Texas Department of Transportation

MEMO

May 25, 2017

To: District Engineers

From: Rene Garcia, P.E.
Director, Design Division

DS RG

Subject: Developer's Outfall Into a TxDOT Drainage Facility Policy

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As the State's population increases, the strain of development continues to impact TxDOT's drainage facilities. Because our drainage systems have limited capacity, developers should be mitigating their impacts to our facilities. Please be mindful that TxDOT has the right to control a developer's outfall onto or across TxDOT right of way, per Title 43 Texas Administrative Code:

Title 43 Texas Administrative Code Rule 15.54(e) *This section of the TAC describes the conditions under which state, federal, and local financing of drainage construction costs are to be shared. In general TxDOT's responsibility includes:*

- *Constructing drainage systems, including outfalls, within the state right of way*
- *Adjusting or relocating existing drainage channels when necessary*
- *Adjusting structures and channels to accommodate any approved drainage plan*

Although TxDOT can adjust a facility to accommodate public improvement works that directly benefit the operation of the highway, it is not required to make changes to highway facilities just to accommodate development in the drainage area.

Parties wishing to discharge drainage onto or across the state highway right of way, where there is no existing drainage system, must obtain approval from TxDOT and provide design, construction, and maintenance costs. Local governments wanting to connect to a TxDOT drainage system must first have approval from TxDOT and then must bear the cost of collecting and carrying its water to the TxDOT system, as well as contribute a share of the TxDOT system costs.

To clarify TxDOT's minimum drainage requirements for the developer, please find the attached *"Developer's Outfall Into a TxDOT Drainage Facility Policy."*

This policy should be implemented immediately by your permit office and District Hydraulics Engineer.

If you have questions or need additional information concerning this drainage policy, please contact Stan Hopfe, P.E., CFM, Chief Hydraulics Engineer, Design Division, at (512) 416-2219.

cc: District Hydraulics Engineers

Developer's Outfall Into a TxDOT Drainage Facility Policy

At the discretion of the District Hydraulics Engineer (DHE), a developer's available outfall capacity shall be based off the as-built drainage area maps. However, if TxDOT as-built plan drainage area maps are not available or acceptable to the DHE, then other/new drainage area maps acceptable to the DHE shall be used. The developer's outfall into a TxDOT drainage system shall be limited to a maximum allowable discharge on a pro-rata share of the drainage area. Should the developer's proposed outfall discharge exceed TxDOT's maximum allowable discharge, detention or drainage system improvements are required by the developer.

Note: The reference "developer" shall denote either developer or owner of tract.

Also, the developer shall not exceed the maximum allowable direct discharge for all of the following storm events: 2-yr (50%), 5-yr (20%), 10-yr (10%), 25-yr (4%), 50-yr (2%), and 100-yr (1%), using a free discharge tailwater condition.

Furthermore, no direct discharge shall be allowed to enter the TxDOT drainage system or roadway without approval of the DHE.

Note: Direct discharge is a structural outfall or modified sheet flow (i.e., sheet flow which has been modified from that of existing conditions), outfalling into a TxDOT facility.

The developer shall coordinate all drainage issues and permits with the local Floodplain Administrator (FPA) before submitting the proposed outfall plan to TxDOT. The developer's drainage facility and outfall(s) into TxDOT right of way shall be constructed at the developer's expense. Furthermore, the State reserves the right to require the following at the developer's expense:

- Compensation of any damages (including silt) to TxDOT facilities caused by the developer's outfall(s).
- Maintenance, or repair to the developer's outfalling facility.
- Any additional modifications to the proposed outfall in the event of any land use change(s) or change(s) in drainage pattern on the developer's tract that will impact the TxDOT's drainage system.

The specific requirements for the developer's outfall structure follow:

- Under no circumstances shall the developer's outfall size exceed the road ditch, culvert, or storm sewer tie-in immediately downstream of the proposed outfall location.
- All proposed open channel flow within the developer's tract shall require an outfall structure to enter the TxDOT right of way (i.e., no direct outfall allowed without an outfall pipe/structure). Deviation from this requirement shall require DHE approval.
- The diameter/rise of the outfall structure shall not exceed the road ditch depth.
- The minimum allowable outfall structure size shall be a 12 inch diameter pipe.
- All proposed outfalls shall be fitted with an appropriate TxDOT end treatment. The DHE shall specify the type of end treatment.
- The DHE shall specify the material type of the outfall pipe.
- All upstream restrictors (detention control structure) and manholes shall be located within the developer's tract.
- The proposed outfall's invert shall be located no more than 6 inches over the flow line of the TxDOT ditch.
- All storm sewer tie-ins shall require a TxDOT standard manhole connection. All existing and new manhole tie-ins shall be approved by the DHE.
- If the developer's outfall connects directly to a TxDOT storm sewer's manhole, the crown of the proposed outfall structure shall match the crown of the existing storm sewer. Deviation from this requirement shall require DHE approval.
- The outfall velocity shall not exceed 3 feet per second (using Continuity and Manning's Equations - with structure flowing full). Deviation from this requirement shall require DHE approval.

- When existing permissible shear capacities are a problem for a TxDOT outfall ditch, additional erosion protection may be required by the DHE.
- The developer's emergency overflow shall not be allowed to discharge directly into the proposed outfall structure.

All water quality issues required by city, county, and state shall be managed by the developer within the developer's tract. Under no circumstances shall the developer be allowed to use TxDOT facilities to mitigate their water quality impacts. If at any time TxDOT determines the developer's outfalls are not in conformance with federal, state and local environmental rules and regulations, TxDOT shall take all appropriate steps to terminate the physical connection and secure the area.

Pro-rata Share Method:

The Pro-rata Share method is a minimum requirement for direct outfalls into a TxDOT drainage facility. However, more substantial methodologies may be required by the DHE for more complex drainage conditions. The allowable discharge is based on the pro-rata share method outlined below:

1. Find the contributing drainage area upstream of the point of the developer's proposed outfall. This is all of the contributing drainage areas, including TxDOT right of way (which can be adjacent to developer's tract), and any portion of the site that actually drains to TxDOT drainage systems in existing conditions.
2. Calculate the percent of the project area to the entire contributing drainage area.
3. Calculate the ditch full bank capacity, using open channel hydraulics, and calculate the capacity of the immediate downstream TxDOT drainage structure (e.g., driveway culvert, crossing culvert, or storm sewer system), using pipe under pressure. Multiply the lesser of the two calculated flows by the percent of site area to the total contributing drainage area, shown in step 2 above.

Example Calculations:

- *Developer's total tract = 5 acres.*
- *Site total contributing drainage area = 5 acres.*
- *Total watershed area contributing to the point of the developer's outfall = 100 acres.*
- *The percent of the site to the total contributing drainage area = 5% (0.05).*
- *Ditch full bank capacity at the outfall using Manning's equation = 35 cfs.*
- *Using the standard equations for culverts under pressure, the capacity of an existing 24" RCP driveway culvert located downstream of the proposed outfall is 25 cfs. Allowable headwater elevation for the culvert calculations shall be the lower of the right and left top bank elevations upstream of the driveway. Tailwater shall be based off Manning's equation. To simply this process, FHWA's HY-8 and Hydraulics Tool Box programs, which are free downloads, are recommended for both of the aforementioned calculations.*
- *Maximum Allowable Discharge = 0.05 x the lesser of two flows calculated above.*
- *Maximum Allowable Discharge = 0.05 x 25 = 1.25 cfs.*

Therefore, the developer shall restrict direct outfall into road ditch/culvert tie-in to no more than 1.25 cfs for the following storm events: 2-yr (50%), 5-yr (20%), 10-yr (10%), 25-yr (4%), 50-yr (2%), and 100-yr (1%). Detention routing calculations are required to determine the maximum allowable discharge is not exceeded for each event.