen		Lbs/Ac				
Phosphate (P205)		Lbs/Ac				
Potash (K20)		Lbs/Ac				

Seeding will be completed: Other 3 — August 1st-September 15th OR Novemeber 15th - freeze

Additional Seeding Criteria: **Seeding plan will be used on pasture areas that were used for borrow sites ouside of the fenced off project area.** If area's can't be seeded prior to Sept 15th only plant oats as temporary cover and plant the res of the mix as a domant seeding **(Novemeber 15th - freeze) and increase rate by 1.5x.**

CONSULT LANDOWNER prior to planting to insure seeding meets **ORGANIC standards.**

Refer to Critical Area Planting jobsheet for additional seeding and establishment recommendations.

Seeding was completed according to the above requirements on: _____
(Date)

By: _____ _____
(Signature) **(Date)**

Certified by: _____ **Date:** _____

USDA

United States Department of Agriculture

Critical Area Planting

Iowa Job Sheet

Natural Resources Conservation Service
Des Moines, Iowa

Iowa Conservation Practice 342
June 2017

Definition

Establishing permanent vegetation on sites that have or are expected to have high erosion rates, and on sites that have physical, chemical or biological conditions that prevent the establishment of vegetation with normal practices.

Purpose

- Stabilize areas with existing or expected high rates of soil erosion by water and wind.
- Stabilize areas, such as sand dunes and other riparian areas.
- Stabilize stream and channel banks, ponds and other shorelines, and earthen features of structural conservation practices.

Condition Where Practice Applies

This practice applies to highly disturbed areas, such as: active or abandoned mined lands; urban restoration sites; construction areas; conservation practice construction sites; eroded banks of natural and constructed channels and lake shorelines; areas needing stabilization before or after natural disasters, such as floods, hurricanes, tornadoes and wildfires; and other areas degraded by human activities or natural events.

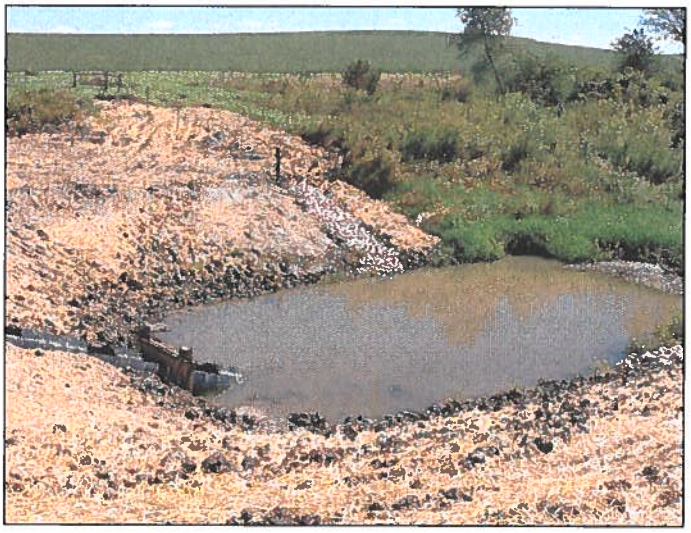
Criteria for Conservation Cover

A. Seeding Periods

Permanent, perennial vegetative cover and/or trees will be established during the first recommended seeding or planting period for the selected species or mixture. Planting dates are outlined on Table 1 of this job sheet. Planting immediately after construction of earthen structures such as terraces, grade stabilization, or ponds may be completed at the discretion of the Conservation Planner with Job Approval Authority.

B. Fertilizer and Lime Requirements

Soil fertility and pH level will be amended to satisfy the needs of the specific plant species planned. Recommendations for establishment will be determined by an approved testing laboratory from soil samples collected in the area to be seeded. Fertilizer requirements



may be waived at the discretion of the Conservation Planner with Job Approval Authority on a site where:

- application equipment cannot access the site (i.e. steep sides of terraces, grade stabilization, ponds).
- field practices, such as waterways and terraces, when soil tests for adjacent cropland is at optimum or higher.

C. Companion Crop

All critical area plantings will contain a companion crop of spring cereal rye or will be mulched. Mulching is recommended on slopes steeper than 4:1 where mowing of a companion crop may be difficult or dangerous. Mulch of small grain straw shall be used at the rate of 2 tons/ac.

For spring seedings of introduced species, oats or a spring cereal grain shall be seeded at a rate of 1 1/2 bushels/acre to reduce soil erosion and help control weed competition. The oats shall be clipped at the time of seed head emergence to promote growth of the new permanent cover. The use of the companion crop is not required when interseeding.

D. Seedbed preparation and Seeding

1. Conventional seeding for spring and late summer

seeding periods where site conditions allow for safe operation of equipment.

- The seedbed shall be worked to a depth of 3", smooth, friable and firm before seeding.
- All tillage operations shall be performed across the general slope of the land.
- Grass and legume seed shall be drilled uniformly over the area at a 1/4-1/2 inch depth, or broadcast uniformly over the area and rolled into the seedbed.
- Where erosion is a concern prepare a seedbed with tillage tool that will leave enough residue or provide mulch to provide adequate protection.

2. No-till seeding for spring, late summer and dormant seeding periods where site conditions allow for safe operation of equipment.
   - Approved herbicides shall be applied to kill or suppress existing weed competition, as necessary. Herbicides will not be used in waterways or filter strips adjacent to wetlands or other waterbody.
   - A drill designed for no-till planting shall be used to plant the seed at a depth of 1/4 - 1/2 inch.

3. Frost Seeding
   - Broadcast seed for only those species approved for frost seeding as shown in table 2 and table 3.

4. Hydro-seeding

Hydro-seeding can be used on all sites but especially on sites that are too steep for regular seeding equipment to operate. The prescribed procedure will be to apply the seed and fertilizer in a water slurry uniformly over the surface. A second trip will be needed to apply an asphalt emulsion to long fiber mulch as it is blown on.

5. Sodding

All sod used shall be free of noxious weeds as listed in Iowa State Laws and shall be cut from stands giving not less than 90 percent ground cover.

Only moist, fresh sod shall be used. Lay sod as soon as possible after delivery to the site. Wet soil to a depth of 2 inches or more prior to laying the sod. Lay the sod from the lower end of the slope. Sod strips shall be laid at right angles to the flow of water; stagger joints. Fill any open joints with loose soil. Tamp or roll laid sod to insure a solid contact of root mass to soil surface.

On severely steep sites or when anticipating overland flow, sod shall be held in place by woven wire, wooden pegs, wire staples, or similar material. Pegs or staples will be a minimum of 10 inches long.

E. Seeding Stand Improvement

This includes any stand modification that maintains some vegetative component of the original stand.

1. Incorporation of grasses and/or legumes with light tillage.
   - Weaken the existing stand in the fall or early winter by use of herbicides, grazing, mowing or a combination of these methods.
   - Use a disk, cultivator, or similar tool to disturb 40- 50% of the existing stand.
   - Grass and legumes shall be drilled uniformly over the area at 1/4-1/2 inch depth, or broadcast uniformly over the area and rolled into the seedbed.
   - Remove early spring regrowth by mowing to reduce competition and allow the new seedlings to become established.

2. Incorporation of grasses and/or legumes with no-tillage (interseeding) for spring, late summer and dormant seeding periods.
   - When interseeding into existing sod, graze, burn, mow or apply herbicides to kill strips or suppress existing vegetation and to control weed competition. Herbicides will not be used in waterways or filter strips adjacent to wetlands or other waterbody.
   - Control broadleaf weeds by applying herbicide at least two weeks prior to applying contact herbicides and prior to seeding.
   - Grass and legumes shall be drilled uniformly over the area at 1/4-1/2 inch depth.
   - Remove early spring regrowth by mowing to reduce competition and allow the new seedlings to become established.

3. Incorporation of grasses and/or legumes with frost seeding.
   - Broadcast seed only species approved for frost seeding as shown in table 2 and table 3. Small smooth (shiny) seeded species are best for incorporation into the soil during freezing and thawing.
   - Frost seeding is likely to be more successful if existing stand is weak and less than 50 percent of the ground is covered with live vegetation.

F. Inoculation

1. Legume seed shall be inoculated and the inoculant shall be specific to the legume seeded.
2. When more than one legume species is used, each species shall be inoculated separately.

G. Seed Quality

1. All seed shall be of high quality and comply with Iowa Seed and Weed Laws.
2. Cool season (introduced) grass and legume seeding rates are expressed in bulk pounds/acre. Seed quality shall not drop below 80% Pure Live Seed (PLS) where PLS = (% germination + dormant seed) X % purity).
3. Native grass species seeding rates are expressed in PLS pounds/acre.

H. Management during the Establishment Year

Plant species and cultivars shall be selected based upon:

1. Climatic conditions such as annual rainfall, seasonal rainfall, growing season length, humidity levels, temperature extremes and the USDA Plant Hardiness Zones.
2. Soil condition and position attributes such as pH, percent slope, available water holding capacity, aspect, drainage class, inherent fertility, flooding and ponding, and levels of salinity and alkalinity.
3. Plant characteristics such as season of growth, vigor, ease of establishment, longevity of the species, growth habit, adaptation to soil conditions, and conservation value.
4. Resistance to diseases and insects common to the site or location.
5. Compatibility with other plant species and their selected cultivars in rate of establishment and growth habit when seeded together as a mixture.
6. Seeding Rates

The pure stand rates in table 2 of this standard are the minimum rates for planting a single species stand into well-prepared seedbed at the proper placement. The pure stand rates are decreased to a percentage of the desired stand when used to calculate a mixture of two or more species. Select combinations of plant species and cultivars best adapted to site conditions.

7. When frost seeding is used, the seeding rate shown in table 2 and table 3 shall be multiplied by 1.5.
8. Introduced Species
   - » Approved introduced plant species, allowable mixture composition and the pure stand seeding rate are shown in Table 2.
   - » A designed seeding mixture shall meet criteria specified in table 2 as to species composition and seeding rate.
   - » For critical area seeding used for erosion control, at least 50% of mixture shall be composed of grasses.
   - » Tall Fescue shall not compose more than 10% of the mixture if the secondary purpose is for wildlife.
   - » Mixtures may include up to 20% native grasses. Use the criteria for the predominant species in the mixture for stand establishment.
9. Native Species
   - » Approved native plant species, allowable mixture composition and a pure stand seeding rate are shown in Table 3.
   - » A designed seeding mixture shall meet criteria specified in table 3 as to species composition and seeding rate. At least 50% of the mixture shall be composed of grasses. For seeding mixtures with the secondary purpose of wildlife not more than 20% of the mixture will be composed of switchgrass.
   - » When developing seeding mixtures, except eastern gamma grass, use 60 seeds/sq. ft. for grass stands.
   - » Mixtures may include up to 20% introduced legumes. Use the criteria for the predominant species in the mixture for stand establishment.

I. Weed Control During the Establishment Year

Weed control during the establishment year shall be provided to ensure survival of the new permanent seeding.

1. To manage severe weed competition, native species may be mowed no closer than 8 inches and introduced species no closer than 4 inches.
2. Approved herbicides may be used on both introduced and native plantings to control weed species.

J. Establishment of Temporary Cover

Temporary cover may be required to reduce potential weed and erosion problems where one of the following conditions exists.

1. Fields with herbicide carry over.
2. Where planting is delayed due to unavailability of

seed.

3. The normal planting period has passed.

Temporary cover or mulching will be established on sites where construction delays or shutdowns occur if the delay or shutdown will last more than 30 days.

4. The temporary cover shall be seeded as specified in Table 4.

K. Site Protection and Access Control

Grazing animal access to planted areas will be controlled for a minimum of two growing seasons during the establishment period.

All areas to be grazed will have a grazing plan that meets the criteria in the Iowa Field Office Technical Guide.

Grazing shall be permanently excluded on high hazard areas, such as cut banks, areas of seepage, or other potentially unstable areas.

L. Re-vegetate Degraded Sites that Cannot Be Stabilized Through Normal Farming Practices

If gullies or deep rills are present, they will be filled and leveled as necessary to allow equipment operation and ensure proper site and seedbed preparation.

Based on a soil test and other appropriate site evaluations, soil amendments will be added as necessary to ameliorate or eliminate physical or chemical conditions that inhibit plant establishment and growth.

Table 1. Seeding dates for introduced and native species

Type of Seeding	Introduced Species[2] (Grasses and Legumes)	Native Species[3]
Spring	March 1 - May 15	April 1 - July 1
Late Summer	August 1 - September 15	Not Recommended
Dormant[1]	November 15 - Freeze	November 15 - Freeze
Frost[1]	February 1 - March 15	February 1 - March 15

1. Refer to Table 2 and 3 for applicable plant species.
2. Includes all species generally considered introduced.
3. Includes all warm and cool season natives planted in mixture.

Table 2. Seeding chart for introduced plant species

	% of Mixture (Range Allowed)		
Plant Species	Critical Areas Grassland[3/]	Trees, Shrubs & Wildlife	Seeding Rate PLS/acre
Smooth bromegrass[1]	0-100	0-25	25
Kentucky bluegrass[1]	0-80	0-10	25
Orchardgrass[2]	0-25	0-100	10
Timothy[2]	0-25	0-100	10
Alfalfa[2]	0-50	0-50	20
Red clover[2]	0-50	0-50	16
Birdsfoot trefoil[2]	0-50	0-25	16

Table 2. Seeding chart for introduced plant species cont...

	% of Mixture (Range Allowed)		
Plant Species	**Critical Areas Grassland[3/]**	**Trees, Shrubs & Wildlife**	**Seeding Rate PLS/acre**
Reed Canarygrass[5]	0-25	0	16
Perennial rye	0-50	0-50	25
Ladino clover[2]	0-50	0-50	8
Red top	0-50	0-80	10
Alsike clover[2]	0-50	0-50	8
Tall Fescue[1]	0-50	0-10	16
Sweetclover[2,4]	0-20	0-20	10

1. For critical area seeding used for erosion control, at least 50% from the grassland or wildlife seeding mixture shall be composed of sod forming grasses. (Tall Fescue should not consist of more than 10% of the mix if primary or secondary purpose is for wildlife.)
2. Species suitable for frost seeding, increase seeding rate by a factor of 1.5.
3. Mixtures may include up to 20% native grasses. See Table 3 for seeding rates. Use the criteria for the predominate species in the mixture for establishment. 4 Sweet clover is to be used in mixtures only.
4. Sweet clover is to be used in mixtures only.
5. Reed Canary grass is to be used only for very wet sites with high nutrient load anywhere it Reed Canary grass is already present downstream of the practice.

Table 3. Seeding chart for native plant species

Grasses[1]	**% of Mixture (Range Allowed)**	**Pure Stand Seeding Rate PLS lbs./acre**	**Seeds/ sq. ft.**	**Seeds/ lb.**
Big bluestem, *Andropogon gerardi*	0-100	16	60	165,000
Blue grama, *Bouteleloua gracilis*	0-20	4	75	825,000
Buffalograss, *Buchloe dactyloides*	0-20	65	60	40,000
Canada wildrye, *Elymus canadensis*	0-20	22	61	121,000
Eastern gamagrass, *Tripsacum dactyloides*	0-100	20	4	7,500
Indiangrass, *Sorghastrum nutans*	0-100	15	60	175,000
Little bluestem, *Schizachyrium scoparium*	0-20	11	60	240,000
Sideoats gramma, *Bouteloua curtipendula*	0-20	14	61	191,000
Switchgrass, *Panicum virgatum*[2]	0-100	7	62	389,000
Virgina Wildrye, *Elymus virginicus*	0-20	27	60	96,000
Western wheatgrass, *Agropyroni smithi*	0-20	24	61	110,000

1. When developing seed mixtures, except eastern gamagrass, use 60 seeds/sq. ft. for grass stands. Grass and forb/legume mixtures are 40 seeds/sq. ft. for the grass component and minimum of 20 seeds/sq. ft. for forb/legume component.
2. Species suitable for frost seeding, multiply seeding rate by factor of 1.5.

Table 4. Temporary Seeding Recommendations

Fields with atrazine[1] carryover, lack of suitable seed or late planting date	
Sudangrass	20 lbs./acre
Sorghum-Sudangrass hybrid	20 lbs./acre
Corn	2 bushels/acre
Fields where planting is delayed, due to lack of suitable seeding or late planting date	
Oats	3 bushels/acre
Winter rye	2 bushels/acre
Spring or winter wheat	2 bushels/acre

1. For other herbicide carryover problems, check with the area office.

Table 5. Critical Area Seedbed Mixtures for Specific Site Conditions

Site Conditions	Seeding Mixture	Rate lbs./acre
Moderately to well drained, limed or non-acid, fertile soils	Alfalfa Red clover Smooth bromegrass	3 2 15
	Alfalfa Timothy Smooth bromegrass Or Orchardgrass	6 2 15 Or 8
Imperfectly drained soils	Red clover Ladino clover Orchardgrass	4 1 8
	Birdsfoot trefoil Smooth bromegrass Timothy	5 12 3
	Big bluestem Switchgrass	14 2
Poorly drained soils	Birdsfoot trefoil Timothy Or Orchardgrass	4 8 Or 12
	Alsike clover Ladino clover Tall fescue Or Timothy	2 3 8 Or 5

Table 5. Critical Area Seedbed Mixtures for Specific Site Conditions cont...

Site Conditions	Seeding Mixture	Rate lbs./acre
Very wet sites with high nutrient loading (i.e. animal waste filter strips)	Reed canary grass	16
	Tall fescue	16
	Switchgrass	7
Medium acid to strongly acid (6.0-5.1) with well drained to poorly drained soil that has a high clay content	Birdsfoot trefoil Tall fescue Bromegrass	7 5 8
Medium to strongly acid (pH 6.0-5.1) shallow (20 in.) with poorly drained soils with low fertility and low level management	Birdsfoot trefoil Tall Fescue Red top Switchgrass	4 4 3 2
Deep or coarse sands, droughty, usually acid (pH 6.0)	Sand lovegrass Switchgrass Prairie sandreed grass	2 5 4
Reclaimed acid mine spoil (pH 4.0)	Birdsfoot trefoil Red clover Crown vetch Tall fescue	4 4 4 4
Reclaimed acid mine spoil, deep coarse sands, droughty, low fertility (pH 4.0)	Switchgrass Big bluestem Indiangrass Little bluestem	2 4 4 3
Alkaline mine spoil (pH 7.4)	Bromegrass Alfalfa	12 10
	Bromegrass Timothy	14 5

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(File Code 180-12-12)

Seeding Plan

Name: **PF CP42 Leopold#2 Pollinator Mix**
Prepared by: **Matt Frana**

Program: **Other**
Field Area (acres): 2.000

Date: **6/6/2019**
Tract No.: **6222**
Field No.: **8555**
Contract No.: **UI-011-BEARD**

Seeding Mix Summary

Grasses	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
1	*Andropogon gerardii*	Big Bluestem	0.918	0.250	0.50	
2	*Sorghastrum nutans*	Indiangrass	1.102	0.250	0.50	
3	*Bouteloua curtipendula*	Sideoats Grama	1.653	0.750	1.50	
4	*Schizachyrium scoparium*	Little Bluestem	5.510	1.000	2.00	
5	*Carex brevior*	Shortbeak Sedge	0.213	0.020	0.040	
6	*Elymus virginicus*	Virginia Wildrye	0.154	0.100	0.20	
7	*Sporobolus compositus*	Composite Dropseed	0.165	0.015	0.030	
8	*Sporobolus heterolepis*	Prairie Dropseed	0.088	0.015	0.030	
9	*Tridens flavus*	Purpletop Tridens	0.048	0.005	0.010	
10	*Carex vulpinoidea*	Fox Sedge	0.184	0.005	0.010	
		SUBTOTAL GRASSES	**10.035**	**2.410**	**4.820**	**$0**

Forbs/Legumes	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
1	*Allium stellatum*	Autumn Onion	0.040	0.010	0.020	
2	*Anemone cylindrica*	Candle Anemone	0.048	0.005	0.010	
3	*Anemone virginiana*	Tall Thimbleweed	0.051	0.005	0.010	
4	*Agastache foeniculum*	Blue Giant Hyssop	0.331	0.010	0.020	
5	*Verbena hastata*	Blue Vervain	1.025	0.030	0.060	
6	*Verbena stricta*	Hoary Vervain	0.514	0.050	0.10	
7	*Baptisia australis*	Blue Wild Indigo	0.003	0.005	0.010	
8	*Baptisia bracteata*	Longbract Wild Indigo	0.003	0.005	0.010	
9	*Baptisia alba*	White Wild Indigo	0.003	0.005	0.010	
10	*Asclepias tuberosa*	Butterfly Milkweed	0.032	0.020	0.040	
11	*Asclepias incarnata*	Swamp Milkweed	0.035	0.020	0.040	
12	*Asclepias sullivantii*	Prairie Milkweed	0.017	0.010	0.020	
13	*Asclepias verticillata*	Whorled Milkweed	0.040	0.010	0.020	
14	*Tradescantia ohiensis*	Common Spiderwort	0.029	0.010	0.020	
15	*Tradescantia bracteata*	Longbract Spiderwort	0.037	0.010	0.020	
16	*Silphium laciniatum*	Compass Plant	0.002	0.010	0.020	
17	*Silphium perfoliatum*	Cup Plant	0.005	0.010	0.020	
18	*Silphium terebinthinaceum*	Prairie Rosinweed	0.004	0.010	0.020	
19	*Silphium integrifolium*	Rosinweed	0.004	0.010	0.020	
20	*Symphyotrichum novae-angliae*	New England Aster	0.242	0.010	0.020	
21	*Symphyotrichum laeve*	Smooth Blue Aster	0.202	0.010	0.020	
22	*Symphyotrichum oolentangiense*	Skyblue Aster	0.294	0.010	0.020	
23	*Oligoneuron album*	Stiff Aster	0.118	0.005	0.010	
24	*Symphyotrichum ericoides*	White Heath Aster	0.367	0.005	0.010	
25	*Symphyotrichum sericeum*	Western Silver Aster	0.103	0.005	0.010	
26	*Rudbeckia hirta*	Black-eyed Susan	3.717	0.110	0.22	
27	*Rudbeckia triloba*	Brown-eyed Susan	0.125	0.010	0.020	
28	*Rudbeckia subtomentosa*	Fragrant Coneflower	0.158	0.010	0.020	
29	*Ratibida pinnata*	Gray-headed Coneflower	2.204	0.200	0.40	
30	*Rudbeckia laciniata*	Tall Coneflower	0.051	0.010	0.020	
31	*Echinacea pallida*	Pale Coneflower	0.096	0.050	0.10	
32	*Eupatorium perfoliatum*	Boneset	0.588	0.010	0.020	
33	*Brickellia eupatorioides*	False Boneset	0.118	0.010	0.020	
34	*Eupatorium altissimum*	Tall Thoroughwort	0.184	0.010	0.020	
35	*Eupatoriadelphus*	Spotted Trumpetweed	0.349	0.010	0.020	
36	*Eupatorium purpureum*	Sweetscented Joe Pye	0.771	0.050	0.10	
37	*Astragalus canadensis*	Canadian Milkvetch	0.624	0.100	0.20	
38	*Chamaecrista fasciculata*	Partridge Pea	0.298	0.300	0.60	
39	*Desmanthus illinoensis*	Prairie Mimosa	0.771	0.500	1.00	
40	*Asclepias syriaca*	Common Milkweed	0.079	0.050	0.10	
41	*Lobelia cardinalis*	Cardinal Flower	0.147	0.001	0.0020	
42	*Lobelia siphilitica*	Great Lobelia	0.184	0.001	0.0020	
43	*Hypericum ascyron*	Giant St. Johnswort	1.396	0.020	0.040	
44	*Mimulus ringens*	Monkey Flower	2.534	0.003	0.0060	
45	*Pycnanthemum virginianum*	Common Mountain Mint	0.808	0.010	0.020	

46	*Pycnanthemum tenuifolium*	Slender Mountain Mint	0.694	0.005	0.010	
47	*Penstemon grandiflorus*	Large-flowered Beardtongue	0.103	0.020	0.040	
48	*Penstemon digitalis*	Foxglove Penstemon	1.433	0.030	0.060	
49	*Oligoneuron rigidum*	Stiff Goldenrod	0.753	0.050	0.10	
50	*Solidago speciosa*	Showy Goldenrod	0.698	0.020	0.040	
51	*Oligoneuron riddellii*	Riddell's Goldenrod	0.342	0.010	0.020	
52	*Liatris aspera*	Tall Blazing Star	0.059	0.010	0.020	
53	*Liatris pycnostachya*	Prairie Blazing Star	0.202	0.050	0.10	
54	*Liatris ligulistylis*	Rocky Mountain Blazing Star	0.037	0.010	0.020	
55	*Coreopsis palmata*	Prairie Coreopsis	0.018	0.005	0.010	
56	*Coreopsis tripteris*	Tall Tickseed	0.051	0.010	0.020	
57	*Helianthus rigidum*	Prairie Sunflower	0.029	0.020	0.040	
58	*Helianthus occidentalis*	Western Sunflower	0.103	0.020	0.040	
59	*Helianthus grosseserratus*	Saw-tooth Sunflower	0.055	0.010	0.020	
60	*Heliopsis helianthoides*	Ox-eye	0.231	0.100	0.20	
61	*Parthenium integrifolium*	Feverfew, Wild Quinine	0.051	0.020	0.040	
62	*Euphorbia corollata*	Flowering Spurge	0.029	0.010	0.020	
63	*Zizia aurea*	Golden Alexander's	0.404	0.100	0.20	
64	*Vernonia fasciculata*	Ironweed	0.176	0.020	0.040	
65	*Physostegia virginiana*	False Dragonhead	0.081	0.020	0.040	
66	*Lespedeza capitata*	Round-headed Bush Clover	0.059	0.020	0.040	
67	*Desmodium canadense*	Showy Ticktrefoil	0.040	0.020	0.040	
68	*Dalea purpurea*	Purple Prairie Clover	4.298	0.650	1.30	
69	*Dalea candida*	White Prairie Clover	0.349	0.050	0.10	
70	*Phlox pilosa*	Prairie Phlox	0.035	0.005	0.010	
71	*Eryngium yuccifolium*	Rattlesnake Master	0.014	0.005	0.010	
72	*Ludwigia alternifolia*	Seedbox	2.388	0.005	0.010	
73	*Gentiana alba*	Pale Gentian, Yellow Gentian	0.514	0.010	0.020	
74	*Arnoglossum atriplicifolium*	Pale Indian Plaintain	0.044	0.020	0.040	
75	*Oenothera biennis*	Common Evening Primrose	3.306	0.100	0.20	
76	*Veronicastrum virginicum*	Culver's Root	1.469	0.005	0.010	
77	*Campanula americana*	Tall Bellflower	0.312	0.005	0.010	
78	*Monarda fistulosa*	Wild Bergamot	2.571	0.100	0.20	
79	*Geranium maculatum*	Wild Geranium	0.009	0.005	0.010	
80	*Ruellia humilis*	Wild Petunia	0.191	0.100	0.20	
		SUBTOTAL FORBS	**39.899**	**3.395**	**6.790**	**$0**

Woody	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
1	*Amorpha canescens*	Lead Plant	0.059	0.010	0.020	
2	*Ceanothus americanus*	New Jersey Tea	0.028	0.010	0.020	
3	*Rosa arkansana*	Prairie Wild Rose	0.005	0.005	0.010	
		SUBTOTAL VINES/WOODY	**0.091**	**0.025**	**0.050**	**$0**
		TOTAL	**50.025**	**5.830**	**11.660**	**$0**

	Soil Test Information	Total Needed lbs
Lime (ECCE) (Actual Lime)		
Nitrogen		
Phosphate (P205)		
Potash (K20)		

Seeding Dates: Dormant: 11/15-3/31

Additional Seeding Criteria: Seeding will be done after project construction is completed. This will likely be a domant seeding. If there is more than a month before the construction completion and a suitable seeding date site should be seeding with a temporary cover (oats)

Seeding was completed by _____ (Date) **according to the above requirements.**

_____ (Producer's Signature)

_____ (Date)

Field Office _____

Certified by _____ (NRCS Representative)

When seeding is completed, return seeding plan to the Natural Resources Conservation Services.
For CRP cost-share, return receipts to Farm Service Agency.
For all other cost-share projects, attach seed tags and receipts for seed, fertilizer, lime, etc.

USDA NRCS
Natural Resources Conservation Service

IA - CPA - 4 REV.
November-17
(File Code 180-12-12)

Seeding Plan

Name: **PF Leopold Grass Bump Up Mix**
Prepared by: **Matt Frana**

Date: **6/5/2019**
Tract No.: **6222**
Field No.: **8555**
Contract No.: **UI-011-BEARD**

Program: **Other**
Field Area (acres): 2.000

Seeding Mix Summary

Grasses	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
1	*Andropogon gerardii*	Big Bluestem	2.571	0.700	1.40	
2	*Sorghastrum nutans*	Indiangrass	1.763	0.400	0.80	
3	*Bouteloua curtipendula*	Sideoats Grama	1.499	0.680	1.36	
4	*Schizachyrium scoparium*	Little Bluestem	4.408	0.800	1.60	
5	*Carex brevior*	Shortbeak Sedge	0.213	0.020	0.040	
6	*Elymus virginicus*	Virginia Wildrye	0.154	0.100	0.20	
7	*Sporobolus compositus*	Composite Dropseed	2.039	0.185	0.37	
8	*Sporobolus heterolepis*	Prairie Dropseed	0.206	0.035	0.070	
9	*Tridens flavus*	Purpletop Tridens	0.191	0.020	0.040	
10	*Carex vulpinoidea*	Fox Sedge	0.918	0.025	0.050	
		SUBTOTAL GRASSES	**13.961**	**2.965**	**5.930**	**$0**

Forbs/Legumes	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
		SUBTOTAL FORBS	**0.000**	**0.000**	**0.000**	**$0**

Woody	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
		SUBTOTAL VINES/WOODY	**0.000**	**0.000**	**0.000**	**$0**
		TOTAL	**13.961**	**2.965**	**5.930**	**$0**

	Soil Test Information	Total Needed lbs
Lime (ECCE) (Actual Lime)		
Nitrogen		
Phosphate (P205)		
Potash (K20)		

Seeding Dates: Dormant: 11/15-3/31

Additional Seeding Criteria: Seeding will be done after project construction is completed. This will likely be a domant seeding. If there is more than a month before the construction completion and a suitable seeding date site should be seeding with a temporary cover (oats)

Seeding was completed by _____ (Date) **according to the above requirements.**

_____ (Producer's Signature)

_____ (Date)

Field Office _____

Certified by _____ (NRCS Representative)

When seeding is completed, return seeding plan to the Natural Resources Conservation Services.
For CRP cost-share, return receipts to Farm Service Agency.
For all other cost-share projects, attach seed tags and receipts for seed, fertilizer, lime, etc.

This order blank is effective to JUNE 30, 2

Iowa Pheasants Forever Native Grass Seed Program

o to www.iowapf.net for more information

WINTER/SPRING 2019

Call Matt O'Connor, moconnor@pheasantsforever.org
563-926-2357 or cell# 319-240-4075

Purchase Order

Send Full Payment and Purchase Order to: **Matt O'Connor**
Pheasants Forever, 2880 Thunder Rd., Hopkinton Iowa 52237

A chapter or personal check must be included with your order *Make check out to:* ***Pheasants Forever – Native Grass Seed Order***

COUNTY NAME:
Contact Person & Phone:

SHIP TO:
(please include phone#)

phone #_____ e-mail_____

Provide us your e-mail address and we will send you a receipt via e-mail plus a hardcopy in the US mail.

Must order at least one acre	***"The Leopold Mix" & Leopold Pollinators*** ***Highly diverse native mixes – the best!*** ***ALL IOWA ECOTYPE SEED*** ***Now we offer Leopold CP42 Pollinator Mixes at great prices!!!!!!***	Unit Price	Total Price
At least one acre	**CP-42 LEOPOLD #1 POLLINATOR (Dry/Wet/Mesic) 10/30 mix:** ***10 grass seed per square foot/30 forb seed per square foot*** .25lb Big bluestem, .25lb Indian grass, .75lb Side oats grama, 1lb Little bluestem, 0.02lb Shortbeak Sedge, 0.1lb Virginia wildrye, 0.015lb Composite(rough) dropseed, 0.015lb Prairie dropseed, .005lb Purpletop tridens, .005lb Fox sedge. **Forbes**: Autumn onion .01lb, Tall thimbleweed .005lb, Blue Giant Hyssop .01lb, Blue Vervain .03lb, Hoary Vervain .05lb, White Wild Indigo .01lb, Butterfly Milkweed .02lb, Swamp Milkweed .02lb, Whorled Milkweed .01lb, Common Spiderwort .01lb, Compass Plant .01lb, Cup Plant .01lb, Prairie Rosinweed .01lb, Rosinweed .01lb, New England Aster .01lb, Smooth Blue Aster .01lb, Skyblue Aster .01lb, Stiff Aster .005lb, Black-eyed Susan .1lb, Brown-eyed Susan .01lb, Gray-headed Coneflower .25lb, Pale Coneflower .05lb, Boneset .01lb, False Boneset .01lb, Tall Thoroughwort .01lb, Spotted Trumpetweed .01lb, Sweetscented Joe Pye Weed .05lb, Canadian Milkvetch .1lb, Partridge Pea .3lb, Prairie Mimosa .5lb, Rattle Box .1lb, Giant St. Johnswort .015lb, Monkey Flower .001lb, Common Mountain Mint .01lb, Large-flowered Beardtongue .02lb, Foxglove Penstemon .02lb, Stiff Goldenrod .03lb, Showy Goldenrod .02lb, Tall Blazing Star .01lb, Prairie Blazing Star .05lb, Lead Plant .01lb, New Jersey Tea .01lb, Prairie Wild Rose .005lb Tall Tickseed .01lb, Prairie Sunflower .02lb, Western Sunflower .02lb, Ox-eye .1lb, Feverfew, Wild Quinine .02lb, Flowering Spurge .01lb, Golden Alexander's .1lb, Ironweed .02lb, False Dragonhead .02lb, Round-headed Bush Clover .05lb, Showy Ticktrefoil .02lb, Purple Prairie Clover .55lb, White Prairie Clover .05lb, Prairie Phlox .005lb, Rattlesnake Master .005lb, Seedbox .005lb, Common Evening Primrose .05lb, Culver's Root .005lb, Wild Bergamot .01lb, Wild Geranium .005lb, Wild Petunia .1lb, Common Milkweed . 01lb	**$278 per acre**	
Must order at least one acre	**CP-42 LEOPOLD #2 POLLINATOR (Dry/Wet/Mesic) 10/40:** ***10 grass seed per square foot/40 forb seed per square foot*** .25 lb Big bluestem, .25 lb Indian grass, .75lb Side Oats Grama, 1lb Little bluestem, 0.02lb Shortbeak Sedge, 0.1lb Virginia wildrye, 0.015lb Composite (rough) dropseed, 0.015lb Prairie dropseed .005lb Purpletop tridens, .005lb Fox sedge. **Forbes**: Autumn onion .01lb, Candle Anemone .005lb, Tall thimble weed .005lb, Blue Giant Hyssop .01lb, Blue Vervain .03lb, Hoary Vervain .05lb, Blue Wild Indigo .005lb, Longbract Wild Indigo .005lb, White Wild Indigo .005lb, Butterfly milkweed .02lb, Swamp Milkweed .02lb, Prairie Milkweed .01lb, Whorled milkweed .01lb, Common Spiderwort .01lb, Longbract Spiderwort .01lb, Compass Plant .01lb, Cup Plant .01lb, Prairie Rosinweed .01lb, Rosinweed .01lb, New England Aster .01lb, Smooth Blue Aster .01lb, Skyblue Aster .01lb, Stiff Aster .005lb, White Heath Aster .005lb, Western Silver Aster .005lb, Black-eyed Susan .11lb, Brown-eyed Susan .01lb, Fragrant Coneflower .01lb, Gray-headed Coneflower .2lb, Tall Coneflower .01lb, Pale Coneflower .05lb, Boneset .01lb, False Boneset .01lb, Tall Thoroughwort .01lb, Spotted Trumpetweed .01lb, Sweetscented Joe Pye .05lb, Canadian Milkvetch .1lb, Partridge Pea .3lb, Prairie Mimosa .5lb, Common Milkweed .05lb, Cardinal Flower .001lb, Great Lobelia .001lb, Giant St. Johnswort .02lb, Monkey Flower .003lb, Common Mountain Mint .01lb, Slender Mountain Mint .005lb, Large-flowered Beardtongue .02lb, Foxglove Penstemon .03lb, Stiff Goldenrod .05lb, Showy Goldenrod .02lb, Riddell's Goldenrod .01lb, Tall Blazing Star .01lb, Prairie Blazing Star .05lb, Rocky Mountain Blazing Star .01lb, Prairie Coreopsis .005lb, Tall Tickseed .01lb, Prairie Sunflower .02lb, Western Sunflower .02lb, Saw-tooth Sunflower .01lb, Ox-eye .1lb, Feverfew, Wild Quinine .02lb, Flowering Spurge .01lb, Golden Alexander's .1lb, Ironweed .02lb, False Dragonhead .02lb, Round-headed Bush Clover .02lb, Showy Ticktrefoil .02lb, Purple Prairie Clover .65lb, White Prairie Clover .05lb, Prairie Phlox .005lb, Rattlesnake Master .005lb, Seedbox .005lb, Pale Gentian-Yellow Gentian .01lb, Pale Indian Plaintain .02lb, Common Evening Primrose .1lb, Culver's Root .005lb, Tall Bellflower .005lb, Wild Bergamot .1lb, Wild Geranium .005lb, Wild Petunia .1lb, Lead Plant .01lb, New Jersey Tea .01lb, Prairie Wild Rose .005lb	**$345 per acre**	
	LEOPOLD GRASS BUMP UP ***10 grass seed per square foot*** .07lb Big bluestem, .04 Indiangrass, .68 Sideoats gramma, 0.8lb Little bluestem, .02lb Shortbeak Sedge, .1lb Virginia wildrye, .185lb Composite dropseed, .035 Prairie dropseed, .02lb Purpletop tridens, .025 Fox sedge	**$36 per acre**	
	Free Shipping!	**BalanceDue**	

You must include a check for full amount with your order! Call Matt O'Connor 563 926-2357 or 319-240-4075 with questions.

USDA NRCS
Natural Resources Conservation Service

Temporary Cover - Oats

Tom Beard

Name _____ Date 7/1/2019 Tract No. _____

Field No. _____

Contract No UI-011-BEARD

Type of Seeding: _____ Prepared by Matt Frana

Seeding Percent Pure Live Seed=(% Germination + Hard Seed) * % Purity
100

Full seeding

Enter Acres: 2

	Acres	% of Stand	Pounds Per Acre PLS*		Total Needed		
Oats	2		96	lb		192.0	lb

Acres % of Stand Acre - Circle One Below

Total Needed

Seeding will be completed: Other 3

Additional Seeding Criteria: Plant 3 bu/ac of oats per acre if needed for temporary cover until conditions are suitable for planting native seed mix.

Seeding was completed according to the above requirements on: _____ (Date)

_____ (Producer's Signature) _____ (Date)

Field Office _____ **Certified by** _____

USDA

United States Department of Agriculture

Conservation Cover

Iowa Job Sheet

Natural Resources Conservation Service
Des Moines, Iowa

Iowa Conservation Practice 327
May 2017

Definition

Establishing and maintaining permanent vegetative cover.

Purpose

This practice may be applied to accomplish one or more of the following:

- Reduce soil erosion and sedimentation.
- Improve water quality.
- Improve air quality.
- Enhance wildlife, pollinator, and beneficial organism habitat.
- Improve soil quality.

Condition Where Practice Applies

This practice applies on all lands needing permanent vegetative cover. This practice does not apply to plantings for forage production or to critical area plantings.

Criteria for Conservation Cover

A. Seeding Periods

Permanent, perennial vegetative cover and/or shrubs will be established during the first recommended seeding or best planting period for the selected species or mixture. Planting dates are outlined on Table 1 of this job sheet.

B. Fertilizer and Lime Requirements

Soil fertility and pH level will be amended on introduced species to satisfy the needs of the specific plant species planned. Soil samples will be collected on the area to be seeded according to the protocol in ISU CROP 3108 "Take a good soil sample to help make decisions." Samples will be tested at a state approved testing laboratory.

- Introduced Species - Recommendations will be based on pastureland, according to ISU Extension publication PM 869 "Fertilizing Pastures for Conservation Cover Establishment." Lime recommendations will be developed from Table 16 of ISU PM 1688 "General Guide for Crop Nutrient Recommendations in Iowa." Soil tests that are less than four years old may be used to make recommendations.

Fertilizer or lime will not be used when establishing seeding in Hydrologic zones B, C, or D, including floodplain filter strips as outlined in Technical Note #27, Guidance on Seeding for Pothole, Floodplain, and Other Wetlands.

- Native Species - For native grass and forb establishment, no N, P, K, or lime is required.

C. Companion Crop

- Introduced Species - Companion crops are required on tilled fields and where slopes are >5%. Companion crops will not be required in fields that are no-tilled into existing residue, if the residue is adequate to reduce soil erosion. A Companion crop of spring cereal grain at the rate of 1 bushel/acre will be drilled or broadcasted. See Table 4 in the 327 Job Sheet for a list of acceptable companion crops. The companion

crops shall be clipped 4-6 inches high at the time of seed head emergence to promote growth of the new permanent cover. The use of the companion crop is not required when interseeding, and is optional for all other seeding periods outside the spring seeding period.

» Native Species - Companion crops are required on tilled fields, and where slopes are >5%. Companion crops will not be required in fields that are no-tilled into existing residue, if the residue is adequate to reduce soil erosion. A companion crop of spring cereal grain at the rate of 1 bushel/acre will be drilled or broadcasted. See Table 4 in the 327 Job Sheet for a list of approved companion crops. The companion crop will be clipped 8 inches high at the time of seed head emergence to promote growth of the new permanent cover.

D. Seedbed preparation and Seeding

1. Perennial vegetation must be killed prior to seeding.
2. Conventional seeding for spring, late summer, and dormant seeding periods where site conditions allow for safe operation of equipment.
   - » The seedbed shall be worked to a depth of 3", smooth, friable and firm before seeding. Native seedings will be rolled or cultipacked before and after seeding.
   - » All tillage operations shall be performed across the general slope of the land.
   - » Seeds shall be drilled uniformly over the area at a 1/8 - 1/4 inch depth depending on site conditions, or broadcast uniformly over the area and rolled/ harrowed into the seedbed. Native forbs will be seeded no deeper than 1/8-inch and must be rolled, not harrowed.
   - » Where erosion is a concern prepare a seedbed with tillage tool that will leave enough residue or mulch to provide adequate protection.
3. No-till seeding for spring, late summer and dormant seeding periods where site conditions allow for safe operation of equipment.
   - » Approved herbicides shall be applied to kill or suppress existing weed competition prior to planting, as necessary. Herbicides will not be used in grassed waterways or filter strips adjacent to wetlands or other waterbody, unless it is labeled for use adjacent to or over water.
   - » A drill designed for no-till planting shall be used to plant the seed at a depth of 1/8 - 1/4-inch depending on site conditions. Native forbs will be seeded no deeper than 1/8-inch.
4. Dormant seeding is done after soil temperatures drop below what is needed for seeds to germinate in the fall (4-inch soil temperature is less than 50 degrees) and before frost is completely out in the spring. This generally occurs around Nov. 15.
   - » Seeding in cornstalks or sod can be done conventionally by preparing the seedbed with tillage, or no-tilled provided there is sufficient seed to soil contact.
   - » On tilled ground, soybean stubble, or corn fields that had residue (burned or removed), the seed may be broadcasted and rolled to provide seed to soil contact and prevent seed from blowing away from site. This shall be done when the top 1-2 inches are thawed to ensure good seed to soil contact.
5. Frost Seeding is done when the ground is frozen at night and thaws during the day. Seed is incorporated by the freezing and thawing. No additional incorporation is required.
   - » Species approved for frost seeding are shown in Table 2. Native species suitable for frost seeding are debeard or smooth coated species.
   - » Frost seeding is not recommended on corn stalks or high residue fields.
   - » Frost seeding cannot be done on ground with ice cover, crusted snow, or snow depth > 4 inches.

E. Seeding Stand Improvement

This includes any stand modification that maintains some vegetative component of the original stand.

1. Incorporation of grasses, forbs and/or legumes with light tillage:
   - » When interseeding into existing sod, graze, burn, mow or apply herbicides to suppress existing vegetation and to control weed competition. Herbicides will not be used in grassed waterways or filter strips adjacent to wetlands or other waterbody, unless it is labeled for use adjacent to or over water.
   - » Use a disk, field cultivator, or similar tool to disturb 40-50% of the existing stand.
   - » Grasses, forbs and/or legumes shall be drilled uniformly over the area at 1/8 - 1/4-inch depth, or broadcast uniformly over the area and rolled into the seedbed. Native forbs will be seeded no deeper than 1/8-inch.

- » Harrow may be used to incorporate seed for introduced species only.
- » Remove early spring regrowth by mowing to reduce competition and allow the new seedlings to become established.

2. Incorporation of grasses and/or legumes with no-tillage (interseeding) for spring, late summer and dormant seeding periods:
   - » When interseeding into existing sod, graze, burn, mow or apply herbicides to suppress existing vegetation and to control weed competition. Herbicides will not be used in grassed waterways or filter strips adjacent to wetlands or other waterbody, unless it is labeled for use adjacent to or over water.
   - » Control weeds prior to seeding.
   - » Grasses, forbs and/or legumes shall be drilled uniformly over the area at 1/8 - 1/4-inch depth. Native forbs will be seeded no deeper than 1/8-inch.
   - » Remove early spring regrowth by mowing to reduce competition and allow the new seedlings to become established.
3. Incorporation of grasses and/or legumes with frost seeding.
   - » When interseeding into existing sod, graze, burn, mow or apply herbicides to suppress existing vegetation and to control weed competition. Herbicides will not be used in grassed waterways or filter strips adjacent to wetlands or other waterbody, unless it is labeled for use adjacent to or over water.
   - » Broadcast species only approved for frost seeding as shown in Table 2. Small, smooth (shiny) seeded species are best for incorporation into the soil during freezing and thawing.
   - » Frost interseeding is only allowed if existing stand is weak and less than 50 percent of the ground is covered with perennial vegetation.

F. Seed Quality

1. All seed shall be of high quality and comply with Iowa Seed and Weed Laws.
2. Cool season (introduced) grass and legume seeding rates are expressed in pounds/acre of Pure Live Seed (PLS) where PLS = (% germination + dormant seed) X % purity).
3. Native grass species seeding rates are expressed in PLS pounds/acre. Either the germination test or Tetrazolium (TZ) test is acceptable to determine PLS for native species.

G. Approved Plant Species and Seeding Rates.

Plant species and cultivars shall be selected based upon the adaptation to site conditions, including moisture regime and landscape preference. See the Native Seeding Calculator.

Introduced Species

The pure stand rates in table 2 of this Job Sheet are the minimum rates for planting a single species stand into well-prepared seedbed at the proper placement. The pure stand rates are decreased to a percentage of the desired stand when used to calculate a mixture of two or more species. Select combinations of plant species and cultivars best adapted to site conditions.

- » Approved introduced plant species, allowable mixture composition and the pure stand seeding rate are shown in Table 2.
- » A designed seeding mixture shall meet criteria specified in table 2 as to species composition and seeding rate.
- » For seedings used for erosion control, at least 50% of mixture shall be composed of grasses.
- » Tall Fescue shall not compose more than 10% of the mixture if the primary or secondary purpose is for wildlife.
- » Mixtures may include up to 20% native species. Use the criteria for the predominant species in the mixture for stand establishment.

Native Species

The Iowa Native Seeding Calculator will be used to develop the Native Seeding mixture. Approved native species are determined by county location, longevity of stand, and moisture regime. They are presorted when using the calculator. The user must select moisture regime, seeding type (prairie, savanna, wetland) and longevity.

- » A designed seeding mixture shall meet criteria specified in the Iowa Native Seeding Calculator as to species composition and seeding rate. At least 25 percent by # of seeds/sq. ft. (10 seed/sq. ft.) of the mixture shall be composed of grasses. For wildlife mixtures not more than 4 seeds/sq. ft. of the total mixture will be composed of switchgrass and not more than 8 seeds/sq. ft. of Canada wild rye. Some programs may be more restrictive.
- » When developing seeding plans, except eastern gramma grass, use 40 seeds/sq. ft. for pure grass stands. Grass and forb mixtures use 10-30 seeds/sq. ft. for the grass component and a minimum of 10-30 seeds/sq. ft. for the forb component. (The sum of the grass and forb mixtures total 40 total

seeds/sq. ft.) Seeding mixtures composed of 20 seeds/sq. ft. or less may only be used on 5 percent slopes or less, unless a nurse crop of 1 bu/ac is used, or on any land if the mix is no-tilled.

» When using a grass/forb mixture, develop a mix of tall, medium and short species. This allows for more light penetration to promote the forb component.

» For diverse prairie restorations and pollinator plantings with a minimum of 10 species or more, no more than 20% of the total mix can comprise of a single species of grass and 10% of the total mix can comprise of a single species of forb. No more than 33% of the stand can be comprised of early successional species. Early successional species is defined as a species with a Coefficient of Conservatism (CC) ≤ 3.

» Mixtures may include up to 20 percent introduced forbs, of which no single introduced forb species may comprise more than 10 percent of the mix. The percentage is based on the total grass and forb mix. Use stand establishment and seeding criteria for native plants when including introduced forbs. Although introduced legumes are allowed in native mixtures, it is not recommended for prairie restoration efforts.

» Annual and biannual forbs/legumes are to be limited to no more than 20% by # of seeds/sq. ft. of the forb/legume component, and no more than 20% of any one species of total mix.

» For long-term prairie reconstruction, use local source identified seed. Refer to Technical Note 28, "Guidance for Seeding Natives on Prairie Reconstruction Sites."

» When planting within one mile of an existing native prairie remnant, the native seeding will be a local ecotype or source identified (seed harvested from remnant sites). Refer to Technical Note 28, "Guidance for Seeding Natives on Prairie Reconstruction Sites."

Additional Criteria for Enhancing Wildlife Habitat

» Grasses, forbs, shrubs, and/or legumes shall be planted in a diverse mix to promote biodiversity and meet the needs of the targeted species of wildlife.

» Tall fescue shall not compose more than 10% (or 4 seeds/sq. ft.) of the mixture if the primary or secondary purpose is wildlife.

» When developing seeding plans for wildlife, restoration or reconstruction of pothole, floodplain, and other wetland ecosystems, consider the soils, moisture regimes, and topography of the site to develop seeding mixtures to meet the site characteristics. See Agronomy Technical Note 27, "Guidance on Seeding For Pothole, Floodplain, and other Wetlands."

» Any mowing after seeding establishment, except for noxious weed control will be done outside primary nesting season, May 15 to Aug. 1, to protect nesting wildlife.

» Annual mowing of an entire field is not permitted.

» For pollinator and monarch habitat, refer to appropriate Job Sheet or habitat guide.

H. Management during the Establishment Year

Weed control during the establishment year shall be provided to ensure survival of the new permanent seeding.

1. To manage weed competition, native species may be mowed no closer than 8 inches and introduced species no closer than 4 inches. Mow to allow for sunlight to get down to young seedlings and reduce the amount of thatch from covering the stand. Mowing should start before vegetation reaches a height of 18 inches, and continue about every two weeks throughout the first growing season. Mow at least once in the second season. Additional mowing beyond that will be based on the amount of weed pressure.
2. Approved herbicides may be used on both cool and native plantings to control weed species.
3. When establishing forbs with warm season grasses, the cover will be suppressed by mowing, grazing, chemicals or burning in the second season to avoid grasses or weeds from shading out the forbs.

I. Establishment of Temporary Cover

Temporary cover may be required to reduce potential weed and erosion problems where one of the following conditions exists:

1. Fields with herbicide carry over.
2. Where planting is delayed due to unavailability of seed.
3. The normal planting period has passed.
4. Delayed planting to ensure previous perennial vegetation is terminated.

The temporary cover shall be seeded as specified in Table 3.

Table 1. Seeding dates for introduced and native species

Type of Seeding	Introduced Species[2] (Grasses and Legumes)	Native Species[3]
Spring	March 1 - May 15	April 1 - July 1
Late Summer	August 1 - September 15	Not Recommended
Dormant[1]	November 15 - March 1	November 15 - March 31
Frost[4]	February 1 - March 15	February 1 - March 31

1 Only if seed can be incorporated by drilling or cultipacking to ensure seed to soil contact can be obtained and reduce predation.
2 Includes all species generally considered introduced.
3 Includes all warm and cool season natives planted in mixture.
4 Refer to Table 2 for applicable Introduced plant species. Native species suitable are debeard or smooth coated.
"Seeding cannot be done on ground with ice cover, crusted snow, or snow depth greater than 4 inches."

Table 2. Seeding chart for introduced plant species

	% of Mixture (Range Allowed)		
Plant Species	Grassland[2] & Wildlife	Trees and Shrubs	Seeding Rate PLS/acre
Grasses			
Kentucky bluegrass	0-100	0-10	5
Orchardgrass	0-50	0-100	8
Smooth bromegrass	0-100	0	10
Tall fescue[1]	0-25	0	8
Timothy[1]	0-50	0-100	4
Red top[1]	0-50	0-100	3
Intermediate wheatgrass	0-25	0	10
Perennial rye[1]	0-25	0-50	10
Legumes			
Alfalfa[1]	0-100	0-50	10
Alsike clover[1]	0-50	0-50	4
Kura clover[1]	0-50	0-50	8
White clover[1]	0-50	0-50	3
Red clover[1]	0-50	0-50	8

1 Species suitable for frost seeding.
2 Mixtures may include 20% native grasses. See the Iowa Native Seeding Calculator for seeding rates. Use the criteria for the predominate species in the mixture for establishment.

Table 3. Temporary Seeding Recommendations

Fields with atrazine[1] carryover, lack suitable seed or late planting date	
Sudangrass	20 lbs./acre
Sorghum-Sudangrass hybrid	20 lbs./acre
Corn	2 bushels/acre
Fields where planting is delayed, due to lack of suitable seed or late planting date	
Oats	3 bushels/acre
Winter rye	2 bushels/acre
Spring or winter wheat	2 bushels/acre

1 For other carryover problems, check with the area office.

Table 4. Companion Crop Recommendations

Spring Grain	
Oats	1 bushel/acre
Spring Wheat	1 bushel/acre
Spring Barley	1 bushel/acre

Planting Native Prairie
Into Cool Season Sod

(Brome, Orchard, Fescue, Bluegrass)

1. **Late Summer** - Start the sod to prairie conversion process. Mow existing grass (4-6" ht.) between Aug. 2 and Sept.1. *(The earlier, the better to ensure time for regrowth during dry conditions. Haying is preferred over mowing, but follow program rules.)*

2. **Early Sept. to Mid Oct.** - Apply glyphosate herbicide at 2 quarts/acre when the active ingredient is 41%. Use 3 quarts for hard to control species such as Canada thistle, clovers, reed canary grass, and fescue. Follow the label for specific rates, adjuvants, etc. Adding 2,4-D Ester can help with difficult to kill perennial broadleaves, i.e. clovers. Apply after there is 6-8 inches of regrowth. Good growing conditions are required (overnight lows 40F+, daytime high 60F+) when and after you spray for 2-3 days.

3. **Early Spring** *(optional)* - Burn off dead plant material in early spring with fire. This will:
   a. encourages a flush of regrowth from any living brome in the Spring;
   b. encourages a flush from seed bank (i.e. red clover, annual weeds);
   c. remove duff layer;
   d. allow better herbicide contact;
   e. make it easier to plant into;
   f. allow you to see hazards such as: ant hills, badger holes, and tile breaks. *Use combination of disk and blade to smooth those areas.*

4. **Late May** - Apply glyphosate herbicide to the area to be planted after green up.

Spraying in the spring is not sufficient to kill the existing perennial vegetation. If you are starting this process in the spring, spray, and then leave the ground fallow for the first growing season.

5. **(Option 1) Late May to Early June** - Plant mixed native grasses and forbs with a native no-till drill 7+ days after the herbicide application. *Chemicals need time to translocate into the root system of emerged vegetation. Cutting up sprayed grass could affect the performance.*
   a. Drill shallow: 1/8" for forbs, 1/4" for grass.
   b. Broadcast and roll only if > 50% of soil is exposed.

5. **(Option 2 - Preferred) Leave area fallow for the growing season**
   a. Spray 1-2 times during the summer when majority of weeds are < than 12" tall.
   Caution: Don't let weeds get too tall. They will be harder to kill, and you don't want them to add seed to the seed bank. Weeds in a fallow field left unchecked can produce a tremendous amount of weed seed.
   b. Spray again in September – first ½ of October
   c. Complete a dormant seeding by drilling (or broadcasting if 50% or more soil is exposed).

Natural Resources Conservation Service, Des Moines, Iowa, August 2018

Planting Native Prairie Into Cool Season Sod

Fall/Dormant Seeding

Fall/Dormant seedings can be conducted Nov. 15 through April 1, or until the freeze/thaw season ends.

- Advantageous to the forb component. Germination increases for many forb species if they go through freeze/thaw cycles.
- Need > 50% of soil exposed.
- In diverse forb mixes, seed 0.25 lbs. (4 oz. or 1.0 seed/ft^2) each of Big Bluestem, Indiangrass and Switchgrass. Dormant seedings are not as conducive as a spring planting for the tall warm season grasses.
- Broadcast and then roll. If the ground is frozen, don't roll.
- Don't broadcast seed on ice covered ground, snow crusted ground, or when snow cover is > than 4".

Other Considerations:

- Seed forbs on the surface or a shallow depth (up to 1/8" depth). Grasses do fine planting up to 1/4" depth. *Some seed on the surface is ok.*
  Tip: When using a native grass drill, disconnect every other tube on the forb box, so seed lands on the ground.
- If you are trying to complete a seeding in an area with reed canary, develop a long-term plan to kill it completely (very difficult) and a proper seed mix that will compete with it.
- Do not use fertilizer because it will only help the weeds out-compete your seeding.
- When broadcasting, rolling will help with seed to soil contact and to reduce predation of seed from birds, mice, and night crawlers.
- When seeding small areas or when broadcasting seed, add a carrier to help ensure you don't run out of seed (i.e. rice hulls, cocoa shells, pell lime, ground cobs). Consider broadcasting the area twice to ensure good coverage.
- On small areas (< 2 acres), you can seed from a bucket.
  - Flag off lines every 50' to help stay in line.
  - Use sand as a carrier — 2 parts damp sand to 1 part seed, minimum.
  - Weigh seed and separate into buckets.
- Adding ½ - 1 bu. of oats to spring seedings can reduce erosion.

If Tillage Is Necessary

- Tillage is only recommended when the field is very rough from gophers, etc.
- Several tillage passes will be required to prepare an acceptable seedbed.
- The downside of tillage is that it can increase weed pressure.

1. If you decide to till, follow steps 1 and 2 from the previous page. If the field is too rough to mow, then skip step 1 and go to step 2.
2. Perform Tillage
   - If spraying occurred, complete tillage in the spring to smooth the area.
   - If no spraying occurred, deep tillage will be required in the fall to kill the cool season stand using a plow or chisel plow, followed up in the spring with a disk and a field cultivator.
3. Seedbed must be rolled 1-2 times before planting to create a firm seedbed.
4. Drill or broadcast, and then roll again.

- **For High-end Seedings** (pollinator/CP-25 /prairie reconstruction):
  - Ideal mix is: 25-50% grass/50-75% forbs.
  - Strive for diversity.
  - Limit amount of tall warm season grasses (Big Bluestem, Indian Grass, & Switchgrass). They establish quickly and can out-compete forbs. Recommended seeding rate: 0.1 (1.6 oz. or 0.4 seeds/ft^2) to 0.25 lbs. (4 oz. or 1.0 seeds/ft^2) each for Big Bluestem and Indian Grass. Limit Switchgrass to the 0.1 lb. rate. Other native grasses are not as competitive.
- Native grasses are an important component of the tall grass prairie. Less favorable grasses such as woolly cupgrass, smooth brome, tall fescue and quack grass will take over if native grasses are excluded.
- Consider Iowa ecotype seed (originated from prairie remnant plants) for long-term to permanent seedings.
- Use high end seedings around the farmstead for added beauty.

If you have additional questions, contact your local NRCS Field Office, Iowa Department of Natural Resources (DNR) biologists, or Pheasants Forever biologist for further guidance.

DNR

USDA United States Department of Agriculture
Natural Resources Conservation Service

PHEASANTS forever

Tallgrass Prairie Center
University of Northern Iowa

Beard Pond Project
UI-011-BEARD
Seeding Map

Date: 6/4/19

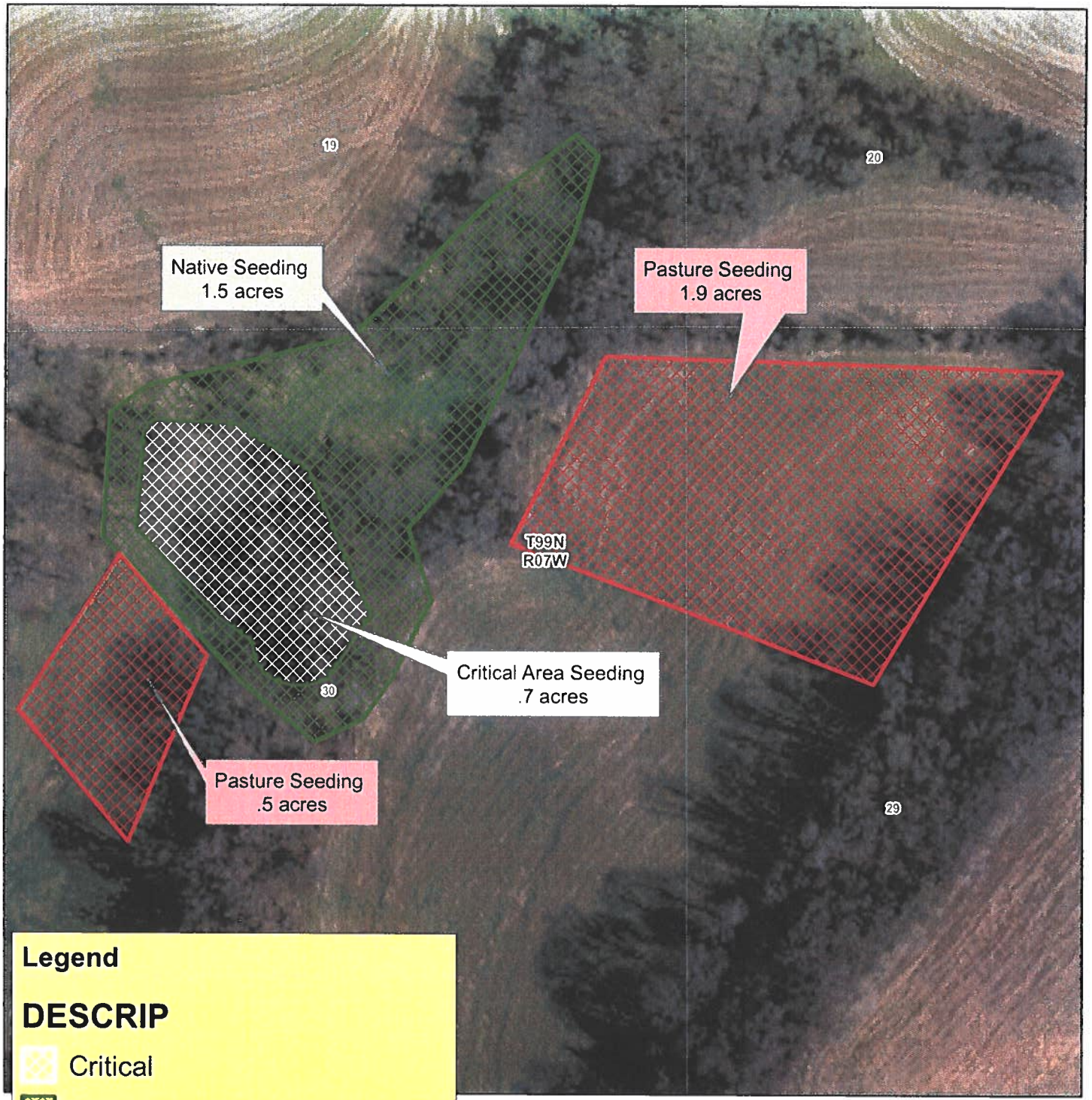
Customer(s): T&M Beard

Field Office: DECORAH SERVICE CENTER

District: WINNESHIEK SOIL & WATER CONSERVATION DISTRICT

Assisted By: Matthew Frana

Legal Description: Tract 6222; T99N R07W Sec 30



Legend

DESCRIP

- Critical
- Native
- Pasture
- Winneshiek Co - Townships
- Winneshiek Co - Section Lines

70 0 70 140 210 280 Feet

N

Beard Pond Project
UI-011-BEARD
Seeding Map

Date: 6/4/19

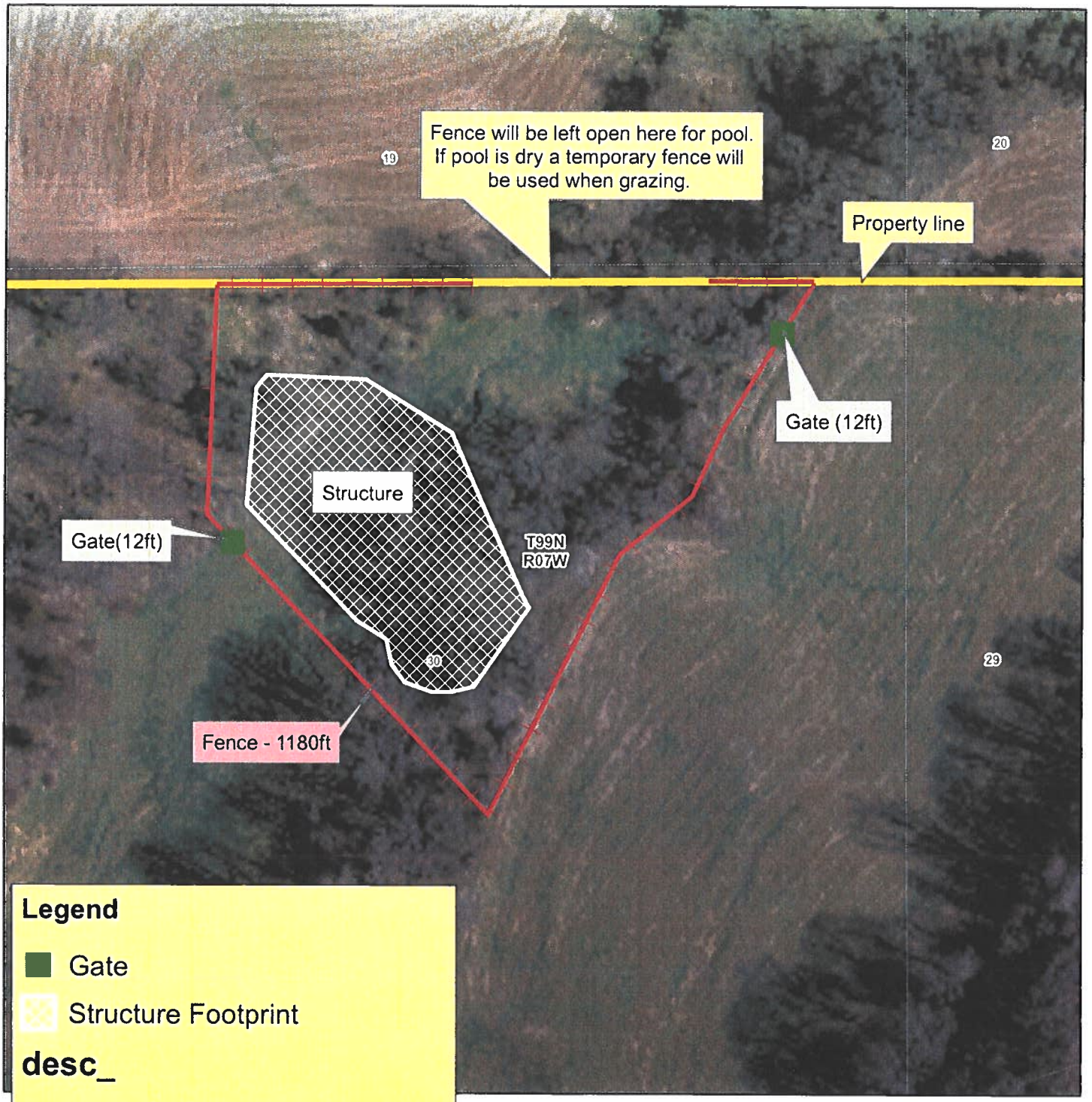
Customer(s): T&M Beard

Field Office: DECORAH SERVICE CENTER

District: WINNESHIEK SOIL & WATER CONSERVATION DISTRICT

Assisted By: Matthew Frana

Legal Description: Tract 6222; T99N R07W Sec 30



SOIL INVESTIGATION NOTES:

On 9/28/18 I investigated a site on the Tom Beard/Luna Valley Farm for proposed flood control structure.
Investigated by: Oyloe, Frana, Sass
Boring method/equipment: Giddings & backsaver probe

Hole 1 – centerline of proposed structure. On alluvial sediment plain.
0 to 102 inches – 10YR 3/4, 3/3, 4/3 silt loam texture. Stratified silty sediments
102 to 115 inches – 10YR 2/1 Ab horizon. Silt loam texture. Original soil surface.
115 to 140 inches – 10YR 4/3-3/4 silt loam-silty clay loam texture. 25-29% clay estimate. This would be a good soil horizon with good materils to anchor a core trench into. This horizon is easily identified as the one just below the buried dark topsoil layer.
Hole 1 comment – much of the material upstream adjacent from this location could be excavated and used to mix with high clay materials for construction. Or this material could be used for sloping/shaping of structure.

Hole 2 – north end of CL on hillside
Surface – 2-10" depending on location – mix of 10YR 2/2 silt loam and fractured bedrock. Bedrock is a mix of limestone and sandstone.
10" probe refusal
Note – large rock outcrop down stream of proposed centerline.

Hole 3 – South end of centerline on hillside
0 to 15" 10YR 2/1 silt loam
15" probe refusal

Hole 4 – on map but not described on field notes.
Silt loam surface approx. 10 inches thick
Sand or loamy sand to 4 foot.
Material not useful for construction.

Hole 5 – south side, possible borrow area in hay field
0 to 10" 10YR 3/2 silt loam
10to 28" 10YR 4/3 silty clay loam 26-28% clay estimate. Good materials for construction of core trench and foundation of structure.
28 to 60" 10YR 4/4 silt loam 20-25% clay estimate
60 to 78" sandy loam-loam texture. Loess w/sand influence
78" probe refusal. Sandstone?

Hole 6 – possible borrow NE part of hay field
0 to 10" 10YR 3/3 silt loam
10 to 46" 10YR 4/4 silty clay loam 26-30% clay estimate. Good construction materials.
46 to 60" 10YR 4/4 w/ 4/2 & 4/6 redox. Silt loam texture. 20-25% clay estimate.

Hole 7 – on map but not described on field notes
Similar to hole 5. Not as thick silty clay loam horizon as hole 6.

Investigators summary of comments:
Valley floor along centerline of proposed structure has a thick layer of silty sediments deposited on it. This material is not well structured but could provide some potential building materials for structure if mixed or used for shaping. Buried A horizon (original soil surface prior to settlement) found at 102" depth. Ideally, core trench should start around 10' depth in heavier soil materials.
Hillsides of proposed structure have shallow bedrock present. Use caution in these areas and inspect them for fractured rock outcroppings. These types of areas will drain a pool area real quick. If clayey or silty clay loam materials are available it would be beneficial to use these materials to layer along the proposed pool area to assist with ponding water. While constructing core trench, use best equipment available to anchor core trench into hillsides. It may be difficult to get 4 or 5 feet but the more the better.
Borrow materials are available in hay field to south. Some pockets of sand exist in this field (point 4). Stay away from these areas for construction materials.

If these considerations are met. Site is suitable for proposed structure.

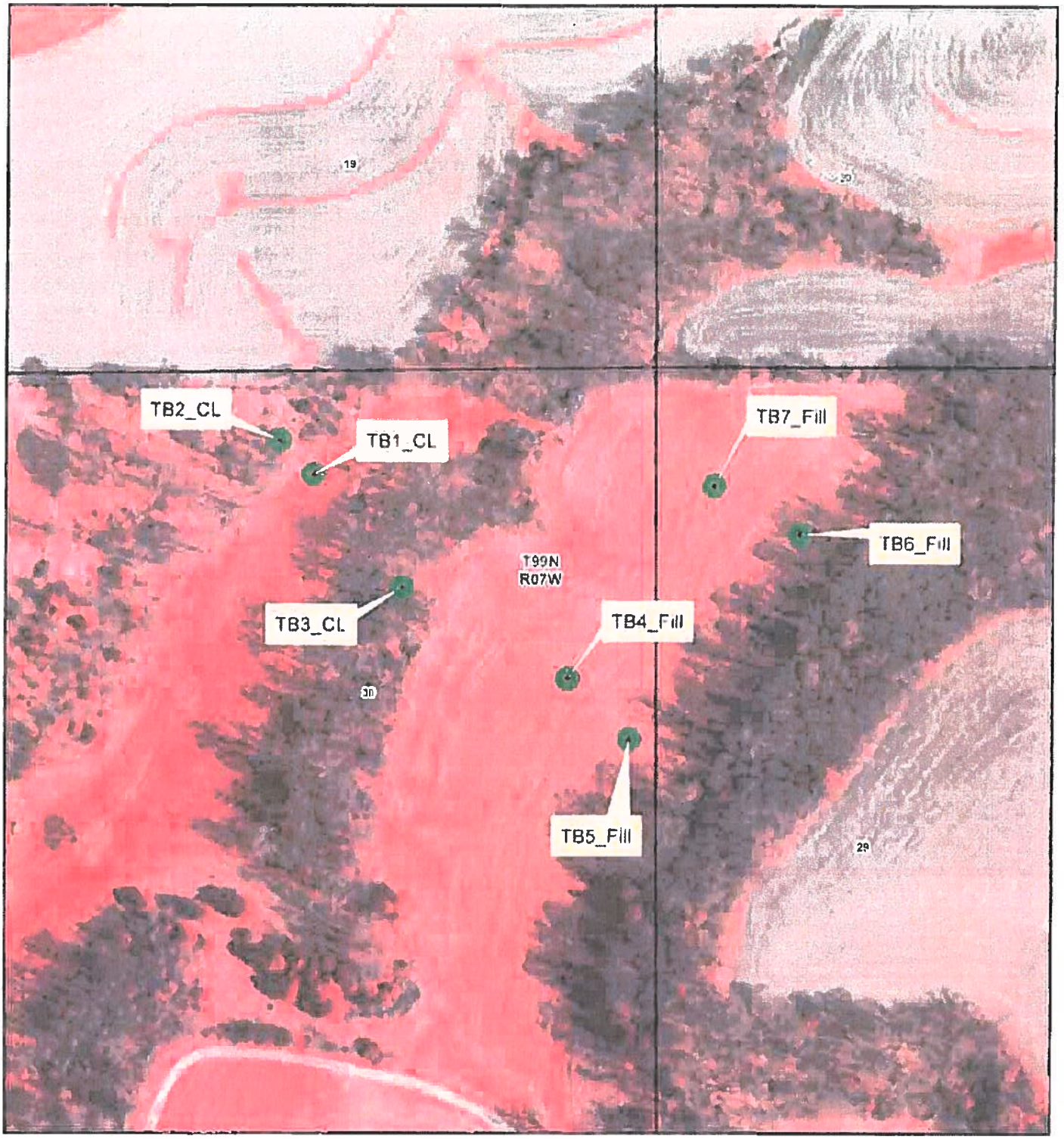
Respectfully submitted,

Neil Sass, CCA
Area 3 Agronomist
USDA NRCS
120 N Industrial Pkwy Ste 4
West Union, IA 52175
Office: 563-412-3019
Cell: 563-422-0785
Neil.Sass@ia.usda.gov

Soil Investigation Map

Customer: Tom Beard
Date: 8/28/18

2016 Spring CIR Imagery, Soils Map



Legend

Points

110 0 110 220 330 440
Feet

N

Log of Test Holes

(Reference: Guide for Subsurface Investigations in Iowa)

Investigated by Oyloe, Frana, Sass Date 9/28/18

Boring Method/Equipment Giddings Owner Tom Beard - Luna Valley Farm

County Winn Assistance Program

Site Coordinates-(WGS 84, Dec.. Degrees)

Hole No.	General Location	Hole Depth From	Hole Depth To	Description of Material
1	CL of proposed structure on alluvial sediment flat	0	102	10YR 3/4, 3/3, 4/3 SiL silty sediment
		102	115	10YR 2/1 SiL A1 original soil surface
		115	140	10YR 4/3 3/4 SiL-SiCL 2% clay flecks
2	North end of CL	0	2-10	Mix of 10YR 2/1 SiL + fractured bedrock
		10 probe refusal		Large rock outcrop downstream of CL
3	South end of CL	0	15	10YR 2/1 SiL
		15		probe refusal

Log of Test Holes

(Reference: Guide for Subsurface Investigations in Iowa)

Investigated by Ogloe, Frana, Sass Date 9/28/18

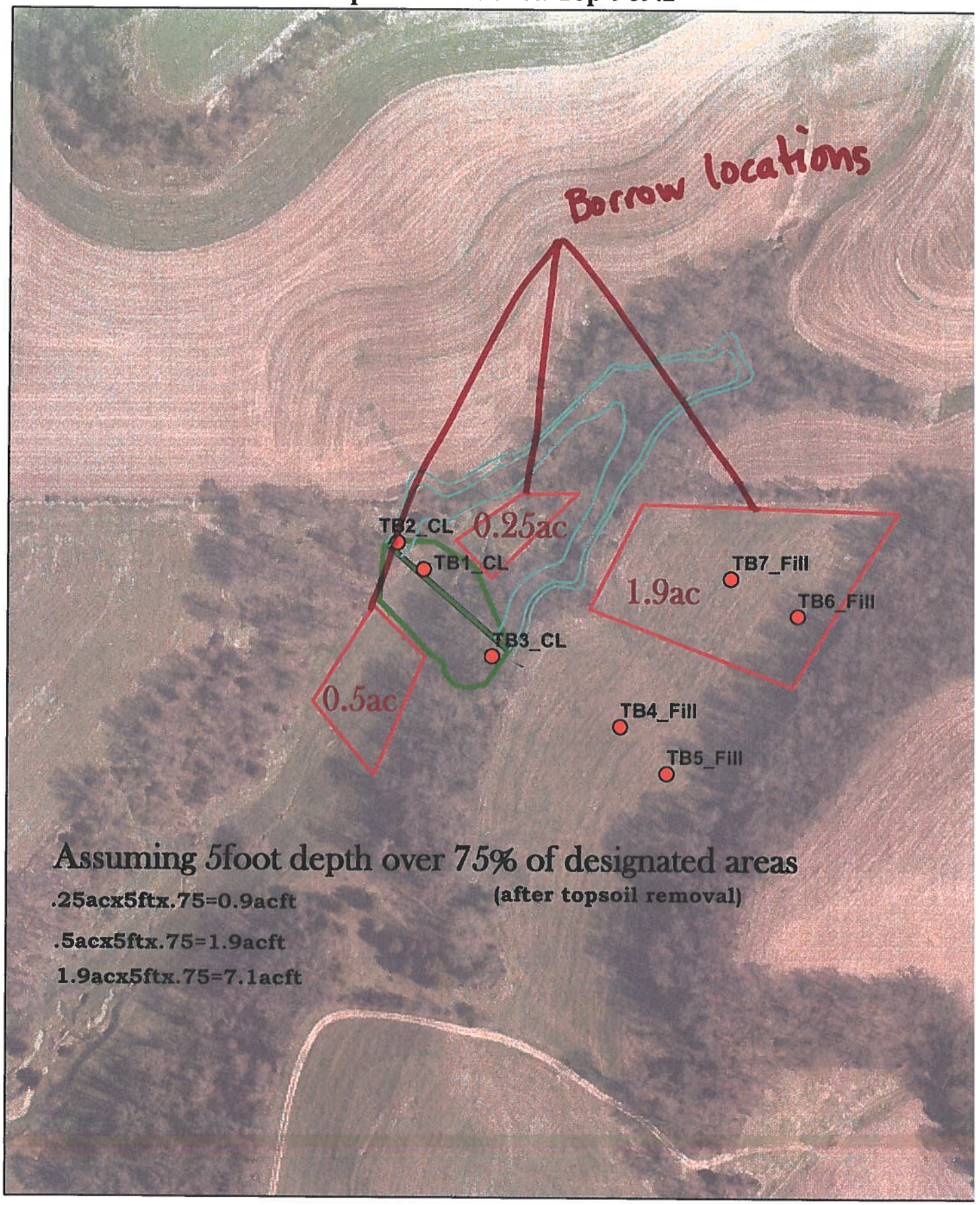
Boring Method/Equipment Giddings / Backsaver Owner Tom Beard - Luna Valley Farm

County Linn Assistance Program

Site Coordinates-(WGS 84, Dec.. Degrees)

Hole No.	General Location	Hole Depth From	Hole Depth To	Description of Material
5	South side possible borrow	0	10	10YR 3/3 SiL
		10	28	10YR 4/3 SiCL 26 28% clay
		28	60	10YR 4/4 SiL 20-25 clay
		60	78	SL-L [illegible]
		78		[illegible]
6	Possible borrow	0	10	10YR 3/3 SiL
(7)	SL part of larger field	10	46	10YR 4/4 SiCL 26-30% clay
		46	60	10YR 4/4 w/ 4/2 & 4/6 redox SiL

Normal Pool-959.3 Aux SpWy-966.1
Settled Top-968.1 Const. Top-969.2



Feet
0 50 100 200

N
W E

Luna Structure

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATIONS for

UI-011-BEARD

Winneshiek County, IA

List of Specifications:

Specification Number	Title	Pages
IA-1	Site Preparation	1
IA-5	Pollution Control	2
IA-6	Seeding & Mulching For Protective Cover	1
IA-21	Excavation	1
IA-23	Earthfill	3
IA-26	Topsoiling	1
IA-45	Plastic Pipe	4
IA-61	Loose Rock Rip Rap	2
IA-92	Fence	7

Hageman Project Summary

UI-033-HAGEMAN (WASCOB)

Assistance by: Matt Frana - UIR Watershed Project Coordinator ***Date:*** *10/23/19*

Project Location: Sec 08, T97N R08W, Springfield Township

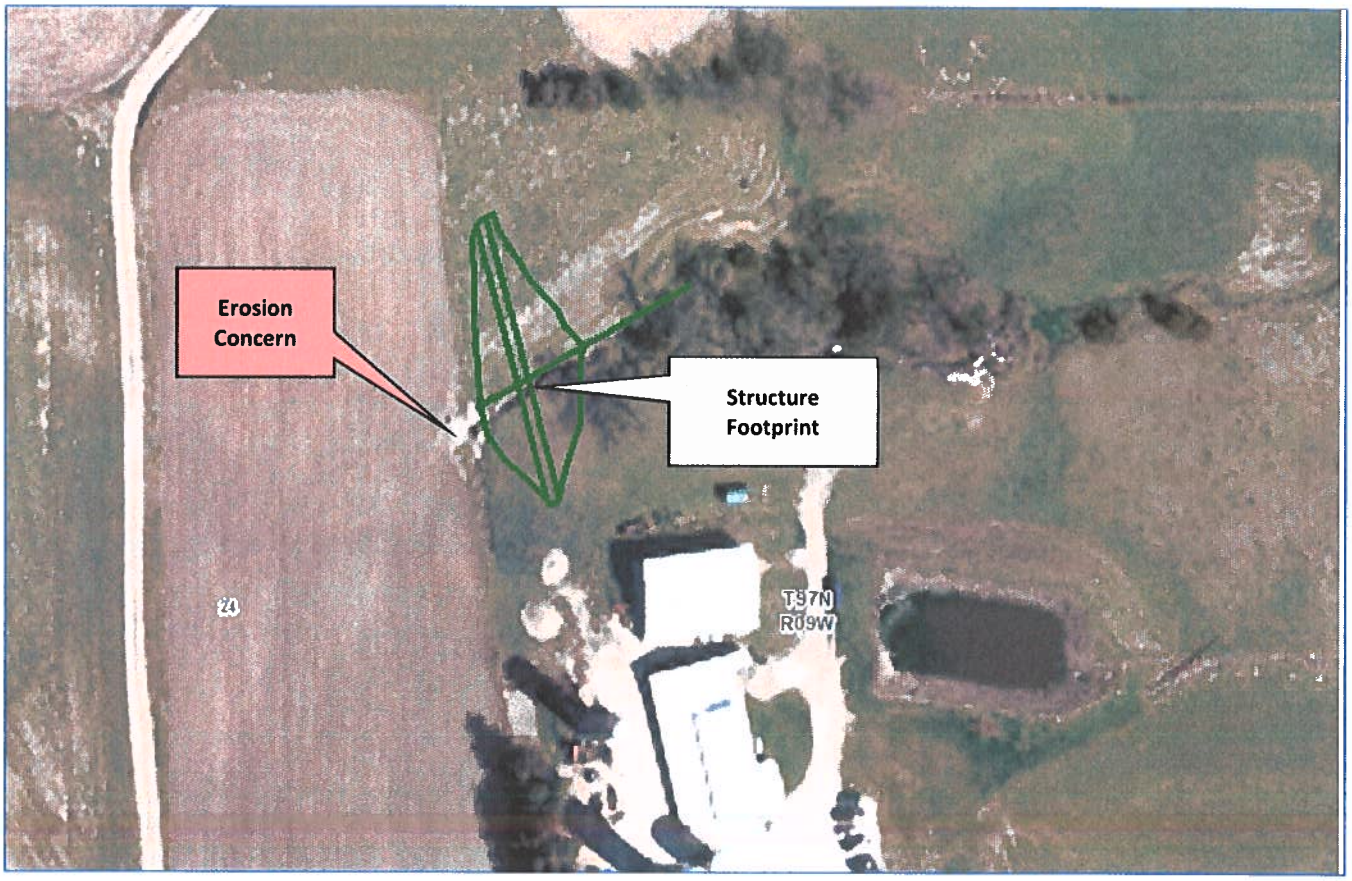
Project Objective: To control on farm erosion and slow water to prevent continued gully advancement.

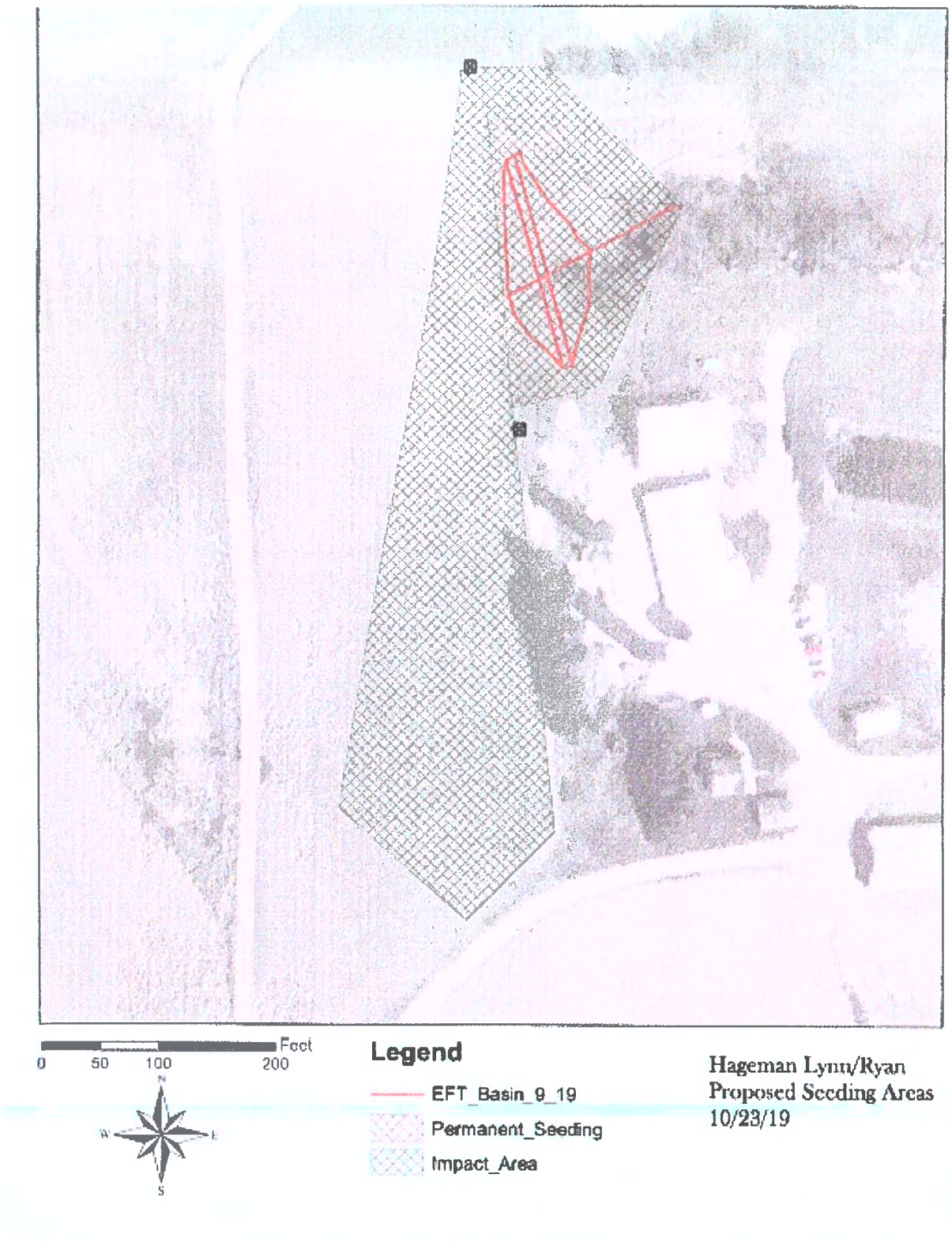
Background: Landowner (Lynn Hageman) and Son (Ryan Hageman) had erosion concerns on their farm attributed to high water flow after heavy rain events. They attempted to reduce erosion advancement and temporary store the water through project they did on their own, but is not a permanent solution that can withstand frequent heavy rain events.

Project Plan:

In order to address this concern, we will be constructing a Water and Sediment Control Basin (WASCOB) at the site that will slow and temporary store water after rain events while controlling erosion issues. The designed project will control 20 drainage acres and reduce water flow by 69%.

After construction, the structure and surrounding area will be seeded with a permanent seed mix for areas that won't be cropped. Depending on the time of year construction is completed a temporary seeding **may** be needed to protect the disturbed ground until crops are planted. This area will be determined post-construction depending on timing and actual area of disturbance.





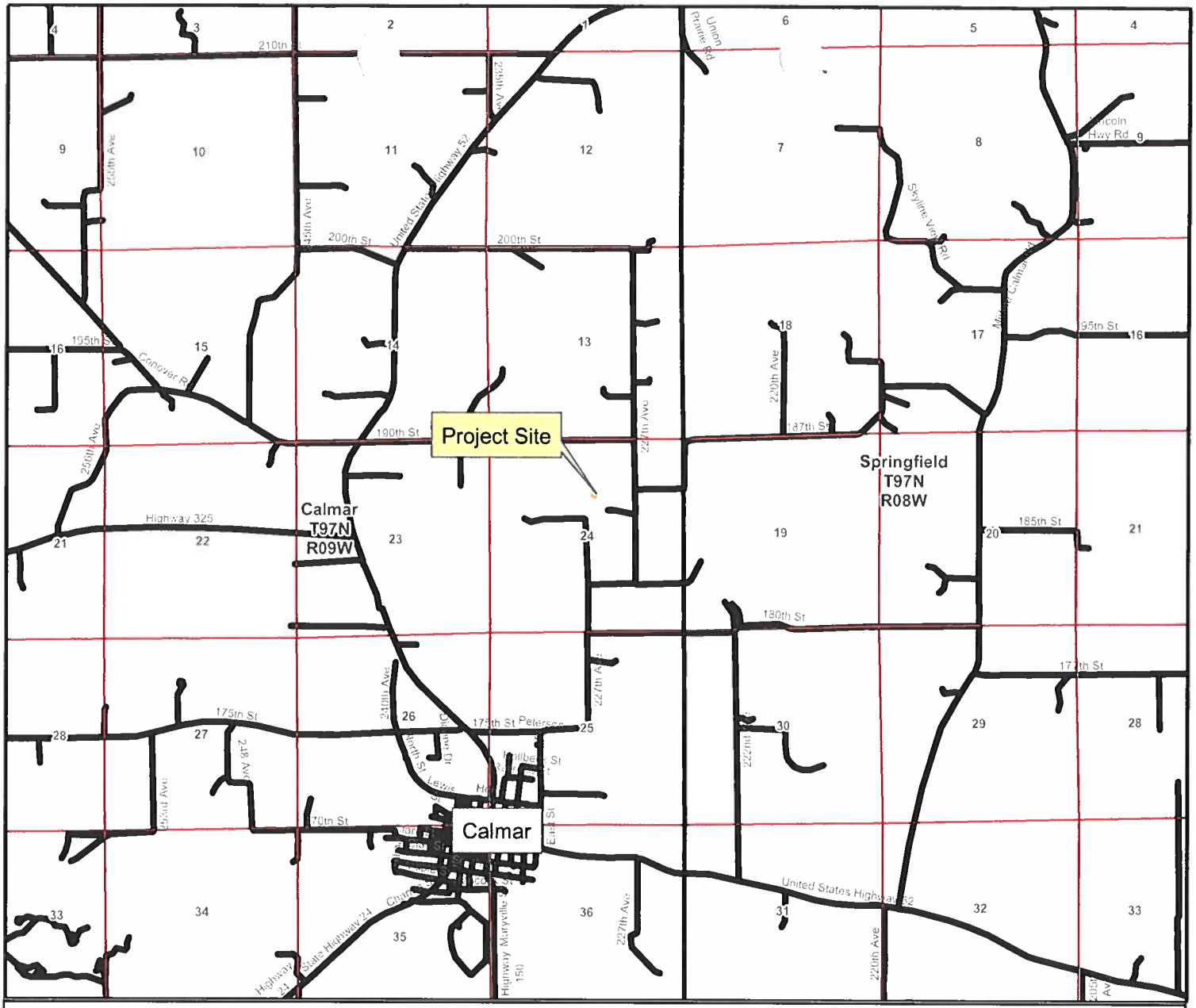
Pemanent Seeding: .6 acres
Impact Area Seeding (temporary): 1.8 acres

UI-033-HAGEMAN
Hageman Sec. 24 Calmar Twp. Winneshiek Co.

Item No.	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
Cost-share expenses						
2	Earthwork/Basin	IA-23	2100	cu.yd.	$3.50	$9,520.00
3	12" SDR21 PVC	IA-45	151	feet	$30	$3,000.00
4	W/Canopy & Animal /Trash Guard		1	no.	$300.00	$300.00
5	Rip Rap Outlet	IA-61	1	job	$250.00	$250.00
6	Seeding	IA-6	1	ac.	$300/ac.	$300.00
Cost-share expenses - TOTAL						**$13,370.00**
Other Expences						
1	Mobization	IA-1	1	LS	$2,000.00	$2,000.00
PROJECT TOTAL						***$15,370.00***

Cost-share expenses - TOTAL	$13,370.00
Landowner Contribution (10%)	**$1,337.00**

also attach IA-5, IA-26



Project Location Map

I have reviewed and agree with the content of the attached plan prepared by the NRCS.

Landowner: _____ *Date:* _____

I certify that this practice has been constructed in accordance with the plans and specifications.

Contractor: _____ *Date:* _____

NRCS Rep.: _____ *Date:* _____

CONTRACTOR IS RESPONSIBLE FOR CALLING IOWA ONE CALL 1-800-292-8989
Ticket #_____

If a cultural resource is identified during construction, stop immediately and notify the Natural Resources Conservation Service Archeologist at (515) 284-4370.

USDA United States Department of Agriculture

Natural Resources Conservation Service

Owner: Hageman Lynn/Ryan

Location: Sec 24, T 97 N, R 9W

Calmar *Township*

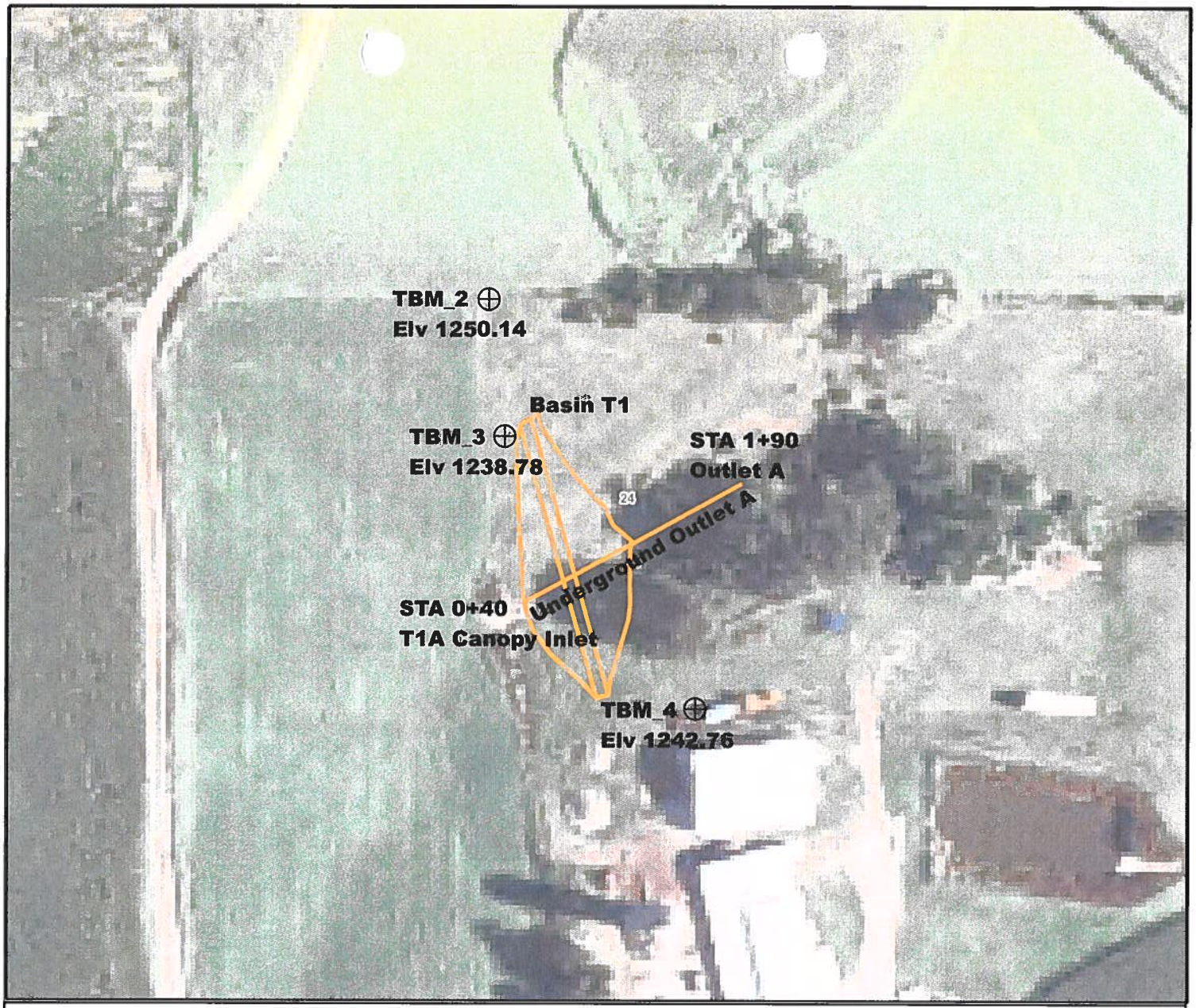
Winneshiek *County, Iowa*

		Date
Designed	moyloe	9/16
Drawn	moyloe	9/16
Checked		
Approved		

Eng. Job Class III

Revision Date January 2017

Sheet of



200 0 200 Feet

N

I have reviewed and agree with the content of the attached plan prepared by the NRCS.

Landowner: _____ *Date:* _____

I certify that this practice has been constructed in accordance with the plans and specifications.

Contractor: _____ *Date:* _____

NRCS Rep.: _____ *Date:* _____

CONTRACTOR IS RESPONSIBLE FOR CALLING IOWA ONE CALL 1-800-292-8989
Ticket #_____

If a cultural resource is identified during construction, stop immediately and notify the Natural Resources Conservation Service Archeologist at (515) 284-4370.

USDA United States Department of Agriculture

Natural Resources Conservation Service

Owner: Hageman Lynn/Ryan

Location: Sec 24, T 97 N, R 9W

Calmar *Township*

Winneshiek *County, Iowa*

		Date
Designed	moyloe	9/18
Drawn	moyloe	9/18
Checked	BEV	9/19
Approved	[signature] CET 9/19	

Eng. Job Class III

Revision Date January 2017

Sheet 1 of 10

Attach IA5, IA6, A23, IA26, IA45

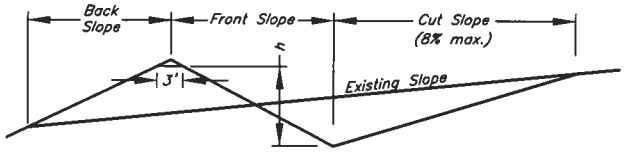
Terrace/Basin Data

Terrace No.	Terrace Type*	Length (ft.)	Front Slope	Back Slope	Min. Cut Slope (ft.)	Fill (cu.yds.)	Top Width** (ft.)
T_1	NB	175	2.5/1	2.5/1	5/1	2100	8

** NB (Narrow Base), GB (Grassed Backslope), BB (Broad Base), GFFB (Grassed Front Farmable Back)*
*** Applicable to 638 – Water And Sediment Control Basin (WASCB) designs.*

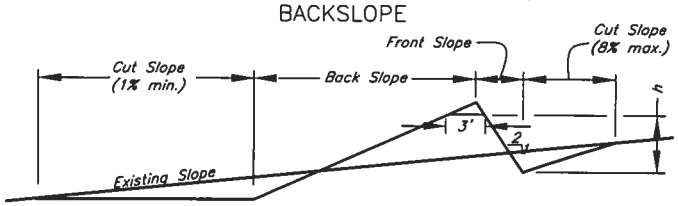
Topsoiling Required: X *YES* ___ *NO*

MINIMUM DIMENSIONS FOR BROADBASED TERRACE



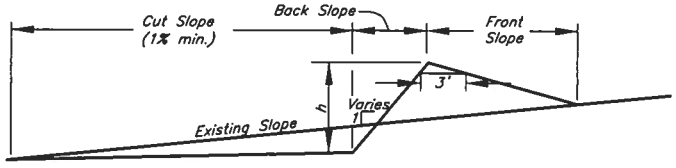
Length of front slope and back slope shall be in increments of machinery width but not shorter than 15 feet or steeper than 5:1
h=Design height of terrace

MINIMUM DIMENSIONS FOR GRASSED FRONT, FARMABLE BACKSLOPE



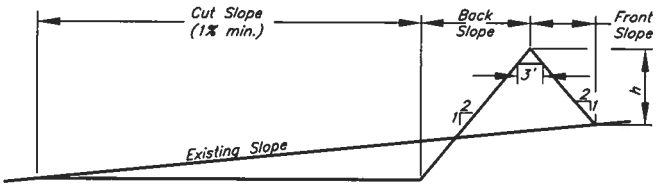
Length of back slope shall be in increments of machinery width but not shorter than 15 feet or steeper than 5:1
h=Design height of terrace

MINIMUM DIMENSIONS FOR GRASS BACK SLOPE



Length of front slope shall be in increments of machinery width but not shorter than 15 feet or steeper than 5:1
The back slope shall be no steeper than 2:1 except when built on Ida and Monona soil series types which may have the back slope constructed no steeper than 1.5:1
h=Design height of terrace

MINIMUM DIMENSIONS FOR NARROW BASE



h=Design height of terrace

STANDARD DWG. IA–1500

DATE *Jan. 2017* | PAGE *1* OF *1*

USDA United States Department of Agriculture

Natural Resources Conservation Service

TERRACE / BASIN PLAN

Owner: Hageman Lynn/Ryan

Location: Sec 24 , *T* 97 *N, R* 9 *W*

Calmar *Township*

Winneshiek *County, Iowa*

	Date
Staked	
Designed moyloe	9/17/19
Checked Bex	9/19
Approved Tom Mitchell	10/19

File Name

Drawing Name

Sheet 2 of 10

USDA United States Department of Agriculture
Natural Resources Conservation Service

T_1.xml

Terrace Construction Checkout Sheet

Report Generated 09/20/2019

Project Name: Basin_2019, HAGEMAN_TRY_AGAIN **Location:** Calmar 24
Project Description: _____ **Practice:** _____
Designed by: moyloe **Date:** _____ **Checked by:** BK **Date:** 9/20/19

Surveyed by **Date** **Checked by** **Date**

NOTE: The column (R) is the elevation difference from the hub to the constructed ridge. The minimum ridge rod is the BM rod reading plus the value in (R).

I certify the information recorded on this sheet is a true representation of the actual practice installation and the practice as installed does ( ) or does not ( ) meet NRCS plans and specifications.

Certified by **Date** **NRCS Rep.** **Date**

Benchmark Desc:

BS _____ **HI** _____ **FS** _____ **BM Elev:** 0.00
BS _____ **HI** _____ **FS** _____ **Elev:**

Strip. Vol. (cy): 203.8 **Total Fill (cy):** 2091.9 **Total Cut (cy):** 213.7 **Total Length (ft):** 240.0

Strip. Depth (in): 6.0 **Flagline Loc:** RIDGE_CENTER **Design Water Elev:** 1238.6 **BM - Des. Water:** -1238.6

set Build hub @ 1240.1

T_1 Profile

Station	FLAG NUMBEI	Ref. Elevation (ft)	Channel Elevation (ft)	Channel C/F	Ridge Elev. (ft)	Ridge C/F	Bottom Width (ft)	Drain/ Block Info	Channel	Ridge Shots	(R) Add to hub rod
0+10.0		1244.1	1244.0	0.1C	1245.9	1.8F	0.0	set outlet end			-1245.9
0+50.0		1238.4	1238.2	0.2C	1240.1	1.7F	0.0	@ 1238.6			-1240.1
1+00		1233.4	1233.3	0.1C	1239.7	6.3F	0.0				-1239.7
1+50.0		1226.2	1228.9	2.7F	1240.1	13.8F	0.0				-1240.1
1+60.0		1225.8	1228.0	2.2F	1240.1	14.3F	0.0	1+59.9			-1240.1
1+80.0		1226.8	1228.2	1.4F	1240.0	13.3F	0.0				-1240.0
2+00		1232.5	1231.1	1.4C	1239.7	7.2F	0.0				-1239.7
2+20.0		1236.8	1236.4	0.4C	1239.5	2.7F	0.0	set high end			-1239.5
2+50.0		1241.6	1241.4	0.2C	1243.3	1.7F	0.0	@ 1239.4			-1243.3

inlet

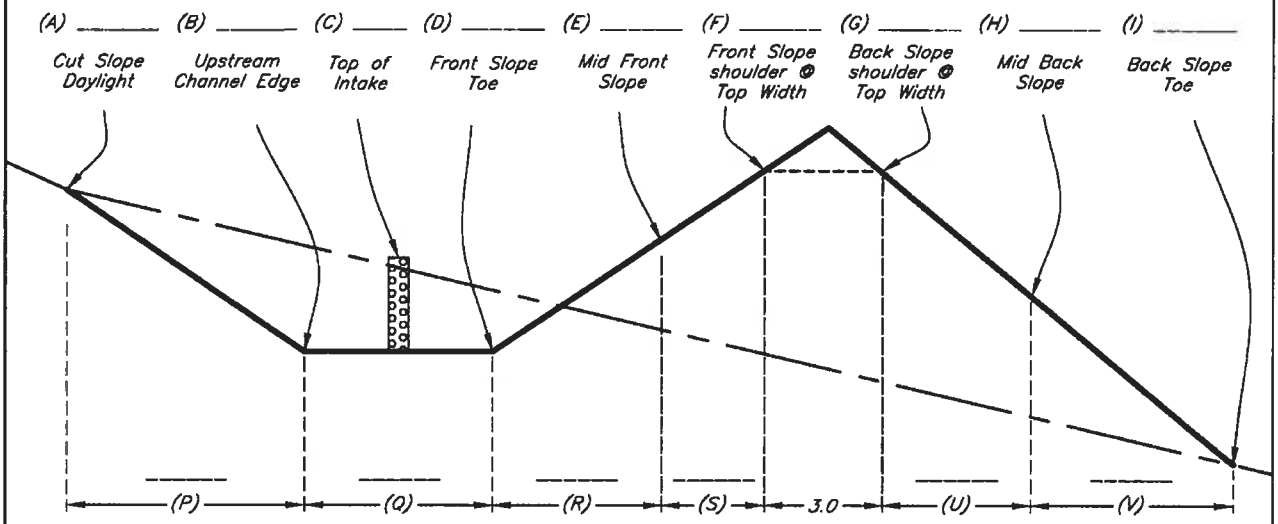
Note: Ridge and Channel Cut/Fill values are relative to ground elevation at reference line.

EFT Version 4.0.3.1

Terrace Cross Section Checkout S t

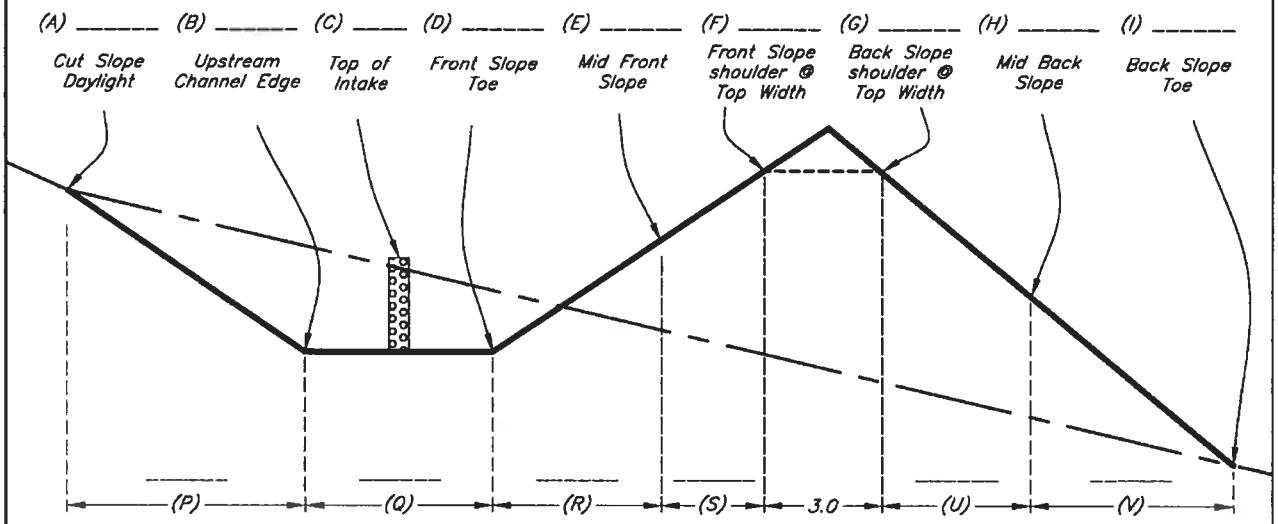
Landowner/Project:_____ Survey By:_____ Date:_____

Terrace:_____ Intake #/Station:_____ BM ID:_____ BM Elev._____ Shot on BM:_____ H.I. _____



Actual Slope Steepness Ratio (Horizontal / Vertical):1 = $\frac{P}{(B-A)}$ $\frac{R}{(D-E)}$ $\frac{S}{(E-F)}$ $\frac{U}{(H-G)}$ $\frac{V}{(I-H)}$

Terrace:_____ Intake #/Station:_____ BM ID:_____ BM Elev._____ Shot on BM:_____ H.I. _____



Actual Slope Steepness Ratio (Horizontal / Vertical):1 = $\frac{P}{(B-A)}$ $\frac{R}{(D-E)}$ $\frac{S}{(E-F)}$ $\frac{U}{(H-G)}$ $\frac{V}{(I-H)}$

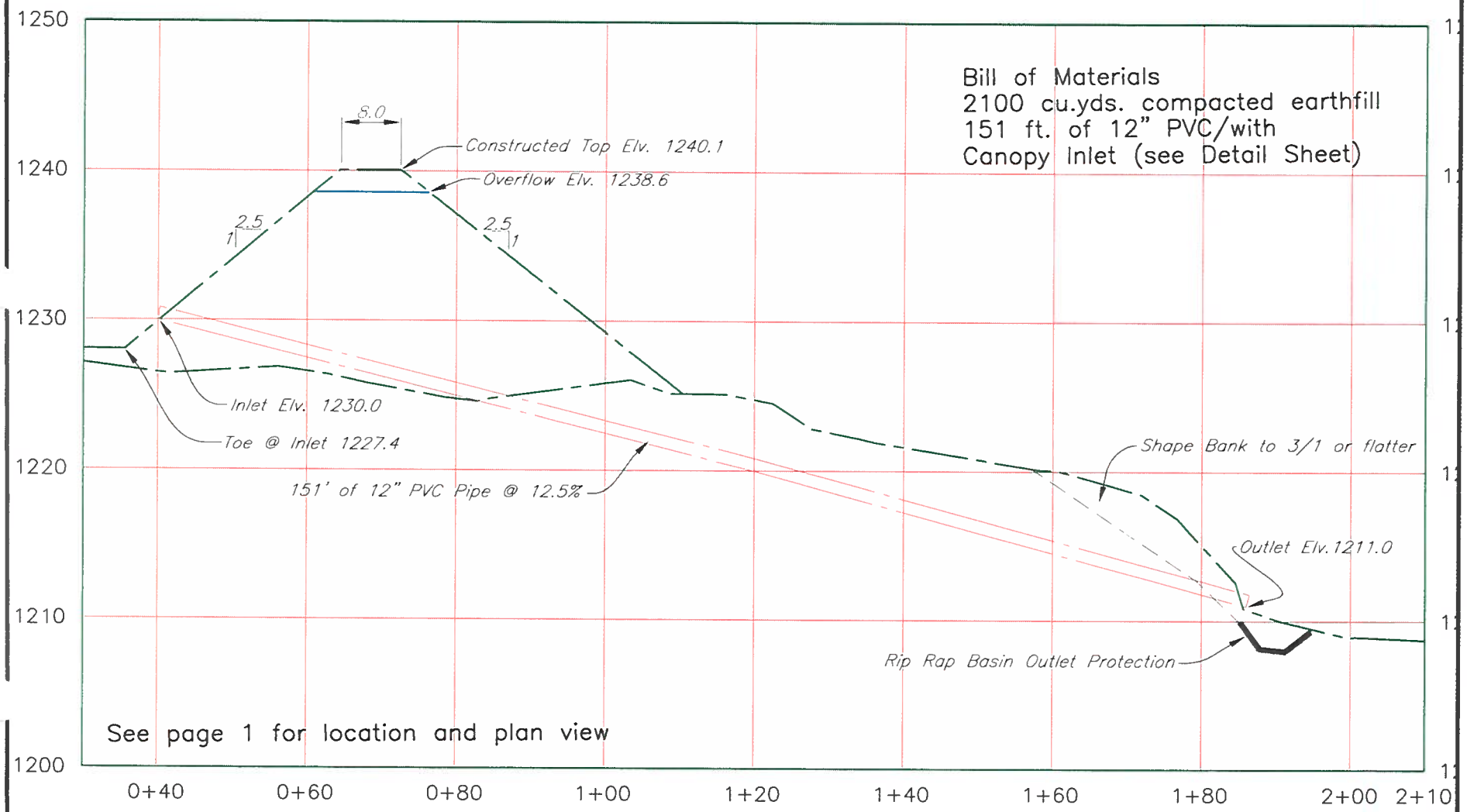
USDA United States Department of Agriculture
Natural Resources Conservation Service

Terrace Cross-Section Checkout Sheet
Basin_2019, T_1

Calmar 24

EFT Version 4.0.3.1

File Name
T_1.xml
Drawing Name
Cross-Section Checkout
08/22/2019
Sheet _____ of _____



Hageman_Profile PROFILE

Hageman_410_EFT_2_3_20.dwg

USDA United States Department of Agriculture
Natural Resources Conservation Service

Hageman Lynn/Ryan

Section on Center Line of Fill

8.5X11 LANDSCAPE

Upper Iowa Watershed Project

Winneshiek County, IA

		Date
Designed	Moyloe	2/20
Drawn	Moyloe	2/20
Checked	Mellick	2/20
Approved		

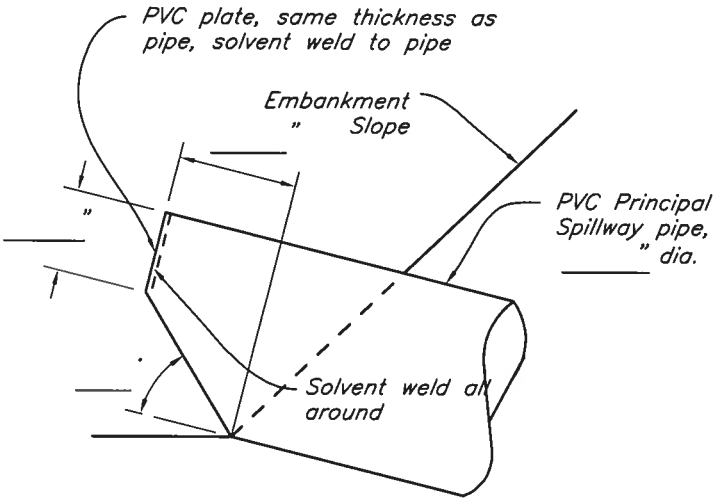
File Name

Drawing Name

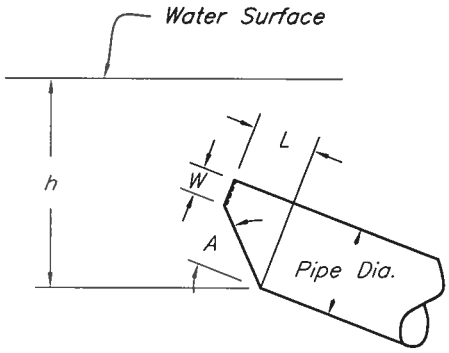
2/6/20 3:49 PM

Sheet 5 of 10

Pipe Diam. In.	Pipe Grade %	W In.	L In.	A Deg.	h Ft.
6	0–5	1 1/8	3 1/4	56	0.9
	5.1–15	1 1/4	4 3/4	45	0.9
	15.1–25	1 5/8	6 5/8	33	0.9
	25.1–32	2 1/8	7 3/4	27	0.9
8	0–5	1 1/2	4 3/8	56	1.2
	5.1–15	1 5/8	6 3/8	45	1.2
	15.1–25	2 1/8	8 3/4	33	1.2
	25.1–32	2 3/4	10 3/8	27	1.2
10	0–5	1 7/8	5 3/8	56	1.5
	5.1–15	2	8	45	1.5
	15.1–25	2 5/8	11	33	1.5
	25.1–32	3 1/2	13	27	1.5
12	0–5	2 1/4	6 1/2	56	1.8
	5.1–15	2 3/8	9 5/8	45	1.8
	15.1–25	3 1/4	13 1/4	33	1.8
	25.1–32	4 1/4	15 5/8	27	1.8

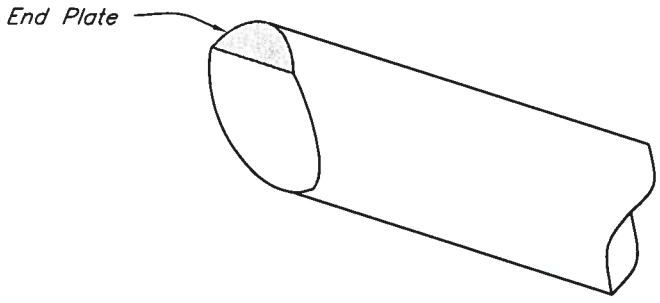


DETAIL OF CANOPY INLET



h=Minimum height for full pipe flow.

CANOPY INLET DIMENSIONS



PARTIAL ISOMETRIC VIEW

NOTES

1. Pressure rated PVC pipe shall conform to ASTM D–2241. Schedule 40 and 80 PVC shall confrom to ASTM D–1785.
2. Pipe material designation shall be PVC 1120 or 1220.
3. The longest section of pipe in the installation shall be 20 feet.
4. PVC pipe shall be joined by:
   a. Double gasketed couplings capable of resisting 160 psi pressure. Minimum length of coupling shall be 7.8" for 6" diameter, 8.2" for 8" diameter, 9.1" for 10" diameter, and 10" for 12" diamter.
   b. Single gasketed joint with minimum joint length beyond gasket of 2".
5. PVC welding solvent must be formulated for the intended use to produce a weld of maximum strength.
6. Non– buried sections (i.e. inlet and outlet) of non–ultraviolet (UV) protected PVC pipe shall be painted with a heavily pigmented, exterior water base latex paint. The latex paint must be thickly applied as an opaque coating on the pipe and fittings that have been well cleaned and very lightly sanded. No painting is required for UV protected PVC pipe.

STANDARD DWG. IA–1214

DATE June 2008 | PAGE 1 OF 1

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

CANOPY INLET DETAIL
6" to 12" PVC PIPE

Designed M Oyloe Date 09/19
Drawn Standard
Checked Ber 9/19
Approved [signature] CET 10/19

File Name

Drawing Name

Sheet 6 of 10

UNDERGROUND OUTLET DESIGN

Line No.	Reach No.	Station to Station		Length of Conduit (ft.)		Conduit Diam. (in.)		Conduit Material Specs.	Conduit Grade (%)		Conduit Cover (ft.)	
				Design	*As Built	Design	*As Built	Material Type and Classification	Design	*As Built	Min. Req'd	Max. Allowed
A		40	190	150		12		SDR 21 PVC	11.5		2.0	17.0

* Contractor shall fill out the "As Built" columns.

Type of Outlet:

- [x] Open ditch
- [ ] Existing tile
- [ ] _____

RELIEF WELL		
Line No.	Station	Riser Diam. (in.)

STANDARD DWG. IA–1501

DATE Mar. 2017 | PAGE 2 OF 2

USDA United States Department of Agriculture

Natural Resources Conservation Service

UNDERGROUND OUTLET

Owner: Hageman Lynn/Ryan

Location: Sec 24, T 97 N, R 9W,

Calmar Township

Winneshiek County, Iowa

Designed moyloe 9/19/19

Drawn moyloe 9/19/19

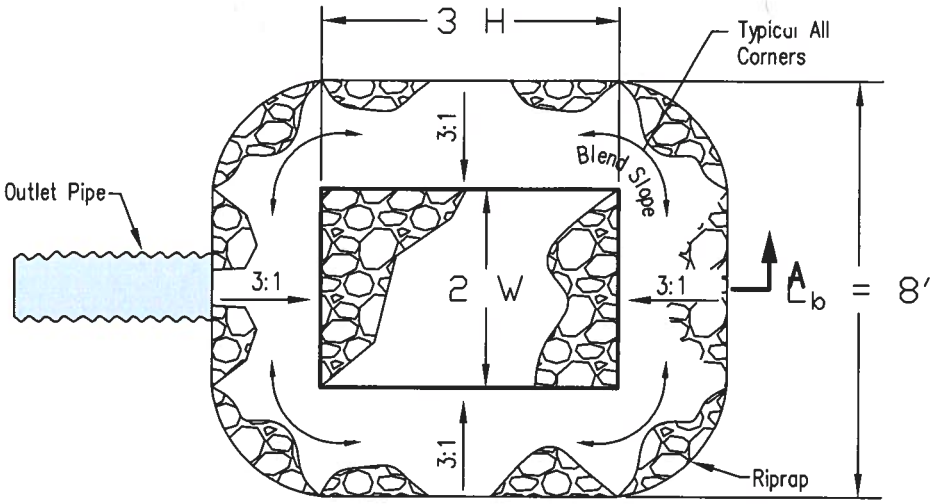
Checked Bux 9/19

Approved [signature] CET 10/19

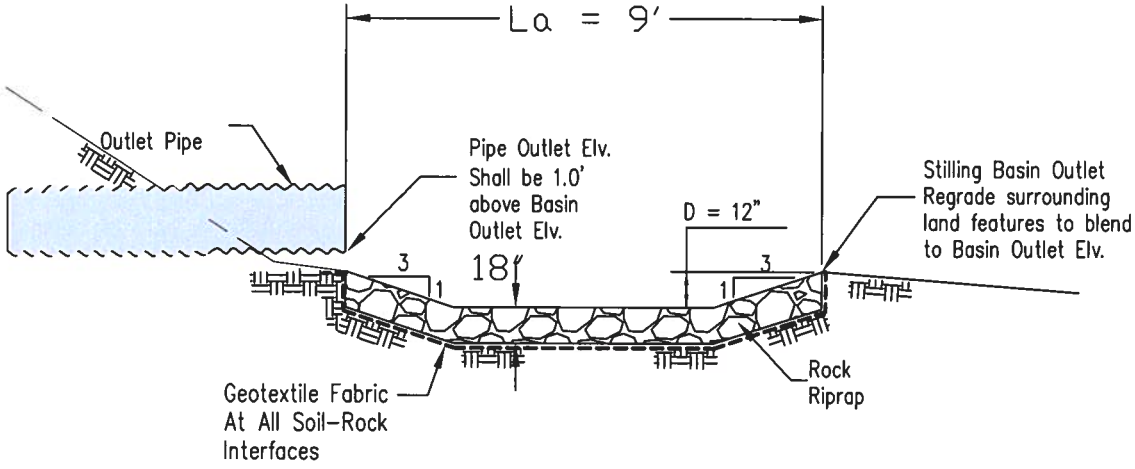
File Name

Drawing Name

Sheet 7 of 10



PLAN



SECTION A–A

NOTES:
1. Rock Riprap shall be well graded field or quarry-run stone (Gabion Stone) with a maximum size of 12" and a minimum size of 2".
2. Use Geotextile (non-woven, needle punched) to line the entire excavation before placing aggregates.
3. Any geotextile splices shall overlap a minimum of 18 inches, with upstream or upslope geotextile overlapping the downslope geotextile.
4. Permanent vegetation shall be established on all disturbed areas.

LIST OF MATERIALS		
Item	Quantity	Unit
Rock Riprap	6	Tons
Geotextile	15	Sq. Yds.

Outlet_Protection_Drawing2.dwg

USDA United States Department of Agriculture
Natural Resources Conservation Service

Hageman Lynn/Ryan
Rip Rap Outlet Protection

8.5X11 LAYOUT
Upper Iowa Watershed Project
Winneshiek County, IA

		Date
Designed	Moyloe	2/20
Drawn	Moyloe	2/20
Checked	Mellick	2/20
Approved		

File Name

Drawing Name

2/6/20 11:24 AM

Sheet 8 of 10

USDA United States Department of Agriculture
Natural Resources Conservation Service

T_1.xml

UGO Construction Checkout Sheet

Report Generated
02/06/2020

Project Name: Basin_2019, HAGEMAN_TRY_AGAIN
Location: Calmar 24
Project Description: _____
Practice: _____
Designed by: moyloe **Date:** _____
Checked by: Mellick **Date:** 2-7-20

_____
Surveyed by **Date** **Checked by** **Date**

I certify the information recorded on this sheet is a true representation of the actual practice installation and the practice as installed does ( ) or does not ( ) meet NRCS plans and specifications.

_____
Certified by **Date** **NRCS Rep.** **Date**

A Profile

Station	Fixture ID	Ref. Elev. (ft)	Plan Flowlin Elev. (ft)	Plan Cut (ft)	Plan Pipe Grade (%)	Actual Pipe Grade (%)	Required Capacity (cfs)	Design Pipe Capacity (cfs)
0+40.0	Inlet inletA	1227.4	1230.0	-2.6	BM _____ BS _____		8.67	15.09
Pipe	10 ft of 12.0 in diam. SMOOTH_PVC				12.52		Len. = _____(ft) Dia. = _____(in) Material = _____	
0+50.0	-	1226.8	1228.7	-1.9	BM _____ BS _____		8.67	15.09
Pipe	50 ft of 12.0 in diam. SMOOTH_PVC				12.52		Len. = _____(ft) Dia. = _____(in) Material = _____	
1+00	-	1226.1	1222.5	3.6	BM _____ BS _____		8.67	15.09
Pipe	20 ft of 12.0 in diam. SMOOTH_PVC				12.52		Len. = _____(ft) Dia. = _____(in) Material = _____	
1+19.9	GB1542	1222.9	1220.0	2.9	BM _____ BS _____		8.67	15.09
Pipe	30 ft of 12.0 in diam. SMOOTH_PVC				13.41		Len. = _____(ft) Dia. = _____(in) Material = _____	
1+50.0	-	1221.2	1216.0	5.2	BM _____ BS _____		8.67	15.09

EFT Version 4.0.3.4

A Profile

Station	Fixture ID	Ref. Elev. (ft)	Plan Flowlin Elev. (ft)	Plan Cut (ft)	Plan Pipe Grade (%)	Actual Pipe Grade (%)	Required Capacity (cfs)	Design Pipe Capacity (cfs)
Pipe	37 ft of 12.0 in diam. SMOOTH_PVC				13.41		Len. = _____(ft) Dia. = _____(in) Material = _____	
1+87.0	Outlet Outlet_A	1212.5	1211.0	1.5	BM _____ BS _____		8.67	15.09
Pipe					N/A		Len. = _____(ft) Dia. = _____(in) Material = _____	

A Inlet(s)

Inlet ID	Channel Bottom Elev.	Channel Cut	Inlet Diam. (in)	Perf Size (in)	Holes / Foot	Perf. Length (ft)	Guard	Orifice Elev.	Orifice Diam. (in)	Base / Elbow Elev.	Offset Pipe Diam. (in)	Offset Pipe Length (ft)
inletA	1228.00	-0.6	12.00	-	-	-	-	-	-	1230.00	-	-
As-Built												

A Outlet

Outlet ID	Outlet Type	Outlet Diam. (in)	Length or Height (ft)	Holes / Foot	Perf Size (in)	Guard	Outlet Elev.	Material
Outlet_A	Standard	12.00	0.0	-	-	YES	1211.00	SMOOTH_PVC
As-Built								

0 50 100 200 Feet

N
W E
S

Legend

- EFT_Basin_9_19
- Permanent_Seeding
- Impact_Area

Hageman Lynn/Ryan
Proposed Seeding Areas
10/23/19

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service
USDA is an equal opportunity provider and employer.

IA - CPA - 4 REV.
May-03
(File Code 180-12-12)

Seeding Plan

Name Lynn Hageman **Date** 2/10/20 Tract No. T1088
Field No. Structure Site
Contract No. UIR-WMA project

Type of Seeding Critical **Prepared by** M Frana

*To figure Pure Live Seed (PLS) rates, multiply the percent purity by the percent germination. Divide the seeding rate by the percent PLS to find the bulk seed needed per acre.

For example, 98% purity X 60% germination = 0.588% PLS
10 lbs./acre ÷ 0.588% PLS = 17 lbs./acre

Species	Acres	Lbs./Acre: Bulk or PLS (Circle One)	Total Needed
Brome	1	25 # Pounds	25Lbs.
		Pounds	
		Pounds	
		Pounds	
		Pounds	
Oats	1	1.5 Bushels Pounds	1.5 Bu.

☐ ***Soil Amendments, based on recent soil test (less than 4 yrs. old)***
■ ***Soil Amendments based on generic recommendation***
Apply soil amendments pior to seedbed preparation or before seeding, if a no-till drill is used.

Amendment	Rate/Acre	Acres	Total
Lime (ECCE)	3000		
Nitrogen	50		
Phosphate (P_2O_5)	100-200		
Potash (K_2O)	50-100		

Establishment Method: No-Till_____ Conventional X Frost_____ Dormant_____

Seeding Completion Date _____

Mulch Needed _____

Additional Seeding Criteria Seed upon completion of construction.

Seeding Complete by _____
(Date)

_____ _____
(Producer's Signature) (Date)

Field Office _____ **Certified by** _____
(NRCS Representative)

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATIONS for

UI-033-HAGEMAN

Winneshiek County, IA

List of Specifications:

Specification Number	Title	Pages
IA-1	Site Preparation	1
IA-5	Pollution Control	2
IA-6	Seeding & Mulching For Protective Cover	1
IA-23	Earthfill	3
IA-26	Topsoiling	1
IA-45	Plastic Pipe	4
IA-61	Loose Rock Rip Rap	2

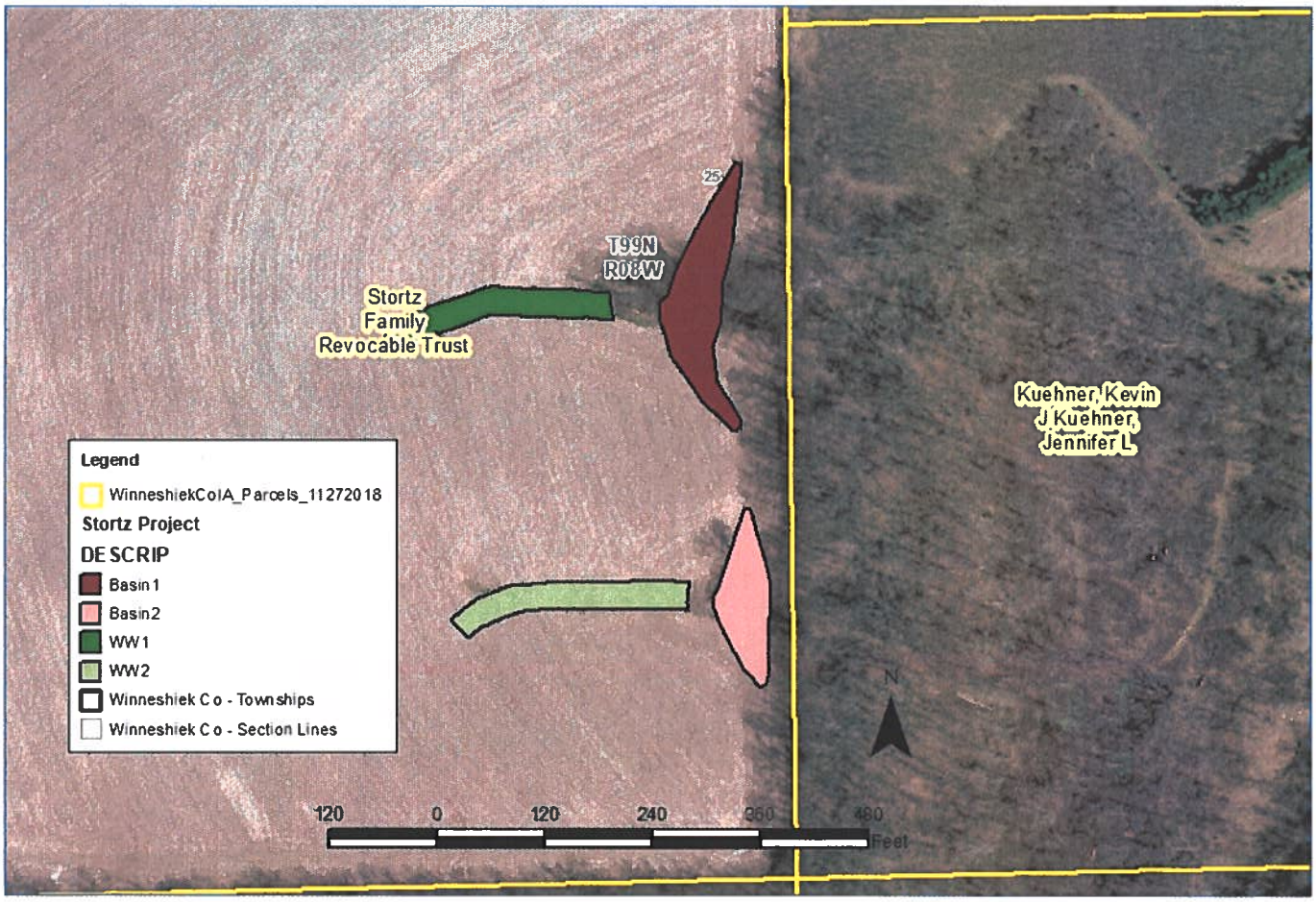
Stortz Project Summary

UI-026-STORTZ, UI-027-STORTZ, UI-028-STORTZ, & UI-029-STORTZ

Customer: Stortz Family Revocable Trust (Ruth Stortz)
Assistance by: Matt Frana - UIR Watershed Project Coordinator ***Date:*** 2/13/20
Project Location: Sec 25, T99N R08W, Canoe Township

Project Objective: To slow water moving through farm to prevent damages from heavy rain events.

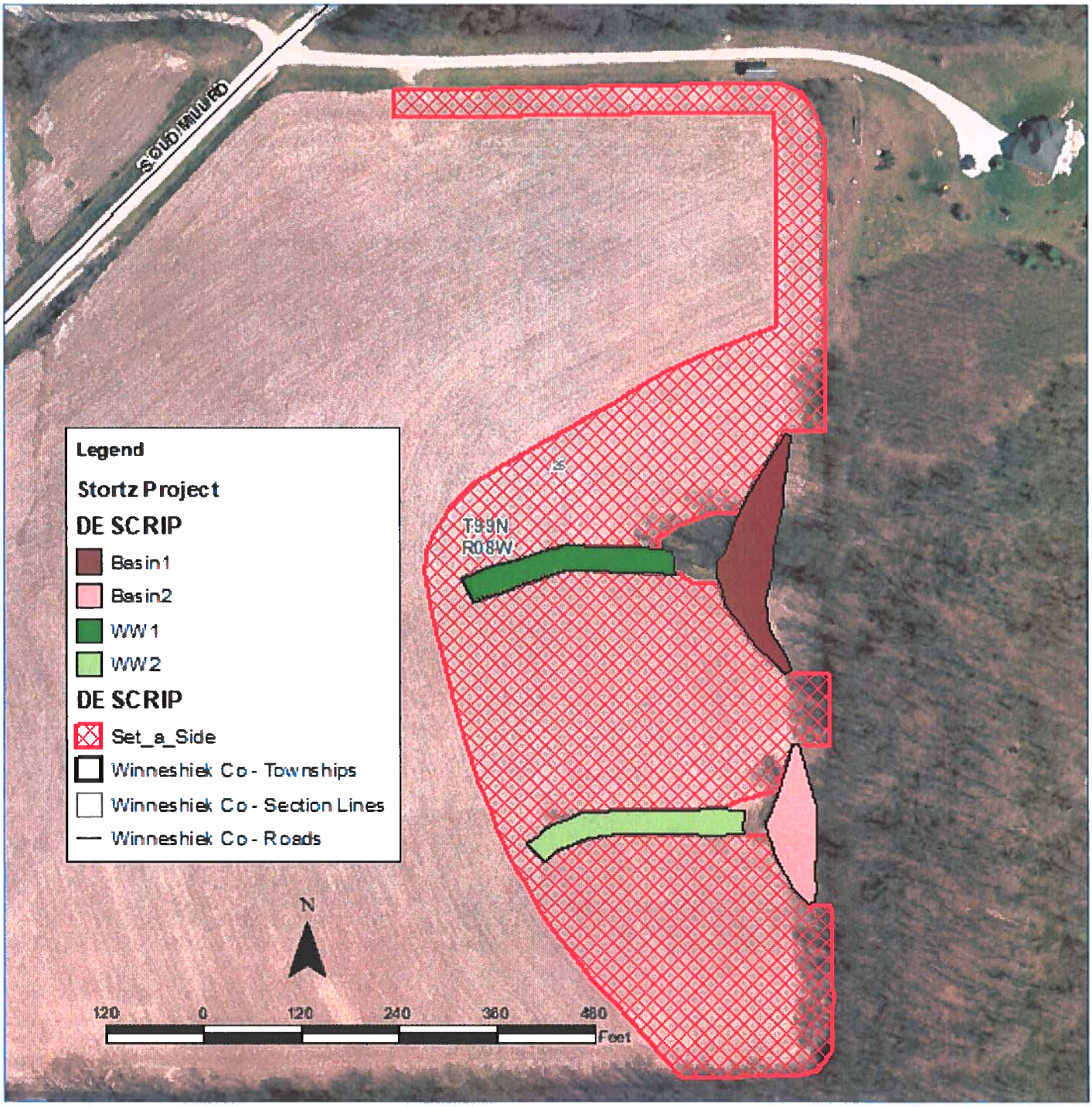
Background:
A site investigation of the Stortz property revealed erosion concerns that could be addressed by reshaping/reestablishing waterways and adding sediment basins. The Stortz's have agreed to the suggested practices to help address erosion issues on both theirs and the adjacent property, while addressing flood mitigation efforts in the Upper Iowa Watershed.



Project Plan:
2 Water and Sediment Control Basins (WASCOB) will be constructed on the Stortz property that will slow and temporary detain water, reducing damages after heavy rain events. Waterways above the WASCOBs will be added to address erosion concerns and add longevity to the WASCOBs.

Cropland Set-aside:

In order to ensure the project can be completed without interferring with farming, the designated acres on the map below have been agreed to be set-aside for the 2020 crop season. The set-aside area will be flagged off prior to construction. **The farmer has requested that there be minimal traffic across the cropland to minimize compaction. Contractors should offload construction equipment on S. Old Mill Rd before proceeding to construction site.**

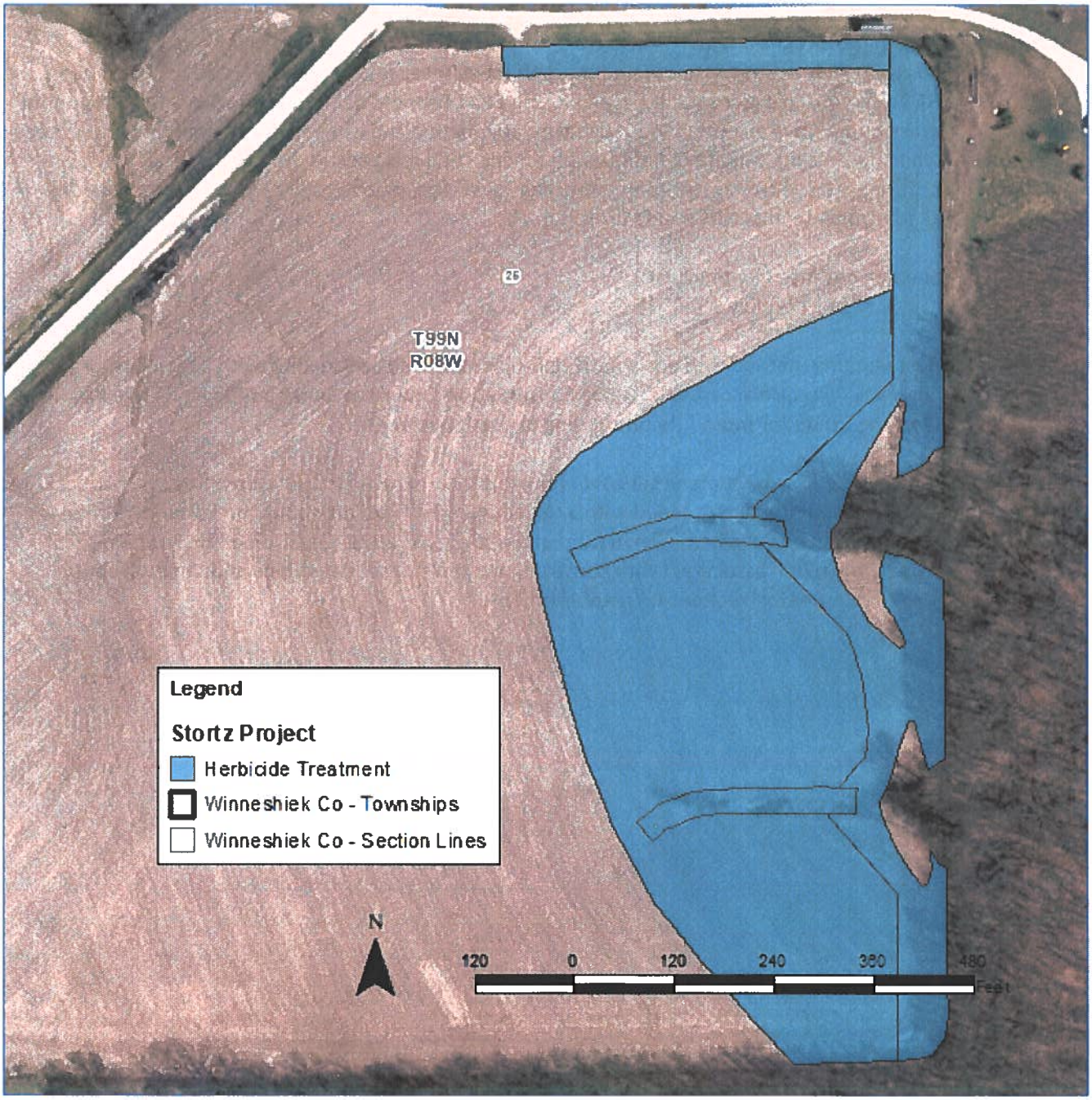


Set-aside Map

Post Construction Seeding:

After construction there will be 3 different seeding mixes used to cover the disturbed areas. Contact Upper Iowa Watershed Coordinator (Matt Frana) to flag out different seeding areas. The seeding and establishment of vegetation at the site post construction is the responsibility of the project contractor. After the new seeding is successfully established, continued maintenance will be the responsibility of the landowner.

A pass of herbicide (glyphosate) should be completed prior to seeding to control any initial weed emergence. Ensure herbicide pass doesn't have a residual an impact on selected vegetation for seeding.



Herbicide Treatment Area Map

1) **Criterial Area Seeding (1.5 ac):** This is the seeding mix/method that will be used for the basin structures and waterways. The goal of this seeding is to quickly establish vegetation to prevent erosion or damage to structure. **Refer to Critical area seeding plan and job sheet for prescribed seed mix and planting methods.**

2) **Native Seeding (2 ac)**: To be used around the structure, odd farming, and along east fence line areas. A diverse mix of natives will enhance wildlife habitat, prevent erosion, and promote water infiltration into the soil. **Refer to seeding plans and Conservation Cover Job Sheet for seed mix and instructions on establishment.**

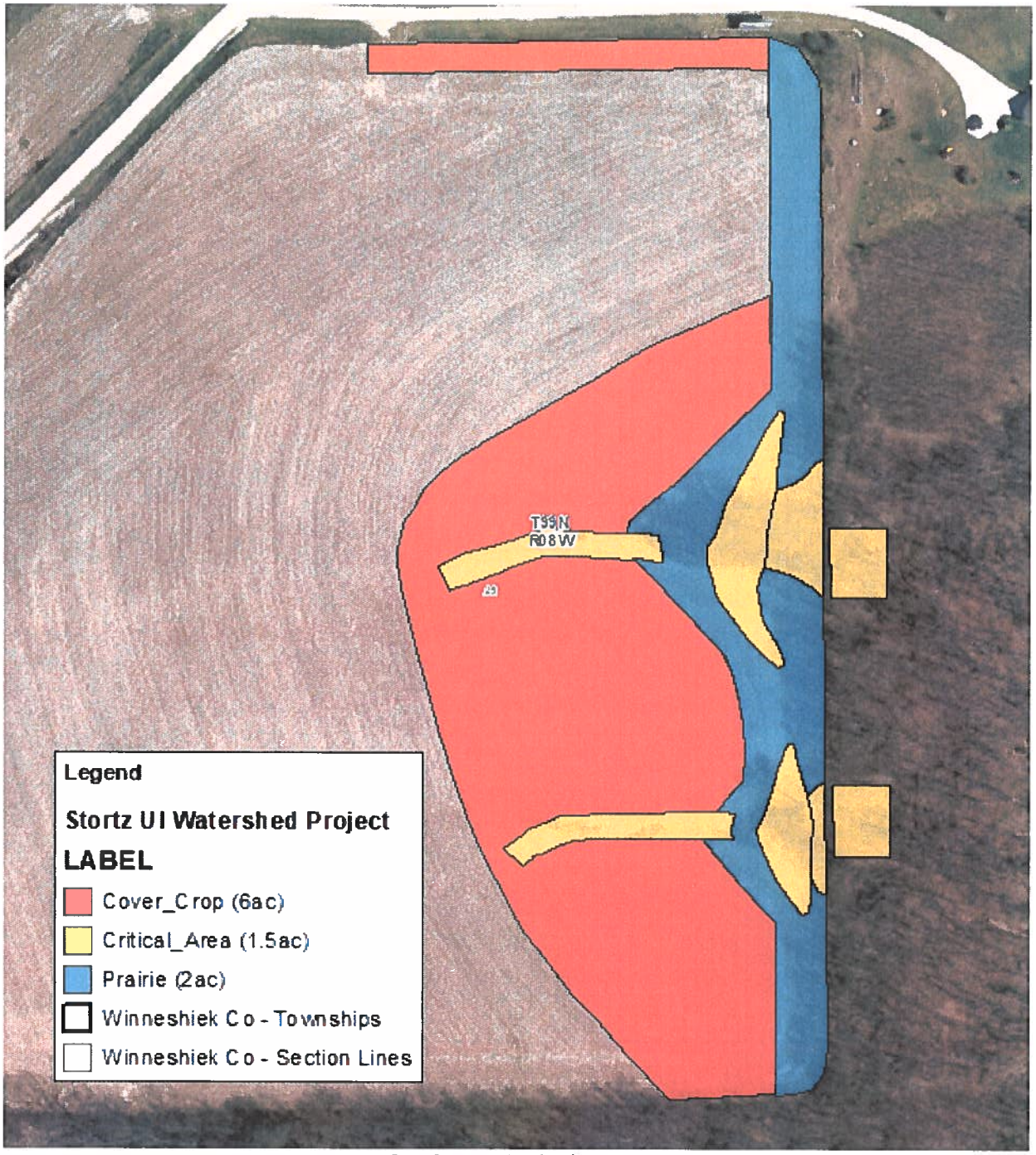
Notes for seeding/establishment:

a. For convenience seed mixes were based off Iowa Pheasants Forever (PF) seed mixes, but are NOT required to order seed through PF. The **CP42 Leopold #1 Pollinator Mix** with the **Leopold grass bump up** is recommended to ensure adequate establishment over a variety of land types while maximizing wildlife benefits. If prescribed seed mix species are not available when ordering, please contact Matt Frana (Upper Iowa Watershed Project Coordinator) to modify seeding plan to ensure it meets project goals.

b. Seeding dates to plant include:
   i. April 1st – July 1st

c. Best planting method is to use a native no-till drill. Broadcast seeding with light incorporation or cultipacking is also acceptable. **Refer Conservation Cover Job Sheet and Iowa Native Prairie Planting Guide for more info on seeding and establishment.**

3) **Cover Crop Seeding (6 ac):** Cropland set-aside for project construction, but not planted with Critical Area or Native Prairie Seeding will be seeded with a Cover Crop mix. Seeding should be left undisturbed for the 2020 crop season and can be prepped for planting a crop in 2021. Cover crop mix will help soils recover from compaction associated with construction**. Refer to seeding plans and Cover Crop Job Sheet for seed mix and instructions on establishment.**



Post Construction Seeding Map

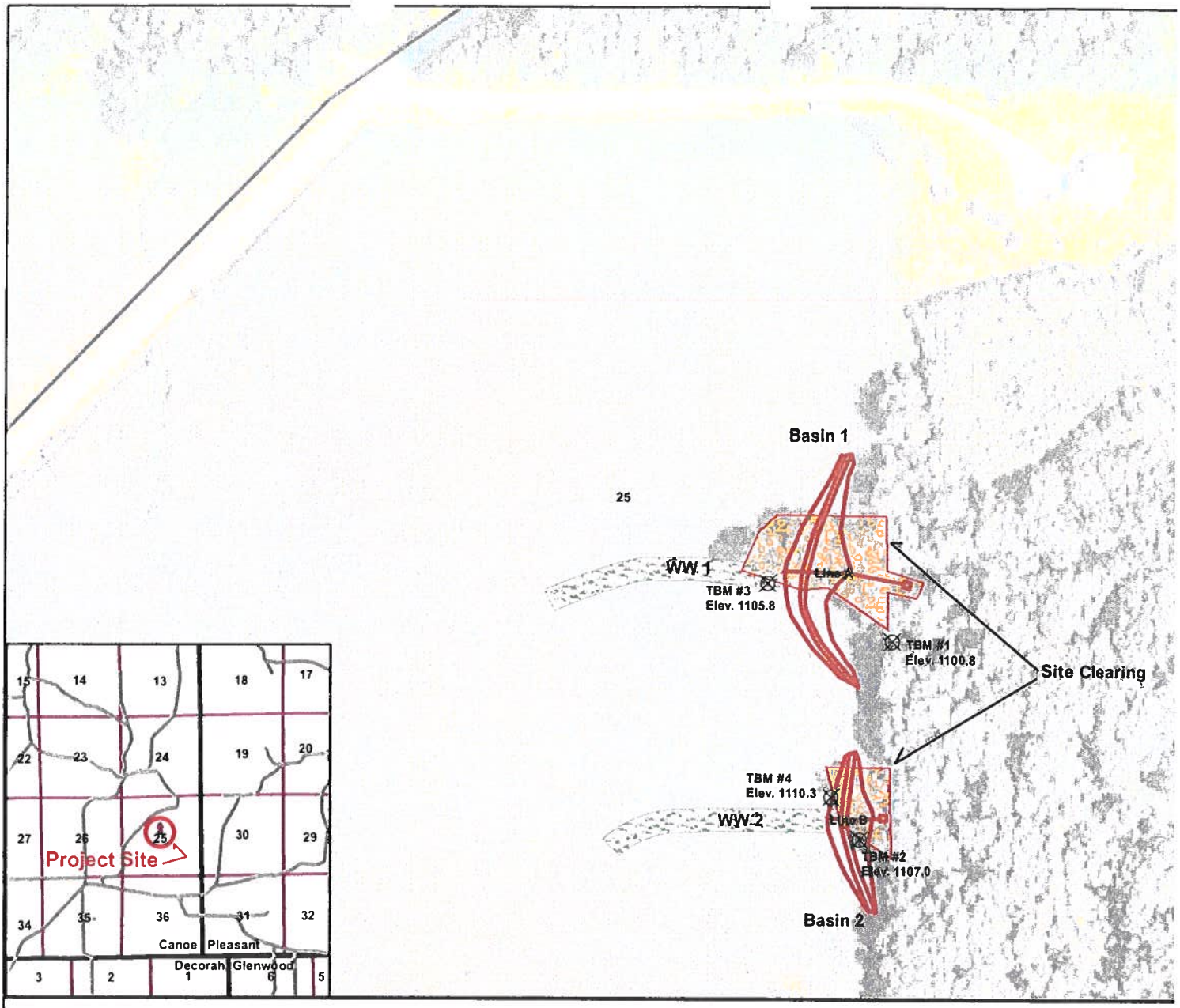
For questions on project construction please contact:

Matt Frana
Upper Iowa Watershed Project Coordinator
Winneshiek County Soil & Water Conservation District
2296 Oil Well Rd – Decorah, IA 52101
Phone: (563) 382-4352 x3
matt.frana@ia.nacdnet.net

Stortz Structures/Waterways February 11, 2020

UI-026-027-028-029-STORTZ

Item No.	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
Cost	**Share Expenses**					
7	Earthwork/Waterways	IA-412	900	cu. Yd.	$1.80	$1,620.00
8	Compacted Earthfill/Basins	IA-23/638	4500	cu. Yd.	$3.50	$15,750.00
10	6" SDR21 PVC	IA-620	200	feet	$13.00	$2,600.00
11	6"Intakes Installed		2	no.	$250.00	$500.00
12	8" PVC Outlet Pipe w/animal guard		2	no.	$300	$600.00
9	Rip Rap Outlet Protection	IA-61	2	job	$250	$500.00
3	Seeding/Structures Waterways	IA-6	1.5	acres	$300	$450.00
5	Native Prairie Seeding	IA-6	2	acres	$400	$800.00
4	Cover Crop	IA-6	6	acres	$50	$300.00
6	Herbicide Treatment		8.1	acres	$20	$162.00
	also attach IA-5, IA-26					
					Total	$23,282.00
					Landowner Cost (10%)	$2,328.20
Forego Commodity Income(cropland setaside value)			5.7	acres	$160.00	$912.00
		Land Ow Final Cost				$1,416.20
Other	**Expenses**					
1	Mobilization & Demobilization	IA-1	1	job	$2,000	$2,000.00
2	Site Clearing, Preperation & Waste Disposal	IA-1	1	job	$1,800.00	$1,800.00
					Other Total	$3,800.00
					Grand Total	**$27,082.00**



I have reviewed and agree with the content of the attached plan prepared by the NRCS.

Landowner: _____ *Date:* _____

I certify that this practice has been constructed in accordance with the plans and specifications.

Contractor: _____ *Date:* _____

NRCS Rep.: _____ *Date:* _____

CONTRACTOR IS RESPONSIBLE FOR CALLING IOWA ONE CALL
1-800-292-8989
Ticket #_____

If a cultural resource is identified during construction, stop immediately and notify the Natural Resources Conservation Service Archeologist at (515) 284-4370.

USDA United States Department of Agriculture

Natural Resources Conservation Service

Owner: Ruth Stortz / Basin-Waterway Project

Location: Sec 25, T 99 N, R 8W

Canoe *Township*

Winneshiek *County, Iowa*

		Date
Designed	moloe	01/20
Drawn	moloe	01/20
Checked	BV	2/20
Approved	Dan Mulh. CET	2/20

Eng. Job Class

Revision Date January 2017

Sheet 1 of 21

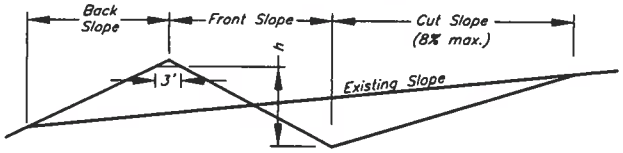
Terrace/Basin Data

Terrace No.	Terrace Type*	Length (ft.)	Front Slope	Back Slope	Min. Cut Slope (ft.)	Fill (cu.yds.)	Top Width** (ft.)
Basin 1	NB	380	2.5/1	2.5/1	5/1	2952	8
Basin 2	NB	235	2.5/1	2.5/1	5/1	1484	8

** NB (Narrow Base), GB (Grassed Backslope), BB (Broad Base), GFFB (Grassed Front Farmable Back)*
*** Applicable to 638 – Water And Sediment Control Basin (WASCB) designs.*

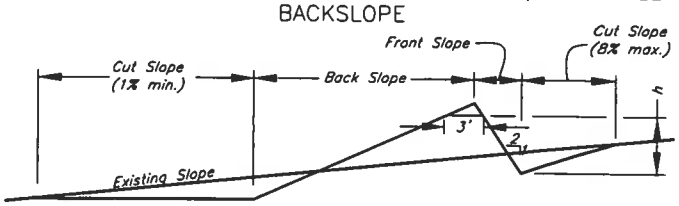
Topsoiling Required: ___YES ___NO

MINIMUM DIMENSIONS FOR BROADBASED TERRACE



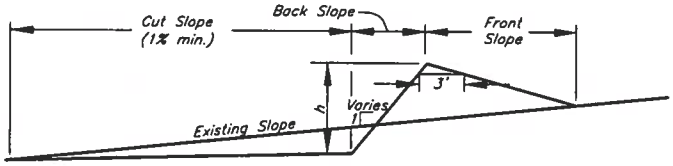
Length of front slope and back slope shall be in increments of machinery width but not shorter than 15 feet or steeper than 5:1
h=Design height of terrace

MINIMUM DIMENSIONS FOR GRASSED FRONT, FARMABLE BACKSLOPE



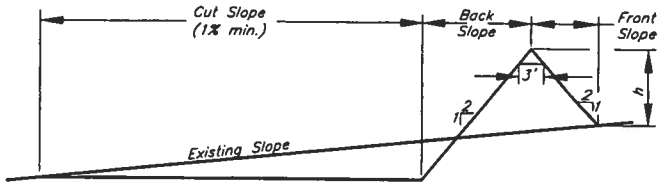
Length of back slope shall be in increments of machinery width but not shorter than 15 feet or steeper than 5:1
h=Design height of terrace

MINIMUM DIMENSIONS FOR GRASS BACK SLOPE



Length of front slope shall be in increments of machinery width but not shorter than 15 feet or steeper than 5:1
The back slope shall be no steeper than 2:1 except when built on Ida and Monona soil series types which may have the back slope constructed no steeper than 1.5:1
h=Design height of terrace

MINIMUM DIMENSIONS FOR NARROW BASE NB



h=Design height of terrace

* For Basin 1 see pages 5-11

* For Basin 2 see pages 12-18

STANDARD DWG. IA–1500

DATE Jan. 2017 | PAGE 1 OF 1

USDA United States Department of Agriculture

Natural Resources Conservation Service

TERRACE / BASIN PLAN

Owner: Ruth Stortz

Location: Sec 25, T 99 N, R 8 W

Canoe *Township*

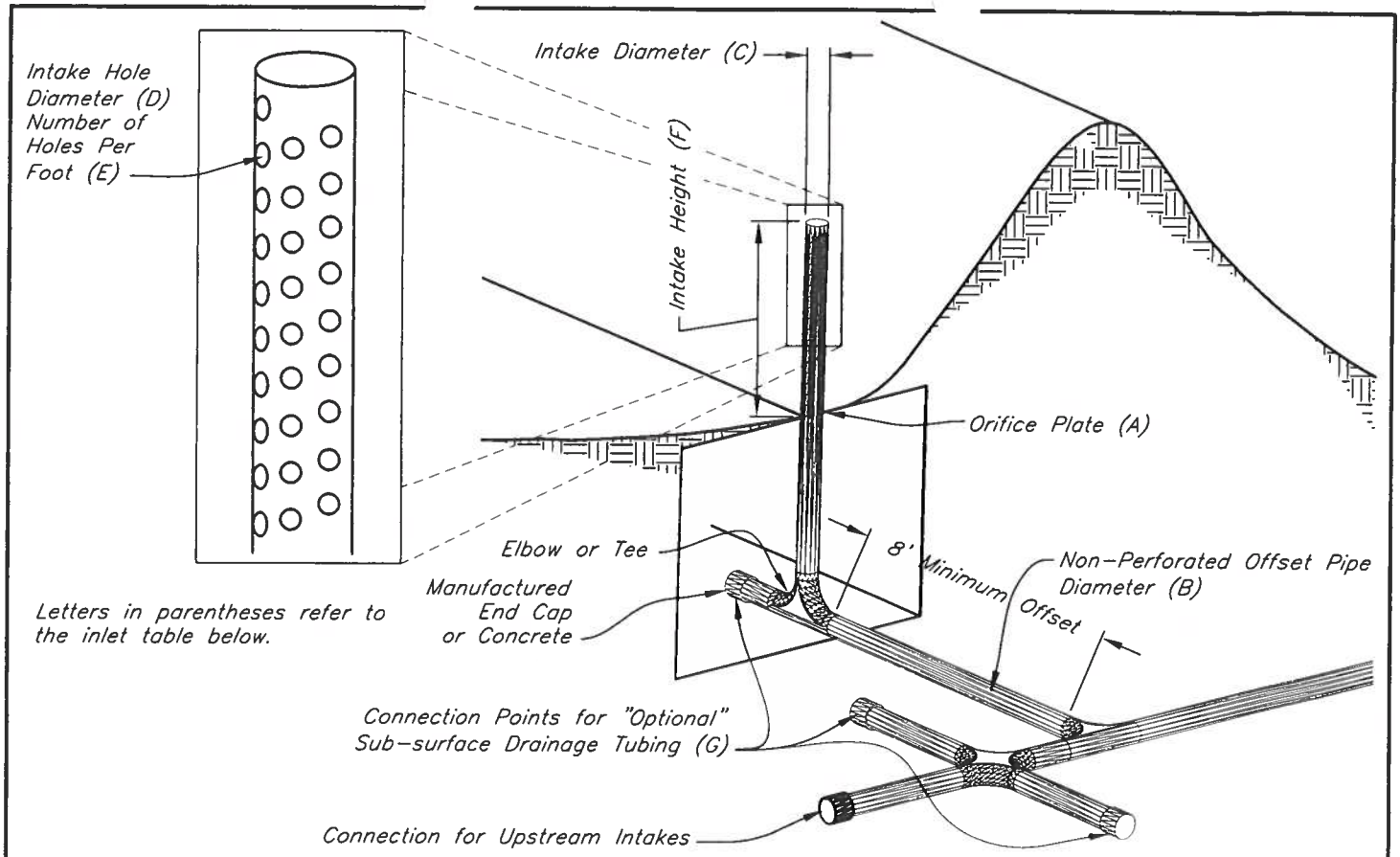
Winneshiek *County, Iowa*

		Date
Staked	moyloe	2/3/20
Designed	moyloe	2/3/20
Checked	BLV	2/20
Approved		

File Name

Drawing Name

Sheet 2 of 21



Letters in parentheses refer to the inlet table below.

INLET DESIGN MATERIALS AND DIMENSIONS

	A	B		C	D	E	F	G		Channel at Intake
Intake No.	Orifice Diam. (in.)	Non-Perforated Offset Pipe Diam. (in.)	Material Type	Intake Diam. (in.)	Intake Hole Dimensions Diam. or Slot size (in.)	Number per foot	Intake Height (ft.)	Additional Drain Tubing Diam. (in.)	Length (ft.)	C/F (ft.)
B1_A				6	1	20	3.0			1,102.0
B2_B				6	1	20	3.0			1,107.5

STANDARD DWG. IA-1501

DATE Mar. 2017 | PAGE 1 OF 2

Note: Channel Cut/Fill values are relative to ground elevation at reference line.

USDA *United States Department of Agriculture*

Natural Resources Conservation Service

UNDERGROUND OUTLET

Owner: Ruth Stortz

Location: Sec 25 , *T* 99 *N, R* 8W .

. Canoe *Township*

. Winneshiek *County, Iowa*

		Date
Designed	moyloe	1/31/20
Drawn	moyloe	1/31/20
Checked	BW	
Approved		

File Name

Drawing Name

Sheet 3 of 21

UNDERGROUND OUTLET DESIGN

Line No.	Reach No.	Station to Station		Length of Conduit (ft.)		Conduit Diam. (in.)		Conduit Material Specs.	Conduit Grade (%)		Conduit Cover (ft.)	
				Design	*As Built	Design	*As Built	Material Type and Classification	Design	*As Built	Min. Req'd	Max. Allowed
A_1		0+10	0+76	66		6"		6" SDR21 PVC	11.3			17.0
A_2		0+76	1+62	86		6"		6" SDR21 PVC	4.2			17.0
B_1		0+14	0+85	71		6"		6" SDR21 PVC	8.7			17.0

see pages 10 & 11 for Rip Rap Outlet Protection - Basin 1

see pages 17 & 18 for Rip Rap Outlet Protection - Basin 2

* Contractor shall fill out the "As Built" columns.

2-8"- PVC - 20'w/guard

Type of Outlet:

- [x] Open ditch
- [ ] Existing tile
- [ ] _____

RELIEF WELL		
Line No.	Station	Riser Diam. (in.)

STANDARD DWG. IA-1501

DATE Mar. 2017 | PAGE 2 OF 2

USDA United States Department of Agriculture

Natural Resources Conservation Service

UNDERGROUND OUTLET

Owner: Ruth Stortz

Location: Sec 25, T 99 N, R 8W,

Canoe Township

Winneshiek County, Iowa

Designed moyloe Date 1/31/20

Drawn moyloe 1/31/20

Checked RW 2/4/20

Approved _____

File Name

Drawing Name

Sheet 4 of 21

USDA United States Department of Agriculture
Natural Resources Conservation Service

TERRACE_17.xml

Report Generated 02/03/2020

Terrace Construction Summary Sheet Basin 1

Project Name: 2019 Basins, Stortz_Basin_1
Project Description: Basin 1
Designed by: _____
Date: _____

Location: _____
Practice: _____
Checked by: BK 2/20
Date: _____

Terraces

Terrace	Type	Reach	Cut Slope	Botton Width	Front Slope	Top Width	Back Slope	Strip. Vol.	Fill Vol.	Layou Length	Constr. Length
Basin_1	*NarrowBase	0+25.2 - 1+25.0	5.0 : 1	0.0	2.5 : 1	8.0	2.5 : 1	341.7	2951.6	99.8	
Basin_1	*NarrowBase	1+25.0 - 2+24.9	5.0 : 1	0.0	2.5 : 1	8.0	2.5 : 1			99.9	
Basin_1	*NarrowBase	2+24.9 - 3+80.0	5.0 : 1	0.0	2.5 : 1	8.0	2.5 : 1			155.1	
Totals								341.7	2951.6	354.8	

Front heights may vary throughout a Terrace
All Stripping Volumes based on 6.0 inch stripping depth

Survey Control Points

Point	Northing	Easting	Elevation	Description

The construction checkout information shown on this sheet is a true representation of the actual construction performed. This practice was installed in accordance with NRCS plans and specifications.

Certified by: _____ Date _____

NRCS Representative: _____ Date _____

EFT Version 4.0.3.4

5 of 21

USDA United States Department of Agriculture
Natural Resources Conservation Service

TERRACE_17.xml

Terrace Construction Checkout Sheet

Report Generated
02/03/2020

Project Name: 2019 Basins, Stortz_Basin_1
Project Description: Sed Basin 1
Designed by: _____ **Date:** _____
Location: _____
Practice: _____
Checked by: BW **Date:** 2/20

Surveyed by **Date** **Checked by** **Date**

NOTE: The column (R) is the elevation difference from the hub to the constructed ridge. The minimum ridge rod is the BM rod reading plus the value in (R).

I certify the information recorded on this sheet is a true representation of the actual practice installation and the practice as installed does ( ) or does not ( ) meet NRCS plans and specifications.

Certified by **Date** **NRCS Rep.** **Date**

Benchmark Desc:

BS _____ **HI** _____ **FS** _____ **BM Elev:** 0.00

BS _____ **HI** _____ **FS** _____ **Elev:**

Strip. Vol. (cy): 341.7 **Total Fill (cy):** 2951.6 **Total Cut (cy):** 422.4 **Total Length (ft):** 354.8

Strip. Depth (in): 6.0 **Flagline Loc:** RIDGE_CENTER **Design Water Elev:** 1110.3 **BM - Des. Water:** -1110.3

Build Ridge to 1111.9 elev.

Basin_1 Profile

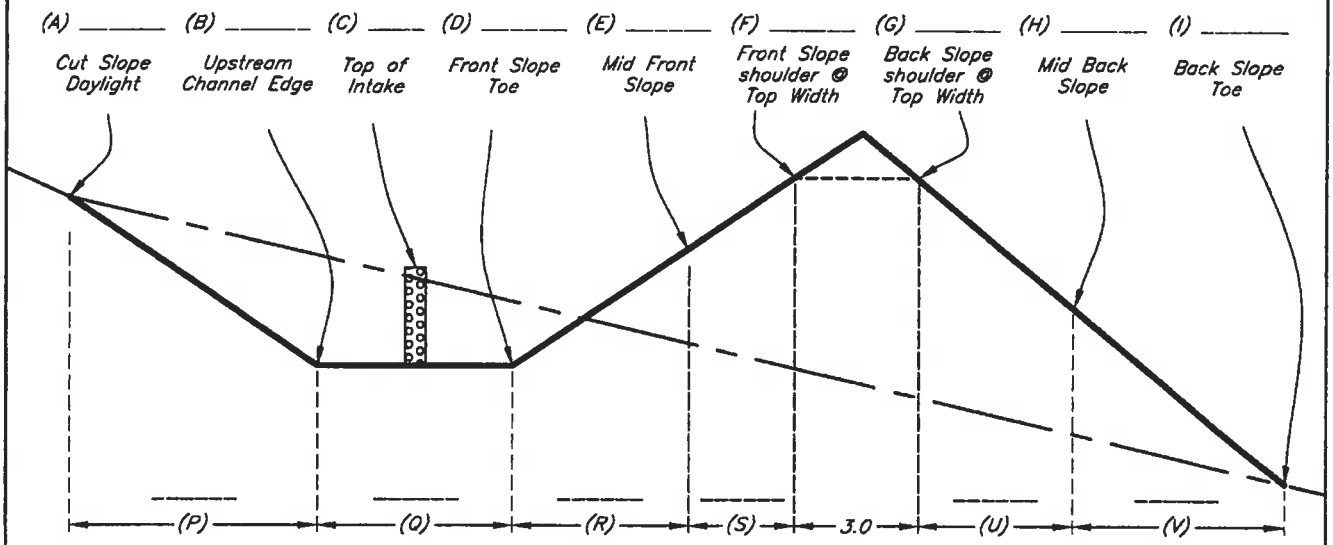
Station	FLAG NUMBEI	Ref. Elevation (ft)	Channel Elevation (ft)	Channel C/F	Ridge Elev. (ft)	Ridge C/F	Bottom Width (ft)	Drain/ Block Info	Channel	Ridge Shots	(R) Add to hub rod
0+25.2		1111.9	1111.8	0.1C	1113.9	2.0F	0.0				-1113.9
0+50.0		1110.4	1110.3	0.1C	1112.4	2.0F	0.0				-1112.4
1+00		1106.4	1107.5	1.1F	1111.5	5.2F	0.0				-1111.5
1+50.0		1102.5	1104.5	2.0F	1111.7	9.3F	0.0				-1111.7
2+00		1099.9	1102.0	2.1F	1111.9	12.0F	0.0	B1_a 0+00.2			-1111.9
2+49.8		1103.7	1104.9	1.2F	1111.7	8.0F	0.0				-1111.7
3+00		1107.6	1108.0	0.4F	1111.5	3.9F	0.0				-1111.5
3+50.0		1110.0	1109.8	0.2C	1111.9	1.9F	0.0				-1111.9
3+80.0		1111.4	1111.3	0.1C	1113.4	2.0F	0.0	*Build end to			-1113.4

Note: Ridge and Channel Cut/Fill values are relative to ground elevation at reference line. elev. 1110.3 for Overflow*

Terrace Cross Section Checkout Sheet

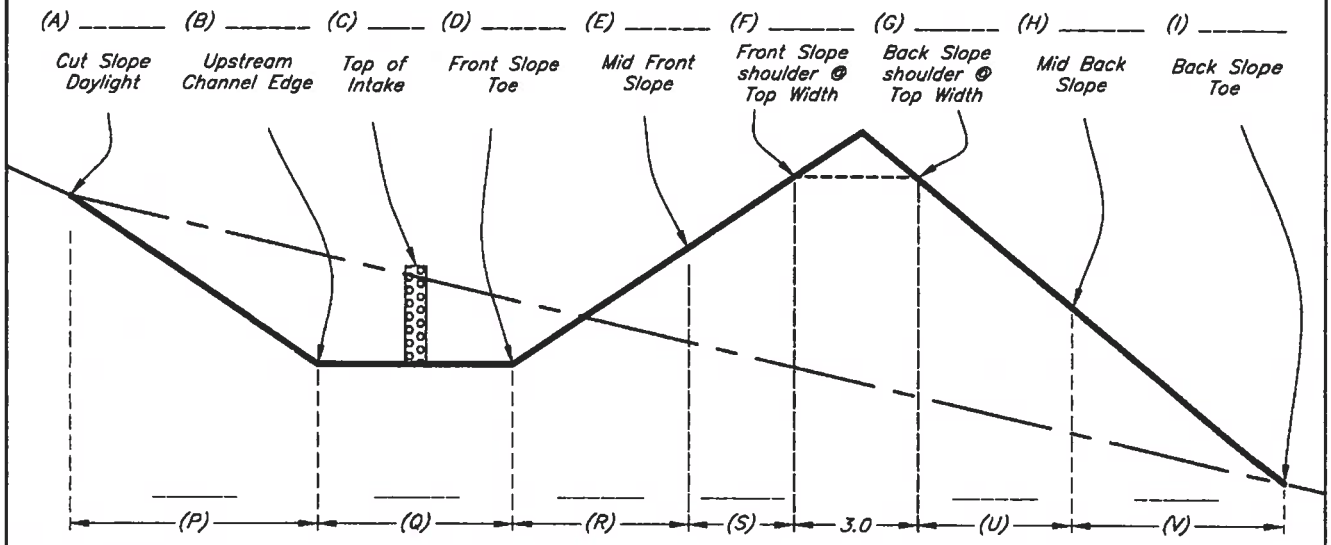
Landowner/Project:_____ Survey By:_____ Date:_____

Terrace:_____ Intake #/Station:_____ BM ID:_____ BM Elev._____ Shot on BM:_____ H.I. _____



Actual Slope Steepness Ratio (Horizontal / Vertical):1 = $\frac{P}{(B-A)}$ $\frac{R}{(D-E)}$ $\frac{S}{(E-F)}$ $\frac{U}{(H-G)}$ $\frac{V}{(I-H)}$

Terrace:_____ Intake #/Station:_____ BM ID:_____ BM Elev._____ Shot on BM:_____ H.I. _____



Actual Slope Steepness Ratio (Horizontal / Vertical):1 = $\frac{P}{(B-A)}$ $\frac{R}{(D-E)}$ $\frac{S}{(E-F)}$ $\frac{U}{(H-G)}$ $\frac{V}{(I-H)}$

USDA United States Department of Agriculture
Natural Resources Conservation Service

Terrace Cross-Section Checkout Sheet
2019 Basins, Stortz_Basin_1

EFT Version 4.0.3.4

File Name
TERRACE_17.xml
Drawing Name
Cross-Section Checkout
02/03/2020
Sheet _____ of _____

USDA United States Department of Agriculture
Natural Resources Conservation Service

TERRACE_17.xml

UGO Construction Checkout Sheet

Report Generated
02/10/2020

Project Name: 2019 Basins, Stortz_Basin_1 **Location:** _____
Project Description: _____ **Practice:** _____
Designed by: _____ **Date:** _____ **Checked by:** Bey **Date:** 2/20

_____
Surveyed by **Date** **Checked by** **Date**

I certify the information recorded on this sheet is a true representation of the actual practice installation and the practice as installed does ( ) or does not ( ) meet NRCS plans and specifications.

_____
Certified by **Date** **NRCS Rep.** **Date**

A Profile

Station	Fixture ID	Ref. Elev. (ft)	Plan Flowlin Elev. (ft)	Plan Cut (ft)	Plan Pipe Grade (%)	Actual Pipe Grade (%)	Required Capacity (cfs)	Design Pipe Capacity (cfs)
0+00.2	Inlet B1_a	1101.7	1098.4	3.3	BM _____ BS _____		1.86	2.49
Pipe	50 ft of 6.0 in diam. SMOOTH_PVC				11.25		Len. = _____(ft) Dia. = _____(in) Material = _____	
0+50.0	-	1095.7	1092.8	2.9	BM _____ BS _____		1.86	2.49
Pipe	16 ft of 6.0 in diam. SMOOTH_PVC				11.25		Len. = _____(ft) Dia. = _____(in) Material = _____	
0+66.0	GB7943	1093.1	1091.0	2.1	BM _____ BS _____		1.86	2.49
Pipe	34 ft of 6.0 in diam. SMOOTH_PVC				4.16		Len. = _____(ft) Dia. = _____(in) Material = _____	
1+00	-	1090.7	1089.6	1.2	BM _____ BS _____		1.86	2.49
Pipe	51 ft of 6.0 in diam. SMOOTH_PVC				4.16		Len. = _____(ft) Dia. = _____(in) Material = _____	
1+51.0	Outlet Outlet	1087.2	1087.5	-0.3	BM _____ BS _____		1.86	2.49

A Profile

Station	Fixture ID	Ref. Elev. (ft)	Plan Flowlin Elev. (ft)	Plan Cut (ft)	Plan Pipe Grade (%)	Actual Pipe Grade (%)	Required Capacity (cfs)	Design Pipe Capacity (cfs)
Pipe					N/A		Len. = _____(ft) Dia. = _____(in) Material = _____	

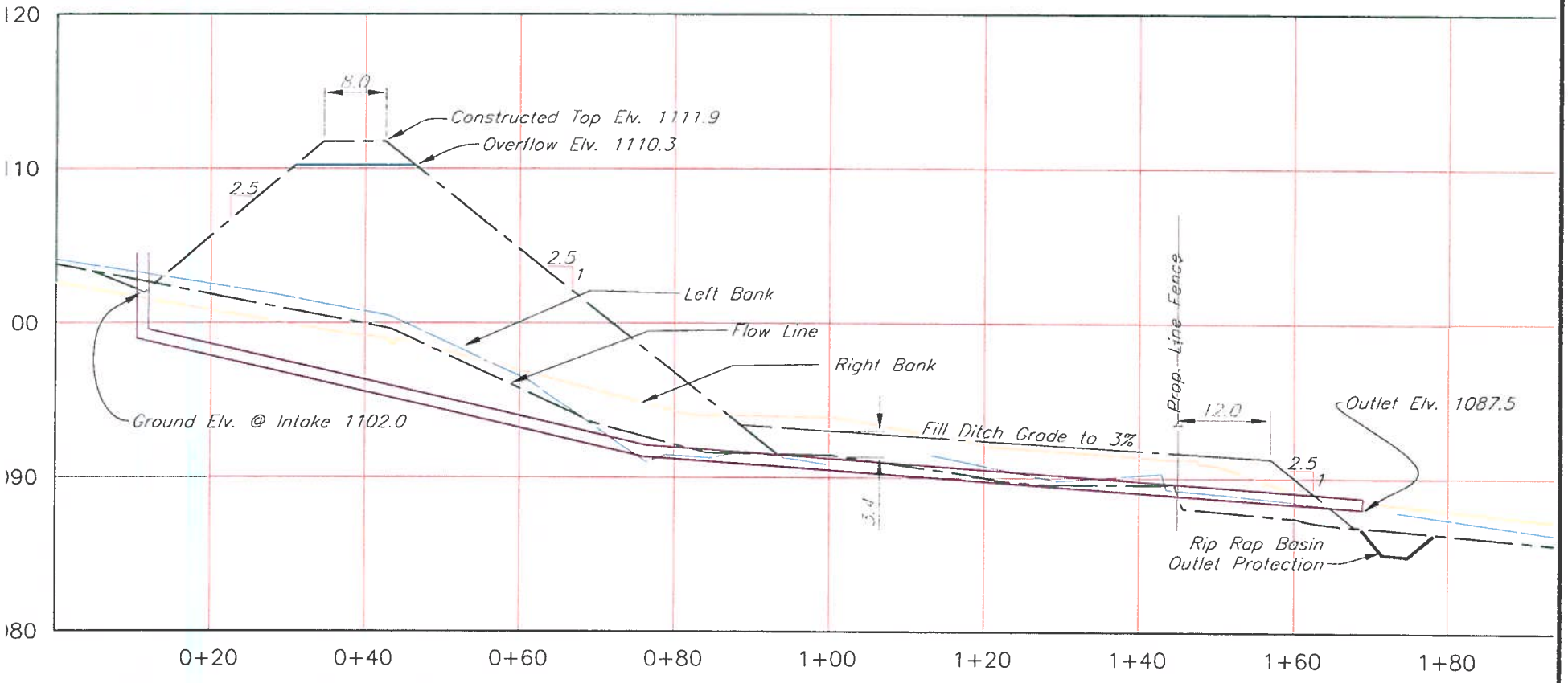
A Inlet(s)

Inlet ID	Channel Bottom Elev.	Channel Cut	Inlet Diam. (in)	Perf Size (in)	Holes / Foot	Perf. Length (ft)	Guard	Orifice Elev.	Orifice Diam. (in)	Base / Elbow Elev.	Offset Pipe Diam. (in)	Offset Pipe Length (ft)
B1_a	1102.00	-0.3	6.00	1.00	20	3.00	TRASH	-	-	1098.40	-	-
As-Built												

A Outlet

Outlet ID	Outlet Type	Outlet Diam. (in)	Length or Height (ft)	Holes / Foot	Perf Size (in)	Guard	Outlet Elev.	Material
Outlet_A	Standard	8.00	20.0	-	-	YES	1087.46	SMOOTH_PVC
As-Built								

Bill of Materials
3000 cu.yds.compacted earthfill
140 ft. 6" Bell & Gasket SDR 21 PVC
Fabricated 6" Intake w/min 3' of 20–1" holes per ft.
20 ft. 8" outlet pipe w/animal gaurd



CL_OUTLET PROFILE

See page 1 for location and plan view

STORTZ_STRUCTURES_EFT_XYZ.dwg

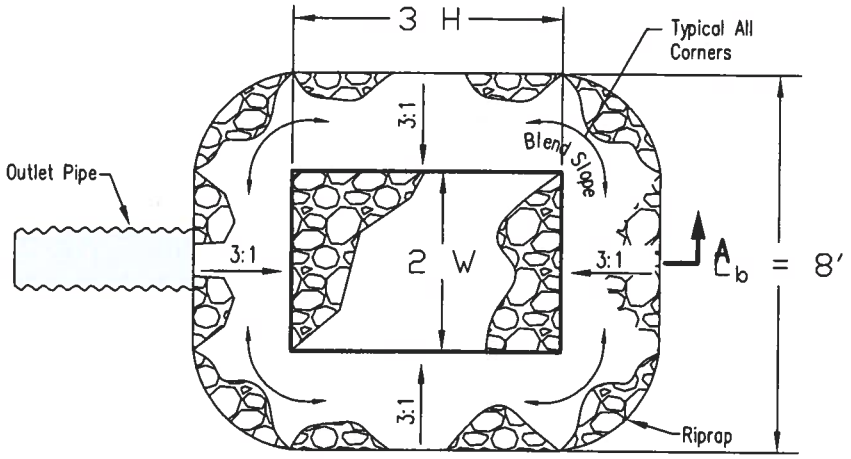
USDA United States Department of Agriculture
Natural Resources Conservation Service

Ruth Stortz
Basin 1 Profile

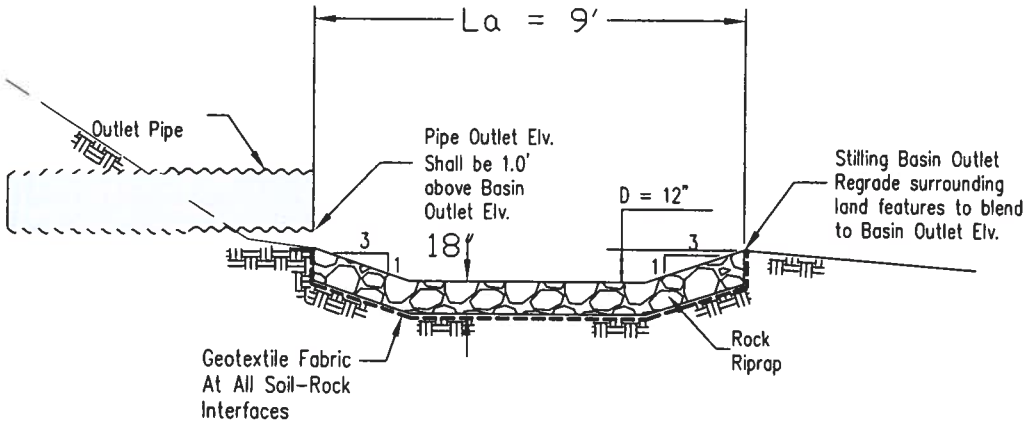
8.5X11 LANDSCAPE
Upper Iowa River Watershed Project
Winneshiek County, IA

		Date
Designed	Moyloe	1/20
Drawn	Moyloe	1/20
Checked	Mellick	2/20
Approved		

File Name
Drawing Name
4/11/20 10:35 AM
Sheet 10 of 21



PLAN



SECTION A–A

NOTES:
1. Rock Riprap shall be well graded field or quarry-run stone (Gabion Stone) with a maximum size of 12" and a minimum size of 2".
2. Use Geotextile (non-woven, needle punched) to line the entire excavation before placing aggregates.
3. Any geotextile splices shall overlap a minimum of 18 inches, with upstream or upslope geotextile overlapping the downslope geotextile.
4. Permanent vegetation shall be established on all disturbed areas.

LIST OF MATERIALS		
Item	Quantity	Unit
Rock Riprap	6	Tons
Geotextile	15	Sq. Yds.

STORTZ_STRUCTURES_EFT_XYZ.dwg

USDA United States Department of Agriculture
Natural Resources Conservation Service

RIP Rap Basin Outlet Protection

Stilling Basin

Upper Iowa Watershed Project

Winneshiek County, IA

Designed	Moyloe	Date 1/20
Drawn	Moyloe	1/20
Checked	BJL	2/20
Approved		

File Name

Drawing Name

1/31/20 3:47 PM

Basin 2

USDA United States Department of Agriculture
Natural Resources Conservation Service

TERRACE_17.xml

Report Generated 01/29/2020

Terrace Construction Summary Sheet

Project Name: ~~2019 Basins, Stortz Basin 1~~
Project Description: Basin #2
Designed by: _____
Date: _____

Location: _____
Practice: _____
Checked by: Bex
Date: 1/2020

Terraces

Terrace	Type	Reach	Cut Slope	Botton Width	Front Slope	Top Width	Back Slope	Strip. Vol.	Fill Vol.	Layou Length	Constr. Length
Basin 2 B	*NarrowBase	0+00.4 - 0+64.4	5.0 : 1	0.0	2.5 : 1	8.0	2.5 : 1	179.2	1483.7	64.0	
Basin 2 B	*NarrowBase	0+64.4 - 2+35.7	5.0 : 1	0.0	2.0 : 1	8.0	2.0 : 1			171.3	
Totals								179.2	1483.7	235.3	

Front heights may vary throughout a Terrace
All Stripping Volumes based on 6.0 inch stripping depth

Survey Control Points

Point	Northing	Easting	Elevation	Description

The construction checkout information shown on this sheet is a true representation of the actual construction performed. This practice was installed in accordance with NRCS plans and specifications.

Certified by: _____ Date _____

NRCS Representative: _____ Date _____

EFT Version 4.0.3.4

12 of 71

USDA United States Department of Agriculture
Natural Resources Conservation Service

TERRACE_17.xml

Terrace Construction Checkout Sheet

Report Generated 01/29/2020

Project Name: 2019 Basins, Stortz_Basin_1
Project Description: Basin # 2
Designed by: _____ **Date:** _____
Location: _____
Practice: _____
Checked by: Bex **Date:** 1/2020

Surveyed by **Date** **Checked by** **Date**

NOTE: The column (R) is the elevation difference from the hub to the constructed ridge. The minimum ridge rod is the BM rod reading plus the value in (R).

I certify the information recorded on this sheet is a true representation of the actual practice installation and the practice as installed does ( ) or does not ( ) meet NRCS plans and specifications.

Certified by **Date** **NRCS Rep.** **Date**

Benchmark Desc:

BS _____ **HI** _____ **FS** _____ **BM Elev:** 0.00
BS _____ **HI** _____ **FS** _____ **Elev:**

Strip. Vol. (cy): 179.2 **Total Fill (cy):** 1483.7 **Total Cut (cy):** 207.5 **Total Length (ft):** 235.3

Strip. Depth (in): 6.0 **Flagline Loc:** RIDGE_CENTER **Design Water Elev:** 1115.7 **BM - Des. Water:** -1115.7

Build Ridge to 1117.2

Basin_2_BigTop Profile

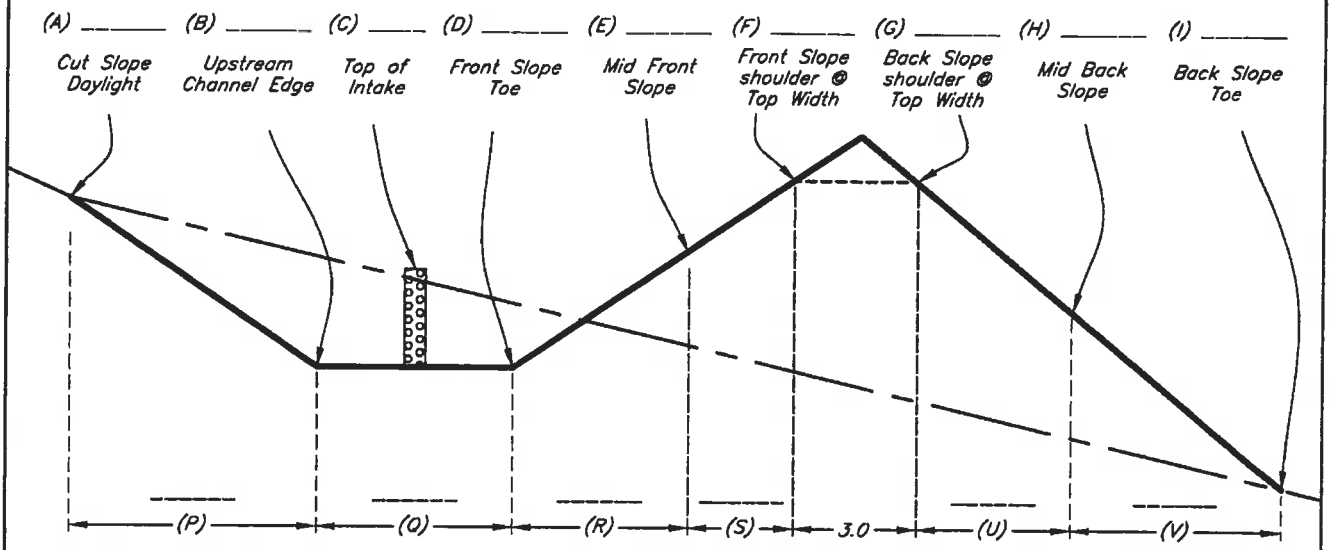
Station	FLAG NUMBEI	Ref. Elevation (ft)	Channel Elevation (ft)	Channel C/F	Ridge Elev. (ft)	Ridge C/F	Bottom Width (ft)	Drain/ Block Info	Channel	Ridge Shots	(R) Add to hub rod
0+00.4		1116.6	~~1116.5~~	0.1C	1117.6	0.9F	0.0	Build End To		1115.7	-1117.6
0+50.0		1112.4	1113.0	0.7F	1116.9	4.5F	0.0	over flow			-1116.9
1+00		1108.4	1109.5	1.2F	1117.1	8.7F	0.0				-1117.1
1+28.3		1105.8	1107.5	1.7F	1117.2	11.4F	0.0	B_I 0+00.8			-1117.2
1+50.0		1107.3	1109.3	2.0F	1117.2	9.8F	0.0				-1117.2
2+00		1113.7	1113.4	0.3C	1116.8	3.1F	0.0				-1116.8
2+35.7		1116.4	1116.4	0.0C	1117.4	1.0F	0.0				-1117.4

Note: Ridge and Channel Cut/Fill values are relative to ground elevation at reference line.

Terrace Cross Section Checkout Sheet

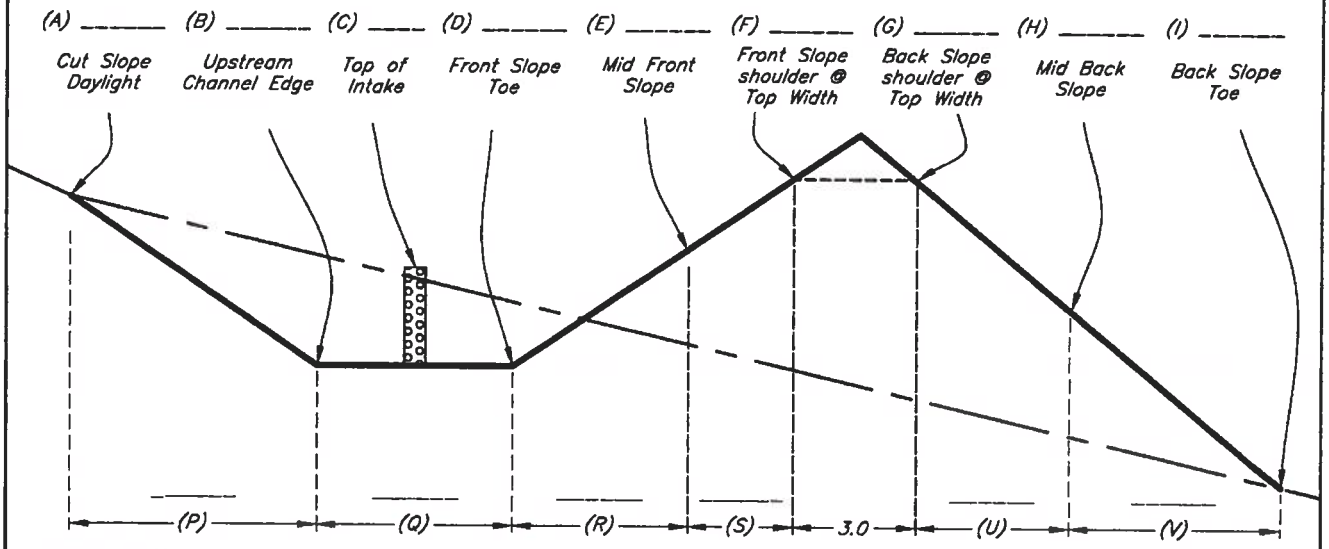
Landowner/Project:_____ Survey By:_____ Date:_____

Terrace:_____ Intake #/Station:_____ BM ID:_____ BM Elev._____ Shot on BM:_____ H.I. _____



Actual Slope Steepness Ratio (Horizontal / Vertical):1 = $\frac{P}{(B-A)}$ $\frac{R}{(D-E)}$ $\frac{S}{(E-F)}$ $\frac{U}{(H-G)}$ $\frac{V}{(I-H)}$

Terrace:_____ Intake #/Station:_____ BM ID:_____ BM Elev._____ Shot on BM:_____ H.I. _____



Actual Slope Steepness Ratio (Horizontal / Vertical):1 = $\frac{P}{(B-A)}$ $\frac{R}{(D-E)}$ $\frac{S}{(E-F)}$ $\frac{U}{(H-G)}$ $\frac{V}{(I-H)}$

USDA United States Department of Agriculture Natural Resources Conservation Service	Terrace Cross-Section Checkout Sheet **2019 Basins, Stortz_Basin_1** _____ _____ *EFT Version 4.0.3.4*	File Name TERRACE_17.xml Drawing Name Cross-Section Checkout 01/29/2020 Sheet _____ of _____

USDA United States Department of Agriculture
Natural Resources Conservation Service

TERRACE_17.xml

UGO Construction Checkout Sheet

Report Generated
02/11/2020

Project Name: 2019 Basins, Stortz_Basin_1
Project Description: _____
Designed by: _____ **Date:** _____

Location: _____
Practice: _____
Checked by: _____ **Date:** 2/20

Surveyed by **Date** **Checked by** **Date**

I certify the information recorded on this sheet is a true representation of the actual practice installation and the practice as installed does ( ) or does not ( ) meet NRCS plans and specifications.

Certified by **Date** **NRCS Rep.** **Date**

B_ReDone Profile

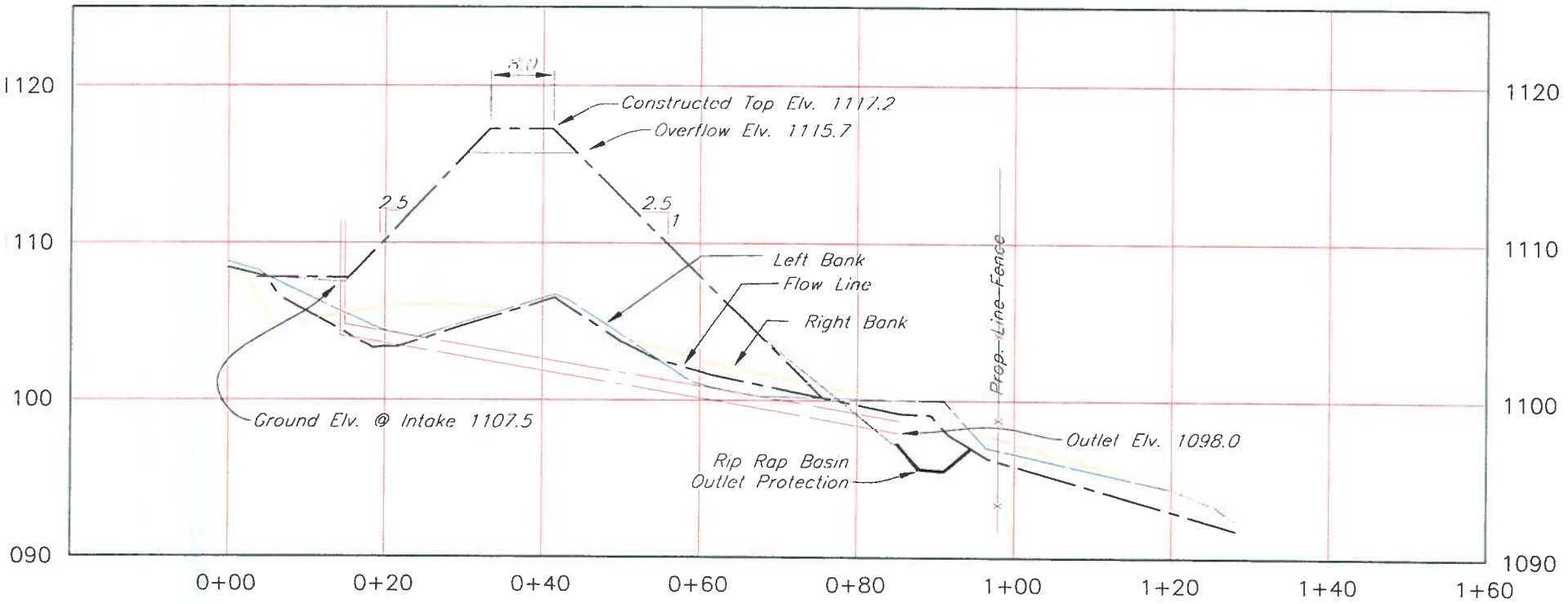
Station	Fixture ID	Ref. Elev. (ft)	Plan Flowlin Elev. (ft)	Plan Cut (ft)	Plan Pipe Grade (%)	Actual Pipe Grade (%)	Required Capacity (cfs)	Design Pipe Capacity (cfs)
0+00.8	Inlet B_I	1104.0	1104.1	-0.1	BM _____ BS _____		1.16	1.74
Pipe	49 ft of 6.0 in diam. SMOOTH_PVC				8.69		Len. = _____(ft) Dia. = _____(in) Material = _____	
0+50.0	-	1101.1	1099.8	1.3	BM _____ BS _____		1.16	1.74
Pipe	21 ft of 6.0 in diam. SMOOTH_PVC				8.69		Len. = _____(ft) Dia. = _____(in) Material = _____	
0+71.0	Outlet bout	1099.2	1098.0	1.2	BM _____ BS _____		1.16	1.74
Pipe					N/A		Len. = _____(ft) Dia. = _____(in) Material = _____	

B_ReDone Inlet(s)

Inlet ID	Channel Bottom Elev.	Channel Cut	Inlet Diam. (in)	Perf Size (in)	Holes / Foot	Perf. Length (ft)	Guard	Orifice Elev.	Orifice Diam. (in)	Base / Elbow Elev.	Offset Pipe Diam. (in)	Offset Pipe Length (ft)
B_I	1107.53	-3.5	6.00	1.00	12	3.00	TRASH	-	-	1104.10	-	-
As-Built												

B_ReDone Outlet								
Outlet ID	**Outlet Type**	**Outlet Diam. (in)**	**Length or Height (ft)**	**Holes / Foot**	**Perf Size (in)**	**Guard**	**Outlet Elev.**	**Material**
bout	Standard	8.00	20.0	-	-	YES	1098.00	SMOOTH_PVC
As-Built								

Bill of Materials
1500 cu.yds.compacted earthfill
60 ft. 6" Bell & Gasket SDR 21 PVC
Fabricated 6" Intake w/min 3' of 20-1" holes per ft.
20 ft. 8" outlet pipe w/animal gaurd



CL2_Outlet PROFILE

See page 1 for location and plan view

STORTZ_STRUCTURES_EFT_XYZ.dwg

USDA United States Department of Agriculture
Natural Resources Conservation Service

Ruth Stortz Basin 2 Profile

8.5X11 LANDSCAPE (2)
Upper Iowa River Watershed Project
Winneshiek County, IA

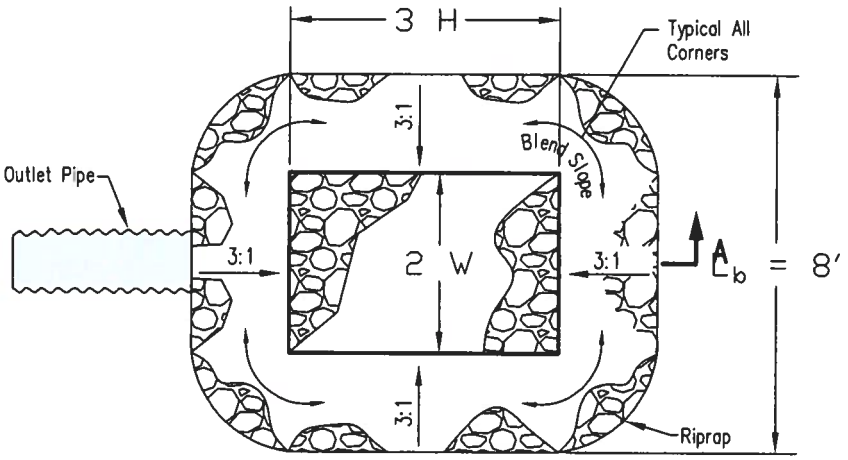
		Date
Designed	Moyloe	1/20
Drawn	Moyloe	1/20
Checked	Mellick	2/20
Approved		

File Name

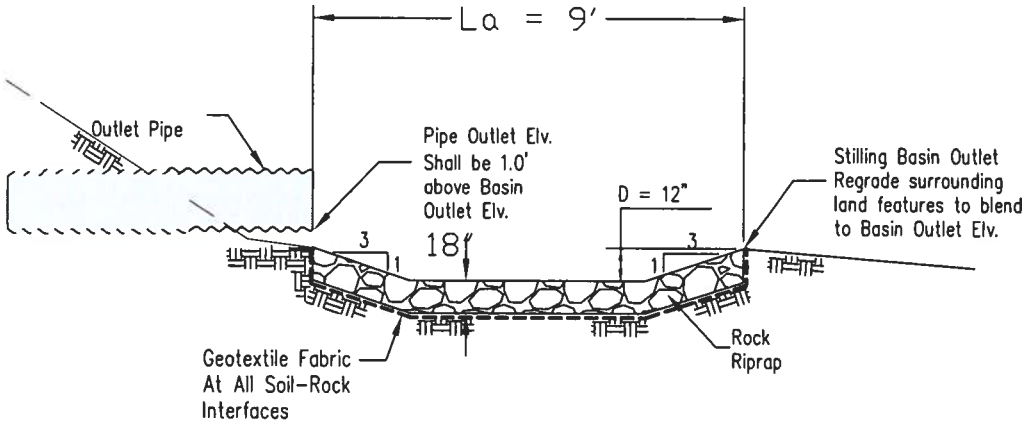
Drawing Name

2/11/20 9:46 AM

Sheet 17 of 21



PLAN



SECTION A-A

NOTES:
1. Rock Riprap shall be well graded field or quarry-run stone (Gabion Stone) with a maximum size of 12" and a minimum size of 2".
2. Use Geotextile (non-woven, needle punched) to line the entire excavation before placing aggregates.
3. Any geotextile splices shall overlap a minimum of 18 inches, with upstream or upslope geotextile overlapping the downslope geotextile.
4. Permanent vegetation shall be established on all disturbed areas.

LIST OF MATERIALS		
Item	Quantity	Unit
Rock Riprap	6	Tons
Geotextile	8	Sq. Yds.

STORTZ_STRUCTURES_EFT_XYZ.dwg

USDA United States Department of Agriculture
Natural Resources Conservation Service

RIP Rap Basin Outlet Protection

Stilling Basin

Upper Iowa Watershed Project
Winneshiek County, IA

		Date
Designed	Moyloe	1/20
Drawn	Moyloe	1/20
Checked	BDV	2/20
Approved		

File Name

Drawing Name

1/30/20 1:42 PM

DESIGN DATA

WW ID	Centerline Data		Cut or Fill at ℄ from None		Reach Length	Grade	Design Top Width (TW)	Design Depth (D)	¼ Top Width (TW/4)	¾ Depth (¾D)	Subsurface Drain Installation	
	Station	Design Elev.	C/F	feet	feet	%	feet	feet	feet	feet	No. Used (0,1,2)	Offset from w/w ℄ feet
WW1	**0+00**					**8.3**	**34**	**1.0**	**8.5**	**0.8**		
WW2	**0+00**					**9.3**	**30**	**1.0**	**7.5**	**0.8**		

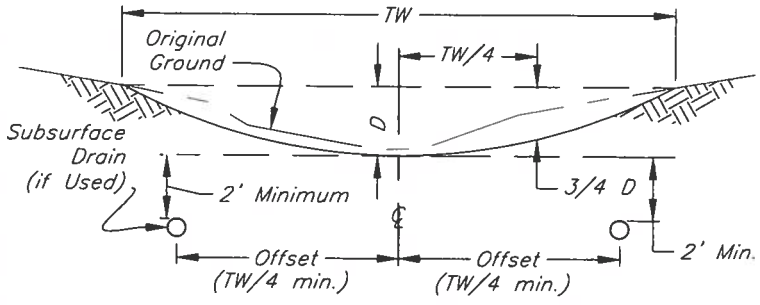
ESTIMATED QUANTITIES

ITEM	QUANTITY	UNIT
Earthfill (if calculated)	**N/A**	cu. yd.
Excavation (if calculated)	**N/A**	cu. yd.
Clearing (if applicable)	**N/A**	ac.
Waterway Length	**0**	ft.
Waterway Area	**0.0**	ac.
Seeding Area		ac.
Other: **cubic yards**	**900**	**cu yards**
Other:		

Notes:

1. All work shall comply with Construction Specification IA-412.
2. See Sheet **1** of ___ for the Plan View.
3. See Sheet(s) **N/A** of **N/A** for the Profile(s).
4. See Sheet **N/A** of **N/A** for the Fabric or Rock Check details.
5. See Sheet(s) **N/A** of **N/A** for the Subsurface Drain details.

**** OUTLETS INTO SEDIMENT BASINS****



TYPICAL PARABOLIC CROSS SECTION

BENCH MARK		
ID	Elev.	Description
TBM1	**1,100.84**	**Hub set in property fenceline between waterways.**

STANDARD DWG. IA-1510

DATE April 2015 | PAGE 1 OF 1

USDA United States Department of Agriculture

Natural Resources Conservation Service

PARABOLIC GRASSED WATERWAY

Owner: **Ruth Stortz**

Location: Sec. **25**, T **99** N R **8** W

Canoe Township

Winneshiek County, Iowa

		Date
Designed	**Moyloe**	**01/20**
Drawn	**Moyloe**	**01/20**
Checked	**Bex**	**2/20**
Approved	Barb Ex. NRCS	

File Name

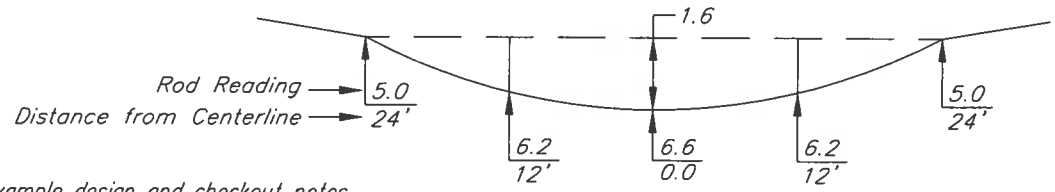
Drawing Name

Sheet 14 of 21

PARABOLIC WATERWAY CHECKOUT SHEET

Complete as-built survey data to provide a record of the construction checkout. If desired, record design data from waterway design or cut sheets. Record shape of waterway with ground shots using laser or optical level. Record grade rod from designated Hub. Left (-) and right correspond to left and right looking in the direction of increasing stationing. Upstream designated by u.s., and downstream is d.s. Waterway depth is determined from the low side of the waterway. Depth halfway to center must have 3/4 depth. Record additional ground shot and distance from centerline 5-10 feet beyond design top width.

Example Design: Top Width: 48 ft., Depth: 1.6 ft., Grade: 1.0%



Example design and checkout notes

Design data from Plan	WW ID	Sta.	℄ Elev.	TW	Depth	Grade (%)	Hub ID	Hub Elev.	Cut/Fill from Hub at ℄
	Ex.	3+00	101.0	48	1.6	1.0	3+00	102.82	1.8'

As-Built Survey Data								
Hub Rod Reading		4.8	Measured Top Width			49		
Rod Reading	4.8	5.0	6.2	6.6	6.2	5.0	4.5	
Distance	-34	-24	-12	℄	12	24	34	
As-built Depth		0.0	1.2	1.6	1.2	0.0		
℄ Rod Reading 50' u.s.		6.1	℄ Rod Reading 50' d.s.			7.1		

Notes: _____

Grade = 7.1-6.1 = 1%

Construction OK? (Y) N

Design data from Plan	WW ID	Sta.	℄ Elev.	TW	Depth	Grade (%)	Hub ID	Hub Elev.	Cut/Fill from Hub at ℄

As-Built Survey Data								
Hub Rod Reading			Measured Top Width					
Rod Reading								
Distance				℄				
As-built Depth								
℄ Rod Reading 50' u.s.			℄ Rod Reading 50' d.s.					

Notes: _____

Grade = _____

Construction OK? Y N

Design data from Plan	WW ID	Sta.	℄ Elev.	TW	Depth	Grade (%)	Hub ID	Hub Elev.	Cut/Fill from Hub at ℄

As-Built Survey Data								
Hub Rod Reading			Measured Top Width					
Rod Reading								
Distance				℄				
As-built Depth								
℄ Rod Reading 50' u.s.			℄ Rod Reading 50' d.s.					

Notes: _____

Grade = _____

Construction OK? Y N

Minimum check out requirements:

1. *Survey at least one cross-section for each design reach.*
2. *Surveyed cross sections shall be no more than* **400** *feet apart.*

STANDARD CHECKOUT SHEET
IA-1510C

DATE April 2015 | PAGE 1 OF 1

USDA United States Department of Agriculture

Natural Resources Conservation Service

PARABOLIC GRASSED WATERWAY CHECK OUT

Owner: **Ruth Stortz**

Location: Sec. **25**, T **99** N R **8** **W**

Canoe Township

Surveyed _____ Date

Checked _____

File Name: NA

Drawing Name: NA

PARABOLIC WATERWAY CHECKOUT SHEET (Continuation)

Design data from Plan	WW ID	Sta.	℄ Elev.	TW	Depth	Grade (%)	Hub ID	Hub Elev.	Cut/Fill from Hub at ℄

As-Built Survey Data							
	Hub Rod Reading		Measured Top Width				
	Rod Reading						
	Distance			℄			
	As-built Depth						
	℄ Rod Reading 50' u.s.		℄ Rod Reading 50' d.s.				

Notes: ______

Grade = ______

Construction OK? Y N

Design data from Plan	WW ID	Sta.	℄ Elev.	TW	Depth	Grade (%)	Hub ID	Hub Elev.	Cut/Fill from Hub at ℄

As-Built Survey Data							
	Hub Rod Reading		Measured Top Width				
	Rod Reading						
	Distance			℄			
	As-built Depth						
	℄ Rod Reading 50' u.s.		℄ Rod Reading 50' d.s.				

Notes: ______

Grade = ______

Construction OK? Y N

Design data from Plan	WW ID	Sta.	℄ Elev.	TW	Depth	Grade (%)	Hub ID	Hub Elev.	Cut/Fill from Hub at ℄

As-Built Survey Data							
	Hub Rod Reading		Measured Top Width				
	Rod Reading						
	Distance			℄			
	As-built Depth						
	℄ Rod Reading 50' u.s.		℄ Rod Reading 50' d.s.				

Notes: ______

Grade = ______

Construction OK? Y N

Design data from Plan	WW ID	Sta.	℄ Elev.	TW	Depth	Grade (%)	Hub ID	Hub Elev.	Cut/Fill from Hub at ℄

As-Built Survey Data							
	Hub Rod Reading		Measured Top Width				
	Rod Reading						
	Distance			℄			
	As-built Depth						
	℄ Rod Reading 50' u.s.		℄ Rod Reading 50' d.s.				

Notes: ______

Grade = ______

Construction OK? Y N

STANDARD CHECKOUT SHEET
IA-1510C-Continuation

DATE April 2015 | PAGE 1 OF 1

USDA United States Department of Agriculture
Natural Resources Conservation Service

PARABOLIC GRASSED WATERWAY CHECK OUT (Cont.)

Owner: **Ruth Stortz**

Location: Sec. **25**, T **99** N R **8** **W**

Canoe Township

Surveyed ______ Date

Checked ______

File Name NA

Drawing Name NA

USDA NRCS
Natural Resources Conservation Service

Critical Area Seeding Plan

Name Stortz Project Critical Area Seeding Plan Date 1/22/2020 Tract No. 7038
Field No. 8356
Contract N
Type of Seed Critical area Prepared by Matt Frana

Seeding Percent Pure Live Seed=(% Germination + Hard Seed) * % Purity
100

Critical area

Enter Acres: 1.5 Acres % of Stand Pounds Per Acre Total Needed

Species	Acres	% of Stand	Pounds Per Acre PLS*		Total Needed	
Smooth Brome	1.5	100	25.0	Pounds	37.50	Pounds
Oats	1.5	100	48.0	Pounds	72	Pounds
				Pounds		Pounds
				Pounds		Pounds
				Pounds		Pounds
				Bushels		Bushels
Fertilizer & Lime						
Lime (ECCE)	0	Lbs/Ac				
Nitrogen	30	Lbs/Ac				
Phosphate (P205)	30	Lbs/Ac				
Potash (K20)	40	Lbs/Ac				

Seeding will be completed: April 1 - June 1
2

Additional Seeding Criteria: **To be used on the identified critical areas including basin structures and waterways**

Seeding was completed according to the above requirements on: _____ (Date)

_____ (Producer's Signature) _____ (Date)

Field Office _____ **Certified by** _____ (NRCS Representative)

USDA NRCS
Natural Resources Conservation Service

IA - CPA - 4 REV.
November-17
(File Code 180-12-12)

Seeding Plan

Name: **18F Leopold#1 - Stortz**
Prepared by: **Matt Frana**
Date: **1/17/2020**
Tract No.: **7038**
Field No.:
Program:
Field Area (acres): 2.000
Contract No.: **UI-26-29-Stortz**

Seeding Mix Summary

Grasses	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
1	*Andropogon gerardii*	Big Bluestem	0.918	0.250	0.50	
2	*Sorghastrum nutans*	Indiangrass	1.102	0.250	0.50	
3	*Bouteloua curtipendula*	Sideoats Grama	1.653	0.750	1.50	
4	*Schizachyrium scoparium*	Little Bluestem	5.510	1.000	2.00	
5	*Carex brevior*	Shortbeak Sedge	0.213	0.020	0.040	
6	*Elymus virginicus*	Virginia Wildrye	0.154	0.100	0.20	
7	*Sporobolus compositus*	Composite Dropseed	0.165	0.015	0.030	
8	*Sporobolus heterolepis*	Prairie Dropseed	0.088	0.015	0.030	
9	*Tridens flavus*	Purpletop Tridens	0.048	0.005	0.010	
10	*Carex vulpinoidea*	Fox Sedge	0.184	0.005	0.010	
		SUBTOTAL GRASSES	**10.035**	**2.410**	**4.820**	**$0**

Forbs/Legumes	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
1	*Allium stellatum*	Autumn Onion	0.040	0.010	0.020	
2	*Anemone virginiana*	Tall Thimbleweed	0.051	0.005	0.010	
3	*Agastache foeniculum*	Blue Giant Hyssop	0.331	0.010	0.020	
4	*Verbena hastata*	Blue Vervain	1.025	0.030	0.060	
5	*Verbena stricta*	Hoary Vervain	0.514	0.050	0.10	
6	*Baptisia alba*	White Wild Indigo	0.006	0.010	0.020	
7	*Asclepias tuberosa*	Butterfly Milkweed	0.032	0.020	0.040	
8	*Asclepias incarnata*	Swamp Milkweed	0.035	0.020	0.040	
9	*Asclepias verticillata*	Whorled Milkweed	0.040	0.010	0.020	
10	*Tradescantia ohiensis*	Common Spiderwort	0.029	0.010	0.020	
11	*Silphium laciniatum*	Compass Plant	0.002	0.010	0.020	
12	*Silphium perfoliatum*	Cup Plant	0.005	0.010	0.020	
13	*Silphium terebinthinaceum*	Prairie Rosinweed	0.004	0.010	0.020	
14	*Silphium integrifolium*	Rosinweed	0.004	0.010	0.020	
15	*Symphyotrichum novae-angliae*	New England Aster	0.242	0.010	0.020	
16	*Symphyotrichum laeve*	Smooth Blue Aster	0.202	0.010	0.020	
17	*Symphyotrichum oolentangiense*	Skyblue Aster	0.294	0.010	0.020	
18	*Oligoneuron album*	Stiff Aster	0.118	0.005	0.010	
19	*Rudbeckia hirta*	Black-eyed Susan	3.717	0.110	0.22	
20	*Rudbeckia triloba*	Brown-eyed Susan	0.125	0.010	0.020	
21	*Ratibida pinnata*	Gray-headed Coneflower	2.755	0.250	0.50	
22	*Echinacea pallida*	Pale Coneflower	0.096	0.050	0.10	
23	*Eupatorium perfoliatum*	Boneset	0.588	0.010	0.020	
24	*Brickellia eupatorioides*	False Boneset	0.118	0.010	0.020	
25	*Eupatorium altissimum*	Tall Thoroughwort	0.184	0.010	0.020	
26	*Eupatoriadelphus maculatus*	Spotted Trumpetweed	0.349	0.010	0.020	
27	*Eupatorium purpureum*	Sweetscented Joe Pye Weed	0.771	0.050	0.10	
28	*Astragalus canadensis*	Canadian Milkvetch	0.624	0.100	0.20	
29	*Chamaecrista fasciculata*	Partridge Pea	0.298	0.300	0.60	
30	*Desmanthus illinoensis*	Prairie Mimosa	0.771	0.500	1.00	
31	*Crotalaria sagittalis*	Rattle Box	0.165	0.100	0.20	
32	*Hypericum ascyron*	Giant St. Johnswort	1.047	0.015	0.030	
33	*Mimulus ringens*	Monkey Flower	0.845	0.001	0.0020	

34	*Pycnanthemum virginianum*	Common Mountain Mint	0.808	0.010	0.020	
35	*Penstemon grandiflorus*	Large-flowered	0.103	0.020	0.040	
36	*Penstemon digitalis*	Foxglove Penstemon	0.955	0.020	0.040	
37	*Oligoneuron rigidum*	Stiff Goldenrod	0.452	0.030	0.060	
38	*Solidago speciosa*	Showy Goldenrod	0.698	0.020	0.040	
39	*Liatris aspera*	Tall Blazing Star	0.059	0.010	0.020	
40	*Liatris pycnostachya*	Prairie Blazing Star	0.202	0.050	0.10	
41	*Coreopsis tripteris*	Tall Tickseed	0.051	0.010	0.020	
42	*Helianthus rigidum*	Prairie Sunflower	0.029	0.020	0.040	
43	*Helianthus occidentalis*	Western Sunflower	0.103	0.020	0.040	
44	*Heliopsis helianthoides*	Ox-eye	0.231	0.100	0.20	
45	*Parthenium integrifolium*	Feverfew, Wild Quinine	0.051	0.020	0.040	
46	*Euphorbia corollata*	Flowering Spurge	0.029	0.010	0.020	
47	*Zizia aurea*	Golden Alexander's	0.404	0.100	0.20	
48	*Vernonia fasciculata*	Ironweed	0.176	0.020	0.040	
49	*Physostegia virginiana*	False Dragonhead	0.081	0.020	0.040	
50	*Lespedeza capitata*	Round-headed Bush Clover	0.147	0.050	0.10	
51	*Desmodium canadense*	Showy Ticktrefoil	0.040	0.020	0.040	
52	*Dalea purpurea*	Purple Prairie Clover	3.636	0.550	1.10	
53	*Dalea candida*	White Prairie Clover	0.349	0.050	0.10	
54	*Phlox pilosa*	Prairie Phlox	0.035	0.005	0.010	
55	*Eryngium yuccifolium*	Rattlesnake Master	0.014	0.005	0.010	
56	*Ludwigia alternifolia*	Seedbox	2.388	0.005	0.010	
57	*Oenothera biennis*	Common Evening	1.653	0.050	0.10	
58	*Veronicastrum virginicum*	Culver's Root	1.469	0.005	0.010	
59	*Monarda fistulosa*	Wild Bergamot	0.257	0.010	0.020	
60	*Geranium maculatum*	Wild Geranium	0.009	0.005	0.010	
61	*Ruellia humilis*	Wild Petunia	0.191	0.100	0.20	
62	*Asclepias syriaca*	Common Milkweed	0.016	0.010	0.020	
		SUBTOTAL FORBS	**30.065**	**3.121**	**6.242**	**$0**

Woody	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
1	*Amorpha canescens*	Lead Plant	0.059	0.010	0.020	
2	*Ceanothus americanus*	New Jersey Tea	0.028	0.010	0.020	
3	*Rosa arkansana*	Prairie Wild Rose	0.005	0.005	0.010	
		SUBTOTAL VINES/WOODY	**0.091**	**0.025**	**0.050**	**$0**
		TOTAL	**40.191**	**5.556**	**11.112**	**$0**

	Soil Test Information	Total Needed lbs
Lime (ECCE) (Actual Lime)		
Nitrogen		
Phosphate (P205)		
Potash (K20)		

Seeding Dates: Spring: 4/1-7/1

Additional Seeding Criteria: TO BE USED IN AREAS DESIGNATE TO BE PLANTED TO NATIVE PRAIRIE VEGETATION

REFER TO CONSERVATION COVER JOBSHEET FOR ESTABLISHMENT INSTRUCTIONS

Seeding was completed by _____ (Date) **according to the above requirements.**

_____ (Producer's Signature)

_____ (Date)

Field Office _____

Certified by _____ (NRCS Representative)

When seeding is completed, return seeding plan to the Natural Resources Conservation Services.
For CRP cost-share, return receipts to Farm Service Agency.
For all other cost-share projects, attach seed tags and receipts for seed, fertilizer, lime, etc.

This order blank is effective to DECEMBE , . *w.iowapf.net* **for more information**

Iowa Pheasants Forever Native Grass Seed Program **FALL 2019**

Call Matt O'Connor, moconnor@pheasantsforever.org
563-926-2357 or cell# 319-240-4075

Send Full Payment and Purchase Order to: **Matt O'Connor**
Pheasants Forever, 2880 Thunder Rd., Hopkinton Iowa 52237

Purchase Order

A chapter or personal check must be included with your order *Make check out to:* ***Pheasants Forever – Native Grass Seed Order***

COUNTY NAME:
Contact Person & Phone:

SHIP TO:
(please include phone#)

phone #_____ e-mail_____

Provide us your e-mail address and we will send you a receipt via e-mail plus a hardcopy in the US mail.

Must order at least one acre	***"The Leopold Mix" & Leopold Pollinators*** ***Highly diverse native mixes – the best!*** ***ALL IOWA ECOTYPE SEED*** ***Now we offer Leopold CP42 Pollinator Mixes at great prices!!!!!!***	Unit Price	Total Price
Must order at least one acre	**CP-42 LEOPOLD #1 POLLINATOR (Dry/Wet/Mesic) 10/30 mix:** ***10 grass seed per square foot/30 forb seed per square foot*** .25lb Big bluestem, .25lb Indian grass, .75lb Side oats grama, 1lb Little bluestem, 0.02lb Shortbeak Sedge, 0.1lb Virginia wildrye, 0.015lb Composite(rough) dropseed, 0.015lb Prairie dropseed, .005lb Purpletop tridens, .005lb Fox sedge. **Forbes**: Autumn onion .01lb, Tall thimbleweed .005lb, Blue Giant Hyssop .01lb, Blue Vervain .03lb, Hoary Vervain .05lb, White Wild Indigo .01lb, Butterfly Milkweed .02lb, Swamp Milkweed .02lb, Whorled Milkweed .01lb, Common Spiderwort .01lb, Compass Plant .01lb, Cup Plant .01lb, Prairie Rosinweed .01lb, Rosinweed .01lb, New England Aster .01lb, Smooth Blue Aster .01lb, Skyblue Aster .01lb, Stiff Aster .005lb, Black-eyed Susan .1lb, Brown-eyed Susan .01lb, Gray-headed Coneflower .25lb, Pale Coneflower .05lb, Boneset .01lb, False Boneset .01lb, Tall Thoroughwort .01lb, Spotted Trumpetweed .01lb, Sweetscented Joe Pye Weed .05lb, Canadian Milkvetch .1lb, Partridge Pea .3lb, Prairie Mimosa .5lb, Rattle Box .1lb, Giant St. Johnswort .015lb, Monkey Flower .001lb, Common Mountain Mint .01lb, Large-flowered Beardtongue .02lb, Foxglove Penstemon .02lb, Stiff Goldenrod .03lb, Showy Goldenrod .02lb, Tall Blazing Star .01lb, Prairie Blazing Star .05lb, Lead Plant .01lb, New Jersey Tea .01lb, Prairie Wild Rose .005lb Tall Tickseed .01lb, Prairie Sunflower .02lb, Western Sunflower .02lb, Ox-eye .1lb, Feverfew, Wild Quinine .02lb, Flowering Spurge .01lb, Golden Alexander's .1lb, Ironweed .02lb, False Dragonhead .02lb, Round-headed Bush Clover .05lb, Showy Ticktrefoil .02lb, Purple Prairie Clover .55lb, White Prairie Clover .05lb, Prairie Phlox .005lb, Rattlesnake Master .005lb, Seedbox .005lb, Common Evening Primrose .05lb, Culver's Root .005lb, Wild Bergamot .01lb, Wild Geranium .005lb, Wild Petunia .1lb, Common Milkweed . 01lb	**$270 per acre**	
Must order at least one acre	**CP-42 LEOPOLD #2 POLLINATOR (Dry/Wet/Mesic) 10/40:** ***10 grass seed per square foot/40 forb seed per square foot*** .25 lb Big bluestem, .25 lb Indian grass, .75lb Side Oats Grama, 1lb Little bluestem, 0.02lb Shortbeak Sedge, 0.1lb Virginia wildrye, 0.015lb Composite (rough) dropseed, 0.015lb Prairie dropseed .005lb Purpletop tridens, .005lb Fox sedge. **Forbes**: Autumn onion .01lb, Candle Anemone .005lb, Tall thimble weed .005lb, Blue Giant Hyssop .01lb, Blue Vervain .03lb, Hoary Vervain .05lb, Blue Wild Indigo .005lb, Longbract Wild Indigo .005lb, White Wild Indigo .005lb, Butterfly milkweed .02lb, Swamp Milkweed .02lb, Prairie Milkweed .01lb, Whorled milkweed .01lb, Common Spiderwort .01lb, Longbract Spiderwort .01lb, Compass Plant .01lb, Cup Plant .01lb, Prairie Rosinweed .01lb, Rosinweed .01lb, New England Aster .01lb, Smooth Blue Aster .01lb, Skyblue Aster .01lb, Stiff Aster .005lb, White Heath Aster .005lb, Western Silver Aster .005lb, Black-eyed Susan .1lb, Brown-eyed Susan .01lb, Fragrant Coneflower .01lb, Gray-headed Coneflower .2lb, Tall Coneflower .01lb, Pale Coneflower .05lb, Boneset .01lb, False Boneset .01lb, Tall Thoroughwort .01lb, Spotted Trumpetweed .01lb, Sweetscented Joe Pye .05lb, Canadian Milkvetch .1lb, Partridge Pea .3lb, Prairie Mimosa .5lb, Common Milkweed .05lb, Cardinal Flower .001lb, Great Lobelia .001lb, Giant St. Johnswort .02lb, Monkey Flower .003lb, Common Mountain Mint .01lb, Slender Mountain Mint .005lb, Large-flowered Beardtongue .02lb, Foxglove Penstemon .03lb, Stiff Goldenrod .05lb, Showy Goldenrod .02lb, Riddell's Goldenrod .01lb, Tall Blazing Star .01lb, Prairie Blazing Star .05lb, Rocky Mountain Blazing Star .01lb, Prairie Coreopsis .005lb, Tall Tickseed .01lb, Prairie Sunflower .02lb, Western Sunflower .02lb, Saw-tooth Sunflower .01lb, Ox-eye .1lb, Feverfew, Wild Quinine .02lb, Flowering Spurge .01lb, Golden Alexander's .1lb, Ironweed .02lb, False Dragonhead .02lb, Round-headed Bush Clover .02lb, Showy Ticktrefoil .02lb, Purple Prairie Clover .65lb, White Prairie Clover .05lb, Prairie Phlox .005lb, Rattlesnake Master .005lb, Seedbox .005lb, Pale Gentian-Yellow Gentian .01lb, Pale Indian Plaintain .02lb, Common Evening Primrose .1lb, Culver's Root .005lb, Tall Bellflower .005lb, Wild Bergamot .1lb, Wild Geranium .005lb, Wild Petunia .1lb, Lead Plant .01lb, New Jersey Tea .01lb, Prairie Wild Rose .005lb	**$340 per acre**	
	LEOPOLD GRASS BUMP UP ***10 grass seed per square foot*** .07lb Big bluestem, .04 Indiangrass, .68 Sideoats gramma, 0.8lb Little bluestem, .02lb Shortbeak Sedge, .1lb Virginia wildrye, .185lb Composite dropseed, .035 Prairie dropseed, .02lb Purpletop tridens, .025 Fox sedge	**$36 per acre**	
	Free Shipping!	BalanceDue	

You must include a check for full amount with your order! Call Matt O'Connor 563 926-2357 or 319-240-4075 with questions.

USDA NRCS
Natural Resources Conservation Service

IA - CPA - 4 REV.
November-17
(File Code 180-12-12)

Seeding Plan

Name: PF Leopold Grass Bump Up Mix - Stortz
Prepared by: Matt Frana
Program: Other
Field Area (acres): 2.000

Date: 1/17/2020
Tract No.: 7038
Field No.:
Contract No.: UI-26-29-Stortz

Seeding Mix Summary

Grasses	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
1	*Andropogon gerardii*	Big Bluestem	2.571	0.700	1.40	
2	*Sorghastrum nutans*	Indiangrass	1.763	0.400	0.80	
3	*Bouteloua curtipendula*	Sideoats Grama	1.499	0.680	1.36	
4	*Schizachyrium scoparium*	Little Bluestem	4.408	0.800	1.60	
5	*Carex brevior*	Shortbeak Sedge	0.213	0.020	0.040	
6	*Elymus virginicus*	Virginia Wildrye	0.154	0.100	0.20	
7	*Sporobolus compositus*	Composite Dropseed	2.039	0.185	0.37	
8	*Sporobolus heterolepis*	Prairie Dropseed	0.206	0.035	0.070	
9	*Tridens flavus*	Purpletop Tridens	0.191	0.020	0.040	
10	*Carex vulpinoidea*	Fox Sedge	0.918	0.025	0.050	
		SUBTOTAL GRASSES	**13.961**	**2.965**	**5.930**	**$0**

Forbs/Legumes	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
		SUBTOTAL FORBS	**0.000**	**0.000**	**0.000**	**$0**

Woody	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
		SUBTOTAL VINES/WOODY	**0.000**	**0.000**	**0.000**	**$0**
		TOTAL	**13.961**	**2.965**	**5.930**	**$0**

	Soil Test Information	Total Needed lbs
Lime (ECCE) (Actual Lime)		
Nitrogen		
Phosphate (P205)		
Potash (K20)		

Seeding Dates: Spring: 4/ 1-7/ 1

Additional Seeding Criteria: TO BE USED IN AREAS DESIGNATE TO BE PLANTED TO NATIVE PRAIRIE VEGETATION
ADD TO THE LEOPOLD #1 SEED MIX. INCREASED GRASSES WILL HELP CONTROL EROSION AND SLOW WATER BETTER.
REFER TO CONSERVATION COVER JOBSHEET FOR ESTABLISHMENT INSTRUCTIONS

Seeding was completed by _____ (Date) **according to the above requirements.**

_____ (Producer's Signature)

_____ (Date)

Field Office _____

Certified by _____ (NRCS Representative)

When seeding is completed, return seeding plan to the Natural Resources Conservation Services.
For CRP cost-share, return receipts to Farm Service Agency.
For all other cost-share projects, attach seed tags and receipts for seed, fertilizer, lime, etc.

USDA United States Department of Agriculture

Iowa Native Prairie Planting Guide

Planting Native Prairie
Into Corn/Bean Stubble

Soybean Stubble *(Spring Seeding)*

1. **5 to 7 Days Before Planting** - Apply glyphosate herbicide to kill emerged weeds. If you are planting early (March 15-April 15), evaluate the field to see if emerged weeds are present before spraying.

2. **Planting Day** - Use a no-till drill or broadcaster to plant a mix of native grasses and forbs. Plant shallow (1/8" for forbs, 1/4" for grass), since forbs germinate well on the surface. Don't till soybean stubble - untouched bean stubble is an ideal seedbed.

3. **Roll/Cultipack After Planting** - If you broadcast seed, roll after planting to improve seed to soil contact and help decrease seed predation.

Corn Stubble *(Spring Seeding)*

Option 1 - No-Till

Follow the same guidelines as above for bean stubble with the following considerations:

- Drilling into corn is more challenging than soybeans due to the amount of residue. Low humidity days will help.
- Broadcasting is not recommended due to the amount of corn residue. *Broadcasting is not allowed in the NRCS 327 Conservation Cover Practice Standard.*
- Baling cornstalks is a way to reduce the residue without tillage and reduce erosion concerns from the site. Do not mow stalks before baling. You want some residue (30%–40%). *When residue is removed, broadcasting seed is allowed in the NRCS 327 Standard.*

Option 2 - Use Tillage

1. **Till Cornstalks** before planting to reduce residue. Approximately 50% of the soil should be showing. Time the second trip within a few days before planting to kill emerged weeds.

2. **Roll/Cultipack Area** once or twice to create a firm seedbed. *Your footprint should not sink in more than 1/8".* Rolling is critical to keep the forb seed shallow.

3. **Plant**: drill or broadcast seed.

4. **Roll/Cultipack again** after planting.

DNR

USDA United States Department of Agriculture
Natural Resources Conservation Service

PHEASANTS forever

Tallgrass Prairie Center
UNIVERSITY OF NORTHERN IOWA

Natural Resources Conservation Service, Des Moines, Iowa, August 2018

Planting Native Prairie Into Corn/Bean Stubble

Fall/Dormant Seeding

Fall/Dormant seedings can take place Nov. 15 through April 1, or until the freeze/thaw season ends.

- Advantageous to the forb component. Germination increases for many forb species if they go through freeze/thaw cycles.
- In diverse forb mixes, seed 0.25 lbs./acre each (4 oz. or 1.0 seed/ft^2) of Big Bluestem, Indian grass, and Switchgrass. Dormant seedings are not as conducive as a spring planting for the tall warm season grasses.
- Ideal seedbed is untilled soybean stubble.
- Plant: drill (if ground isn't frozen) or broadcast seed and then roll.
- Don't broadcast on ice covered ground, snow crusted ground, or when snow cover is > than 4".

Other Considerations:

- Residual herbicides from the previous crop can impact prairie establishment. Consider herbicide products that are less likely to carryover. Some contact herbicides have no residual or limited residual.
- Seed forbs on the surface or a shallow depth (up to 1/8" depth). Grasses do fine planting up to 1/4" depth. Some seed on the surface is ok.
- If you are trying to complete a seeding in an area with reed canary, develop a long-term plan to kill it completely (very difficult) and a proper seed mix that will compete with it.
- Do not use fertilizer because it will help the weeds out-compete your seeding.
- When broadcasting, rolling will help with seed to soil contact and to reduce seed predation.
- When seeding small areas or when broadcasting seed, add a carrier to help ensure you don't run out of seed (i.e. rice hulls, cocoa shells, pell lime, ground cobs). Consider broadcasting the area twice to ensure good coverage.
- On small areas (< 2 acres), you can broadcast seed from a bucket.
  - Flag off lines every 50' to help stay in line.
  - Use sand as a carrier — 2 parts damp sand to 1 part seed, minimum.
  - Weigh seed and separate into buckets to monitor the distribution rate.
- Adding ½ - 1 bu. of oats to spring seedings can reduce erosion. NRCS 327 Standard requires 1 bu. on slopes > 5% when seeding on tilled land. Mow before seed head emergence to allow light and to preserve moisture for seedlings.
- **For High-end Seedings** (pollinator/CP-25 /prairie reconstruction):
  - Ideal mix is: 25-50% grass/50-75% forbs.
  - Strive for diversity.
  - Limit amount of tall warm season grasses (Big Bluestem, Indian Grass, & Switchgrass). They establish quickly and can out-compete forbs. Recommended seeding rate: 0.1 (1.6 oz. or 0.4 seeds/ft^2) to 0.25 lbs. (4 oz. or 1.0 seeds/ft^2) each for Big Bluestem and Indian Grass. Limit Switchgrass to the 0.1 lb. rate. Other native grasses (i.e. little bluestem, side oats gramma, drop seeds, Canada wild rye) are not as competitive.
  - It is important that tall warm season grasses are present, if the goal is to mimic the tall grass prairie ecosystem and maximize the benefits..
- Native grasses are an important component of the tall grass prairie. Less favorable grasses such as woolly cupgrass, smooth brome, tall fescue and quack grass will take over if natives are excluded.
- Consider Iowa ecotype seed (originated from prairie remnant plants) for long-term to permanent seedings.
- Use high end seedings around the farmstead for added beauty.

If you have additional questions, contact your local NRCS Field Office, Iowa Department of Natural Resources (DNR) biologists, or Pheasants Forever biologist for further guidance.

Cover Crop Seeding Plan

Name: Stortz **Date:** 4/15/2019

Tract. No.	7038
Field No.	
Prepared by	Matt Frana
Acres	6

Seeding *Percent Pure Live Seed = $\frac{(\%\ \text{germination} + \%\ \text{hard seed}) \times \%\ \text{purity}}{100}$

Species	Pounds Per Acre PLS	Total Pounds Needed (6 acres)
Oats	45 #	270 lb
Cowpeas	5 #	30 lb
Sorghum-Sudangrass	3 #	18 lb
Oilseed Radish	0.5 #	3 lb
Rapeseed	0.5 #	3 lb
Mustard	0.5 #	3 lb
Turnip	0.5 #	3 lb

Seeding will be completed: __ 3/1 to 5/15 X 4/1 to 7/1
__ 6/1 to 8/15 _ 11/15-Freeze

Cover crop seeding will be planting on set aside crop ground after project construction is completed. Mix was designed to quickly cover exposed soil, alleviate compaction, and return healthy soil properties to cropland degraded from construction. Ideally seeding should be done with a drill. If seeding is broadcast with light incorporation use 1.1x the seeding rate. If using just braodcast use 1.2x the seeding rate. See cover crop tech notes for more detatils.

Seeding was completed by _____ according to the above requirements.

_____ _____
(Contractor's Signature) (Date)

Certified by _____

USDA
United States Department of Agriculture
Natural Resources Conservation Service

TECHNICAL NOTE

IOWA AGRONOMY TECHNICAL NOTE 38: COVER CROP MANAGEMENT

COVER CROP BENEFITS

Erosion Control: Cover crops reduce soil erosion in several ways. They protect the soil surface from raindrop impact, increase water infiltration, trap and secure crop residues, improve soil aggregate stability and provide a network of roots which protect soil from flowing water.

Nitrate Loss Reduction: Nitrate losses from Iowa cropland can find its way to surface waters through surface runoff and tile. Studies show that as much as 80% of these losses can occur during the winter fallow period and into the spring. Many cover crops are good scavengers of nitrogen and will take up excess nitrogen and store it in plant tissues through the winter and early spring. Studies at the USDA-ARS National Laboratory for Agriculture and the Environment (NLAE) have shown that a winter cover crop of Cereal Rye can reduce the total nitrate loading in drainage systems by 55%. Some of this nitrogen will be available to the following crop and most of the rest is stored in the soil organic matter.

Phosphorus Loss Reduction: Phosphorus loss from Iowa fields occurs in both soluble and particulate (i.e. attached to soil particles or organic manure or crop residues) forms. Cover crops reduce runoff of soluble phosphorus through increased infiltration and plant uptake. Particulate phosphorus loss is reduced by trapping organic residues and reducing soil erosion.

Atmospheric Nitrogen Fixation into the Soil: Legume cover crops can fix nitrogen, and if they grow enough they can reduce additions of nitrogen for the subsequent crop. All legumes require Rhizobium bacteria to fix nitrogen. In many cases these are Rhizobium strains specific to individual species of legumes. Assure the proper inoculant is applied to the seed just before planting. Use only fresh inoculant (check the date). See Reference: (SARE) "Managing Cover Crops Profitably, 3rd edition", page 122, *Nodulation* and Chart 3B. *planting*.

Weed Suppression: Cereal Grains, especially Cereal Rye, are very effective in providing a mulch that will create a weed barrier by blocking sunlight and producing natural chemicals which suppress weed growth.

Soil Health Improvement: Cover crops have the potential to increase soil organic matter and increase the biodiversity of organisms in the soil. This increase is greater where less tillage is used to establish the cover crop and more growth is allowed prior to spring termination. Studies show that tillage prior to seeding or as a part of seeding may cause a greater net loss of carbon than the cover crop can regain. Additionally, cover crop roots can penetrate compacted soil layers and maintain or open channels or macropores through the soil, which increases infiltration, aeration, and rooting depth. Increased biodiversity from cover crops can increase populations of beneficial organisms such as earthworms and other soil organisms such as mycorhizae which greatly improve nutrient cycling, aeration and improve soil structure. Select cover crop species to achieve one or more of the following: a species mix with different maturity dates and/or physiology, attract beneficial insects, attract pollinators, increase biological diversity to a crop rotation, serve as a trap crop for damaging insects, and/or provide food and cover for wildlife habitat management.

Cover Crop Grazing: Research has shown that cover crop grazing can improve soil health more rapidly than cover crops alone as part of a cropping system. Livestock converts above ground biomass to urine and manure, creating a beneficial environment that increases organic matter in the soil. Grazing should be used as a tool primarily in the later part of the cover crop growth cycle to: terminate the cover crop, convert biomass into urine and manure, and potentially create more cash flow. Generally, the cover crop should be 6 inches or taller to begin grazing. Higher density strip grazing or a similar method will maximize the benefit by ensuring even distribution of animal wastes.

When a cover crop will be grazed or hayed, ensure the selected crop complies with pesticide label rotational crop restrictions and that the planned management will not compromise the selected conservation purpose(s). See Iowa State University publication Crop 3082 "Herbicide Use My Restrict Grazing Options for Cover Crops."

SITE PREPARATION & WEED CONTROL

Preceding crop residues should be spread evenly before seeding or following aerial seeding. Existing weeds should be eliminated by applying herbicide if it is determined that sufficient pressure exists to hinder the establishment and growth of the cover crop or perennial weeds are present. If spraying, work with a local consultant or Iowa State University Extension Specialist to determine the best herbicide combination and timing. Follow the manufacturer's label rates and guidelines when applying herbicides. Herbicide residue or carryover from previous crop can cause problems with cover crop establishment. A bioassey test is recommended to determine if a herbicide carry over is present.

SEEDING

Selection of Plant Materials: Use certified (Tested) seed that has been cleaned and is free from noxious weeds. Select a species that is adaptable to the desired planting date with ample time to germinate and reach an acceptable growth stage prior to a killing

freeze or adequate root growth to survive the winter. **See Table 1 "Late Summer & Fall Cover Crop Seeding Rates".** Select a species or mix which will meet the intended purpose and maximize the desired benefits. **See references.**

No-till Seeding: Ensure the drill or planter (15" rows or less) is designed to handle the crop residues and seed being planted (especially important for small seeds or mixture with varying size and/or density). Set and operate the drill/planter to provide an ideal planting depth. Seed at the full base rate of 100%. (See Table 1)

Broadcast Seeding: Seed may be broadcast using a broadcast seeder if capable of spreading seed in a uniform manner. Premixing the seed with needed fertilizer or pelletized lime and utilizing an airflow applicator can also be effective. Seed at 110% of base rate if seed is incorporated with light tillage or cultipacking. Seed at 120% of base rate if there is no incorporation. (See Table 1)

Aerial Seeding: Over seeding into the existing crop in August through September can be an effective seeding method to acquire more fall growth. Seed spread on the surface is more rain dependent, generally requires a higher seeding rate, and takes longer to establish. Seeding cover crops just ahead of soybean leaf drop will aid in mulching the seed and conserving moisture. Results are dependent on adequate rainfall. Seed at 120% of base rate. (See Table 1)

Lime and Fertilizer: Fertilizer is not recommended (this includes nitrogen) for the establishment of the

cover crop, but may be used to increase biomass production on poor or damaged sites or for grazing. The cover crop may be used to sequester or trap nutrients from manure or fertilizer applied for the subsequent crop. Lime application in conjunction with a cover crop is advantageous to improve soil quality benefits where pH is less than 6.4. Apply all soil amendments prior to seedbed preparation where possible, or before planting if a no-till drill is used.

TERMINATION

For most cropping systems, it is not desirable to allow the cover crop to produce seed. Harvest for grain is not a purpose of this practice standard. Termination for winter hardy species should be done as late as possible to maximize the intended benefits. If moisture is not a concern, cover crops should be left to achieve a minimum of 8 inches in the spring to ensure adequate growth and maximum benefits.

Ensure cover crops are managed and compatible with Risk Management Agency (RMA) crop insurance and/or USDA program criteria. (See "NRCS Cover Crop Termination Guidelines" - September 2014.)

Use of Herbicides: If the cover crop is to be terminated with herbicides, assure that timing and selection of herbicides achieve a complete kill. Translocated herbicides will normally perform better under conditions that are ideal for active growth. A minimum daytime temperature above 55° and night time temperature above 45° is needed for good translocation. During cool weather periods, application should be made during the warming time of day (i.e. 9:00am-3:00pm). Avoid tank mixing herbicides that are antagonistic to translocation. Consider the following crop when selecting the herbicide for termination. Follow all federal, state, and local guidelines as well as the manufacturer's label rates and guidelines when applying herbicides. For additional information on herbicide controls, contact a local consultant or ISU Extension Specialist. Always apply herbicides according to labeled directions. See references.

Mechanical: Most cereal grains are easily terminated by mowing, crimping, haying, tillage, or heavy grazing once the cover crop has reached a reproductive growth stage.

Note: Haying a cover crop removes some of the nutrients.

Frost: Non-winter hardy species of cover crops are primarily terminated by cold winter temperatures. However, some species may have hard seed that will germinate in the spring prior to the planting of the primary cash crop, or growing plants may over-winter in mild winters, especially if there is snow cover.

OPERATION & MAINTENANCE

The cover crop should be integrated as a part of a conservation cropping system with practices such as: Continuous No-till/Strip-till, Mulch-Till, Nutrient Management, Pest Management and Waste Utilization.

REFERENCES

Midwest Cover Crop Council - Cover Crop Decision Tool - Cover Crop Selector for Iowa Counties www.mccc.msu.udu/SelectorTool/2011CCSelectorTool.pdf

Sustainable Agriculture Research and Education (SARE) "Managing Cover Crops Profitably" explores how and why cover crops work and provides all the information needed to build cover crops into any farming operation. www.sare.org/publications/.

Table 1

Late Summer and Fall Cover Crop Seeding Rates

Species Common Name	Winter Hardy?	Drilled Base Rate[1] (lbs/acre of PLS[6])	Broadcast with Incorporation Base Rate = 1.1 x base rate (lbs/acre of PLS[6])	Broadcast on Surface Base Rate[2] = 1.2 x base rate (lbs/acre of PLS[6])
Rye, Winter Cereal	Yes - all cultivars	55	61	66
Triticale, Winter	Yes - most cultivars	55	61	66
Wheat, Winter	Yes - many cultivars	55	61	66
Barley, Winter[3]	No	60	66	72
Oats	No	60	66	72
Ryegrass, Annual[4]	No/Sometimes	12	13	14
Mustard, Oriental	No	3	3	4
Radish, Oilseed	No	5	6	6
Rapeseed	No	3	3	4
Turnip, Forage type	No	3	3	4
Vetch, Hairy[5]	Usually/Slow Growth	12	13	14

Late Summer and Fall Cover Crop Recommended Planting Dates

Zone (See Map)	Drilled or Incorporated Planting Date[2] for Winter Hardy Cover Crops	Drilled or Incorporated Planting Date[2] for Cool Season Non-Winter Hardy Cover Crops
Zone 1	October 21	September 9
Zone 2	October 28	September 16
Zone 3	November 5	September 23

[1]Minimum rates are for optimum planting time windows and conditions. Seeding rates can be increased if conditions are less than optimum or for planting dates late in the planting windows. Also, the seeding rates for cover crops intended for grazing should be increased 1.5 to 2.0 times the base rate.

[2]If surface broadcasting is used, planting will occur 7-10 days earlier than recommended planting date to compensate for slower establishment and variable rainfall. Surface broadcasting becomes less effective because of reduced tillering or branching later in planting windows, especially after non-winter hardy planting dates.

[3]Winter barley is rarely winter hardy in Iowa.

[4]Some cultivars of annual ryegrass are winter hardy in Iowa.

[5]Hairy Vetch is somewhat winter hardy if enough fall growth occurs, but it grows slowly in both fall and spring. It benefits from an earlier fall planting. Soil incorporation is preferable.

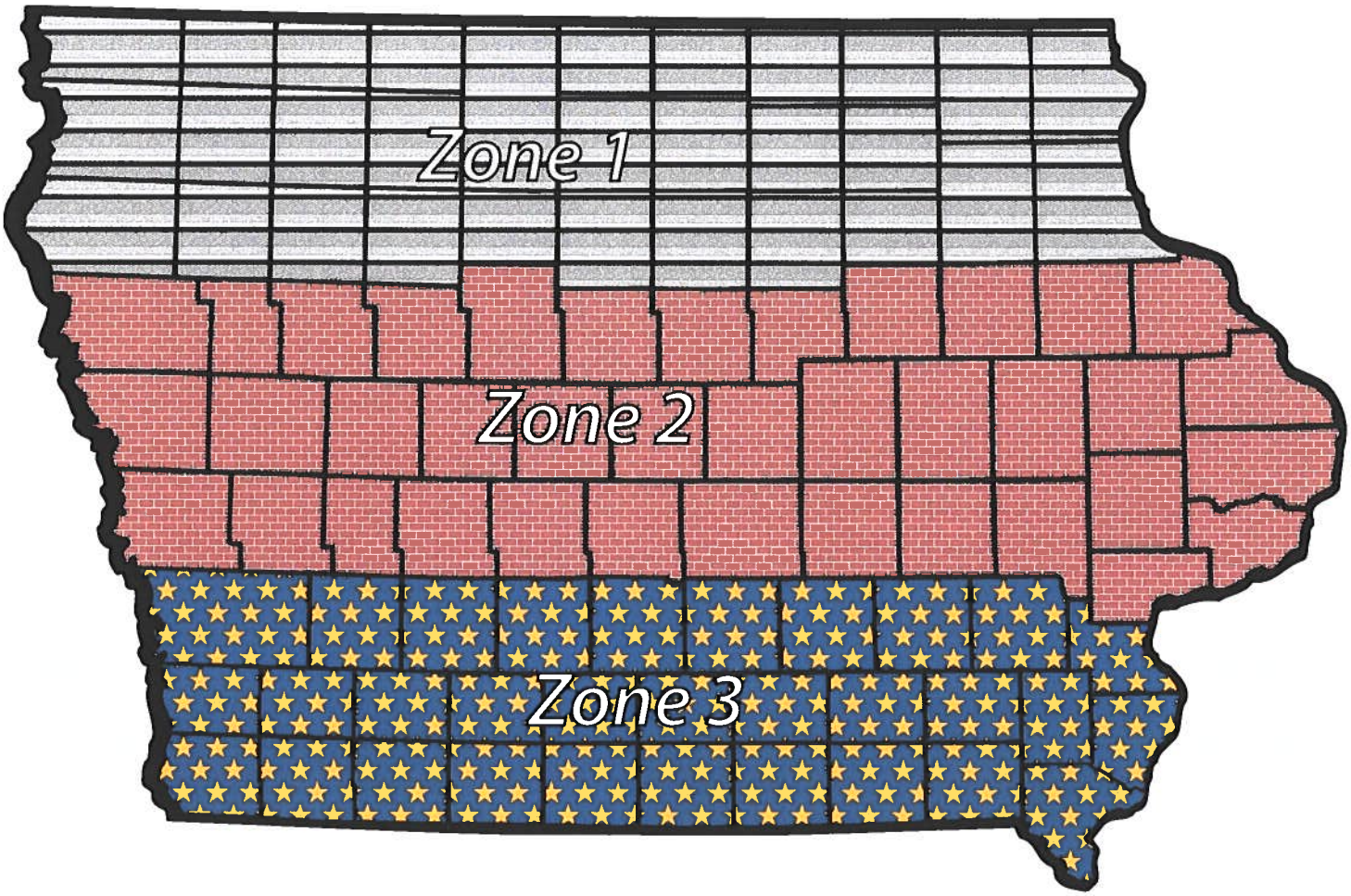
[6]PLS (Pure Live Seed) - Expression of seeding rate in pounds per acre. PLS = (% germination + dormant seed x % purity) ÷ 100

This is not an all-inclusive list of species. See Midwest Cover Crop Council-Cover Crop Decision Tool – Cover Crop Selector for Iowa Counties.

It is recommended that you plant diverse cover crop mixes. The rates listed are for pure stand seedings. When developing a cover crop mix, take the percent desired by the pure stand rate to determine seeding rate by species.

(Example: 60% cereal rye + 40% radish would have a seeding rate of .6 X 55 = 33 lbs. cereal rye and .4 X 5 = 2 lbs. radish)

Iowa Cover Crop Planting Zones



Zone 1 - Oct. 21 for winter hardy cover crops; Sept. 9 for cool season non-winter hardy cover crops

Zone 2 - Oct.28 for winter hardy cover crops; Sept. 16 for cool season non-winter hardy cover crops

Zone 3 - Nov. 5 for winter hardy cover crops; Sept. 23 for cool season non-winter hardy cover crops

Examples of Diverse Cover Crop Mixes

See Midwest Cover Crop Council-Cover Crop Decision Tool – Cover Crop Selector for Iowa Counties for an all-inclusive species list.

Resource Concern	Species Mix	% of Pure Stand Rate	lbs./ac. of PLS[3]
SUMMER COVER (Seed by Aug. 1)			
Compaction Mix	Oilseed Radish[1]	20	1
	Turnips[1]	20	1
	Rape	30	1
	Oats	30	18
Nitrogen Fixing Mix 1	Alfalfa	30	5
	Red Clover	30	3
	Oats	40	24
Nitrogen Fixing Mix 2	Oats	50	30
	Hairy Vetch	50	6
Grazing/Compaction Mix (2x base rate for grazing)	Oats	40	48
	Mustard	20	1
	Turnip[1]	20	1
	Forage Radish[1]	20	2
FALL/WINTER COVER (Seed by zone - see map)[2]			
Soil Building/N Scavenge Mix	Cereal Grain (Cereal Rye, Winter Wheat, Winter Triticale)	85	47
	Oilseed Radish	15	1
Erosion Control Mix & Nitrogen Fixing	Cereal Grain (Cereal Rye, Winter Wheat, Winter Triticale)	60	33
	Hairy Vetch	40	5
Erosion Control	Annual Ryegrass	60	7
	Rape	20	.6
	Mustard,Oriental	20	.6
Grazing/Compaction Mix (2x base rate for grazing)	Cereal Grain (Cereal Rye, Winter Wheat, Winter Triticale)	50	55
	Oilseed Radish	25	2.75
	Turnip	25	1.5

[1]Brassicas will bolt when seeded in the spring, and will produce seed.

[2]If a non-winter hardy species is used in the mix, seed the mix by the earlier seeding date.

[3]PLS (Pure Live Seed) - Expression of seeding rate in pounds per acre. PLS = (% germination + dormant seed x % purity) ÷ 100

Technical Note:

Iowa Agronomy Technical Note 39 (Cover Crop Seeding Methods and Tools)

Cover Crops provide numerous benefits, and these are greatest when a good stand is established with as little soil disturbance as possible. To maximize benefits and to meet the criteria of the FOTG-329- Residue and Tillage Management Standard, the seeding tool or method should have a calculated Soil Tillage Intensity Rating (STIR) rating of 15 or less according to the Revised Universal Soil Loss Equation (RUSLE2).

Cover Crop Establishment

Cover Crop success is dependent on several factors:

- Seeding date
- Weather (temperature and moisture) after seeding
- Seedbed conditions
- Fertility
- Mulch or previous crop residue amounts
- Planting depth
- Seed soil contact
- Seeding rate
- Seed quality (% germination and % purity)
- Time of freeze after seeding
- Insects and diseases

Seeding Depth Guidance

Groups	Optimum	Maximum
Brassicas, Clovers, Small Seeded Legumes, Small Seeded Grasses	1/4"	3/4"
Vetches, Sorghums	1/2"	1"
Cereal Grains	3/4"	1 1/2"
Beans, Peas	1 1/2"	2"

Cover crop mix with excellent establishment.

The following are recommended seeding methods and tools which optimize establishment factors. Each has been evaluated for their relative establishment effectiveness for: depth control, seed to soil contact, timeliness and weather conditions.

No-Till Drilling: Use a no-till drill that is designed to handle heavy crop residues and the type of seed being planted (especially important for small seeded species). Set properly, the no-till drill will provide good seed-to-soil contact and a planting depth preferred for the desired species to be planted. This should provide for faster and more consistent emergence and is recommended for seeding species during the final days of the approved seeding period. Depth control for most drills is not as precise as a planter, so it is important to set it for the optimum depth, and check often to assure placement doesn't exceed the maximum depth for selected species. Drilling in soils that are too wet can also cause improper seed placement and be antagonistic to the desired soil health benefits. Seed at the drilled/incorporated rate. (See Table 1)

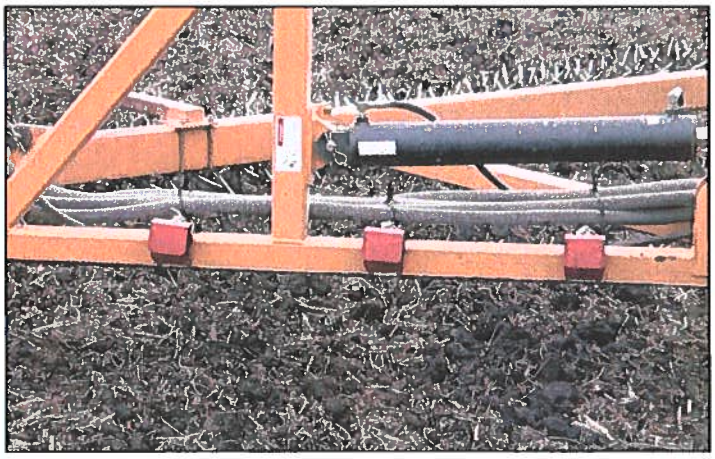
Narrow Row Planting: Many split-row or narrow row planters (15" row width or less) can be equipped with seed plates, such as those used for sugar beets or sorghum, which work well for many cover crop species. Additional adaptation and/or calibration may be necessary due to variation of seed size among cover crop species and varieties. This method should provide the fastest and most consistent emergence and is recommended for seeding species during the final days of the approved seeding period. To improve crop diversity at least two species of cover crops could be planted either in alternating rows or combined together. This method should not be used if weed control is the primary purpose. Seed at the drilled/incorporated rate. (See Table 1)

Narrow row or split-row planter

Two species of cover crops growing in alternating 15" rows.

Harrow Seeding: Rotary harrows, coulter harrow type vertical tillage tools or similar tools can be used to aid in fluffing or cutting residue to allow improved seed to soil contact over broadcasting alone but may lack the depth control of planters and drills. Air delivery seeders can be mounted to these tools to deliver the seed to the soil as the residue is lifted or cut. The implement will be set to run no deeper than 1" and not be designed to invert the soil or to bury the crop residue. Coulters will be set to run straight and not be cupped or concave. Tools with multiple operation gangs should only utilize the coulters with the rear harrow gangs raised or detached. This prevents excessive soil disturbance and moisture and carbon loss that will reduce the desired benefits of the cover crop. This will be a fast, single pass operation, that can seed many acres in a short period of time. Seed at the incorporated rate. (See Table 1)

Rotary Harrow Seeding - mounted air delivery seeder in light crop residue



Rotary Harrow Seeding - seed delivery ports

Coulter Harrow (vertical tillage tool) Seeding - air delivery seeder on a coulter harrow in heavy crop residue

Broadcast Seeding: Seed may be inexpensively broadcast into light residue crops without a seedbed preparation if completed in a uniform manner. Expect only fair seed-to-soil contact with no planting depth. This method relies on rain, freeze/thaw cycles, or snow to incorporate the seed. Heavier seeds such as cereal grains are more adapted to this method when seeding into freshly harvested crop residues. Seed at broadcast on surface rate. (See Table 1) Pre-mixing the seed with 200 lbs. per acre of pelletized lime or blended with the fertilizer intended for the subsequent crop is acceptable if using an airflow applicator. Seed blended with fertilizer should be immediately spread to prevent damage to the seed. Wind speed should be 15 m.p.h. or less when broadcasting light seed, such as annual ryegrass.

Airflow Applicator

Aerial Inter-Crop Seeding: Broadcast via a plane, helicopter or high-clearance spreader into existing vegetation or standing crops. This method relies on rain, freeze/thaw cycles, or snow to incorporate the seed. Timing in the fall should be just prior to leaf drop or early crop maturity stage for most cover crops. This method may provide more timely seeding for species that require an earlier establishment. Some shade tolerant species may be adapted to earlier seeding. Earlier seeding is desirable when the cover crop is to be used for fall forage. An attempt should be made to seed just ahead of predicted rain. Seed at broadcast on surface rate. (See Table 1) Only seed mixes of species with similar density should be considered. Aerial applicators should be knowledgeable of the spreading width and the weight of the planned species. Wind speed should be 15 m.p.h. or less when broadcasting. It does not include a seedbed preparation. In dry years, this method may provide poor or inconsistent emergence compared to planting or drilling.

Aerial Inter-Crop Seeding

Aerial Inter-Crop Seeding - established in standing soybeans

High-Clearance Sprayer, converted to air seed cover crops
(photo courtesy of Mike Shuter)

Other approved Innovations: Air delivery seeders can be mounted to combine heads to deliver the seed to the soil as the residue is being cut or shredded. As the residues exit the back of the combine they are spread as mulch over the seed to allow improved seed to soil contact and emergence rates over broadcasting alone. Mixes with smaller seed size may be preferable to reduce seed hopper filling frequency. Seed at drilled/incorporated rate. (See Table 1) Additional seeding innovations are likely and should be evaluated on a case by case basis.

Air seeder mounted to corn head *(photo by Ray McCormick)*

Table 1

Cool Season Cover Crop Seeding Rates *(minimum rates)*

Species Common Name	Winter Hardy?	Drilled or Incorporated (Bulk lbs/acre)	Broadcast on Surface (Bulk lbs/acre)
Rye, Winter Cereal	Yes - all cultivars	45	45
Triticale, Winter	Yes - most cultivars	45	45
Wheat, Winter	Yes - many cultivars	45	45
Barley, Winter	No	60	60
Oats	No	60	60
Ryegrass, Annual	No/Sometimes	12	14
Mustard, Oriental	No	3	4
Radish, Oilseed	No	5	6
Rapeseed	No	3	4
Turnip, Forage type	No	3	4
Vetch, Hairy	Usually/Slow Growth	12	14

Cool Season Cover Crop Recommended Planting Dates

Zone (See Map[1])	Winter Hardy Cover Crops	Non-Winter Hardy Cover Crops
Zone 1	October 21	September 9
Zone 2	October 28	September 16
Zone 3	November 5	September 23

[1]See "NRCS Technical Note 38: Cover Crop Management" for Zone map.

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATIONS for

UI-026-027-028-029-STORTZ

Winneshiek County, IA

List of Specifications:

Specification Number	Title	Pages
IA-1	Site Preparation	1
IA-5	Pollution Control	2
IA-6	Seeding & Mulching For Protective Cover	1
IA-23	Earthfill	3
IA-26	Topsoiling	1
IA-61	Loose Rock Rip Rap	2
IA-412	Grassed Waterway	2
IA-620	Underground Outlet	4
IA-638	Water and Sediment Control Basin	2

Upper Iowa River Flood Reduction Project

UI-BID-002

Standard NRCS Specifications

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-1 SITE PREPARATION

1. SCOPE

Site preparation work shall consist of clearing, grubbing, stripping, refuse removal, bank sloping and structure removal on the site as necessary to rid the site of all undesirable materials on or near the surface and prepare the site for the structure. All woody growth within the construction area shall be cleared and all stumps and roots one inch in diameter or larger shall be grubbed from the site. In addition, all areas within 25 feet of the footprint of the structure shall be cleared and grubbed except as directed by NRCS. The work shall also consist of the removal and disposal of structures (including fences) that must be removed to perform other items of work.

For wetland restoration, enhancement, or creation projects, the wetland area shall be disturbed as little as possible and existing naturally vegetated spillway areas shall not be disturbed.

2. FOUNDATION PREPARATION

The construction areas shall be stripped a minimum of 6 inches to remove all unsuitable materials such as organic matter, grasses, weeds, sod, debris, and stones larger than 6 inches in diameter.

In an earth embankment foundation area, all channel banks and sharp breaks shall be sloped to no steeper than 1.5 horizontal to 1 vertical.

The foundation area shall be thoroughly scarified before placement of fill material. The surface shall have moisture added or shall be compacted if necessary so that the first layer of fill material can be compacted and bonded to the foundation.

3. STRIPPED MATERIAL DISPOSAL

Suitable soil material shall be stockpiled for use as topsoil. The other stripped materials shall be buried, removed from the site, or disposed of as directed by the owner or NRCS. Whenever possible, material shall not be disposed of in the pool area created by the structure.

Stockpiled materials around a construction site should be placed so as not to hinder subsequent construction operations.

4. DISPOSAL OF REFUSE MATERIALS

Waste materials from clearing and structure removal shall be burned or buried at locations approved by the owner. Buried materials shall be covered with a minimum of 2 feet of earthfill. Whenever possible, material shall not be disposed of in any pool area created by the structure.

All refuse shall be disposed of in a manner which complies with all local and state regulations.

5. SALVAGE

Items to be salvaged shall be as shown on the drawings. Structures and fencing materials that are designated to be salvaged shall be carefully removed and neatly placed in the specified storage areas.

6. SPECIAL SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-3 STRUCTURE REMOVAL

1. SCOPE

The work shall consist of the removal, salvage and/or disposal of structures (including fences) from the designated areas and as indicated on the drawings.

2. MARKING

Each structure or item to be removed will be marked by means of stakes, flags, painted markers or other suitable methods.

3. REMOVAL

All structures designated for removal shall be removed to the specified extent and depth.

4. SALVAGE

Structures that are designated to be salvaged shall be carefully removed and neatly placed in the specified storage areas. Salvaged structures that are capable of being disassembled shall be dismantled into individual members or sections. Such structures shall be neatly match marked with paint prior to disassembly. All pins, nuts, bolts, washers, plates and other loose parts shall be marked or tagged to indicate their proper location in the structure and shall be fastened to the appropriate structural member or packed in suitable containers. Materials from fences designated to be salvaged shall be placed outside the work area on the property from which they are removed. Wire shall be rolled into uniform rolls of convenient size. Posts and rails shall be neatly piled.

5. DISPOSAL OF REFUSE MATERIALS

Refuse materials resulting from structure removal shall be burned or buried at locations shown on the drawings. Buried materials shall be covered with a minimum of 2 feet of earthfill. Whenever possible, material shall not be disposed of in the pool area created by the structure.

All refuse shall be disposed of in a manner which complies with all local and state regulations.

6. SPECIAL SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-5 POLLUTION CONTROL

1. SCOPE

The work shall consist of installing measures or performing work to control erosion and minimize the production of sediment and other pollutants to water and air during construction operations.

2. MATERIALS

All materials furnished shall meet the requirements shown on the drawings or in the specifications.

3. EROSION AND SEDIMENT CONTROL MEASURES AND WORKS

The measures and works shall include, but are not limited to, the following:

Staging of Earthwork Activities: The excavation and moving of soil materials shall be scheduled so that areas unprotected from erosion will be minimized. These areas will be unprotected for the shortest time feasible.

Seeding: Structures and disturbed areas shall be seeded as soon as possible after construction is completed.

Temporary seedings may be used as an alternative to other stabilization measures as approved by NRCS.

Mulching: Construction areas that have been disturbed but have no construction activity scheduled for 21 days or more shall have erosion protection measures applied by the 14th day. This erosion protection may be mulching or other approved temporary measures. Construction areas shall not be left open during a winter shutdown period and shall be protected by mulching.

All seeding and mulching shall be completed in accordance with the seeding plan and Iowa Construction Specification IA-6, Seeding and Mulching for Protective Cover.

The following works may be temporary. If they are installed as a temporary measure, they shall be removed and the area restored to its original state when they are no longer needed or when permanent measures are installed.

Diversions: Diversions may be required to divert clean runoff water away from work areas and to collect runoff from work areas for treatment and safe disposition.

Stream Crossings: Culverts or bridges may be required where construction equipment must cross streams.

Sediment Basins: Sediment basins may be required to settle and filter out sediment from eroding areas to protect properties and streams below the construction site.

Sediment Filters: Straw bale filters, geotextile sediment fences, or other equivalent methods may be used to trap sediment from areas of limited runoff. Sediment filters shall be properly anchored to prevent erosion under them.

Waterways: Waterways may be required for the safe removal of runoff from fields, diversions, and other structures or measures.

4. CHEMICAL POLLUTION

The Contractor shall provide watertight tanks or barrels or construct a sump sealed with plastic sheets to be used to dispose of chemical pollutants, such as drained lubricating or transmission oils, greases, soaps, concrete mixer wash water, asphalt, etc., produced as a by-product of the construction work. At the completion of the construction work, sumps shall be removed and the area restored without causing pollution.

Sanitary facilities such as chemical toilets or septic tanks shall not be placed adjacent to live streams, wells, or springs. They shall be located at a distance sufficient to prevent contamination of any water sources. At the completion of construction work, facilities shall be disposed of without causing pollution.

5. AIR POLLUTION

The burning of brush or trash or disposal of other materials shall adhere to local and state regulations.

Fire prevention measures shall be taken to prevent the start or the spreading of wild fires, which result from project work. Fire breaks or guards shall be constructed at locations shown on the drawings.

All public access or haul roads used by the contractor during construction of the project shall be sprinkled or otherwise treated to fully suppress dust. All dust control methods shall insure safe operations at all times. If chemical dust suppressants are used, the material shall be a commercially available product specifically designed for dust suppression and the application shall follow manufacturer's requirements and recommendations. A copy of the product data sheet and manufacturer's recommended application procedures shall be provided to the Engineer five working days before use.

6. MAINTENANCE, REMOVAL, AND RESTORATION

All pollution control measures and works shall be adequately maintained in a functional condition as long as needed during the construction operation. All temporary measures shall be removed and the site restored to as near original conditions as practical.

7. SPECIAL SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-6 SEEDING AND MULCHING FOR PROTECTIVE COVER

1. SCOPE

The work shall consist of seeding, mulching, and fertilizing all disturbed areas and other areas as indicated on the drawings or otherwise designated.

2. SEEDBED PREPARATION AND APPLICATION

The entire area to be seeded shall be reasonably smooth and all washes and gullies shall be filled to conform to the desired cross-section before actual seedbed preparation is begun. At this stage of the operation, the required fertilizer and lime shall be applied uniformly and incorporated into the top 3 inches of the soil with suitable tillage equipment. The seedbed preparation operation shall be suspended when the soil is too wet or too dry. The seedbed shall be loosened to a depth of at least three inches.

On side slopes steeper than 2-1/2 horizontal to1 vertical, the 3 inch minimum depth of seedbed preparation is not required, but the soil shall be worked enough to insure sufficient loose soil to provide adequate seed cover.

Unless otherwise specified, the seeding operation shall be performed immediately after preparation of the seedbed. The seed shall be drilled or broadcast by equipment that will insure uniform distribution of the seed.

3. MATERIALS

The seeding, fertilizing, and mulching requirements are as specified on Form IA-CPA-4.

Straw from cereal grains or hay will be used as mulching material. It shall be relatively free of weeds.

4. MULCH APPLICATION

The required mulching shall be performed as soon as possible after seeding unless otherwise specified. The mulch shall be applied uniformly over the area. The type and rate shall be as specified. When mulching is required, all areas seeded during any one day shall be mulched within 24 hours. The mulch may be spread by any means that results in a uniform cover.

The mulch shall be anchored. Anchoring of the mulch may be performed by a mulch anchoring tool or regular farm disk weighted and set nearly straight, by installation of mulch netting, or by other methods approved by NRCS.

5. SPECIAL SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-8 MOBILIZATION AND DEMOBILIZATION

1. SCOPE

This work shall consist of the mobilization and demobilization of the Contractor's forces and equipment necessary for performing the work required under the contract.

The work shall not include mobilization and demobilization for specific items of work for which payment is provided elsewhere in the contract.

Mobilization will not be considered as work in fulfilling the contract requirement for commencement of work.

2. EQUIPMENT AND MATERIALS

Mobilization shall include all activities and costs for transportation of personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary facilities for the Contractor's operations at the site; premiums paid for performance and payment bonds, including coinsurance and reinsurance agreements as applicable; and other items specified in Section 4.

Demobilization shall include all activities and costs for transportation of personnel, equipment, and supplies not included in the contract form the site; including the disassembly, removal and site cleanup of offices, buildings, and other facilities assembled for this contract.

The work includes mobilization and demobilization activities required by the contract at the time of award. If additional mobilization and demobilization activities and costs are required during the performance of the contract as a result of changed, deleted or added items of work for which the contractor is entitled to an adjustment in contract price, compensation of such costs will be included in the price adjustment for the item or items of work changed or added.

3. SPECIAL SPECIFICATIONS

A. Measurement and Payment
   a. Payment will be made as the work proceeds, after presentation of invoices by the contractor showing specific mobilization and demobilization costs and evidence of the charges of suppliers, subcontractors, and others. If the total of such payments is less than the lump sum contract price, the unpaid balance will be included in the final contract payment. Payment of the lump sum contract price for mobilization and demobilization will constitute full compensation for the completion of the work.
   b. Payment will not be made under this item for the purchase costs of materials having a residual value, the cost of materials to be incorporated in the project, or the purchase costs of operating supplies.

B. Items of Work and Construction Details
   a. Items of work to be performed in conformance with this specification and the construction details therefor are:
      i. Bid Item 4, Mobilization & Demobilization

         1. This item shall consist of mobilizing and demobilizing personnel and equipment in preparation to perform the work within the scope of this contract.

2. Any work that is necessary to provide access to the site including, but not limited to, grading, temporary culverts, and clearing will be included in this item. When construction is completed access areas will be restored, as close as practical, to its original condition.
3. Any fence removed for access and /or to provide work area shall be replaced with same or like materials as approved by the engineer.
4. The Contractor shall exercise caution to minimize the amount of damage caused by the grading and clearing operations.
5. Portable toilets shall be provided at the construction site and used for the sanitary facilities.
6. This item shall not include transportation of personnel, equipment and operating supplies within the work limits areas of this contract.
7. Payment will constitute full compensation for related subsidiary items.

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-9 SUBSURFACE DRAIN INVESTIGATION, REMOVAL, AND REPAIR

1. SCOPE

The work shall consist of investigation, location, repair, and/or removal of subsurface drains (tile) near new or existing animal waste storage facilities or in wetland restoration, enhancement, or creation project areas, or other situations where subsurface drains may be present.

2. INVESTIGATION AND LOCATION

An inspection trench at least 10 inches wide shall be dug at the location shown on the drawings or as directed by the engineer or his representative. The trench shall be at least 6 feet deep measured from the original ground line, unless otherwise shown on the plans. The Engineer or his representative shall examine the trench and excavated material to identify tile lines.

Size, material, operating condition and direction of flow of each conduit shall be documented. Location and flow line elevation of each conduit shall be surveyed with horizontal and vertical control based on benchmarks shown on the plans.

The inspection trench shall be documented by surveying the natural ground and trench bottom location and elevations at the beginning, end, and every 50 feet for trenches longer than 50 feet.

Backfilling shall not be started without approval of the Engineer. See Section 5 for backfill specifications.

Trench shields, shoring and bracing, or other methods necessary to safeguard the workers and work, and to prevent damage to the existing improvements shall be furnished, placed, and subsequently removed by the contractor.

3. TILE REPAIR

Unless designated for removal, replace damaged conduit with new conduit having equal or greater capacity using material specified in Section 6 or 7. When replacing short sections of clay or concrete tile with single-wall corrugated polyethylene pipe, use the next larger nominal size.

Make connections with manufactured fittings and tight joints. Where joints have gaps that would allow soil to enter, cover the joint with a permanent type material such as coal tar pitch treated roofing paper, fiber glass sheet or mat, or plastic sheet.

If the investigation trench has been excavated below the existing drain grade, backfill the trench with gravel or well-pulverized soil in layers not over four (4) inches thick and tamp by hand or manually directed power tamper to provide a firm foundation for the conduit at the existing grade. Do not backfill with any soil containing broken tile fragments.

Using selected soil free of hard clods, rocks, or frozen soil, hand tamp the backfill material around the haunch of the pipe in layers not over four (4) inches thick to provide support. Hold the conduit in place mechanically while placing excavated material around and over the conduit to ensure proper alignment and grade is maintained. Complete the backfill operation according to Section 5.

4. TILE REMOVAL

Remove conduits as shown on the plans or directed by the Engineer or his representative, including envelope filter material or other flow enhancing material when present.

Cap or plug the open ends of the disconnected conduit to prevent soil entry when the conduit will continue to function downstream, or otherwise shown on the plans. For a minimum distance of two feet around each sealed conduit end, backfill in layers not over four (4) inches thick and tamp by hand or manually directed power tamper to a density equal to or greater than the surrounding undisturbed soil. Do not backfill with any soil containing broken tile fragments, large stones, frozen material, or large dry clods.

Where tile are located beneath an existing animal waste facility, remove the tile or fill the entire length of tile with concrete or Portland cement grout as shown on the plans. When tile removal is specified, the owner shall contact the Iowa Department of Natural Resources (IDNR) for permission to remove the drainage tile under the structure. The structure shall be emptied of waste or lowered to a point below the tile prior to its removal. The structure must be retested for percolation and the results submitted to IDNR and approval received prior to reusing the structure.

If shown on the plans or directed by the engineer, reroute upstream drain lines so the capacity of the upstream drainage system is maintained. Install conduit in accordance with Iowa Construction Specification IA-46, Tile Drains for Land Drainage.

5. BACKFILL

Compact soil around disturbed tile as specified in Section 3 (Tile Repair) and Section 4 (Tile Removal). Keep the backfill within 5 feet of the conduit free from large stones, frozen material, and large dry clods. Unless otherwise shown on the plans, backfill the remainder of the trench as follows:

For trenches located under or near structures, backfill in 12 inch layers and compact each layer to a density equal to or greater than the surrounding undisturbed soil.

For other locations, backfill the remainder of each trench with the excavated soil material which shall extend above the ground surface and be well rounded over the trench.

6. MATERIALS

Unless otherwise shown on the plans, conduit and fittings used for repair shall conform to the specifications listed in Table 1. Perforated pipe shall have a water inlet area of at least 1 square inch per foot, provided by perforations spaced uniformly along the long axis of the pipe. The perforations shall be circular or slots. Circular perforations shall not exceed 3/16 inch in diameter. Slots shall not be more than 1/8 inch wide.

Table 1. Acceptable pipe for subsurface drain repair

Kind of Pipe[#]	Specification
Corrugated Polyethylene (PE) Pipe and Fittings, 3 to 6 inch	ASTM F 405
Corrugated Polyethylene (PE) Pipe and Fittings, 3 to 24 inch	ASTM F 667
Corrugated Profile Wall (Dual Wall) Polyethylene (PE) pipe, 2 to 60 inch	ASTM F 2648[$]
Corrugated Profile Wall (Dual Wall) Polyethylene (PE) pipe, 12 to 60 inch	ASTM F 2306[$]
Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80 and 120	ASTM D 1785
PVC Pressure-Rated Pipe (SDR Series)	ASTM D 2241
Clay drain tile	ASTM C 4
Concrete drain tile	ASTM C 412

[#] Pipe sizes are nominal and the ranges are inclusive
[$] Pipe conforming to AASHTO M 252 (3 to 10 inch), or AASHTO M 294 (12 to 60 inch) is acceptable

7. SPECIAL SPECIFICATIONS

None

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-11 REMOVAL OF WATER

1. SCOPE

The work shall consist of the removal of surface water and ground water as needed to perform the required construction in accordance with the plans and specifications.

2. DIVERTING SURFACE WATER

The Contractor shall build, maintain and operate all cofferdams, channels, diversions, flumes, sumps, and other temporary protective works needed to divert surface water away from the construction site while construction is in progress.

3. DEWATERING THE CONSTRUCTION SITE

Foundations, cutoff trenches, borrow areas and other parts of the construction site shall be dewatered as needed for proper execution of the construction work. The Contractor shall furnish, install, operate and maintain all works and equipment needed to perform the dewatering.

4. EROSION AND POLLUTION CONTROL

Removal of water from the construction site, including the borrow areas shall be accomplished in such a manner that erosion and the transmission of sediment and other pollutants are minimized.

5. REMOVAL OF TEMPORARY WORKS

After temporary works have served their purposes and before the Contractor leaves the site, they shall be removed.

6. SPECIAL SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-21 EXCAVATION

1. SCOPE

The work shall consist of the excavation required by the drawings and specifications and disposal of the excavated materials. The cutoff trench and any other required excavations shall be dug to the lines and grades shown on the drawings or as staked in the field. Structure or trench excavations will conform to all safety requirements of OSHA.

2. USE OF EXCAVATED MATERIALS

Suitable materials from the specified excavations shall be used in the construction of required permanent earth fill. The suitability of materials for specific purposes shall be determined by the NRCS Inspector.

3. DISPOSAL OF WASTE MATERIAL

All surplus or waste material shall be disposed of in areas shown on the drawings or as approved by the NRCS Inspector. The waste material shall be smoothed and sloped to provide drainage.

4. STRUCTURE AND TRENCH EXCAVATION

Structure or trench excavations will conform to all safety requirements of OSHA.

5. BORROW EXCAVATION

When the quantities of suitable materials obtained from specified excavations are insufficient to construct the specified fills, additional materials shall be obtained from the designated borrow areas as shown on the drawings or as approved by NRCS and the landowner. On wetland projects, borrow shall not be taken from the wetland area within 10 feet of the embankment or as shown on the drawings.

Borrow areas shall be excavated and grading completed in a manner to eliminate steep or unstable side slopes or hazardous or unsightly conditions.

6. OVER-EXCAVATION

Excavation beyond the specified lines and grades shall be corrected by filling the resulting voids with compacted earthfill, except that if the earth is to become the subgrade for riprap, sand or gravel bedding or drainfill, the voids shall be filled with material conforming to the specifications for the riprap, bedding or drainfill, as appropriate.

7. SPECIAL SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-23 EARTHFILL

1. SCOPE

The work shall consist of the construction of earth fills required by the drawings and specifications. The completed work shall conform to the lines, grades, and elevations shown on the drawings or as staked in the field.

2. MATERIALS

All fill materials shall be obtained from required excavations and designated borrow areas. Fill materials shall contain no sod, brush, roots or other bio-degradable materials. Rocks larger than 6 inches in diameter shall be removed prior to compaction of the fill.

3. FOUNDATION PREPARATION

Foundations for earthfill shall be stripped a minimum of 6 inches to remove vegetation and other unsuitable materials. Foundation surfaces shall be scarified to a minimum depth of 2 inches prior to placing fill material.

Foundation and abutment surfaces shall not be sloped steeper than 1.5 horizontal to 1 vertical unless otherwise shown on the drawings.

4. PLACEMENT

Fill shall not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by NRCS. Fill shall not be placed upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill.

Adjacent to structures or pipes, fill shall be placed in a manner which will prevent damage. The height of the fill adjacent to structures or pipes shall be increased at approximately the same rate on all sides.

The materials used throughout the earth fill shall be essentially uniform. Selective placement shall be as shown on the drawings or approved by NRCS.

If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified to a minimum depth of 2 inches before the next layer is placed.

The top surfaces of embankments shall be maintained approximately level during construction, except that a cross-slope of approximately 2% shall be maintained to ensure effective drainage.

When moving fill material from the borrow area(s) to the embankment by use of bulldozers only, the following steps shall be followed:

- Immediately after the borrow material is pushed to the embankment, it shall be spread in horizontal lifts placed parallel to the centerline of the embankment.
- Compactive effort will then be applied by operating equipment parallel to the centerline of the fill or embankment.
- Lift thicknesses shall be in strict compliance with Clause 6, below.

Sectional fills are not allowed unless they are shown on the construction drawings.

5. CONTROL OF MOISTURE CONTENT

The moisture content of the fill material shall be adequate for obtaining the required compaction. Material that is too wet shall be dried to meet this requirement, and material that is too dry shall have water added and mixed until the requirement is met.

The moisture content of the fill material shall be such that a ball formed with the hands does not crack or separate when struck sharply with a pencil and will easily ribbon out between the thumb and finger.

Earth foundations under and adjacent to concrete structures shall be prevented from drying and cracking before concrete and backfill are placed.

The application of water to the fill materials shall be accomplished at the borrow areas insofar as possible.

6. COMPACTION

Earth fill shall be compacted by one of the following methods as specified on the plans or in Section 8, Special Specifications. If no method is specified, compaction will be in accordance with Method 1.

- Method 1 - Earthfill shall be placed so that the wheels or tracks of the loaded hauling equipment, traveling in a direction parallel to the centerline of fill, pass over the entire surface of each layer being placed. Low ground pressure vehicles shall not be used for this purpose.

- Method 2 - Two (2) complete passes of a tamping-type roller will be made over each layer. The roller shall be capable of exerting a minimum force of two hundred (200) pounds per square inch.

- Method 3 - Minimum density shall be 90% of the maximum density as determined by ASTM D 698 and as shown on the plans.

The maximum thickness of a lift of fill before compaction shall be 9 inches, unless otherwise indicated on the drawings.

Fill adjacent to structures, pipe conduits, and appurtenances shall be placed in layers not more than 4 inches thick and compacted to a density equivalent to that of the surrounding fill. Methods used to obtain compaction for fine or coarse grained materials are as follows:

- For fine grained materials, hand tamping or manually directed power tampers may be used. Hand compaction only shall be used to compact the earthfill under the bottom half of circular pipes. Manually directed power tampers shall not be used in tight spaces where applying full compactive effort will result in direct contact of the tamper plate with the pipe. Care should be taken so that compaction around the spillway pipe does not cause uplift of the pipe resulting in a void beneath the pipe.

- For coarse grained materials (sands and gravels), vibratory plate compactors shall be used for obtaining compaction. However, hand tamping shall be used to compact the material under the bottom half of circular pipes.

In all cases, follow manufacturer instructions for the specific compaction equipment being used. Heavy equipment shall not be operated within 2 feet of any structure or pipe.

Compacting of fill adjacent to concrete structures shall not be started until the concrete is 7 days old.

7. ISLANDS, MOUNDS, AND LOAFING AREAS ON WETLAND RESTORATION, ENHANCEMENT, OR CREATION PROJECTS

Islands shall be randomly located within the wetland area at locations shown on the drawings or as staked in the field. The orientation of island shorelines shall be random with attention given to prevailing winds to limit wave damage. In general, the side of the island with the longest dimension shall be parallel to the prevailing wind direction. Side slopes of islands shall be as shown on the drawings, but in no case shall be steeper than 6 horizontal to 1 vertical. Island shapes shall be irregular.

Loafing areas shall be constructed in the areas shown on the drawings or as staked in the field and shall be graded to drain runoff water. The elevation of at least one loafing area should be above the maximum water level whenever possible.

Excavated material not suitable for embankments, wetland dikes, or islands can be used to create mounds or blended into surrounding topography to create a natural appearance. Spoil material shall not be spread on existing wetland areas.

Organic soils shall not be used to construct islands, loafing areas, dikes, or embankments.

8. SPECIAL SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-26 TOPSOILING

1. SCOPE

The work shall consist of salvaging topsoil from borrow areas or required excavations and spreading it on the exposed disturbed areas.

2. QUALITY OF TOPSOIL

Topsoil shall consist of friable surface soil reasonably free of grass, roots, weeds, sticks, stones, or other foreign materials.

3. EXCAVATION

After the site has been cleared and grubbed, the topsoil shall be removed from borrow areas and required excavation areas to the depth as shown on the drawings. Topsoil shall be stockpiled at locations approved by NRCS.

4. SPREADING

Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Surfaces designated to be covered shall be lightly scarified just prior to the spreading operation. Where compacted fills are designated to be covered by topsoil, the topsoil shall be placed concurrently with the fill and shall be bonded to the compacted fill with the equipment.

Topsoil shall be placed to the minimum depth shown on the drawings. After the spreading operation is completed, the surface shall be finished to a reasonably smooth surface.

5. SPECIAL SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-45 PLASTIC (PVC, PE) PIPE

1. SCOPE

The work shall consist of furnishing and installing plastic pipe and the necessary fittings specified herein or as shown on the drawings. This specification does not cover subsurface drainage systems.

2. MATERIALS

Corrugated Polyethylene (PE) Tubing. Corrugated PE tubing and fittings shall conform to the requirements of the applicable specification listed below:

Kind of Pipe	Specification
Corrugated Polyethylene(PE) Tubing and Fittings, Nominal Sizes 3 to 6 inch, inclusive	ASTM F 405
Large Diameter Corrugated Polyethylene Tubing and Fittings, Nominal Sizes 8 to 24 inch, inclusive	ASTM F 667
Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe	ASTMF 894

Poly(Vinyl Chloride) (PVC) Plastic Pipe. PVC pipe and fittings shall conform to the requirements of the applicable specification listed below:

Kind of Pipe	Specification
PVC Plastic Pipe, Schedules 40, 80 and 120	ASTM D 1785
PVC Pressure-Rated Pipe (SDR Series)	ASTM D 2241
PVC Pressure Pipe, 4 in. through 12 in., for Water Distribution	AWWA C900
PVC Water Transmission Pipe, Nominal Diameters 14 in through 36 in.	AWWA C905

PVC and PE Plastic Pipe. Plastic pipes meant for non-potable, livestock water supply shall conform to the requirements of the applicable specification listed below:

Kind of Pipe	Specification
Polyethylene (PE) Plastic Pipe, (SIDR-PR) Based on Controlled Inside Diameter	ASTM D 2239
PVC Pressure-Rated Pipe (SDR Series)	ASTM D 2241

3. FITTINGS AND JOINTS

Pipe joints shall conform to the details shown on the drawings. Pipe shall be installed and joined in accordance with the manufacturer's recommendations.

Joints may be bell and spigot type with elastomeric gaskets, coupling type with elastomeric gasket on each end, or solvent cemented. Gaskets shall conform to ASTM D 1869. Solvent cemented joints shall not be used for pond spillway pipes. Solvent cemented joints for PVC pipe and fittings shall be in accordance with ASTM D 2855. When a lubricant is required to facilitate joint assembly, it shall be a type having no detrimental effect on the gasket or pipe material.

Mechanical joints (split couplings and snap couplings) may be used when joining PE pipe and fittings when the pipe is used for non-pressure flow and a free draining sand or gravel bedding material is provided. Elastomeric-sealed mechanical joints shall be used when joining PE pipe and

fittings under pressure flow or where seepage cannot be tolerated. Where non-pressure pipe is specified, the fittings shall be of the same or similar materials as the pipe and shall provide the same durability and strength as the pipe.

A special case of livestock water supply involves pipes through a dam or embankment. Only PE pipe meeting the above specification may be used. PE pipe, of 1 ¼, 1 ½, or 2-inch diameter shall be installed so that there are no joints within the embankment area.

Where pressure pipe is specified, fittings shall have a design capacity equal to or exceeding that specified for the pipe to which it is attached. Fittings shall be cast iron, steel, one piece injection molded plastic fitting or fabricated from plastic pipe and one piece injection molded plastic fittings. Pressure pipe fittings shall conform to the requirements of the applicable specification listed below.

Kind of Fitting	Specification
Threaded PVC Plastic Pipe Fittings, Schedule 80	ASTM D 2464
PVC Plastic Pipe Fittings, Schedule 40	ASTM D 2466
PVC Plastic Pipe Fittings, Schedule 80	ASTM D 2467
Butt Heat Fusion (PE) Plastic Fittings for PE Plastic Pipe and Tubing	ASTM D 3261
Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals	ASTM D 3139
PVC Pressure Pipe, 4 in. through 12 in., for Water Distribution	AWWA C900
PVC Water Transmission Pipe, Nominal Diameters 14 in through 36 in.	AWWA C905

4. HANDLING AND STORAGE

Pipe shall be delivered to the job site and handled by means which provide adequate support to the pipe and does not subject it to undue stresses or damage. When handling and placing plastic pipe, care shall be taken to prevent impact blows, abrasion damage, and gouging or cutting (by metal surfaces or rocks). All special handling requirements of the manufacturer shall be strictly observed. Special care shall be taken to avoid impact when the pipe must be handled at temperatures of 40 degrees F (4.4 degrees C) or less.

Pipe shall be stored on a relatively flat surface so that the barrels are evenly supported. Unless the pipe is specifically coated to withstand exposure to ultraviolet radiation, it shall be covered with an opaque material when stored outdoors for a period of 15 days or longer.

5. TRENCHING

Plastic pipe conduits shall be installed in trenches or plowed in according to the following methods:

A. **Trencher Constructed** - When conditions permit, trenching for pipelines, which are buried from 5 to 6 feet deep, are usually done with a narrow 4 to 6 inch wide chain trencher. Where there is little gravel and the ground is not too wet, these trenchers bring up well pulverized soil that makes good backfill material. Where rocks are not present, any of this material may be backfilled directly around the pipe. There is no practical way to compact the fill in these narrow trenches. The owner must be made aware that this material normally consolidates to its maximum extent in two to five years, but depressions or low spots can be hazards to livestock, humans and equipment.

B. **Backhoe Constructed Trench** – Backhoe trenches are usually a minimum of 12 inches wide. The material frequently comes out of the trench as clods, large chunks, and rocks. Immediately backfill over the pipe with 4 to 6 inches of soil that is free of these clods, large chunks, and rocks. If adequate excavated material is not available, then material such as sand or fine gravel should be imported and placed around the pipe to a depth of 4 to 6 inches over the top of the pipe. Fill the trench with the remaining excavated material.

C. **Plowing** – Plowing, or ripping, is a trenchless method for installing plastic pipe. It is a multi-stage process consisting of positioning a vibrating or static (non-vibrating) plow equipped with a trailing product guide which feeds pipe to the depth setting of the plow as it moves forward. The pipe is inserted into the ground continuously along a predetermined path and depth. The vertical depth of installation is controlled by hydraulic adjustment of the plow shear head and the surface contours. The depth of insertion must be continually adjusted to compensate for changes in terrain.

6. LAYING AND BEDDING THE PIPE

Plastic pipe conduits and fittings shall be installed as shown on the drawings and specified herein. The pipe shall be laid so that there is no reversal of grade between joints, unless otherwise shown on the drawings. The pipe shall be placed with the bell end upstream, unless otherwise specified. The pipe shall be carefully placed on the bedding or into the pipe trench.

Care shall be taken to prevent distortion and damage during unusually hot (over 90 degrees F) or cold weather (under 40 degrees F). After the pipe has been assembled in the trench, it shall be allowed to reach ground temperature before backfilling to prevent pull out of joints due to thermal contraction.

The pipe ends and the couplings shall be free of foreign material when assembled. During the placement of the pipe, each open end of the pipeline shall be closed off by a suitable cover or plug at the end of work on the pipeline each day and until work resumes or installation is complete.

Perforated pipe shall be laid with the perforations down and oriented symmetrically about the vertical centerline. Perforations shall be clear of any obstructions when the pipe is laid.

Pipe shall be firmly and uniformly supported throughout the entire length. Bell-holes shall be made in the bedding under bells or couplings and other fittings to prevent the pipe from being supported by fittings.

a. Earth Bedding. When bedding is specified, the pipe shall be firmly and uniformly bedded in a shaped bedding groove that closely conforms to the bottom of the pipe for a depth equal to a minimum of 1 inch or 5 percent of the diameter of the pipe, whichever is greater. The bedding material shall be free of rocks or stones greater than 0.5 inch diameter and earth clods greater than 2 inch diameter.

b. Sand or Gravel Bedding. When sand or gravel bedding is specified, the pipe shall be firmly and uniformly placed on a sand or gravel bed. Sand or gravel fill shall be carefully placed and compacted as specified herein and as shown on the drawings.

A few installations of above ground pipelines have been noted. These installations are normally laid directly on the ground and very close to an existing fence line for protection. Only those pipelines designed to withstand exposure to ultraviolet radiation may be utilized for these installations. Adequate thrust control shall be incorporated in these installations.

7. BACKFILL

The pipe shall be held down during backfilling to the top of the pipe to prevent its being lifted from its original placement.

Within 2 feet of the pipe, backfill shall be carefully placed and compacted by means of hand tamping or manually directed power tampers or plate vibrators to form a continuous uniform support around the pipe. Maximum thickness of layers before compaction within 2 feet of the pipe shall be 4 inches and at more than 2 feet from the pipe a maximum thickness before compaction shall be 9 inches. Unless otherwise specified, the initial backfill shall be compacted to a density equivalent to that of the adjacent fill or foundation materials.

The water content of cohesive backfill material shall be such that, kneaded in the hand, the soil will form a ball which does not readily separate. For non-cohesive sand and gravel backfill material, water content is not a concern for thin lifts.

8. SPECIAL SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-51 CORRUGATED METAL PIPE CONDUITS

1. SCOPE

The work shall consist of furnishing and placing circular, arched or elliptical corrugated metal pipe and the necessary fittings.

2. MATERIALS

Metallic-coated steel corrugated pipe and fittings shall be zinc-coated or aluminized, Type 2, and shall conform to the requirements of ASTM A 760 and A 929 for the specified type and size of pipe. Aluminum corrugated pipe shall conform to the requirements of ASTM B 745 for the specified type and size of pipe. All pipe is subject to the following additional requirements:

A. When polymer coating is specified, pipe, coupling bands and anti-seep collars shall be coated in accordance with ASTM A 762. All riveted joints shall be caulked as described in paragraph B.

B. Pipe with annular corrugations shall be furnished with caulked seams. Riveted pipe joints shall be caulked with a bituminous mastic material during fabrication to provide a watertight joint. All circumferential and longitudinal seams shall be caulked before riveting. This shall be accomplished by applying a uniform bead of the mastic compound to the inner lap surface before riveting such that when the rivets are in place, all voids are filled and a coating of mastic is between the lap surfaces. The inner surface of coupling bands shall be asphalt coated in the field prior to installation. A neoprene gasket having a minimum thickness of 3/8 inch and a minimum width of 7 inches may be used in lieu of mastic coated coupling bands.

C. Welded or lock seams in helical corrugated pipe are considered to be watertight.

D. When close riveted pipe is specified: (1) the pipe shall be fabricated so that the rivet spacing in the circumferential seams shall not exceed 3 inches, except that 12 rivets will be sufficient to secure the circumferential seams in 12-inch pipe, and (2) in those portions of the longitudinal seams that will be covered by the coupling bands, the rivets shall have finished flat heads or the rivets and holes shall be omitted and the seams shall be connected by welding to provide a minimum of obstruction to the seating off the coupling bands.

E. Double riveting or double spot welding of pipe less than 42 inches in diameter may be required. If specified, the riveting or welding shall be done in the manner specified for pipe 42 inches or greater in diameter.

3. COUPLING BANDS

Coupling bands shall meet the requirements of the table below or have detailed drawings submitted for approval by the State Conservation Engineer. Coupling bands shall be of the same minimum thickness (gage) as the pipe being connected.

Description of Coupling Band	Maximum Fill Height, Ft.	Maximum Pipe Diam., In.
24-inch wide coupling band with four 1/2-inch Diam. galvanized rods with tank lugs for annular or helical corrugated metal pipe. Bands shall have a minimum lap of 3 inches.	All	All
Hugger band from Armco Steel Corp. for helical corrugated metal pipe with reformed ends; and for annular corrugated pipe. Bands include O-ring gaskets and two 1/2-inch Diam. galvanized rods and lugs.1/	35	48
Hugger band without rods and lugs but including O-ring gaskets.1/	20	24
Angles riveted or welded to a coupling band and drawn tight with bolts. Bands shall be a minimum of 7 corrugations wide and have a minimum lap of 2 inches.	35	15
Flanged couplings for helical corrugated pipe welded to the ends of the pipe and field assembled by a minimum of 3/8-inch Diam. bolts. A joint sealer shall be placed between the flanges to ensure water tightness.	25	12

1/ Use is limited to sites where soft foundation and conduit elongation is not anticipated.

4. FABRICATION

Fabrication of all appurtenances shall be done as shown on the drawings. All appurtenances shall be made of metallic-coated steel when corrugated steel pipe is used and aluminum when used with aluminum pipe. Dissimilar metals shall not be installed in contact with each other.

5. REPAIR OF DAMAGED COATINGS

The Contractor shall place the pipe without damaging the pipe or coatings. The pipe shall be transported and handled in a manner to prevent damage to the pipe or coating.

Breaks, scuffs, or other damage to the various coatings shall be repaired as follows:

A. Metallic Coating - by thoroughly wire brushing the damaged area and cleaning with solvent, and then painting two coats of one of the following paints:

(1) Zinc Dust - Zinc Oxide Primer conforming to ASTM D 79 and D 520.

(2) Single package, moisture cured urethane prime in silver metallic color.

(3) Zinc-rich cold galvanized compound, brush, or aerosol applications.

B. Polymer Coating - apply two coats of polymer material similar to and compatible with the durability, adhesion and appearance of the original polymer coating. The repair coating shall be a minimum thickness of 0.010 (10 mils) after drying and shall bond securely to the pipe.

6. LAYING AND BEDDING THE PIPE

The pipe shall be laid to the line and grade shown on the drawings and shall be firmly and uniformly bedded throughout its entire length. Details of the bedding are as shown on the drawings.

The pipe shall be laid with the outside laps of circumferential joints pointing upstream and with longitudinal laps on the sides at approximately the vertical mid-height of the pipe. Field welding of corrugated galvanized steel pipe will not be permitted. The pipe sections shall be joined with coupling bands.

7. BACKFILLING

Special care shall be taken during backfill operations not to disturb the grade and alignment.

The pipe shall be tied down or loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding.

Backfill material shall have sufficient moisture so that optimum compaction can be obtained. Backfill around the pipe shall be placed in layers not more than 4 inches thick before compaction.

Each layer of backfill shall be compacted with power tampers, hand tampers, or plate vibrators to the same density requirements as specified for the adjacent embankment. Backfill over and around the pipe shall be brought up uniformly on all sides. The passage of earth moving equipment will not be allowed over the pipe until backfill has been placed above the top of the pipe surface to a depth of two (2) feet.

8. SPECIAL SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-61 LOOSE ROCK RIPRAP

1. SCOPE

The work shall consist of the construction of loose rock riprap revetments, structures and blankets, including filter layers or bedding where specified.

2. MATERIALS

Rock for loose rock riprap, filter layers or bedding shall come from sources approved by NRCS. The rock shall be excavated, selected and handled as necessary to meet the quality and grading requirements of this specification and the construction drawings.

Individual rock fragments shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. The rock fragments shall be angular to sub rounded in shape. The least dimension of an individual rock fragment shall not be less than 1/3 the greatest dimension of the fragment unless otherwise specified on the construction drawings.

3. SUBGRADE PREPARATION

The subgrade surfaces on which the riprap or bedding is to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. When fill to subgrade lines is required, it shall consist of approved materials and shall be compacted to a density equal to the adjacent existing soil material.

Rock materials shall not be placed until the foundation preparation is completed and the subgrade surfaces have been inspected and approved by NRCS.

4. EQUIPMENT-PLACED ROCK RIPRAP

Rock shall be placed by equipment on the surfaces and to the depths specified. The riprap shall be constructed to the full thickness in one operation and in such a manner as to avoid serious displacement of the underlying materials. The rock shall be delivered and placed in a manner that will insure that the riprap in place shall be reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact, one to another, with the smaller rocks and spalls filling the voids between the larger rocks. Placement of rock shall begin at the bottom of the slope or downstream end of the structure.

Riprap shall be placed in a manner to prevent damage to structures. Hand placing will be required to the extent necessary to prevent damage to adjacent structures.

5. HAND-PLACED RIPRAP

Rock shall be placed by hand on the surfaces and to the depths specified. It shall be securely bedded with the larger rocks firmly in contact, one to another. Spaces between the larger rocks shall be filled with smaller rocks and spalls. Smaller rocks shall not be grouped as a substitute for larger rock. Flat slab rock shall be laid on edge unless otherwise specified. Placement of rock shall begin at the bottom of the slope or downstream end of the structure.

6. FILTER LAYERS OR BEDDING

When the drawings specify filter layers or bedding beneath riprap, the filter or bedding material shall be spread uniformly on the prepared subgrade surfaces to the depth specified. Compaction of filter layers or bedding will not be required, but the surface of such layers shall be finished reasonably free of mounds, dips or windrows.

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-81 METAL FABRICATION AND INSTALLATION

1. SCOPE

The work shall consist of furnishing, fabricating, and installing metalwork including metal parts of composite structures.

2. MATERIALS

Steel shall be of structural quality. Finished surfaces shall be smooth and true to assure proper fit.

Bolts, nuts, washers, rods, rivets, etc., shall be of a material equal to the steel being fastened.

3. PROTECTIVE COATINGS

Protective coatings will consist of either galvanizing or painting and shall be applied by the fabricator.

Galvanizing shall consist of a zinc coating by the hot dip process, except that bolts, nuts, and washers may have a electrodeposited zinc coating.

Paint System for this specification shall consist of the application of one coat of Epoxy Polyamide Primer (lead and chromate free) and one or more coats of Epoxy Polyamide (intermediate or finish), lead free. When finished, it will have a minimum dry film thickness of 8.0 mils.

4. FABRICATION

Materials shall be carefully fabricated as shown on the drawings. The fabrication shall be smooth and true to assure proper fit. Galvanized items shall not be cut, welded, or drilled after the zinc coating is applied.

5. ERECTION

The metal shall be erected true and plumb, closely conforming to the drawings.

6. SPECIAL SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-92. FENCES

1. SCOPE

The work shall consist of furnishing and installing fences, including gates and fittings.

2. STANDARD FENCE

Barbed wire fences shall have a minimum of 4 wires for farm borders. A minimum of three wires shall be used for interior fencing, cross fencing, or excluding livestock from special areas such as wildlife area, forested tracts or other special use areas. Wires shall be spaced approximately an equal distance apart. The top wire shall be at least 42 inches high and 2 inches below the top on wood posts and 1 inch below the top on steel posts. The bottom wire shall be 18 inches or less above the ground level. Wire shall be spaced no more than 12 inches apart.

Each barbed wire shall consist of 2 twisted strands of either 12 ½ gauge wire or 15 ½ gauge high tensile strength wire. The barbs shall be either 2-point barbs on approximately 4 inch centers or 4-point barbs on approximately 5 inch centers. Wire shall be stretched and attached after the posts are properly set and backfilled. Attach wire to the side of the post closest to the livestock, except on corners and curves where the wire should be placed on the outside of the corner or curve.

Top and bottom strands of woven wire shall be a minimum of 12 ½ gauge. Wire for intermediate strands shall be 14 1/3 gauge or heavier. Fences with woven wire 32 inches or less in height shall have at least 2 barbed wires above the woven wire spaced 8 to 12 inches apart. Fences constructed with woven wire higher than 32 inches shall have at least 1 barbed wire 8 to 12 inches above the woven wire. The base of the woven wire shall be placed near the ground surface. The top wire shall be at least 42 inches above the ground level and 2 inches below the top of wood posts and 1 inch below the top of steel posts. All wire shall be galvanized. . Wire shall be stretched and attached after the posts are properly set and backfilled. Attach wire to the side of the post closest to the livestock, except on corners and curves where the wire should be placed on the outside of the corner or curve.

Staples shall be 9 gauge steel or heavier with a minimum length of 1 ½ inches for soft woods and a minimum length of 1 inch for close grained hardwoods. Drive staples diagonal to the grain of the wood and at a slight downward angle. Space should be left between the staple and the post to permit free movement of the wire. Wires may be attached to steel posts by use of manufacturer's clips or by 14 gauge galvanized wire twisted at least two turns.

All wooden posts (except red cedar, Osage orange, or black locust) shall be treated with pentachlorophenol, creosote, or chromated copper arsenate (CCA) by a method that ensures complete penetration of the sapwood. At least half of the diameter of red cedar shall be heartwood. Quality of treated wood shall provide sufficient strength and quality to last for the expected life of the fence.

All corner posts, gate posts, end posts, pull posts and brace posts normally shall be wood with sufficient length for the construction of at least a 42 inch high fence and permit setting the post at least 36 inches deep. Earth backfill shall be thoroughly tamped. On areas where soil depth is restricted to less than 36 inches, additional anchors or deadman applied against the direction of pull may be needed. Wood posts shall have a minimum top diameter of 5 inches. A 2-½ inch steel pipe with appropriate bracing or set in concrete of sufficient depth also may be used. Reinforced concrete or metal posts of equivalent strength may be substituted if they have suitable means of attaching wires and braces.

The maximum spacing of line posts shall be one rod (16.5 feet). Wood line posts shall have a 3 inch top (2 ½ inch for Osage orange). Wood line posts shall have a minimum length of 6 ½ feet and shall be set or driven to a minimum depth of 24 inches where conditions permit. When posts are set, earth backfill shall be thoroughly tamped. Steel line posts shall weigh not less than 1.33 pounds per foot and shall have a steel anchor plate securely fastened to the plate. The posts shall be "T", "U", or "Y" shaped and have corrugations, knobs, studs, or grooves suitable for fastening fencing to the posts. Steel posts shall be rolled from high carbon steel and shall have a protective coating; either galvanized by the hot dip process, painted with one or more coats of high grade weather resistant paint for steel, or enameled and baked. Steel line posts shall be at least 6 feet in length and shall be set in the ground a minimum of 20 inches. Steel posts shall be used as line posts at least once every 6 rods (99 feet) to act as a ground for lightning protection.

End bracing will be installed at locations where the fence ends and on both sides of gate openings. Corner bracing should be installed where fence alignment changes 15 degrees or more. Bracing is required at all corner, gate, pull and end assemblies in a fence. The brace member shall be the equivalent of a wood post with at least a 3 ½ inch diameter at the top or standard weight 2 inch diameter galvanized steel pipe. The brace shall be at least 3 feet above the ground and at least 8 inches below the top of the post. The brace member shall be 6 to 8 feet in length. A brace wire consisting of 2 complete loops of 9 gauge smooth wire, 2 loops of barbed wire or a single loop of 12 ½ gauge high tensile strength wire shall be installed. "H" braces or angle braces as shown in figure 3 will be used in standard fences.

Pull post assemblies consisting of three posts with braces shall be installed in straight reaches of fence at intervals 660 feet (40 rods), at any point where the vertical angle described by two adjacent reaches of wire is upward and exceeds 10 percent and at the beginning and end of each curve.

For a narrow ditch or draw crossing with slopes steeper than 8 feet horizontal to 1 foot vertical, the fence shall be anchored with a concrete anchor weighing at least 150 pounds and buried with at least 18 inches of cover or a commercial screw-in type metal anchor 5 inches in diameter and not less than 48" long to position the fence to the contour of the ditch or draw.

Wire gates shall be made of the same materials as used for the fence. Panel or tube type gates shall be equivalent in quality to the fencing material and shall be fitted with at least two hinges and a latch or galvanized chain for fastening.

3. CHAIN LINK FENCE

Chain link fence, fabric, posts, top rails, braces, gates and accessories shall conform to the requirements of ASTM Specifications types, classes and materials listed below. The fence shall be constructed in a workmanlike manner.

Fabric shall be ASTM A392, 2-inch mesh, 9 gauge galvanized steel wire. Zinc coating shall be Class 2. Fabric shall be 60 inches in height. Fabric shall not be stretched until at least 4 days after the posts are set in concrete backfill or grouted in concrete walls. A stretcher bar of the same length as the fabric width shall secure each end of each run of fabric. The bar and fabric shall be stretched taut and secured to the end post by tension bands equally spaced not more than 15 inches apart. The fabric shall be attached to all braces; the top rail, all line posts and the tension wire by wire ties or clips at intervals not exceeding two feet.

Posts and fence framework shall conform to the requirements of ASTM F1043 Group 1A, for Heavy Industrial Fence. Coatings shall be type A galvanized coating both internal and external surfaces. Steel pipe for posts shall conform to the requirements of ASTM F1043 and F1083. The minimum diameter of end, corner, and pull posts shall be 2 3/8 inches. Line posts shall be at lest 1.9 inches in diameter. Gate posts shall have a minimum diameter of 2 7/8 inches. The maximum spacing of line posts shall be ten feet. Post holes shall be at least 6 inches in diameter and 18 inches deep for line posts and 24 inches for corner, end, pull and gate posts. All posts shall be set in concrete backfill. Concrete shall completely fill the annular space around the posts and shall be neatly finished to slope

up to the post approximately 1 ½ inches above the ground surface. Pull posts shall be located in long straight runs of fence at intervals of 500 feet or less. Posts set in concrete walls shall be grouted into preformed holes at lest 12 inches in depth. Where posts are installed in highly corrosive soils such as disturbed mine spoil, the posts shall be vinyl coated in addition to the above requirements and set in concrete poured inside a 6 inch clay tile or plastic tubing at least 24 inches long.

When used, **braces and top rails** shall be installed horizontally at the height shown on the drawings or recommended by the manufacturer. See previous paragraph for specifications. Braces and top rails shall be attached to the posts by suitable fittings, as recommended by the manufacturer. When the brace has been placed, a 6 gauge double truss galvanized steel wire with adjustable tightener and fittings shall be attached to the corner post just below the brace and to the brace post approximately 4 inches above ground level. A similar truss wire shall be attached to brace post just below the brace and to the corner post approximately 4 inches above ground level. A 7 gauge galvanized steel tension wire, tightened by mechanical means, shall be placed approximately 4 inches from the ground level. A similar tension wire shall be placed at the top of the fence if a top rail is not used.

Gates, gateposts and gate accessories shall conform to the requirements of ASTM F900. Coating shall be the same as the adjoining fence and framework.

4. HIGH TENSILE WIRE (HTW) FENCE

HTW fence shall have a minimum of eight smooth strands of galvanized 12 ½ gauge **wire** with not less than 0.8 ounce of zinc per square foot of wire surface and a tensile strength of 200,000 pounds per square inch. Each strand of wire shall be strung to a tension of not less than 250 pounds. The top wire shall be 48 to 54 inches above the ground surface. The bottom wire shall not be more than 6 inches above the ground surface. The wire shall be fastened on a direct line splice with enough nicopress sleeves that the accumulated strength of the sleeves exceeds the tensile strength of the wire. End wrap splices shall be fastened with two nicopress sleeves. Splices may also be made with other products used as directed by the manufacturer.

Posts shall be the same size and material as posts for standard fences. Line posts shall be spaced not more than 30 feet apart with spacer made of wood or fiberglass spaced at not more than 15 feet from either post. Corners, pull assemblies, ends and gates shall have a double assembly consisting of three driven posts with horizontal braces. Each assembly shall be further braced with a double wrap of high tensile wire (see attachment A).

5. PERMANENT HTW ELECTRIC FENCE

Permanent HTW electric fences are constructed with the intent of being in place for years. It is the equivalent of any non-electric permanent fence. Electric fences provide psychological deterrent rather than a physical barrier to livestock and wildlife. To be effective, a shock of at least 1,000 volts must be delivered to cattle, 2,000 volts to sheep and 2,500-3,000 volts to deer, dogs, and coyotes.

Wire shall be a single strand of 12 ½ gauge or larger with a minimum tensile strength of 110,000 pounds per square inch. The wire shall galvanized (Type III) or aluminum or copper clad. Barbed wire should not be used on electric fences because of safety hazard. Wire will be attached to the posts by a method that allows them to slip. Wires will be attached to stays in a manner that prevents stay slippage along the fence. The tension of each wire shall be sufficient to maintain the wires at the appropriate height. Suggested wire heights and spacing are shown by intended use in the following table:

Fence Description	Number of Wires	Wire Height (In.)
Internal/Cross Fence		
Cow /calf & stocker	1 wire	30 to 34
Hogs	1 wire	12
Cow /calf & stocker	2 wire	22;32
Sheep and cattle	3 wire	10; 20; 32
Sheep and cattle	4 wire	10; 20;32;46
Perimeter Fence		
Cattle, horses, sheep (Non-predator)	5 wire	10; 20; 30; 40; 50
Sheep, goats (Predator)	8 wire	4; 8; 12; 18; 24; 30; 40; 52

Electronic energizers of power fence controllers shall be installed according to manufacturer's recommendations. The energizers shall be high power, low impedance with 5,000 volt peak output and a pulse that is less than 300 mAmps in intensity, finished within 0.0003 of a second and at a rate of 35-65 pulses per minute. Energizers shall be provided with high impact, weather resistant cases. Circuitry shall be solid state. Service modules shall be snap-in for fast field repair. A safety fuse to prevent over pulsing shall be provided. The system shall be 110 volt, 220 volt or 12-volt battery powered. The battery-powered system shall be capable of working for at least 3 weeks without replacing the battery. If the length of the fence requires more than 4 joules (watts times seconds equals joules), a solar charger will be needed for 12 volt systems. The energizer shall be capable of producing one joule for each mile of planned fence when average energy loss is expected.

All electric fences must be properly grounded. The energizer ground wire should be connected to a galvanized pipe or rod ½ inch or larger in diameter. Bury 3 feet of ground rod for each joule of energy output. Ground rods should be buried where soil remains moist for best results. Ground rods should be driven into the ground at least 10 feet apart when multiple rods are necessary to provide the required length of ground rod. Normally individual ground rods will be driven no more than 6 to 8 feet into the ground. Connect a continuous ground wire from the energizer to each ground rod with aluminum or galvanized steel clamp. If energizer terminals are not stainless steel or copper, do not use copper ground rods due to corrosion at the connection and subsequent loss of electrical continuity. Copper rods with copper wire may be used if energizer terminals are stainless steel or copper. Use copper clamps with copper wire and copper rods.

The ground wire(s) of the fence may be connected to the same ground as the energizer or to a separate ground with the same size and depth requirements. More ground rods may be needed for the system to function properly. Do not use the grounding system for other existing applications, such as power poles, breaker boxes and milk barns,. At least 25 feet should separate the fence grounding system from any other grounding system.

Lightening can cause damage to the energizer. Most energizers are poorly protected from damage caused by lightning. External **lightning arrestors** and an induction loop (lightning choke) should be installed for added protection. Lightning arrestor grounding rods should be placed at least 65 feet from those of the energizer (See attachment B).

Install an additional set of ground rods and attach to a lightning arrestor. The lightning arrestor ground must be better than the energizer ground for it to function properly, because lightning will seek the path of least resistance to ground. Use at least 1 more ground rod on the arrestor than was used on the energizer. Attach the lightning arrestor to the wires of the fence. Install a lightning choke in the fence line immediately between the lightning arrestor and the energizer.

For protection of energizers, it is recommended that for 120 or 240-volt energizers that a voltage **spike protector** be used. Also, a ground rod should be installed at electric company's transformer pole (primary ground) and another ground rod installed at the electrical circuit breaker box (secondary ground), if they do not exist. Additionally, a surge protector should be installed between the energizer and power supply.

Insulation used for positive charged wire(s) must be high-density polyethylene with ultra-violet stabilizer or high-density polypropylene with ultra-violet stabilizer.

Braces and end assemblies are required at all corners, gates and angles in the fence line (See attachment A for criteria on corners, angles, and brace assemblies.)

For 1 and 2 wire fences, corner, gate, end and brace assemblies use one of the following:

- Steel "T" post that are a minimum of 1.25 pounds per foot of length, with appropriate knee, deadman, angle or H-brace.
- Wood posts with a minimum top diameter of 3.5 inches set two feet in the ground with appropriate knee, deadman, angle, or H-brace.
- Wood, steel pipe or fiberglass post with a minimum top diameter of 5 inches, set to a depth equal to, or greater than, the height of the post above the ground without bracing.
- Steel pipe or fiberglass posts with a minimum diameter of 2 inches, set 2 feet in the ground with appropriate knee, angle, or H-brace, deadman or anchor plate.
- Steel pipe or fiberglass posts with a minimum diameter of 2 inches and set in concrete to a depth of 2 feet.
- Steel pipe or fiberglass posts with a minimum diameter of 1 inch with appropriate angle bracing and sufficient ground anchoring to maintain wire tension while remaining erect and firmly anchored.

For 3 or more wire power fences; corner, gate, end and brace assemblies will be either a floating angle brace or H-brace assembly. Posts will be 4-inch nominal wood, 2-inch nominal steel pipe (capped), 2-inch fiberglass or steel "T" posts with appropriate appurtenances for corner and end bracing. Posts must be set a minimum of 2 feet in the ground.

All wood posts shall be at least 2 inches higher than the top wire of the fence. Posts of any other material shall be at least 1 inch higher than the top wire of the fence.

Line post and stays will be either:

- Australian ironwood (eucalyptus) at least 2 inches in diameter; fiberglass, rigid plastic and PVC solid round sucker rod of at least 5/8 inch diameter, or fiberglass "T" post and stays of at least 1 inch in cross-section. Attach wire to the post with loose wire clips or run the wire through holes in the post. Attach the wire to stays with tight clips.
- Wood posts at least 3 inches in diameter of black locust, red cedar, Osage orange, redwood, pressure treated pine or any other wood of equal life and strength may be used. At least one half of the diameter of the red cedar and redwood post shall be heartwood. Pressure treated posts shall be treated with pentachlorophenol, creosote, or chromated copper arsenate (CCA) by a method which ensures the complete penetration of the sapwood. Insulators shall attach wire.
- Steel "U" or "T" posts that are a minimum of 1.25 pounds per foot of length. Wire shall be attached with insulators.

Posts for one or two wire fences shall be long enough to be set at least 18 inches in the ground, except that in soils which are sandy loam or coarser in texture, the posts shall be set at least 24 inches into the ground. Posts for 3 or more wire fences shall be set at least 24 inches into the ground. Posts in dips shall be constructed so that they do not pull out of the soil. Posts 2 inch or smaller shall be anchored. Wood posts shall be set to a depth sufficient to resist pull out.

Wood posts shall be at least 2 inches higher than the top wire on the fence. All other posts shall be at least 1 inch higher than the top wire of the fence.

Spacing of the line posts and stays depends on the terrain and the number of wires. Maximum spacing is as follows

- One or two wire fences may have line posts spaced up to 100 feet apart with no stays. Line posts may be spaced 150 feet apart with stays every 50 feet between the posts
- For three and four wire fences, the line posts may be spaced every 50 feet with no stays or every 150 feet with stays at spacing of not more than every 50 feet.
- Fences with more than 4 wires shall have posts and stays spaced every 30 feet, with posts not further apart than every 90 feet.
- In undulating terrain, space posts and stays as needed to maintain the fence height.

Insulators for conductive material posts, end, corner and angle braces shall be high-density polyethylene with ultra-violet stabilizer, high density polypropylene with ultra-violet stabilizer, or porcelain. All insulators shall be capable of withstanding 10,000 volts or more of current leakage. Red insulators attract hummingbirds and should not be used.

Electrified **gates** may be constructed of a single straight wire, galvanized cable, or polytape with a insulated spring loaded handle or an expandable, coiled, high tensile, 12 ½ gauge wire attached to an insulated handle. The number of wires shall be determined by the objective of the fence. The gate shall be constructed so that it is non-electrified when the gate is open. Overhead or underground transmission lines will be used to carry electricity past the gate to the remainder of the fence.

Use insulated galvanized wire for crossing gates and areas where an electrical shock to livestock and humans is undesirable. All underground wires must be insulated for a minimum of 15,000 volts. Insulated underground wire should be specifically designed for high voltage electric fence. The insulation shall be high-density polyethylene with ultra-violet stabilizer or high-density polypropylene with ultra-violet stabilizer. Placing buried wire inside plastic pipe helps to decrease the likelihood of short-circuiting. Overhead transmission lines shall be at a height where the lines do not impeded movement of livestock or equipment.

An electrified **floodgate** may be used in lieu of a non-electrified gate if desired. The electrified floodgate should be constructed by stretching an electrified wire across the drainage above the high water level. Attach droppers of 12 ½ gauge high tensile fence wire, galvanized cable or galvanized chains to the electrified wire at a spacing of 6 inches for sheep and 12 inches for cattle. The droppers shall be extended to approximately 6 inches above normal water level. Connect gate to electric fence with a double insulated cable through a cutoff switch and flood control gate controller. If flooding is expected to last for an extended period of time, switch the floodgate off. (See attachment C).

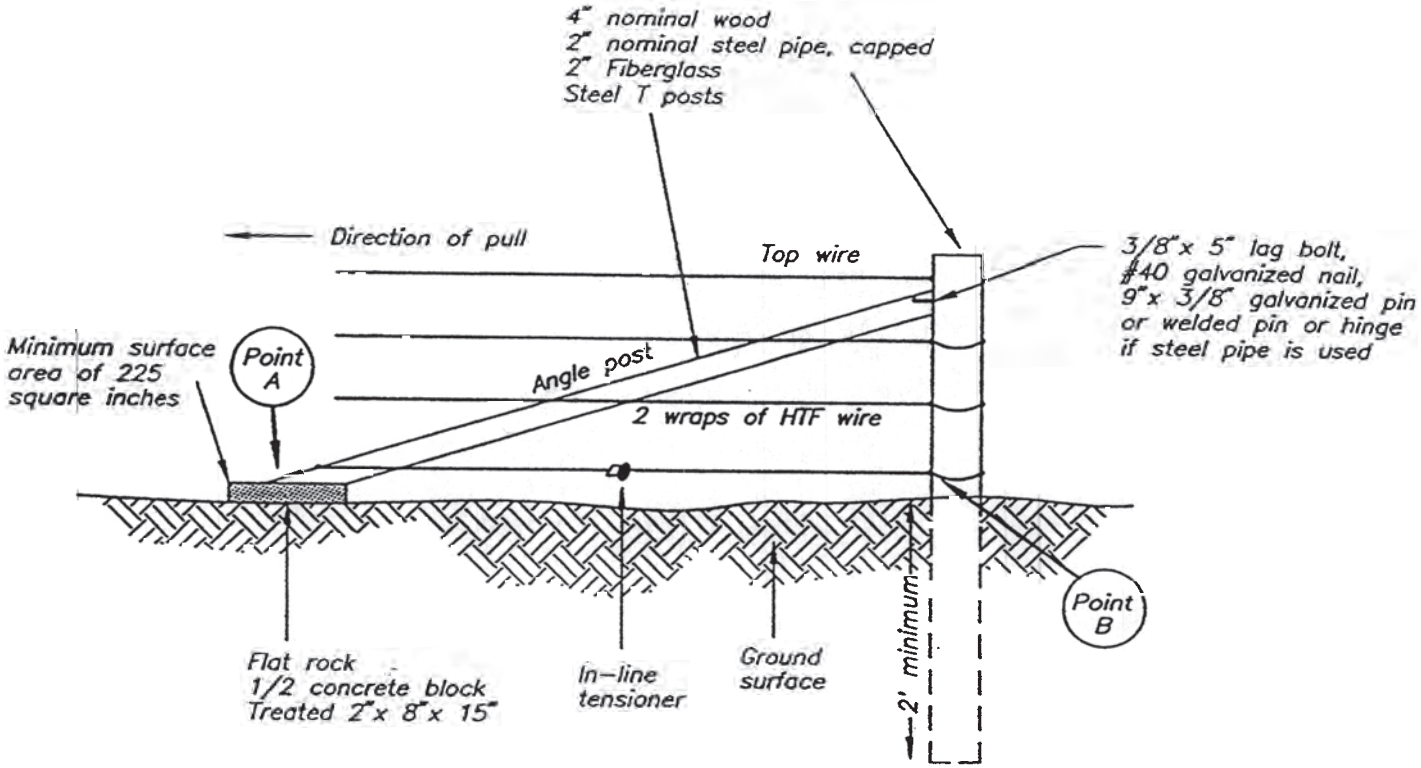
Other materials of equivalent strength, durability and design may be used.

6. TEMPORARY ELECTRIC FENCE

Temporary electric fencing is constructed with the intent of being left in place for only a short period of time. The fence is not intended as a substitute or equivalent of permanent fence. The temporary fence requires materials, design and construction that will accomplish the intended purpose and last for the planned time period with no more maintenance than is desired.

Many companies market portable fence systems that use materials such as polyethylene wire and tape with steel or aluminum wire woven into them, aluminum wire, plastic and fiberglass posts, reels to roll up wire, and battery operated energizers that are high voltage and low impedance (see previous section on energizers). A minimum of six strands of steel or aluminum wire should be woven into the polywire or polytape. Temporary fences may be attached to permanent fences to subdivide pasture. Follow manufacturer's directions for construction, use and operation of temporary electric fences

7. SPECIAL SPECIFICATIONS

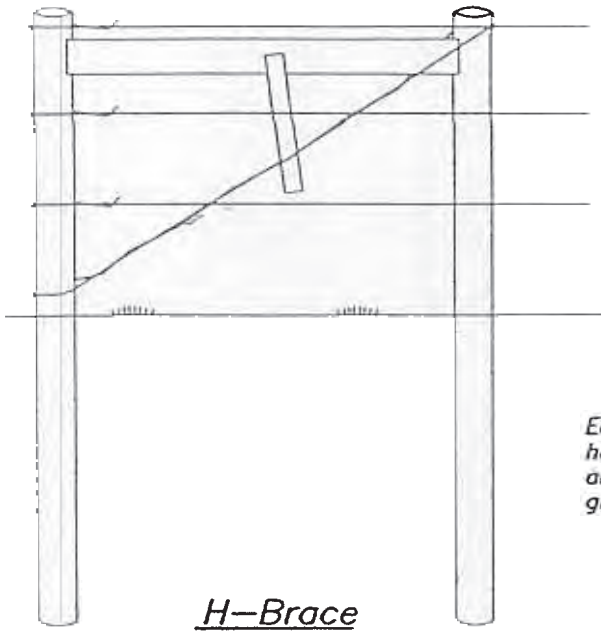


Note:
Distance from point A to B shall be a minimum twice the height between the top wire and the ground surface.

Single Post End Brace (Floating Angle Brace) Assembly

Figure 1

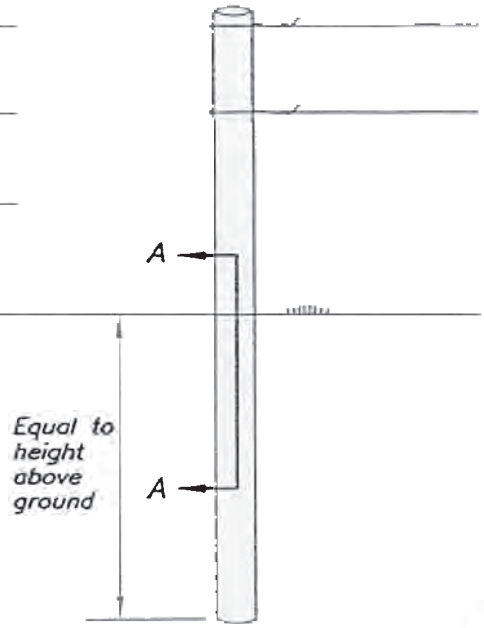
Attachment A



H–Brace

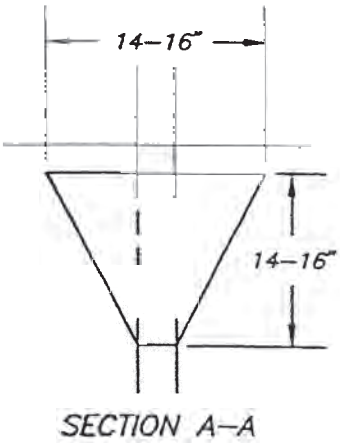
Note:
Same sizes with bracing (See Figure 1)

Use H or Diagonal Braces with fences having over 2 wires or where pull distances is > 660 feet.



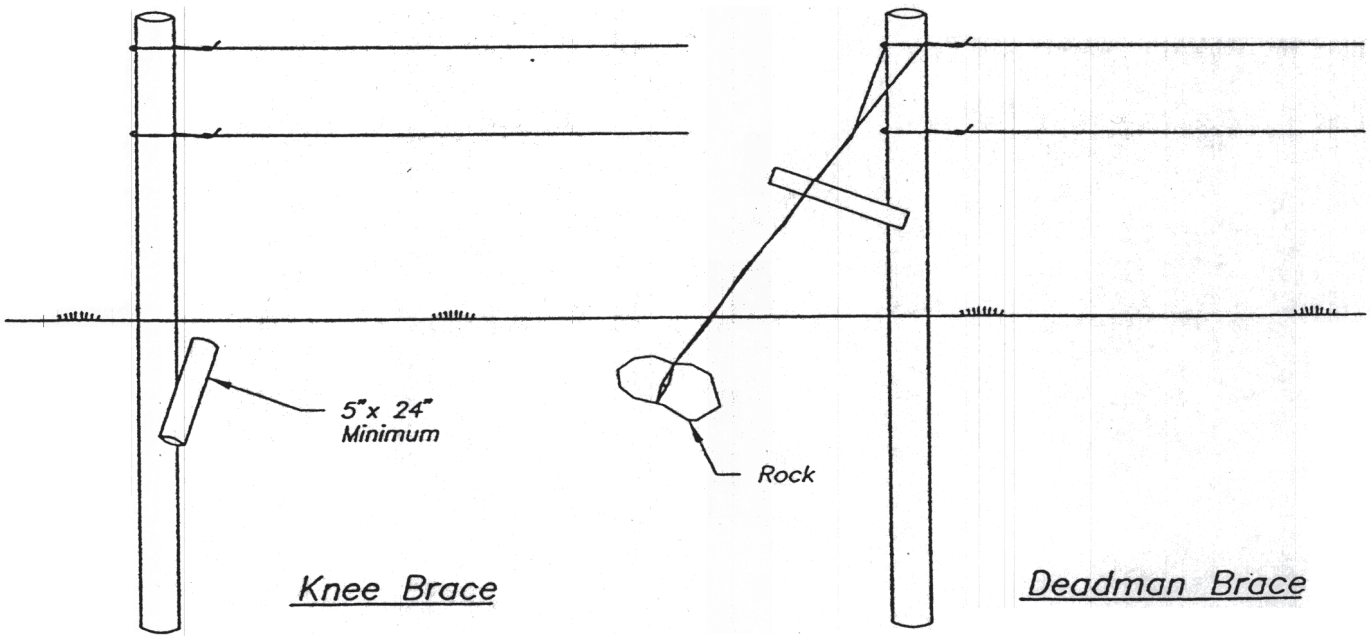
Single Post Assembly

Single Post–No brace with wood, fiberglass, or steel pipe with a minimum top diameter of 5" set to depth greater than or equal to the height of the post above ground.



Alternate Single Post Assembly

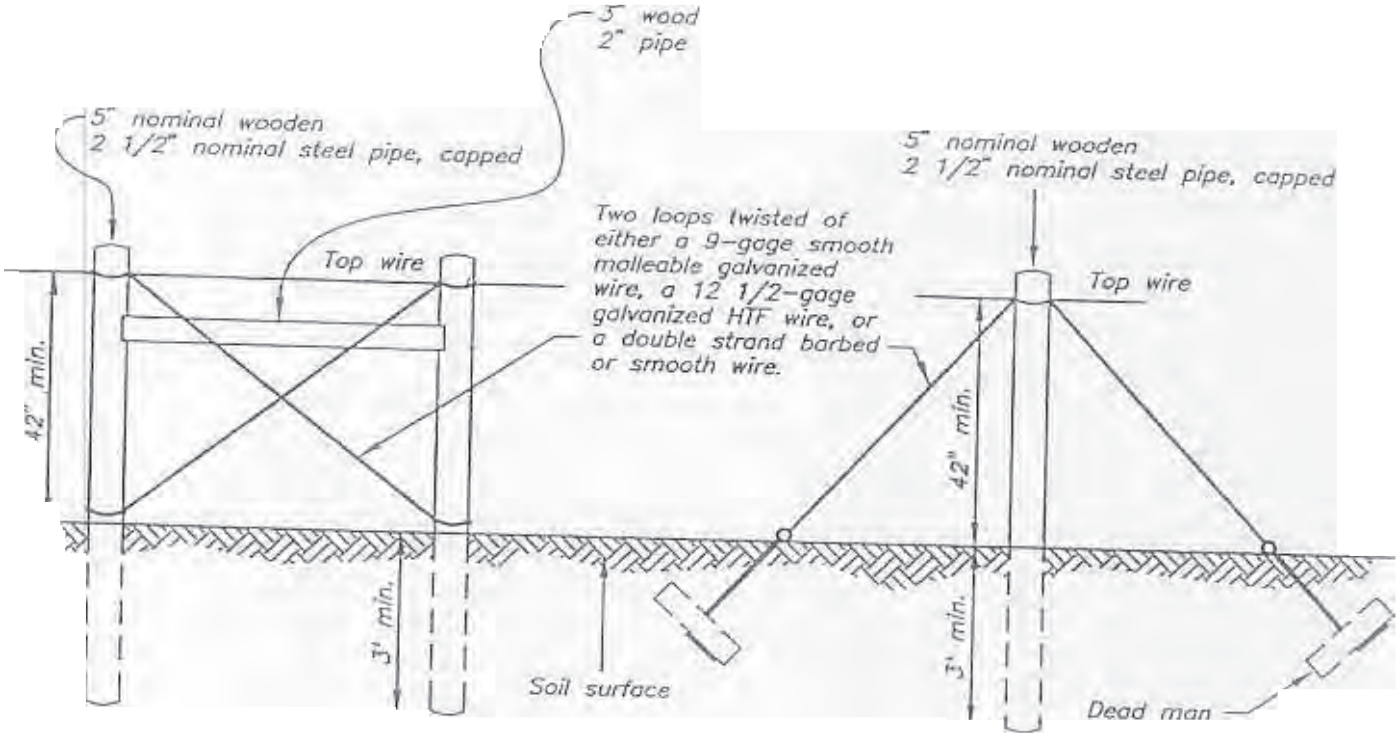
Single steel post with a minimum nominal diameter of 2" set in ground 1/2 the length of the post with anchor plate, knee brace or deadman.



Knee or Deadman Braces may be used on fences with 2 wires or where pull distances is < 660 feet.

Electric Fencing Bracing Alternatives

Figure 2



H-Brace
Pull Assembly

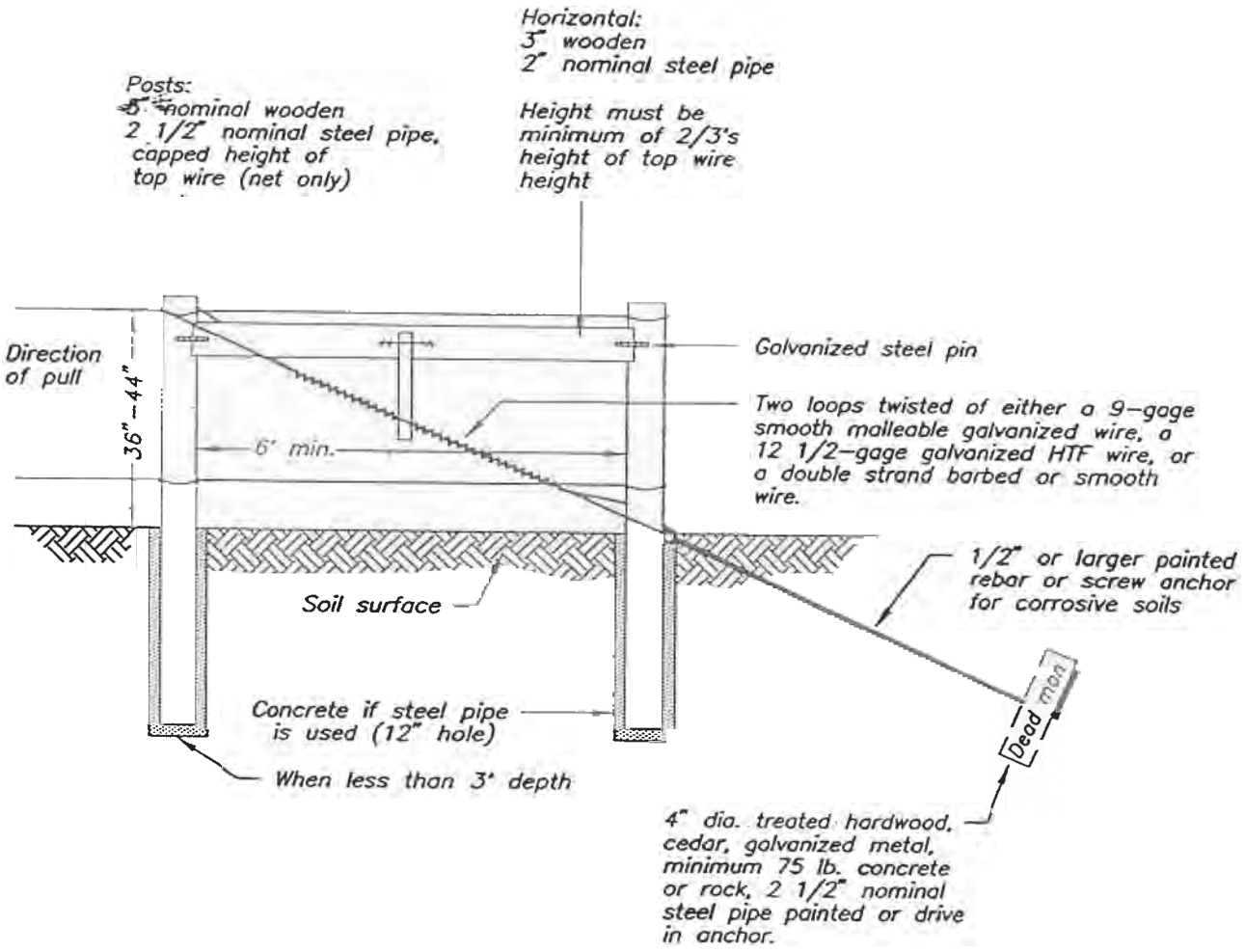
(a)

Single Post
Pull Assembly

(b)

Standard Suspension Fence,
Corner and Pull Assembly

Figure 3



Materials: Post must be new eastern red juniper, blueberry juniper, bois–d'arc, treated pine, treated hardwood, or steel pipe (cemented). Used steel pipe is acceptable and must be painted.

Splices: Use "western–union splices, figure "8" knots or crimping sleeves for malleable wire.

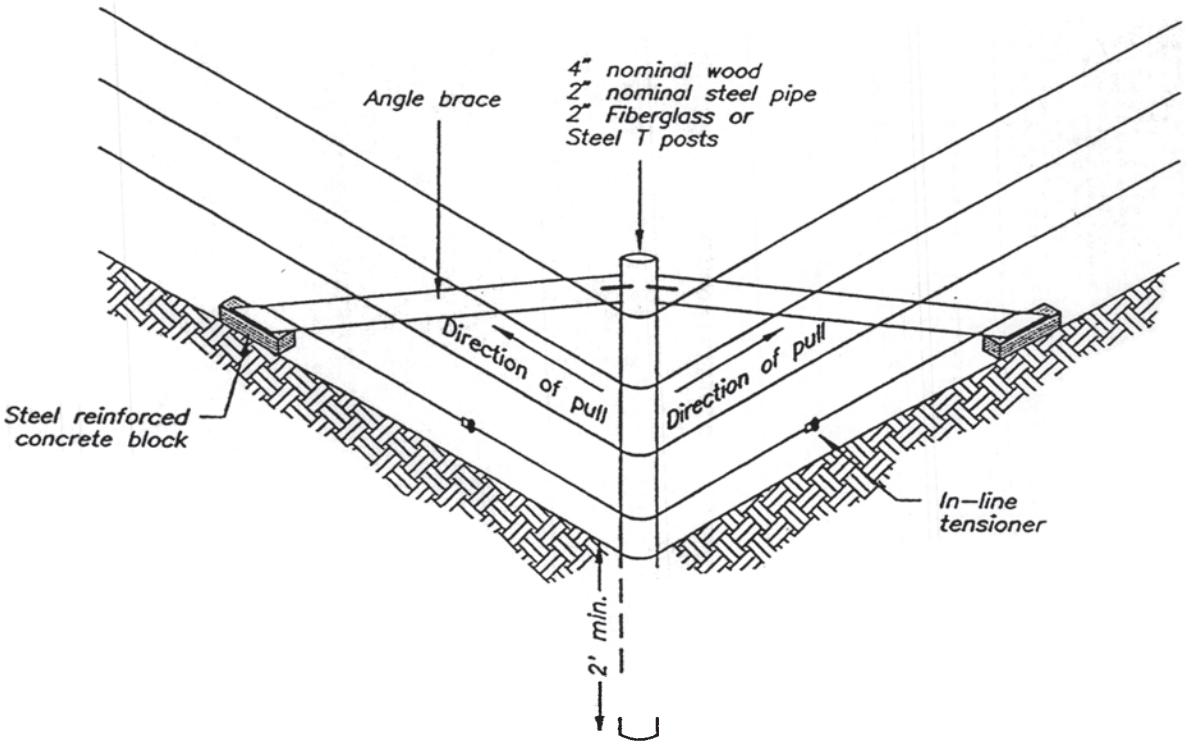
Use crimping sleeves or figure "8" knot for high tensile strength wire.

2 Post Brace With Deadman

(c)

Standard Suspension Fence, Corner and Pull Assembly

Figure 3

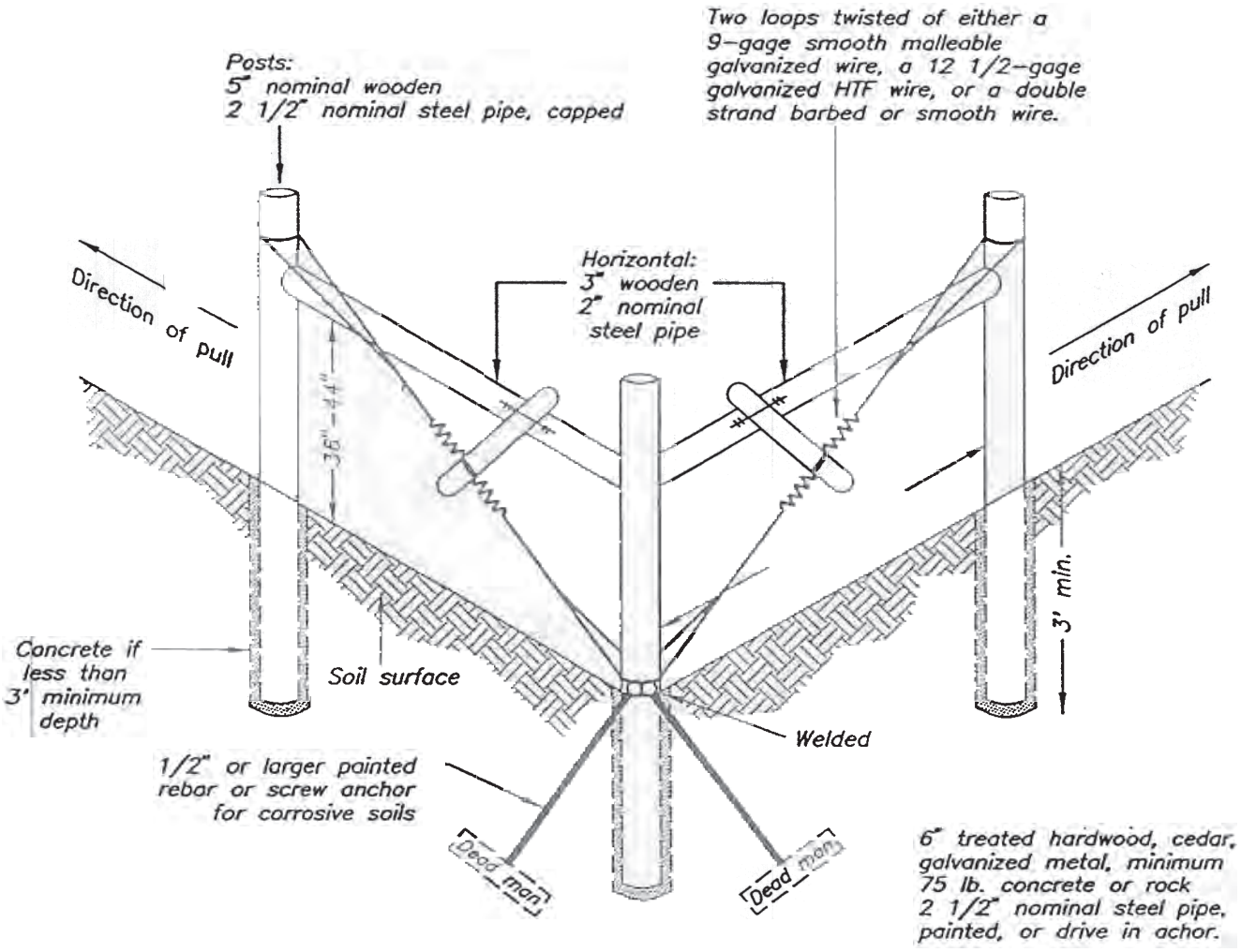


Single Post Corner or Angle Brace Assembly

(d)

Standard Suspension Fence,
Corner and Pull Assembly

Figure 3



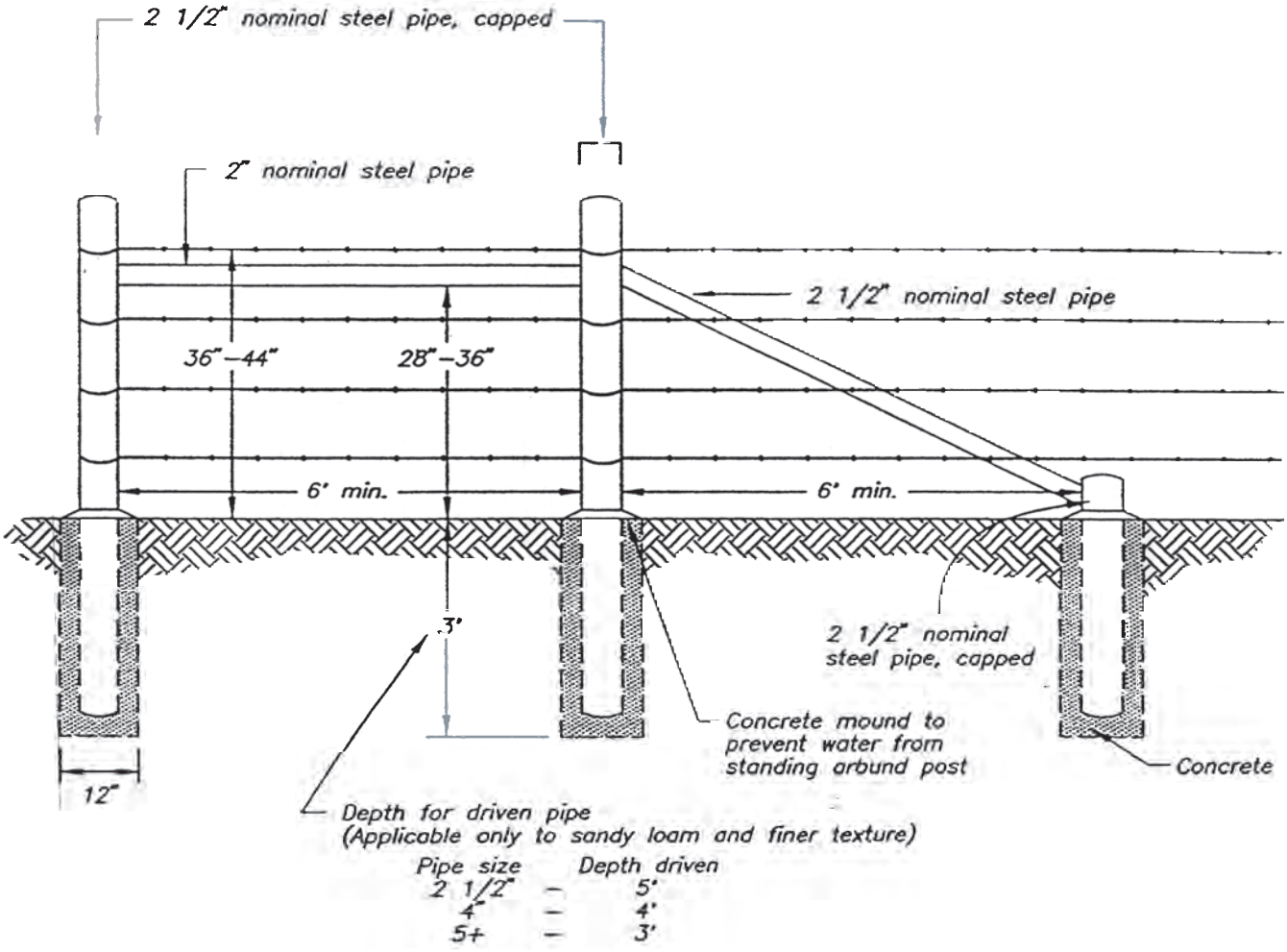
Materials: Post must be new eastern red juniper, blueberry juniper, bois-d'arc, treated pine, treated hardwood, or steel pipe. Used steel pipe is acceptable and must be painted.

Splices: Use "western-union splices, figure "8" knots or crimping sleeves for malleable wire.

Use crimping sleeves or figure "8" knot for high tensile strength wire.

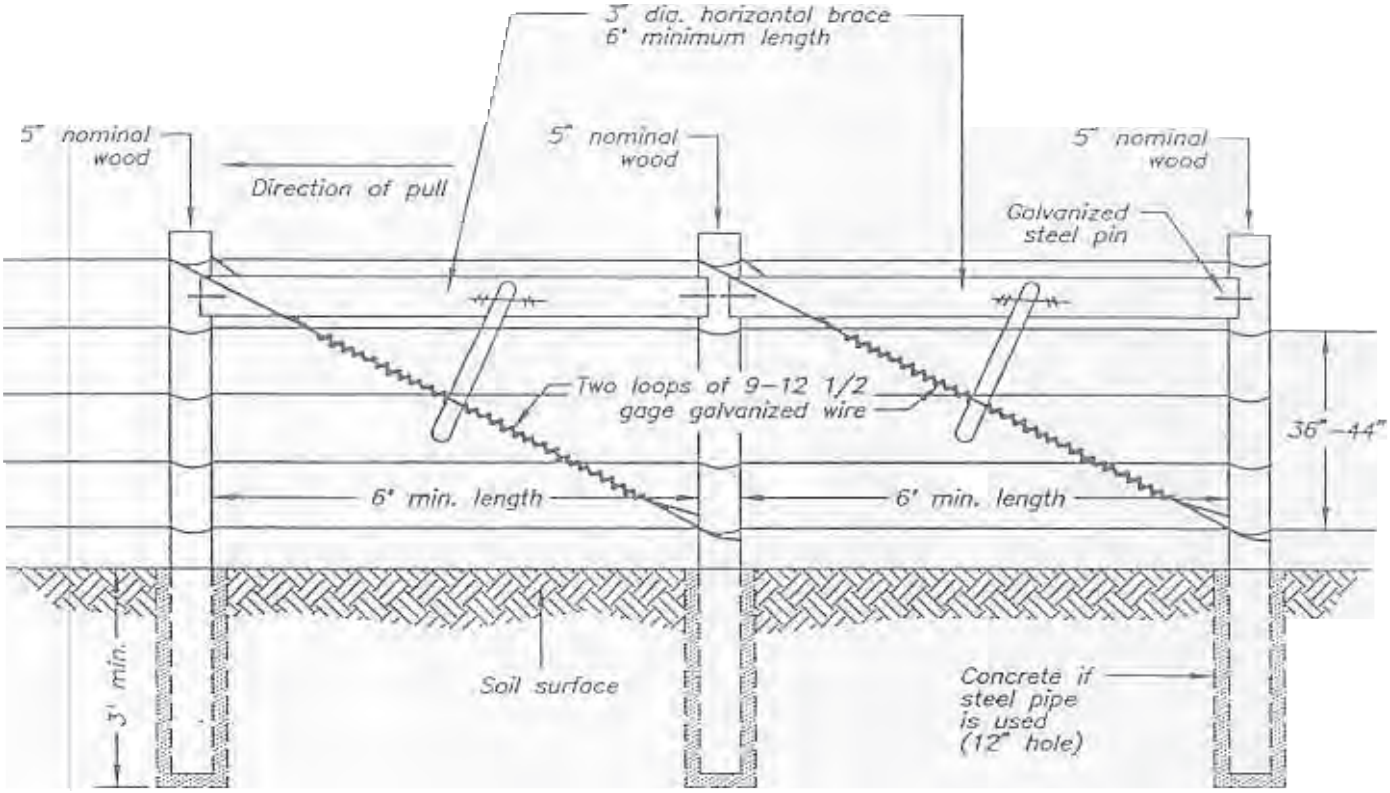
Deadmaned 3-Post Corner

Figure 4



Welded Steel 3–Post Diagonal
End Brace Assembly

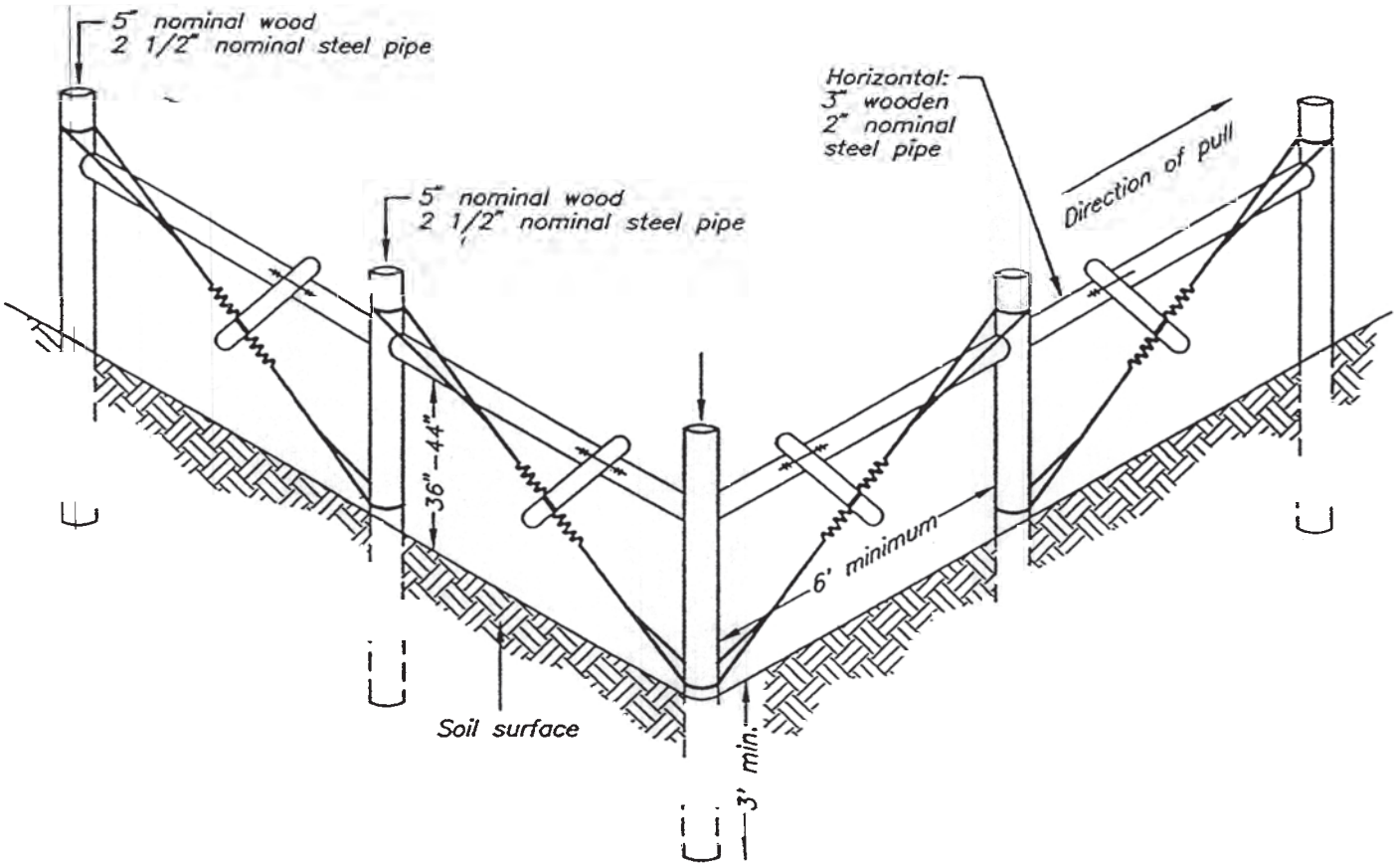
Figure 5



Note:
Materials shown above may be substituted using 2 1/2" nominal steel pipe, capped, set in concrete (12 in. diameter hole). Pipe must be painted.

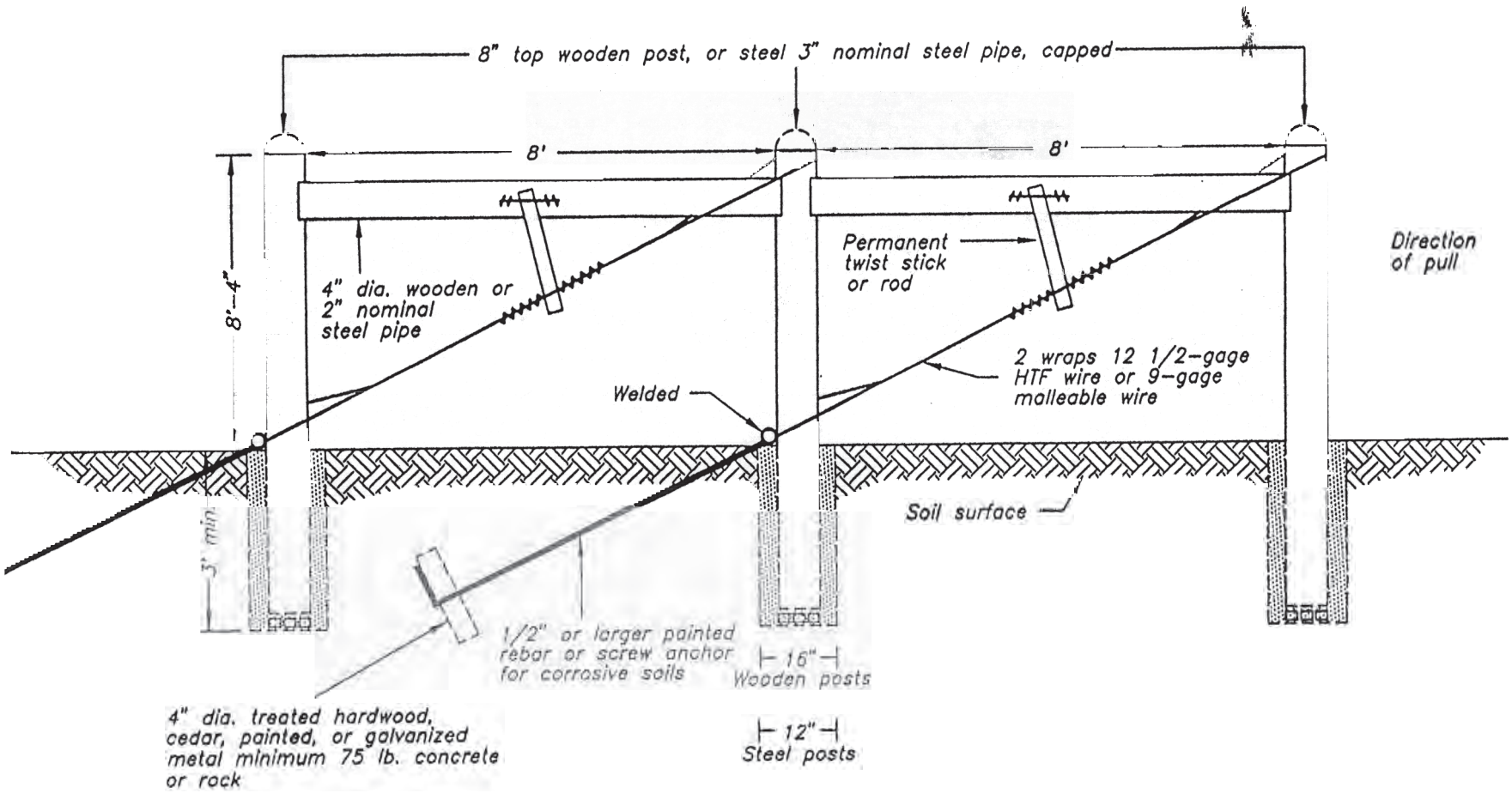
Wooden 3 Post Double "H" Brace End Assembly Without Deadman

Figure 6



Without Deadman

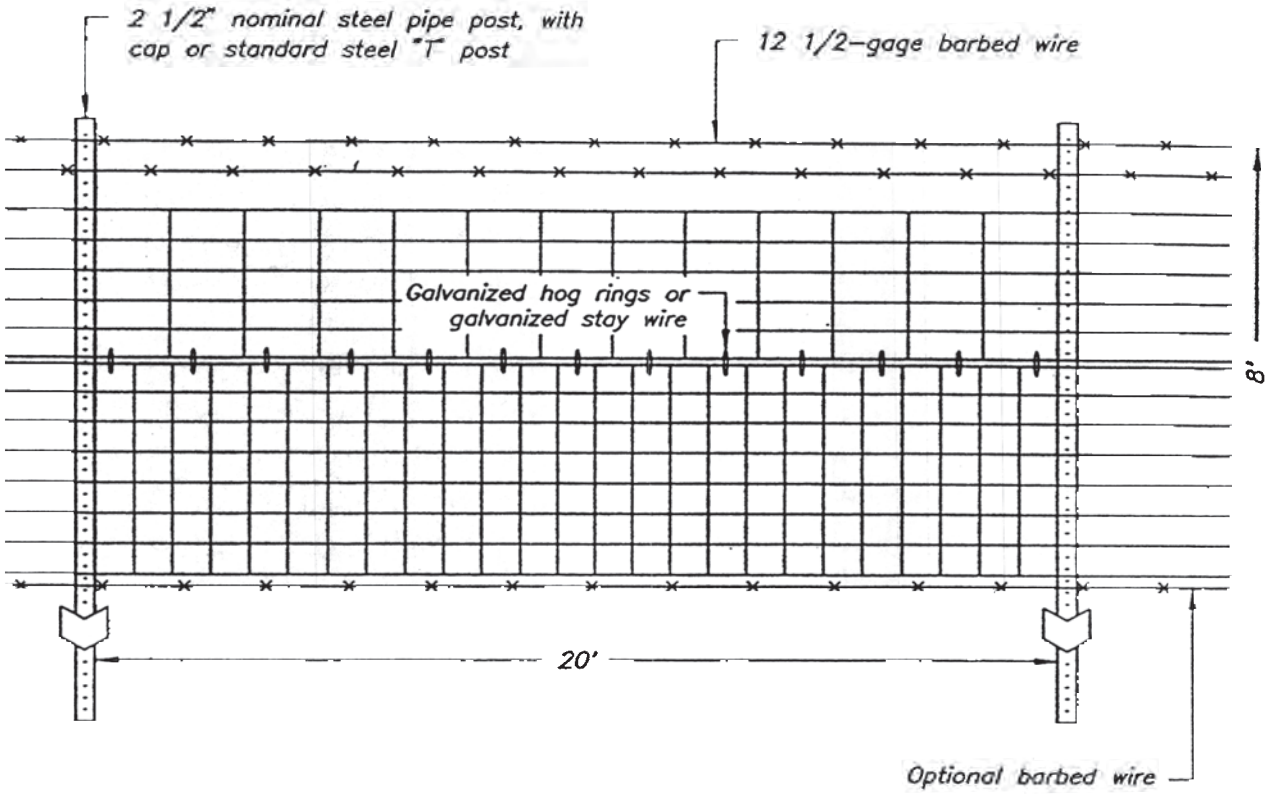
Figure 7



Deadman is optional except where surface of soil is more than 20 inches in depth of loamy fine sand or coarser.

End Brace Assembly Deer Managemet Fence

Figure 8



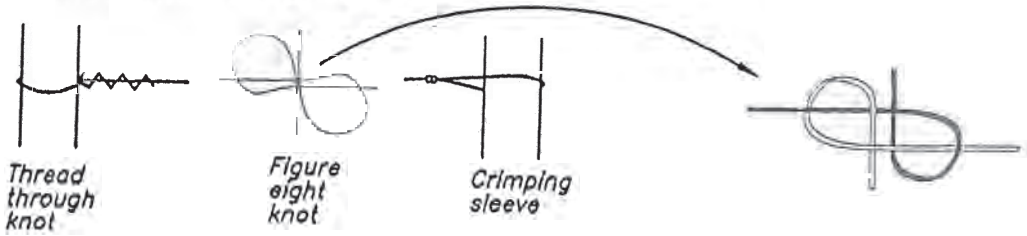
Note: If standard steel "T" posts are used, install 2 1/2" nominal steel pipe post, with cap or 6" top wooden post every 150' (Wooden stays may be placed between line post as needed.

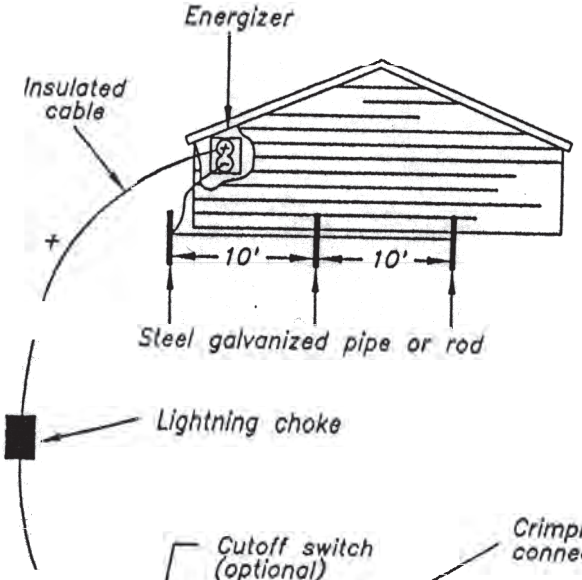
General Installation Specification For Deer Management Fence

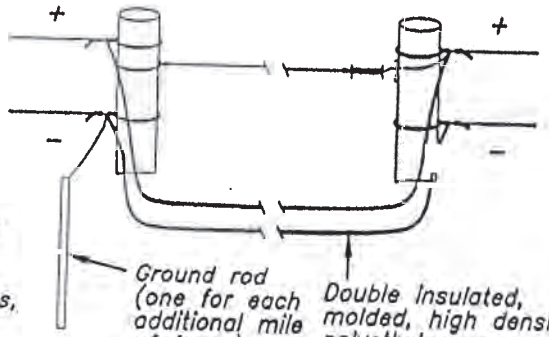
Figure 9

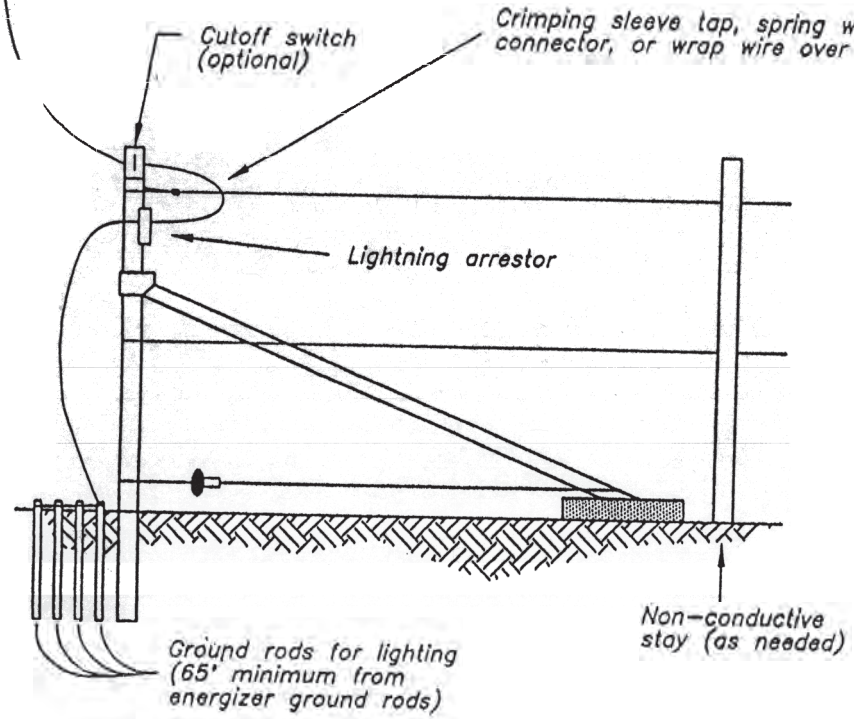
Attachment B

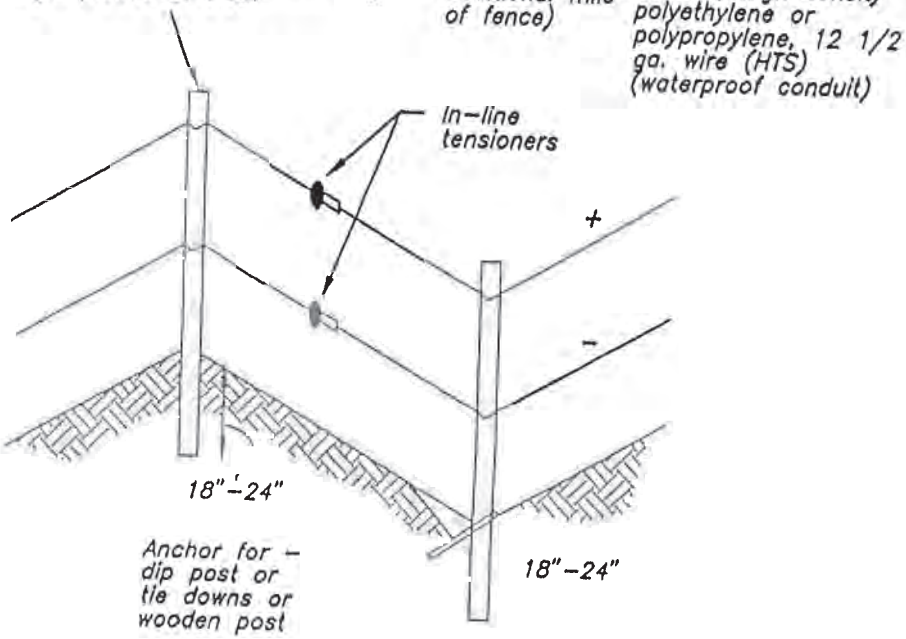
Methods of tying HTS Wire

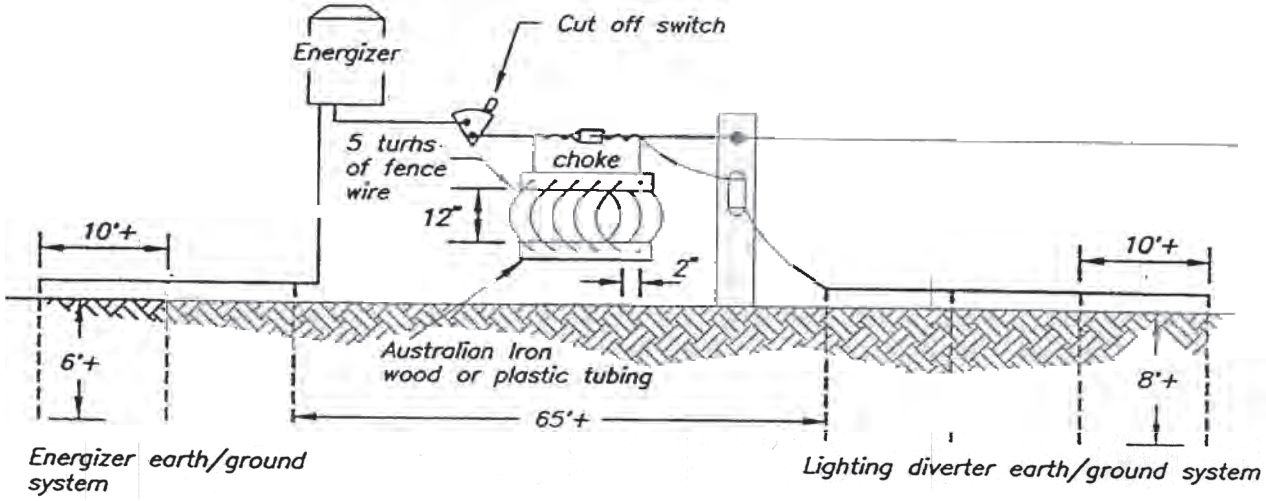










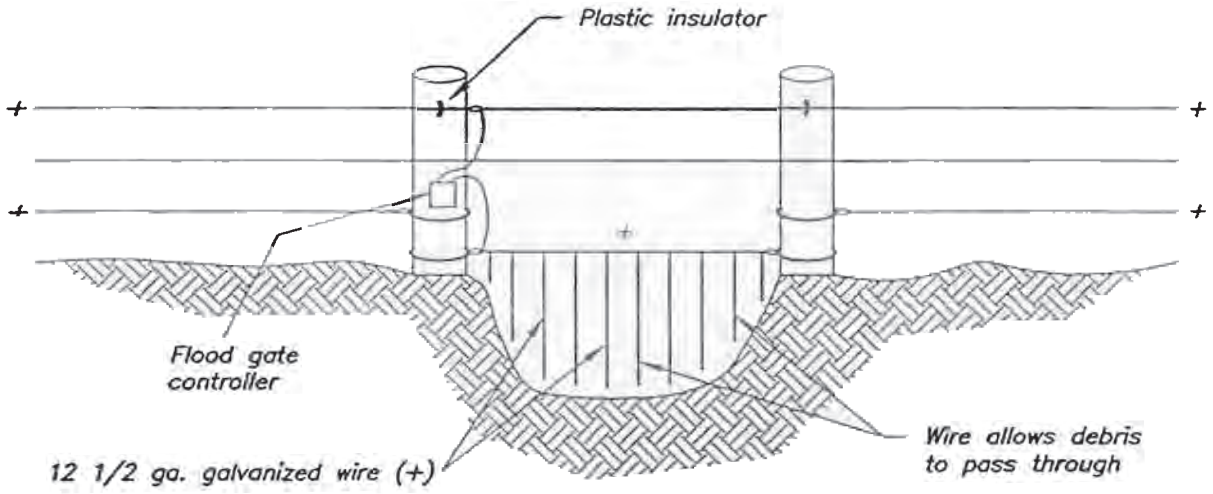


An induction loop may be as an alternative to a choke.

An induction loop is made by coiling 8 to 10 loops of heavily insulated 12 gage wire in 10–12" diameter circles and taping the loops together.

Electric Fence

Figure 2



Electric Flood Gate

Figure 1

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-95 GEOTEXTILE

1. SCOPE

This work shall consist of furnishing all materials, equipment, and labor necessary for the installation of geotextile.

2. MATERIAL QUALITY

Geotextile shall be manufactured from synthetic long chain or continuous polymeric filaments or yarns, having a composition of at least 95 percent, by weight, of polypropylene, polyester or polyvinylidene-chloride. The geotextile shall be formed into a stable network of filaments or yarns that retain their relative position to each other, are inert to commonly encountered chemicals and are resistant to ultraviolet light, heat, hydrocarbons, mildew, rodents and insects. Unless otherwise specified, the class and type of geotextile shall be as shown on the drawings and shall meet the requirements for materials that follow:

a. Woven Geotextile shall conform to the physical properties listed in Table 1. The woven geotextile shall be manufactured from monofilament yarns that are woven into a uniform pattern with distinct and measurable openings. The geotextile shall be manufactured so that the yarns will retain their relative position with regard to each other. The yarns shall contain stabilizers and/or inhibitors to enhance their resistance to ultraviolet light or heat exposure. The edges of the material shall be selvaged or otherwise finished to prevent the outer yarn from unraveling.

b. Nonwoven Geotextile shall conform to the physical properties listed in Table 2. Nonwoven geotextile shall be manufactured from randomly oriented fibers that have been mechanically bonded together by the needle-punched process. In addition, one side may be slightly heat bonded. Thermally bonded, nonwoven geotextile, in addition to mechanically bonded, nonwoven geotextile, may be used for Road Stabilization. The filaments shall contain stabilizers and/or inhibitors to enhance their resistance to ultraviolet light or heat exposure.

c. The geotextile shall be shipped in rolls wrapped with a protective covering to keep out mud, dirt, dust, debris and direct sunlight. Each roll of geotextile shall be clearly marked to identify the brand, type and production run.

3. STORAGE

Prior to use, the geotextile shall be stored in a clean dry place, out of direct sunlight, not subject to extremes of either hot or cold, and with the manufacturer's protective cover in place. Receiving, storage, and handling at the job site shall be in accordance with the requirements in ASTM D 4873.

4. SURFACE PREPARATION

The surface on which the geotextile is to be placed shall be graded to the neat lines and grades as shown on the drawings. The surface shall be reasonably smooth and free of loose rock and clods, holes, depressions, projections, muddy conditions and standing or flowing water (unless otherwise shown on the drawings).

5. PLACEMENT

Prior to placement of the geotextile, the soil surface will be inspected for quality assurance of design and construction. The geotextile shall be placed on the approved prepared surface at the locations and in accordance with the details shown on the drawings. The geotextile shall be unrolled along the placement area and loosely laid (not stretched) in such a manner that it will conform to the surface irregularities when material is placed on or against it. The geotextile may be folded and overlapped to permit proper placement in the designated area.

The geotextile shall be joined by overlapping a minimum of 18 inches (unless otherwise specified), and secured against the underlying foundation material. Securing pins, approved and provided by the geotextile manufacturer, shall be placed along the edge of the panel or roll material to adequately hold it in place during installation. Pins shall be steel or fiberglass formed as a "U", "L", or "T" shape or contain "ears" to prevent total penetration. Steel washers shall be provided on all but the "U" shaped pins. The upstream or up-slope geotextile shall overlap the abutting down-slope geotextile. At vertical laps, securing pins shall be inserted through both layers along a line through approximately the midpoint of the overlap. At horizontal laps and across slope laps, securing pins shall be inserted through the bottom layer only. Securing pins shall be placed along a line approximately 2 inches in from edge of the of the placed geotextile at intervals not to exceed 12 feet unless otherwise specified. Additional pins shall be installed as necessary and where appropriate, to prevent any undue slippage or movement of the geotextile. The use of securing pins will be held to the minimum necessary. Pins are to be left in place unless otherwise specified.

Should the geotextile be torn or punctured, or the overlaps disturbed, as evidenced by visible geotextile damage, subgrade pumping, intrusion, or grade distortion, the backfill around the damaged or displaced area shall be removed and restored to the original approved condition. The repair shall consist of a patch of the same type of geotextile being used, overlaying the existing geotextile. The patch shall extend a minimum of 2 feet from the edge of any damaged area.

The geotextile shall not be placed until it can be anchored and protected with the specified covering within 48 hours or protected from exposure to ultraviolet light. Geotextile shall be placed in accordance with the following applicable specification according to the use indicated in drawings:

Slope protection – Class I or II as indicated in Tables 1 and 2.

The geotextile shall not be placed until it can be anchored and protected with the specified covering within 48 hours or protected from exposure to ultraviolet light. Rock shall not be pushed or rolled over the geotextile.

Class I, unprotected – limit height for dropping stone onto bare geotextile to 3 feet.

Class II, protected – require the use of 6 inches a clean pit-run gravel over the geotextile to cushion the stone and limit the height of drop to 3 feet.

On slopes with strong seepage flow, the geotextile must be in intimate contact with the soil to prevent erosion of the soil surface. Use 6 inches of a clean pit-run gravel over the geotextile to hold it in place and minimize voids under the riprap. Embedment of the geotextile in a trench to form a cutoff at regular intervals down the slope will prevent erosion under the fabric. Place cutoffs more closely together in highly erodible soils and wider apart in more stable soils.

Subsurface drains – Class III as indicated in Tables 1 and 2.

The geotextile shall not be placed until drainfill or other material can be used to provide cover within the same working day. Drainfill material shall be placed in a manner that prevents damage to the geotextile. In no case shall material be dropped on uncovered geotextile from a height of more than 5 feet.

Road stabilization – Class IV as indicated in Tables 1 and 2.

The geotextile shall be unrolled in a direction parallel to the roadway centerline in a loose manner permitting conformation to the surface irregularities when the roadway fill material is placed on its surface. In no case shall material be dropped on uncovered geotextile from a height of more than 5 feet. Unless otherwise specified, the minimum overlap of geotextile panels joined without sewing shall be 24 inches. The geotextile may be temporarily secured with pins recommended or provided by the manufacturer, but they shall be removed before the permanent covering material is placed.

6. SPECIAL SPECIFICATIONS

TABLE 1. REQUIREMENTS FOR WOVEN GEOTEXTILES [1/]

Property	Test Method	Class I	Class II	Class III	Class IV
Grab tensile strength (pounds)	ASTM D4632	247 minimum	180 minimum	180 minimum	315 minimum
Elongation at failure (%)	ASTM D4632	< 50	< 50	< 50	< 50
Trapezoidal tear strength (pounds)	ASTM D4533	90 minimum	67 minimum	67 minimum	112 minimum
Puncture strength (pounds)	ASTM D6241	495 minimum	371 minimum	371 minimum	618 minimum
Ultraviolet light (% retained strength)	ASTM D4355	50 minimum	50 minimum	50 minimum	70 minimum
Permittivity (sec^{-1})	ASTM D4491	as specified			
Apparent opening size (AOS) [2/]	ASTM D4751	as specified			
Percent open area (POA) (%)	USACE [3/]CWO-02215-86	as specified			

1/ All values are minimum average roll values (MARV) in the weakest principal direction, unless otherwise noted.
2/ Maximum average roll value.
3/ Note: CWO is a USACE reference.

TABLE 2. REQUIREMENTS FOR NONWOVEN GEOTEXTILES [1/]

Property	Test Method	Class I [2/]	Class II [2/]	Class III [2/]	Class IV [2/]
Grab tensile strength (pounds)	ASTM D4632 grab test	202 minimum	157 minimum	112 minimum	202 minimum
Elongation at failure (%)	ASTM D4632	50 minimum	50 minimum	50 minimum	50 minimum
Trapezoidal tear strength (pounds)	ASTM D4533	79 minimum	56 minimum	40 minimum	79 minimum
Puncture strength (pounds)	ASTM D6241	433 minimum	309 minimum	223 minimum	433 minimum
Ultraviolet light (retained strength) (%)	ASTM D4355	50 minimum	50 minimum	50 minimum	50 minimum
Permittivity (sec^{-1})	ASTM D4491	0.70 minimum or as specified			
Apparent opening size (AOS) (mm) [3/]	ASTM D4751	0.22 maximum or as specified			

1/ All values are minimum average roll values (MARV) in the weakest principal direction, unless otherwise noted.
2/ Needle punched geotextiles may be used for all classes. Heat-bonded or resin-bonded geotextiles may be used for class IV only.
3/ Maximum average roll value.

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-412 GRASSED WATERWAYS

1. SCOPE

The work consists of all excavations, shaping, grading, and earthfill required to construct the waterways as shown on the drawings or as staked in the field It is the land user's responsibility to locate any existing tile that may be under, along, or crossing the waterways prior to construction. The NRCS is not responsible for any tile damaged during construction.

2. MATERIALS

The earth materials used in constructing the earthfill portions of the waterways shall be suitable material obtained from the waterway channel or other approved sources. The fill material shall be free from brush, roots, frozen material, sod, stones over 6 inches in diameter, or other objectionable material.

3. FOUNDATION PREPARATION

All trees, stumps, brush and debris shall be removed from the site and disposed of so that they will not interfere with construction or proper functioning of the waterway. In fill sections, trees and stumps may be sawed off at a height not exceeding 6 inches above natural ground, provided that the final grade is four feet or more above the top of the stumps.

4. PLACEMENT

Fill will not be placed until the required foundation preparation is complete. Smooth surfaces where fill material is to be placed shall be scarified to insure bonding. Fill shall not be placed upon a frozen surface.

Fill will be placed in approximately uniform horizontal layers of not more than 9 inches in thickness. The moisture content of the material shall be sufficient to obtain firm and suitable compaction. Compaction shall be obtained by routing the hauling and spreading equipment over the fill in such a manner that the entire surface of each layer will be traversed by not less than one tread track of the loaded equipment, or equivalent methods approved by the inspector.

5. EXCAVATION

Excavation shall be to the lines and grades shown on the drawings or staked in the field. All surplus and unsuitable excavated materials will be disposed of at locations shown on the drawings or at locations approved by the inspector. Spoil shall not be placed where it will block the flow of water into the waterway, except as shown on the plan for the construction of temporary diversions.

Where infertile subsoil will be exposed by construction operations, topsoil shall be stripped, stockpiled, and spread on infertile areas after excavation is completed. Areas to be topsoiled shall be undercut so that the finished surface is a design grade after topsoiling is complete.

The area adjacent to the upper end of the waterway shall be graded to divert upper watershed flows into the newly constructed waterway. The outlet end of the waterway shall be left in a stable condition after construction is complete.

6. DIVERSIONS

Temporary or permanent diversions shall be constructed as shown on the plans or staked in the field.

Temporary diversions constructed around the top and sides of the waterway to divert runoff water from the new grass seeding shall be removed following seeding establishment. Spoil from this operation shall not permanently block runoff from adjacent land from entering the waterway and may be placed to help ensure runoff enters the waterway in the future.

7. TOLERANCES

The waterway shall be constructed to the specified width, depth, and grade. The constructed waterway shall present a workmanlike finish with uniform grades and cross sections.

The quarter points of a parabolic waterway shall be constructed to the required elevation plus or minus 10% of the depth. For example, if the waterway has a depth of 1.0 ft., the tolerance is plus or minus 0.1 ft.

The side slopes of a trapezoidal waterway shall be constructed to the required slope plus or minus 10% of the slope when expressed as a ration xH:1V. For example, if the required side slope is 8H:1V, the tolerance is plus or minus 0.8 and the constructed side slope shall be in the range of 7.2H:1V to 8.8H:1V.

Depth shall be measured at one-half the design width from the centerline at the lowest side of the waterway.

In addition to the tolerances stated above, Case 1 shall apply unless Case 2 is specified in Section 9, Additional Requirements. In all cases, no flat or reverse grades will be allowed.

Case 1: The center of parabolic waterways and the bottom of trapezoidal waterways shall be constructed to the required elevations with allowable tolerances as follows:

- For waterway slopes 1.5% or less: plus or minus 0.1 ft.
- For waterway slopes greater than 1.5%: plus or minus 0.2 ft.

Case 2 (Applies only to waterways with grades over 1.5%): Each reach of the grassed waterway shall be constructed to the specified depth and grade, with allowable tolerances as follows:

- The constructed depth plus or minus 0.2 ft.
- The constructed grade plus or minus 10% of the design grade. For example, if the waterway reach has a design grade of 3%, the tolerance is plus or minus 0.3% and the constructed grade shall be within the range of 2.7-3.3%.

8. SEEDING

A protective cover of vegetation shall be established on all surfaces of the areas disturbed by construction as shown on the plans or staked in the field. Seeding and mulching shall be performed in accordance with the IA-CPA-4, Seeding Plan, and Construction Specification IA-6, Seeding and Mulching for Protective Cover.

9. ADDITIONAL REQUIREMENTS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATIONS

IA-620 UNDERGROUND OUTLET

1. SCOPE

This work shall consist of installation of underground outlets and any appurtenant water control structures in accordance with an approved plan and design.

2. MATERIALS

Materials for underground outlets shall meet the requirements as shown in the plans and specifications. They shall be field inspected for any deficiencies such as thin spots or cracking prior to installation.

Conduit

The following reference specifications pertain to products currently acceptable for use as underground outlets:

Plastic

Corrugated Polyethylene (PE) Pipe and Fittings (3-6 inch) ..... ASTM F 405
3 through 24 inch Corrugated Polyethylene (PE) Pipe and Fittings..... ASTM F 667
Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth
Interior and Fittings (4-36 inch) ..... ASTM F 949
Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings..... ASTM D 2729
Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings..... ASTM D 3034
Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series) ..... ASTM D 2241
Polyethylene Plastics Pipe and Fittings Materials ..... ASTM D 335

Clay

Clay Drain Tile ..... ASTM C 4
Vitrified Clay Pipe, Extra Strength, Standard Strength and Perforated..... ASTM C 700
Vitrified Clay Pipe, test methods..... ASTM C 301

Concrete

Concrete Drain Tile (4-36 inch)..... ASTM C 412
Concrete Pipe for Irrigation or Drainage ..... ASTM C 118
Concrete Pipe, Manhole Sections, or Tile (test methods)..... ASTM C 497
Concrete Sewer, Storm Drain and Culvert Pipe ..... ASTM C 14
Reinforced Concrete Culvert, Storm Drain and Sewer Pipe..... ASTM C 76
Perforated Concrete Pipe ..... ASTM C 444
Portland Cement ..... ASTM C 150

Other

Styrene-Rubber (SR) Plastic Drain Pipe and Fittings..... ASTM D 2852
Corrugated Aluminum Pipe for Sewers and Drains ..... ASTM B 745
Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains..... ASTM A 760

Inlet

The inlet shall be fabricated and installed as shown on the plans. Inlets must be of durable material, structurally sound, and resistant to damage by rodents or other animals. Inlets shall be of rigid material, which does not require supplemental support to remain in a vertical position. Materials, which meet these requirements, include the following:

1. Corrugated metal pipe, galvanized or aluminum, 16 gauge minimum,
2. Smooth steel pipe, with 3/16 inch minimum wall thickness,
3. Smooth plastic pipe, polyvinyl chloride (PVC), with an SDR of 43 or less,
4. High-density polyethylene pipe (PE). Round pipe shall have an SDR of 43 or less. Square intakes shall have minimum wall thickness as shown in the following table:

Nominal Size	Minimum Thickness
6 inch	0.16 inch
8 inch	0.21 inch
10 inch	0.26 inch
12 inch	0.31 inch

All plastic and polyethylene inlets shall include ultra-violet stabilizer to protect from solar degradation.

Perforations in the inlet shall be smooth and free of burrs. Unless otherwise specified, the above ground portion of the inlet shall have holes evenly spaced around the perimeter of the inlet in accordance with the following table:

Inlet Size	Minimum Number of 1" Diameter Holes per Foot of Inlet
4 inch	20
5 inch	24
6 inch	30
8 inch	40
10 inch	50
12 inch	60

If slots or round holes other than 1 inch in diameter are provided, the total cross sectional area of the openings per foot shall be equivalent to that provided by 1 inch diameter round holes meeting the above criteria.

The below ground portion of the inlet may be perforated with holes 5/16 of an inch in diameter or less to provide drainage around the inlet.

Appurtenances (i.e. tees and elbows) for polyvinyl chloride (PVC) inlets shall be schedule 40 or heavier.

Additional subsurface drainage tubing or tile may be used in conjunction with the surface inlet to improve access and farmability around the inlet. These underground extensions (when used) shall have a minimum length of 10 feet.

The inlet shall be offset from the main conduit except as noted below. A minimum of 8 feet of non-perforated conduit shall be installed between the inlet and the main conduit. The minimum diameter of the offset line shall be 3 inches. When conduit capacity is based on orifice flow from the inlet, such inlets shall be fabricated so that an orifice can easily be installed.

Only the top inlet in a terrace system may be placed directly on the main conduit. If the top most inlet in a terrace system is placed directly on the main conduit, the conduit shall be non- perforated from the inlet to the toe of the terrace back slope.

Outlet

A continuous section of non-perforated conduit at least 20 feet long shall be used at the outlet. Two-thirds of the outlet pipe shall be buried in the ditch bank, and the cantilever section must extend to the toe of the ditch side slope or the side slope shall be protected from erosion. Acceptable materials for use at the outlet include the following:

1. Corrugated metal pipe, galvanized or aluminum, 16 gauge minimum;
2. Smooth steel pipe, with 3/16 inch minimum wall thickness;
3. Smooth plastic pipe, polyvinyl chloride (PVC), with a SDR of 26 or less or schedule 40 or heavier; or
4. Corrugated profile wall (dual wall) polyethylene (PE) pipe meeting or exceeding the requirements of ASTM F 2648 (2" to 60"), ASTM F 2306 (12" to 60"). Pipe conforming to AASHTO M 252 (3" to 10"), or AASHTO M 294 (12" to 60") is acceptable.

All plastic and polyethylene pipe outlets shall include ultra-violet stabilizer. PVC and PE pipe outlets shall not be used where burning vegetation on the outlet ditch bank is likely to create a fire hazard.

Connections with the outlet pipe shall be made watertight.

The outlet shall be equipped with a flap-gate type rodent guard.

3. TRENCH EXCAVATION

Trench excavation shall be sufficient to provide required cover after other construction is completed.

The trench bottom shall be smooth and free of exposed rock. If rock is encountered in the trench bottom, over-excavate the trench and place at least 6 inches of compacted earth or sand bedding in the trench to bring it up to the conduit grade. In stable soils, the bottom of the trench shall be shaped to form a semicircular, trapezoidal, or 90-degree "V" groove in its center. The groove shall be shaped to fit the size of conduit. The 90-degree "V" groove shall not be used on conduits greater than 6 inches in diameter.

Unless otherwise shown on the drawings, trench width at the top of the conduit should be the minimum required to permit installation and provide bedding conditions suitable to support the load on the conduit, but with not less than 3 inches of clearance on each side. Maximum trench width shall be the conduit diameter plus 12 inches measured at the top of the conduit, unless approved bedding is installed.

Plow installation is allowed except under the base width of the terrace or embankment. Trench width shall be at least two (2) inches wider than the conduit on each side to allow sufficient bedding to support the pipe.

4. INSTALLATION

The underground outlet system shall be installed to the line and grade shown in the plans or as staked in the field. Conduit lines shall be installed and properly blinded or bedded prior to placement of any other earthfill over the lines.

Conduit lines shall be joined with standard factory couplers, if applicable, to produce a continuous system. Internal couplers may be used if they do not cause excessive flow restrictions. Conduit ends shall be protected during installation.

All appurtenant structures, including trash and rodent guards, shall be installed promptly and provisions shall be made for protecting them during installation. All conduit ends except the outlet and inlets with screens shall be capped with standard factory end caps or concrete. When corrugated plastic tubing is used, no more than 5% stretch will be allowed.

Orifice plates, when specified, shall have smooth edges and fit tightly.

5. TRENCH BACKFILL

Conduits shall be bedded and backfilled throughout the base width of the basin embankment or terrace ridge. Friable soil material shall be placed in 4 inch layers and hand tamped to a depth of 2 feet above the conduit. The sides of the remaining trench shall be sloped no steeper than 3 horizontal to 1 vertical and backfill placed in 9 inch layers and machine compacted.

Water packing may be used as an alternative to mechanical compaction. If the conduit is non-perforated, it shall be filled with water during the water packing procedure. The initial backfill, before wetting, shall be of sufficient depth to ensure complete coverage of the pipe after consolidation has taken place. Water packing is accomplished by adding water in such quantity as to thoroughly saturate the initial backfill without inundation. The wetted fill shall be allowed to dry until firm before final backfill is begun. Final backfill shall be accomplished by placing friable soil material in 4 inch layers and hand tamping to a depth of 2 feet above the conduit. The sides of the remaining trench shall be sloped no steeper than 3 horizontal to 1 vertical and backfill placed in 9 inch layers and machine compacted.

Conduit which is not under the embankment or terrace ridge shall be backfilled with select bedding material containing no hard objects larger than 1½ inches in diameter to a minimum depth of 6 inches over the conduit. The conduit shall be held in place mechanically while select backfill material is placed around and over the conduit. This is to ensure that the proper conduit grade is maintained. All backfill material shall be placed so that deflection or displacement of the conduit will not occur. The remainder of the trench above the conduit shall be backfilled as rapidly as consistent with the soil conditions. Backfill shall extend above the ground surface and be well rounded over the trench. Large stones, frozen material, and large clods are not allowed in the backfill material.

6. FINISH

Work areas shall be smoothed and left in a workmanlike manner. Vegetation or other protective cover shall be established as specified.

7. SPECIAL SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-638 WATER AND SEDIMENT CONTROL BASIN

1. SCOPE

The work consists of furnishing materials, installing all components, and performing all clearing and grubbing, excavations, shaping, grading, and earthfill required to construct the Water and Sediment Control Basin (WASCoB) as shown on the drawings or as staked in the field.

It is the land user's responsibility to locate any existing subsurface drains that may be under, along, or crossing the WASCoB prior to construction. The NRCS is not responsible for any subsurface drains damaged during construction.

2. MATERIALS

Cuts and fills should be made in such a manner that topography will be enhanced. Unless otherwise shown on the plans or specified in Section 7, all earth materials used in constructing the earthfill portions of the WASCoBs shall be suitable material obtained downslope from the WASCoB or from other approved sources as shown on the plans, described in Section 7, or approved by the Inspector. The fill material shall be free from brush, roots, frozen material, sod, and stones over 6 inches in diameter, or other objectionable material.

Borrow areas shall be finished so they are suitable for the planned use after construction is completed. If needed, topsoil shall be stockpiled and spread over excavations and other areas to facilitate establishment of vegetation.

Pipe, pipe sizes, fittings, and other necessary pipe material shall be as specified on the drawings, Construction Specification IA-620, Underground Outlets, or in Section 7, when applicable.

Other required materials shall be as shown in the drawings, specified in Construction Specification IA-620, Underground Outlets, or in Section 7 of this specification.

3. FOUNDATION PREPARATION

All areas within 25 feet of the footprint of the structure shall be cleared and grubbed unless otherwise shown on the plans or directed by NRCS. All trees, stumps, brush, and debris shall be removed from the site and disposed of so that they will not interfere with construction or proper functioning of the WASCoB. Burning shall comply with all applicable state and local regulations.

All earthfill and borrow areas shall be stripped a minimum of 6 inches to remove vegetation and other unsuitable materials.

All channel banks and sharp breaks shall be sloped to no steeper than 1.5:1 in the foundation area under the embankment.

All dead furrows, ditches, or gullies shall be filled before construction begins or shall become part of the construction. All fill shall meet the requirements of Section 4, Placement.

4. PLACEMENT

The water and sediment control basin shall be constructed according to planned alignment, grade, and cross section with the specified overfill for settlement and the channel graded to promote positive drainage. Any ditch or depression at the bottom of the back slope shall be filled and smoothed so that drainage will be away from the embankment and not parallel to it.

Fill shall not be placed until the required foundation preparation is complete. Smooth surfaces where fill material is to be placed shall be scarified to insure bonding. Fill shall not be placed upon a frozen surface.

The moisture content of the fill material shall be adequate for obtaining the required compaction. Material that is too wet shall be dried to meet this requirement, and material that is too dry shall have water added and mixed until the requirement is met. The application of water to the fill materials shall be accomplished at the borrow areas insofar as possible.

The moisture content of the fill material shall be such that a ball formed with the hands does not crack or separate when struck sharply with a pencil and will easily ribbon out between the thumb and finger.

The placing and spreading of fill material shall be started at the lowest point of the foundation. Fill shall be placed in approximately uniform horizontal layers of not more than 9 inches in thickness. Compaction shall be obtained by routing the hauling and spreading equipment over the fill in such a manner that the entire surface of each layer will be traversed by not less than one tread track of the loaded equipment, or equivalent methods approved by the Inspector.

The finished surface shall be reasonably smooth and present a workmanlike finish.

5. PIPE INSTALLATION

The pipe(s) and appurtenances shall be installed as shown on the plans. Trench excavation, pipe installation, and trench backfill shall be in accordance with Construction Specification IA-620, Underground Outlets, or appropriate specification listed in Section 7.

6. SEEDING

A protective cover of vegetation shall be established on all surfaces of the areas disturbed by construction as shown on the plans or staked in the field. Seeding and mulching shall be performed in accordance with the IA-CPA-4, Seeding Plan, and Construction Specification IA-6, Seeding and Mulching for Protective Cover.

7. SPECIAL SPECIFICATIONS