**ODOT TP 26 SE Region Site 6**

**Introduction**

The TP 26 SE Region Site 6 project, henceforth referred to as TP Site 6, includes the construction of a parking lot on an existing grass area near the US-35 and US-50 interchange in Ross County. The existing site has a depression that collects surface runoff from surrounding areas including the Marathon gas station to the east of TP Site 6. Field surveys have not found any outlets in the depression area, so it is assumed that runoff stays in this location until it evaporates, transpires through existing vegetation, or infiltrates into the ground. There are existing ditches along US-35 and US-50 that discharge through an existing 46” steel culvert under US-50. Runoff from the proposed TP Site 6 will enter these ditches through curb cuts or storm sewer outlets.

**Pavement Drainage**

TP Site 6 will have cub around the perimeter of the parking lot. Therefore, we performed spread calcs to determine necessary locations for curb cuts. The entire parking lot will slope from east to west so that curb cuts will only be needed on the western, low side. Since the outlet ditch along US-35 is so close to the western edge of the proposed parking lot, curb cuts were used to allow runoff to exit the parking lot and enter the ditch. A 50% AEP design storm was used for the spread analysis with a total allowable spread of 10 feet. We used the 10-foot allowable spread to limit the amount of curb cuts needed and assumed that the truck cabins will be far enough away from the back of the trucks to be outside of the spread limits. We used FHWA Hydraulic Toolbox to analyze spread for the curb cuts.

**Storm Sewer**

We designed the storm pipes in CDSS using a 10% AEP design storm and a 4% AEP HGL check storm. There are existing catch basins in the Marathon parking lot that discharge to the depression TP Site 6 is filling in. Those storm sewers have been re-routed to outlet into the ditch on the west side of the parking lot.

**Existing Ditch and Culvert Analysis**

As previously mentioned, no evidence was found that the existing depression area at the site discharges into the existing roadside ditch or culvert. This existing depression will be filled in for the new parking lot. Therefore, we analyzed the ditch and culvert to ensure they could adequately convey the additional flow. We analyzed the ditch flow depth using a 10% AEP storm in CDSS. The following table summarizes the ditch calculations:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Model | Drainage Area  (ac) | 10% AEP flow  (cfs) | 10% AEP flow depth  (ft) | 10% AEP Elev. at Low Point  (ft) | Near, Low Edge of Pavement Elev.  (ft) | Freeboard Below Near, Low Edge of Pavement  (ft) |
| Existing | 63.29 | 44.91 | 1.80 | 626.76 | 639.05 | 12.29 |
| Proposed | 70.09 | 54.49 | 1.98 | 626.94 | 12.11 |

The additional flow from the proposed parking lot does increase the flow depth, but it is still well below the near, low edge of pavement and exceeds the 1-foot requirement in the ODOT L&D Volume 2. The existing ditch has sufficient capacity to adequately convey the 10% AEP design storm for the proposed condition. The existing ditch also has a concrete lining that is in good condition and will not need improvements.

We analyzed the culvert in HY-8 using a 4% AEP design storm and a 1% AEP design check storm with those flows calculated from the drainage areas shown in the ditch summary table above. The following table summarizes the culvert calculations for the 4% AEP design storm:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model | 4% AEP flow  (cfs) | 4% AEP HW Elev.  (ft) | Near, Low Edge of Pavement Elev.  (ft) | Freeboard Below Near, Low Edge of Pavement  (ft) |
| Existing | 55.79 | 628.77 | 639.05 | 10.28 |
| Proposed | 67.53 | 629.32 | 9.73 |

The additional flow from the proposed parking lot does increase the 4% AEP design storm HW elevation, but it is still well below the near, low edge of pavement and exceeds the 1-foot requirement in the ODOT L&D Volume 2.

The following table summarizes the culvert calculations for the 1% AEP check storm:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model | 1% AEP flow  (cfs) | 1% AEP HW Elev.  (ft) | Near, Low Edge of Pavement Elev.  (ft) | Marathon Lowest Building Elev.  (ft) | TP Site 6 Parking Lot Low Elev.  (ft) |
| Existing | 67.22 | 629.31 | 639.05 | 639.15± | 630.20 |
| Proposed | 81.37 | 630.14 |

The additional flow from the proposed parking lot does increase the 1% AEP check storm HW elevation, but it will not impact any surrounding buildings or infrastructure. The existing culvert has sufficient capacity to adequately convey the 4% AEP design and 1% AEP check storms.

**BMP**

The project EDA for TP Site 6 is 4.26 acres. The entire site is within existing ODOT right-of-way, therefore, only water quality treatment is required. The treatment percentage is 20% resulting in a treatment requirement of 0.85 acres. Sloping the proposed parking lot from east to west closely matches existing conditions and is the preferred layout. This is too much pavement for a vegetated filter strip adjacent to the parking lot, so a vegetated filter strip is proposed on the south side of US-50 directly north of TP Site 6. A vegetated filter strip is preferable for water quality treatment due to less required maintenance and reduced installation costs when compared to a manufactured system. The vegetated filter strip provide 0.86 acres of treatment which satisfies the required treatment.