

February 26, 2021

Mr. Kris Bakkegard, Director of Engineering
Metro Flood Diversion Authority
207 4th Street N, Suite A
Fargo, ND 58102

RE: Construction Permit Application No. 2489 – FMM Overall Southern Embankment & SE-1

Dear Mr. Bakkegard:

The Office of the State Engineer (OSE) has reviewed your construction permit application for the Fargo-Moorhead Metropolitan Area Flood Risk Management Project's Southern Embankment, which includes all Southern Embankment phases. The State Engineer has approved the application and signed Construction Permit No. 2489 (CP No. 2489).

In addition, the OSE has reviewed and accepted the final plans for Phase SE-1 of the Southern Embankment, satisfying Condition No. 3 of CP No. 2489. All future phases of the Southern Embankment must be reviewed and accepted by the OSE per this condition.

The permit issued is subject to the conditions listed on the permit. Our office suggests you file the permit with the county recorder's office. Our office also recommends compliance with the North Dakota Department of Environmental Quality's Construction and Environmental Disturbance Requirements (enclosed).

If you have any questions, please feel free to contact me at 701-328-4288 or kahuber@nd.gov.

Sincerely,



Kelsey Huber
Water Resource Engineer

KH:/1928

Enclosures: Permit to Construct or Modify No. 2489
NDDH Construction and Environmental Disturbance Requirements
Construction Completion Notification SFN 60895

cc (electronic): Terry Williams - US Army Corps of Engineers – St. Paul District
Nathan Boerboom – City of Fargo
Cass County Joint Water Resource District
ND Game and Fish Department
ND Department of Environmental Quality
Minnesota Department of Natural Resources
Richland County Water Resource District

CONSTRUCTION PERMIT NO. 2489

This permit authorizes the permittee to construct or modify a structure, pursuant to North Dakota Century Code § 61-16.1-38, subject to the permit conditions.

Name of Permittee: **Metro Flood Diversion Authority
207 4th Street N, Suite A
Fargo, ND 58102**

Structure Type: **Dam**

Purpose: **Flood Control**

Location and Waterway on which Project will be constructed:

Location: **See Attached Map**

Stream: **Red River, Wild Rice River, Various Drains**

Basin: **Upper Red**

Project: **Southern Embankment and associated infrastructure**

This permit covers the Southern Embankment (Dam) and associated infrastructure that form a portion of the Fargo-Moorhead Metropolitan Area Flood Risk Management Project.

Location Map: **See Attached Map**

CONSTRUCTION PERMIT NO. 2489 (CONTINUED)

CONDITIONS TO PERMIT

1. The Permittee, Project owner, Project sponsor, landowner, and any associated parties may be liable for all activity conducted and all effects caused by the construction, modification, and operation of the dam, dike, or other device as described in the application and this permit. Consequently, the receipt of this permit does not relieve the Permittee, Project owner, Project sponsor, landowner, or any associated parties from liability resulting from the construction, modification, operation, or maintenance of the dam, dike, or other device, as approved under this permit.
2. In accordance with North Dakota Century Code chapter 61-03, section 61-04-11, and section 61-16.1-38, this permit and the project approved under this permit are subject to changes, conditions, or modifications as in the judgement or discretion of the State Engineer may be necessary for safety or the protection of property. Such changes, conditions, or modifications, if required, will be at the expense of the Permittee, Project owner, Project sponsor, or any associated parties.
3. Prior to construction, in accordance with North Dakota Century Code section 61-16.1-38, plans and specifications associated with each Project component must be signed by a professional engineer eligible to practice engineering in the state of North Dakota, and reviewed and accepted by the State Engineer.
4. In accordance with North Dakota Administrative Code section 89-08-02-07, the Permittee must provide the State Engineer with As-Built plans within six months after the Project's construction.
5. Access to the Project for inspection will not be denied to the county water resource district of jurisdiction, State Engineer staff, or State Water Commission staff.
6. If prior to or during construction items of substantial archeological value are discovered or a deposit of such items are disturbed, the Permittee must cease construction activities in the affected area. The State Historical Preservation Office and the State Engineer must be promptly notified of the discovery, and construction will not resume until the State Engineer gives written permission.
7. The permit applies to the specific Project and Project location described in the permit application.
8. Any activity below the Ordinary High Water Mark of the Red River may not be conducted until an approved sovereign lands permit is obtained from the Office of the State Engineer.
9. Construction for works authorized under this permit are to be completed within a total of 4 years under North Dakota Administrative Code sections 89-08-02-03.1 and 89-08-02-03.2, including extensions, from the approval date. Construction expected beyond 4 years will require the permit to be reauthorized.
10. In accordance with North Dakota Administrative Code chapter 89-08-03, a registered and licensed professional engineer must be in charge of and responsible for inspections during construction.

CONSTRUCTION PERMIT NO. 2489 (CONTINUED)

11. In accordance with North Dakota Administrative Code chapter 89-08-03, inspections during construction must be performed at intervals necessary to ensure conformity with the construction permit as well as the plans and specifications.
12. In accordance with North Dakota Administrative Code chapter 89-08-03, the information obtained during an inspection must be documented in a written report. The report will specify any changes necessary under section 89-08-03-03. The inspection reports must be provided to the State Engineer upon request.

SPECIAL CONDITIONS

1. This permit is subject to compliance with the FM Area Diversion Project Property Rights Acquisition and Mitigation Plan. Any modifications to the Project Property Rights Acquisition and Mitigation Plan are subject to approval by the State Engineer. If additional mitigation needs are deemed necessary, the State Engineer reserves the right to require modifications to the approved Property Rights Acquisition and Mitigation Plan.
2. An Operation and Maintenance Plan for the Project must be submitted, reviewed, and accepted by the State Engineer before the Project is operated.
3. Prior to construction, the final Memorandum of Understanding between the Metro Flood Diversion Authority and Southeast Cass Water Resource District must be submitted to the Office of the State Engineer.
4. Prior to construction, the permittee must provide certification that the Project component being constructed is in compliance with the FM Area Diversion Project Property Rights Acquisition and Mitigation Plan.
5. Prior to Project completion, the Office of the State Engineer must be notified of and accept any changes to the Project plans or specifications.
6. An Emergency Action Plan must be submitted to and approved by the State Engineer before the Project is operated.
7. With regard to any Project component or phase that will impact or require modification of any Southeast Cass County water resource District Facility, the USACE must submit all engineering designs and construction plans to the Southeast Cass County Water Resource District.
8. USACE should consult with the Southeast Cass County Water Resource District to ensure acceptable mitigation of impacts to drainage as a result of construction or operation of the Diversion Inlet Structure; the USACE should otherwise ensure the Diversion Inlet Structure does not impede or inhibit drainage.
9. No portion of the Project shall be constructed, including those portions of the Project located in Minnesota, without approval from the North Dakota State Engineer. For review of Project components in Minnesota, the State Engineer will review only the Project design without consideration of Minnesota statutes and rules.


CONSTRUCTION PERMIT NO. 2489 (CONTINUED)

RECOMMENDATIONS

The following list of recommendations, though not binding to the approval of this permit, are strongly encouraged:

1. Given the high hazard nature of the Project, the State Engineer strongly encourages wise and sound development downstream of the Project to ensure those high-risk areas downstream of the Project are developed in a way that will minimize risk to the public.
2. The Permittee is encouraged to coordinate with the Office of the State Engineer regarding Project status updates and the format in which they will be submitted to the Office of the State Engineer.
3. The Permittee is responsible for obtaining any other local, state, or federal permits or approvals that may be necessary prior to construction.




John Paczkowski, P.E.
Interim State Engineer

Date: 02/24/2021

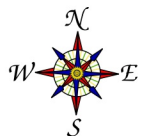


Date: 2/24/2021
Prepared by: CWN

Construction Permit Application No. 2489 Metro Flood Diversion Authority

Southern Embankment

Cass County, North Dakota and Clay and Wilkin Counties, Minnesota





Construction and Environmental Disturbance Requirements

These represent the minimum requirements of the North Dakota Department of Health. They ensure that minimal environmental degradation occurs as a result of construction or related work which has the potential to affect the waters of the State of North Dakota. All projects will be designed and implemented to restrict the losses or disturbances of soil, vegetative cover, and pollutants (chemical or biological) from a site.

Soils

Prevent the erosion of exposed soil surfaces and trapping sediments being transported. Examples include, but are not restricted to, sediment dams or berms, diversion dikes, hay bales as erosion checks, riprap, mesh or burlap blankets to hold soil during construction, and immediately establishing vegetative cover on disturbed areas after construction is completed. Fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.

Surface Waters

All construction which directly or indirectly impacts aquatic systems will be managed to minimize impacts. All attempts will be made to prevent the contamination of water at construction sites from fuel spillage, lubricants, and chemicals, by following safe storage and handling procedures. Stream bank and stream bed disturbances will be controlled to minimize and/or prevent silt movement, nutrient upsurges, plant dislocation, and any physical, chemical, or biological disruption. The use of pesticides or herbicides in or near these systems is forbidden without approval from this Department.

Fill Material

Any fill material placed below the high water mark must be free of top soils, decomposable materials, and persistent synthetic organic compounds (in toxic concentrations). This includes, but is not limited to, asphalt, tires, treated lumber, and construction debris. The Department may require testing of fill materials. All temporary fills must be removed. Debris and solid wastes will be removed from the site and the impacted areas restored as nearly as possible to the original condition.



CONSTRUCTION COMPLETION NOTIFICATION

NORTH DAKOTA STATE WATER COMMISSION

REGULATORY DIVISION

SFN 60895 (10/2018)

OFFICE OF
THE STATE
ENGINEER
USE ONLY

Mail To:
Office of the State Engineer
900 East Boulevard Ave
Bismarck, ND 58505-0850

Contact Info:
(P) (701) 328-2750
(F) (701) 328-3696
www.swc.nd.gov

For structures that require a construction permit from the State Engineer, this form is to be submitted to the State Engineer upon completion of the structure in accordance with North Dakota Administrative Code **89-08-02-03.1**. As built plans of the structure must be submitted with this form in accordance with North Dakota Administrative Code **89-08-02-07**. For structures that do not require a construction permit, the State Engineer requests that the owner of the structure complete applicable sections of this form for the State Engineer's records. As built plans are not required for structures not requiring a construction permit.

89-08-02-03.1: *Construction must be completed and the State Engineer must be notified of completion in writing within two years from the date of final approval or the permit is void. The two-year period does not begin until any appeal is complete.*

89-08-02-07: *As a condition on all construction permits, the owner of the dam, dike, or other device will provide the state engineer with "as built" plans within six months after the dam, dike, or other device has been constructed to provide details of the modifications that occurred during construction.*

1. General Information

Type Of Structure (choose one) ☐ Dam ☐ Dike ☐ Other (Diversion, Pond, Lagoon, etc.) _____

Name Of Structure

Legal Description	1/4	1/4	Section	Township	Range
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Construction Permit Number (if applicable)	Water Use Permit Number (if applicable)
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Construction Permit Approval Date (if applicable)

2. Verification Of Construction (complete sections A, B or C as applicable)

A. For Structures Requiring A Construction Permit

This structure has been built or modified in accordance with the construction permit. As built plans are attached.

☐ Yes ☐ No (If no, please complete section C)

Completion Date

B. For Structures Not Requiring A Construction Permit

This structure has been built in accordance with the submitted plans

☐ Yes ☐ No (If no, please complete section C)

List Any Modifications From The Submitted Plans That Occurred During Construction

Completion Date

C. This Structure Will Not Be Constructed ☐ Yes

Reason

3. Ownership And Maintenance (complete all)			
A. Owner Of The Property On Which The Structure Is Located			
Name Or Agency			
Agency Contact Person (if applicable)			
Mailing Address	City	State	ZIP Code
Email Address	Home Telephone Number		
Work Telephone Number	Cell Telephone Number		
B. Agency Or Individual Responsible For Operation And Maintenance Of The Structure			
<input type="checkbox"/> Land Owner Listed Above <input type="checkbox"/> Other (if other, please complete information below)			
Name Or Agency			
Agency Contact Person (if applicable)			
Mailing Address	City	State	ZIP Code
Email Address	Home Telephone Number		
Work Telephone Number	Cell Telephone Number		
(Signature Of Owner or Agency Representative)	(Print Name)		(Date)

TECHNICAL MEMORANDUM

DATE: **February 23, 2021**

TO: **JP** John Paczkowski, P.E., Interim State Engineer

FROM: **AC** Aaron Carranza, P.E., Director, Regulatory Division
ML Matt Lindsay, P.E., Manager, Engineering and Permitting Section
KH Kelsey Huber, E.I.T., Water Resource Engineer

SUBJECT: **Construction Permit Application No. 2489 – FMM Southern Embankment**

An application to modify Construction Permit No. 2489 (Application) was received by this office on December 16, 2020 from the Metro Flood Diversion Authority (Diversion Authority) for the permitting of the Southern Embankment and associated infrastructure (Dam). The Dam forms part of the Fargo-Moorhead Metropolitan Area Flood Risk Management Project (FMM Project), a project that intends to provide federally certifiable flood protection to the cities of Fargo and West Fargo in North Dakota and Moorhead in Minnesota. All elevations are in reference to the North American Vertical Datum of 1988 GEOID 12B.

BACKGROUND

In October of 2010, Fargo-Moorhead leaders decided on a North Dakota diversion and upstream storage flood protection approach that, through a series of developments, is referred today as the FMM Project. The FMM Project includes the Dam, Diversion, in-town levees and floodwalls, as well as a ring levee around the communities of Oxbow, Hickson, and Bakke (OHB Ring Dike) and other mitigation features. The federal government, through the United States Army Corps of Engineers (USACE), is responsible for the Dam and OHB Ring Dike construction, while the non-federal sponsors are responsible for the remaining project features, including the Diversion. Some significant milestones during the development of the FMM Project include:

July 2011 - USACE Final Feasibility Report and Environmental Impact Statement (FEIS)

September 2013 - USACE Supplemental Environmental Assessment (SEA), addressed modifications to the FEIS

October 2016 - Minnesota Department of Natural Resources (MN DNR) denies permit for the FMM Project

October 2017 - North Dakota Governor Burgum and Minnesota Governor Dayton created a joint task force to develop engineering options to address concerns about project impacts

December 2018 – MN DNR granted a Dam Safety and Public Waters Work Permit, also referred to as the Fargo-Moorhead Plan B permit

February 2019 - Additional modifications were addressed in the second USACE SEA

September 2020 - Federal Emergency Management Agency (FEMA) issued a Conditional Letter of Map Revision (CLOMR) for Minnesota and North Dakota.

Additionally, the Office of the State Engineer (OSE) approved the Property Rights Acquisition and Mitigation Plan v.5 (Mitigation Plan), a document that outlines how the FMM Project will mitigate impacted properties, on **June 1, 2020**, and has permitted portions of the FMM Project listed below:

- Parts of the Dam under Construction Permit No. 2489 on **July 8, 2016** (Diversion Inlet Structure) and **August 23, 2019** (Wild Rice River Structure)
- Parts of the OHB Ring Dike under Construction Permit Nos. 2427 on **August 7, 2017** and 2429 on **June 19, 2014**
- In-town levees and floodwalls under several Construction Permits
- The Diversion under Construction Permit No. 2626 on **November 25, 2020**

While the Dam is to be constructed by the USACE, the Flood Diversion Authority will be responsible for operation and maintenance of the Dam and its gated structures. Additionally, as part of the Project Partnership Agreement (PPA), the USACE is responsible for preparing the Initial Reservoir Filling Plan, Surveillance Plan, O&M Manual, Emergency Action Plan, and Water Control Plan.

Full authorization of the FMM Project is subject to all applicable local, state, and federal rules and requirements.

DAM LOCATION AND DESCRIPTION

According to the Application materials, the Dam consists of an approximately 21-mile long earthen embankment located south of Interstate-94 within Cass County, North Dakota and Clay County, Minnesota. The Dam extends west to east, with an irregular alignment that ties into high ground on the west in Normanna Township, North Dakota, along the west border of Section 12, and ties into high ground on the east in Minnesota along the Clay-Wilkin County line east of Wolverton Creek. The Dam's irregular alignment was designed to provide flood protection downstream the embankment while limiting impacts upstream.

The Dam crosses the Wild Rice and Red Rivers in North Dakota and Wolverton Creek in Minnesota. Along the Dam alignment, gated structures are to be placed on the Wild Rice (WRRS) and Red Rivers (RRS), and an un-gated structure is to be placed on Wolverton Creek Crossing (a structure designed to be overtopped during a PMF event). In addition, a gated structure was placed along the Dam alignment at the Diversion Inlet Structure (DIS), to control flow into the Diversion.

The Dam is intended to act as a dry, flood control and diversion dam, impounding water through the operation of the WRRS and RRS and directing a portion of the impounded water through the DIS into the Diversion Channel when combined flows at the USGS gages at Enloe, ND and Abercrombie, ND are 21,000 cubic feet per second (cfs) or greater. The Dam and Diversion are to be operated such that floodwaters are stored upstream the Dam and a portion diverted around the Cities of Horace, West Fargo, Fargo, and Harwood, until joining with the Red River in the N ½ of Section 36, Township 142 North, Range 49 West, Cass County across from Georgetown, Minnesota. The inlet to the FM Diversion or DIS is located just south of Horace within the Dam in the SE ¼ of Section 31 and the SW ¼ of Section 32, Township 138 North, Range 49 West, Cass County.

APPLICATION REVIEW

According to North Dakota Century Code (N.D.C.C.) § 61-16.1-38 and North Dakota Administrative Code (N.D.A.C.) § 89-08-02-01, a permit is required from the OSE for the construction or modification of a structure capable of retaining, obstructing, or diverting more than fifty acre-feet of water. The Dam will be capable of retaining a volume greater than 50 acre-feet. Therefore, a construction permit is required from the OSE.

Given this project is supervised by the US Army Corps of Engineers (a federal agency), the Dam is exempt from drainage permitting according to N.D.C.C. § 61-32-03 and N.D.A.C. § 89-02-01-05.

COMPLETE APPLICATION

According to N.D.C.C. § 61-16.1-38 and N.D.A.C. § 89-08-02-02, a completed construction permit application must include complete plans and specifications completed by a professional engineer and evidence establishing a property right for the property that will be affected by the construction of the project proposed under the Application.

DAM DESIGN PROCESS

The Dam is to be designed and constructed in phases (SE-1, SE-2, SE-3, SE-4, SE-5, I-29 Road Raise, Wild Rice River Structure, Red River Structure, and Diversion Inlet Structure), such that associated plans and specifications are to be finalized as construction of the individual Dam component (phase) nears. Even though detailed information specific to each Dam component may not yet be available, the USACE has prepared a 95-percent Overall Southern Embankment Design Documentation Report (SE DDR) that "is intended to establish the basic design requirements for the features associated with the Southern Embankment."

Given the FMM Project has been issued a MN DNR's Dam Safety and Public Waters Work Permit, a CLOMR by FEMA, and been reviewed under the USACE's SEA, significant changes to the Dam alignment and basic design and operation criteria, as described in the SE DDR, are not anticipated. However, in the case that there are changes, special conditions are recommended to be placed on the permit requiring the OSE review and accept those changes.

MITIGATION PLAN

The OSE's approval of the Mitigation Plan for the FMM Project was determined to satisfy the requirement for evidence of a property right for property affected by the construction of the FMM Project. A special condition was placed on the permit such that it is subject to the Mitigation Plan and any modifications to the Mitigation Plan require State Engineer approval.

Based on review of N.D.A.C. § 89-08-02-02, with the submission of an updated Construction Permit Application, the OSE determined the Application complete on December 16, 2020.

DAM DESIGN

According to the Application and supporting materials, the Dam includes the following (also see Figure 1):

Southern Embankment (Dam), typical top width of 15 feet and up to 28 feet along roadways, overall length 21 miles, 4:1 side slopes, earthen embankment, impervious clay fill

- Southern Embankment Reach 1 (SE-1), Western Tieback (Auxiliary Emergency Spillway), upstream crest elevation, 923.5-928.5 feet
 - Top of spillway, 923.5 feet at top of impervious, designed to overtop during the Probable Maximum Flood (PMF)
- Southern Embankment Reach 2 (SE-2), Upstream crest elevation, 928.5 feet
- Southern Embankment Reach 3 (SE-3), Upstream crest elevation, 928.5 feet
- Southern Embankment Reach 4 (SE-4), Upstream crest elevation, 928.5 - 930.0 feet
- Southern Embankment Reach 5 (SE-5), Eastern Tieback (extends from Highway 75 to high ground in Minnesota, includes the Wolverton Creek Crossing), upstream crest elevation, 928.5 feet
 - Wolverton Creek Crossing, un-gated crossing
 - Designed to limit upstream impacts in Wilkin County, Minnesota and ensure the City of Comstock, Minnesota, is not adversely affected through the Inflow Design Flood (IDF)

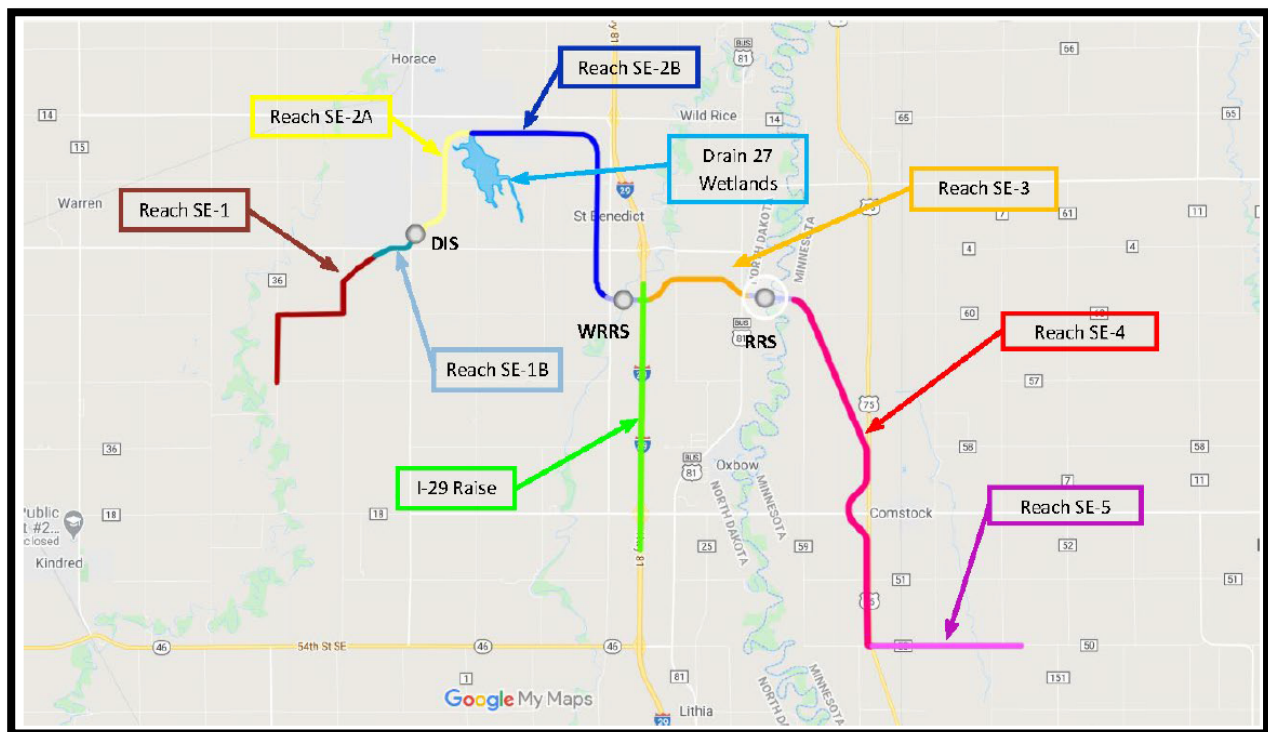


Figure 1. Map taken from the USACE Overall Southern Embankment Design Documentation Report, where the map is presented as “Figure 2.”

Associated Infrastructure

- Diversion Inlet Structure (Emergency Spillway) - permitted under Construction Permit No. 2489
 - Controls flows into the Diversion Channel
 - 3-tainter gate structure
 - Default position is closed until 5-percent AEP event (21,000 cfs) where the tainter gates partially open
- Wild Rice River Structure (Auxiliary Principal Spillway) - permitted under Construction Permit No. 2489
 - Controls Wild Rice River flows into the benefitted area

- 2-tainter gate structure
 - Default position is open to allow unimpeded flow of Wild Rice River until a 5-percent AEP event (21,000 cfs) where the tainter gates partially close
- Red River Structure (Principal Spillway)
 - Controls Red River flows into the benefitted area
 - 3-tainter gate structure
 - Default position is open to allow unimpeded flow of Red River until a 5-percent AEP event (21,000 cfs) where the tainter gates partially close
- Borrow ditch - located approximately 50 feet south of the upstream side of the Dam
 - Varied bottom width
 - 7:1 side slopes, except for SE-1 with 5:1 side slopes due to narrower ditch bottom width
 - Ditch provides borrow for the Dam and local drainage
 - Upstream side of the ditch is designed to allow for lateral expansion should additional fill be required
- Drainage ditch - located approximately 50 feet north of the toe of the downstream side (benefitting side) of the Dam
 - Typical, 10-foot bottom width
 - 5:1 side slopes
 - Convey local runoff to larger county drains or rivers

DAM OPERATION & MAINTENANCE

Even though the USACE is designing and constructing the Dam, the responsibility for operation and maintenance rests with the Diversion Authority. According to the SE DDR, given the USACE is designing and constructing the Dam “ER 1130-2-530, *Flood Control Operations and Maintenance Policies*, applies to USACE-built flood protection projects operated and maintained by non-Federal Sponsors.” ER 1130-2-530 requires the USACE to develop and maintain an O&M manual, Water Control Manual, and an Emergency Action Plan for the Dam. Specifics related to Dam operation is provided in the USACE’s 2019 SEA.

In general, Dam operation is guided by the volume of water in the pool, magnitude of the flood, and the tributary river flows that need to be mitigated. The operation goal is to allow a maximum amount of flow into and around the benefitted area, while minimizing the impacted area upstream the Dam and ensuring in-town protection, as well as the Dam, are not overtopped up to and including the PMF event.

The Dam goes into operation for flood events in excess of the 5-percent annual exceedance probability event (AEP). During non-flood operation, the default position for the RRS and WRRS is open, allowing the rivers to flow unimpeded, and the default for the DIS is closed. During flood operation, the RRS and WRRS gates are lowered to restrict flow and begin storing water in the storage area and the DIS is opened.

A special condition was recommended to be placed on the permit requiring an Operation and Maintenance Plan to be accepted by the State Engineer before the project is operated.

WATER RESOURCE DISTRICT AND OTHER AGENCY COMMENTS

Comment was solicited from the Cass County Joint Water Resource District, North Dakota USACE Regulatory Office, and North Dakota Department of Environmental Quality (DEQ) on February 12, 2021 (see file).

Cass County Joint Water Resource District provided comment on February 15, 2021 stating that “[a]ny issues of concern to the Cass County Water Resource Districts will be addressed in a *Memorandum of Understanding* with the Diversion Authority.”

DEQ provided comment on February 16, 2021 noting that “[they] believe the department concerns will be addressed through the construction storm water and section 401 permitting process.”

OTHER OSE PERMITS AND CONSIDERATIONS

The Dam crosses the Red River. Given the bed and banks of the Red River are considered sovereign land under N.D.C.C. § 61-33-01(5), any work completed within the bed and banks of the Red River requires a Sovereign Lands permit. This requirement was included as a standard condition on the permit:

Any activity below the Ordinary High Water Mark of the Red River may not be conducted until an approved sovereign lands permit is obtained from the Office of the State Engineer.

Given the Dam will act as a dry dam, temporarily storing water for flood events that meet or exceed the 5-percent AEP, a Water Permit from the State Water Commission is not required.

CONCLUSION

Based on the information provided in the Application and supporting materials, **I recommend the State Engineer approve Construction Permit Application No. 2489 subject to the standard construction permit conditions and the following special conditions and recommendations:**

Special Conditions

1. This permit is subject to compliance with the FM Area Diversion Project Property Rights Acquisition and Mitigation Plan. Any modifications to the Project Property Rights Acquisition and Mitigation Plan are subject to approval by the State Engineer. If additional mitigation needs are deemed necessary, the State Engineer reserves the right to require modifications to the approved Property Rights Acquisition and Mitigation Plan.
2. An Operation and Maintenance Plan for the Project must be submitted, reviewed, and accepted by the State Engineer before the Project is operated.
3. Prior to construction, the final Memorandum of Understanding between the Metro Flood Diversion Authority and Southeast Cass Water Resource District must be submitted to the Office of the State Engineer.
4. Prior to construction, the permittee must provide certification that the Project component being constructed is in compliance with the FM Area Diversion Project Property Rights Acquisition and Mitigation Plan.
5. Prior to Project completion, the Office of the State Engineer must be notified of and accept any changes to the Project plans or specifications.

6. An Emergency Action Plan must be submitted to and approved by the State Engineer before the Project is operated.
7. With regard to any project component or phase that will impact or require modification of any Southeast Cass County water resource District Facility, the USACE must submit all engineering designs and construction plans to the Southeast Cass County Water Resource District.
8. USACE should consult with the Southeast Cass County Water Resource District to ensure acceptable mitigation of impacts to drainage as a result of construction or operation of the Diversion Inlet Structure; the USACE should otherwise ensure the Diversion Inlet Structure does not impede or inhibit drainage.
9. No portion of the Project shall be constructed, including those portions of the Project located in Minnesota, without approval from the North Dakota State Engineer. For review of project components in Minnesota, the State Engineer will review only the project design without consideration of Minnesota statutes and rules.

Recommendations

1. Given the high hazard nature of the Project, the State Engineer strongly encourages wise and sound development downstream of the Project to ensure those high-risk areas downstream of the Project are developed in a way that will minimize risk to the public.
2. The Permittee is encouraged to coordinate with the Office of the State Engineer regarding Project status updates and the format in which they will be submitted to the Office of the State Engineer.
3. The Permittee is responsible for obtaining any other local, state, or federal permits or approvals that may be necessary prior to construction.

TECHNICAL MEMORANDUM

DATE: **February 25, 2021**

TO: **JP** John Paczkowski, P.E., Interim State Engineer

FROM: **ac** Aaron Carranza, P.E., Director, Regulatory Division
ML Matt Lindsay, P.E., Manager, Engineering and Permitting Section
KH Kelsey Huber, E.I.T., Water Resource Engineer

SUBJECT: **Construction Permit Application No. 2489 – FMM SE-1**

Supplemental materials for Construction Permit No. 2489 (CP No. 2489) were received by this office on November 11, 2020 from the Metro Flood Diversion Authority (Diversion Authority) for the Southern Embankment - Reach 1 and associated infrastructure (SE-1) of the Fargo-Moorhead Metropolitan Area Flood Risk Management Project (FMM Project). The entirety of the "Southern Embankment" of the FMM Project was approved under CP No. 2489, an umbrella-style permit. All elevations are in reference to the North American Vertical Datum of 1988 GEOID 12B.

The supplemental materials for SE-1 were submitted for Office of the State Engineer (OSE) review to ensure the Southern Embankment project is in compliance with CP No. 2489 permit conditions.

SE-1 forms the westernmost segment of the Southern Embankment and is the first of several reaches of the Southern Embankment to be constructed (see Figure 1). SE-1 ties into high ground at the SW corner of Section 12, Normanna Township, and continues along the west and north borders of that Section until heading north on 169th Avenue Southeast and cutting diagonally northeast across the NW ¼ of Section 6, Pleasant Township, towards the Diversion Inlet Structure (see Figure 1). While SE-1 is to be constructed by the U.S. Army Corps of Engineers (USACE), the Diversion Authority will be responsible for operation and maintenance.

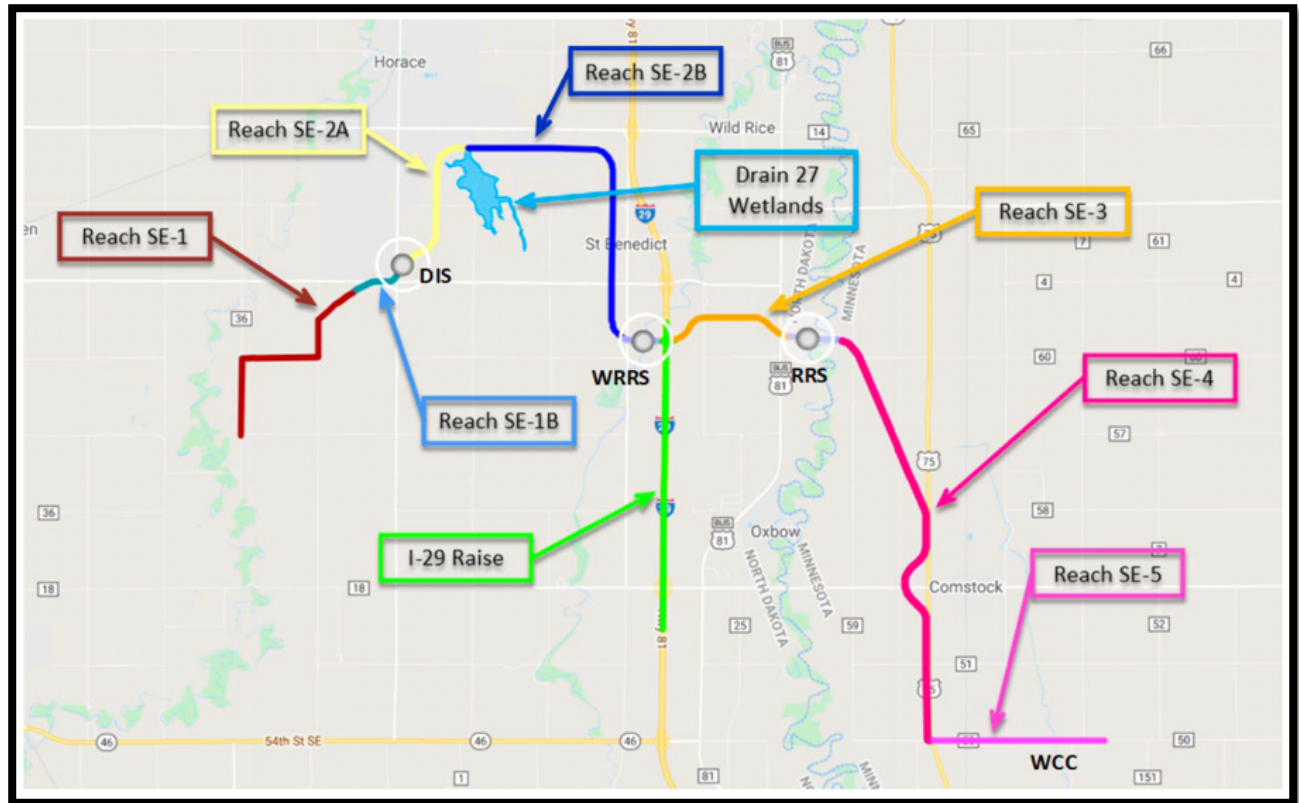


Figure 1. Map taken from the USACE Southern Embankment – Reach SE-1 Design Documentation Report, where the map is presented as “Figure 1.”

PERMIT REVIEW

CP No. 2489 included conditions that require the submission of additional materials prior to construction of any component of the Southern Embankment:

Condition No. 3 - Prior to construction, in accordance with North Dakota Century Code section 61-16.1-38, plans and specifications associated with each Project component must be signed by a professional engineer eligible to practice engineering in the state of North Dakota, and reviewed and accepted by the State Engineer.

Special Condition No. 3 – Prior to construction, the final Memorandum of Understanding between the Metro Flood Diversion Authority and Southeast Cass Water Resource District must be submitted to the Office of the State Engineer

Special Condition No. 4 - Prior to construction, the permittee must provide certification that the Project component being constructed is in compliance with the FM Area Diversion Project Property Rights Acquisition and Mitigation Plan.

Per Special Condition No. 3, final plans and specifications for SE-1 were provided on November 11, 2021. The Diversion Authority provided an Affidavit of the Design Engineer, Michael J. Bart (Professional Engineer registered in the State of Kansas #11410), stating “that the plans and specifications for the project described in this application were prepared in accordance with U.S. Army Corps of Engineers regulations and meet or exceed Federal standards.” There does not appear to be any significant alignment or design changes to SE-1 when compared with the 95-percent Overall Southern Embankment Design Documentation Report reviewed and approved under CP No. 2489.

Per Special Condition Nos. 3 and 4, the final Memorandum of Understanding and certification that SE-1 is in compliance with the FM Area Diversion Project Property Rights Acquisition and Mitigation Plan must be provided prior to construction.

SE-1 DESIGN

According to the Southern Embankment – Reach SE-1 Design Documentation Report, plans and specifications, SE-1 includes the following:

Southern Embankment – Reach 1 (SE-1), earthen embankment with impervious clay fill, typical top width of 15 feet and up to 28 feet along roadways, 3.1 miles long, typical side slopes of 4:1 and 3.5 – 5:1 along roadways

- SE-1 acts as the Western Tieback (Auxiliary Emergency Spillway) for the Southern Embankment with an upstream crest elevation ranging from 923.5 to 928.5 feet.
 - Top of spillway, 923.5 feet at top of impervious, designed to overtop during the Probable Maximum Flood (PMF).
 - Maximum pool elevation for PMF is 923.5 feet. Deviations from the operating plan could cause the pool elevation to exceed 923.5 feet.
- SE-1 incorporates 168th Avenue Southeast, a naturally high ridge where only a portion of the roadway becomes loaded during a PMF event.
 - The loaded segment is loaded by less than 2.5 feet during a PMF event
 - Geometry of the road, 24-28 foot top width, 3.5-5:1 side slopes
- Inspection trench, depth 6 feet, along centerline of embankment. Except along 168th Avenue Southeast, where the existing roadway is used as the dam embankment.

- Erosion protection, upstream (south) slope has a Turf Reinforcement Mat for wave protection for a portion of the reach from the toe of the dam to the side edge of the top of embankment.

Associated Infrastructure

- Borrow ditch - located approximately 50 feet south of the upstream side of the Dam.
 - Not included along the majority of the dam embankment north of 169th Avenue Southeast for Geotechnical reasons
 - Varied bottom width
 - 5:1 side slopes
- Drainage ditch - located approximately 50 feet north of the toe of the downstream side (benefitting side) of the Dam
 - Typical, 10-foot bottom width
 - 5:1 side slopes
 - Convey local runoff to larger county drains or rivers
- Existing ditches along 168th Avenue Southeast are at the toe of the embankment and will not be redesigned
- Ditches along the overtopping reach of the dam are offset 15 feet from either toe of the dam, transitioning to a 50 foot offset as the dam embankment rises to its top of dam elevation of 928.5 feet
- Culverts are located through and adjacent to the dam embankment
 - 3 reinforced concrete culverts, through SE-1
 - 2x36-inch (at one location)
 - 2x24-inch (at one location)
 - 36-inch
 - 5 corrugated steel culverts, parallel to SE-1 under access roads
 - 15-inch (at three locations)
 - 30-inch
 - 36-inch

WATER RESOURCE DISTRICT AND OTHER AGENCY COMMENTS

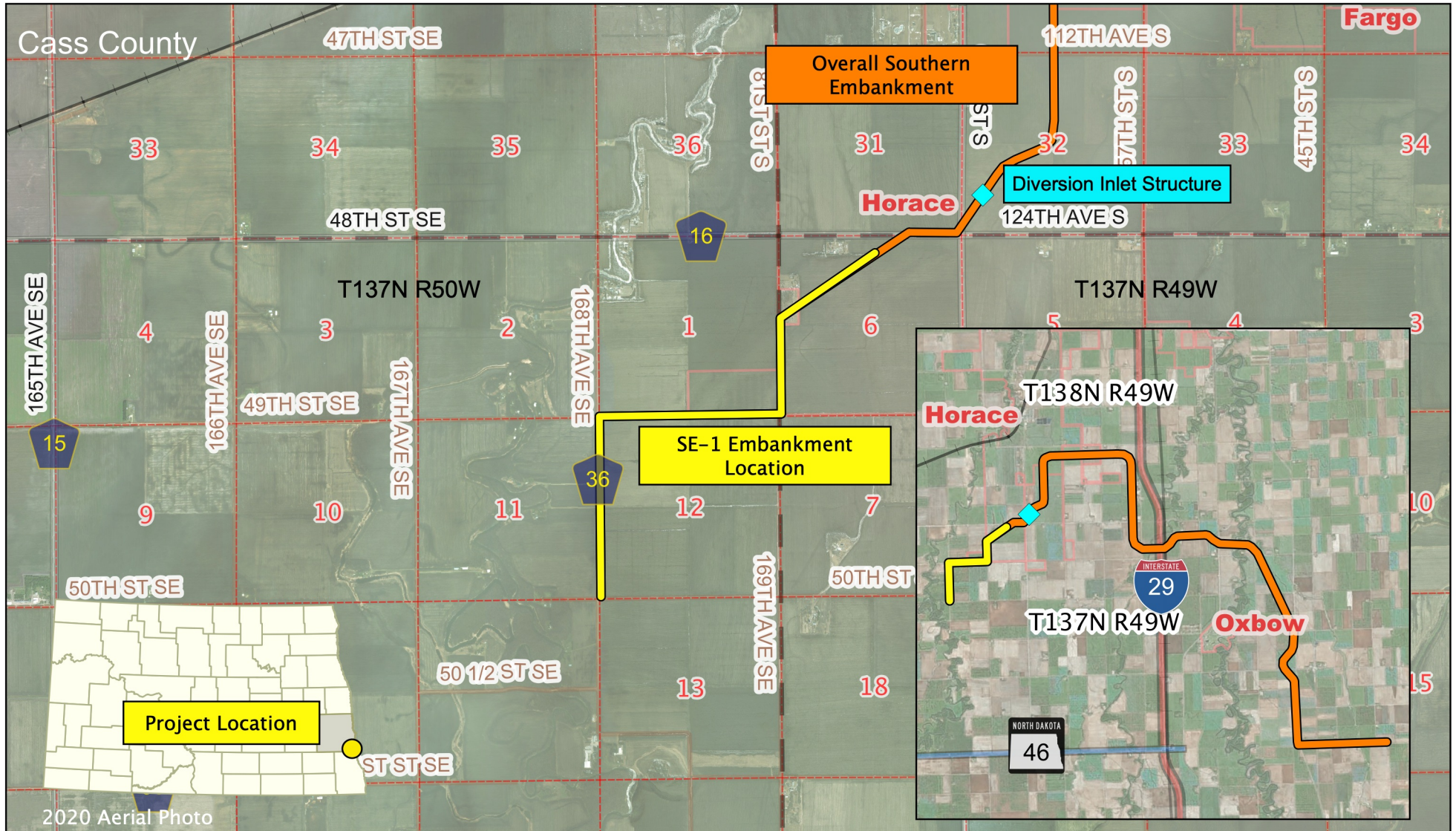
Comment was solicited from the Cass County Joint Water Resource District on February 12, 2021 for SE-1 under the umbrella review of CP No. 2489. See CP No. 2489 umbrella review and approval for District and other agency comments.

DESIGN REVIEW

After review of the design materials and discussions with USACE staff, I have no reason to assume the design will be inadequate or unsafe so long as the Application, its supporting materials, and the permit conditions are followed in the construction of reach SE-1.

CONCLUSION

Based on the information provided in the Application and supporting materials, I **recommend the State Engineer accept the plans and specifications for SE-1, which forms a portion of the Southern Embankment permitted under Construction Permit Application No. 2489. Acceptance of the plans and specifications satisfies Condition No. 3 placed on Construction Permit No. 2489 issued on February 24, 2021.**



Date: 2/24/2021
Prepared by: CWN

Construction Permit Application No. 2489
Metro Flood Diversion Authority

Southern Embankment Reach 1 (SE-1)

Sections 1, 11, and 12, T137N, R50W, and Section 6, T137N, R49W, Cass County, North Dakota

