STORM WATER MANAGEMENT PLAN

Project:
Avid Hotel
City of Waukesha, Wisconsin
JSD Project No: 18-8713A

www.JSDinc.com



Planning & Development
Site/Civil Engineering
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Water Resources
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Construction Management

February 25, 2019
Rev: May 10, 2019

Prepared for:
MSI General Corporation
PO BOX 7
Oconomowoc WI, 53066

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Questions and comments may be directed to:

Isaac Newman, E.I.T.
Staff Engineer
isaac.newman@jsdinc.com

Rizal W. Iskandarsjach, P.E., P.L.S.
Senior Project Engineer
riz@jsdinc.com

Phone: 262.513.0666
Fax: 262.513.1232

JSD Professional Services, Inc.
• Engineers • Surveyors • Planners

Milwaukee Regional Office
W238 N1610 Busse Rd, Suite 100
Waukesha, WI 53188
www.jsdinc.com

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1.0 INTRODUCTION

The proposed Avid Hotel site will be located along the south side of Meadow Ln and west of the Goodwill Donation Center in the City of Waukesha, Waukesha County, Wisconsin. The site is positioned in the Northeast 1/4 of the Northwest 1/4 of Section 28, Township 7 North, Range 19 East. The site is generally bounded by Meadow Ln to the north, properties to the east and west, and wetlands to the south. A location map illustrating the project site has been included in **Appendix 1**.

This Stormwater Management Plan has been created to address runoff rate control, water quality treatment, and infiltration requirements for the proposed Avid Hotel.

The existing site receives runoff from approximately 3.6 acres that flow through the site to Meadow Ln to the north or to a wetland that has developed to the south of the site.

The proposed development is a hotel with driveways, private sanitary sewer, storm sewer, and water service, and storm water management facilities. The stormwater design also assumes the future development of a commercial site to the east of the hotel and north of the proposed wet pond. Stormwater from the project will be controlled by a wet pond to be constructed in the southeast corner of the site.

The onsite stormwater control devices have been designed to provide runoff rate control and water quality treatment in accordance with City of Waukesha ordinance and Wisconsin Department of Natural Resources (WDNR) regulations. Please refer to **Section 3.0** and **Section 5.0** for design criteria and additional details of the storm water facilities.

2.0 EXISTING CONDITIONS

The existing site is an undeveloped empty lot. The existing topography mostly flows from the north to the south of the site into the existing wetland with a portion flowing to the Existing Meadow Ln to the north. See **Appendix 3** for an Existing Conditions Hydrology Exhibit.

Based on the Geotechnical report provided by Giles Engineering Associates, dated May 9, 2019 the subsurface conditions within the Stormwater facility regions are silty clay soils with a shallow water table. The Geotechnical report has been included in **Appendix 2**.

In addition, multiple soil types have been identified on-site using soils data obtained from the United States Department of Agriculture – Natural Resources Conservation Service Web Soil Survey. A soil location map illustrating the various soils has been included in **Appendix 2**. A listing of the soil map units and descriptions is shown in Table 1 below.

Table 1 – Soil Types

Map Symbol	Map Unit Name	Hydrologic Soil Group
HmB2	Hochheim loam, 2-6% slopes, eroded	D
HoD3	Hochheim loam, 12-20% slopes, severely eroded	B
HtA	Houghton Muck, 0-2% slopes	A/D
LmB	Lamatrine silt loam, 0-3% slopes	B/D
Ph	Pella silt loam, 0-2% slopes	B/D

3.0 DESIGN CRITERIA

3.1 City of Waukesha

City of Waukesha Municipal Code 32.10: Storm Water Management Requirements

3.2 Wisconsin Department of Natural Resources

WDNR – Technical Standards (NR151 and NR216)

Water Quantity: City of Waukesha ordinance requires that the Stormwater management practices maintain or reduce the 100-year, 10-year, 2-year, and 1-year 24-hour pre-development runoff rate. Refer to **Section 5.1** for a description of the on-site water quantity measures.

Water Quality: City of Waukesha and the WDNR requires for a new development, storm water discharges shall be treated to remove a minimum of 80% of the total suspended solids load, based on an average annual rainfall. Please refer to **Section 5.2** for a description of the on-site water quality measures.

Infiltration: City of Waukesha states where applicable, evaluation of the need for, appropriateness of, and required volume of infiltration shall be based on the most current DNR rules and technical standards.

NR 151 states: Infiltration practices located in the following areas may be credited toward meeting the requirement under the following conditions, but the decision to infiltrate under these conditions is optional:

1. Where the infiltration rate of the soil measured at the proposed bottom of the infiltration system is less than 0.6 inches per hour using a scientifically credible field test method.
2. Areas with less than 3 feet of separation from bottom of Infiltration System to seasonal high groundwater or top of bedrock.

As recommended in Section 8.6 of the Geotechnical report included in **Appendix 2**, a stormwater management basin is planned to be constructed in the southern area of the site, west of the existing Goodwill facility, as shown in the Test Boring and Observation Well Location Plan. The bottom of the basin is planned to be at El. 876. It is estimated that, at the time of geotechnical field services, the water table at the site was between +/- El. 878 and +/- 881. Based on the bottom elevation, and considering the shallow water table, the proposed basin location is not suitable for the infiltration of stormwater through the use of an infiltration device. Due to shallow

water table, the proposed basin location is considered exempt from stormwater infiltration requirements per section NR 151.124(4) of the Wisconsin Administrative Code and WDNR 1002 guidelines.

4.0 ANALYSIS

HydroCAD® Stormwater Modeling System (Version 10.00) software has been used to analyze stormwater characteristics for the Avid Hotel project HydroCAD® uses the accepted TR-55 methodology for determining peak runoff rates and runoff discharge volumes. Curve numbers for proposed ground cover have been selected using the standard values specified in TR-55 for a type "B" soil. Rainfall depths utilized in the HydroCAD® model were based on the rainfall depths specified in NOAA Atlas 14 with the MSE 3 rainfall intensity curve. Results of the modeling have been included in **Appendix 3** and **Appendix 4**. The corresponding rainfall depths are shown below in Table 2.

Table 2 – Rainfall Depths

Storm Event	Rainfall Depth
1-year	2.4"
2-year	2.7"
10-year	3.81"
100-year	6.18"

The sediment reduction characteristics of the proposed stormwater management facilities have been analyzed using WinSLAMM® (Version 10.3.3) Source Loading and Management Model. Peak release rates from the proposed stormwater devices were based on the results of the HydroCAD® modeling. WinSLAMM® input and output data have been included in **Appendix 5**.

5.0 DESIGN

The proposed hotel site will encompass approximately 3.6 acres. The development will include installation of private utilities, construction of the building with associated parking, and construction of a storm water wet pond with plans for the construction of a commercial site in the future. Stormwater runoff will be conveyed to the wet pond via overland flow and proposed storm sewers.

Drainage Area 1S represents 2.72 acres encompassing the majority of the site including the parking lot, majority of the driveways, building, and all of the future development. All of this will drain to the Wet Pond (1P).

Wet Pond 1P will control peak runoff release and total suspended solids, and outlet to the existing wetlands on site. In the event the outlet structure becomes clogged or otherwise inoperable, storm water will discharge by an overflow weir into the wetlands.

The remaining sub-catchment, Drainage Area 2S, represents 0.66 acres. Runoff from these areas will discharge from the site undetained but has still been included in the total runoff calculations.

A Proposed Conditions Hydrology Exhibit illustrating the drainage areas has been included in **Appendix 4.** Please refer to **Appendix 6** for additional details of the storm water biofiltration basin and outlet structures.

5.1 Runoff Rate and Volume Control

The proposed stormwater wet pond has been designed to meet the peak runoff release rates in accordance with the City of Waukesha ordinance for the 1-year 2-year, 10-year, and 100-year storm events.

City of Waukesha ordinance requires that the Stormwater management practices maintain or reduce the 100-year, 10-year, 2-year, and 1-year, 24-hour pre-development runoff rate. Table 3 summarizes the existing release rates for the developed compared to the proposed peak release rates determined using HydroCAD®. Please refer to **Appendix 3** and **Appendix 4** for additional details of the existing and proposed peak runoff rate calculations.

Table 3 – Peak Release Rates

	Existing Release Rate (cfs)	Proposed Release Rate (cfs)
1-year	0.78	0.24
2-year	1.02	0.38
10-year	2.14	1.83
100-year	6.58	5.56

Table 5 and Table 6 present the proposed drainage area and storm water management facility characteristics, respectively.

Table 5 – Proposed Drainage Area Hydrologic Characteristics

Drainage Area (HydroCAD® Node)	Area (Acres)	Curve Number	Peak Runoff Rate (cfs)			
			1-year	2-year	10-year	100-year
1S	2.72	91	7.26	8.50	13.10	22.81
2S	0.66	63	0.13	0.25	0.89	2.73

Table 6 – Proposed Storm Water Management Facility Characteristics

Stormwater Management Facility		1-year	2-year	10-year	100-year
1P	Peak Inflow (cfs)	7.26	8.50	13.10	22.81
	Peak Outflow (cfs)	0.15	0.16	1.66	3.15
	Peak Water Surface Elevation	883.19	883.55	884.17	885.72
	Spillway Elevation	885.80			
	Top of Berm Elevation	886.80			

5.2 Water Quality – Total Suspended Solids Treatment

Water quality for Avid Hotel will be achieved through the settling of suspended solids in the proposed Wet Pond. The Wet Pond has been designed in accordance with the parameters set forth in WDNR Technical Standard 1004 and 1003 respectively.

Calculation of overall TSS reduction for the site has been determined based on the difference between the total mass of solids generated under the "without controls" and "after controls" conditions using WinSLAMM® software. Table 7 summarizes the TSS reduction as calculated using WinSLAMM®. Refer to **Appendix 5** for input and output data used in the water quality and infiltration models.

Table 7 – Total Suspended Solids Loading

Without Controls (lbs)	After Controls (lbs)	Percent Reduction
944.0	180.7	**80.86%**

5.3 Infiltration

NR 151.124(3)(a)3 states that infiltration is not required through the wet pond. The site is exempt from infiltration per the City of Waukesha exemption due to areas designated for stormwater have less than 3 feet of separation from bottom of infiltration system to seasonal high groundwater. Refer to the geotechnical report included in **Appendix 2.**

5.4 Storm Sewer

Storm sewer will be constructed within the proposed site to convey storm water to the wet pond. The storm sewers have been sized to collect runoff from building roofs and pavement. All private storm sewers have been designed in accordance with the rational method and have been sized to accommodate runoff from the 10-year storm event. Complete storm sewer design computations have been included in **Appendix 6**.

5.5 Waukesha County Airport Concurrence Letter

The Waukesha County Airport was contacted in regards to the proposed wet pond for storm water management and its close proximity of the Waukesha County Airport. The concern is that transient species of birds may stop and rest at the proposed pond location and that there is a potential for birds that are moving from the pond to fly within the airspace of the airport. The airport biologist stated that heavy riprap placed around the perimeter of the pond is of sufficient height and grid wire suspended above at 10' X 10' spacing would discourage larger birds from flying into the pond. There is a recommendation that smaller grid squares would further reduce attractiveness to wildlife. The plan detail for the grid has been modified to provide a 5' X 5' grid as recommended. The Waukesha Airport concurrence letter is included in **Appendix 8.**

6.0 CONCLUSION

The stormwater management facilities for Avid Hotel have been designed to meet or exceed City of Waukesha ordinance and WDNR Technical Standards NR151 and NR216. The post-development stormwater peak runoff release rates have been reduced below the City of Waukesha's allowable peak release rates. The stormwater facilities will provide an overall TSS reduction of 80.86%.

(Appendices Follow)

APPENDIX 1

Location Map

Location Map

APPENDIX 2

Soil Data

- USDA Soil Map
- Geotechnical Report

Soil Map—Milwaukee and Waukesha Counties, Wisconsin

Map Scale: 1:1,310 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Milwaukee and Waukesha Counties, Wisconsin
Survey Area Data: Version 14, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 7, 2014—Sep 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HmB2	Hochheim loam, 2 to 6 percent slopes, eroded	0.9	20.8%
HoD3	Hochheim soils, 12 to 20 percent slopes, severely eroded	1.0	23.8%
HtA	Houghton muck, 0 to 2 percent slopes	0.9	20.4%
LmB	Lamartine silt loam, 0 to 3 percent slopes	0.6	13.2%
Ph	Pella silt loam, 0 to 2 percent slopes	0.9	21.7%
Totals for Area of Interest		**4.3**	**100.0%**

Geotechnical Engineering Exploration and Analysis

Proposed Avid Hotel
Marshview Street
Waukesha, Wisconsin

Prepared for:

MSI General Corporation
Oconomowoc, Wisconsin

May 9, 2019
Giles Project No. 1G-1904007

GILES
ENGINEERING ASSOCIATES, INC.

GILES
ENGINEERING ASSOCIATES, INC.
GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION MATERIALS CONSULTANTS

• Atlanta, GA
• Baltimore, MD
• Dallas, TX
• Los Angeles, CA
• Manassas, VA
• Milwaukee, WI

May 9, 2019

MSI General Corporation
P.O. Box 7
Oconomowoc, WI 53066

Attention: Mr. Bert Zenker, AIA
Vice President – Design Services

Subject: Geotechnical Engineering Exploration and Analysis
Proposed Avid Hotel
Marshview Street
Waukesha, Wisconsin
Giles Proposal No. 1G-1904007

Dear Mr. Zenker:

As requested, Giles Engineering Associates, Inc. conducted a *Geotechnical Engineering Exploration and Analysis* for the proposed project. The accompanying report describes the services that were performed, and it provides geotechnical-related findings, conclusions, and recommendations that were derived from those services.

We sincerely appreciate the opportunity to provide geotechnical services for the proposed project. Please contact the undersigned if there are questions about the report, or if we may be of further service.

Very truly yours,

GILES ENGINEERING ASSOCIATES, INC.

Anthony C. Giles, P.E.
Vice President

WISCONSIN
ANTHONY C. GILES
29561-6
OCONOMOWOC
WIS.
PROFESSIONAL ENGINEER

David M. Cornale, P.E.
Senior Geotechnical Consultant

Distribution: MSI General Corporation
Attn: Mr. Bert Zenker (1 via email: bert@msigeneral.com)
Attn: Mr. Adam Wolfe (1 via email: AdamW@msigeneral.com)

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GEOTECHNICAL ENGINEERING EXPLORATION AND ANALYSIS

PROPOSED AVID HOTEL
MARSHVIEW STREET
WAUKESHA, WISCONSIN
GILES PROJECT NO. 1G-1904007

GEOTECHNICAL ENGINEERING EXPLORATION AND ANALYSIS

PROPOSED AVID HOTEL
MARSHVIEW STREET
WAUKESHA, WISCONSIN
GILES PROJECT NO. 1G-1904007

EXECUTIVE SUMMARY

This Executive Summary provides limited geotechnical information regarding the proposed project. Since this Executive Summary is exceedingly abbreviated, it must be read in complete context with the following report ("Report").

Subsurface Conditions

- Fifteen geotechnical test borings were performed at the site to explore subsurface conditions.
- Topsoil that varied between 4 and 18 inches thick was at the ground surface at the test borings. The topsoil generally consisted of silty clay and included an estimated trace to little amount of organic matter.
- Material classified as fill was below the surface materials at Test Borings 3, 5, 6, 10, 11, 12, and 15. The fill material was identified to depths between ±2 and ±9 feet below-ground, depending on the test boring. Fill material predominantly consisted of silty clay with variable amounts of sand and gravel; however, the fill at Test Boring 12 consisted of silty sand. Also, the fill between ±6½ and ±8 feet below-ground at Test Boring 11 included glass debris. Cohesive fill material (silty clay) had relatively low to moderate strength characteristics, with comparative consistencies ranging between medium stiff and stiff. The granular fill material (silty sand) at Test Boring 12 also had very low to moderate strength characteristics, with very loose to firm relative densities.
- Soil classified as possible fill was between ±9 and ±13 feet below-ground at Test Boring 3. The possible fill generally consisted of silty clay.
- Native soil was below the materials described above, and extended to the termination depth at each test boring. The native soil varied, but generally consisted of sand (with variable silt and gravel content), silt, silty clay, and lean clay. The strength characteristics of the native soil varied: Native cohesive soil (silty clay and lean clay) exhibited stiff to hard comparative consistencies, based on laboratory testing. Native granular soil (sand and silt) exhibited loose to very dense relative densities, based on SPT N-values; however, at least some of the N-values within the granular soil are likely not representative of soil density due to encountering gravel, cobbles, and/or boulders while sampling/testing.
- It is estimated that, at the time of our field services, the water table at the site was between ±El. 878 and ±El. 881. Consequently, the water table is relatively shallow within less elevated areas of the site, such as near the wetland. During our field services, water was ponded within the wetland.

Hotel Building Foundation

- A spread-footing foundation is recommended for the proposed hotel building. However, existing fill is unsuitable for direct and/or indirect support of foundations; all footings must be directly supported by suitable-bearing (non-organic) native soil, or by new engineered fill or lean-concrete backfill placed directly on suitable native soil. The foundations are recommended to be designed using a 3,000 pound per square foot (psf) maximum, net, allowable soil bearing capacity. Some over-excavation is expected to be necessary to develop suitable support for foundations. The actual depths and areas of over-excavation should be determined during construction, on a location-by-location basis, with the assistance of a geotechnical engineer.

Hotel At-Grade Floor Slab

- With proper subgrade preparation, existing soil (including existing fill) is expected to be suitable to support an at-grade floor slab for the hotel building; new engineered fill that is placed on suitable-bearing existing soil is also expected to be suitable. However, subgrade improvement (such as over-excavation and/or mechanical modification) might be necessary to develop proper slab support in some areas, considering the former structures, and because existing fill and lower-strength native soil was encountered at the test borings.
- Assuming a maximum 100 psf floor load, and with regard to geotechnical considerations, the at-grade floor slab is recommended to be at least 4 inches thick. A minimum 4-inch-thick base course is recommended to be below the floor slab to serve as a capillary break and for support considerations. A minimum 10-mil vapor retarder is recommended to be directly above or below the base course throughout all at-grade floor areas.

Hotel Pavement

- Hot-mix asphalt (HMA) pavement is suitable for the site, but Portland cement concrete (PCC) pavement is recommended in higher-stress areas, such as at entrance/exit aprons, at the trash enclosure, and in areas where trucks will turn or will be parked.

Site Development Considerations

- Unstable materials will likely be encountered during preparation of the hotel site, especially within the southwest parking area, located behind the proposed hotel building location. It is important to note that only one test boring (Test Boring 9) was conducted in the southwest parking area. Low-strength soil was encountered to about 6½ feet below-ground at that test boring. Considering the adjacent wetland, and shallow water table, low-strength soil (possibly including peat) likely exists away from Test Boring 9, and low-strength soil might be widespread throughout the entire southwest parking area. Significant over-excavation along with mechanical modification using crushed stone placed on geogrid or geotextile will likely be necessary to develop a stable subgrade in the southwest parking area, and possibly in other areas. Areas requiring subgrade improvement could be large and improvement methods might need to extend several feet below the planned subgrade, depending on the conditions that are encountered.

GEOTECHNICAL ENGINEERING EXPLORATION AND ANALYSIS

PROPOSED AVID HOTEL
MARSHVIEW STREET
WAUKESHA, WISCONSIN
GILES PROJECT NO. 1G-1904007

1.0 SCOPE OF SERVICES

This report provides the results of the *Geotechnical Engineering Exploration and Analysis* that Giles Engineering Associates, Inc. ("Giles") conducted for the proposed hotel development. The *Geotechnical Engineering Exploration and Analysis* included a Geotechnical Subsurface Exploration Program, Geotechnical Laboratory Services, and Geotechnical Engineering Services. The scope of each service area was narrow and limited, as directed by our client, and based on our understanding and assumptions about the proposed project. Service areas are briefly described later. Environmental consulting was beyond our authorized scope for this project.

Geotechnical-related recommendations are provided in this report for design and construction of the foundations, at-grade floor slabs, and elevator pits for the proposed hotel building. Recommendations are also provided for parking lot pavement at the hotel site. Furthermore, preliminary screening information is provided regarding stormwater infiltration at the planned location of the proposed stormwater basin. Site preparation recommendations are given, but are only preliminary, as the means and methods of site preparation will depend on factors that were unknown when this report was prepared. Those factors include, but are not limited to, the weather before and during construction, subsurface conditions that are exposed during construction, and final details of the proposed project.

As discussed later, two test borings were conducted in the furture restaurant parcel, located southeast of the hotel site. These test borings were only conducted to preliminarily evaluate subsurface conditions at the restaurant parcel. Specific geotechnical-related recommendations regarding design and construction of the future restaurant development are not provided in this report.

2.0 SITE DESCRIPTION

The subject site is south of Marshview Street and west of an existing Goodwill facility. Vacant land is west of the site; Good Harvest Market is to northwest. The site area is shown on the *Test Boring and Observation Well Location Plan*, enclosed as Figure 1 in Appendix A. During our field services, the northern portion of the site was wooded, and weedy groundcover was throughout the entire site. Although the site was vacant during our field services, historic aerial photographs show that at least several structures formerly existed at the site. The former structures likely included residential dwellings, which might have had basements. During our field services, piles of rubble and debris were observed at the ground surface within the general areas of former buildings, and foundation remnants were also observed. Historic aerial photographs show that the eastern area of the site (adjacent to the existing Goodwill facility) was formerly an agriculture field, which might have included drain-tile.

Topographically, the site is highly irregular. A topographic map provided by MSI General Corporation shows that ground grade at the site generally range between ±El. 879 and ±El. 899. Ground elevations are highest in the northwest corner of the site, near Meadow Lane, which borders the north side of the site. Ground elevations are lowest within the south and southwest areas of the site, which are delineated wetland area. During our field services, water was ponded within the wetland area.

3.0 PROJECT DESCRIPTION

The proposed hotel building will be constructed in the area shown on the *Test Boring and Observation Well Location Plan*. It is understood that the hotel will have four above-grade levels. The building will not have a basement, but will have elevator pits, which are assumed to be a maximum of four feet deep, measured from the surface of the first floor. It is assumed that the hotel will be a stud-frame building with exterior finishes consisting of brick, masonry, and EIFS. Structural support is expected to be from bearing walls and columns. Maximum foundation loads were not provided, but are assumed to be 8,000 pounds per lineal foot (plf) from bearing walls and 100,000 pounds per column. A ground-bearing concrete slab is planned for the first floor, with an assumed maximum floor load of 100 pounds per square foot (psf). The first floor is planned to be at El. 890. Topographic contour lines on the provided topographic map show that ground grades in the hotel building area range between ±El. 889 and ±El. 899; therefore, the building area will be lowered a maximum of about 10 feet, with little or no filling expected.

A parking lot will surround the hotel building, and will include automobile parking stalls and automobile drive lanes. Parking lot pavement will assumedly consist of hot-mix asphalt (HMA), but Portland cement concrete (PCC) pavement is expected and recommended in high-stress areas. Traffic within the parking lot will assumedly consist of passenger vehicles, with infrequent heavy-truck traffic from weekly refuse removal and from occasional deliveries. Based on topographic information provided by MSI General Corporation, pavement grades will generally range between ±El. 887 and ±El. 889, except that the access drive (near the primary entry) will slope down to about El. 884, matching the existing road. Significant cutting and filling is expected in the hotel parking lot area. Cut and fill depths are expected to be a maximum of about 10 feet deep

A stormwater basin is planned to be constructed in the southeast area of the site, adjacent to the existing Goodwill facility. The bottom of the basin is planned to be at El. 876 and the finished ground grade at the perimeter of the basin is planned to be at El. 887. Existing ground grades in the basin area range between ±El. 883 and ±El. 886.

4.0 GEOTECHNICAL SUBSURFACE EXPLORATION PROGRAM

Test Borings

To explore subsurface conditions, fifteen geotechnical test borings were conducted at the site, using a mechanical drill-rig. Test Borings 1 through 7 were in the proposed hotel building area and were advanced to ±36 feet below-ground. Test Borings 8, 9, 10 and 12 were in the proposed hotel parking lot area and were ±11 feet deep. Test Borings 11 and 13 were at the future restaurant parcel and were ±21 and ±11 feet deep, respectively. Test Borings 14 and 15 were in the proposed stormwater basin area and were ±21 feet deep. Test boring locations were positioned on-site relative to apparent property lines, features of the site, and by estimating right angles. Approximate locations of the test borings are shown on the *Test Boring and Observation Well Location Plan*.

Samples were collected from each test boring, at certain depths, using the Standard Penetration Test (SPT), conducted with the drill rig. A brief description of the SPT is given in Appendix B, along with descriptions of other field procedures. Immediately after sampling, select portions of the SPT samples were placed in containers that were labeled at the site for identification. A Standard Penetration Resistance value (N-value) was determined from each SPT. N-values are reported on the *Test Boring Logs* (in Appendix A), which are records of the test borings. At least some of the N-values within the granular soil (discussed below) are likely not representative of soil density due to encountering gravel, cobbles, and/or boulders while sampling/testing.

Ground elevations at the test borings were estimated from the topographic contours on the topographic map provided by MSI General Corporation. The test boring elevations were rounded to the nearest ½-foot and are noted on the *Test Boring Logs*. Elevations on the *Test Boring Logs* are considered accurate within about one foot (one contour interval).

The boreholes were backfilled upon completion. However, backfill material will likely settle and/or heave, possibly creating a hazard that can lead to a threat of injury to people and animals. Borehole areas should, therefore, be carefully and routinely monitored by the property owner; settlement and/or heave of backfill materials should be repaired immediately. Giles will not monitor or repair boreholes.

Groundwater Observation Well

To evaluate groundwater depth, a temporary groundwater observation well, constructed with solid and slotted PVC pipe, was installed at Test Boring 4, conducted in the proposed hotel building area, as shown on the *Test Boring and Observation Well Location Plan*. A Giles representative measured the water level within the well on May 2, 2019 and on May 6, 2019. Results of the limited groundwater measurements are provided in Section 7.0 below. The groundwater observation well should be abandoned before construction in accordance with

Wisconsin Department of Natural Resources regulations. Giles can abandon the well upon request and authorization under separate contract.

5.0 GEOTECHNICAL LABORATORY SERVICES

Samples that were retained from the test borings were classified, in the laboratory, using the descriptive terms and particle-size criteria shown on the *General Notes* in Appendix D, and by using the Unified Soil Classification System (ASTM D 2488) as a general guide. The classifications are shown on the *Test Boring Logs*, along with horizontal lines that show estimated depths of material change. Field-related information pertaining to the test borings is also shown on the *Test Boring Logs*. For simplicity and abbreviation, terms and symbols are used on the *Test Boring Logs;* the terms and symbols are defined on the *General Notes*.

Unconfined compression (without controlled strain), calibrated penetration resistance, and moisture content tests were performed on select soil samples to evaluate their engineering properties. Test results are on the *Test Boring Logs*. Because the tests were conducted on SPT samples, which are categorized as disturbed samples, results of strength-related tests (unconfined compression and penetration resistance) are considered approximate and were used as such. Laboratory procedures are briefly described in Appendix C.

6.0 MATERIAL CONDITIONS

Because material sampling at the test borings was discontinuous, it was necessary to estimate conditions between sample intervals. Estimated conditions at the test borings are briefly discussed in this section and are described in more detail on the *Test Boring Logs*. The conclusions and recommendations in this report are based only on the estimated conditions.

6.1. Surface Materials

Topsoil that varied between 4 and 18 inches thick was at the ground surface at the test borings. Topsoil thicknesses are shown on the *Test Boring Logs*, enclosed in Appendix A. The topsoil generally consisted of silty clay with an estimated trace to little amount of organic matter.

6.2. Fill Materials

Material classified as fill was below the surface materials at Test Borings 3, 5, 6, 10, 11, 12, and 15. The fill materials were identified to depths between ±2 and ±9 feet below-ground, depending on the test boring. Fill material predominantly consisted of silty clay with variable amounts of sand and gravel; however, the fill at Test Boring 12 consisted of silty sand. Also, the fill between ±6½ and ±8 feet below-ground at Test Boring 11 included glass debris. Cohesive fill material (silty clay) had relatively low to moderate strength characteristics, with comparative consistencies ranging between medium stiff and stiff. The granular fill material (silty sand) at

Test Boring 12 also had very low to moderate strength characteristics, with very loose to firm relative densities.

6.3. Possible Fill

Soil classified as possible fill was between ±9 and ±13 feet below-ground at Test Boring 3. The possible fill generally consisted of silty clay.

6.4. Native Soil

Native soil was below the materials described above, and extended to the termination depth at each test boring. The native soil varied, but generally consisted of sand (with variable silt and gravel content), silt, silty clay, and lean clay. The strength characteristics of the native soil varied: Native cohesive soil (silty clay and lean clay) exhibited stiff to hard comparative consistencies, based on laboratory testing. Native granular soil (sand and silt) exhibited loose to very dense relative densities, based on SPT N-values; however, as noted above, at least some of the N-values within the granular soil are likely not representative of soil density due to encountering gravel, cobbles, and/or boulders while sampling/testing.

7.0 GROUNDWATER CONDITIONS

To evaluate groundwater depth, the observation well that was installed at Test Boring No. 4 was monitored on May 2, 2019 and on May 6, 2019. Results of the observation-well monitoring are provided in the following table.

TABLE 1
RESULTS OF OBSERVATION-WELL MONITORING

Monitoring Date	Groundwater Depth and Elevation	
	Depth [1]	Elevation[2]
May 2, 2019	±11.1 feet	±El. 879.9
May 6, 2019	±11.0 feet	±El. 880.0

Notes:
1) Groundwater depth is referenced to the ground surface adjacent to the observation well
2) Elevations are referenced to the topographic contour lines on the topographic map provided by MSI General Corporation

Based on the observation-well readings, and the subsurface conditions at the test borings, it is estimated that, at the time of our field services, the water table at the site was between about El. 878 and El. 881. Consequently, the water table is relatively shallow within less elevated areas of the site, such as near the wetland. During our field services, water was ponded within the wetland.

It is important to note that groundwater conditions at the site will fluctuate, especially seasonally and with weather events. Additional observation-well monitoring could be performed to further evaluate groundwater depth. The longer the groundwater observation well is monitored, the more accurately the seasonal groundwater level can be defined. Giles can continue to observe monitor the well, upon request and authorization. If the well is monitored by others, Giles should be provided with the results, which may require revisions to this report.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1. Seismic Design Considerations

A soil Site Class C is recommended for seismic design. By definition, Site Class is based on the average properties of subsurface materials to 100 feet below-ground. Because 100-foot test borings were not requested or authorized, it was necessary to estimate the Site Class based on the test borings, presumed area geology, and the International Building Code.

8.2. Hotel Foundation Recommendations

A spread-footing foundation is recommended for the proposed hotel building. However, existing fill is unsuitable for direct and/or indirect support of foundations; all footings must be directly supported by suitable-bearing (non-organic) native soil, or by new engineered fill or lean-concrete backfill (both discussed below) placed directly on suitable native soil. The foundations are recommended to be designed using a 3,000 pound per square foot (psf) maximum, net, allowable soil bearing capacity. For geotechnical considerations, strip footings are recommended to be at least 16 inches wide and isolated footings are recommended to be at least 24 inches wide/long, regardless of the calculated foundation-bearing stress. From a geotechnical perspective, foundation walls could be built of cast-in-place concrete or concrete masonry units. Specific foundation dimensions, reinforcing, concrete parameters, and other details are recommended to be specified by the project structural engineer.

The local building code requires a minimum 48-inch foundation-embedment depth for frost protection. It is, therefore, recommended that footings for perimeter walls (and other exterior elements) bear at least 48 inches below the adjacent (finished) exterior grade, or to a depth required by the governing building code. From a geotechnical perspective, interior footings could be directly below the first-floor slab, since it is assumed that soil beneath the heated building will not freeze. Therefore, it is assumed that the planned bearing grade of perimeter and interior footings will be 4½ and 1½ feet below the first-floor surface, respectively. Based on the planned first-floor elevation (El. 890), it is expected that perimeter and interior footings will bear at El. 885.5 and El. 888.5, respectively.

The following table shows estimated depths and elevations of suitable-bearing native soil at Test Borings 1 through 7, conducted in the proposed hotel building area. Due to the former structures (discussed in Section 2.0), and because existing fill and lower-strength native soil

were encountered at the test borings, testing and approval of foundation-support soil by a geotechnical engineer on a full-time basis during construction is critical. Without evaluation and approval of foundation-support soil by a geotechnical engineer, the proposed hotel building could be improperly supported, which could lead to excessive settlement and structural distress.

TABLE 2
ESTIMATED DEPTH/ELEVATION OF SUITABLE-BEARING NATIVE SOIL

Test Boring	Estimated Depth of Suitable-Bearing Native Soil	Estimated Elevation of Suitable-Bearing Native Soil
1	±2 feet	±El. 897.0
2	±2 feet	±El. 892.5
3	±9 to ±13 feet	±El. 882 to ±El. 878
4	±2 feet	±El. 889.0
5	±2 feet	±El. 891.0
6	±5 feet	±El. 886.0
7	±2 feet	±El. 887.5

(a) For direct foundation support and/or for placement of lean-mix concrete; based on a 3,000 psf maximum, net, allowable soil bearing capacity.
(b) Referenced to the site grades during the Geotechnical Subsurface Exploration Program.
(c) Elevations are referenced to the topographic contour lines on the topographic map provided by MSI General Corporation

Considering the approximate depths/elevations of suitable-bearing native soil shown in Table 2, and the assumed foundation-bearing elevations described above, some over-excavation is expected to be necessary to develop suitable support for foundations. The actual depths and areas of over-excavation should be determined during construction, on a location-by-location basis, with the assistance of a geotechnical engineer.

Foundation excavations are recommended to be dug with a smooth-edge backhoe bucket to develop a relatively undisturbed bearing grade. A toothed bucket will likely disturb foundation-bearing soil more than a smooth-edge bucket, thereby making soil at the excavation base more susceptible to saturation and instability, especially during adverse weather. It is critical that contractors protect foundation-support soil and foundation construction materials (concrete, reinforcing, etc.). In addition, engineered fill is recommended to be placed and compacted in benched excavations along foundation walls immediately after the foundation walls are capable of supporting lateral pressures from backfill, compaction, and compaction equipment. Due to granular site soil, and expected over-excavations, trench-footing construction methods are not expected to be feasible.

Foundation Support Soil Requirements

Existing fill is unsuitable for direct and/or indirect support of foundations; all footings must be directly supported by suitable-bearing (non-organic) native soil, or by new engineered fill or lean-concrete backfill (both discussed below) placed directly on suitable native soil. Based on

the recommended 3,000 psf maximum, net, allowable soil bearing capacity, the in-situ unconfined compressive strength of native cohesive soil, such as silty clay and lean clay, within foundation influence zones is recommended to be at least 1.5 tons per square foot (tsf). Native granular soil, such as sand and silt, within foundation influence zones is recommended to have a corrected N-value (determined from SPTs and correlated from other in-situ tests) of at least 10, based on the recommended bearing capacity. It is further recommended that the strength characteristics of soil within all foundation influence zones (determined by a geotechnical engineer during construction) meet or exceed the recommended values, unless Giles approves other values.

Due to the former structures, and because existing fill and lower-strength native soil were encountered at the test borings, full-time evaluation of foundation-support soil by a geotechnical engineer during foundation excavation and foundation construction is critical. The purpose of the recommended evaluation is (1) to confirm that the foundations will be properly supported by suitable (non-organic) native soil, (2) to determine over-excavation depths and areas, and (3) to confirm that the subsurface conditions are similar to those described on the *Test Boring Logs*. If a firm other than Giles performs the recommended support-soil evaluation, Giles must be notified if the composition or strength characteristics of foundation-support soil differs from the subsurface conditions shown on the *Test Boring Logs*, thereby allowing us the opportunity to revise this report, if needed. Without evaluation and approval of foundation-support soil by a geotechnical engineer, the proposed hotel building could be improperly supported, which could lead to excessive settlement and structural distress.

Unsuitable materials beneath foundation areas could be replaced with engineered fill consisting of properly compacted well-graded aggregate. Aggregate fill is recommended to consist of dense-graded crushed stone that meets the gradation requirements of *dense-graded base* (1¼-inch) in Section 305 of the Wisconsin Department of Transportation Standard Specifications (2019). Aggregate with other gradation characteristics could possibly be used, but should be approved by a geotechnical engineer before the material is placed. If engineered fill is used as backfill, lateral over-excavation of unsuitable materials will also be required, in addition to the required vertical over-excavation. The overall width of lateral over-excavation will depend on the vertical over-excavation depth. For estimating purposes, the minimum lateral over-excavation could be determined by extending an imaginary line outward and downward at a ratio of 1(horizontal):2(vertical) from the bottom edges of a footing pad, but the actual lateral extents of over-excavation are recommended to be approved by a geotechnical engineer during construction.

Lean Portland cement concrete (minimum 28-day compressive strength of 500 psi) could also be used to replace unsuitable materials beneath foundation areas, but caving of granular site-soil might be encountered, requiring the use of extra concrete. Where lean concrete is used as backfill, footing construction must not begin until the lean concrete has gained sufficient strength. Also, over-excavations that are filled with lean concrete are recommended to be at

least as wide (on all sides) as the footing pad that will be supported by the concrete, and excavation sidewalls are recommended to be plumb and parallel. To help control sloughing and caving, especially due to the granular soil, lean-concrete backfill is recommended to be placed immediately after excavation. This trench-and-pour method requires close communication and scheduling between the general contractor, foundation contractor, concrete supply company, and geotechnical engineer. With a trench-and-pour method, a geotechnical engineer must observe excavations as they are made. Full-time observation by a geotechnical engineer is, therefore, recommended.

Estimated Foundation Settlement

The post-construction total and differential settlements of a spread-footing foundation designed and constructed based on this report are estimated to be less than about 1 inch and ½ inch, respectively. The post-construction angular distortion is estimated to be less than about 0.002 inch per inch across a distance of 20 feet or more. Estimated settlements are based on the assumption that foundation-support soil will be evaluated and approved by a geotechnical engineer during construction.

8.3. Hotel At-Grade Floor Slab Recommendations

With proper subgrade preparation, existing soil (including existing fill) is expected to be suitable to support an at-grade floor slab for the hotel building; new engineered fill that is placed on suitable-bearing existing soil is also expected to be suitable. However, subgrade improvement (such as over-excavation and/or mechanical modification) might be necessary to develop proper slab support in some areas, considering the former structures, and because existing fill and lower-strength native soil was encountered at the test borings. Consequently, the entire at-grade floor area is recommended to be thoroughly evaluated (and approved) by a geotechnical engineer immediately before fill placement (if any) and before floor construction. Without a thorough evaluation of floor slab support materials, the at-grade floor slab within the hotel building might be improperly supported, which could lead to excessive settlement.

From a geotechnical perspective, the at-grade floor slab for the hotel building is recommended to be at least 4 inches thick; that thickness assumes that the 28-day compressive strength of concrete will be at least 3,500 pounds per square inch (psi). Assuming proper site preparation, the at-grade floor slab may be designed using a *Modulus of Subgrade Reaction* (K_{v1}) value of 75 pounds per square inch per inch (psi/in). It is recommended and assumed that a structural engineer will design/specify the floor slab thicknesses, reinforcing, joint details, and other parameters.

A minimum 4-inch-thick base course is recommended to be below the at-grade floor slab in the hotel building to serve as a capillary break and for support considerations. It is recommended that the base course consist of free-draining aggregate that has been tested and approved by a geotechnical engineer. Depending on aggregate gradation, geotextile might need to be below

the base course to serve as a separator. The need for geotextile should be determined during construction with the assistance of a geotechnical engineer.

A minimum 10-mil vapor retarder is recommended to be directly above or below the base course throughout all at-grade floor areas. The location (above or below the base course) of the vapor retarder should be specified by the project structural engineer. Abutting vapor retarder sheets are recommended to be overlapped and taped, and must extend to all foundation walls. Vapor retarders are recommended to be in accordance with ASTM E 1745, entitled *Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs*, or other relevant documents. If the base course has sharp, angular aggregate, protecting the retarder with geotextile (or by other means) is recommended.

Due to the frost-susceptible site soil, areas of the at-grade floor slab (such as near exterior doors and entrance/exit vestibules) will be susceptible to freeze-thaw related movement. Installation of insulation (or other protective measures against freeze-thaw movement) should be considered for these areas. Ground grades are recommended to be sloped away from the hotel building and sidewalks to reduce water infiltration and potential freeze-thaw problems.

Estimated Floor Slab Settlement

The post-construction total and differential settlements of an isolated floor slab constructed in accordance with this report are estimated to be less than about ⅝ inch and ½ inch, respectively, over a distance of about 20 feet. Settlement estimates are based on the assumption that floor slab support materials will be evaluated and approved by a geotechnical engineer during and immediately before floor slab construction.

8.4. Hotel Elevator Pit Recommendations

Elevator pits within the hotel building are recommended to be watertight structures. It is recommended that watertight construction include water stops at all control joints, construction joints, and at all other junctures where water could enter the elevator pits. In addition, an appropriate waterproofing material is recommended to be along the outside of elevator-pit walls and below pit floors to create an impermeable barrier around each pit. Alternative waterproofing materials could also be used to waterproof the elevator pits. Waterproofing materials are recommended to be specified by a structural engineer and installed by a qualified, experienced contractor in strict accordance with the manufacturer's recommendations. Also, it is recommended that Giles review the project plans and specifications prior to construction to confirm that our recommendations have been interpreted correctly, especially regarding the watertight elevator pit.

Elevator-pit walls are recommended to be designed to resist lateral earth pressures, and any horizontal pressures caused by surface and subsurface surcharge loads. It is assumed that elevator-pit walls will be cast near existing soil, and that engineered fill between the walls and

surrounding soil will consist of properly compacted, well-graded aggregate. Based on that assumption, the pit walls are recommended to be designed for an equivalent "at-rest" fluid pressure of 75 psf/ft. Horizontal pressures caused by surface and subsurface surcharge loads (such as floor loads) must be added to the "at-rest" fluid pressure. Giles could provide supplemental recommendations regarding surface and subsurface surcharge loads on a case-by-case basis, but would require specific structural information. Below-grade walls that are not designed to resist actual pressures could move laterally and possibly fail.

8.5. Hotel Pavement Recommendations

Giles was not given traffic information for pavement design; therefore, recommendations for light-duty pavement are provided below and are based on an arbitrarily assumed traffic condition consisting of five 18-kip Equivalent Single Axle Loads (ESALs) per day. The recommended pavement sections are only intended for use in light-duty areas subject to passenger vehicles with infrequent traffic from heavier vehicles due to occasional deliveries and due to weekly removal of refuse and recyclables. The recommended pavement sections assume no increase in traffic volume and no changes in vehicle type or traffic pattern. Also, it is assumed that the ESALs noted above will be in one direction for each lane.

It is critical that the project owner, developer, civil engineer, and other design professionals involved with the project confirm that the ESALs noted above are appropriate for the expected traffic conditions, vehicle types, and axle loadings. If requested, Giles can provide supplemental pavement recommendations based upon other traffic conditions, vehicle types, and axle loads. The recommended pavement sections could underperform or fail prematurely if the design ESALs are exceeded.

It is expected that pavement support materials will consist of various materials including existing fill, native soil, and newly placed engineered fill (used to raise grades). Generally, site soil at the expected pavement subgrade consists of silty sand, silty clay, and lean clay. Because silty clay and lean clay have lower support characteristics (when compared with silty sand), the recommended pavement sections were developed based on a silty clay and lean clay subgrade with an assumed field CBR value of 3 and a *Modulus of Subgrade Reaction* (K_{V1}) value of 75 psi/in. Engineered fill that is placed in proposed pavement areas is recommended to have a field CBR value and a *Modulus of Subgrade Reaction* (K_{V1}) value at least equivalent to the design values. Fill is recommended to be placed and compacted per this report.

Asphalt-Concrete Pavement

The following table shows the recommended thicknesses for asphalt-concrete pavement with an aggregate base-course. State specifications are also included in the table. The recommended pavement section is based on the traffic condition described above.

TABLE 3 RECOMMENDED HMA PAVEMENT SECTION		
Materials	**Pavement Thickness**	**Wisconsin DOT Standard Specifications**
Hot-Mix Asphalt Surface Course	1.5 inches	Section 460
Hot-Mix Asphalt Binder Course	2.5 inches	Section 460
Dense-Graded Aggregate Base Course	8.0 inches	Section 305, 1¼-inch Crushed Stone

Portland Cement Concrete

Portland cement concrete pavement is recommended in high-stress areas, such as the lot entrance/exit aprons, at the refuse/recyclables enclosure, and in areas where trucks will turn or will be parked. Concrete pavement is recommended to be at least 6 inches thick, and is recommended to be underlain by a minimum 4-inch-thick aggregate base-course. It is recommended that concrete pavement have load-transfer reinforcement, where appropriate. Control-joint spacing should be determined in accordance with the current ACI code. Expansion joints should be provided where pavement abuts fixed objects, such as the building and light poles. It is recommended and assumed that a civil engineer will provide specific recommendations for concrete pavement, including reinforcing details and control-joint spacing. The 28-day compressive strength of concrete is recommended to be at least 4,000 psi and the concrete should be properly air-entrained. Materials and construction procedures for concrete pavement and the aggregate base are recommended to be in accordance with Wisconsin DOT specifications.

General Pavement Considerations

The pavement recommendations assume that the pavement subgrade will be prepared according to this report, the base course will be properly drained, and a geotechnical engineer will observe and test pavement construction. Pavement was designed based on AASHTO design parameters for a twenty-year design period, but the actual service life may be much less, especially considering that the pavement subgrade is expected to consist of silty clay and lean clay, which are relatively poor subgrade materials. Also, because of the existing fill, and shallow groundwater, additional pavement maintenance should be expected. Local codes may require specific testing to determine soil support characteristics and/or minimum pavement section thickness might be required.

8.6. Preliminary Stormwater Infiltration Screening

A stormwater management basin is planned to be constructed in the southern area of the site, west of the existing Goodwill facility, as shown on the *Test Boring and Observation Well Location Plan*. The bottom of the basin is planned to be at El. 876. As noted above, it is estimated that, at the time of our field services, the water table at the site was between ±El. 878 and ±El. 881. Based on the planned bottom elevation, and considering the shallow water table, the proposed basin location is not suitable for the infiltration of stormwater through the use of an infiltration device. Due to the shallow water table, the proposed basin location is considered by Giles to be exempt from stormwater infiltration requirements per section NR 151.124(4)(c) of the Wisconsin Administrative Code and WDNR 1002 guidelines.

Preliminary Wet Detention Pond Information

A wet detention pond could possibly be used. However, due to the shallow water table, extensive construction difficulties, that are expected to require groundwater control and construction dewatering, are expected to be needed for wet pond construction, particularly for construction of the pond liner. A properly constructed clay liner or synthetic liner, approved by a geotechnical engineer, is recommended at the sides and bottom of the wet pond to control seepage. The required liner thickness and material composition will depend on details of the planned pond construction. Installation of liner material is recommended to be in accordance with the manufacturer's recommendations and is recommended to be observed by a geotechnical engineer. Also, wet pond design and construction is recommended to be in accordance with the guidelines and requirements provided in Wisconsin WDNR Conservation Practice Standard 1001.

8.7. Generalized Site Preparation Recommendations

This section deals with site preparation at the hotel site, including preparation of floor slab, pavement, and engineered fill areas. The means and methods of site preparation will greatly depend on the weather conditions before and during construction, the subsurface conditions that are exposed during earthwork operations, and the final details of the proposed development. Therefore, only generalized site preparation recommendations are given.

In addition to being general, the following site preparation recommendations are abbreviated; the *Guide Specifications* in Appendix D gives further recommendations. The *Guide Specifications* should be read along with this section. Also, the *Guide Specifications* are recommended to be used as an aid to develop the project specifications.

Demolition and Removal

Aerial photographs show that at least several structures existed at the site, and some of the structures might have had basements. All remaining components of the former structures (and

former developments) are recommended to be completely removed from the hotel building area. Disposal of rubble and debris is recommended to be in accordance with local, state, and federal regulations for the material type. Outside the hotel building area, it might be feasible for foundation remnants to remain in place, provided the foundations are stable, are cut off at least 3 feet below the planned subgrade, and hollow cores are grouted solid. Remaining floor slabs that are outside the hotel building area could also stay in-place, provided that the slabs are at least 3 feet below the planned finished grade, are perforated (broken) on a maximum 2-foot grid, are "seated" into the subgrade for stability, and are covered with a minimum 12-inch-thick layer of well-graded, free-draining, granular material for drainage. It is important to note that building remnants that are left in-place may cause excavation difficulties for new utilities and landscape plantings, and for future construction. Excavations created during removal of construction components must be backfilled with engineered fill, which might need to be benched into the surrounding soil, as noted in Item No. 3 of the *Guide Specifications* enclosed in Appendix D.

Rubble, debris, surface vegetation, trees and bushes (including root-balls), topsoil with adverse organic content, and otherwise unsuitable materials are recommended to be removed from the proposed building location, parking lot area, and other structural areas. Clearing, grubbing and stripping should extend at least several feet beyond proposed development areas, where feasible.

Proof-Rolling and Fill Placement

After the recommended removal and stripping, and once the hotel development area is cut (lowered) as needed, the site is recommended to be thoroughly proof-rolled with a fully-loaded, tandem-axle dump truck, or other suitable construction equipment, to help locate unstable areas based on subgrade deflection caused by the wheel loads of the proof-roll equipment. For safety, proof-roll equipment must be kept a sufficient distance from excavations and slopes. It is recommended that a geotechnical engineer observe proof-roll operations and evaluate subgrade stability based on those observations. Areas that cannot be proof-rolled are recommended to be tested (and approved) by a geotechnical engineer using appropriate means and methods.

Unstable materials will likely be encountered during proof-rolling/testing, especially within the southwest parking area, located behind the proposed hotel building location. It is important to note that only one test boring (Test Boring 9) was conducted in the southwest parking area. Low-strength soil was encountered to about 6½ feet below-ground at that test boring. Considering the adjacent wetland, and shallow water table, low-strength soil (possibly including peat) likely exists away from Test Boring 9, and low-strength soil might be widespread throughout the entire southwest parking area. Significant over-excavation along with mechanical modification using crushed stone placed on geogrid or geotextile will likely be necessary to develop a stable subgrade in the southwest parking area, and possibly in other areas. Areas requiring subgrade improvement could be large and improvement methods might need to

extend several feet below the planned subgrade, depending on the conditions that are encountered. Areas requiring improvement should be defined during construction with the assistance of a geotechnical engineer. Also, specific improvement methods should be determined during construction on an area-by-area basis, depending on the site conditions and results of proof-rolling/testing. Where subgrade improvement is needed, it might be necessary/beneficial to construct "test strips" to determine the most cost-effective and appropriate means of developing a suitable subgrade.

The site is recommended to be raised, where necessary, to the planned finished grade with engineered fill immediately after the subgrade is confirmed to be stable and suitable to support the proposed site improvements. Engineered fill is recommended to be placed in uniform, relatively thin layers (lifts). And each layer of engineered fill is recommended to be compacted to at least 95 percent of the fill material's maximum dry density determined from the Standard Proctor compaction test (ASTM D698). As an exception, the in-place dry density of engineered fill within one foot of the pavement subgrade is recommended to be compacted to at least 100 percent of the fill's maximum dry density. The water content of fill material is recommended to be uniform and within a narrow range of the optimum moisture content, also determined by the Standard Proctor compaction test. Item Nos. 4 and 5 of the *Guide Specifications* give move information pertaining to selection and compaction of engineered fill.

Engineered fill that does not meet the density and water content requirements is recommended to be replaced with new fill or scarified to a sufficient depth (likely 6 to 12 inches, or more), moisture-conditioned, and compacted to the required density. A subsequent lift of fill should only be placed after a geotechnical engineer confirms that the previous lift was properly placed and compacted. Subgrade soil will likely need to be recompacted immediately before construction since equipment traffic and adverse weather may reduce soil stability.

The water table is relatively shallow within less elevated areas of the site, such as near the wetland area. Because of the shallow water table, extreme caution is recommended to be taken when using vibratory compaction equipment at the site. Vibratory compaction could cause soils to become unstable; therefore, in certain areas, it might be necessary to use static compaction equipment.

Use of Site Soil as Engineered Fill

Site soil that does not contain rubble, debris, adverse organic content, or other deleterious materials, can be used as engineered fill to raise grades. However, due to its variability, it might not be possible to monitor the in-place compaction and moisture content of site soil (used as new fill) using a nuclear gauge or sand cone, since the maximum dry density and optimum moisture content of the soil would also be variable. Instead, a method specification might need to be developed for placement and compaction of site soil used as engineered fill. In general, a method specification should be based on the actual compaction equipment used, and should

specify a maximum lift thickness, minimum number and orientation of passes with the compaction equipment, and minimum overlap of passes.

Site soil will likely need to be moisture conditioned (uniformly moistened or dried) prior to use as engineered fill. If construction is during adverse weather (discussed below), drying site soil will likely not be feasible. In that case, aggregate fill with a low sensitivity will likely need to be imported to the site. Additional recommendations regarding fill selection, placement and compaction are given in the *Guide Specifications*.

8.8. General Construction Considerations

Adverse Weather

Site soil is moisture sensitive and will become unstable when exposed to adverse weather such as rain, snow, and freezing temperatures. Therefore, it might be necessary to remove or stabilize the upper 6 to 12 inches (or more) of soil due to adverse weather, which commonly occurs during late fall, winter, and early spring. At least some over-excavation and/or stabilization of unstable soil should be expected if construction is during or after adverse weather. Because site preparation is weather dependent, bids for site preparation, and other earthwork activities, should consider the time of year that construction will be conducted.

To protect soil from adverse weather, the site is recommended to be smoothly graded and contoured during construction to divert surface water away from construction areas. Contoured subgrades are recommended to be rolled with a smooth-drum compactor, before precipitation, to "seal" the surface. Furthermore, construction traffic should be restricted to certain aggregate-covered areas in an effort to reduce traffic-related soil disturbance. Foundation, floor slab, and pavement construction should begin immediately after suitable support is confirmed.

Dewatering

Filtered sump pumps, drawing water from sump pits excavated in the bottom of construction trenches, are expected to be adequate to remove water that collects in excavations that are above, or possibly slightly below, the water table. Depending on the excavation depth, presence of perched groundwater, and proximity of the water table, multiple sump pumps might be needed. Excavated sump pits should be fully-lined with a geotextile and filled with free-draining aggregate, such as crushed stone meeting the gradation requirements of ASTM No. 57 aggregate. To prevent "boiling" and/or "heaving" of the subgrade soils, specialized dewatering techniques might be necessary where excavations/cuts extend near or below the water table. Vibratory compaction methods are not recommended near the water table since a "quick" or "boiling" condition could develop. Depending on the conditions during construction, dewatering by a specialty dewatering contractor might be necessary. Furthermore, it is recommended that a geotechnical engineer monitor and approve dewatering. Improper dewatering could cause support-related problems at the site and at nearby properties.

Excavation Stability

Excavations are recommended to be made in accordance with current OSHA excavation and trench safety standards, and other applicable requirements. Sides of excavations might need to be sloped, benched, and/or braced to maintain or develop a safe work environment. Temporary shoring must be designed according to applicable regulatory requirements. Contractors are responsible for excavation safety.

Questionable Materials

Questionable materials, where encountered, are recommended to be evaluated by a geotechnical engineer to determine if removal and replacement with engineered fill is necessary. Disposal of materials should be in accordance with local, state and federal regulations for the material type. This report might need to be revised if subsurface conditions differ from those shown on the *Test Boring Logs*.

Existing Utilities

All existing utilities should be identified and located, and any planned to be reused should be relocated outside the proposed building area. Utilities that are not reused should be capped-off and removed in accordance with pertinent regulations. Excavations for utility removal are recommended to be backfilled with engineered fill. Earthwork operations must be done carefully so that existing utilities are not damaged or disturbed. Utility elevations, locations, and sizes should be checked relative to the proposed construction.

Drain-Tile Considerations

Historic aerial photographs show that the eastern area of the site (adjacent to the existing Goodwill facility) was formerly an agriculture field. Therefore, drain-tile could exist at the site. Drain-tile that is encountered during construction is recommended to be rerouted around proposed development areas, and be discharged to suitable drainage facilities on a permanent basis. Drain-tile should not be plugged, since it may drain large areas. Drain-tile that is damaged during construction should be repaired.

8.9. Recommended Construction Materials Testing Services

This report was prepared assuming that a geotechnical engineer will perform Construction Materials Testing ("CMT") services during construction of the proposed development. It might be necessary for Giles to provide supplemental geotechnical recommendations based on the results of CMT services and specific details of the project not known at this time.

9.0 BASIS OF REPORT

This report is strictly based on the project description given earlier in this report. Giles must be notified if any part of the project description or our assumptions about the proposed project are not accurate so that this report can be amended, if needed. This report is based on the assumption that the facility will be designed and constructed according to the codes that govern construction at the site.

The conclusions and recommendations in this report are based on estimated subsurface conditions as shown on the *Test Boring Logs*. Giles must be notified if the subsurface conditions that are encountered during construction of the proposed development differ from those shown on the *Test Boring Logs* because this report will likely need to be revised. General comments and limitations of this report are given in the appendix.

The conclusions and recommendations presented in this report have been promulgated in accordance with generally accepted professional engineering practices in the field of geotechnical engineering. No other warranty is either expressed or implied.

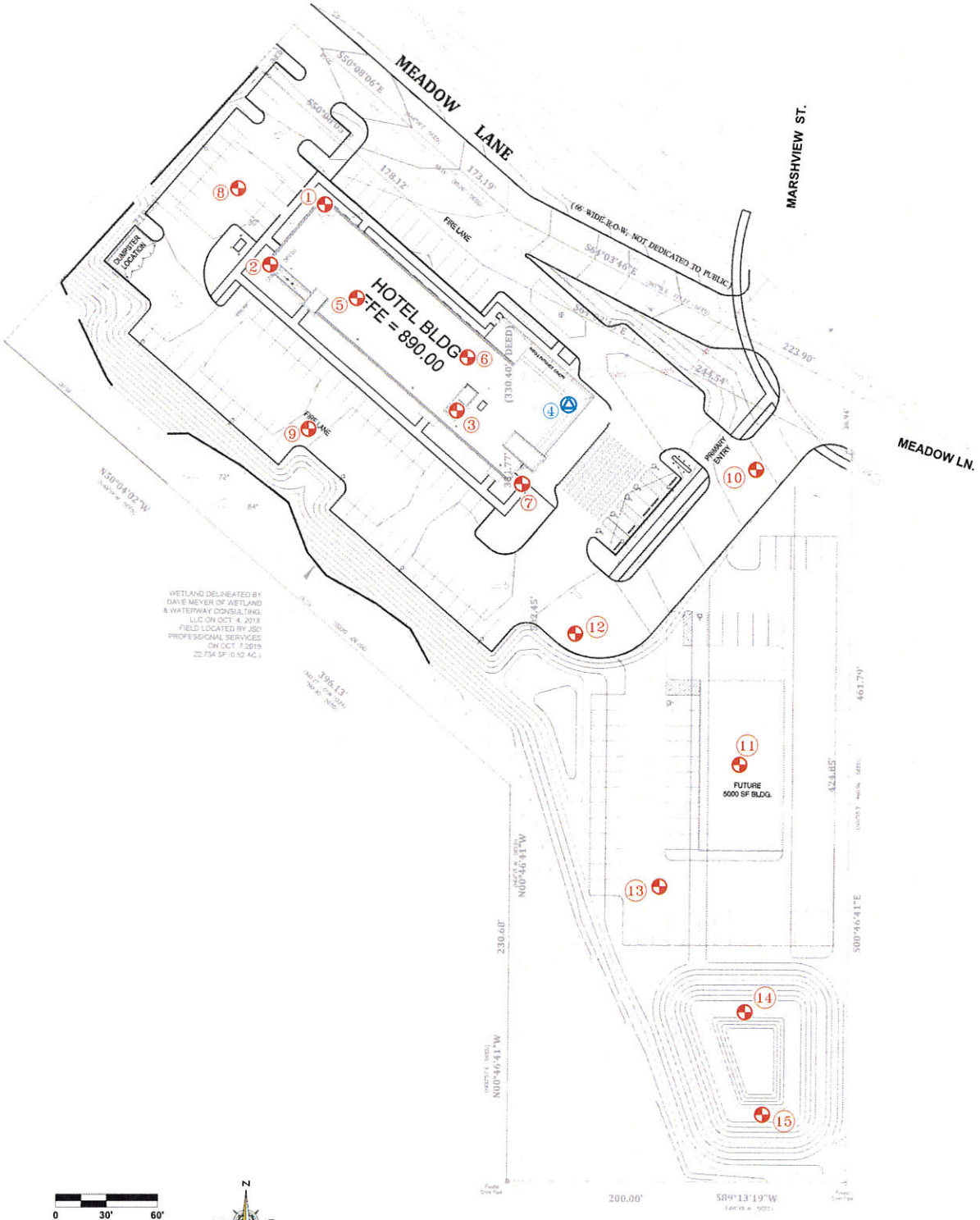
 1G-1904007/Report/19geo2/acg

APPENDIX A

FIGURES AND TEST BORING LOGS

The Test Boring Location Plan contained herein was prepared based upon information supplied by *Giles'* client, or others, along with *Giles'* field measurements and observations. The diagram is presented for conceptual purposes only and is intended to assist the reader in report interpretation.

The Test Boring Logs and related information enclosed herein depict the subsurface (soil and water) conditions encountered at the specific boring locations on the date that the exploration was performed. Subsurface conditions may differ between boring locations and within areas of the site that were not explored with test borings. The subsurface conditions may also change at the boring locations over the passage of time.



GILES ENGINEERING ASSOCIATES, INC.
N8 W22350 JOHNSON DRIVE, SUITE A1
WAUKESHA, WI 53186 (262)544-0118
www.gilesengr.com

FIGURE 1
TEST BORING AND OBSERVATION WELL LOCATION PLAN
PROPOSED AVID HOTEL
MARSHVIEW STREET
WAUKESHA, WISCONSIN

DESIGNED	DRAWN	SCALE	DATE	REVISED
ACG/BMS		approx. 1"=60'	05-09-19	--
PROJECT NO.: 1G-1904007			CAD No. 1g1904007-blp	

LEGEND:

① GEOTECHNICAL TEST BORING

④ GEOTECHNICAL TEST BORING / GROUNDWATER OBSERVATION WELL

NOTES:

1.) TEST BORING LOCATIONS ARE APPROXIMATE.

2.) BASE MAP DEVELOPED FROM THE "SOIL BORING PLAN" (SHEET C-106), DATED 2-11-19, PREPARED BY MSI GENERAL CORPORATION.

BORING NO. & LOCATION: 1	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 899 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/17/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: CHARLES RENS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±9" Topsoil: Dark Brown Silty Clay, trace Sand and Organic Matter-Moist			1-SS	4						
Light Brown Silty fine Sand, little Gravel-Moist			2-SS	13		2.2		10		
		895								
Light Brown Silty Clay, trace Gravel-Moist (Contains Silty fine Sand lenses)	5		3-SS	14						
			4-SS	32						
		890								
Light Brown fine Sand-Damp	10		5-SS	24						
		885								
Light Brown Silty Clay, trace Sand and Gravel-Moist	15		6-SS	31						
		880								
	20		7-SS	29				18		
Gray Silt-Damp										
		875								
	25		8-SS	43						
		870								
	30		9-SS	65						
		865								
	35		10-SS	47		3.2		16		
Boring Terminated at about 36 feet (EL. 863')										

Water Observation Data	Remarks:
Water Encountered During Drilling:	
Water Level At End of Drilling:	
Cave Depth At End of Drilling: 22 ft.	
Water Level After Drilling:	
Cave Depth After Drilling:	

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 2	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 894.5 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/17/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: CHARLES RENS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±12" Topsoil: Black Silty Clay, trace Sand and Organic Matter-Moist			1-SS	4		2.7		14		
Light Brown fine Sand, trace Silt-Moist			2-SS	11						
	5	890	3-SS	9						(a)
Light Brown Silty fine Sand, trace Gravel-Moist			4-SS	50/5"						
Light Brown Silty Clay, trace Sand-Moist	10	885	5-SS	34						
	15	880	6-SS	30						
Light Brown Silt-Damp	20	875	7-SS	47						
	25	870	8-SS	66						(a)
Gray Silt, trace to little fine Sand-Wet	30	865	9-SS	20				17		
	35	860	10-SS	31				14		
Boring Terminated at about 36 feet (EL. 858.5')										

Water Observation Data	Remarks:
▽ Water Encountered During Drilling: 34.5 ft.	(a) No Sample Recovery
▼ Water Level At End of Drilling:	
Cave Depth At End of Drilling: 23 ft.	
▼ Water Level After Drilling:	
Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

BORING NO. & LOCATION: 3	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 891 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/17/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: CHARLES RENS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±12" Topsoil: Black Silty Clay, little Sand, trace Organic Matter-Moist		890	1-SS	4						
Fill: Brown and Dark Brown Silty Clay, little Sand, trace Gravel-Moist			2-SS	5		1.5		14		
	5	885	3-SS	7	1.4	1.7		15		(a)
			4-SS	7						
Possible Fill: Brown Silty Clay, little Sand-Very Moist	10	880	5-SS	10				15		
Light Brown fine Sand, trace Silt-Wet	15	875	6-SS	15						
Gray Silt, trace Gravel-Moist to Very Moist	▼ 20	870	7-SS	17	1.7	3.0		14		
	▽ 25	865	8-SS	17	2.5	1.7		14		
	30	860	9-SS	22	4.0	3.0		12		
Light Gray Silty fine Sand, little Gravel-Wet	35	855	10-SS	25						
Boring Terminated at about 36 feet (EL. 855')										

	Water Observation Data	Remarks:
▽	Water Encountered During Drilling: 24.5 ft.	(a) No Sample Recovery
▼	Water Level At End of Drilling: 20 ft.	
	Cave Depth At End of Drilling: 22.5 ft.	
▼	Water Level After Drilling:	
	Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

BORING NO. & LOCATION: 4	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 891 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/15/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: KEITH FLOWERS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±12" Topsoil: Dark Brown Silty Clay, trace Sand and Organic Matter-Moist	0	890	1-SS	6						
Brown Silty Clay, little Sand-Moist			2-SS	23						
Light Brown fine Sand, trace Gravel and Silt-Moist	5	885	3-SS	25						
Light Brown Silty fine Sand, little Gravel-Moist			4-SS	27						
Light Brown fine Sand, trace Silt-Wet	10	880	5-SS	18						
Gray Silty Clay-Moist	15	875	6-SS	14	2.3	1.7		14		
Gray fine Sand-Wet	20	870	7-SS	35						
Gray Silty Clay, trace Sand-Moist	25	865	8-SS	40	7.6	4.0		12		
	30	860	9-SS	27	4.3	3.2		13		
Gray Silty fine Sand, little Gravel-Very Moist	35	855	10-SS	53						
Boring Terminated at about 36 feet (EL. 855')										

Water Observation Data	Remarks:
▽ Water Encountered During Drilling: 17 ft.	
▽ Water Level At End of Drilling:	
Cave Depth At End of Drilling: 18 ft.	
▼ Water Level After Drilling:	
Cave Depth After Drilling:	

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 5	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 893 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/17/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: CHARLES RENS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±4" Topsoil: Dark Brown Silty Clay, little Sand, trace Organic Matter-Moist			1-SS	4						
Fill: Brown Silty Clay, trace Sand-Moist		890	2-SS	11						
Light Brown fine Sand, trace Silt-Damp										
Light Brown Silty fine Sand, little Gravel-Moist	5		3-SS	40						
		885	4-SS	24						(a)
Light Brown fine Sand, trace Silt-Very Moist to Wet	10		5-SS	18						
		880								
	15		6-SS	19						
Gray fine to medium Sand and Gravel-Wet		875								
	20		7-SS	22						
		870								
Gray Silt-Moist	25		8-SS	35						
		865								
	30		9-SS	33						
		860								
Gray Silty Clay-Moist	35		10-SS	16	3.9	3.0		14		
Boring Terminated at about 36 feet (EL. 857')										

Water Observation Data	Remarks:
Water Encountered During Drilling:	(a) Poor Sample Recovery
Water Level At End of Drilling:	
Cave Depth At End of Drilling: 9 ft.	
Water Level After Drilling:	
Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

BORING NO. & LOCATION: 6	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 891 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/17/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: CHARLES RENS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±4" Topsoil: Black Silty fine Sand, trace Organic Matter-Moist		890	1-SS	4						
Fill: Brown and Black Silty Clay, little Sand and Gravel-Moist			2-SS	8						
	5		3-SS	13						
Light Brown Silty fine Sand, little Gravel-Very Moist to Wet		885	4-SS	49						
	10		5-SS	6				16		
		880								
Gray-Brown fine to medium Sand, trace Gravel-Wet	15		6-SS	20						
		875								
	20		7-SS	55						
		870								
Gray fine to medium Sand, trace to little Gravel-Moist	25		8-SS	29						
		865								
Gray Silt-Moist	30		9-SS	30	4.3	2.5		14		
		860								
	35		10-SS	18	2.3	3.5		14		
		855								
Boring Terminated at about 36 feet (EL. 855')										

	Water Observation Data	Remarks:
▽	Water Encountered During Drilling:	
▼	Water Level At End of Drilling:	
	Cave Depth At End of Drilling: 12.5 ft.	
▼	Water Level After Drilling:	
	Cave Depth After Drilling:	

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 7	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 889.5 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/17/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: CHARLES RENS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±4" Topsoil: Dark Brown Silty Clay, little Sand and Organic Matter-Moist			1-SS	8						
Light Brown Silty fine Sand, little Gravel-Moist			2-SS	24						
Light Brown fine Sand, trace Silt-Moist	5	885	3-SS	11						
			4-SS	17						
Light Brown Silty fine Sand, little Gravel-Very Moist	10	880	5-SS	15						
Gray-Brown Silt-Damp	15	875	6-SS	44						
Gray Silt-Damp (Contains Silty Clay lenses)	20	870	7-SS	33						
	25	865	8-SS	29						
	30	860	9-SS	30						
Gray Silty fine to medium Sand and Gravel-Very Moist	35	855	10-SS	47						
Boring Terminated at about 36 feet (EL. 853.5')										

Water Observation Data	Remarks:
Water Encountered During Drilling:	
Water Level At End of Drilling:	
Cave Depth At End of Drilling: 14.3 ft.	
Water Level After Drilling:	
Cave Depth After Drilling:	

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 8	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 896 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/17/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: CHARLES RENS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±10" Topsoil: Dark Brown Silty Clay, little Sand, trace Organic Matter-Moist		895	1-SS	3						
Brown fine to medium Sand, trace Gravel-Damp			2-SS	8						
Light Brown Silty fine Sand, little to some Gravel-Moist	5	890	3-SS	42						
			4-SS	35						
Light Brown fine Sand-Damp	10	885	5-SS	25						
Boring Terminated at about 11 feet (EL. 885')										

	Water Observation Data	Remarks:
▽	Water Encountered During Drilling:	
▼	Water Level At End of Drilling:	
	Cave Depth At End of Drilling: 10 ft.	
▼	Water Level After Drilling:	
	Cave Depth After Drilling:	

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 9	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 881 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/17/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: CHARLES RENS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±15" Topsoil: Black Silty Clay, trace Sand and Organic Matter-Moist		880	1-SS	3						
Gray and Brown mottled lean Clay, little Sand and Gravel-Very Moist			2-SS	4		0.8		22		
Gray Silty fine Sand, little Gravel-Very Moist	5	875	3-SS	6						
			4-SS	20						(a)
Gray-Brown Silty Clay, trace fine Sand-Moist	10	870	5-SS	10	4.1	3.5		15		
Boring Terminated at about 11 feet (EL. 870')										

Water Observation Data	Remarks:
Water Encountered During Drilling:	(a) No Sample Recovery
Water Level At End of Drilling:	
Cave Depth At End of Drilling: 6 ft.	
Water Level After Drilling:	
Cave Depth After Drilling:	

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 10	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 885 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/15/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: KEITH FLOWERS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±15" Topsoil: Black Silty Clay, little Sand, trace Organic Matter-Moist			1-SS	6				34		
Fill: Gray and Brown Silty Clay, little Sand, trace Gravel-Moist			2-SS	5		1.3		21		
Gray-Brown Silty Clay, trace Sand and Gravel-Moist (Contains Silty Sand and Gravel lenses)	5	880	3-SS	9		3.3		13		
			4-SS	31				14		
	10	875	5-SS	13		1.8		13		
Boring Terminated at about 11 feet (EL. 874')										

	Water Observation Data	Remarks:
▽	Water Encountered During Drilling:	
▼	Water Level At End of Drilling:	
	Cave Depth At End of Drilling: 8 ft.	
▼	Water Level After Drilling:	
	Cave Depth After Drilling:	

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 11	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 883 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/15/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: KEITH FLOWERS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±15" Topsoil: Black Silty Clay, trace Sand and Organic Matter-Moist			1-SS	6						
Fill: Gray and Brown mottled Silty Clay, trace Sand-Moist		880	2-SS	4						
	5		3-SS	10		1.0		23		
Fill: Black Silty Clay, little Sand, trace Organic Matter-Moist (Contains Glass fragments)		875	4-SS	27	1.0	1.3		21		
Brown Silty fine Sand, little Gravel-Moist	10		5-SS	21						(a)
Brown fine Sand, trace Silt-Wet		870								
	15		6-SS	13						
Gray fine to medium Sand and Gravel, trace Silt-Wet		865								
	20		7-SS	14						
Boring Terminated at about 21 feet (EL. 862')										

	Water Observation Data	Remarks:
▽	Water Encountered During Drilling:	(a) No Split Spoon Recovery - Auger Sample Obtained
▼	Water Level At End of Drilling: 7 ft.	
	Cave Depth At End of Drilling: 9 ft.	
▼	Water Level After Drilling:	
	Cave Depth After Drilling:	

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 12	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 882 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/15/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: KEITH FLOWERS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±8" Topsoil: Black Silty Clay, trace Sand and Organic Matter-Moist			1-SS	4						
Fill: Brown and Gray Silty fine to medium Sand to Sandy Silt, trace Gravel-Very Moist		880	2-SS	5		1.0		19		(a)
	5		3-SS	6		1.8		16		
		875	4-SS	17				13		
Gray fine Sand-Wet	10		5-SS	8				17		

Boring Terminated at about 11 feet (EL. 871')

	Water Observation Data	Remarks:
▽	Water Encountered During Drilling:	(a) No Split Spoon Recovery - Auger Sample Obtained
▼	Water Level At End of Drilling: 3 ft.	
	Cave Depth At End of Drilling: 3 ft.	
▼	Water Level After Drilling:	
	Cave Depth After Drilling:	

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 13	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 882.5 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/15/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: KEITH FLOWERS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±18" Topsoil: Black Silty Clay, little Sand, trace Organic Matter-Moist			1-SS	7						
Gray and Brown Silty fine Sand-Very Moist to Wet		880	2-SS	4						
Light Brown Silty Clay, little Sand-Moist to Very Moist	5		3-SS	10		3.0		10		
		875	4-SS	16				17		
Gray Silty Clay, trace Sand-Moist	10		5-SS	13	2.6	3.3		16		
Boring Terminated at about 11 feet (EL. 871.5')										

	Water Observation Data	Remarks:
▽	Water Encountered During Drilling:	
▼	Water Level At End of Drilling: 5.5 ft.	
	Cave Depth At End of Drilling: 6 ft.	
▼	Water Level After Drilling:	
	Cave Depth After Drilling:	

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 14	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 885 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/15/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: KEITH FLOWERS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±10" Topsoil: Black Silty Clay, trace Organic Matter-Moist			1-SS	7		4.3		16		
Brown and Gray Silty fine to medium Sand, trace Gravel-Very Moist to Wet			2-SS	5						
Light Brown Silty Clay, little fine Sand, trace Gravel-Moist (Contains Wet fine Sand lenses)	5	880	3-SS	7		2.3		15		
			4-SS	6	1.0	1.5		12		
Gray Silty Clay, trace Sand-Moist (Contains Wet fine to medium Sand lenses)	10	875	5-SS	9	1.5	2.0		15		
			6-SS	18	1.5	1.8		14		
	15	870	7-SS	10	1.9	2.3		14		
	20	865	8-SS	11		1.1		17		
Boring Terminated at about 21 feet (EL. 864')										

Water Observation Data	Remarks:
Water Encountered During Drilling:	
Water Level At End of Drilling: 14.5 ft.	
Cave Depth At End of Drilling: 16 ft.	
Water Level After Drilling:	
Cave Depth After Drilling:	

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 15	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 884.5 feet	PROPOSED AVID HOTEL	
COMPLETION DATE: 04/15/19	MARSHVIEW STREET WAUKESHA, WISCONSIN	
FIELD REP: KEITH FLOWERS	PROJECT NO: 1G-1904007	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
±12" Topsoil: Black Silty Clay, little Sand and Organic Matter-Moist			1-SS	5						
Fill: Gray and Brown Silty Clay, little Sand and Gravel-Moist			2-SS	4		2.0		19		
Gray-Brown Silty Clay, little Sand, trace Gravel-Moist	5	880	3-SS	12	1.5	2.0		24		
Gray Silty fine Sand, trace Gravel-Wet			4-SS	15						
Gray fine to coarse Sand-Wet	10	875	5-SS	11						
Gray Silt-Moist (Contains Wet fine Sand and Gravel lenses)	15	870	6-SS	16	2.5	3.8		15		
	20	865	7-SS	10		2.5		15		
Boring Terminated at about 21 feet (EL. 863.5')										

	Water Observation Data	Remarks:
▽	Water Encountered During Drilling:	
▼	Water Level At End of Drilling: 8 ft.	
	Cave Depth At End of Drilling: 9 ft.	
▼	Water Level After Drilling:	
	Cave Depth After Drilling:	

GILES LOG REPORT 1G1904007.GPJ GILES.GDT 5/9/19

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

1002-CPS-23
Division of Industry Services
P. O. Box 2658
Madison, Wisconsin 53701
Scott Walker, Governor
Laura Gutierrez, Secretary

Attachment 2:

SOIL AND SITE EVALUATION – STORM

In accordance with SPS 382.365, 385, Wis. Adm. Code, and WDNR Standard 1002

Attach a complete site plan on paper not less than 8 ½ x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent of slope, scale or dimensions, north arrow, and BM referenced to nearest road

Please print all information

Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04(1)(m)]

County

Parcel I.D.

Reviewed by:
Date:

Property Owner

Property Location
Govt. Lot SW ¼ NW ¼ S 28 T7N R19E

Property Owner' Mail Address

Lot # | Block # | Subd. Name or CSM #

City | State | Zip Code | Phone Number

[x] City [ ] Village [ ] Town Nearest Road
Waukesha, WI Marshview Street

Drainage area sq. ft. acres

Test site suitable for (check all that apply) [ ] Site not suitable:
[ ] Bioretention [ ] Subsurface Dispersal System:
[ ] Reuse: [ ] Irrigation: [ ] Other:

Hydraulic Application Test Method
__x__ Morphological Evaluation
___ Double Ring Infiltrometer
___ Other: (specify)

Soil Moisture
Date of soil borings:
USDA-NRCS WETS Value:
___ Dry = 1;
___ Normal = 2;
___ Wet = 3

14 #OBS. [ ] Pit [x] Boring Ground surface elevation 885.0 ft. Elevation of limiting factor _____ ft.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines	Hydraulic App Rate inches/Hr
A	0-10	10 YR 2/1		SICL	1,F,SBK	M,FR	A,I	5	85	0.04
B	10-24	10 YR 4/2		CL	2,M,ABK	M,FI	G,W	<5	50	0.03
C	24-108	10 YR 5/4	Streaks, f, 1, d, 10YR 6/1	CL	MA	M,FI	G,S	10	25	0.03
C	108-252	10 YR 4/1		SICL*	MA	M,FI	--	5	90	0.04

Comments: *Contains Loamy Sand Lenses

15 #OBS. [ ] Pit [x] Boring Ground surface elevation 884.5 ft. Elevation of limiting factor _____ ft.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines	Hydraulic App Rate inches/Hr
FILL	0-12	10 YR 2/2		CL	1,F,SBK	M,FR	A,I	<5	75	0.03
FILL	12-48	10 YR 5/6		CL	2,M,SBK	M,FI	A,I	10	70	0.03
C	48-78	10 YR 5/4		CL	1,F,ABK	M,FI	C,S	10	70	0.03
C	78-108	10 YR 5/1		L	1,F,GR	M,FI	C,W	5	50	0.24
C	108-156	10 YR 4/1		S	MA	M,FI	A,S	5	10	3.60
C	156-252	10 YR 5/1		SICL	MA	M,FI	--	<5	90	0.04

Comments: *Infiltration rate estimated from infiltrometer test
-Significant amount of cobbles and boulders was encountered at bottom of excavation

Name (Please Print) Benjamin M. Stark
Signature
Credential Number 984619

Address N8 W22350 Johnson Drive
Date Evaluation Conducted April 15, 2019
Telephone Number 262-544-0118

APPENDIX B

FIELD PROCEDURES

The field operations were conducted in general accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) designation D

420 entitled "Standard Guide for Sampling Rock and Rock" and/or other relevant specifications. Soil samples were preserved and transported to *Giles'* laboratory in general accordance with the procedures recommended by ASTM designation D 4220 entitled "Standard Practice for Preserving and Transporting Soil Samples." Brief descriptions of the sampling, testing and field procedures commonly performed by *Giles* are provided herein.

GENERAL FIELD PROCEDURES

Test Boring Elevations

The ground surface elevations reported on the Test Boring Logs are referenced to the assumed benchmark shown on the Boring Location Plan (Figure 1). Unless otherwise noted, the elevations were determined with a conventional hand-level and are accurate to within about 1 foot.

Test Boring Locations

The test borings were located on-site based on the existing site features and/or apparent property lines. Dimensions illustrating the approximate boring locations are reported on the Boring Location Plan (Figure 1).

Water Level Measurement

The water levels reported on the Test Boring Logs represent the depth of "free" water encountered during drilling and/or after the drilling tools were removed from the borehole. Water levels measured within a granular (sand and gravel) soil profile are typically indicative of the water table elevation. It is usually not possible to accurately identify the water table elevation with cohesive (clayey) soils, since the rate of seepage is slow. The water table elevation within cohesive soils must therefore be determined over a period of time with groundwater observation wells.

It must be recognized that the water table may fluctuate seasonally and during periods of heavy precipitation. Depending on the subsurface conditions, water may also become perched above the water table, especially during wet periods.

Borehole Backfilling Procedures

Each borehole was backfilled upon completion of the field operations. If potential contamination was encountered, and/or if required by state or local regulations, boreholes were backfilled with an "impervious" material (such as bentonite slurry). Borings that penetrated pavements, sidewalks, etc. were "capped" with Portland Cement concrete, asphaltic concrete, or a similar surface material. It must, however, be recognized that the backfill material may settle, and the surface cap may subside, over a period of time. Further backfilling and/or re-surfacing by *Giles'* client or the property owner may be required.

FIELD SAMPLING AND TESTING PROCEDURES

Auger Sampling (AU)

Soil samples are removed from the auger flights as an auger is withdrawn above the ground surface. Such samples are used to determine general soil types and identify approximate soil stratifications. Auger samples are highly disturbed and are therefore not typically used for geotechnical strength testing.

Split-Barrel Sampling (SS) – (ASTM D-1586)

A split-barrel sampler with a 2-inch outside diameter is driven into the subsoil with a 140-pound hammer free-falling a vertical distance of 30 inches. The summation of hammer-blows required to drive the sampler the final 12-inches of an 18-inch sample interval is defined as the "Standard Penetration Resistance" or N-value is an index of the relative density of granular soils and the comparative consistency of cohesive soils. A soil sample is collected from each SPT interval.

Shelby Tube Sampling (ST) – (ASTM D-1587)

A relatively undisturbed soil sample is collected by hydraulically advancing a thin-walled Shelby Tube sampler into a soil mass. Shelby Tubes have a sharp cutting edge and are commonly 2 to 5 inches in diameter.

Bulk Sample (BS)

A relatively large volume of soils is collected with a shovel or other manually-operated tool. The sample is typically transported to *Giles'* materials laboratory in a sealed bag or bucket.

Dynamic Cone Penetration Test (DC) – (ASTM STP 399)

This test is conducted by driving a 1.5-inch-diameter cone into the subsoil using a 15-pound steel ring (hammer), free-falling a vertical distance of 20 inches. The number of hammer-blows required to drive the cone 1¾ inches is an indication of the soil strength and density, and is defined as "N". The Dynamic Cone Penetration test is commonly conducted in hand auger borings, test pits and within excavated trenches.

- Continued -

Ring-Lined Barrel Sampling – (ASTM D 3550)

In this procedure, a ring-lined barrel sampler is used to collect soil samples for classification and laboratory testing. This method provides samples that fit directly into laboratory test instruments without additional handling/disturbance.

Sampling and Testing Procedures

The field testing and sampling operations were conducted in general accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) and/or other relevant specifications. Results of the field testing (i.e. N-values) are reported on the Test Boring Logs. Explanations of the terms and symbols shown on the logs are provided on the appendix enclosure entitled "General Notes".

APPENDIX C

LABORATORY TESTING AND CLASSIFICATION

The laboratory testing was conducted under the supervision of a geotechnical engineer in accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) and/or other relevant specifications. Brief descriptions of laboratory tests commonly performed by *Giles* are provided herein.

LABORATORY TESTING AND CLASSIFICATION

Photoionization Detector (PID)

In this procedure, soil samples are "scanned" in *Giles'* analytical laboratory using a Photoionization Detector (PID). The instrument is equipped with an 11.7 eV lamp calibrated to a Benzene Standard and is capable of detecting a minute concentration of **certain** Volatile Organic Compound (VOC) vapors, such as those commonly associated with petroleum products and some solvents. Results of the PID analysis are expressed in HNu (manufacturer's) units rather than actual concentration.

Moisture Content (w) (ASTM D 2216)

Moisture content is defined as the ratio of the weight of water contained within a soil sample to the weight of the dry solids within the sample. Moisture content is expressed as a percentage.

Unconfined Compressive Strength (qu) (ASTM D 2166)

An axial load is applied at a uniform rate to a cylindrical soil sample. The unconfined compressive strength is the maximum stress obtained or the stress when 15% axial strain is reached, whichever occurs first.

Calibrated Penetrometer Resistance (qp)

The small, cylindrical tip of a hand-held penetrometer is pressed into a soil sample to a prescribed depth to measure the soils capacity to resist penetration. This test is used to evaluate unconfined compressive strength.

Vane-Shear Strength (qs)

The blades of a vane are inserted into the flat surface of a soil sample and the vane is rotated until failure occurs. The maximum shear resistance measured immediately prior to failure is taken as the vane-shear strength.

Loss-on-Ignition (ASTM D 2974; Method C)

The Loss-on-Ignition (L.O.I.) test is used to determine the organic content of a soil sample. The procedure is conducted by heating a dry soil sample to 440°C in order to burn-off or "ash" organic matter present within the sample. The L.O.I. value is the ratio of the weight loss due to ignition compared to the initial weight of the dry sample. L.O.I. is expressed as a percentage.

Particle Size Distribution (ASTB D 421, D 422, and D 1140)

This test is performed to determine the distribution of specific particle sizes (diameters) within a soil sample. The distribution of coarse-grained soil particles (sand and gravel) is determined from a "sieve analysis," which is conducted by passing the sample through a series of nested sieves. The distribution of fine-grained soil particles (silt and clay) is determined from a "hydrometer analysis" which is based on the sedimentation of particles suspended in water.

Consolidation Test (ASTM D 2435)

In this procedure, a series of cumulative vertical loads are applied to a small, laterally confined soil sample. During each load increment, vertical compression (consolidation) of the sample is measured over a period of time. Results of this test are used to estimate settlement and time rate of settlement.

Classification of Samples

Each soil sample was visually-manually classified, based on texture and plasticity, in general accordance with the Unified Soil Classification System (ASTM D-2488-75). The classifications are reported on the Test Boring Logs.

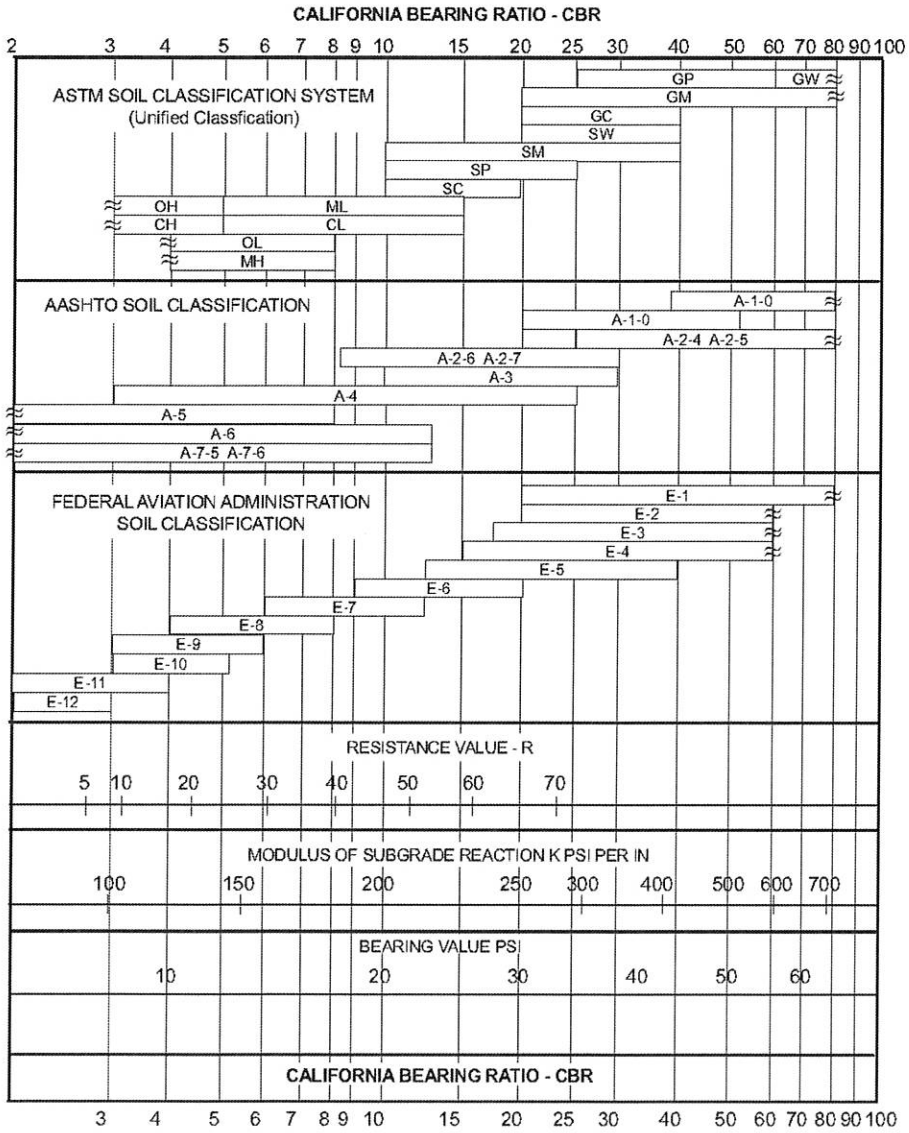
Laboratory Testing

The laboratory testing operations were conducted in general accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) and/or other relevant specifications. Results of the laboratory tests are provided on the Test Boring Logs or other appendix enclosures. Explanation of the terms and symbols used on the logs is provided on the appendix enclosure entitled "General Notes."

California Bearing Ratio (CBR) Test ASTM D-1833

The CBR test is used for evaluation of a soil subgrade for pavement design. The test consists of measuring the force required for a 3-square-inch cylindrical piston to penetrate 0.1 or 0.2 inch into a compacted soil sample. The result is expressed as a percent of force required to penetrate a standard compacted crushed stone.

Unless a CBR test has been specifically requested by the client, the CBR is estimated from published charts, based on soil classification and strength characteristics. A typical correlation chart is below.



APPENDIX D

GENERAL INFORMATION

AND
IMPORTANT INFORMATION ABOUT
YOUR GEOTECHNICAL REPORT

GENERAL COMMENTS

The soil samples obtained during the subsurface exploration will be retained for a period of thirty days. If no instructions are received, they will be disposed of at that time.

This report has been prepared exclusively for the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. Copies of this report may be provided to contractor(s), with contract documents, to disclose information relative to this project. The report, however, has not been prepared to serve as the plans and specifications for actual construction without the appropriate interpretation by the project architect, structural engineer, and/or civil engineer. Reproduction and distribution of this report must be authorized by the client and *Giles.*

This report has been based on assumed conditions/characteristics of the proposed development where specific information was not available. It is recommended that the architect, civil engineer and structural engineer along with any other design professionals involved in this project carefully review these assumptions to ensure they are consistent with the actual planned development. When discrepancies exist, they should be brought to our attention to ensure they do not affect the conclusions and recommendations provided herein. The project plans and specifications may also be submitted to *Giles* for review to ensure that the geotechnical related conclusions and recommendations provided herein have been correctly interpreted.

The analysis of this site was based on a subsoil profile interpolated from a limited subsurface exploration. If the actual conditions encountered during construction vary from those indicated by the borings, *Giles* must be contacted immediately to determine if the conditions alter the recommendations contained herein.

The conclusions and recommendations presented in this report have been promulgated in accordance with generally accepted professional engineering practices in the field of geotechnical engineering. No other warranty is either expressed or implied.

GUIDE SPECIFICATIONS FOR SUBGRADE AND GRADE PREPARATION FOR FILL, FOUNDATION, FLOOR SLAB AND PAVEMENT SUPPORT; AND SELECTION, PLACEMENT AND COMPACTION OF FILL SOILS USING STANDARD PROCTOR PROCEDURES

1. Construction monitoring and testing of subgrades and grades for fill, foundation, floor slab and pavement; and fill selection, placement and compaction shall be performed by an experienced soils engineer and/or his representatives.

2. All compaction fill, subgrades and grades shall be (a) underlain by suitable bearing material; (b) free of all organic, frozen, or other deleterious material, and (c) observed, tested and approved by qualified engineering personnel representing an experienced soils engineer. Preparation of subgrades after stripping vegetation, organic or other unsuitable materials shall consist of (a) proof-rolling to detect soil, wet yielding soils or other unstable materials that must be undercut, (b) scarifying top 6 to 8 inches, (c) moisture conditioning the soils as required, and (d) recompaction to same minimum in-situ density required for similar materials indicated under Item 5. Note: compaction requirements for pavement subgrade are higher than other areas. Weather and construction equipment may damage compacted fill surface and reworking and retesting may be necessary to assure proper performance.

3. In overexcavation and fill areas, the compacted fill must extend (a) a minimum 1 foot lateral distance beyond the exterior edge of the foundation at bearing grade or pavement subgrade and down to compacted fill subgrade on a maximum 0.5(H):1(V) slope, (b) 1 foot above footing grade outside the building, and (c) to floor subgrade inside the building. Fill shall be placed and compacted on a 5(H):1(V) slope or must be stepped or benched as required to flatten if not specifically approved by qualified personnel under the direction of an experienced soil engineer.

4. The compacted fill materials shall be free of deleterious, organic, or frozen matter, shall contain no chemicals that may result in the material being classified as "contaminated", and shall be low-expansive with a maximum Liquid Limit (ASTM D-423) and Plasticity Index (ASTM D-424) of 30 and 15, respectively, unless specifically tested and found to have low expansive properties and approved by an experienced soils engineer. The top 12 inches of compacted fill should have a maximum 3-inch-particle diameter and all underlying compacted fill a maximum 6-inch-diameter unless specifically approved by an experienced soils engineer. All fill materials must be tested and approved under the direction of an experienced soils engineer prior to placement. If the fill is to provide non-frost susceptible characteristics, it must be classified as a clean GW, GP, SW or SP per the Unified Soil Classification System (ASTM D-2487).

5. For structural fill depths less than 20 feet, the density of the structural compacted fill and scarified subgrade and grades shall not be less than 95 percent of the maximum dry density as determined by Standard Proctor (ASTM-698) with the exception of the top 12 inches of pavement subgrade which shall have a minimum in-situ density of 100 percent of maximum dry density, or 5 percent higher than underlying fill materials. Where the structural fill depth is greater than 20 feet, the portions below 20 feet should have a minimum in-place density of 100 percent of its maximum dry density of 5 percent greater than the top 20 feet. The moisture content of cohesive soil shall not vary by more than -1 to +3 percent and granular soil ±3 percent of the optimum when placed and compacted or recompacted, unless specifically recommended/approved by the soils engineer monitoring the placement and compaction. Cohesive soils with moderate to high expansion potentials (PI>15) should, however, be placed, compacted and maintained prior to construction at a moisture content 3±1 percent above optimum moisture content to limit further heave. The fill shall be placed in layers with a maximum loose thickness of 8 inches for foundations and 10 inches for floor slabs and pavement, unless specifically approved by the soils engineer taking into consideration the type of materials and compaction equipment being used. The compaction equipment should consist of suitable mechanical equipment specifically designed for soil compaction. Bulldozers or similar tracked vehicles are typically not suitable for compaction.

6. Excavation, filling, subgrade and grade preparation shall be performed in a manner and sequence that will provide drainage at all times and proper control of erosion. Precipitation, springs and seepage water encountered shall be pumped or drained to provide a suitable working platform. Springs or water seepage encountered during grading/foundation construction must be called to the soil engineer's attention immediately for possible construction procedure revision or inclusion of an underdrain system.

7. Non-structural fill adjacent to structural fill should typically be placed in unison to provide lateral support. Backfill along walls must be placed and compacted with care to ensure excessive unbalanced lateral pressures do not develop. The type of fill material placed adjacent to below-grade walls (i.e. basement walls and retaining walls) must be properly tested and approved by an experienced soils engineer with consideration for the lateral pressure used in the wall design.

8. Whenever, in the opinion of the soils engineer or the Owner's Representatives, an unstable condition is being created either by cutting or filling, the work shall not proceed into that area until an appropriate geotechnical exploration and analysis has been performed and the grading plan revised, if found necessary.

CHARACTERISTICS AND RATINGS OF UNIFIED SOIL SYSTEM CLASSES FOR SOIL CONSTRUCTION *									
Class	**Compaction Characteristics**	**Max. Dry Density Standard Proctor (pcf)**	**Compressibility and Expansion**	**Drainage and Permeability**	**Value as an Embankment Material**	**Value as Subgrade When Not Subject to Frost**	**Value as Base Course**	**Value as Temporary Pavement**	
								With Dust Palliative	**With Bituminous Treatment**
GW	Good: tractor, rubber-tired, steel wheel or vibratory roller	125-135	Almost none	Good drainage, pervious	Very stable	Excellent	Good	Fair to poor	Excellent
GP	Good: tractor, rubber-tired, steel wheel or vibratory roller	115-125	Almost none	Good drainage, pervious	Reasonably stable	Excellent to good	Poor to fair	Poor	
GM	Good: rubber-tired or light sheepsfoot roller	120-135	Slight	Poor drainage, semipervious	Reasonably stable	Excellent to good	Fair to poor	Poor	Poor to fair
GC	Good to fair: rubber-tired or sheepsfoot roller	115-130	Slight	Poor drainage, impervious	Reasonably stable	Good	Good to fair **	Excellent	Excellent
SW	Good: tractor, rubber-tired or vibratory roller	110-130	Almost none	Good drainage, pervious	Very stable	Good	Fair to poor	Fair to poor	Good
SP	Good: tractor, rubber-tired or vibratory roller	100-120	Almost none	Good drainage, pervious	Reasonably stable when dense	Good to fair	Poor	Poor	Poor to fair
SM	Good: rubber-tired or sheepsfoot roller	110-125	Slight	Poor drainage, impervious	Reasonably stable when dense	Good to fair	Poor	Poor	Poor to fair
SC	Good to fair: rubber-tired or sheepsfoot roller	105-125	Slight to medium	Poor drainage, impervious	Reasonably stable	Good to fair	Fair to poor	Excellent	Excellent
ML	Good to poor: rubber-tired or sheepsfoot roller	95-120	Slight to medium	Poor drainage, impervious	Poor stability, high density required	Fair to poor	Not suitable	Poor	Poor
CL	Good to fair: sheepsfoot or rubber-tired roller	95-120	Medium	No drainage, impervious	Good stability	Fair to poor	Not suitable	Poor	Poor
OL	Fair to poor: sheepsfoot or rubber-tired roller	80-100	Medium to high	Poor drainage, impervious	Unstable, should not be used	Poor	Not suitable	Not suitable	Not suitable
MH	Fair to poor: sheepsfoot or rubber-tired roller	70-95	High	Poor drainage, impervious	Poor stability, should not be used	Poor	Not suitable	Very poor	Not suitable
CH	Fair to poor: sheepsfoot roller	80-105	Very high	No drainage, impervious	Fair stability, may soften on expansion	Poor to very poor	Not suitable	Very poor	Not suitable
OH	Fair to poor: sheepsfoot roller	65-100	High	No drainage, impervious	Unstable, should not be used	Very poor	Not suitable	Not suitable	Not suitable
Pt	Not suitable		Very high	Fair to poor drainage	Should not be used	Not suitable	Not suitable	Not suitable	Not suitable

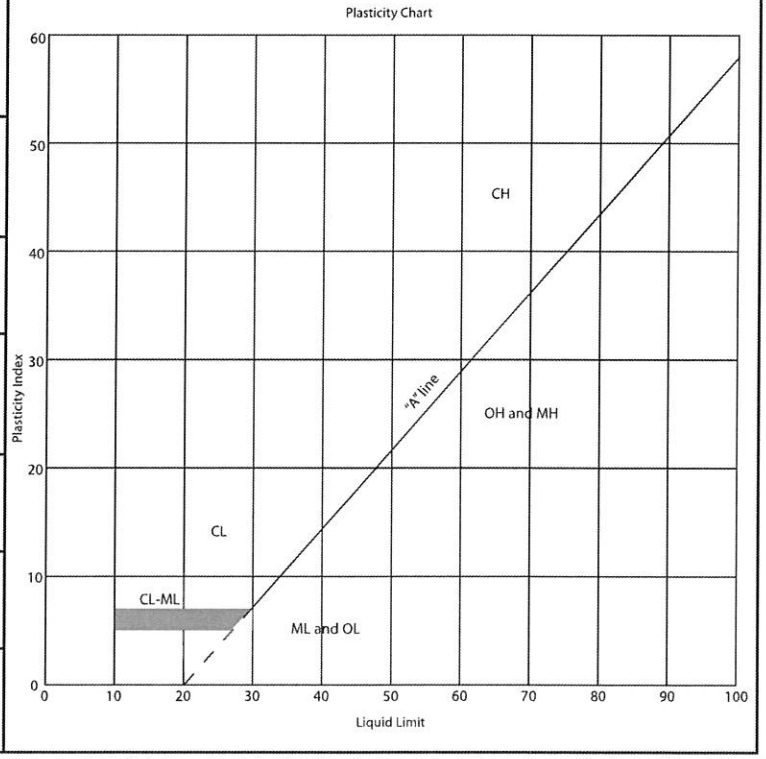
* "The Unified Classification: Appendix A - Characteristics of Soil, Groups Pertaining to Roads and Airfields, and Appendix B - Characteristics of Soil Groups Pertaining to Embankments and Foundations," Technical Memorandum 357, U.S. Waterways Ixperiment Station, Vicksburg, 1953.

** Not suitable if subject to frost.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D-2487)

Major Divisions			Group Symbols	Typical Names	Laboratory Classification Criteria
Coarse-grained soils (more than half of material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			GP	Poorly graded gravels, gravel-sand mixtrues, little or no fines	Not meeting all gradation requirements for GW
		Gravels with fines (appreciable amount of fines)	GM[a] d	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4 — Limits plotting within shaded area, above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols
			GM[a] u		Atterberg limits above "A" line or P.I. greater than 7
			GC	Clayey gravels, gravel-sand-clay mixtures	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			SP	Poorly graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW
		Sands with fines (Appreciable amount of fines)	SM[a] d	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4 — Limits plotting within shaded area, above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols
			SM[a] u		Atterberg limits above "A" line or P.I. greater than 7
			SC	Clayey sands, sand-clay mixtures	
Fine-grained soils (More than half material is smaller than No. 200 sieve size)	Silts and clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays	
			OL	Organic silts and organic silty clays of low plasticity	
	Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
			CH	Inorganic clays of high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity, organic silts	
	Highly organic soils		Pt	Peat and other highly organic soils	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:
Less than 5 percent: GW, GP, SW, SP
More than 12 percent: GM, GC, SM, SC
5 to 12 percent: *Borderline* cases requiring dual symbols[b]



[a] Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits, suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u is used when L.L. is greater than 28.

[b] Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group sympols. For example GW-GC, well-graded gravel-sand mixture with clay binder.

GENERAL NOTES

SAMPLE IDENTIFICATION

All samples are visually classified in general accordance with the Unified Soil Classification System (ASTM D-2487-75 or D-2488-75)

DESCRIPTIVE TERM (% BY DRY WEIGHT)

Trace:	1-10%
Little:	11-20%
Some:	21-35%
And/Adjective	36-50%

PARTICLE SIZE (DIAMETER)

Boulders:	8 inch and larger
Cobbles:	3 inch to 8 inch
Gravel:	coarse - ¾ to 3 inch
	fine – No. 4 (4.76 mm) to ¾ inch
Sand:	coarse – No. 4 (4.76 mm) to No. 10 (2.0 mm)
	medium – No. 10 (2.0 mm) to No. 40 (0.42 mm)
	fine – No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt:	No. 200 (0.074 mm) and smaller (non-plastic)
Clay:	No 200 (0.074 mm) and smaller (plastic)

SOIL PROPERTY SYMBOLS

Dd:	Dry Density (pcf)
LL:	Liquid Limit, percent
PL:	Plastic Limit, percent
PI:	Plasticity Index (LL-PL)
LOI:	Loss on Ignition, percent
Gs:	Specific Gravity
K:	Coefficient of Permeability
w:	Moisture content, percent
qp:	Calibrated Penetrometer Resistance, tsf
qs:	Vane-Shear Strength, tsf
qu:	Unconfined Compressive Strength, tsf
qc:	Static Cone Penetrometer Resistance (correlated to Unconfined Compressive Strength, tsf)
PID:	Results of vapor analysis conducted on representative samples utilizing a Photoionization Detector calibrated to a benzene standard. Results expressed in HNU-Units. (BDL=Below Detection Limit)

DRILLING AND SAMPLING SYMBOLS

SS:	Split-Spoon
ST:	Shelby Tube – 3 inch O.D. (except where noted)
CS:	3 inch O.D. California Ring Sampler
DC:	Dynamic Cone Penetrometer per ASTM Special Technical Publication No. 399
AU:	Auger Sample
DB:	Diamond Bit
CB:	Carbide Bit
WS:	Wash Sample
RB:	Rock-Roller Bit
BS:	Bulk Sample
Note:	Depth intervals for sampling shown on Record of Subsurface Exploration are not indicative of sample recovery, but position where sampling initiated

N: Penetration Resistance per 12 inch interval, or fraction thereof, for a standard 2 inch O.D. (1⅜ inch I.D.) split spoon sampler driven with a 140 pound weight free-falling 30 inches. Performed in general accordance with Standard Penetration Test Specifications (ASTM D-1586). N in blows per foot equals sum of N-Values where plus sign (+) is shown.

Nc: Penetration Resistance per 1¾ inches of Dynamic Cone Penetrometer. Approximately equivalent to Standard Penetration Test N-Value in blows per foot.

Nr: Penetration Resistance per 12 inch interval, or fraction thereof, for California Ring Sampler driven with a 140 pound weight free-falling 30 inches per ASTM D-3550. Not equivalent to Standard Penetration Test N-Value.

SOIL STRENGTH CHARACTERISTICS

COHESIVE (CLAYEY) SOILS

COMPARATIVE CONSISTENCY	BLOWS PER FOOT (N)	UNCONFINED COMPRESSIVE STRENGTH (TSF)
Very Soft	0 - 2	0 - 0.25
Soft	3 - 4	0.25 - 0.50
Medium Stiff	5 – 8	0.50 - 1.00
Stiff	9 – 15	1.00 - 2.00
Very Stiff	16 – 30	2.00 - 4.00
Hard	31+	4.00+

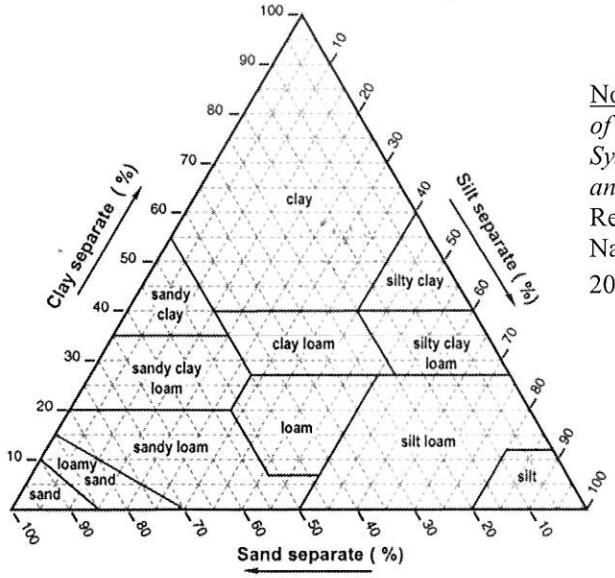
NON-COHESIVE (GRANULAR) SOILS

RELATIVE DENSITY	BLOWS PER FOOT (N)
Very Loose	0 - 4
Loose	5 - 10
Firm	11 - 30
Dense	31 - 50
Very Dense	51+

DEGREE OF PLASTICITY	PI	DEGREE OF EXPANSIVE POTENTIAL	PI
None to Slight	0 - 4	Low	0 - 15
Slight	5 - 10	Medium	15 - 25
Medium	11 - 30	High	25+
High to Very High	31+		

SOIL CLASSIFICATION NOTES

Texture Triangle:
Fine Earth Texture Classes (———)



Note: *Texture Triangle* and *Comparison of Particle Size Classes in Different Systems* from *Field Book for Describing and Sampling Soil*, USDA Natural Resources Conservation Service National Soil Survey Center (September 2002).

Comparison of Particle Size Classes in Different Systems

	FINE EARTH										ROCK FRAGMENTS						
											channers			flagst.	stones	boulders	
USDA [1]	Clay [2]		Silt		Sand						Gravel			Cobbles	Stones	Boulders	
	fine	co.	fine	co.	v.fi.	fi.	med.	co.	v. co.		fine	medium	coarse				
millimeters:	0.0002	.002 mm		.02	.05	.1	.25	.5	1		2 mm	5	20	76	250	600 mm	
U.S. Standard Sieve No. (opening):					300	[3] 140	60	35	18		10	4	(3/4")	(3")	(10")	(25")	

International [4]	Clay	Silt	Sand		Gravel	Stones	
			fine	coarse			
millimeters:	.002 mm	.02	.20		2 mm	20 mm	
U.S. Standard Sieve No. (opening):					10	(3/4")	

Unified [5]	Silt or Clay	Sand			Gravel		Cobbles	Boulders
		fine	medium	co.	fine	coarse		
millimeters:		.074	.42	2 mm	4.8	19	76	300 mm
U.S. Standard Sieve No. (opening):		200	40	10	4	(3/4")	(3")	

AASHTO [6,7]	Clay	Silt	Sand		Gravel or Stones			Broken Rock (angular), or Boulders (rounded)
			fine	coarse	fine	med.	co.	
millimeters:	.005 mm		.074	.42	2 mm	9.5	25	75 mm
U.S. Standard Sieve No.:			200	40	10	(3/8")	(1")	(3")

phi #:	12	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10		-12
Modified Wentworth [8]	clay			silt				sand					pebbles					cobbles		boulders				
millimeters:	.002	.004	.008	.016	.031	.062	.125	.25	.5	1	2 mm		8	16	32	64		256		4092 mm				
U.S. Standard Sieve No.:						230	120	60	35	18	10	5												

1. Soil Survey Staff. 1995. Soil survey Laboratory information manual. USDA, Natural Resources Conservation Service, Soil Survey Investigations Report No. 45, Version 1.0, National Soil Survey Center, Lincoln, NE. 305 p.
2. Soil Survey Staff. 1995. Soil Survey Lab information manual. USDA-NRCS, Soil Survey Investigation Report #45, version 1.0, National Soil Survey Center, Lincoln, NE. Note: Mineralogy studies may subdivide clay into three size ranges; fine (<0.08µm), medium (0.08-0.2µm), and coarse (0.2-2µm); Jackson, 1969.
3. The Soil Survey Lab (Lincoln, NE) uses a no. 300 sieve (0.047 mm opening) for the USDA-sand/silt measurement. A no. 270 sieve (0.053 mm opening) is more readily available and widely used.
4. International Soil Science Society. 1951. *In*: Soil Survey Manual. Soil Survey Staff, USDA-Soil Conservation Service, Agricultural Handbook No. 18, U.S. Gov. Print. Office, Washington, D.C. 214 p.
5. ASTM. 1993. Standard classification of soils for engineering purposes (Unified Soil Classification System). ASTM designation D2487-92. *In*: Soil and rock; dimension stone; geosynthetics. Annual book of ASTM standards-Vol. 04.08.
6. AASHTO. 1986a. Recommended practice for the classification of soils and soil-aggregate mixtures for highway construction purposes. AASHTO designation M145-82. *In*: Standard specifications for transportation materials and methods of sampling and testing; Part 1: Specifications (14th ed.). American Association of State Highway and Transportation Officials, Washington, D.C.
7. AASHTO. 1986b. Standard definitions of terms relating to subgrade, soil-aggregate, and fill materials. AASHTO designation M146-70 (1980). *In*: sampling and testing; Part 1: Specifications (14th ed.). American Association of State Highway and Transportation Officials, Washington, D.C.
8. Ingram, R.L. 1982. Modified Wentworth scale. *In*: Grain-size scales. AGI Date Sheet 29.1. *In*: Dutro, J.T., Dietrich, R.V., and Foose, R.M. 1989. AGI data sheets for geology in the field, laboratory, and office, 3rd edition. American Geological Institute, Washington, D.C.

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Important Information About Your
Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

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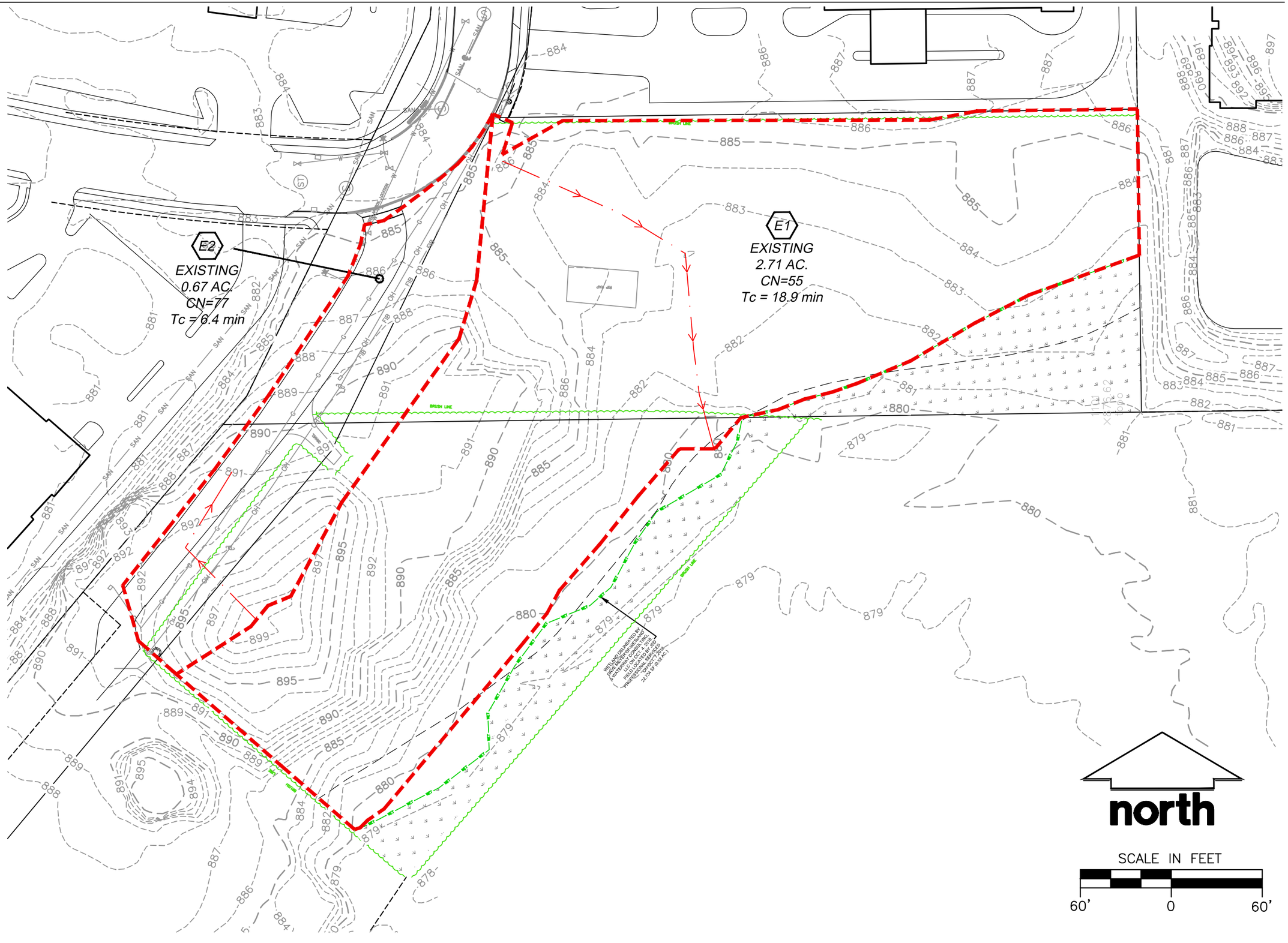
APPENDIX 3

PRE-DEVELOPMENT SITE HYDROLOGY

- Existing Conditions Hydrology Exhibit
- Existing Conditions HydroCAD Output



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CLIENT:
Avid Hotels

CLIENT ADDRESS:
Marshview Street
Waukesha, WI 53186

PROJECT:
Avid Hotel
Meadow Lane

PROJECT LOCATION:
Waukesha, WI 53072
Waukesha County

PLAN MODIFICATIONS:

#	Date:	Description:

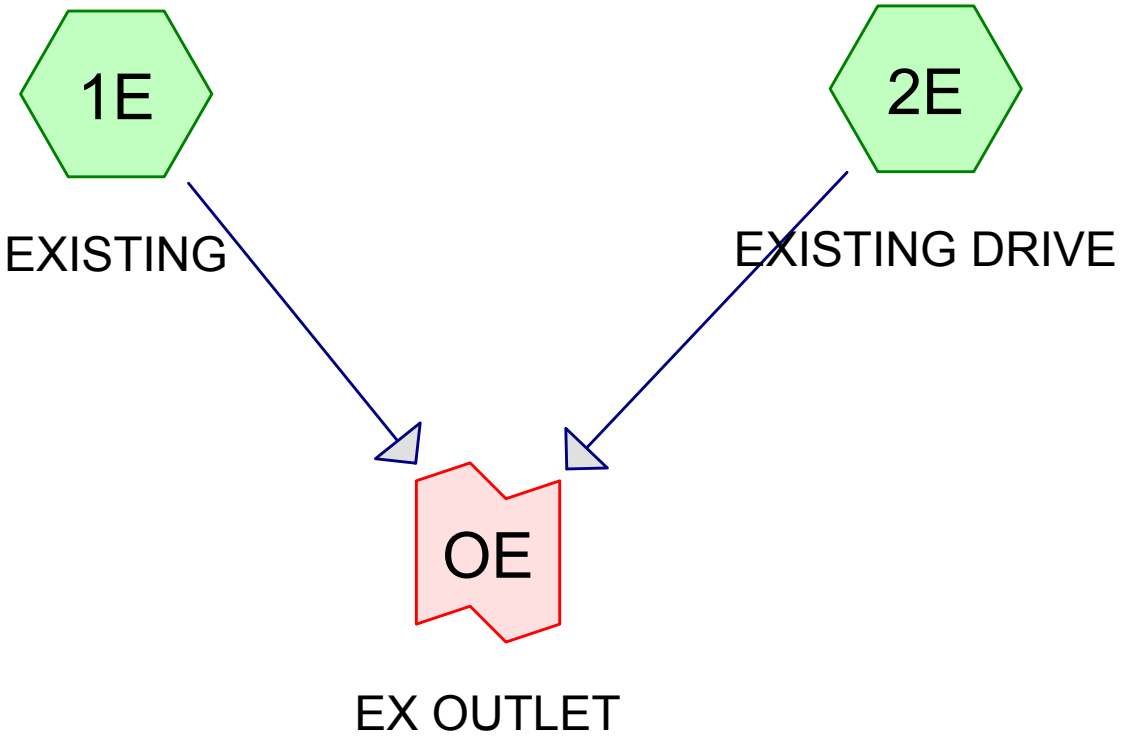
Design/Drawn: IRN
Approved: RWI

SHEET TITLE:
EXISTING HYDROLOGY

SHEET NUMBER:
H1.0

JSD PROJECT NO: 18-8713A

File: N:\2018\18-8713A Avid Hotel\Dwg\18-8713A SWMP.dwg Layout: H1.0 User: pmartens Plotted: May 10, 2019 – 11:55am Xrefs:



Subcat Reach Pond Link

Routing Diagram for 18-8713A_Existing
Prepared by Microsoft, Printed 5/10/2019

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1E: EXISTING Runoff Area=118,111 sf 0.00% Impervious Runoff Depth>0.05"
Flow Length=265' Slope=0.0150 '/' Tc=18.9 min CN=55 Runoff=0.04 cfs 0.012 af

Subcatchment2E: EXISTING DRIVE Runoff Area=29,185 sf 23.20% Impervious Runoff Depth>0.64"
Flow Length=133' Tc=6.4 min CN=77 Runoff=0.78 cfs 0.036 af

Link OE: EX OUTLET Inflow=0.78 cfs 0.048 af
Primary=0.78 cfs 0.048 af

Total Runoff Area = 3.381 ac Runoff Volume = 0.048 af Average Runoff Depth = 0.17"
95.40% Pervious = 3.226 ac 4.60% Impervious = 0.155 ac

Summary for Subcatchment 1E: EXISTING

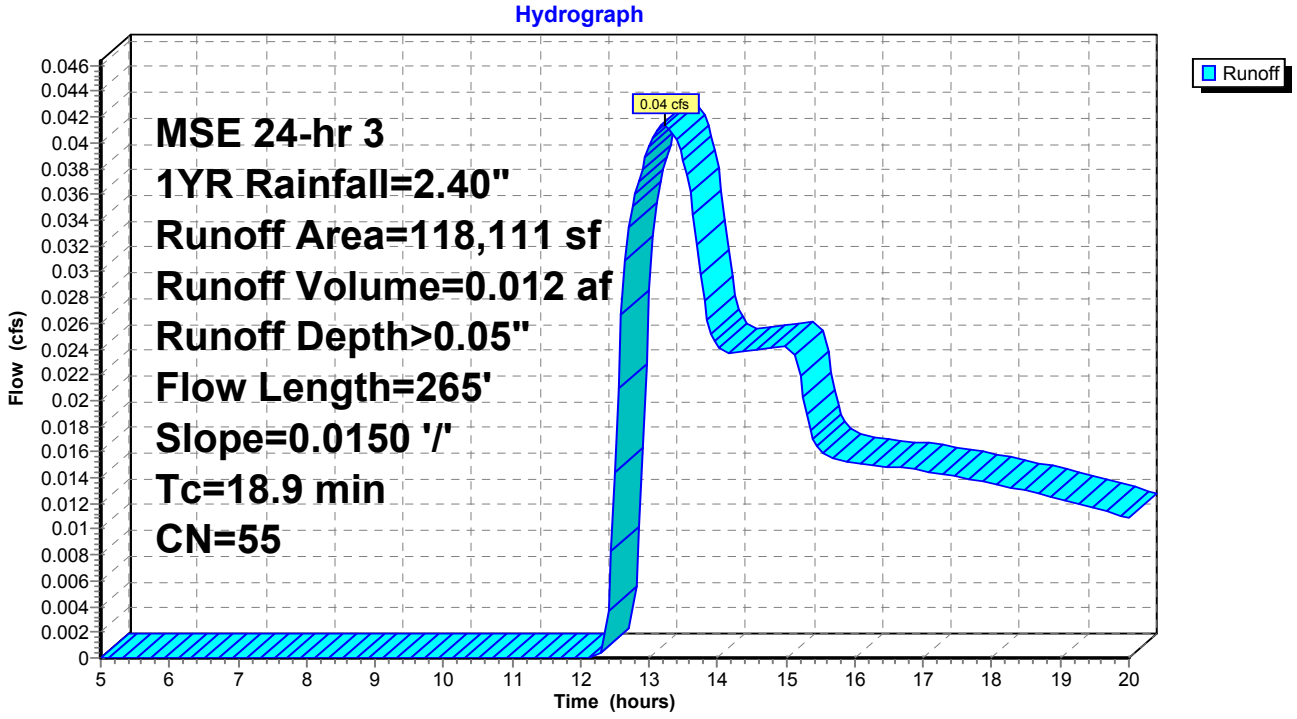
Runoff = 0.04 cfs @ 13.22 hrs, Volume= 0.012 af, Depth> 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1YR Rainfall=2.40"

	Area (sf)	CN	Description
*	66,229	61	Grass - HSG B City of Waukesha
*	15,555	55	Wood -HSG B City of Waukesha
*	4,221	39	Grass - HSG A City of Waukesha
*	22,584	30	Wood - HSG A City of Waukesha
*	2,958	78	Grass - HSG D City of Waukesha
*	6,564	77	Wood - HSG D City of Waukesha
	118,111	55	Weighted Average
	118,111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0150	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.5	165	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
18.9	265	Total			

Subcatchment 1E: EXISTING



Summary for Subcatchment 2E: EXISTING DRIVE

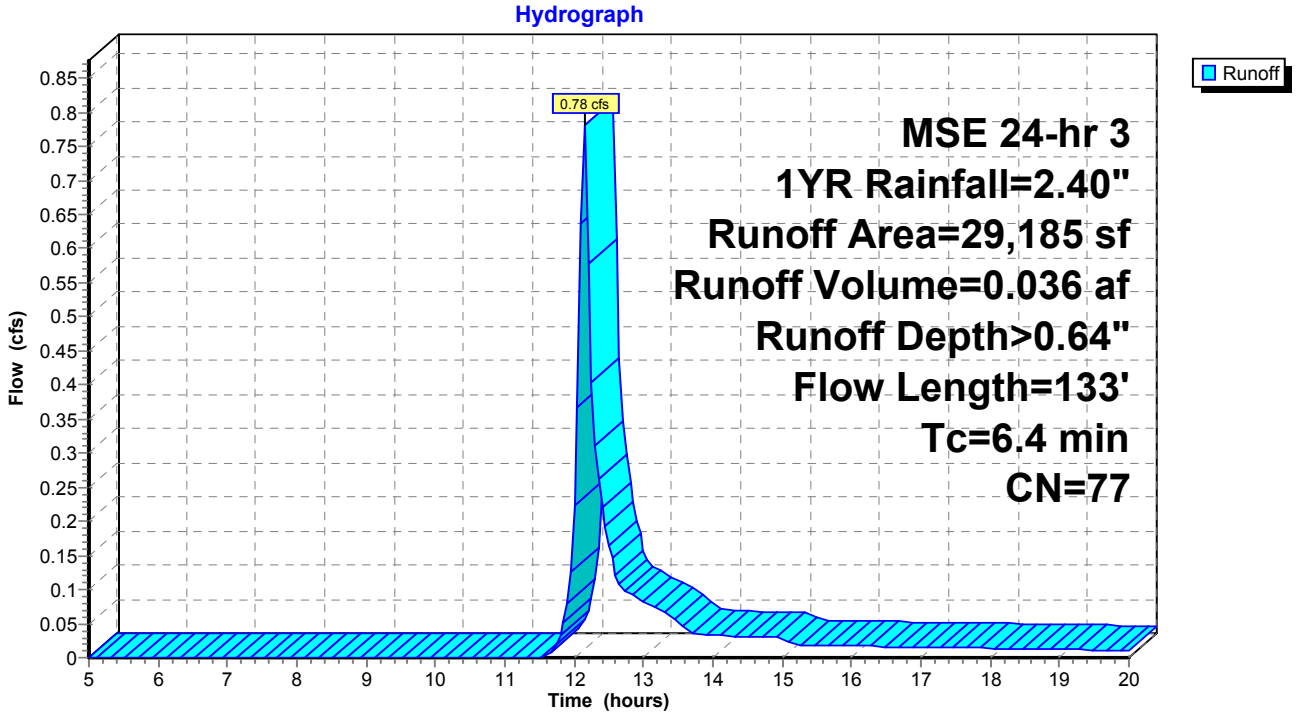
Runoff = 0.78 cfs @ 12.15 hrs, Volume= 0.036 af, Depth> 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1YR Rainfall=2.40"

	Area (sf)	CN	Description
	6,772	98	Paved parking, HSG B
*	8,391	61	Grass - HSG B City of Waukesha
*	5,000	78	Grass - HSG D City of Waukesha
*	9,022	77	Wood - HSG D City of Waukesha
	29,185	77	Weighted Average
	22,413		76.80% Pervious Area
	6,772		23.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	65	0.1090	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.8	68	0.0294	1.36		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
6.4	133	Total			

Subcatchment 2E: EXISTING DRIVE

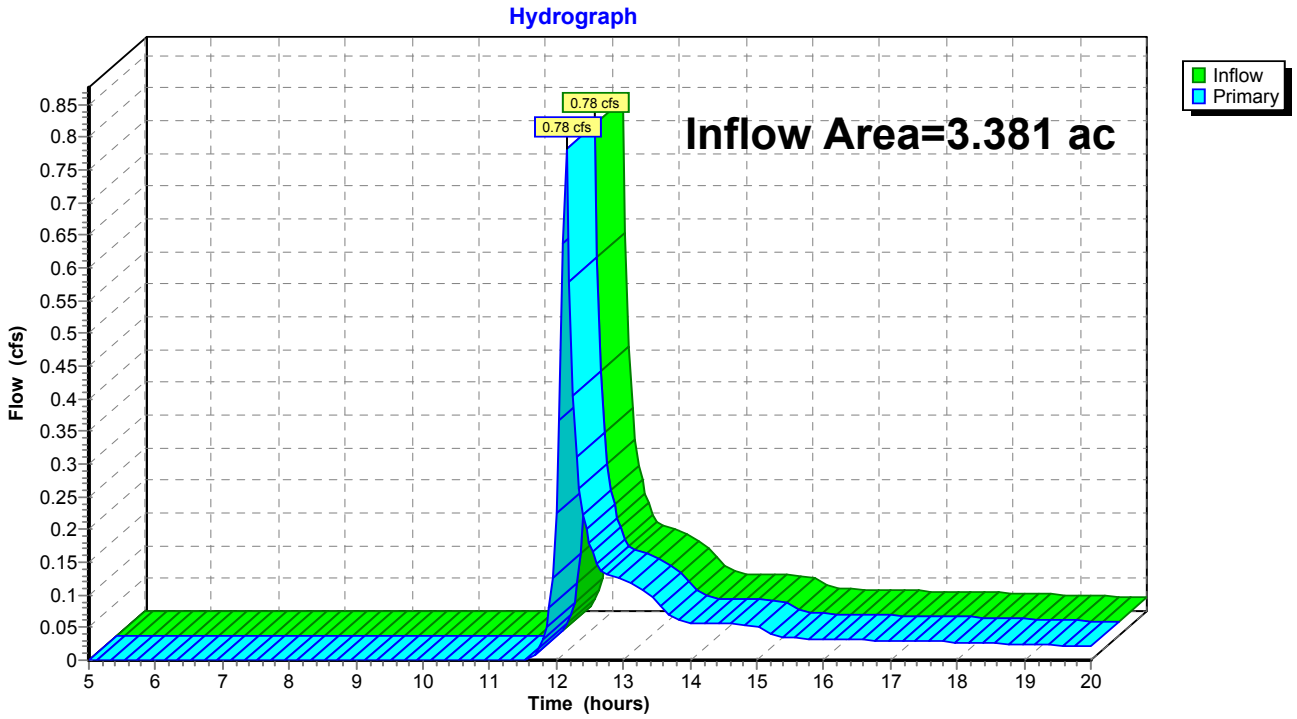


Summary for Link OE: EX OUTLET

Inflow Area = 3.381 ac, 4.60% Impervious, Inflow Depth > 0.17" for 1YR event
Inflow = 0.78 cfs @ 12.15 hrs, Volume= 0.048 af
Primary = 0.78 cfs @ 12.15 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link OE: EX OUTLET



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1E: EXISTING Runoff Area=118,111 sf 0.00% Impervious Runoff Depth>0.11"
Flow Length=265' Slope=0.0150 '/' Tc=18.9 min CN=55 Runoff=0.11 cfs 0.024 af

Subcatchment2E: EXISTING DRIVE Runoff Area=29,185 sf 23.20% Impervious Runoff Depth>0.82"
Flow Length=133' Tc=6.4 min CN=77 Runoff=1.02 cfs 0.046 af

Link OE: EX OUTLET Inflow=1.02 cfs 0.070 af
Primary=1.02 cfs 0.070 af

Total Runoff Area = 3.381 ac Runoff Volume = 0.070 af Average Runoff Depth = 0.25"
95.40% Pervious = 3.226 ac 4.60% Impervious = 0.155 ac

Summary for Subcatchment 1E: EXISTING

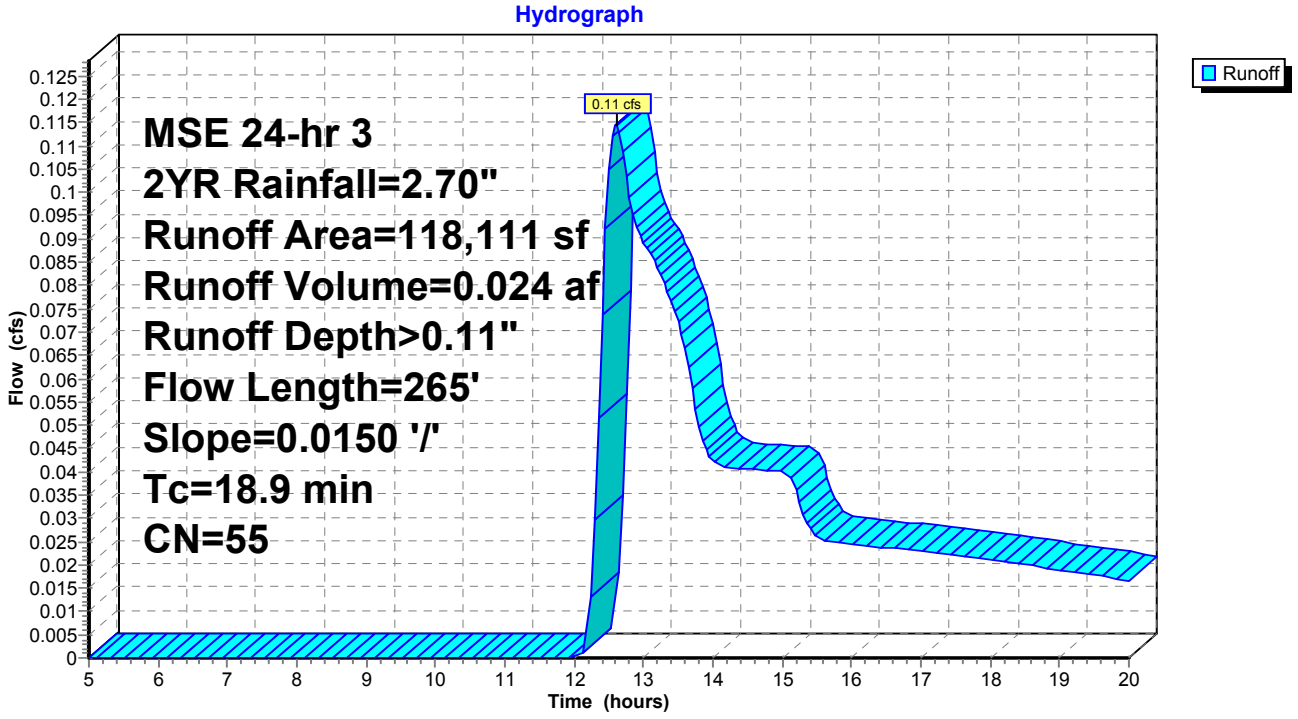
Runoff = 0.11 cfs @ 12.60 hrs, Volume= 0.024 af, Depth> 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2YR Rainfall=2.70"

	Area (sf)	CN	Description
*	66,229	61	Grass - HSG B City of Waukesha
*	15,555	55	Wood -HSG B City of Waukesha
*	4,221	39	Grass - HSG A City of Waukesha
*	22,584	30	Wood - HSG A City of Waukesha
*	2,958	78	Grass - HSG D City of Waukesha
*	6,564	77	Wood - HSG D City of Waukesha
	118,111	55	Weighted Average
	118,111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0150	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.5	165	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
18.9	265	Total			

Subcatchment 1E: EXISTING



Summary for Subcatchment 2E: EXISTING DRIVE

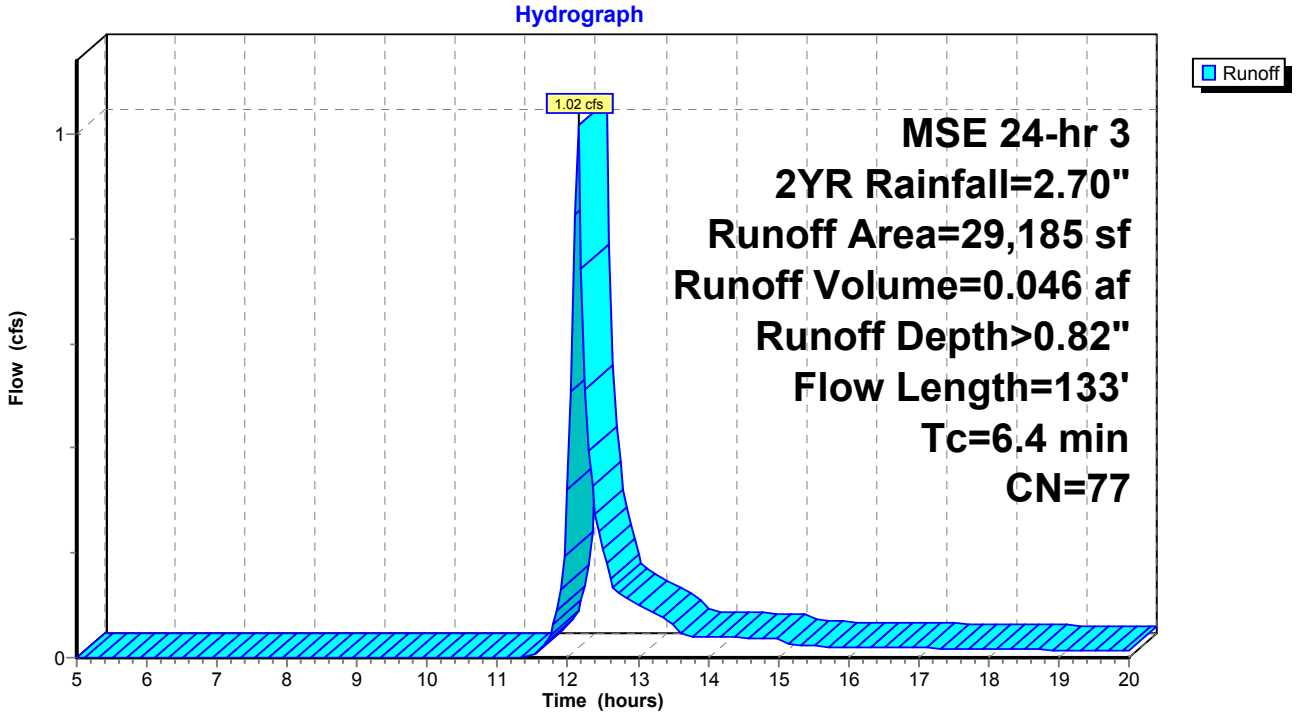
Runoff = 1.02 cfs @ 12.14 hrs, Volume= 0.046 af, Depth> 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2YR Rainfall=2.70"

	Area (sf)	CN	Description
	6,772	98	Paved parking, HSG B
*	8,391	61	Grass - HSG B City of Waukesha
*	5,000	78	Grass - HSG D City of Waukesha
*	9,022	77	Wood - HSG D City of Waukesha
	29,185	77	Weighted Average
	22,413		76.80% Pervious Area
	6,772		23.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	65	0.1090	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.8	68	0.0294	1.36		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
6.4	133	Total			

Subcatchment 2E: EXISTING DRIVE

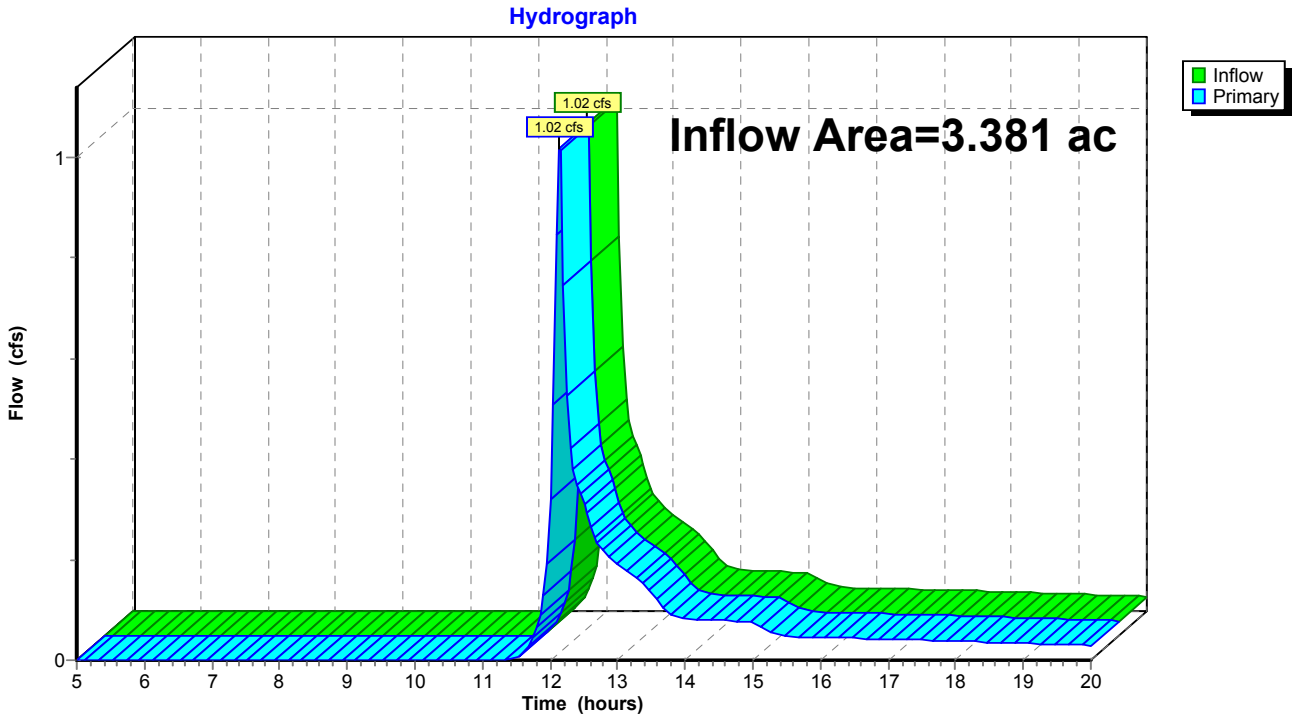


Summary for Link OE: EX OUTLET

Inflow Area = 3.381 ac, 4.60% Impervious, Inflow Depth > 0.25" for 2YR event
Inflow = 1.02 cfs @ 12.14 hrs, Volume= 0.070 af
Primary = 1.02 cfs @ 12.14 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link OE: EX OUTLET



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1E: EXISTING Runoff Area=118,111 sf 0.00% Impervious Runoff Depth>0.42"
Flow Length=265' Slope=0.0150 '/' Tc=18.9 min CN=55 Runoff=0.90 cfs 0.094 af

Subcatchment2E: EXISTING DRIVE Runoff Area=29,185 sf 23.20% Impervious Runoff Depth>1.59"
Flow Length=133' Tc=6.4 min CN=77 Runoff=1.98 cfs 0.089 af

Link OE: EX OUTLET Inflow=2.14 cfs 0.182 af
Primary=2.14 cfs 0.182 af

Total Runoff Area = 3.381 ac Runoff Volume = 0.182 af Average Runoff Depth = 0.65"
95.40% Pervious = 3.226 ac 4.60% Impervious = 0.155 ac

Summary for Subcatchment 1E: EXISTING

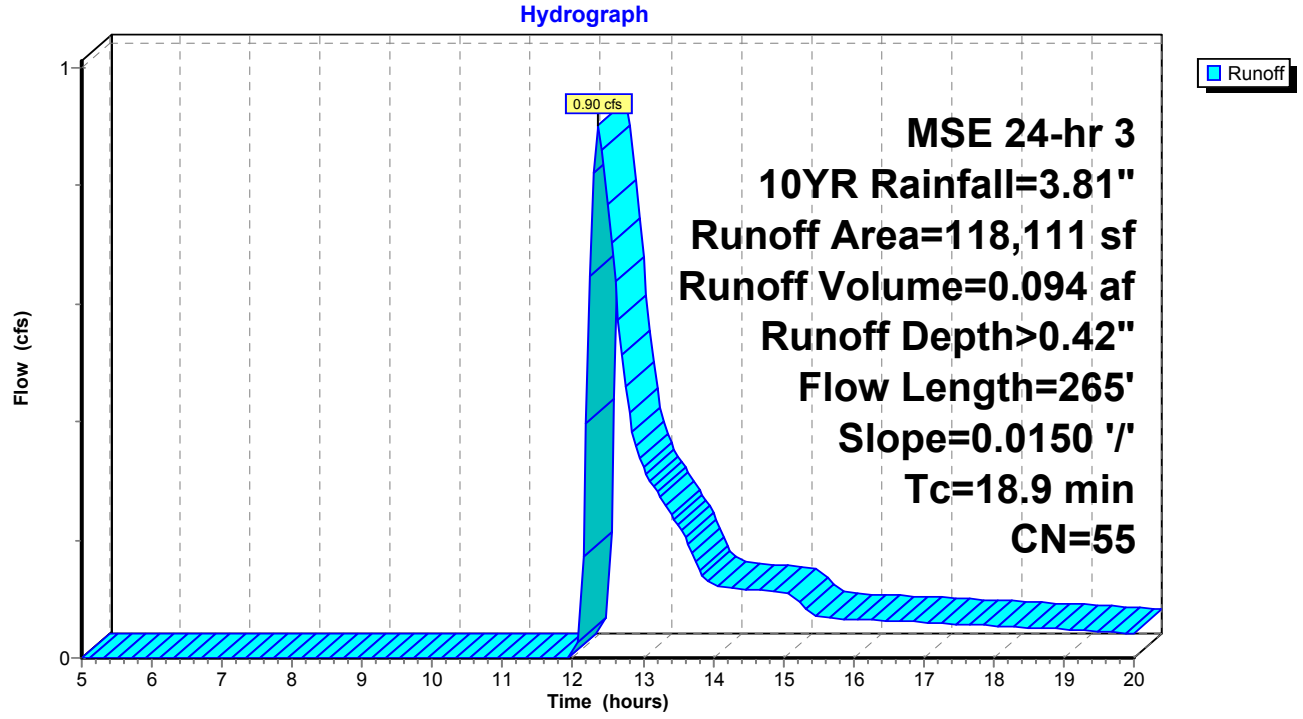
Runoff = 0.90 cfs @ 12.37 hrs, Volume= 0.094 af, Depth> 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10YR Rainfall=3.81"

	Area (sf)	CN	Description
*	66,229	61	Grass - HSG B City of Waukesha
*	15,555	55	Wood -HSG B City of Waukesha
*	4,221	39	Grass - HSG A City of Waukesha
*	22,584	30	Wood - HSG A City of Waukesha
*	2,958	78	Grass - HSG D City of Waukesha
*	6,564	77	Wood - HSG D City of Waukesha
	118,111	55	Weighted Average
	118,111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0150	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.5	165	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
18.9	265	Total			

Subcatchment 1E: EXISTING



Summary for Subcatchment 2E: EXISTING DRIVE

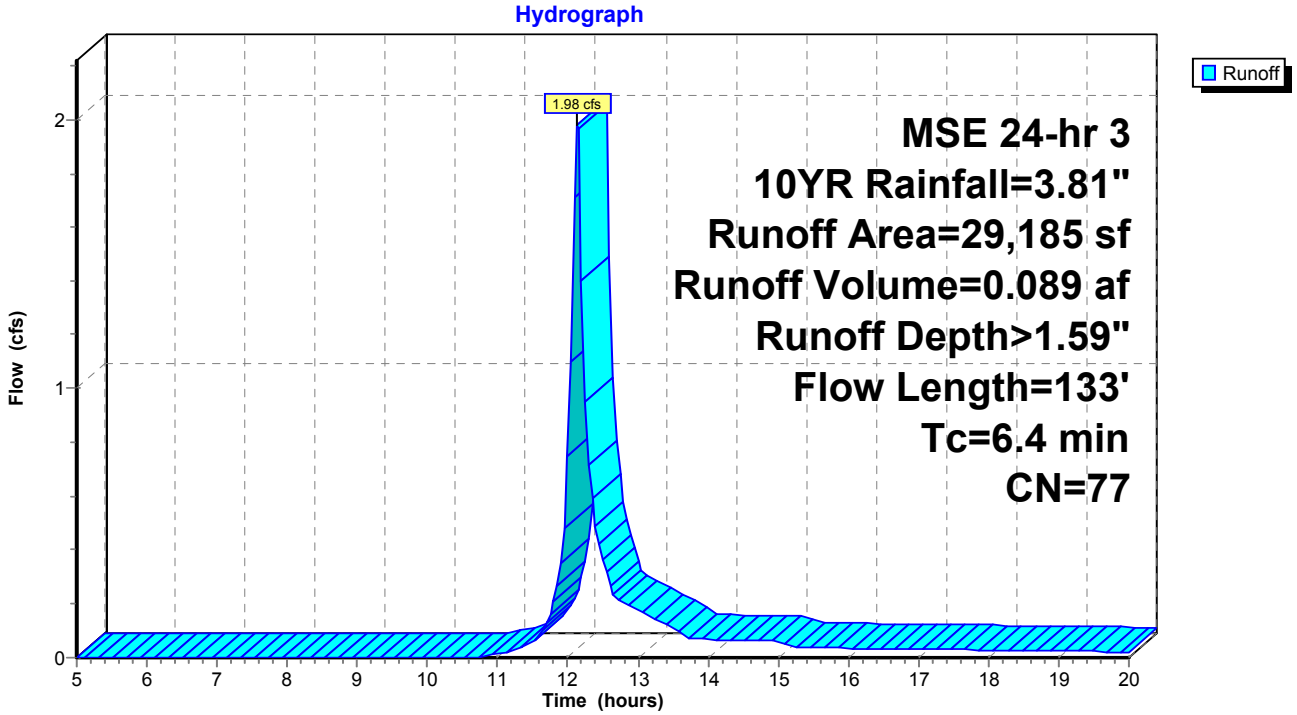
Runoff = 1.98 cfs @ 12.14 hrs, Volume= 0.089 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10YR Rainfall=3.81"

	Area (sf)	CN	Description
	6,772	98	Paved parking, HSG B
*	8,391	61	Grass - HSG B City of Waukesha
*	5,000	78	Grass - HSG D City of Waukesha
*	9,022	77	Wood - HSG D City of Waukesha
	29,185	77	Weighted Average
	22,413		76.80% Pervious Area
	6,772		23.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	65	0.1090	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.8	68	0.0294	1.36		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
6.4	133	Total			

Subcatchment 2E: EXISTING DRIVE

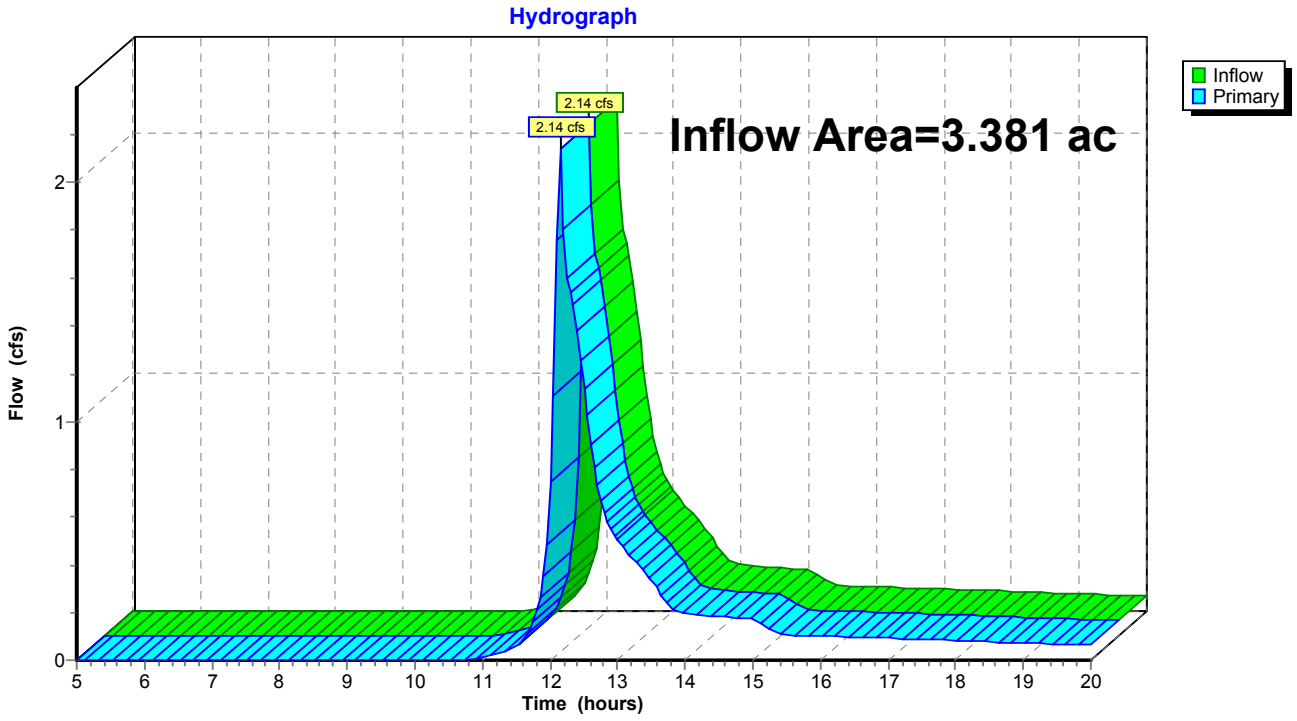


Summary for Link OE: EX OUTLET

Inflow Area = 3.381 ac, 4.60% Impervious, Inflow Depth > 0.65" for 10YR event
Inflow = 2.14 cfs @ 12.15 hrs, Volume= 0.182 af
Primary = 2.14 cfs @ 12.15 hrs, Volume= 0.182 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link OE: EX OUTLET



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1E: EXISTING Runoff Area=118,111 sf 0.00% Impervious Runoff Depth>1.52"
Flow Length=265' Slope=0.0150 '/' Tc=18.9 min CN=55 Runoff=4.61 cfs 0.343 af

Subcatchment2E: EXISTING DRIVE Runoff Area=29,185 sf 23.20% Impervious Runoff Depth>3.49"
Flow Length=133' Tc=6.4 min CN=77 Runoff=4.27 cfs 0.195 af

Link OE: EX OUTLET Inflow=6.58 cfs 0.538 af
Primary=6.58 cfs 0.538 af

Total Runoff Area = 3.381 ac Runoff Volume = 0.538 af Average Runoff Depth = 1.91"
95.40% Pervious = 3.226 ac 4.60% Impervious = 0.155 ac

Summary for Subcatchment 1E: EXISTING

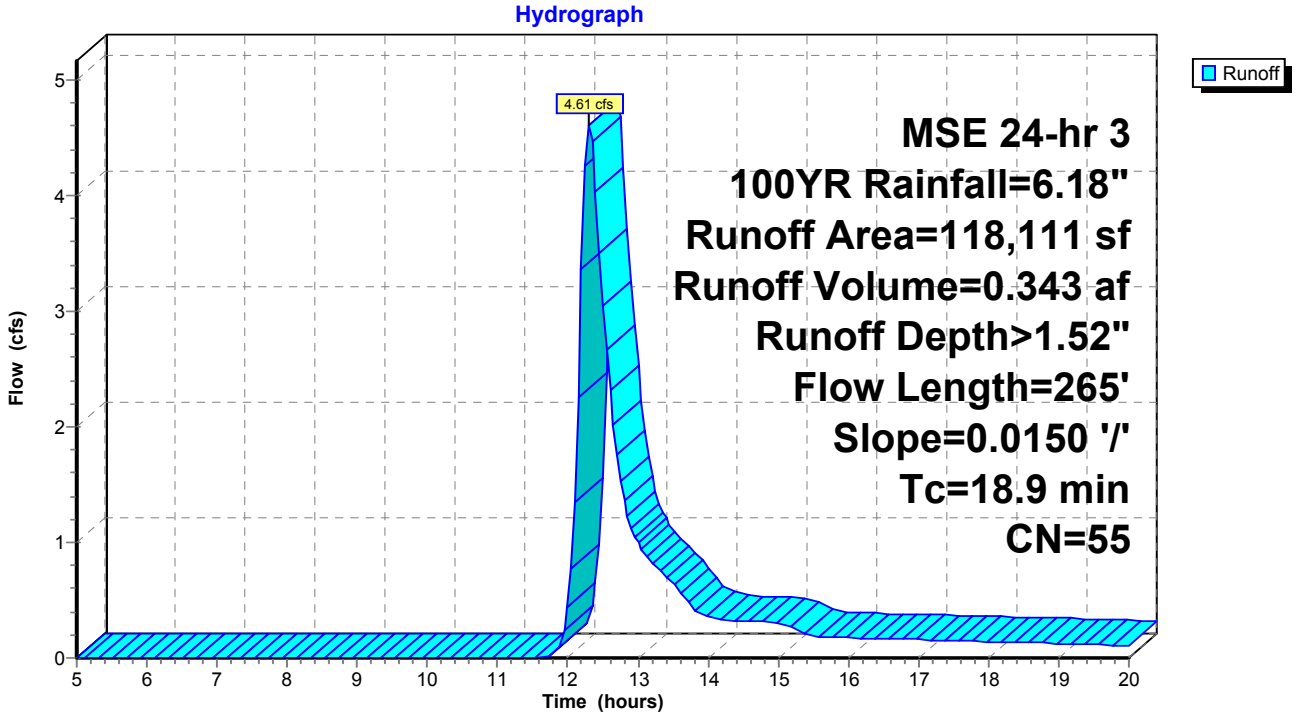
Runoff = 4.61 cfs @ 12.31 hrs, Volume= 0.343 af, Depth> 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100YR Rainfall=6.18"

	Area (sf)	CN	Description
*	66,229	61	Grass - HSG B City of Waukesha
*	15,555	55	Wood -HSG B City of Waukesha
*	4,221	39	Grass - HSG A City of Waukesha
*	22,584	30	Wood - HSG A City of Waukesha
*	2,958	78	Grass - HSG D City of Waukesha
*	6,564	77	Wood - HSG D City of Waukesha
	118,111	55	Weighted Average
	118,111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0150	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.5	165	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
18.9	265	Total			

Subcatchment 1E: EXISTING



Summary for Subcatchment 2E: EXISTING DRIVE

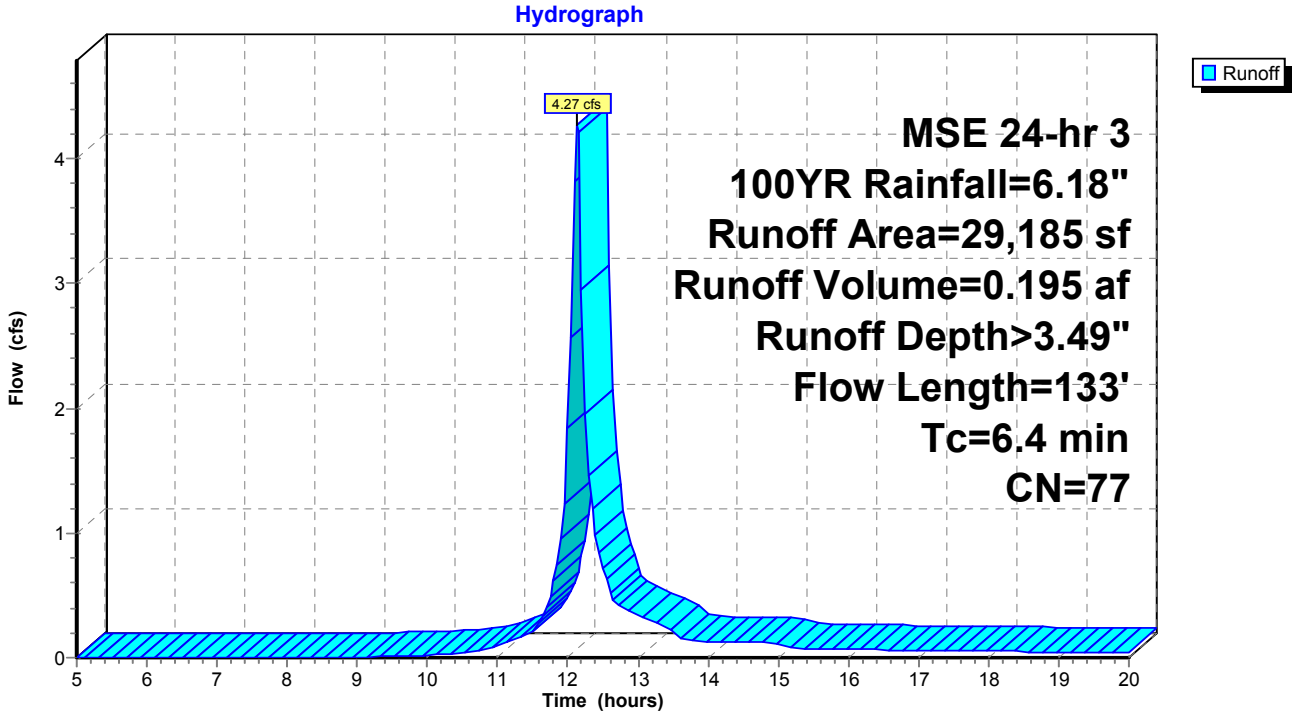
Runoff = 4.27 cfs @ 12.14 hrs, Volume= 0.195 af, Depth> 3.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100YR Rainfall=6.18"

	Area (sf)	CN	Description
	6,772	98	Paved parking, HSG B
*	8,391	61	Grass - HSG B City of Waukesha
*	5,000	78	Grass - HSG D City of Waukesha
*	9,022	77	Wood - HSG D City of Waukesha
	29,185	77	Weighted Average
	22,413		76.80% Pervious Area
	6,772		23.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	65	0.1090	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.8	68	0.0294	1.36		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
6.4	133	Total			

Subcatchment 2E: EXISTING DRIVE

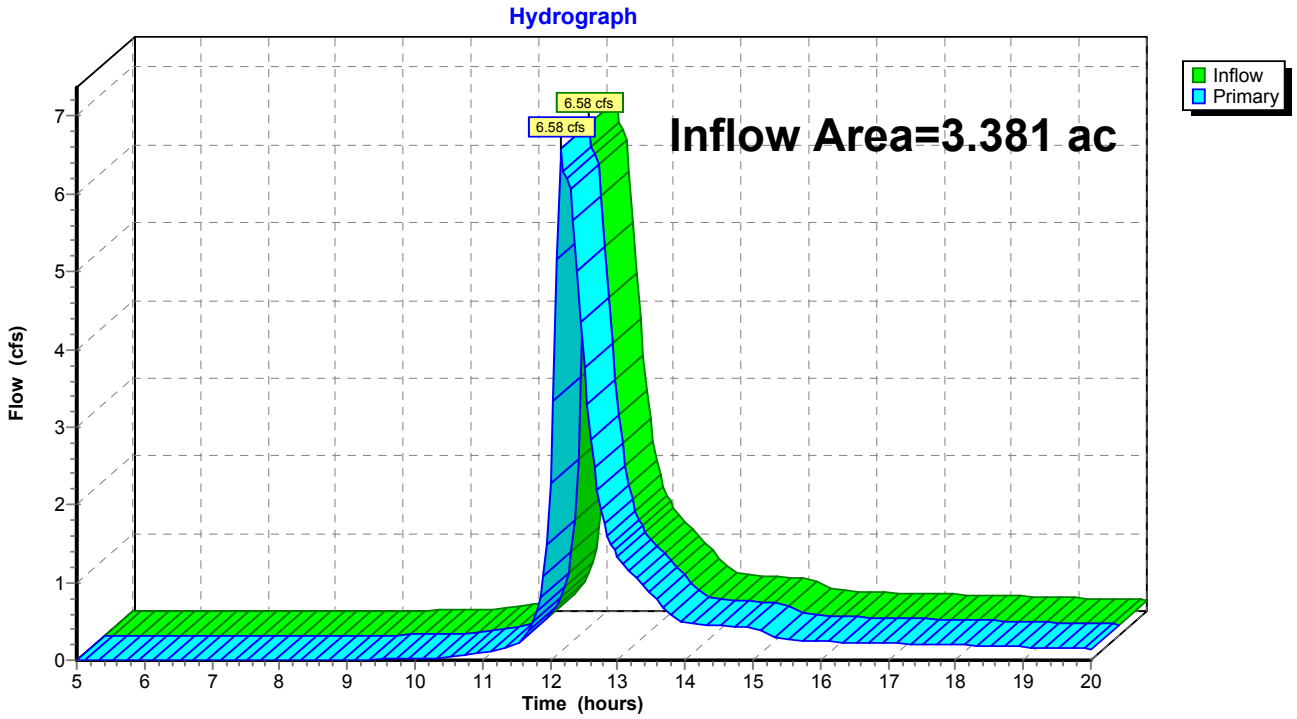


Summary for Link OE: EX OUTLET

Inflow Area = 3.381 ac, 4.60% Impervious, Inflow Depth > 1.91" for 100YR event
Inflow = 6.58 cfs @ 12.17 hrs, Volume= 0.538 af
Primary = 6.58 cfs @ 12.17 hrs, Volume= 0.538 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

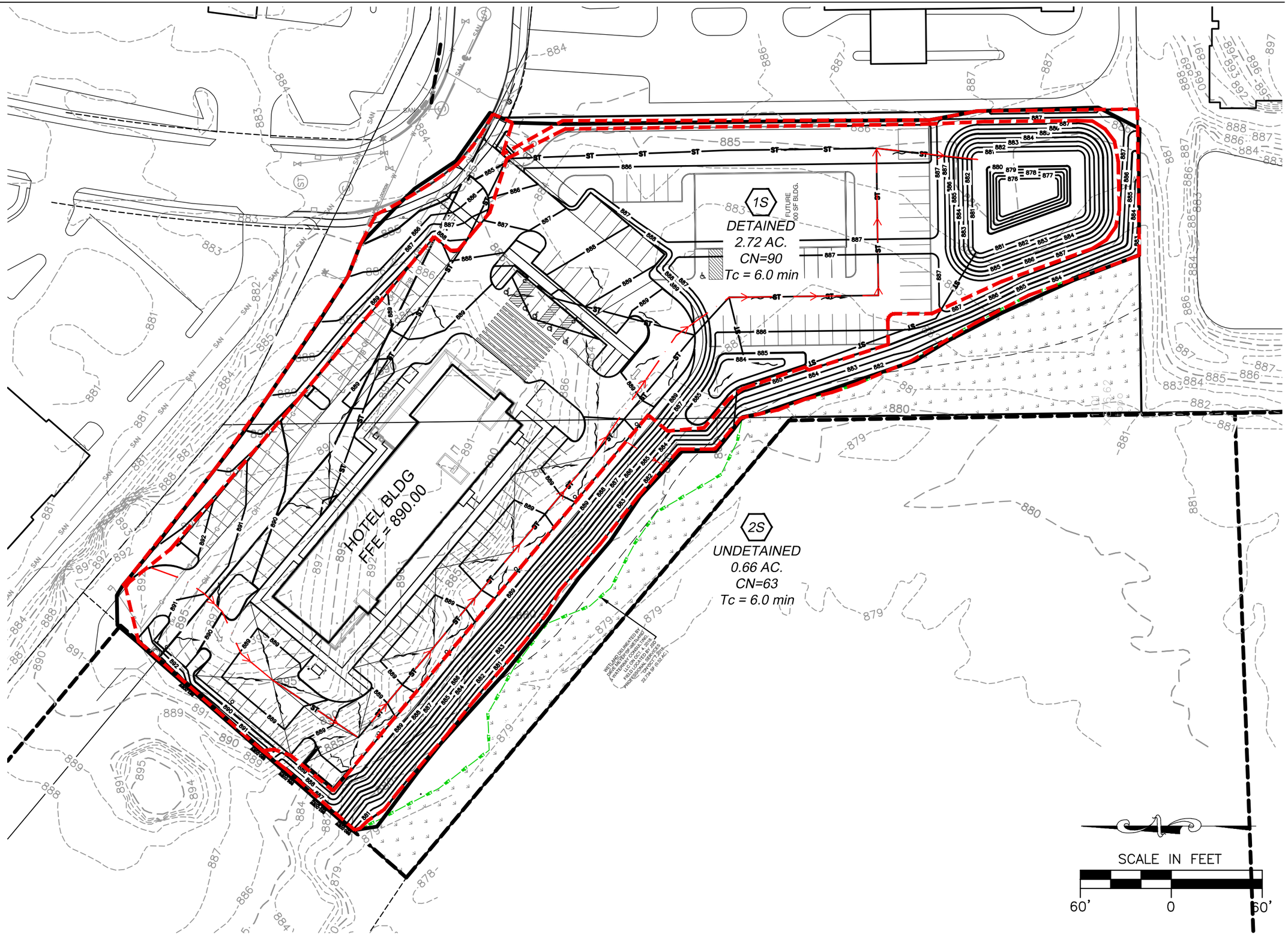
Link OE: EX OUTLET



APPENDIX 4

POST-DEVELOPMENT SITE HYDROLOGY

- Proposed Conditions Hydrology Exhibit
- Proposed Conditions HydroCAD Output



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WAUKESHA, WISCONSIN 53188
P. 262.513.0666

CLIENT:
Avid Hotels

CLIENT ADDRESS:
Marshview Street
Waukesha, WI 53186

PROJECT:
Avid Hotel
Meadow Lane

PROJECT LOCATION:
Waukesha, WI 53072
Waukesha County

PLAN MODIFICATIONS:

#	Date:	Description:

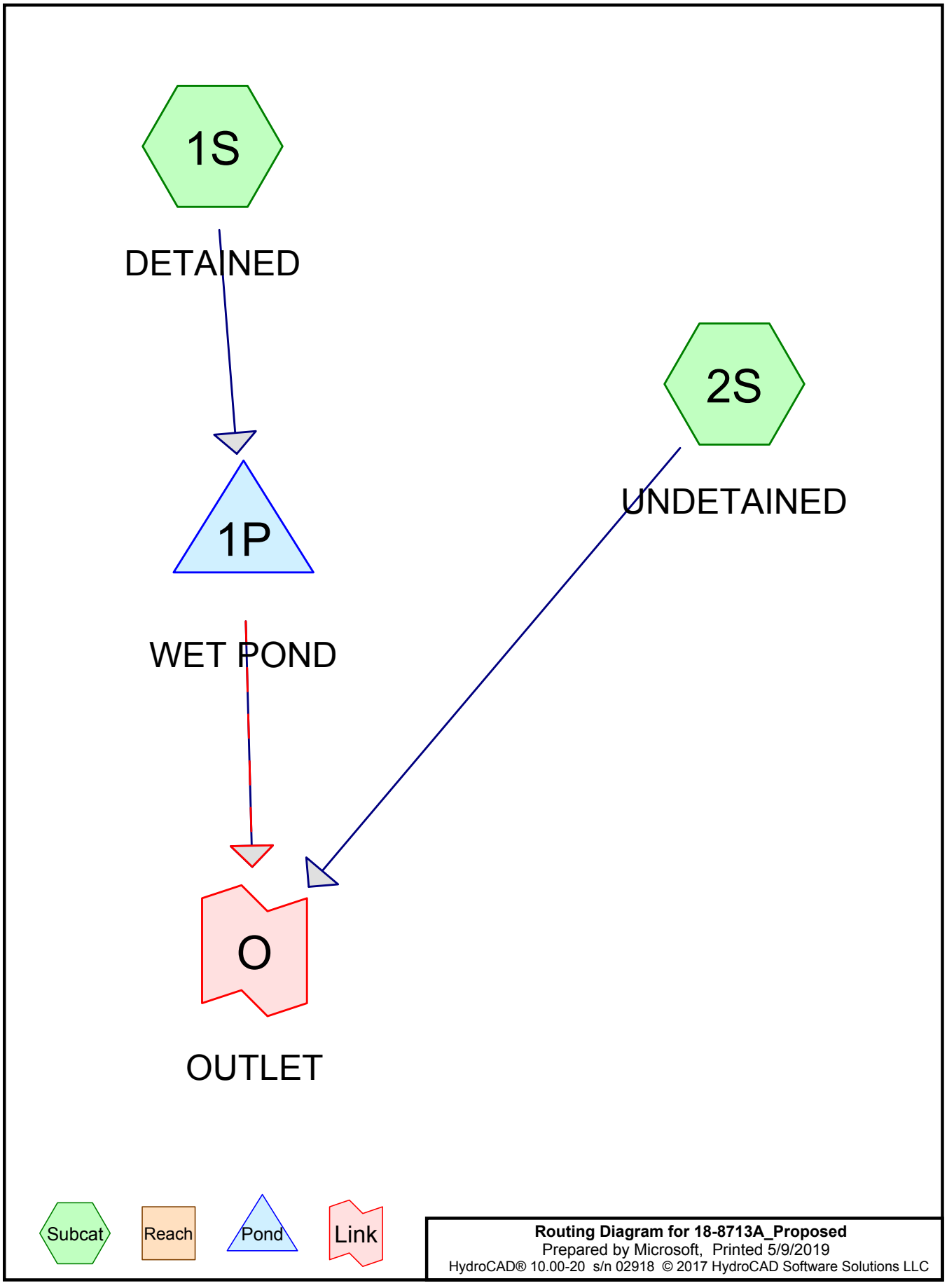
Design/Drawn: IRN
Approved: RWI

SHEET TITLE:
PROPOSED HYDROLOGY

SHEET NUMBER:
H2.0

JSD PROJECT NO: 18-8713A

File: N:\2018\18-8713A Avid Hotel\Dwg\18-8713A SWMP.dwg Layout: H2.0 User: pmartens Plotted: May 10, 2019 – 11:52am Xref's:



Routing Diagram for 18-8713A_Proposed
Prepared by Microsoft, Printed 5/9/2019

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DETAINED Runoff Area=118,535 sf 79.98% Impervious Runoff Depth>1.46"
Tc=6.0 min CN=91 Runoff=7.26 cfs 0.331 af

Subcatchment2S: UNDETAINED Runoff Area=28,832 sf 4.73% Impervious Runoff Depth>0.19"
Tc=6.0 min CN=63 Runoff=0.13 cfs 0.011 af

Pond 1P: WET POND Peak Elev=883.19' Storage=11,027 cf Inflow=7.26 cfs 0.331 af
Primary=0.15 cfs 0.102 af Secondary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.102 af

Link O: OUTLET Inflow=0.24 cfs 0.113 af
Primary=0.24 cfs 0.113 af

Total Runoff Area = 3.383 ac Runoff Volume = 0.342 af Average Runoff Depth = 1.21"
34.74% Pervious = 1.175 ac 65.26% Impervious = 2.208 ac

Summary for Subcatchment 1S: DETAINED

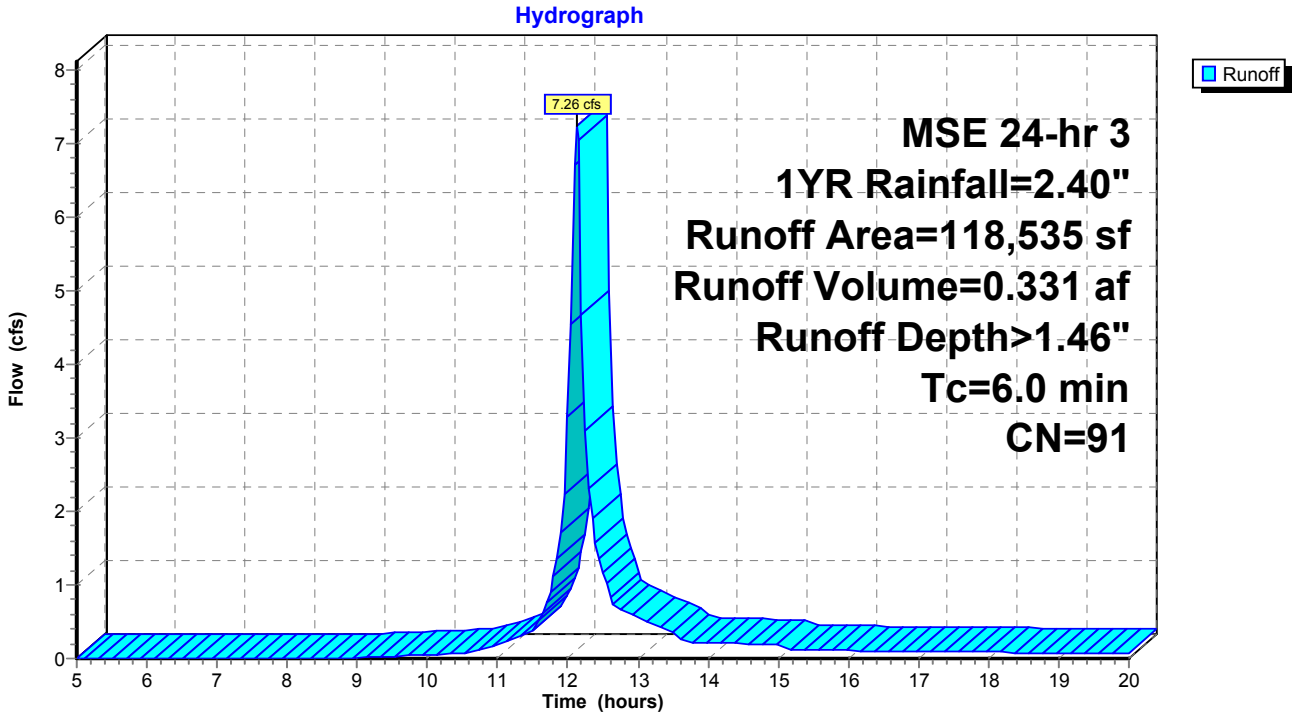
Runoff = 7.26 cfs @ 12.13 hrs, Volume= 0.331 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1YR Rainfall=2.40"

Area (sf)	CN	Description
23,732	61	>75% Grass cover, Good, HSG B
94,803	98	Paved parking, HSG B
118,535	91	Weighted Average
23,732		20.02% Pervious Area
94,803		79.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: DETAINED



Summary for Subcatchment 2S: UNDETAINED

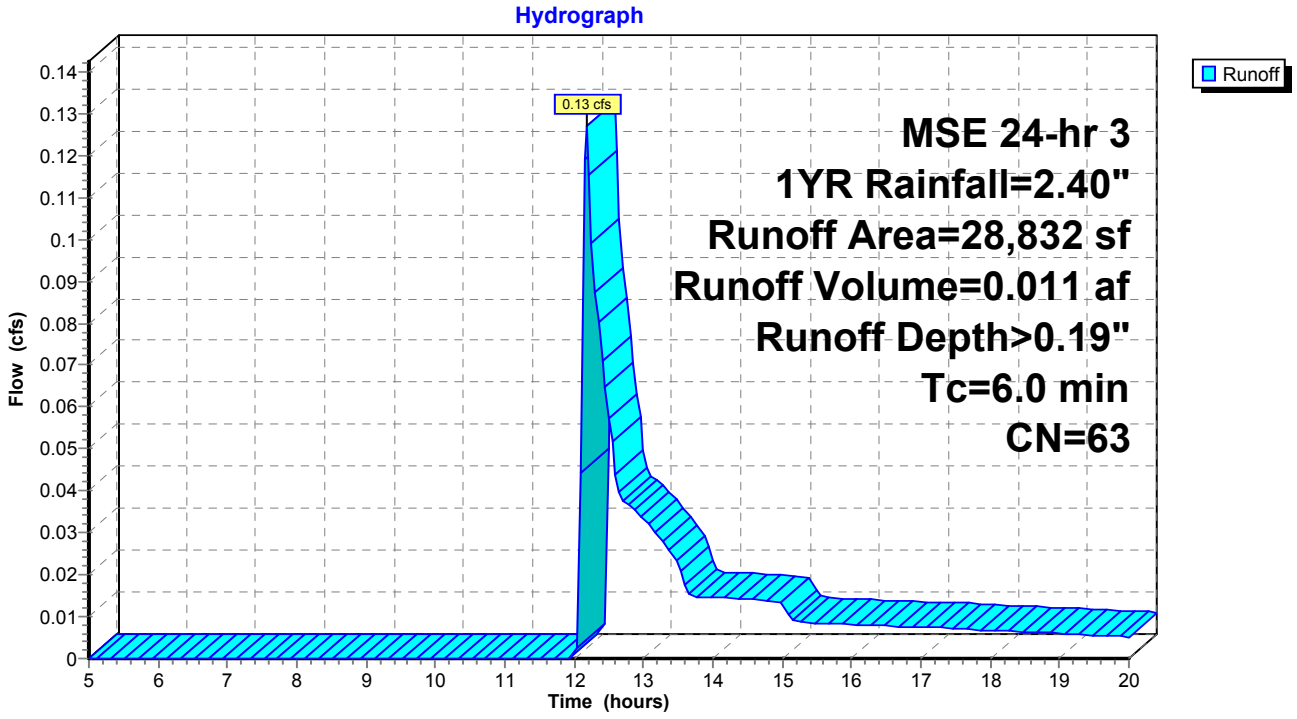
Runoff = 0.13 cfs @ 12.17 hrs, Volume= 0.011 af, Depth> 0.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1YR Rainfall=2.40"

Area (sf)	CN	Description
27,468	61	>75% Grass cover, Good, HSG B
1,364	98	Paved parking, HSG B
28,832	63	Weighted Average
27,468		95.27% Pervious Area
1,364		4.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: UNDETAINED



Summary for Pond 1P: WET POND

Inflow Area = 2.721 ac, 79.98% Impervious, Inflow Depth > 1.46" for 1YR event
Inflow = 7.26 cfs @ 12.13 hrs, Volume= 0.331 af
Outflow = 0.15 cfs @ 15.09 hrs, Volume= 0.102 af, Atten= 98%, Lag= 177.6 min
Primary = 0.15 cfs @ 15.09 hrs, Volume= 0.102 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 883.19' @ 15.09 hrs Surf.Area= 5,969 sf Storage= 11,027 cf

Plug-Flow detention time= 251.8 min calculated for 0.102 af (31% of inflow)
Center-of-Mass det. time= 178.3 min (952.1 - 773.8)

Volume	Invert	Avail.Storage	Storage Description
#1	881.00'	40,778 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

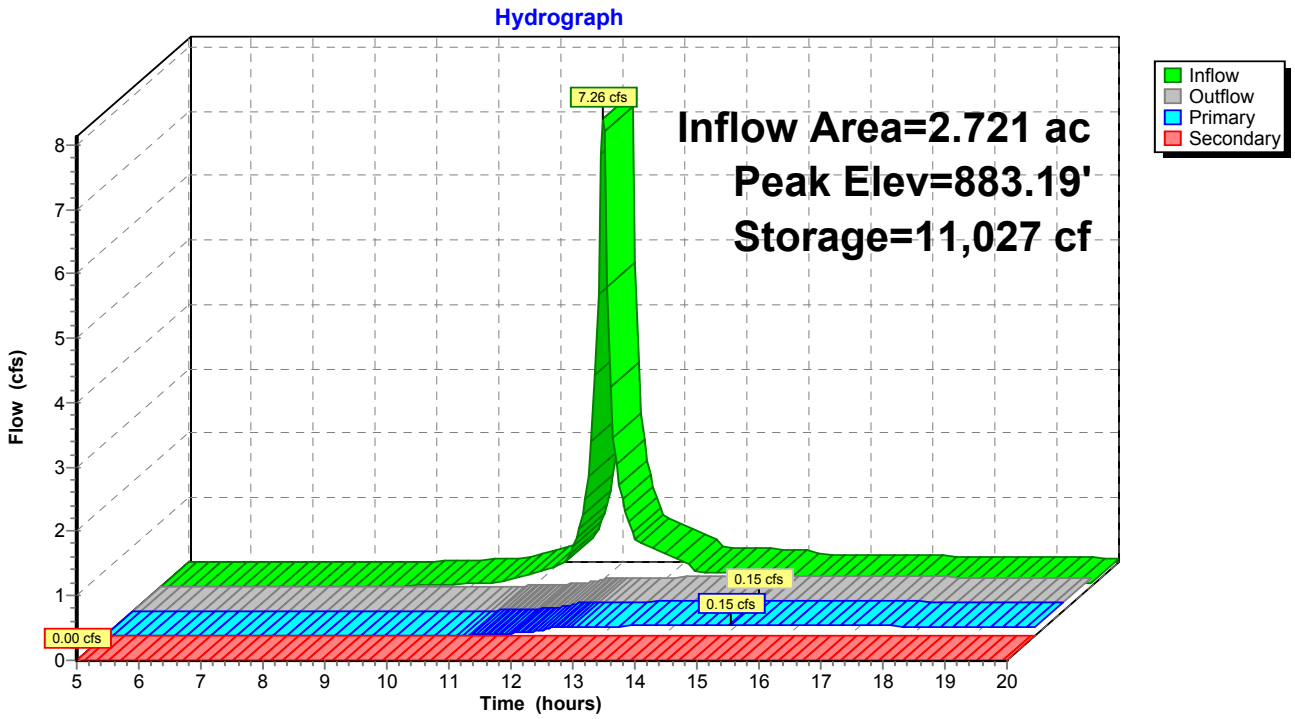
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
881.00	4,155	256.0	0	0	4,155
882.00	4,951	275.0	4,547	4,547	5,001
883.00	5,803	294.0	5,371	9,919	5,907
884.00	6,712	313.0	6,252	16,171	6,873
885.00	7,678	331.0	7,190	23,360	7,850
886.00	8,700	350.0	8,184	31,544	8,935
887.00	9,778	369.0	9,234	40,778	10,080

Device	Routing	Invert	Outlet Devices
#1	Primary	881.00'	**10.0" Round Culvert** L= 218.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 881.00' / 880.25' S= 0.0034 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.55 sf
#2	Device 1	881.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	884.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	885.80'	**8.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.15 cfs @ 15.09 hrs HW=883.19' (Free Discharge)
└**1=Culvert** (Passes 0.15 cfs of 2.12 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.99 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=881.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: WET POND

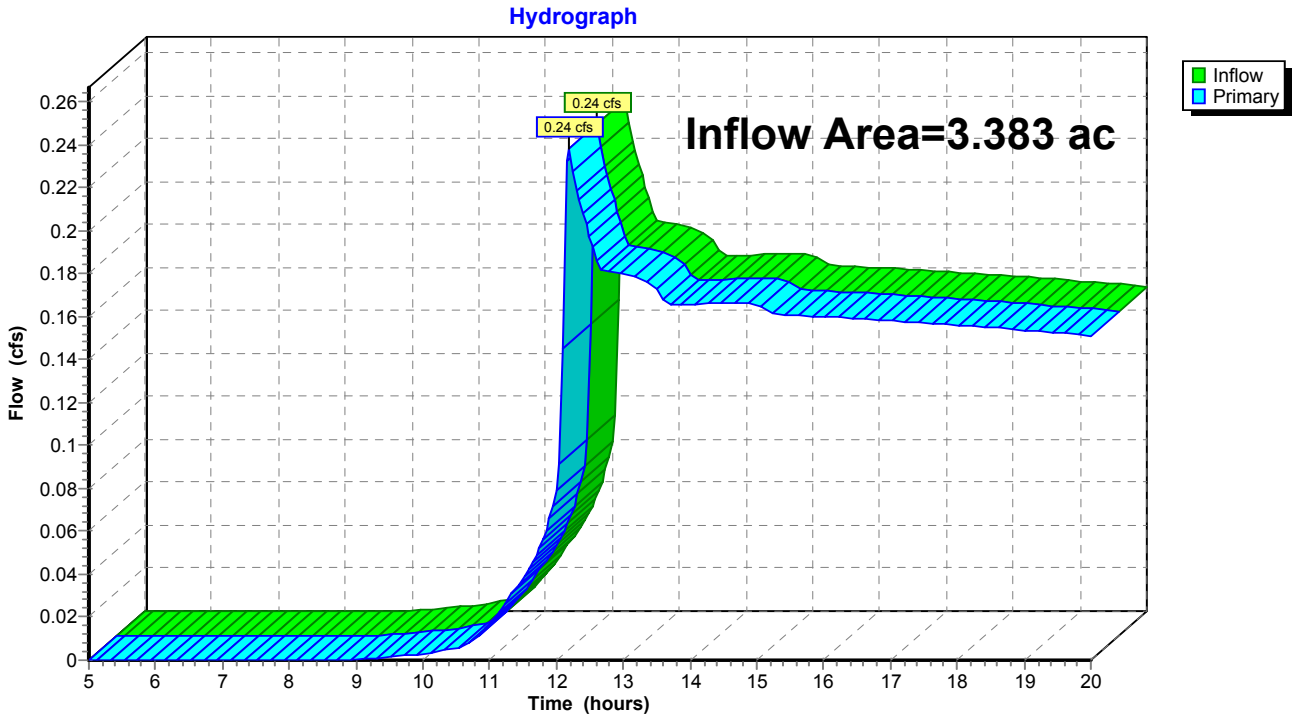


Summary for Link O: OUTLET

Inflow Area = 3.383 ac, 65.26% Impervious, Inflow Depth > 0.40" for 1YR event
Inflow = 0.24 cfs @ 12.19 hrs, Volume= 0.113 af
Primary = 0.24 cfs @ 12.19 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link O: OUTLET



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DETAINED Runoff Area=118,535 sf 79.98% Impervious Runoff Depth>1.73"
Tc=6.0 min CN=91 Runoff=8.50 cfs 0.392 af

Subcatchment2S: UNDETAINED Runoff Area=28,832 sf 4.73% Impervious Runoff Depth>0.29"
Tc=6.0 min CN=63 Runoff=0.25 cfs 0.016 af

Pond 1P: WET POND Peak Elev=883.55' Storage=13,215 cf Inflow=8.50 cfs 0.392 af
Primary=0.16 cfs 0.112 af Secondary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.112 af

Link O: OUTLET Inflow=0.38 cfs 0.128 af
Primary=0.38 cfs 0.128 af

Total Runoff Area = 3.383 ac Runoff Volume = 0.408 af Average Runoff Depth = 1.45"
34.74% Pervious = 1.175 ac 65.26% Impervious = 2.208 ac

Summary for Subcatchment 1S: DETAINED

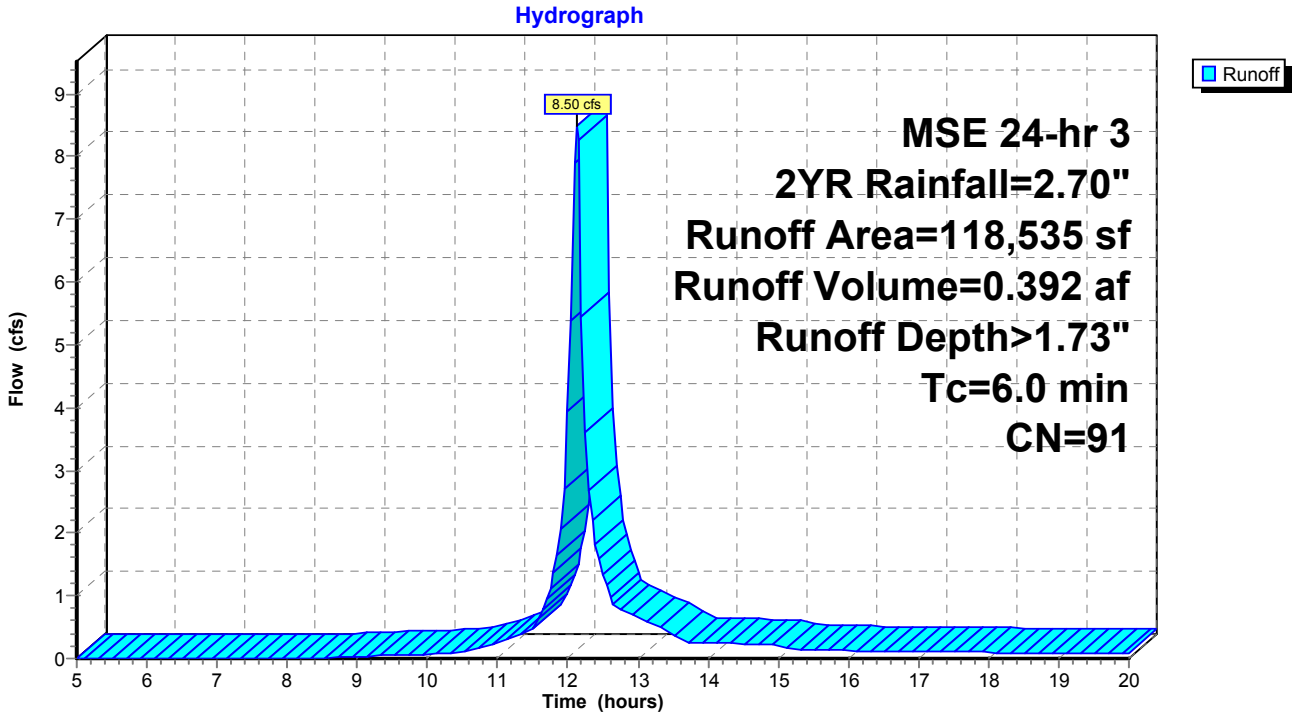
Runoff = 8.50 cfs @ 12.13 hrs, Volume= 0.392 af, Depth> 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2YR Rainfall=2.70"

Area (sf)	CN	Description
23,732	61	>75% Grass cover, Good, HSG B
94,803	98	Paved parking, HSG B
118,535	91	Weighted Average
23,732		20.02% Pervious Area
94,803		79.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: DETAINED



Summary for Subcatchment 2S: UNDETAINED

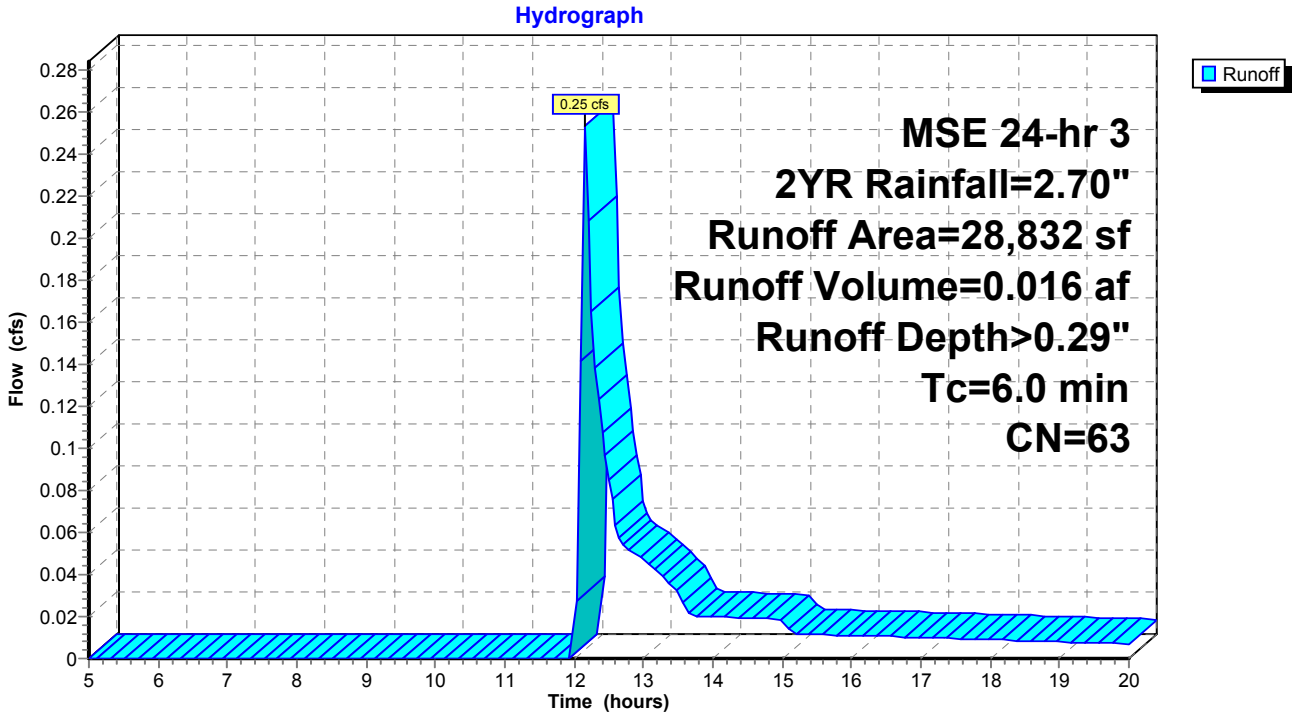
Runoff = 0.25 cfs @ 12.16 hrs, Volume= 0.016 af, Depth> 0.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2YR Rainfall=2.70"

Area (sf)	CN	Description
27,468	61	>75% Grass cover, Good, HSG B
1,364	98	Paved parking, HSG B
28,832	63	Weighted Average
27,468		95.27% Pervious Area
1,364		4.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: UNDETAINED



Summary for Pond 1P: WET POND

Inflow Area = 2.721 ac, 79.98% Impervious, Inflow Depth > 1.73" for 2YR event
Inflow = 8.50 cfs @ 12.13 hrs, Volume= 0.392 af
Outflow = 0.16 cfs @ 15.11 hrs, Volume= 0.112 af, Atten= 98%, Lag= 178.6 min
Primary = 0.16 cfs @ 15.11 hrs, Volume= 0.112 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 883.55' @ 15.11 hrs Surf.Area= 6,290 sf Storage= 13,215 cf

Plug-Flow detention time= 254.6 min calculated for 0.111 af (28% of inflow)
Center-of-Mass det. time= 178.5 min (949.4 - 771.0)

Volume	Invert	Avail.Storage	Storage Description
#1	881.00'	40,778 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

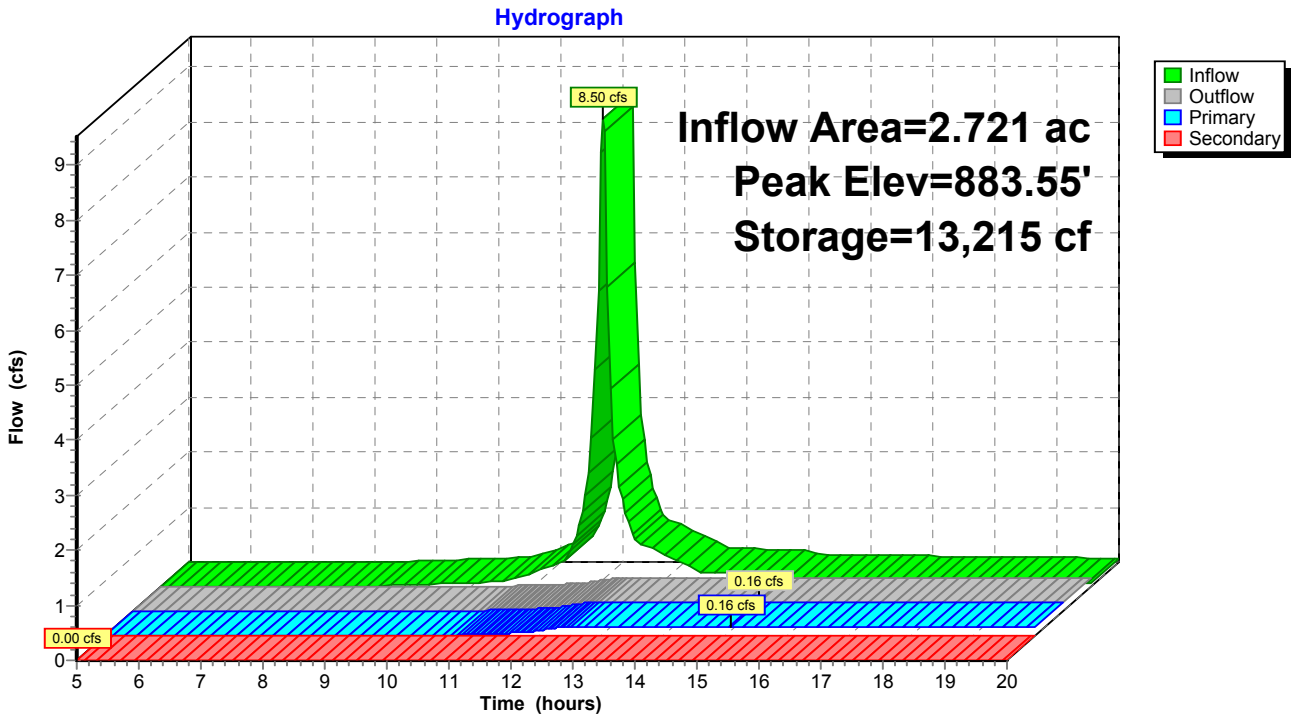
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
881.00	4,155	256.0	0	0	4,155
882.00	4,951	275.0	4,547	4,547	5,001
883.00	5,803	294.0	5,371	9,919	5,907
884.00	6,712	313.0	6,252	16,171	6,873
885.00	7,678	331.0	7,190	23,360	7,850
886.00	8,700	350.0	8,184	31,544	8,935
887.00	9,778	369.0	9,234	40,778	10,080

Device	Routing	Invert	Outlet Devices
#1	Primary	881.00'	**10.0" Round Culvert** L= 218.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 881.00' / 880.25' S= 0.0034 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.55 sf
#2	Device 1	881.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	884.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	885.80'	**8.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.16 cfs @ 15.11 hrs HW=883.55' (Free Discharge)
└**1=Culvert** (Passes 0.16 cfs of 2.30 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.55 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=881.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: WET POND

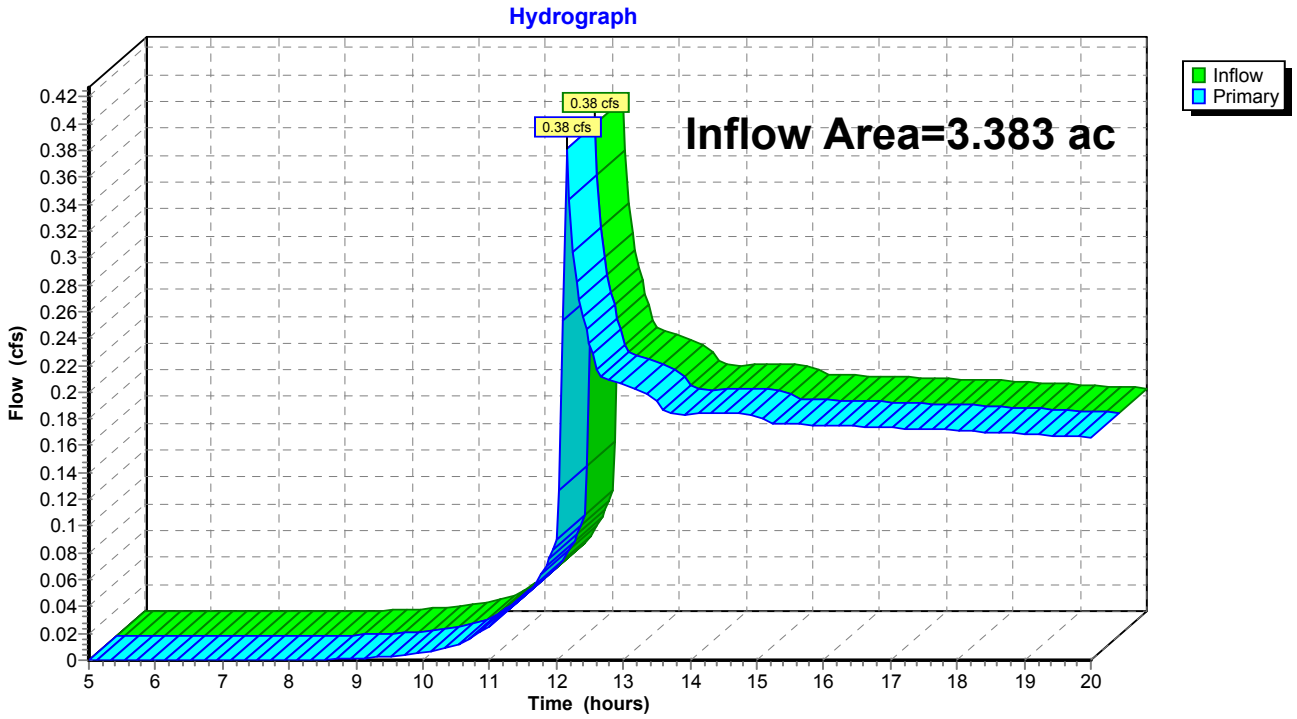


Summary for Link O: OUTLET

Inflow Area = 3.383 ac, 65.26% Impervious, Inflow Depth > 0.45" for 2YR event
Inflow = 0.38 cfs @ 12.16 hrs, Volume= 0.128 af
Primary = 0.38 cfs @ 12.16 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link O: OUTLET



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DETAINED Runoff Area=118,535 sf 79.98% Impervious Runoff Depth>2.74"
Tc=6.0 min CN=91 Runoff=13.10 cfs 0.621 af

Subcatchment2S: UNDETAINED Runoff Area=28,832 sf 4.73% Impervious Runoff Depth>0.76"
Tc=6.0 min CN=63 Runoff=0.89 cfs 0.042 af

Pond 1P: WET POND Peak Elev=884.17' Storage=17,338 cf Inflow=13.10 cfs 0.621 af
Primary=1.66 cfs 0.261 af Secondary=0.00 cfs 0.000 af Outflow=1.66 cfs 0.261 af

Link O: OUTLET Inflow=1.83 cfs 0.303 af
Primary=1.83 cfs 0.303 af

Total Runoff Area = 3.383 ac Runoff Volume = 0.663 af Average Runoff Depth = 2.35"
34.74% Pervious = 1.175 ac 65.26% Impervious = 2.208 ac

Summary for Subcatchment 1S: DETAINED

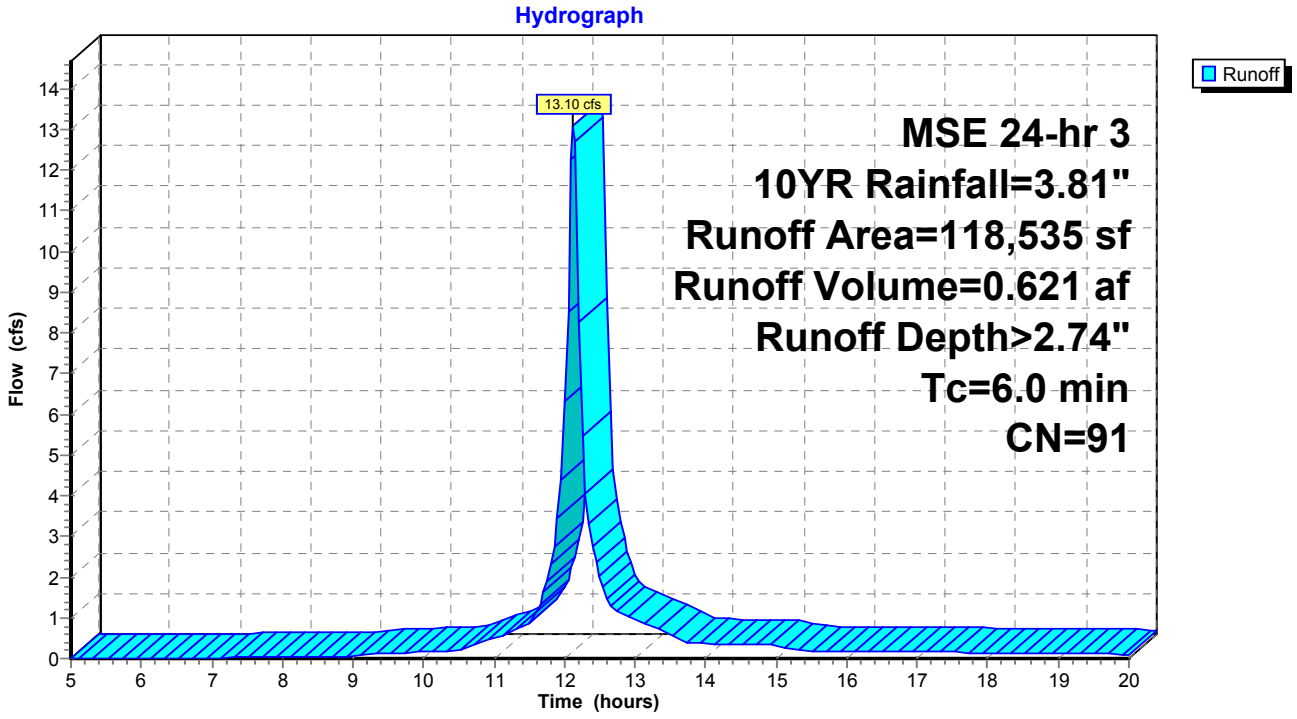
Runoff = 13.10 cfs @ 12.13 hrs, Volume= 0.621 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10YR Rainfall=3.81"

Area (sf)	CN	Description
23,732	61	>75% Grass cover, Good, HSG B
94,803	98	Paved parking, HSG B
118,535	91	Weighted Average
23,732		20.02% Pervious Area
94,803		79.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: DETAINED



Summary for Subcatchment 2S: UNDETAINED

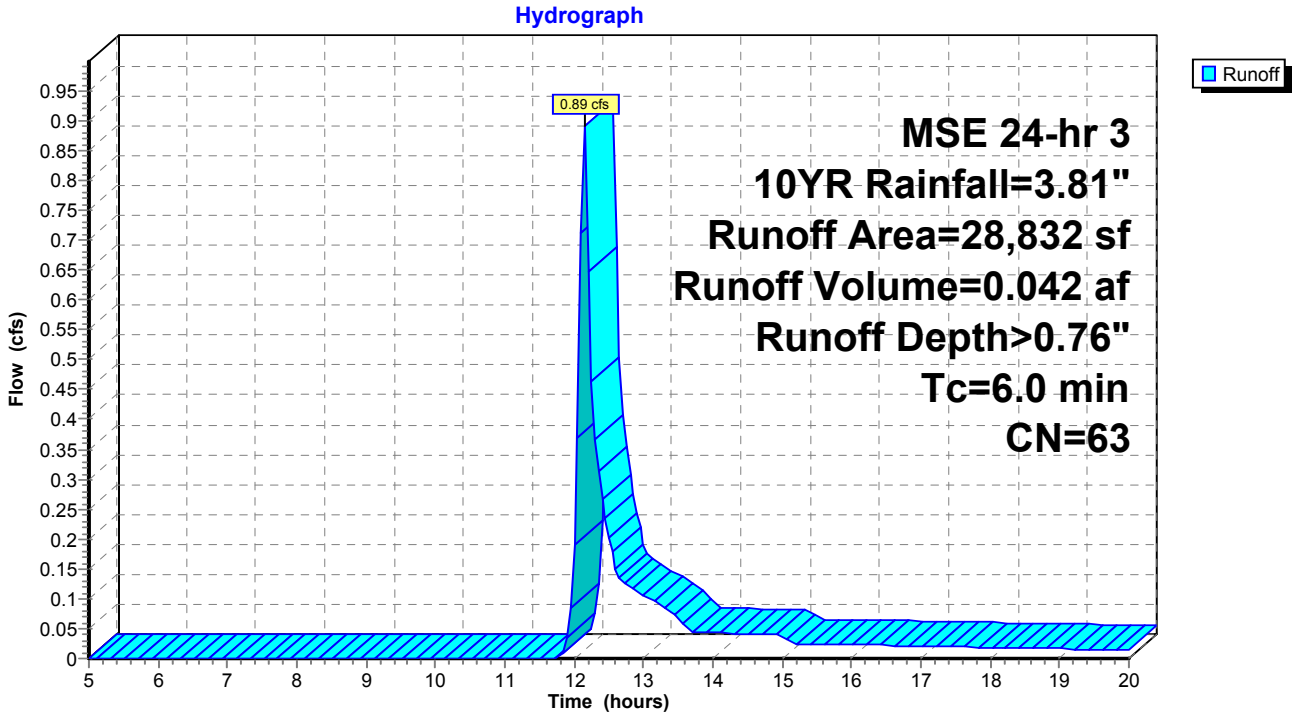
Runoff = 0.89 cfs @ 12.15 hrs, Volume= 0.042 af, Depth> 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10YR Rainfall=3.81"

Area (sf)	CN	Description
27,468	61	>75% Grass cover, Good, HSG B
1,364	98	Paved parking, HSG B
28,832	63	Weighted Average
27,468		95.27% Pervious Area
1,364		4.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: UNDETAINED



Summary for Pond 1P: WET POND

Inflow Area = 2.721 ac, 79.98% Impervious, Inflow Depth > 2.74" for 10YR event
Inflow = 13.10 cfs @ 12.13 hrs, Volume= 0.621 af
Outflow = 1.66 cfs @ 12.57 hrs, Volume= 0.261 af, Atten= 87%, Lag= 26.3 min
Primary = 1.66 cfs @ 12.57 hrs, Volume= 0.261 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 884.17' @ 12.57 hrs Surf.Area= 6,873 sf Storage= 17,338 cf

Plug-Flow detention time= 171.0 min calculated for 0.261 af (42% of inflow)
Center-of-Mass det. time= 102.4 min (865.5 - 763.0)

Volume	Invert	Avail.Storage	Storage Description
#1	881.00'	40,778 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

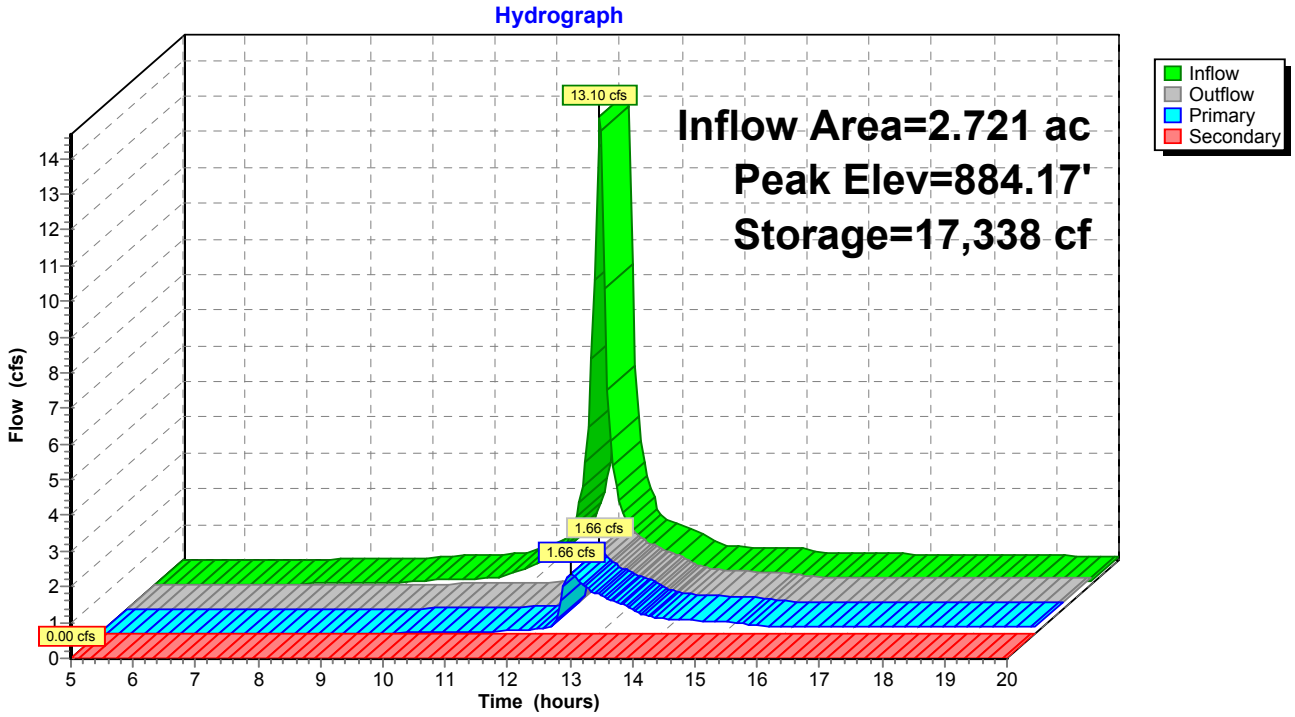
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
881.00	4,155	256.0	0	0	4,155
882.00	4,951	275.0	4,547	4,547	5,001
883.00	5,803	294.0	5,371	9,919	5,907
884.00	6,712	313.0	6,252	16,171	6,873
885.00	7,678	331.0	7,190	23,360	7,850
886.00	8,700	350.0	8,184	31,544	8,935
887.00	9,778	369.0	9,234	40,778	10,080

Device	Routing	Invert	Outlet Devices
#1	Primary	881.00'	**10.0" Round Culvert** L= 218.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 881.00' / 880.25' S= 0.0034 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.55 sf
#2	Device 1	881.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	884.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	885.80'	**8.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.64 cfs @ 12.57 hrs HW=884.17' (Free Discharge)
└**1=Culvert** (Passes 1.64 cfs of 2.57 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.46 fps)
  └**3=Orifice/Grate** (Weir Controls 1.45 cfs @ 1.35 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=881.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: WET POND

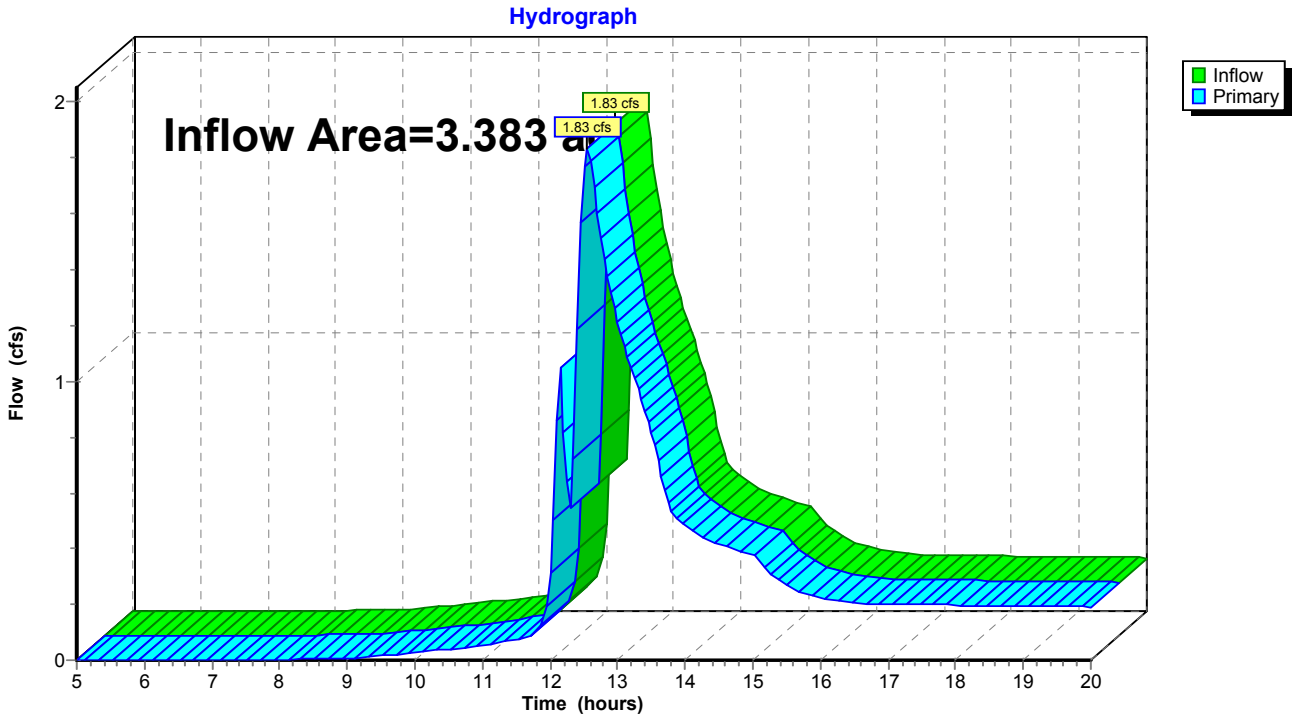


Summary for Link O: OUTLET

Inflow Area = 3.383 ac, 65.26% Impervious, Inflow Depth > 1.08" for 10YR event
Inflow = 1.83 cfs @ 12.55 hrs, Volume= 0.303 af
Primary = 1.83 cfs @ 12.55 hrs, Volume= 0.303 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link O: OUTLET



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DETAINED Runoff Area=118,535 sf 79.98% Impervious Runoff Depth>4.97"
Tc=6.0 min CN=91 Runoff=22.81 cfs 1.127 af

Subcatchment2S: UNDETAINED Runoff Area=28,832 sf 4.73% Impervious Runoff Depth>2.19"
Tc=6.0 min CN=63 Runoff=2.73 cfs 0.121 af

Pond 1P: WET POND Peak Elev=885.72' Storage=29,122 cf Inflow=22.81 cfs 1.127 af
Primary=3.15 cfs 0.756 af Secondary=0.00 cfs 0.000 af Outflow=3.15 cfs 0.756 af

Link O: OUTLET Inflow=5.56 cfs 0.876 af
Primary=5.56 cfs 0.876 af

Total Runoff Area = 3.383 ac Runoff Volume = 1.248 af Average Runoff Depth = 4.43"
34.74% Pervious = 1.175 ac 65.26% Impervious = 2.208 ac

Summary for Subcatchment 1S: DETAINED

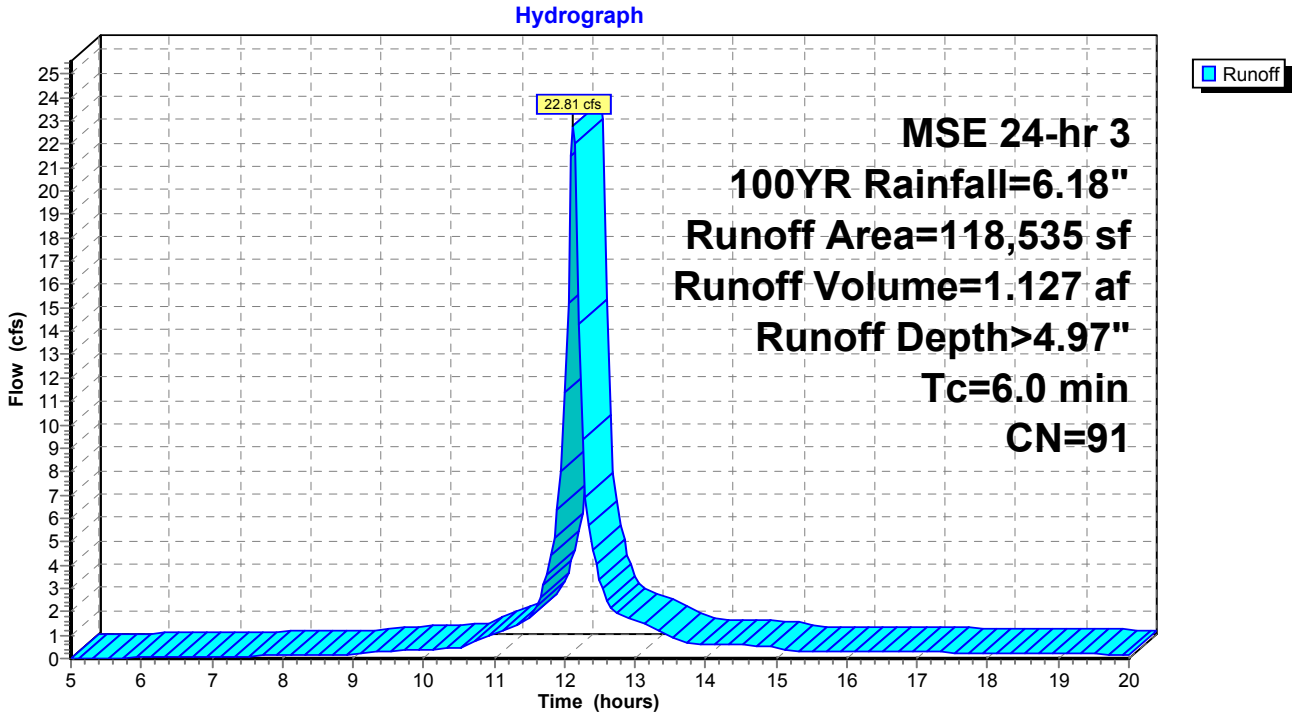
Runoff = 22.81 cfs @ 12.13 hrs, Volume= 1.127 af, Depth> 4.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100YR Rainfall=6.18"

Area (sf)	CN	Description
23,732	61	>75% Grass cover, Good, HSG B
94,803	98	Paved parking, HSG B
118,535	91	Weighted Average
23,732		20.02% Pervious Area
94,803		79.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: DETAINED



Summary for Subcatchment 2S: UNDETAINED

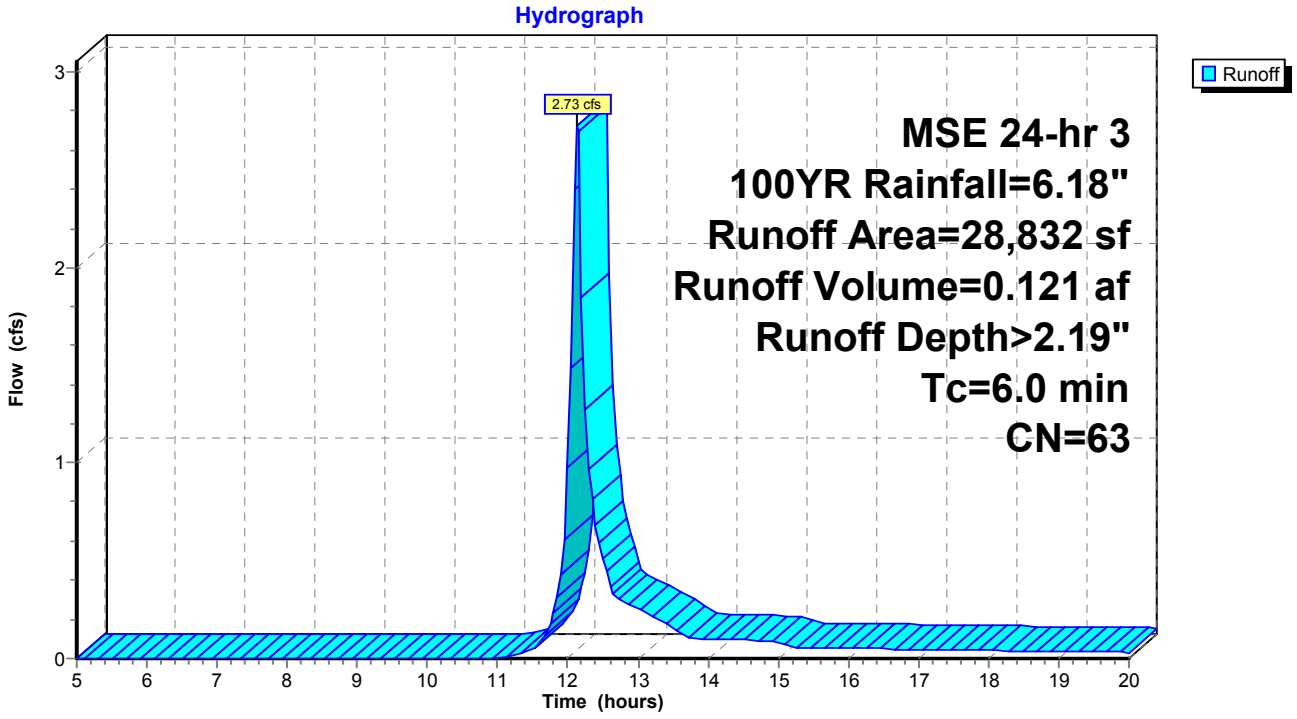
Runoff = 2.73 cfs @ 12.14 hrs, Volume= 0.121 af, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100YR Rainfall=6.18"

Area (sf)	CN	Description
27,468	61	>75% Grass cover, Good, HSG B
1,364	98	Paved parking, HSG B
28,832	63	Weighted Average
27,468		95.27% Pervious Area
1,364		4.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: UNDETAINED



Summary for Pond 1P: WET POND

Inflow Area = 2.721 ac, 79.98% Impervious, Inflow Depth > 4.97" for 100YR event
Inflow = 22.81 cfs @ 12.13 hrs, Volume= 1.127 af
Outflow = 3.15 cfs @ 12.53 hrs, Volume= 0.756 af, Atten= 86%, Lag= 24.1 min
Primary = 3.15 cfs @ 12.53 hrs, Volume= 0.756 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 885.72' @ 12.53 hrs Surf.Area= 8,404 sf Storage= 29,122 cf

Plug-Flow detention time= 129.1 min calculated for 0.753 af (67% of inflow)
Center-of-Mass det. time= 76.2 min (828.8 - 752.6)

Volume	Invert	Avail.Storage	Storage Description
#1	881.00'	40,778 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

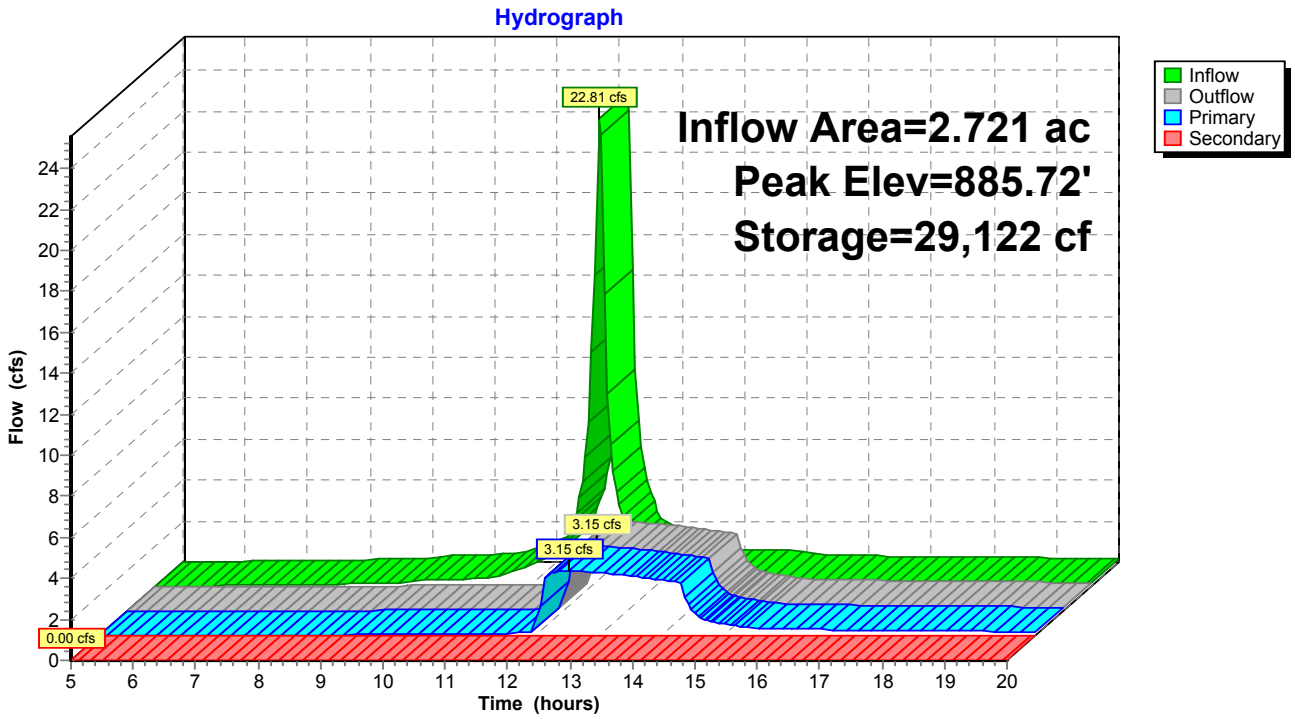
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
881.00	4,155	256.0	0	0	4,155
882.00	4,951	275.0	4,547	4,547	5,001
883.00	5,803	294.0	5,371	9,919	5,907
884.00	6,712	313.0	6,252	16,171	6,873
885.00	7,678	331.0	7,190	23,360	7,850
886.00	8,700	350.0	8,184	31,544	8,935
887.00	9,778	369.0	9,234	40,778	10,080

Device	Routing	Invert	Outlet Devices
#1	Primary	881.00'	**10.0" Round Culvert** L= 218.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 881.00' / 880.25' S= 0.0034 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.55 sf
#2	Device 1	881.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	884.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	885.80'	**8.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.15 cfs @ 12.53 hrs HW=885.72' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.15 cfs @ 5.77 fps)
  └**2=Orifice/Grate** (Passes < 0.23 cfs potential flow)
  └**3=Orifice/Grate** (Passes < 19.81 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=881.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: WET POND

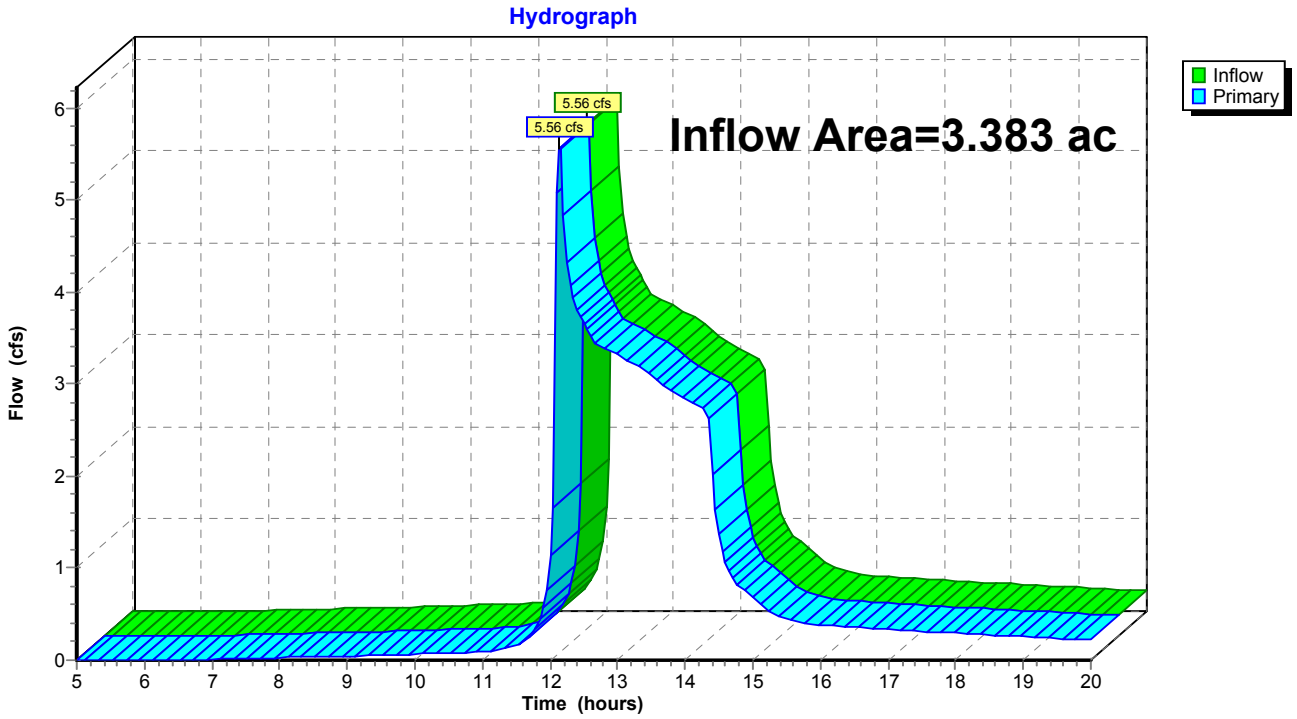


Summary for Link O: OUTLET

Inflow Area = 3.383 ac, 65.26% Impervious, Inflow Depth > 3.11" for 100YR event
Inflow = 5.56 cfs @ 12.14 hrs, Volume= 0.876 af
Primary = 5.56 cfs @ 12.14 hrs, Volume= 0.876 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

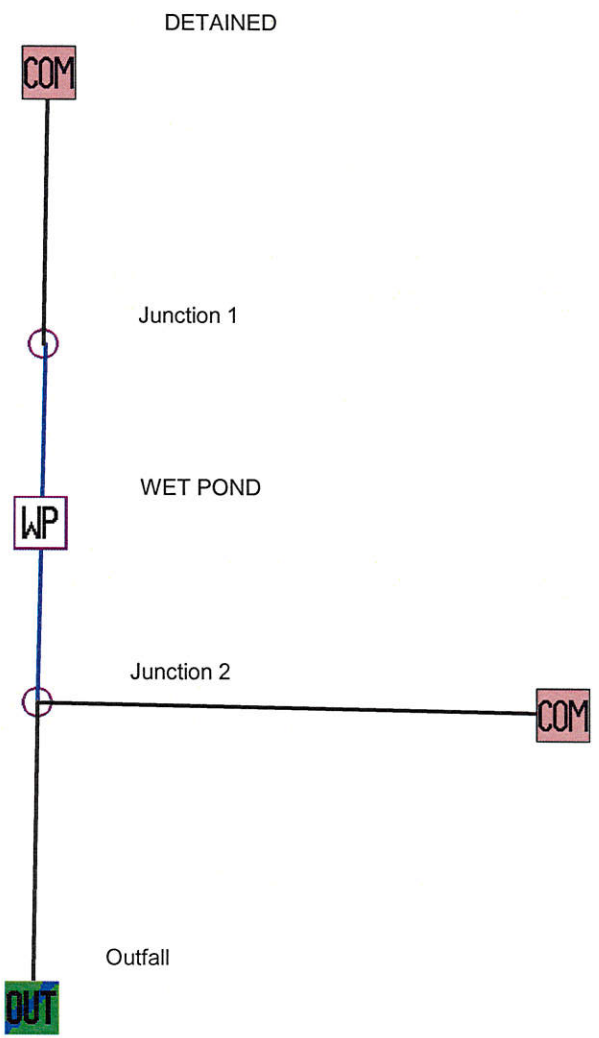
Link O: OUTLET



APPENDIX 5

Water Quality Calculations

- Post development Modeling


DETAINED
COM
Junction 1
WET POND
WP
Junction 2
COM
Outfall
OUT

Data file name: R:\2018\18-8713A Avid Hotel\Civil\SWMP\Modeling\AVID HOTEL.mdb
WinSLAMM Version 10.4.1
Rain file name: C:\WinSLAMM Files\Rain Files\WI Green Bay 69.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/69 Study period ending date: 12/31/69
Start of Winter Season: 12/02 End of Winter Season: 03/12
Date: 05-10-2019 Time: 09:59:19
Site information:

LU# 1 - Commercial: DETAINED Total area (ac): 2.722
- 1 - Roofs 1: 0.386 ac. Pitched Connected PSD File: C:\WinSLAMM Files\NURP.cpz
- 13 - Paved Parking 1: 1.471 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz CB-CP#2
- 25 - Driveways 1: 0.121 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
- 31 - Sidewalks 1: 0.110 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
- 45 - Large Landscaped Areas 1: 0.545 ac. Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz
- 70 - Water Body Areas: 0.089 ac. PSD File:

LU# 2 - Commercial: UNDETAINED Total area (ac): 0.662
- 25 - Driveways 1: 0.017 ac. Disconnected Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz
- 31 - Sidewalks 1: 0.014 ac. Disconnected Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz
- 45 - Large Landscaped Areas 1: 0.631 ac. Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - WET POND
- Particle Size Distribution file name: Not needed - calculated by program
- Initial stage elevation (ft): 5
- Peak to Average Flow Ratio: 3.8
- Maximum flow allowed into pond (cfs): No maximum value entered
- Outlet Characteristics:
  - Outlet type: Orifice 1
    1. Orifice diameter (ft): 0.17
    2. Number of orifices: 1
    3. Invert elevation above datum (ft): 5
  - Outlet type: Broad Crested Weir
    1. Weir crest length (ft): 10
    2. Weir crest width (ft): 10
    3. Height from datum to bottom of weir opening: 9.8
  - Outlet type: Vertical Stand Pipe
    1. Stand pipe diameter (ft): 2
    2. Stand pipe height above datum (ft): 8
- Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0167	0.00	0.00
2	1.00	0.0225	0.00	0.00
3	2.00	0.0290	0.00	0.00
4	3.00	0.0363	0.00	0.00
5	4.00	0.0443	0.00	0.00
6	5.00	0.0954	0.00	0.00
7	6.00	0.1136	0.00	0.00
8	7.00	0.1332	0.00	0.00
9	8.00	0.1541	0.00	0.00
10	9.00	0.1763	0.00	0.00
11	10.00	0.1997	0.00	0.00
12	10.50	0.2245	0.00	0.00

Control Practice 2: Catchbasin Cleaning CP# 1 (SA) - SA Device, LU# 1 ,SA# 13
1. Fraction of area served by catchbasins (acres) = 1.00
2. Number of catchbasins = 18
3. Average sump depth below catchbasin outlet invert (feet) = 2
4. Depth of sediment in catchbasin sump at beginning of study period (ft) = 0
5. Typical outlet pipe diameter (ft) = 1
6. Typical outlet pipe Mannings n = 0.013
7. Typical outlet pipe slope (ft/ft) = 0.003
8. Typical catchbasin sump surface area (square feet) = 12.6
9. Total catchbasin depth (feet) = 5
10. Inflow hydrograph peak to average flow ratio = 3.8
11. Leakage rate through sump bottom (in/hr) = 0
12. Catchbasin Critical Particle Size File Name: Not needed - calculated by program

SLAMM for Windows Version 10.4.1

Data file name: R:\2018\18-8713A Avid Hotel\Civil\SWMP\Modeling\AVID HOTEL.mdb
Data file description:
Rain file name: C:\WinSLAMM Files\Rain Files\WI Green Bay 69.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Start of Winter Season: 12/02 End of Winter Season: 03/12
Model Run Start Date: 01/01/69 Model Run End Date: 12/31/69
Date of run: 05-10-2019 Time of run: 09:57:47
Total Area Modeled (acres): 3.384
Years in Model Run: 0.99

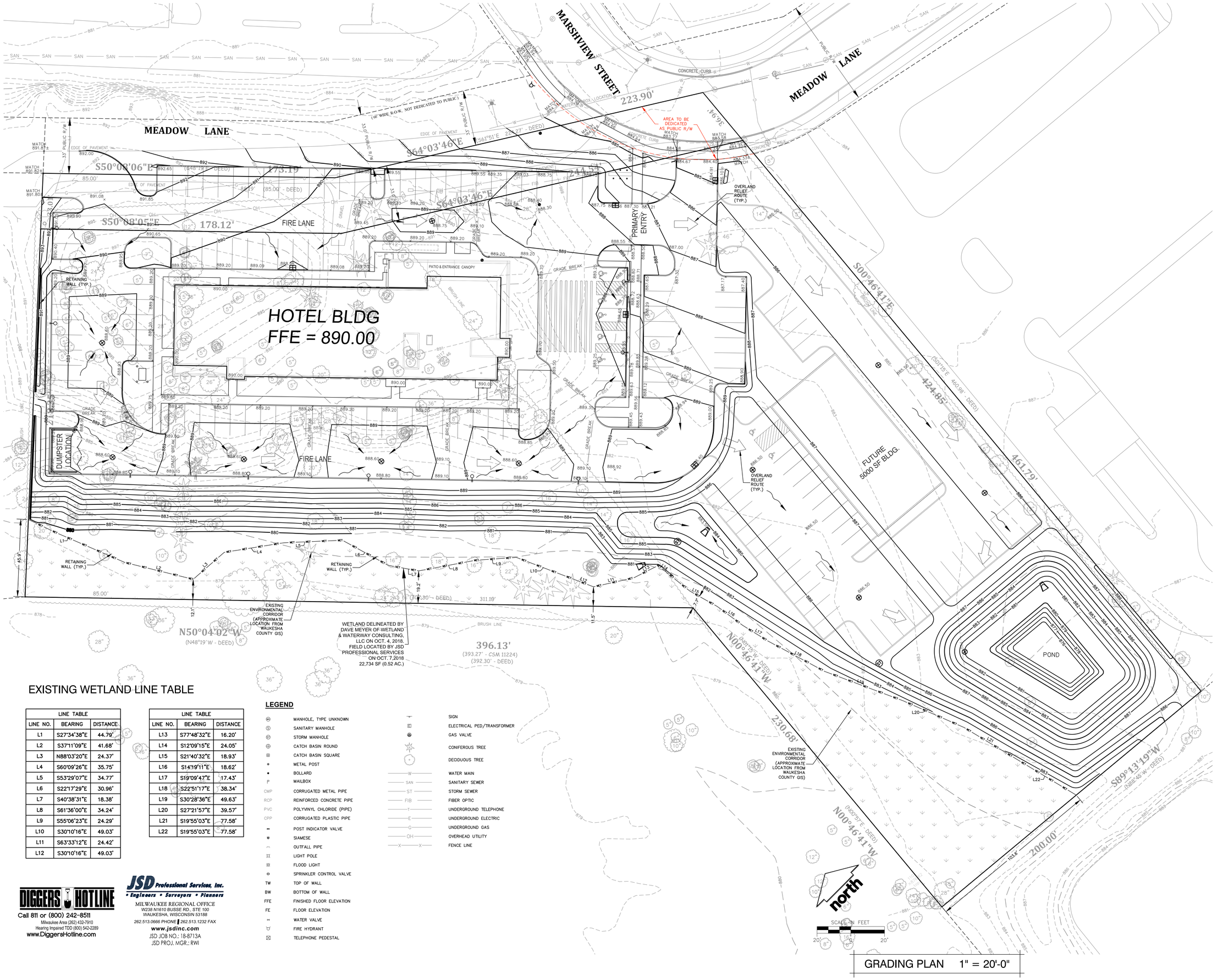
	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	144547	-	104.6	944.0	-
Outfall Total with Controls:	144664	-0.08%	20.01	180.7	80.86%
Annualized Total After Outfall Controls:	146673				

183.2

APPENDIX 6

Storm Sewer Design

- PROPOSED GRADING, EROSION CONTROL, & UTILITY PLAN
- PROPOSED WET POND DETAIL
- STORM SEWER SIZING CALCULATIONS
- ANTI-SEEP COLLAR DESIGN



EXISTING WETLAND LINE TABLE

LINE TABLE		
LINE NO.	BEARING	DISTANCE
L1	S27°34'38"E	44.79'
L2	S37°11'09"E	41.68'
L3	N88°03'20"E	24.37'
L4	S60°09'26"E	35.75'
L5	S53°29'07"E	34.77'
L6	S22°17'29"E	30.96'
L7	S40°38'31"E	18.38'
L8	S61°36'00"E	34.24'
L9	S55°06'23"E	24.29'
L10	S30°10'16"E	49.03'
L11	S63°33'12"E	24.42'
L12	S30°10'16"E	49.03'

LINE TABLE		
LINE NO.	BEARING	DISTANCE
L13	S77°48'32"E	16.20'
L14	S12°09'15"E	24.05'
L15	S21°40'32"E	18.93'
L16	S14°19'11"E	18.62'
L17	S19°09'47"E	17.43'
L18	S22°51'17"E	38.34'
L19	S30°28'36"E	49.63'
L20	S27°21'57"E	39.57'
L21	S19°55'03"E	77.58'
L22	S19°55'03"E	77.58'

LEGEND

	MANHOLE, TYPE UNKNOWN		SIGN
S	SANITARY MANHOLE	E	ELECTRICAL PED/TRANSFORMER
ST	STORM MANHOLE	G	GAS VALVE
	CATCH BASIN ROUND		CONIFEROUS TREE
	CATCH BASIN SQUARE		DECIDUOUS TREE
	METAL POST		
	BOLLARD	W	WATER MAIN
	MAILBOX	SAN	SANITARY SEWER
CMP	CORRUGATED METAL PIPE	ST	STORM SEWER
RCP	REINFORCED CONCRETE PIPE	FIB	FIBER OPTIC
PVC	POLYVINYL CHLORIDE (PIPE)	T	UNDERGROUND TELEPHONE
CPP	CORRUGATED PLASTIC PIPE	E	UNDERGROUND ELECTRIC
	POST INDICATOR VALVE	G	UNDERGROUND GAS
	SIAMESE	OH	OVERHEAD UTILITY
	OUTFALL PIPE	X	FENCE LINE
	LIGHT POLE		
	FLOOD LIGHT		
	SPRINKLER CONTROL VALVE		
TW	TOP OF WALL		
BW	BOTTOM OF WALL		
FFE	FINISHED FLOOR ELEVATION		
FE	FLOOR ELEVATION		
	WATER VALVE		
	FIRE HYDRANT		
	TELEPHONE PEDESTAL		

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JSD JOB NO.: 18-8713A
JSD PROJ. MGR.: RWI

GRADING PLAN 1" = 20'-0"

MSI GENERAL CORPORATION
P.O. BOX. 7
OCONOMOWOC, WI 53066
PHONE: 262-367-3661
FAX: 262-367-7390

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KEY PLAN

avid AN IHG® HOTEL

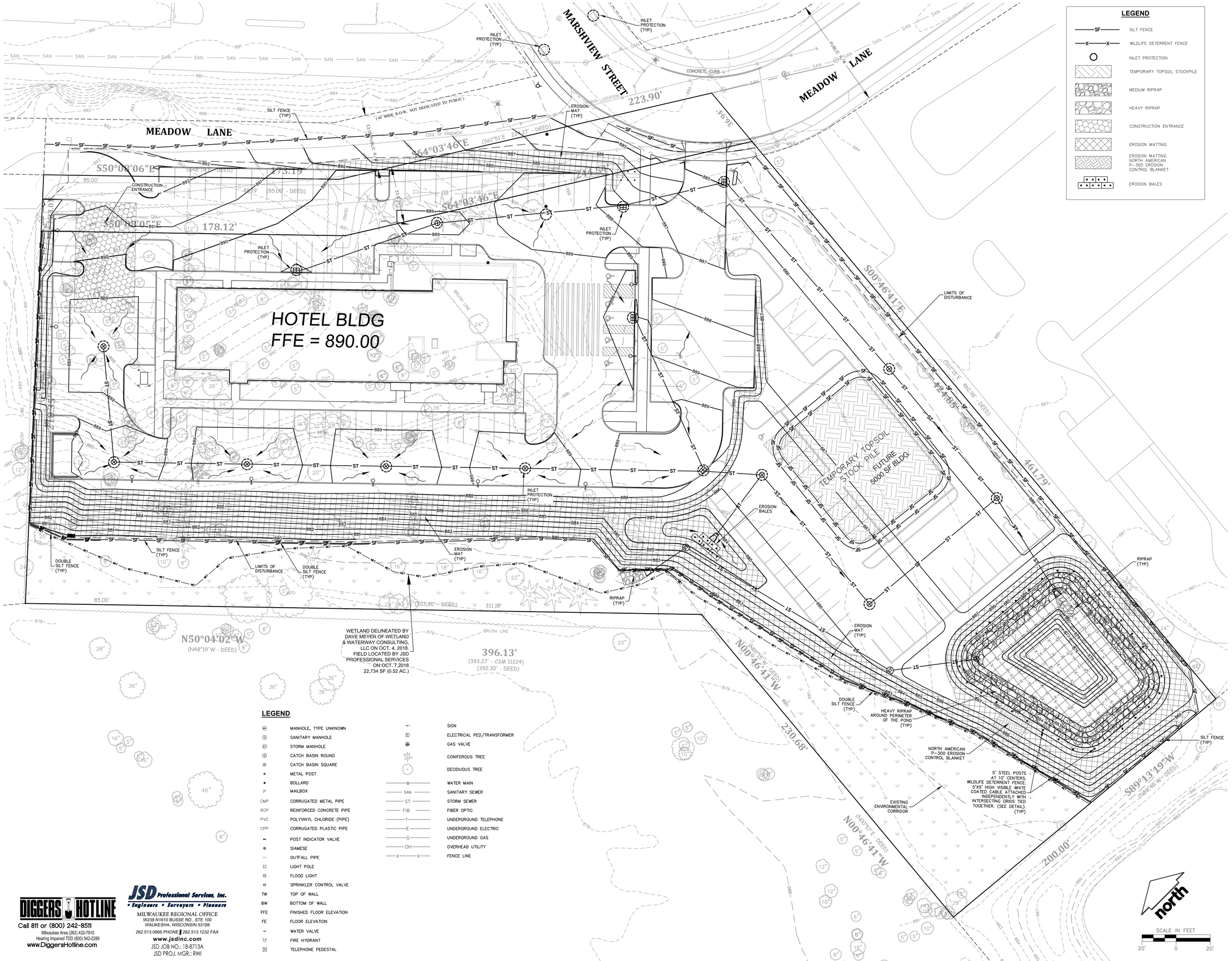
PROJECT ADDRESS:
PROJECT NAME
avid™ hotels
STREET ADDRESS
Marshview Street
CITY/ STATE / ZIP
Waukesha, WI 53186

ALL WORK TO BE COMPLETED AS SHOWN, AND IN ACCORDANCE WITH THE LATEST EDITION OF THE MSI GENERAL MASTER SPECIFICATION

Architect:	Engineer:	Reviewed By:
CJO	JSD	XXX

Sheet Title:
GRADING PLAN
Sheet Number:
C-103
Project Number: P12269
P12269

MANAGERS . ENGINEERS . CONTRACTORS . ARCHITECTS



LEGEND

SF	SILT FENCE
X X	WILDLIFE DETERRENT FENCE
	INLET PROTECTION
	TEMPORARY TOPSOIL STOCKPILE
	MEDIUM RIPRAP
	HEAVY RIPRAP
	CONSTRUCTION ENTRANCE
	EROSION MATTING
	EROSION MATTING NORTH AMERICAN P-300 EROSION CONTROL BLANKET
	EROSION BALES

LEGEND

	MANHOLE, TYPE UNKNOWN		SIGN
S	SANITARY MANHOLE		ELECTRICAL PED/TRANSFORMER
ST	STORM MANHOLE		GAS VALVE
	CATCH BASIN ROUND		CONIFEROUS TREE
	CATCH BASIN SQUARE		DECIDUOUS TREE
	METAL POST		
	BOLLARD	W	WATER MAIN
P	MAILBOX	SAN	SANITARY SEWER
CMP	CORRUGATED METAL PIPE	ST	STORM SEWER
RCP	REINFORCED CONCRETE PIPE	FIB	FIBER OPTIC
PVC	POLYVINYL CHLORIDE (PIPE)	T	UNDERGROUND TELEPHONE
CPP	CORRUGATED PLASTIC PIPE	E	UNDERGROUND ELECTRIC
	POST INDICATOR VALVE	G	UNDERGROUND GAS
	SIAMESE	OH	OVERHEAD UTILITY
	OUTFALL PIPE	X X	FENCE LINE
	LIGHT POLE		
	FLOOD LIGHT		
	SPRINKLER CONTROL VALVE		
TW	TOP OF WALL		
BW	BOTTOM OF WALL		
FFE	FINISHED FLOOR ELEVATION		
FE	FLOOR ELEVATION		
	WATER VALVE		
	FIRE HYDRANT		
	TELEPHONE PEDESTAL		

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JSD JOB NO.: 18-8713A
JSD PROJ. MGR.: RWI

EROSION CONTROL PLAN 1" = 20'-0"

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PHONE: 262-367-3661
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KEY PLAN

avid AN IHG® HOTEL

PROJECT ADDRESS:

PROJECT NAME
avid™ hotels
STREET ADDRESS
Marshview Street
CITY/ STATE / ZIP
Waukesha, WI 53186

ALL WORK TO BE COMPLETED AS SHOWN, AND IN ACCORDANCE WITH THE LATEST EDITION OF THE MSI GENERAL MASTER SPECIFICATION

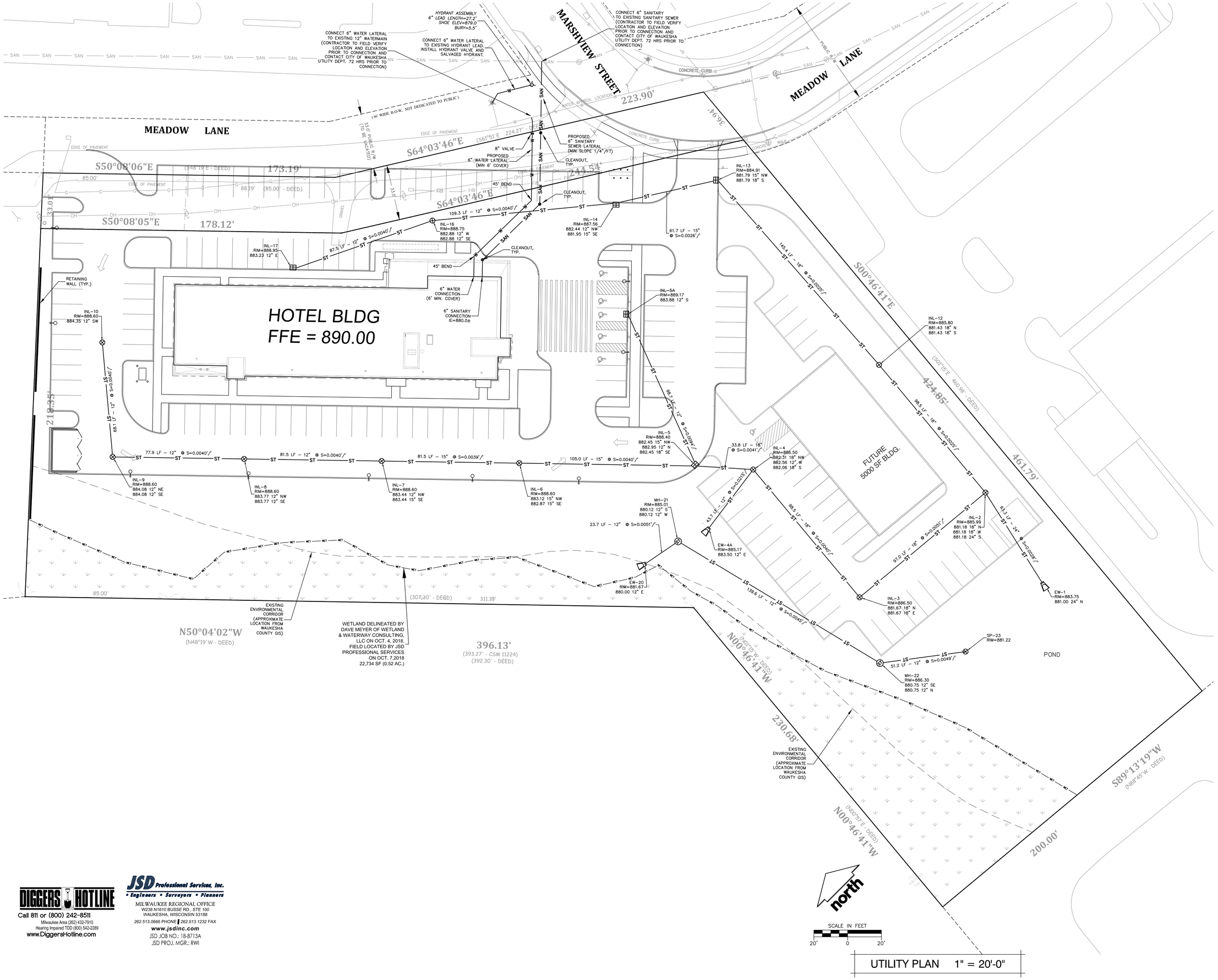
Architect:	Engineer:	Reviewed By:
CJO	JSD	XXX

Sheet Title:
EROS. CONTROL PLAN

Sheet Number:
C-102

Project Number: P12269

P12269



UTILITY PLAN 1" = 20'-0"

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Architect:	Engineer:	Reviewed By:
CJO	JSD	XXX

Sheet Title:
UTILITY PLAN

Sheet Number:
C-104

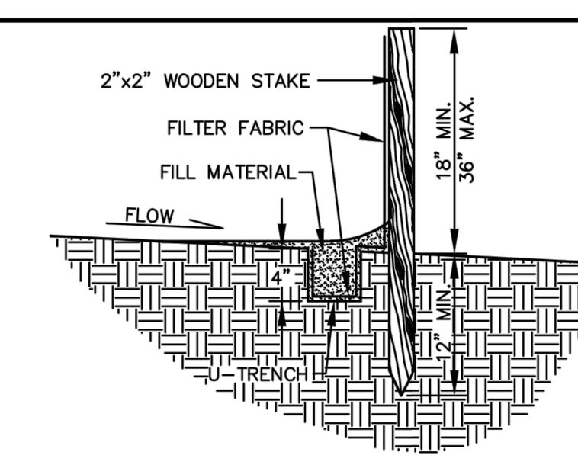
Project Number: P12269

P12269

MANAGERS · ENGINEERS · CONTRACTORS · ARCHITECTS

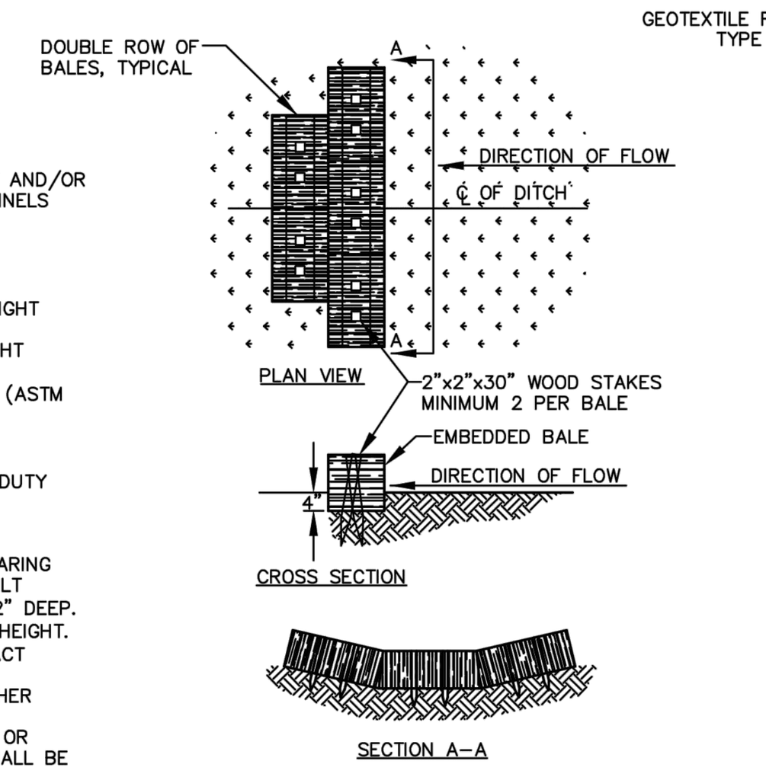
EROSION CONTROL DETAILS

NOT TO SCALE



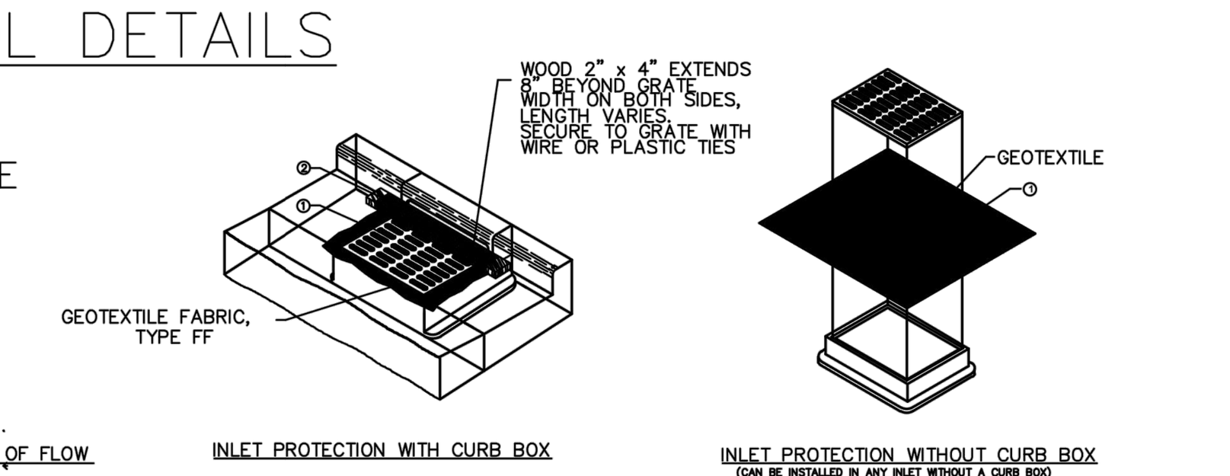
NOTES:
1. SILT FENCE SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITY AND/OR WITHIN 24 HOURS OF CONSTRUCTING DITCHES, DIVERSIONS, OR OTHER CHANNELS
2. SILT FENCE FABRIC SHALL HAVE THE FOLLOWING PROPERTIES:
   A. GRAB STRENGTH: 100 LBS. (ASTM D-1682)
   B. MULLEN BURST: 200 PSI MIN. (ASTM D-3786)
   C. EQUIVALENT OPENING SIZE: BETWEEN 50 AND 140 FOR SOILS WITH MORE THAN 15 PERCENT BY WEIGHT PASSING A NO. 200 SIEVE. BETWEEN 20 AND 50 FOR SOILS WITH LESS THAN 15 PERCENT BY WEIGHT PASSING A NO. 200 SIEVE.
   D. WATER FLOW RATE OF 10 GAL/MIN/SQ. FT. AT 50 MM CONSTANT HEAD (ASTM D-4491)
   E. ULTRA VIOLET RADIATION STABILITY OF 90%
   F. IF SUPPORT NETTING IS REQUIRED, NETTING SHALL BE AN INDUSTRIAL POLYPROPYLENE WITH A 3/4 INCH SPACING OR EQUIVALENT. A HEAVY DUTY NYLON TOP SUPPORT CORD OR EQUIVALENT IS REQUIRED.
3. INSTALLATION PROCEDURE AS FOLLOWS:
   A. EXCAVATE A U-TRENCH UPSLOPE FROM THE LINE OF STAKES.
   B. INSTALL SILT FENCE IN TRENCH. CARE SHOULD BE TAKEN TO AVOID TEARING FABRIC. TORN FABRIC SHALL BE REMOVED AND A NEW SEGMENT OF SILT FENCE SHALL BE PLACED. STAKES SHALL BE DRIVEN A MINIMUM OF 12" DEEP. SILT FENCE SHALL BE A MINIMUM OF 18" AND A MAXIMUM OF 36" IN HEIGHT.
   C. FIT LOWER 8" OF FILTER FABRIC INTO U-TRENCH. BACKFILL AND COMPACT U-TRENCH.
   D. THE ENDS OF TWO SECTIONS OF SILT FENCE MUST BE WRAPPED TOGETHER AROUND A STAKE AND THEN DRIVEN INTO THE GROUND.
4. SILT FENCE SHALL BE INSPECTED WITHIN 24 HOURS AFTER EACH RAINFALL OR DAILY DURING PERIODS OF PROLONGED RAIN. REPAIR OR REPLACEMENT SHALL BE MADE IMMEDIATELY.
5. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT OR WHEN DEPOSITS REACH ONE HALF THE HEIGHT OF THE BARRIER.
6. SILT FENCE SHALL BE REMOVED ONLY WHEN THE THREAT OF EROSION HAS PASSED AND PERMANENT VEGETATION HAS BEEN ESTABLISHED.

SILT FENCE DETAIL



NOTES:
1. INSTALL BALES BY DIGGING A 4" DEEP TRENCH WIDE ENOUGH FOR BALE. EMBED BALE IN TRENCH AND SECURE WITH STAKES.
2. 2. BALES SHALL BE INSPECTED WITHIN 24 HOURS AFTER EACH RAINFALL OR DAILY DURING PERIODS OF PROLONGED RAIN. REPAIR OR REPLACEMENT SHALL BE MADE IMMEDIATELY.
3. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT OR WHEN DEPOSITS REACH ONE HALF THE HEIGHT OF THE BARRIER. BALES SHALL BE REMOVED ONLY WHEN
4. THE THREAT OF EROSION HAS PASSED AND PERMANENT VEGETATION HAS BEEN ESTABLISHED.

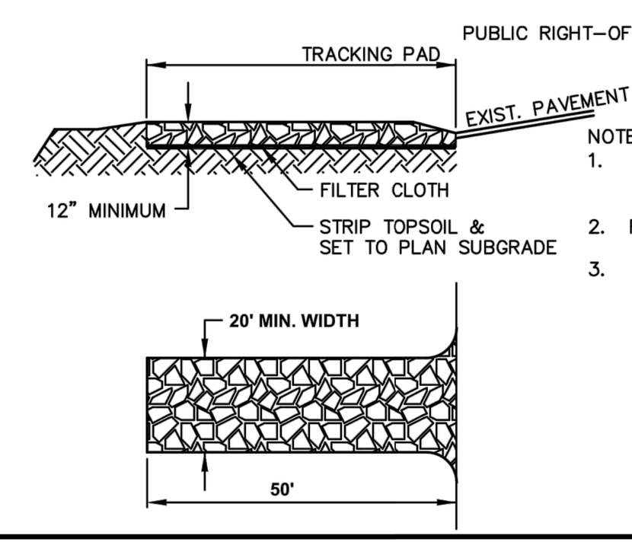
EROSION BALES DETAIL



①FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
②FOR INLET PROTECTION WITH A CURB BOX, AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX OPENING.
③FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2X4.

NOTES:
1. TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.
2. THE CONTRACTOR SHALL DEMONSTRATE A METHOD OF MAINTENANCE, USING A SEWN FLAP, HAND HOLDS OR OTHER METHOD TO PREVENT ACCUMULATED SEDIMENT FROM ENTERING THE INLET.
3. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

INLET PROTECTION

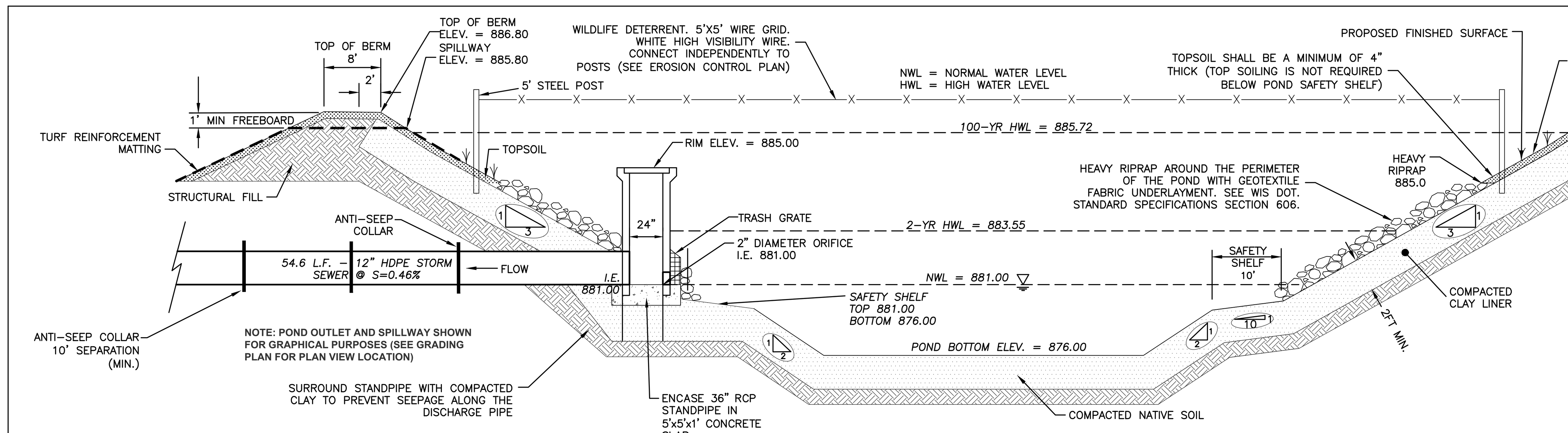


NOTES:
1. USE 3-INCH CLEAN STONE. MINIMUM 50' LENGTH OR AS SHOWN ON PLAN. MINIMUM 20' WIDTH. MINIMUM 12" THICK.
2. FILTER CLOTH SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
3. THE FABRIC SHALL BE WISDOT TYPE R GEOTEXTILE FABRIC. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRED PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND/OR REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
4. WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTERING PUBLIC RIGHT-OF-WAYS. WHEN WASHING IS DONE, IT SHALL BE DONE IN AN AREA STABILIZED WITH STONE AND WHICH DRAINS TO AN APPROVED SEDIMENT TRAPPING DEVICE.
5. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO A PUBLIC RIGHT-OF-WAY SHALL BE REMOVED IMMEDIATELY.
6. ACCESS PERMIT TO PUBLIC ROADS MUST BE OBTAINED PRIOR TO CONSTRUCTION.

STONE TRACKING PAD DETAIL

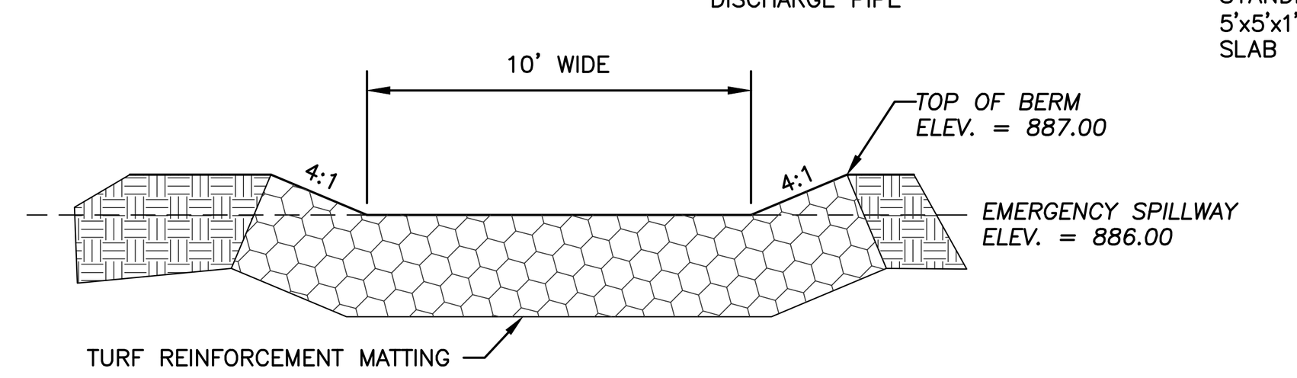
CITY OF WAUKESHA DEPARTMENT OF PUBLIC WORKS	STANDARD CONSTRUCTION DETAILS EROSION CONTROL	APPROVED: ALEX DAMIEN DATE: APPROVED: DATE:	DRAWN BY: DSB DATE: CHECKED BY: DATE:	PLOT SCALE :0.808850 PLOT DATE : 12/13/2018 8:08 AM	DETAIL NUMBER: 02-0001 PROJECT NO: STANDARD DETAILS

FILE NAME : O:±Standard Construction Specifications - 2018 Edition±2019 Updates and Revisions - Staff Mark-ups±Division 4 - Standard Details±02-0001-EROSION CONTROL.dwg



CROSS-SECTION

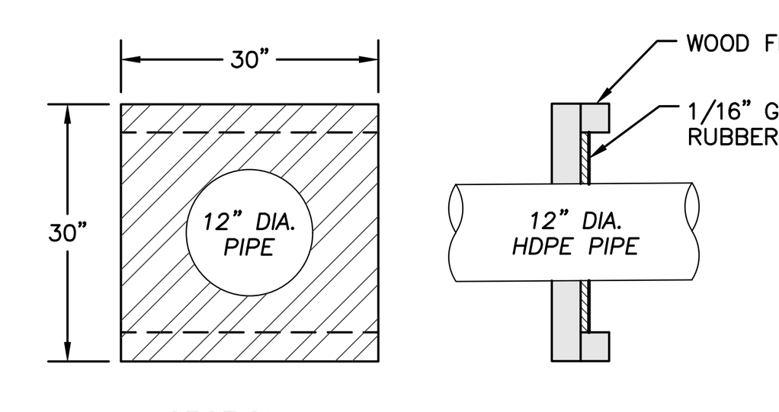
N.T.S.



NOTES
1. EXTEND TURF REINFORCEMENT MATTING 2' BELOW THE ELEVATION OF THE EMERGENCY SPILLWAY ON THE INSIDE OF THE POND.
2. EXTEND TURF REINFORCEMENT MATTING TO THE TOE OF SLOPE ON THE OUTSIDE OF THE POND.

EMERGENCY SPILLWAY DETAIL

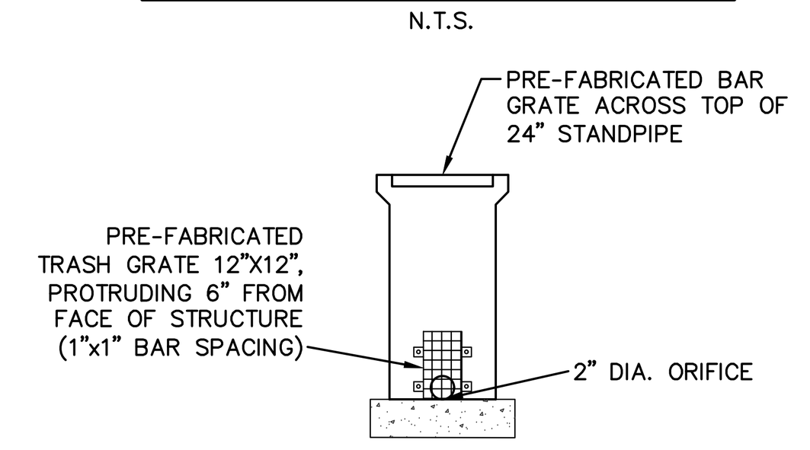
N.T.S.



NOTE: ANTI-SEEP COLLAR TO BE AGRI DRAIN ASC05 OR EQUAL

GUM RUBBER ANTI-SEEP COLLAR

N.T.S.



OUTLET STRUCTURE DETAIL

N.T.S.

GENERAL NOTES
1. ALL CONSTRUCTION SHALL MEET THE SPECIFICATIONS OF "WDNR WET DETENTION BASIN TECHNICAL STANDARD 1001".
2. ALL WORK TO BE CONDUCTED IN CONFORMANCE WITH THE STORMWATER MANAGEMENT PLAN FOR THE PROJECT SITE AS APPROVED BY THE REGULATORY ENGINEER OF RECORD.
3. OWNER OR CONTRACTOR MUST CONSULT LANDSCAPE ARCHITECT OR ECOLOGICAL PLANNING AGENCY FOR APPROPRIATE PLANTS AND PLANTING CONFIGURATIONS.
4. CLAY LINER SHALL BE A MINIMUM OF 2-FEET THICK. CLAY SHALL BE COMPACTED AT ±2.0% OPTIMAL MOISTURE CONTENT TO 90% MODIFIED PROCTOR. MEDIUM STIFF TO STIFF CLAYS PRESENT ONSITE MAY BE USED AT THE DISCRETION OF THE GEOTECHNICAL ENGINEER OF RECORD.
5. FOR CONSTRUCTED EMBANKMENTS WHERE THE PERMANENT POOL IS PONDED 3 FT OR MORE AGAINST THE EMBANKMENT, THERE SHALL BE A CORE TRENCH OR KEYWAY ALONG THE CENTERLINE OF THE EMBANKMENT UP TO THE PERMANENT POOL ELEVATION. THE CORE TRENCH OR KEYWAY SHALL BE A MINIMUM OF 2 FT DEEP AND 8 FT WIDE WITH A SIDE SLOPE OF 1:1 OR FLATTER.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE PROPER CONSTRUCTION PRACTICES HAVE BEEN UTILIZED AND THAT STORMWATER MANAGEMENT FEATURES HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH APPROVED DESIGN PLANS. JSD, INC. SHALL NOT BE LIABLE FOR ANY CONSTRUCTION PRACTICES OR INSTALLATION WHICH DEVIATES FROM THE APPROVED PLAN SET. ONCE THE OWNER HAS PROVIDED FINAL APPROVAL TO THE WORK PERFORMED BY THE CONTRACTOR AND ENSURED COMPLIANCE WITH THE PLAN, IT IS THE OWNER'S RESPONSIBILITY TO MAINTAIN STORMWATER MANAGEMENT FEATURES IN ACCORDANCE WITH THE RECORDED MAINTENANCE AGREEMENT. PROPER OPERATION IS DEPENDENT ON A MULTITUDE OF VARIABLES INCLUDING WEATHER. THESE COMPONENTS REQUIRE ONGOING MAINTENANCE FOR WHICH THE OWNER IS RESPONSIBLE. JSD TAKES NO RESPONSIBILITY FOR PROPER OPERATION OF THE WATER QUALITY COMPONENTS.

STORMWATER DETENTION EAST POND 1P DETAIL

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JSD JOB NO.: 18-8713A
JSD PROJ. MGR.: RWI

CITY OF WAUKESHA EROSION CONTROL GENERAL PROJECT INFORMATION

GENERAL PROJECT INFORMATION

PROJECT LOCATION AND NARRATIVE
THIS EROSION CONTROL PROJECT AND SITE IS CURRENTLY A HOTEL COMMERCIAL SITE. IT IS LOCATED IN PART OF THE XX 1/4 OF THE XX 1/4 OF SECTION X, TOWNSHIP X NORTH, RANGE XX EAST, XXXXXXX, WAUKESHA COUNTY, WISCONSIN. THE CURRENT OWNER IS AVID HOTELS.

RESPONSIBLE PARTIES
THE CONTRACTOR AND OWNER ARE REQUIRED TO APPLY FOR A GENERAL PERMIT TO DISCHARGE UNDER THE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM WPDES PERMIT NO. WI-5067831-3 AT LEAST 14 DAYS PRIOR TO THE START OF THE WORK.

THE CONTRACTOR AND OWNER SHALL IDENTIFY A PERSON KNOWLEDGEABLE AND EXPERIENCED IN THE APPLICATION OF EROSION PREVENTION AND SEDIMENT CONTROL BMPs WHO WILL OVERSEE THE IMPLEMENTATION OF THE WRAPP.

OWNER:	CONTACT PERSON	PHONE:
PLAN PREPARER	CONTACT PERSON	PHONE:
CONTRACTOR	CONTACT PERSON	PHONE:
PERSON RESPONSIBLE FOR INSPECTIONS	CONTACT PERSON	PHONE:
STATE REGULATION ENTITY	CONTACT PERSON	PHONE:
LOCAL REGULATING ENTITY	CONTACT PERSON	PHONE:

PROJECT AREAS
TOTAL PROJECT AREA = X.XXX ACRES
TOTAL PROJECT SIZE (DISTURBED AREA) = X.XXX ACRES
MINIMUM AREA REQUIRING A WRAPP PERMIT = 1.0 ACRES

EXISTING AREA OF IMPERVIOUS SURFACE = X.XXX ACRES
POST-CONSTRUCTION AREA OF IMPERVIOUS SURFACE = X.XXX ACRES

STORMWATER MANAGEMENT
☐ WET DETENTION POND ☐ SITE EVALUATION
☐ VEGETATED SWALES ☐ RAIN GARDENS
☐ BIORETENTION FOR INFILTRATION ☐ INFILTRATION BASIN

INFILTRATION VOLUME PROVIDED = XXX.XX CF
TOTAL SUSPENDED SOLIDS (TSS) REDUCTION = XXX.XX LBS

RECEIVING WATERS
SURFACE WATERS AND WETLANDS THAT WILL RECEIVE STORMWATER RUNOFF FROM THE SITE AND ARE WITHIN (1) MILE OF THE SITE AREA INDICATED. IN ADDITION, IMPAIRED WATERS (STATE'S 303d LIST) WITHIN (1) MILE OF THE SITE AND COULD BE RECEIVING RUNOFF FROM THE SITE ARE LISTED BELOW:

NAME OF WATER BODY TYPE OF IMPAIRMENT

CONSTRUCTION ACTIVITY NOTES
ALL CONSTRUCTION ACTIVITIES SHALL MEET THE REQUIREMENTS OF THE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM.

EROSION PREVENTION
THE CONTRACTOR SHALL USE PHASED CONSTRUCTION WHENEVER POSSIBLE OR PRACTICAL TO MINIMIZE DISTURBED AREAS.

ALL DISTURBED SOIL AREAS MUST BE STABILIZED AS SOON AS POSSIBLE TO LIMIT SOIL EROSION, AND SHALL BE STABILIZED NO LATER THAN 7 (SEVEN) DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT AREA OF THE SITE HAS BEEN TEMPORARILY OR PERMANENTLY COMPLETED.

THE FOLLOWING EROSION PREVENTION ITEMS SHALL BE INSTALLED WITHIN 24 HOURS AFTER INSTALLATION OF NOTED CONVEYANCE:

1). ENERGY DISSIPATION (RIPRAP) AT APRON ENDWALLS.

2). STABILIZATION OF TEMPORARY OR PERMANENT DRAINAGE SWALES WITHIN 200 FEET OF THE PROPERTY LINES, OR CONNECTION TO SURFACE STORMWATER DRAINAGE INCLUDING INLETS.

CONSTRUCTION SEQUENCE, SCHEDULE AND PHASING
ALL SILT FENCE AND CONSTRUCTION ENTRANCE/EXIT(S) AND OTHER NECESSARY EROSION CONTROL BMPs SHALL BE IN PLACE PRIOR TO THE START OF ANY CONSTRUCTION-RELATED ACTIVITIES.

REMOVE TOPSOIL NECESSARY AND STOCKPILE IN DESIGNATED AREA(S). STOCKPILES SHALL BE STABILIZED BY TEMPORARY SEEDING AND MULCHING IF THEY ARE TO REMAIN FOR MORE THAN 10 (TEN) DAYS.

DISTURBED SOIL OUTSIDE OF THE DAY-TO-DAY CONSTRUCTION AREAS SHALL BE STABILIZED BY MULCHING, TEMPORARY SEEDING, COVERING WITH TARPS OR EQUIVALENT CONTROL MEASURES.

COMPLETE TANK (UST) REMOVALS, EQUIPMENT AND ASSOCIATED PIPING AND SOILS.

REMOVE CONCRETE AND ASPHALT PAVING, AND REMOVE AS SPECIFIED.

WITHIN 7 DAYS OF COMPLETION OF THE REQUIRED FACILITIES AND PAVEMENT, THE ENTIRE SITE SHALL BE GRADED AS DESCRIBED IN THE WORK PLAN AND SPECIFICATIONS. CONTRACTOR SHALL STABILIZE THE SITE FOR THE FUTURE DEVELOPMENT BY OTHERS.

CONTRACTOR SHALL REMOVE ALL INLET PROTECTION ONLY AFTER THE SITE IS STABILIZED, OR AS DIRECTED BY THE ENGINEER.

RECORD RETENTION
THE WRAPP, ALL CHANGES TO IT, AND INSPECTIONS AND MAINTENANCE RECORDS ARE THE RESPONSIBILITY OF THE PERMITEE AND MUST BE KEPT AT THE SITE DURING CONSTRUCTION.

ALL OWNER(S) SHALL RETAIN THE FOLLOWING FOR THREE (3) YEARS AFTER SUBMITTAL OF THE NOTICE OF TERMINATION:
1). WRAPP
2). ANY OTHER PERMITS REQUIRED FOR THE PROJECT.
3). INSPECTION AND MAINTENANCE LOGS/REPORTS.
4). ALL PERMANENT OPERATION AND MAINTENANCE AGREEMENTS FOR SURFACE WATER FACILITIES.
5). ALL DESIGN CALCULATIONS FOR TEMPORARY AND PERMANENT STORM WATER

INSPECTIONS AND MAINTENANCE
CONTRACTOR IS SOLELY RESPONSIBLE FOR INSTALLATION, MAINTENANCE AND REMOVAL OF ALL EROSION CONTROL DEVICES AND SHALL COMPLY WITH ALL REQUIREMENTS SHOWN ON THE PLANS, IN THE PROJECT SPECIFICATIONS, AND AS MANDATED BY LOCAL, STATE AND FEDERAL REGULATIONS.

INSPECT THE EROSION CONTROL MEASURES WITHIN 24 HOURS AFTER EACH RAIN OF 0.5 INCHES OR MORE AND AT LEAST ONCE EACH WEEK. MAKE NEEDED REPAIRS AND DOCUMENT THE FINDINGS OF THE INSPECTIONS IN A SITE EROSION CONTROL LOG WITH THE DATE OF INSPECTION, THE NAME OF THE PERSON CONDUCTING THE INSPECTION, AND A DESCRIPTION OF THE PRESENT PHASE OF THE CONSTRUCTION AT THE SITE.

ANY SEDIMENT REACHING A PUBLIC OR PRIVATE ROAD SHALL BE REMOVED BY STREET CLEANING (NOT FLUSHING) BEFORE END OF WORK EACH DAY.

FOR MORE EROSION CONTROL REQUIREMENTS, REFER TO STANDARD SPECIFICATION SECTION 02.

CONTRACTOR TO OBTAIN APPLICABLE PERMITS.

IF DEWATERING IS NEEDED, CONTRACTOR SHALL PROVIDE FOR SEDIMENT REMOVAL AND SHALL OBTAIN ALL APPLICABLE DNR PERMITTING.

BUILT-UP SEDIMENT SHALL BE REMOVED FROM SILT FENCE WHEN IT HAS REACHED ONE-THIRD THE HEIGHT OF THE FENCE.

THE CONTRACTOR SHALL ROUTINELY INSPECT THE CONSTRUCTION SITE ONCE EVERY SEVEN (7) DAYS DURING ACTIVE CONSTRUCTION, AND WITHIN 24 HOURS OF A RAINFALL EVENT GREATER THAN 0.5 INCHES IN A 24-HOUR PERIOD.

ALL INSPECTIONS MUST BE RECORDED AND RECORDS MUST BE RETAINED WITH THE ECIP ON SITE. COPIES SHALL BE MADE AVAILABLE TO THE ENGINEER OR UPON REQUEST.

IF TEMPORARY SEDIMENT BASINS ARE REQUIRED, THEY SHALL BE DRAINED AND CLEANED OF EXCESS SEDIMENT WHEN THE DEPTH OF THE SEDIMENT IN THE BASIN IS EQUAL TO THE ORIGINAL STORAGE VOLUME INTENDED. FOR THIS SITE, IT SHALL BE WHEN THE FOREBAY ACCUMULATES TWO (2) FEET OF SEDIMENT AND WHEN THE MAIN POND ACQUIRES SIX (6) INCHES OF SEDIMENT. DRAINAGE AND REMOVAL SHALL BE COMPLETED WITHIN 72 HOURS OF DISCOVERY.

ALL NON-FUNCTIONAL BMPs SHALL BE REPAIRED, REPLACED OR SUPPLEMENTED WITH ADDITIONAL BMPs WITHIN A 24-HOUR PERIOD OF DISCOVERY, OR AS SOON AS FIELD CONDITIONS ALLOW.

POLLUTION PREVENTION
ALL SOLID WASTE GENERATED BY / COLLECTED FROM THE CONSTRUCTION SITE SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL APPLICABLE STATE, FEDERAL AND LOCAL REGULATIONS.

ALL HAZARDOUS MATERIALS (OILS, GASOLINE, FUEL, PAINT, ETC.) MUST BE PROPERLY AND SECURELY STORED AND CONTAINED TO PREVENT SPILLS, LEAKS OR OTHER DISCHARGE.

VEHICLE OR EQUIPMENT WASHING OR TEMPORARY MAINTENANCE AREAS MUST BE LIMITED TO A DEFINED AREA OF THE SITE. RUNOFF CONTAINING ANY HAZARDOUS WASTES MUST BE PROPERLY AND LAWFULLY COLLECTED AND DISPOSED OF. NO ENGINE DEGREASING IS ALLOWED ON THE SITE.

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR MONITORING AIR POLLUTION AND ENSURING THAT IT DOES NOT EXCEED LEVELS SET BY LOCAL, STATE OR FEDERAL LEVELS. THIS INCLUDES DUST BEING CREATED BY WORK BEING PERFORMED ON THE SITE. DUST CONTROL MEASURES ARE CONSIDERED INCIDENTAL TO THE CONTRACT FOR WHICH WORK IS BEING PERFORMED. ADDITIONAL DUST CONTROL MEASURES OR OTHER AIR POLLUTION CONTROL MEASURES MAY BE REQUIRED BY THE ENGINEER.

FINAL STABILIZATION
THE CONTRACTOR SHALL ENSURE FINAL STABILIZATION OF THE SITE. THE PERMITEES SHALL SUBMIT A NOTICE OF TERMINATION WITHIN 30 DAYS AFTER FINAL STABILIZATION IS COMPLETE.

ALL TEMPORARY EROSION CONTROL MEASURES AND BMPs MUST BE REMOVED AS PART OF THE FINAL SITE STABILIZATION.

THE GENERAL PERMIT FURTHER DEFINES FINAL STABILIZATION AND ITS REQUIREMENTS.

EROSION AND SEDIMENT CONTROL NOTES

1. ALL CONSTRUCTION SHALL ADHERE TO THE REQUIREMENTS SET FORTH IN WISCONSIN'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER GENERAL PERMIT FOR CONSTRUCTION SITE LAND DISTURBANCE ACTIVITIES. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES (WDNR) TECHNICAL STANDARDS (REFERRED TO AS BMP'S) AND THE CITY OF WAUKESHA ORDINANCE. THESE PROCEDURES AND STANDARDS SHALL BE REFERRED TO AS BEST MANAGEMENT PRACTICES (BMP'S). IT IS THE RESPONSIBILITY OF ALL CONTRACTORS ASSOCIATED WITH THE PROJECT TO OBTAIN A COPY OF, AND UNDERSTAND, THE BMP'S PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
2. THE EROSION CONTROL MEASURES INDICATED ON THE PLANS ARE THE MINIMUM REQUIREMENTS. ADDITIONAL CONTROL MEASURES AS DIRECTED BY JSD PROFESSIONAL SERVICES, INC. OR GOVERNING AGENCIES SHALL BE INSTALLED WITHIN 24 HOURS OF REQUEST.
3. MODIFICATIONS TO THE APPROVED SWPPP IN ORDER TO MEET UNFORESEEN FIELD CONDITIONS ARE ALLOWED IF MODIFICATIONS CONFORM TO BMP'S. ALL MODIFICATIONS MUST BE APPROVED BY JSD/MUNICIPALITY PRIOR TO DEVIATION OF THE APPROVED PLAN.
4. INSTALL PERIMETER EROSION CONTROL MEASURES (SUCH AS CONSTRUCTION ENTRANCES, SILT FENCE AND EXISTING INLET PROTECTION) PRIOR TO ANY SITE WORK, INCLUDING GRADING OR DISTURBANCE OF EXISTING SURFACE COVER, AS SHOWN ON PLAN IN ORDER TO PROTECT ADJACENT PROPERTIES/STORM SEWER SYSTEMS FROM SEDIMENT TRANSPORT.
5. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT ALL LOCATIONS OF VEHICLE INGRESS/EGRESS POINTS. CONTRACTOR IS RESPONSIBLE TO COORDINATE LOCATION(S) WITH THE PROPER AUTHORITIES, PROVIDE NECESSARY FEES AND OBTAIN ALL REQUIRED APPROVALS OR PERMITS. ADDITIONAL CONSTRUCTION ENTRANCES OTHER THAN AS SHOWN ON THE PLANS MUST BE PRIOR APPROVED BY THE APPLICABLE GOVERNING AGENCIES PRIOR TO INSTALLATION.
6. PAVED SURFACES ADJACENT TO CONSTRUCTION ENTRANCES SHALL BE SWEPT AND/OR SCRAPED TO REMOVE ACCUMULATED SOIL, DIRT AND/OR DUST AFTER THE END OF EACH WORK DAY AND AS REQUESTED BY THE GOVERNING AGENCIES.
7. ALL EXISTING STORM SEWER FACILITIES THAT WILL COLLECT RUNOFF FROM DISTURBED AREAS SHALL BE PROTECTED TO PREVENT SEDIMENT DEPOSITION WITHIN STORM SEWER SYSTEMS. INLET PROTECTION SHALL BE IMMEDIATELY FITTED AT THE INLET OF ALL INSTALLED STORM SEWER. ALL INLETS, STRUCTURES, PIPES, AND SWALES SHALL BE KEPT CLEAN AND FREE OF SEDIMENTATION AND DEBRIS.
8. EROSION CONTROL FOR UTILITY CONSTRUCTION (STORM SEWER, SANITARY SEWER, WATER MAIN, ETC.) OUTSIDE OF THE PERIMETER CONTROLS SHALL INCORPORATE THE FOLLOWING:
   - PLACE EXCAVATED TRENCH MATERIAL ON THE HIGH SIDE OF THE TRENCH.
   - BACKFILL, COMPACT, AND STABILIZE THE TRENCH IMMEDIATELY AFTER PIPE CONSTRUCTION.
   - DISCHARGE TRENCH WATER INTO A SEDIMENTATION BASIN OR FILTERING TANK IN ACCORDANCE WITH BMP'S PRIOR TO RELEASE INTO STORM SEWER OR DITCHES.
9. AT A MINIMUM, SEDIMENT BASINS AND NECESSARY TEMPORARY DRAINAGE PROVISIONS SHALL BE CONSTRUCTED AND OPERATIONAL BEFORE BEGINNING OF SIGNIFICANT MASS GRADING OPERATIONS TO PREVENT OFFSITE DISCHARGE OF UNTREATED RUNOFF.
10. ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES MUST BE MAINTAINED AND REPAIRED AS NEEDED. THE GENERAL CONTRACTOR WILL BE RESPONSIBLE FOR INSPECTION AND REPAIR DURING CONSTRUCTION. THE OWNER WILL BE RESPONSIBLE IF EROSION CONTROL IS REQUIRED AFTER THE CONTRACTOR HAS COMPLETED THE PROJECT.
11. TOPSOIL STOCKPILES SHALL HAVE A BERM OR TRENCH AROUND THE CIRCUMFERENCE AND PERIMETER SILT FENCE TO CONTROL SILT. IF TOPSOIL STOCKPILE REMAINS UNDISTURBED FOR MORE THAN SEVEN (7) DAYS, TEMPORARY SEEDING AND STABILIZATION IS REQUIRED.
12. EROSION CONTROL MEASURES TEMPORARILY REMOVED FOR UNAVOIDABLE CONSTRUCTION ACTIVITIES SHALL BE IN WORKING ORDER PRIOR TO THE COMPLETION OF EACH WORK DAY.
13. MAINTAIN SOIL EROSION CONTROL DEVICES THROUGH THE DURATION OF THIS PROJECT. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN THIRTY (30) DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED. DISTURBANCES ASSOCIATED WITH EROSION CONTROL REMOVAL SHALL BE IMMEDIATELY STABILIZED.
14. PUMPS MAY BE USED AS BYPASS DEVICES. IN NO CASE SHALL PUMPED WATER BE DIVERTED OUTSIDE THE PROJECT LIMITS.
15. GRADING EFFORTS SHALL BE CONDUCTED IN SUCH A MANNER AS TO MINIMIZE EROSION. EROSION AND SEDIMENT CONTROL MEASURES SHALL CONSIDER THE TIME OF YEAR, SITE CONDITIONS, AND THE USE OF TEMPORARY OR PERMANENT MEASURES. ALL DISTURBED AREAS THAT WILL NOT BE WORKED FOR A PERIOD OF THIRTY (30) DAYS REQUIRE TEMPORARY SEEDING FOR EROSION CONTROL. SEEDING FOR EROSION CONTROL SHALL BE IN ACCORDANCE WITH TECHNICAL STANDARDS.
16. ALL DISTURBED SLOPES EXCEEDING 4:1 YET LESS THAN 3:1, SHALL BE STABILIZED WITH NORTH AMERICAN GREEN S75BN EROSION MATTING (OR APPROVED EQUAL) AND DISTURBED SLOPES EXCEEDING 3:1 YET LESS THAN 2:1 SHALL BE STABILIZED WITH NORTH AMERICAN GREEN C125BN (OR APPROVED EQUAL) OR APPLICATION OF AN APPROVED POLYMER SOIL STABILIZATION TREATMENT OR A COMBINATION THEREOF, AS REQUIRED. EROSION MATTING AND/OR NETTING USED ONSITE SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES.
17. DURING PERIODS OF EXTENDED DRY WEATHER, THE CONTRACTOR SHALL KEEP A WATER TRUCK ON SITE FOR THE PURPOSE OF WATERING DOWN SOILS WHICH MAY OTHERWISE BECOME AIRBORNE. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING WIND EROSION (DUST) DURING CONSTRUCTION AT HIS/HER EXPENSE.
18. DISTURBED AREAS AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION SHALL BE VISUALLY INSPECTED FOR EVIDENCE OF, OR THE POTENTIAL FOR, POLLUTANTS ENTERING THE DRAINAGE SYSTEM ON A DAILY BASIS.
19. QUALIFIED PERSONNEL (PROVIDED BY THE GENERAL/PRIME CONTRACTOR) SHALL INSPECT DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED AND EROSION AND SEDIMENT CONTROLS WITHIN 24 HOURS OF ALL 0.5-INCH, OR MORE, PRECIPITATION EVENTS WITH A MINIMUM INSPECTION INTERVAL OF ONCE EVERY SEVEN (7) CALENDAR DAYS IN THE ABSENCE OF A QUALIFYING RAIN OR SNOWFALL EVENT. REPORTING SHALL BE IN ACCORDANCE WITH PART IV D.4. (a-f). OF THE NPDES GENERAL PERMIT. CONTRACTOR SHALL IMMEDIATELY ARRANGE TO HAVE ANY DEFICIENT ITEMS REVEALED DURING INSPECTIONS REPAIRED/REPLACED.
20. THE FOLLOWING MAINTENANCE PRACTICES SHALL BE USED TO MAINTAIN, IN GOOD AND EFFECTIVE OPERATING CONDITIONS, VEGETATION, EROSION AND SEDIMENT CONTROL MEASURES, AND OTHER PROTECTIVE MEASURES IDENTIFIED IN THIS PLAN. UPON IDENTIFICATION, DEFICIENCIES IN STORMWATER CONTROLS SHALL BE ADDRESSED IMMEDIATELY. THE MAINTENANCE PROCEDURES FOR THIS DEVELOPMENT SHALL INCLUDE, BUT NOT BE LIMITED TO THE BELOW.
   - SILT FENCE – REPAIR OR REPLACE ANY DAMAGED FILTER FABRIC AND/OR STAKES. REMOVE ACCUMULATED SEDIMENT WHEN IT HAS REACHED ONE-HALF THE ABOVE GROUND HEIGHT OF THE FENCE.
   - CONSTRUCTION ENTRANCE – AS NEEDED, ADD STONE TO MAINTAIN CONSTRUCTION ENTRANCE DIMENSIONS AND EFFECTIVENESS.
   - DITCH CHECK (STRAW BALES) – RE-SECURE STAKES; ADJUST OR REPOSITION BALES TO ADDRESS PROPER FLOW OF STORMWATER; AND REMOVE ACCUMULATED SEDIMENT WHEN IT HAS REACHED ONE-HALF THE HEIGHT OF THE BALE.
   - EROSION CONTROL MATTING – REPAIR MATTING IMMEDIATELY IF INSPECTION REVEALS BREACHED OR FAILED CONDITIONS. REPAIR AND RE-GRADE SOIL WHERE CHANNELIZATION HAS OCCURRED.
   - DIVERSION BERM/SWALE – REPLACE OR RE-COMPACT THE CONSTRUCTION MATERIALS AS NECESSARY.
   - INLET PROTECTION – CLEAN, REPAIR OR REPLACE FILTER FABRIC AND/OR STONE WHEN CONTROL MEASURE IS CLOGGED. INLET FILTER BAGS SHALL BE REPLACED ONCE BAG BECOMES ONE-HALF FULL OF SEDIMENT.

ADDITIONAL POLLUTANT CONTROL MEASURES TO BE IMPLEMENTED DURING CONSTRUCTION ACTIVITIES SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING.

- CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF. THIS INCLUDES ALL CONSTRUCTION SITE WASTE MATERIAL, SANITARY WASTE, AND WASTE FROM VEHICLE TRACKING OF SEDIMENTS. THE CONTRACTOR SHALL ENSURE THAT NO MATERIAL WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED, BURNED, OR DISCHARGED TO THE WATERS OF THE STATE. VEHICLES HAULING MATERIAL AWAY FROM THE SITE SHALL BE COVERED WITH A TARPAULIN TO PREVENT BLOWING DEBRIS.
- DUST CONTROL SHALL BE ACCOMPLISHED BY ONE OR MORE OF THE FOLLOWING METHODS:
  A. COVERING 30% OR MORE OF THE SOIL SURFACE WITH A NON-ERODIBLE MATERIAL.
  B. ROUGHENING THE SOIL TO PRODUCE RIDGES PERPENDICULAR TO THE PREVAILING WIND. RIDGES SHALL BE AT LEAST SIX (6) INCHES IN HEIGHT.
  C. FREQUENT WATERING OF EXCAVATION AND FILL AREAS.
  D. PROVIDING GRAVEL OR PAVING AT ENTRANCE/EXIT DRIVES, PARKING AREAS AND TRANSIT PATHS.
- STREET SWEEPING SHALL BE PERFORMED TO IMMEDIATELY REMOVE ANY SEDIMENT TRACKED ON PAVEMENTS.

DETAILS

MANAGERS • ENGINEERS • CONTRACTORS • ARCHITECTS

MSI GENERAL

MSI GENERAL CORPORATION
P.O. BOX. 7
OCONOMOWOC, WI 53066
PHONE: 262-367-3661
FAX: 262-367-7390

WWW.MSIGENERAL.COM
SINGLE SOURCE RESPONSIBILITY ™

ISSUE DATES:	
Proposal: 10/31/18	
Bid:	
Contract:	
State Submittal / Permit:	
As-Built:	

REVISIONS:		
1	P. C. SUBMITTAL	02-25-19
2	ADDR. CITY COMMENTS	05-10-19
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KEY PLAN

avid AN IHG® HOTEL

PROJECT ADDRESS:

PROJECT NAME
avid™ hotels
STREET ADDRESS
Marshview Street
CITY/ STATE / ZIP
Waukesha, WI 53186

ALL WORK TO BE COMPLETED AS SHOWN, AND IN ACCORDANCE WITH THE LATEST EDITION OF THE MSI GENERAL MASTER SPECIFICATION

Architect:	Engineer:	Reviewed By:
CJO	JSD	XXX

Sheet Title:
DETAILS

Sheet Number:
C-106

Project Number: P12269
P12269

RATIONAL METHOD STORM SEWER CALCULATIONS

Project Name: AVID HOTEL

Project Location: Waukesha, WI
JSD Project Number: 18-8713A

Performed by: PSM
Date: 5/7/2019

#NUM!

MILWAUKEE REGIONAL OFFICE
N22 W22931 Nancy Court, Suite 3
Waukesha, Wisconsin 53186
Ph: (262) 513-0666 Fax: (262) 513-1232

MADISON REGIONAL OFFICE
161 Horizon Drive, Suite 101
Verona, Wisconsin 53593
Ph: (608) 848-5060 Fax: (608) 848-2255

JSD Professional Services, Inc.
• Engineers • Surveyors • Planners

Structure abbreviations are as follows: ES - End Section, MH - Manhole, FI - Field Inlet, TD - Trench Drain, BC - Building Connection, RD - Roof Drain, STB - Stub

PIPE LOCATION		STRUCTURE CONTRIBUTING AREA					PIPE FLOW				PIPE DATA				PIPE CAPACITY INFORMATION							DROP	ELEVATIONS			COVER TO CROWN (FT)
															ACTUAL FLOW				FULL	TIME TO	TIME IN	THRU				
UP STRUCT	DOWN STRUCT	ROOF C = 0.95 (SQ FT)	PAVED C = 0.95 (SQ FT)	GRASS C = 0.20 (SQ FT)	INDIVID AREA (ACRES)	INDIV COMP C VALUE (UNITLESS)	STORM EVENT 2,5,10,25,50,100	INTENSITY I (IN/HR)	INDIV RUNOFF (CFS)	TOTAL FLOW (CFS)	LENGTH (FT)	DIA. (IN)	SLOPE (FT/FT)	Manning's n RCP=0.013 HDPE=0.012 PVC=0.011	REQD DROP	ACTUAL DROP	PARTS FULL	VEL (FPS)	FLOW (CFS)	STRUCT. (MIN)	SEWER (MIN)	STRUCT (FT)	RIM/(F/L) UP	INVERT UP	INVERT DOWN	
INL-10	**INL-9**	0	7,860	2,613	0.24	0.76	10	5.14	0.94	0.94	**68.1**	**12**	**0.0040**	**0.013**	0.05	0.27	0.45	2.77	2.25	10.00	10.41	0.00	**888.60**	**884.35**	**884.08**	3.15
INL-9	**INL-8**	0	2,689	282	0.07	0.88	10	5.07	0.30	1.25	**77.9**	**12**	**0.0040**	**0.013**	0.10	0.31	0.55	2.96	2.25	10.41	10.85	0.00	**888.60**	**884.08**	**883.77**	3.42
INL-8	**INL-7**	2,557	3,961	834	0.17	0.86	10	4.99	0.73	1.98	**81.5**	**12**	**0.0040**	**0.013**	0.25	0.33	0.79	3.25	2.25	10.85	11.27	0.00	**888.60**	**883.77**	**883.44**	3.73
INL-7	**INL-6**	2,464	4,001	815	0.17	0.87	10	4.92	0.71	2.69	**81.5**	**15**	**0.0040**	**0.013**	0.14	0.33	0.62	3.55	4.08	11.27	11.65	0.25	**888.60**	**883.44**	**883.12**	3.78
INL-6	**INL-5**	962	3,961	1,099	0.14	0.81	10	4.86	0.55	3.23	**105.0**	**15**	**0.0040**	**0.013**	0.26	0.42	0.71	3.69	4.08	11.65	12.12	0.00	**888.60**	**882.87**	**882.45**	4.36
INL-5	**INL-4**	0	3,294	721	0.09	0.82	10	4.78	0.36	4.15	**33.8**	**18**	**0.0040**	**0.013**	0.05	0.14	0.59	3.97	6.64	12.12	12.27	0.25	**888.40**	**882.45**	**882.31**	4.30
INL-4	**INL-3**	1,734	5,018	0	0.16	0.95	10	4.76	0.70	4.93	**98.5**	**18**	**0.0040**	**0.013**	0.22	0.39	0.69	4.14	6.64	12.27	12.66	0.00	**886.50**	**882.06**	**881.67**	2.79
INL-3	**INL-2**	683	5,968	1,178	0.18	0.84	10	4.69	0.71	5.64	**97.0**	**18**	**0.0050**	**0.013**	0.28	0.49	0.69	4.63	7.43	12.66	13.01	0.00	**886.50**	**881.67**	**881.18**	3.18
INL-2	**EW-1**	710	3,809	1,575	0.14	0.76	10	4.64	0.49	9.99	**67.3**	**24**	**0.0027**	**0.013**	0.13	0.18	#NUM!	#NUM!	11.75	13.01	#NUM!	0.00	**886.00**	**881.18**	**881.00**	2.62
INL-17	**INL-16**	2,836	8,044	770	0.27	0.90	10	5.14	1.24	1.24	**87.5**	**12**	**0.0040**	**0.013**	0.11	0.35	0.55	2.96	2.25	10.00	10.49	0.00	**888.95**	**1.87**	**1.52**	885.98
INL-16	**INL-14**	1,746	4,214	139	0.14	0.93	10	5.05	0.66	1.90	**63.9**	**12**	**0.0040**	**0.013**	0.18	0.26	0.77	3.23	2.25	10.49	10.82	0.25	**888.75**	**1.52**	**1.26**	886.13
INL-14	**INL-13**	397	4,633	0	0.12	0.95	10	5.00	0.55	2.45	**61.7**	**15**	**0.0025**	**0.013**	0.09	0.15	0.70	2.90	3.23	10.82	11.18	0.25	**887.56**	**1.01**	**0.86**	885.17
INL-13	**INL-12**	0	6,570	0	0.15	0.95	10	4.93	0.71	3.15	**145.4**	**18**	**0.0025**	**0.013**	0.13	0.36	0.58	3.11	5.25	11.18	11.96	0.00	**884.91**	**0.61**	**0.25**	882.65
INL-12	**INL-2**	0	6,570	787	0.17	0.87	10	4.81	0.71	3.86	**98.5**	**18**	**0.0025**	**0.013**	0.13	0.25	0.68	3.25	5.25	11.96	12.46	0.00	**885.80**	**0.25**	**0.00**	883.90
INL-5A	**INL-5**	0	4,957		0.11	0.95	10	5.14	0.56	0.56	**93.4**	**12**	**0.0100**	**0.013**	0.02	0.93	0.23	3.39	3.56	10.00	10.46	0.50	**888.65**	**883.88**	**882.95**	3.67
EW-4A	**INL-4**	0		3,466	0.08	0.20	10	5.14	0.08	0.08	**43.7**	**12**	**0.0215**	**0.013**	0.00	0.94	0.05	2.67	5.22	10.00	10.27	0.50	**886.00**	**883.50**	**882.56**	1.40

Anti-Seep Collar Design

Project: **AVID HOTEL**
Project Location: PEWAUKEE, WI
JSD Project # : 18-8550

Performed By: APM Date: 1/17/2019

MADISON REGIONAL OFFICE
161 Horizon Drive, Suite 101
Verona, Wisconsin 53593
Ph: (608) 848-5060 Fax: (608) 848-2255

MILWAUKEE REGIONAL OFFICE
W238 N1610 Busse Rd., Ste 100
Waukesha, Wisconsin 53188
Ph: (262) 513-0666 Fax: (262) 513-1232

JSD Professional Services, Inc.
• Engineers • Surveyors • Planners

SOUTH BIORETENTION

Discharge Pipe Diameter =	1	ft
Discharge Pipe Slope =	0.0054	ft/ft
100yr Pond Water Surface Elev. =	885.67	
Pond Discharge Pipe Elev. =	881.00	
Embankment Side Slope (H:1) =	3.00	

Notes:

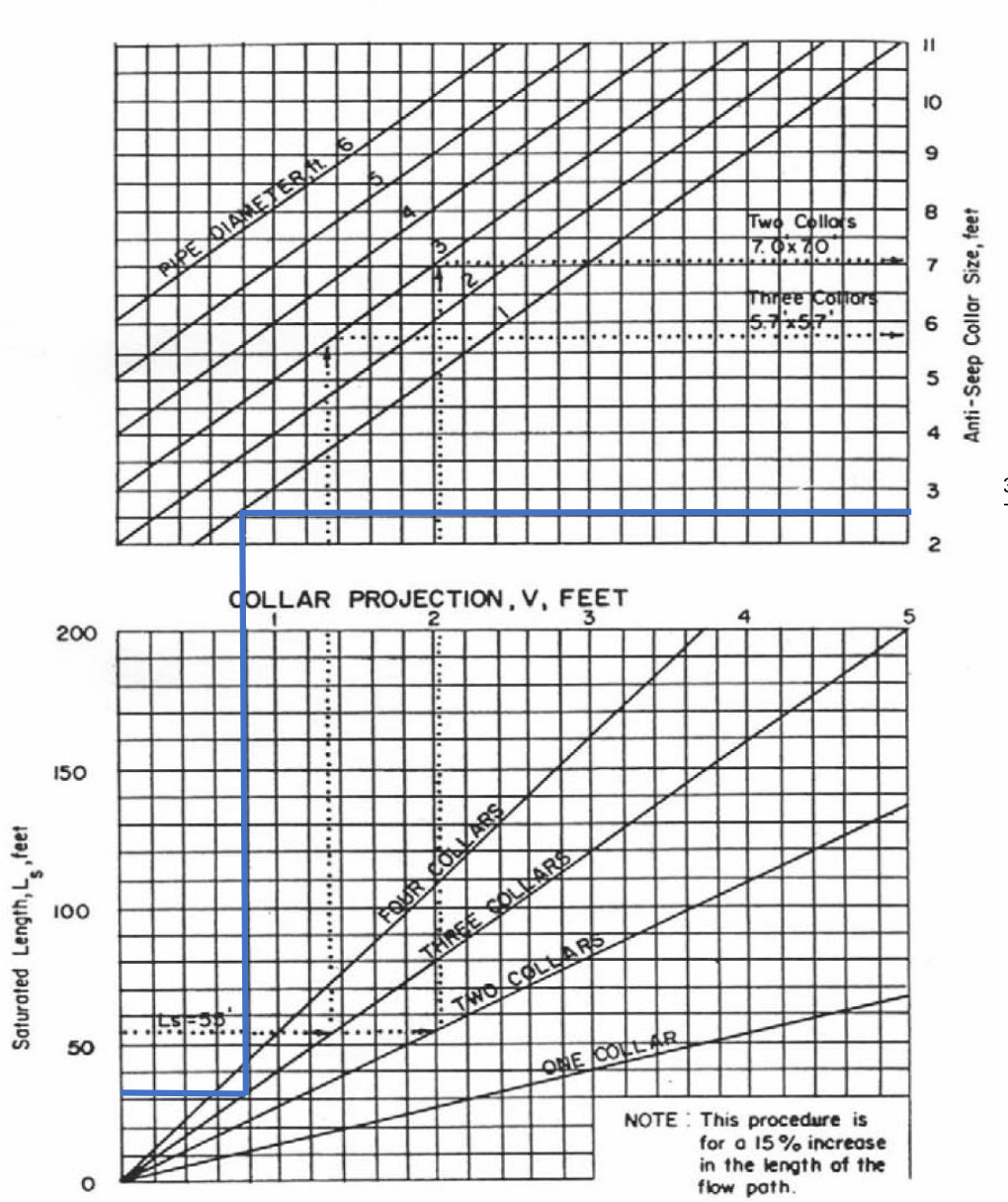
Ls - Length of Discharge Pipe in Saturated Zone
y - Headwater Acting on Discharge Pipe
z - Embankment Side Slope

$$Ls = y(z+4)\left[1+\frac{PipeSlope}{0.25-PipeSlope}\right]$$

$$Ls = (885.67 - 881.00)\ (3.00 + 4)\left|1 + \frac{0.0054}{(0.25 - 0.0540)}\right|$$

Ls = **33.41 ft**

Figure 5A.31(2)
Anti-Seep Collar Design Charts (USDA - NRCS)



30"x30" Three Collar

APPENDIX 7

Operation and Maintenance Plan

Storm Water Management Practice Maintenance Agreement

Document Number

Avid Hotels, as "Owner" of the property described below, in accordance with Chapter 14 Waukesha County Code of Ordinances, agrees to install and maintain storm water management practice(s) on the subject property in accordance with approved plans and Storm Water Permit conditions. The owner further agrees to the terms stated in this document to ensure that the storm water management practice(s) continues serving the intended functions in perpetuity. This Agreement includes the following exhibits:

Exhibit A: Legal Description of the real estate for which this Agreement applies ("Property").
Exhibit B: Location Map(s) – shows an accurate location of each storm water management practice affected by this Agreement.
Exhibit C: Maintenance Plan – prescribes those activities that must be carried out to maintain compliance with this Agreement.

Note: After construction verification has been accepted by Waukesha County for all planned storm water management practices, an addendum(s) to this agreement shall be recorded by the Owner showing design and construction details. The addendum may contain several additional exhibits, as described below.

Through this Agreement, the Owner hereby subjects the Property to the following covenants, conditions and restrictions:

Name and Return Address

Land Resources Division
515 W Moreland Blvd, Rm AC260
Waukesha, WI 53188

Parcel Identification Number(s) – (PIN)

1. The Owner shall be responsible for the routine and extraordinary maintenance and repair of the storm water management practice(s) and drainage easements identified in Exhibit B in accordance with the maintenance plan contained in Exhibit C.
2. Upon written notification by City of Waukesha or their designee, the Owner(s) shall, at their own cost and within a reasonable time period determined by the City of Waukesha, have an inspection of the storm water management practice conducted by a qualified professional, file a report with the City of Waukesha and complete any maintenance or repair work recommended in the report. The Owner(s) shall be liable for the failure to undertake any maintenance or repairs.
3. In addition, and independent of the requirements under paragraph 2 above, the City of Waukesha, or its designee, is authorized to access the property as necessary to conduct inspections of the storm water management practices or drainage easements to ascertain compliance with the intent of this Agreement and the activities prescribed in Exhibit C. The City of Waukesha may require work to be done which differs from the report described in paragraph 2 above, if the City of Waukesha reasonably concludes that such work is necessary and consistent with the intent of this agreement. Upon notification by the City of Waukesha of required maintenance or repairs, the Owner(s) shall complete the specified maintenance or repairs within a reasonable time frame determined by the City of Waukesha.
4. If the Owner(s) do not complete an inspection under 2 above or required maintenance or repairs under 3. above within the specified time period, the City of Waukesha is authorized, but not required, to perform the specified inspections, maintenance or repairs. In the case of an emergency situation, as determined by the City of Waukesha, no notice shall be required prior to the City of Waukesha performing emergency maintenance or repairs. The City of Waukesha may levy the costs and expenses of such inspections, maintenance or repair related actions as a special charge against the Property and collected as such in accordance with the procedures under s. 66.0627 Wis. Stats. or subch. VII of ch. 66 Wis. Stats.
5. This Agreement shall run with the Property and be binding upon all heirs, successors and assigns. After the Owner records the addendum noted above, the City of Waukesha shall have the sole authority to modify this agreement upon a 30-day notice to the current Owner(s).

Dated this____day of_____, 20 .

Owner:

_____
(Owners Signature)

_____
(Owners Typed Name)

Acknowledgements

State of Wisconsin:
County of Waukesha

Personally came before me this____day of_____, 20 , the above named [Owners name] to me known to be the person who executed the foregoing instrument and acknowledged the same.

_____.
[Name]
Notary Public, Waukesha County, WI
My commission expires:_____.

This document was drafted by:

[Name and address of drafter]

For Certification Stamp

Exhibit A – Legal Description

The following description and reduced copy map identifies the land parcel(s) affected by this Agreement. For a larger scale view of the referenced document, contact the Waukesha County Register of Deeds office.

Date of Recording: [date.]
Map Produced By: [designer's name.]
Legal Description: [enter legal description as described on the property title here.]

Exhibit B - Location Map
Storm Water Management Practices Covered by this Agreement

The storm water management practices covered by this Agreement are depicted in the reduced copy of a portion of the construction plans, as shown below. All of the noted storm water management practices are located within a drainage easement, as noted in Exhibit A.

Storm water Practices: Catch basins and Wet Pond
Location of Practices: Catch Basins located throughout the site with the Wet Pond located in the southeast corner of the site

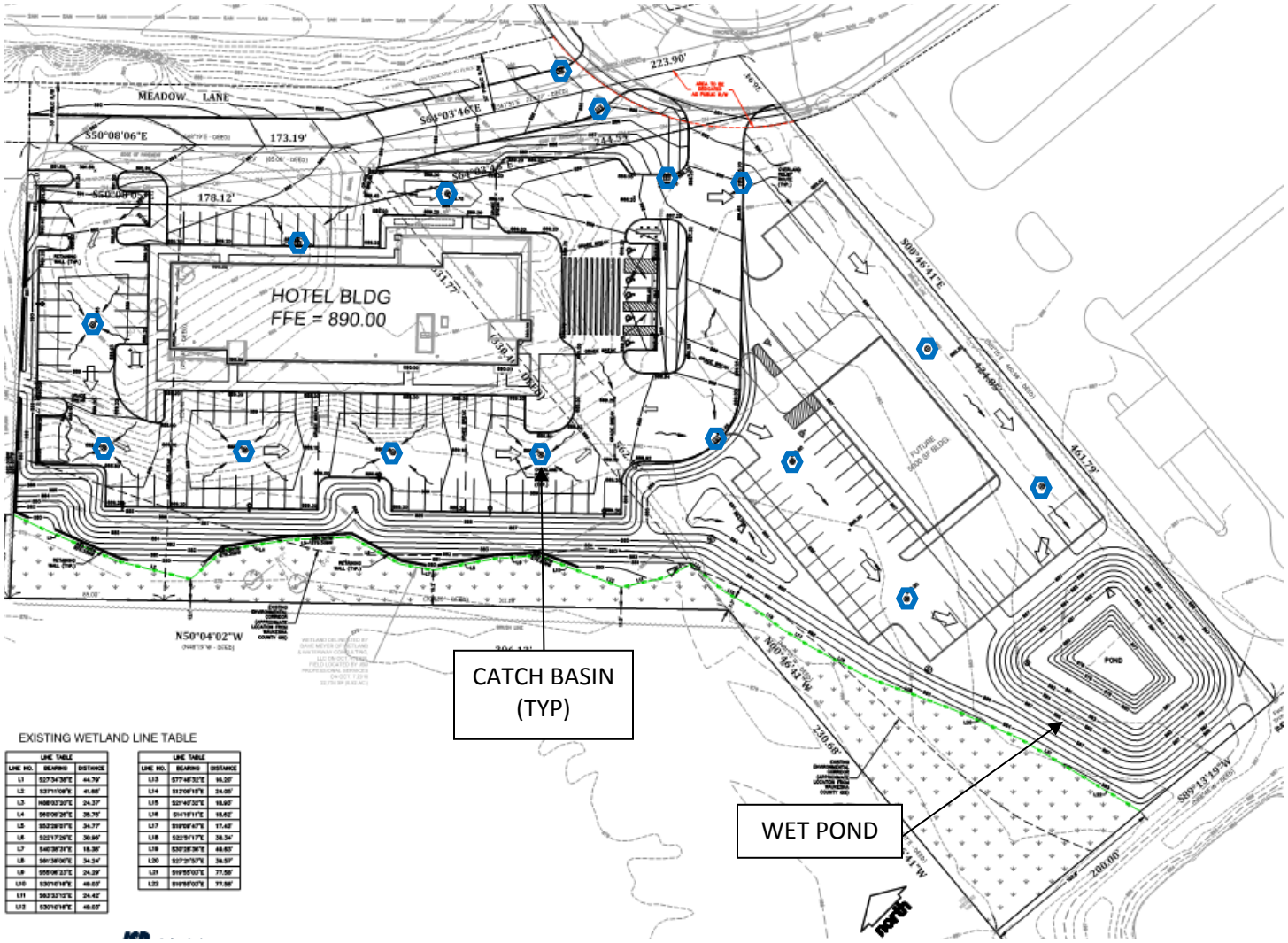


Exhibit C
Storm Water Practice Maintenance Plan

This exhibit explains the basic function of each of the storm water practices listed in Exhibit B and prescribes the minimum maintenance requirements to remain compliant with this Agreement. The maintenance activities listed below are aimed to ensure these practices continue serving their intended functions in perpetuity. The list of activities is not all inclusive, but rather indicates the minimum type of maintenance that can be expected for this particular site. Access to the stormwater practices for maintenance vehicles is shown in Exhibit B. Any failure of a storm water practice that is caused by a lack of maintenance will subject the Owner(s) to enforcement of the provisions listed on page 1 of this Agreement by the City of Waukesha.

System Description:
The proposed hotel site will encompass approximately 3.6 acres. The development will include installation of private utilities, construction of the building with associated parking, and construction of a storm water wet pond with plans for the construction of a commercial site in the future. Stormwater runoff will be conveyed to the wet pond via overland flow and proposed storm sewers.

"As-built" construction drawings of the basin, showing actual dimensions, elevations, outlet structures, etc. will be recorded as an addendum(s) to this agreement within 60 days after Waukesha County accepts verification of construction from the project engineer.

Minimum Maintenance Requirements:
To ensure the proper long-term function of the storm water management practices described above, the following activities must be completed:

1. All outlet pipes must be checked monthly to ensure there is no blockage from floating debris or ice, especially the washed stone in front of the 3-inch orifice and the trash rack on the riser in the main basin. Any blockage must be removed immediately. The washed stone must be replaced when it becomes clogged.
2. Grass swales shall be preserved to allow free flowing of surface runoff in accordance with approved grading plans. No buildings or other structures are allowed in these areas. No grading or filling is allowed that may interrupt flows in any way.
3. Grass swales, inlets and outlets must be checked after heavy rains (minimum of annually) for signs of erosion. Any eroding areas must be repaired immediately to prevent premature sediment build-up in the downstream forebays or basin. Erosion matting is recommended for repairing grassed areas.
4. NO trees are to be planted or allowed to grow on the earthen berms. Tree root systems can reduce soil compaction and cause berm failure. The berms must be inspected annually and any woody vegetation removed.
5. Invasive plant and animal species shall be managed in compliance with Wisconsin Administrative Code Chapter NR 40. This may require eradication of invasive species in some cases.
6. If the permanent pool falls below the safety shelf, a review shall be performed to determine whether the cause is liner leakage or an insufficient water budget. If the cause is leakage, the liner shall be repaired. Leakage due to muskrat burrows may require removal of the animals, repair of the liner with clay, and embedding wire mesh in the liner to deter further burrowing. If the permanent pool cannot be sustained at the design elevation, benching of the safety shelf may be necessary.
7. If floating algae or weed growth becomes a nuisance (decay odors, etc.), it must be removed from the basin or the forebay and deposited where it cannot drain back into the basin. Removal of the vegetation from the water reduces regrowth the following season (by harvesting the nutrients). Wetland vegetation must be maintained along the waters edge for safety and pollutant removal purposes.
8. If mosquitoes become a nuisance, the use of mosquito larvicide containing naturally-occurring Bti soil bacteria is recommended.
9. When sediment in the forebays or the basin has accumulated to an elevation of three feet below the outlet elevation, it must be removed (see Exhibit D). All removed sediment must be placed in an appropriate upland disposal site and stabilized (grass cover) to prevent sediment from washing back into the basin. The forebays will likely need sediment removal first. Failure to remove sediment from the forebays will cause resuspension of previously trapped sediments and increase downstream deposition.
10. No grading or filling of the basin or berm other than for sediment removal is allowed, unless otherwise approved by the City of Waukesha.
11. Periodic mowing of the grass swales will encourage vigorous grass cover and allow better inspections for erosion. Waiting until after August 1 will avoid disturbing nesting wildlife. Mowing around the basin or

the forebays may attract nuisance populations of geese to the property and is not necessary or recommended.

12. Any other repair or maintenance needed to ensure the continued function of the storm water practices or as ordered by the City of Waukesha under the provisions listed on page 1 of this Agreement.
13. Aerators/Fountains – If an aerator or fountain is desired for visual and other aesthetic effects (aerators designed to mix the contents of the pond are prohibited) they must meet all of the items below:
    - Use an aerator/fountain that does not have a depth of influence that extends into the sediment storage depth (i.e. more than three feet below the normal water surface).
    - If the water surface drops due to drought or leakage, the aerator / fountain may not be operated until the water rises enough for the depth of influence to be above the sediment storage layer. Therefore, if the depth of influence of the aerator / fountain is two feet, the water surface must be within one foot or less of the lowest pond outlet.
    - Provide an automatic shut-off of the aerator/fountain as the pond starts to rise during a storm event. The aerator/fountain must remain off while the pond depth returns to the permanent pool elevation and, further, shall remain off for an additional 48 hours, as required for the design micron particle size to settle to below the draw depth of the pump.
    - Configure the pump intake to draw water primarily from a horizontal plane so as to minimize the creation of a circulatory pattern from bottom to top throughout the pond.

WET DETENTION POND OPERATION AND MAINTENANCE

I. ROUTINE MAINTENANCE

A. Mowing

1. Side slopes, embankments, and emergency spillways that are not rock lined which have been planted with turf grasses should be mowed at least twice a year to prevent woody growth and control noxious weeds.
2. Adjacent to the residential areas, more frequent mowing, typically once a week during a normal growing season, is recommended for aesthetic and allergy control purposes.
3. Native grasses should be mowed to a height of 6" in mid to late summer or after they have achieved a height of 1-1/2 feet during the first growing season. Further mowing in subsequent growing seasons will not be required
4. If possible, the native grass area should be burned off every three to four years in the spring of the year. Check local burning regulations as permits may be required.
5. If burning of the native grass areas is not possible, a 5 to 8" mowing every 3 to 4 years, may suffice as a substitute management technique. The mowed area should be raked and performed in the spring.

B. Inspections

1. Inspections of the ponds shall he completed on a quarterly basis or after significant rainfall events.
2. The inspections should be completed during wet weather conditions to determine if the ponds are functioning properly.
3. Inspection priorities shall be as follows:
    a. Inspect the embankments for subsidence, erosion, cracking and tree growth.
    b. Inspect the condition of the emergency spillway and overland flow path
    c. Inspect the pond for accumulation of sediment.
    d. Inspect the outlet control structure for clogs, debris and material failures.
    e. Inspect upstream and downstream channels from an erosion perspective.
    f. Inspect any modifications that may have been done to the ponds following their initial construction.
    g. Inspect the side slopes of the pond for erosion, slumping, cracking or woody plant materials.
4. As-built plans shall accompany the person responsible for the pond inspections.
5. Documentation of the inspections should be completed and filed. Documentation should include at a minimum:
    a. Inspectors name, affiliation and professional credentials if applicable.
    b. Date, time and weather conditions.
    c. Approximate rainfall total over a 24 hour period if applicable.
    d. Existing embankment, outlet and inlet conveyance systems and vegetation condition.
    e. Sediment depth at the outlet control structure and at a minimum one other location.
    f. Identification of potential structural failures and repair needs
    g. Other pond conditions such as vegetation growth, algae growth and emergency spillway conditions.
    h. Repair recommendations.

C. Debris and Litter Removal.

1. Debris and litter removal from the pond surface shall be completed at least once a month.
2. Particular attention should be paid to debris accumulating around the riser pipe to prevent potential clogging.

D. Erosion Control.

1. The pond side slopes, embankments and emergency spillways may suffer from periodic slumpage and erosion.
2. Corrective measures shall include re-grading, filling and re-vegetation of the eroded or slumping areas.
3. Rip rap at the pond outlet and emergency spillways should be inspected for displacement or undermining. Repairs shall be made upon discovery.

E. Nuisance Control.

1. Biological control of algae and mosquitoes is preferred over chemical control. Consultation with local WDNR officials is recommended prior to the introduction of any biological control.
2. Maintaining the native grass perimeter will aide in the control of geese.
3. Mechanical controls should be used when feasible.

II. NON-ROUTINE MAINTENANCE

A. Structural Repairs and Replacement.

1. The outlets of the pond have been constructed utilizing concrete pipe. The estimate life of these structures is 75 to 100 years. Annual inspection of the structures will disclose any potential structural problems. If structural problems appear, repair or replace the outlet.
2. Excessive or chronic drawdown of the ponds may cause leaks or seepage through the embankments. Excessive drawdown should be avoided and thus corrective measures for leakage and seepage can be avoided.

B. Sediment Removal

1. A sediment clean out cycle of 10 to 15 years is recommended. Sediment removal may be necessary prior to 10 years if there is a substantial amount of land disturbance occurring within the contributory watershed. Annual inspections shall be made to ensure that the design depth of the permanent water pool is maintained.
2. Sediment removed from the ponds shall be hauled to an upland area, spread and stabilized with vegetative material or disposed of in accordance with Chapter NR 528 of the Wisconsin Administrative Code.
3. It is recommended that the sediment be tested to determine if land filling is necessary. Contact the local DNR prior to sediment sampling and testing to insure compliance with State standards and regulations.
4. Surveyed depths of the sediment storage area and permanent pool elevations shall be made immediately following the construction of the ponds and recorded on the as-built plans. Annual inspections shall include measure downs to determine sediment elevations in relation to the permanent pool elevation.

APPENDIX 8

Waukesha County Airport Concurrence Letter

WAUKESHA COUNTY AIRPORT
CRITES FIELD

May 1, 2019

Paul Martens
JSD Professional Services, Inc.
W238 N1610 Busse Rd Suite 100
Waukesha, WI 53188

Dear Paul,

Thank you for contacting me regarding the proposed wet detention pond for the Avid Hotel site.

Based on the location of the proposed pond located approximately 0.55 miles west-southwest of the Waukesha Airport at the Avid Hotel site, the pond would be considered a wildlife attractant per FAA guidelines and would be located within the 10,000 feet separation criteria for airports and wildlife attractants.

Due to the proximity of your site to the approach course to our main runway, we would greatly prefer to have you design and install a dry detention pond. However, based on our conversations and a review of your site plans, I've attached an analysis and list of recommendations for your proposed wet detention pond.

If you have any questions or concerns please let me know. After construction is completed, I would like to inspect the site to ensure the planned mitigation techniques are in place.

Sincerely,

Kurt Stanich
Manager

Encl: Analysis

Avid Hotel Analysis

Location:
The proposed pond would be located just north of an existing pond. The pond would not be considered unique habitat for the area where wildlife (i.e. migratory birds) would be attracted to in relation to other ponds. With other numerous water sources closer to the Airport, the proposed pond is not expected to provide ample nesting or feeding opportunities which would attract waterfowl, water birds, or other shorebirds that are not already present in the surrounding environment.

However, the detention pond does not preclude the fact that transient species of birds may stop over to loaf and rest at the proposed pond location. There is potential for birds that are moving from this pond to other surrounding ponds to be flying within the airspace of the Waukesha Airport. This proposed pond at the Avid Hotel site would not necessarily increase the bird presence in the area given the similar habitat around this location.

Installation Recommendations:

- Reviewing the proposed wildlife mitigation plans for your proposed wet pond in lieu of constructing a dry detention pond and considering the normal water levels shown on the drawing, our wildlife biologist believes the height of the rip rap on the bank is sufficient.
    - That rip rap will discourage wildlife from loafing on the edge of the pond.
    - Having the wire grid above the pond is an acceptable wildlife deterrent that will further discourage use of the pond surface. The drawing shows the grid spacing at 10' x 10'.
        - If that is correct, grid spacing at that size would discourage larger birds from flying into the pond. However, smaller birds especially waterfowl/ducks would still be able to maneuver through those spaces.
        - <u>The grid would be more successful in deterring wildlife if the grid squares were made smaller to further reduce attractiveness to waterfowl.</u>

- At the proposed pond site, maintenance of turf vegetation surrounding the pond:
    - Should be kept to within 6 to 12 inches in length within
    - Any grasses, shrubs, or other landscaping planted should be small seed producing varieties to discourage the area from becoming a food source for hazardous wildlife.
- The pond will require seasonal monitoring to determine if significant numbers of birds are being attracted to the location and if their flying presence could impact traveling aircraft. If so, mitigation/management should be considered for this proposed pond.