



Maryland

Department of the Environment

Wes Moore, Governor
Aruna Miller, Lt. Governor

Serena McIlwain, Secretary
Suzanne E. Dorsey, Deputy Secretary

December 21, 2023

Mr. Neb Sertsu
Baltimore Washington Rapid Rail
6 South Gay Street
Baltimore, MD 21202

Re: MDE No. 24-SF-0077
Baltimore-Washington SCMagLev Rapid Rail
Preliminary Stormwater Management Concept Design

Dear Mr. Sertsu:

The Maryland Department of the Environment (MDE) has reviewed the submittal received December 5, 2023 for the above referenced project in Prince George's, Anne Arundel, Baltimore Counties and Baltimore City. The review was in accordance with Sections 4-106, 4-205, and 5-503 of the Environment Article, Annotated Code of Maryland with regard to sediment control, stormwater management, and small ponds as well as the Stormwater Management and Erosion & Sediment Control Guidelines for State and Federal Projects. The following comments are a result of the review:

General

1. Due to the lack of supporting information at this time, the completed review of the preliminary SWM concept design focused on the proposed approach and processes rather than validation of numbers. Detailed comments are not being provided on each plan sheet or report page. Comments made in reference to a particular plan sheet or page in the report are made as examples.
2. In addition to the Stormwater Management and Erosion & Sediment Control Guidelines for State and Federal Projects, Technical Memoranda with guidance on different topics are provided on the Plan Review Division's webpage: <https://mde.maryland.gov/programs/water/StormwaterManagementProgram/Pages/PlanReviewforStateandFederalProjects.aspx> This project will be expected to comply with the memos.
3. This project has been assigned MDE number 24-SF-0077. Please include this number on each plan sheet, the cover sheet of the report, and on all future correspondence related to this project. Future sediment and stormwater resubmissions need to be sent to MDE.SSPRD@maryland.gov along with a new MDE transmittal form.
4. For projects with a disturbed area equal to or greater than 1 acre, a notice of intent (NOI) to comply with the NPDES General Permit for Construction Activity must be submitted to and approved by the MDE Industrial Discharge Permits Division prior to commencing with earth disturbance. The application for the "General Permit for Stormwater Associated with Construction Activity" is available on MDE's website. Please note that due to the public comment period, attaining an approved application will require a minimum of 14 days. For

- further information, please visit <https://egov.maryland.gov/mde/npdes/Account/Login>
5. Applicants are advised that projects submitted for sediment control approval are subject to the requirements of the Maryland Forest Conservation Act (FCA), Annotated Code of Maryland, Natural Resources Article Section 5-1601, et seq., and regulations adopted thereunder. Failure to comply with the FCA may result in enforcement actions, such as monetary penalties, as imposed by the Act. For further information, please contact the appropriate regional office as directed by webpage <https://dnr.maryland.gov/forests/Pages/programapps/newFCA.aspx>
 6. This project impacts a waterway, wetland, or 100-year floodplain. Approval is required from MDE's Wetlands and Waterways Program. Applications are available on MDE's website. Questions should be directed to (410) 537-3768 for waterways and non-tidal wetlands and to (410) 537-3837 for tidal wetlands.
 7. If a portion of this project is located in a mapped Federal Emergency Management Agency (FEMA) 100-year floodplain, tidal or nontidal. You or your authorized agent are required to notify the appropriate local government and the state National Floodplain Insurance Program (NFIP) coordinator at MDE, Dave Guignet, of the proposed work and the impacts to the FEMA floodplain. dave.guignet@maryland.gov If the proposed work/construction activity changes or alters the FEMA 100-year boundaries or elevations, you are fully responsible for and required to contact FEMA and apply for a Conditional Letter of Map Amendment (CLOMR), which may necessitate a separate hydrologic and hydraulic study (determined by FEMA) before construction, and to complete the FEMA Amendment process with a Letter of Map Amendment or Revision (LOMR) after construction is completed. This includes coordinating and informing the local government/community throughout the process.
 8. Segments of this project are located in a Tier II Watershed, and therefore anti-degradation policies apply. Please refer to https://mde.maryland.gov/programs/water/tmdl/waterqualitystandards/pages/antidegradation_policy.aspx If a project requires Wetlands and Waterways Authorization and a Joint Permit Application is submitted to MDE, a Tier II review will be performed as part of that application. If not, compliance with Tier II anti-degradation policy will be required prior to issuance of the NPDES General Permit for Stormwater Associated with Construction Activity. Please be advised of these additional requirements and incorporate them into the stormwater management and sediment control plans now, rather than later.
 9. Please be advised that this project is located in the Chesapeake Bay Critical Area (the 1000 foot zone above the Mean High Water Line of the Chesapeake Bay) and is subject to the requirements of the Chesapeake Bay Critical Area Commission. Appendix D.4 of the "2000 Maryland Stormwater Design Manual, Volumes I & II" contains information on Critical Area requirements. For further information, please contact the Commission at (410) 260-3460, 1804 West Street, Suite 100, Annapolis, MD 21401.
 10. In cooperation with MDE's Wetlands and Waterways Program's consideration of the Water Quality Certification, MDE Sediment and Stormwater Plan Review division provided BWRR with preliminary feedback on the SWM design in the form of two memos (attached) dated November 14, 2023 and November 30, 2023.

Stormwater Management

11. The SWM Regulations require that at least the first inch of new development be treated using Environmental Site Design (ESD), not "ESD to the MEP". The proposed design treats the required ESD volume using a combination of ESD and non-ESD practices, but the requisite portion of ESD volume required to be treated by small scale ESD practices is not being met. When there are unique circumstances applicable such that strict adherence to ESD will result in unnecessary hardship and not fulfill the intent of the SWM Regulations, a request for a

variance may be made to MDE, explaining the reasons and providing justification. Looking over the alignment, there is no obvious reason as to why ESD will not be practicable. Requests for a variance will need to be made on a POI-by-POI basis. Please know that obtaining a variance from ESD practices in the Tier II Watershed is unlikely.

12. As outlined in our November 14, 2023 memo, MDE upholds the quantity management requirements established by the local jurisdiction. Most of this project is located in Prince George's County, MD. Please be aware that Prince George's County has very substantial quantity requirements for both the 10-yr and 100-yr storms which will require reducing discharges down to vegetated conditions (RCN for meadow or woods), not just maintaining existing flow rates. PG Techno-Gram 002-2019 identifies all of the alignment (except the portions in 02-13-11-07-09-39 and 02-13-11-07-09-41) as needing 100-year management.
13. The report states that quantity management will be addressed, but the concept design does not provide any details on this other than to say that it will be provided by underground storage. More information is needed, including, but not limited to: H&H comps for pre-dev'l and post-dev'l conditions; Identification of POIs requiring quantity management; Type and location of proposed quantity management BMPs; Preliminary drainage area delineations to proposed BMPs with Tc path; explanation of the methodology that will be used for modeling ESD practices (reduced RCN or routing) and confirmation that only surface storage will be considered in routing (not media storage and not wet pool volumes).
14. Underground storage is not a panacea. Apart from being very expensive, it is not always feasible. There needs to be enough slope/head to discharge to the surface; it needs to be watertight; there will need to be setbacks from the viaduct tunnel; and, there will be utility conflicts to work around. In short, there is no assurance that the ROW will be large enough.
15. The Dam Safety Division will need to review and possibly permit underground structures with volumes over 1.5 ac-feet. See Dam Safety Policy Memo #9. Also, MDE would probably require a special maintenance agreement for underground structure since facilities that are not visible tend to not receive attention and are easily overlooked.
16. MDE will need to verify locations of the POIs and LOIs prior to concept approval. The provided DA maps only show existing contours and the POIs based on existing conditions. There is no way to verify POIs in proposed conditions without proposed contours, and proposed POIs are more important than existing POIs. Also note that the required scale for a DA maps is at least 1 inch = 100 feet.
17. Water quality mapping of existing and proposed impervious areas is needed to verify calculations for the impervious area requiring treatment (IART). For example, the report states that water quality will be provided for both the elevated viaduct and the maintenance road, but this cannot be confirmed. It seems that the layout of the emergency egress facilities (EGSs) and the train maintenance facility (TMF) and stations and associated development has not yet been completed.
18. The BMP Design calculations spreadsheets are acceptable for sizing the BMPs, but MDE's SWM Calculator needs to be used to compute required ESDv and required Rev. MDE Plan Review Division requires that the target Pe and ESDv be calculated based on the IART, not the entire site.
19. The report needs to explain how Cpv will be addressed at the 17 POIs with indicated alerts on the ESD summary sheet.
20. In the most recent version of the report, the required surface storage was amended to be 75% of the ESDv, but the language that references to MDE's Surface Storage Tables in the report still needs to be removed.

21. Note that BMPs that provide water quality treatment for drainage areas outside of BWRR's right-of-way will only get 50% credit. A 50% efficiency rate is applied to this area to compensate for the applicant's lack of control over property owned by others.
22. There needs to be separate ESD summary sheets for each 8-digit watershed. each Tier II watershed will also need its own spreadsheet.
23. If a KMZ file of the selected alignment for use with Google Earth is available, MDE would appreciate a copy.

Small Pond Approval

24. Any sediment basins or stormwater management facilities that are categorized as small ponds will need to be designed to meet MD Pond Code 378 as well as the MDE Dam Safety Policy Memoranda.

Maintenance Road

25. On the location map, please add to the legend the maintenance roads (purple area) and SWM BMPs (thick solid red line). Also, show the locations of the eight EGSs and the TMF.
26. Please confirm that the maintenance road will only be provided for elevated portions of rail and will not run along the top of the tunneled alignment.
27. Much of the proposed maintenance access road(s?) will be permeable surface. Alternative surfaces although permeable for smaller storm events will generate more runoff than the existing vegetated condition. Please clarify what RCN will be used for modeling these "permeable" roads in TR-55 and the basis for that value.

Plans

28. There are a few locations where existing roadways and ramps will need to be reconstructed to accommodate the rail line. Unless these roadways are replaced in kind without any changes to grade, line, or cross section, the reconstructed roadways will have to meet SWM requirements for redevelopment and/or new development as applicable. For example, on PP-52, raising the existing roadway ramps is not considered to be returning the impervious area to existing surface condition, and therefore SWM will be required.
29. Sheet PP-52, for example. Please clarify what a "SWM DIVERSION LOD" is.
30. Sheet PP-53a, for example. On some of the plan sheets, it is hard to identify the LOD. Will the LOD be the outer limits of footprint or will it be segmented?
31. Sheet TMF-02. There are 46 micro-bioretenion facilities all clustered together. That is not ESD. One of the tenants of ESD is distributing the BMPs throughout the site integrated into the site layout.
32. Sheet F-20, for example. What are the MAGLEV systems identified by a solid yellow line? There needs to be an identified POI or LOI from these locations. Even if the IART is zero, removing trees will affect the volume of runoff.
33. There is an existing pond on PP-60. The pond embankment appears to be adjacent to the river. Note that disturbance needs to be avoided within the footprint of the pond embankment plus 15 feet from the toe of upstream and downstream slope.
34. PP-60. If the bridge is being fully reconstructed (i.e.: new superstructure) then stormwater management will need to be provided in accordance with MDE's Technical Memo #4.

35. PP-76. Is BWRR intending to acquire the property between the rail and the river? The SWM plans will need to show how runoff from the viaduct reaches the river. Whether this will be considered a direct tidal discharge and eligible for a waiver will depend on the conveyance. Regardless, the stormwater design will need to be approved by the Critical Area Commission, and their requirements tend to be more stringent than the regular SWM regulations.
36. FF-44. I-95 is incorrectly labeled as the Capital Beltway.

Sediment Control

37. Sediment control plans are typically not submitted until after approval of the concept design. However, if there are any special ESC considerations, the concept design needs to identify and consider them. In the case of this project, more information is needed on the drilling operation. How and where will spoils be “disposed”? Drilling fluids must be contained and disposed of in accordance with sediment control regulations, or wastewater regulations if drilling fluid additives are used.
38. Throughout the project there are substantial areas identified as “Temporary construction disturbance for viaduct laydown. Water will be managed using standard erosion and sediment control practices.” How long will the site be active? If it's more than 2-years, we're going to require that the sediment controls also provide some level of quantity management. Note that the 20-CP will require that the project reduce downstream impacts related to potential flooding, for which no standard is provided. Also, these areas will need to be restored to pre-development land use which means de-compacting the soil and planting with the pre-development cover or better.
39. For the portions of the project located within a Tier II Watershed, redundant ESCs are required for disturbances located within the stream protection zone.

Review of this project will continue upon satisfactory response to the above comments. Please contact me at amanda.malcolm@maryland.gov or (410) 537-3563 with any questions or comments.

Sincerely,

Amanda Malcolm, P.E., Chief
Sediment and Stormwater Plan Review Division
Water and Science Administration

APM

cc: gregg.iskra@wsp.com

attachments: November 14, 2023 memo from SSPRD
November 30, 2023 memo from SSPRD



TO: Neb Sertsu, Director of Project Development
Baltimore Washington Rapid Rail LLC
Gregg Iskra, WSP USA Inc.

FROM: Amanda Malcolm, Sediment and Stormwater Plan Review Division,
Water and Science Administration

DATE: November 14, 2023

SUBJECT: **Baltimore Washington Rapid Rail (BWRR) Maglev Train**

ADDITIONAL INFORMATION NEEDED

1. Map of preferred alignment.
2. Miles of total track.
3. Miles of tunneled track.
4. Miles of elevated track and typical [rudimentary] profile and section. Clarify whether rail will have intermittent structural supports rather than a continuous embankment.
5. Miles of at grade track.
6. Number of fresh air/emergency egress shafts along alignment.
7. Number of stations.
8. Approximate total limit of disturbance (LOD).
9. Approximate total ROW/property being acquired.
10. Indication of how project design and construction will be phased.

STORMWATER MANAGEMENT (SWM) CRITERIA AND CONSIDERATIONS

The following list of criteria and considerations is being provided in an effort to guide BWRR on developing SWM designs which will be approvable. These are anticipated considerations and not necessarily a comprehensive position statement. Additional considerations may arise once actual plans are provided and the review proceeds.

1. Because of the Rail Passenger Service Act, 49 U.S.C. §24902(j), MDE, not the local governments, will be the SWM and ESC authority for this project.
2. Because MDE will be the approval authority for this project, the processes and policies used for state/federal applicants apply, notably the SWM and ESC Guidelines for State and Federal and associated technical memorandum.
3. BWRR will need to retain a MDE consultant reviewer or reviewers to work under the auspices of MDE Plan Review.

4. If BWRR intends to pursue a phased approval process, SWM concept approval must be obtained before ESC approval will be given for any earth disturbance. Final SWM approval will be required prior to starting construction on any structural improvements. If BWRR intends to break the overall project up into multiple segments contracts, a map and description of breakouts will need to be provided to MDE Plan Review, and a decision will have to be made as to whether SWM concept approval is needed for the complete alignment or just the respective segment.
5. State law (§4-205(c)) gives the local SWM approval authorities legal authority to request the plans for State/federal projects and provide comments. The same provision will apply to this project. MDE Plan Review will be reaching out to each of the affected counties about exercising this right and establishing a process for coordinating submissions, reviews, and comments.
6. MDE Plan Review does not require stormwater management bonds because the State/federal applicants are considered low risk. The Baltimore Washington Rapid Rail is a private enterprise, and as such, it is appropriate that a bond be required. MDE Plan Review will partner with the local governments on holding a bond.
7. Water quality treatment equal to 1 inch of rainfall over the impervious area requiring treatment must be provided using ESD practices, following Technical Memos #10 and #11.
8. The minimum ESDv, as determined using MDE's spreadsheets, must be provided for each point of investigation (POI) using ESD practices to the maximum extent practicable. If not practicable, Cpv for the POI, calculated using Appendix D.11 of the MD Stormwater Manual, must be provided using structural practices.
9. MDE upholds the quantity management requirements established by the local jurisdiction. It will be necessary to establish these requirements up front, particularly in Anne Arundel County. The following will likely apply:
 - a. For all POIs, the 10-yr post-development peak discharge rate must be equal to or lower than the pre-development peak discharge rate.
 - b. For all POIs located in Prince George's County, 100-year management must be provided in accordance with PG Techno-Gram 002-2019 (dated Sept 13, 2019).
 - c. For all POIs located in Baltimore City, the 100-yr post-development peak discharge rate must be equal to or lower than the pre-development peak discharge rate.
 - d. For quantity management, reduced RCN or routing (using only the storage above the media surface) may be used, but not both together, and may only be used for Q₂ and Q₁₀, not Q₁₀₀. If a reduced RCN is used, a reduced RCN must be calculated for each design storm of interest.
10. SWM will not be required for the underground section that involves no surface disturbance. If there is surface disturbance and the area is being restored to its existing conditions, a 3.3.A waiver from SWM would be applicable.
11. SWM will be required for the elevated rail in accordance with Technical Memorandum #6 – Bridges. MDE is in the process of revising this memo, but essentially it states that water quality treatment is required for elevated roads/railroads and that quantity management requirements are dependent on sustaining non-erosive discharges as well as the overall requirements for the respective point-of-investigation.

12. The MDE Plan Review Division no longer allows the draft surface storage tables to be used. Instead, 75% of the ESDv must be provide as surface storage. The voids in the media cannot be included as provided storage.
13. For portions of the project located in a mapped Federal Emergency Management Agency (FEMA) 100-year floodplain, tidal or nontidal, BWRR is required to notify the appropriate local government and the state National Floodplain Insurance Program (NFIP) coordinator at MDE, Dave Guignet, of the proposed work and the impacts to the FEMA floodplain. dave.guignet@maryland.gov If the proposed work/construction activity changes or alters the FEMA 100-year boundaries or elevations, BWRR is fully responsible for and required to contact FEMA and apply for a Conditional Letter of Map Amendment (CLOMR), which may necessitate a separate hydrologic and hydraulic study (determined by FEMA) before construction, and to complete the FEMA Amendment process with a Letter of Map Amendment or Revision (LOMR) after construction is completed. This includes coordinating and informing the local government/community throughout the process.
14. Portions of the project located in the Chesapeake Bay Critical Area are subject to Critical Area requirements and require approval from the Critical Area Commission prior to SWM final approval from MDE.
15. If SWM concept design approval is not attained by June 2028 and final approval is not attained by June 2030, the SWM design will need to be in accordance with 2024 SWM Regulations, and the above will not apply.
16. The State is in the process of promulgating new SWM Regs. Depending on this project's timeline, it may have to comply with an entirely different set of regulations. To be grandfathered, concept approval will have to be obtained by June 30, 2028* and final approval by June 30, 2030*. (*Note that these dates have not been finalized.)
17. Erosion and Sediment Control (ESC) Plans must be developed and approved for this project. Particular considerations include, but are not limited to:
 - a. Providing redundant ESCs for disturbances located in the stream protection zone of a Tier II watershed.
 - b. Forest conservation plan approval from DNR for disturbances greater than 40,000 sf.
 - c. Permit coverage under the NPDES General Permit for Construction (20-CP).
18. Constructing and maintaining tunnels will require groundwater dewatering. A groundwater appropriations permit will be required by a separate program at MDE. Nonetheless, the locations of any dewatering operations and associated surface discharges need to be indicated and provided for on the ESC and SWM plans. SWM recharge requirements for this project will not be diminished because of proposed dewatering.
19. Dam safety issues, including but not limited to:
 - a. Culverts causing a railroad embankment or road embankment to function as a dam.
 - b. Construction on the embankment of an existing dam.
 - c. Construction that could change the hazard condition of a pond or dam.

COMMENTS ON SHARED PRELIMINARY SWM CONCEPT DESIGN MATERIAL

1. Comments from the MDE Wetlands group refer to Exhibit H which states that drainage scuppers may be utilized from the viaduct section to disperse runoff in the air, presumably avoiding the need for additional BMPs. This approach was not mentioned in the SWM material shared with the Plan Review Division. Please explain.
2. For the example or elevated track, non-roof top disconnection is being proposed to meet water quality requirements. The proposed disconnection area in PP-56 does not seem to meet the criteria. Acceptable disconnection areas will need to meet the sheet flow and slope requirements. Disconnections for this project would be a hybrid of rooftop/non-rooftop, and MDE may be willing to forego the 1000 sf area limitation if additional provisions are met. These could include a gravel drip line trench, decompaction of disturbed soils, leaving trees in place, and fostering unmanicured vegetative growth. It will not be acceptable to clear and grade existing wooded areas to meet the minimum 5% slope requirement.
3. Use the methodology required by MDE Plan Review for S/F projects to compute project requirements. The WSP spreadsheets are not acceptable for determining project requirements. WSP spreadsheets can be used for calculating the achieved P_e and achieved ESD_v , but the methodology needs to be the same as MDE's template spreadsheet. See Tech Memos #11 for instructions. For example, for the PP-56 package, WSP calculations indicate that $A_i=1.35$ ac is being treated for $P_E= 2.6$ inches, but MDE's calculations indicate that the achieved P_E is only 1.63 in.
4. The MDE Plan Review Division no longer allows use of the draft MDE surface storage volume tables. The provided surface storage must be $\geq 75\%$ of the ESD_v .
5. The achieved ESD_v needs to be shown in calcs. (The MDE spreadsheets do this.)



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Suzanne E. Dorsey, Deputy Secretary

TO: Neb Sertsu, Director of Project Development
Baltimore Washington Rapid Rail LLC
Gregg Iskra, WSP USA Inc.

FROM: Amanda Malcolm, Sediment and Stormwater Plan Review Division,
Water and Science Administration

DATE: November 30, 2023

SUBJECT: Feedback on SWM Concept Approach Report
Baltimore Washington Rapid Rail (BWRR) Maglev Train

1. MD Stormwater Regulations require that Environmental Site Design (ESD) practices be used for treating the first inch of rainfall for new development. For rainfall above 1 inch and for redevelopment treatment, ESD practices are required “to the maximum extent practicable”. When ESD practices are not practicable for treating rainfall above 1 inch or redevelopment, structural practices may be used to meet water quality volume and C_{pv}.
2. ESD practices are micro-scale or non-structural practices, presented in Chapter 5 of the MD Stormwater Manual. The drainage area to these practices, such as micro-bioretenion, is generally limited to 0.5 acre. The drainage area to a bioswale can be larger because factors other than drainage area are considered for qualification as ESD. The primary treatment practices proposed by the Concept Approach are bioretention and bio-swales. Bioretention is not small scale and, therefore, is not considered to be an ESD practice.
3. When there are unique circumstances applicable such that strict adherence to ESD will result in unnecessary hardship and not fulfill the intent of the SWM Regulations, a request for a variance may be made to MDE, explaining the reasons and providing justification. Please know, however, that looking over the alignment, there is no obvious reason as to why ESD will not be practicable. Any requests for a variance will need to be made on a POI-by-POI basis.
4. The Concept Approach indicates that the project wide impervious area requiring treatment is 402 areas and that 135 BMPs will be proposed, which is roughly 3 acres/BMP. ESD to the MEP is not being proposed.
5. The Concept Approach lists thirty-five (35) bioretention facilities in the Tier II watersheds (PP-52 to F-20 and PP-56 to PP-59). Thirteen (13) of these bioretention facilities have drainage areas larger than 3 acres, and twenty-two (22) have drainage areas between 0.5 acre and 3 acres. ESD to the MEP is not being proposed in the Tier II watersheds.
6. Provide more information on the permeable surface BMPs proposed for the permanent access roads. Show the access roads on the plan sheets.
7. A separate WQ Summary Sheet is needed for each 8-digit watershed, except for the Tier II areas. For Tier II, each Tier II catchment must have its own Water Quality Summary Sheet. Water quality treatment is only additive for the Watershed, not for the whole project.
8. WSP spreadsheets can be used for calculating the achieved Pe and achieved ESD_v need to be revised to follow the methodology used by MDE’s template spreadsheet, which are based on

the provided surface storage being $\geq 75\%$ of the ESDv. The MDE Plan Review Division no longer allows use of the draft MDE surface storage volume tables. The required size of BMPs is going to be substantially larger (back of the napkin calcs indicate roughly 60% larger) using 75% surface storage, which could in turn affect the footprint needed for constructing the SWM BMPs.

9. There is no mention of quantity management in the Concept Approach. There will be quantity management requirements for this project, and they will be significant for the portions of the project located in Prince George's County and Baltimore City due to 100-yr management requirements. It is not possible for MDE Plan Review to have a level of comfort for a SWM concept that does not address quantity management or consider the footprint needed for constructing the respective BMPs.
10. A portion of this project is located in the Chesapeake Bay Critical Area. The stormwater management design for the area located in the Critical Area must be approved by the Critical Area Commission prior to final SWM approval from MDE.
11. There is a station proposed at BWI Airport. MAA has an institutional management plan for BWI which includes a master TR-20 model for each watershed. If the proposed station changes surface hydrology or any hydraulic inputs, the model will need to be updated by either MAA or BWRR.