

Minnesota Public Drainage Manual

Chapter 3 – II. Engineering and Environmental Considerations - Specific environmental considerations

Summary

Drainage projects may be subject to additional local, state, or federal environmental regulations, which are not addressed specifically within [Minn. Stat. 103E](#). Since these regulations can have substantial bearing on the overall design of the project, it is critical that regulatory criteria are reviewed and addressed early in the project process. It is important to incorporate such regulatory considerations into early project planning as they can have significant bearing on the overall design, timeline, budget and success of a project. The roles of the engineer and regulating agency staff and a list of some pertinent regulations are provided in **Section II, A**.

Wetlands

Wetlands impacts are commonly associated with drainage projects due to the location and purpose of drainage systems. Impacts are regulated by various agencies depending on the proposed activity. Determining the activities that will impact wetlands, which activities may require wetland replacement/mitigation and which agency(s) regulate those impacts is dependent upon thorough communication between the drainage authority and the agencies that regulate wetlands in Minnesota. Wetland regulation in Minnesota occurs through state law (Wetland Conservation Act and Public Waters), federal law (Clean Water Act and Food Security Act), and sometimes local ordinances. **Section II, B** provides detailed discussion regarding the relationship of public drainage system projects and activities with these regulations, including:

- Wetland Conservation Act (**Section II, B.1**);
- Clean Water Act (**Section II, B.2**);
- Food Security Act of 1985 (“Swampbuster”) (**Section II, B.3**);

Wetland impacts may result from several different activities involved with a proposed drainage system project (e.g., placement of spoil/fill, excavation, whole/partial drainage). Determination of wetland impacts is discussed in more detail under **Section II, B.4**.

Public Waters

Public waters are defined within [Minn. Stat. 103G.005, subd. 15](#) and include natural and altered watercourses, lakes, and some wetlands. County public waters inventory (PWI) maps and lists are available on the DNR website. Public waters are delineated by the Ordinary High Water Level (OHWL). Proposed project activities within public waters (below the OHWL) may require a permit or permissions from the DNR and potentially mitigation. Applications for a public waters work permit are completed using the DNR, online Permitting and Report System (MPARS). Engineer responsibilities and statutory requirements as they pertain to drainage system projects within public waters are discussed within **Section II, C**.

Environmental Review

Environmental review in Minnesota is managed by the Environmental Quality Board (EQB) under

authority through [Minn. Stat. 116C](#) and [Minn. Rule 4410](#). Some public drainage system projects may trigger formal environmental review requiring an Environmental Assessment Worksheet (EAW) or Environmental Impact Statement (EIS). Mandatory EAW categories can be found in [Minn. Rule 4410.4300](#) and mandatory EIS categories in [Minn. Rule 4410.4400](#). Detail regarding environmental reviews can be found in (**Section II, D**).

Threatened and Endangered Species

Minnesota's Endangered Species Statute ([Minn. Stat. 84.0895](#)) and associated rules may apply to proposed public drainage system activities. The endangered species program regulates activities that take, import, transport, or sell any portion of an endangered or threatened species where these acts may be allowed by permit issued by the DNR. The statutes exempt activities on certain agricultural lands, ditches, and roadways; plants destroyed in consequence of certain agricultural practices; and accidental, unknowing destruction of designated plants. Additional detail regarding the due diligence in avoiding impacts is provided in **Section II, E**.

Water Quality

Water quality is defined by the [Clean Water Act](#) to include the chemical, physical and biological components of a surface water. Water quality impacts resulting from a public drainage project may be positive or negative and may extend downstream of the project. [Minn Stat. 103E.015, subd.1](#) requires the drainage authority to consider water quality before a drainage project (a drainage system improvement, improvement of an outlet, or a lateral).is established.

- There are several statewide and regional standards and goals that may be applicable to public drainage system projects. These standards and goals are described within **Section II, F**.

A. General

Drainage projects may be subject to additional local, state, or federal environmental regulations, which are not addressed specifically within Minn. Stat. 103E. Since these regulations can have substantial bearing on the overall design of the project, it is critical that regulatory criteria are reviewed and addressed early in the project development process. By considering the requirements during the initial design, time delays and unanticipated design changes can be avoided, thus potentially reducing project costs. This requires frequent and timely interaction between the Engineer and regulatory agencies, and a common understanding of the responsibilities of both parties in this collaboration.

It is the role of the Engineer to:

- Understand the state and federal regulations applicable to the project;
- Provide complete project submittals to environmental regulators;
- Understand the level of detail and analysis required to provide a complete submittal (this typically requires communication with the regulating agency prior to design and submittal); and
- Provide the regulatory agencies pertinent timely revisions to the project plans as they occur.

It is the role of the regulating agency staff reviewer to:

- Provide clear descriptions of the applicability of the regulatory program to the project;
- Identify any specific criteria that must be met by the applicable rules;
- Provide guidance on how the process proceeds through the regulatory program;

- Upon request, provide **clear** and **specific** guidance as to what constitutes a complete submittal; and
- Provide timely responses to the project proposer when submittals are discovered to be incomplete.

It is recommended that the engineer begin a proposed project with a conceptual plan or feasibility study as soon as possible (see **Appendix 3**. A concept plan or feasibility study can define the project's magnitude and scope, and inform appropriate federal, state and local officials. It is also useful for defining the overall drainage problem, design criteria, and potential alternatives for the engineer, the drainage authority, and the petitioners. (see **Multipurpose Drainage Management** in Chapter 2.)

Table 1 provides engineers and drainage authorities a starting point in determining pertinent environmental regulatory requirements related to public drainage systems including wetland, public waters, environmental review, threatened and endangered species, and water quality regulation.

See **Appendix 4** for links to and contact information for the regulatory agencies providing environmental oversight on public drainage systems has been provided in.

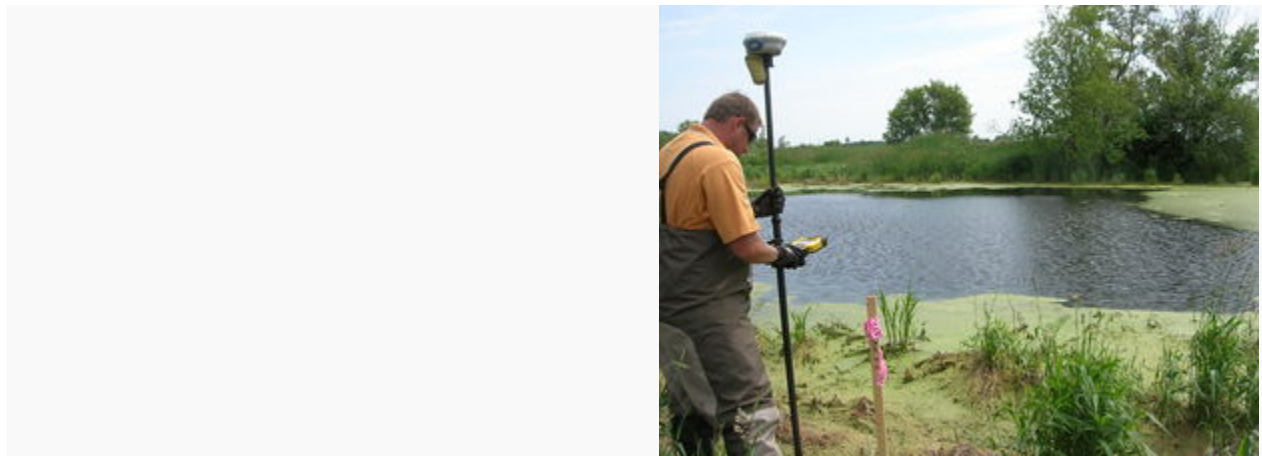
Note: This is not meant to be an exhaustive summary of all environmental regulations potentially encountered during a public drainage system project, but rather a narrative regarding the most common environmental regulations related to public drainage systems.

Table 1. Pertinent Regulations

Agency	Local Regs.	State Regs.	Federal Regs.
Local Government			
Townships	Ordinances	Minn. Stat. 160.20	
Counties	Ordinances	Minn. Stat. 103E , Minn. Stat. 160.20	
Watershed Districts	WD Rules	Minn. Stat. 103E , Minn. Stat. 103D.335	
State Agencies			
BWSR	Rules	WCA (Minn. R. 8420 , Minn. Stat. 103G). Note – WCA is administered by the local government.	
DNR	Rules	• Public Waters and Groundwater Use (Minn. R. 6115, Minn. Stat. 103G) • Calcareous Fens (Minn. Stat. 103G.223) • Endangered Species Laws (Minn. R. 6134)	
Environmental Quality Board		• Minn. R. 4410.1000 • Minn. R. 4410.4300, subp. 26 • Minn.R. 4410.4600, subp. 14E, subp. 17	
MnDOT (State Hwy ROWs)		• Minn. Stat. 160.20 • Minn. Stat. 161.28 • Minn. Stat. 160.201 • Minn. Stat. 160.2715 • Minn. Stat. 161.45	

MPCA		- State Water Quality Standards (Minn. R. 7050) - Municipal/Industrial Stormwater NPDES Permit - NPDES/SDS Construction Stormwater General Permit	
Federal Agencies			
US Army Corps of Engineers (USACE)/EPA			Clean Water Act
USDA			Food Security Act

B. Wetlands



Public drainage systems are frequently located along low-lying landscapes and through wetlands. Because of this, nearly any drainage system activity can have the potential to result in wetland impacts.

Public drainage systems are frequently located along low-lying landscapes and through wetlands. Drainage systems utilize the lower topography to reduce the depth of excavations and provide the most efficient gravity flow, reducing costs, as well as impacts from excavation. Additionally, since public drainage systems primary purpose is to remove water from the landscape and historically to convert wet areas to upland for agricultural purposes, it is common for systems to traverse wetland areas. Because of their proximity to wet areas, nearly any drainage system activity, including new drainage systems, repairs, improvements, realignments, and impoundments, can have the potential to result in wetland impacts. However, the degree to which these impacts are regulated by various programs can vary, depending on the activity.

Determining which activities will impact wetlands, which activities may require replacement (mitigation), and which agency(s) regulate those impacts is dependent upon thorough communication between the drainage authority and the agencies that regulate wetlands in Minnesota. Wetland regulation in Minnesota occurs through state law (Wetland Conservation Act and Public Waters), federal

law (Clean Water Act and Food Security Act), and sometimes local ordinances or rules. The following is a summary of how each of these laws relates to and regulates public drainage.

1. Wetland Conservation Act

The purpose of the Wetland Conservation Act (WCA) ([Minn. Stat. § 103G.221-2375](#)), enacted in 1991 and amended several times since, is to maintain and protect Minnesota's wetlands and the benefits they provide, with a goal of no net loss of wetland resources. WCA regulates the draining or filling of wetlands and employs the concept of sequencing. Sequencing requires project proposers to initially attempt to avoid wetlands. Wetland impacts that are unavoidable and subject to be drained, filled, or excavated by project activities must minimize any impact on the wetland; and any lost wetland acreage, functions, and values must be replaced or mitigated. Certain wetland activities are exempt from the act, allowing projects with minimal impact or projects located on land where certain pre-established land uses are present to proceed without regulation. Public drainage systems are one of these pre-established land uses ([Minn. Stat. § 103G.2241 subd.2](#)).

Under the WCA, most activities related to minor maintenance of a public drainage system, though potentially taking place within the confines of wetlands, are **not** considered to result in jurisdictional wetland loss. [Minn. R. § 8420.0415](#) establishes "no-loss" criteria identifying activities that are considered to result in no permanent loss (or impact to) wetlands. These activities related to public drainage system maintenance include:

- Excavation in wetlands when limited to removal of sediment or debris such as trees, logs, stumps, beaver dams, blockage of culverts, and trash, provided the removal does not result in alteration of the original cross-section of the wetland or watercourse;
- Removing those materials placed by beaver;
- Removing or moving materials blocking installed roadway culverts and related drainage structures; and
- Temporary or seasonal water level management activities done for the purpose of performing maintenance.

Other activities related to maintenance or repair of a public drainage system may result in wetland impacts but are exempt from replacement. [Minn. R. § 8420.0420 Subp. 3](#) identifies exempt activities related to public drainage systems, which include:

- Maintenance or repair of a public drainage system which drains Type 1, 2, 6, 7, or 8 wetlands; and
- Maintenance or repair of a public drainage system which drains Type 3, 4, or 5 wetlands that have existed for 25 years or less.

Activities considered to be "no-loss" or exempt from replacement do not require wetland replacement plans under the WCA. Though not required, in these cases it may be prudent for the drainage authority to apply to the local government unit (LGU) for a no-loss or exemption decision prior to proceeding with the maintenance activity.

Several activities completed on a public drainage system may result in wetland impacts that are not exempt and require a permit application with replacement plan. These activities include, but are not limited to:

- Maintenance or repair of a public drainage system which drains Type 3, 4, or 5 wetlands that have existed for more than 25 years ([Minn. R. § Part 8420.0420 Exemption Standards, Subp. 3. Drainage B.\(1\)](#));
- Maintenance or repair of a public drainage system not authorized by the drainage authority; and
- Improvement of a public drainage system.

Applications for WCA impacts are received by, reviewed, and approved or denied by the designated Local Government Unit (LGU). The LGU is most frequently the county in which the majority of work for the project takes place, though some cities and watershed districts are the designated LGU for work within their boundaries. A directory of the WCA LGUs throughout the state are found on [BWSR's website](#).

Calcareous fens have special protections under the WCA. According to the WCA, calcareous fens may not be filled, drained, or otherwise degraded, wholly or partially, by any activity, unless the commissioner of natural resources, under an approved management plan, decides some alteration is necessary ([Minn. Stat. § 103G.223](#)). The DNR maintains a list of known calcareous fens, which is available on the [DNR's website](#).

The DNR should be consulted regarding any public drainage system project that may affect a calcareous fen.

More information regarding WCA compliance can be found on the [Board of Water and Soil Resources \(BWSR\) website](#).

2. Clean Water Act (CWA)

The portions of the CWA related to wetlands and public drainage systems are Section 401 (33 U.S.C. §1341) and Section 404 (33 U.S.C. § 1344). Section 404 requires a Federal permit for the discharge of dredged or fill material into waters of the United States, which includes some wetlands. The US Army Corps of Engineers administers the program and issues 404 permits. For categories of activities that have minimal impact, nationwide, regional, or state general permits are issued which do not require individual permits. Other activities which involve a greater risk to water quality require an individual 404 permit.

Maintenance of drainage ditches is generally exempt from Section 404 requirements. This includes work required to restore public drainage system function to the as-constructed and subsequently improved hydraulic capacity ([Minn. Stat. 103E.701, Subd. 1](#)).

Various federal and state agencies, depending upon the nature of the project, review Section 404 permit applications. Section 401 of the Clean Water Act requires any applicant for a federal license or permit to discharge a pollutant into waters of the United States to obtain a certification from the State that the discharge complies with applicable water quality standards. States or tribes have the ability to grant the certification, place conditions on the certification, deny, or wave certification. A denial of certification prohibits issuance of the permit. The Minnesota Pollution Control Agency issues 401 certifications for Section 404 permits. Individual 404 permits for activities which involve a greater risk to water quality require individual review. Section 404 general permits have been reviewed and certified and do not require further review. Additional information regarding the MPCA 401 certification program is available [here](#).

Regional General Permit RGP-003-MN, last re-issued by the U.S. Army Corps of Engineers in 2018, authorizes discharges of dredged or fill material into waters of the United States associated with certain types of agricultural activities, including the following activities related to public drainage systems:

- Replacing altered natural watercourses, artificial watercourses, or linear wetland drainage with subsurface drainage tile or pipe (e.g. replacing public drainage system open channel with tile);
- A drainage improvement of NRCS-designated farmed wetlands or wetlands that have been in agricultural use for six of the last ten years. Typically the improvement consists of the installation of subsurface drainage tile; and
- Installation of non-perforated drainage tile in wetlands for the purposes of connecting an upland drainage system to a waterbody or ditch (e.g. portions of an improvement or new public drainage system consisting of non-perforated tile).

Details regarding the general permit are available [here](#).

Those undertaking ditch maintenance may want to contact the St. Paul District for an exemption verification. If an activity is believed to be covered by a General Permit, project proposers should carefully read the descriptions for each category to insure that their project is eligible for authorization based on the impact thresholds, exclusions, and terms and conditions. Some categories under General Permits require pre-construction notification.

Section 404 regulates the discharge of dredged/fill material into wetlands, streams, lakes, and other waters regulated by the program. Drainage system projects that involve placement of fill into wetlands or other waters may require authorization from the U.S. Army Corp of Engineers (St. Paul District) under the Section 404 regulatory program. Projects may be authorized by a [General Permit](#) issued by the Corps or they may require issuance of an Individual Permit. Compensatory mitigation for proposed wetland/water fill may be required depending on the type of authorization needed (General or Individual Permit), purpose of the project, types of wetlands/waters impacted, the severity of the impacts on aquatic resource functions, and the overall amount of fill proposed. When mitigation is required, using/purchasing previously established wetland bank credits in the state wetland banking system is typically preferred.

Projects where more than one jurisdiction may require wetland mitigation, need to be coordinated early with the appropriate agencies to assure that mitigation choices are made with, and meet the requirements of, all the agencies.

Contact the [U.S. Army Corp of Engineers, St. Paul District](#), for more information on CWA requirements.

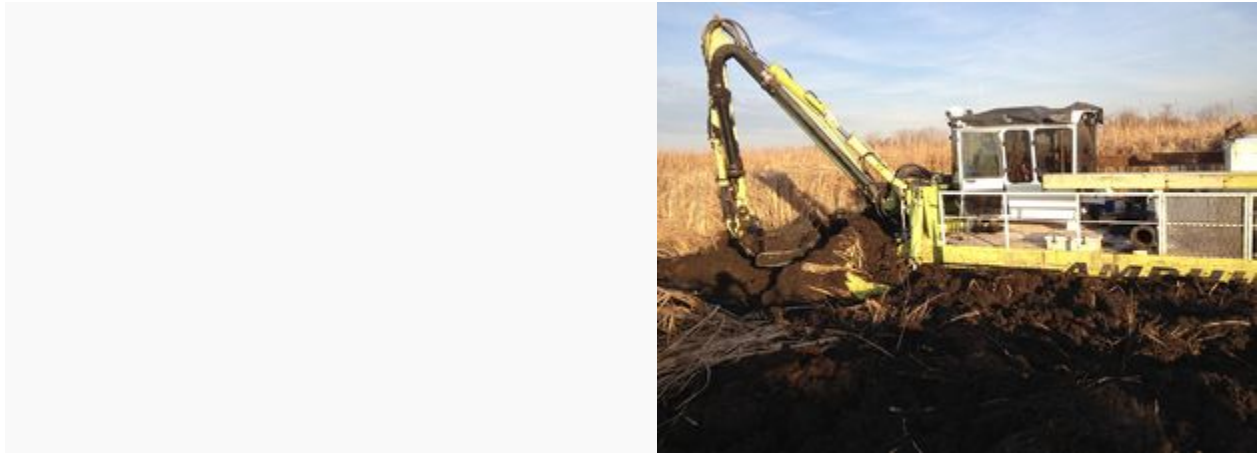
A combined project application form for 401 certification and a 404 permit is available [here](#).

3. Swampbuster

Swampbuster is a provision of the Food Security Act of 1985 (P.L. 99-198) that discourages the conversion of wetlands to cropland use. Persons who plant an agricultural commodity on wetlands that were converted between December 23, 1985 and November 28, 1990 will be ineligible for U.S. Department of Agriculture (USDA) farm program benefits in any year an agricultural commodity is planted unless an exemption applies. Persons who convert a wetland making production of an agricultural commodity possible after November 28, 1990, will be ineligible for program benefits until the functions of the wetland that was converted are mitigated, unless an exemption applies.

Swampbuster does not have a direct effect on public drainage authorities, but may affect the allowable uses for lands drained by a public drainage system. For instance, an agricultural producer who plants a crop on wetlands drained by a public drainage system improvement may be ineligible for farm program benefits until the wetland impacts are mitigated. As part of a public drainage system project proceedings, the drainage authority should inform landowners and agricultural producers of potential implications to land uses resulting from the project, including Swampbuster provisions.

4. Determining Wetland Impacts



Determining the footprint of excavations and fills is relatively easy and straightforward. However, determining impacts resulting from drainage is an inexact science.

Wetland impacts may result from a public drainage system project through several different mechanisms, including placement of spoil or fill in a wetland, excavation of a wetland (where it changes the wetland type), whole/partial drainage of a wetland, and potential effects of increased flow or sediment on a regulated wetland affected by a drainage system project. Determining the footprint of excavations and fills is relatively easy and straightforward. However, determining impacts resulting from drainage (particularly subsurface drainage) is an inexact science and can require field work, modeling, and the engineer's professional judgement to effectively estimate the impacts and required mitigation for a project. Potential effects of increased flow or sediment on a jurisdictional wetland might include effects on vegetation, habitat, and associated wetland functions and values.

a. Drainage Setback Requirements

In 2012, the Natural Resource Conservation Service (NRCS) issued drainage setback tables to provide producers and decision-makers guidance on setback distances for installation of drains (tile or open channel) to avoid wetland impacts resulting from lateral drainage effects (i.e. subsurface drainage). These tables, which are derived from the Van Schilfgaarde equation, are county-specific and based on the existing database of soil properties within each county. However, the setback tables are approximations only, and may not reflect actual field conditions. If the nature of their use requires more "precision", setback tables should be verified by comparison with other techniques for evaluating drainage effects. In no case should drainage tables overrule onsite evidence of wetland hydrology or its absence. The extent to which a wetland is affected by a drainage activity depends on several factors, not all of which may be captured in the setback calculation.

To enable a more detailed application of the Van Schilfgaarde equation, the NRCS also developed a tool called “ND Drain” which accepts detailed soil properties and geometry of the drain to determine lateral drainage effects. Using this tool enables more site-specific calculation of drainage impacts, increasing the precision of the determination.

A detailed guide on usage of the NRCS drainage setback and ND Drain is found on the [BWSR website](#).

b. Van Schilfgaarde Equation

The predicted impact of public drainage systems on wetlands can be evaluated through use of the Van Schilfgaarde equation (see **Appendix 5** for a full description of the equation and its input parameters). Originally developed to determine spacing distances between drainage tiles for optimal drainage performance, this equation has since been applied to determining the width of effective drainage resulting from a tile or open channel. Automated calculation of this equation over an entire drainage system in which soils, drain depth, and drain size vary can be completed using the use of a spreadsheet, a simple custom program, or a geospatial tool.

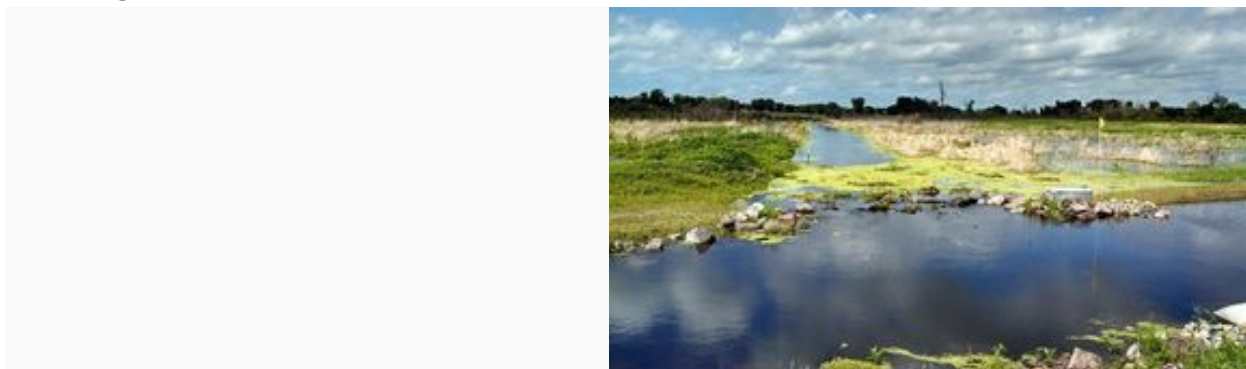
The most critical variable within the Van Schilfgaarde equation is “**d**” – depth to free water surface from the ground surface. For tile systems, this variable at any location within the system can be simply equated as the depth to the bottom of the tile (assuming the tile is fully drained most of time). However, determination the appropriate value of this variable for open channel systems is much less clear, since the water surface can vary substantially over time. Simply picking the bottom of the open channel may overestimate the lateral drainage effects substantially, as many open channel systems (particularly those situated in relatively flat topography) are very infrequently fully drained. One method to determine the free water surface in an open channel system is through the use of a hydrology and hydraulics model. Modeling prepared to assess the benefit of a public drainage system project may often be modified for this purpose.

c. Impacts Resulting from Repairs and Improvements

Improvement projects and repairs to public drainage systems not maintained in the last 25 years may result in wetland impacts that require mitigation (WCA, [Minn. R. Part 8420.0420 Exemption Standards, Subp. 3. Drainage B.\(1\)](#)). The estimated scope (width) of lateral drainage can be determined by the methods outlined in the previous paragraphs. However, the real impacts resulting from the improvement or repair may only be a portion of the estimated scope, since some portion of the wetlands previously experienced altered hydrology due to the presence of the existing drainage system. An accepted method of determining the scope of wetlands impacted by the project is to determine and compare the scope of lateral drainage for the public drainage system under both proposed and existing conditions, and apply required replacement ratios to the difference.

The engineer should be sure to consider the wetland delineation when selecting and calibrating the parameters in the equation. The existing wetland type may indicate a need to adjust the parameters to account for compaction of the soil column under the spoil bank (which may affect soil permeability), confining soils layers, or surface flow into the wetland. These assumptions should be considered in both the existing and proposed conditions lateral drainage effect calculations prior to determining project impacts.

5. Downgradient Wetland Effects



The water control structure at Brown's Preserve in Columbus, MN, preserves hydrology in a wetland restoration area, yet enables restored function of Judicial Ditch 4. Photo courtesy of the Rice Creek Watershed District.

Increases in peak flow and in volume under certain circumstances may have deleterious effects upon downgradient wetland plants due to fluctuating water levels, or “bounce.” It is common for public drainage systems to intersect (flow into and out of) lakes and/or wetlands. Shallow wetland basins may contain fine sediments and nutrients – particularly phosphorus, that can be transported by high flows. As additional drainage capacity is added to a drainage network, the potential for these fine sediments and nutrients to be moved to downstream receiving waters, including other wetlands, may be significant and should be considered.

Another potential downgradient wetland impact from drainage is the interconnection of wetlands, which can result in pollutant transport and invasive species movement. Movement of invasive species has proven to be detrimental to the biological integrity of surface waters including wetlands.

Note: Downgradient wetland impacts are not specifically regulated under the Clean Water Act or Wetland Conservation Act but may be a pertinent consideration when examining the effects on wetland per [Minn. Stat. 103.015](#).

C. Public Waters

Public waters are defined within [Minn. Stat. § 103G.005 subd. 15](#) and include natural and altered watercourses, lakes and wetlands. Unique to the public waters program is the fact that public waters have been inventoried and designated through a public process. These public waters have also been listed and mapped to identify their general location. County public waters inventory (PWI) maps are available on the [DNR website](#).

*Note: Dashed lines on the PWI map denote watercourses which are designated as both public waters **AND** public drainage systems.*

Unlike wetlands regulated by WCA or CWA, which require delineation by hydrology, soils, and vegetative indicators, public waters are delineated by the [Ordinary High Water Level \(OHWL\)](#). Public drainage system activities within public waters (below the OHW) may require a permit or permissions from the DNR. It is a responsibility of the engineer to identify the locations of public waters potentially affected by the public drainage system project, evaluate the project’s potential for impacts, and coordinate with

the DNR to determine necessary approvals for the project (if required). It is recommended that prior to the development of project plans, the engineer should consult with the area hydrologist to conduct an OHW survey if needed and to discuss the nature of the proposed project.

[Minn. Stat. § 103G.245](#) regulates work within public waters, and generally exempts public drainage projects conforming to [Minn. Stat. 103E](#) requirements from a public waters work permit if they are located in an altered natural watercourse (identified on the PWI maps) or do not substantially affect public waters. The determination of what constitutes a substantial impact to public waters is a key component for the engineer to consider in developing the project, and the engineer should consult with the DNR area hydrologist to determine how the engineer's report or additional supplemental information should be developed to assist the DNR in this determination (see **Appendix 6** for a checklist of items to consult with DNR Hydrologist). When determining whether a project will have substantial impacts the DNR may consider a number of factors including but not limited to the following: (whether the project changes the current course or cross-section of a public water;

- Whether the project triggers mandatory environmental review;
- Whether the project impacts significant fish and wildlife habitats;
- Whether the project has the potential to impact protected species; and
- Whether the project requires DNR authorization (i.e. permission or a permit) under [Minn. Stat. § 103E.011](#).

Projects that substantially affect public waters require a public waters work permit and may require mitigation. Applications for a public waters work permit are completed using the [DNR Permitting and Reporting System \(MPARS\)](#).

Specific to repair projects, [Minn. Stat. § 103E.701 subd. 2](#) requires the drainage authority to notify the DNR if a repair **may** affect public waters. If the DNR disagrees with the repair depth, the engineer, DNR, and a soil and water conservation district technician must jointly determine the repair depth, which will then be recommended to the drainage authority. The drainage authority may accept the recommended repair depth and proceed with the repair.

D. Environmental Review

Minnesota has developed a system for reviewing and determining the potential for significant environmental effects of projects initiated by individuals, organizations, and government units. Environmental review (ER) is managed by the Environmental Quality Board (EQB) under authority through [Minn. Stat. § 116C](#) and [Minn. R. § 4410](#). Some public drainage system projects may trigger formal environmental review requiring an Environmental Assessment Worksheet (EAW) or Environmental Impact Statement (EIS). The mandatory EAW categories can be found at [Minn. R. § 4410.4300](#) and the mandatory EIS categories at [Minn. R. § 4410.4400](#).

It is critical to know early in the project life whether an EAW or EIS is required for the project (see **Appendix 7**), since they can take several months or longer to complete. Conceptual (preliminary) plans are typically sufficient for preparation of either ER document.

[Minn. R. § 4410](#) designates a Responsible Government Unit (RGU) to administer the preparation of ER documents, the verification of the documents for accuracy, and timely compliance with environmental

review processes. The RGU for public drainage projects is typically the county or watershed district in which the majority of the project is located.

Routine maintenance or repair of a public drainage system within the limits of its original construction flow capacity, performed within 20 years of construction or major repair, is exempt from all EAW/EIS requirements.

Some public drainage system projects may trigger a mandatory EAW. They include:

- Impoundment of a public drainage system creating additional water surface of 160 or more acres;
- Projects changing or diminishing the course, current, or cross-section of one acre of any public water;
- Projects changing or diminishing the course, current, or cross-section of 40 percent or 5 acres of Type 3 through 8 wetlands of 2.5 acres in size or greater if any part of the wetland is within a shoreland area or delineated floodplain;
- Diversion, realignment or channelization of a designated trout stream; and
- Diversion, realignment or channelization of more than 500 feet of a natural watercourse with a drainage area of 10 or more square miles.

An EAW may also be required as a result of a petition by at least 100 individuals who reside or own property in the state. If the petition meets [Minn. R. § 4410](#) requirements, and if the evidence provided by the petitioner demonstrates that the project may have significant environmental effects, the RGU must order the preparation of an EAW or deny the petition if this has not been demonstrated.

A mandatory EIS will be required for a public drainage system project that eliminates a public water.

If an EAW or EIS is required for a governmental action under [Minn. R. § 4410](#), or if the RGU orders a discretionary review, or if a petition for an EAW is filed no permits can be issued, approvals given, or projects started, or actions taken (such as acquisition of property) that could prejudice the decision on the project until:

- a) A petition for the EAW is dismissed;
- b) A negative declaration on the need for an EIS is issued;
- c) An EIS is determined adequate; or
- d) A variance is granted per [Minn. R. § 4410.3100](#).

E. Threatened and Endangered Species



*It is the engineer's responsibility to **complete due diligence** to **avoid** impacts to threatened and endangered species.*

Public drainage systems may encounter situations where Minnesota's Endangered Species Statute ([Minn. Stat. 84.0895](#)) and the associated rules apply. The endangered species program regulates activities that take, import, transport, or sell any portion of an endangered or threatened species where these acts may be allowed by permit issued by the DNR. The [statutes](#) exempt activities on certain agricultural lands, ditches, and roadways; plants destroyed in consequence of certain agricultural practices; and the accidental, unknowing destruction of designated plants.

It is the responsibility of the Engineer when preparing a final report to complete due diligence to avoid impacts to threatened and endangered species. This due diligence may include checking the [DNR Natural Heritage Information System \(NHIS\)](#) for observances of rare species within the project corridor and notating these occurrences within the report, or may include more extensive field surveys and avoidance planning in extremely sensitive locations and as required by permitting agencies. The Engineer may consider completing this due diligence early in the project cycle to allow for design modifications or changes to the estimate of project costs necessary for impact avoidance.

More information regarding endangered and threatened species can be found on the [DNR website](#).

F. Water Quality

Water quality is defined by the Clean Water Act to include the chemical, physical and biological components of a surface water. Public drainage system projects have potential to affect water quality (both positively and negatively) within the drainage system and/or downstream, through a variety of different mechanisms, including changes in velocity and scour potential, depth and duration of high

flows, altered vegetation, changes in nutrient and sediment delivery, and modifications of runoff volumes and peak flows. These mechanisms may affect delivery of sediment (suspended solids and/or bedload), phosphorus, nitrogen, other nutrients, other substances, and biological oxygen demand within the drainage system and/or downstream. [Minn. Stat. § 103E.015 Subd. 1](#) requires the drainage authority to consider water quality before a drainage project (a new drainage system, an improvement of a drainage system, an improvement of an outlet, or a lateral) is established. It is recommended that the engineer begin this consideration during the preliminary design phase of the drainage project to accomplish the following:

- Identify the mechanisms related to the project that may affect water quality, including the potential for increased erosion and/or sedimentation in channels, wetlands, or other waterbodies;
- Evaluate (qualitatively or quantitatively) whether the project will result in a water quality impact via these mechanisms;
- As necessary, provide options to offset the effects of these impacts; and
- Make a recommendation to the drainage authority.

It is the responsibility of the drainage authority to evaluate and initiate appropriate methods for proper consideration of water quality impacts for a given drainage project. A list of questions helpful in considering water quality impacts has been provided in **Appendix 8**.

There are several statewide and regional water quality regulations, standards and goals that may be applicable to public drainage system projects. These include:

Construction Stormwater Permits

Under the Clean Water Act (CWA) and state law, a [National Pollutant Discharge Elimination System \(NPDES\)/State Disposal System \(SDS\) Construction Stormwater Permit](#) may be needed for a public drainage system project. This permit requires best management practices (BMPs) for erosion prevention and sediment control during construction.

Generally, construction activities including clearing, grading, and excavating that will disturb one or more acres of land requires coverage under a NPDES/SDS construction stormwater permit. However, disturbance of less than five acres for the purpose of routine maintenance to maintain the original line and grade, hydraulic capacity, and purpose of the drainage system is exempt **if all of the following apply to the project:**

- The project will disturb less than five acres of land as part of the routine maintenance activity;
- Clean out of a ditch will return the affected reach to the original line and grade, hydraulic capacity, and original purpose of the ditch;
- Maintenance of the ditch is in compliance with state and federal wetland regulations; and
- Appropriate BMPs are used for erosion prevention and sediment control to avoid transport of sediment and associated contaminants that would violate water quality standards downstream from the project area during maintenance and restabilization of the drainage ditch.

Drainage ditch repair or maintenance projects that will disturb five acres of land or greater are not considered routine maintenance and require NPDES/SDS construction stormwater permit coverage. A permit is also required for a public or private ditch project if:

- The project is to establish a new drainage ditch and will disturb one or more acres of land; or
- The project involves improvement of an existing drainage ditch and will disturb one or more acres of land; or
- The project involves repair by re-sloping of an existing drainage ditch and will disturb one or more acres of land.

Additional guidance on drainage project BMPs for construction stormwater permits is available [here](#).

State Water Quality Standards

When an engineer is in the “consideration” process of [Minn. Stat. § 103E.015](#), she/he will need to know the condition of the water quality of the drainage system as well as downstream waters. [Minnesota Rules Chapters 7050.0221](#) through [7050.0227](#) specify water quality standards for waters of the state, classified into seven classes of water uses. If water quality standards are exceeded, the Clean Water Act requires that the water is listed as impaired.

Total Maximum Daily Load (TMDL):

Once a water is listed as impaired, a total maximum daily load (TMDL) must be prepared to determine the allowable point and nonpoint source pollutant loads to an impaired stream, reach or waterbody necessary to meet applicable water quality standards. The engineer should identify within the preliminary engineer’s report if the drainage project is within or upstream of an impaired water or within a watershed subject to a TMDL. The report should include a discussion on how potential increases in pollutant loading to impaired waters and those with TMDLs are considered and a recommendation to the drainage authority on any specific actions that should be taken.

Some drainage projects can result in the rerouting of runoff from one watershed to a neighboring watershed, resulting in the alteration of pollutant loads to the receiving water of the neighboring watershed. Such a change in loading may require a recalculation of total maximum daily loads for the receiving water.

Watershed Restoration and Protection Strategy (WRAPS):

In 2013, the Minnesota Legislature adopted amendments to [Minn. Stat. 114D](#) requiring that all major watersheds (HUC (Hydrologic Unit Code) - 8) have a Watershed Restoration and Protection Strategy (WRAPS). A WRAPS is a summary document that includes TMDLs, watershed assessment and biological stressor identification work, watershed and water quality modeling and monitoring, as well as summaries of other relevant projects and efforts in that watershed. The WRAPS provides a table that includes the implementation strategies needed to meet the water quality standards and a timeframe with interim milestones to achieve them.

The Engineer can assess the [current status of these water quality documents](#), by major watershed on the MPCA website. The Minnesota Pollution Control Agency also maintains a [list of TMDLs and WRAPS](#). Additional information regarding watershed planning is available in **Appendix 13**.

Statewide and Regional Reduction Goals:

The [Minnesota Nutrient Reduction Strategy](#), adopted in September 2014, is a valuable tool for drainage authorities and engineers for consideration of water quality impacts. This strategy report provides

nutrient reduction goals and milestones for the three major drainage basins in Minnesota, prioritizes problems and solutions, and provides general strategies for accomplishing these goals.

The Red River Basin Commission and the State of Minnesota have also developed flow reduction goals for two of the state's largest river basins to achieve multiple long term goals including flood and nutrient reduction. These flow reduction goals include:

- A [20% peak flow reduction goal on the main stem of the Red River](#), for a flood equivalent to the 1997 spring flood; and
- A [25% reduction](#) in the magnitude and duration of the two-year peak flow in the Minnesota River.