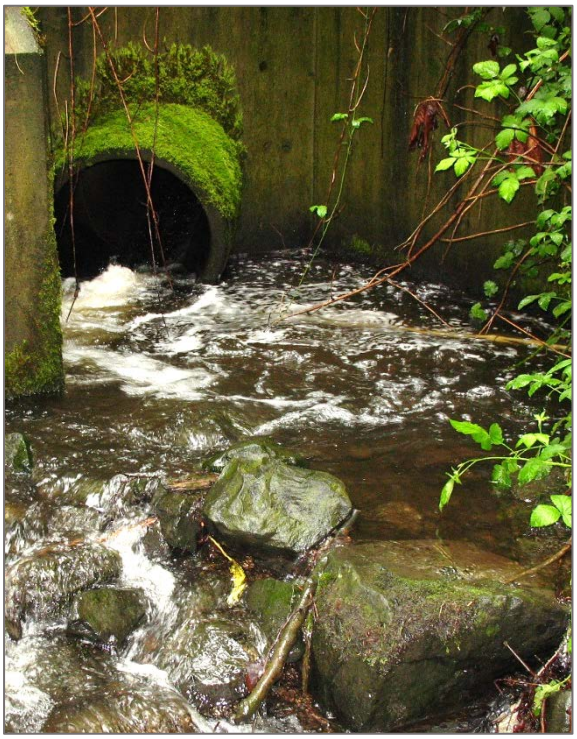
Mapping Guidance for Municipal Stormwater Permittees

Guidance for the Western and Eastern Washington Municipal Stormwater General Permits



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I. Purpose of this Document

This document provides general guidance on the mapping requirements found in the 2019 Phase I, Western Washington Phase II, and Eastern Washington Phase II Municipal Stormwater permits (permits). Although the specific mapping requirements between the permits vary, the terms used are the same. The reader should be familiar with the permit requirements in order to follow the information provided below. The following provides guidance on mapping terms and definitions, and example Municipal Separate Storm Sewer System (MS4) scenarios, including which features should be mapped in accordance with the permit requirements. This document does not provide guidance on standard operating procedures for field- or office-based mapping of stormwater features and their associated attributes. Additional guidance may be found on Ecology's website.

II. Know Your MS4

The mapping requirements found in the permit supports implementation of permit requirements for:

- Illicit Discharge Detection and Elimination (IDDE).
  - Including responding to and notification of spills.
- Operation and maintenance of the stormwater infrastructure.
- Informing programs of potential pollutant sources (e.g., public education and outreach, source control inspections, and local monitoring programs).

To be successful and remain in compliance with their permit, Permittees must have complete and accurate knowledge of what is regulated under their permit.

Mapping requirements apply only to the Permittee's municipal stormwater system.

Permittees must maintain an on-going program to keep updated maps of their MS4. The permits require Permittees to update their MS4 maps to include mapping of new features and attribute information for existing features by a certain date. Permittees should establish their own protocols for maintaining and updating their MS4 maps to best support permit implementation.

Table 1 summarizes the required features to map, as described in the permits. Refer to the current permit language for a complete description of the mapping requirements.

MS4 mapping and documentation requirements are included in the ***Phase I permit*** at:

- S5.C.2 for Clark, King, Pierce, and Snohomish Counties; and Cities of Tacoma and Seattle
- S6.D.3.c for Secondary Permittees
- S6.E.3.c for the Ports of Seattle and Tacoma

MS4 mapping and documentation requirements are included in the ***Phase II permits*** at:

- S5.C.4 for W.WA Phase II
- S5.B.3 for E. WA Phase II Permittees
- S6.D.3.c for Secondary Permittees

Table 1: Summary Table of Municipal Stormwater Mapping Requirements

Mapping Features
Common Elements for the Three Permits*

• Known MS4 outfalls (discharges to surface receiving waters or waterbody)
  o Include size and material of known outfalls
• Known discharge points (DP) (discharges through facilities/BMPs designed to infiltrate)
• Receiving waters ("other than groundwater")
• Stormwater treatment and flow control BMPs/facilities owned or operated by the Permittee.
  o E.WA Phase II permit uses, "Permanent stormwater facilities owned or operated by the Permittee."
• Geographic areas served by the MS4 that do not discharge to surface waters.
  o E.WA Phase II permit uses, "Areas served by the MS4 that discharge to ground."
• Connections:
  o Between Permittee's MS4 and other municipalities or public entities
  o To the MS4 authorized after 2/16/07 (Western WA); 8/1/2019 (Eastern WA)
  o From the MS4 to a privately owned stormwater system

Western Washington Only

• For outfalls & DP with ≥ 24" diameter, or an equivalent cross-sectional area for non-pipe, the following shall be mapped to each outfall or DP:
  o Tributary conveyance type, material, and size, where known
  o Associated drainage areas
  o Land use

Phase I Only

• Connections:
  o ≥8" diameter connections to tributary conveyances.
  o Between stormwater treatment and flow control BMPs and tributary conveyances, including emergency overflows

* Required format: Electronic, with fully described mapping standards.

Mapping format and standards

For the first time, the 2019 Phase II permits require all Permittees to develop their map in an electronic format, with fully described mapping standards and metadata. For Phase I Permittees, this is not a new requirement; however, for Phase II Permittees an electronic format has only been "preferred" in previous permit cycles. The 2019 Phase II permits describe acceptable electronic formats, including any Geographic Information System (GIS) software or CAD drawings. GIS software can map and store spatial features (i.e., point, line, and polygon, data) and associated feature attribute data. The purpose of the requirement to fully describe the mapping standards used to map stormwater features is to ensure this

spatial data can be understood by someone outside of your organization and is translatable, if requested. To assure compatibility and encourage sharing of geospatial data among Permittees and Ecology, we encourage Permittees to aim to be consistent with the standards on Ecology's webpage. These are the same standards grant recipients are asked to follow.

See guidance on Ecology's web page: https://ecology.wa.gov/Research-Data/Data-resources/Geographic-Information-Systems-GIS/Standards.

III. Permit Mapping Terms and Definitions - With Guidance

This section pertains to terms and definitions used in the permits' mapping requirements section. See permits for any other relevant definitions. The *Additional Guidance* is largely taken from past Fact Sheets and Response to Comments documents associated with the permits.

Conveyance system means that portion of the municipal separate storm sewer system designed or used for conveying stormwater.

Additional Guidance

- This definition is provided to distinguish the parts of the system that are used to transport stormwater from all other parts.

Discharge point (DP) means the location where a discharge leaves the Permittee's MS4 through the Permittee's MS4 facilities/BMPs designed to infiltrate.

Additional Guidance

- Permittees are required to map all "known" DPs, which includes those found during field reconnaissance, permitting, etc. As a Permittee discovers or permits a DP that is not in their mapping system, the Permittee should follow an established protocol to update the map to include this feature.
- This definition refers specifically to facilities/BMPs designed to infiltrate that are owned or operated by the Permittee, such as infiltrative BMPs listed in the SWMMWW, SWMMEW, or an approved equivalent manual.
- In locations where DPs overlap with other features that are required to be mapped (such as stormwater treatment and flow control BMPs/facilities), both features should be mapped and distinguishable - as permit requirements, such as inspection and maintenance, relate to the features differently. In other words, a DP and stormwater facility may be mapped/represented by the same point or polygon feature so long as the attribute information associated with that feature (point or polygon) communicates whether it is or is not a DP.

Municipal Separate Storm Sewer System (MS4) means a conveyance, or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

(i) Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State Law) having jurisdiction over disposal of

wastes, stormwater, or other wastes. This includes special districts under State Law, such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under Section 208 of the CWA that discharges to waters of the State.

(ii) Designed or used for collecting or conveying stormwater.

(iii) Which is not a combined sewer.

(iv) Which is not part of a Publicly Owned Treatment Works (POTW), as defined at 40 CFR 122.2.

(v) Which is defined as "large" or "medium" or "small" or otherwise designated by Ecology pursuant to 40 CFR 122.26.

Outfall means a point source, as defined by 40 CFR 122.2, at the point where a discharge leaves the Permittee's MS4 and enters a surface receiving waterbody or surface receiving waters. Outfall does not include pipes, tunnels, or other conveyances which connect segments of the same stream or other surface waters and are used to convey primarily surface waters (i.e., culverts).

Additional Guidance

- Permittees are required to map all "known" outfalls, which includes those found during field reconnaissance, permitting, etc. As a Permittee discovers or permits an outfall that is not in their mapping system, the Permittee should follow an established protocol to update the map to include this feature with the size and material information.
- Definition clearly refers to a stormwater discharge to a surface receiving water and does not include discharges to ground.
- Outfalls are not intended to connect the same stream segment or conveyance system under roads or driveways.

Receiving waterbody or receiving waters means naturally and/or reconstructed naturally occurring surface water bodies – such as creeks, streams, rivers, lakes, wetlands, estuaries, and marine waters, or ground water – to which a MS4 discharges.

Additional Guidance

- Receiving waters is intended as a sub-set of 'waters of the State.'
- Federal regulations require the mapping of receiving waters by the Permittee.

Tributary conveyance means pipes, ditches, catch basins, and inlets owned or operated by the Permittee and designed or used for collecting and conveying stormwater.

Additional Guidance

- Tributary conveyance refers to the MS4 conveyance system and not the natural stream system.
- Permittees are required to map tributary conveyances to an outfall or DP that is ≥24" in diameter and collect the following information on the tributary conveyance itself:
  type (e.g., ditch, pipe, catch basins), *material* (e.g., metal), and *size* (e.g., 24").
- The following additional data must be mapped to outfalls or DPs with a ≥24" diameter:

- Associated drainage areas – delineate the contributing drainage area to outfalls or DPs through both the tributary conveyance system and overland runoff.
- Land use information for associated drainage areas.

Permittees can rely on local land use information. Permittees should be aware of several existing references for land use data. The Multi-Resolution Land Characteristics (MLRC) consortium recently re-published the National Land Cover Dataset, which uses 16 categories of land use (e.g. low, med, and high intensity developed, cultivated crops, forests). Regional or national scale files can be downloaded from the MRLC Web site (http://www.mrlc.gov) and user-specified areas can be viewed and downloaded. The United States Geological Survey (USGS) also provides the National Map, available at https://www.usgs.gov/core-science-systems/national-geospatial-program/national-map.

NOAA Office for Coastal Management updates the Coastal Change Analysis Program (C-CAP) https://coast.noaa.gov/digitalcoast/data/ccapregional.html, which also has higher resolution land use data in the Land Cover Atlas. The online viewer provides summary land use information of states, watersheds or user-specified areas. (C-CAP Land Cover only includes Western Washington in Washington State.)

(WWA Only) Stormwater Treatment and Flow Control BMPs/Facilities means detention facilities, permanent treatment BMPs/facilities; and bioretention, vegetated roofs, and permeable pavements that help meet Appendix 1 – Minimum Requirements #6 (Runoff treatment), #7 (Flow control), or both.

Additional Guidance

- Stormwater treatment and flow control BMPs/Facilities includes all detention facilities and permanent treatment BMPs/facilities designed or used to control or treat stormwater. The mapping section requires Permittees to map features that they own or operate.
  - This refers to any detention facility or permanent treatment BMP that Permittees own or operate, regardless of when it was built or installed. This maintains and clarifies the intent of the previous permit cycles.
  - In the 2012 permits, some may have interpreted this definition to mean only map those detention facilities or treatment BMPs/facilities that help to meet Minimum Requirements #6 or #7. Over the permit cycle, Permittees may discover additional Permittee-owned facilities not yet mapped. Add these stormwater features as they are found, or per established protocol.
- Bioretention, vegetated roofs, and permeable pavements that help to meet Minimum Requirements #6, #7, or both are required to be mapped. If more than one BMP/facility is required to meet either of these minimum requirements, all must be mapped.
- Permittees are **not** required to map stormwater facilities which are not owned or operated by the Permittee. While Permittees are not required to map privately owned stormwater facilities, they must inspect private facilities that control stormwater runoff from new development and redevelopment sites; thus, it may be useful to map those facilities that require inspection.

- *Phase I Only:* Phase I Permittees must also map tributary conveyances (to outfalls and discharge points ≥24" diameter) and emergency overflows associated with stormwater treatment and flow control BMPs/facilities owned or operated by the Permittee.
    - Emergency overflows – are those features of the treatment or flow control BMPs that serve to safely convey flood discharges in excess of the capacity of the principal flow path.

Underground Injection Control (UIC) Program

UIC wells are manmade structures used to discharge fluids into the subsurface. Examples are drywells, infiltration trenches with perforated pipe, and any structure deeper than the widest surface dimension. The majority of UIC wells in Washington are used to manage stormwater (i.e., drywells) and sanitary waste (large, on-site sewage systems), return water to the ground, and help clean up contaminated sites. UIC wells are regulated under the UIC Program (Chapter 173-218 WAC). Both the Stormwater Management Manual for Eastern and Western Washington include guidance on UICs for stormwater management.

The terms "outfall" and "discharge point" **do not** include UIC wells. The Municipal Stormwater permits do not authorize discharges to groundwater through UIC wells (Special Condition S2.A.1). Wells regulated through the UIC program are not required to be mapped under the Municipal Stormwater permits, as the UIC program (and registration) rules apply. However, if any stormwater bypasses or otherwise is not entirely infiltrated by the UIC well(s), and it drains to the MS4, the contributing drainage area is subject to the MS4 permit and the associated features must be mapped. It may be useful to include UICs on the MS4 map, even if they are not required.

IV. More Guidance on Features Required to be Mapped

The following features are not specifically defined, but are required to be mapped. The following guidance is intended to support the mapping effort.

MS4 Geographic areas that do not discharge to surface waters (EWA: Areas served by MS4 that discharge to ground)

The requirement to map MS4 areas that do not discharge to surface waters calls for mapping geographic areas served by the MS4, which instead drain to the ground. This includes areas that discharge to ground through natural and man-made features. This may look like city blocks, or parts of sub-basins that discharge to ground rather than to surface waters. This provision does not require mapping of the individual drainage systems that discharge to ground, unless the area discharges to a discharge point that is equal to or greater than the 24-inch nominal diameter, or an equivalent cross-sectional area for non-pipe systems – in this case the tributary conveyance would be mapped.

Connections

Connection refers to any discrete point where stormwater enters or leaves the MS4 - such as from ditches or pipes. This term does not include sheet flow or roof drains.

This term is not defined in the permits. The Response to Comments for the 2007, 2013 permits, and 2014 permit modification, all include the above definition.

Specific connection points to/from the MS4 are called out to be mapped (see above). Permittees are not required to map the following residential connections: individual driveways, sump pumps, or roof downspouts. Knowing where stormwater discharges leave or enter your MS4 system assists with notifying adjacent municipalities/ entities that a hazardous spill has occurred, helps to better trace illicit discharges, and/or aids understanding of where stormwater impacts may be occurring.

EWA Only: Permanent stormwater facilities (owned or operated by the Permittee)

These are Permittee-owned or operated structural stormwater treatment and flow control BMPs. For example, this includes detention ponds or permanent treatment devices or facilities that the Permittee owns or maintains.

Phase I Only: Emergency overflows

The Phase I permit requires the mapping of the overflows that safely convey flood discharges in excess of the capacity of the principal spillway.

V. Recommended Features to Map

The requirements for mapping are limited to the minimum features necessary to implement the permits. However, Ecology recommends that Permittees map additional features so that knowledge of the stormwater system is comprehensive. Consider mapping the following additional features or attributes, although this universe can be easily expanded based on local needs:

- UIC facilities
- Age of infrastructure or installation date
- Tributary conveyance to outfalls or discharge points with a smaller diameter (or equivalent cross-section) than 24 inches
- Catch basins
- Land use
- Older or retrofit permanent stormwater BMPs, otherwise not required to be mapped
- Critical habitats and waterbodies with listed salmon species
- Associated drainage areas outside of permit coverage areas

VI. MS4 Mapping Scenarios

The following scenarios are provided to illustrate terms and definitions of stormwater features in the context of a typical MS4, as well as which of these features ought to be mapped by the Permittee.

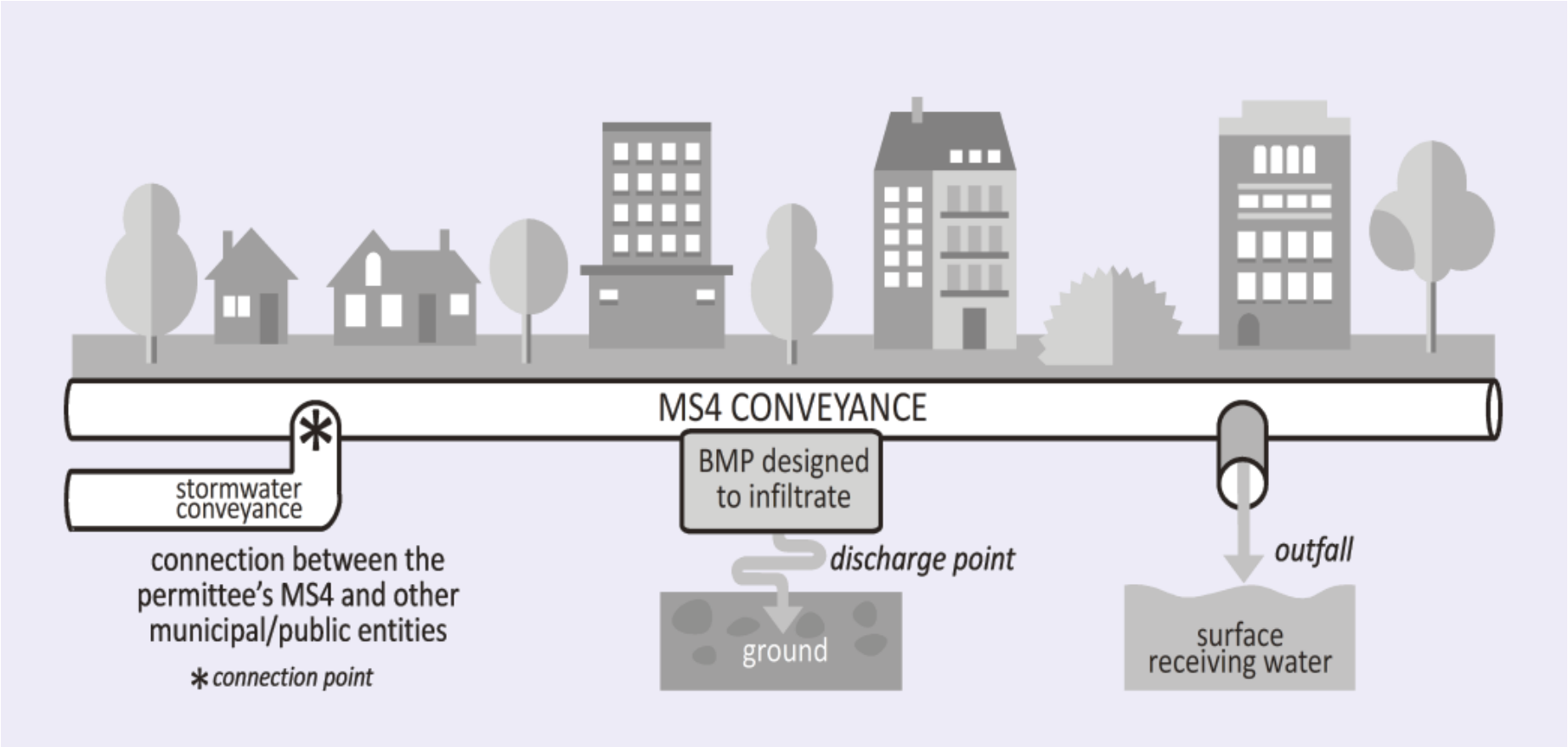

Figure 1 - Simplified Overview of the Selected Terms Used to Describe the Municipal Storm Sewer System (MS4)

Figure 1 illustrates the MS4 terms *connection*, *discharge point*, and *outfall*. Permittees are required to map all known MS4 outfalls and discharge points, and connections: between the Permittee's MS4 and other municipalities, or to a private stormwater system; as well as "all connections to the MS4 authorized or allowed by the Permittee" by a specific date (after February 16, 2007 in WWA / August 1, 2019 in EWA). This includes connections from private systems to the MS4 authorized or allowed by the Permittee, other than residential connections from individual driveways, sump pumps, or roof downspouts.

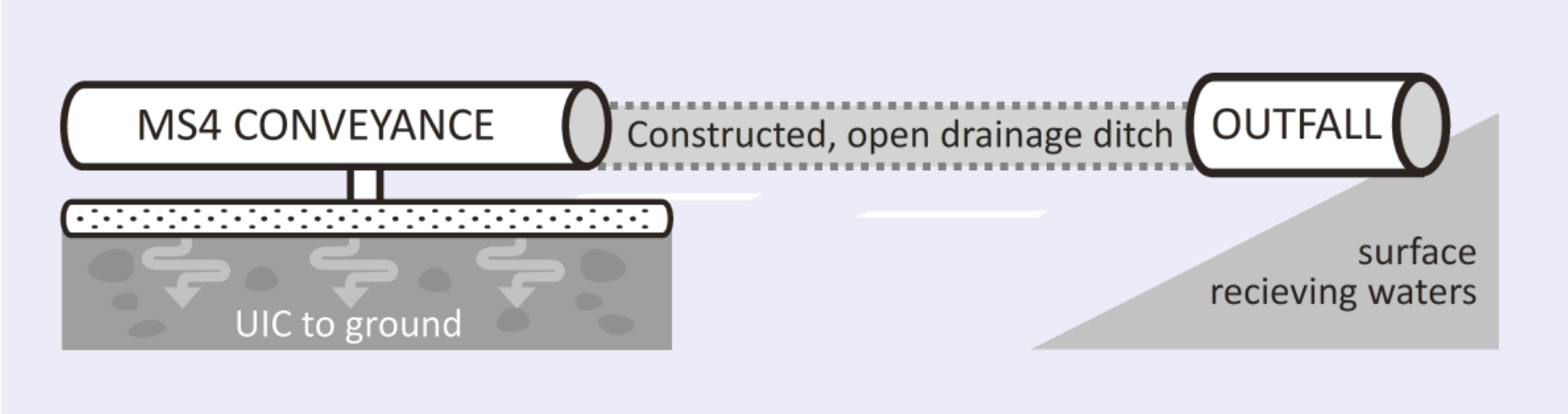

Figure 2 - Single Jurisdiction's MS4 Discharges to Surface Receiving Waters

This example includes a UIC facility with an emergency overflow to the MS4

In Figure 2, the Permittee does not need to map the open drainage ditch as a Discharge Point, although mapping the ditch as a line segment may be of use to the Permittee. The point where the runoff leaves the ditch and discharges to the surface receiving water is mapped as an outfall. This outfall is less than 24"; therefore, the tributary conveyance, or ditch, is not required to be mapped. The UIC well is regulated through its own program and is not required to be mapped per the Phase I or Phase II permit requirements. See UIC section above and UIC Program additional info at https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Underground-injection-control-program.

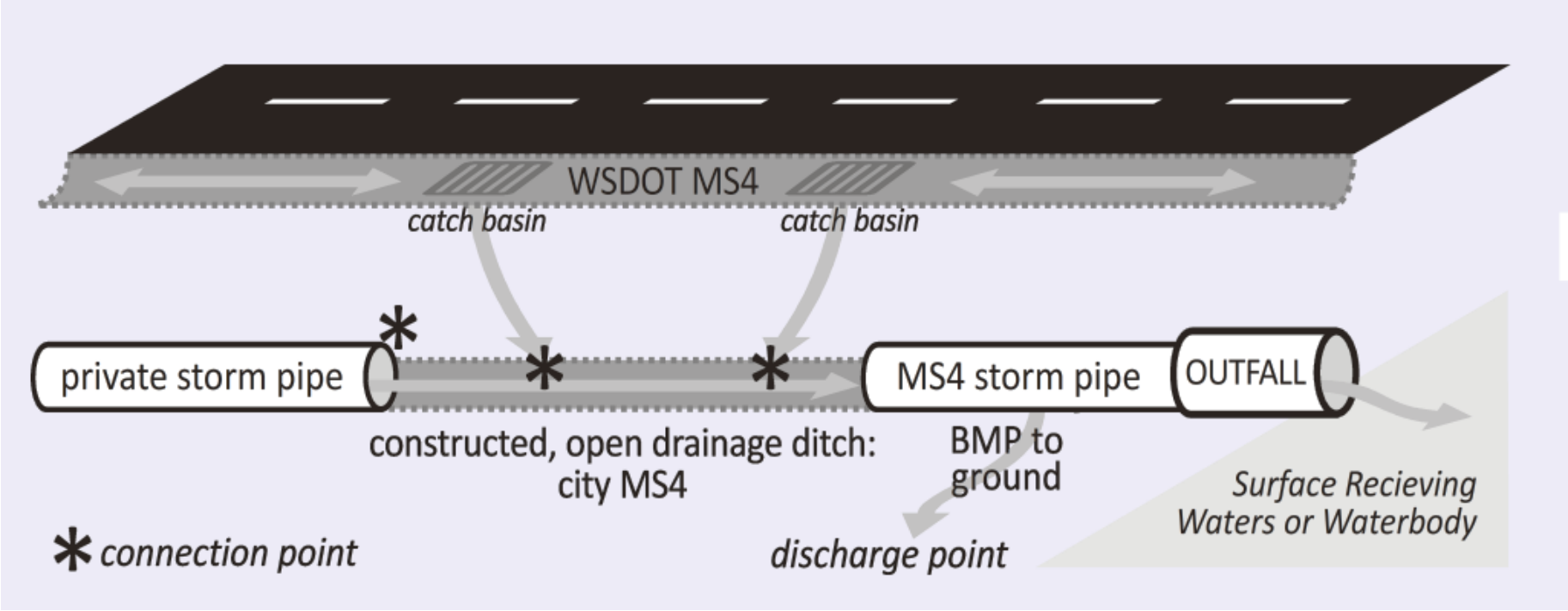

Figure 3 - Example of the Department of Transportation (WSDOT) MS4 Discharging to a City's MS4

In Figure 3, the city would map the three connection points where WSDOT's catch basins direct runoff to a city's MS4, and the private storm pipe connection authorized by the Permittee. The city would map the BMP that was designed to infiltrate as a discharge point and as a stormwater treatment and flow control facility / BMP, or in E.WA – as a permanent stormwater facility. The city would map the overflow pipe that discharges to a surface receiving waters, as an outfall (this outfall is less than 24", so the tributary conveyance does not need to be mapped).

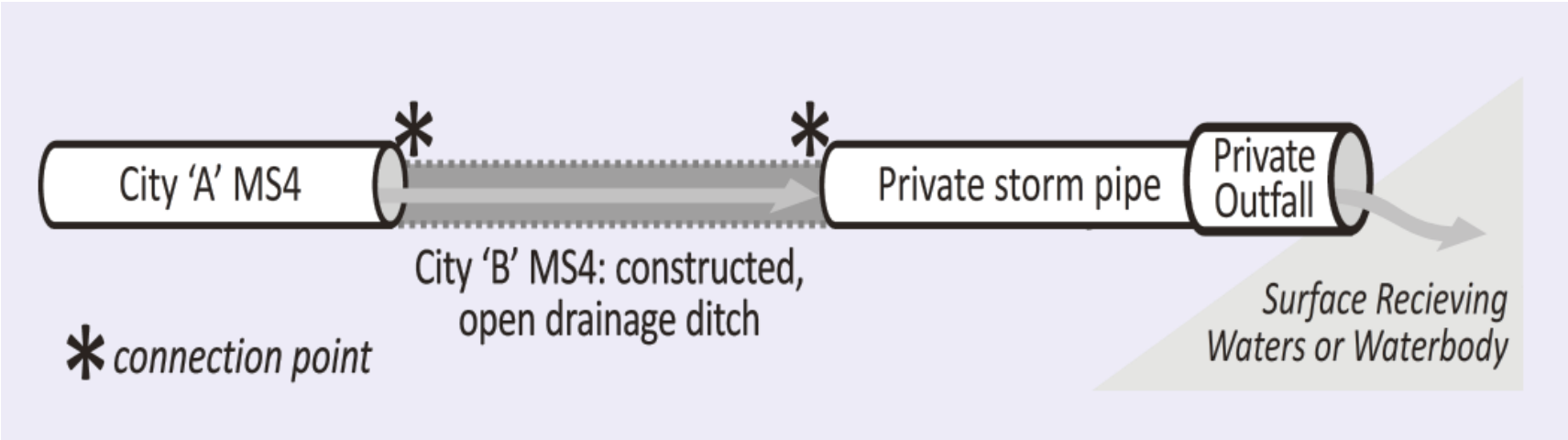

Figure 4 - Example of Two MS4s Discharging to a Private Storm System with a MS4 Outfall

In Figure 4, City 'A' should map the connection where its MS4 discharges to City 'B's open drainage ditch. City B would map the location where the drainage ditch (part of the MS4) discharges to the private storm system as a connection to a private storm system. The private infrastructure would not be required to be mapped per the permit, although this may be helpful for a Permittee's program.

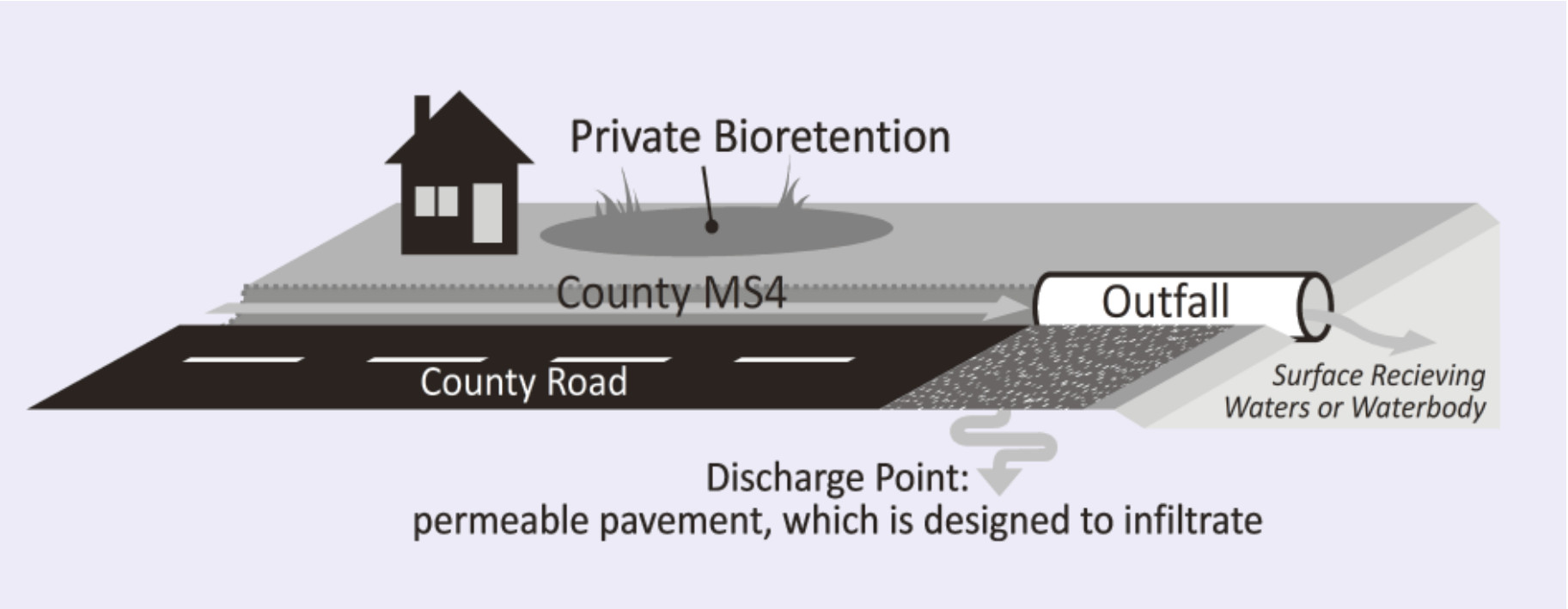

Figure 5 - Examples of Several Types of Stormwater BMPs Near and Within the MS4 System

In Figure 5, the county-owned permeable pavement, which has been designed to infiltrate stormwater runoff, would be mapped as a discharge point and as stormwater treatment or flow control facility/BMP. The bioretention facility located on private property is not required to be mapped as a discharge point or as a stormwater treatment or flow control facility/BMP because it is not part of the Permittee's MS4 and there is no connection to the MS4. The point where there is a discharge from the MS4 to a surface receiving waters would be mapped as an outfall. In Western Washington, since this outfall is greater than 24" in diameter, the tributary conveyance (including land use, associated drainage areas, and the tributary conveyance types, size, and material) must be mapped.

Figure **6** - Municipal System to Private Stormwater System

In this scenario, the city maps the location where discharge leaves the MS4 and enters the private stormwater system as a connection.

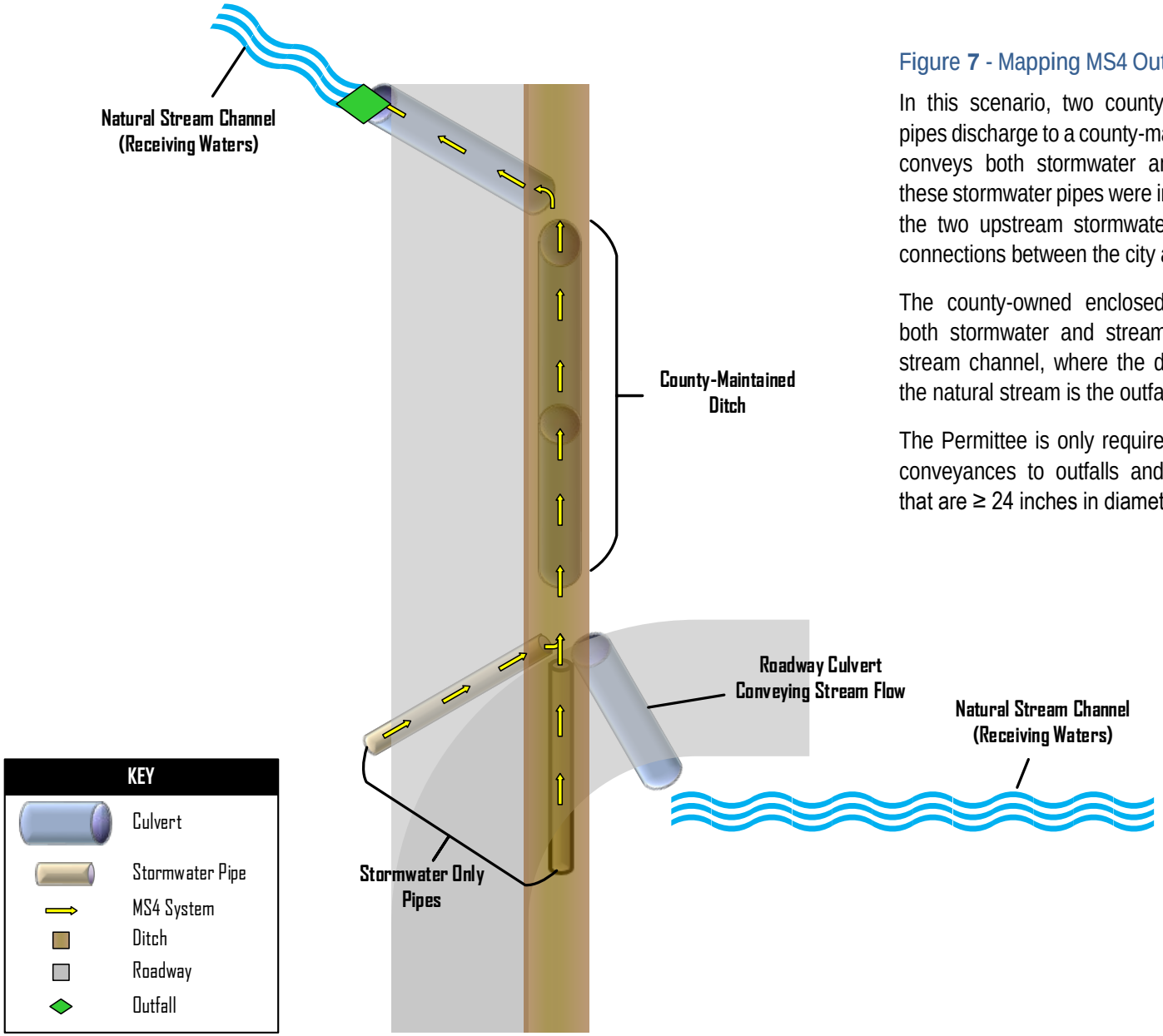

Figure **7** - Mapping MS4 Outfall Locations

In this scenario, two county MS4 stormwater pipes discharge to a county-maintained ditch that conveys both stormwater and streamflow. (If these stormwater pipes were instead city-owned, the two upstream stormwater pipes would be connections between the city and county MS4s.)

The county-owned enclosed pipe discharges both stormwater and streamflow to a natural stream channel, where the ditch discharges to the natural stream is the outfall.

The Permittee is only required to map tributary conveyances to outfalls and discharge points that are ≥ 24 inches in diameter.

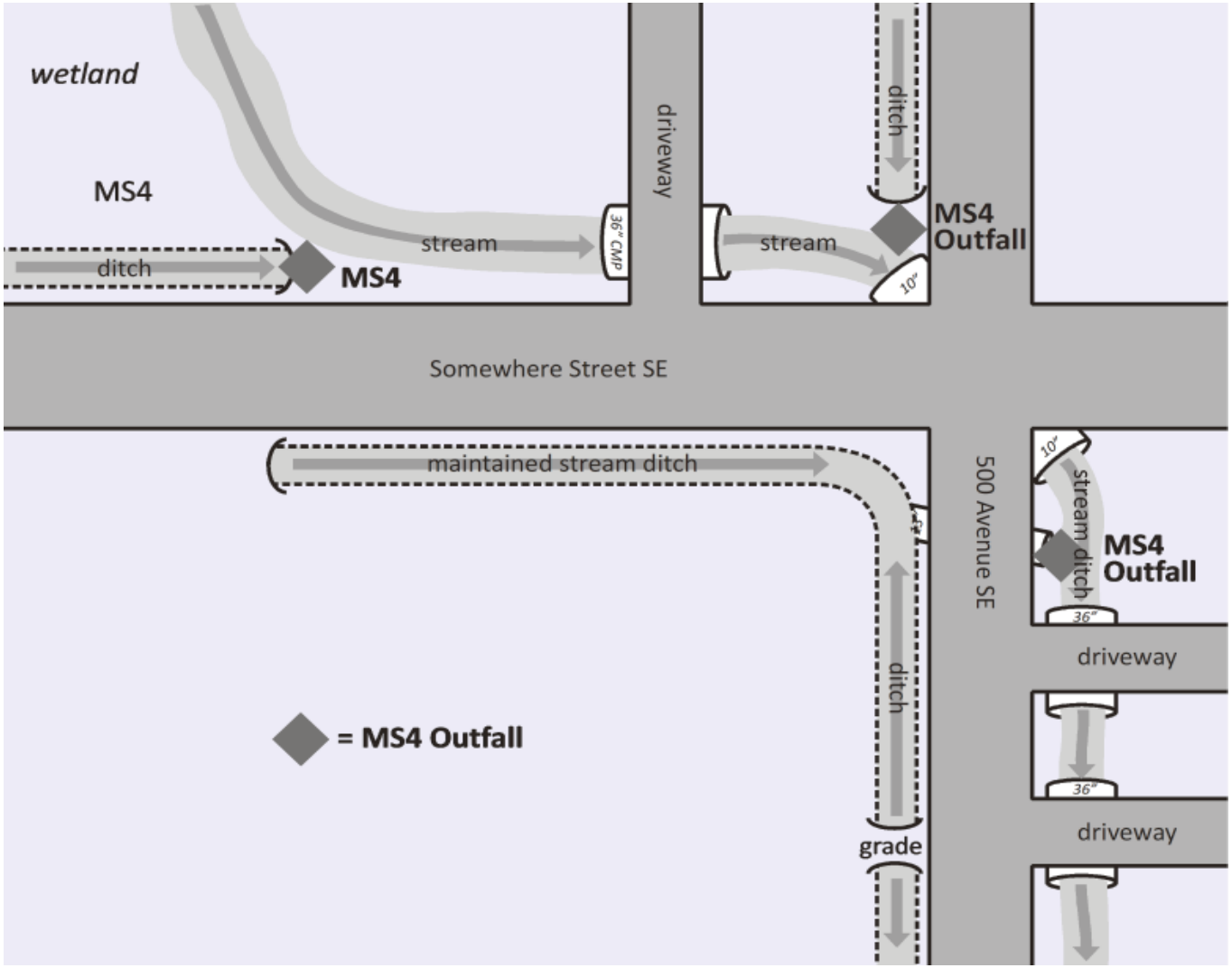

Figure **8** - Mapping MS4 Outfall Locations (Not Culverts)

In Figure 8, three MS4 outfalls (<24") are mapped within this commingled stream and MS4 ditched system. The culverts under driveways are not required to be mapped.

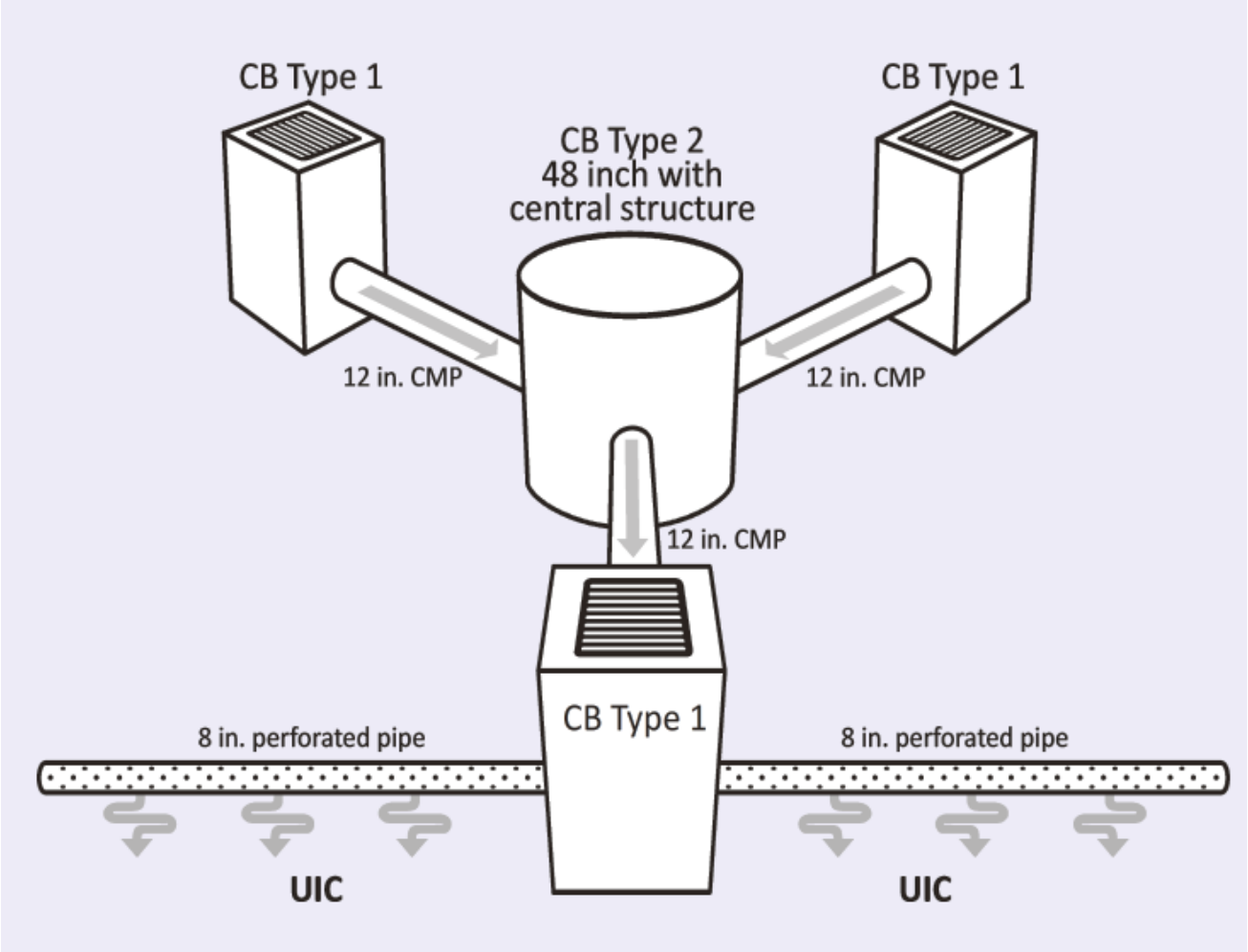

Figure **9** - 'Is it a Discharge Point, a UIC, or an Outfall?' Scenario

In Figure 9, the perforated pipe represents an infiltration trench, which meets the definition of a UIC, and can fully infiltrate all stormwater that it receives. As such, the Permittee is not required to map this UIC per the permit. However, as aforementioned, the Permittee may find it useful to map this UIC from a system-maintenance standpoint.