

STORM WATER DRAINAGE REPORT

RADER REAL ESTATE OFFICE

2 SW MAIN STREET

LEE'S SUMMIT, MISSOURI

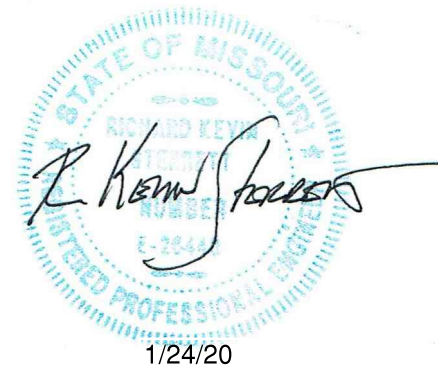
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1/24/20

Project Overview

The proposed project is the rehabilitation of a 1,012 square-foot house with a 720 square-foot addition for use as a real estate office on the northeast corner of 5th Street and Main in the downtown district. This project is contained on a 0.56 acre site. The intent is to provide for an on-site, 7 space asphalt parking lot with access from the existing asphalt alley on the east side of the lot. Stormwater quality management, due to the increased impervious area of the building addition and parking lot, will be added to the project to allow for proper drainage and the filtering of the storm water from the roof and pavement contaminants prior to discharge from the site. Detention and water quality measures, in the form of an infiltration basin, will be implemented into the drainage system.

Drainage Assessment of the Project Site

The topography of the site is a gentle slope from the southeast to the northwest. Storm water, upon saturation, is mostly sheet flow and generally drains over the curb and onto Main Street where it drains north within the street gutter system. Based on the topography, the site drains to the street system and receives no off site drainage as it is at a high point elevation. There is no underground storm piping system in the area of the project. The closest system is near the southeast corner of 4th Street and Main Street. Design requirements call for an infiltration trench at the north side of the parking lot and building addition with an overflow swale and a discharge pipe from the infiltration basin to drain to the northeast corner of the property at the curb line. There are no wetlands or flood plain on the site.

Conveyance Design

As shown on the Preliminary Development Drainage Area Map for the site, the parking lot and building addition drain to the north. The parking lot has a flume at the northwest corner where stormwater will drain, along with the roof drains from the addition. The stormwater will drain into a Nyloplast drain inlet located in the grass area just beyond the curb cut. This structure drains into the rock infiltration basin by a 12" HDPE pipe for treatment and absorption.

The infiltration basin has been designed based on Section 8.3 of the APWA/MARC BMP Manual to meet detention and water quality requirements.

Temporary Erosion and Sediment Control

During construction and prior to paving, it will be necessary to control erosion and sediment from the site during storms within the construction timeframe. To insure that sediment and debris does not leave the site, perimeter containment is controlled by silt fence installation. To

keep construction traffic from tracking dirt and silt into the alley and onto the adjacent city street, a stabilized rock construction entrance will need to be installed. These erosion control devices, and their maintenance throughout the construction timeframe, are required by ordinance and the details for them are referenced by the City’s Design and Construction Manual.

Post development water quality will be addressed through the use of the Infiltration basin system.

Design Calculations

The method for evaluating the Rader Real Estate Office was the use of a HydroCAD Model. Both Pre-Development and Post-Development conditions were considered:

- TR-55 Unit Hydrograph Method
 - 2-year, 10-year and 100-year Return Frequency storms
 - AMC II Soil Moisture conditions
 - 24-Hour SCS Type II Rainfall Distribution
 - SCS Runoff Curve Numbers per APWA 5600 (Table 5602-3)
 - Time of Concentration developed per TR-55

Table 1 – Inflow and Storage Calculations

Storm Event	Inflow (cfs)	Elevation (ft)	Storage (cubic-ft)
2-year	0.53	1,055.47	114
10-year	0.87	1,056.38	251
100-year	1.32	1,057.82	467

Table 2 – Hydrology Calculations

Name	Area (acres)	Composite CN	Tc (hrs)
Pre-Development	0.125	75	0.083
Post-Development	0.125	90	0.083

Table 3 – Hydraulic Calculations

Name	Q2 (cfs)	Q10 (cfs)	Q100 (cfs)
Pre-Development	0.29	0.61	1.05
Post-Development	0.38	0.55	0.75

The discharge for the 2-year storm event is slightly higher for the post-development condition. Because the drainage area is small and the discharges are minimal, this was deemed negligible.

The trench was sized based on 25% voids with in the the rock bed of the trench for the volume requirement.