ECOLOGY TOOLKIT
Stream Diversion

OVERVIEW

For projects that involve new culvert construction, extension, or replacement within a perennial or intermittent stream, the Ecologist must address dewatering impacts associated with temporary stream diversions, as well as mitigation requirements, when applicable, in the Ecology report and Section 404 Preconstruction Notification (PCN) or Individual Permit application (IPA). Please note, the procedures described in this toolkit do not apply to bridge activities.

STREAM DIVERSION METHODS

There are three types of temporary stream diversion methods used on GDOT projects: pumping, berm, and channel diversion. These methods are typically applied in the following ways:

1. Pumping diversions – single barrel culverts proposed for extension or replacement.
2. Berm diversions – multi-barrel culverts proposed for extension.
3. Channel diversions – new and replacement culverts, regardless of barrels (restricted to a drainage area that is less than 1 square mile).

Diagram 1, located at the end of this document, was developed by GDOT Design Policy and Support and provides a schematic, as well as a description of each diversion method. Please note, Diagram 1 is for informational purposes only and should not be included in any Ecology report, PCN, or IPA.

REGULATIONS AND GUIDANCE

US Army Corps of Engineers (USACE) Regional Conditions

The 2021 Nationwide Permit Regional Conditions published February 2022 by the USACE Savannah District include Regional Condition C.10., which addresses temporary stream diversions installed in perennial streams. This condition requires that stream diversions be designed to ensure aquatic life passage is maintained to the maximum extent practicable. The condition also requires that a restoration plan be included in the PCN or IPA to demonstrate that the affected reach of the stream channel is returned to preexisting conditions after the stream diversion has been removed.

USACE Standard Operating Procedure (SOP) for Compensatory Mitigation

The SOP for Compensatory Mitigation (Version 2.0), published October 2021 by the USACE Savannah District, includes requirements for temporary dewatering impacts associated with temporary stream diversions on culverts in either perennial or intermittent streams. Mitigation would be required for temporary dewatering impacts with a duration of 60 days or greater. Anything less than 60 days would not require mitigation and would not contribute towards the overall project mitigation thresholds (100 linear feet of stream and 0.01 acre of wetland). Dewatering impacts with a duration of 60 to 90 days would be considered “temporary” and impacts with a duration of greater than 90 days but less than 1 year would be considered “short-term” for the purposes of compensatory mitigation. Please note, if a stream diversion is needed for 1 year or greater, it would be considered “permanent” and the impact type should be “discharge of fill”. The images below show the options when selecting impact type and duration in the USACE Qualitative Worksheet for Stream Impacts V2.0.

Dewatering (Stream and Pump Diversions) – Short Term/Temporary
Discharge of Dredge Material
Discharge of Fill (Including Culverts)
Primary Morphological Alteration

Choose Secondary Adverse Impact
Hydrologic Alteration - Impound
Secondary Morphological Alteration
Dewatering (Stream and Pump Diversions) – Short Term/Temporary

Temporary – Less than (or equal to) 90 Days
Choose Duration
Permanent/Reoccurring
Short Term – Less than 1 Year
Temporary – Less than (or equal to) 90 Days

GDOT Guidance

GDOT will meet the requirement for a restoration plan via a plan note located in the General Notes (Series 4). Design is responsible for including the plan note, however, it is the Ecologist's responsibility to verify its inclusion in the General Notes. The note calls for dewatering activities to be completed in less than 60 days. In cases where a stream diversion is required for 60 days or greater, concurrence from the State Construction Engineer will be required and the plan note table (see below) shall be completed by Design with information provided by the District Construction Engineer at Preliminary Field Plan Review (PFPR). These responsibilities are described in a GDOT Interoffice Memo issued by the State Design Policy Engineer on February 1, 2022.

The plan note shall state:

> *Temporary diversion methods (e.g., pumping, berm, channel, etc.) used to install structures in perennial and intermittent streams, except as notes in the table below, shall be in place less than 60 days to minimize impacts to aquatic life passage. Fill material required for temporary diversions shall be non-erodible and shall be removed in its entirety upon completion of the diversion.*
>
> *Upon completion of any stream diversion that requires alteration of the stream bed or bank, the affected reach shall be restored to pre-project elevations, widths, and contours or such that the morphology of the impacted stream reach mimics the adjacent upstream and downstream reach. Additionally, disturbed stream banks shall be stabilized and revegetated*.

STREAM DIVERSION DURATION EXCEPTIONS DIVERSIONS OF LESS THAN 60 DAYS ARE NOT LISTED IN THIS TABLE			
RESOURCE ID	ALIGNMENT/RDWY	STRUCTURE NO.	DURATION
PS# OR IS#			≥60days ≤90days OR >90days <365days OR ≥365days

COMMUNICATION MILESTONES

There are three communication milestones associated with stream diversions with which the Ecologist should be involved.

Avoidance and Minimization Measures Meeting (A3M)

During the A3M, the Ecologist shall discuss with Design if there will be new culvert construction, replacement, or extension within a perennial or intermittent stream for the proposed project. If so, the project team shall discuss the requirement for the plan note regarding stream diversions in the General Notes. Please note, the duration of a temporary stream diversion will not be determined at this time, however, the project team should be made aware that this information will be required for the PCN or IPA.

Preliminary Field Plan Review (PFPR)

During PFPR, the Ecologist, Design, and District Construction are responsible for discussing any temporary stream diversions that require 60 days or greater to complete. All stream diversion durations 60 days or greater shall be approved by the State Construction Engineer, and the plan note table should be modified accordingly. It is the responsibility of the District Construction Engineer or their designee to provide information on durations at PFPR. However, the Ecologist shall be prepared to ask for this information if it is not provided. In addition, the Ecologist shall ensure the plan note regarding stream diversions is included in General Notes.

Final Field Plan Review (FFPR)

During FFPR, the Ecologist shall confirm with District Construction that the durations of each temporary stream diversion remain unchanged since PFPR. In addition, the Ecologist shall review and confirm that the plan note regarding stream diversions is included in the General Notes and that the plan note table is correctly filled out.

DOCUMENTATION

Mainline Plans (Series 13)

Temporary dewatering impacts shall be measured and highlighted on Mainline Plans (Series 13) included with the ERS-AOER and Addendum. The dewatering impact shall extend upstream and downstream of the proposed inlet and outlet, respectively, up to 50 linear feet (as measured along the stream channel, and from the ends of the wingwalls) OR up to the required right-of-way (ROW) or easement line, whichever is less. Please note, if only one end of an existing culvert is being extended, dewatering impacts should still be accounted for on both sides of the stream crossing, regardless of which end the work is occurring. However, if orange barrier fence (OBF) is placed less than 50 linear feet upstream/downstream from the inlet or outlet, and its placement would prevent the contractor from accessing the stream beyond the location of the OBF, dewatering impacts would extend only to the OBF line. In the event of overlapping impact types (e.g., permanent discharge of fill from riprap placement and temporary dewatering) on the same stream segment, only the most adverse impact type shall be assessed for that segment (e.g., permanent discharge of fill from riprap placement). Dewatering impacts would then be assessed starting upstream/downstream from the end of the permanent fill impact associated with the culvert construction or extension. There will occasionally be atypical scenarios where the appropriate assessment of the temporary stream diversion and associated impact may fall outside the guidance provided above (see Figure 5 below for an example of such an atypical situation). In those situations, work with your GDOT Ecologist to determine the appropriate assessment. The dewatering impact shall be highlighted on plan sheets with a distinct color and shall be included in a legend

identifying the color of each impact type. A callout box pointing to the impact shall also state the linear feet and area for the temporary dewatering impact. See examples below.

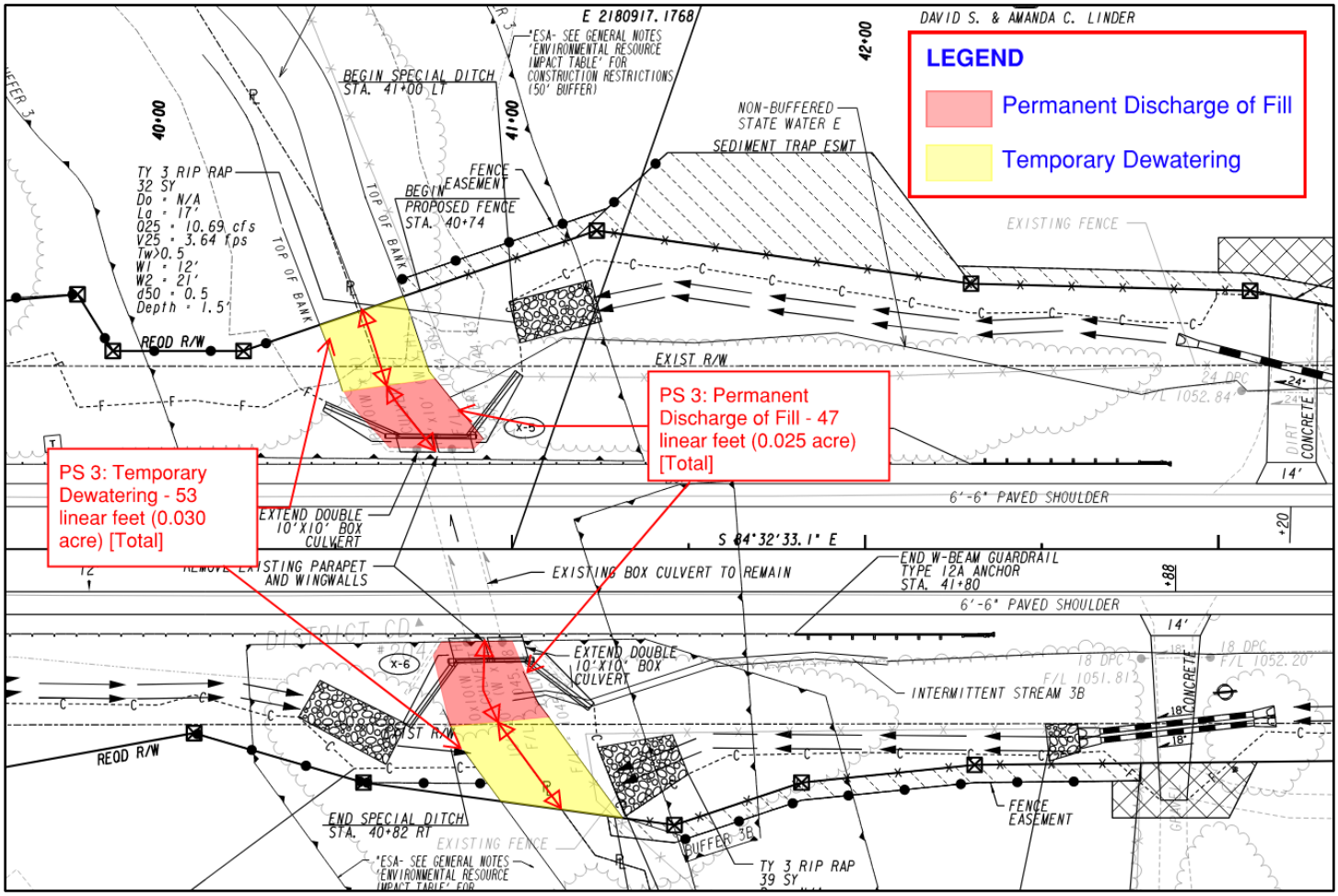


Figure 1 – Example of a culvert extension showing a temporary dewatering impact on both ends of the proposed extension measuring up to the required ROW limit. Please note, for this example, the OBF would not prevent the contractor from accessing the stream up to the required ROW limit. Therefore, the impact should be measured up to the required ROW limit and not to the OBF. The label indicating 53 linear feet of dewatering impacts refers to the combined length on both ends of the culvert extension. In this scenario, the distance along the stream channel from the ends of the wingwalls (i.e., the end of the permanent discharge of fill impact) to the required ROW limit is less than 50 linear feet on both ends of the culvert.

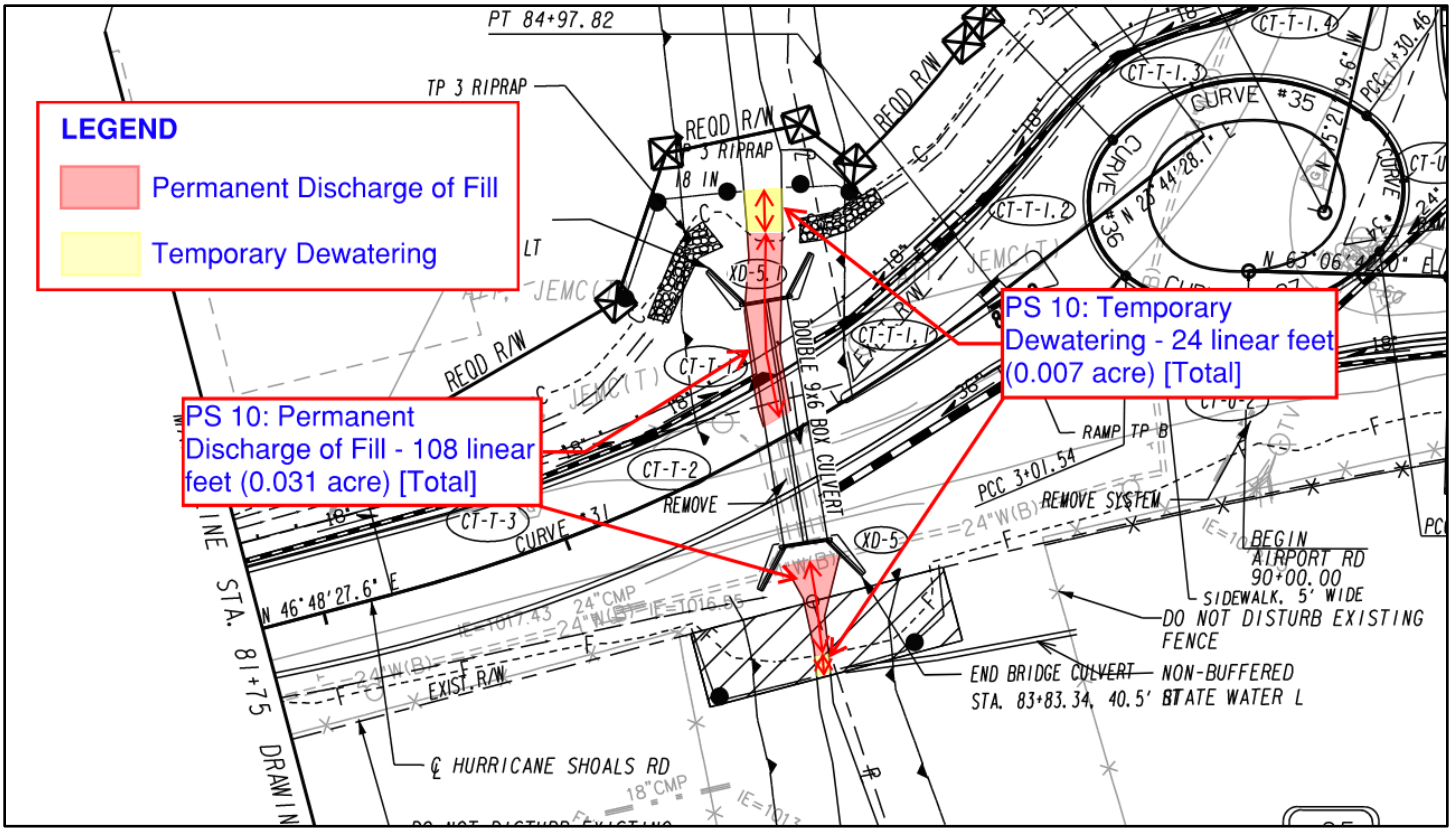


Figure 2 – Example of a culvert extension showing a temporary dewatering impact on both ends of the proposed replacement. On the culvert inlet side of the crossing, the OBF would prevent the contractor from accessing the stream up to the required ROW limit; therefore, the impact would be measured only up to the OBF. On the culvert outlet side, the OBF is placed along the required ROW limit; therefore, the dewatering impact is measured up to the required ROW limit.

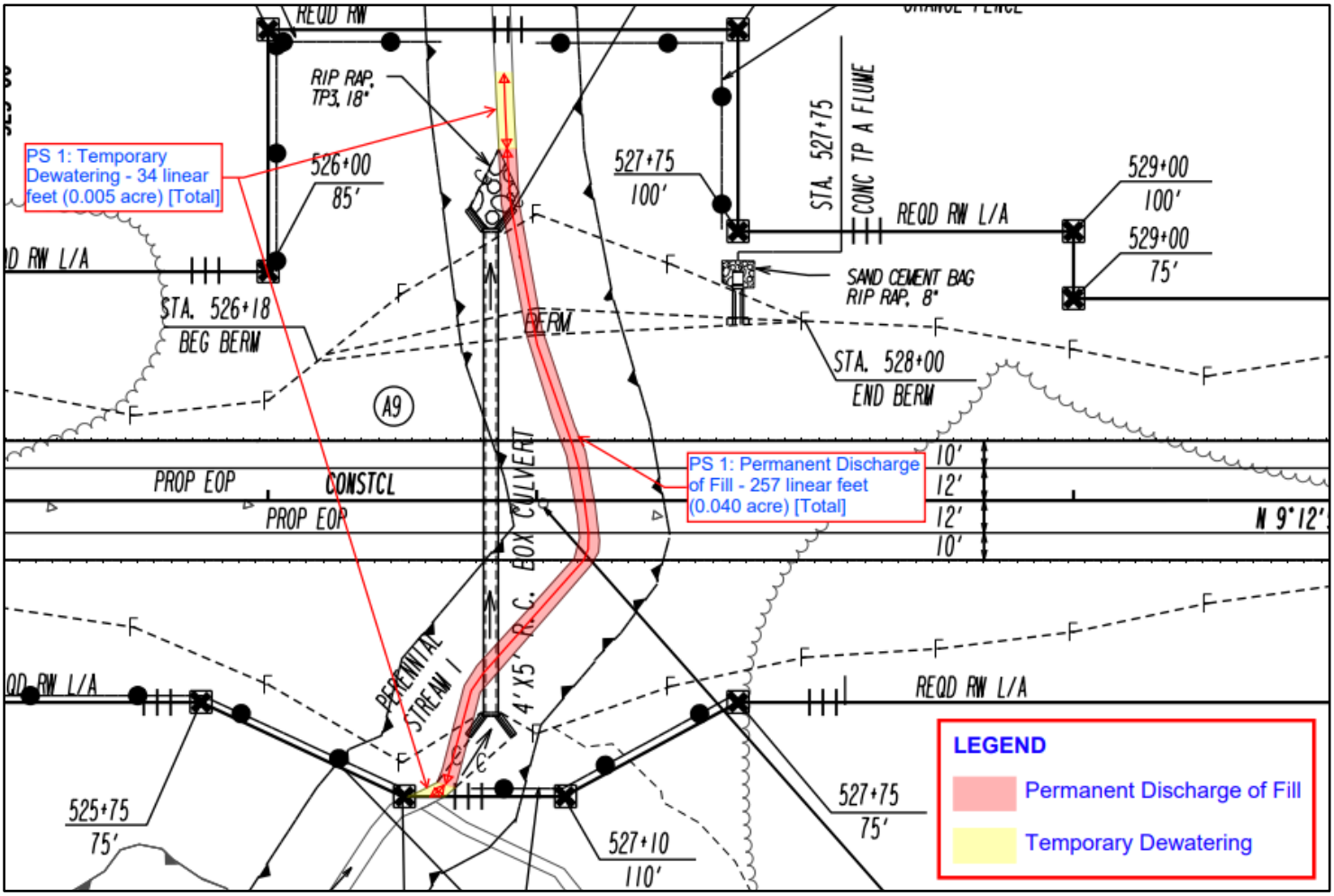


Figure 3 – Example of new culvert construction. The temporary dewatering impacts on both ends of the culvert are highlighted beginning where the permanent impact ends rather than at the culvert structure to assess only the most adverse impact. In this scenario, permanent discharge of fill from riprap placement overlaps with the temporary dewatering impact on the proposed culvert outlet side of the crossing. On the proposed inlet side of the crossing, permanent impacts from the cutting of a connection between the existing stream channel and proposed inlet (as denoted by cut limits) overlap with the temporary dewatering impact. The temporary dewatering impact on the outlet side is assessed 50 linear feet along the stream channel from the proposed culvert wingwalls because the required ROW limit and proposed OBF are both located more than 50 linear feet from the ends of the wingwalls. The temporary dewatering impact on the inlet side of the proposed culvert is assessed to the required ROW limit and proposed OBF as it is less than 50 linear feet from the ends of the wingwalls and the OBF is located along the required ROW limit.

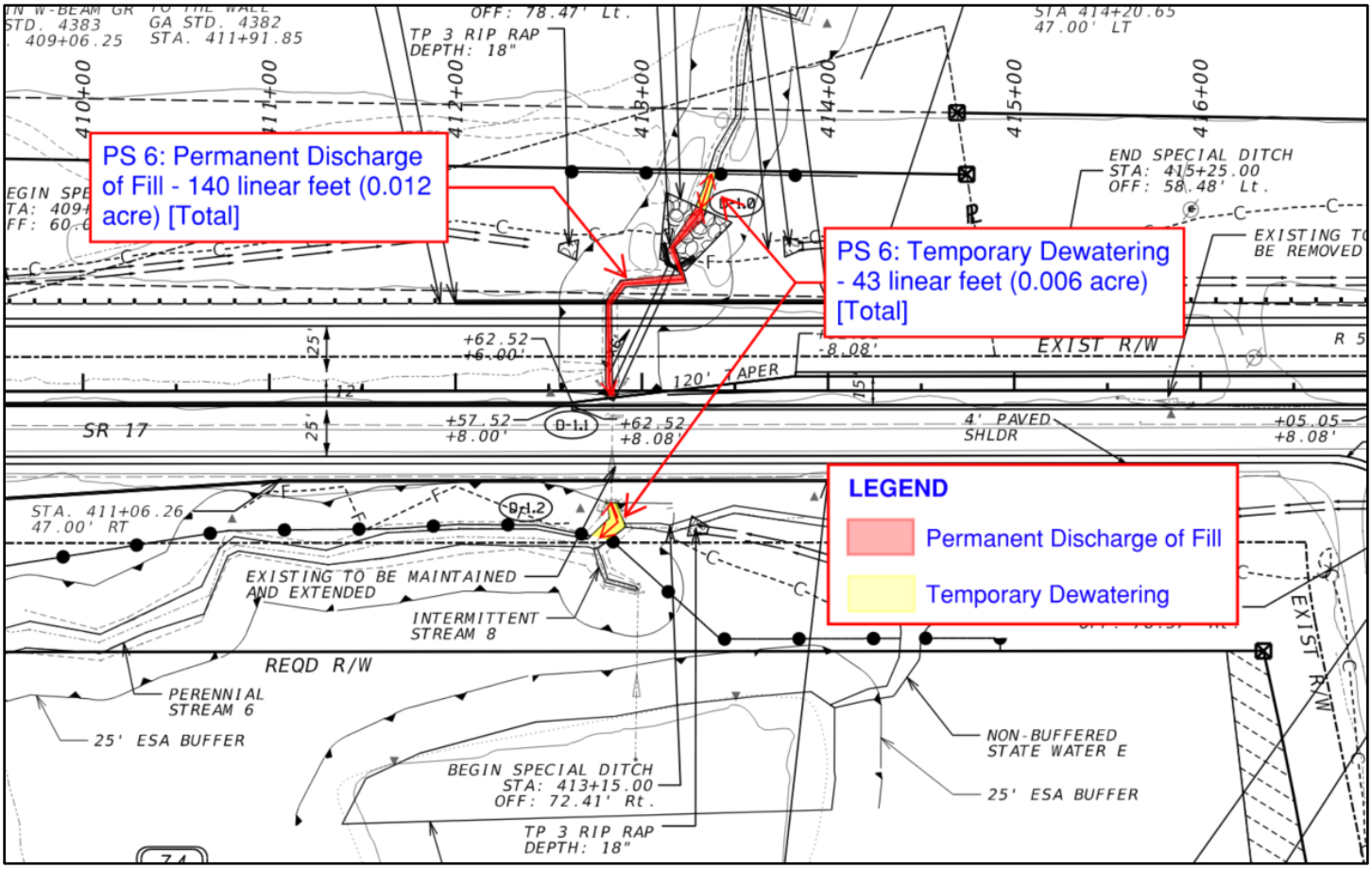


Figure 4 – Example of a culvert extension occurring on only one side of the crossing. Although the extension is occurring on only the outlet side of the crossing, it is assumed temporary dewatering impacts would occur on both sides. The temporary dewatering impact on the outlet side is assessed to the required ROW limit because it is less than 50 linear feet from the ends of the proposed wingwalls and the OBF is located along the required ROW limit. The temporary dewatering impact on the inlet side is assessed to the proposed OBF. In this example, the proposed OBF on the inlet side of the crossing would prevent the contractor from accessing the stream up to the required ROW limit.

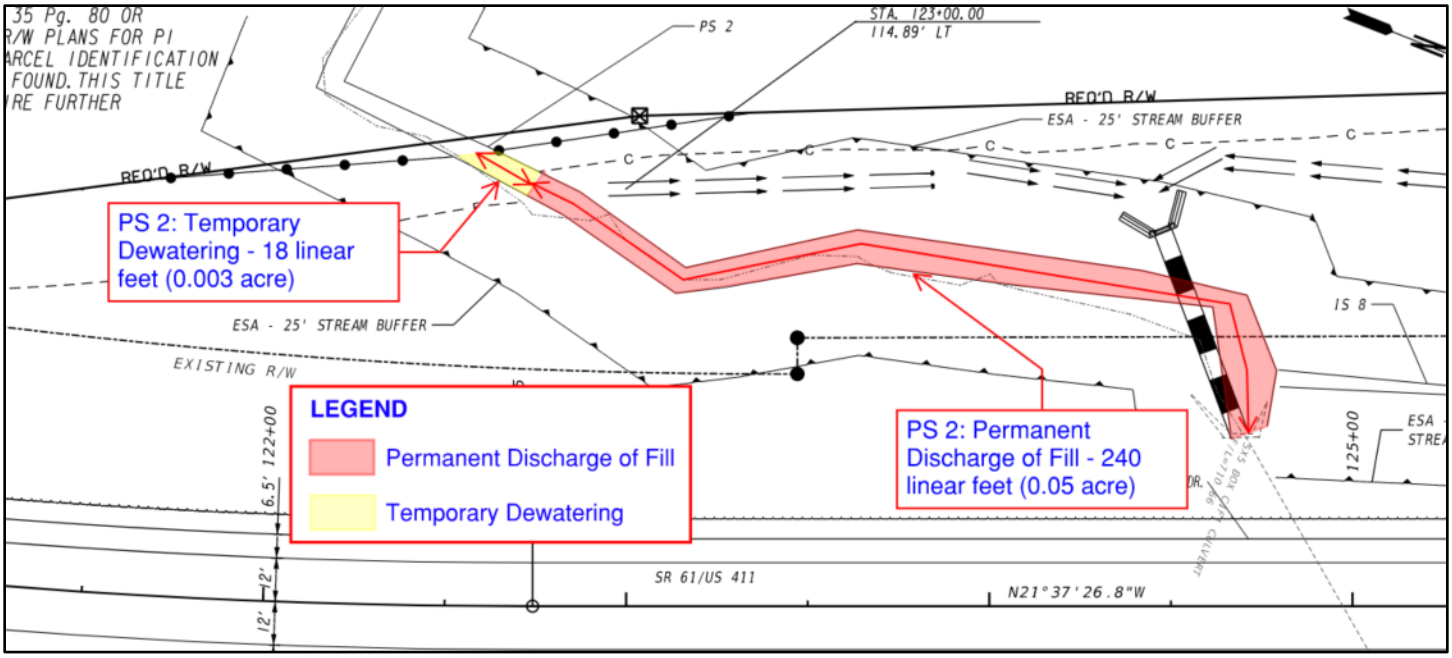


Figure 5 – Example of an atypical scenario where a portion of PS 2 is being relocated via a proposed ditch and culvert extension. PS 2 is being temporarily diverted from the existing channel upstream of where the proposed ditch ties into the existing channel while the proposed ditch and culvert extension are being constructed. The temporary dewatering impact on the inlet side is assessed to the proposed OBF. In this example, the proposed OBF on the inlet side of the stream crossing would prevent the contractor from accessing the stream up to the required ROW limit.

Ecology Resource Survey and Assessment of Effects Report (ERS-AOER)

Dewatering impacts shall be included in the following sections of the ERS-AOER: Jurisdictional Waters overview table, individual stream tables (Section III.H. Jurisdictional Waters of the U.S.), and the Jurisdictional Stream Summary Impact Table (Section IV. Permit and Mitigation).

At the time of the ERS-AOER submittal, the duration of the stream diversion will not be known. Therefore, the Ecologist shall use the default duration of less than 60 days and shall label the Impact/Length(Area)/Duration cell in the individual stream table as “dewatering/XX LF (X.XXX ac)/temporary (<60 days)”. The Ecologist shall label the impact type as “temporary stream diversion” in both the Impact Activity cell in the individual stream table and the Jurisdictional Stream Summary Impact Table. In the event a more adverse impact type overlaps entirely with the length of the dewatering impact, the Impact Activity cell shall still include the temporary stream diversion activity; however, the impact length/area of the dewatering impact should not be included in the Impact/Length(Area)/Duration cell or the Jurisdictional Stream Summary Impact Table.

Addendum

When drafting the Addendum, the Ecologist shall review the stream diversion durations based on the plan note table in the General Notes and update the previously reported durations, as needed. If it was determined at PFPR that the duration would be 60 days or greater, the Ecologist shall update the individual stream table and the Jurisdictional Stream Summary Impact Table. In addition, mitigation for dewatering impacts should be accounted for in the Agency Coordination overview table and the Permit and Mitigation Summary Table (Section IV. Permit and Mitigation). If mitigation is required for dewatering impacts, calculations of required

mitigation credits for these impacts shall be included in the most recent version of the USACE Qualitative Worksheet(s) for Stream Impacts included in Appendix IV: Permit and Mitigation.

The extent of the temporary stream diversion shown on the Mainline Plans should also be confirmed and updated, if applicable. At this time, the General Notes sheet containing the plan note regarding stream diversions shall be included with the construction plans provided in the addendum.

Preconstruction Notification or Individual Permit Application

Dewatering impacts for perennial and intermittent streams with a duration of 60 days or greater for new culvert construction, replacement, and extension shall be included in the ORM Impact Table attached to the PCN or IPA, as well as in the project impact table of the Regional Permit PCN form. If the temporary stream diversion would occur for a duration of less than 60 days, this impact should be included in only the supplemental information section (see below). Temporary dewatering impacts shall be included on Mainline Plans attached to the PCN or IPA. In addition, the General Notes sheet containing the plan note regarding stream diversions shall be included. If mitigation is required for dewatering impacts, calculations of required mitigation credits for these impacts shall be included in the most recent version of the USACE Qualitative Worksheet(s) for Stream Impacts included with the PCN or IPA.

The following narrative shall be provided in the supplemental information section of the PCN or IPA for all proposed culverts that will need a stream diversion:

The streams listed in the below table have proposed culvert activities and would be temporarily diverted within the project limits. Fill material required for temporary stream diversions shall be non-erodible and shall be removed in its entirety upon completion of the diversion. Upon completion of the diversion, the affected reaches of the streams shall be restored to pre-project elevations, widths, and contours or such that the morphology of the impacted stream reach mimics the adjacent upstream and downstream reaches.

Resource Name	Impact Length (Area)	Duration
PS or IS X	XX LF (X.XXX ac)	*Select one of the following:* < 60 days (temporary) ≤ 90 days (temporary) < 1 year (short-term) ≥ 1 year (permanent)

OTHER CONSIDERATIONS

Protected Species

This toolkit focuses on temporary dewatering impacts as they pertain to Section 404 reporting, permitting, and mitigation. However, impacts associated with temporary stream diversions should also be considered when evaluating project impacts to protected aquatic species where culvert work is proposed.

Fish and Wildlife Coordination Act (FWCA)

A stream diversion would not contribute to the threshold for FWCA coordination unless the duration for a stream diversion would be one year or greater, whereupon it would be considered a permanent discharge of fill.

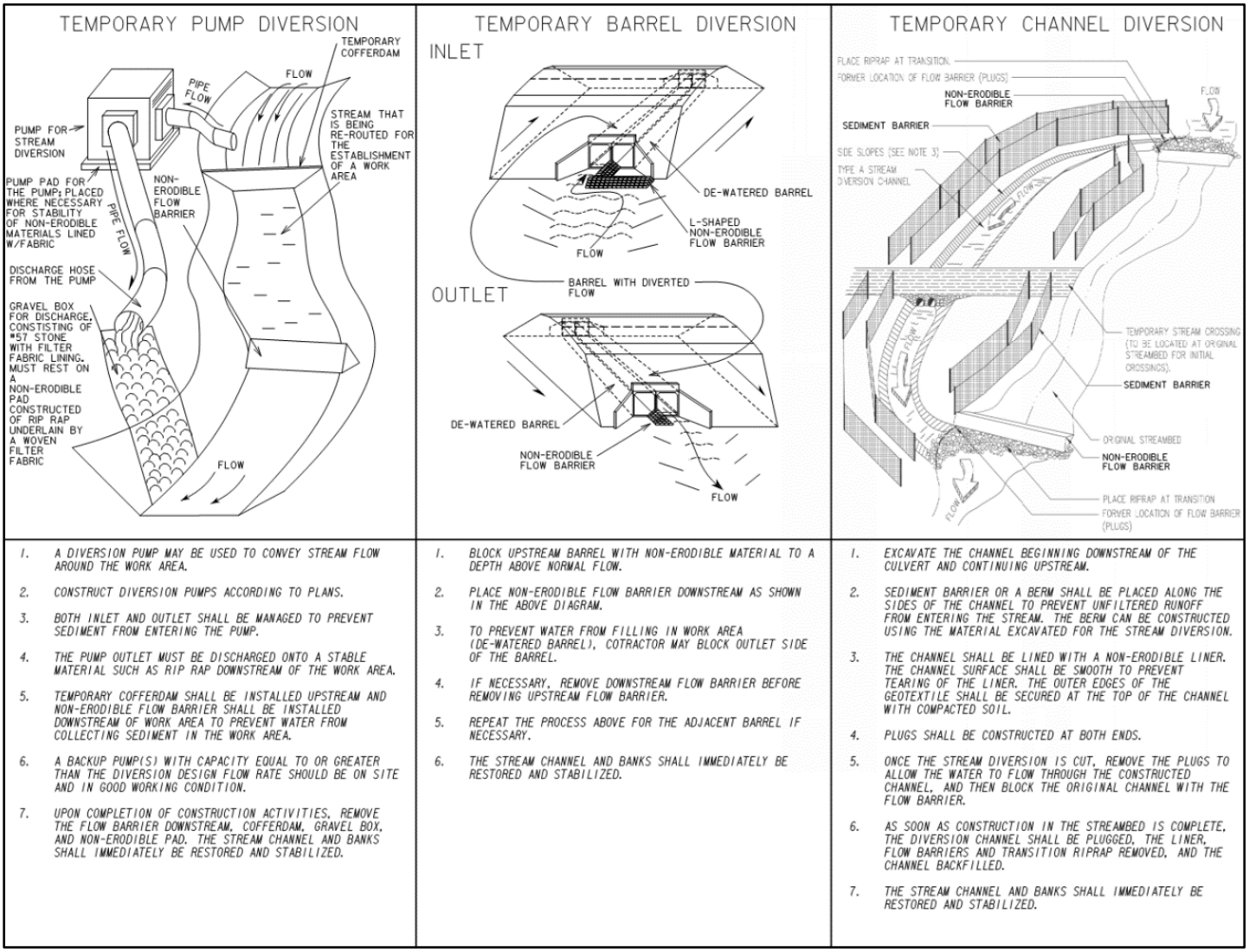
State Protected Buffers

Impacts to the state-mandated 25- or 50-foot stream buffer associated with a stream diversion will typically be included in the 50-foot roadway drainage structure exemption (RDSE) area associated with the proposed culvert work and, therefore, be exempt from buffer variance requirements. (Note: For culvert extensions, RDSE areas are associated with the extended portions only. Thus, if only one end of an existing culvert is being extended, a 50-foot RDSE area would be associated with only to the extension at that end even though dewatering impacts would still be accounted for on both sides of the stream crossing, regardless of which end the work is occurring. As such, a buffer variance may be needed for impacts to the stream buffer associated with a stream diversion on the side of the stream crossing opposite from where the extension is to be constructed.

TOOLKIT REVISION HISTORY

Revision Description	Relevant Sections	Revision Date
Initial Publication	All	05/02/2022
Minor editorial revisions & hyperlinks Update to mitigation requirements Added Figures 2, 4 & 5	All Regulations & Guidance – USACE SOP for Compensatory Mitigation; Documentation – PCN or IPA Documentation – Mainline Plans	4/22/2024
Content review (no changes)	All	1/22/2025

Diagram 1 – Stream Diversion Methods



1. A DIVERSION PUMP MAY BE USED TO CONVEY STREAM FLOW AROUND THE WORK AREA.
2. CONSTRUCT DIVERSION PUMPS ACCORDING TO PLANS.
3. BOTH INLET AND OUTLET SHALL BE MANAGED TO PREVENT SEDIMENT FROM ENTERING THE PUMP.
4. THE PUMP OUTLET MUST BE DISCHARGED ONTO A STABLE MATERIAL SUCH AS RIP RAP DOWNSTREAM OF THE WORK AREA.
5. TEMPORARY COFFERDAM SHALL BE INSTALLED UPSTREAM AND NON-ERODIBLE FLOW BARRIER SHALL BE INSTALLED DOWNSTREAM OF WORK AREA TO PREVENT WATER FROM COLLECTING SEDIMENT IN THE WORK AREA.
6. A BACKUP PUMP(S) WITH CAPACITY EQUAL TO OR GREATER THAN THE DIVERSION DESIGN FLOW RATE SHOULD BE ON SITE AND IN GOOD WORKING CONDITION.
7. UPON COMPLETION OF CONSTRUCTION ACTIVITIES, REMOVE THE FLOW BARRIER DOWNSTREAM, COFFERDAM, GRAVEL BOX, AND NON-ERODIBLE PAD. THE STREAM CHANNEL AND BANKS SHALL IMMEDIATELY BE RESTORED AND STABILIZED.

1. BLOCK UPSTREAM BARREL WITH NON-ERODIBLE MATERIAL TO A DEPTH ABOVE NORMAL FLOW.
2. PLACE NON-ERODIBLE FLOW BARRIER DOWNSTREAM AS SHOWN IN THE ABOVE DIAGRAM.
3. TO PREVENT WATER FROM FILLING IN WORK AREA (DE-WATERED BARREL), COTRACTOR MAY BLOCK OUTLET SIDE OF THE BARREL.
4. IF NECESSARY, REMOVE DOWNSTREAM FLOW BARRIER BEFORE REMOVING UPSTREAM FLOW BARRIER.
5. REPEAT THE PROCESS ABOVE FOR THE ADJACENT BARREL IF NECESSARY.
6. THE STREAM CHANNEL AND BANKS SHALL IMMEDIATELY BE RESTORED AND STABILIZED.

1. EXCAVATE THE CHANNEL BEGINNING DOWNSTREAM OF THE CULVERT AND CONTINUING UPSTREAM.
2. SEDIMENT BARRIER OR A BERM SHALL BE PLACED ALONG THE SIDES OF THE CHANNEL TO PREVENT UNFILTERED RUNOFF FROM ENTERING THE STREAM. THE BERM CAN BE CONSTRUCTED USING THE MATERIAL EXCAVATED FOR THE STREAM DIVERSION.
3. THE CHANNEL SHALL BE LINED WITH A NON-ERODIBLE LINER. THE CHANNEL SURFACE SHALL BE SMOOTH TO PREVENT TEARING OF THE LINER. THE OUTER EDGES OF THE GEOTEXTILE SHALL BE SECURED AT THE TOP OF THE CHANNEL WITH COMPACTED SOIL.
4. PLUGS SHALL BE CONSTRUCTED AT BOTH ENDS.
5. ONCE THE STREAM DIVERSION IS CUT, REMOVE THE PLUGS TO ALLOW THE WATER TO FLOW THROUGH THE CONSTRUCTED CHANNEL, AND THEN BLOCK THE ORIGINAL CHANNEL WITH THE FLOW BARRIER.
6. AS SOON AS CONSTRUCTION IN THE STREAMBED IS COMPLETE, THE DIVERSION CHANNEL SHALL BE PLUGGED, THE LINER, FLOW BARRIERS AND TRANSITION RIPRAP REMOVED, AND THE CHANNEL BACKFILLED.
7. THE STREAM CHANNEL AND BANKS SHALL IMMEDIATELY BE RESTORED AND STABILIZED.