



AZURE | GREEN

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February 1, 2023

Re: Taco Time Preliminary Drainage Report
Parcel # 784510-003-2 & 042027-1-171

Overview:

The site is located on the north side of E Main, east of SR 512. The site address is 1115 E Main. Tax parcel numbers are 784510-003-2 & 042027-1-171. Total parcel area is 3.21 acres. The site is currently developed with a Taco Time Restaurant, primarily on parcel -003-2. The project consists of the construction of a new Taco Time Restaurant building and expansion of the existing parking lot. The existing building will remain for use by other tenants.

Improvements for the project will include the new building, additional parking lot, storm drainage facilities, expansion of existing driveway approach, sanitary sewer service, water service, and other underground utilities.

Project Requirements:

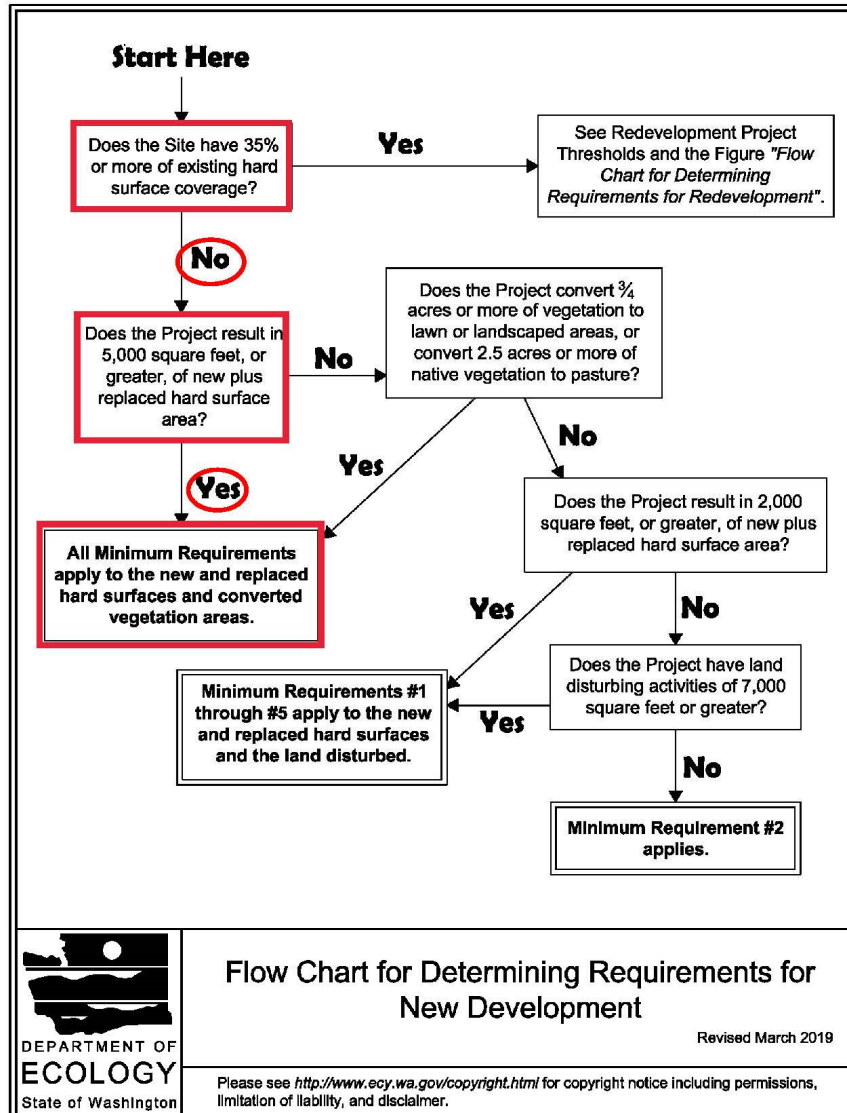
Determination of Applicable Minimum Requirements

Per PMC 21.10.040 the City of Puyallup has adopted the Washington State Department of Ecology Stormwater Management Manual for Western Washington (SMMWW), with the version in effect being “the most current version approved for city use by the council.” The 2019 DOE Manual has been adopted by the City and is the controlling regulation and is referred to as “the Manual” or “SMMWW” hereinafter.

The project consists of over 18,000 sf of new plus replaced hard surfaces onsite. The existing hard surfaces are less than 35% of the site and therefore, the project is considered new development. Since the total new plus replaced hard surfaces for the project are greater than 5,000 square feet, all minimum requirements apply to the new and replaced hard surfaces and converted vegetation areas.



Figure I-3.1: Flow Chart for Determining Requirements for New Development



Flow Chart for Determining Requirements for New Development

Revised March 2019

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Discussion of Minimum Requirements

The Minimum Requirements per Section I-3.4 of the Manual:

Minimum Requirement #1: Preparation of Stormwater Site Plans

The Stormwater Site Plan consists of a report and construction plans. This report and the attached conceptual storm plan are preliminary versions of the Drainage Report and the site improvement plans that will be submitted for construction permits and will satisfy Minimum Requirement #1.

Minimum Requirement #2: Construction Stormwater Pollution Prevention (SWPPP)

The SWPPP consists of a narrative and drawings. The narrative will be addressed in Section V of the final version of the Drainage Report. The drawings will include a TESC plan, notes, and details as part of the site development construction plans. The narrative and drawings will be prepared and submitted at time of civil permit application.

Minimum Requirement #3: Source Control of Pollution

A Pollution Source Control Plan will be prepared in conformance with requirements of Section IV of the Manual and will be submitted as a separate document at time of civil permit application.

Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls

Currently, drainage from the original improvements to the site, generally the southwest portion of the site, are collected in a conveyance system that connects to the existing closed conveyance system in E Main. Drainage from improvements to the site made in 2003 are collected, routed through a bioswale for treatment, then infiltrated in an underground gallery, with an overflow connection into the original conveyance system. The improvements proposed under this permit will infiltrate runoff to the greatest extent feasible to preserve the natural drainage system and outfall.

Minimum Requirement #5: On-site Stormwater Management

Because the project triggers MR #1-9, and is inside the urban growth area, the project must either meet the Low Impact Development Performance Standard, or use List #2 to determine applicable On-Site Stormwater Management BMPs. This project will use List #2. For each surface the BMP's must be considered in the order listed for that type of surface and use the first BMP that is considered feasible.

Lawn and Landscaped Areas:

- All lawn and landscaped areas will meet the requirements of BMP T5.13, Post Construction Soil Quality and Depth with notes on the plans to this effect.

Roofs:

1. BMP T5.30: Full Dispersion – infeasible due to inadequate vegetated area to meet the 65:10 ratio.
2. BMP T5.10A: Downspout Full Infiltration – will be used for the new building.

Other Hard Surfaces:

1. BMP T5.30: Full Dispersion – infeasible due to inadequate vegetated area to meet the 65:10 ratio
2. BMP T5.15: Permeable pavement – infeasible due to fill required for grading of parking lot; as a technical equivalent, an infiltration trench per BMP T7.20 will be used



Minimum Requirement #6: Runoff Treatment

New plus replaced pollution generating hard surfaces (PGHS) is the parking lot paving. The total area is well over 5,000 square feet and therefore runoff treatment is required. As a commercial development, enhanced treatment is required. Filterra or Biopod systems will be used for to meet enhanced treatment requirements.

Minimum Requirement #7: Flow Control

The total new plus replaced hard surface for the project is well over 10,000 sf, however, through the use of infiltration, the effective impervious area will be essentially zero. The converted vegetation areas are below the thresholds, and the increase in runoff rates for the 100-year event is less than 0.15 cfs. Therefore, this minimum requirement does not apply.

Minimum Requirement #8: Wetlands Protection

There are no wetlands on or near the site.

Minimum Requirement #9: Operation and Maintenance

The stormwater facilities required for this project that require a maintenance plan are: conveyance system, infiltration gallery, and Filterra or Biopod. All onsite stormwater facilities will be owned, operated, and maintained by the property owner. An O&M plan will be submitted with civil plan application in the future.

Soils:

The NRCS Soil Survey of Pierce County indicates the soils on the portion of the site to be developed are Puyallup fine sandy loam (31A). Puyallup soils are hydrologic group A. Based on the soils exploration performed by GeoResources, infiltration is feasible on the eastern portion of the development with a design infiltration rate of 1.1 inches per hour. Groundwater monitoring found peak groundwater at depths ranging from 5.3 to 8.8 feet or elevations 43.7 to 47.7. Based on the location of monitoring wells, peak groundwater is estimated at 47.7 at the proposed roof drain infiltration trench and 46.0 at the main infiltration trench.

Floodplain

The site is mapped with an AE floodplain at elevation 46.3. All proposed improvements are outside the mapped floodplain.



Flow Control

Infiltration will be used so that there is no effective impervious area and so that runoff rates do not increase by more than 0.15 cfs. A downspout infiltration trench will be used for the roof, and an infiltration gallery with underground lattice structure such as StormTank will be used for the parking lot. WWHM is used to size each infiltration facility. For the WWHM analysis, the site is in the 42-inch, east rainfall zone. The infiltration systems are modeled in WWHM as gravel trench beds. For the downspout trench the voids are 30%, standard for drainrock, and for the lattice grid system, 95% per manufacturer's specifications. The depth of each system is assumed to be 2 feet, so an overflow standpipe is set at that depth and trench re-sized until 100% infiltration is achieved. The following tables shows the design parameters and trench sizing for full infiltration:

Infiltration Design for Restaurant			Infiltration Design for New Parking Lot		
	Area			Area	
	sf	acre		sf	acre
Roof	2987	0.0686	Total Area	22250	0.5108
depth	2	ft	Roof	648	0.0149
Infil. Rate	1.1	in/hr	Parking, Flat	15448	0.3546
Voids (%)	30%		Total Impervious	16096	0.3695
Length	80	ft	C, Lawn, Flat	6154	0.1413
Width	6	ft	depth	2	ft
			Infil. Rate	1.1	in/hr
			Voids	95%	
			Length	53	ft
			Width	32	ft

Groundwater at the proposed parking lot infiltration system is interpolated at elevation 46.0. Therefore, the infiltration trench for parking lot must be 49.0 or higher. The roof infiltration trench extends closer to the groundwater monitoring well where groundwater peaked at 47.7. Therefore, the bottom of roof drain trench must be 48.7 or higher. Finished grade is expected to be approximately 53.0 making the trenches feasible with required separation to groundwater.



Existing Storm System

The existing storm drainage system on the site consists of two parts. The original improvements were installed prior to 2003 and consist of a simple conveyance system tied into the City's storm line in Main. In 2003/2004 the parking lot was expanded with a bioswale installed for treatment and an infiltration gallery installed for flow control. The overflow from this system is tied to the original conveyance system.

In existing conditions, the area draining directly to the original conveyance system is:

PRE-2003 IMPROVEMENTS	
DIRECT DISCHARGE	
Existing	Area (sf)
Roof	3625
Paving	6847
Walk	197
Total Impervious	10669

The proposed improvements will result in the removal of some existing paving and the addition of some new paving. The resulting drainage area to the original conveyance system is:

DEVELOPED				
DIRECT DISCHARGE	Existing	Removed	New	Final
	sf	sf	sf	sf
Roof	3625	0	0	3625
Paving	6847	1318	469	5998
Walk	197	0	0	197
Total Impervious	10669	1318	469	9820

The new impervious routed to the existing conveyance system is de minimum and the result of the improvements is a net reduction in impervious area with direct discharge.

The area draining to the bioswale and infiltration trench in existing conditions is:

2003/2004 IMPROVEMENTS	
TO BIOSWALE AND INFILTRATION	
Existing	Area (sf)
Paving	17035



The proposed improvements will both add and subtract impervious surfaces routed to the existing infiltration trench:

TO STORMFILTER & EXISTING INFILTRATION	Existing	Removed	New+Replaced	Final
	sf	sf	sf	sf
Paving	17035	6858	1335	11512
Walk	0	0	1930	1930
Total Impervious	17035	6858	3265	13442

The existing infiltration trench will remain. The infiltration trench has a storage volume of 3,504 cf. With the proposed improvements, the total tributary impervious area is reduced to 60% of the original. Therefore, it can be concluded that only 60% of the storage volume will be used, 2,093 cf, leaving 1,411 cf of storage available. A WWHM analysis was run of the existing infiltration trench for the new plus replaced impervious area. This analysis shows that only 0.04 feet of storage depth is used for the 100-year event. This depth equals 71 cf of storage, well below the available storage.

Runoff Treatment

Because the project is commercial, enhanced treatment of runoff is required. Filterra, Biopod, or other GULD enhanced treatment device will be used precedent to infiltration. The WWHM analysis shows that the treatment flow rate for all new improvements is 0.0795 cfs. The exact configuration of treatment facilities will be determined at time of civil plan submittal.

In existing conditions, a bioswale provides treatment of runoff for the 2003 improvements. The improvements for this project will eliminate this bioswale. It will be replaced by a StormFilter catch basin.

Conclusions

The preliminary analysis shows that infiltration is feasible for runoff and the site plan shows there is adequate area for the required infiltration systems. Full design and analysis will be prepared and submitted with civil permit application.

Please contact us if you require further information.

Sincerely,



Robert Trivitt, P.E.
Project Manager
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