Grade Control Implementation Guidance Document

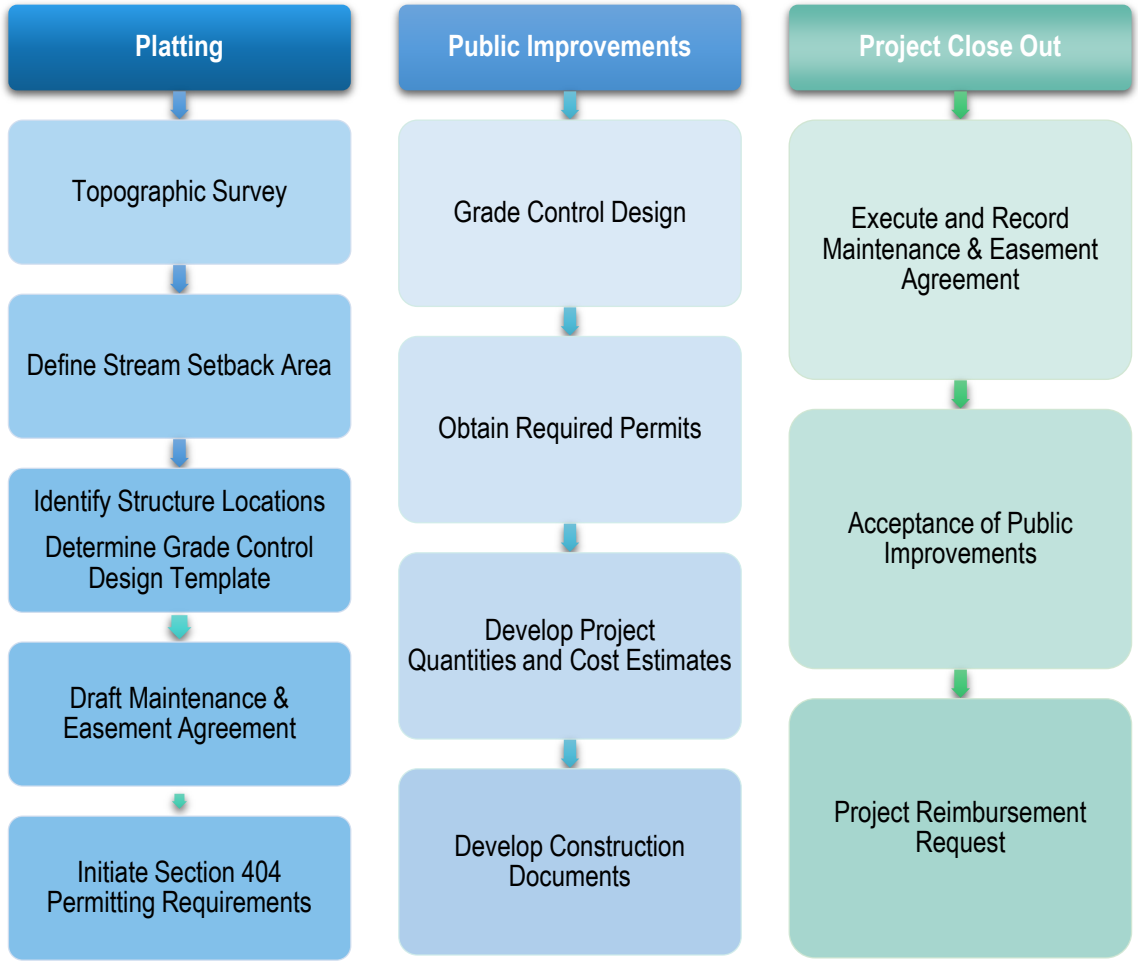
Prepared as part of the
Southern Sarpy Watersheds Management Plan

SECTION 1
Overview and Intent

The Southern Sarpy Watersheds Partnership (SSWP) has a developed a set of six (6) policies to include in the Southern Sarpy Watersheds Management Plan (Plan). The Stream Corridor Preservation policy requires that grade control structures are incorporated into developments on stream segments with a drainage area of 0.5 mi^2 or greater. The purpose of this document is to guide developers through incorporating grade control structures into developments as required by the policy.

The process for completing major tasks during the different phases of development (grouped as platting, public improvements, and project closeout) is summarized in the diagram below. Details for completing each task are provided in the subsequent sections of this document that can be accessed by clicking each cell. Design templates, permitting guidance, checklists, and forms referenced throughout the guidance document are included as appendices and linked below. Click the logo on each page to return to the flow chart.

Figure 1. Grade Control Implementation Process



Appendices

- Appendix A – Design Guidance
- Appendix B – Section 404 Permit Guidance
- Appendix C - Forms

SECTION 2
Grade Control Implementation Procedures

The grade controls structures are intended to limit future degradation from the existing stream bed elevations to a maximum of 4 ft. There are pre-approved design templates that pin the stream bed at existing grade and are designed to prevent downstream head cuts from progressing upstream. The Grade Control Submittal Checklist – Appendix C provides a summary of the submittals required for each phase.

2.1 Platting Phase

Steps to complete the design of the grade control structure are outlined below.

- Topographic Survey

  Collect elevation data within the channel less than twelve (12) months prior to preliminary plat submission. This survey will be used for defining the stream setback area and determining the number and location of grade control structures. Survey should adequately reflect the channel geometry and grades as required to accurately determine stream setback area, primarily the channel bottom at edge. Survey data should accurately reflect a stream profile that will be used for grade control determinations. Any hard point located downstream (even if off-site) that will be used for establishing the future stable grade (see section Identify Structure Locations) should be surveyed to collect the invert elevation of the structure that is used in the development of the future stable grade. Supplemental survey of the stream at the selected grade control locations will be required during final design to develop accurate designs and quantity calculations.

- Define Stream Setback Area

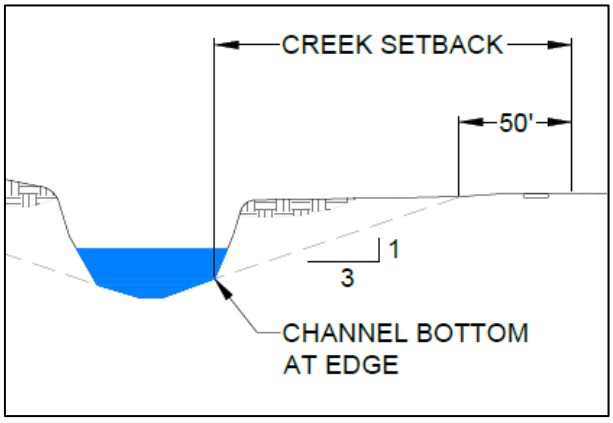


Figure 2. Stream Setback Definition

Use the channel survey data to define the creek setback distance at each surveyed cross section.

- ✓ Project a 3:1 slope from the channel bottom at edge (not the edge of water since this varies) on each side of the channel located on the property until it daylights with existing ground. If survey data doesn't extend into uplands, LiDAR can be used for determining the daylight location.
- ✓ Add 50 ft horizontally (perpendicular to channel alignment) from the daylight point to locate the setback boundary.
- ✓ Plot the setback boundary in plan view and ensure a single continuous setback area is accessible via public right of way.

SECTION 2
Grade Control Implementation Procedures

- Identify Structure Locations

The location of grade controls are determined with an exercise that compares the existing (surveyed) bed slope with the projected future stable slope. Grade controls will be placed to prevent future degradation depths (D) from exceeding 4 ft. Structure locations should consider impacts to the Waters of the United States and thresholds for the USACE 404 permits that are required for all in-stream structures located within the development. Strategic placement of structures to minimize stream impacts should be applied to stay within permit thresholds.

- ✓ Create a profile along the stream flowline.
- ✓ Start at the nearest downstream existing hard point (i.e. culvert or grade control structure). If there is no hard point on the property, an off-site hard point can be used, or a new grade control structure can be implemented on the downstream end of the parcel. This grade control structure should be designed with the assumption of a future degradation depth of 4 ft.
- ✓ Project a future stable slope line of **0.15%** and identify grade control locations that prevent D from exceeding 4 ft and minimizes permitting impacts along the stream length within the platted property
- ✓ Establish an identification number and D for each grade control structure location to be used for design

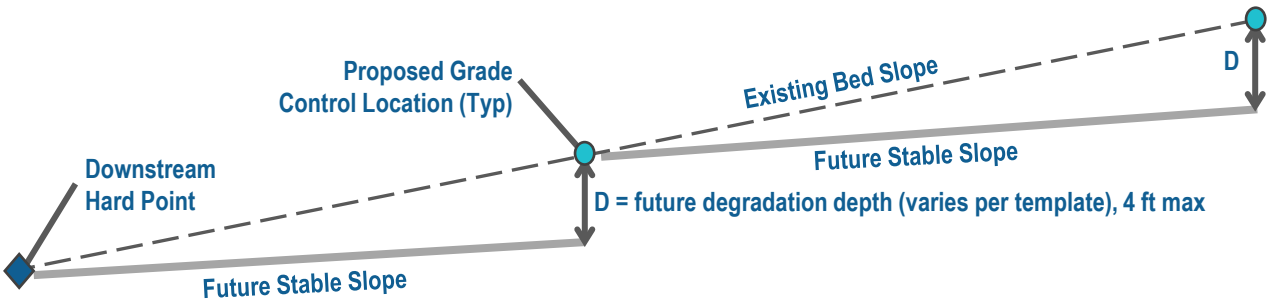


Figure 3. Stream Profile for Locating Grade Controls

- Determine Grade Control Design Template

Design templates for three different grade stabilization structures are located in Appendix A-Design Templates. The future degradation depth (D) that each structure can be designed for varies per template. The acceptable range of D for each structure is identified below and on the design templates.

- Rock Riprap Riffle with Sheet Pile, D= 0-4 ft
- Rock Slab Drop Structure, D= 0-1.5 ft (placement limited to ephemeral streams)
- Grouted Boulder Drop Structure, D= 0-4 ft

The D at each structure location must fall within the acceptable range of Ds for the selected design template.

- Draft Maintenance and Easement Agreement

  The Maintenance Agreement - Appendix C shall be developed that documents the responsibilities of the owner, the Sanitary Improvement District or Homeowners Association, and the local jurisdiction as applicable. The maintenance agreement shall be approved by the local jurisdiction. Exhibits to be included with the agreement are:

  - Exhibit A – Real Property Depiction shall provide lot certificate or platted subdivision with legal description
  - Exhibit B – Grade Control Maintenance Requirements including site and grade control structure information, a description of maintenance repair tasks, and a maintenance schedule

- Initiate Section 404 Permitting Requirements
  - Complete jurisdictional waters of the United States determination
  - Schedule pre-application meeting with the USACE

2.2 Public Improvements Phase

- Grade Control Design
  - Hydrology
    - Develop peak flow rates according to the Omaha Regional Stormwater Design Manual
      - Design event = future conditions, 24-hr, 100-yr frequency
      - Design discharge to be the rate at the top of the bank or the 100-year discharge, whichever is the lesser
      - A Design Discharge Rate Approximations Figure – Appendix A is provided that approximates peak flows at selected points with the future land use used to develop the estimates. This figure can be used as a check to determine if the calculated design rates are within reason.
  - Structure Design and Calculations
    - See Appendix A - Design Templates for establishing structure dimensions and stable rock size
    - Develop table with design parameters and final structure information
  - Document the design information identified in the Grade Control Submittal Checklist - Appendix C. This can be a stand along report or added into or as an appendix to the Drainage Report that is required for the Post Construction Stormwater Management Plan.

- Obtain Required Permits
  - Include pertinent information for the grade controls in all permits required for the project
  - For Section 404 permitting requirements, follow Appendix B – Section 404 Permitting Guidance

SECTION 2
Grade Control Implementation Procedures

- Develop Project Quantities and Cost Estimates
  - Separate quantities and costs specific to grade controls
  - Only materials in the design template and bid line items below will be approved for reimbursement, which include:
    - Rock riprap (*Nebraska Type A-C*) (ton)
    - Rock riprap (*South Dakota Class A-F*) (ton)*
    - Limestone slabs (tons)*
    - Boulders (tons)*
    - Grout (*NDOT - flowable fill concrete*) (CY)
    - Steel Sheet pile (SF)
    - Earth fill (*NDOT - earthwork measured in embank*ment) (CY)
    - Excavation (CY)
    - Geotextile fabric (*NDOT - riprap filter fabric*) (SY)
    - Weep drains (*NDOT hose clamp* and PVC conduit*)
    - Seeding (ac or SY)
    - Extra SWPPP measures required for in-stream work*
    - Dewatering*
  - Nebraska Department of Transportation (NDOT) Average Unit Prices from the previous fiscal year (Bid Item History & Information - NDOT (nebraska.gov)) shall be used as the basis for established acceptable prices for reimbursement. Unit prices within 15% of the NDOTs shall be considered the approved cost range. Line items with an asterisk (*) are not currently listed in the NDOT's average prices and shall be reviewed independently.

- Develop Construction Documents
  - Construction plans sheets specific to each individual grade control structure that include but are not limited to grading plan views, profiles, cross sections, and relevant details required to accurately convey the design of each structure.
  - Construction specification and/or bid document information that needs to be included due the addition of the grade controls to the construction project:
    - Add specifications for materials that were otherwise not included in the project
    - If the specifications do not already include a Performance Bond, one is required for the grade control structures. An example is included in Performance Bond - Appendix C.
  - Bid forms and pay applications
    - Must have separate line items for all grade control materials, even if duplicating materials already used on the project, with no lump sum or each units.
    - Line items labeled with Grade Control pre-curser (i.e. GRADE CONTROL – TYPE "B" ROCK RIPRAP)

2.3 Project Close Out Phase

Construction costs for grade stabilization structure installed by developer are reimbursable as long as the procedures are followed.

- Execute and Record Maintenance and Easement Agreement

  The Maintenance Agreement - Appendix C and associated exhibits shall be finalized, approved by the local jurisdiction, and recorded with the Register of Deeds.

- Acceptance of Public Improvements

  Upon construction completion, the grade control structures need to be inspected and shall be certified by a licensed professional engineer registered in the State of Nebraska. The following documents shall be provided:

  - Request inspection walk through with local jurisdiction and obtain Letter of Acceptance.
  - Complete Grade Control Certification Form – Appendix C
  - Develop Record Drawings – plan sheets specific to grade control structures with "As-Built" stamp, date, and name of engineer. Any change in function must be verified and documented within the as-builts.

- Project Reimbursement Request

  Once the public improvements have been accepted, provide the following items in an electronic submittal to the Papio-Missouri River Natural Resources District via the Southern Sarpy Watersheds Partnership website:

  Grade Control Reimbursement Request – Southern Sarpy Watersheds Partnership (https://southernsarpy.org/grade-control-reimbursement-request)

  Required attachments include:

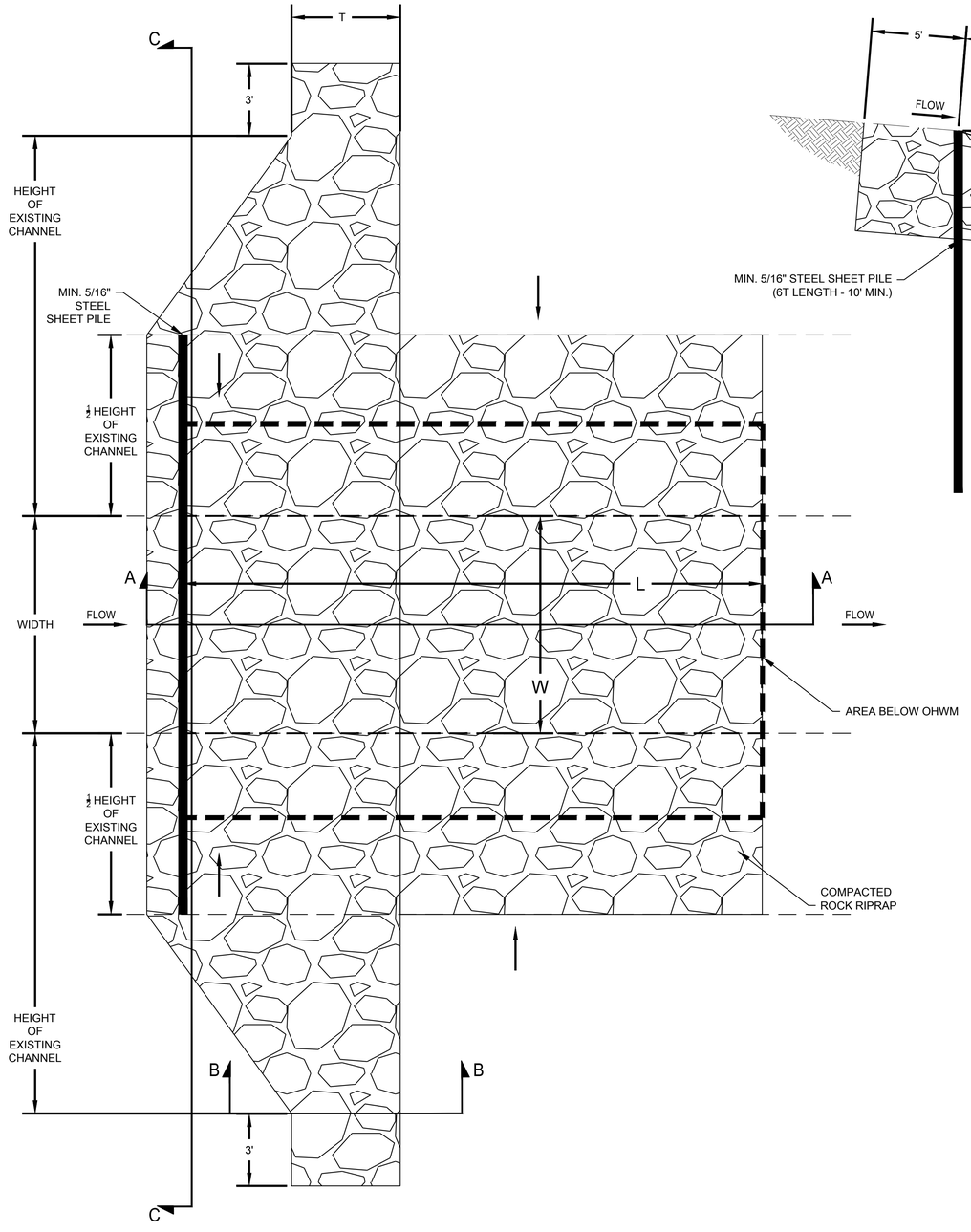
  - Letter of Acceptance from local jurisdiction
  - Executed versions of Maintenance Agreement
  - Signed Grade Control Certification Form and Photolog
  - Record Drawings
  - Final Pay Application

DESIGN GUIDANCE

APPENDIX A

DESIGN TEMPLATES

- Rock Riprap Riffle with Sheet Pile
- Rock Slab Drop Structure
- Grouted Boulder Drop Structure



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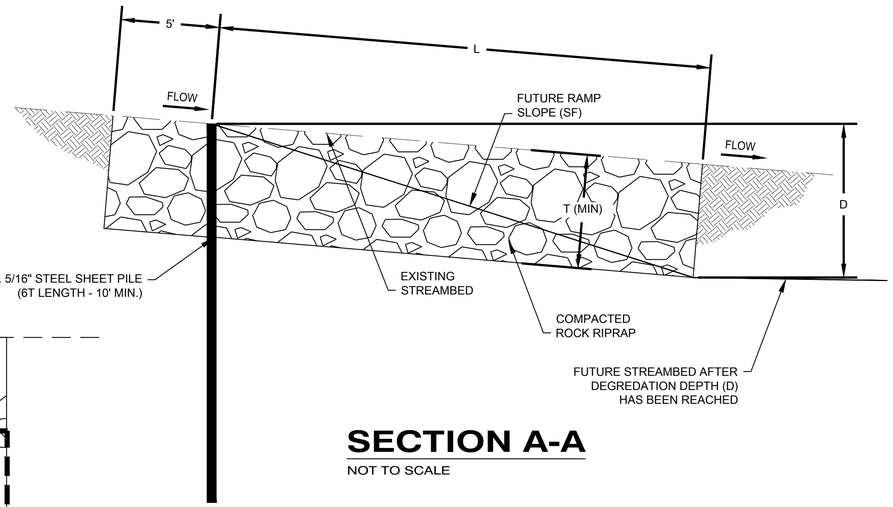

SECTION A-A

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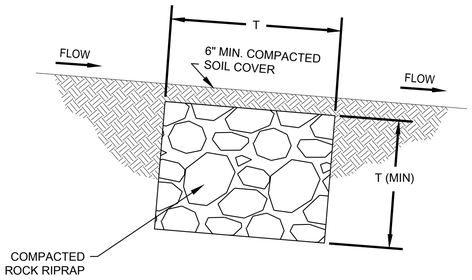

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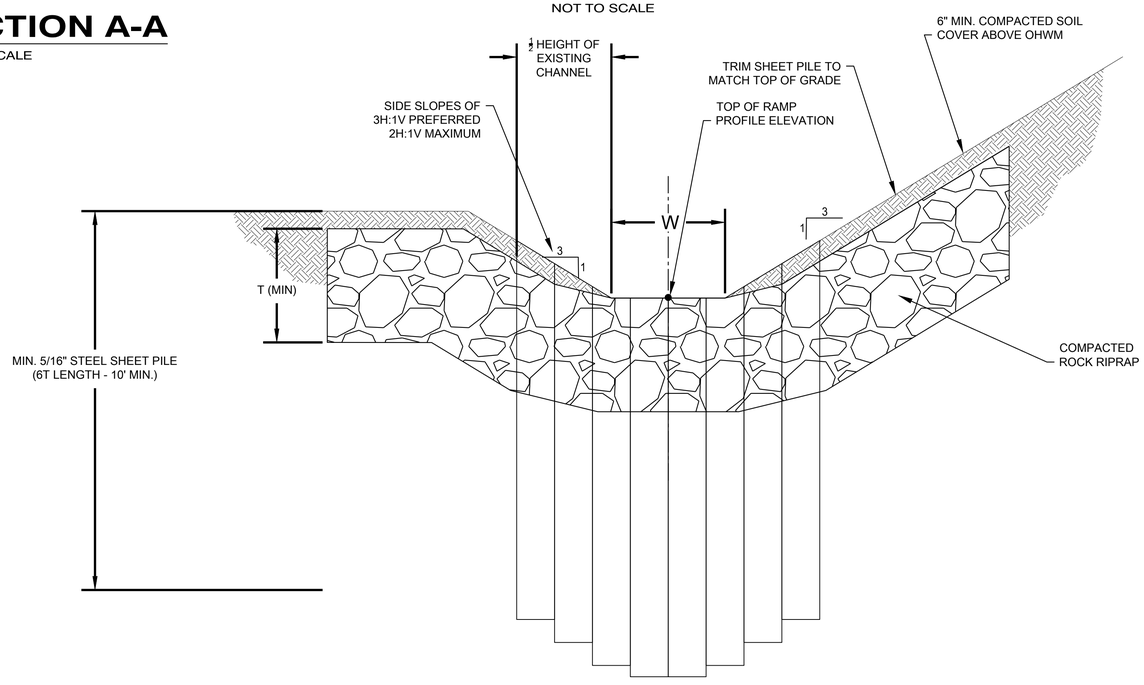

SECTION C-C

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REVISIONS	ROCK RIPRAP RAMP WITH SHEET PILE	SOUTHERN SARPY WATERSHEDS PARTNERSHIP IN-STREAM GRADE CONTROL STRUCTURES	ISSUE DATE 11/1/2023 DESIGN BY JLG DRAWN BY JLG
			SHEET GC-01

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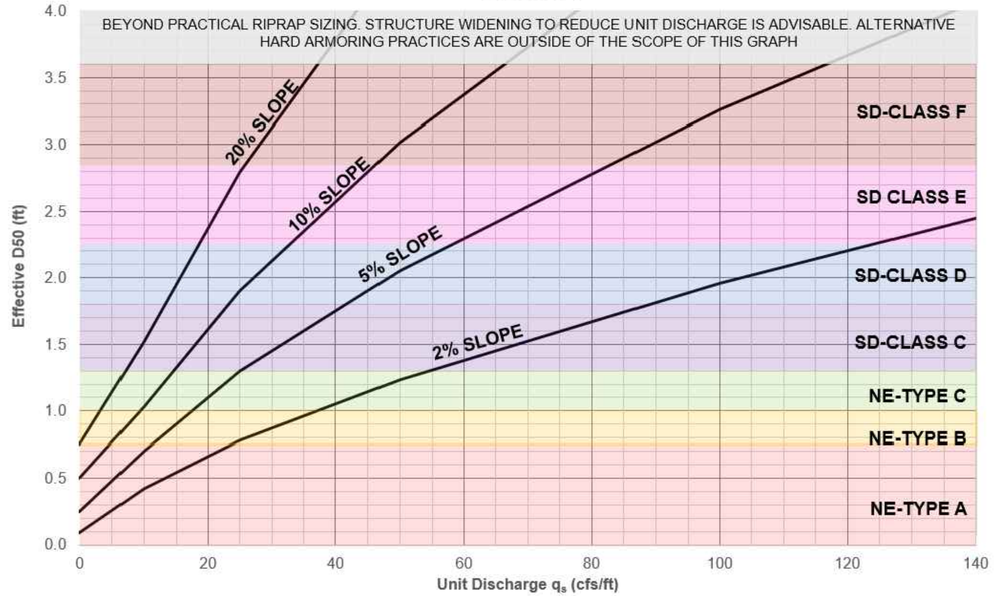
NOTES:

1. DIMENSION DEFINITIONS
   - 1.1 "W" EQUALS THE WIDTH OF THE ROCK RAMP BOTTOM. RAMP WIDTH DOES NOT HAVE TO EQUAL EXISTING CHANNEL WIDTH. "W" MAY NEED TO INCREASE TO CREATE STABLE ROCK CONDITIONS
   - 1.2 "L" EQUALS LENGTH OF ROCK RIPRAP RAMP
   - 1.3 "D" EQUALS FUTURE DEGRADATION DEPTH AS DETERMINED WHEN IDENTIFYING STRUCTURE LOCATIONS
   - 1.4 "S_F" EQUALS THE FUTURE SLOPE OF THE ROCK RIPRAP RAMP
   - 1.5 "T" EQUALS THE MINIMUM ROCK RIPRAP LAYER THICKNESS

2. DESIGN DIMENSIONS AND ROCK SIZING
   - 2.1 ITERATIVE PROCESS TO ESTABLISH STABLE ROCK CONDITIONS
     - A. SELECT DESIGN "W"
     - B. SELECT DESIGN "L"
     - C. CALCULATE "S_F" AS A FUNCTION OF "L" AND "D"
     - D. DETEREMINE STABLE ROCK SIZE (D50) USING SELECTED DESIGN DIMENSIONS AND FUTURE SLOPE OF RAMP PER GUIDANCE IN NOTE 2.2.
     - E. ITERATE UNTIL STABLE CONDITIONS ARE REACHED FOR THE ROCK RIPRAP SIZE THAT WILL BE SPECIFIED FOR THE DESIGN
   - 2.2 ROCK RIPRAP SHALL BE SIZED USING US ARMY CORPS OF ENGINEERS EM-1110-2-1601: HYDRAULIC DESIGN OF FLOOD CONTROL CHANNELS MANUAL (USACE EM-1110-2-1601) FOR THE DESIGN DISCHARGE (Q).
     - A. FIGURE 1 WAS DEVELOPED FROM EQUATION 3-5 IN USACE EM-1110-2-1601 AND CAN BE USED TO DETERMINE STABLE ROCK FOR THE ROCK RIPRAP RAMP DESIGN TEMPLATE ONLY.
     - B. FIGURE 1 DOES NOT ACCOUNT FOR TAILWATER CONDITIONS. IF TAILWATER IS CONSIDERED, MORE FREQUENT RECURRENCE INTERVALS (10-, 25- AND 50-YR) NEED TO BE ASSESSED TO DETERMINE IF THE DESIGN DISCHARGE (Q) IS GREATER FOR EVENTS LESS THAN THE 100-YR WITH LESSER TAILWATER CONDITIONS. PROVIDE CALCULATIONS IN DESIGN REPORT.
     - C. IF FIGURE 1 IS NOT USED, USE METHODS IN USACE EM-1110-2-1601 AND PROVIDE CALCULATIONS FOR ROCK SIZING IN DESIGN REPORT.
3. DEFINING "T"
   - 3.1. "T" SHALL BE 2 TIMES THE D50
   - 3.2. "T" SHALL NOT BE LESS THAN 1-FT.
   - 3.3 "T" SHALL BE INCREASED BY 50% WHEN THE RIPRAP IS PLACED IN UNDERWATER CONDITIONS TO COMPENSATE FOR UNCERTAINTIES ASSOCIATED WITH THIS PLACEMENT CONDITION.
4. ROCK RIPRAP MATERIALS
   - 4.1. ALL RIPRAP, INCLUDING BROKEN CONCRETE, MUST MEET THE SIZING REQUIREMENTS DETERMINED ABOVE AND MUST BE ACCEPTABLE MATERIAL, FREE OF PROTRUDING REINFORCING STEEL OR WIRE MESH OR OTHER CONSTRUCTION DEBRIS (I.E. LATHE, PLASTER, ASPHALT, SCRAP IRON, ETC.) AND FROM A NON-STREAMBED SOURCE
   - 4.2. ANY MATERIAL USED SHALL BE REASONABLY WELL-GRADED MATERIAL TO CREATE A DENSE EROSION RESISTANT STRUCTURE.
   - 4.3. THE MATERIAL SHALL BE ANGULAR IN SHAPE. NO MORE THAN 30% OF THE MATERIAL SHALL HAVE THE MAXIMUM DIMENSION MORE THAN 2.5 TIMES THE MINIMUM DIMENSION AND NO MATERIAL SHALL HAVE THE MAXIMUM DIMENSION MORE THAN 3.5 TIMES THE MINIMUM.
   - 4.4. RIPRAP MATERIALS SHOULD HAVE THE FOLLOWING PROPERTIES
     - A. BULK SPECIFIC GRAVITY (SATURATED SURFACE-DRY BASIS) NOT LESS THAN 2.5 AS DETERMINED BY ASTM C127
     - B. ABSORPTION NOT MORE THAN 2% AS DETERMINED BY ASTM C127
     - C. SOUNDLESS LOSS NO GREATER THAN 10% IN 20 FREEZE AND THAWING CYCLES IN ACCORDANCE WITH COE CRD-C144 AND THE COMBINED LOSS OF SOUNDESS IN MAGNESIUM SULFATE AT 5 CYCLES SHALL NOT EXCEED 12% IN ACCORDANCE WITH ASTM C88.
5. THE RIPRAP SHALL BE COVERED ON THE BANKS WITH A MINIMUM OF 6-INCHES OF SOIL COMPACTED INTO THE VOIDS OF THE RIPRAP AND IMMEDIATELY SEEDED WITH AN ANNUAL COVER CROP AND A MIXTURE OF NATIVE GRASS SPECIES.
6. ALL EXCAVATED MATERIALS SHALL BE PLACED ON AN UPLAND SITE ABOVE THE ORDINARY HIGH WATER MARK IN A CONFINED AREA, NOT CLASSIFIED AS A WETLAND, TO PREVENT THE RETURN OF SUCH MATERIALS TO THE WATERWAY. ALL CONSTRUCTION DEBRIS SHALL BE DISPOSED OF IN UPLANDS IN SUCH A MANNER THAT IT CANNOT ENTER A WATERWAY OR WETLAND.
7. MINIMUM STEEL SHEET PILE THICKNESS IS 5/16". THE 5/16" TOTAL THICKNESS REPRESENTS A MINIMUM DESIGN THICKNESS OF 1/4" + 1/16" SACRIFICIAL THICKNESS FOR CORROSION CONTROL. SEE US ARMY CORPS OF ENGINEERS ETL 1110-2-584: DESIGN OF HYDRAULIC STEEL STRUCTURES FOR ADDITIONAL GUIDANCE.

Parameters – provide values per structure on detail sheets	Unit	Value
Design Event Peak Flow (Q)	cfs	
Channel X-Sectional Area	ft2	
Future Degradation Depth (D)	ft	
Future Grade Control Slope (SF)	ft/ft	
Grade Control Width (W)	ft	
Grade Control Length (L)	ft	
Design Velocity or Unit Discharge	ft/s or cfs/ft	
Riprap Size, D50 Weight	lbs	
Riprap Classification (indicate Nebraska or South Dakota specification)	--	

FIGURE 1



DIRECTIONS FOR FIGURE 1:

i. PER USACE EM-1110-2-1601:

q=Q/W.

q = UNIT DISCHARGE (CFS/FT)

Q = 100-YR FLOW RATE (CFS)

W = RAMP BOTTOM WIDTH (FT)

THIS METHOD MAY RESULT IN OVERESTIMATED ROCK SIZES FOR HIGHER DISCHARGE RATES. REFINE q BY REPLACING WITH q_S PER BELOW.

ii. USE q_S EQUATION TO REFINE THE UNIT DISCHARGE. VARIABLE q_S IS AN APPROXIMATION OF THE UNIT DISCHARGE WITH AN ESTIMATED ERROR WITHIN BOUND OF GRAPH IS +/- 10%. EQUATION ONLY APPLIES TO DESIGNS COMPLIENT WITH STANDARD TEMPLATES PROVIDED. UNIT DISCHARGE VALUE MAY ALSO BE EXTRACTED FROM MODELING SOFTWARE. DOCUMENT ALTERNATIVE METHODS IF USED.

$$q_s = \frac{Q}{W * \sqrt{\frac{W + 6Y}{W}}}$$

q_S = APPROXIMATED UNIT DISCHARGE (CFS/FT)

Q = 100-YR FLOW RATE (CFS)

W = RAMP BOTTOM WIDTH (FT)

Y = 100-YR FLOW DEPTH (FT)

iii. Y TO BE CALCULATED USING MANNING'S EQUATION OR MODELING SOFTWARE.

iv. USE GRAPH TO IDENTIFY ACCEPTABLE D50 AND ROCK CLASSIFICATION FOR SPECIFICATIONS. USE SLOPE LINE OR INTERPOLATE BETWEEN SLOPE LINES THAT REPRESENT FUTURE RAMP SLOPE CONDITIONS (S_F).

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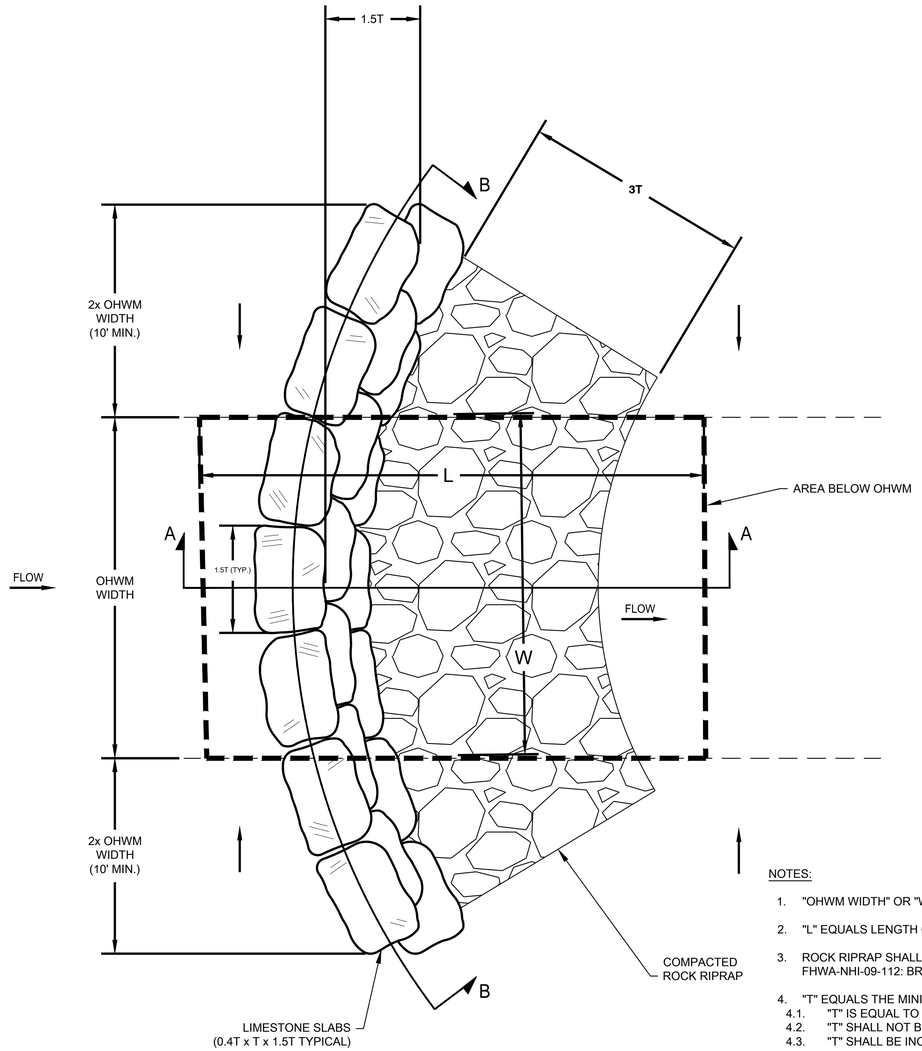

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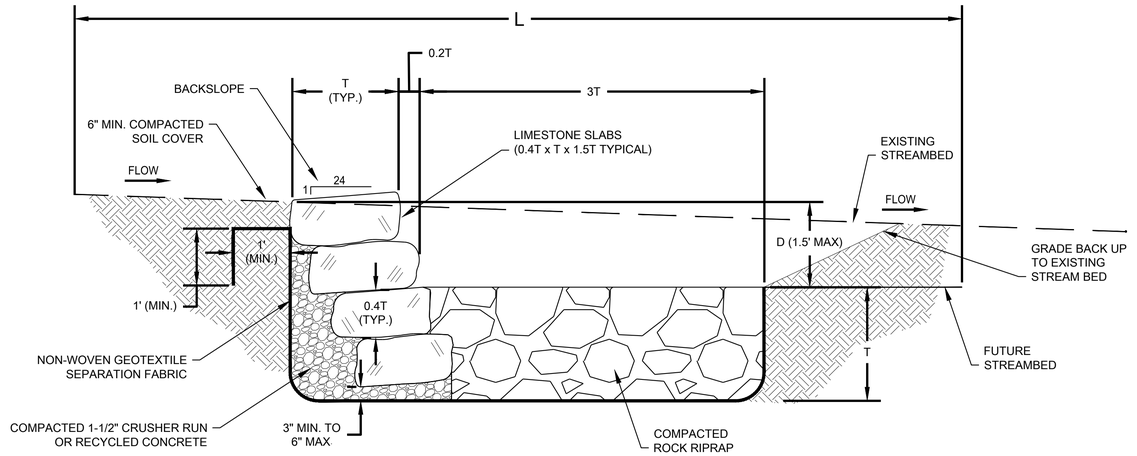

SECTION A-A

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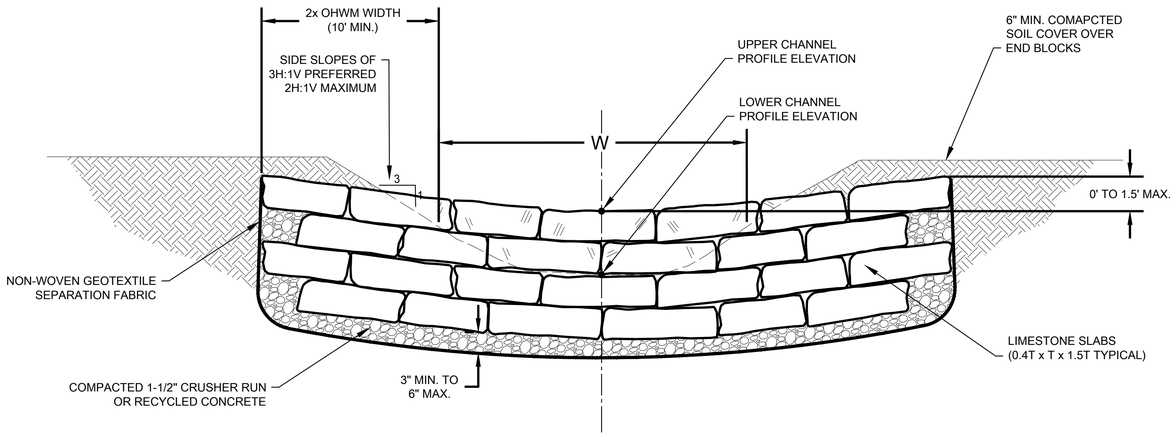

SECTION B-B

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NOTES:

1. "OHWM WIDTH" OR "W" EQUALS THE WIDTH OF THE ORDINARY HIGH WATER MARK OF THE STREAM.
2. "L" EQUALS LENGTH OF ROCK RIPRAP NEEDED ON STREAM LENGTH AND IS A COMPONENT OF FUTURE CONDITION SLOPE.
3. ROCK RIPRAP SHALL BE SIZED USING EQUATION 3-3 FROM US ARMY CORPS OF ENGINEERS EM-1110-2-1601: HYDRAULIC DESIGN OF FLOOD CONTROL CHANNELS MANUAL OR EQUATION 4.1 FROM THE FHWA-NHI-09-112: BRIDGE SCOUR AND STREAM INSTABILITY COUNTERMEASURES MANUAL.
4. "T" EQUALS THE MINIMUM ROCK RIPRAP LAYER THICKNESS.
   - 4.1. "T" IS EQUAL TO THE SPHERICAL DIAMETER D50 OF THE STONE.
   - 4.2. "T" SHALL NOT BE LESS THAN 1-FT.
   - 4.3. "T" SHALL BE INCREASED BY 50% WHEN THE RIPRAP IS PLACED IN UNDERWATER CONDITIONS TO COMPENSATE FOR UNCERTAINTIES ASSOCIATED WITH THIS PLACEMENT CONDITION.
5. IF USING ANY RIPRAP OTHER THAN QUARRY FRADED/SIZED ROCK RIPRAP, THE FOLLOWING CONDITIONS WILL APPLY:
   - 5.1. ALL RIPRAP, INCLUDING BROKEN CONCRETE, MUST MEET THE SIZING REQUIREMENTS DETERMINED ABOVE AND MUST BE ACCEPTABLE MATERIAL, FREE OF PROTRUDING REINFORCING STEEL OR WIRE MESH OR OTHER CONSTRUCTION DEBRIS (I.E. LATHE, PLASTER, ASPHALT, SCRAP IRON, ETC.) AND FROM A NON-STREAMBED SOURCE.
   - 5.2. ANY MATERIAL USED SHALL BE REASONABLY WELL-GRADED MATERIAL TO CREATE A DENSE EROSION RESISTANT STRUCTURE.
   - 5.3. THE MATERIAL SHALL BE ANGULAR IN SHAPE. NO MORE THAN 30% OF THE MATERIAL SHALL HAVE THE MAXIMUM DIMENSION MORE THAN 2.5 TIMES THE MINIMUM DIMENSION AND NO MATERIAL SHALL HAVE THE MAXIMUM DIMENSION MORE THAN 3.5 TIMES THE MINIMUM.
   - 5.4. THE TOP ELEVATION OF THE RIPRAP SHALL NOT EXCEED THE TOP ELEVATION OF THE BANK.
6. THE RIPRAP SHALL BE COVERED, FROM THE TOP OF THE STRUCTURE DOWN TO THE ORDINARY HIGH WATER MARK, WITH A MINIMUM OF 6-INCHES OF SOIL COMPACTED INTO THE VOIDS OF THE RIPRAP AND IMMEDIATELY SEEDED WITH AN ANNUAL COVER CROP AND A MIXTURE OF NATIVE GRASS SPECIES.
7. ALL DREDGED OR EXCAVATED MATERIALS SHALL BE PLACED ON AN UPLAND SITE ABOVE THE ORDINARY HIGH WATER MARK IN A CONFINED AREA, NOT CLASSIFIED AS A WETLAND, TO PREVENT THE RETURN OF SUCH MATERIALS TO THE WATERWAY. ALL CONSTRUCTION DEBRIS SHALL BE DISPOSED OF IN UPLANDS IN SUCH A MANNER THAT IT CANNOT ENTER A WATERWAY OR WETLAND.
8. MINIMUM STEEL SHEET PILE THICKNESS IS 5/16". THE 5/16" TOTAL THICKNESS REPRESENTS A MINIMUM DESIGN THICKNESS OF 1/4" + 1/16" SACRIFICAL THICKNESS FOR CORROSION CONTROL. SEE US ARMY CORPS OF ENGINEERS ETL 1110-2-584: DESIGN OF HYDRAULIC STEEL STRUCTURES FOR ADDITIONAL GUIDANCE.

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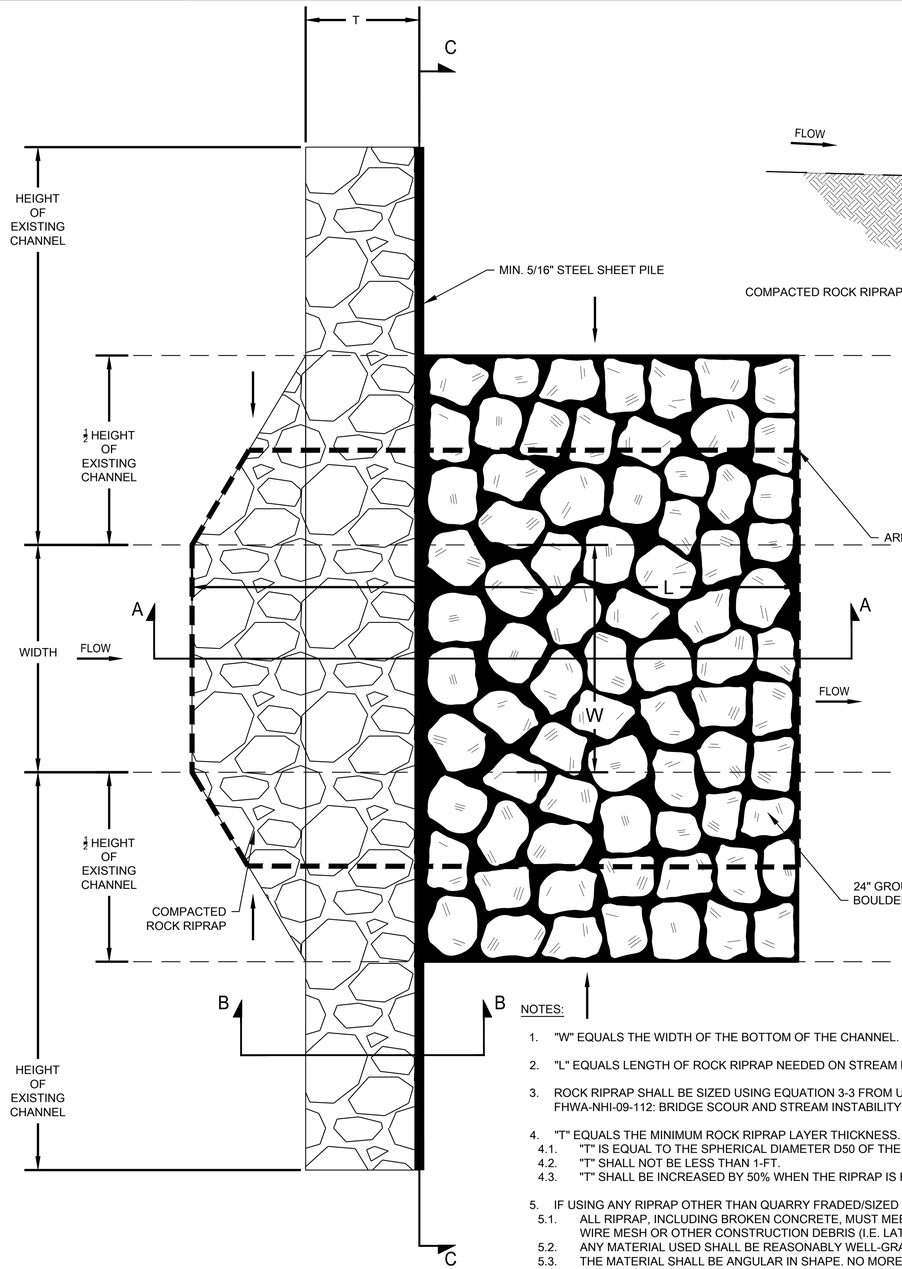

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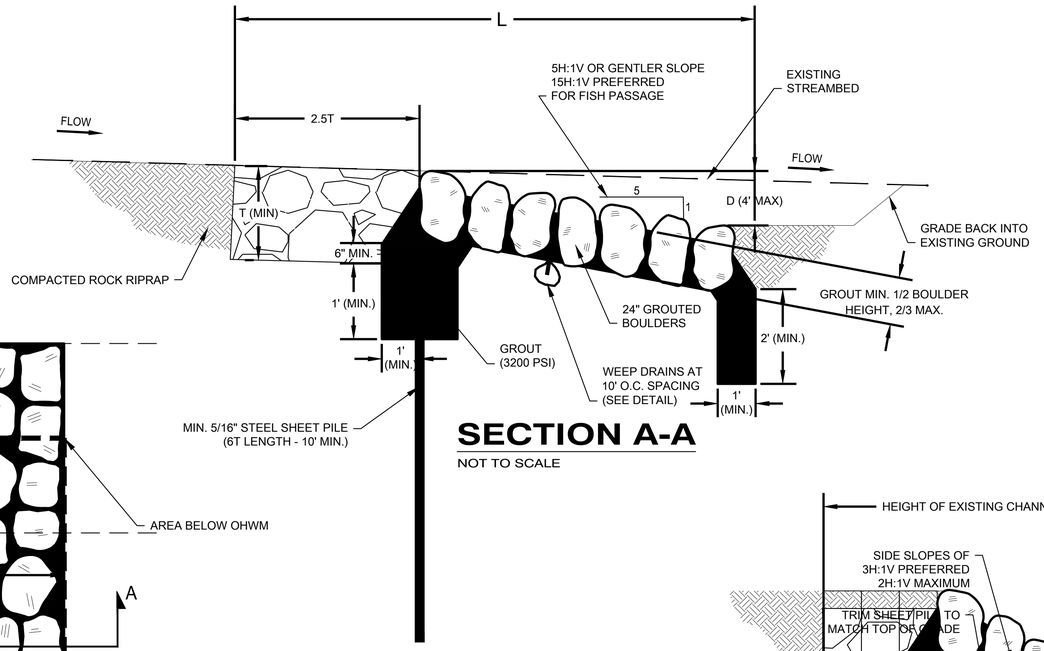

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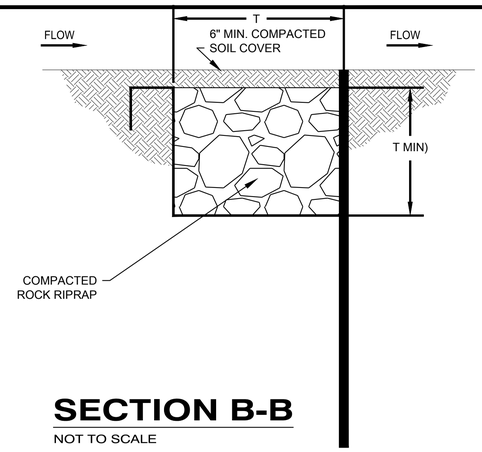

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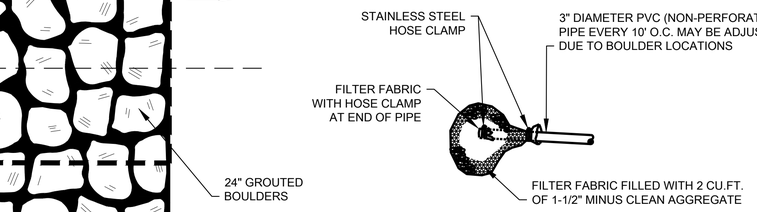
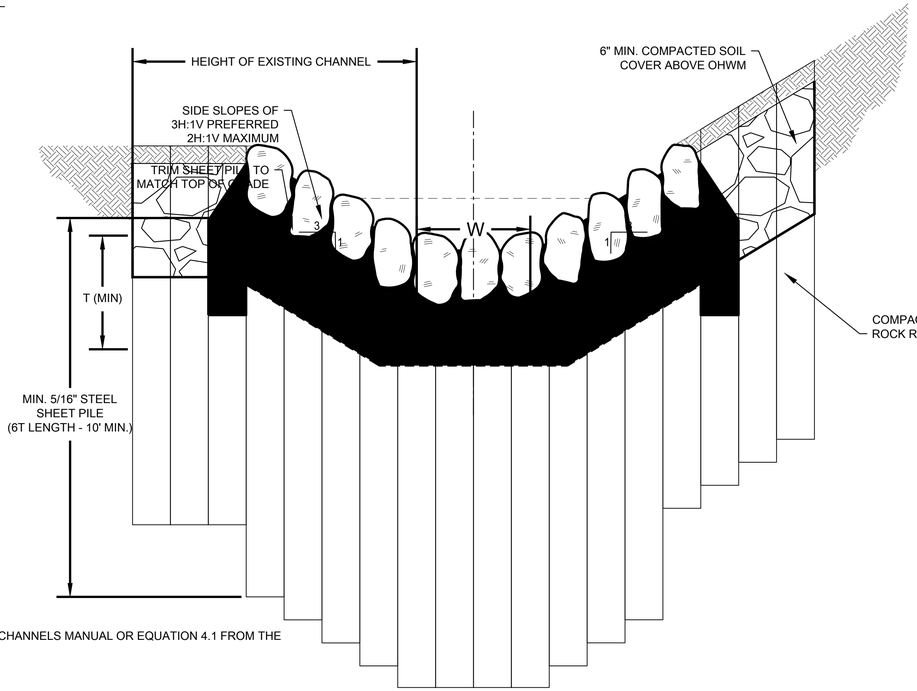


WEEP DRAIN DETAIL

NOT TO SCALE



SECTION C-C

NOT TO SCALE

NOTES:

1. "W" EQUALS THE WIDTH OF THE BOTTOM OF THE CHANNEL.
2. "L" EQUALS LENGTH OF ROCK RIPRAP NEEDED ON STREAM LENGTH AND IS A COMPONENT OF FUTURE CONDITION SLOPE.
3. ROCK RIPRAP SHALL BE SIZED USING EQUATION 3-3 FROM US ARMY CORPS OF ENGINEERS EM-1110-2-1601: HYDRAULIC DESIGN OF FLOOD CONTROL CHANNELS MANUAL OR EQUATION 4.1 FROM THE FHWA-NHI-09-112: BRIDGE SCOUR AND STREAM INSTABILITY COUNTERMEASURES MANUAL.
4. "T" EQUALS THE MINIMUM ROCK RIPRAP LAYER THICKNESS.
   - 4.1. "T" IS EQUAL TO THE SPHERICAL DIAMETER D50 OF THE STONE.
   - 4.2. "T" SHALL NOT BE LESS THAN 1-FT.
   - 4.3. "T" SHALL BE INCREASED BY 50% WHEN THE RIPRAP IS PLACED IN UNDERWATER CONDITIONS TO COMPENSATE FOR UNCERTAINTIES ASSOCIATED WITH THIS PLACEMENT CONDITION.
5. IF USING ANY RIPRAP OTHER THAN QUARRY FRADED/SIZED ROCK RIPRAP, THE FOLLOWING CONDITIONS WILL APPLY:
   - 5.1. ALL RIPRAP, INCLUDING BROKEN CONCRETE, MUST MEET THE SIZING REQUIREMENTS DETERMINED ABOVE AND MUST BE ACCEPTABLE MATERIAL, FREE OF PROTRUDING REINFORCING STEEL OR WIRE MESH OR OTHER CONSTRUCTION DEBRIS (I.E. LATHE, PLASTER, ASPHALT, SCRAP IRON, ETC.) AND FROM A NON-STREAMBED SOURCE.
   - 5.2. ANY MATERIAL USED SHALL BE REASONABLY WELL-GRADED MATERIAL TO CREATE A DENSE EROSION RESISTANT STRUCTURE.
   - 5.3. THE MATERIAL SHALL BE ANGULAR IN SHAPE. NO MORE THAN 30% OF THE MATERIAL SHALL HAVE THE MAXIMUM DIMENSION MORE THAN 2.5 TIMES THE MINIMUM DIMENSION AND NO MATERIAL SHALL HAVE THE MAXIMUM DIMENSION MORE THAN 3.5 TIMES THE MINIMUM.
   - 5.4. THE TOP ELEVATION OF THE RIPRAP SHALL NOT EXCEED THE TOP ELEVATION OF THE BANK.
6. THE RIPRAP SHALL BE COVERED, FROM THE TOP OF THE STRUCTURE DOWN TO THE ORDINARY HIGH WATER MARK, WITH A MINIMUM OF 6-INCHES OF SOIL COMPACTED INTO THE VOIDS OF THE RIPRAP AND IMMEDIATELY SEEDED WITH AN ANNUAL COVER CROP AND A MIXTURE OF NATIVE GRASS SPECIES.
7. ALL DREDGED OR EXCAVATED MATERIALS SHALL BE PLACED ON AN UPLAND SITE ABOVE THE ORDINARY HIGH WATER MARK IN A CONFINED AREA, NOT CLASSIFIED AS A WETLAND, TO PREVENT THE RETURN OF SUCH MATERIALS TO THE WATERWAY. ALL CONSTRUCTION DEBRIS SHALL BE DISPOSED OF IN UPLANDS IN SUCH A MANNER THAT IT CANNOT ENTER A WATERWAY OR WETLAND.
8. MINIMUM STEEL SHEET PILE THICKNESS IS 5/16". THE 5/16" TOTAL THICKNESS REPRESENTS A MINIMUM DESIGN THICKNESS OF 1/4" + 1/16" SACRIFICAL THICKNESS FOR CORROSION CONTROL. SEE US ARMY CORPS OF ENGINEERS ETL 1110-2-584: DESIGN OF HYDRAULIC STEEL STRUCTURES FOR ADDITIONAL GUIDANCE.

REVISIONS

GROUTED BOULDER DROP STRUCTURE

SOUTHERN SARPY WATERSHEDS PARTNERSHIP
IN-STREAM GRADE CONTROL STRUCTURES

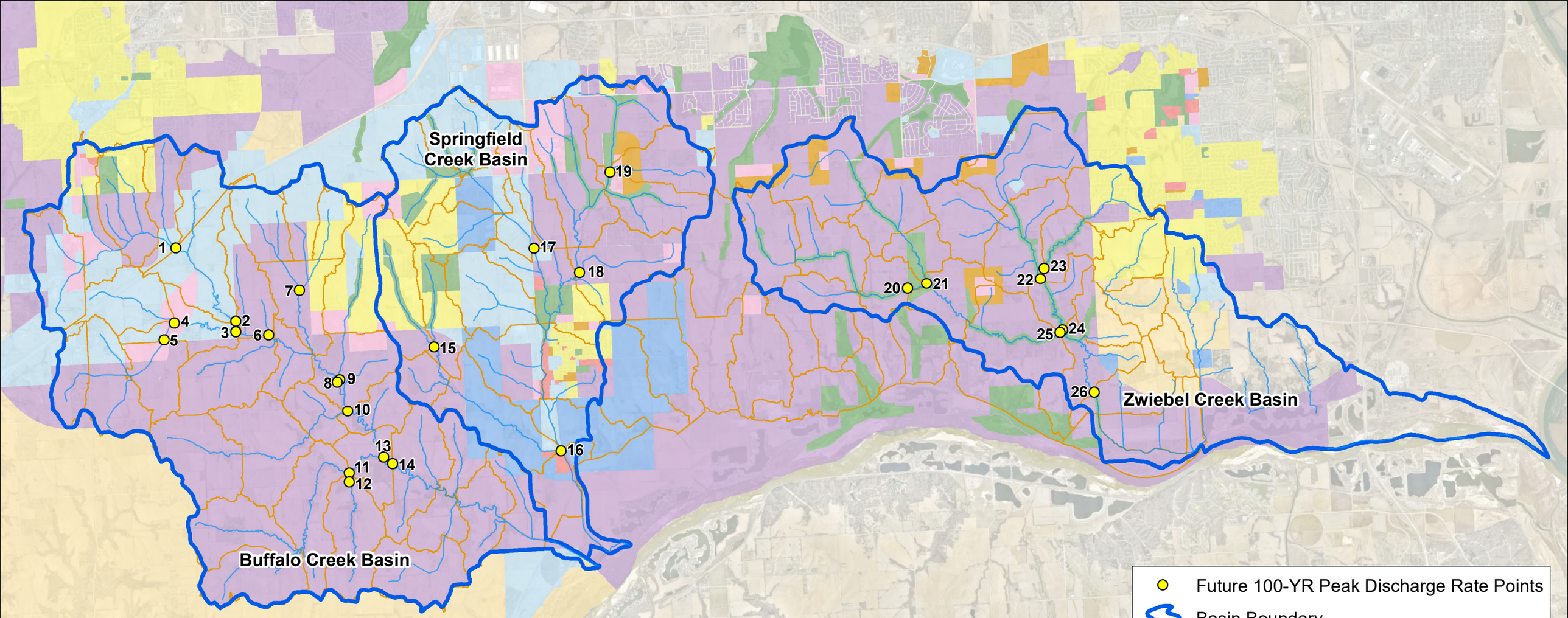
ISSUE DATE 11/1/2023
DESIGN BY JLG
DRAWN BY JLG

SHEET GC-04

FILENAME: H:\PPRA\Projects\Projects\001-16-03\DWG\PCWP permitting Structures\Grade_Control_Structures Updated.dwg
DATE PLOTTED: 11/2/2023 1:50 PM DRAWN BY: XXX PLOT SCALE: 1:1

APPENDIX A

DESIGN DISCHARGE RATE APPROXIMATIONS FIGURE



BUFFALO CREEK BASIN		
Discharge Point	Future 100-YR Peak Flow (cfs)	Storm Size (sq mi.)
1	4,203.0	10
2	4,696.3	30
3	4,096.2	10
4	4,131.5	10
5	2,932.3	10
6	11,164.6	30
7	1,976.2	10
8	14,862.8	50
9	1,033.6	10
10	3,412.5	10
11	4,944.9	10
12	1,243.1	10
13	23,163.3	50
14	23,337.4	50

SPRINGFIELD CREEK BASIN (Plus Turtle Creek)		
Discharge Point	Future 100-YR Peak Flow (cfs)	Storm Size (sq mi.)
15	858.4	10
16	2,797.2	10
17	3,871.2	10
18	4,662.5	10
19	2,225.3	10

ZWIEBEL CREEK BASIN		
Discharge Point	Future 100-YR Peak Flow (cfs)	Storm Size (sq mi.)
20	2,681.5	10
21	3,114.3	10
22	4,132.0	10
23	1,907.1	10
24	5,589.2	30
25	7,737.5	30
26	14,205.3	30

SECTION 404 PERMIT GUIDANCE

Application Guide for Department of the Army Permit to include Southern Sarpy Watersheds Partnership (SSWP) In-Stream Grade Control Structure(s)

Contents

This document was adapted for the Southern Sarpy Watersheds Partnership from the Papillion Creek Watershed Partnership Application Guide developed by HDR.

Purpose of Application Guide

The purpose of this Department of the Army Permit Guide is to provide Applicants information on typical in-stream grade control structures that could be used for a stand-alone Section 404 of the Clean Water Act permit (permit) application or as part of a permit application that includes other project related activities that may require a permit authorization. The three in-stream grade control structures included in this application guide are 1) rock riprap ramp with sheet pile, 2) rock slab drop, and 3) grouted boulder drop structure.

This application guide is intended to serve as the basis for either a General Permit (in the form of a Nationwide Permit) or an Individual Permit. Information on these permit types can be found at the end of this application guide. The Section 404 Application Template Form may be incorporated into Eng Form 6082 for a Nationwide permit or 4345 for an Individual Permit. Please refer to the U.S. Army Corps of Engineers Regulatory Program and Permits (https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/Obtain-a-Permit/). The Instructions provide details regarding information needed for each of the numbered blocks within each part. Guidance to permit other waters of the US under either a Nationwide or Individual Permit, outside of the in-stream grade control structures are not specifically addressed in this application guide.

In-stream grade control structure templates for each of the three types are provided in Appendix A of the Grade Control Implementation Guidance Document for the Southern Sarpy Watersheds Management Plan. These templates are referenced within the instructions to the application guide. Attachment B provides an example of an impact table. Attachment C provides additional information on General Permits and Individual Permits.

Section 404 Permit Application Template Form for In-Stream Grade Control Structure(s)

Part I: Project Information

1. Project Name or Title							
2. Applicant's Name				**5. Authorized Agent's Name and Title (agent is not required)**			
First	Middle	Last		First	Middle	Last	
Company:				Company:			
Company Title:				Company Title:			
E-mail Address:				E-mail Address:			
3. Applicant's Address				**6. Agent's Address**			
Address				Address			
City	State	Zip	Country	City	State	Zip	Country
4. Applicant's Phone Nos. with Area Code				**7. Agent's Phone Nos. with Area Code**			
Business		Mobile		Business		Mobile	

8. Statement of Authorization

I hereby authorize,_____to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this application.

SIGNATURE OF APPLICANT	DATE

9. Name of Waterbody, If Known *(if applicable)*				**10. Proposed Activity Street Address** *(if applicable)*		
11. Location of Proposed Activity (see instructions)				City	State	Zip
Latitude	°N	Longitude	°W			
12. Other Location Descriptions, If Known (see instructions)						
State Tax Parcel ID				Municipality		
Section		Township		Range		
13. Directions to the Site						
14. Names of adjoining property owner, lessee, etc. whose property adjoins the project site (applicable for individual permits)						

15. Identify the Specific Nationwide Permit(s) you proposed to use or an Individual Permit
16. Description of Proposed Activity
17. Purpose of Permit Activity

Part II: Alternatives Analysis

18. Alternatives Analysis (applicable for Individual Permit applications)

Part III: Impacts and Mitigation

19. Quantity of Wetlands, Streams, or Other Types of Waters Directly Affected by Proposed Activity (see instructions)		
Acres	Linear Feet	Cubic Yards Dredge or Discharged

Each Application must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site.
20. Describe All Impact Minimization Measures implemented as part of the Activity.
21. If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and/ or 3/100-acre of waterways, explain how the compensatory mitigation requirement will be satisfied, or explain why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required for the proposed activity. Identify if Nebraska Stream Condition Assessment Procedures (NeSCAP) have been applied to identify if stream mitigation will be required and if so, describe how stream mitigation will be accomplished.

22. Is any portion of the Permit activity already complete?		YES		NO	If Yes, describe the completed work:

23. List the name(s) of any species listed as endangered or threatened under the Endangered Species Act that might be affected by the proposed activity
24. List any historic properties that have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property or properties
25. If the proposed activity also requires permission from the USACE pursuant to 33 United States Code [U.S.C.] 408 because it will alter or temporarily or permanently occupy or use a USACE federally authorized civil works project, have you submitted a written request for Section 408 permission from the USACE district having jurisdiction over that project?

	YES		NO	If "Yes", please provide the date your request was submitted to the USACE District.	

Part IV: Permit Application Certification

Application is hereby made for permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Signature of Applicant	Date	Signature of Agent	Date

The application must be signed by the person who desires to undertake the proposed activity (applicant), and if the statement in Block 5 has been filled out and signed, the authorized agent.

18 U.S.C Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious, or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Part V: Attachments

Include the following attachments:

- Project Vicinity Map
- Design Drawings (see template for In-Stream Grade Control Structures)
    - To-scale plan view drawing(s)
    - To-scale elevation and / or cross section drawing(s)
- Figures showing impacts on waters of the US
- Wetland Delineation Report
- Compensatory Mitigation Plan
- Federally Threatened or Endangered Species Information
- Historic Properties and Cultural Resources Information

Instructions

Instructions for Preparing a Department of the Army
Section 404 Permit Application

Block 1 Project Name or Title.

Block 2. Applicant's Name. Enter the name and the e-mail address of the responsible party or parties. If the responsible party is an agency, company, corporation, or other organization, indicate the name of the organization and responsible officer and title. If more than one party is associated with the application, please attach a sheet of paper with the necessary information market Block 2.

Block 3. Address of Applicant. Please provide the full address of the party or parties responsible for the application. If more space is needed, attach an extra sheet of paper marked Block 3.

Block 4. Applicant's Phone Number(s) with Area Code. Please provide the telephone number where you can usually be reached during normal business hours.

Blocks 5 through 8. To be completed if an agent is being used for development and coordination of the application.

Block 9. Name of Waterbody. Please provide the name (if it has a name) of any stream, lake, marsh, or other waterway to be directly impacted by the activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 10. Proposed Activity Street Address. If the proposed activity is located at a site having a street address (not a box number), please enter it here.

Block 11. Location of Proposed Activity. Enter the latitude and longitude of where the proposed activity is located. Indicate whether the project location provided is the center of the project or whether the project location is provided as the latitude and longitude for each of the "corners" of the project area requiring evaluation. If there are multiple sites, please list the latitude and longitude of each site (center or corners) on a separate sheet of paper and mark as Block 11.

Block 12. Other Location Descriptions. If available, provide the Tax Parcel Identification number of the site, Section, Township, and Range of the site (if known), and/ or local Municipality where the site is located.

Block 13. Directions to the Site. Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site. You may also provide a description of the location of the proposed activity, such as lot numbers, tract numbers, or you may choose to locate the proposed activity site from a known point (such as the right descending bank of Smith Creek, one mile downstream from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed activity site if known. If there are multiple locations, please indicate directions to each location on a separate sheet of paper and mark as Block 13.

Block 14. Names of adjoining property owner, lessee, etc. whose property adjoins the project site. For Individual Permits only, provide names and full mailing addresses of the adjacent property owners (public and private), lessees, etc., whose property adjoins the waterbody(ies) or aquatic site(s) where the activity is being proposed so that they may be notified of the proposed activity.

Block 15. Identify the specific nationwide permit(s) proposed to use or if an Individual Permit is anticipated. Listing of the current Nationwide Permit(s) can be found on USACE's Regulatory home page.

Block 16. Description of Proposed Activity. Describe the overall activity or project. Give appropriate dimensions of structures. Provide the materials to be used in construction as well as the methods for which the work is to be done. Provide length, width, and height of excavations. The application must include all activities the applicant proposes to undertake that are reasonable related to the project, including temporary construction measures, borrow and disposal sites, access roads, staging and laydown areas, etc. Include a project schedule and other available information that will

assist USACE in a review of the proposed activity or interested parties in evaluating the likely effect of the activity on factors of public interest.

Provide sketches when necessary to show that the proposed activity. Sketches usually clarify the activity and result in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed (that is, a conceptual plan), but do not need to be detailed engineering plans.

IN-STREAM GRADE STABILIZATION STRUCTURE DESCRIPTONS AND DETAIL

The following information is provided for providing the information on in-stream grade stabilization structures individually or as a component of the overall activity.

- Rock Riprap Ramp with Sheet Pile – The Rock Riprap Ramp structure is a buried riprap structure that is constructed at grade with the existing streambed. The buried riprap serves as self-armoring protection from head cuts working their way upstream. The structure will maintain the existing elevation on the upstream end of the structure and allows the rock to adjust into a steeper rock ramp as future streambed degradation lowers the elevation of the downstream end. A sill is incorporated up to the top of the banks that helps redirect high flows into the center of the channel while preventing flanking.

- Rock Slab Drop - Rock Slab Drops are designed to maintain existing stream grade on the upstream end and constructed below grade to depths that will protect against anticipated future degradation. Structures are limestone ledge rock or similar rock and serve as a type of cross vane structure to protect small drops on ephemeral channels. The rock slabs help to redirect flows into the center of the channel while preventing flanking while the downstream rock riprap apron provides protection from downstream scour.

- Grouted Boulder Drop Structure - Grouted Boulder Drop Structures provide robust hard armoring of large drops in stream elevation. Due to the application of high strength grout between the boulders, these structures can provide drops with steeper slopes than loose rock riprap riffles. The large boulders serve as energy dissipation, while the sheet pile weir provides protection against deep head cuts and can protect upstream infrastructure.

A table, such as the following can be used to provide dimensions and material types for in-stream grade control structures. The design templates identify each in-stream grade control structure and related cross-sections (Section A-A, Section B-B, and Section C-C, respectively) that can be used to identify structure dimensions.

XXX Grade Control Structure			
Length, L (measured parallel to stream flow)	Width, W (measured perpendicular to stream flow)	Material Type(s)	T, thickness of fill
Plan View and Section A-A – identify total length	Plan View and Section B-B, or Section C-C – identify width within the Ordinary High Water Mark (OHWM) and total width	See typical details in templates	Section A-A – Identify thickness of fill

Block 17. Purpose of Permit Activity. Describe the purpose and need for the proposed activity. What will it be used for and why? Also include a brief description of any related activities associated with the proposed project. Provide the approximate dates you plan to begin and complete all work.

It is assumed that most permit applications that would utilize/require an in-stream grade control structure would be part of a larger project that would have impacts on waters of the US in addition to those of an in-stream grade control structure. In those instances, the project purpose would need to address the broader purpose of the project.

If the grade control activity is the sole action involving an impact on a waters of the US, the following is example text for use as purpose statement for the in-stream grade control structure(s):

The purpose of the (*enter in-stream grade control structure type(s) here*) Grade Control Structure(s) are to provide a permanent means of prevention existing and future streambed degradation. Streambed degradation is caused by a multitude of factors, including stream bed and bank soil types/characteristics and land use changes and associated changes in runoff volume and velocity. In-stream grade control structures provide a solution that protects further stream degradation and the potential to expose adjacent utilities and potential human safety risks.

The project is needed due to *(insert details documenting the historic stream degradation and anticipated future degradation if grade control measures are not implemented*).

Block 18. Alternatives Analysis. An alternatives analysis is required for Individual Permit Applications. If applicable, describe the alternatives that would meet your overall project purpose in accordance with the Clean Water Act Section 404(b)(1) guidelines to demonstrate the proposed activity represents the least environmentally damaging practicable alternative.

It is assumed that most Individual Permit Applications that would utilize/require an in-stream grade control structure would be part of a larger project that would have impacts to waters of the US in addition to those of an in-stream grade control structure. In those instances, the alternatives analysis would be related to the broader project purpose. The range of alternatives would be project specific.

If the in-stream grade control structure activity is the sole action involving an impact on a waters of the US, the following is example text for use for formulation of an alternatives analysis:

Alternative	**Description**	**Disposition**
XXXXX In-Stream Grade Control Structure	Use corresponding description in Block 16	Meets the project purpose and is practicable. Advance for evaluation for impacts to waters of the US and other environmental consequences
Stream Setbacks (this alternative is included as this is the other option available as part of a development project being reviewed by members of the PCWP)	Restrict development within XXX feet. (utilize stream setback policy for description of setback distance)	Does not meet project purpose of grade control. Dismissed from further analysis.
Upstream Best Management Practices	Implementation of best management practices within the basin upstream of the project area to address the factors that are creating stream degradation. This can include: • Land use changes to more intensive to less intensive (agricultural production to pasture/native grasses) • Riparian buffers • Other?	Meets purpose and need but is not logistically practicable as the applicant does not have the authority to acquire the land necessary to implement best management practices. Additionally, not logistically practicable as this alternative is not currently an option available as part of the PCWP policies.

Block 19. Quantity of Wetlands, Streams, or Other Types of Waters Directly Affected by the Proposed Activity. For discharges of dredged or fill material into waters of the United States, provide the amount of wetlands, streams, or other types of waters filled, flooded, excavated, or drained by the proposed activity. For structures or work in navigable waters of the United States subject to Section 10 of the Rivers and Harbors Act of 1899, provide the amount of navigable waters filled, dredged, or occupied by one or more structures (e.g., aids to navigation, mooring buoys) by the proposed activity.

The design templates and table provided in **Attachment B** provides information of how impacts should be shown and described for In-stream Grade Control Structures.

A wetland delineation performed in accordance with the *1987 Wetland Delineation Manual* and Midwest Regional Supplement is needed (refer to USACE Regulatory Programs and Permits (https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/reg_supp/). Other Waters of the U.S., such as streams, also need to be identified. Refer to guidance from the USACE Engineer Research and Development Center and Design Ordinary High Water Mark (OHWM) Research, Development, and Training (https://www.erdc.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/486085/ordinary-high-water-mark-ohwm-research-development-and-training/). In addition, based on coordination with the USACE Nebraska Regulatory Office, data should be collected for implementation of the Nebraska Stream Condition Assessment Procedure (NeSCAP). Refer to the USACE Nebraska Regulatory website for wetland mitigation (https://www.nwo.usace.army.mil/Missions/Regulatory-Program/Nebraska/Mitigation/).

Block 20. Describe All Impact Minimization Measures implemented as part of the Activity. Describe any proposed minimization measures intended to reduce the adverse environmental effects caused by the proposed activity. The description of any proposed minimization measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or additional mitigation measures.

Block 21. If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and/ or 3/100-acre of stream bed, explain how the compensatory mitigation requirement will be satisfied, or explain why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required for the proposed activity. Refer to General Condition 23 of the currently issued Nationwide Permits for mitigation definitions). Identify if Nebraska Stream Condition Assessment Procedures (NeSCAP) have been applied to identify if stream mitigation (a negative balance of functional units between pre- and post-project) will be required and if so, describe how stream mitigation will be accomplished.

Paragraph (c) of NWP general condition 23 requires compensatory mitigation at a minimum one-for-one replacement ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation is more environmentally appropriate or the adverse environmental effects of the proposed NWP activity are no more than minimal without compensatory mitigation, and provides an activity-specific waiver of this requirement. Mitigation would also be required for Individual Permits.

Describe the proposed compensatory mitigation for wetland losses greater than 1 /1O acre, or provide an explanation of why the district engineer should not require wetland compensatory mitigation for the proposed NWP activity or Individual Permit. If NeSCAP was utilized, identify stream mitigation using the mitigation tab. Utilize the 2008 Final Rule – Compensatory Mitigation for Losses of Aquatic Resources (33 Code of Federal Regulations [CFR] Parts 325 and 332).

The preferred mechanism for providing compensatory mitigation is mitigation banking credits or in-lieu fee program credits. However, if an appropriate number and type of mitigation bank or in-lieu fee credits are not available or if it is determined that the mitigation bank or in-lieu fee credits are determined to be inappropriate by the USACE, then permittee-responsible mitigation may be approved to offset adverse environmental effects.

If permittee-responsible mitigation is proposed, the prospective permittee is responsible for submitting a mitigation plan. A separate mitigation attachment is recommended. If mitigation bank or in-lieu fee program credits are proposed, the mitigation plan needs to address only the baseline conditions at the impact site and the number of credits to be provided (statement of credit availability).

Block 22. Is any portion of the Permit activity already complete? Describe any work that has already been completed.

Block 23. List the name(s) of any species listed as endangered or threatened under the Endangered Species Act that might be affected by the proposed activity. If you are not a federal agency, and if any listed species or designated critical habitat might be affected or is in the vicinity of the proposed activity, or if the proposed activity is located in designated critical habitat, list the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity

Block 24. List any historic properties that have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property or properties. List the name(s) of those historic properties that have the potential to be affected by the proposed activity.

Block 25. Permit Activities that also Require Permission from the Corps Under 33 U.S.C. 408. If the proposed activity also requires permission from the Corps under 33 U.S.C. 408 because it will temporarily or permanently alter, occupy, or use a Corps federal authorized civil works project, indicate whether you have submitted a written request for Section 408 permission from the Corps district having jurisdiction over that project.

Signature of Applicant or Agent. The application must be signed by the person proposing to undertake the proposed activity, and if applicable, the authorized party (agent) that prepared the application. The signature of the person proposing to undertake the proposed activity shall be an affirmation that the party submitting the application possesses the requisite property rights to undertake the proposed activity (including compliance with special conditions, mitigation, etc.).

DRAWINGS AND ILLUSTRATIONS

General Information.

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a Project Vicinity Map, a Plan View or a Typical Cross-Section drawing. Identify each illustration with a figure or attachment number. For linear projects (that is, roads, subsurface utility lines, etc.) gradient drawings should also be included. Please submit one original, or good quality copy, of all drawings on 8½x11 inch plain white paper (electronic media may be substituted). Use the fewest number of sheets necessary for your drawings or illustrations. Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view, or cross-section). While illustrations need not be professional (many small, private project illustrations are prepared by hand), they should be clear, accurate, and contain all necessary information.

ADDITIONAL INFORMATION AND REQUIREMENTS

For proposed activities that involve discharges into waters of the US, water quality certification from the State, Tribe, or EPA must be obtained or waived. Some States, Tribes, or EPA have issued water quality certification for one or more NWPs. Please check the appropriate Corps district web site to see if water quality certification has already been issued for the NWP(s) you propose to use. Individual Permits will require an Individual Section 401 Water Quality Certification. For more information about Water Quality Certification please contact:

CWA Section 401 Coordinator
Nebraska Department of Environment and Energy
P.O. Box 98922
Lincoln, NE 68509-8922
Phone: 402-471-2875
Email: ndee.401certification@nebraska.gov

Attachment B – Example Impact Table

Example Impact Table for Grade Control Structures

Impact Area	Lat/Long (approx.)	Section, Township, Range	Report ID (reference to wetland delineation report for wetland/stream reference)	Temporary Wetland Impact[1] (wetlands adjacent/abutting relatively permanent waters)			Permanent[2] Wetland Impact (wetlands adjacent/abutting relatively permanent waters			Temporary impact on Waterway Impact (fill up to the OHWM[3]) (Identify all construction related short-term impacts)			Permanent Impact on Waterway (fill up to the OHWM)			Type of Fill / Discharge	Fill Volume[4]
				Cowardin[5]	NE Subclass[6]	Acres	Cowardin[5]	NE Subclass[6]	Acres	Type[7]	Linear Feet	Acres	Type[7]	Linear Feet[8]	Acres[9]		Cu. Yards
Rock Riprap Ramp with Sheet Pile														Linear feet of impact is identified in template Plan View	Impact area is identified in template Plan View	Rock Riprap	Fill volume area is identified in template Section A-A
Rock Slab Drop																Compacted 1-1/2” crusher run or recycled concrete Rock Rip Rap Limestone slabs	
Grouted Boulder Drop Structure																Grouted Boulders	
Temporary Construction Crossings																	
						Total											

Notes: [1]Tempoary – A temporary impact occurs for a limited time, typically during construction, and the area will be restored to pre-existing contours after the temporary disturbance is complete. This includes construction access and limits of stormwater pollution prevention practices.

[2]Permanent – A permanent impact is part of the project that will impact the resource permanently.

[3]OHWM – This is the Ordinary High Water Mark. The ordinary high water mark defines the boundaries of aquatic features for regulatory purposes**.** The federal regulatory definition of the OHWM, 33 CFR 328.3(c)(7), states the OHWM is “that line on the shore established by the fluctuations of water and indicated by physical characteristics such as [a] clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.” Multiple forms of guidance on identifying the OHWM are available.

[4]List volume by type to the existing bottom elevation wetland or waterway to exiting bottom elevation. Fill volume area is identified in template Section A-A of In-Stream Grade Control Structure Templates

[5]Cowardin – A hierarchical system of wetland classification used to name wetland types.

[6]Nebraska Subclass – Nebraska subclass provides the landform or environmental setting that a wetland exists within.

[7]Stream Type – Stream type should be listed as perineal, intermittent, or ephemeral. Definitions can vary. Consult with USACE for current definitions as they apply to potential jurisdiction. However, definitions may include: Perennial: surface water flowing continuously year-round. Intermittent: surface water flowing continuously during certain times of the year and more than in direct response to precipitation (e.g. , seasonally when the groundwater table is elevated or when snowpack melts). Ephemeral: surface water flowing or pooling only in direct response to precipitation (e.g., rain or snow fall).

[8] Linear feet of stream below fill as determined from the In-Stream Grade Control Structure Templates

[9] Impact area below the ordinary high water mark is identified in Plan View of In-Stream Grade Control Structure Templates

Attachment C – Information on Nationwide and Individual Permits

Information on Nationwide and Individual Permits

Nationwide Permits

Nationwide permits (NWPs) are general permits that streamline USACE authorization of certain activities under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 that have no more than minimal individual and cumulative adverse environmental effects. To qualify for the use of a NWP, perspective permittees must comply with all the terms, general conditions (GCs), and regional conditions (RCs) of the NWP, including any requirements for the submittal of a pre-construction notification (PCN).

Individual Permits

Authorities: 33 USC 401, Section 10 of the Rivers and Harbors Act of 1899; Section 404 of the Clean Water Act, and Section 103 of the Marine Protection Research and Sanctuaries Act of 1976 (not applicable in the Fort Worth District). Principal Purpose: These laws require permits authorizing activities in, or affecting, navigable waters of the U.S.; the discharge of dredged or fill material into waters of the US; and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: Information provided on this form will be used in evaluating the application for a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed, nor can a permit be issued.

Activities that do not qualify for authorization under the General Permit program may qualify for authorization by Individual Permit (IP). Authorization under IP may be obtained only through application with the USACE. These permits are issued for activities that have more than minimal adverse impacts to waters of the US, and evaluation of each permit application involves more thorough review of the potential environmental and socioeconomic effects of the proposed activity.

An application for a Department of the Army IP under Section 404 or Section 10 will be determined to be complete when the USACE receives sufficient information to issue a public notice (see 33 CFR 325.1(d) and 325.3(a) for details and supporting information). The applicant should address all activities that the applicant plans to undertake that are reasonably related to the same project and for which a Department of the Army permit would be required. An alternatives analysis and a mitigation plan are not required for a complete application to prepare a public notice but are very helpful.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

FORMS

APPENDIX C

GRADE CONTROLS SUBMITTALS CHECKLIST

GRADE CONTROL SUBMITTALS CHECKLIST

All materials in the checklist below are to be submitted as described during each phase of the project to the designated locations. Approvals must be provided as described in order to receive reimbursement for the construction of the grade control structures.

Platting Phases

Submit the following information to the local jurisdiction as part of the standard platting process.

- ❑ Plats shall include setback area.
- ❑ Cross sections of existing ground survey data at representative locations used to calculate the setback area with a minimum spacing every 200 ft, showing the calculations and dimensions of the setback.
- ❑ Plan and profile of the entire stream length on the property showing existing streambed survey data, proposed grade controls, and the future degradation profiles between.
- ❑ Draft Maintenance and Easement Agreement.

Public Improvements Phase

Include the following information within or as an appendix to the Drainage Report when submitted to the local jurisdiction as part of the public improvements process.

- ❑ Design Information
  - Site layout with grade control structure locations and identification numbers.
  - Hydrology specific to each individual grade control structure.
  - Design calculations used for determining design velocities, structure dimensions, and stable rock sizing.
  - Design details with table of design parameters and final design information requested on the design templates.
- ❑ Table of quantities per grade control structure and estimated costs.
- ❑ Public improvement plans for grade control structures and contract documents.

Approvals must be obtained prior to construction.

Project Closeout

- ❑ Maintenance Agreement (and Exhibits) - shall be approved by the local jurisdiction and recorded with the Register of Deeds.
- ❑ Grade Control Certification Form and Record Drawings – both shall be electronically submitted in conjunction to the local jurisdiction.
- ❑ Submit a reimbursement request and attachments (executed project closeout documents listed above and final pay application) to the Papio NRD on the following website: Grade Control Reimbursement Request – Southern Sarpy Watersheds Partnership

APPENDIX C

EXAMPLE PERFORMANCE BOND

Performance Bond

KNOW ALL MEN BY THESE PRESENTS: That _____

_____

as principal, and _____

_____, as surety, are held and firmly bound unto the City of Omaha, Nebraska, in the penal and full sum of _____ Thousand Dollars ($_____), for the payment of which well and truly to be made we hereby jointly and severally bind ourselves, our heirs, executors, administrators, personal representatives, successors and assigns.

The conditions of the above obligation are such that, whereas the above bounden principal has applied for a Certificate of Occupancy, for the property located at _____ Omaha, Nebraska, prior to the installation of _____

_____

_____

as required by the Ordinances, Rules and Regulations of the City of Omaha, and other laws. That said Certificate must be obtained prior to occupancy of the property.

NOW, THEREFORE, in consideration of a Certificate of Occupancy being issued, said principal shall:

1) Complete the required installation of _____

_____

_____ by the ___ ____ day of _____, 20_____.

2) Indemnify and save harmless the City of Omaha, its officials, employees, and any members of the applicable Department or Board, and their successors, from and on account of any and all judgments, claims, demands, losses, costs, expenses, or liabilities of any kind whatsoever which said City and any or all of the persons above enumerated may sustain or which may be recovered from it or them, from or by reason of the issuance of such Certificate, or by reason of any act, neglect or thing done under or by virtue of the authority given in any such Certificate, or in any way connected with, relating to, or growing out of any work performed by said principal, his or its agents and employees, or any sub-contractor or anyone in any way under his or its supervision and direction.
3) In all respects be bound hereby to any and all applicable requirements and provisions required to be in this bond by existing and hereafter existing Ordinances, Rules and Regulations of the City of Omaha, and other laws, the same as though such requirements and provisions were fully set forth in this bond, and by reference such requirements and provisions are made a part hereof;
4) Comply with and faithfully observe and obey all applicable Rules and Regulations and Ordinances of the City of Omaha now or hereafter existing and all other applicable laws now or hereafter existing affecting or relating to the issuance of the Certificate of Occupancy.
5) Pay all damages or loss that may occur from any act, neglect, or carelessness of said principal, his or its agents or employees, anyone under his or its supervision or direction, or any subcontractor, from such work pertaining to said Certificate of Occupancy, or from poor or defective work or material;
6) Properly perform and execute and fully protect any and all work undertaken by principal or under his or its direction and supervision, or by any agent or employee, or by any subcontractor.

Compliance with all and several of the above enumerated items shall make this bond void. Otherwise, it shall remain in full force and effect within the City of Omaha, Nebraska.

IN WITNESS WHEREOF, we have hereunto set our hands this _____ day of _____, 20_____.

In Presence of _____

_____ _____

Principal

Address of Witness _____ _____

_____ _____

Street Surety

_____ _____

City State Zip Attorney-In-Fact

APPROVED AS TO FORM:

_____ _____

Resident Agent Assistant City Attorney

APPENDIX C

MAINTENANCE AGREEMENT

Grade Control Structures
MAINTENANCE AGREEMENT AND EASEMENT

WHEREAS, The Property Owner, _____, recognizes that grade control structure must be maintained for the development called _____located in the jurisdiction of; _____ and,

WHEREAS, the Property Owner (whether one of more) is the owner of real property depicted on Exhibit "A" (hereinafter referred to as "the Property"), and,

WHEREAS, the _____ (hereinafter referred to as "the Jurisdiction") requires and the Property Owner, and its administrators, executors, successors, heirs, or assigns, agree that the health, safety and welfare of the citizens of the Jurisdiction require that the facilities be constructed and maintained on the property, and,

WHEREAS, the Grade Control Structures for,

_____

should be constructed and maintained by the Property Owner, its administrators, executors, successors, heirs, or assigns.

NOW, THEREFORE, in consideration of the foregoing premises, the covenants contained herein, and the following terms and conditions, the property owner agrees as follows:

1. The grade control structures shall be constructed by the Property Owner in accordance with the design, which has been reviewed and accepted by the Jurisdiction or its designee.
2. The Property Owner must develop and provide the "Grade Control Maintenance Requirements", attached here to as Exhibit "B", which have been reviewed and accepted by the Jurisdiction or its designee. The Grade Control Maintenance Requirements shall describe the specific maintenance practices to be performed for the facilities and include a schedule for implementation of these practices. The Plan shall indicate that the facility or facilities shall be inspected by a professional qualified in stormwater BMP function and maintenance at least annually to ensure that it is operating properly. A written record of inspection results and any maintenance work shall be maintained and available for review by the Jurisdiction.
3. The Property Owner, its administrators, executors, successors, heirs, or assigns, shall construct and perpetually operate and maintain, at its sole expense, the facilities in strict accordance with the attached Grade Control Maintenance Requirements accepted by the Jurisdiction or its designee.
4. The Property Owner, its administrators, executors, successors, heirs, or assigns hereby grants permission to the Jurisdiction, its authorized agents and employees, to enter upon the property and to inspect the facilities whenever the Jurisdiction deems necessary. The Jurisdiction shall provide the Owner copies of the inspection findings and a directive to commence with the repairs if necessary.

The Jurisdiction will require the Property Owner to provide, within 7 calendar days, a written response addressing what actions will be taken to correct any deficiencies and provide a schedule of repairs within a reasonable time frame. Whenever possible, the Jurisdiction shall provide notice prior to entry. The Jurisdiction shall indemnify and hold the Property Owner harmless from any damage by reason of the Jurisdiction's negligent or intentional acts during such entry upon the property.

5. The Property Owner its administrators, executors, successors, heirs, or assigns, agrees that should it fail to correct any defects in the facility or facilities within reasonable time frame agreed to in the response by the Property Owner for corrective actions, or shall fail to maintain the structure in accordance with the attached Grade Control Maintenance Requirements and with the law and applicable executive regulation or, in the event of an emergency as determined by the Jurisdiction or its designee in its sole discretion, the Jurisdiction or its designee is authorized to enter the property to make all repairs, and to perform all maintenance, construction and reconstruction as the Jurisdiction or its designee deems necessary. Notwithstanding the foregoing, the Jurisdiction shall indemnify and hold the Property Owner harmless from any damage by reason of the Jurisdiction's negligent or intentional acts during such entry upon the property.
   The Jurisdiction or its designee shall have the right to recover from the Property Owner any and all reasonable costs the Jurisdiction expends to maintain or repair the facility or facilities or to correct any operational deficiencies subject to the provisions of the immediately preceding sentence relating to negligence or intentional acts of the Jurisdiction. Failure to pay the Jurisdiction or its designee all of its expended costs, after forty-five days written notice, shall constitute a breach of the agreement. The Jurisdiction or its designee shall thereafter be entitled to bring an action against the Property Owner to pay, or foreclose upon the lien hereby authorized by this agreement against the property, or both. Interest, collection costs, and reasonable attorney fees shall be added to the recovery to the successful party.
6. The Property Owner shall not obligate the Jurisdiction to maintain or repair the facility or facilities, and the Jurisdiction shall not be liable to any person for the condition or operation of the facility or facilities.
7. The Property Owner, its administrators, executors, successors, heirs, or assigns, hereby indemnifies and holds harmless the Jurisdiction and its authorized agents and employees for any and all damages, accidents, casualties, occurrences or claims that may arise or be asserted against the Jurisdiction from the construction, presence, existence or maintenance of the facility or facilities by the Property Owner. In the event a claim is asserted against the Jurisdiction, its authorized agents or employees, the Jurisdiction shall promptly notify the Property Owner and the Property Owner shall defend at its own expense any suit based on such claim unless due solely to the negligence of the Jurisdiction in which event the Jurisdiction shall be required to defend any such suit at its own expense. Notwithstanding the foregoing, if any claims are made against both the Jurisdiction and the Property Owner, each will be required to defend any such suit or claim against it at its own expense. Each shall be responsible for payment of any recovery to the extent determined in such suit. If any

judgment or claims against the Jurisdiction, its authorized agents or employees shall be allowed, the Property Owner shall pay for all costs and expenses in connection herewith except to the extent of the negligence or intentional act of the Jurisdiction.

8. The Property Owner shall not in any way diminish, limit, or restrict the right of the Jurisdiction to enforce any of its ordinances as authorized by law.
9. This Agreement shall be recorded with the Register of Deeds of Sarpy County, Nebraska and shall constitute a covenant running with the land and shall be binding on the Property Owner, its administrators, executors, successors, heirs, or assigns, including any homeowners or business association and any other successors in interest.

IN WITNESS WHEREOF, the Property Owner (s) has/ have executed this agreement this day of _____, 20_____.

INDIVIDUAL and/or PARTNERSHIP

_____ Name _____ Title _____ Signature	_____ Name _____ Title _____ Signature
_____ Name _____ Title _____ Signature	_____ Name _____ Title _____ Signature

ACKNOWLEDGMENT

_____)
State

_____)
County

On this _____day of __, 20_____before me, a Notary Public, in and for said County, personally came the above named: _____who is (are) personally known to me to be the identical person(s) whose name(s) is (are) affixed to the above instrument and acknowledged the instrument to be his, her (their) voluntary act and deed for the purpose therein stated.

WITNESS my hand and Notarial Seal the day and year last above written.

_____
Notary Public

_____
Notary Seal

Exhibit “A”

Insert Real Property Depiction

Exhibit “B”

Insert BMP Maintenance Requirements

A template for potential maintenance activities is provided in Table B.1. The activities may include but are not limited to the item in the template and needs to be developed with and approved by the local jurisdiction. The frequency of maintenance activities needs to be agreed upon and defined in this agreement; minimum of six months is required.

Table B.1 – Maintenance Requirements Template

Maintenance Activity	**Responsible Party**
Remove trash and debris	
Inspect stream banks for erosion; install erosion control matting if erosion cannot be controlled with establishing vegetation	
Maintain rock riprap in place; any rock washed away should be supplemented/replaced	
Frequency of Maintenance Activities:	

APPENDIX C

GRADE CONTROL CERTIFICATION FORM

GRADE CONTROL STRUCTURE CERTIFICATION

For Grade Controls Constructed in the Southern Sarpy Watersheds

All submittals should be provided electronically to the local jurisdiction. Attach a photolog with a minimum of one photo of each grade control structure and the Record Drawings of the Grade Control Structure Plan Sheets.

Project Information

Project Name	
Project Address	
Subdivision Name	
SID #	
Number of Grade Controls	

This certification must be executed and sealed by a licensed professional civil engineer registered in the State of Nebraska.

Certification Statement

Based upon MY inspection of the constructed grade control structure(s) for the above-referenced project, I hereby certify that the grade control structure(s) are in general compliance with the intent of the original design plans and with Southern Sarpy Watersheds Grade Control Implementation Guidance Document requirements.

Name (Signature): _____ Date:_____

Name (Printed): _____

Qualifications: _____

PE Seal:

(Attachments)