

Project Name | BCWD Permit 23-01 CSAH 61 Improvements

Date | March 2, 2023

To / Contact info | BCWD Board of Managers

Cc / Contact info | Eden Rogers, PE / Washington County

Cc / Contact info | Dan Elemes, PE / Moore Engineering

Cc / Contact info | Karen Kill, Administrator / BCWD

From / Contact info | Paul Nation, EIT / EOR

Regarding | Permit Application No. 23-01 Engineer's Report

The following review of the above mentioned project located within the legal jurisdiction of the Brown's Creek Watershed District (BCWD) was conducted to determine compliance with the BCWD rules for purposes of the engineer's recommendation to the Board of Managers for its determination of the permit application.

Applicant: Washington County

Permit Submittal Date: February 2, 2023

Completeness Determination: February 7, 2023

Board Action Required By: April 2, 2023

Review based on BCWD Rules effective April 1, 2020

Recommendation: *Consider Variance Request*

GENERAL COMMENTS

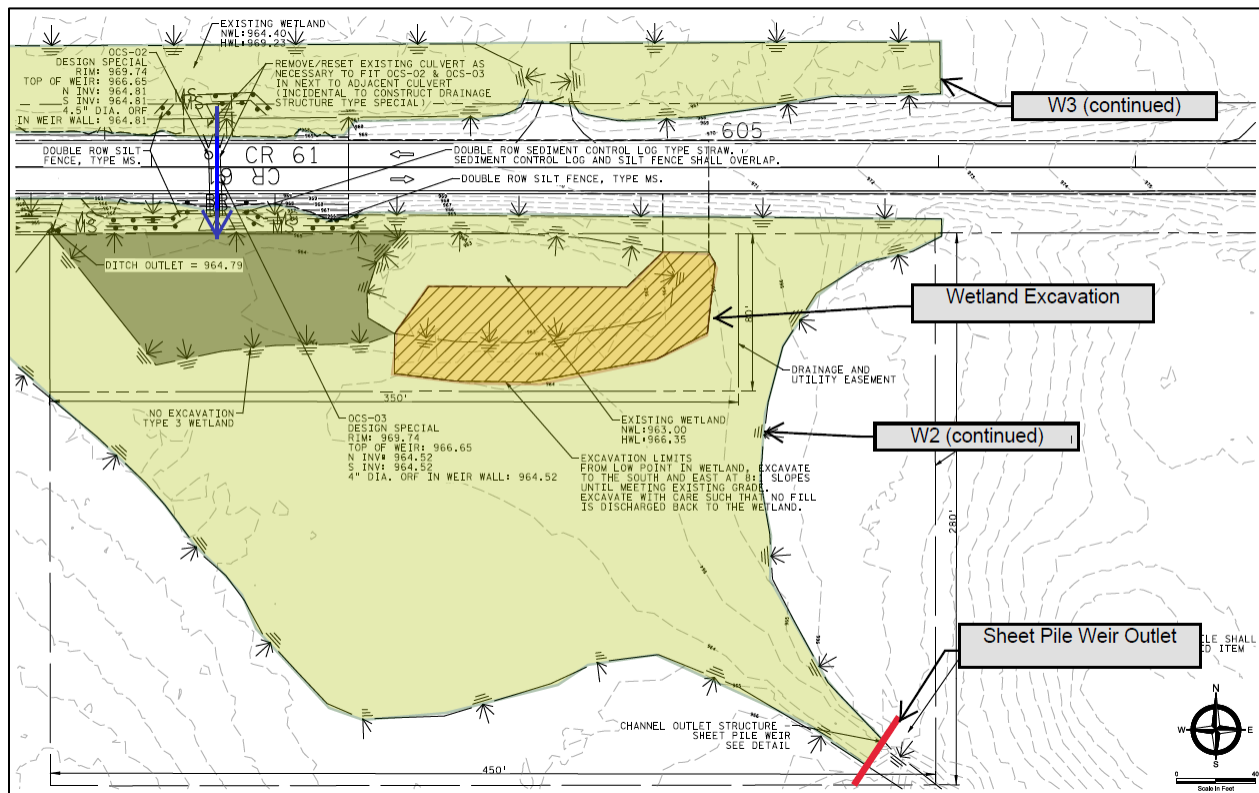
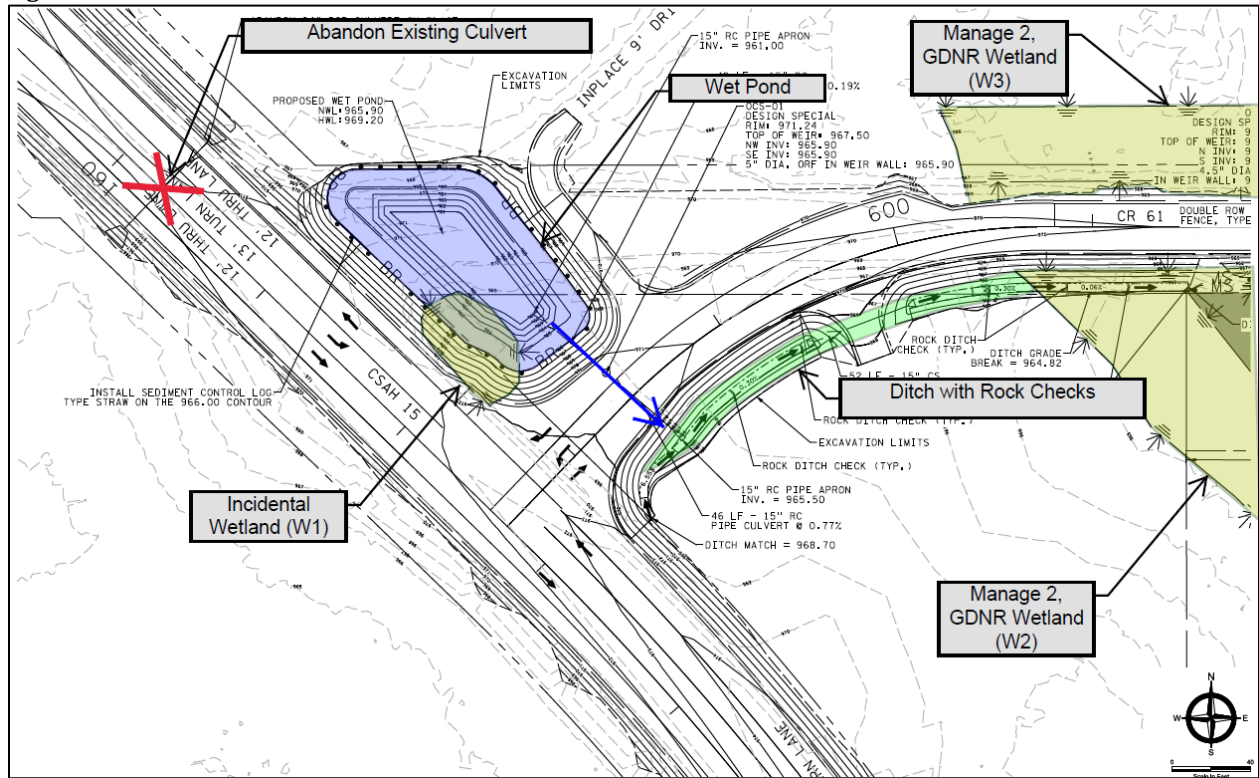
County State Aid Highway (CSAH) 61 currently intersects CSAH 15 (Manning Avenue) at a 45-degree angle and, as indicated by Washington County, does not meet current, applicable design standards for intersection safety. (Please see figure 1, below.) Both roads are rural section with ditches to convey runoff. Runoff from CSAH 15, north of CSAH 61, drains through an east-to-west culvert at the intersection and flows through the neighboring farm field before discharging to Brown's Creek. Runoff along CSAH 61 drains to two wetlands on either side of the highway which are groundwater-dependent, Manage 2 wetlands. The wetland on the north side of the highway (W3) is connected by two culverts to the wetland on the south side of the highway (W2) and the two function hydraulically as one unit. Wetland W2 overflows to the south, through several other wetlands, eventually draining to Brown's Creek.

Washington County proposes to realign the intersection so that CSAH 61 makes a 90-degree angle with CSAH 15, resulting in an increase of 0.25 acres of impervious surface. This project also includes pavement rehabilitation (mill and overlay) along a larger stretch of CSAH 15. New and reconstructed impervious from the road realignment (0.66 acres) will be treated by a wet pond, plus rock check dams along the CSAH 61 ditch to promote infiltration. This ditch drains to wetland W2, which will be partially excavated to create additional open water habitat and improve the quality of the wetland. A sheet-pile weir will be installed at the wetland outlet to provide additional stormwater capacity. The project also includes redirecting runoff along CSAH 15 to drain to the wet pond instead of to Brown's Creek. This addresses a longstanding drainage issue (erosive runoff from the culvert outfall) that has

been the subject of past conversations among BCWD, Washington County, and the owners of the property on which the wetland is located, Craig & Marcia DeWolf.

Recommendation: The BCWD engineer recommends that the Board consider the applicant's requests for two variances and permit application in light of the analysis provided below.

Figure 1: Site Plan



Rule 2.0—STORMWATER MANAGEMENT

Under 2.2(c) of the rule, the proposed project triggers the application of Rule 2.0 Stormwater Management because it is a linear project creating 28,530 square feet of new and reconstructed impervious surface within the surface water contributing area of a groundwater-dependent natural resource (greater than the 6,000 square foot threshold). The site is not within the Diversion Structure Subwatershed, so the stormwater criteria in subsection 2.4.2(a) apply.

The stormwater management plan for the project includes a wet pond, receiving runoff from CSAH 15 and the reconstructed portion of CSAH 61, a ditch with rock check dams providing additional treatment of pond outflow, wetland grading and outlet modification to provide additional storage capacity, and abandoning of an existing culvert which contributed to erosion issues. (Note that Wetland Conservation Act (WCA) determinations have been issued for all wetland impacts, and documentation of WCA determinations has been provided by the applicant.) Under current and proposed conditions, Wetlands W2 and W3 are connected by two culverts under CSAH 61 such that they function hydraulically as one system.

Under current and proposed conditions, runoff leaves the site at the following discharge points:

- *“Southwest” – This discharge point receives 28.0 acres of runoff from the CSAH 15 ditches, north of CSAH 61 and ultimately drains to Brown’s Creek. Under proposed conditions this discharge point will only receive runoff from the west ditch line of CSAH 15, totaling 11.0 acres.*
- *“Southeast” – This discharge point is the outlet of Wetland W2 and receives 155.9 acres of runoff under existing conditions. This includes CSAH 61, along with a larger drainage area to the north, extending towards 124th Street N. Under proposed conditions the drainage area will increase to 172.9 acres due to the planned drainage alteration.*

Rate Control

According to BCWD Rule 2.4.1(a)(i), an applicant for a stormwater management permit must demonstrate to the District that the proposed land-altering activity will not increase peak stormwater flow from the site, as compared with the pre-settlement condition, for a 24-hour precipitation event with a return frequency of two, 10 or 100 years for all points where discharges leave a site.

Rule Requirement Met

The stormwater management plan developed for the site was evaluated using a HydroCAD model of pre-settlement and proposed site conditions. A comparison of the modeled peak flow rates is included in Table 1 and Table 2.

Table 1 - Peak Discharge Rate “Southwest”

<i>Event</i>	<i>Pre-settlement Runoff Rate (cfs)</i>	<i>Proposed Runoff Rate (cfs)</i>
2-year (2.79”)	10.4	7.9
10-year (4.16”)	22.3	16.2
100-year (7.14”)	44.0	35.5

Table 2 - Peak Discharge Rate "Southeast"

<i>Event</i>	<i>Pre-settlement Runoff Rate (cfs)</i>	<i>Proposed Runoff Rate (cfs)</i>
2-year (2.79")	10.2	5.1
10-year (4.16")	29.1	25.4
100-year (7.14")	101.4	98.6

Volume Control

According to BCWD Rule 2.4.2(a), an applicant must provide retention of larger of the following: (i) 100 percent of the required volume per 2.4.1(a)(ii) (*i.e., the difference between pre-settlement and proposed runoff volumes for the two-year, 24-hour storm event*) from the net additional impervious surface; or (ii) 50 percent of the required volume per 2.4.1(a)(ii) from all new and reconstructed impervious surfaces.

Rule Requirement Not Met. *See Rule 10.0 for variance request.*

The stormwater management plan developed for the site was evaluated using a HydroCAD model of pre-settlement and proposed site conditions. Required volume control was calculated by comparing the two year runoff volume for both the net additional impervious area or the new and reconstructed impervious area against that same area under pre-settlement conditions. Soil borings throughout the realignment area document that the site is entirely composed of hydrologic soil group (HSG) D, making large scale infiltration infeasible. The small amount of volume control provided is from infiltration of water pooled behind the proposed ditch checks. The applicant is requesting a variance from this rule requirement, which is discussed in more detail under Rule 10.0. The required and provided runoff volume is summarized in Table 3.

Table 3 – Volume Control

<i>Criteria</i>	<i>Impervious (ac)</i>	<i>Required Volume (CF)</i>	<i>Provided Volume (CF)</i>
Net Additional Impervious	0.25	1,945	413
New/Reconstructed Impervious	0.66	1,950	413

Pollutant Loading

According to BCWD Rule 2.4.1(a)(iii), an applicant for a stormwater management permit must demonstrate to the District that the proposed land-altering activity will not at the downgradient property boundary or to an onsite receiving waterbody or wetland, increase annual phosphorus loading as compared with the pre-development condition.

Rule Requirement Not Met. *See Rule 10.0 for variance request.*

The Permit Applicant submitted P8 modeling for phosphorus loading under both pre-development and proposed conditions. Wetland W1 will be filled to accommodate grading for the intersection realignment and therefore was not included in this analysis. Phosphorus loading is reduced at both site discharge points, but phosphorus loading for wetlands W2 and W3 will increase from pre-development conditions due to the diversion of additional drainage area to these wetlands. As such, this rule

requirement has not been met and a variance has been requested. Annual phosphorus loading is summarized in Table 4.

Table 4 - Phosphorus Loading

<i>Discharge Point/Wetland</i>	<i>Pre-Development Annual Phosphorus Loading (lbs)</i>	<i>Proposed Annual Phosphorus Loading (lbs)</i>	<i>Difference (lbs)</i>
W1	N/A – incidental wetland filled		
W2	35.2	35.7	+0.5
W3	42.6	43.1	+0.5
Southwest	12.7	6.7	-6.0
Southeast	30.3	30.1	-6.2

Lake/Wetland Bounce and Inundation

According to BCWD Rule 2.4.1(a)(iv), an applicant for a stormwater management permit must demonstrate to the District that the proposed land-altering activity will not increase the bounce in water level or duration of inundation, for a 24-hour precipitation event with a return frequency of two, 10 or 100 years in the subwatershed in which the site is located, for any downstream lake or wetland beyond the limit specified in Appendix 2.1.

Rule Requirement Met

As mentioned previously, this site discharges to two on-site Manage 2 wetlands, which then overflow to additional downstream wetlands. On-site wetlands were evaluated using the applicant’s HydroCAD model, while the District’s SWMM model was used to evaluate downstream wetlands. Results are summarized in Table 5 and Table 6.

No downstream analysis was necessary for discharge point “Southwest” as both flow rate and volume were reduced below pre-settlement conditions for all storm events. For both the on-site wetlands and the first downstream wetland, proposed high-water levels (HWLs) are within 1 foot of pre-development HWLs, meeting the rule criteria. Since the proposed HWLs for the downstream wetland match pre-development HWLs, this analysis was not carried further downstream. For both the on-site wetlands and the first downstream wetland, the proposed inundation period is less than 48 hours longer than the pre-development inundation period, meeting the rule criteria. Hydrographs for the downstream wetland were reviewed and the BCWD engineer determined that the difference in inundation period is within the uncertainty of the model. Therefore, this analysis was not carried further downstream.

Table 5 – On-Site and Downstream Wetland High Water Levels (ft)

Waterbody	Management Category	2-year		10-year		100-year	
		Pre-development	Proposed	Pre-development	Proposed	Pre-development	Proposed
W1	N/A – incidental wetland filled						
W2	Manage 2	963.8	964.3	964.3	965.0	965.4	966.4
W3	Manage 2	965.8	966.4	966.8	967.5	969.2	969.2
Downstream Wetland	Manage 2	961.5	961.5	961.8	961.8	962.3	962.3

Table 6 – On-Site and Downstream Wetland Inundation (hours)

Waterbody	Management Category	2-year		10-year		100-year	
		Pre-development	Proposed	Pre-development	Proposed	Pre-development	Proposed
W1	N/A – incidental wetland filled						
W2	Manage 2	+9		+12		+8	
W3	Manage 2	+2		+6		+8	
Downstream Wetland	Manage 2	+8		+7		+5	

Infiltration Pretreatment

According to BCWD Rule 2.5.2 surface flows to infiltration facilities must be pretreated for long-term removal of at least 50 percent of sediment loads.

Rule Requirement Met

The project includes infiltration at proposed ditch checks to provide volume control. Therefore, pretreatment is required for runoff directed to these features. Runoff being routed to the ditch checks will first be directed to the proposed wet pond. The Permit Applicant submitted P8 modeling demonstrating compliance with Rule 2.5.2. Sediment loading results are summarized in Table 7.

Table 7 – Ditch Check Pretreatment

Practice	TSS Inflow Loading (lb/yr)	TSS Outflow Loading (lb/yr)	TSS Reduction (%)
Ditch Checks	2,941	292	90%

Basins in Contributing Area to Groundwater-Dependent Natural Resources

According to BCWD Rule 2.5.3, a stormwater basin within the surface contributing area to a groundwater-dependent natural resource must contain and infiltrate the volume generated by a two-year, 24-hour storm event, if feasible. The basin bottom must be at least three feet above the seasonally high water table, bedrock or other impeding layer. If this infiltration standard is

determined to be infeasible, basin outflow must be non-erosive and routed through a subsurface system, flow spreader or other device that discharges water through or across the ground to lower discharge temperature to that of the ambient soil.

☒ Rule Requirement Met

Both Manage 2 wetlands on-site are classified as groundwater-dependent natural resources. Therefore, the applicant's stormwater-management plan must meet the standard in subsection 2.5.3 for the proposed wet pond. Since large-scale infiltration is infeasible due to HSG D soils, the pond outflow is routed through a series of ditch checks, such that outflow will be non-erosive and will be reduced to the ambient soil temperature. A thermal loading analysis, using the MINUHET model, confirms that pond outflow will be reduced to ambient soil temperature. Results from this analysis are shown in Table 8.

The two rainfall events listed below (Observed01 and Observed02) represent local, observed storm events that are included in the MINUHET model. These rainfall events were chosen because they represented a range of initial conditions and storm timing that impact the temperature of stormwater runoff.

- *Observed01 – Observed storm in June, resulting in 1.5 inches of rain over a 2.3 hour period. This storm was preceded by two weeks of mild weather with 3 inches of rain.*
- *Observed02 – Observed storm in August, resulting in 1.5 inches of rain over a 4 hour period. This storm was preceded by two weeks of hot, dry weather with no antecedent rainfall.*

The results below are provided as a range of values, due to model uncertainty. The low end of the range is based on modeling the ditch area upstream of each culvert as a dry pond. However, the BCWD engineer finds that these results likely underestimate discharge temperature. The high end of the range is based on ignoring any storage area on the upstream end of each culvert. Further review of the model indicated that a low percentage of impervious surface (19%) relative to pervious surface, long flow paths along vegetated ditches, and a dense tree canopy were the main variables that contributed to low discharge temperatures.

Table 8 – Ditch Check Outflow Temperatures

Rainfall Event	Ambient Soil Temperature (°F)	Average Discharge Temperature (°F)
Observed01	70	49 - 69
Observed02	71	56 – 69

Rule 2.0 Conditions:

- 2-1. Provide BCWD with the final Civil Plan Set prior to start of construction. (BCWD 2.7.9)
- 2-2. The stormwater management facilities to be constructed for the project must be added to the inventory of those maintained under the May 20, 2008 programmatic maintenance agreement between the County and BCWD (BCWD Rule 2.6).
- 2-3. Provide documentation as to the status of a National Pollutant Discharge Elimination System stormwater permit for the project from the Minnesota pollution Control Agency and provide the Storm Water Pollution Prevention Plan (SWPPP) as it becomes available (BCWD Rule 2.7.15).

Rule 3.0—EROSION CONTROL

According to BCWD Rule 3.2, all persons undertaking any grading, filling, or other land-altering activities which involve movement of more than fifty (50) cubic yards of earth or removal of vegetative cover on five thousand (5,000) square feet or more of land shall submit an erosion control plan to the District, and secure a permit from the District approving the erosion control plan. The proposed project triggers the application of Rule 3.0 Erosion Control because it includes removal of vegetative cover on greater than 5,000 square feet.

Rule Requirements Met with Conditions

The erosion and sediment control plan includes:

- *Sediment control logs around the proposed wet pond*
- *Double row of silt fence adjacent to wetlands W2 and W3*
- *Sediment logs, seed and blanket as needed for mill and overlay sections*
- *Rock construction entrances*
- *Final vegetation details*

The following conditions must be addressed in the erosion and sediment control plan to comply with the District's requirements:

Rule 3.0 Conditions:

- 3-1. Provide the contact information for the erosion and sediment control responsible party during construction once a contractor is selected. Provide the District with contact information for the Erosion Control Supervisor and the construction schedule when available (BCWD 3.3.2).

Rule 4.0—LAKE, STREAM, AND WETLAND BUFFER REQUIREMENTS

According to BCWD Rule 4.2.1, Rule 4.0 applies to land that is (a) adjacent to Brown's Creek; a tributary of Brown's Creek designated as a public water pursuant to Minnesota Statutes section 103G.005, subdivision 15; a lake, as defined in these rules; a wetland one acre or larger; or a groundwater-dependent natural resource; and (b) that has been either (i) subdivided or (ii) subject to a new primary use for which a necessary rezoning, conditional use permit, special-use permit or variance has been approved on or after April 9, 2007, (for wetlands and groundwater-dependent natural resources other than public waters) or January 1, 2000 (for other waters).

Rule Not Applicable to Permit. *The site will neither be subdivided nor subject to a new primary use under proposed conditions.*

Rule 5.0—SHORELINE AND STREAMBANK ALTERATIONS

According to BCWD Rule 5.2, no person may disturb the natural shoreline or streambank partially or wholly below the ordinary high water mark of a waterbody, without first securing a permit from the District. The proposed project triggers the application of Rule 5.0 Shoreline and Streambank Alterations due to the proposed excavation of wetland W2.

Rule Requirements Met with Conditions

The proposed wetland excavation will reduce the slope of the shoreline for wetland W2 to an 8:1 slope. This excavation was recommended by the WCA Technical Evaluation Panel (TEP) to improve wetland

habitat and is consistent with BCWD policy to preserve and enhance shoreline where feasible. The BCWD engineer finds that the proposed plan will be structurally stable based on the low slope of the proposed shoreline and negligible runoff velocities within the wetland, and implementation of a planting plan sufficient to establish native vegetation should not need ongoing maintenance to achieve and retain the stable condition required by subsection 5.3.3.

The following conditions must be addressed in the construction plans to comply with the District's requirements:

Rule 5.0 Conditions:

- 5-1 Include a planting plan for the portion of the wetland that will be excavated, including notes on inspection and replacement of vegetation as necessary to ensure successful establishment (BCWD 5.3.3).

Rule 6.0—WATERCOURSE AND BASIN CROSSINGS

According to Rule 6.2, no person shall use the beds of any waterbody within the District for the placement of roads, highways and utilities without first securing a permit from the District.

- Rule Not Applicable to Permit. *There are no proposed watercourse or basin crossings.*

Rule 7.0—FLOODPLAIN AND DRAINAGE ALTERATIONS

According to Rule 7.2, no person shall alter or fill land below the 100-year flood elevation of any waterbody, wetland, or stormwater management basin, or place fill in a landlocked basin, without first obtaining a permit from the District. No person shall alter stormwater flows at a property boundary by changing land contours, diverting or obstructing surface or channel flow, or creating a basin outlet, without first obtaining a permit from the District. The proposed project triggers the application of Rule 7.0 due to both filling of the incidental wetland and the proposed drainage alteration.

Floodplain Fill

According to BCWD Rule 7.3.1, floodplain filling must be accompanied by a replacement of flood volume between the ordinary water level and the 100-year flood elevation.

- Rule Requirements Met

Since Wetland W1 will be filled, this loss of floodplain must be offset by replacement flood volume. As shown in Table 9, the provided live storage from the proposed wet pond exceeds the volume of fill meeting this requirement.

Table 9 – Floodplain Fill

<i>Fill Volume (CF)</i>	<i>Wet Pond Volume (CF)</i>
599	33,395

Freeboard

According to BCWD Rule 7.3.2, no stormwater management facility may be constructed at an elevation that brings an adjacent permanent building into noncompliance with a standard in this subsection 7.3.2 (i.e., two-foot freeboard above 100-year HWLs or one-foot freeboard above overflows).

- Rule Requirements Met

Table 10 summarizes freeboard for the proposed wet pond. Low floor elevations were estimated based on Washington County Lidar. Greater than 2 feet of freeboard is provided in all cases. While not required by the rules, the applicant is providing compliant freeboard for additional structures adjacent to the onsite wetlands, as discussed in the volume control variance request below.

Table 10 - Freeboard Requirement Summary

<i>Stormwater Facility</i>	<i>Structure Address</i>	<i>HWL (ft)</i>	<i>Low Floor (ft)</i>	<i>Freeboard (ft)</i>
Wet Pond	12033 Manning Trl N	969.2	981.9	12.7
	11458 120 th St N		977.5	8.3
	11458 120 th St N		972.1	2.9

Drainage Alterations

According to BCWD Rule 7.3.5, the District will issue a permit to alter surface flows under paragraph 7.2 only on a finding that the alteration will not have an unreasonable impact on an upstream or downstream landowner and will not adversely affect flood risk, basin or channel stability, groundwater hydrology, stream baseflow, water quality or aquatic or riparian habitat.

- Rule Requirements Met

The proposed project alters stormwater flows by diverting runoff that currently drains through the culvert under CSAH 15 and instead routing it to wetland W2. Downstream impacts were analyzed using the District’s SWMM model. This model demonstrates that there will be no impact to downstream properties or resources as a result of the proposed project. As noted above in the stormwater section, the proposed alteration does not increase HWLs for the downstream wetland for any storm events, nor does it alter the shape of the wetland hydrograph beyond model uncertainty. Therefore, any increase in stormwater volume routed downstream is mitigated by this wetland. Additionally, phosphorus loading is reduced at the project boundary, so runoff to downstream resources will be higher quality than under existing conditions.

Rule 8.0—FEES

As a government entity, Washington County is exempt from submitting permitting fees.

Rule 9.0—FINANCIAL ASSURANCES

As a government entity, Washington County is exempt from the BCWD financial-assurance requirement.

Rule 10.0—VARIANCES

According to BCWD Rule 10.0, the Board of Managers may hear requests for variances from the literal requirements of these rules in instances where their strict enforcement would cause undue hardship because of the circumstances unique to the property under consideration. The Board of Managers may grant variances where it is demonstrated that such action will be keeping with the spirit and intent of these rules. Variance approval may be conditioned on an applicant’s preventing or mitigating adverse impacts from the activity. The applicant has submitted that attached memo in support of the two variance requests analyzed below.

The permit applicant has submitted a request for a variance from the following rule criterion.

1. BCWD Rule 2.4.2(a) states, “Outside the Diversion Structure Subwatershed an applicant must provide retention of larger of the following: (i) 100 percent of the required volume per 2.4.1(a)(ii) from the net additional impervious surface; or (ii) 50 percent of the required volume per 2.4.1(a)(ii) from all new and reconstructed impervious surfaces.”

As shown in Table 3, the proposed project does not provide the required stormwater volume. The applicant asserts that its ability to provide stormwater management is limited by the width of the available right of way for construction of infiltration practices. The land available for stormwater BMPs includes the right-of-way along both CSAH 15 and CSAH 61 and the original alignment of CSAH 61, where the proposed wet pond will be located. Soil borings were collected across this area and confirmed HSG D soils throughout. Based on the required 48-hour drawdown time for infiltration facilities, an infiltration basin in this location could be at most 3 inches deep. To meet the required volume control, this would have required an infiltration basin with a footprint of 7,800 square feet which, in combination with basin side slopes, would exceed the available right-of-way area.

To mitigate impacts from the increase in runoff volume from the project, the applicant has added ditch checks along the south side of CSAH 61 which further treat runoff from the proposed wet pond. These ditch checks are designed with compacted topsoil for the bottom 3 inches to provide infiltration, with the upper 15 inches of the ditch check being rock, which will filter the runoff as it drains towards wetland W2. The applicant further notes that ditch checks have already been incorporated along CSAH 15, north of the intersection, as part of a previous project. As shown in both the Stormwater and Floodplain sections of this report, the increase in runoff volume does not have adverse impacts either to on-site wetlands or to downstream waterbodies. Table 11 shows that there is adequate freeboard to all structures surrounding the on-site wetlands and that granting this variance request would not put any existing structures at risk of flooding.

Table 11 - Freeboard Summary

Waterbody	Structure Address	HWL (ft)	Low Floor (ft)	Freeboard (ft)
Wetland W2	1190 Manning Trl N	966.4	974.7	8.3
Wetland W3	11458 120 th St N	969.2	977.5	8.3
	11458 120 th St N		972.1	2.9
	11520 120 th St N		985.9	16.7
	11640 120 th St N		974.4	5.2

The BCWD engineer finds that the applicant provided a sufficient factual and analytical basis for the managers to grant the variance request.

The permit applicant has submitted a request for a variance from the following rule criterion.

2. *BCWD Rule 2.4.1(a)(iii) states, "an applicant for a stormwater management permit must demonstrate to the District that the proposed land-altering activity will not at the downgradient property boundary or to an onsite receiving waterbody or wetland, increase annual phosphorus loading as compared with the pre-development condition.*

As Table 4 demonstrates, the proposed project increases phosphorus loading to both wetlands W2 and W3. This increase is due to the increase in runoff volume routed to these wetlands from the diversion of runoff that would otherwise flow to Brown's Creek. The 0.5 lb/year increase in phosphorus loading to each wetland represents a 1% increase from existing conditions.

The applicant points to the benefits of the proposed diversion as a basis for allowing a small increase in phosphorus to the on-site wetlands. Under current conditions the outflow from the culvert across CSAH 15 causes erosion in the property owner's farm field, which then mobilizes sediment that eventually discharges to Brown's Creek. (BCWD had previously investigated a similar diversion project, which was put on hold until Washington County was ready to implement the proposed roadway improvements. However, an applicant's providing an 'extra' water-resource benefit does not support noncompliance with another.)

The BCWD engineer finds that the proposed project may have slight negative impacts to the on-site wetlands (phosphorus increase) and leaves it to the managers to consider the variance request.

RECOMMENDED CONDITIONS OF THE PERMIT:

The following is a summary of the remaining tasks necessary to bring the project into compliance with the BCWD Rules in all respects other than where variances are requested as discussed above:

1. Meet all stormwater management conditions 2-1 to 2-3.
2. Meet erosion control condition 3-1.
3. Meet shoreline alterations condition 5-1.

STIPULATIONS OF APPROVAL:

1. Note that the permit, if issued, will require that the applicant notify the District in writing at least three business days prior to commencing land disturbance. (BCWD Rule 3.3.1)
2. Provide the District with As-built record drawings showing that the completed grading and stormwater facilities conform to the grading plan.



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Memorandum

Date: February 24, 2023
To: Karen Kill, Administrator, Browns Creek Watershed District
Paul Nation, EIT, EOR
Copy: Eden Rogers, Project Manager, Washington County Public Works
From: Daniel Elemes, PE, Moore Engineering, Inc.
Subject: County Road 61 Variance Justification

Moore Engineering Inc. (Moore) is aware that this proposed project requests the following variances from Brown's Creek Watershed District (BCWD) rules:

- Volume Control
- Total Phosphorus (TP) discharged to an onsite wetland

Volume Control. BCWD stormwater management rules are triggered on this project due to fully reconstructing and placing new pavement within a watershed that drains to a groundwater dependent resource (wetland south of CSAH 61). The new and reconstructed pavement areas are due to realigning CSAH 61 to intersect with CSAH 15 at an angle closer to 90 degrees. This realignment is due to safety considerations and includes minor widening of CSAH 15 to include a right turn lane for northbound traffic. The remainder of the project involves pavement rehabilitation via milling and overlaying, or reclaiming, based on the County's plans. Without the realignment component of the project, it is Moore's understanding that only a BCWD erosion control permit would be required.

To accommodate realigning CSAH 61, Washington County needed to acquire additional right-of-way from the landowner in the southeast corner of the CSAH 15 and CSAH 61 intersection. As part of these negotiations, the parties agreed to acquiring sufficient right-of-way to construct the realigned road with a typical ditch. Within the area of the realignment, the only practical location to construct a stormwater BMP within County right-of-way was within the footprint of existing CSAH 61.

As shown in the soil borings attached to the provided stormwater analysis, soils within the realignment area are consistently sandy lean clays (CL) and clayey sands (SC) at approximate elevations: 962 to 964. The proposed pond's bottom is 961, with a normal water level of 965.9. As the Type D soils are within five feet of the bottom and normal water level of the pond, it was determined that infiltration as a primary means of treatment was infeasible.

Moore proposed ditch checks, to the extent feasible, within the realignment area to provide some amount of volume control. As these are underlain by Type D soils, a maximum infiltration depth of three inches is proposed, such that they will draw down within 48-hours based on a design infiltration rate of 0.08 inches per hour. Ditch checks are placed such that the toe of the upstream ditch check is at the same elevation as the overflow elevation of the next downstream ditch check. Additional ditch checks beyond areas where currently proposed were deemed to be infeasible due to bordering wetlands or lack of a defined ditch (such as along the disturbed area of CSAH 61).

Total Phosphorus Discharged to an Onsite Wetland. The current design proposes to increase the mass of TP discharged to the wetlands north and south of CSAH 61. This is primarily due to rerouting 17 acres of drainage area. Under existing conditions, this 17-acre area drains to the ditch northeast of the CSAH 15 and CSAH 61 intersection. There, it flows through a culvert beneath CSAH 15, through a farm field and graveled

driveway/equipment storage area, and ultimately to the headwaters of Brown’s Creek. Under proposed conditions, this 17-acre area will drain to the proposed pond, pass through a new culvert beneath CSAH 61, and to the wetland on the south side of CSAH 61. Moore understands this concept was evaluated by BCWD several years ago but was put on hold due to lack of landowner interest.

Increases in TP load to the northern wetland are due to a slightly larger watershed with slightly more impervious area, due to realigning CSAH 61. Specifically, additional impervious area is due to a proposed right turn lane for westbound CSAH 61 traffic and extending a private driveway. As the northern wetland abuts project limits, it is infeasible to capture this impervious area for treatment, without drastically altering the proposed improvements (i.e. starting the realignment further to the east would have required acquiring additional right-of-way, and would have increased project wetland impacts).

The table below summarizes the mass of pollutant increases to each of the wetlands. Outlet structures for the pond, and for pipes that drain the north wetland to the south wetland were designed with the intent to maximize TP reduction to the extent practical, while considering rate control and high-water level ramifications. Infiltration ditch checks are provided to the extent practical, as discussed above. With these efforts, the mass of TP increased to both the wetlands is 0.5 pounds per year, based on P8 output.

Wetland	Existing TSS Load (lb/yr)	Proposed TSS Load (lb/yr)	TSS Increase (lb/yr)	Existing TP Load (lb/yr)	Proposed TP Load (lb/yr)	TP Increase (lb/yr)
EP/PP-16 (North)	13,748	13,895	+ 147	42.6	43.1	+ 0.5
EP/PP-19 (South)	8,119	7,482	- 637	35.2	35.7	+ 0.5

The table below summarizes the mass of pollutants discharged at project limits. At each discharge location, the mass of TSS and TP discharged is the same, or decreases from existing conditions. Project wide, the proposed stormwater BMPs decrease TSS discharged by 741-pounds per year, and TP discharged by 6.2-pounds per year. Furthermore, of the 6.2-pounds per year of TP reduced, 6.0-pounds per year is reduced from the southwest discharge location, which drains to Brown’s Creek’s headwaters. Finally, by rerouting the 17-acre drainage area, nuisance drainage conditions on a private landowner’s farm field are improved. Though not explicitly accounted for in the P8 model that Moore developed, Moore suggests rerouting this area to pass through grassed, maintained series of ditches and a series of wetland complexes is qualitatively “better” than maintaining a flow path that point-discharges to a field used for row crops.

Outlet	Existing TSS Discharge (lb/yr)	Proposed TSS Discharge (lb/yr)	Existing TP Discharge (lb/yr)	Proposed TP Discharge (lb/yr)
Northwest (NW)	5,155	5,155	16.3	16.3
Southwest (SW)	2,371	2,084	12.7	6.7
Southeast (SE)	5,897	5,443	30.3	30.1
TOTAL	13,423	12,682	59.3	53.1