VILLAGE OF WINDSOR
VILLAGE BOARD RESOLUTION 2018-56

APPROVAL OF SITE PLAN REVIEW
FOR THE EXPANSION OF THE OLD DOMINION FREIGHT LINE FACILITY
LOCATED AT 4380 DURAFORM LANE, WINDSOR

WHEREAS, JSD Professional Services ("Petitioner"), on behalf of Jerry Canada (dba Old Dominion Freight Line), as owner ("Owner"), are requesting Site Plan Review approval for the expansion of the Old Dominion Freight Line facility located at 4380 Duraform Lane, in the Village of Windsor ("Subject Property"); and

WHEREAS, the Petitioners obtained a recommendation for Approval of the Site Plan Review request in Plan Commission Resolution 2018-14; and

WHEREAS, the Village Director of Planning / Zoning Administrator has reviewed the Petitioners' request and prepared a Staff Report dated July 20, 2018 recommending approval, subject to certain conditions specified in the Staff Review; and

WHEREAS, following review of the information presented at the Plan Commission and the Village Board meetings, and the Staff Report recommending approval, the Village Board Approves the Site Plan, subject to the conditions specified in the Staff Report and as set forth herein.

NOW, THEREFORE, BE IT RESOLVED by the Village Board of the Village of Windsor as follows:

The Village of Windsor Board **Approves** the Site Plan Review request for Jerry Canada (dba Old Dominion Freight Line) located 4380 Duraform Lane, Windsor WI, subject to the following conditions:

1. The Village Board grants an exemption from the landscape and buffer requirements, architecture requirements, and lighting requirements as set forth in the Village Staff Comments of this Staff Report.
2. This approval is limited to Jerry Canada (dba Old Dominion Freight Line) located at 4380 Duraform Lane, Windsor, WI.
3. This approval is limited to the construction of a 4,512 square foot addition to the existing freight transfer station facility, in addition to the site improvements, as presented to the Village Board on August 2, 2018.
4. Prior to the start of construction, the Petitioner shall address the technical comments set forth in the Village Staff Comments and Village Policy Comments/Concerns sections of this Staff Report to the satisfaction of the Village Plan Commission, Village Board, and Village Staff.

5. Prior to the start of construction, t Petitioner shall present to the Village Director of Planning / Zoning Administrator the following fully executed original documents:
   a. A Stormwater Management Agreement, in a form satisfactory to the Village Board, Village Attorney, Village Director of Planning / Zoning Administrator and Village Engineer, for all stormwater management facilities.
6. The Petitioner shall construct the proposed development as illustrated on the Plan Sheets as presented to the Village Board at its meeting on August 2, 2018. The Plan Sheets include:
   a. C3.0 – Site Plan dated June 13, 2018
   b. C4.0 – Grading and Erosion Control dated June 13, 2018
   c. C5.0 – Utility Plan dated June 13, 2018
   d. C6.0 and C6.1 – Site Details dated June 13, 2018
   e. ES2.1A and ES2.1B
   f. L1.0 and L2.0 - Landscape Plans dated June 11, 2018
   g. Elevation Drawings dated May 18, 2018
   h. Lighting Plan dated June 11, 2018
7. The Petitioner shall obtain approval of an Erosion & Sedimentation Control Plan and Stormwater Management Plan by the Village of Windsor and Dane County. The Petitioners shall comply with the approved plan/permit requirements and applicable law as determined by the Village of Windsor and Dane County prior to the start of construction.
8. The Petitioner shall obtain approval of the Site Plan Review by the DeForest Windsor Fire & EMS District. The Petitioner shall comply with any and all recommendations by the DeForest Windsor Fire & EMS District prior to the start of construction.
9. The Petitioner shall obtain approval of the Site Plan Review by Advanced Disposal (or designee). The Petitioner shall comply with any and all recommendations by Advanced Disposal (or designee) prior to start of construction.
10. The Petitioner shall comply with the requirements of Sec. 52-73 *C-2, General Commercial District Regulations* of the Village of Windsor Code of Ordinances.
11. The Petitioner shall allow representatives from the Village of Windsor to inspect the subject property upon 24-hour notice for the purposes of determining compliance with this approval, and without prior notice in the event of an emergency as determined by the Village.
12. The Petitioner shall promptly reimburse the Village of Windsor for all costs and expenses incurred by Windsor in connection with the review and approval of the Site Plan Review request, including, but not limited to, the cost of professional services incurred by the Village of Windsor for the review and preparation of required documents, attendance at meetings or other related professional services.

13. This approval expires one hundred-eighty (180) days from the date of adoption of this Resolution. Time is of the essence. If the Petitioner encounters an unforeseen development delay, as determined by the Zoning Administrator, the Zoning Administrator is authorized to extend the one hundred-eighty (180) days expiration up to an additional one hundred-twenty (120) days. If the Petitioner is unable to or does not act on the Village of Windsor Board's recommendation prior to expiration, then this matter shall be re-referred to the Village of Windsor Plan Commission prior to further action by the Village of Windsor Board.

The above and foregoing Resolution was duly adopted at a meeting of the Village Board of the Village of Windsor held on August 2, 2018, by a vote of 5 in favor and 0 opposed.

VILLAGE OF WINDSOR

Robert E. Wipperfurth

Robert E. Wipperfurth, President

Attested by:

Christine Capstran

Christine Capstran, Clerk

INCORPORATED BY REFERENCE:
Staff Report
Petitioner Application

Windsor
Growing Forward

To:	Village of Windsor Board
Cc:	Robert Wipperfurth, Tina Butteris, Christine Capstran, Kevin Richardson, William Cole
From:	Amy Anderson Schweppe, Jamie Rybarczyk
Rpt Date:	July 20, 2018
Mtg Date:	August 2, 2018
Submtl Date:	June 13, 2018
Re:	Old Dominion Freight Line – Site Plan Review

BACKGROUND:

Petitioner: JSD Professional Services, Inc.

Property Owner: Jerry Canada (dba Old Dominion Freight Line)

Location / Address: 4380 Duraform Lane, Windsor, WI

Taxkey Number: 196/0910-323-0556-0

Area: 6.56 acres

Existing Zoning: C-2, General Commercial District

Future Land Use: Corporate Park

REQUEST:

Old Dominion Freight Line (ODFL) requests approval of a Site Plan Review for the expansion of their freight transfer facility located in the Village of Windsor. In addition to the Site Plan Review, the Petitioner is requesting exemptions (design standards for architecture, landscaping, and lighting) from Windsor's Code of Ordinances (Code) for Site Plan Review.

See Exhibit A for additional information regarding the Petitioner's request.

OVERVIEW:

ODFL is proposing site improvements for the expansion of their freight transfer facility. The site improvements will include the construction/installation of:

- 4,512 square foot addition onto the existing freight transfer facility;
- 16 additional loading dock doors for a total of 38 loading dock doors;
- 32 additional parking stalls for semi-trailers for a total of 94 parking stalls;
- Additional pavement for circulation of semi-tractors/trailers;

- 19 additional employee and visitor parking stalls for a total of 45 parking stalls, which two (2) will be ADA accessible;
- An additional access drive to the subject property. The east access drive will be for in-bound semi-tractor/trailer and vehicle traffic and the west access drive will be for out-bound semi-tractor/trailer and vehicle traffic;
- A bioretention pond and underground box culvert facilities for stormwater treatment;
- Streetscaping along Duraform Lane; and
- Perimeter security fencing.

VILLAGE STAFF COMMENTS:

The Planning, Zoning and Development Department provides the Village of Windsor Board with the following **planning, zoning and development** comment(s):

1. *Village of Windsor Code of Ordinances: Chapter 10 Buildings and Building Regulations*

    a. Site design: The Site Plan depicts the 4,512 square foot addition to the existing freight transfer facility, enhanced site circulation, expanded semi-tractor/trailer and vehicle parking, and stormwater management facilities. Based on the existing site topography, location of the existing freight transfer facility, and use of the subject property, the proposed site improvements are logical alternations leading to improved efficiency of the freight transfer station. The Site Plan meets the requirements for site design.

    b. Circulation and access: The Site Plan depicts improved traffic circulation for both semi-tractors/trailers and vehicles. The east access drive will be for in-bound semi-tractor/trailer and vehicle traffic and the new west access drive will be for out-bound semi-tractor/trailer and vehicle traffic. Both access drives to the freight transfer facility will be secured with a gated entry and perimeter fencing. The employee/visitor parking will use the same access drives but will be located outside the security fencing. The Site Plan meets the requirements for circulation and access.

    c. Landscape and buffers: The Site Plan depicts the required landscaping (i.e. point system) for the street frontage, employee/visitor parking lot, and general site.

    The Petitioner is requesting discussion and action by the Village of Windsor Board for an exemption on the required landscaping for building foundation and district boundary due to paved berths to loading docks and the subject property being located in an industrial park.

    d. Architecture: The architecture of the proposed addition will match the existing freight transfer facility (i.e. off-white metal siding, galvalume standing seam metal roof, and white metal coiling loading dock doors). The addition, like the existing freight transfer facility, will be on a four foot above grade concrete stem wall and slab.

    The Petitioner is requesting discussion and action by the Village of Windsor Board for an exemption on the regarded building scale, building rhythm, vertical articulation, and architectural elements due to the desire to match architecturally

the existing transfer station facility, the industrial use of the facility, and the subject property located in an industrial park.

e. Signage: The Petitioner did not submit a Sign Plan; therefore, it is presumed no new or additional signs will be installed. All signage shall comply with Secs 10-499, 52-23 and 52-101(7) of the Code.

f. Lighting: The Photometric Plan complies lighting requirements of the Code.

   The Petitioner is requesting discussion and action by the Village of Windsor Board for an exemption for the height of the light poles. Per the Code, light poles shall not exceed a height of 25 feet. The Petitioner is request a height of 30 feet to match the existing light poles and maintain a safe working environment. The Petitioner will be replacing and installing new LED lighting on the subject property.

2. *Village of Windsor Code of Ordinances: Chapter 52 Zoning Districts*

   The Site Plan complies with the requirements of the C-2, General Commercial Zoning District.

3. *Village of Windsor Comprehensive Plan: 2035*

   The Site Plan is consistent with the Village of Windsor Comprehensive Plan: 2035 and the Corporate Park land use designation.

The Engineering Department provides the Village of Windsor Board with the following **engineering** comment(s):

1. The Village Engineer has reviewed the stormwater management plan and the civil engineering plans prepared by JSD Professional Services Inc. and has no objections to the plans as presented.
2. The Petitioner is requesting an exemption from the stormwater management infiltration requirements based on the type of soils that are present on the subject property. The Village Engineer has no objections to this the exemption request.
3. Site constraints require the Petitioner to propose underground concrete located under the pavement and a bioretention pond north of the pavement to meet the stormwater retention and treatment requirements. The Village Engineer has no objections to the plans as presented.
4. Prior to construction, the Petitioner shall obtain approval from Dane County for Erosion & Sedimentation Control Plan and Stormwater Management Plan.
5. The Petitioner proposes a second access drive to Duraform Lane. The Village Engineer has no objections to the proposed second access drive.

The Utility District provides the Village of Windsor Board with the following **utility** comment(s):

1. Expansion to the existing water and sanitary sewer service is not required; therefore, Windsor Utility has no comments.

The DeForest Windsor Fire & EMS District provides the Village of Windsor Board with the following **fire and emergency services** comment(s):

1. The DeForest Windsor Fire & EMS District has no preliminary comments to the Site Plan Review.

VILLAGE POLICY COMMENTS/CONCERNS:

The Village Staff provides the Village of Windsor Board with the following policy comments/concerns that require further discussion and action:

1. The Petitioner's application requests three (3) exemptions from the Site Plan Review requirements:
    a. Landscape and buffers exemption regarding landscaping for building foundation and district boundary;
    b. Architecture exemption regarding the building scale, building rhythm, vertical articulation, and architectural elements; and
    c. Lighting exemption regarding the height of the light poles.

    The Village of Windsor Board shall determine if the Petitioner's exemption requests are consistent with the purpose, goals, objectives, policies and standards of the Code.

VILLAGE PLAN COMMISSION RECOMMENDATION:

On July 12, 2018 the Village Plan Commission recommended to the Village Board Approval of the Site Plan Review request for Old Dominion Freight Line located at 4380 Duraform Lane, Windsor by Resolution 2018-14.

Exhibit B provides the unofficial meeting minutes for the Village Plan Commission regarding the Petitioner's request.

VILLAGE STAFF RECOMMENDATION:

Depending on confirmation by the Village of Windsor Board of the above described comments, the Village of Windsor Board may take the following action:

The Village of Windsor Board **Approves** the Site Plan Review request for Jerry Canada (dba Old Dominion Freight Line) located 4380 Duraform Lane, Windsor WI, subject to the following conditions:

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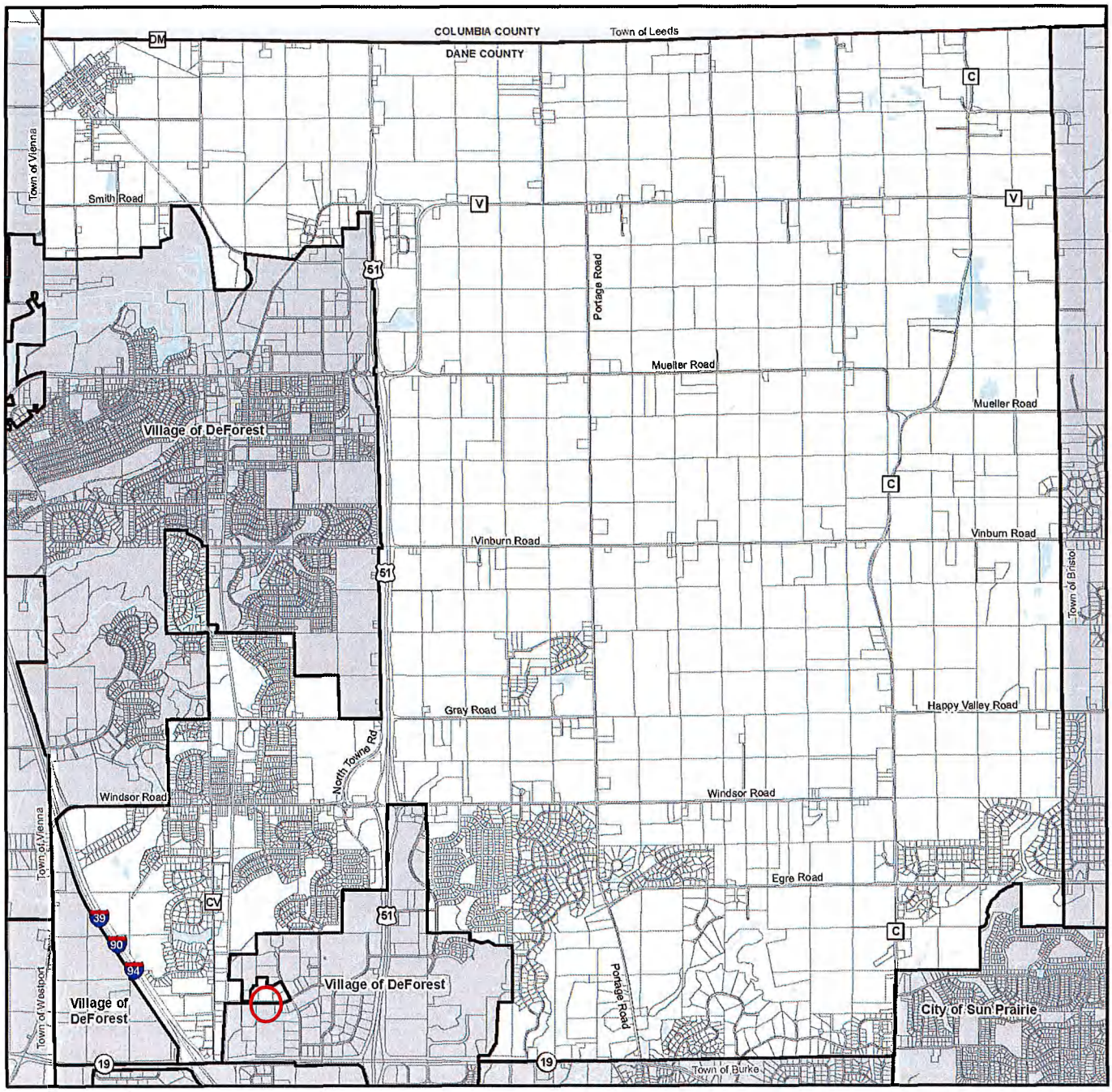
13. This approval expires one hundred-eighty (180) days from the date of adoption of this Resolution. Time is of the essence. If the Petitioner encounters an unforeseen development delay, as determined by the Zoning Administrator, the Zoning Administrator is authorized to extend the one hundred-eighty (180) days expiration up to an additional one hundred-twenty (120) days. If the Petitioner is unable to or does not act on the Village of Windsor Board's

recommendation prior to expiration, then this matter shall be re-referred to the Village of Windsor Plan Commission prior to further action by the Village of Windsor Board.

LOCATION MAP:



EXHIBITS:

A. Petitioner Application

B. Village Plan Commission Meeting Minutes (Unofficial) of July 12, 2018

Old Dominion Freight Line

Site Improvements

Letter of Intent

4380 Duraform Lane, Windsor WI

Site Pan Submittal

June 13th, 2018

209 10th Ave South • Suite 414
Nashville, Tennessee 37203
v. 615.296.9146 • f. 615.733.0052

Architectural Consultant

Site & Landscape Design Consultant

Construction Manager

Project Intent

Old Dominion Freight Line (ODFL) is proposing site improvements and facilities associated with their existing facility located at 4380 Duraform Lane. These improvements will include constructing a building addition to the north of approximately 4,500 square feet, which will accommodate 16 additional loading dock doors for freight transfer. Other improvements also include additional pavement maneuvering and truck / trailer parking areas, surface ponds and underground detention stormwater treatment facilities, additional employee parking spaces, an additional access drive to the property and other landscape and site amenity additions include landscaping and secure perimeter fencing. The primary intent of the improvements is improve efficiency of the freight transfer station.

The existing ODFL facility operates as a freight transfer station with 22 loading dock bays and 62 total trailer parking stalls. ODFL is proposing the site improvements and specifically the building addition to provide 16 additional dock doors and 32 additional trailer parking stalls to increase the efficiency of the inbound and outbound freight transfers. In existing conditions, freight transfer is inefficient and time consuming due to the inadequate number of dock doors to facilitate the time efficient loading & unloading.

The site currently employs approximately 30 persons on-site to operate the loading docks and office logistics. These employees are split evenly between 2 shifts. On an average day, the site accommodates approximately 20 freight transfer trips in and/or out-bound of the site. All trips originate and return to this transfer station at the completion of each day.

With the proposed building the employee numbers will increase by approximately 6-8 employees total between the two shifts for dock operations and office logistics. Additional employees as freight drivers will also be added due to the increased number of dock doors. This will increase the number of trips in and/or out-bound of the site each day by approximately 10%.

To accommodate the existing employee numbers, the existing site currently accommodates 22 parking stalls for staff and visitors. There are two (2) allocated ADA accessible parking spaces on-site as well, for a total of 24 surface parking spaces.

In the proposed conditions, the site has expanded parking areas along Duraform Lane. An additional 19 parking stalls have been added and the existing two (2) ADA accessible parking spaces will be maintained. In total the proposed site will accommodate 45 parking stalls, including the ADA stalls.

Project Location & Property Zoning

The property address is Lot 2 of CSM 10994 located in the NE ¼ of the SW ¼ of Section 32, Town 09N, Range 10E, Village of Windsor, Dane County, Wisconsin; or more specifically 4380 Duraform Lane. The property is located in an existing industrialized area along Duraform Lane and as such the property is currently zoned as G-2 General Commercial. The site operates as a freight transfer station which is a permitted use within the zoning district.

Proposed Improvements -

Architecture – Building Addition

The proposed building addition is a dock high (finished floor 4'-0" above finished grade) concrete stem wall and slab with a pre-engineered metal building sitting on the slab. The building is proposed to match the existing in size and shape, including the roof pitch. The siding finish will be an off-white similar to the existing (color may very slightly due to age and weathering of existing panels). The roof is proposed to be a galvalume standing seam metal roof (similar to the existing roof). The dock doors will be metal coiling doors finished white. The North facing doors will have dock shelters to minimize the winter winds. The addition will not be heated or cooled and has no plumbing with the exception of an airline (the existing dock area is this same way). The interior of the addition will be exposed structure and exterior skin. The existing dock as well as the new addition will be lighted with LED type fixture with motion sensors that will turn them off when there are no activities.

We would like to seek exemptions from the Architectural Ordinances for the following reasons:

The building is located in an older Industrial Park where the surrounding buildings appear to be similar structures with metal siding. For the most part the existing surrounding buildings in the industrial area do not exhibit "Building Rhythm", "Vertical Articulation", Scale" or much change in "Building Material". The entry to the ODFL office is existing and no work is proposed for this feature. To meet the "Architectural Elements" as outlined in the Ordinance for a 100' plus addition (which is all located toward the back of the site) would add more confusion to the Architectural Language in this particular circumstance. We propose to match the existing construction as close as possible, keeping the language the same for continuity.

Site Access & Parking Improvements

The site improvements include adding loading dock and truck maneuvering pavement areas to accommodate the building addition and dock doors, additional employee parking spaces adjacent to Duraform Lane and the addition of an access drive to the site. Each of these will assist in increasing the sites efficiency and optimizing the operations; most specifically the additional access drive.

With the addition of an access west of the existing access, the site will be allowed to operate in a defined truck traffic circulation pattern counter-clockwise. The eastern driveway will be inbound only and the western driveway will be out bound only for freight. Both driveways will be gated secure entries/exits with access control devices. The existing driveway will be reduced in width due to only accommodating one-way freight truck traffic.

Both proposed driveways will serve the employee parking area, which is outside of the secure perimeter of the freight transfer station due to safety and homeland security precautions. Employees enter the interior of the site through a secure man-gate at the central location of the parking area.

Total proposed parking stall count will be 45 employee parking stalls, two (2) of which will be ADA accessible. This is an increase is 19 parking stalls for existing conditions. The 19 parking stalls added will accommodate the 6-8 additional employees, additional freight truck drivers that originate from the site each day, overflow parking during shift change and visitor parking.

An additional 32 truck / truck-trailer parking stalls are added in the interior secured pavement area of the site to accommodate the expansion of the freight transfer building and docks. The additional stalls are added to the north end of the site in an open undeveloped area.

Stormwater Management

The proposed site improvements trigger village of Windsor stormwater management treatment requirements to be met. Due to the site improvements eclipsing 20,000 square feet of additional impervious area, the Village's New Development storm water management requirements must be met for these specific areas. There are areas on-site that will be consider Redevelopment, and as such these specific areas will meet the applicable redevelopment storm water management standards. A further description of the new development and redevelopment areas is provided in the Storm water Management Plan report for the site that accompanies this Site Plan Submittal.

In order to meet the storm water standards a combination of facilities have been designed to meet the stormwater water quality and rate control requirements. Due to a high groundwater table, an infiltration exemption is being requested with the Village, Dane County and WDNR and awaiting approval. The storm water management facilities include a surface bio-retention pond on the north end of the site which is responsible for treating total suspended solids and rate control; and two sets of underground box culvert which also treats for total suspended solids and rate control. One set of underground box culvert is north of the building addition and is approximately, 270 LF of 8'x6' concrete box culvert. The second set of underground box culvert is on the south end of the site which treats the new and redevelopment parking areas along Duraform Lane which totals approximately 125 LF of 8'x6' concrete box culvert.

Ultimately, the site drainage will enter the private storm sewer system on-site and discharge to the public storm sewer system in Duraform Lane. Further analysis and pipe sizing calculations are provided in the Stormwater Management Plan report.

Site Utilities

The proposed building addition will be served by the existing sanitary and water services, since the building addition does not require additional water or sewerage facilities. Existing gas and electrical services to the building will also be maintain with this proposed build-out.

Other on-site private utilities such as electrical and telecommunications will be routed interior to the site to power additional light poles and provide communications to the security camera systems.

New private storm sewer system will be added to the existing on-site private storm sewer system to facilitate the drainage of the proposed areas. Existing pipes will be re-routed into a new portion of the system on the north and south ends of the site due to an existing northern pipe falling underneath the proposed building addition and the southern pipe needed to be routed to detain runoff prior to release. The existing pipe under the proposed addition will be cut, filled with a flow-able slurry fill, capped and abandoned in-place under the building. The southern pipe which is being re-routed will have the existing pipe sealed within the structure and abandoned in place. A new pipe will be installed in the structure and drain to the south. Further details will be provided on the construction plans.

Ultimately, the private storm sewer will discharge to the same location in Duraform Lane. Modeling and sizing has been completed to ensure the existing public storm sewer has adequate capacity to accept the drainage from the site. Refer to attached plans for further details.

Landscape Plan and Requirements

The proposed site improvements will be constructed with the appropriate landscaping per Village of Windsor ordinance requirements. Per Village ordinance, the "point" system for the landscaping requirements was met for the following areas; street frontage areas, parking lot areas, general site areas.

Due to the nature of the proposed build-out the following areas are requested to be exempt from meeting the applicable landscape point requirement ; Building Foundation Landscaping & District Boundary Landscaping.

The building foundation landscaping requirement is not feasible to be met due to the proposed building additions foundation being surrounded by loading dock paved berths on the three (3) sides of the exposed building faces.

The district boundary landscaping requirement shall also be exempt due to the surrounding areas, specifically at the rear and side property lines, sharing the same industrial/commercial use as the proposed improvement site. The property directly adjacent to the property area of industrial/commercial use or currently undeveloped.

Overall the landscape plan concentrates landscaping on the frontage of the property adjacent to Duraform Lane and at the entry and exit drives. The existing landscaping, including trees, east of the driveway will be preserved during development. Existing trees west of the existing parking lot will be removed to accommodate the new parking areas, and new landscaping and trees will be installed in proposed parking islands to offset the loss of existing trees.

Other Site Amenity Improvements

The remaining site improvements include expanding the existing secured perimeter fencing to the north to encompass the expanded building and pavement areas. The secure perimeter fence is an 8 foot fence with 3 strand barbed-wire cantilevered at the top. The secure perimeter is necessary for site safety and security as freight transfer stations are monitored by homeland security agencies.

An additional secure automated gate at the new westerly exit only drive will be installed to facilitate exiting traffic. The existing secure automated entry gate will be modified to fit the improved existing easterly entry only driveway.

To add additional security, the site will be monitored by private security camera system and additional site lighting will be installed to accommodate the expanded site areas. Site lighting will be per Village ordinance standards and existing fixtures will be retrofitted with LED fixtures and all required new poles will be installed with similar LED fixtures. Existing light poles on-site are 30' feet in height, which exceed the ordinance standards of 25 feet. ODFL is requesting an exemption of the light pole height, as the taller 30 foot poles provide a safer and more secure site. The taller poles allow for better site illumination an reduce the light blocking and shadowing that a 13-14 foot high parked trailers provide along the exterior of the site. Refer to the provided site photometric and lighting plan for further details.

A trash enclosure will be installed on the north side of the proposed building addition. This will relocate the existing trash enclosure further north. The trash enclosure will be screen on east, west and south side which are visible from the street frontage. Screening materials are specified on the attached architectural and site plans.

Eight (8) Tractor electrical hot-starts will be installed in the southwest tractor/trailer parking spaces for use during cold winter months to keep the tractors block-heaters warm while parked. Existing underground electrical will re-routed to provide power to these locations.

Also along the western parking area, an above ground liquid storage tank and storage container will be installed; the tank will hold a non-flammable Diesel Exhaust Fluid (DEF) for the tractors and the container will hold miscellaneous automotive fluids such as oil, washer fluid, coolant etc. for drivers to re-fill and service their tractors with prior to leaving site.

Village of Windsor
Site Plan Review Application

General Requirements

The Village of Windsor Plan Commission typically meets on the second Thursday of every month at 5:00 p.m., and the Village Board typically reviews planning issues on the first Thursday of every month at 5:00 p.m. (or as otherwise scheduled) at the Village Hall, 4084 Mueller Road. Applicants must submit an application for a Site Plan Plan review no less than 30 days prior to the next regularly scheduled Plan Commission meeting.

The applicant is responsible for adhering to all requirements of Village ordinances, regulations, plans, and policies. This form shall not be deemed a substitute for the applicant's thorough reading and understanding of applicable Village ordinances, regulations, plans, and policies.

The application shall: 1) be on forms made available from the Village and accompanied by the required fee and review escrow, and 2) include a digital pdf copy of all submitted drawings and supplementary data.

Applicability

Applications for building permits for any construction, expansion, or conversion of structures other than single or two family residences, agricultural structures, or agricultural accessory buildings shall require site plan approval from the Village Board, upon recommendation from the Plan Commission.

Brief Description of Project:
Old Dominion Freight Line - Transfer Station Site Improvements

Project Location: 4380 Duraform Lane

Parcel Number(s): 091032305560

Process for Review and Approval (per Section 10-462 of the Village Ordinance)

1) One consultation meeting with Village Staff (Engineer, Legal Counsel, Planner and Planning and Development Coordinator at no charge.) Optional

2) Submittal of application form, fees/review escrow, and electronic/digital pdf copies of the Site Plan and supplementary materials as described above (at least 30 days prior to next plan commission meeting).

3) Staff review of application materials for compliance with requirements.

4) Plan Commission review and comment.

5) Village Board Review

6) Upon approval of the application, compliance with all applicable conditions and other Village ordinances, and execution of a development agreement if required, the Building Inspector, or designee, may issue or reject a building permit.

Checklist Legend:	
✓	submitted completely

N/S	not submitted
N/A	not applicable to project
W	waived for reasons to be described in staff report
P	submittal pending, material must be submitted prior to meeting as requested by staff
A	submittal pending, material required as condition for approval

Date Complete Application Submitted: _____

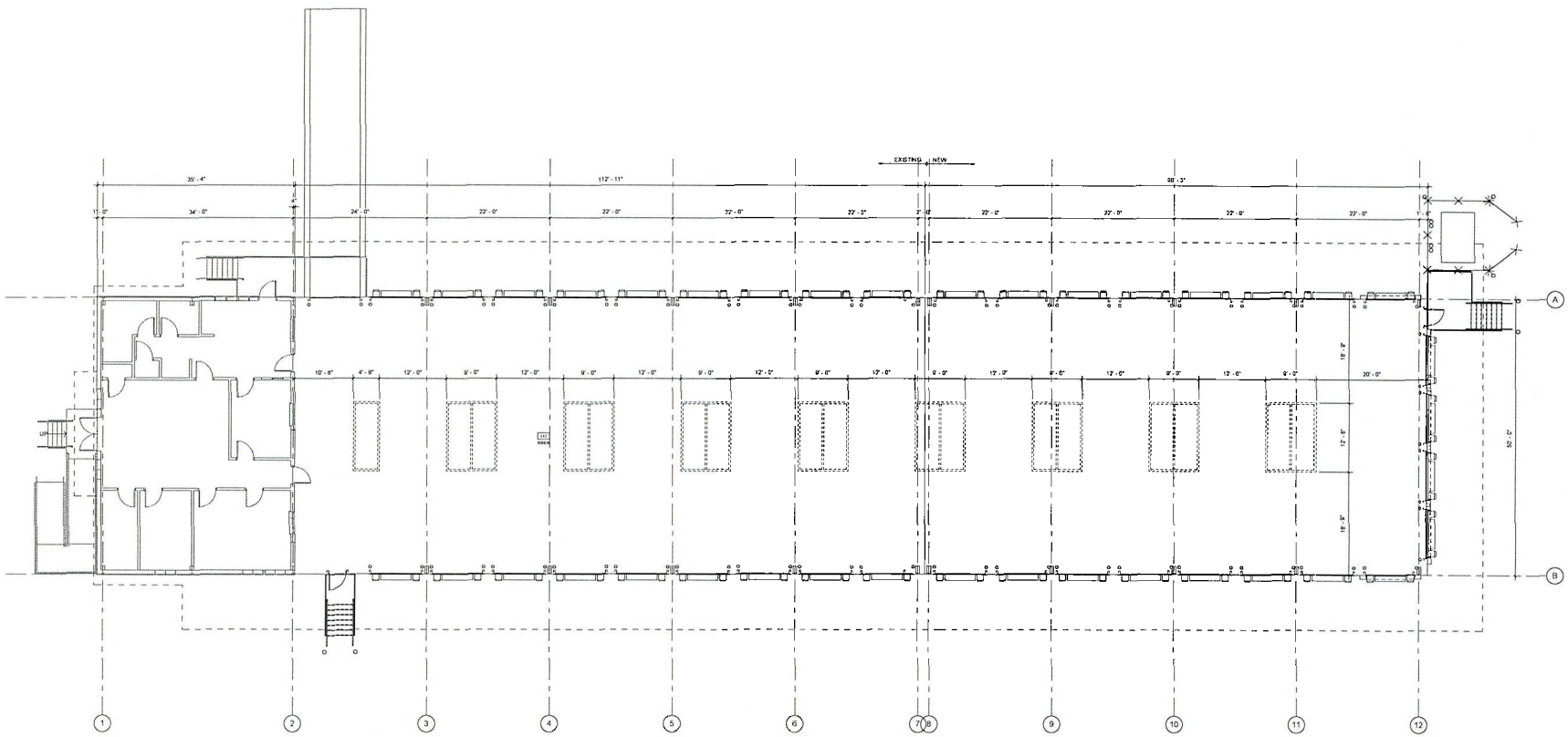
Submittal Requirements for Site Plan Review (per Section 10-497 of Village Ordinance)

The Site Plan shall be prepared in accordance with the Village Ordinance, and shall include the following minimum information:

	Item	Applicant
1	Site Plans shall be prepared in recognized architectural scale. Scale, site size, building area and lot coverage, and north arrow shall be shown. Site plans shall include the area surrounding the proposed development at the same level of detail as the site plan. The site plan shall show the relationship of the proposed development of the site to surrounding streets, buildings, lots, parking, landscape, topography, and any other important features.	X
2	Document title, date prepared, applicable Owner's and Developer's names and addresses noted. Where applicable, names and addresses of all professionals involved in any preparation of design plans shall be provided.	X
3	Existing and proposed topography shown at contour level of not less than 2' indicating proposed grade on a preliminary grading plan and the location of proposed improvements.	X
4	Building and yard setback lines indicated.	X
5	Locate all outdoor lighting proposed to illuminate the site. Provide lighting type and product information.	X
6	Indicate and locate all electrical and other easements on the subject property.	X
7	Locate existing and general location of proposed municipal services and proposed connection locations, if applicable.	X
8	Locate any proposed storm water management facilities, including retention/detention areas.	X
9	Identify existing and proposed road names.	X
10	Locate existing and proposed public and private road rights of way.	X
11	Show all drives, curb cuts, and ingress/egress locations.	X
12	Identify and show the locations of all driveways on adjoining property within 200' of the subject property.	X
13	Identify parking area and show number of spaces.	X

14	Show location and type of proposed and existing landscape plantings and buffer areas for adjoining properties.	X
15	Show pedestrian sidewalks and walkway locations.	
16	Sketch outline of any development phasing plan.	
17	Provide written project summary including operational information, construction schedule, and estimate of project value.	X
18	Provide building elevations, drawn to scale, showing building materials to be used.	X
19	List external building materials and note building front design standards identified in this ordinance.	X
20	Where applicable, 100 year occurrence interval floodplain and floodway to be identified.	
21	Where applicable, wetlands as delineated in the WDNR Wetland Inventory and a 75' setback line from each wetland shall be shown.	
22	When proposed buildings are located within 100' of an existing building, the elevation of the existing building shall be included in the site plan at the same scale and level of detail.	X

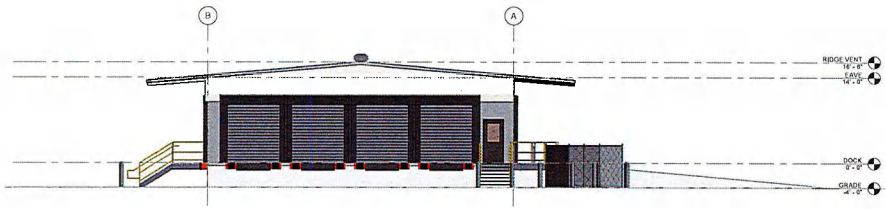
Date Complete Application Submitted _____



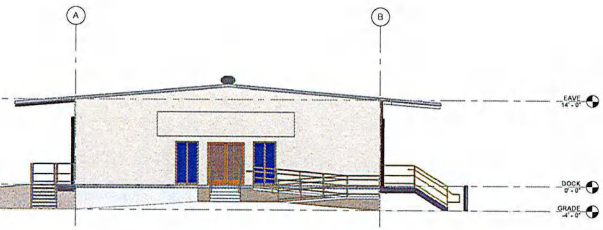
ODFL Windsor, WI
TERMINAL RENOVATION AND ADDITION

30 x 42 = 1/8" = 1'-0"
11 x 17 = NO SCALE
05/18/18

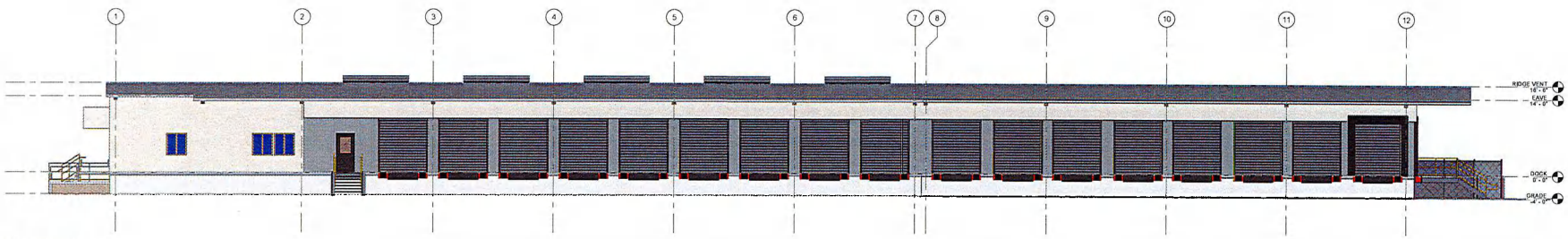
959 16th Ave South • Suite 414
Nashville, Tennessee 37203
v: 615.296.9146 • f: 615.733.6092



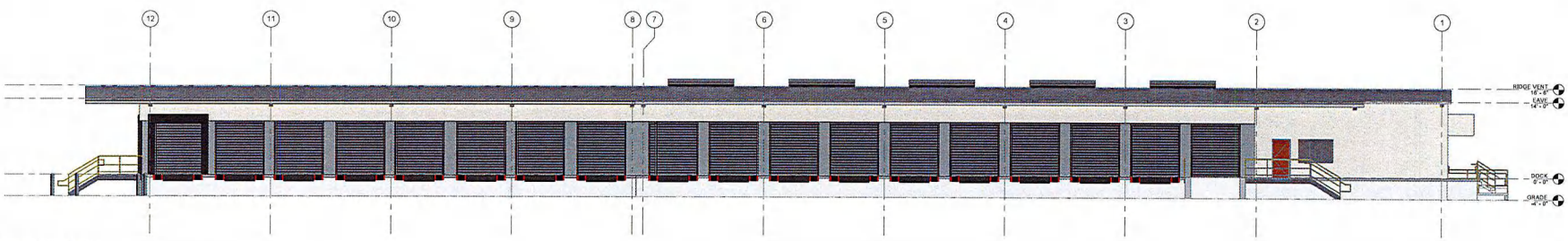
4 Pres - NORTH ELEVATION
1/8" = 1'-0"



3 Pres - SOUTH ELEVATION
1/8" = 1'-0"



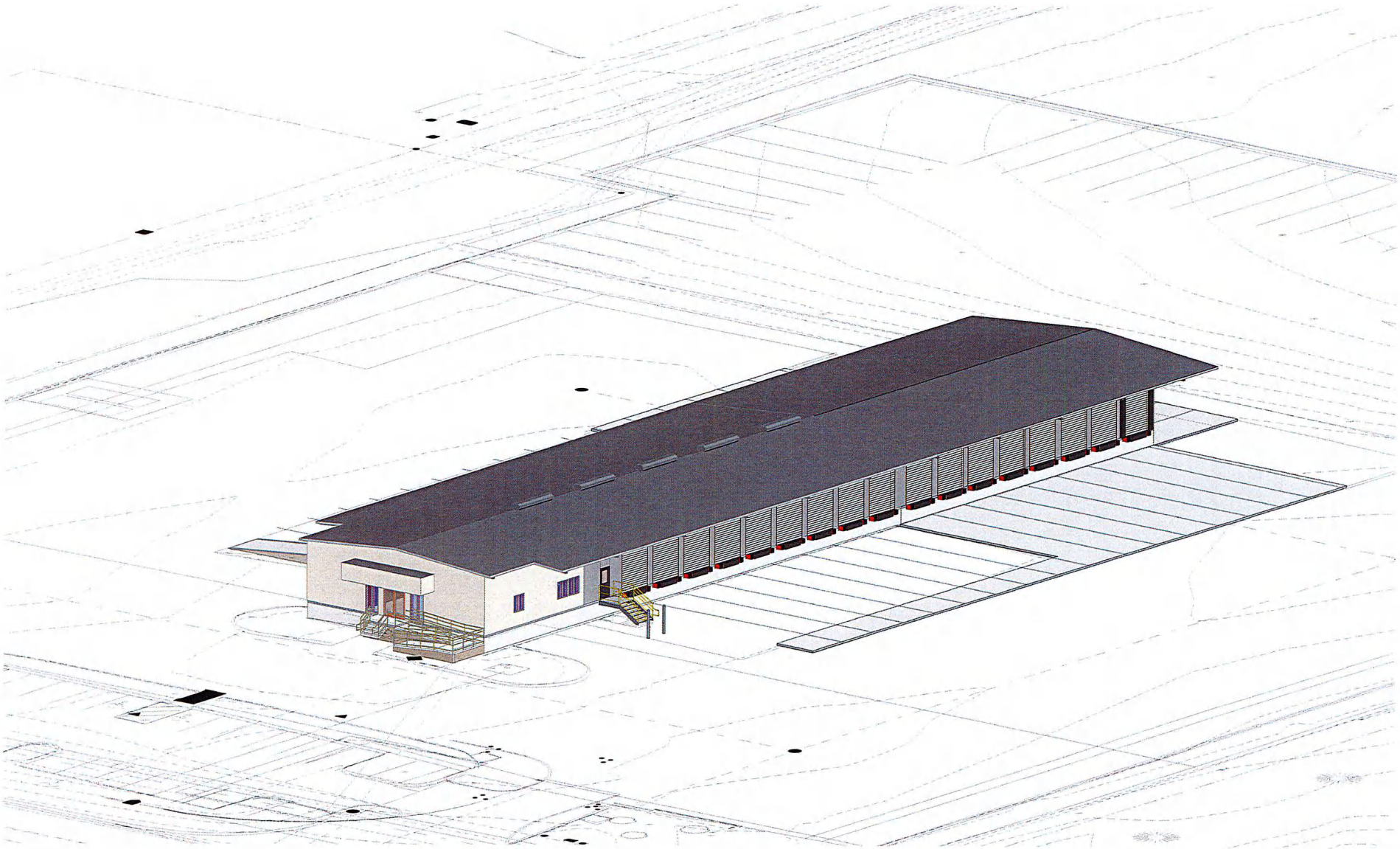
2 Pres - WEST ELEVATION
1/8" = 1'-0"



1 Pres - EAST ELEVATION
1/8" = 1'-0"

ODFL Windsor, WI
BUILDING ELEVATIONS
30 x 42 = 1/8" = 1'-0"
11 x 17 = NO SCALE
05/18/18

959 10th Ave South • Suite 414
Nashville, Tennessee 37203
v. 615.296.9146 • f. 615.733.5052



ODFL Windsor, WI
PERSPECTIVE 1

30 x 42 =
11 x 17 = NO SCALE
05/18/18

209 10th Ave South • Suite 414
Nashville, Tennessee 37203
v. 615.296.9146 • f. 615.733.6259

ODFL Windsor, WI
PERSPECTIVE 2

30 x 42 =
11 x 17 = NO SCALE
05/18/18

david mollenkopf architect
999 10th Ave South • Suite 414
Nashville, Tennessee 37203
v: 615.296.9146 • f: 615.733.6292

OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

VILLAGE OF WINDSOR, WISCONSIN

NE 1/4, SW 1/4, SECTION 32, TOWNSHIP 09 NORTH, RANGE 10 EAST

DRAWING INDEX

C0.0	TITLE SHEET
C1.0	SURVEY
C2.0	DEMOLITION PLAN
C3.0	SITE PLAN
C4.0	GRADING & EROSION CONTROL PLAN
C5.0	UTILITY PLAN
C6.0	DETAILS
C6.1	STORMWATER DETAILS
L1.0	LANDSCAPE PLAN
L2.0	LANDSCAPE DETAILS & NOTES

PROJECT AREA
NOT TO SCALE

north

PROJECT INFORMATION

OWNER
CONTACT: Old Dominion Freight Line
Jerry Canada - Construction Manager
4380 Duraform Lane
Windsor, WI 53598
P: (608) 846-2489
jerry.canada@odfl.com

ARCHITECT
David Mollenkopf Architect
David Mollenkopf, AIA - Project Architect
49 Music Square W #600
Nashville, TN 37203
P: (615) 296-9146
djmollen@themdgllc.com

CONSULTANTING ENGINEER
JSD Professional Services
Matt Haase, P.E. - Project Engineer
161 Horizon Drive, Suite 101
Verona, WI 53593
P: (608) 848-5060
matt.haase@jsdinc.com

MUNICIPAL CONTACTS

VILLAGE OF WINDSOR
Kevin Richardson
Village Engineer
4084 Mueller Road
DeForest, WI 53532
P: (608) 888-0066
kevin@windsorwi.gov

UTILITY CONTACTS

GAS & ELECTRIC
Madison Gas & Electric
Shaun Endres
PO Box 1231
Madison, WI 73701-1231
P: (608) 252-7224
sendres@mge.com

CABLE TV
Charter Communications
Miguel Del Moral
2701 Daniels St
Madison, WI 53718
P: (608) 209-4817
miguel.delmoral@charter.com

COMMUNICATIONS
Century Link
Steven Bishop
710 E Mifflin St #116
Madison, WI 53703
P: (608) 291-7872
steven.bishop@centurylink.com

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VERONA, WISCONSIN 53593
P. 608.848.5060

CLIENT:
DAVID MOLLENKOPF ARCHITECT

CLIENT ADDRESS:
49 MUSIC SQUARE W #600
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR
DANE COUNTY, WI

PLAN MODIFICATIONS:

#	Date:	Description:
1	05/31/2018	VILLAGE PRE-APP MTG
2	06/13/2018	VILLAGE SUBMITTAL
3		
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12		
13		

Design/Drawn: KWH
Approved: MHH

SHEET TITLE:
TITLE SHEET

SHEET NUMBER:
C0.0

JSD PROJECT NO: 18-8488

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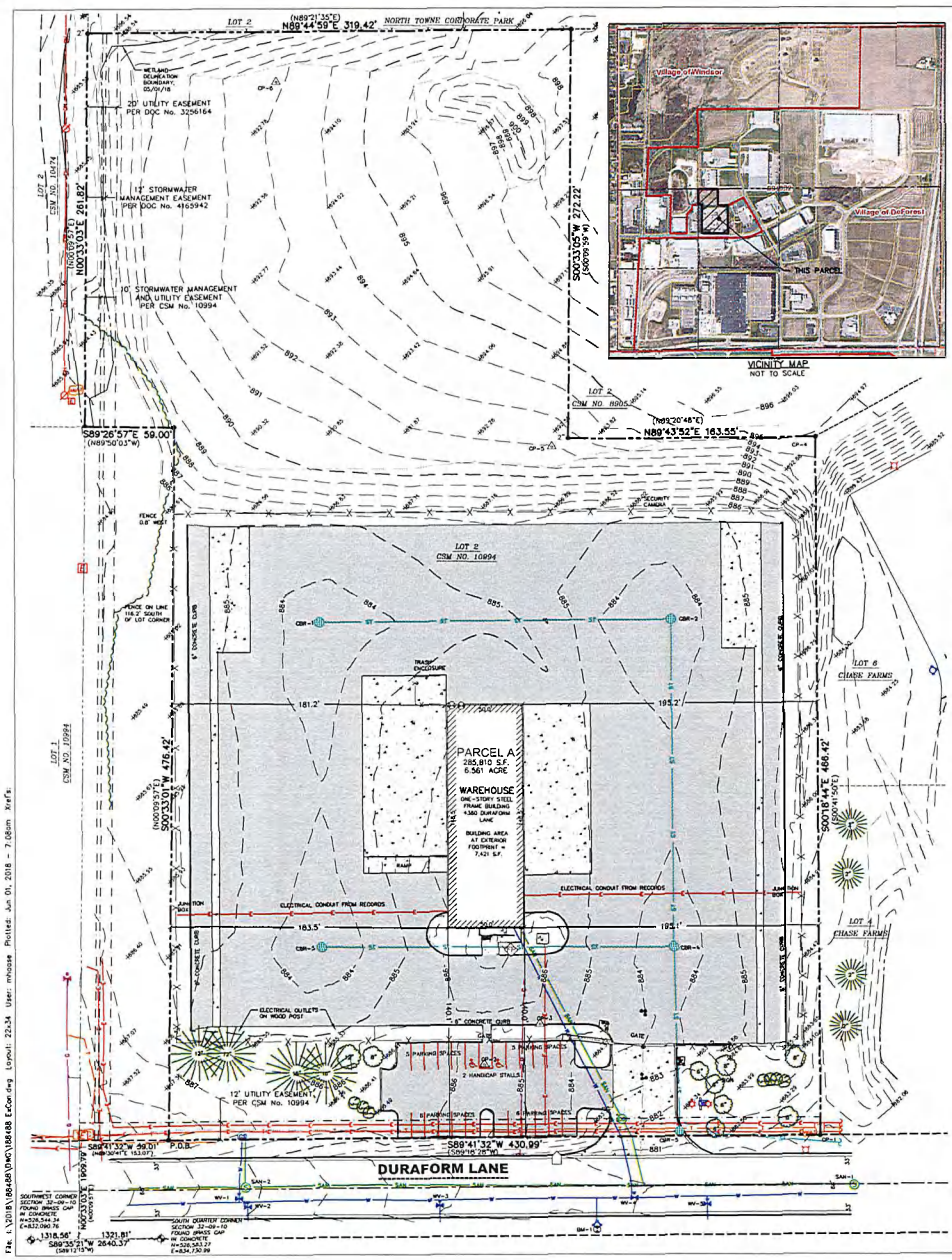
EXISTING CONDITIONS SURVEY

LOT 2, CERTIFIED SURVEY MAP No. 10994, RECORDED IN VOLUME 66 OF DANE COUNTY CERTIFIED SURVEYS, PAGE 36 THRU 40 AS DOCUMENT No. 3879522, LOCATED IN THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 32, TOWN 09 NORTH, RANGE 10 EAST, VILLAGE OF WINDSOR, DANE COUNTY, WISCONSIN.



LEGEND

- GOVERNMENT CORNER
- 2" IRON PIPE FOUND
- ¾" REBAR FOUND
- CONTROL POINT
- BENCHMARK
- FINISHED FLOOR SHOT LOCATION
- BOLLARD
- FLAG POLE
- MAIL BOX
- POST
- SIGN
- SANITARY MANHOLE
- CLEAN OUT
- WATERMAIN OR GASMAIN VALVE
- HYDRANT
- CURB STOP/SERVICE VALVE
- SPRINKLER VALVE BOX
- ROUND CASTED INLET
- ELECTRIC PEDESTAL
- ELECTRIC TRANSFORMER
- LIGHT POLE
- POWER POLE W/GUY
- YARD LIGHT
- VAULT
- TELEPHONE PEDESTAL
- CABLE PEDESTAL
- DECIDUOUS TREE
- CONIFEROUS TREE
- HANDICAP PARKING
- CENTERLINE
- RIGHT-OF-WAY LINE
- SECTION LINE
- PARCEL BOUNDARY
- PROPERTY LINE
- EASEMENT LINE
- FENCE LINE
- SANITARY SEWER
- WATER LINE
- STORM SEWER
- NATURAL GAS
- OVERHEAD LINE
- UNDERGROUND ELECTRIC
- FIBER OPTIC
- UNDERGROUND TELEPHONE
- UNDERGROUND CABLE
- EDGE OF WOODS OR BRUSH
- BUILDING
- WALL LINE
- 875 INDEX CONTOUR
- 874 INTERMEDIATE CONTOUR
- DELINEATED WETLANDS
- +874.76 SPOT ELEVATION
- EDGE OF PAVEMENT
- CONCRETE CURB & GUTTER
- EDGE OF GRAVEL
- BITUMINOUS PAVEMENT
- RETAINING WALL
- CONCRETE PAVEMENT
- GRAVEL
- EDGE OF BITUMINOUS
- PAVEMENT STRIPING
- END OF FLAGGED UTILITIES
- ( ) DENOTES RECORD DATA DEPICTING THE SAME LINE ON THE GROUND AS RETRACED BY THIS SURVEY

STORM SEWER INLETS

STRUCT. ID	RIM ELEVATION	INVERT	ELEVATION	PIPE SIZE	PIPE TYPE
CBR-1	883.34	*	–	–	–
CBR-2	883.12	*	–	–	–
CBR-3	883.15	*	–	–	–
CBR-4	883.15	*	–	–	–
CBR-5	881.50	*	–	–	–

*UNABLE TO MEASURE DUE TO INSTALLED FILTER FABRIC

WATER VALVES

VALVE No.	RIM ELEVATION	INVERT	TOP NUT ELEVATION
WV-1	885.18	TN	879.48
WV-2	884.95	TN	879.65
WV-3	882.00	TN	876.70
WV-2	880.98	TN	876.48
WV-3	880.65	TN	877.25

TN= TOP NUT OF WATER VALVE

BENCHMARKS

BENCH MARK	ELEVATION	DESCRIPTION
BM-1	883.39	TOP NUT ON HYDRANT ON S. SIDE OF DURAFORM LN.

*JSD DOES NOT GUARANTEE THE BENCHMARK ELEVATIONS LISTED ON THIS MAP ARE ACCURATE AND SHOULD BE VERIFIED PRIOR TO CONSTRUCTION ACTIVITIES.

SANITARY SEWER MANHOLES

STRUCT. ID	RIM ELEVATION	INVERT	ELEVATION	PIPE SIZE	PIPE TYPE
SAN-1	880.48	E	870.63	12"	DI
		W	870.48	12"	DI
SAN-2	885.36	E	869.26	12"	DI
		N	870.01	8"	PVC
		N	876.11	8"	PVC
		S	870.06	8"	PVC
		S	876.11	8"	PVC
		*W	869.36	12"	DI

*UNABLE TO MEASURE DUE TO LADDER LOCATION. MEASUREMENT TAKEN IN CHANNEL NEAR PIPE.

CONTROL POINTS

CONTROL POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP-1	529170.41	833559.21	893.17	3/4" REBAR
CP-2	528513.32	833695.51	885.74	MAG NAIL
CP-3	528540.71	833732.21	885.40	MAG NAIL
CP-4	528932.48	833915.15	894.42	3/4" REBAR
CP-5	528926.04	833740.81	892.15	60D NAIL
CP-6	529170.41	833559.21	893.17	3/4" REBAR

*JSD DOES NOT GUARANTEE THE CONTROL POINT ELEVATIONS LISTED ON THIS MAP ARE ACCURATE AND SHOULD BE VERIFIED PRIOR TO CONSTRUCTION ACTIVITIES.

NOTES

1. FIELD WORK PERFORMED BY JSD PROFESSIONAL SERVICES, INC. FROM APRIL 10 TO APRIL 11, 2018.
2. BEARINGS FOR THIS SURVEY AND MAP ARE REFERENCED TO THE WISCONSIN COUNTY COORDINATE SYSTEM, DANE COUNTY ZONE / THE SOUTH LINE OF THE SOUTHWEST QUARTER OF SECTION 32-09-10, BEARS N 89°35'21" E.
3. ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). BENCHMARK IS A BRASS CAP IN CONCRETE MARKING THE SOUTHWEST CORNER OF SECTION 32, T09N, R10E. ELEVATION = 871.82'
4. CONTOUR INTERVAL IS ONE FOOT.
5. SPOT ELEVATIONS IN CURBED AREAS REFERENCE THE PAVEMENT EDGE ELEVATIONS.
6. SUBSURFACE UTILITIES AND FEATURES SHOWN ON THIS MAP HAVE BEEN APPROXIMATED BY LOCATING SURFICIAL FEATURES AND APPURTENANCES, LOCATING DIGGERS HOTLINE FIELD MARKINGS AND BY REFERENCE TO UTILITY RECORDS AND MAPS. DIGGER'S HOTLINE TICKET NO. 20181407127, 20181407148, 20181407116 AND 20181407165, WITH A CLEAR DATE OF APRIL 09, 2018.
7. UTILITY COMPANIES CONTACTED THRU DIGGERS HOTLINE:
   VILLAGE OF DE FOREST
   WINDSOR UTILITY DISTRICT #1
   MADISON GASE & ELECTRIC CO
   ALLIANT ENERGY
   CENTURYLINK
   CHARTER COMMUNICATIONS
8. BEFORE EXCAVATION, APPROPRIATE UTILITY COMPANIES SHOULD BE CONTACTED. FOR EXACT LOCATION OF UNDERGROUND UTILITIES, CONTACT DIGGERS HOTLINE, AT 1.800.242.8511.
9. THIS PARCEL IS ZONED SUBURBAN INDUSTRIAL PER THE CITY OF VERONA ZONING MAP DATED DECEMBER 2005.
10. THIS PARCEL IS SUBJECT TO ALL EASEMENTS AND AGREEMENTS, BOTH RECORDED AND UNRECORDED.

LEGAL DESCRIPTION

LOT 2, CERTIFIED SURVEY MAP NO. 10994, RECORDED IN VOLUME 66 OF DANE COUNTY CERTIFIED SURVEY MAPS ON PAGES 36-40 AS DOCUMENT NUMBER 3879522, VILLAGE OF WINDSOR, DANE COUNTY, WISCONSIN.

TAX KEY NO: 196/0910-323-0556-0

SURVEYOR'S CERTIFICATE

I, XXXX XXXX, WISCONSIN PROFESSIONAL LAND SURVEYOR NO. S-XXXX, HEREBY CERTIFY THAT THIS EXISTING CONDITIONS SURVEY AND MAP IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF IN ACCORDANCE WITH THE INFORMATION PROVIDED.

JOHN KREDS, S-1878 — DATE
PROFESSIONAL LAND SURVEYOR

OR

TODD J. BUHR, S-2614 — DATE
PROFESSIONAL LAND SURVEYOR

WISCONSIN JOHN KREDS S-1878 McFARLAND, WISCONSIN LAND SURVEYOR

WISCONSIN TODD J. BUHR S-2614 DEFOREST, WI LAND SURVEYOR

north

SCALE IN FEET
40' 0 40'

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MADISON REGIONAL OFFICE
161 HORIZON DRIVE, SUITE 101
VERONA, WISCONSIN 53593
P. 608.848.5060

CLIENT:
THE MOLLENKOPF DESIGN GROUP, LLC

CLIENT ADDRESS:
49 MUSIC SQUARE WEST, STE. 600
NASHVILLE, TN 37203

DIGGERS HOTLINE
Toll Free (800) 242-8511

PROJECT:
OLD DOMINION FREIGHT LINE - 4380 DURAFORM LANE

PROJECT LOCATION:
V. OF WINDSOR, WI
DANE COUNTY

PLAN MODIFICATIONS:

#	Date:	Description:
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Design/Drawn: CJO 04-16-18
Approved: TJB 04-16-18

SHEET TITLE:
EXISTING CONDITIONS SURVEY

MAP NO: C-*
SHEET NUMBER:
1 OF 1

JSD PROJECT NO: 18-8488

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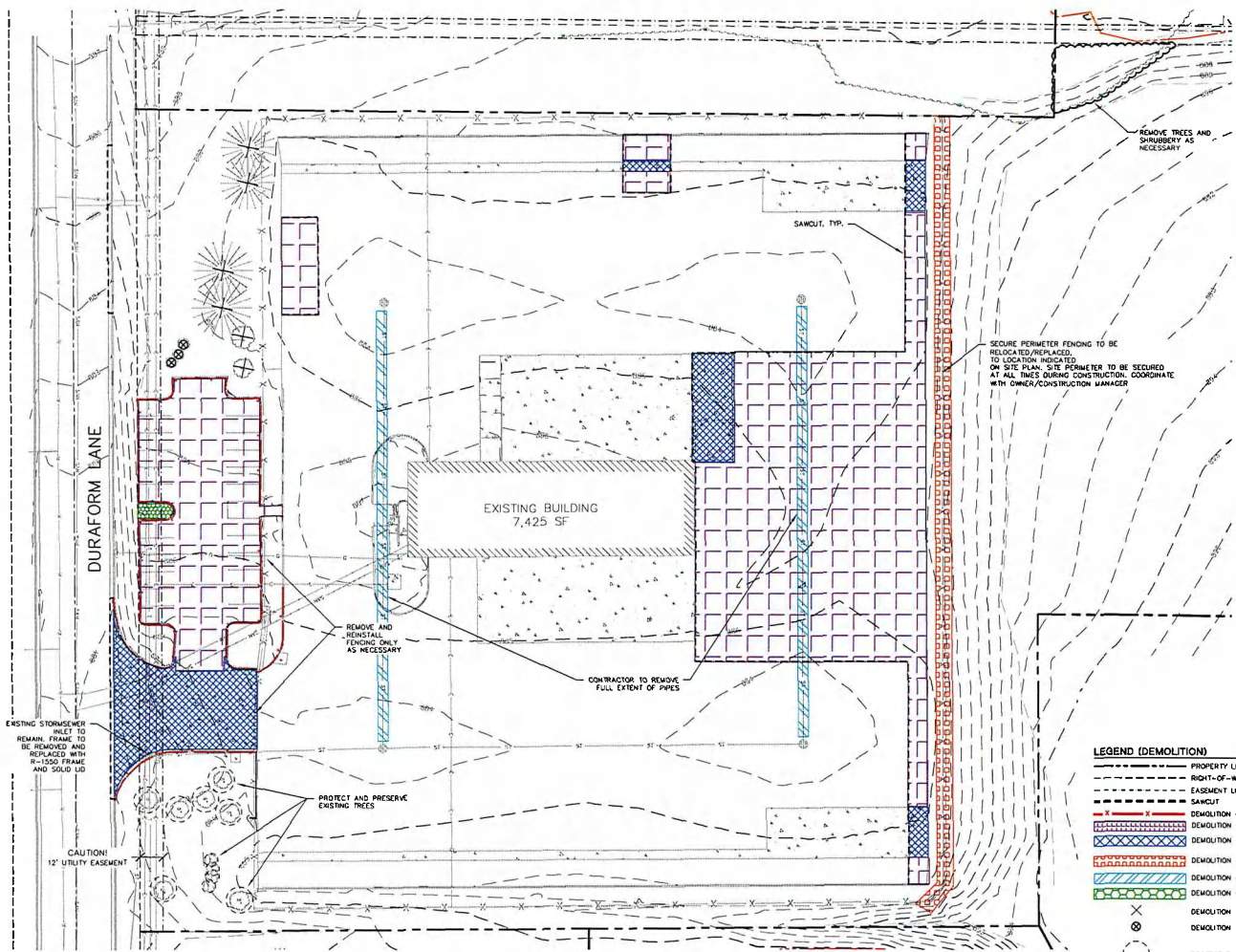

GENERAL NOTES

1. REFER TO THE EXISTING CONDITIONS SURVEY FOR EXISTING CONDITIONS NOTES AND LEGENDS.
2. ALL WORK IN THE ROW SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR SEWER & WATER CONSTRUCTION IN WISCONSIN, LATEST EDITION AND VILLAGE OF WINDSOR REQUIREMENTS.
3. NO SITE GRADING OUTSIDE OR DOWNSLOPE OF PROPOSED SILT FENCE LOCATION. NO LAND DISTURBANCE BEYOND PROPERTY LINES UNLESS OTHERWISE SHOWN.
4. THIS PROJECT HAS BEEN DESIGNED AND WILL BE CONSTRUCTED IN COMPLIANCE WITH ALL OF THE WDNR WRAPP PERMIT APPLICATION STANDARDS.
5. JSD SHALL BE HELD HARMLESS AND DOES NOT WARRANT ANY DEVIATIONS BY THE OWNER/CONTRACTOR FROM THE APPROVED CONSTRUCTION PLANS THAT MAY RESULT IN DISCIPLINARY ACTIONS BY ANY OR ALL REGULATORY AGENCIES.

DEMOLITION NOTES

1. THIS PLAN INDICATES ITEMS ON THE PROPERTY INTENDED FOR DEMOLITION BASED ON THE CURRENT SITE DESIGN THAT HAVE BEEN IDENTIFIED BY A REASONABLE OBSERVATION OF THE EXISTING CONDITIONS THROUGH FIELD SURVEY RECONNAISSANCE, "DIGGER'S HOTLINE" LOCATION, AND GENERAL "STANDARD OF CARE". THERE MAY BE ADDITIONAL ITEMS THAT CAN NOT BE IDENTIFIED BY A REASONABLE ABOVE GROUND OBSERVATION, OF WHICH THE ENGINEER WOULD HAVE NO KNOWLEDGE OR MAY BE A PART OF ANOTHER DESIGN DISCIPLINE. IT IS THE CONTRACTOR'S/BIDDER'S RESPONSIBILITY TO REVIEW THE PLANS, INSPECT THE SITE AND PROVIDE HIS OWN DUE DILIGENCE TO INCLUDE IN HIS BID WHAT ADDITIONAL ITEMS, IN HIS OPINION, MAY BE NECESSARY FOR DEMOLITION. ANY ADDITIONAL ITEMS IDENTIFIED BY THE CONTRACTOR/BIDDER SHALL BE IDENTIFIED IN THE BID AND REPORTED TO THE ENGINEER OF RECORD. JSD TAKES NO RESPONSIBILITY FOR ITEMS ON THE PROPERTY THAT COULD NOT BE LOCATED BY A REASONABLE OBSERVATION OF THE PROPERTY OR OF WHICH THEY WOULD HAVE NO KNOWLEDGE.
2. CONTRACTOR SHALL KEEP ALL STREETS AND PRIVATE DRIVES FREE AND CLEAR OF ALL CONSTRUCTION RELATED DIRT, DUST AND DEBRIS.
3. ALL TREES WITHIN THE CONSTRUCTION LIMITS SHALL BE REMOVED UNLESS SPECIFICALLY CALLED OUT FOR PROTECTION. ALL TREES TO BE REMOVED SHALL BE REMOVED IN THEIR ENTIRETY AND STUMPS SHALL BE GROUND TO PROPOSED SUBGRADE.
4. ALL LIGHT POLES TO BE REMOVED SHALL BE REMOVED IN THEIR ENTIRETY, INCLUDING BASE AND ALL APPURTENANCES. SALVAGE FOR RELOCATION, COORDINATE RELOCATION AND/OR ABANDONMENT OF ALL ELECTRIC LINES WITH ELECTRICAL ENGINEER AND OWNER PRIOR TO DEMOLITION.
5. ABANDONED/REMOVED ITEMS SHALL BE DISPOSED OF OFF SITE UNLESS OTHERWISE NOTED.
6. CONTRACTOR TO REPLACE ALL SIDEWALK AND CURB AND GUTTER ABUTTING THE PROPERTIES, WHICH IS DAMAGED BY THE CONSTRUCTION, OR ANY SIDEWALK AND CURB AND GUTTER THAT THE VILLAGE OF WINDSOR ENGINEER DETERMINES NEEDS TO BE REPLACED BECAUSE IT IS NOT AT A DESIRABLE GRADE REGARDLESS OF WHETHER THE CONDITION EXISTED PRIOR TO BEGINNING CONSTRUCTION.
7. PRIOR TO CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR:
   - 7.1. EXAMINE ALL SITE CONDITIONS RELATIVE TO THE CONDITIONS INDICATED ON THE ENGINEERING DRAWINGS. ANY DISCREPANCIES ARE TO BE REPORTED IMMEDIATELY TO THE ENGINEER AND RESOLVED PRIOR TO THE START OF CONSTRUCTION.
   - 7.2. VERIFYING UTILITY ELEVATIONS AND NOTIFYING ENGINEER OF ANY DISCREPANCIES. NO WORK SHALL BE PERFORMED UNTIL THE DISCREPANCIES ARE RESOLVED.
   - 7.3. NOTIFYING ALL UTILITIES PRIOR TO THE REMOVAL OF ANY UNDERGROUND UTILITIES.
   - 7.4. NOTIFYING THE DESIGN ENGINEER AND LOCAL CONTROLLING MUNICIPALITY 48 HOURS PRIOR TO THE START OF CONSTRUCTION TO ARRANGE FOR APPROPRIATE CONSTRUCTION INSPECTION.
8. ANY SANITARY SEWER, SANITARY SEWER SERVICES, WATER MAIN, WATER SERVICES, STORM SEWER, OR OTHER UTILITIES, WHICH ARE DAMAGED BY THE CONTRACTORS, SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE.
9. CONTRACTOR IS RESPONSIBLE FOR SITE SAFETY DURING THE CONSTRUCTION OF THESE IMPROVEMENTS.
10. CONTRACTOR TO COORDINATE PRIVATE UTILITY REMOVAL / ABANDONMENT AND NECESSARY RELOCATION WITH RESPECTIVE UTILITY COMPANY. COORDINATION REQUIRED PRIOR TO CONSTRUCTION.
11. ALL DEMOLITION SHALL BE IN ACCORDANCE WITH THE APPROVED MUNICIPALITY RECYCLING PLAN.
12. ANY CONTAMINATED SOILS SHALL BE REMOVED IN ACCORDANCE WITH FEDERAL AND STATE REGULATIONS TO AN APPROVED LANDFILL.
13. ALL EXISTING UTILITIES TO BE FIELD LOCATED AND FLAGGED BY CONTRACTOR.
14. EXISTING FIBER OPTIC LINE TO BE CLEARLY MARKED PRIOR TO ANY EXCAVATION. CONTRACTOR TO NOTIFY ENGINEER IMMEDIATELY IF ANY DISCREPANCIES OCCUR IN THE LOCATION SHOWN OR PROPOSED IMPROVEMENTS IMPACTING EXISTING FIBER OPTIC LINE LOCATION.
15. SEWER ABANDONMENT SHALL BE IN ACCORDANCE WITH SECTION 3.2.24. OF THE STANDARD SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION IN WISCONSIN, LATEST ADDITION, AND WINDSOR UTILITY DISTRICT #1 SPECIFICATIONS.
16. WATER ABANDONMENT SHALL BE IN ACCORDANCE WITH SECTION 4.14.0 OF THE STANDARD SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION IN WISCONSIN, LATEST ADDITION, AND THE WINDSOR UTILITY DISTRICT #1 SPECIFICATIONS.
17. ALL PERIMETER EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF DEMOLITION ACTIVITIES. CONTRACTOR SHALL KEEP ALL STREETS AND PAVEMENT FREE AND CLEAR OF ALL CONSTRUCTION RELATED DIRT, DUST AND DEBRIS.
18. BUILDING REMOVALS SHALL BE BY A QUALIFIED CONTRACTOR. CONTRACTOR TO FOLLOW ALL DEMOLITION REGULATIONS, DISCONNECT ALL UTILITIES, OBTAIN ALL APPLICABLE PERMITS AND DISPOSE OF ALL BUILDING MATERIALS IN APPROPRIATE LANDFILLS. DEMOLISHED MATERIALS SHALL NOT BE BURIED ON SITE. IF ENCOUNTERED, ANY CONTAMINATED SOILS SHALL BE REMOVED TO A LANDFILL IN ACCORDANCE WITH APPROPRIATE STATE AND FEDERAL REGULATIONS.
19. CONTRACTOR TO REMOVE EXISTING UTILITY PIPE OR PROVIDE PIPE BACK-FILLING AFTER REMOVAL OF EXISTING UTILITIES WITHIN BUILDING FOOTPRINT USING "LOW DENSITY CONCRETE/FLOWABLE FILL".
20. RESTORATION OF THE EXISTING ROADWAY RIGHT-OF-WAYS ARE CONSIDERED INCIDENTAL AND SHOULD BE PART OF THE COST OF THE UNDERGROUND IMPROVEMENTS, DEMOLITION AND REMOVAL. THIS INCLUDES CURB & GUTTER, SIDEWALK, TOPSOIL, SEEDING AND MULCHING.

LEGEND (DEMOLITION)

- PROPERTY LINE
- RIGHT-OF-WAY
- EASEMENT LINE
- SAWCUT
- DEMOLITION – REMOVAL OF CURB
- DEMOLITION – REMOVAL OF ASPHALT SURFACES
- DEMOLITION – REMOVAL OF CONCRETE SURFACES
- DEMOLITION – REMOVAL OF BUILDINGS/STRUCTURES
- DEMOLITION – REMOVAL OF UTILITIES
- DEMOLITION – REMOVAL OF LANDSCAPE BEDDING
- DEMOLITION – REMOVAL OF TREES
- DEMOLITION – REMOVAL OF SHRUBS
- PROTECT EXISTING TREE

north

SCALE IN FEET
30' 0 30'

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CLIENT:
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NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR
DANE COUNTY, WI

PLAN MODIFICATIONS:

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Design/Drawn: KWH
Approved: MRH

SHEET TITLE:
DEMOLITION PLAN

SHEET NUMBER:
C2.0

JSD PROJECT NO: 18-8488

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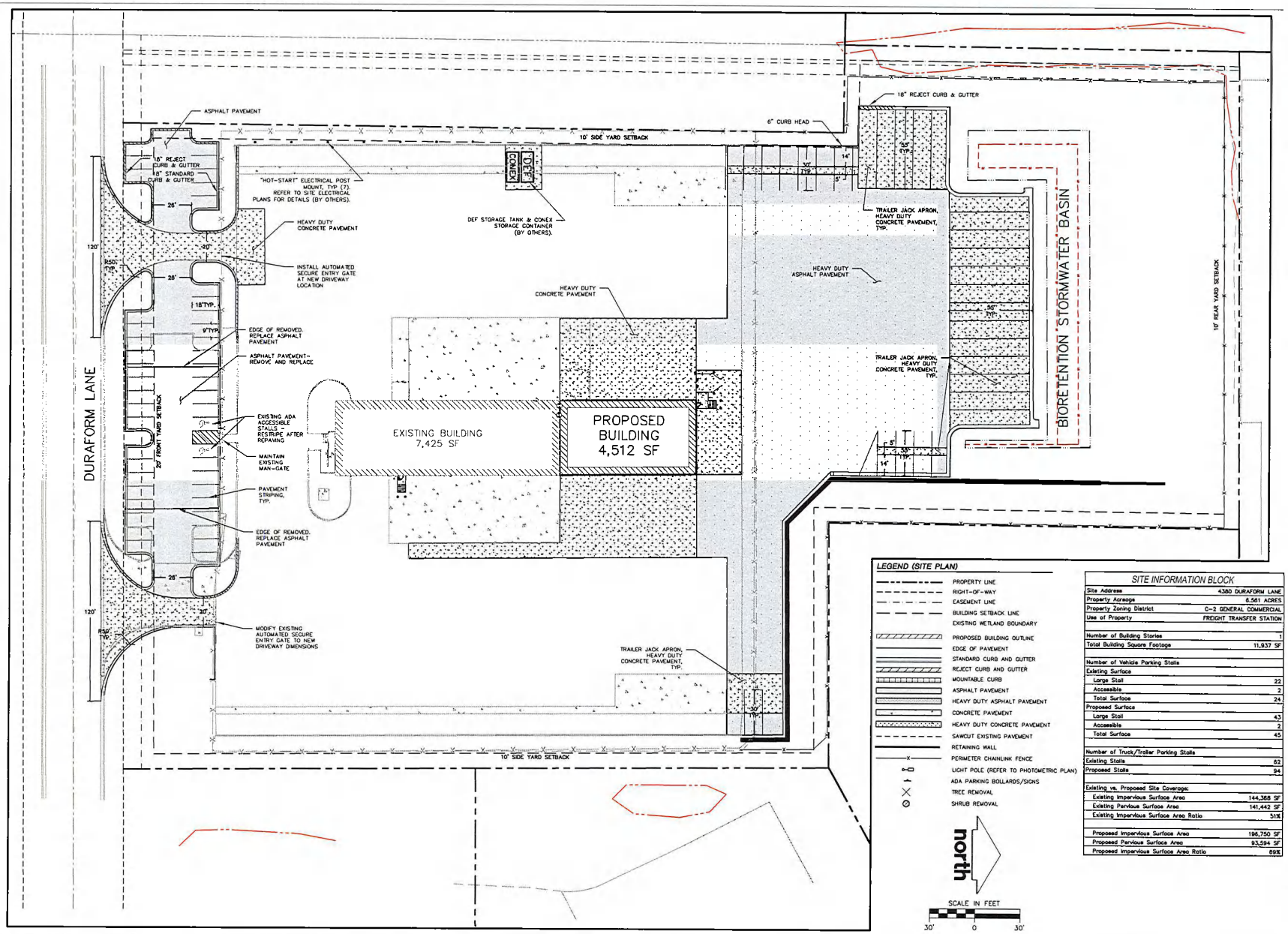

LEGEND (SITE PLAN)

- PROPERTY LINE
- RIGHT-OF-WAY
- EASEMENT LINE
- BUILDING SETBACK LINE
- EXISTING WETLAND BOUNDARY
- PROPOSED BUILDING OUTLINE
- EDGE OF PAVEMENT
- STANDARD CURB AND GUTTER
- REJECT CURB AND GUTTER
- MOUNTABLE CURB
- ASPHALT PAVEMENT
- HEAVY DUTY ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- HEAVY DUTY CONCRETE PAVEMENT
- SAWCUT EXISTING PAVEMENT
- RETAINING WALL
- PERIMETER CHAINLINK FENCE
- LIGHT POLE (REFER TO PHOTOMETRIC PLAN)
- ADA PARKING BOLLARDS/SIGNS
- TREE REMOVAL
- SHRUB REMOVAL

north

SCALE IN FEET

30' 0 30'

SITE INFORMATION BLOCK

Site Address	4380 DURAFORM LANE
Property Acreage	6.561 ACRES
Property Zoning District	C-2 GENERAL COMMERCIAL
Use of Property	FREIGHT TRANSFER STATION
Number of Building Stories	1
Total Building Square Footage	11,937 SF
Number of Vehicle Parking Stalls	
Existing Surface	
Large Stall	22
Accessible	2
Total Surface	24
Proposed Surface	
Large Stall	43
Accessible	2
Total Surface	45
Number of Truck/Trailer Parking Stalls	
Existing Stalls	62
Proposed Stalls	94
Existing vs. Proposed Site Coverage:	
Existing Impervious Surface Area	144,368 SF
Existing Pervious Surface Area	141,442 SF
Existing Impervious Surface Area Ratio	51%
Proposed Impervious Surface Area	196,750 SF
Proposed Pervious Surface Area	93,594 SF
Proposed Impervious Surface Area Ratio	69%

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P. 608.848.5060

CLIENT:
DAVID MOLLENKOPF ARCHITECT

CLIENT ADDRESS:
49 MUSIC SQUARE W #600
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR
DANE COUNTY, WI

PLAN MODIFICATIONS:

#	Date:	Description:
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2	06/13/2018	VILLAGE SUBMITTAL
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Design/Drawn: KWH
Approved: MRH

SHEET TITLE:
SITE PLAN

SHEET NUMBER:
C3.0

JSD PROJECT NO: 18-8468

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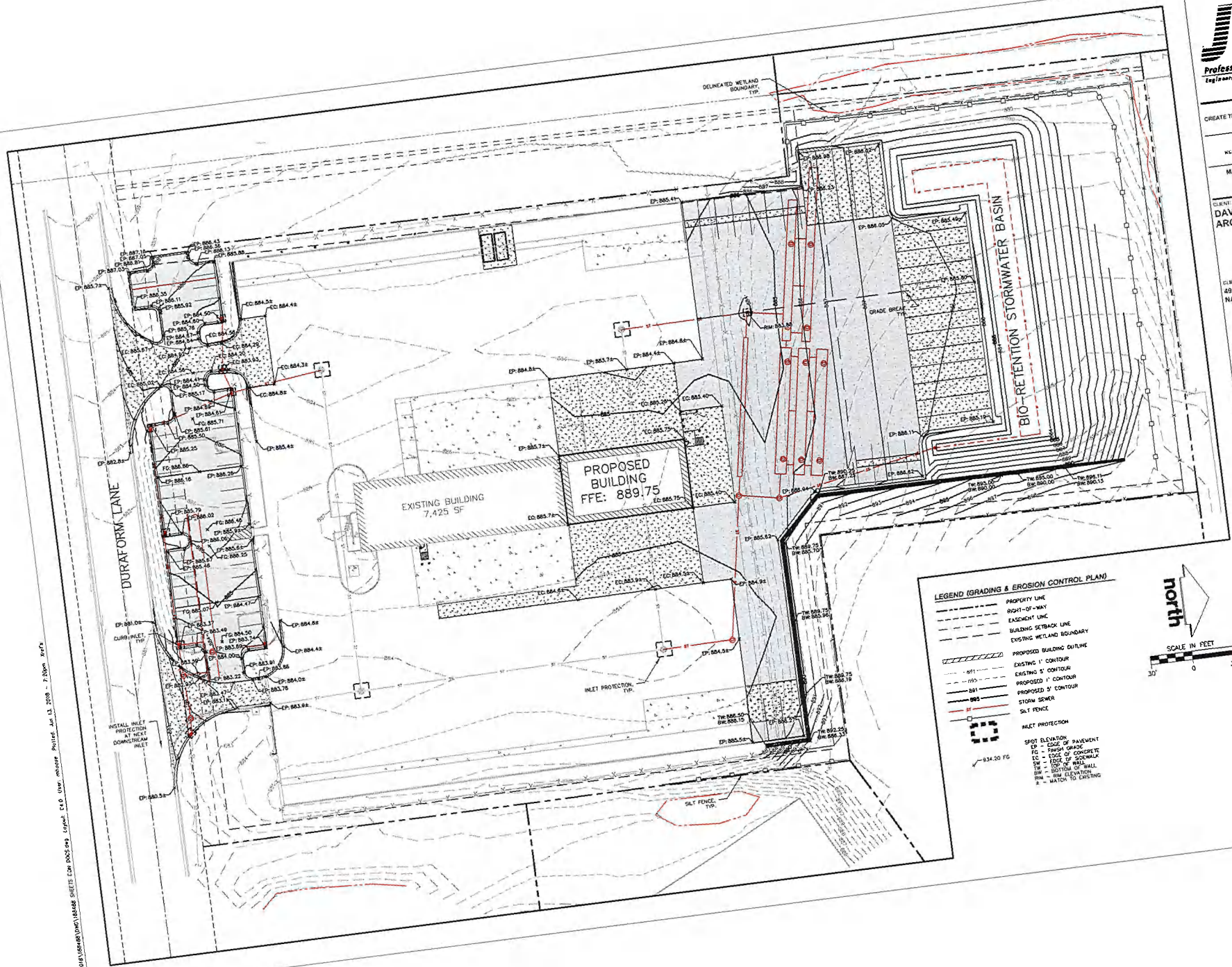

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Drafted/Drawn: KWH
Approved: MHH

SHEET TITLE:
GRADING AND EROSION CONTROL PLAN

SHEET NUMBER:
C4.0

JSD PROJECT NO: 18-6468

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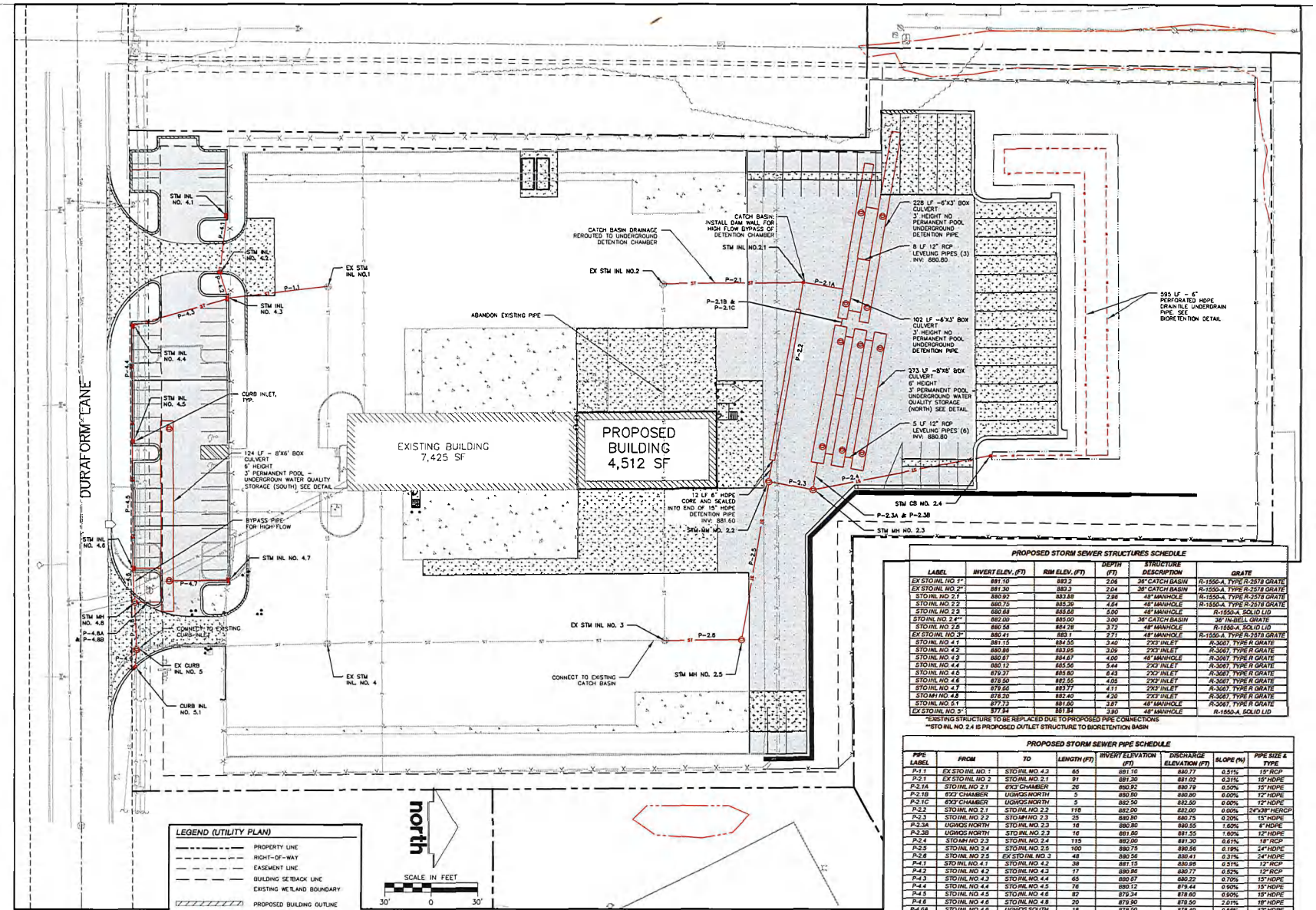

PROPOSED STORM SEWER STRUCTURES SCHEDULE

LABEL	INVERT ELEV. (FT)	RIM ELEV. (FT)	DEPTH (FT)	STRUCTURE DESCRIPTION	GRATE
EX STO INL NO. 1*	881.10	883.2	2.06	36" CATCH BASIN	R-1550-A, TYPE R-2578 GRATE
EX STO INL NO. 2*	881.30	883.3	2.04	36" CATCH BASIN	R-1550-A, TYPE R-2578 GRATE
STO INL NO. 2.1	880.92	883.88	2.96	48" MANHOLE	R-1550-A, TYPE R-2578 GRATE
STO INL NO. 2.2	880.75	885.39	4.64	48" MANHOLE	R-1550-A, TYPE R-2578 GRATE
STO INL NO. 2.3	880.68	885.68	5.00	48" MANHOLE	R-1550-A, SOLID LID
STO INL NO. 2.4**	882.00	885.00	3.00	36" CATCH BASIN	36" IN-BELL GRATE
STO INL NO. 2.5	880.56	884.28	3.72	48" MANHOLE	R-1550-A, SOLID LID
EX STO INL NO. 3*	880.41	883.1	2.71	48" MANHOLE	R-1550-A, TYPE R-2578 GRATE
STO INL NO. 4.1	881.15	884.55	3.40	2'X3' INLET	R-3067, TYPE R GRATE
STO INL NO. 4.2	880.86	883.95	3.09	2'X3' INLET	R-3067, TYPE R GRATE
STO INL NO. 4.3	880.67	884.67	4.00	48" MANHOLE	R-3067, TYPE R GRATE
STO INL NO. 4.4	880.12	885.56	5.44	2'X3' INLET	R-3067, TYPE R GRATE
STO INL NO. 4.5	879.37	885.80	6.43	2'X3' INLET	R-3067, TYPE R GRATE
STO INL NO. 4.6	878.50	882.55	4.05	2'X3' INLET	R-3067, TYPE R GRATE
STO INL NO. 4.7	879.66	883.77	4.11	2'X3' INLET	R-3067, TYPE R GRATE
STO MH NO. 4.8	878.20	882.40	4.20	2'X3' INLET	R-3067, TYPE R GRATE
STO INL NO. 5.1	877.73	881.60	3.87	48" MANHOLE	R-3067, TYPE R GRATE
EX STO INL NO. 5*	877.94	881.94	3.90	48" MANHOLE	R-1550-A, SOLID LID

*EXISTING STRUCTURE TO BE REPLACED DUE TO PROPOSED PIPE CONNECTIONS
**STO INL NO. 2.4 IS PROPOSED OUTLET STRUCTURE TO BIORETENTION BASIN

PROPOSED STORM SEWER PIPE SCHEDULE

PIPE LABEL	FROM	TO	LENGTH (FT)	INVERT ELEVATION (FT)	DISCHARGE ELEVATION (FT)	SLOPE (%)	PIPE SIZE & TYPE
P-1.1	EX STO INL NO. 1	STO INL NO. 4.3	65	881.10	880.77	0.51%	15" RCP
P-2.1	EX STO INL NO. 2	STO INL NO. 2.1	91	881.30	881.02	0.31%	15" HDPE
P-2.1A	STO INL NO. 2.1	6'X3' CHAMBER	26	880.92	880.79	0.50%	15" HDPE
P-2.1B	6'X3' CHAMBER	UGWQS NORTH	5	880.80	880.80	0.00%	12" HDPE
P-2.1C	6'X3' CHAMBER	UGWQS NORTH	5	882.50	882.50	0.00%	12" HDPE
P-2.2	STO INL NO. 2.1	STO INL NO. 2.2	118	882.00	882.00	0.00%	24"x38" HERCP
P-2.3	STO INL NO. 2.2	STO MH NO. 2.3	25	880.80	880.75	0.20%	15" HDPE
P-2.3A	UGWQS NORTH	STO INL NO. 2.3	16	880.80	880.55	1.60%	6" HDPE
P-2.3B	UGWQS NORTH	STO INL NO. 2.3	16	881.80	881.55	1.60%	12" HDPE
P-2.4	STO MH NO. 2.3	STO INL NO. 2.4	115	882.00	881.30	0.61%	18" RCP
P-2.5	STO INL NO. 2.4	STO INL NO. 2.5	100	880.75	880.56	0.19%	24" HDPE
P-2.6	STO INL NO. 2.5	EX STO INL NO. 3	48	880.56	880.41	0.31%	24" HDPE
P-4.1	STO INL NO. 4.1	STO INL NO. 4.2	38	881.15	880.98	0.51%	12" RCP
P-4.2	STO INL NO. 4.2	STO INL NO. 4.3	17	880.86	880.77	0.52%	12" RCP
P-4.3	STO INL NO. 4.3	STO INL NO. 4.4	65	880.67	880.22	0.70%	15" HDPE
P-4.4	STO INL NO. 4.4	STO INL NO. 4.5	76	880.12	879.44	0.90%	15" HDPE
P-4.5	STO INL NO. 4.5	STO INL NO. 4.6	87	879.34	878.60	0.90%	15" HDPE
P-4.6	STO INL NO. 4.6	STO INL NO. 4.8	20	879.90	879.50	2.01%	18" HDPE
P-4.6A	STO INL NO. 4.6	UGWQS SOUTH	18	878.50	878.40	0.56%	12" HDPE
P-4.7	STO INL NO. 4.7	UGWQS SOUTH	36	879.66	879.30	1.00%	10" HDPE
P-4.8	STO MH NO. 4.8	EX STO INL NO. 5	27	878.20	877.94	0.96%	18" HDPE
P-4.8A	UGWQS SOUTH	STO MH NO. 4.8	15	878.30	878.30	0.00%	6" HDPE
P-4.8B	UGWQS SOUTH	STO MH NO. 4.8	15	879.30	879.10	1.31%	12" HDPE
P-4.9	EX STO INL NO. 5	STO INL NO. 5.1	12	877.94	877.73	1.80%	18" RCP

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Design/Drawn: KWH
Approved: MRH

SHEET TITLE:
UTILITY PLAN

SHEET NUMBER:
C5.0

JSD PROJECT NO: 18-8488

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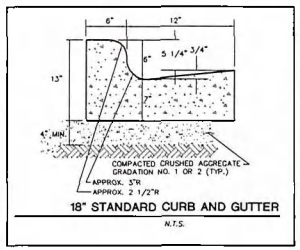

18" STANDARD CURB AND GUTTER

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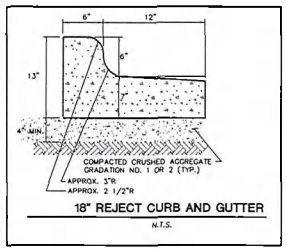
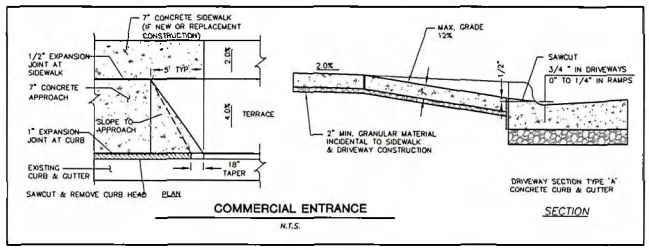


18" REJECT CURB AND GUTTER

N.T.S.



COMMERCIAL ENTRANCE

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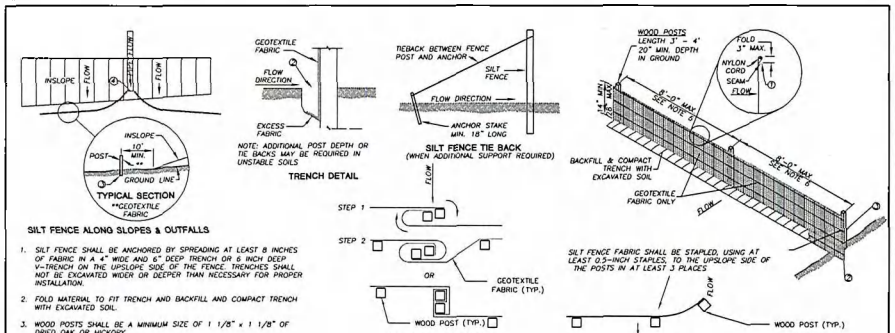
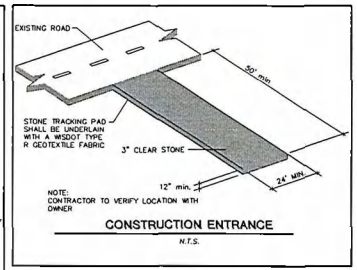


SILT FENCE ALONG SLOPES & OUTFALLS

1. SILT FENCE SHALL BE ANCHORED BY SPREADING AT LEAST 8 INCHES OF FABRIC IN A 4" WIDE AND 6" DEEP TRENCH OR 6 INCH DEEP V-TRENCH ON THE UPSLOPE SIDE OF THE FENCE. TRENCHES SHALL NOT BE EXCAVATED WIDER OR DEEPER THAN NECESSARY FOR PROPER INSTALLATION.
2. FOLD MATERIAL TO FIT TRENCH AND BACKFILL AND COMPACT TRENCH WITH EXCAVATED SOIL.
3. WOOD POSTS SHALL BE A MINIMUM SIZE OF 1 1/8" x 1 1/8" OF DRIED OAK OR HICKORY.
4. SILT FENCE TO EXTEND ABOVE THE TOP OF PIPE.
5. SILT FENCE CONSTRUCTION AND GEOTEXTILE FABRIC SHALL CONFORM TO WDNR TECHNICAL STANDARD 1056.
6. POST SPACING SHALL BE SELECTED BASED ON GEOTEXTILE FABRIC (8'-0" FOR WOVEN & 3'-0" FOR NON-WOVEN)

SILT FENCE

N.T.S.



CONSTRUCTION ENTRANCE

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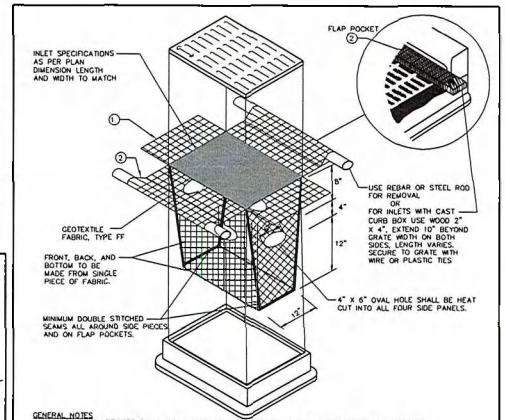

GENERAL NOTES
INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.

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.

① FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.

② FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2X4.

INSTALLATION NOTES
DO NOT INSTALL INLET PROTECTION TYPE D IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

INLET PROTECTION, TYPE D

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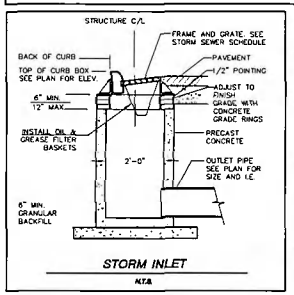

STORM INLET

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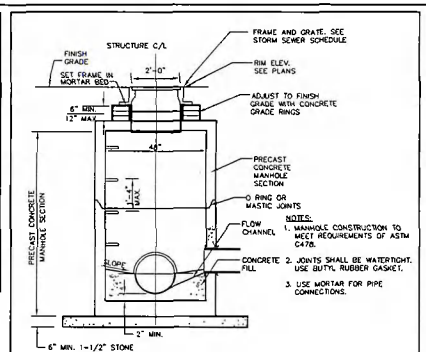

NOTES:
1. MANHOLE CONSTRUCTION TO MEET REQUIREMENTS OF ASTM C478.
2. JOINTS SHALL BE WATERTIGHT. USE BUTYL RUBBER GASKET.
3. USE MORTAR FOR PIPE CONNECTIONS.

STORM MANHOLE (FLAT)

N.T.S.

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Approved: MRH

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DETAILS

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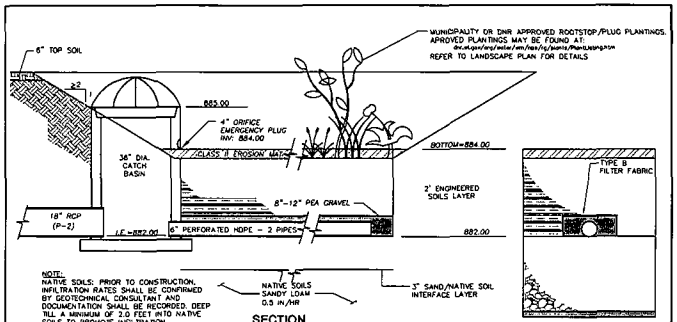

SECTION
N.T.S.

SECTION
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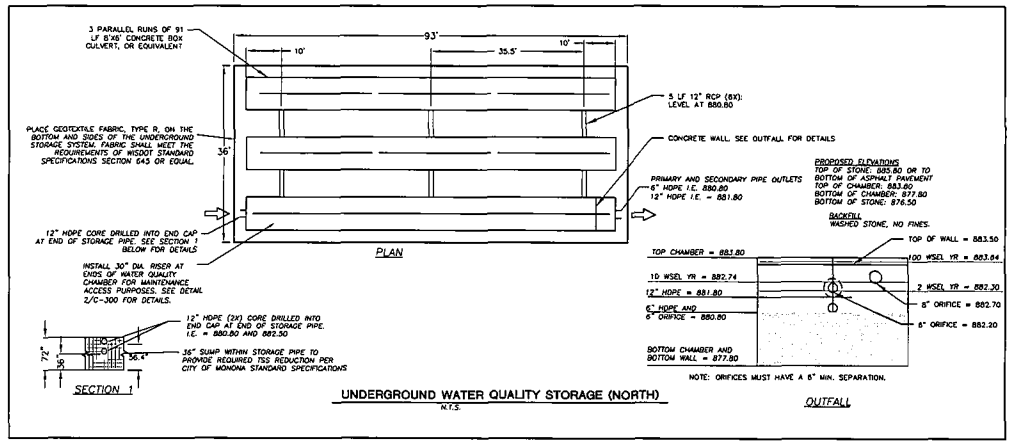
GENERAL NOTES:

1. ALL CONSTRUCTION PRACTICES SHALL MEET THE SPECIFICATIONS OF THE WDNR TECHNICAL STANDARD 1004 – BIORETENTION FOR INFILTRATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A COPY OF THIS STANDARD AND CONSTRUCT THE BIORETENTION DEVICE IN ACCORDANCE WITH THE REQUIREMENTS OUTLINED THEREIN.
2. CONTRACTOR SHALL INSTALL ENGINEERED SOIL CONSISTING OF: 70% ASTM C33 SAND, 30% CERTIFIED COMPOST (SEE GENERAL NOTE 3).
3. CERTIFIED COMPOST SHALL CONSIST OF: >40% ORGANIC MATTER, <60% ASH CONTENT, pH OF 6-8, AND MOISTURE CONTENT OF 35-50% BY WEIGHT.
4. SAND OR GRAVEL STORAGE LAYER SHALL MEET ONE OF THE FOLLOWING GRADATION REQUIREMENTS: USDA COURSE SAND (.02 – .04 INCHES); ASTM C33 (FINE AGGREGATE CONCRETE SAND); WISDOT STANDARDS & SPECIFICATIONS FOR HIGHWAY & STRUCTURE CONSTRUCTION, CURRENT EDITION, SECTION 501.2.5.3.4 (FINE AGGREGATE CONCRETE SAND); OR OTHER APPROVED EQUIVALENT BY AGENCY.
5. SAND/NATIVE SOIL INFILTRATION LAYER SHALL BE FORMED BY A LAYER OF SAND 3 INCHES DEEP, WHICH IS VERTICALLY MIXED WITH THE NATIVE SOIL TO A DEPTH OF 2-4 INCHES.
6. FILTER FABRIC SHALL BE PLACED ABOVE AND AROUND THE SIDES OF THE PERFORATED PIPE, BETWEEN THE PEA GRAVEL AND THE ENGINEERED SOIL, A WIDTH OF 4 FEET CENTERED OVER THE FLOW LINE OF THE PIPE.
7. ANNUAL RYE GRASS SHALL BE SEEDED AT 40 LB/ACRE WITH THE SEED MIX IN THE AREAS SURROUNDING THE BASIN, ON SIDE SLOPES, AND OVER ANY LAND THAT DISCHARGES INTO THE BASIN FOR EROSION CONTROL WHEN BASIN IS BROUGHT ON-LINE. ROOTSTOP AND PLUGS ARE REQUIRED TO ESTABLISH VEGETATION AT THE INVERT OF THE BASIN. REFER TO LANDSCAPE PLANS FOR DETAILS.
8. RUNOFF MUST INFILTRATE WITHIN 48-HOURS. BASINS UNABLE TO MAINTAIN THESE RATES MUST BE DEEP TILLED, REGRADED, AND IF NECESSARY REPLANTED TO RESTORE ORIGINAL INFILTRATION RATES.
9. ALL WORK TO BE CONDUCTED IN CONFORMANCE WITH APPLICABLE LOCAL, REGIONAL, AND STATE STORMWATER STANDARDS FOR THE PROJECT SITE AS APPROVED BY THE REGULATORY ENGINEER.
10. OWNER OR CONTRACTOR MUST CONSULT LANDSCAPE ARCHITECT OR ECOLOGICAL PLANTING AGENCY FOR APPROPRIATE PLANTS AND PLANTING CONFIGURATIONS.
11. 4" ORIFICE W/ EMERGENCY PLUG SHALL BE INSTALLED W/ ORIFICE OPEN TO ALLOW ESTABLISHMENT OF SEEDING AT BOTTOM OF BASIN. UPON VEGETATION ESTABLISHMENT AT INVERT OF BASIN 4" EMERGENCY ORIFICE SHALL BE PLUGGED W/ WATER TIGHT PLUG.

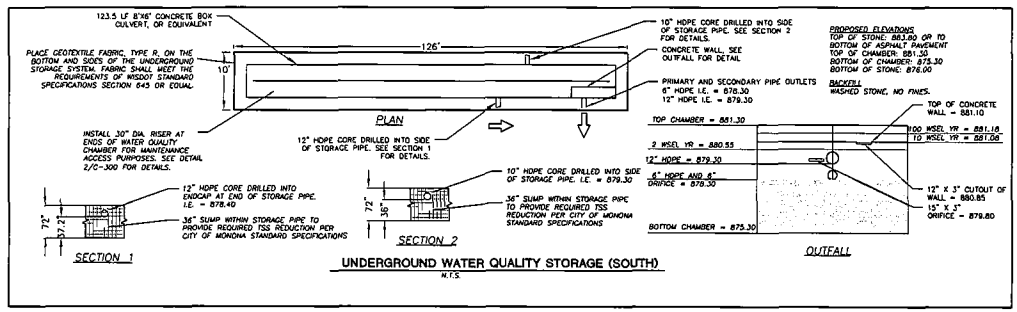
INFILTRATION DEVICES ARE DESIGNED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES (WDNR), COUNTY, MUNICIPALITY, AND ENGINEERING STANDARD OF CARE. ALL DESIGNATED INFILTRATION AREAS (e.g. RAIN GARDENS, INFILTRATION BASINS, BIORETENTION DEVICES) SHALL BE FENCED PRIOR TO CONSTRUCTION AND REMAIN UNDISTURBED AND PROTECTED DURING THE CONSTRUCTION OF PROPOSED SITE IMPROVEMENTS. PROPOSED BIORETENTION DEVICES SHALL NOT BE CONSTRUCTED UNTIL THE DEVICE'S CONTRIBUTING WATERSHED AREA MEETS ESTABLISHED VEGETATION REQUIREMENTS SET FORTH WITHIN THE RESPECTIVE WDNR TECHNICAL STANDARDS. IF THE LOCATION OF THE INFILTRATION AREA CONFLICTS WITH CONSTRUCTION STAGING AND/OR CONSTRUCTION TRAFFIC AND IS DISTURBED, COMPACTION MITIGATION WILL BE REQUIRED AT THE CONTRACTOR'S EXPENSE.

THE CONTRACTOR IS REQUIRED TO PROVIDE QUALIFIED STAFF FOR INSPECTION AND OBSERVATION OF THE CONSTRUCTION ACTIVITIES RELATING TO ALL JOB SITE REGULATORY COMPLIANCE INCLUDING THE PROTECTION AND CONSTRUCTION OF ALL STORMWATER MANAGEMENT FEATURES. ANY OBSERVATION OF PLAN OR SITE DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION.

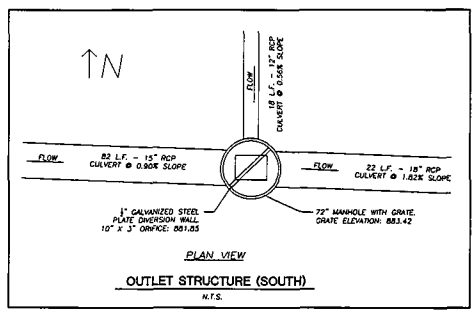
BIORETENTION BASIN
N.T.S.



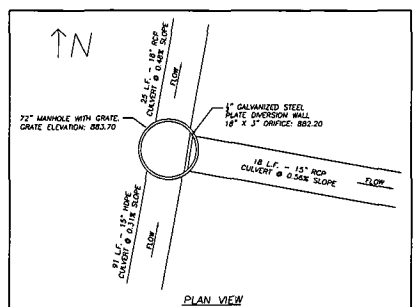
UNDERGROUND WATER QUALITY STORAGE (NORTH)
N.T.S.



UNDERGROUND WATER QUALITY STORAGE (SOUTH)
N.T.S.



OUTLET STRUCTURE (SOUTH)
N.T.S.



OUTLET STRUCTURE (NORTH)
N.T.S.

JSD Professional Services, Inc.
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MADISON REGIONAL OFFICE
161 HORIZON DRIVE, SUITE 101
VERONA, WISCONSIN 53593
P. 608.848.5060

CLIENT:
DAVID MOLLENKOPF ARCHITECT

CLIENT ADDRESS:
49 MUSIC SQUARE W #600
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR
DANE COUNTY, WI

PLAN MODIFICATIONS:

#	Date:	Description:
1	05/31/2018	VILLAGE PRE-APP MTG
2	09/13/2018	VILLAGE SUBMITTAL
3		
4		
5		
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12		
13		
14		
15		

Design/Drawn: KWH
Approved: MNH

SHEET TITLE:
DETAILS

SHEET NUMBER:
C6.1

JSD PROJECT NO: 18-5488

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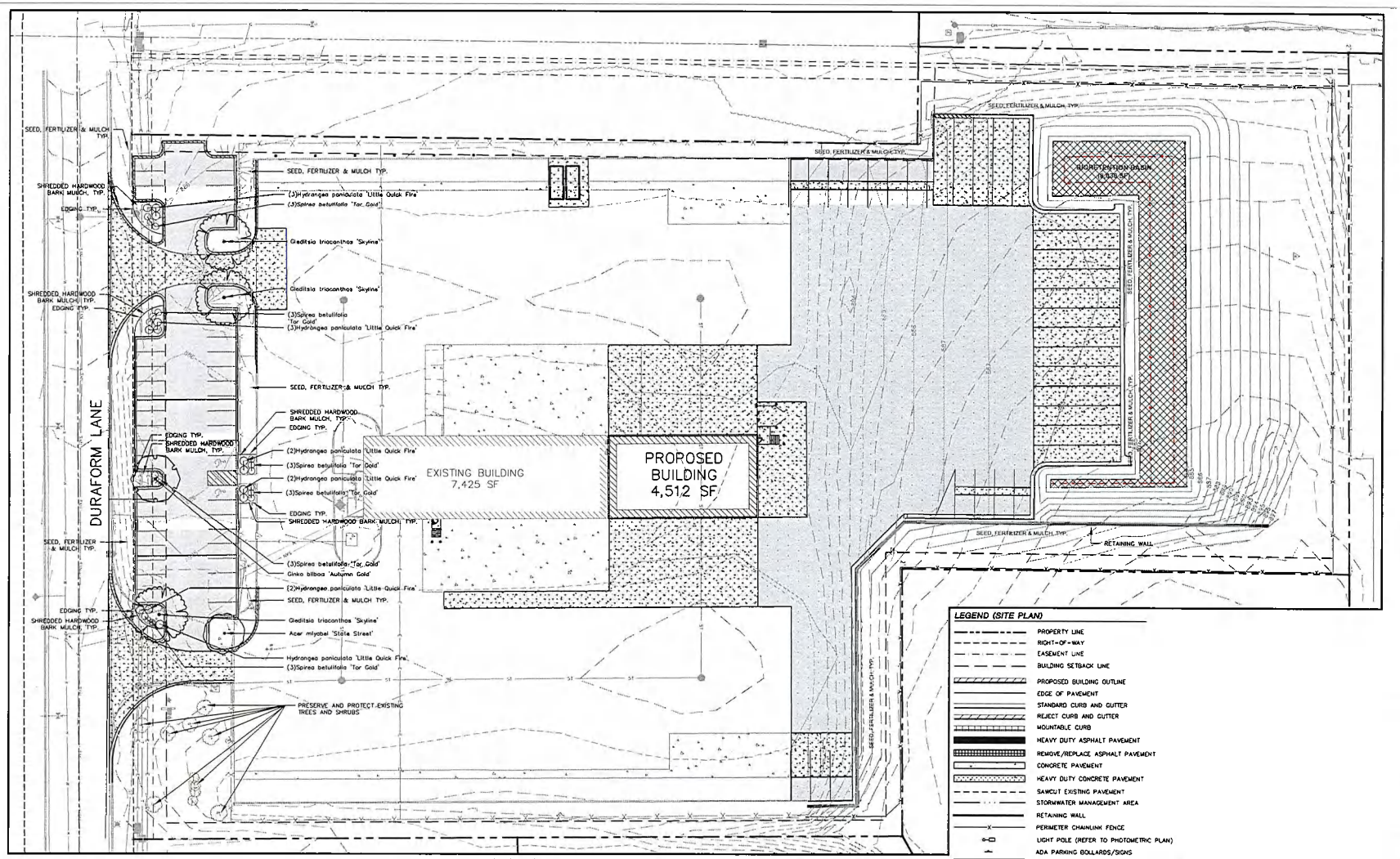

LEGEND (SITE PLAN)

- PROPERTY LINE
- RIGHT-OF-WAY
- EASEMENT LINE
- BUILDING SETBACK LINE
- PROPOSED BUILDING OUTLINE
- EDGE OF PAVEMENT
- STANDARD CURB AND GUTTER
- REJECT CURB AND GUTTER
- MOUNTABLE CURB
- HEAVY DUTY ASPHALT PAVEMENT
- REMOVE/REPLACE ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- HEAVY DUTY CONCRETE PAVEMENT
- SAWCUT EXISTING PAVEMENT
- STORMWATER MANAGEMENT AREA
- RETAINING WALL
- PERIMETER CHAINLINK FENCE
- LIGHT POLE (REFER TO PHOTOMETRIC PLAN)
- ADA PARKING BOLLARDS/SIGNS
- NATIVE VEGETATION MAT OR PRAIRIE SEED MIX

PLANT SCHEDULE

TREES	QTY	COMMON NAME / BOTANICAL NAME	ROOT CONDITION	SIZE AT PLANTING	MATURE HT	MATURE SP
	1	Miyabei Maple / Acer miyabei 'State Street'	B & B	2"Cal	40'	25'
	1	Maidenhair Tree / Ginkgo biloba 'Autumn Gold' TM	B & B	2"Cal	50'	30'
	3	Skyline Honey Locust / Gleditsia triacanthos 'Skyline'	B & B	2"Cal	50'	40'
SHRUBS	QTY	COMMON NAME / BOTANICAL NAME	CONT	SIZE AT PLANTING	MATURE HT	MATURE SP
	13	Little Quick Fire Hydrangea / Hydrangea paniculata 'Little Quick Fire'	3 gal	18" tall min	5'	5'
	18	Glow Girl Birchleaf Spirea / Spiraea betulifolia 'Tor Gold'	3 gal	18" tall min	2'	4'

north

SCALE IN FEET
30' 0 30'

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209 10TH AVENUE SOUTH, STE 414
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR, WI
DANE COUNTY

PLAN MODIFICATIONS:

#	Date:	Description:
1	06/11/2018	MUNICIPAL APPROVAL
2		
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15		

Design/Drawn: MWS
Approved: ABK

SHEET TITLE:
LANDSCAPE PLAN

SHEET NUMBER:
L1.0

JSD PROJECT NO: 18-8488

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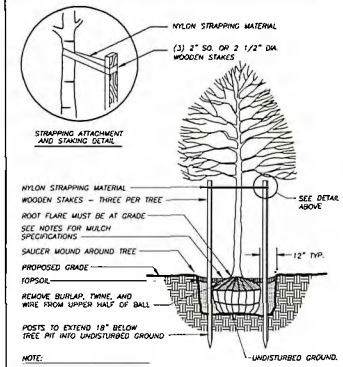
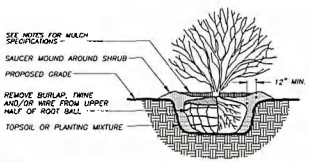


NOTE:
1. ROOT FLARE TO BE EXPOSED.
2. DIG HOLE NO DEEPER THAN BASE OF ROOT BALL TO FLARE.
3. ROOT BALL TO BE SET ON UNDISTURBED GROUND.

DECIDUOUS TREE PLANTING DETAIL

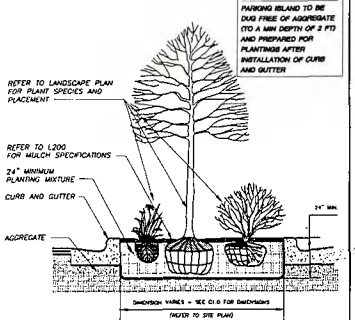
N.T.S.



NOTE:
1. ROOT FLARE TO BE EXPOSED.
2. DIG HOLE NO DEEPER THAN BASE OF ROOT BALL TO FLARE.

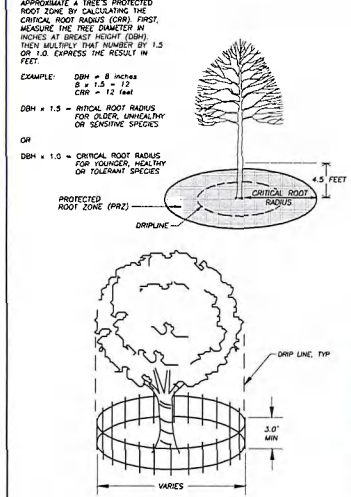
DECIDUOUS SHRUB PLANTING DETAIL

N.T.S.



TYPICAL PARKING ISLAND DETAIL

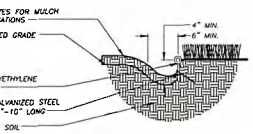
N.T.S.



TREE NOTES:
1. CONTRACTOR SHALL INSTALL TREE PROTECTION FENCING IN THE AREA SURROUNDING THE TREE WITHIN THE CRITICAL ROOT RADIUS
2. NO EXCAVATION IS PERMITTED WITHIN THE CRITICAL ROOT RADIUS
3. IF EXCAVATION WITHIN THE CRITICAL ROOT RADIUS OF ANY TREE IS NECESSARY, CONTRACTOR SHALL CONTACT CITY FORESTER PRIOR TO EXCAVATION TO ASSESS THE IMPACT TO THE TREE AND ROOT SYSTEM.

TREE PROTECTION DETAIL

N.T.S.



LANDSCAPE EDGING DETAIL

N.T.S.

Stormwater Plug Plant Mix 7,990 sq. ft.

Botanical Name	Common Name	Quantity	Spacing
Permanent Grasses:			
Carex grayii	Common Bur Sedge	447	1'0" On Center
Carex stipata	Common Fox Sedge	447	1'0" On Center
Panicum virgatum	Switch Grass	447	1'0" On Center
Spartina pectinata	Prairie Cord Grass	447	1'0" On Center
Forbs:			
Aster novae-angliae	New England Aster	443	1'0" On Center
Asclepias incarnata	Swamp Milkweed	443	1'0" On Center
Echinacea purpurea	Broad-Leaved Purple Coneflower	443	1'0" On Center
Eryngium yuccifolium	Rattlesnake Master	443	1'0" On Center
Eupatorium maculatum	Spotted Joe-Pye Weed	443	1'0" On Center
Liatris spicata	Marsh Blazing Star	443	1'0" On Center
Lobelia cardinalis	Cardinal Flower	443	1'0" On Center
Monarda fistulosa	Wild Bergamot	443	1'0" On Center
Penstemon digitalis	Foxglove Beardtongue	443	1'0" On Center
Pycnanthemum virginianum	Common Mountain Mint	443	1'0" On Center
Ratibida pinnata	Yellow Coneflower	443	1'0" On Center
Rudbeckia hirta	Black-Eyed Susan	443	1'0" On Center
Veronicastrum virginianum	Culver's Root	443	1'0" On Center
Zizia aurea	Golden Alexanders	443	1'0" On Center
	TOTAL	7990	

LANDSCAPE MATERIAL NOTES

1. MATERIALS – SOIL: PLANTING SOIL SHALL MEET THESE REQUIREMENTS:
   A. PLANTING AREAS = 24"
   B. TREE PITS = SEE DETAILS
2. PLANTING SOIL TO BE A MINIMUM 24" DEPTH, UNLESS OTHERWISE SPECIFIED AS ABOVE OR ON DETAILS. TOPSOIL TO BE CLEAN, FRIABLE LOAM FROM A LOCAL SOURCE, FREE FROM STONES OR DEBRIS OVER 3/4" IN DIAMETER, AND FREE FROM TOXINS. TOPSOIL SHALL HAVE A pH VALUE BETWEEN 6 AND 7. TOPSOIL AND PLANTING SOIL SHALL BE TESTED TO CONFORM TO THESE SPECIFICATIONS AND SHALL BE AMENDED TO MEET THESE SPECIFICATIONS. PROVIDE TEST RESULTS TO OWNER'S REPRESENTATIVE PRIOR TO PLACEMENT. DO NOT PLACE FROZEN OR MUDDY TOPSOIL. APPLY SOIL AMENDMENTS TO ALL LANDSCAPE AREAS PER SOIL TEST.
3. MATERIALS – SHREDDED HARDWOOD BARK MULCH: ALL PLANTING AREAS LABELED ON PLAN SHALL RECEIVE CERTIFIED WEED FREE SHREDDED HARDWOOD BARK MULCH OVER ALL PLANTING AREAS. SHREDDED HARDWOOD BARK MULCH SIZE & COLOR TO BE APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION. FERTILIZER SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL, COUNTY AND STATE OF WISCONSIN REQUIREMENTS. SHREDDED HARDWOOD BARK MULCH AREAS SHALL NOT RECEIVE WOVEN WEED BARRIER FABRIC.
4. MATERIALS – TREE & SHRUB RINDS: ALL TREES AND/OR SHRUBS PLANTED IN SEEDED LAWN AREAS TO BE INSTALLED WITH A MINIMUM 5' DIAMETER SHREDDED HARDWOOD BARK MULCH TREE RING SPREAD TO A CONSISTENT DEPTH OF 4 INCHES. ALL TREE RINGS SHOULD BE INSTALLED WITH A 5" DEPTH SHOVEL CUT EDGE, ANGLED 45 DEGREES INTO SOIL AT A 5' DIAMETER ABOUT THE CENTER OF THE TREE PLANTING. A PRE-EMERGENT GRANULAR HERBICIDE WEED-PREVENTER SHOULD BE MIXED WITH MULCH USED TO INSTALL TREE RING AS WELL AS TOPICALLY APPLIED TO FINISHED INSTALLATION OF TREE RING.
5. MATERIALS – EDGING: EDGING SHALL BE 5" DEEP, POLYETHYLENE EDGING. OWNER'S REPRESENTATIVE SHALL APPROVE PRODUCT SPECIFICATION PROVIDED BY LANDSCAPE CONTRACTOR.
6. MATERIALS – SEED: DISTURBED LAWN AREAS LABELED ON PLAN AS SUCH, SHALL RECEIVE "NO MOW" FESCUE OR EQUIVALENT AS APPROVED BY THE OWNER'S REPRESENTATIVE, INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. IN ADDITION TO FESCUE SEED, ANNUAL RYE SHALL BE APPLIED TO ALL DISTURBED AREAS AT A RATE OF 1 1/2 LBS PER 1000 SQUARE FEET. FERTILIZE AND MULCH PER MANUFACTURER'S RECOMMENDATIONS.
7. MATERIALS – SEED: DISTURBED LAWN AREAS LABELED ON PLAN AS SUCH, SHALL BE SPREAD BY HAND BROADCAST METHOD OR APPROPRIATE SPREADER EQUIPMENT WITH EARTH CARPET'S "MADISON PARKS" OR EQUIVALENT AS APPROVED BY THE OWNER'S REPRESENTATIVE, INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. IN ADDITION TO LAWN SEED, ANNUAL RYE SHALL BE APPLIED TO ALL DISTURBED AREAS AT A RATE OF 1 1/2 LBS PER 1000 SQUARE FEET. FERTILIZE AND MULCH PER MANUFACTURER'S RECOMMENDATIONS.
8. MATERIALS – BIORETENTION BASIN NATIVE VEGETATIVE MAT (NVM): AREAS SPECIFIED ON PLANS SHALL RECEIVE AGRECOL "RAINWATER RENEWAL" NATIVE VEGETATIVE MAT – DEGRADABLE CORE. CONTRACTOR SHALL CONTACT AGRECOL 16 WEEKS IN ADVANCE OF INSTALLATION FOR PROPER GROWING LEAD TIME. CONTRACTOR SHALL ASSUME AVAILABLE DELIVERY DATE TO BE BETWEEN MID-JUNE THROUGH THE END OF OCTOBER DUE TO THE NMV GROWING SEASON. REFER TO PRODUCT SPECIFICATIONS AND MANUFACTURER'S RECOMMENDATIONS FOR INSTALLATION.

OR

9. MATERIALS – BIORETENTION BASIN PLUG PLANTINGS: PLUG PLANTINGS TO BE INSTALLED 1'-0" ON CENTER, MIXING SPECIES INTERNALLY IN FLATS OF 32 AT A TIME. REFER TO WDNR TECHNICAL STANDARDS FOR ROOTSTOCK AND PLUG PLANTINGS FOR BIORETENTION BASINS.

GENERAL NOTES

1. GENERAL: ALL WORK IN THE R-O-W AND PUBLIC EASEMENTS SHALL BE IN ACCORDANCE WITH LOCAL MUNICIPAL REQUIREMENTS. JSD SHALL BE HELD HARMLESS AND DOES NOT WARRANT ANY DEVIATIONS BY THE OWNER/CONTRACTOR FROM THE APPROVED CONSTRUCTION PLANS THAT MAY RESULT IN DISCIPLINARY ACTIONS BY ANY OR ALL REGULATORY AGENCIES. LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE DONE TO UTILITIES. CONTRACTOR MUST CALL 1-800-382-5544 FOR UTILITY LOCATIONS AT LEAST THREE DAYS PRIOR TO DIGGING. HAND DIG AND INSTALL ALL PLANTS THAT ARE NEAR EXISTING UTILITIES. PROTECT PREVIOUSLY INSTALLED WORK OF OTHER TRADES. CONTRACTOR IS RESPONSIBLE FOR STAKING THE PLANT MATERIALS FOR REVIEW BY OWNER PRIOR TO DIGGING AND PLACEMENT AND SHALL COORDINATE ALL FINE GRADING AND RESTORATION WITH THE GRADING CONTRACTOR.
2. DELIVERY AND HANDLING: DO NOT DELIVER MORE PLANT MATERIALS THAN CAN BE PLANTED IN ONE DAY, UNLESS ADEQUATE, APPROPRIATE AND SECURE STORAGE IS PROVIDED AND APPROVED BY OWNER'S REPRESENTATIVE. AT ALL TIMES, PROTECT ALL PLANT MATERIALS FROM WIND AND DIRECT SUN. DELIVER PLANTS WITH LEGIBLE IDENTIFICATION LABELS. PROTECT PLANTS DURING DELIVERY AND DO NOT PRUNE PRIOR TO DELIVERY. ALL TREES AND SHRUBS SHALL BE PLANTED ON THE DAY OF DELIVERY; IF THIS IS NOT POSSIBLE, PROTECT THE PLANT MATERIALS NOT PLANTED BY STORING THEM IN A SHADED, SECURE AREA, PROTECTING THE ROOT MASS WITH WET SOIL, MULCH, HAY OR OTHER SUITABLE MEDIUM. CONTRACTOR TO KEEP ALL PLANT MATERIALS ADEQUATELY WATERED TO PREVENT ROOT DESICCATION. DO NOT REMOVE CONTAINER GROWN STOCK FROM CONTAINERS BEFORE TIME OF PLANTING. DO NOT PICK UP CONTAINER OR BALLED PLANTS BY STEM OR ROOTS. ALL PLANTS SHALL BE LIFTED AND HANDLED FROM THE BOTTOM OF THE CONTAINER OR BALL. PERFORM ACTUAL PLANTING ONLY WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE IN ACCORDANCE WITH LOCALLY ACCEPTED BEST HORTICULTURAL PRACTICES.
3. MATERIALS – PLANTS: ALL PLANTS SHALL CONFORM TO THE AMERICAN STANDARD FOR NURSERY STOCK ANSI Z60.1-2004. PLANTS SHALL BE TRUE TO SPECIES AND VARIETY SPECIFIED AND NURSERY GROWN IN ACCORDANCE WITH GOOD HORTICULTURAL PRACTICES UNDER CLIMATIC CONDITIONS SIMILAR TO THOSE IN THE LOCALITY OF THE PROJECT FOR AT LEAST 2 YEARS. PLANTS SHALL BE FRESHLY DUG (DURING THE MOST RECENT FAVORABLE HARVEST SEASON). PLANTS SHALL BE SO TRAINED IN DEVELOPMENT AND APPEARANCE AS TO BE UNQUESTIONABLY SUPERIOR IN FORM, COMPACTNESS, AND SYMMETRY. PLANTS SHALL BE SOUND, HEALTHY, VIGOROUS, WELL BRANCHED AND DENSELY FOLIATED WHEN IN LEAF, AND FREE OF DISEASE AND INSECTS (ADULT EGGS, PUPAE OR LARVAE). THEY SHALL HAVE HEALTHY, WELL-DEVELOPED ROOT SYSTEMS AND SHALL BE FREE FROM PHYSICAL DAMAGE OR OTHER CONDITIONS THAT WOULD PREVENT THRIVING GROWTH. PLANTS SHALL BE OF THE HIGHEST QUALITY, POSSESS TYPICAL GROWTH HABITS AND FORM FOR THEIR SPECIES AND BE FREE OF INJURY. PARKWAY TREES AND PARKING LOT TREES SHALL HAVE A MINIMUM BRANCHING HEIGHT OF SIX (6) FEET ABOVE THE GROUND TO ALLOW ADEQUATE VISUAL AND PHYSICAL CLEARANCE.
4. PRUNING: THE CONTRACTOR SHALL PRUNE ALL TREES AND REPAIR ANY INJURIES THAT OCCURRED DURING THE PLANTING PROCESS. DOUBLE LEADERS, DEAD BRANCHES, AND LIMBS DAMAGED OR BROKEN DURING THE PLANTING PROCESS SHALL BE PRUNED. THIS SHALL BE THE ONLY PRUNING ALLOWED AT PLANTING. PRUNING SHALL CONFORM TO AMERICAN STANDARD FOR TREE CARE OPERATIONS, ANSI A300. PRUNE TREES IN ACCORDANCE WITH NAA GUIDELINES. DO NOT TOP TREES. PRUNE SHRUBS ACCORDING TO STANDARD HORTICULTURAL PRACTICES. ON CUTS OVER 3/4" IN DIAMETER AND BRUISES OR SCARS ON BARK, TRACE THE INJURED CAMBIUM LAYER BACK TO LIVING TISSUE AND REMOVE. SMOOTH AND SHAPE WOUNDS SO AS NOT TO RETAIN WATER. TREAT THE AREA WITH AN APPROVED INCONSPICUOUS LATEX BASED ANTISEPTIC TREE PAINT, IF PRUNING OCCURS "IN SEASON". DO NOT PRUNE ANY OAK TREES DURING THE MONTHS FROM APRIL TO OCTOBER.
5. CLEANUP: DISPOSED OF EXCESS SOIL. REMOVE ALL CUTTINGS AND WASTE MATERIALS. SOIL, BRANCHES, BINDING AND WRAPPING MATERIALS, REJECTED PLANTS, OR OTHER DEBRIS RESULTING FROM ANY PLANTING SHALL BE PROMPTLY CLEANED UP AND REMOVED. THE WORK AREA SHALL BE KEPT SAFE AND NEAT AT ALL TIMES. UNDER NO CONDITION SHALL THE ACCUMULATION OF SOIL, BRANCHES OR OTHER DEBRIS BE ALLOWED UPON A PUBLIC PROPERTY IN SUCH A MANNER AS TO RESULT IN A PUBLIC SAFETY HAZARD. LIKEWISE, UNDER NO CIRCUMSTANCES SHALL ANY DEBRIS OR INCIDENTAL MATERIALS BE ALLOWED UPON ADJACENT PRIVATE PROPERTY.

POINT REQUIREMENT 1: STREET FRONTAGE AREA

	432 Linear Feet of Street Frontage
Calculation:	40 Landscape Points per 100 L.F.
Calculation Formula:	(432 Feet of Street Frontage / 100 Linear Feet) x 40 Points per 100 L.F.= 172.8
Total Points Required:	**173 Total Points**
Total Points Provided:	**182 Total Points**
Code of Ordinances:	To be located a maximum of 30' from R-O-W
	Preserved trees within 30' R-O-W count as one and one-half times normal point value.

Species: Scientific Name	Species: Common Name	QTY	POINTS	TOTAL POINTS
Existing Tree 6-inch		2	30	60
Ginkgo biloba 'Autumn Gold' TM	Maidenhair Tree	1	20	20
Gleditsia triacanthos 'Skyline'	Skyline Honey Locust	3	20	60
Hydrangea paniculata 'Little Quick Fire'	Little Fire Quickfire Hydrangea	9	2	18
Spirea betulifolia 'Tor Gold'	Glow Girl Birchleaf Spirea	12	2	24
			Total Points =	182

POINT REQUIREMENT 2: PARKING LOT AREA

	74 Parking Stalls
Calculation 1:	30 Points per 10 Stalls
Calculation 1 Formula:	(74 Stalls /10 Stalls) x 30 Points = 222
Total Points Required:	**222 Total Points**
Total Points Provided:	**222 Total Points**
Code of Ordinances:	Landscaping that satisfies more than one locational requirement,
	excluding general site landscaping, may be counted for each.

Species: Scientific Name	Species: Common Name	QTY	POINTS	TOTAL POINTS
Acer miyabei 'State Street'	State Street Maple	1	20	20
Hydrangea paniculata 'Little Quick Fire'	Little Fire Quickfire Hydrangea	4	2	8
Spirea betulifolia 'Tor Gold'	Glow Girl Birchleaf Spirea	6	2	12
Total from Street Frontage Area				182
			Total Points =	222

POINT REQUIREMENT 3: GENERAL SITE AREA

	103,000 S.F. Newly Developed Area
Calculation 1:	5 Points per 10,000 S.F.
Calculation 1 Formula:	(103,000 S.F./10,000 S.F) x 5 Points = 51.5
Total Points Required:	**52 Total Points**
Total Points Provided:	**150 Total Points**
Code of Ordinances:	Preserved trees count as one and one-half times normal point value.

Species: Scientific Name	Species: Common Name	QTY	POINTS	TOTAL POINTS
Existing Tree 6-inch		2	30	60
Existing Tree 8-inch		3	30	90
			Total Points =	150

CONTRACTOR AND OWNER RESPONSIBILITY NOTES

1. GUARANTEE: THE CONTRACTOR SHALL GUARANTEE ALL PLANTS THROUGH ONE (1) YEAR AFTER ACCEPTANCE BY THE OWNER'S REPRESENTATIVE. PLANTS SHALL BE ALIVE AND IN HEALTHY AND FLOURISHING CONDITION AT THE END OF THE GUARANTEE PERIOD. THE CONTRACTOR SHALL REPLACE (AT NO COST TO OWNER) ANY PLANTS THAT ARE DEAD OR NOT IN A VIGOROUS THRIVING CONDITION. REPLACEMENT PLANTS SHALL BE OF THE SAME KIND AND SIZE AS ORIGINALLY SPECIFIED UNLESS OTHERWISE DIRECTED BY OWNER'S REPRESENTATIVE. RESTORE BEDS AS NECESSARY FOLLOWING PLANT REPLACEMENT, INCLUDING BUT NOT LIMITED TO BEDDING, EDGING, MULCH, ETC. REPLACE PLANTS DAMAGED AT TIME OF PLANTING. REPAIR AREAS DISTURBED IN ANY WAY DURING PLANT REPLACEMENT AT NO COST TO OWNER. CONTRACTOR SHALL PROVIDE A TWO (2)-YEAR STRAIGHTLINING GUARANTEE FOR ALL TREES.
2. CONTRACTOR IS RESPONSIBLE FOR STAKING THE PLANT MATERIALS FOR REVIEW BY OWNER'S REPRESENTATIVE PRIOR TO DIGGING AND PLACEMENT AND SHALL COORDINATE ALL FINE GRADING AND RESTORATION WITH THE GRADING CONTRACTOR.
3. MAINTENANCE: (CONTRACTOR) FOR ALL PLANTINGS, SEEDED AREAS AND SODDED LAWN AREAS: THE CONTRACTOR SHALL MAINTAIN ALL PLANTINGS AND LAWN AREAS FOR A MINIMUM TIME PERIOD OF 60 DAYS, UNTIL FINAL ACCEPTANCE BY OWNER'S REPRESENTATIVE. THE CONTRACTOR IS RESPONSIBLE FOR ADEQUATELY WATERING PLANTS AND LAWN/TURFGRASS DURING THIS 60 DAY ESTABLISHMENT PERIOD. CONTRACTOR IS RESPONSIBLE FOR THE ESTABLISHMENT OF HEALTHY VIGOROUS PLANT MATERIALS AND LAWN/TURFGRASS GROWTH. CONTRACTOR IS ALSO RESPONSIBLE FOR ANY PRUNING OF PLANT MATERIALS, AND SHAPING AND/OR REPLACEMENT OR SUPPLEMENT OF DEFICIENT SHREDDED HARDWOOD BARK MULCH DURING THIS PERIOD. LONG TERM PLANT MATERIALS AND LAWN/TURFGRASS MAINTENANCE AND ANY PROGRAM FOR SUCH IS THE RESPONSIBILITY OF THE OWNER. ALL PLANTINGS AND LAWN/TURFGRASS AREAS SHALL BE MAINTAINED IN A MANICURED CONDITION UNTIL THE TIME WHEN THE OWNER'S ACCEPTANCE IS GIVEN.
4. MAINTENANCE: (OWNER) THE OWNER IS RESPONSIBLE FOR THE CONTINUED MAINTENANCE, REPAIR AND REPLACEMENT OF ALL LANDSCAPING MATERIALS AND WEED BARRIER FABRIC AS NECESSARY FOLLOWING THE ONE (1) YEAR CONTRACTOR GUARANTEE PERIOD.

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P. 608.848.5060

CLIENT
DAVID MOLLENKOPF ARCHITECT

CLIENT ADDRESS
209 10TH AVENUE SOUTH, STE 414
NASHVILLE, TN 37203

PROJECT
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION
VILLAGE OF WINDSOR, WI
DANE COUNTY

PLAN MODIFICATIONS

#	Date	Description
1	09/11/2018	MUNICIPAL APPROVAL
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Design/Drawn MWS
Approved ABK

SHEET TITLE
LANDSCAPE DETAILS, NOTES AND SPECIFICATIONS

SHEET NUMBER
L2.0

JSD PROJECT NO 18-8458

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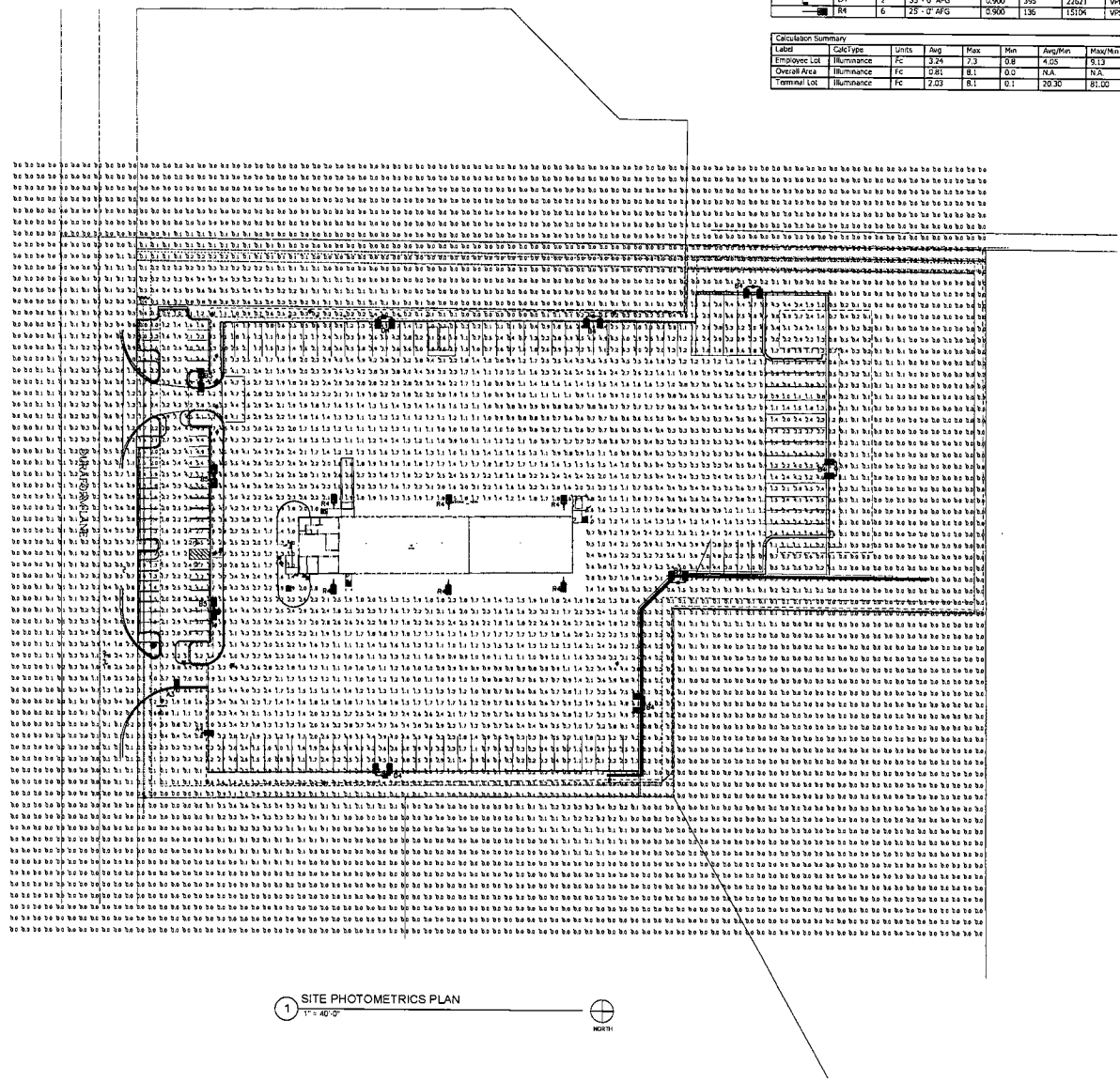
Oliver • Little • Gipson
OLG Engineering, Inc.
300 Industrial Blvd
Hollywood, TN 37088
Office: 931.454.9949
4300 Pine Hill Drive
Nashville, TN 37211
Office: 615.670.6057
olgengineering.com

david mallenkopf architect
49 Main Square W, Suite 600
Hendersonville, Tennessee 37075
tel 615.946.6146
www.thewalkfk.com

Luminaire Schedule								
Symbol	Label	Qty	Mounting Height	LLF	Watts	Lumens	Description	
	A3	1	25' - 0" AFG	0.900	220	27220	VPL-96L-220-4K7-3	
	A4	1	25' - 0" AFG	0.900	220	15072	VPL-96L-220-4K7-4W-BC	
	B4	5	25' - 0" AFG	0.900	220	15072	VPL-96L-220-4K7-4W-BC	
	B5	3	25' - 0" AFG	0.900	220	26023	VPL-96L-220-4K7-SW	
	D4	2	35' - 0" AFG	0.900	395	22621	VPL-96L-395-4K7-4W-BC	(EXISTING POLE)
	R4	6	25' - 0" AFG	0.900	136	15104	VPS-60L-136-4K7-4W	

Calculation Summary							
Label	Calc Type	Units	Avg	Max	Min	Avg/Min	Max/Min
Employee Lot	Illuminance	Fc	3.24	7.3	0.8	4.05	9.13
Overall Area	Illuminance	Fc	0.81	8.1	0.0	N.A.	N.A.
Terminal Lot	Illuminance	Fc	2.03	8.1	0.1	20.30	81.00



1 SITE PHOTOMETRICS PLAN
1" = 40'-0"

NORTH

Anthony D Gipson

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Maxim
ELECTRICAL AND REFRIGERATION CONTRACTORS
DEPENDABLE, INC.

Contractor:
Maxim Services LLC
6550 Guion Rd

OLD DOMINION FREIGHT LINE

A New Service Center for:
OLD DOMINION FREIGHT LINE
WINDSOR, WI
4380 Duraform Lane
Windsor, WI 53598

SUBMITAL 12JUNE18

15063.00 ODFL Burlington, VT

Project No. 15063.00

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Sheet Name:
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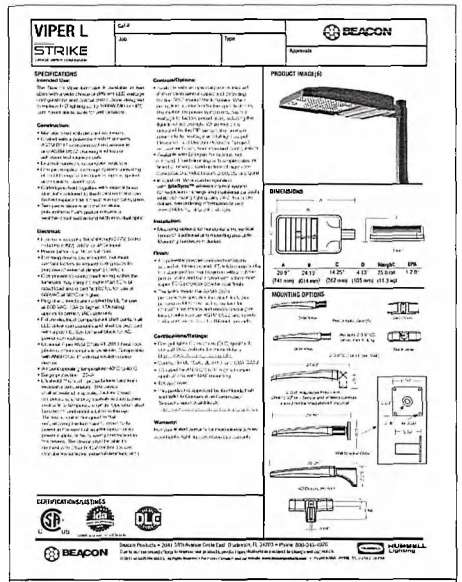
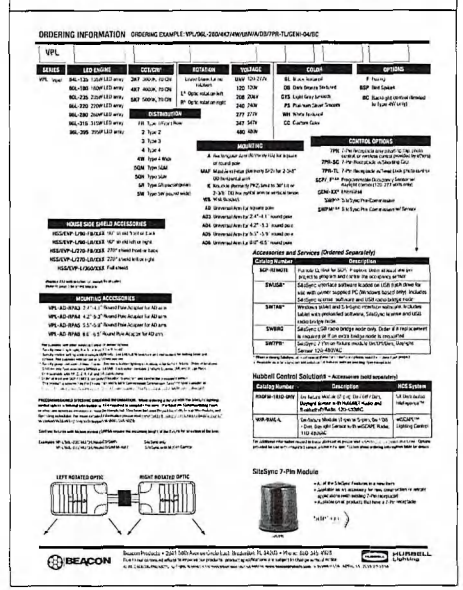
Sheet Number:
ES2.1A

OLG File: 05018

FIXTURE TYPES A3, A4, B4, B5, D4





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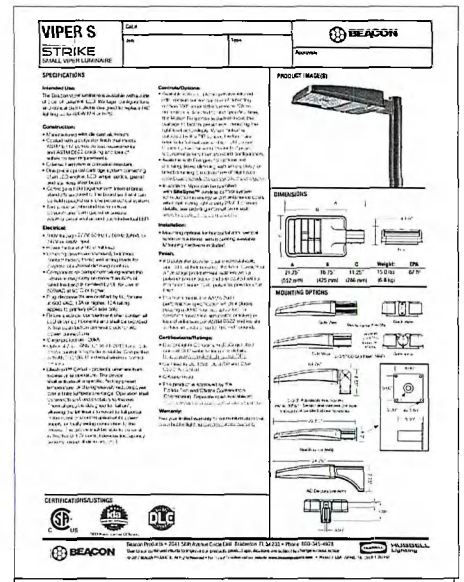

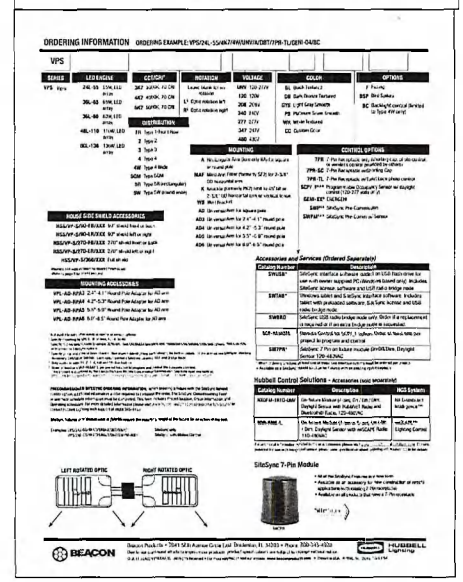

Oliver · Little · Gipson
OLG Engineering, Inc.
301 Industrial Blvd.
Tullahoma, TN 37388
Office: 931-454-0940
3006 Blair Hill Place
Nashville, TN 37214
Office: 615.670.0022
olgengineering.com

david mollenkopf architect
49 Music Square W. Suite 600
Nashville, Tennessee 37203
615.294.9146
www.themolpf.com

Anthony D Gipson
Digitally signed by Anthony D Gipson
DN: c=US, o=OLG Engineering, Inc., cn=Anthony D Gipson, 0.9.2342.19200300.100.1.1=40428
Date: 2018.06.05 14:46:04 -05'00'

Maxim Services, LLC
Electrical and Geotechnical

Contractor:
Maxim Services LLC
6550 Guion Rd

OLD DOMINION FREIGHT LINE

A New Service Center for:
OLD DOMINION FREIGHT LINE
WINDSOR, WI
4380 Duraform Lane
Windsor, WI 53598

15063.00 - ODFL Burlington, VT

SUBMITTAL 12JUN18

Project No. 15063.00

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Sheet Name:
SITE FIXTURE DETAILS

Sheet Number:
ES2.1B

OLG File: 05018

David Mollenkopf Architect
Old Dominion Freight Line Terminal Expansion
Village of Windsor, Wisconsin
Stormwater Management Plan Submittal

www.JSDinc.com

Planning & Development

Site/Civil Engineering

Transportation Engineering

Structural Engineering

Water Resources

Landscape Architecture

Surveying & Mapping

Construction Management

Prepared for:

David Mollenkopf Architect
48 Music Square W #600
Nashville, TN 37203

JSD Project No.: 18-8488

June 13th, 2018

Prepared by: Matt Haase, P.E.

JSD Professional Services, Inc.
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Reviewed & Approved By:
Matt Haase, P.E.
Project Engineer

Future questions and comments can be directed to:

Matt Haase, P.E.
Project Engineer

matt.haase@jsdinc.com
Phone: 608.848.5060
Fax: 608.848.2255

JSD Professional Services, Inc.
• Engineers • Surveyors • Planners
Madison Regional Office
161 Horizon Drive, Suite 101
Verona, WI 53593
www.jsdinc.com

1.0 INTRODUCTION

The Old Dominion Freight Line (ODFL) proposed industrial site improvement project is located in the Village of Windsor at 4380 Duraform Lane. The site is bordered by other commercial/industrial users to the north, east and west, and Duraform Lane right-of-way to the south. More specifically the site can be described as Lot 2 of CSM 10994 as recorded with Dane County, Wisconsin.

Proposed site improvements include constructing an approximately 4,500 square foot building addition which will accommodate 16 additional loading dock doors for freight transfer. Other site improvements include additional pavement area to the north of the site to facilitate truck maneuvering and tractor/trailer parking, additional parking lot areas to the south of the site along Duraform Lane; construction of above ground and underground stormwater management facilities; and site lighting, landscaping and security fencing.

The existing site is a developed industrial site home to ODFL. The site operates as an existing freight transfer station with an existing 7,400 square foot building with 22 loading docks, an employee parking lot and tractor/trailer maneuvering and parking areas adjacent to the building. The proposed site improvements as described above will increase the site impervious area due to added building, truck parking and employee parking areas. The net increase in pavement is in excess of 20,000 square feet, although some of the improvements will be a redevelopment of existing impervious surfaces. A further description and analysis of these new and redevelopment improvements are provided below.

The existing drainage pattern generally drains north to south with a private storm sewer system. Ultimately, drainage is captured by public storm sewer in Duraform Lane, and routed off-site to the east.

In proposed conditions the site drainage maintains the same ultimate drainage pattern, although to the north end of the site, surface and underground detention facilities are proposed to meet the applicable storm water management requirements. There is also an underground detention system in the south employee parking area which will connect and discharge to the same location.

Due to the high groundwater conditions that were explored during the sites geotechnical investigation, an infiltration exemption has been requested for the site. Further details on this exemption request can be found in **Appendix 5.**

The proposed development will be treated as a new development site, with areas of redeveloped impervious areas. Village of Windsor, Dane County and WDNR storm water management standards require water quantity and water quality on-site treatment, which include runoff rate control, total suspended solids (TSS) reduction, infiltration, oil and grease control and stable outlet design.

2.0 EXISTING CONDITIONS

The existing site is a developed industrial site home to ODFL. The site operates as an existing freight transfer station with an existing building with loading docks, an employee paved parking lot and paved tractor/trailer maneuvering and parking areas surrounding the building

According to the USDA Web Soil Survey, the predominant soil types within the development are silt loams, with Virgil silt loam (VwA) covering 49.0%, Pecatonica Silt Loam (PeC2) covering 43.4%, Batavia silt loam (BbB) covering 5.9% and Radford silt loam (RaA) covering 1.6% of the site. All of the predominant soils on site have a HSG classification B in drained areas. The exception is with the Virgil and Radford units with a HSG classification of B/D, where these soils have a HSG classification of D in undrained conditions.

A geotechnical engineering exploration was conducted by TerraCon Consultants, Inc. (TerraCon Project No. 58185000) dated May 21, 2018 and can be referenced in **Appendix 2**.

An existing conditions map of the site can be found in **Appendix 1**.

3.0 DESIGN CRITERIA

3.1 Dane County Ordinances

Chapter 14 – Manure Management, Erosion Control and Stormwater Management

3.2 Wisconsin Administrative Code

WDNR – Technical Standards (NR 151 and NR 216)

This site will need to meet the criteria for land disturbing activities subject to erosion control as defined in the Dane County Chapter 14 ordinance as:

- *Land-disturbing activity in excess of 4,000 square feet;*

-And-

The site will need to meet the criteria for storm water management per Dane County Chapter 14 Ordinances

- *Any development(s) after August 22, 2001 that result(s) in the cumulative addition of 20,000 square feet of impervious surface to the site.*
- *Any development that requires a certified survey map, as defined in the applicable local land division ordinance(s); for property intended for commercial or industrial use.*
- *Redevelopment, as defined in s. 14.41(31).*
- *Other land development activities including, but not limited to, redevelopment or alteration of existing buildings and other structures, that the local approval authority determines may significantly increase downstream runoff volumes, flooding, soil erosion, water pollution or property damage, or significantly impact a lake, stream, or wetland area. All such determinations shall be made in writing unless waived by the applicant.*

The on-site specific stormwater management controls for this redevelopment and expansion include the following:

- TSS Reduction
- Oil & Grease Control
- Runoff Rate Control
- Stable Outlet

4.0 ANALYSIS

The storm water management and erosion control plan have been written and analyzed for a single phase of construction to full build-out conditions. Construction will include both on-site storm water management and erosion control.

An exemption to infiltration requirements has been requested from the Village of Windsor, Dane County and WDNR. As of the date of this report, the WDNR has offered this exemption.

TSS reduction calculations were prepared in WinSLAMM version 10.3.4 to measure the reduction on the site for both new and redeveloped surfaces. For the analysis, only surfaces that are new or will be replaced and redeveloped were included in the WinSLAMM model. The system achieves an

overall TSS reduction of 64.67% or 1189.6 lbs, for the redeveloped and new impervious surfaces. This exceeds the minimum mass needed for 40% sediment reduction in redeveloped areas and 80% in new areas per the Dane County code. Refer to **Appendix 6** for TSS WinSLAMM calculations.

Runoff rate control was modeled using HydroCAD version 10.00-20. Since nearly all the proposed stormwater discharges into an existing pipe that enters the public storm sewer on Duraform Lane, the 1-year, 2-year, 10-year and 100-year peak flows need to be maintained or reduced for the entire site, not just the redeveloped or new areas. To meet this requirement, additional underground storage was included in the north area of the site to reduce peak flows in the larger storm events. Below is a summary table of the results from HydroCAD and the HydroCAD reports for the existing and proposed models can be found in **Appendix 7.**

Storm Water Management Facility			Max T_c (min)	CN*	1-year	2-year	10-year	100-year
EX 5	Proposed Curb Inlet No. 5 Outfall	Outflow Volume w/ Detention (cfs)	15.8	71	6.56	7.73	14.29	27.06
		Outflow Volume w/o Detention (cfs)	15.8	71	12.12	14.21	22.01	38.84
		Existing Outflow (cfs)	21.8	71	6.94	8.52	14.43	27.11
		Difference: Proposed w/ Detention vs. Existing			-0.38	-0.79	-0.14	-0.05
2L	Existing Offsite Drainage	Outflow Volume w/o Detention (cfs)	27	71	0.67	0.99	2.36	5.76
7L	Proposed Offsite Drainage	Outflow Volume w/o Detention (cfs)	16.9	71	0.34	0.50	1.17	2.82
		Difference: Proposed w/o Detention vs. Existing			-0.33	-0.49	-1.19	-2.94
1L	Total	Outflow Volume w/ Detention (cfs)	16.9	71	6.95	8.39	14.84	29.87
		Outflow Volume w/o Detention (cfs)	16.9	71	12.46	14.71	23.18	41.66
		Existing Outflow (cfs)	27	71	7.27	9.05	16.01	31.46
		Difference: Proposed w/ Detention vs. Existing			-0.32	-0.66	-1.17	-1.59

5.0 DESIGN

The proposed development will have approximately 3.01 acres of disturbed area. Stormwater management calculations are based on one phase, full build-out conditions. The existing site has a 7,425 SF building and 136,943 SF of paved parking and dock space. Proposed build-out includes a 4,512 SF building expansion, new parking and dock space, curb and gutter, underground detention and water quality chambers, and a bioretention basin.

The designed stormwater management facilities consist of facilities in two areas. Two underground water quality chambers, two underground detention chambers and an 8,034 SF bioretention basin provide total suspended solids reduction and runoff rate control for the site. In addition, the main structures discharging into the detention chambers are bypass structures with steel plate walls. These force all stormwater into the detention chambers in the 1-year storm for TSS treatment and then bypass some of stormwater through orifices and over the walls in larger storm events. The

basin and underground chambers all have piped connections eventually leading into an existing curb inlet which discharges into the Duraform Lane public storm sewer.

The site has high groundwater conditions that restricts the potential for infiltration. Due to this, a request for exemption from infiltration has been submitted to the Village of Windsor, Dane County and the Wisconsin DNR (WDNR). As of this report submission, the WDNR has provided the exemption for infiltration, which can be found in **Appendix 5**. The exemption request memo can be found in **Appendix 5** and the geotechnical report is in **Appendix 2**.

Storm inlets will be installed with oil and grease filter baskets as specified on the construction drawings to provide oil and grease control. The engineered soil in the bioretention basin will provide oil and grease control for the area draining to it. Refer to the proposed watershed map in **Appendix 4** and proposed construction drawings in **Appendix 3** for further details.

5.1 Total Suspended Solids (TSS)

Dane County Ordinances Chapter 14.51(2)(a)

(a) Sediment control.

1. For new development, design practices to retain soil particles greater than 5 microns on the site (80% reduction) resulting from a one-year 24-hour storm event (2.5 inches over 24-hour duration), according to approved procedures, and assuming no sediment resuspension;

2. For redevelopment resulting in exposed surface parking lots and associated traffic areas, design practices to retain soil particles greater than 20 microns on the entire site (40% reduction) resulting from a one-year 24-hour storm event, according to approved procedures, and assuming no sediment resuspension. Under no circumstances shall the site's existing sediment control level or trapping efficiency be reduced as a result of the redevelopment

Total suspended solids reduction will be achieved through the bioretention basin and two underwater quality chambers. Since the sediment control regulations are separate for redeveloped versus new development, all drainage areas were split between redeveloped and new areas and labeled accordingly. This allowed a separation of the sediment load from redeveloped areas and that of new impervious areas.

With this separation, the sediment loads for these two conditions were multiplied by the percentage of reduction needed, 40% for redeveloped areas and 80% for new areas. This provided a minimum sediment load reduction for our site of 1179.15 lbs, or an overall reduction of 64.67 %. The stormwater system in the plans provides a total sediment load reduction of 1189.6 lbs per the WinSLAMM output, which is 1.01% of what is needed. Refer to **Appendix 6** for TSS WinSLAMM calculations.

5.2 Oil and Grease Control

Dane County Ordinances Chapter 14.51(2)(a)

(b) Oil and grease control. For all stormwater plans for commercial or industrial developments and all other uses where the potential for pollution by oil or grease, or both, exists, the first 0.5 inches of runoff will be treated using the best oil and grease removal technology available. This requirement may be waived by the plan reviewer only when the applicant can demonstrate that installation of such practices is not necessary.

Oil and grease control for the site will be achieved through the filtering action of the engineered soil layer within the bioretention cells described above. The areas draining to catch basins and curb inlets will be cleaned using oil and grease filter baskets.

5.3 Runoff Rate Control

Dane County Ordinances Chapter 14.51(2)(cm)

(cm) Runoff rate control - design standards. Except for redevelopment projects, all stormwater facilities shall be designed, installed and maintained to effectively accomplish the following:

1. *Maintain predevelopment peak runoff rates for the 1-year, 24-hour storm event (2.49 inches over 24-hour duration using the NRCS MSE4 storm distribution).*
2. *Maintain predevelopment peak runoff rates for the 2-year, 24-hour storm event (2.84 inches over 24-hour duration using the NRCS MSE4 storm distribution).*
3. *Maintain predevelopment peak runoff rates for the 10-year, 24-hour storm event (4.09 inches over 24-hour duration using the NRCS MSE4 storm distribution).*
4. *Maintain predevelopment peak runoff rates for the 100-year, 24-hour storm event (6.66 inches over 24-hour duration using the NRCS MSE4 storm distribution).*

Runoff rate control for the entire site is achieved through the detention chambers and bioretention basin. Although part of the project is redeveloped impervious area, the majority of the disturbance area is new development. In addition, the majority of the drainage is leaving the site through one existing pipe, so the pre-redevelopment runoff rates through that pipe need to be maintained or reduced. To achieve this, the underground detention chambers use restrictive outlets to retain stormwater and release it over a longer period of time. In the north area, additional chambers beyond the water quality chambers are used to aid in providing sufficient volume retention during the larger storm events. The HydroCAD model reports for existing and proposed conditions can be found in **Appendix 7.**

5.4 Outlets

Dane County Ordinances Chapter 14.51(2)(d)

Discharges from new construction sites must have a stable outlet capable of carrying designed flow as required in sub. (2)(cm), at a non-erosive velocity. Outlet design must consider flow capacity and flow duration. This requirement applies to both the site outlet and the ultimate outlet to stormwater conveyance or waterbody.

On-site storm sewer has been designed with the "Rational Method"**.** Storm sewer is designed to convey the 10-year storm event and analyzed for the 100-year event performance.

5.5 Infiltration

Dane County Ordinances Chapter 14.51(2)(e)

For both residential and nonresidential developments, design practices to infiltrate sufficient runoff volume so that post development infiltration volume shall be at least 90% of the pre-development infiltration volume, based upon average annual rainfall.

Due to the high groundwater located on this site, a request for exemption from this ordinance and the WDNR ordinance have been made. As of this report date, the WDNR has provided this exemption. See the infiltration exemption memo and WDNR response in **Appendix 5**.

6.0 EROSION CONTROL

Erosion control measures onsite will conform to the Wisconsin Department of Natural Resources Technical Standards, Dane County and Village of Windsor requirements. These measures include, but are not limited to; construction entrance, silt fencing, silt socks, straw wattles, grading, seeding, mulching, erosion matting, and temporary sediment basins as necessary. Construction sequencing shall be as follows:

1. Install silt fence in the appropriate locations and stone tracking pad on all the entrances to be used by construction traffic
2. Install all temporary erosion control measures as noted on the Erosion Control Plan
3. Topsoil removal and stockpile
4. Mass Grading, Building Pad Preparation, Building Pad, Pavement Subgrade Prep., Stormwater Detention Chamber Installation & Storm Sewer Installation

5. Install Aggregate Base in Paved Areas
6. Stabilize open areas with fertilizer, seed and e-mat/mulch
7. Install Engineered Soils Layer in Bioretention Basin
8. Install Curb & Gutter, Concrete & Asphalt Pavement
9. Remove temporary erosion control practices upon contributing area stabilization

For more detailed requirements regarding erosion control and grading efforts refer to grading and erosion control plans and notes in the attached proposed construction plans in **Appendix 3.**

7.0 CONCLUSION

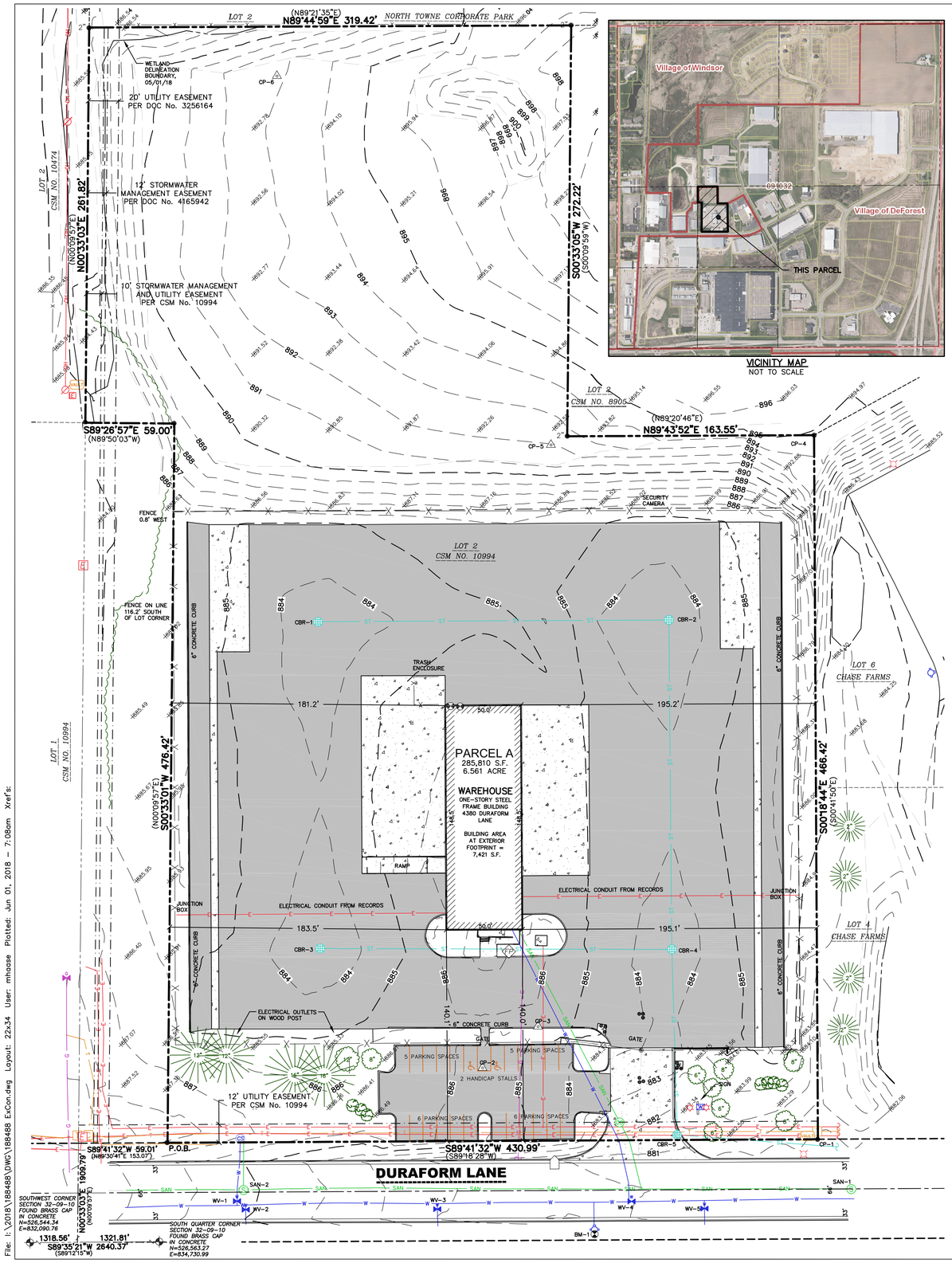
Stormwater management features and erosion control measures for the ODFL site improvements project have been designed in accordance with the development standards within the Village of Windsor, Dane County Ordinances and WDNR standards. Erosion control measures have been designed to limit soil loss to 5 tons per acre annually. Improvements will include proposed building, asphalt pavement, concrete curb and gutter, landscaping and storm water management facilities. On-site facilities provide the runoff rate control, TSS reduction, oil and grease control and a stable outlet design prior to offsite discharge. Infiltration requirements are requested to be exempt due to the high groundwater table documented in the provided geotechnical report.

APPENDIX 1

EXISTING CONDITIONS SURVEY

EXISTING CONDITIONS SURVEY

LOT 2, CERTIFIED SURVEY MAP No. 10994, RECORDED IN VOLUME 66 OF DANE COUNTY CERTIFIED SURVEYS, PAGE 36 THRU 40 AS DOCUMENT No. 3879522, LOCATED IN THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 32, TOWN 09 NORTH, RANGE 10 EAST, VILLAGE OF WINDSOR, DANE COUNTY, WISCONSIN.



VICINITY MAP
NOT TO SCALE

LEGEND

- GOVERNMENT CORNER
- 2" IRON PIPE FOUND
- ¾" REBAR FOUND
- CONTROL POINT
- BENCHMARK
- FINISHED FLOOR SHOT LOCATION
- BOLLARD
- FLAG POLE
- MAIL BOX
- POST
- SIGN
- SANITARY MANHOLE
- CLEAN OUT
- WATERMAIN OR GASMAIN VALVE
- HYDRANT
- CURB STOP/SERVICE VALVE
- SPRINKLER VALVE BOX
- ROUND CASTED INLET
- ELECTRIC PEDESTAL
- ELECTRIC TRANSFORMER
- LIGHT POLE
- POWER POLE W/GUY
- YARD LIGHT
- VAULT
- TELEPHONE PEDESTAL
- CABLE PEDESTAL
- DECIDUOUS TREE
- CONIFEROUS TREE
- HANDICAP PARKING
- CENTERLINE
- RIGHT-OF-WAY LINE
- SECTION LINE
- PARCEL BOUNDARY
- PROPERTY LINE
- EASEMENT LINE
- FENCE LINE
- SAN — SANITARY SEWER
- W — WATER LINE
- ST — STORM SEWER
- G — NATURAL GAS
- OH — OVERHEAD LINE
- E — UNDERGROUND ELECTRIC
- FO — FIBER OPTIC
- T — UNDERGROUND TELEPHONE
- CaTV — UNDERGROUND CABLE
- EDGE OF WOODS OR BRUSH
- BUILDING
- WALL LINE
- 875 — INDEX CONTOUR
- 874 — INTERMEDIATE CONTOUR
- DELINEATED WETLANDS
- ×874.29 SPOT ELEVATION
- EDGE OF PAVEMENT
- CONCRETE CURB & GUTTER
- EDGE OF GRAVEL
- BITUMINOUS PAVEMENT
- RETAINING WALL
- CONCRETE PAVEMENT
- GRAVEL
- EDGE OF BITUMINOUS
- PAVEMENT STRIPING
- END OF FLAGGED UTILITIES
- ( ) DENOTES RECORD DATA DEPICTING THE SAME LINE ON THE GROUND AS RETRACED BY THIS SURVEY

STORM SEWER INLETS

STRUCT. ID	RIM ELEVATION	INVERT	ELEVATION	PIPE SIZE	PIPE TYPE
CBR-1	883.34	*	–	–	–
CBR-2	883.12	*	–	–	–
CBR-3	883.15	*	–	–	–
CBR-4	883.15	*	–	–	–
CBR-5	881.50	*	–	–	–

*UNABLE TO MEASURE DUE TO INSTALLED FILTER FABRIC.

SANITARY SEWER MANHOLES

STRUCT. ID	RIM ELEVATION	INVERT	ELEVATION	PIPE SIZE	PIPE TYPE
SAN-1	880.48	E	870.63	12"	DI
		W	870.48	12"	DI
SAN-2	885.36	E	869.26	12"	DI
		N	870.01	8"	PVC
		N	876.11	8"	PVC
		S	870.06	8"	PVC
		S	876.11	8"	PVC
		*W	869.36	12"	DI

*UNABLE TO MEASURE DUE TO LADDER LOCATION. MEASUREMENT TAKEN IN CHANNEL NEAR PIPE.

WATER VALVES

VALVE No.	RIM ELEVATION	INVERT	TOP NUT ELEVATION
WV-1	885.18	TN	879.48
WV-2	884.95	TN	879.65
WV-3	882.00	TN	876.70
WV-2	880.98	TN	876.48
WV-3	880.65	TN	877.25

TN=TOP NUT OF WATER VALVE

BENCHMARKS

BENCH MARK	ELEVATION	DESCRIPTION
BM-1	883.39	TOP NUT ON HYDRANT ON S. SIDE OF DURAFORM LN.

*JSD DOES NOT GUARANTEE THE BENCHMARK ELEVATIONS LISTED ON THIS MAP ARE ACCURATE AND SHOULD BE VERIFIED PRIOR TO CONSTRUCTION ACTIVITIES.

CONTROL POINTS

CONTROL POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP-1	529170.41	833559.21	893.17	3/4" REBAR
CP-2	528513.32	833695.51	885.74	MAG NAIL
CP-3	528540.71	833732.21	885.40	MAG NAIL
CP-4	528932.48	833915.15	894.42	3/4" REBAR
CP-5	528926.04	833740.81	892.15	60D NAIL
CP-6	529170.41	833559.21	893.17	3/4" REBAR

*JSD DOES NOT GUARANTEE THE CONTROL POINT ELEVATIONS LISTED ON THIS MAP ARE ACCURATE AND SHOULD BE VERIFIED PRIOR TO CONSTRUCTION ACTIVITIES.

NOTES

1. FIELD WORK PERFORMED BY JSD PROFESSIONAL SERVICES, INC. FROM APRIL 10 TO APRIL 11, 2018.
2. BEARINGS FOR THIS SURVEY AND MAP ARE REFERENCED TO THE WISCONSIN COUNTY COORDINATE SYSTEM, DANE COUNTY ZONE / THE SOUTH LINE OF THE SOUTHWEST QUARTER OF SECTION 32–09–10, BEARS N 89°35'21" E.
3. ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). BENCHMARK IS A BRASS CAP IN CONCRETE MARKING THE SOUTHWEST CORNER OF SECTION 32, T09N, R10E, ELEVATION = 871.82'
4. CONTOUR INTERVAL IS ONE FOOT.
5. SPOT ELEVATIONS IN CURBED AREAS REFERENCE THE PAVEMENT EDGE ELEVATIONS.
6. SUBSURFACE UTILITIES AND FEATURES SHOWN ON THIS MAP HAVE BEEN APPROXIMATED BY LOCATING SURFICIAL FEATURES AND APPURTENANCES, LOCATING DIGGERS HOTLINE FIELD MARKINGS AND BY REFERENCE TO UTILITY RECORDS AND MAPS. DIGGER'S HOTLINE TICKET NO. 20181407127, 20181407148, 20181407116 AND 20181407165, WITH A CLEAR DATE OF APRIL 09, 2018.
7. UTILITY COMPANIES CONTACTED THRU DIGGERS HOTLINE:
   - VILLAGE OF DE FOREST
   - WINDSOR UTILITY DISTRICT #1
   - MADISON GASE & ELECTRIC CO
   - ALLIANT ENERGY
   - CENTURYLINK
   - CHARTER COMMUNICATIONS
8. BEFORE EXCAVATION, APPROPRIATE UTILITY COMPANIES SHOULD BE CONTACTED. FOR EXACT LOCATION OF UNDERGROUND UTILITIES, CONTACT DIGGERS HOTLINE, AT 1.800.242.8511.
9. THIS PARCEL IS ZONED SUBURBAN INDUSTRIAL PER THE CITY OF VERONA ZONING MAP DATED DECEMBER 2005.
10. THIS PARCEL IS SUBJECT TO ALL EASEMENTS AND AGREEMENTS, BOTH RECORDED AND UNRECORDED.

LEGAL DESCRIPTION

LOT 2, CERTIFIED SURVEY MAP NO. 10994, RECORDED IN VOLUME 66 OF DANE COUNTY CERTIFIED SURVEY MAPS ON PAGES 36–40 AS DOCUMENT NUMBER 3879522, VILLAGE OF WINDSOR, DANE COUNTY, WISCONSIN.

TAX KEY NO: 196/0910–323–0556–0

SURVEYOR'S CERTIFICATE

I, XXXX XXXX, WISCONSIN PROFESSIONAL LAND SURVEYOR NO. S–XXXX, HEREBY CERTIFY THAT THIS EXISTING CONDITIONS SURVEY AND MAP IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF IN ACCORDANCE WITH THE INFORMATION PROVIDED.

JOHN KREBS, S–1878
PROFESSIONAL LAND SURVEYOR

DATE

OR

TODD J. BUHR, S–2614
PROFESSIONAL LAND SURVEYOR

DATE

WISCONSIN JOHN KREBS S–1878 McFARLAND, WISCONSIN LAND SURVEYOR

WISCONSIN TODD J. BUHR S–2614 DEFOREST, WI LAND SURVEYOR

north

SCALE IN FEET
40' 0 40'

JSD Professional Services, Inc.
Engineers • Surveyors • Planners

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P. 608.848.5060

CLIENT:
THE MOLLENKOPF DESIGN GROUP, LLC

CLIENT ADDRESS:
49 MUSIC SQUARE WEST, STE. 600
NASHVILLE, TN 37203

DIGGERS HOTLINE
Toll Free (800) 242–8511

PROJECT:
OLD DOMINION FREIGHT LINE - 4380 DURAFORM LANE

PROJECT LOCATION:
V. OF WINDSOR, WI
DANE COUNTY

PLAN MODIFICATIONS:

#	Date:	Description:
1		
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Design/Drawn: CJO 04-16-18
Approved: TJB 04-16-18

SHEET TITLE:
EXISTING CONDITIONS SURVEY

MAP NO: C–*

SHEET NUMBER:
1 OF 1

JSD PROJECT NO: 18-8488

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File: I:\2018\188488\DWG\188488 ExCon.dwg Layout: 22x34 User: mhoase Plotted: Jun 01, 2018 – 7:08am Xref's:

APPENDIX 2

SOILS INFORMATION

GEOTECHNICAL ENGINEERING EXPLORATION AND ANALYSIS
BY TERRACON CONSULTANTS DATED 5/21/2018

Geotechnical Engineering Report

Old Dominion Freight Line Terminal Expansion
4400 Duraform Lane
Windsor, Wisconsin

May 21, 2018
Terracon Project No. 58185000

Prepared for:

Old Dominion Freight Line, Inc.
Indianapolis, Indiana

Prepared by:

Terracon Consultants, Inc.
Franklin, Wisconsin

terracon.com

Terracon

Environmental ■ Facilities ■ Geotechnical ■ Materials

May 21, 2018

Old Dominion Freight Line, Inc.
3915 West Morris Street
Indianapolis, Indiana 46241

Att: Jerry Canada – Manager of Construction
E: jerry.canada@odfl.com

Re: Geotechnical Engineering Report
Old Dominion Freight Line Terminal Expansion
4400 Duraform Lane
Windsor Wisconsin
Terracon Project No. 58185000

Dear Mr. Canada:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. This study was performed in accordance with Terracon Proposal No. P58185000R3, dated April 16, 2018 and our existing Master Service Agreement.

This report presents the findings of the subsurface exploration and provides geotechnical recommendations regarding earthwork and the design and construction of foundations, floor slabs, retaining walls, and pavements for the project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Nathan J. Liggett, P.E.
Project Engineer

Paul A. Tarvin, P.E.
Regional Geotechnical Manager

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EXECUTIVE SUMMARY

Terracon Consultants, Inc. (Terracon) has completed a subsurface exploration program for the proposed Old Dominion Freight Line (ODFL) Terminal Expansion planned in Windsor, Wisconsin. The results of our exploration indicate that the subsurface conditions at the site are generally suitable for the use of shallow footing foundations for support of the proposed structural loads. The floor slabs can be grade supported.

However, **the following geotechnical related issues at the site will affect construction** of the proposed structures:

- Support of the proposed building foundations on the native granular soil appears feasible at the project site location. However, low strength soils or existing fill may be encountered in footing excavations in some areas; **footings should not be supported directly on existing fill materials, buried topsoil, or low strength native soils.** If low strength soils or existing fills are present at the design bearing depth, **they should be removed and replaced** with engineered fill or lean concrete extending to competent native soils.
- The floor slab can be grade supported. Details related to site development, foundation and pavement design and construction considerations are included in subsequent sections of this report.
- **Provided ODFL is willing to accept the risk** associated with supporting the floor slabs and pavements over the existing fill materials (in exchange for reduced construction costs), it is our opinion that stable portions of the existing fill could be left in place. To reduce the risk of adverse performance of floor slabs and pavements, and to provide more uniform subgrade support, **any existing fill materials exposed at subgrade level in these areas should be thoroughly observed and tested** by proofrolling during construction.
- Site soils at this location primarily consist of silty sands and sand with a seasonal high groundwater elevation of approximately 882 feet. Based on our review of the soil samples collected and estimation of the seasonal high groundwater elevation, it is our professional opinion that this site is exempt from required infiltration per WDNR Technical Standard 1002 due to the relatively high groundwater at the site.
- Because of site constraints and a high seasonal water table, a below-grade storm water detention basin is planned to be constructed below the proposed pavement section, extending approximately 8 to 10 feet below site grade.
- Close monitoring of the construction operations discussed herein will be critical in achieving the design subgrade support. We therefore recommend that Terracon be retained to provide observation/testing during this portion of the work.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and **the report must be read in its entirety for a comprehensive understanding of the items contained herein.**

The section titled **GENERAL COMMENTS** should be read for an understanding of the report limitations.

GEOTECHNICAL ENGINEERING REPORT

Old Dominion Freight Line Terminal Expansion
4400 Duraform Lane
Windsor, Wisconsin

Terracon Project No. 58185000
May 21, 2018

1.0 INTRODUCTION

Terracon Consultants, Inc. (Terracon) has completed our subsurface exploration for the proposed Old Dominion Freight Line (ODFL) terminal expansion planned in Windsor, Wisconsin. Nine (9) borings were performed at the site to depths ranging from approximately 10 to 30 feet below the existing ground surface. Boring logs and a Boring Location Diagram are included in Appendix A.

This report describes the subsurface conditions encountered at the boring locations, presents the test data, and provides geotechnical engineering recommendations regarding the following items

- site preparation and earthwork
- design and construction of shallow footing foundations
- floor slab subgrade preparation
- lateral earth pressures
- pavement subgrade preparation
- minimum pavement sections
- storm water considerations
- seismic site class

2.0 PROJECT INFORMATION

2.1 Project Description

Item	Description
Site Layout	See Appendix A, Exhibit A-2, Boring Location Diagram

Item	Description
Project Description	We understand that the existing truck terminal is to be renovated. The renovations include the construction of a new 16 door/4-bay addition at the north end of the existing structure. The paved area is anticipated to be extended north approximately 200 feet from the existing pavement limits, with the pavement extension extending into the existing raised grassy portion of the site. In addition, a new employee parking area and additional site entrance is anticipated to be added at the south end of the site.
Maximum Loads	**Structural loads were not provided.** The following maximum loads were **assumed**: ■ Columns: 150 to 200 kips ■ Walls: 10 kips per linear foot ■ Floor slabs: 250 psf
Finished Floor Elevation (FFE)	The FFE of the proposed addition is expected to be approximately 889.5 feet. The surrounding pavement elevation is anticipated to be approximately 885 feet.
Pavements	The proposed terminal renovations will include pavement replacement and construction. Information regarding traffic volumes has not been provided.
Grading	A preliminary site grading plan was provided to Terracon. We anticipated that 6 to 10 feet of cut will be required at the north end of the site to facilitate the proposed pavement expansion. The FFE of the proposed addition is anticipated to be approximately 4.5 feet above existing pavement grade to match the FFE of the existing structure. We anticipate that material from the cut planned at the north end of the site will likely be utilized for engineered fill below the proposed addition. In addition, further cuts of up to 8 to 10 feet may be required for construction of an underground detention basin.
Free-Standing Retaining Walls	A retaining wall is anticipated to be constructed at the north end of the site. The wall is anticipated to retain up to 5 feet of soil, which will then be graded back to meet existing grade. We anticipate that the wall will be either a reinforced concrete cantilever wall or modular block wall. In addition, the proposed addition will house truck dock walls.
Below Grade Structures	An underground storm water detention basin is anticipated to be located on the site. We expect the detention basin will be of concrete construction and located below a paved area of the site. The exact location of the storm water areas has not been determined.

NOTE: If any of the above information or assumptions are not accurate or correct, **please advise us immediately so we may amend/revise this report.**

2.2 Site Location and Description

Item	Description
Location	The site is located at 4400 Duraform Lane in Windsor, Wisconsin.
Current Site Improvements	The site is currently occupied by an existing Old Dominion Freight Terminal. The area of the proposed truck dock expansion is currently paved. The parking lot expansion to the north is currently occupied by an existing slope and elevated ground that extends approximately 10 feet higher than the existing terminal pavement grade.
Existing Topography	Based on a provided site grading plan, the existing ground surface within the existing truck terminal pavement area ranges from approximately 884 feet to 885 feet. However, the existing undeveloped area at the north end of the site extends up to approximately elevation 896 feet.

3.0 SUBSURFACE CONDITIONS

3.1 Typical Profile

Subsurface conditions at each boring location are described on the individual boring and test pit logs in Appendix A. The stratification boundaries shown on the boring logs represent the approximate depths where changes in material types occur. In-situ, transitions between material types can be more gradual.

Based on the results of the soil borings, subsurface conditions on the project site can be generalized as follows:

Description	Approximate Elevation of Bottom of Stratum	Material Encountered	Consistency/Density
Stratum 1 [1]	882 to 890 feet	FILL: lean clay (CL) to sandy lean clay	Stiff to very stiff Moisture Content: 16% to 26%
Stratum 2	872 to 876 feet	Silty sand (SM) to sand (SP), varying amounts of gravel	Medium dense
Stratum 3	Below 865 feet	Silty sand (SM) to sand (SP), varying amounts of gravel	Dense to very dense

1. It should be noted that the surface of most of the borings within the existing pavement area consisted of 3 to 4 inches of asphalt over 12 inches of aggregate base course. Borings B-7 and B-8 had a granular surface in lieu of asphalt. The borings within grassy areas (B-5, B-6, and B-9) consisted of 14 to 15 inches of topsoil.

3.2 Water Level Observations

The current Terracon borings were observed during and after the completion of drilling for the presence and level of water. In addition, a temporary groundwater monitoring well was installed in borings B-5 and B-8 in order to obtain long-term groundwater levels. The water levels observed in the boreholes and wells can be found on the boring logs in Appendix A, and are summarized below:

Boring No.	Groundwater Measurements During Drilling		Groundwater Measurements After Drilling	
	Depth bgs (ft) [1]	Elevation (ft)	Depth bgs (ft) [1]	Elevation (ft)
B-1	6.5	878.5	9.0	876.0
B-2	6.0	879.0	6.0	879.0
B-3	9.0	876.0	--	--
B-4	4.0	881.0	17.0	868.0
B-5	17.0	874.0	9.0 on 5/7/2018	882.0
B-6	20.0	876.0	--	--
B-7	4.5	880.5	--	--
B-8	4.5	880.5	4.0 on 5/7/2018	881.0 on 5/7/2018
B-9	9.0	877.0	--	--

1. bgs = below ground surface

Based upon these measurements, we recommend a design long-term groundwater elevation of approximately 882 feet. Groundwater level fluctuations can occur over a period of years or seasonally due to variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed.

In addition, perched or trapped water can develop in granular layers within low permeability soils. Therefore, groundwater levels during construction or at other times in the life of the structure may be different than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Earthwork

Earthwork for the project should be observed and evaluated by Terracon. Recommendations for site preparation, excavation, subgrade preparation and placement of engineered fill for the project are provided below.

4.1.1 Site Preparation

Any existing pavement, topsoil, organics, construction debris, loose, soft, or otherwise unsuitable materials should be removed from proposed construction areas. Stripping depths will likely vary across the site. Any organic soils removed during site preparation should not be used as fill beneath the proposed new building addition or pavement areas. Following removal of any surface materials and prior to placing new engineered fill, the exposed soils should be observed and tested by Terracon.

A Terracon representative should observe proofrolling of the exposed subgrade soils. Proofrolling of sandy subgrades can be completed with a large vibratory roller with a gross weight of at least 10 tons. Proofrolling of cohesive subgrades can be accomplished using a loaded tandem-axle dump truck with a gross weight of at least 25 tons, or similarly loaded equipment. Areas that display excessive deflection (pumping) or rutting during proofroll operations should be improved by scarification and compaction, or by removal and replacement with an approved gradation of crushed stone aggregate.

The borings indicate that some areas of high moisture content clay and silty sand soils were encountered within the upper few feet of the soil profile. These soils will be sensitive to disturbance from construction activities, particularly if further wetted by surface water. Therefore, it is anticipated that some areas of the site will become unstable during proofrolling and construction operations.

The amount of stabilization required will be highly dependent upon weather conditions during construction and drainage measures implemented during mass grading and construction. Maintaining positive surface drainage should help promote drying of the near surface soils.

4.1.2 Engineered Fill Material Requirements

Engineered fill should meet the following material property requirements:

Fill Type [1]	USCS Classification	Acceptable Location for Placement
Cohesive [2]	CL, CL-ML	Adjacent to foundations, and below/adjacent to slabs and pavements

Fill Type [1]	USCS Classification	Acceptable Location for Placement
Granular	GW, GP, GM, GC, SW, SP, SM, SC	Below/ adjacent to foundations, slabs, and pavements
Unsuitable	CH, MH, OL, OH, PT	Non-structural locations

1. Engineered fill should consist of approved materials that are free of organic matter and debris. Cohesive fill materials should have a liquid limit less than 45 and a plasticity index less than 25; cohesive soils that do not meet these criteria should be considered "unsuitable." Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to Terracon for evaluation prior to use on this site.
2. Based on visual and tactile examination of recovered soil samples and the results of the laboratory tests, most of the on-site soils would likely meet the criteria for engineered fill, though they will likely require moisture conditioning prior to their use as structural fill. Any materials with organic content greater than 5 percent, rock fragments larger than 3 inches, and other unsuitable materials should be removed prior to use of the existing clay materials in new fill sections.

4.1.3 Fill Placement and Compaction Requirements

Item	Description
Fill Lift Thickness	9 inches or less in loose thickness when heavy, self-propelled compaction equipment is used. 4 to 6 inches in loose thickness when hand-guided equipment (i.e., a jumping jack or plate compactor) is used.
Minimum Compaction Requirement [1, 2] **Below Foundations and Slabs-on-grade, Upper 12 inches of Areas to be Paved**	95% of the modified Proctor maximum dry density (ASTM D 1557). This level of compaction should extend beyond the edges of footings at least 8 inches for every foot of fill placed below the foundation base elevation.
Minimum Compaction Requirement [1, 2] **Below 12 Inches in Areas to be Paved, Landscaped Areas**	90% of the maximum modified Proctor dry density (ASTM D 1557)
Moisture Content of Cohesive Soil [3]	-2% to +3% of modified Proctor optimum (ASTM D 1557)
Moisture Content of Granular Material [4]	Workable moisture levels

Item	Description
1.	We recommend that each lift of fill be tested by Terracon for moisture content and compaction prior to the placement of additional fill or concrete. If the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.
2.	If the granular material is a coarse sand or gravel, is of a uniform size, or has a low fines content, compaction comparison to relative density (ASTM D 4253/4254) may be more appropriate. In this case, granular materials should be compacted to at least 60% relative density.
3.	Drying of the upper on-site clay soils should be anticipated to reach the moisture content range recommended for compaction.
4.	The gradation of a granular material affects its stability and the moisture content required for proper compaction. Moisture levels should be maintained to achieve compaction without bulking during placement or pumping when proofrolled.

4.1.4 Grading and Drainage

During construction, grades should be developed to direct surface water flow away from or around the site. Exposed subgrades should be sloped to provide positive drainage so that saturation of subgrades is avoided. Surface water should not be permitted to accumulate on the site.

Final surrounding grades should be sloped away from the structure to promote rapid surface drainage. Accumulation of water adjacent to the building could contribute to significant moisture increases in the subgrade soils and subsequent settlement. Roof drains should discharge into a storm sewer or at least 10 feet away from the building.

4.1.5 Earthwork Construction Considerations

Terracon should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation, proofrolling, placement and compaction of engineered fills, backfilling of excavations, and just prior to construction of foundations, slabs and pavements.

Site soils may be sensitive to disturbance from construction activities, particularly if further wetted by surface water or seepage. Therefore, it is anticipated that some areas of the site may become unstable during proofrolling and construction operations. The amount of stabilization required will be highly dependent upon weather conditions during construction and drainage measures implemented during mass grading and construction.

In general (weather permitting), scarifying, drying and recompacting the exposed subgrades is expected to be the most economical means of improving these soils prior to placing new fill. However, this option is typically less effective where soft/wet soils are thicker than about one or two feet, and this method is also dependent on weather conditions.

Alternatives for subgrade stabilization could include undercutting unsuitable (wet, low strength, and/or disturbed) soils followed by the addition of crushed stone aggregate (typically on the order of 12 to 18 inches) to improve subgrade stability, perhaps in conjunction with the use of a geotextile fabric, or the incorporation of a chemical additive such as lime, Class C fly ash or Portland cement.

A geosynthetic (i.e., a geogrid or high-modulus geotextile) overlain with crushed stone could be used in some areas to reduce undercut depths and to develop stable subgrades for fill placement or new construction. The geotextile should consist of a non-woven needle punched fabric with an Apparent Opening Size (AOS) in the range of 70 to 100. The purpose of the geotextile is to maintain separation between the fine grained subgrade and the crushed stone. The need for stabilization and most appropriate type of stabilization will be dependent upon soil, groundwater and weather conditions, as well as the proposed grading plan, the construction schedule and methods of construction that will be used. Terracon should be retained during construction to help provide recommendations as needed.

Based on our field observations, we anticipate groundwater is located approximately 4 to 5 feet below proposed site grade. The majority of the native soils encountered below the surficial fill materials consist of silty sands and sands. These soils typically have relatively high hydraulic conductivities, such that large volumes of water could be encountered in excavations that extend more than 1 or 2 feet below the groundwater table.

The contractor is responsible for employing appropriate dewatering methods to control seepage and facilitate construction. In our experience, dewatering of excavations in sandy soils at or above the water table can typically be accomplished using sump pits and pumps. This is likely the case for shallow excavations for construction of new footings for the proposed addition and any retaining wall structures. Excavations extending to greater depths may require more extensive dewatering techniques, such as large diameter pumping wells or a system of well points.

The proposed underground storm water detention basin is likely to extend up to 10 feet below proposed site grade (approx. Elev. 875 feet), which is 5 to 6 feet below anticipated groundwater elevation. Depending on the fines content of the soils and the groundwater elevation at the time of excavation, large volumes of water infiltration may occur.

Based on our experience, an engineered dewatering system consisting of perimeter well points or corner sump pits will likely be required to maintain a dry and stable base of excavation. Due to the silty nature of the on-site native soils, the pumps will need to be adequately filtered to prevent the migration of fines. Groundwater levels within the excavation should be maintained at least two-feet below the base of excavation.

Care should be taken to avoid disturbance of prepared subgrades. Unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/ or subjected to repetitive construction traffic.

New fill compacted above optimum moisture content or that accumulates water during construction can also become disturbed under construction equipment. Construction traffic over the completed subgrade should be avoided to the extent practical.

If the subgrade becomes saturated, desiccated, or disturbed, the affected materials should either be scarified and compacted or be removed and replaced. Subgrades should be observed and tested by Terracon prior to construction of slabs and pavements.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, state, and federal safety regulations. The contractor should be aware that slope height, slope inclination, and excavation depth should in no instance exceed those specified by these safety regulations.

The soils at the site are considered Type "C" soils under OSHA regulations. OSHA recommends a slope inclination no steeper than 1.5H:1V for Type "C" soils. Flatter slopes than those dictated by these regulations may be required depending upon the soil conditions encountered and other external factors. These regulations are strictly enforced and if they are not followed, the owner, contractor, and/or earthwork and utility subcontractor could be liable and subject to substantial penalties.

Under no circumstances should the information provided in this report be interpreted to mean that Terracon is responsible for construction site safety or the contractor's activities. Construction site safety is the sole responsibility of the contractor who shall also be solely responsible for the means, methods, and sequencing of the construction operations.

4.2 Foundations

Based on the proposed grading plans provided to Terracon, it is our opinion that the proposed building and retaining walls can be supported by conventional spread footing foundations. These foundations should extend through any overlying fill to bear on the native medium-dense to dense granular soils, or newly placed engineered fill or lean concrete that extends to suitable native soil.

Where any unsuitable conditions (such as existing fill or soft or loose native soils) are encountered at design footing bearing depth, the remedial methods recommended in Section 4.1 should be implemented.

Design recommendations for shallow foundations to support the proposed building and retaining wall structures are presented below:

4.2.1 Foundation Design Recommendations

Description	Value
Net allowable bearing pressure [1]	3,500 psf
Minimum footing dimensions	Isolated footings: 30 inches Continuous footings: 18 inches
Minimum embedment below finished grade for frost protection [2]	4 feet for perimeter footings in heated areas 5 feet for footings in unheated areas
Ultimate Coefficient of Friction for Sliding Resistance [3]	0.32 (cohesive) 0.40 (granular)
Approximate total settlement [4]	Less than 1 inch
Estimated differential settlement [4]	1/2 to 2/3 of the total settlement

1. The recommended net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. This pressure assumes that any existing fill or lower strength soils, if encountered, will be undercut and replaced with engineered fill.
2. Footings beneath unheated areas and footings that will be exposed to freezing conditions during construction should be located at least 5 feet below grade.
3. A factor of safety has not been applied to the provided value. We recommend a minimum factor of safety of 1.5 be used in determining sliding stability.
4. Foundation settlement will depend upon the variations within the subsurface soil profile, the structural loading conditions, the embedment depth of the footings, the thickness of engineered fill, and the quality of the earthwork operations and footing construction.

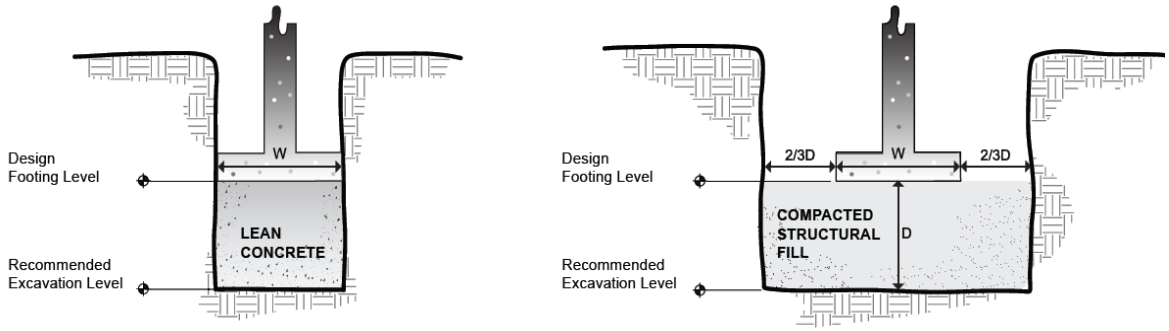
4.2.2 Foundation Construction Considerations

The base of each foundation excavation should be free of water and loose soil prior to placing concrete. Concrete should be placed as soon after excavating as possible to reduce bearing soil disturbance. If the soils at bearing level become excessively dry, disturbed, saturated, or frozen, the affected soil should be removed prior to placing concrete. Placement of a granular working may or lean concrete mud-mat over the bearing soils should be considered if the excavations must remain open overnight or for an extended period of time.

Footings should bear directly on tested and approved native soils, on lean concrete that extends to approved native soils, or on new engineered fill that extends to approved native soils. If lower strength native soils or otherwise unsuitable bearing soils are encountered in footing excavations, the excavation could be extended deeper to suitable soils and the footing could bear directly on these soils at the lower level, or on lean concrete backfill placed in the excavations.

If unsuitable native soils are present within the zone of influence determined by Terracon, the footing excavations should be deepened to suitable native bearing materials. If lean concrete backfill (minimum 28-day compressive strength of 1,500 psi) is used, widening of excavation may not be needed.

If engineered fill will be placed to support the footings, the excavations should be widened at least 8 inches beyond each footing edge for every foot of new fill placed below the design footing base elevation. The overexcavated depth should then be backfilled up to the foundation base elevation with an approved granular fill material that is placed in lifts and compacted to at least 95% of the modified Proctor maximum dry density. Backfill materials could consist of the materials recommended in Section 4.1.2. The recommended extents of the overexcavation and backfill procedure are illustrated in the following figure.



Lean Concrete Backfill **Overexcavation / Backfill**

NOTE: Excavations in sketches shown vertical for convenience. Excavations should be sloped as necessary for safety.

4.3 Floor Slab

4.3.1 Design Recommendations

Item	Description
Floor Slab Support	Existing tested and approved fill that appears firm under proofrolling, suitable native soils, or new engineered fill materials that have been prepared in accordance with Section 4.1 and tested/approved by Terracon
Granular Leveling Course [2]	At least 6 inches of well-graded crushed stone with less than 3 percent fines
Modulus of Subgrade Reaction (k) [3]	125 pci for a soil subgrade prepared as recommended in this report

1. Floor slabs should be structurally independent of building footings and walls supported on the footings to reduce the potential for floor slab cracking caused by differential movements between the slab and foundation.
2. The floor slab should be placed on a leveling course comprised of well-graded granular material (e.g., WisDOT Open Graded Base or an approved alternate gradation).
3. The recommended modulus value is based on a 12-inch square plate. The modulus value used in design should be adjusted based on the actual size of the floor slab according to the Naval Facilities Engineering Design Manual 7.2, page 7.2-155, Table 4.

Joints should be constructed at regular intervals as recommended by the American Concrete Institute (ACI) to help control the location of cracking. It should be understood that differential settlement between the floor slab and foundations could occur.

The use of a vapor retarder should be considered beneath concrete slabs on grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

4.3.2 Floor Slab Construction Considerations

On most project sites, the site grading is generally accomplished early in the construction phase. However as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, rainfall, etc. As a result, the floor slab subgrade may not be suitable for placement of the aggregate leveling course and concrete and corrective action will be required.

Terracon should review the condition of the floor slab subgrades immediately prior to placement of the granular leveling course and construction of the slabs. Particular attention should be paid to high traffic areas that were rutted and disturbed earlier and to areas containing backfilled trenches. Areas where unsuitable conditions are located should be repaired by removing and replacing the affected material with properly compacted fill.

4.4 Loading Dock and Low Retaining Walls

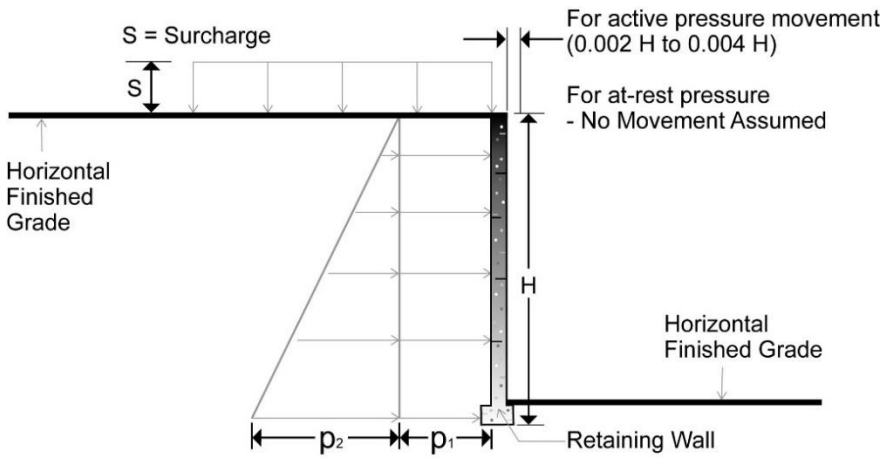
Retaining walls for this project are expected to be limited to the truck dock walls and a perimeter retaining wall at the northeast corner of the site. **We recommend the walls be designed for the drained condition** with a perimeter drain connected to a storm sewer outlet.

4.4.1 Lateral Earth Pressures

Walls with unbalanced backfill levels on opposite sides should be designed for lateral earth pressures at least equal to those indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained.

Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The "at-rest" condition assumes no wall movement and is used for design of rigid walls or below grade structures. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls.

Since the truck dock walls with likely be restrained at the top, we recommend using the “at-rest” condition for design. The perimeter low retaining wall can be designed for the “active” condition.



Earth Pressure Coefficients

Earth Pressure Conditions	Coefficient for Backfill Type	Equivalent Fluid Density (pcf)	Surcharge Pressure, p_1 (psf)	Earth Pressure, p_2 (psf)
Active (K_a)	Granular - 0.33	40	(0.33)S	40 H
At-Rest (K_o)	Granular - 0.50	60	(0.50)S	60 H
Passive (K_p)	Granular - 3.0	360	---	----

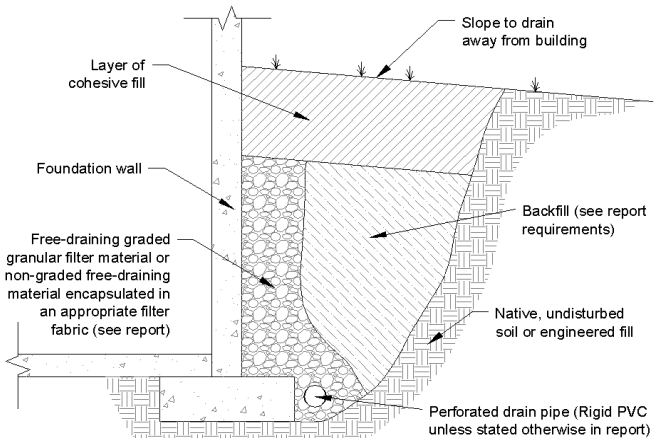
Applicable conditions to the above include:

- For active earth pressure, wall must rotate about base, with top lateral movements of about 0.002 H to 0.004 H, where H is wall height
- For passive earth pressure to develop, wall must move horizontally to mobilize resistance. We recommend using a minimum factor of safety of 2 for passive earth pressure calculations to account for the large strains required to develop the full passive resistance.
- Uniform surcharge, where S is surcharge pressure
- In-situ soil backfill weight is a maximum of 120 pcf
- Horizontal backfill, compacted to at least 92 percent of the modified Proctor maximum dry density
- Loading from heavy compaction equipment not included
- No hydrostatic pressures acting on wall (i.e., permanent drainage will be installed and maintained)
- No dynamic loading
- No safety factor included in soil parameters
- Ignore passive pressure in frost zone

General backfill placed behind the retaining walls should consist of granular soils with less than 15% fines. Material used as a drainage medium should conform to the requirements listed in Section 4.4.2. For the granular values to be valid, the granular backfill must extend out from the base of the wall at an angle of at least 45 degrees for the active cases. Cohesive soils should not be placed behind the constructed wall.

4.4.2 Subsurface Drainage

A perforated rigid plastic drain line installed behind the base of the retaining walls and extends below adjacent grade is recommended to prevent hydrostatic loading on the walls. The invert of a drain line behind a wall should be placed near the foundation bearing level. The drain line should be sloped to provide positive gravity drainage to daylight or to a sump pit and pump. The drain line should be surrounded by clean, free-draining granular material having less than 3 percent passing the No. 200 sieve. The free-draining aggregate should be encapsulated in a filter fabric. The granular fill should extend to within 2 feet of final grade, where it should be capped with compacted cohesive fill to reduce infiltration of surface water into the drain system. For interior locations (dock walls), the granular fill should extend up to the floor slab granular leveling course.



4.5 Pavements

4.5.1 Pavement Design Recommendations

Pavement thickness design is dependent upon:

- the anticipated traffic conditions,
- subgrade and paving material characteristics, and
- climate conditions at the project site.

The following traffic volumes were assumed:

- Car Parking/Drives: 500 cars per day (i.e., Light Duty)
- Truck Parking/Drives: 100 semi tractor-trailers per day (i.e., Heavy Duty)

These traffic conditions were converted to 18-kip equivalent single axle loads (ESALs), as shown on the table below. A design period of 20 years was used in our evaluation. If there are any changes in the assumed traffic volumes or vehicle types, Terracon should be notified so we can review the design and provide supplemental recommendations, if needed.

DESIGN ESAL VALUES		
Traffic Area	**Pavement Type**	
	Asphalt	**Concrete**
Light Duty	15,000	15,000
Heavy Duty	2 Million	3 Million

A California Bearing Ration (CBR) value of 4 and a modulus of subgrade reaction (k) of 125 pounds per cubic inch (pci) were used in our analyses. Pavement thicknesses were calculated using the AASHTO Guide for Design of Pavement Structures (1993) methodology. Pavement design input parameters include:

- reliability: 85%
- initial serviceability: 4.2
- terminal serviceability: 2.0
- standard deviation: 0.45
- drainage coefficient: 1.0

The following layer coefficients were assigned to the pavement materials:

- asphalt (surface and binder): 0.44
- crushed stone aggregate base: 0.13

Estimated sections for asphaltic cement concrete (ACC) over an aggregate base and Portland cement concrete (PCC) pavements are provided in the following tables. The estimated pavement sections are based on a 20-year design life using the assumed traffic volumes provided above.

Pavement Area	Type [1]	Pavement Thickness (in)	Base Course Thickness [2] (in)
Light Duty (Car Parking)	Portland Cement Concrete (PCC) Pavement	5.0	4.0
	Asphaltic Concrete (AC) Pavement [3]	4.0	6.0
Heavy Duty (Truck Parking)	PCC Pavement	8.0	4.0
	AC Pavement [3,4]	6.0	8.0

1. Portland cement concrete pavements are recommended for areas subject to repeated truck traffic.
2. The base course aggregate beneath the new pavement should conform to the ¾-inch or 1-1/4-inch Dense Graded Base listed in Section 305 of the WisDOT Standard Specifications (current edition).
3. The minimum AC binder lift thickness be 3 times the nominal maximum aggregate size.
4. If asphalt pavements are used in truck traffic areas, the owner must accept the potential for some rutting/shoving of the pavement surface. Frequent mill-and-overlay rehabilitation or other pavement repairs may be required if asphalt pavements are used in areas subject to turning trucks and/or heavy static loads (e.g., parked trucks/trailers).

Based on the assumed loading conditions, project location, and anticipated pavement thickness, the AC pavement discussed in the tables above should conform to the following WisDOT HMA mixture types for the surface and binder courses:

Loading Condition	Asphalt Layer	WisDOT HMA Mixture
Standard Duty	Surface Course	4 LT 58-28 S
	Binder Course	4 LT 58-28 S
Heavy Duty	Surface Course	4 LT 58-28 S
	Binder Course	3 LT 58-28 S

Pavements and subgrades will be subject to freeze-thaw cycles and seasonal fluctuations in moisture content. The pavement sections provided in the table above were developed based on local soil and climate conditions. If the pavements will be subject to construction equipment/vehicles, hostlers/yard trucks, or other heavy vehicles besides legally loaded, 5-axle, 18-wheel semi tractor-trailers, the pavement sections should be revised to consider the additional loading.

Asphalt, concrete and aggregate base course materials for pavements should conform to the applicable WisDOT Standard Specifications. Asphalt mixes should provide sufficient strength/stability for use in heavy truck areas. Concrete pavement should be air-entrained and have a minimum compressive strength of 4,000 psi after 28 days of laboratory curing (ASTM C 31).

PCC pavements should be designed with longitudinal and transverse joints spaced no more than 15 feet apart. Control joints should be saw-cut at least ¼ of the depth of the concrete section, and should be cut within the appropriate timeframe (usually within 12 to 24 hours, depending on

the concrete mix properties and conditions at the time of placement). Expansion (isolation) joints must be full depth and should only be used to isolate fixed objects abutting or within the paved area.

Longitudinal construction joints in PCC pavement drive lanes should be tied with No. 5 deformed reinforcing bars, 30 inches long, spaced on 30-inch centers. Tie bars should be placed at mid-slab depth. Transverse construction and contraction joints in drive lanes, and all joints within distributed (non-channelized) traffic areas, should be constructed with dowel load transfer devices.

We recommend using 18-inch long, 1¼-inch diameter smooth dowels, spaced at 12-inch centers to provide load transfer across these joints in the heavy duty and extra heavy duty PCC areas. Dowels should be placed at mid-slab depth, with a tolerance of 2 percent on horizontal and vertical level.

The length to width ratio of any individual PCC slab should not exceed 1.25 without provision for additional steel reinforcement. Odd shaped slabs (triangles, fillets, etc.) and slabs with a length to width ratio greater than 1.25 should be constructed with deformed steel reinforcing. For these conditions, we recommend using at least 0.05 percent steel reinforcement in both directions to accommodate the increased stresses and help keep cracks tightly closed. The reinforcing steel should be placed one-third of the slab thickness below the top of the slab and should not extend through planned construction or contraction joints.

All joints should be sealed and maintained. The pavement designer should select the joint sealant material based on expected joint movement, in accordance with ACI 504 ("Guide to Sealing Joints in Concrete Structures"). All joint sealant reservoirs should be designed to accommodate the specified joint sealant compound's thermal and shrinkage tolerances.

The pavement sections provided above assume that the subgrade soils will not experience significant increases in moisture content. Paved areas should be sloped to provide rapid drainage of surface water and to drain water away from the pavement edges. Water should not be allowed to accumulate on or adjacent to the pavement, since this could saturate and soften the subgrade soils and subsequently accelerate pavement deterioration.

Storm water catch basins and manhole structures should include "finger drains" or weep holes to facilitate drainage of water around these structures. Periodic maintenance of the pavements will be required. Cracks should be sealed, and areas exhibiting distress should be repaired promptly to help prevent further deterioration.

Even with periodic maintenance, some movement and related cracking may still occur and repairs may be required.

4.5.2 Pavement Subdrains

The recommended pavement sections provided above include an aggregate base course. In our opinion, installation of a subdrain system would reduce the potential for water to collect in the aggregate base course and soften the underlying soil subgrade. Typical locations for subdrain installation would include along the edges of drives, the perimeters of pavement areas, radiating from catch basins, and at regular intervals (maximum spacing of approximately 100 feet center-to-center) below the pavement areas.

Each pavement subdrain should consist of a 4-inch diameter, perforated pipe placed in a minimum 12-inch wide trench. The lines should extend at least 2 feet below the subgrade surface and should be sloped to provide positive gravity drainage to a reliable discharge point. The drain trenches should be backfilled to subgrade level with free draining granular material.

The free-draining granular material should be graded to help reduce the intrusion of fines; however, open-graded free draining granular backfill (e.g., granular material with less than 3 percent fines passing the #200 sieve) could be used, provided the drain trenches are lined with an approved geotextile filter fabric to help prevent the intrusion of fines from the surrounding soils.

The granular material in the drain trenches should be hydraulically connected with the aggregate base course below the pavements.

4.5.3 Pavement Construction Considerations

Pavement subgrades should be prepared in accordance with the recommendations presented in Section 4.2 of this report. Grading and paving is commonly performed by separate contractors and there is often a time lapse between the end of grading operations and the commencement of paving.

Subgrades prepared early in the construction process may become disturbed by construction traffic. Non-uniform subgrades often result in poor pavement performance and local failures relatively soon after pavements are constructed. Depending on the paving equipment used by the contractor, measures may be required to improve subgrade strength to greater depths for support of heavily loaded concrete/asphalt trucks.

Before paving and prior to placement of the aggregate base, pavement subgrades should be proofrolled in the presence of a Terracon representative. Proofrolling of the subgrade should help locate soft, yielding, or otherwise unsuitable soil at or just below the exposed subgrade level.

Unsuitable areas observed at this time should be improved by scarification and compaction or be removed and replaced with engineered fill.

4.6 Seismic Site Class

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with ASCE 7-10.

Description	Value
2015 International Building Code (IBC) Site Classification [1]	D [2]
Site Latitude	43.2009 ° N
Site Longitude	89.3371° W
S_{DS} Spectral Acceleration for a Short Period [3]	0.086g
S_{D1} Spectral Acceleration for a 1-Second Period [3]	0.071g

1. Seismic site classification in general accordance with the *2015 International Building Code*, which refers to ASCE 7-10.
2. The 2015 International Building Code (IBC) uses a site profile extending to a depth of 100 feet for seismic site classification. Borings at this site were extended to a maximum depth of 30 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.
3. These values were obtained using online seismic design maps and tools provided by the USGS (http://earthquake.usgs.gov/hazards/designmaps/).

4.7 Storm Water Management

Site soils at this location primarily consist of silty sands and sand with a seasonal high groundwater elevation of approximately 882 feet. Based on our review of the soil samples collected and estimation of the seasonal high groundwater elevation, it is our professional opinion that this site is exempt from infiltration due to the relatively high groundwater at the site.

Due to site constraints and a high seasonal water table, a below-grade storm water detention basin is planned to be constructed below the proposed pavement section. It is likely that the underground detention basin will extend approximately 8 to 10 feet below site grade to provide adequate capacity.

The excavation for the detention basin, assuming approximately 8 feet of overburden removal, will result in an effective stress relief of about 900 psf due to the removal of soil. Considering the 900 psf stress relief due to the excavation, the actual net pressure increase on the underlying subgrade soils will be fully compensated and any settlement should be negligible.

Settlement of the below grade detention basin should be limited to elastic recompression of the underlying soils, which should occur during construction.

The underground detention basin is expected to extend up to 5 feet below the long-term groundwater elevation and be water-tight. At this depth, the basin is anticipated to be within saturated silty sands and sands. Thus, we recommend that the walls and base slab be designed to resist a hydrostatic imbalance on the outside of the basin. The basin walls can be designed for an equivalent fluid pressure of 55 psf per foot of depth above Elev. 882 feet. Below the estimated long-term groundwater elevation, an equivalent fluid pressure of 88 psf per foot of depth below Elev. 882 feet.

If the basin is anticipated to be empty periodically, the basin structure should be designed to resist a hydrostatic uplift of up to 5 or 6 feet acting below the base slab. If the self-weight of the structure and overburden soil are not adequate to resist the hydrostatic uplift pressures, a system of hold-downs, such as helical tension piles, may be needed to provide the necessary uplift capacity. Alternatively, the base slab could be extended out laterally and sufficiently reinforced to provide additional overburden resistance area.

We recommend that the base slab and basin walls be waterproofed to reduce the migration of water through the walls due to an unbalanced hydrostatic head. Waterstops should be installed in all construction and expansion joints. Sufficient measures should be undertaken to ensure that the detention basin remain water tight.

We would be pleased to discuss waterproofing options for the walls and base slab and recommend that Terracon reviews the architectural and structural drawing for the below grade spaces for the project to check that the design is consistent with our recommendations.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

A reminder on risk:

Support of floor slabs and pavements on/above existing fill is discussed in this report. **Even with the construction observation/testing recommended in this report, a risk remains for the owner that unsuitable materials within or buried by the fill will not be discovered.**

This may result in larger than normal settlement and damage to floor slabs and pavements supported above existing fill, requiring additional maintenance. This risk cannot be eliminated without removing the existing fill from below the floor slab and pavement areas, but can be reduced by thorough observation and testing as discussed herein.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather.

The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

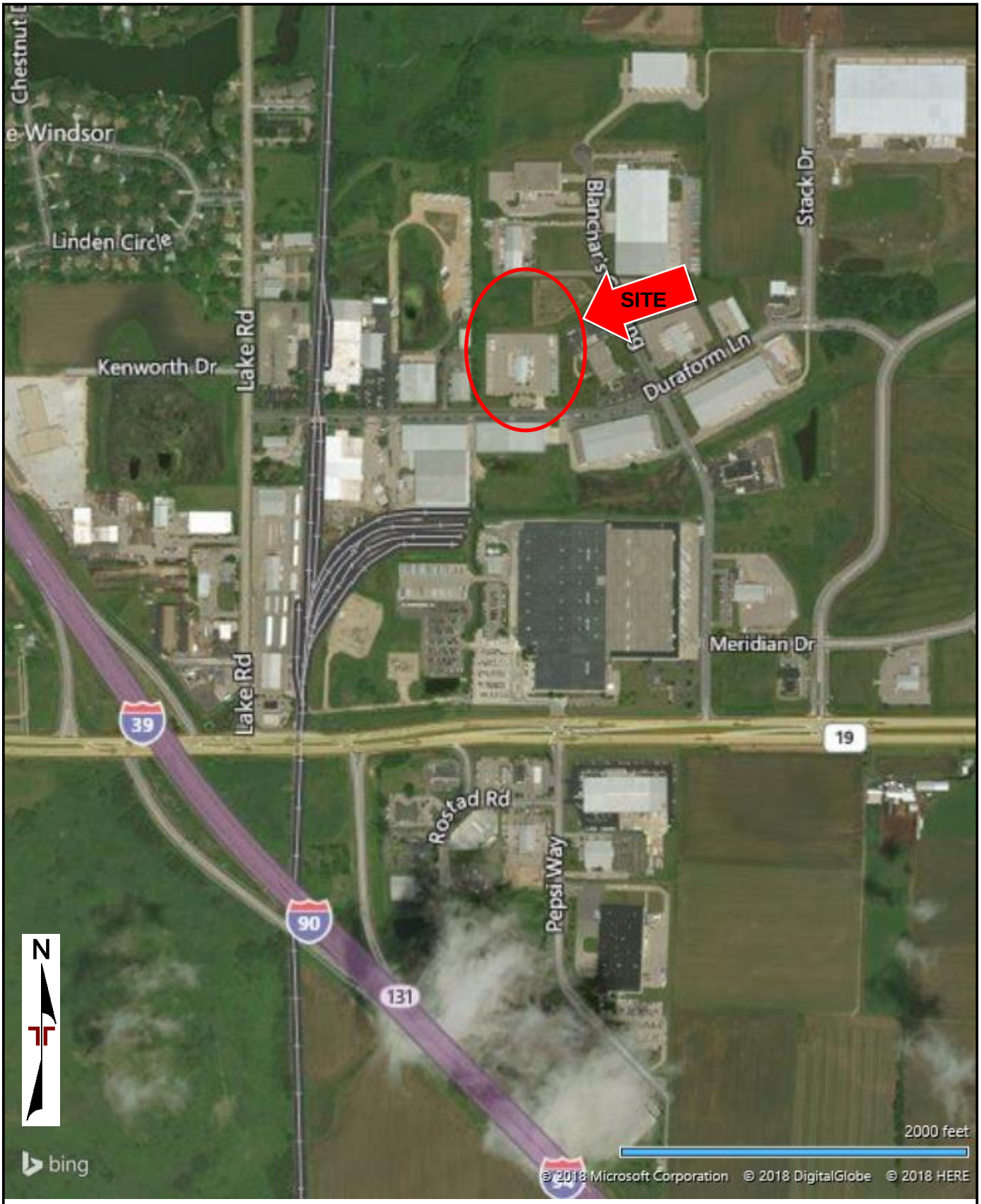
The scope of geotechnical services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others.

In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A

FIELD EXPLORATION



AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

Project Manager: NJL	Project No. 58185000	Terracon 9656 South 57th Street Franklin, Wisconsin 53132	SITE LOCATION DIAGRAM	Exhibit
Drawn by: NJL	Scale: AS SHOWN		ODFL Terminal Expansion **4400 Duraform Lane** **Windsor, Wisconsin**	A-1
Checked by: PAT	File Name: BLD			
Approved by: PAT	Date: 5/18/2018			

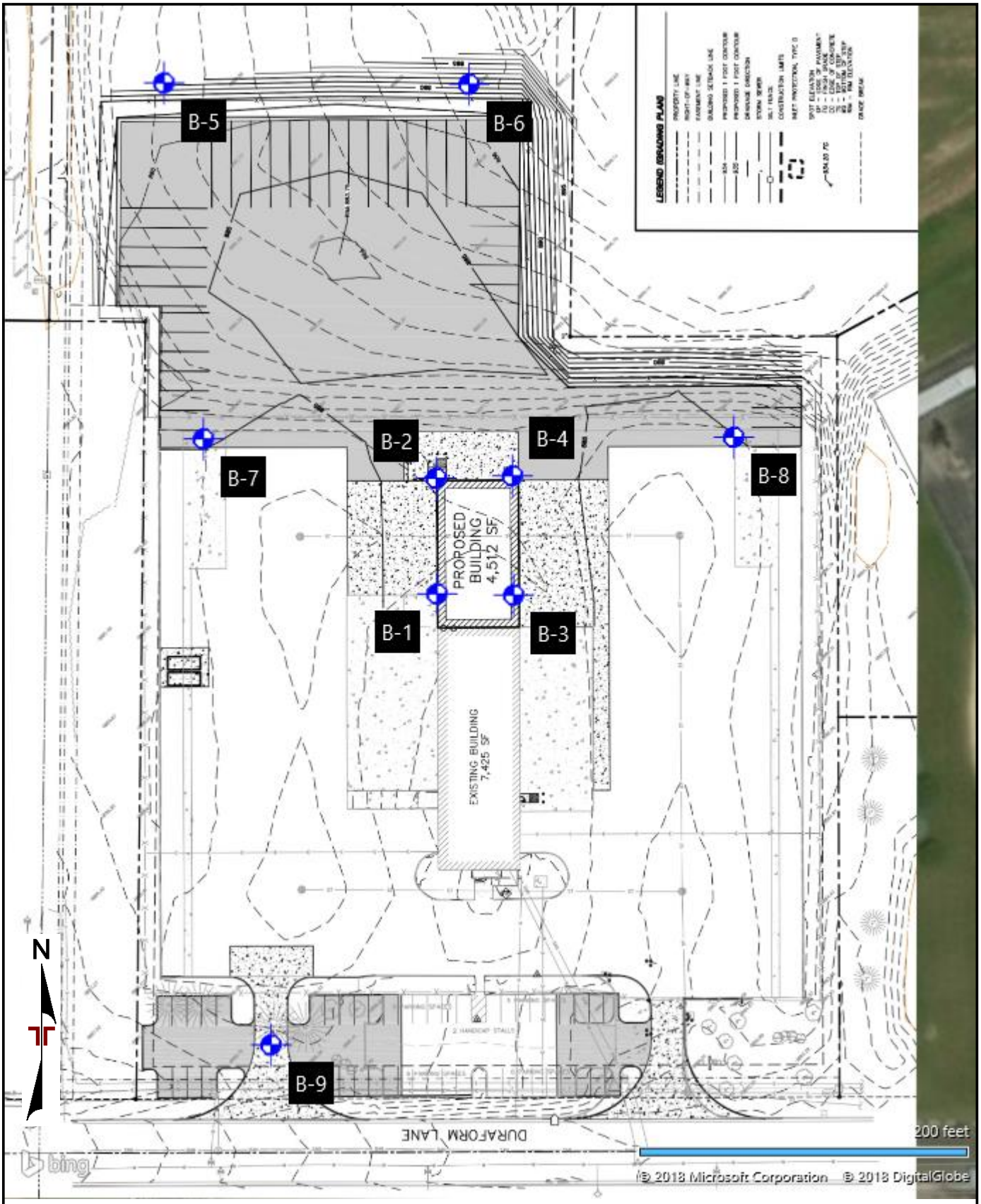


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

Project Manager: NJL	Project No. 58185000	Terracon 9656 South 57th Street Franklin, Wisconsin 53132	BORING LOCATION DIAGRAM
Drawn by: NJL	Scale: AS SHOWN		ODFL Terminal Expansion 4400 Duraform Lane Windsor, Wisconsin
Checked by: PAT	File Name: BLD		
Approved by: PAT	Date: 5/18/2018		

Exhibit

A-2

Field Exploration Description

The borings were drilled at the approximate locations indicated on the attached Boring Location Diagram (Exhibit A-2). A Terracon representative laid out the borings in the field using a handheld GPS device accurate to within 25 feet (+/-). Ground surface elevations indicated on the boring logs were estimated from a site topographic plan provided by the Client. The locations and elevations of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

The borings were drilled with a truck-mounted, rotary drill rig using hollow-stem augers to advance the boreholes. Soil samples were obtained using the split-barrel sampling procedures. In the split-barrel procedure a standard 2-inch (outside diameter) split-barrel sampling spoon is driven into the ground with a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value.

These values, also referred to as SPT N-values, are an indication of soil strength/density and are provided on the boring logs at the depths of occurrence. The samples were sealed and transported to the laboratory for testing and classification. Upon completion of drilling, the boreholes were backfilled with bentonite chips. Borings in pavement areas were patched with asphalt.

The drill crew prepared a field log of each boring. These logs included visual classifications of the materials encountered during drilling and the driller's interpretation of the subsurface conditions between samples. The boring logs included with this report represent the engineer's interpretation of the field logs and include modifications based on laboratory observation and tests of the samples.

BORING LOG NO. B-1

PROJECT: ODFL Terminal Expansion

CLIENT: Old Dominion Freight Line, Inc.
Thomasville, NC

SITE: 4300 Duroform Lane
Windsor, Wisconsin

LOCATION See Exhibit A-2

Latitude: 43.2007° Longitude: -89.3372°

Approximate Surface Elev: 885 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
0.4	884.5+/-	**ASPHALT**, 4 inches
1.4	883.5+/-	**AGGREGATE BASE COURSE**, 12 inches
3.0	882+/-	**POSSIBLE FILL - LEAN CLAY WITH SAND (CL)**, trace gravel, brown, stiff
		SILTY SAND (SM), trace gravel, light brown, medium dense
13.0	872+/-	**SILTY SAND WITH GRAVEL (SM)**, light brown, dense
20.0	865+/-	***Boring Terminated at 20 Feet***

DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY HP (tsf)	WATER CONTENT (%)
	16	4-4-6 N=10	1	1.75 (HP)	26
	18	4-6-12 N=18	2		10
5	18	4-8-13 N=21	3		8
	18	12-14-8 N=22	4		12
10	18	8-9-14 N=23	5		11
	18	11-17-25 N=42	6		12
15	18	10-14-18 N=32	7		8
	12	27-50/5"	8		9
20					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite chips upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

6.5' while drilling

9' upon completion

Terracon
9856 S 57th St
Franklin, WI

Boring Started: 04-27-2018 | Boring Completed: 04-27-2018

Drill Rig: CME-55 Truck | Driller: PTS/Mike

Project No.: 58185000 | Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 58185000 ODFL TERMINAL EXP.GPJ TERRACON_DATATEMPLATE.GDT 5/21/18

BORING LOG NO. B-2

PROJECT: ODFL Terminal Expansion

CLIENT: Old Dominion Freight Line, Inc.
Thomasville, NC

SITE: 4300 Duroform Lane
Windsor, Wisconsin

LOCATION See Exhibit A-2

Latitude: 43.2009° Longitude: -89.3372°

Approximate Surface Elev: 885 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
0.4	884.5+/-	**ASPHALT**, 4 inches
1.4	883.5+/-	**AGGREGATE BASE COURSE**, 12 inches
2.5	882.5+/-	**POSSIBLE FILL - LEAN CLAY WITH SAND (CL)**, trace gravel, brown, stiff
5.0	880+/-	**SANDY LEAN CLAY/CLAYEY SAND (CL/SC)**, brown, medium dense
8.5	876.5+/-	**SILTY SAND (SM)**, trace clay and gravel, light brown, medium dense
20.0	865+/-	**SILTY SAND WITH GRAVEL (SM)**, light brown, dense
		Boring Terminated at 20 Feet

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY HP (tsf)	WATER CONTENT (%)
		X	16	2-4-6 N=10	1	1.50 (HP)	20
		X	5	5-8-7 N=15	2		15
5	▽	X	18	4-8-9 N=17	3		11
		X	4	14-20-24 N=44	4		4
10		X	18	9-12-16 N=28	5		8
		X	11	20-50/5"	6		7
15		X	18	12-18-22 N=40	7		9
		X	18	13-23-20 N=43	8		9
20							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite chips upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *6' while drilling*

▽ *6' upon completion*

Terracon
9856 S 57th St
Franklin, WI

Boring Started: 04-27-2018	Boring Completed: 04-27-2018
Drill Rig: CME-55 Truck	Driller: PTS/Mike
Project No.: 58185000	Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 58185000 ODFL TERMINAL EXP.GPJ TERRACON_DATATEMPLATE.GDT 5/21/18

BORING LOG NO. B-3

PROJECT: ODFL Terminal Expansion

CLIENT: Old Dominion Freight Line, Inc.
Thomasville, NC

SITE: 4300 Duroform Lane
Windsor, Wisconsin

LOCATION See Exhibit A-2

Latitude: 43.2007° Longitude: -89.337°

Approximate Surface Elev: 885 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
0.3	884.5+/-	**ASPHALT**, 3 inches
1.2	884+/-	**AGGREGATE BASE COURSE**, 12 inches
3.0	882+/-	**POSSIBLE FILL - LEAN CLAY WITH SAND (CL)**, trace gravel, brown, stiff
5.0	880+/-	**SANDY LEAN CLAY/CLAYEY SAND (CL/SC)**, brown, medium dense
8.0	877+/-	**SILTY SAND (SM)**, trace gravel, light brown, medium dense
10.5	874.5+/-	**SAND (SP)**, trace silt and gravel, brown, medium dense
15.5	869.5+/-	**SILTY SAND (SM)**, trace gravel, brown, medium dense to dense
18.0	867+/-	**SAND (SP)**, trace gravel, brown, dense
20.0	865+/-	**SILTY SAND (SM)**, trace gravel, brown, dense
		Boring Terminated at 20 Feet

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY HP (tsf)	WATER CONTENT (%)
		X		3-5-6 N=11	1	1.50 (HP)	26
5		X		3-5-7 N=12	2		26
		X		3-5-6 N=11	3		11
10	▽	X		4-6-10 N=16	4		18
		X		4-5-7 N=12	5		10
15		X		9-13-17 N=30	6		8
		X		12-50/3"	7		18
20		X		6-15-21 N=36	8		10

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite chips upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *9' while drilling*

Terracon
9856 S 57th St
Franklin, WI

Boring Started: 04-27-2018	Boring Completed: 04-27-2018
Drill Rig: CME-55 Truck	Driller: PTS/Mike
Project No.: 58185000	Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 58185000 ODFL TERMINAL EXP.GPJ TERRACON_DATATEMPLATE.GDT 5/21/18

BORING LOG NO. B-4

PROJECT: ODFL Terminal Expansion

CLIENT: Old Dominion Freight Line, Inc.
Thomasville, NC

SITE: 4300 Duroform Lane
Windsor, Wisconsin

LOCATION See Exhibit A-2

Latitude: 43.2009° Longitude: -89.3371°

Approximate Surface Elev: 885 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
0.4	884.5+/-	**ASPHALT**, 4 inches
1.4	883.5+/-	**AGGREGATE BASE COURSE**, 12 inches
		SILTY SAND (SM), trace gravel, light brown, medium dense to dense
15.0	870+/-	**SILTY SAND WITH GRAVEL (SM)**, light brown, dense
20.0	865+/-	***Boring Terminated at 20 Feet***

SAMPLE NUMBER	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1	16	6-8-12 N=20	11
2	18	5-6-6 N=12	11
3	18	6-9-11 N=20	12
4	18	11-12-14 N=26	10
5	18	12-14-16 N=30	14
6	5	50/5"	11
7	8	17-50/3"	9
8	18	17-23-25 N=48	8

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite chips upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

4' while drilling

17' upon completion

Terracon
9856 S 57th St
Franklin, WI

Boring Started: 04-27-2018 | Boring Completed: 04-27-2018

Drill Rig: CME-55 Truck | Driller: PTS/Mike

Project No.: 58185000 | Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 58185000 ODFL TERMINAL EXP.GPJ TERRACON_DATATEMPLATE.GDT 5/21/18

BORING LOG NO. B-5

PROJECT: ODFL Terminal Expansion

CLIENT: Old Dominion Freight Line, Inc.
Thomasville, NC

SITE: 4300 Duroform Lane
Windsor, Wisconsin

LOCATION: See Exhibit A-2

Latitude: 43.2016° Longitude: -89.3378°

Approximate Surface Elev: 891 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
1.1	890+/-	**TOPSOIL / ROOT ZONE**, 14 inches
8.0	883+/-	**FILL - LEAN CLAY WITH SAND (CL)**, trace gravel, brown to dark brown, very stiff
11.0	880+/-	**SILTY SAND (SM)**, trace gravel, light brown, medium dense
13.0	878+/-	**SAND (SP)**, trace gravel, fine grained, brown, medium dense
28.0	863+/-	**SILTY SAND (SM)**, trace gravel, light brown, medium dense to dense
30.0	861+/-	**GRAVEL WITH SAND (GP)**, light brown, dense
		Boring Terminated at 30 Feet

INSTALLATION DETAILS: Solid riser pipe sealed in bentonite; Sand pack around solid 2" PVC riser pipe; Sand pack around slotted 2" PVC well screen

DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	SAMPLE NUMBER	WATER CONTENT (%)
	10	2-2-3 N=5	2.00 (HP)	1	20
5	10	4-5-8 N=13	2.50 (HP)	2	16
	2	14-17-23 N=40	dist.	3	24
10	12	5-4-5 N=9		4	11
	10	9-4-7 N=11		5	15
15	10	5-10-11 N=21		6	12
	8	11-21-28 N=49		7	11
20	10	15-15-24 N=39		8	9
	12	8-10-10 N=20		9	9
25	4	20-6-15 N=21		10	11
	10	13-21-35 N=56		11	8
30		23-30-39 N=69		12	7

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Monitoring well installed

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

17' while drilling

9' on 5/7/2018

Terracon
9856 S 57th St
Franklin, WI

Boring Started: 04-26-2018 | Boring Completed: 04-26-2018

Drill Rig: CME-55 Truck | Driller: PTS/Mike

Project No.: 58185000 | Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL 58185000 ODFL TERMINAL EXP.GPJ TERRACON_DATATEMPLATE.GDT 5/21/18

BORING LOG NO. B-6

PROJECT: ODFL Terminal Expansion

CLIENT: Old Dominion Freight Line, Inc.
Thomasville, NC

SITE: 4300 Duroform Lane
Windsor, Wisconsin

LOCATION See Exhibit A-2

Latitude: 43.2016° Longitude: -89.3372°

Approximate Surface Elev: 897 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
1.1	896+/-	**TOPSOIL / ROOT ZONE**, 14 inches
7.0	890+/-	**FILL - LEAN CLAY WITH SAND (CL)**, trace gravel, brown to dark brown, very stiff
13.0	884+/-	**POSSIBLE FILL - SAND (SP)**, trace gravel, fine grained, brown, medium dense to dense
20.0	877+/-	**SILTY SAND (SM)**, trace gravel, light brown, medium dense to dense
28.0	869+/-	**SILTY SAND WITH GRAVEL (SM)**, light brown, dense
30.0	867+/-	**SAND WITH GRAVEL (SP)**, brown, dense
		Boring Terminated at 30 Feet

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY HP (tsf)	WATER CONTENT (%)
			10	3-5-5 N=10	1	4.00 (HP)	16
5			12	7-6-7 N=13	2	2.50 (HP)	23
			6	8-14-6 N=20	3		6
			2	23-50/3"	4		6
10			4	13-18-25 N=43	5		5
			4	4-6-9 N=15	6		12
15			6	14-21-33 N=54	7		8
	▽		8	16-19-27 N=46	8		10
20			4	23-50/4"	9		8
			4	25-50/5"	10		10
25			4	29-50/4"	11		7
			4	3-3-7 N=10	12		13
30							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite chips upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *20' while drilling*

dry at completion

Terracon
9856 S 57th St
Franklin, WI

Boring Started: 04-26-2018	Boring Completed: 04-26-2018
Drill Rig: CME-55 Truck	Driller: PTS/Mike
Project No.: 58185000	Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 58185000 ODFL TERMINAL EXP.GPJ TERRACON_DATATEMPLATE.GDT 5/21/18

BORING LOG NO. B-7

PROJECT: ODFL Terminal Expansion

CLIENT: Old Dominion Freight Line, Inc.
Thomasville, NC

SITE: 4300 Duroform Lane
Windsor, Wisconsin

LOCATION See Exhibit A-2

Latitude: 43.201° Longitude: -89.3378°

Approximate Surface Elev: 885 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
0.4	884.5+/-	**GRAVEL SURFACE**, 4 inches
3.0	882+/-	**SILTY SAND WITH GRAVEL (SM)**, brown, loose
6.0	879+/-	**SAND (SP)**, trace silt and gravel, brown, medium dense
10.0	875+/-	**SILTY SAND (SM)**, trace gravel, light brown, medium dense
15.0	870+/-	**SILTY SAND (SM)**, trace gravel, light brown, dense
		Boring Terminated at 15 Feet

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY HP (tsf)	WATER CONTENT (%)
			3	3-3-3 N=6	1		20
5	▽		18	3-5-10 N=15	2		18
			18	7-6-7 N=13	3		15
10			10	7-9-10 N=19	4		13
			18	12-15-18 N=33	5		12
15			18	50/5"	6		10

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite chips upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *4.5' while drilling*

Terracon
9856 S 57th St
Franklin, WI

Boring Started: 04-27-2018	Boring Completed: 04-27-2018
Drill Rig: CME-55 Truck	Driller: PTS/Mike
Project No.: 58185000	Exhibit: A-10

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 58185000 ODFL TERMINAL EXP.GPJ TERRACON_DATATEMPLATE.GDT 5/21/18

BORING LOG NO. B-8

PROJECT: ODFL Terminal Expansion

CLIENT: Old Dominion Freight Line, Inc.
Thomasville, NC

SITE: 4300 Duroform Lane
Windsor, Wisconsin

LOCATION: See Exhibit A-2

Latitude: 43.201° Longitude: -89.3365°

Approximate Surface Elev: 885 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	INSTALLATION DETAILS	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	SAMPLE NUMBER	WATER CONTENT (%)
0.5	884.5+/-	**GRAVEL SURFACE**	Flush mounted steel casing								
2.0	883+/-	**FILL - SILTY SAND WITH GRAVEL**, brown to dark brown									
		SAND (SP), trace gravel, brown, medium dense	Solid riser pipe sealed in bentonite				4	15-24-36 N=60		1	6
			Sand pack around solid 2" PVC riser pipe				18	4-7-12 N=19		2	16
5.0	880+/-	**SILTY SAND (SM)**, trace gravel, light brown, dense		5							
							4	50/5"		3	15
							18	6-14-17 N=31		4	9
10.5	874.5+/-	**SAND (SP)**, trace gravel, fine to coarse grained, brown, medium dense to dense	Sand pack around slotted 2" PVC well screen	10							
							16	15-21-24 N=45		5	7
							18	6-6-7 N=13		6	8
15.0	870+/-	***Boring Terminated at 15 Feet***		15							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Monitoring well installed

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

4.5' while drilling

4' on 5/7/2018

Terracon
9856 S 57th St
Franklin, WI

Boring Started: 04-27-2018	Boring Completed: 04-27-2018
Drill Rig: CME-55 Truck	Driller: PTS/Mike
Project No.: 58185000	Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL 58185000 ODFL TERMINAL EXP.GPJ TERRACON_DATATEMPLATE.GDT 5/21/18

BORING LOG NO. B-9

PROJECT: ODFL Terminal Expansion

CLIENT: Old Dominion Freight Line, Inc.
Thomasville, NC

SITE: 4300 Duroform Lane
Windsor, Wisconsin

LOCATION See Exhibit A-2

Latitude: 43.2° Longitude: -89.3376°

Approximate Surface Elev: 886 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY HP (tsf)	WATER CONTENT (%)
1.1	885+/-								
				X	18	4-5-5 N=10	1	2.00 (HP)	24
3.0	883+/-								
				X	18	4-4-8 N=12	2		15
5.0	881+/-	5							
				X	18	8-15-17 N=32	3		11
			▽	X	18	6-5-4 N=9	4		12
10.0	876+/-	10							

TOPSOIL / ROOT ZONE, 15 inches

POSSIBLE FILL - LEAN CLAY WITH SAND (CL), trace gravel, brown to dark brown, very stiff

SANDY LEAN CLAY/CLAYEY SAND (CL/SC), brown, medium dense

SILTY SAND (SM), trace gravel, light brown, medium dense to dense

Boring Terminated at 10 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite chips upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *9' while drilling*

Terracon
9856 S 57th St
Franklin, WI

Boring Started: 04-27-2018	Boring Completed: 04-27-2018
Drill Rig: CME-55 Truck	Driller: PTS/Mike
Project No.: 58185000	Exhibit: A-12

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 58185000 ODFL TERMINAL EXP.GPJ TERRACON_DATATEMPLATE.GDT 5/21/18

APPENDIX B

LABORATORY TESTING

Laboratory Testing

The soil samples obtained from the borings were tested in the laboratory to measure their natural water contents. A pocket penetrometer was used to help estimate the unconfined compressive strength of other cohesive samples.

The soil samples were classified in the laboratory based on visual observation, texture, plasticity, and the limited laboratory testing described above. The soil descriptions presented on the boring logs for native soils are in accordance with the enclosed General Notes (Exhibit C-1) and Unified Soil Classification System (USCS). The estimated USCS group symbols for native soils are shown on the boring logs, and a brief description of the USCS (Exhibit C-2) is included with this report.

Six (6) of the borings were also classified in accordance with the United States Department of Agriculture (USDA) classification system in order to determine the soils pedagogical classification. These borings were classified by a Certified Soils Tester (CST) registering in the State of Wisconsin. Subsequently, WDNR Storm Water Evaluation Forms for each of the six borings were completed and are attached to this report (Exhibits B-2 to B-4).

Wis. Dept. of Safety and Professional Services
Division of Industry Services

SOIL EVALUATION - STORM

in accordance with SPS 382.365 and 385, Wis. Adm. Code

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent 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: Dane

Parcel I.D.: 068/0910-323-0556-0

Reviewed by: | Date:

Property Owner	Property Location
Old Dominion Freight Line, Inc.	Govt. Lot NW 1/4 SW 1/4 S 32 T 9 N R 10 E (or) W
Property Owner's Mailing Address: 3915 West Morris Street	Lot # 2 / Block # / Subd. Name or CSM#
City: Indianapolis / State: IN / Zip Code: 46241 / Phone Number: (317) 481-8100	☐ City ☐ Village ☒ Town / Nearest Road: Duraform Lane

Drainage area _____ ☐ sq. ft. ☐ acres
Optional:
Test Site Suitable for (check all that apply)
☐ Irrigation ☐ Bioretention trench ☐ Trench(es)
☐ Rain garden ☐ Grassed swale ☐ Reuse
☐ Infiltration trench ☐ SDS (> 15' wide) ☐ Other _____

Hydraulic Application Test Method:
☒ Morphological Evaluation
☐ Double-Ring Infiltrometer
☐ Other (specify) _____

B-2 Obs. # ☒ Boring ☐ Pit Ground surface elev. 885 ft. Depth to limiting factor 72 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
Fill	16	asphalt/over base course							
B	30	10YR 5/4	none	C	3,co,sbk	FI	AS	0	
C	72	10YR 5/4	none	LCOS	0,sg	L	GW	10%	
C	240	7.5YR 6/4	none	LCOS	0,sg	L	GW	15%	

B-4 Obs. # ☒ Boring ☐ Pit Ground surface elev. 885 ft. Depth to limiting factor 42 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
Fill	16	asphalt/over base course							
C	42	7.5YR 5/4	none	S	0,sg	L	AS	10%	
C	72	7.5YR 6/4	none	LCOS	0,sg	L	GW	15%	
C	102	10YR 6/4	none	GRLCOS	0,sg	L	GW	25%	
C	132	10YR 6/4	none	SL	0,sg	L	GW	10%	
C	192	10YR 6/4	none	LCOS	0,sg	L	GW	10%	
C	240	10YR 6/4	none	VGRLCOS	0,sg	L	GW	40%	

CST/PSS Name (Please Print)	Signature	CST/PSS Number
Paul J. Koszarek, P.E., C.S.T.		126130
Address	**Date Evaluation Conducted**	**Telephone Number**
9856 S. 57th Street, Franklin, WI 53132	5-16-2018	262-332-3399

Property Owner Old Dominion Freight Line, Inc. Parcel ID # 068/0910-323-0556-0

B-5 Obs. # [X] Boring [ ] Pit Ground surface elev. 891 ft. Depth to limiting factor 102 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
Fill	14	10YR 4/2	none	C	3,co,sbk	FI	AS	0	
Fill	42	10YR 5/4	none	C	3,co,sbk	FI	AS	0	
Fill	72	7.5YR 4/4	none	SC	3,co,sbk	HA	AS	5%	
Fill	102	7.5YR 3/1	none	C	3,co,sbk	FI	AS	0	
C	132	7.5YR 6/3	none	GRLOS	0,sg	L	GW	25%	
C	162	10YR 6/3	none	S	0,sg	L	GW	15%	
C	342	7.5YR 6/3	none	GRLOS	0,sg	L	GW	25%	
C	360	10YR 6/4	none	VGRLOS	0,sg	L	GW	35%	

B-6 Obs. # [X] Boring [ ] Pit Ground surface elev. 896 ft. Depth to limiting factor 192 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
Fill	14	10YR 4/2	none	C	3,co,sbk	FI	AS	0	
Fill	72	7.5YR 5/4	none	C	3,co,sbk	HA	AS	0	
Fill	132	10YR 6/4	none	LOS	0,sg	L	GW	10%	
Fill	162	7.5YR 6/4	none	VGRS	0,sg	L	GW	40%	
Fill	192	7.5YR 6/4	none	LOS	0,sg	L	GW	5%	
C	336	7.5YR 6/3	none	LOS	0,sg	L	GW	25%	
C	360	10YR 6/3	none	GRS	0,sg	L	GW	25%	

B-7 Obs. # [X] Boring [ ] Pit Ground surface elev. 885 ft. Depth to limiting factor 42 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
Fill	4		gravel base						
C	42	10YR 5/4	none	GRLOS	0,sg	L	GW	25%	
C	72	10YR 6/4	none	S	0,sg	L	GW	0	
C	102	10YR 6/4	none	LOS	0,sg	L	GW	0	
C	162	10YR 6/4	none	GRLOS	0,sg	L	GW	25%	
C	180	10YR 6/4	none	VGRS	0,sg	L	GW	40%	

Property Owner Old Dominion Freight Line, Inc. Parcel ID # 068/0910-323-0556-0 Page 3 of 3

B-8 Obs. # [X] Boring [ ] Pit Ground surface elev. 885 ft. Depth to limiting factor 72 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
FILL	4	10YR 4/2	none	SL	0,sg	L	AS	5	
FILL	24	10YR 6/4	none	GRS	0,sg	L	AS	25	
C	72	7.5YR 5/4	none	S	0,sg	L	GW	0	
C	132	10YR 6/4	none	GRLOS	0,sg	L	GW	35	
C	180	10YR 6/3	none	VGRCOS	0,sg	L	GW	45	

[ ] Obs. # [ ] Boring [ ] Pit Ground surface elev. _____ ft. Depth to limiting factor _____ in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr

Test Results and/or Summary Comments

The Dept. of Safety and Professional is an equal opportunity service provider and employer. If you need assistance to access services or need material in an alternate format, contact the department at 608-266-3151 or TTY through Relay.

APPENDIX C

SUPPORTING DOCUMENTS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING

Auger	Split Spoon
Shelby Tube	Macro Core
Ring Sampler	Rock Core
Grab Sample	No Recovery

WATER LEVEL

- Water Initially Encountered
- Water Level After a Specified Period of Time
- Water Level After a Specified Period of Time

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	Hand Penetrometer
(T)	Torvane
(b/f)	Standard Penetration Test (blows per foot)
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance				BEDROCK		
Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength, Qu, psf	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.	Ring Sampler Blows/Ft.	Standard Penetration or N-Value Blows/Ft.	Descriptive Term (Consistency)
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3	< 30	< 20	Weathered
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4	30 - 49	20 - 29	Firm
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9	50 - 89	30 - 49	Medium Hard
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18	90 - 119	50 - 79	Hard
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42	> 119	>79	Very Hard
			Hard	> 8,000	> 30	> 42			

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

Terracon

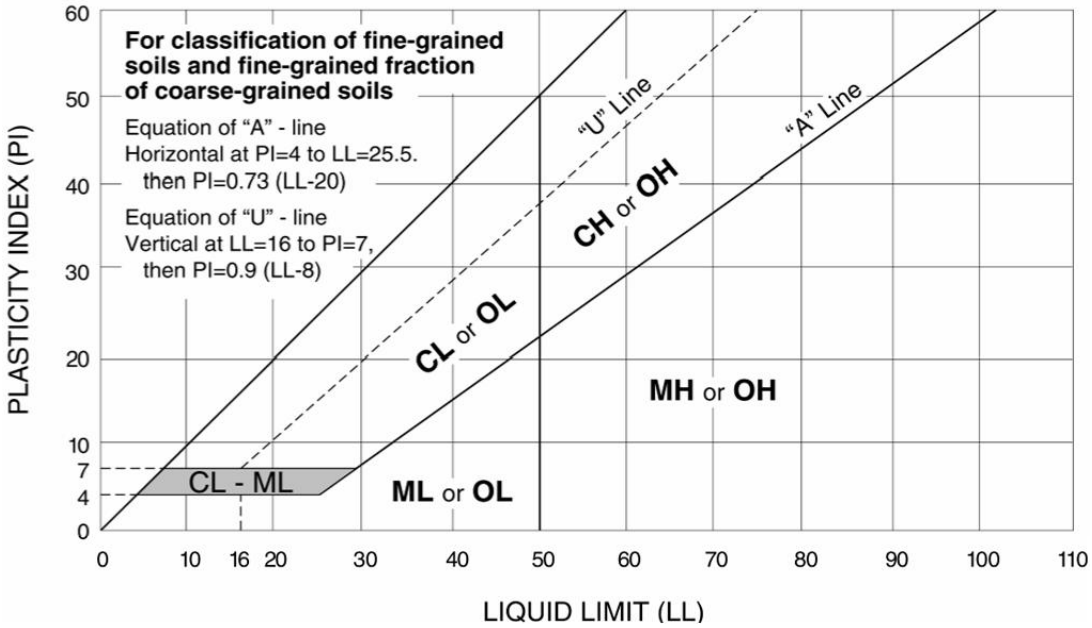
UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]		CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K,L,M,N]
			Liquid limit - not dried			Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K,L,M]
			PI plots below "A" line		MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K,L,M,P]
			Liquid limit - not dried			Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



Terracon

Exhibit C-2

APPENDIX 3

PROPOSED CONSTRUCTION PLANS

OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

VILLAGE OF WINDSOR, WISCONSIN

NE 1/4, SW 1/4, SECTION 32, TOWNSHIP 09 NORTH, RANGE 10 EAST

DRAWING INDEX

C0.0	TITLE SHEET
C1.0	SURVEY
C2.0	DEMOLITION PLAN
C3.0	SITE PLAN
C4.0	GRADING & EROSION CONTROL PLAN
C5.0	UTILITY PLAN
C6.0	DETAILS
C6.1	STORMWATER DETAILS
L1.0	LANDSCAPE PLAN
L2.0	LANDSCAPE DETAILS & NOTES

PROJECT AREA

NOT TO SCALE

north

PROJECT INFORMATION

OWNER
CONTACT: Old Dominion Freight Line
Jerry Canada - Construction Manager
4380 Duraform Lane
Windsor, WI 53598
P: (608) 846-2489
jerry.canada@odfl.com

ARCHITECT
David Mollenkopf Architect
David Mollenkopf, AIA - Project Architect
49 Music Square W #600
Nashville, TN 37203
P: (615) 296-9146
djmollen@themdgllc.com

CONSULTANTING ENGINEER
JSD Professional Services
Matt Haase, P.E. - Project Engineer
161 Horizon Drive, Suite 101
Verona, WI 53593
P: (608) 848-5060
matt.haase@jsdinc.com

MUNICIPAL CONTACTS

VILLAGE OF WINDSOR
Kevin Richardson
Village Engineer
4084 Mueller Road
DeForest, WI 53532
P: (608) 888-0066
kevin@windsorwi.gov

UTILITY CONTACTS

GAS & ELECTRIC
Madison Gas & Electric
Shaun Endres
PO Box 1231
Madison, WI 73701-1231
P: (608) 252-7224
sendres@mge.com

CABLE TV
Charter Communications
Miguel Del Moral
2701 Daniels St
Madison, WI 53718
P: (608) 209-4817
miguel.delmoral@charter.com

COMMUNICATIONS
Century Link
Steven Bishop
710 E Mifflin St #116
Madison, WI 53703
P: (608) 291-7872
steven.bishop@centurylink.com

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P. 608.848.5060

CLIENT:
DAVID MOLLENKOPF ARCHITECT

CLIENT ADDRESS:
49 MUSIC SQUARE W #600
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR
DANE COUNTY, WI

PLAN MODIFICATIONS:

#	Date:	Description:
1	05/31/2018	VILLAGE PRE-APP MTG
2	06/13/2018	VILLAGE SUBMITTAL
3		
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14		
15		

Design/Drawn: KWH
Approved: MRH

SHEET TITLE:
TITLE SHEET

SHEET NUMBER:
C0.0

JSD PROJECT NO: 18-8488

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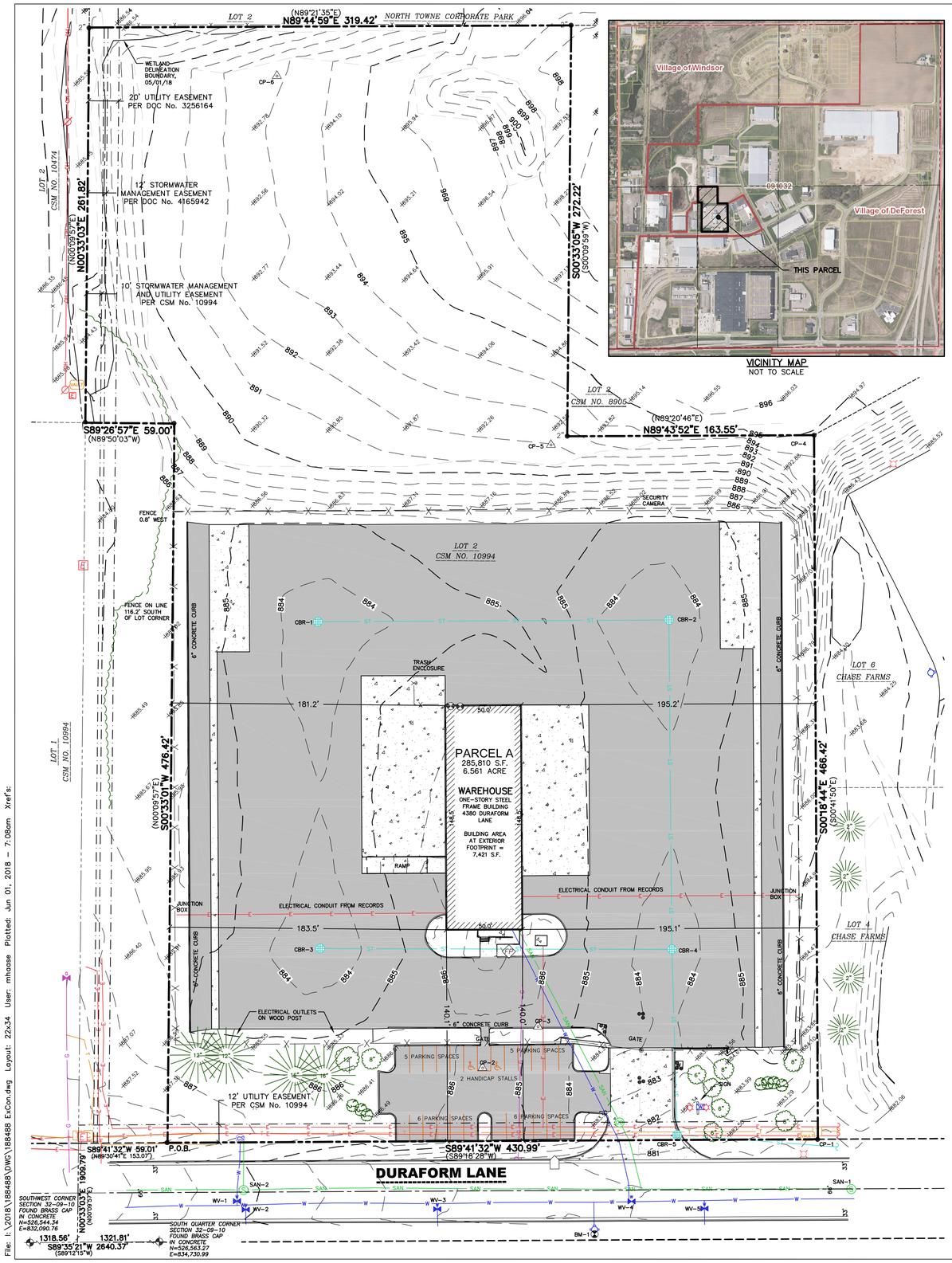
EXISTING CONDITIONS SURVEY

LOT 2, CERTIFIED SURVEY MAP No. 10994, RECORDED IN VOLUME 66 OF DANE COUNTY CERTIFIED SURVEYS, PAGE 36 THRU 40 AS DOCUMENT No. 3879522, LOCATED IN THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 32, TOWN 09 NORTH, RANGE 10 EAST, VILLAGE OF WINDSOR, DANE COUNTY, WISCONSIN.



VICINITY MAP
NOT TO SCALE

LEGEND

- GOVERNMENT CORNER
- 2" IRON PIPE FOUND
- ¾" REBAR FOUND
- CONTROL POINT
- BENCHMARK
- FINISHED FLOOR SHOT LOCATION
- BOLLARD
- FLAG POLE
- MAIL BOX
- POST
- SIGN
- SANITARY MANHOLE
- CLEAN OUT
- WATERMAIN OR GASMAIN VALVE
- HYDRANT
- CURB STOP/SERVICE VALVE
- SPRINKLER VALVE BOX
- ROUND CASTED INLET
- ELECTRIC PEDESTAL
- ELECTRIC TRANSFORMER
- LIGHT POLE
- POWER POLE W/GUY
- YARD LIGHT
- VAULT
- TELEPHONE PEDESTAL
- CABLE PEDESTAL
- DECIDUOUS TREE
- CONIFEROUS TREE
- HANDICAP PARKING
- CENTERLINE
- RIGHT-OF-WAY LINE
- SECTION LINE
- PARCEL BOUNDARY
- PROPERTY LINE
- EASEMENT LINE
- FENCE LINE
- SAN — SANITARY SEWER
- W — WATER LINE
- ST — STORM SEWER
- G — NATURAL GAS
- OH — OVERHEAD LINE
- E — UNDERGROUND ELECTRIC
- FO — FIBER OPTIC
- T — UNDERGROUND TELEPHONE
- CaTV — UNDERGROUND CABLE
- EDGE OF WOODS OR BRUSH
- BUILDING
- WALL LINE
- 875 — INDEX CONTOUR
- 874 — INTERMEDIATE CONTOUR
- DELINEATED WETLANDS
- ×874.29 SPOT ELEVATION
- EDGE OF PAVEMENT
- CONCRETE CURB & GUTTER
- EDGE OF GRAVEL
- BITUMINOUS PAVEMENT
- RETAINING WALL
- CONCRETE PAVEMENT
- GRAVEL
- EDGE OF BITUMINOUS
- PAVEMENT STRIPING
- END OF FLAGGED UTILITIES
- ( ) DENOTES RECORD DATA DEPICTING THE SAME LINE ON THE GROUND AS RETRACED BY THIS SURVEY

STORM SEWER INLETS

STRUCT. ID	RIM ELEVATION	INVERT	ELEVATION	PIPE SIZE	PIPE TYPE
CBR-1	883.34	*	–	–	–
CBR-2	883.12	*	–	–	–
CBR-3	883.15	*	–	–	–
CBR-4	883.15	*	–	–	–
CBR-5	881.50	*	–	–	–

*UNABLE TO MEASURE DUE TO INSTALLED FILTER FABRIC.

SANITARY SEWER MANHOLES

STRUCT. ID	RIM ELEVATION	INVERT	ELEVATION	PIPE SIZE	PIPE TYPE
SAN-1	880.48	E	870.63	12"	DI
		W	870.48	12"	DI
SAN-2	885.36	E	869.26	12"	DI
		N	870.01	8"	PVC
		N	876.11	8"	PVC
		S	870.06	8"	PVC
		S	876.11	8"	PVC
		*W	869.36	12"	DI

*UNABLE TO MEASURE DUE TO LADDER LOCATION. MEASUREMENT TAKEN IN CHANNEL NEAR PIPE.

WATER VALVES

VALVE No.	RIM ELEVATION	INVERT	TOP NUT ELEVATION
WV-1	885.18	TN	879.48
WV-2	884.95	TN	879.65
WV-3	882.00	TN	876.70
WV-2	880.98	TN	876.48
WV-3	880.65	TN	877.25

TN=TOP NUT OF WATER VALVE

BENCHMARKS

BENCH MARK	ELEVATION	DESCRIPTION
BM-1	883.39	TOP NUT ON HYDRANT ON S. SIDE OF DURAFORM LN.

*JSD DOES NOT GUARANTEE THE BENCHMARK ELEVATIONS LISTED ON THIS MAP ARE ACCURATE AND SHOULD BE VERIFIED PRIOR TO CONSTRUCTION ACTIVITIES.

CONTROL POINTS

CONTROL POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP-1	529170.41	833559.21	893.17	3/4" REBAR
CP-2	528513.32	833695.51	885.74	MAG NAIL
CP-3	528540.71	833732.21	885.40	MAG NAIL
CP-4	528932.48	833915.15	894.42	3/4" REBAR
CP-5	528926.04	833740.81	892.15	60D NAIL
CP-6	529170.41	833559.21	893.17	3/4" REBAR

*JSD DOES NOT GUARANTEE THE CONTROL POINT ELEVATIONS LISTED ON THIS MAP ARE ACCURATE AND SHOULD BE VERIFIED PRIOR TO CONSTRUCTION ACTIVITIES.

NOTES

1. FIELD WORK PERFORMED BY JSD PROFESSIONAL SERVICES, INC. FROM APRIL 10 TO APRIL 11, 2018.
2. BEARINGS FOR THIS SURVEY AND MAP ARE REFERENCED TO THE WISCONSIN COUNTY COORDINATE SYSTEM, DANE COUNTY ZONE / THE SOUTH LINE OF THE SOUTHWEST QUARTER OF SECTION 32–09–10, BEARS N 89°35'21" E.
3. ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). BENCHMARK IS A BRASS CAP IN CONCRETE MARKING THE SOUTHWEST CORNER OF SECTION 32, T09N, R10E, ELEVATION = 871.82'
4. CONTOUR INTERVAL IS ONE FOOT.
5. SPOT ELEVATIONS IN CURBED AREAS REFERENCE THE PAVEMENT EDGE ELEVATIONS.
6. SUBSURFACE UTILITIES AND FEATURES SHOWN ON THIS MAP HAVE BEEN APPROXIMATED BY LOCATING SURFICIAL FEATURES AND APPURTENANCES, LOCATING DIGGERS HOTLINE FIELD MARKINGS AND BY REFERENCE TO UTILITY RECORDS AND MAPS. DIGGER'S HOTLINE TICKET NO. 20181407127, 20181407148, 20181407116 AND 20181407165, WITH A CLEAR DATE OF APRIL 09, 2018.
7. UTILITY COMPANIES CONTACTED THRU DIGGERS HOTLINE:
   - VILLAGE OF DE FOREST
   - WINDSOR UTILITY DISTRICT #1
   - MADISON GASE & ELECTRIC CO
   - ALLIANT ENERGY
   - CENTURYLINK
   - CHARTER COMMUNICATIONS
8. BEFORE EXCAVATION, APPROPRIATE UTILITY COMPANIES SHOULD BE CONTACTED. FOR EXACT LOCATION OF UNDERGROUND UTILITIES, CONTACT DIGGERS HOTLINE, AT 1.800.242.8511.
9. THIS PARCEL IS ZONED SUBURBAN INDUSTRIAL PER THE CITY OF VERONA ZONING MAP DATED DECEMBER 2005.
10. THIS PARCEL IS SUBJECT TO ALL EASEMENTS AND AGREEMENTS, BOTH RECORDED AND UNRECORDED.

LEGAL DESCRIPTION

LOT 2, CERTIFIED SURVEY MAP NO. 10994, RECORDED IN VOLUME 66 OF DANE COUNTY CERTIFIED SURVEY MAPS ON PAGES 36–40 AS DOCUMENT NUMBER 3879522, VILLAGE OF WINDSOR, DANE COUNTY, WISCONSIN.

TAX KEY NO: 196/0910–323–0556–0

SURVEYOR'S CERTIFICATE

I, XXXX XXXX, WISCONSIN PROFESSIONAL LAND SURVEYOR NO. S–XXXX, HEREBY CERTIFY THAT THIS EXISTING CONDITIONS SURVEY AND MAP IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF IN ACCORDANCE WITH THE INFORMATION PROVIDED.

JOHN KREBS, S–1878
PROFESSIONAL LAND SURVEYOR

DATE

OR

TODD J. BUHR, S–2614
PROFESSIONAL LAND SURVEYOR

DATE

WISCONSIN JOHN KREBS S–1878 McFARLAND, WISCONSIN LAND SURVEYOR

WISCONSIN TODD J. BUHR S–2614 DEFOREST, WI LAND SURVEYOR

north

SCALE IN FEET
40' 0 40'

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P. 608.848.5060

CLIENT:
THE MOLLENKOPF DESIGN GROUP, LLC

CLIENT ADDRESS:
49 MUSIC SQUARE WEST, STE. 600
NASHVILLE, TN 37203

DIGGERS HOTLINE
Toll Free (800) 242–8511

PROJECT:
OLD DOMINION FREIGHT LINE - 4380 DURAFORM LANE

PROJECT LOCATION:
V. OF WINDSOR, WI
DANE COUNTY

PLAN MODIFICATIONS:

#	Date:	Description:
1		
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11		
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13		
14		
15		

Design/Drawn: CJO 04-16-18
Approved: TJB 04-16-18

SHEET TITLE:
EXISTING CONDITIONS SURVEY

MAP NO: C–*

SHEET NUMBER:
1 OF 1

JSD PROJECT NO: 18-8488

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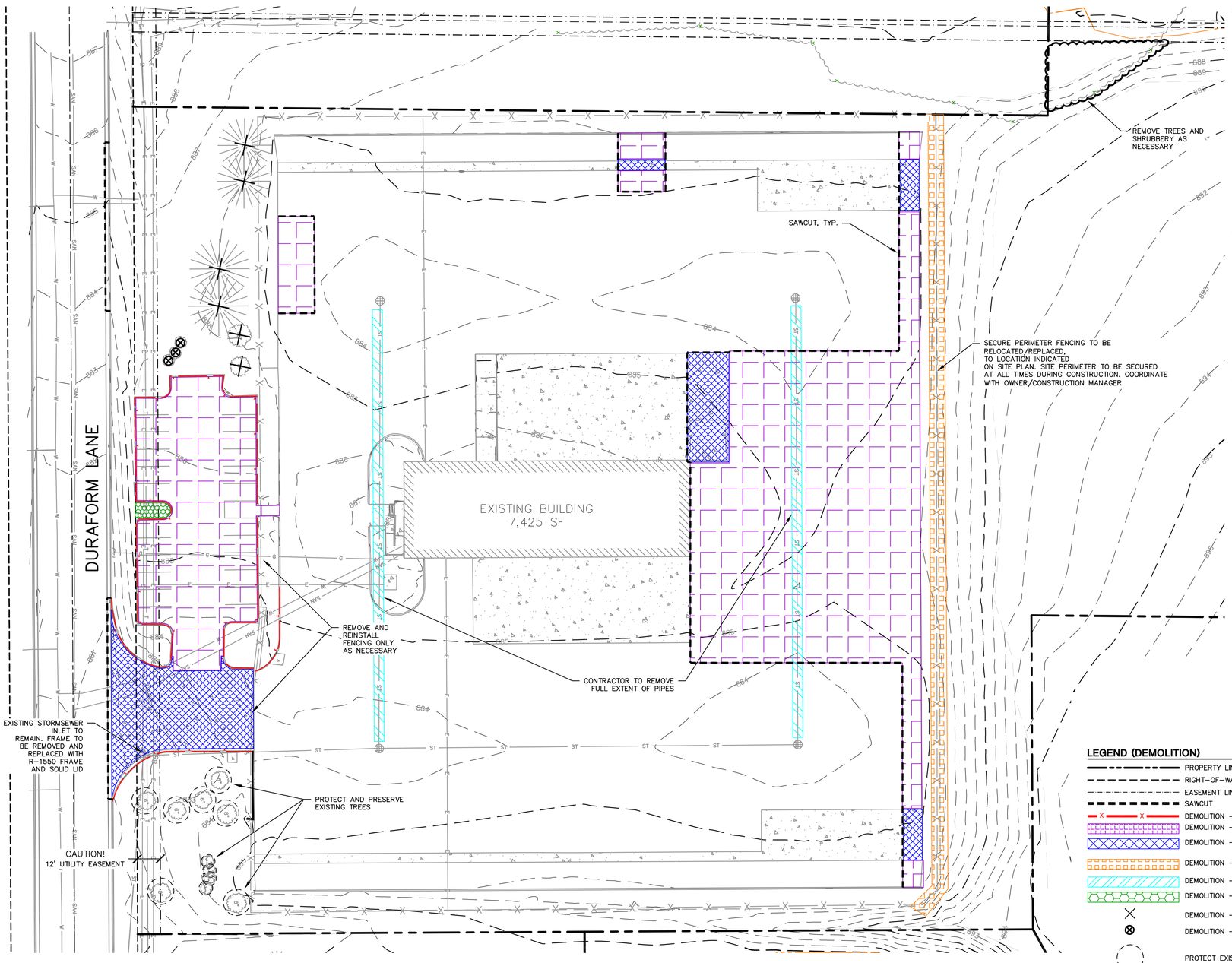

GENERAL NOTES

1. REFER TO THE EXISTING CONDITIONS SURVEY FOR EXISTING CONDITIONS NOTES AND LEGENDS.
2. ALL WORK IN THE ROW SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR SEWER & WATER CONSTRUCTION IN WISCONSIN, LATEST EDITION AND VILLAGE OF WINDSOR REQUIREMENTS.
3. NO SITE GRADING OUTSIDE OR DOWNSLOPE OF PROPOSED SILT FENCE LOCATION. NO LAND DISTURBANCE BEYOND PROPERTY LINES UNLESS OTHERWISE SHOWN.
4. THIS PROJECT HAS BEEN DESIGNED AND WILL BE CONSTRUCTED IN COMPLIANCE WITH ALL OF THE WDNR WRAPP PERMIT APPLICATION STANDARDS.
5. JSD SHALL BE HELD HARMLESS AND DOES NOT WARRANT ANY DEVIATIONS BY THE OWNER/CONTRACTOR FROM THE APPROVED CONSTRUCTION PLANS THAT MAY RESULT IN DISCIPLINARY ACTIONS BY ANY OR ALL REGULATORY AGENCIES.

DEMOLITION NOTES

1. THIS PLAN INDICATES ITEMS ON THE PROPERTY INTENDED FOR DEMOLITION BASED ON THE CURRENT SITE DESIGN THAT HAVE BEEN IDENTIFIED BY A REASONABLE OBSERVATION OF THE EXISTING CONDITIONS THROUGH FIELD SURVEY RECONNAISSANCE, "DIGGER'S HOTLINE" LOCATION, AND GENERAL "STANDARD OF CARE". THERE MAY BE ADDITIONAL ITEMS THAT CAN NOT BE IDENTIFIED BY A REASONABLE ABOVE GROUND OBSERVATION, OF WHICH THE ENGINEER WOULD HAVE NO KNOWLEDGE OR MAY BE A PART OF ANOTHER DESIGN DISCIPLINE. IT IS THE CONTRACTOR'S/BIDDER'S RESPONSIBILITY TO REVIEW THE PLANS, INSPECT THE SITE AND PROVIDE HIS OWN DUE DILIGENCE TO INCLUDE IN HIS BID WHAT ADDITIONAL ITEMS, IN HIS OPINION, MAY BE NECESSARY FOR DEMOLITION. ANY ADDITIONAL ITEMS IDENTIFIED BY THE CONTRACTOR/BIDDER SHALL BE IDENTIFIED IN THE BID AND REPORTED TO THE ENGINEER OF RECORD. JSD TAKES NO RESPONSIBILITY FOR ITEMS ON THE PROPERTY THAT COULD NOT BE LOCATED BY A REASONABLE OBSERVATION OF THE PROPERTY OR OF WHICH THEY WOULD HAVE NO KNOWLEDGE.
2. CONTRACTOR SHALL KEEP ALL STREETS AND PRIVATE DRIVES FREE AND CLEAR OF ALL CONSTRUCTION RELATED DIRT, DUST AND DEBRIS.
3. ALL TREES WITHIN THE CONSTRUCTION LIMITS SHALL BE REMOVED UNLESS SPECIFICALLY CALLED OUT FOR PROTECTION. ALL TREES TO BE REMOVED SHALL BE REMOVED IN THEIR ENTIRETY AND STUMPS SHALL BE GROUND TO PROPOSED SUBGRADE.
4. ALL LIGHT POLES TO BE REMOVED SHALL BE REMOVED IN THEIR ENTIRETY, INCLUDING BASE AND ALL APPURTENANCES. SALVAGE FOR RELOCATION. COORDINATE RELOCATION AND/OR ABANDONMENT OF ALL ELECTRIC LINES WITH ELECTRICAL ENGINEER AND OWNER PRIOR TO DEMOLITION.
5. ABANDONED/REMOVED ITEMS SHALL BE DISPOSED OF OFF SITE UNLESS OTHERWISE NOTED.
6. CONTRACTOR TO REPLACE ALL SIDEWALK AND CURB AND GUTTER ABUTTING THE PROPERTIES, WHICH IS DAMAGED BY THE CONSTRUCTION, OR ANY SIDEWALK AND CURB AND GUTTER THAT THE VILLAGE OF WINDSOR ENGINEER DETERMINES NEEDS TO BE REPLACED BECAUSE IT IS NOT AT A DESIRABLE GRADE REGARDLESS OF WHETHER THE CONDITION EXISTED PRIOR TO BEGINNING CONSTRUCTION.
7. PRIOR TO CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR:
   - 7.1. EXAMINE ALL SITE CONDITIONS RELATIVE TO THE CONDITIONS INDICATED ON THE ENGINEERING DRAWINGS. ANY DISCREPANCIES ARE TO BE REPORTED IMMEDIATELY TO THE ENGINEER AND RESOLVED PRIOR TO THE START OF CONSTRUCTION.
   - 7.2. VERIFYING UTILITY ELEVATIONS AND NOTIFYING ENGINEER OF ANY DISCREPANCIES. NO WORK SHALL BE PERFORMED UNTIL THE DISCREPANCIES ARE RESOLVED.
   - 7.3. NOTIFYING ALL UTILITIES PRIOR TO THE REMOVAL OF ANY UNDERGROUND UTILITIES.
   - 7.4. NOTIFYING THE DESIGN ENGINEER AND LOCAL CONTROLLING MUNICIPALITY 48 HOURS PRIOR TO THE START OF CONSTRUCTION TO ARRANGE FOR APPROPRIATE CONSTRUCTION INSPECTION.
8. ANY SANITARY SEWER, SANITARY SEWER SERVICES, WATER MAIN, WATER SERVICES, STORM SEWER, OR OTHER UTILITIES, WHICH ARE DAMAGED BY THE CONTRACTORS, SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE.
9. CONTRACTOR IS RESPONSIBLE FOR SITE SAFETY DURING THE CONSTRUCTION OF THESE IMPROVEMENTS.
10. CONTRACTOR TO COORDINATE PRIVATE UTILITY REMOVAL / ABANDONMENT AND NECESSARY RELOCATION WITH RESPECTIVE UTILITY COMPANY. COORDINATION REQUIRED PRIOR TO CONSTRUCTION.
11. ALL DEMOLITION SHALL BE IN ACCORDANCE WITH THE APPROVED MUNICIPALITY RECYCLING PLAN.
12. ANY CONTAMINATED SOILS SHALL BE REMOVED IN ACCORDANCE WITH FEDERAL AND STATE REGULATIONS TO AN APPROVED LANDFILL.
13. ALL EXISTING UTILITIES TO BE FIELD LOCATED AND FLAGGED BY CONTRACTOR.
14. EXISTING FIBER OPTIC LINE TO BE CLEARLY MARKED PRIOR TO ANY EXCAVATION. CONTRACTOR TO NOTIFY ENGINEER IMMEDIATELY IF ANY DISCREPANCIES OCCUR IN THE LOCATION SHOWN OR PROPOSED IMPROVEMENTS IMPACTING EXISTING FIBER OPTIC LINE LOCATION.
15. SEWER ABANDONMENT SHALL BE IN ACCORDANCE WITH SECTION 3.2.24, OF THE STANDARD SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION IN WISCONSIN, LATEST ADDITION, AND WINDSOR UTILITY DISTRICT #1 SPECIFICATIONS.
16. WATER ABANDONMENT SHALL BE IN ACCORDANCE WITH SECTION 4.14.0 OF THE STANDARD SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION IN WISCONSIN, LATEST ADDITION, AND THE WINDSOR UTILITY DISTRICT #1 SPECIFICATIONS.
17. ALL PERIMETER EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF DEMOLITION ACTIVITIES. CONTRACTOR SHALL KEEP ALL STREETS AND PAVEMENT FREE AND CLEAR OF ALL CONSTRUCTION RELATED DIRT, DUST AND DEBRIS.
18. BUILDING REMOVALS SHALL BE BY A QUALIFIED CONTRACTOR. CONTRACTOR TO FOLLOW ALL DEMOLITION REGULATIONS, DISCONNECT ALL UTILITIES, OBTAIN ALL APPLICABLE PERMITS AND DISPOSE OF ALL BUILDING MATERIALS IN APPROPRIATE LANDFILLS. DEMOLISHED MATERIALS SHALL NOT BE BURIED ON SITE. IF ENCOUNTERED, ANY CONTAMINATED SOILS SHALL BE REMOVED TO A LANDFILL IN ACCORDANCE WITH APPROPRIATE STATE AND FEDERAL REGULATIONS.
19. CONTRACTOR TO REMOVE EXISTING UTILITY PIPE OR PROVIDE PIPE BACK-FILLING AFTER REMOVAL OF EXISTING UTILITIES WITHIN BUILDING FOOTPRINT USING "LOW DENSITY CONCRETE/FLOWABLE FILL".
20. RESTORATION OF THE EXISTING ROADWAY RIGHT-OF-WAYS ARE CONSIDERED INCIDENTAL AND SHOULD BE PART OF THE COST OF THE UNDERGROUND IMPROVEMENTS, DEMOLITION AND REMOVAL. THIS INCLUDES CURB & GUTTER, SIDEWALK, TOPSOIL, SEEDING AND MULCHING.

LEGEND (DEMOLITION)

- PROPERTY LINE
- RIGHT-OF-WAY
- EASEMENT LINE
- SAWCUT
- DEMOLITION – REMOVAL OF CURB
- DEMOLITION – REMOVAL OF ASPHALT SURFACES
- DEMOLITION – REMOVAL OF CONCRETE SURFACES
- DEMOLITION – REMOVAL OF BUILDINGS/STRUCTURES
- DEMOLITION – REMOVAL OF UTILITIES
- DEMOLITION – REMOVAL OF LANDSCAPE BEDDING
- DEMOLITION – REMOVAL OF TREES
- DEMOLITION – REMOVAL OF SHRUBS
- PROTECT EXISTING TREE

north

SCALE IN FEET
30' 0 30'

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161 HORIZON DRIVE, SUITE 101
VERONA, WISCONSIN 53593
P. 608.848.5060

CLIENT:
DAVID MOLLENKOPF ARCHITECT

CLIENT ADDRESS:
49 MUSIC SQUARE W #600
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR
DANE COUNTY, WI

PLAN MODIFICATIONS:

#	Date:	Description:
1	05/31/2018	VILLAGE PRE-APP MTG
2	06/13/2018	VILLAGE SUBMITTAL
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Design/Drawn: KWH
Approved: MRH

SHEET TITLE:
DEMOLITION PLAN

SHEET NUMBER:
C2.0

JSD PROJECT NO: 18-8488

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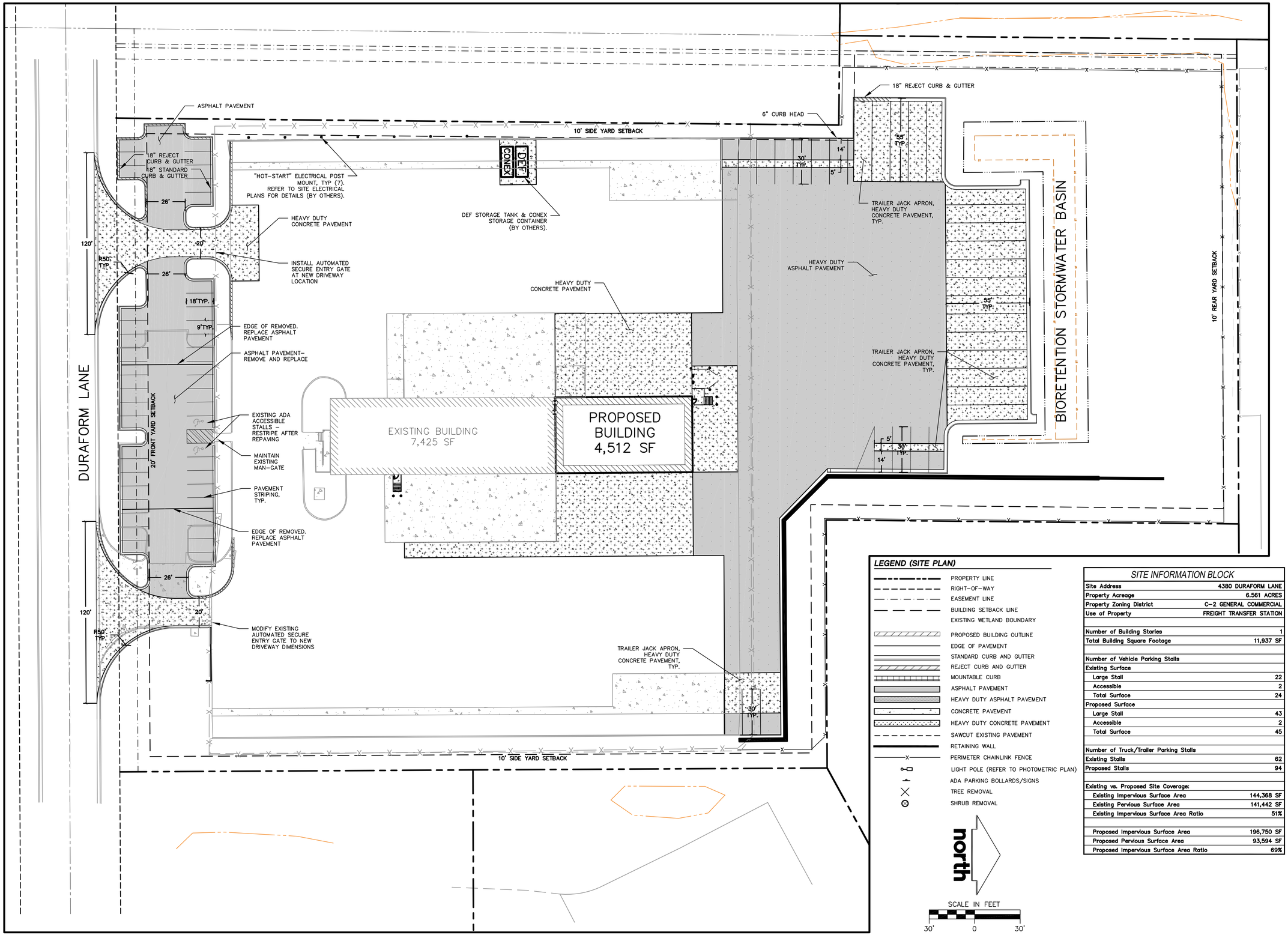

LEGEND (SITE PLAN)

- PROPERTY LINE
- RIGHT-OF-WAY
- EASEMENT LINE
- BUILDING SETBACK LINE
- EXISTING WETLAND BOUNDARY
- PROPOSED BUILDING OUTLINE
- EDGE OF PAVEMENT
- STANDARD CURB AND GUTTER
- REJECT CURB AND GUTTER
- MOUNTABLE CURB
- ASPHALT PAVEMENT
- HEAVY DUTY ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- HEAVY DUTY CONCRETE PAVEMENT
- SAWCUT EXISTING PAVEMENT
- RETAINING WALL
- PERIMETER CHAINLINK FENCE
- LIGHT POLE (REFER TO PHOTOMETRIC PLAN)
- ADA PARKING BOLLARDS/SIGNS
- TREE REMOVAL
- SHRUB REMOVAL

north

SCALE IN FEET

30' 0 30'

SITE INFORMATION BLOCK

Site Address	4380 DURAFORM LANE
Property Acreage	6.561 ACRES
Property Zoning District	C-2 GENERAL COMMERCIAL
Use of Property	FREIGHT TRANSFER STATION
Number of Building Stories	1
Total Building Square Footage	11,937 SF
Number of Vehicle Parking Stalls	
Existing Surface	
Large Stall	22
Accessible	2
Total Surface	24
Proposed Surface	
Large Stall	43
Accessible	2
Total Surface	45
Number of Truck/Trailer Parking Stalls	
Existing Stalls	62
Proposed Stalls	94
Existing vs. Proposed Site Coverage:	
Existing Impervious Surface Area	144,368 SF
Existing Pervious Surface Area	141,442 SF
Existing Impervious Surface Area Ratio	51%
Proposed Impervious Surface Area	196,750 SF
Proposed Pervious Surface Area	93,594 SF
Proposed Impervious Surface Area Ratio	69%

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161 HORIZON DRIVE, SUITE 101
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P. 608.848.5060

CLIENT:
DAVID MOLLENKOPF ARCHITECT

CLIENT ADDRESS:
49 MUSIC SQUARE W #600
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR
DANE COUNTY, WI

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Design/Drawn: KWH
Approved: MRH

SHEET TITLE:
SITE PLAN

SHEET NUMBER:
C3.0

JSD PROJECT NO: 18-8488

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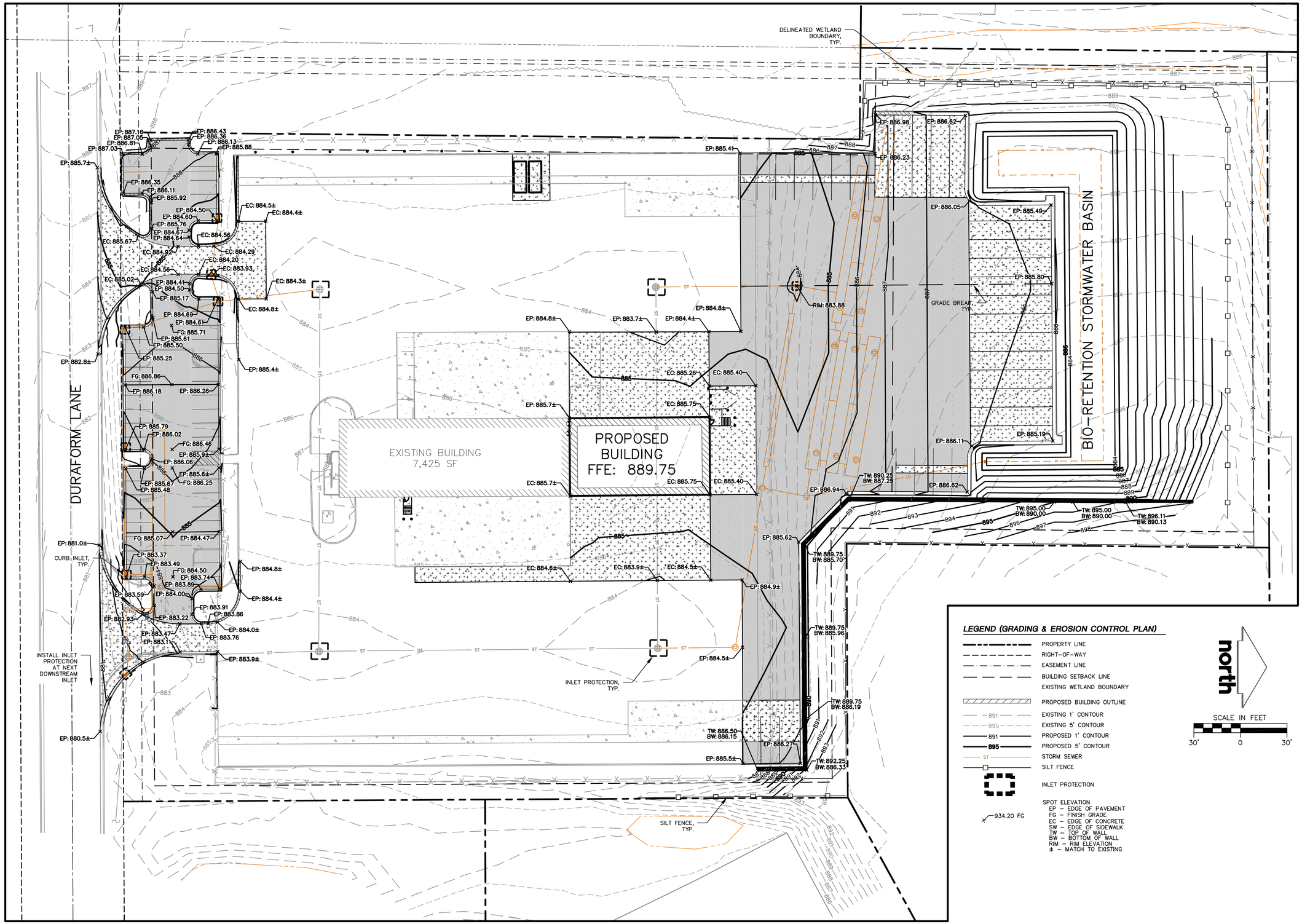

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Design/Drawn: KWH
Approved: MRH

SHEET TITLE:
GRADING AND EROSION CONTROL PLAN

SHEET NUMBER:
C4.0

JSD PROJECT NO: 18-8488

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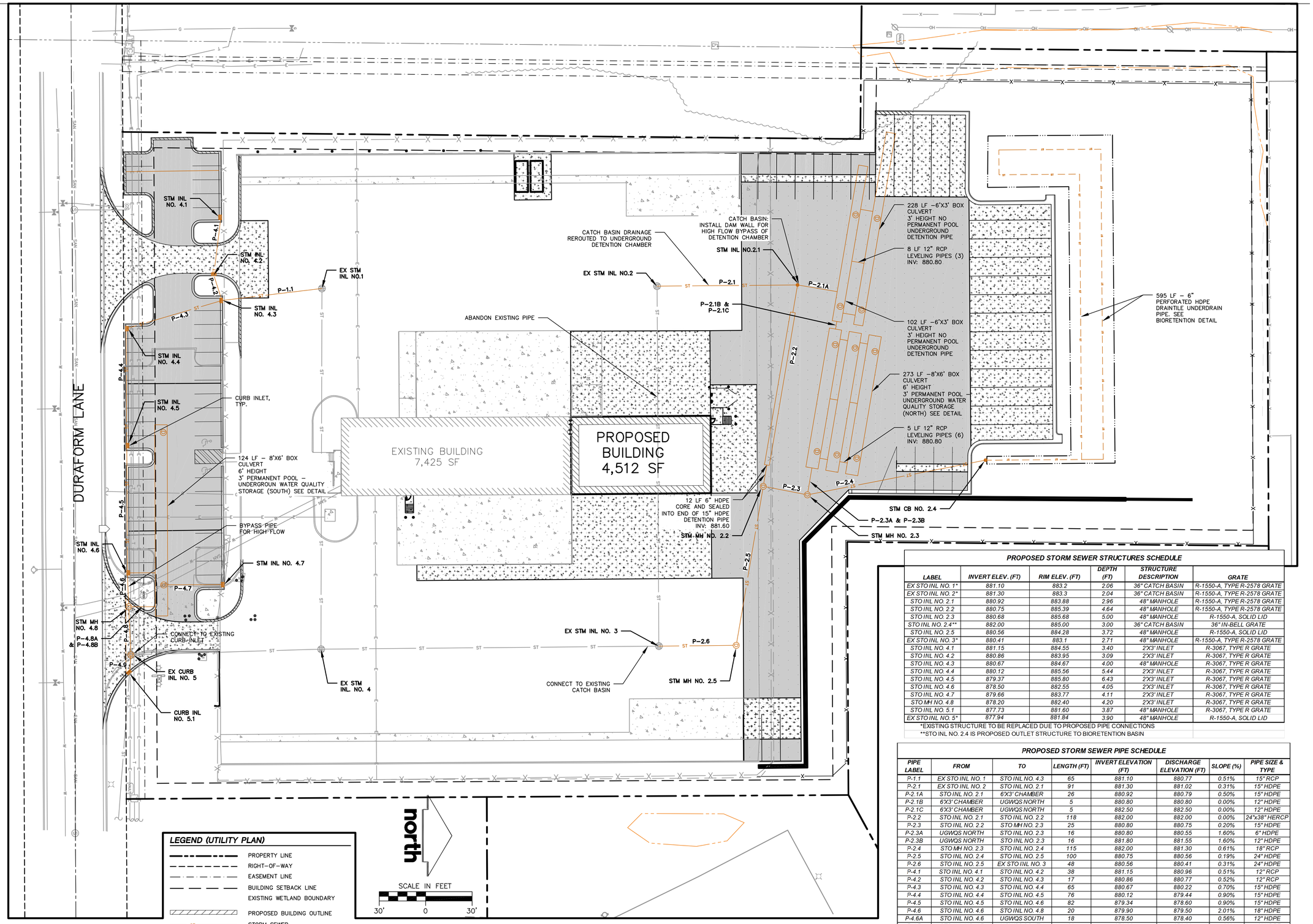

PROPOSED STORM SEWER STRUCTURES SCHEDULE

LABEL	INVERT ELEV. (FT)	RIM ELEV. (FT)	DEPTH (FT)	STRUCTURE DESCRIPTION	GRATE
EX STO INL NO. 1*	881.10	883.2	2.06	36" CATCH BASIN	R-1550-A, TYPE R-2578 GRATE
EX STO INL NO. 2*	881.30	883.3	2.04	36" CATCH BASIN	R-1550-A, TYPE R-2578 GRATE
STO INL NO. 2.1	880.92	883.88	2.96	48" MANHOLE	R-1550-A, TYPE R-2578 GRATE
STO INL NO. 2.2	880.75	885.39	4.64	48" MANHOLE	R-1550-A, TYPE R-2578 GRATE
STO INL NO. 2.3	880.68	885.68	5.00	48" MANHOLE	R-1550-A, SOLID LID
STO INL NO. 2.4**	882.00	885.00	3.00	36" CATCH BASIN	36" IN-BELL GRATE
STO INL NO. 2.5	880.56	884.28	3.72	48" MANHOLE	R-1550-A, SOLID LID
EX STO INL NO. 3*	880.41	883.1	2.71	48" MANHOLE	R-1550-A, TYPE R-2578 GRATE
STO INL NO. 4.1	881.15	884.55	3.40	2'X3' INLET	R-3067, TYPE R GRATE
STO INL NO. 4.2	880.86	883.95	3.09	2'X3' INLET	R-3067, TYPE R GRATE
STO INL NO. 4.3	880.67	884.67	4.00	48" MANHOLE	R-3067, TYPE R GRATE
STO INL NO. 4.4	880.12	885.56	5.44	2'X3' INLET	R-3067, TYPE R GRATE
STO INL NO. 4.5	879.37	885.80	6.43	2'X3' INLET	R-3067, TYPE R GRATE
STO INL NO. 4.6	878.50	882.55	4.05	2'X3' INLET	R-3067, TYPE R GRATE
STO INL NO. 4.7	879.66	883.77	4.11	2'X3' INLET	R-3067, TYPE R GRATE
STO MH NO. 4.8	878.20	882.40	4.20	2'X3' INLET	R-3067, TYPE R GRATE
STO INL NO. 5.1	877.73	881.60	3.87	48" MANHOLE	R-3067, TYPE R GRATE
EX STO INL NO. 5*	877.94	881.84	3.90	48" MANHOLE	R-1550-A, SOLID LID

*EXISTING STRUCTURE TO BE REPLACED DUE TO PROPOSED PIPE CONNECTIONS
**STO INL NO. 2.4 IS PROPOSED OUTLET STRUCTURE TO BIORETENTION BASIN

PROPOSED STORM SEWER PIPE SCHEDULE

PIPE LABEL	FROM	TO	LENGTH (FT)	INVERT ELEVATION (FT)	DISCHARGE ELEVATION (FT)	SLOPE (%)	PIPE SIZE & TYPE
P-1.1	EX STO INL NO. 1	STO INL NO. 4.3	65	881.10	880.77	0.51%	15" RCP
P-2.1	EX STO INL NO. 2	STO INL NO. 2.1	91	881.30	881.02	0.31%	15" HDPE
P-2.1A	STO INL NO. 2.1	6'X3' CHAMBER	26	880.92	880.79	0.50%	15" HDPE
P-2.1B	6'X3' CHAMBER	UGWQS NORTH	5	880.80	880.80	0.00%	12" HDPE
P-2.1C	6'X3' CHAMBER	UGWQS NORTH	5	882.50	882.50	0.00%	12" HDPE
P-2.2	STO INL NO. 2.1	STO INL NO. 2.2	118	882.00	882.00	0.00%	24"x38" HERCP
P-2.3	STO INL NO. 2.2	STO MH NO. 2.3	25	880.80	880.75	0.20%	15" HDPE
P-2.3A	UGWQS NORTH	STO INL NO. 2.3	16	880.80	880.55	1.60%	6" HDPE
P-2.3B	UGWQS NORTH	STO INL NO. 2.3	16	881.80	881.55	1.60%	12" HDPE
P-2.4	STO MH NO. 2.3	STO INL NO. 2.4	115	882.00	881.30	0.61%	18" RCP
P-2.5	STO INL NO. 2.4	STO INL NO. 2.5	100	880.75	880.56	0.19%	24" HDPE
P-2.6	STO INL NO. 2.5	EX STO INL NO. 3	48	880.56	880.41	0.31%	24" HDPE
P-4.1	STO INL NO. 4.1	STO INL NO. 4.2	38	881.15	880.96	0.51%	12" RCP
P-4.2	STO INL NO. 4.2	STO INL NO. 4.3	17	880.86	880.77	0.52%	12" RCP
P-4.3	STO INL NO. 4.3	STO INL NO. 4.4	65	880.67	880.22	0.70%	15" HDPE
P-4.4	STO INL NO. 4.4	STO INL NO. 4.5	76	880.12	879.44	0.90%	15" HDPE
P-4.5	STO INL NO. 4.5	STO INL NO. 4.6	82	879.34	878.60	0.90%	15" HDPE
P-4.6	STO INL NO. 4.6	STO INL NO. 4.8	20	879.90	879.50	2.01%	18" HDPE
P-4.6A	STO INL NO. 4.6	UGWQS SOUTH	18	878.50	878.40	0.56%	12" HDPE
P-4.7	STO INL NO. 4.7	UGWQS SOUTH	36	879.66	879.30	1.00%	10" HDPE
P-4.8	STO MH NO. 4.8	EX STO INL NO. 5	27	878.20	877.94	0.96%	18" HDPE
P-4.8A	UGWQS SOUTH	STO MH NO. 4.8	15	878.30	878.30	0.00%	6" HDPE
P-4.8B	UGWQS SOUTH	STO MH NO. 4.8	15	879.30	879.10	1.31%	12" HDPE
P-4.9	EX STO INL NO. 5	STO INL NO. 5.1	12	877.94	877.73	1.60%	18" RCP

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CLIENT ADDRESS:
49 MUSIC SQUARE W #600
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR
DANE COUNTY, WI

PLAN MODIFICATIONS:

#	Date:	Description:
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Design/Drawn: KWH
Approved: MRH

SHEET TITLE:
UTILITY PLAN

SHEET NUMBER:
C5.0

JSD PROJECT NO: 18-8488

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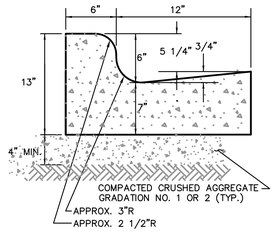
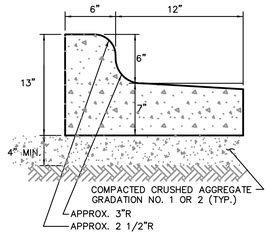


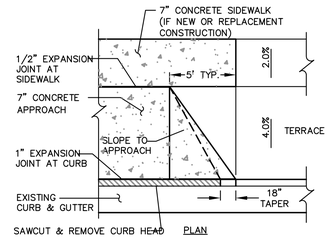
18" STANDARD CURB AND GUTTER

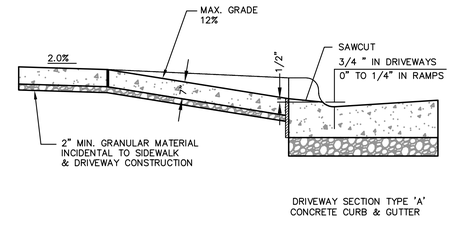
N.T.S.



18" REJECT CURB AND GUTTER

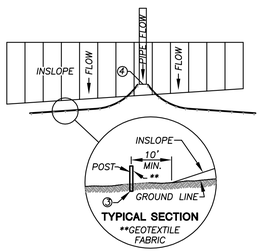
N.T.S.

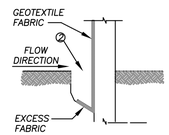




COMMERCIAL ENTRANCE

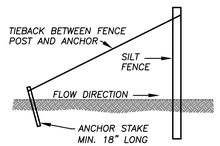
N.T.S.



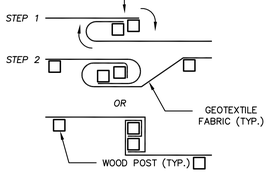


NOTE: ADDITIONAL POST DEPTH OR TIE BACKS MAY BE REQUIRED IN UNSTABLE SOILS

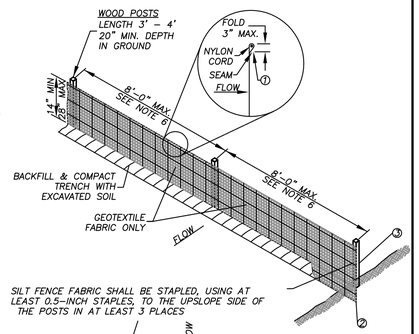
TRENCH DETAIL



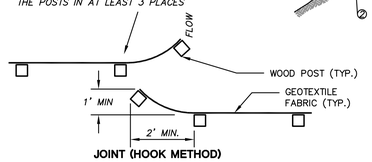
SILT FENCE TIE BACK
(WHEN ADDITIONAL SUPPORT REQUIRED)



JOINT (TWIST METHOD)



SILT FENCE FABRIC SHALL BE STAPLED, USING AT LEAST 0.5-INCH STAPLES, TO THE UPSLOPE SIDE OF THE POSTS IN AT LEAST 3 PLACES

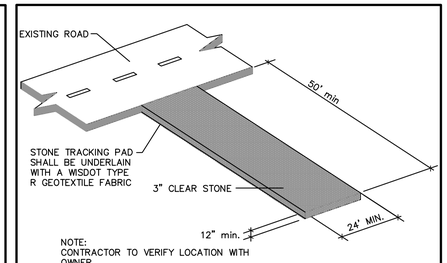


JOINT (HOOK METHOD)

SILT FENCE

N.T.S.

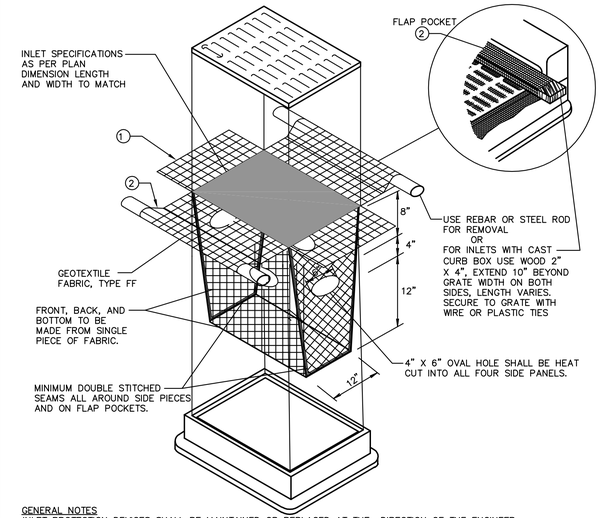
1. SILT FENCE SHALL BE ANCHORED BY SPREADING AT LEAST 8 INCHES OF FABRIC IN A 4" WIDE AND 6" DEEP TRENCH OR 6 INCH DEEP V-TRENCH ON THE UPSLOPE SIDE OF THE FENCE. TRENCHES SHALL NOT BE EXCAVATED WIDER OR DEEPER THAN NECESSARY FOR PROPER INSTALLATION.
2. FOLD MATERIAL TO FIT TRENCH AND BACKFILL AND COMPACT TRENCH WITH EXCAVATED SOIL.
3. WOOD POSTS SHALL BE A MINIMUM SIZE OF 1 1/8" x 1 1/8" OF DRIED OAK OR HICKORY.
4. SILT FENCE TO EXTEND ABOVE THE TOP OF PIPE.
5. SILT FENCE CONSTRUCTION AND GEOTEXTILE FABRIC SHALL CONFORM TO WDNR TECHNICAL STANDARD 1056.
6. POST SPACING SHALL BE SELECTED BASED ON GEOTEXTILE FABRIC (8'-0" FOR WOVEN & 3'-0" FOR NON-WOVEN)



NOTE:
CONTRACTOR TO VERIFY LOCATION WITH OWNER

CONSTRUCTION ENTRANCE

N.T.S.



GENERAL NOTES
INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.

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.

① FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.

② FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2X4.

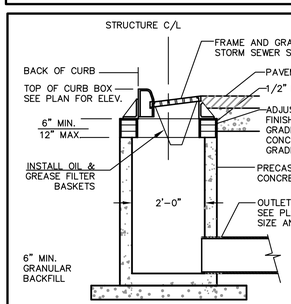
INSTALLATION NOTES
DO NOT INSTALL INLET PROTECTION TYPE D IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

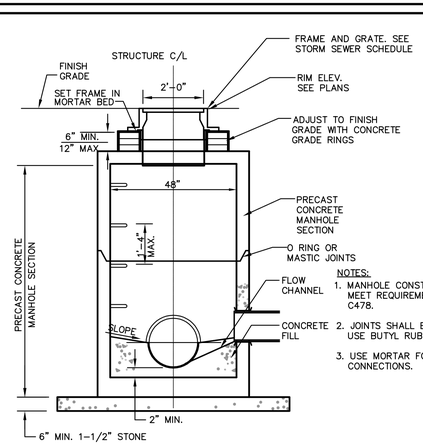
INLET PROTECTION, TYPE D

N.T.S.



STORM INLET

N.T.S.



NOTES:
1. MANHOLE CONSTRUCTION TO MEET REQUIREMENTS OF ASTM C478.
2. JOINTS SHALL BE WATERTIGHT. USE BUTYL RUBBER GASKET.
3. USE MORTAR FOR PIPE CONNECTIONS.

STORM MANHOLE (FLAT)

N.T.S.

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P. 608.848.5060

CLIENT:
DAVID MOLLENKOPF ARCHITECT

CLIENT ADDRESS:
49 MUSIC SQUARE W #600
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR
DANE COUNTY, WI

PLAN MODIFICATIONS:

#	Date:	Description:
1	05/31/2018	VILLAGE PRE-APP MTG
2	06/13/2018	VILLAGE SUBMITTAL
3		
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Design/Drawn: KWH
Approved: MRH

SHEET TITLE:
DETAILS

SHEET NUMBER:
C6.0

JSD PROJECT NO: 18-8488

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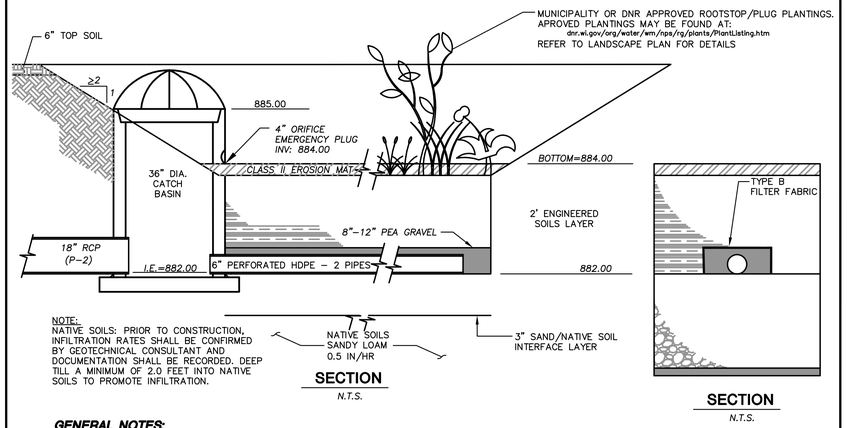


NOTE:
NATIVE SOILS: PRIOR TO CONSTRUCTION, INFILTRATION RATES SHALL BE CONFIRMED BY GEOTECHNICAL CONSULTANT AND DOCUMENTATION SHALL BE RECORDED. DEEP TILL A MINUS OF 2.0 FEET INTO NATIVE SOILS TO PROMOTE INFILTRATION.

SECTION
N.T.S.

SECTION
N.T.S.

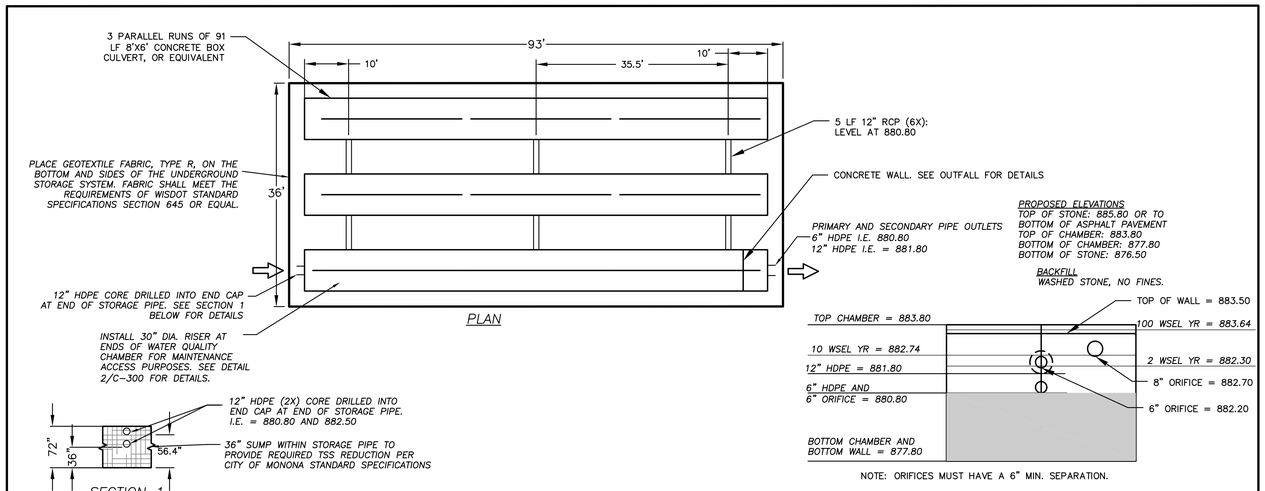
GENERAL NOTES:

1. ALL CONSTRUCTION PRACTICES SHALL MEET THE SPECIFICATIONS OF THE WDNR TECHNICAL STANDARD 1004 – BIORETENTION FOR INFILTRATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A COPY OF THIS STANDARD AND CONSTRUCT THE BIORETENTION DEVICE IN ACCORDANCE WITH THE REQUIREMENTS OUTLINED THEREIN.
2. CONTRACTOR SHALL INSTALL ENGINEERED SOIL CONSISTING OF: 70% ASTM C33 SAND, 30% CERTIFIED COMPOST (SEE GENERAL NOTE 3).
3. CERTIFIED COMPOST SHALL CONSIST OF: >40% ORGANIC MATTER, <60% ASH CONTENT, pH OF 6–8, AND MOISTURE CONTENT OF 35–50% BY WEIGHT.
4. SAND OR GRAVEL STORAGE LAYER SHALL MEET ONE OF THE FOLLOWING GRADATION REQUIREMENTS: USDA COURSE SAND (.02 – .04 INCHES); ASTM C33 (FINE AGGREGATE CONCRETE SAND); WSDOT STANDARDS & SPECIFICATIONS FOR HIGHWAY & STRUCTURE CONSTRUCTION, CURRENT EDITION, SECTION 501.2.5.3.4 (FINE AGGREGATE CONCRETE SAND); OR OTHER APPROVED EQUIVALENT BY AGENCY.
5. SAND/NATIVE SOIL INFILTRATION LAYER SHALL BE FORMED BY A LAYER OF SAND 3 INCHES DEEP, WHICH IS VERTICALLY MIXED WITH THE NATIVE SOIL TO A DEPTH OF 2–4 INCHES.
6. FILTER FABRIC SHALL BE PLACED ABOVE AND AROUND THE SIDES OF THE PERFORATED PIPE, BETWEEN THE PEA GRAVEL AND THE ENGINEERED SOIL, A WIDTH OF 4 FEET CENTERED OVER THE FLOW LINE OF THE PIPE.
7. ANNUAL RYE GRASS SHALL BE SEEDED AT 40 LB/ACRE WITH THE SEED MIX IN THE AREAS SURROUNDING THE BASIN, ON SIDE SLOPES, AND OVER ANY LAND THAT DISCHARGES INTO THE BASIN FOR EROSION CONTROL WHEN BASIN IS BROUGHT ON–LINE. ROOTSTOP AND PLUGS ARE REQUIRED TO ESTABLISH VEGETATION AT THE INVERT OF THE BASIN. REFER TO LANDSCAPE PLANS FOR DETAILS.
8. RUNOFF MUST INFILTRATE WITHIN 48–HOURS. BASINS UNABLE TO MAINTAIN THESE RATES MUST BE DEEP TILLED, REGRADED, AND IF NECESSARY REPLANTED TO RESTORE ORIGINAL INFILTRATION RATES.
9. ALL WORK TO BE CONDUCTED IN CONFORMANCE WITH APPLICABLE LOCAL, REGIONAL, AND STATE STORMWATER STANDARDS FOR THE PROJECT SITE AS APPROVED BY THE REGULATORY ENGINEER.
10. OWNER OR CONTRACTOR MUST CONSULT LANDSCAPE ARCHITECT OR ECOLOGICAL PLANTING AGENCY FOR APPROPRIATE PLANTS AND PLANTING CONFIGURATIONS.
11. 4" ORIFICE W/ EMERGENCY PLUG SHALL BE INSTALLED W/ ORIFICE OPEN TO ALLOW ESTABLISHMENT OF SEEDING AT BOTTOM OF BASIN. UPON VEGETATION ESTABLISHMENT AT INVERT OF BASIN 4" EMERGENCY ORIFICE SHALL BE PLUGGED W/ WATER TIGHT PLUG.

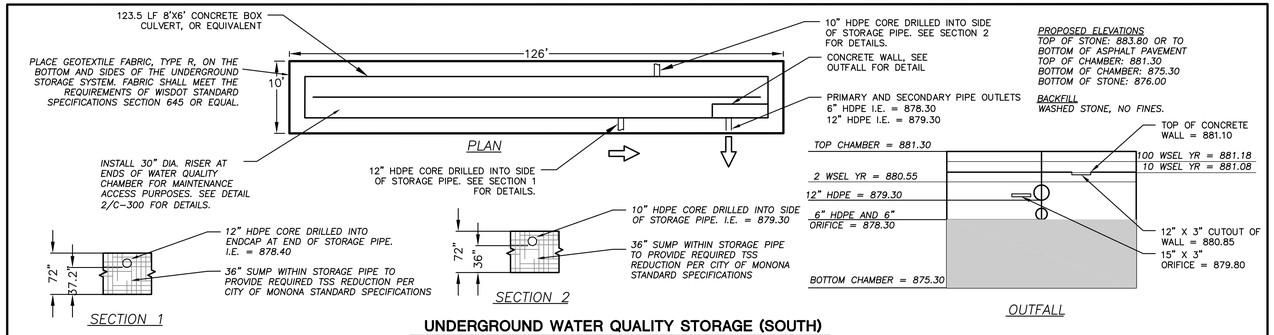
INFILTRATION DEVICES ARE DESIGNED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES (WDNR), COUNTY, MUNICIPALITY, AND ENGINEERING STANDARD OF CARE. ALL DESIGNATED INFILTRATION AREAS (e.g. RAIN GARDENS, INFILTRATION BASINS, BIORETENTION DEVICES) SHALL BE FENCED PRIOR TO CONSTRUCTION AND REMAIN UNDISTURBED AND PROTECTED DURING THE CONSTRUCTION OF PROPOSED SITE IMPROVEMENTS. PROPOSED BIORETENTION DEVICES SHALL NOT BE CONSTRUCTED UNTIL THE DEVICE'S CONTRIBUTING WATERSHED AREA MEETS ESTABLISHED VEGETATION REQUIREMENTS SET FORTH WITHIN THE RESPECTIVE WDNR TECHNICAL STANDARDS. IF THE LOCATION OF THE INFILTRATION AREA CONFLICTS WITH CONSTRUCTION STAGING AND/OR CONSTRUCTION TRAFFIC AND IS DISTURBED, COMPACTION MITIGATION WILL BE REQUIRED AT THE CONTRACTOR'S EXPENSE.

THE CONTRACTOR IS REQUIRED TO PROVIDE QUALIFIED STAFF FOR INSPECTION AND OBSERVATION OF THE CONSTRUCTION ACTIVITIES RELATING TO ALL JOB SITE REGULATORY COMPLIANCE INCLUDING THE PROTECTION AND CONSTRUCTION OF ALL STORMWATER MANAGEMENT FEATURES. ANY OBSERVATION OF PLAN OR SITE DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION.

BIORETENTION BASIN
N.T.S.



UNDERGROUND WATER QUALITY STORAGE (NORTH)
N.T.S.



UNDERGROUND WATER QUALITY STORAGE (SOUTH)
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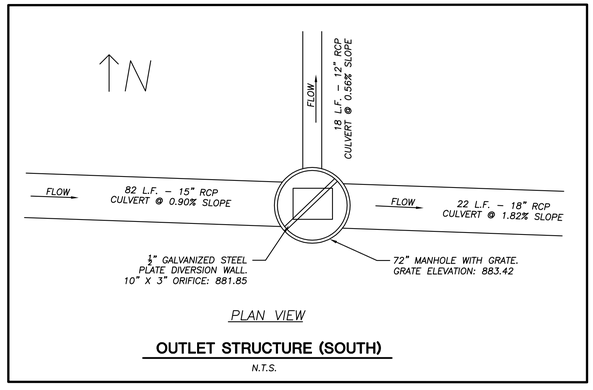

OUTLET STRUCTURE (SOUTH)
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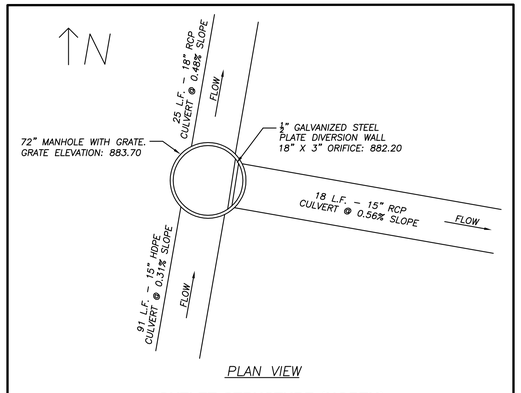

OUTLET STRUCTURE (NORTH)
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P. 608.848.5060

CLIENT:
DAVID MOLLENKOPF ARCHITECT

CLIENT ADDRESS:
49 MUSIC SQUARE W #600
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR
DANE COUNTY, WI

PLAN MODIFICATIONS:

#	Date:	Description:
1	05/31/2018	VILLAGE PRE-APP MTG
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Design/Drawn: KWH
Approved: MRH

SHEET TITLE:
DETAILS

SHEET NUMBER:
C6.1

JSD PROJECT NO: 18-8488

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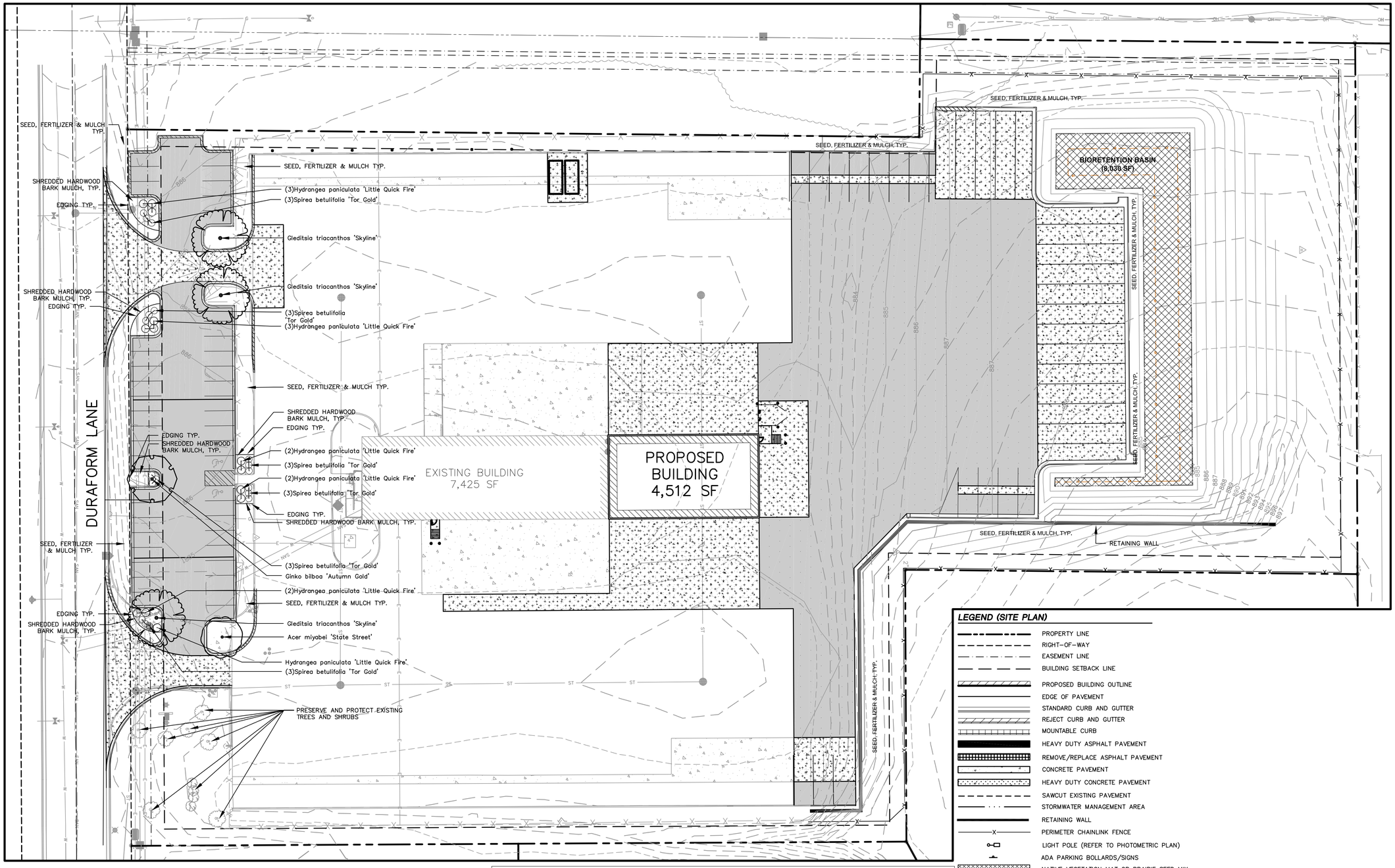

LEGEND (SITE PLAN)

- PROPERTY LINE
- RIGHT-OF-WAY
- EASEMENT LINE
- BUILDING SETBACK LINE
- PROPOSED BUILDING OUTLINE
- EDGE OF PAVEMENT
- STANDARD CURB AND GUTTER
- REJECT CURB AND GUTTER
- MOUNTABLE CURB
- HEAVY DUTY ASPHALT PAVEMENT
- REMOVE/REPLACE ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- HEAVY DUTY CONCRETE PAVEMENT
- SAWCUT EXISTING PAVEMENT
- STORMWATER MANAGEMENT AREA
- RETAINING WALL
- PERIMETER CHAINLINK FENCE
- LIGHT POLE (REFER TO PHOTOMETRIC PLAN)
- ADA PARKING BOLLARDS/SIGNS
- NATIVE VEGETATION MAT OR PRAIRIE SEED MIX

PLANT SCHEDULE

TREES	QTY	COMMON NAME / BOTANICAL NAME	ROOT CONDITION	SIZE AT PLANTING	MATURE HT	MATURE SP
	1	Miyabei Maple / Acer miyabei `State Street`	B & B	2"Cal	40'	25'
	1	Maidenhair Tree / Ginkgo biloba `Autumn Gold` TM	B & B	2"Cal	50'	30'
	3	Skyline Honey Locust / Gleditsia triacanthos `Skyline`	B & B	2"Cal	50'	40'
SHRUBS	**QTY**	**COMMON NAME / BOTANICAL NAME**	**CONT**	**SIZE AT PLANTING**	**MATURE HT**	**MATURE SP**
	13	Little Quick Fire Hydrangea / Hydrangea paniculata `Little Quick Fire`	3 gal	18" tall min.	5'	5'
	18	Glow Girl Birchleaf Spirea / Spiraea betulifolia `Tor Gold`	3 gal	18" tall min.	4'	4'

north

SCALE IN FEET
30' 0 30'

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CLIENT:
DAVID MOLLENKOPF ARCHITECT

CLIENT ADDRESS:
209 10TH AVENUE SOUTH, STE 414
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR, WI
DANE COUNTY

PLAN MODIFICATIONS:

#	Date:	Description:
1	06/11/2018	MUNICIPAL APPROVAL
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Design/Drawn: MWS
Approved: ABK

SHEET TITLE:
LANDSCAPE PLAN

SHEET NUMBER:
L1.0

JSD PROJECT NO: 18-8488

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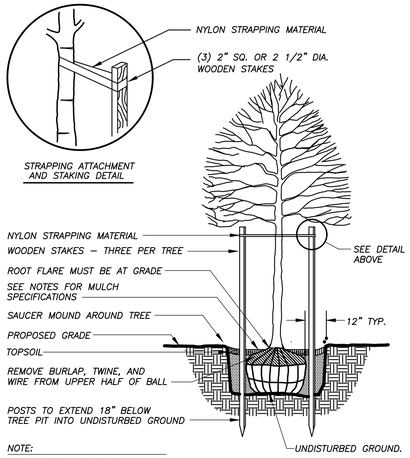
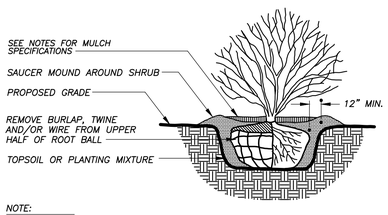


NOTE:
1. ROOT FLARE TO BE EXPOSED.
2. DIG HOLE NO DEEPER THAN BASE OF ROOT BALL TO FLARE.
3. ROOT BALL TO BE SET ON UNDISTURBED GROUND.

DECIDUOUS TREE PLANTING DETAIL

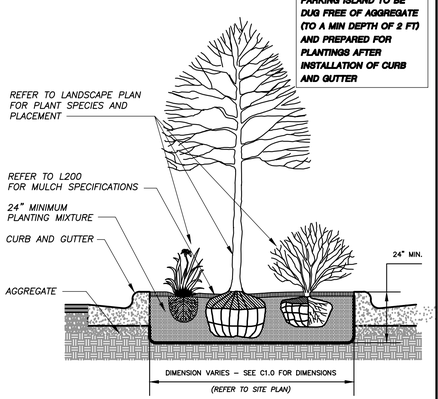
N.T.S.



NOTE:
1. ROOT FLARE TO BE EXPOSED.
2. DIG HOLE NO DEEPER THAN BASE OF ROOT BALL TO FLARE.

DECIDUOUS SHRUB PLANTING DETAIL

N.T.S.



TYPICAL PARKING ISLAND DETAIL

N.T.S.

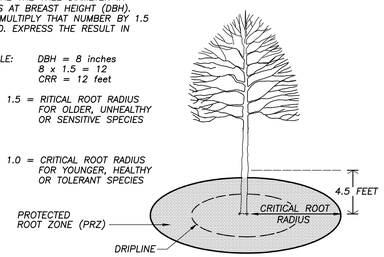
APPROXIMATE A TREE'S PROTECTED ROOT ZONE BY CALCULATING THE CRITICAL ROOT RADIUS (CRR). FIRST, MEASURE THE TREE DIAMETER IN INCHES AT BREAST HEIGHT (DBH). THEN MULTIPLY THAT NUMBER BY 1.5 OR 1.0. EXPRESS THE RESULT IN FEET.

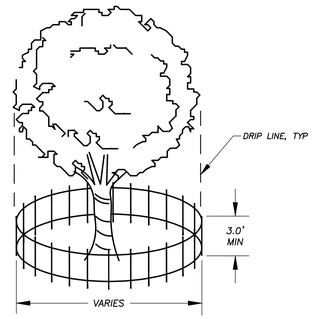
EXAMPLE: DBH = 8 inches
8 x 1.5 = 12
CRR = 12 feet

DBH x 1.5 = RITICAL ROOT RADIUS FOR OLDER, UNHEALTHY OR SENSITIVE SPECIES

OR

DBH x 1.0 = CRITICAL ROOT RADIUS FOR YOUNGER, HEALTHY OR TOLERANT SPECIES

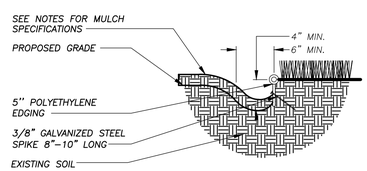




TREE NOTES:
1. CONTRACTOR SHALL INSTALL TREE PROTECTION FENCING IN THE AREA SURROUNDING THE TREE WITHIN THE CRITICAL ROOT RADIUS
2. NO EXCAVATION IS PERMITTED WITHIN THE CRITICAL ROOT RADIUS
3. IF EXCAVATION WITHIN THE CRITICAL ROOT RADIUS OF ANY TREE IS NECESSARY, CONTRACTOR SHALL CONTACT CITY FORESTER PRIOR TO EXCAVATION TO ASSESS THE IMPACT TO THE TREE AND ROOT SYSTEM.

TREE PROTECTION DETAIL

N.T.S.



LANDSCAPE EDGING DETAIL

N.T.S.

Stormwater Plug Plant Mix 7,990 sq. ft.

Botanical Name	Common Name	Quantity	Spacing
Permanent Grasses:			
Carex grayii	Common Bur Sedge	447	1'0" On Center
Carex stipata	Common Fox Sedge	447	1'0" On Center
Panicum virgatum	Switch Grass	447	1'0" On Center
Spartina pectinata	Prairie Cord Grass	447	1'0" On Center
Forbs:			
Aster novae-angilae	New England Aster	443	1'0" On Center
Asclepias incamata	Swamp Milkweed	443	1'0" On Center
Echinacea purpurea	Broad-Leaved Purple Coneflower	443	1'0" On Center
Eryngium yuccifolium	Rattlesnake Master	443	1'0" On Center
Eupatorium maculatum	Spotted Joe-Pye Weed	443	1'0" On Center
Liatris spicata	Marsh Blazing Star	443	1'0" On Center
Lobelia cardinalis	Cardinal Flower	443	1'0" On Center
Monarda fistulosa	Wild Bergamot	443	1'0" On Center
Penstemon digitalis	Foxglove Beardtongue	443	1'0" On Center
Pycnanthemum virginianum	Common Mountain Mint	443	1'0" On Center
Ratibida pinnata	Yellow Coneflower	443	1'0" On Center
Rudbeckia hirta	Black-Eyed Susan	443	1'0" On Center
Veronicastrum virginianum	Culver's Root	443	1'0" On Center
Zizia aurea	Golden Alexanders	443	1'0" On Center
	TOTAL	**7990**	

LANDSCAPE MATERIAL NOTES

1. MATERIALS – SOIL: PLANTING SOIL SHALL MEET THESE REQUIREMENTS:
   A. PLANTING AREAS = 24"
   B. TREE PITS = SEE DETAILS
2. PLANTING SOIL TO BE A MINIMUM 24" DEPTH, UNLESS OTHERWISE SPECIFIED AS ABOVE OR ON DETAILS. TOPSOIL TO BE CLEAN, FRIABLE LOAM FROM A LOCAL SOURCE, FREE FROM STONES OR DEBRIS OVER 3/4" IN DIAMETER, AND FREE FROM TOXINS. TOPSOIL SHALL HAVE A pH VALUE BETWEEN 6 AND 7. TOPSOIL AND PLANTING SOIL SHALL BE TESTED TO CONFORM TO THESE SPECIFICATIONS AND SHALL BE AMENDED TO MEET THESE SPECIFICATIONS. PROVIDE TEST RESULTS TO OWNER'S REPRESENTATIVE PRIOR TO PLACEMENT. DO NOT PLACE FROZEN OR MUDDY TOPSOIL. APPLY SOIL AMENDMENTS TO ALL LANDSCAPE AREAS PER SOIL TEST.
3. MATERIALS – SHREDDED HARDWOOD BARK MULCH: ALL PLANTING AREAS LABELED ON PLAN SHALL RECEIVE CERTIFIED WEED FREE SHREDDED HARDWOOD BARK MULCH OVER ALL PLANTING AREAS. SHREDDED HARDWOOD BARK MULCH SIZE & COLOR TO BE APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION. FERTILIZER SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL, COUNTY AND STATE OF WISCONSIN REQUIREMENTS. SHREDDED HARDWOOD BARK MULCH AREAS SHALL NOT RECEIVE WOVEN WEED BARRIER FABRIC.
4. MATERIALS – TREE & SHRUB RINGS: ALL TREES AND/OR SHRUBS PLANTED IN SEEDED LAWN AREAS TO BE INSTALLED WITH A MINIMUM 5' DIAMETER SHREDDED HARDWOOD BARK MULCH TREE RING SPREAD TO A CONSISTENT DEPTH OF 4 INCHES. ALL TREE RINGS SHOULD BE INSTALLED WITH A 5" DEPTH SHOVEL CUT EDGE, ANGLED 45 DEGREES INTO SOIL AT A 5' DIAMETER ABOUT THE CENTER OF THE TREE PLANTING. A PRE–EMERGENT GRANULAR HERBICIDE WEED–PREVENTER SHOULD BE MIXED WITH MULCH USED TO INSTALL TREE RING AS WELL AS TOPICALLY APPLIED TO FINISHED INSTALLATION OF TREE RING.
5. MATERIALS – EDGING: EDGING SHALL BE 5" DEEP, POLYETHYLENE EDGING. OWNER'S REPRESENTATIVE SHALL APPROVE PRODUCT SPECIFICATION PROVIDED BY LANDSCAPE CONTRACTOR.
6. MATERIALS – SEED: DISTURBED LAWN AREAS LABELED ON PLAN AS SUCH, SHALL RECEIVE "NO MOW" FESCUE OR EQUIVALENT AS APPROVED BY THE OWNER'S REPRESENTATIVE, INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. IN ADDITION TO FESCUE SEED, ANNUAL RYE SHALL BE APPLIED TO ALL DISTURBED AREAS AT A RATE OF 1 1/2 LBS PER 1000 SQUARE FEET. FERTILIZE AND MULCH PER MANUFACTURER'S RECOMMENDATIONS.
7. MATERIALS – SEED: DISTURBED LAWN AREAS LABELED ON PLAN AS SUCH, SHALL BE SPREAD BY HAND BROADCAST METHOD OR APPROPRIATE SPREADER EQUIPMENT WITH EARTH CARPET'S 'MADISON PARKS' OR EQUIVALENT AS APPROVED BY THE OWNER'S REPRESENTATIVE, INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. IN ADDITION TO LAWN SEED, ANNUAL RYE SHALL BE APPLIED TO ALL DISTURBED AREAS AT A RATE OF 1 1/2 LBS PER 1000 SQUARE FEET. FERTILIZE AND MULCH PER MANUFACTURER'S RECOMMENDATIONS.
8. *MATERIALS – BIORETENTION BASIN NATIVE VEGETATIVE MAT (NVM): AREAS SPECIFIED ON PLANS SHALL RECEIVE AGRECOL "RAINWATER RENEWAL" NATIVE VEGETATIVE MAT – DEGRADABLE CORE. CONTRACTOR SHALL CONTACT AGRECOL 16 WEEKS IN ADVANCE OF INSTALLATION FOR PROPER GROWING LEAD TIME. CONTRACTOR SHALL ASSUME AVAILABLE DELIVERY DATE TO BE BETWEEN MID–JUNE THROUGH THE END OF OCTOBER DUE TO THE NMV GROWING SEASON. REFER TO PRODUCT SPECIFICATIONS AND MANUFACTURER'S RECOMMENDATIONS FOR INSTALLATION.*

OR

9. MATERIALS – BIORETENTION BASIN PLUG PLANTINGS: PLUG PLANTINGS TO BE INSTALLED 1'–0" ON CENTER, MIXING SPECIES INTEGRALLY IN FLATS OF 32 AT A TIME. REFER TO WDNR TECHNICAL STANDARDS FOR ROOTSTOCK AND PLUG PLANTINGS FOR BIORETENTION BASINS.

GENERAL NOTES

1. GENERAL: ALL WORK IN THE R–O–W AND PUBLIC EASEMENTS SHALL BE IN ACCORDANCE WITH LOCAL MUNICIPAL REQUIREMENTS. JSD SHALL BE HELD HARMLESS AND DOES NOT WARRANT ANY DEVIATIONS BY THE OWNER/CONTRACTOR FROM THE APPROVED CONSTRUCTION PLANS THAT MAY RESULT IN DISCIPLINARY ACTIONS BY ANY OR ALL REGULATORY AGENCIES. LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE DONE TO UTILITIES. CONTRACTOR MUST CALL 1–800–382–5544 FOR UTILITY LOCATIONS AT LEAST THREE DAYS PRIOR TO DIGGING. HAND DIG AND INSTALL ALL PLANTS THAT ARE NEAR EXISTING UTILITIES. PROTECT PREVIOUSLY INSTALLED WORK OF OTHER TRADES. CONTRACTOR IS RESPONSIBLE FOR STAKING THE PLANT MATERIALS FOR REVIEW BY OWNER PRIOR TO DIGGING AND PLACEMENT AND SHALL COORDINATE ALL FINE GRADING AND RESTORATION WITH THE GRADING CONTRACTOR.
2. DELIVERY AND HANDLING: DO NOT DELIVER MORE PLANT MATERIALS THAN CAN BE PLANTED IN ONE DAY, UNLESS ADEQUATE, APPROPRIATE AND SECURE STORAGE IS PROVIDED AND APPROVED BY OWNER'S REPRESENTATIVE. AT ALL TIMES, PROTECT ALL PLANT MATERIALS FROM WIND AND DIRECT SUN. DELIVER PLANTS WITH LEGIBLE IDENTIFICATION LABELS. PROTECT PLANTS DURING DELIVERY AND DO NOT PRUNE PRIOR TO DELIVERY. ALL TREES AND SHRUBS SHALL BE PLANTED ON THE DAY OF DELIVERY; IF THIS IS NOT POSSIBLE, PROTECT THE PLANT MATERIALS NOT PLANTED BY STORING THEM IN A SHADED, SECURE AREA, PROTECTING THE ROOT MASS WITH WET SOIL, MULCH, HAY OR OTHER SUITABLE MEDIUM. CONTRACTOR TO KEEP ALL PLANT MATERIALS ADEQUATELY WATERED TO PREVENT ROOT DESICCATION. DO NOT REMOVE CONTAINER GROWN STOCK FROM CONTAINERS BEFORE TIME OF PLANTING. DO NOT PICK UP CONTAINER OR BALLED PLANTS BY STEM OR ROOTS. ALL PLANTS SHALL BE LIFTED AND HANDLED FROM THE BOTTOM OF THE CONTAINER OR BALL. PERFORM ACTUAL PLANTING ONLY WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE IN ACCORDANCE WITH LOCALLY ACCEPTED BEST HORTICULTURAL PRACTICES.
3. MATERIALS – PLANTS: ALL PLANTS SHALL CONFORM TO THE AMERICAN STANDARD FOR NURSERY STOCK ANSI Z60.1–2004. PLANTS SHALL BE TRUE TO SPECIES AND VARIETY SPECIFIED AND NURSERY GROWN IN ACCORDANCE WITH GOOD HORTICULTURAL PRACTICES UNDER CLIMATIC CONDITIONS SIMILAR TO THOSE IN THE LOCALITY OF THE PROJECT FOR AT LEAST 2 YEARS. PLANTS SHALL BE FRESHLY DUG (DURING THE MOST RECENT FAVORABLE HARVEST SEASON). PLANTS SHALL BE SO TRAINED IN DEVELOPMENT AND APPEARANCE AS TO BE UNQUESTIONABLY SUPERIOR IN FORM, COMPACTNESS, AND SYMMETRY. PLANTS SHALL BE SOUND, HEALTHY, VIGOROUS, WELL BRANCHED AND DENSELY FOLIATED WHEN IN LEAF, AND FREE OF DISEASE AND INSECTS (ADULT EGGS, PUPAE OR LARVAE). THEY SHALL HAVE HEALTHY, WELL–DEVELOPED ROOT SYSTEMS AND SHALL BE FREE FROM PHYSICAL DAMAGE OR OTHER CONDITIONS THAT WOULD PREVENT THRIVING GROWTH. PLANTS SHALL BE OF THE HIGHEST QUALITY, POSSESS TYPICAL GROWTH HABITS AND FORM FOR THEIR SPECIES AND BE FREE OF INJURY. PARKWAY TREES AND PARKING LOT TREES SHALL HAVE A MINIMUM BRANCHING HEIGHT OF SIX (6) FEET ABOVE THE GROUND TO ALLOW ADEQUATE VISUAL AND PHYSICAL CLEARANCE.
4. PRUNING: THE CONTRACTOR SHALL PRUNE ALL TREES AND REPAIR ANY INJURIES THAT OCCURRED DURING THE PLANTING PROCESS. DOUBLE LEADERS, DEAD BRANCHES, AND LIMBS DAMAGED OR BROKEN DURING THE PLANTING PROCESS SHALL BE PRUNED. THIS SHALL BE THE ONLY PRUNING ALLOWED AT PLANTING. PRUNING SHALL CONFORM TO AMERICAN STANDARD FOR TREE CARE OPERATIONS, ANSI A300. PRUNE TREES IN ACCORDANCE WITH NAA GUIDELINES. DO NOT TOP TREES. PRUNE SHRUBS ACCORDING TO STANDARD HORTICULTURAL PRACTICES. ON CUTS OVER 3/4" IN DIAMETER AND BRUISES OR SCARS ON BARK, TRACE THE INJURED CAMBIUM LAYER BACK TO LIVING TISSUE AND REMOVE. SMOOTH AND SHAPE WOUNDS SO AS NOT TO RETAIN WATER. TREAT THE AREA WITH AN APPROVED INCONSPICUOUS LATEX BASED ANTISEPTIC TREE PAINT, IF PRUNING OCCURS "IN SEASON". DO NOT PRUNE ANY OAK TREES DURING THE MONTHS FROM APRIL TO OCTOBER.
5. CLEANUP: DISPOSED OF EXCESS SOIL. REMOVE ALL CUTTINGS AND WASTE MATERIALS. SOIL, BRANCHES, BINDING AND WRAPPING MATERIALS, REJECTED PLANTS, OR OTHER DEBRIS RESULTING FROM ANY PLANTING SHALL BE PROMPTLY CLEANED UP AND REMOVED. THE WORK AREA SHALL BE KEPT SAFE AND NEAT AT ALL TIMES. UNDER NO CONDITION SHALL THE ACCUMULATION OF SOIL, BRANCHES OR OTHER DEBRIS BE ALLOWED UPON A PUBLIC PROPERTY IN SUCH A MANNER AS TO RESULT IN A PUBLIC SAFETY HAZARD. LIKEWISE, UNDER NO CIRCUMSTANCES SHALL ANY DEBRIS OR INCIDENTAL MATERIALS BE ALLOWED UPON ADJACENT PRIVATE PROPERTY.

POINT REQUIREMENT 1: STREET FRONTAGE AREA

	432 Linear Feet of Street Frontage			
Calculation:	40 Landscape Points per 100 L.F.			
Calculation Formula:	(432 Feet of Street Frontage / 100 Linear Feet) x 40 Points per 100 L.F.= 172.8			
Total Points Required:	**173 Total Points**			
Total Points Provided:	**182 Total Points**			
Code of Ordinances:	To be located a maximum of 30' from R-O-W			
	Preserved trees within 30' R-O-W count as one and one-half times normal point value.			
Species: Scientific Name	**Species: Common Name**	**QTY**	**POINTS**	**TOTAL POINTS**
Existing Tree 6-inch		2	30	60
Ginkgo biloba `Autumn Gold` TM	Maidenhair Tree	1	20	20
Gleditsia triacanthos `Skyline`	Skyline Honey Locust	3	20	60
Hydrangea paniculata `Little Quick Fire`	Little Fire Quickfire Hydrangea	9	2	18
Spirea betulifolia 'Tor Gold'	Glow Girl Birchleaf Spirea	12	2	24
			Total Points =	**182**

POINT REQUIREMENT 2: PARKING LOT AREA

	74 Parking Stalls			
Calculation 1:	30 Points per 10 Stalls			
Calculation 1 Formula:	(74 Stalls /10 Stalls) x 30 Points = 222			
Total Points Required:	**222 Total Points**			
Total Points Provided:	**222 Total Points**			
Code of Ordinances:	Landscaping that satisfies more than one locational requirement,			
	excluding general site landscaping, may be counted for each.			
Species: Scientific Name	**Species: Common Name**	**QTY**	**POINTS**	**TOTAL POINTS**
Acer miyabei `State Street`	State Street Maple	1	20	20
Hydrangea paniculata `Little Quick Fire`	Little Fire Quickfire Hydrangea	4	2	8
Spirea betulifolia 'Tor Gold'	Glow Girl Birchleaf Spirea	6	2	12
Total from Street Frontage Area				182
			Total Points =	**222**

POINT REQUIREMENT 3: GENERAL SITE AREA

	103,000 S.F. Newly Developed Area			
Calculation 1:	5 Points per 10,000 S.F.			
Calculation 1 Formula:	(103,000 S.F./10,000 S.F) x 5 Points = 51.5			
Total Points Required:	**52 Total Points**			
Total Points Provided:	**150 Total Points**			
Code of Ordinances:	Preserved trees count as one and one-half times normal point value.			
Species: Scientific Name	**Species: Common Name**	**QTY**	**POINTS**	**TOTAL POINTS**
Existing Tree 6-inch		2	30	60
Existing Tree 8-inch		3	30	90
			Total Points =	**150**

CONTRACTOR AND OWNER RESPONSIBILITY NOTES

1. GUARANTEE: THE CONTRACTOR SHALL GUARANTEE ALL PLANTS THROUGH ONE (1) YEAR AFTER ACCEPTANCE BY THE OWNER'S REPRESENTATIVE. PLANTS SHALL BE ALIVE AND IN HEALTHY AND FLOURISHING CONDITION AT THE END OF THE GUARANTEE PERIOD. THE CONTRACTOR SHALL REPLACE (AT NO COST TO OWNER) ANY PLANTS THAT ARE DEAD OR NOT IN A VIGOROUS THRIVING CONDITION. REPLACEMENT PLANTS SHALL BE OF THE SAME KIND AND SIZE AS ORIGINALLY SPECIFIED UNLESS OTHERWISE DIRECTED BY OWNER'S REPRESENTATIVE. RESTORE BEDS AS NECESSARY FOLLOWING PLANT REPLACEMENT, INCLUDING BUT NOT LIMITED TO BEDDING, EDGING, MULCH, ETC. REPLACE PLANTS DAMAGED AT TIME OF PLANTING. REPAIR AREAS DISTURBED IN ANY WAY DURING PLANT REPLACEMENT AT NO COST TO OWNER. CONTRACTOR SHALL PROVIDE A TWO (2)–YEAR STRAIGHTENING GUARANTEE FOR ALL TREES.
2. CONTRACTOR IS RESPONSIBLE FOR STAKING THE PLANT MATERIALS FOR REVIEW BY OWNER'S REPRESENTATIVE PRIOR TO DIGGING AND PLACEMENT AND SHALL COORDINATE ALL FINE GRADING AND RESTORATION WITH THE GRADING CONTRACTOR.
3. MAINTENANCE: (CONTRACTOR) FOR ALL PLANTINGS, SEEDED AREAS AND SODDED LAWN AREAS: THE CONTRACTOR SHALL MAINTAIN ALL PLANTINGS AND LAWN AREAS FOR A MINIMUM TIME PERIOD OF 60 DAYS, UNTIL FINAL ACCEPTANCE BY OWNER'S REPRESENTATIVE. THE CONTRACTOR IS RESPONSIBLE FOR ADEQUATELY WATERING PLANTS AND LAWN/TURFGRASS DURING THIS 60 DAY ESTABLISHMENT PERIOD. CONTRACTOR IS RESPONSIBLE FOR THE ESTABLISHMENT OF HEALTHY VIGOROUS PLANT MATERIALS AND LAWN/TURFGRASS GROWTH. CONTRACTOR IS ALSO RESPONSIBLE FOR ANY PRUNING OF PLANT MATERIALS, AND SHAPING AND/OR REPLACEMENT OR SUPPLEMENT OF DEFICIENT SHREDDED HARDWOOD BARK MULCH DURING THIS PERIOD. LONG TERM PLANT MATERIALS AND LAWN/TURFGRASS MAINTENANCE AND ANY PROGRAM FOR SUCH IS THE RESPONSIBILITY OF THE OWNER. ALL PLANTINGS AND LAWN/TURFGRASS AREAS SHALL BE MAINTAINED IN A MANICURED CONDITION UNTIL THE TIME WHEN THE OWNER'S ACCEPTANCE IS GIVEN.
4. MAINTENANCE: (OWNER) THE OWNER IS RESPONSIBLE FOR THE CONTINUED MAINTENANCE, REPAIR AND REPLACEMENT OF ALL LANDSCAPING MATERIALS AND WEED BARRIER FABRIC AS NECESSARY FOLLOWING THE ONE (1) YEAR CONTRACTOR GUARANTEE PERIOD.

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VERONA, WISCONSIN 53593
P. 608.848.5060

CLIENT:
DAVID MOLLENKOPF ARCHITECT

CLIENT ADDRESS:
209 10TH AVENUE SOUTH, STE 414
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR, WI
DANE COUNTY

PLAN MODIFICATIONS:

#	Date:	Description:
1	06/11/2018	MUNICIPAL APPROVAL
2		
3		
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15		

Design/Drawn: MWS
Approved: ABK

SHEET TITLE:
LANDSCAPE DETAILS, NOTES AND SPECIFICATIONS

SHEET NUMBER:
L2.0

JSD PROJECT NO: 18-8488

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File: I:\2018\188488\DWG\188488 Landscape.dwg Layout: L2.0 User: msirinscotchi Plotted: Jun 12, 2018 – 4:29pm Xref's: 188488 Old Dominion Freight

APPENDIX 4

EXISTING AND PROPOSED WATERSHED MAPS

NOTE: TIME OF CONCENTRATION (TC) PATHS NOT SHOWN ON THIS WATERSHED MAP ARE ASSUMED TO HAVE A MINIMUM TIME OF 6 MINUTES.

Existing Design			
Area	Total Area	Pervious Area	Impervious Area
S-1	75792	35838	39954
S-2	66709	36206	30504
S-3	60434	31260	29175
S-4	29766	862	28904
S-5	16577	2537	14041
OS-1	2356	2356	0
OS-2	10544	10053	491
OS-3	79958	79958	0

north

SCALE IN FEET

40' 0 40'

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P. 608.848.5060

CLIENT:
DAVID MOLLENKOPF ARCHITECT

CLIENT ADDRESS:
49 MUSIC SQUARE W #600
NASHVILLE, TN 37203

PROJECT:
OLD DOMINION FREIGHT LINE TERMINAL EXPANSION

PROJECT LOCATION:
VILLAGE OF WINDSOR
DANE COUNTY, WI

PLAN MODIFICATIONS:

#	Date:	Description:
1	05/31/2018	VILLAGE PRE-APP MTG
2	06/13/2018	VILLAGE SUBMITTAL
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15		

Design/Drawn:
Approved:

SHEET TITLE:
EXISTING WATERSHED MAP

SHEET NUMBER:
EXHIBIT

JSD PROJECT NO: 18-8488

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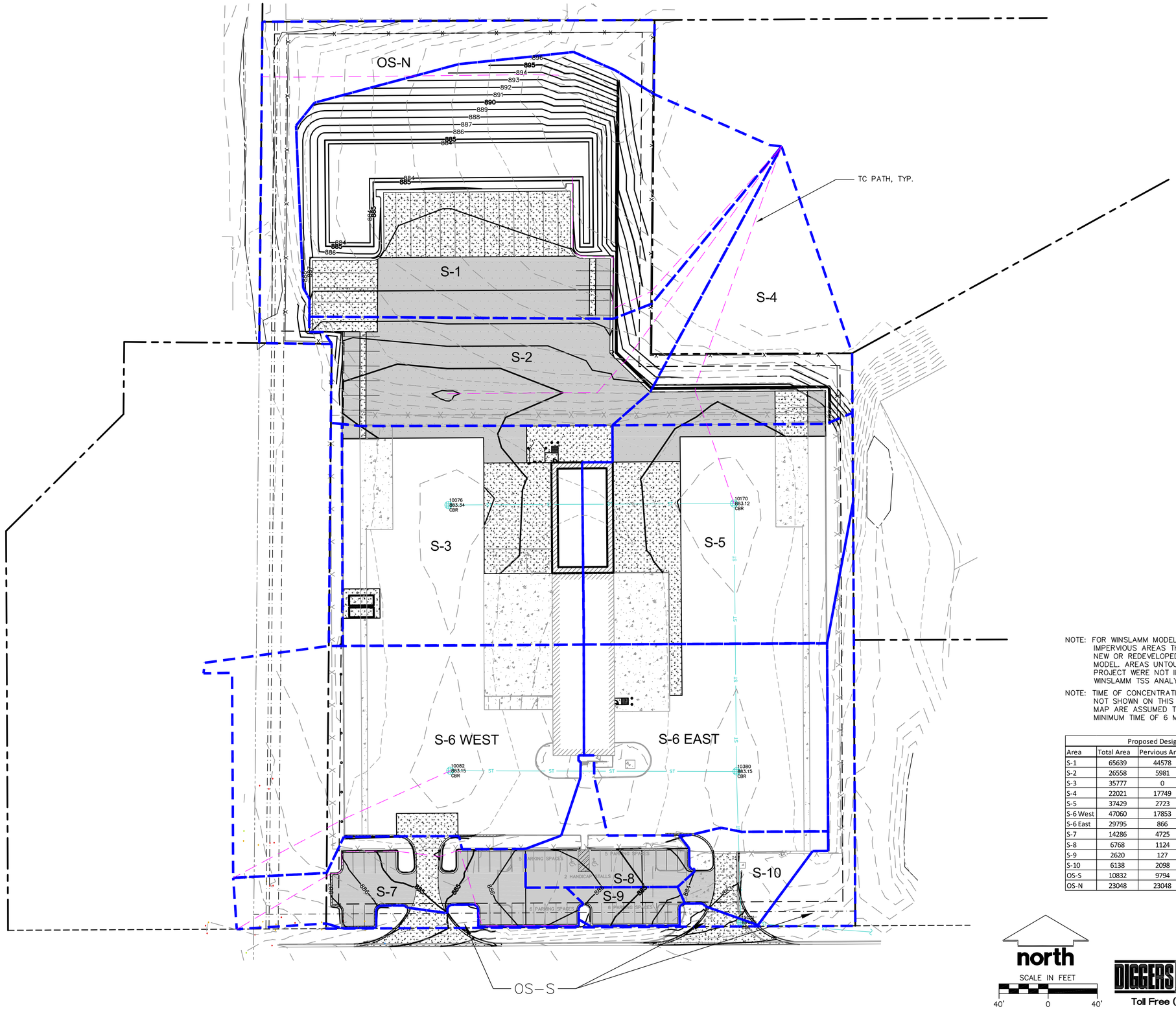
File: I:\2018\188488\DWG\188488 SWMP Existing.dwg Layout: Existing Watershed User: khoff Plotted: Jun 13, 2018 - 6:36pm Xref's:



NOTE: FOR WINSLAMM MODEL, ONLY IMPERVIOUS AREAS THAT ARE EITHER NEW OR REDEVELOPED WERE PUT INTO MODEL. AREAS UNTOUCHED BY THIS PROJECT WERE NOT INCLUDED IN WINSLAMM TSS ANALYSIS.

NOTE: TIME OF CONCENTRATION (TC) PATHS NOT SHOWN ON THIS WATERSHED MAP ARE ASSUMED TO HAVE A MINIMUM TIME OF 6 MINUTES.

Proposed Design			
Area	Total Area	Pervious Area	Impervious Area
S-1	65639	44578	21062
S-2	26558	5981	20577
S-3	35777	0	35777
S-4	22021	17749	4272
S-5	37429	2723	34706
S-6 West	47060	17853	29207
S-6 East	29795	866	28928
S-7	14286	4725	9561
S-8	6768	1124	5644
S-9	2620	127	2493
S-10	6138	2098	4040
OS-S	10832	9794	1038
OS-N	23048	23048	0

north

SCALE IN FEET

40' 0 40'

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Design/Drawn:
Approved:

SHEET TITLE:
PROPOSED WATERSHED MAP

SHEET NUMBER:
EXHIBIT

JSD PROJECT NO: 18-8488

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File: I:\2018\188488\DWG\188488 SWMP.dwg Layout: Proposed Watershed User: khoff Plotted: Jun 13, 2018 - 6:22pm Xrefs:

APPENDIX 5

INFILTRATION EXEMPTION REQUEST

REQUEST MEMORANDUM
WDNR APPROVAL EMAIL

Memorandum

www.jsdinc.com

To:	Dane County Land and Water Resources/Village of Windsor Engineering/WDNR
From:	Matt Haase, JSD Professional Services
Re:	Old Dominion Redevelopment – Stormwater Infiltration Exemption Request
JSD Project #:	18-8488
Date:	06-01-18
cc:	David Mollenkopf, Jerry Canada (Old Dominion Freight Line); Matt Haase, Kyle Hoff (JSD Professional Services); Kevin Richardson (Village); Josh Harder (Dane County); Kim McCutcheon, Eric Rortvedt (WNDR)

This technical memorandum shall serve as a request for an exemption to the infiltration requirements in the Dane County Code of Ordinances Chapter 14 Section 14.51(2)(e). This memo is a precursor to the stormwater management report, which will be completed and submitted for review at a later time. The reason for the requested exemption is due to a high groundwater level, which we believe qualifies this site for infiltration exemption under Dane County Ordinance 14.47(3)(d) which states:

> *(3) The following activities are exempt from the infiltration standards described in s. 14.51(2)(e):*
> *(d) Areas where the infiltration rate of the soil is less than 0.6 inches/hour measured at the bottom of the proposed infiltration system where the soil layer is not easily removed or manipulated.*

Due to the observed groundwater levels, per geotechnical investigation report, the site's options of stormwater management facilities which would provide infiltration are limited. Groundwater elevations were observed with 4 feet of existing pavement grades.

We have investigated 2 stormwater management facility types for infiltration, underground and surface pond; each of which are further described below.

Refer to attached geotechnical investigation report and supporting plans and graphics to support the scenario's below.

<u>Infiltration System Examples</u>
Example 1:

One potential infiltration option would be an underground infiltration chamber. The underground chamber would be preceded by a water quality chamber for appropriate pre-treatment. Based on our current design, which is very restrictive in elevation due to the existing storm sewer, an infiltration chamber gravity draining from a pre-treatment chamber would have an invert elevation discharging to the infiltration area of approximately 880.50. This system would likely be located somewhere between borings B-4 and B-8.

At a minimum, elevation 880.50 would be the elevation at which this site would be able to infiltrate into the native soils. In the attached geotechnical report, B-4 and B-8 both show ground water level observations at approximately 881, placing the bottom of our infiltration system at least 0.5 feet into the groundwater level. In addition, the report recommends a design long-term groundwater elevation of 882 (section 3.2), placing the bottom of our system even deeper into groundwater.

With this design, WNDR tech standard 1002 would also be a constraint as a minimum of 5 feet of separation between bedrock or seasonable high groundwater levels and bottom of infiltration device must be provided.

Example 2:

Another potential infiltration facility option is a surface infiltration basin located north of the proposed trailer parking expansion, near borings B-5 and B-6. A significant additional quantity of excavation would need to occur to allow gravity drainage to and out of this basin. If this were the case the bottom of the surface infiltration facility would likely be elevation 880. This elevation would pose similar issues as an underground facility with not having adequate separation distance between the bottom of the facility and groundwater.

In order to allow a surface pond to work north of the site, a pumping system would likely be necessary. This would pump pre-treated water to an elevation above the groundwater table and with adequate separation, at least 5 feet; from the groundwater elevation. This alternative is cost prohibitive for this site.

Conclusions and Additional Information

As we have demonstrated and as the data suggests, infiltration efforts for this site would be ineffective and cost prohibitive to the owner. As a side note, JSD worked on expansion of the adjacent site of Clack Corporation. This site had similar groundwater issues and several wetlands. As a result, the WDNR and the Village of DeForest issued an infiltration exemption for the project. Because of the explored options described above, the attached geotechnical report showing high groundwater and the similarity in conditions to the Clack property, we believe this project should receive an exemption from meeting infiltration standards.

Attachments:

A: Geotechnical Engineering Report
B: Proposed Grading and Storm Sewer Exhibit

From: Rortvedt, Eric - DNR <Eric.Rortvedt@wisconsin.gov>
Sent: Tuesday, June 12, 2018 11:42 AM
To: Kyle Hoff; Kevin Richardson (Kevin@windsorwi.gove); Joshua Harder (Harder@countyofdane.com); McCutcheon, Kim M - DNR
Cc: David Mollenkopf (djmollen@themdgllc.com); Jerry Canada (Jerry.Canada@odfl.com); Matt Haase
Subject: RE: Old Dominion Redevelopment Project - Stormwater Infiltration Exemption Request

Kyle,

I have reviewed the submitted soil borings for this site and feel that this site qualifies for an exemption from the NR 151.124 infiltration performance standard based primarily on high groundwater. The far NE part of the site (boring B-6) has adequate separation from groundwater but it is on the highest point of the site and DNR does not require pumping of water upgradient to meet the infiltration standard.

Eric Rortvedt, P.E.
Phone: (608) 273-5612
Eric.Rortvedt@Wisconsin.gov

From: Kyle Hoff [mailto:kyle.hoff@JSDinc.com]
Sent: Friday, June 01, 2018 4:36 PM
To: Kevin Richardson (Kevin@windsorwi.gove) <Kevin@windsorwi.gove>; Joshua Harder (Harder@countyofdane.com) <Harder@countyofdane.com>; McCutcheon, Kim M - DNR <Kim.McCutcheon@wisconsin.gov>; Rortvedt, Eric - DNR <Eric.Rortvedt@wisconsin.gov>
Cc: David Mollenkopf (djmollen@themdgllc.com) <djmollen@themdgllc.com>; Jerry Canada (Jerry.Canada@odfl.com) <Jerry.Canada@odfl.com>; Matt Haase <matt.haase@jsdinc.com>
Subject: Old Dominion Redevelopment Project - Stormwater Infiltration Exemption Request

Kevin, Josh, Kim, Eric,

We would like to submit an infiltration exemption request for the Old Dominion Freight Line Expansion project, located at 4380 Duraform Lane, Windsor, WI. As described in the attached memo, which includes our geotech and current grading and storm sewer, this site has a high groundwater elevation that would make infiltration very difficult and likely unattainable. We are still designing our stormwater system but we wanted to submit this request early to avoid delays and surprises further down the line. Matt Haase will be on vacation all of next week so please direct any questions or requests for further information to me. Thank you and have a nice weekend.

Kyle Hoff, E.I.T.
Staff Engineer

JSD Professional Services, Inc.
Engineers · Surveyors · Planners
Madison Regional Office
161 Horizon Drive, Suite 101
Verona, WI 53593

608.848.5060 phone
608.848.2255 fax

email@jsdinc.com ▌ www.jsdinc.com

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APPENDIX 6

TOTAL SUSPENDED SOLIDS CALCULATIONS

Input Data

Data file name: I:\2018\188488\Civil\SWMP\Modeling\Winslamm\Proposed Model.mdb
WinSLAMM Version 10.3.4
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.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.stc
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.stc
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.stc
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: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/02 End of Winter Season: 03/12
Date: 06-13-2018 Time: 13:08:00
Site information:

LU# 1 - Industrial: S-2 All New Total area (ac): 0.530
13 - Paved Parking 1: 0.068 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.404 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.058 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 2 - Industrial: S-3 All Redeveloped Total area (ac): 0.283
1 - Roofs 1 - New Building: 0.052 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.129 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.102 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 3 - Industrial: S-5 Redeveloped Total area (ac): 0.244
1 - Roofs 1 - New Building: 0.052 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.141 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.051 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 4 - Industrial: S-4 All New Total area (ac): 0.219
25 - Driveways 1: 0.098 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.121 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 5 - Industrial: S-7 New Total area (ac): 0.202
13 - Paved Parking 1: 0.062 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.103 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.037 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 6 - Industrial: S-6 East Redeveloped Total area (ac): 0.010
13 - Paved Parking 1: 0.010 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 7 - Industrial: S-8 Redeveloped Total area (ac): 0.086
13 - Paved Parking 1: 0.045 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

25 - Driveways 1: 0.041 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 8 - Industrial: S-8 New Total area (ac): 0.009
13 - Paved Parking 1: 0.009 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 9 - Industrial: OS-S New Total area (ac): 0.015
25 - Driveways 1: 0.015 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 10 - Industrial: OS-S Redeveloped Total area (ac): 0.009
25 - Driveways 1: 0.009 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 11 - Industrial: S-1 New Total area (ac): 1.306
13 - Paved Parking 1: 0.302 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.182 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.822 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 12 - Industrial: S-9 Redeveloped Total area (ac): 0.053
13 - Paved Parking 1: 0.024 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.026 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.003 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 13 - Industrial: S-9 New Total area (ac): 0.007
13 - Paved Parking 1: 0.007 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 14 - Industrial: S-6 West Redeveloped Total area (ac): 0.022
25 - Driveways 1: 0.022 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 15 - Industrial: S-7 Redeveloped Total area (ac): 0.055
13 - Paved Parking 1: 0.029 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.026 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 16 - Industrial: S-10 Redeveloped Total area (ac): 0.041
25 - Driveways 1: 0.041 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 17 - Industrial: S-10 New Total area (ac): 0.003
25 - Driveways 1: 0.003 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - D1
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 3
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): 0.5

2. Number of orifices: 1
3. Invert elevation above datum (ft): 3

Outlet type: Orifice 2

1. Orifice diameter (ft): 0.5
2. Number of orifices: 1
3. Invert elevation above datum (ft): 4.4

Outlet type: Orifice 3

1. Orifice diameter (ft): 0.67
2. Number of orifices: 1
3. Invert elevation above datum (ft): 4.9

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 8
2. Weir crest width (ft): 1
3. Height from datum to bottom of weir opening: 5.7

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	0.0501	0.00	0.00
2	1.00	0.0501	0.00	0.00
3	2.00	0.0501	0.00	0.00
4	3.00	0.0501	0.00	0.00
5	6.00	0.0501	0.00	0.00

Control Practice 2: Catchbasin Cleaning CP# 1 (DS) - EX INL 3,4

1. Fraction of area served by catchbasins = 1.00
2. Number of catchbasins = 2
3. Average sump depth below catchbasin outlet invert (feet) = 3
4. Depth of sediment in catchbasin sump at beginning of study period (ft) = 0
5. Typical outlet pipe diameter (ft) = 1.5
6. Typical outlet pipe Mannings n = 0.011
7. Typical outlet pipe slope (ft/ft) = 0.007
8. Typical catchbasin sump surface area (square feet) = 7.1
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
13. Catchbasin cleaning frequency: Annually

Control Practice 3: Catchbasin Cleaning CP# 2 (DS) - EX INL 2

1. Fraction of area served by catchbasins = 1.00
2. Number of catchbasins = 1
3. Average sump depth below catchbasin outlet invert (feet) = 3
4. Depth of sediment in catchbasin sump at beginning of study period (ft) = 0
5. Typical outlet pipe diameter (ft) = 1.25
6. Typical outlet pipe Mannings n = 0.011
7. Typical outlet pipe slope (ft/ft) = 0.003
8. Typical catchbasin sump surface area (square feet) = 3.1
9. Total catchbasin depth (feet) = 6
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
13. Catchbasin cleaning frequency: Annually

Control Practice 4: Catchbasin Cleaning CP# 3 (DS) - EX INL 5

1. Fraction of area served by catchbasins = 1.00
2. Number of catchbasins = 1
3. Average sump depth below catchbasin outlet invert (feet) = 3
4. Depth of sediment in catchbasin sump at beginning of study period (ft) = 0
5. Typical outlet pipe diameter (ft) = 2
6. Typical outlet pipe Mannings n = 0.013
7. Typical outlet pipe slope (ft/ft) = 0.01
8. Typical catchbasin sump surface area (square feet) = 12.6
9. Total catchbasin depth (feet) = 6
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
13. Catchbasin cleaning frequency: Annually

Control Practice 5: Wet Detention Pond CP# 2 (DS) - D2

Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 3
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): 0.5
2. Number of orifices: 1
3. Invert elevation above datum (ft): 3

Outlet type: Orifice 2
1. Orifice diameter (ft): 0.63
2. Number of orifices: 1
3. Invert elevation above datum (ft): 4.5

Outlet type: Orifice 3
1. Orifice diameter (ft): 0.56
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5.45

Outlet type: Broad Crested Weir
1. Weir crest length (ft): 8
2. Weir crest width (ft): 1
3. Height from datum to bottom of weir opening: 5.7

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	0.0227	0.00	0.00
2	1.00	0.0227	0.00	0.00
3	2.00	0.0227	0.00	0.00
4	3.00	0.0227	0.00	0.00
5	6.00	0.0227	0.00	0.00

Control Practice 6: Biofilter CP# 1 (DS) - Bioretention Pond

1. Top area (square feet) = 8034
2. Bottom aea (square feet) = 8034
3. Depth (ft): 4
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.2
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.01
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0

10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 13
12. Engineered soil depth (ft) = 2
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data Soil Type Fraction in Eng. Soil

User-Defined Soil Type 1.000

Saturation water content percent (Porosity) = 0

Field capacity (%) = 0

Permanent Wilting Point (%) = 0

Infiltration rate (in/hr) = 13

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 3.5

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 3

Outlet type: Drain Tile/Underdrain

1. Underdrain outlet diameter (ft): 0.33
2. Invert elevation above datum (ft): 0
3. Number of underdrain outlets: 2

Control Practice 7: Catchbasin Cleaning CP# 4 (DS) - EX INL 1

1. Fraction of area served by catchbasins = 1.00
2. Number of catchbasins = 1
3. Average sump depth below catchbasin outlet invert (feet) = 3
4. Depth of sediment in catchbasin sump at beginning of study period (ft) = 0
5. Typical outlet pipe diameter (ft) = 1.25
6. Typical outlet pipe Mannings n = 0.013
7. Typical outlet pipe slope (ft/ft) = 0.07
8. Typical catchbasin sump surface area (square feet) = 7.1
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
13. Catchbasin cleaning frequency: Annually

SLAMM for Windows Version 10.3.4
(c) Copyright Robert Pitt and John Voorhees 2012
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Data file name: I:\2018\188488\Civil\SWMP\Modeling\Winslamm\Proposed Model.mdb
Data file description:
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.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
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Start of Winter Season: 12/02 End of Winter Season: 03/12
Model Run Start Date: 01/01/81 Model Run End Date: 12/31/81
Date of run: 06-13-2018 Time of run: 13:05:49
Total Area Modeled (acres): 3.094
Years in Model Run: 1.00

	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:	164443	-	177.6	1823	-
Outfall Total with Controls:	137397	16.45%	73.84	633.4	65.26%
Annualized Total After Outfall Controls:	137775			635.1	

Data File: I:\2018\188488\Civil\SWMP\Modeling\Winslamm\Proposed Model.mdb
Rain File: WisReg - Madison WI 1981.RAN
Date: 06-13-18 Time: 10:15:04 AM
Site Description:

New Areas
Redeveloped Areas

	Total Particulate Solids Yield (lbs)	Reduction Rate Required	Reduction Needed (lbs)
New Areas	1124.67	80%	899.736
Redeveloped Areas	698.54	40%	279.416
Total Reduction Required (lbs)			1179.152

From Output Summary	
Particulate Solids Yield (lbs)	1823
Outfall Total with Controls (lbs)	633.4
Reduction (lbs)	1189.6

1189.6 > 1179.2 Minimum Reduction Met

Industrial: S-2 All New Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain	Land	Paved Park	Driveways	Undeveloped Areas 1
Minimum:	0	0	0	0	0
Maximum:	2.59	42.69	9.138	33.44	0.1089
Flow Wt Avg:	N/A	17.26	3.675	13.45	0.05914
Total:	28.81	375.73	80.56	294.8	0.3636

Industrial: S-3 All Redeveloped Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain	Land	Roofs 1 - N	Paved Park	Driveways 1
Minimum:	0	0	0	0	0
Maximum:	2.59	26.68	0.9065	17.33	8.443
Flow Wt Avg:	N/A	10.59	0.3685	6.971	3.395
Total:	28.81	236.58	9.335	152.8	74.43

Industrial: S-5 Redeveloped Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain	Land	Roofs 1 - N	Paved Park	Driveways 1
Minimum:	0	0	0	0	0
Maximum:	2.59	24.07	0.9065	18.95	4.222
Flow Wt Avg:	N/A	9.531	0.3685	7.62	1.698
Total:	28.81	213.59	9.335	167	37.22

Industrial: S-4 All New Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain	Land	Driveways	Undeveloped Areas 1
Minimum:	0	0	0	0
Maximum:	2.59	8.34	8.112	0.2273
Flow Wt Avg:	N/A	3.512	3.262	0.1234
Total:	28.81	72.27	71.51	0.7587

Industrial: S-7 New Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain	Land	Paved Park	Driveways	Undeveloped Areas 1
Minimum:	0	0	0	0	0
Maximum:	2.59	16.93	8.331	8.526	0.06949
Flow Wt Avg:	N/A	6.873	3.351	3.429	0.03773
Total:	28.81	148.85	73.45	75.16	0.232

Industrial: S-6 East Redeveloped Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain	Land	Paved Parking 1
Minimum:	0	0	0
Maximum:	2.59	1.34	1.344
Flow Wt Avg:	N/A	0.5404	0.5404
Total:	28.81	11.85	11.85

Industrial: S-8 Redeveloped Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain	Land	Paved Park	Driveways 1
Minimum:	0	0	0	0
Maximum:	2.59	9.44	6.047	3.394
Flow Wt Avg:	N/A	3.797	2.432	1.365
Total:	28.81	83.23	53.31	29.92

Industrial: S-8 New Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain	Land	Paved Parking 1
Minimum:	0	0	0
Maximum:	2.59	1.21	1.209
Flow Wt Avg:	N/A	0.4864	0.4864
Total:	28.81	10.66	10.66

Industrial: OS-S New Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain	Land	Driveways 1
Minimum:	0	0	0
Maximum:	2.59	1.24	1.242
Flow Wt Avg:	N/A	0.4993	0.4993
Total:	28.81	10.95	10.95

Industrial: OS-S Redeveloped Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain	Land	Driveways 1
Minimum:	0	0	0
Maximum:	2.59	0.75	0.745
Flow Wt Avg:	N/A	0.2996	0.2996
Total:	28.81	6.57	6.568

Industrial: S-1 New Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain	Land	Paved Park	Driveways	Undeveloped Areas 1
Minimum:	0	0	0	0	0
Maximum:	2.59	57.19	40.58	15.07	1.544
Flow Wt Avg:	N/A	24.53	16.32	6.059	0.8382
Total:	28.81	495.73	357.7	132.8	5.154

Industrial: S-9 Redeveloped Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain Total (in.)	Land Use Totals	Paved Park	Driveways	Undeveloped Areas 1
Minimum:	0	0	0	0	0
Maximum:	2.59	5.38	3.225	2.152	0.005635
Flow Wt Avg:	N/A	2.171	1.297	0.8655	0.003059
Total:	28.81	47.42	28.43	18.97	0.01881

Industrial: S-9 New Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain Total (in.)	Land Use Totals	Paved Parking 1
Minimum:	0	0	0
Maximum:	2.59	0.94	0.9406
Flow Wt Avg:	N/A	0.3783	0.3783
Total:	28.81	8.29	8.293

Industrial: S-6 West Redeveloped Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain Total (in.)	Land Use Totals	Driveways 1
Minimum:	0	0	0
Maximum:	2.59	1.82	1.821
Flow Wt Avg:	N/A	0.7324	0.7324
Total:	28.81	16.05	16.05

Industrial: S-7 Redeveloped Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain Total (in.)	Land Use Totals	Paved Park	Driveways 1
Minimum:	0	0	0	0
Maximum:	2.59	6.05	3.897	2.152
Flow Wt Avg:	N/A	2.433	1.567	0.8655
Total:	28.81	53.33	34.35	18.97

Industrial: S-10 Redeveloped Areas - Particulate Solids Yield (lbs)

Summary for All Events

	Rain Total (in.)	Land Use Totals	Driveways 1
Minimum:	0	0	0
Maximum:	2.59	3.39	3.394
Flow Wt Avg:	N/A	1.365	1.365
Total:	28.81	29.92	29.92

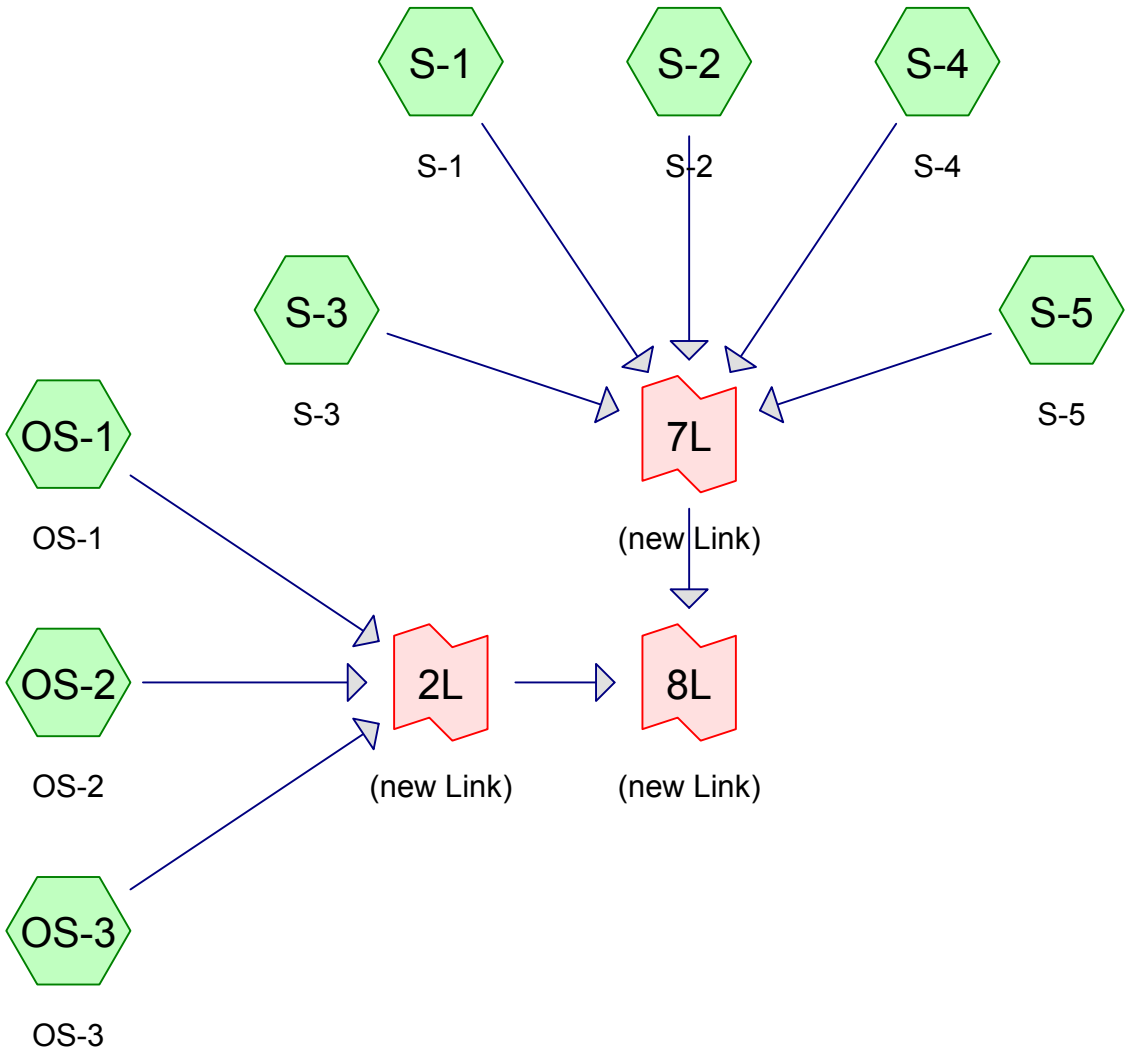
Industrial: S-10 New Areas - Particulate Solids Yield (lbs)

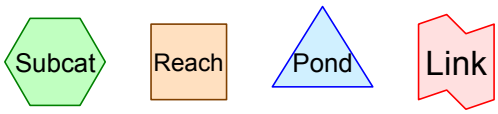
Summary for All Events

	Rain Total (in.)	Land Use Totals	Driveways 1
Minimum:	0	0	0
Maximum:	2.59	0.25	0.2483
Flow Wt Avg:	N/A	0.09987	0.09987
Total:	28.81	2.19	2.189

APPENDIX 7

RUNOFF RATE CONTROL CALCUALTIONS





Routing Diagram for 18-8488 Existing
Prepared by {enter your company name here}, Printed 6/13/2018
HydroCAD® 10.00-20 s/n 02918 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.562	71	>75% Grass cover, Good, HSG C (OS-1, OS-2, OS-3, S-1, S-2, S-3, S-4, S-5)
0.700	98	Existing parking and roof, new roof (S-2)
0.322	98	Impervious Areas (S-5)
1.333	98	Impervious Surfaces (S-3, S-4)
0.917	98	Parking and drive lane (S-1)
7.834	**82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
4.562	HSG C	OS-1, OS-2, OS-3, S-1, S-2, S-3, S-4, S-5
0.000	HSG D	
3.272	Other	S-1, S-2, S-3, S-4, S-5
7.834		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchme Numbers
0.000	0.000	4.562	0.000	0.000	4.562	>75% Grass cover, Good	
0.000	0.000	0.000	0.000	0.700	0.700	Existing parking and roof, new roof	
0.000	0.000	0.000	0.000	0.322	0.322	Impervious Areas	
0.000	0.000	0.000	0.000	1.333	1.333	Impervious Surfaces	
0.000	0.000	0.000	0.000	0.917	0.917	Parking and drive lane	
0.000	**0.000**	**4.562**	**0.000**	**3.272**	**7.834**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentOS-1: OS-1 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=71 Runoff=0.04 cfs 0.002 af

SubcatchmentOS-2: OS-2 Runoff Area=0.223 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=71 Runoff=0.15 cfs 0.009 af

SubcatchmentOS-3: OS-3 Runoff Area=1.836 ac 0.00% Impervious Runoff Depth>0.48"
Flow Length=312' Tc=27.0 min CN=71 Runoff=0.62 cfs 0.074 af

SubcatchmentS-1: S-1 Runoff Area=1.739 ac 52.73% Impervious Runoff Depth>1.17"
Flow Length=425' Tc=21.8 min CN=85 Runoff=1.93 cfs 0.169 af

SubcatchmentS-2: S-2 Runoff Area=1.531 ac 45.72% Impervious Runoff Depth>1.05"
Flow Length=294' Tc=15.6 min CN=83 Runoff=1.79 cfs 0.134 af

SubcatchmentS-3: S-3 Runoff Area=1.388 ac 48.27% Impervious Runoff Depth>1.11"
Flow Length=262' Tc=14.1 min CN=84 Runoff=1.81 cfs 0.128 af

SubcatchmentS-4: S-4 Runoff Area=0.683 ac 97.07% Impervious Runoff Depth>2.15"
Tc=6.0 min CN=97 Runoff=2.13 cfs 0.123 af

SubcatchmentS-5: S-5 Runoff Area=0.380 ac 84.74% Impervious Runoff Depth>1.86"
Tc=6.0 min CN=94 Runoff=1.09 cfs 0.059 af

Link 2L: (new Link) Inflow=0.67 cfs 0.085 af
Primary=0.67 cfs 0.085 af

Link 7L: (new Link) Inflow=6.94 cfs 0.612 af
Primary=6.94 cfs 0.612 af

Link 8L: (new Link) Inflow=7.27 cfs 0.697 af
Primary=7.27 cfs 0.697 af

Total Runoff Area = 7.834 ac Runoff Volume = 0.697 af Average Runoff Depth = 1.07"
58.23% Pervious = 4.562 ac 41.77% Impervious = 3.272 ac

Summary for Subcatchment OS-1: OS-1

Runoff = 0.04 cfs @ 12.14 hrs, Volume= 0.002 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.054	71	>75% Grass cover, Good, HSG C
	0.054		100.00% Pervious Area

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

Summary for Subcatchment OS-2: OS-2

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.223	71	>75% Grass cover, Good, HSG C
	0.223		100.00% Pervious Area

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

Summary for Subcatchment OS-3: OS-3

Runoff = 0.62 cfs @ 12.45 hrs, Volume= 0.074 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	1.836	71	>75% Grass cover, Good, HSG C
	1.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
1.1	17	0.1760	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
18.6	258	0.0310	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.1	17	0.1760	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.2	20	0.0750	1.92		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
27.0	312	Total			

Summary for Subcatchment S-1: S-1

Runoff = 1.93 cfs @ 12.32 hrs, Volume= 0.169 af, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.917	98	Parking and drive lane
*	0.822	71	>75% Grass cover, Good, HSG C
	1.739	85	Weighted Average
	0.822		47.27% Pervious Area
	0.917		52.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	141	0.0355	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
10.3	151	0.0464	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.1	35	0.1330	5.47		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.5	98	0.0224	3.04		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
21.8	425	Total			

Summary for Subcatchment S-2: S-2

Runoff = 1.79 cfs @ 12.25 hrs, Volume= 0.134 af, Depth> 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.700	98	Existing parking and roof, new roof
*	0.831	71	>75% Grass cover, Good, HSG C
	1.531	83	Weighted Average
	0.831		54.28% Pervious Area
	0.700		45.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	168	0.0417	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
3.0	61	0.1640	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.9	65	0.0231	1.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
15.6	294	Total			

Summary for Subcatchment S-3: S-3

Runoff = 1.81 cfs @ 12.23 hrs, Volume= 0.128 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.670	98	Impervious Surfaces
*	0.718	71	>75% Grass cover, Good, HSG C
	1.388	84	Weighted Average
	0.718		51.73% Pervious Area
	0.670		48.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	160	0.0313	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.4	102	0.0176	1.24		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
14.1	262	Total			

Summary for Subcatchment S-4: S-4

Runoff = 2.13 cfs @ 12.13 hrs, Volume= 0.123 af, Depth> 2.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.663	98	Impervious Surfaces
*	0.020	71	>75% Grass cover, Good, HSG C
	0.683	97	Weighted Average
	0.020		2.93% Pervious Area
	0.663		97.07% Impervious Area

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

Summary for Subcatchment S-5: S-5

Runoff = 1.09 cfs @ 12.13 hrs, Volume= 0.059 af, Depth> 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.322	98	Impervious Areas
*	0.058	71	>75% Grass cover, Good, HSG C
	0.380	94	Weighted Average
	0.058		15.26% Pervious Area
	0.322		84.74% Impervious Area

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

Summary for Link 2L: (new Link)

Inflow Area = 2.113 ac, 0.00% Impervious, Inflow Depth > 0.48" for 1-yr event
Inflow = 0.67 cfs @ 12.44 hrs, Volume= 0.085 af
Primary = 0.67 cfs @ 12.44 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Summary for Link 7L: (new Link)

Inflow Area = 5.721 ac, 57.19% Impervious, Inflow Depth > 1.28" for 1-yr event
Inflow = 6.94 cfs @ 12.17 hrs, Volume= 0.612 af
Primary = 6.94 cfs @ 12.17 hrs, Volume= 0.612 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Summary for Link 8L: (new Link)

Inflow Area = 7.834 ac, 41.77% Impervious, Inflow Depth > 1.07" for 1-yr event
Inflow = 7.27 cfs @ 12.17 hrs, Volume= 0.697 af
Primary = 7.27 cfs @ 12.17 hrs, Volume= 0.697 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentOS-1: OS-1 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth>0.67"
Tc=6.0 min CN=71 Runoff=0.05 cfs 0.003 af

SubcatchmentOS-2: OS-2 Runoff Area=0.223 ac 0.00% Impervious Runoff Depth>0.67"
Tc=6.0 min CN=71 Runoff=0.23 cfs 0.012 af

SubcatchmentOS-3: OS-3 Runoff Area=1.836 ac 0.00% Impervious Runoff Depth>0.67"
Flow Length=312' Tc=27.0 min CN=71 Runoff=0.92 cfs 0.102 af

SubcatchmentS-1: S-1 Runoff Area=1.739 ac 52.73% Impervious Runoff Depth>1.45"
Flow Length=425' Tc=21.8 min CN=85 Runoff=2.41 cfs 0.210 af

SubcatchmentS-2: S-2 Runoff Area=1.531 ac 45.72% Impervious Runoff Depth>1.32"
Flow Length=294' Tc=15.6 min CN=83 Runoff=2.27 cfs 0.168 af

SubcatchmentS-3: S-3 Runoff Area=1.388 ac 48.27% Impervious Runoff Depth>1.38"
Flow Length=262' Tc=14.1 min CN=84 Runoff=2.27 cfs 0.160 af

SubcatchmentS-4: S-4 Runoff Area=0.683 ac 97.07% Impervious Runoff Depth>2.50"
Tc=6.0 min CN=97 Runoff=2.45 cfs 0.142 af

SubcatchmentS-5: S-5 Runoff Area=0.380 ac 84.74% Impervious Runoff Depth>2.19"
Tc=6.0 min CN=94 Runoff=1.27 cfs 0.070 af

Link 2L: (new Link) Inflow=0.99 cfs 0.118 af
Primary=0.99 cfs 0.118 af

Link 7L: (new Link) Inflow=8.52 cfs 0.750 af
Primary=8.52 cfs 0.750 af

Link 8L: (new Link) Inflow=9.05 cfs 0.868 af
Primary=9.05 cfs 0.868 af

Total Runoff Area = 7.834 ac Runoff Volume = 0.868 af Average Runoff Depth = 1.33"
58.23% Pervious = 4.562 ac 41.77% Impervious = 3.272 ac

Summary for Subcatchment OS-1: OS-1

Runoff = 0.05 cfs @ 12.14 hrs, Volume= 0.003 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.054	71	>75% Grass cover, Good, HSG C
	0.054		100.00% Pervious Area

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

Summary for Subcatchment OS-2: OS-2

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.223	71	>75% Grass cover, Good, HSG C
	0.223		100.00% Pervious Area

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

Summary for Subcatchment OS-3: OS-3

Runoff = 0.92 cfs @ 12.44 hrs, Volume= 0.102 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	1.836	71	>75% Grass cover, Good, HSG C
	1.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
1.1	17	0.1760	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
18.6	258	0.0310	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.1	17	0.1760	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.2	20	0.0750	1.92		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
27.0	312	Total			

Summary for Subcatchment S-1: S-1

Runoff = 2.41 cfs @ 12.32 hrs, Volume= 0.210 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.917	98	Parking and drive lane
*	0.822	71	>75% Grass cover, Good, HSG C
	1.739	85	Weighted Average
	0.822		47.27% Pervious Area
	0.917		52.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	141	0.0355	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
10.3	151	0.0464	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.1	35	0.1330	5.47		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.5	98	0.0224	3.04		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
21.8	425	Total			

Summary for Subcatchment S-2: S-2

Runoff = 2.27 cfs @ 12.24 hrs, Volume= 0.168 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.700	98	Existing parking and roof, new roof
*	0.831	71	>75% Grass cover, Good, HSG C
	1.531	83	Weighted Average
	0.831		54.28% Pervious Area
	0.700		45.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	168	0.0417	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
3.0	61	0.1640	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.9	65	0.0231	1.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
15.6	294	Total			

Summary for Subcatchment S-3: S-3

Runoff = 2.27 cfs @ 12.23 hrs, Volume= 0.160 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.670	98	Impervious Surfaces
*	0.718	71	>75% Grass cover, Good, HSG C
	1.388	84	Weighted Average
	0.718		51.73% Pervious Area
	0.670		48.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	160	0.0313	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.4	102	0.0176	1.24		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
14.1	262	Total			

Summary for Subcatchment S-4: S-4

Runoff = 2.45 cfs @ 12.13 hrs, Volume= 0.142 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.663	98	Impervious Surfaces
*	0.020	71	>75% Grass cover, Good, HSG C
	0.683	97	Weighted Average
	0.020		2.93% Pervious Area
	0.663		97.07% Impervious Area

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

Summary for Subcatchment S-5: S-5

Runoff = 1.27 cfs @ 12.13 hrs, Volume= 0.070 af, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.322	98	Impervious Areas
*	0.058	71	>75% Grass cover, Good, HSG C
	0.380	94	Weighted Average
	0.058		15.26% Pervious Area
	0.322		84.74% Impervious Area

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

Summary for Link 2L: (new Link)

Inflow Area = 2.113 ac, 0.00% Impervious, Inflow Depth > 0.67" for 2-yr event
Inflow = 0.99 cfs @ 12.43 hrs, Volume= 0.118 af
Primary = 0.99 cfs @ 12.43 hrs, Volume= 0.118 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Summary for Link 7L: (new Link)

Inflow Area = 5.721 ac, 57.19% Impervious, Inflow Depth > 1.57" for 2-yr event
Inflow = 8.52 cfs @ 12.17 hrs, Volume= 0.750 af
Primary = 8.52 cfs @ 12.17 hrs, Volume= 0.750 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Summary for Link 8L: (new Link)

Inflow Area = 7.834 ac, 41.77% Impervious, Inflow Depth > 1.33" for 2-yr event
Inflow = 9.05 cfs @ 12.17 hrs, Volume= 0.868 af
Primary = 9.05 cfs @ 12.17 hrs, Volume= 0.868 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentOS-1: OS-1 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth>1.46"
Tc=6.0 min CN=71 Runoff=0.13 cfs 0.007 af

SubcatchmentOS-2: OS-2 Runoff Area=0.223 ac 0.00% Impervious Runoff Depth>1.46"
Tc=6.0 min CN=71 Runoff=0.52 cfs 0.027 af

SubcatchmentOS-3: OS-3 Runoff Area=1.836 ac 0.00% Impervious Runoff Depth>1.45"
Flow Length=312' Tc=27.0 min CN=71 Runoff=2.20 cfs 0.222 af

SubcatchmentS-1: S-1 Runoff Area=1.739 ac 52.73% Impervious Runoff Depth>2.53"
Flow Length=425' Tc=21.8 min CN=85 Runoff=4.20 cfs 0.367 af

SubcatchmentS-2: S-2 Runoff Area=1.531 ac 45.72% Impervious Runoff Depth>2.36"
Flow Length=294' Tc=15.6 min CN=83 Runoff=4.08 cfs 0.301 af

SubcatchmentS-3: S-3 Runoff Area=1.388 ac 48.27% Impervious Runoff Depth>2.45"
Flow Length=262' Tc=14.1 min CN=84 Runoff=4.00 cfs 0.283 af

SubcatchmentS-4: S-4 Runoff Area=0.683 ac 97.07% Impervious Runoff Depth>3.74"
Tc=6.0 min CN=97 Runoff=3.59 cfs 0.213 af

SubcatchmentS-5: S-5 Runoff Area=0.380 ac 84.74% Impervious Runoff Depth>3.41"
Tc=6.0 min CN=94 Runoff=1.91 cfs 0.108 af

Link 2L: (new Link) Inflow=2.36 cfs 0.256 af
Primary=2.36 cfs 0.256 af

Link 7L: (new Link) Inflow=14.43 cfs 1.272 af
Primary=14.43 cfs 1.272 af

Link 8L: (new Link) Inflow=16.01 cfs 1.528 af
Primary=16.01 cfs 1.528 af

Total Runoff Area = 7.834 ac Runoff Volume = 1.528 af Average Runoff Depth = 2.34"
58.23% Pervious = 4.562 ac 41.77% Impervious = 3.272 ac

Summary for Subcatchment OS-1: OS-1

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.054	71	>75% Grass cover, Good, HSG C
	0.054		100.00% Pervious Area

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

Summary for Subcatchment OS-2: OS-2

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.027 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.223	71	>75% Grass cover, Good, HSG C
	0.223		100.00% Pervious Area

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

Summary for Subcatchment OS-3: OS-3

Runoff = 2.20 cfs @ 12.40 hrs, Volume= 0.222 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	1.836	71	>75% Grass cover, Good, HSG C
	1.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
1.1	17	0.1760	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
18.6	258	0.0310	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.1	17	0.1760	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.2	20	0.0750	1.92		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
27.0	312	Total			

Summary for Subcatchment S-1: S-1

Runoff = 4.20 cfs @ 12.32 hrs, Volume= 0.367 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.917	98	Parking and drive lane
*	0.822	71	>75% Grass cover, Good, HSG C
	1.739	85	Weighted Average
	0.822		47.27% Pervious Area
	0.917		52.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	141	0.0355	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
10.3	151	0.0464	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.1	35	0.1330	5.47		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.5	98	0.0224	3.04		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
21.8	425	Total			

Summary for Subcatchment S-2: S-2

Runoff = 4.08 cfs @ 12.24 hrs, Volume= 0.301 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.700	98	Existing parking and roof, new roof
*	0.831	71	>75% Grass cover, Good, HSG C
	1.531	83	Weighted Average
	0.831		54.28% Pervious Area
	0.700		45.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	168	0.0417	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
3.0	61	0.1640	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.9	65	0.0231	1.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
15.6	294	Total			

Summary for Subcatchment S-3: S-3

Runoff = 4.00 cfs @ 12.22 hrs, Volume= 0.283 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.670	98	Impervious Surfaces
*	0.718	71	>75% Grass cover, Good, HSG C
	1.388	84	Weighted Average
	0.718		51.73% Pervious Area
	0.670		48.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	160	0.0313	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.4	102	0.0176	1.24		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
14.1	262	Total			

Summary for Subcatchment S-4: S-4

Runoff = 3.59 cfs @ 12.13 hrs, Volume= 0.213 af, Depth> 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.663	98	Impervious Surfaces
*	0.020	71	>75% Grass cover, Good, HSG C
	0.683	97	Weighted Average
	0.020		2.93% Pervious Area
	0.663		97.07% Impervious Area

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

Summary for Subcatchment S-5: S-5

Runoff = 1.91 cfs @ 12.13 hrs, Volume= 0.108 af, Depth> 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.322	98	Impervious Areas
*	0.058	71	>75% Grass cover, Good, HSG C
	0.380	94	Weighted Average
	0.058		15.26% Pervious Area
	0.322		84.74% Impervious Area

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

Summary for Link 2L: (new Link)

Inflow Area = 2.113 ac, 0.00% Impervious, Inflow Depth > 1.45" for 10-yr event
Inflow = 2.36 cfs @ 12.39 hrs, Volume= 0.256 af
Primary = 2.36 cfs @ 12.39 hrs, Volume= 0.256 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Summary for Link 7L: (new Link)

Inflow Area = 5.721 ac, 57.19% Impervious, Inflow Depth > 2.67" for 10-yr event
Inflow = 14.43 cfs @ 12.18 hrs, Volume= 1.272 af
Primary = 14.43 cfs @ 12.18 hrs, Volume= 1.272 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Summary for Link 8L: (new Link)

Inflow Area = 7.834 ac, 41.77% Impervious, Inflow Depth > 2.34" for 10-yr event
Inflow = 16.01 cfs @ 12.22 hrs, Volume= 1.528 af
Primary = 16.01 cfs @ 12.22 hrs, Volume= 1.528 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentOS-1: OS-1 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth>3.44"
Tc=6.0 min CN=71 Runoff=0.30 cfs 0.015 af

SubcatchmentOS-2: OS-2 Runoff Area=0.223 ac 0.00% Impervious Runoff Depth>3.44"
Tc=6.0 min CN=71 Runoff=1.24 cfs 0.064 af

SubcatchmentOS-3: OS-3 Runoff Area=1.836 ac 0.00% Impervious Runoff Depth>3.43"
Flow Length=312' Tc=27.0 min CN=71 Runoff=5.38 cfs 0.525 af

SubcatchmentS-1: S-1 Runoff Area=1.739 ac 52.73% Impervious Runoff Depth>4.92"
Flow Length=425' Tc=21.8 min CN=85 Runoff=7.99 cfs 0.713 af

SubcatchmentS-2: S-2 Runoff Area=1.531 ac 45.72% Impervious Runoff Depth>4.70"
Flow Length=294' Tc=15.6 min CN=83 Runoff=7.98 cfs 0.600 af

SubcatchmentS-3: S-3 Runoff Area=1.388 ac 48.27% Impervious Runoff Depth>4.81"
Flow Length=262' Tc=14.1 min CN=84 Runoff=7.69 cfs 0.557 af

SubcatchmentS-4: S-4 Runoff Area=0.683 ac 97.07% Impervious Runoff Depth>6.30"
Tc=6.0 min CN=97 Runoff=5.90 cfs 0.359 af

SubcatchmentS-5: S-5 Runoff Area=0.380 ac 84.74% Impervious Runoff Depth>5.95"
Tc=6.0 min CN=94 Runoff=3.22 cfs 0.188 af

Link 2L: (new Link) Inflow=5.76 cfs 0.604 af
Primary=5.76 cfs 0.604 af

Link 7L: (new Link) Inflow=27.11 cfs 2.416 af
Primary=27.11 cfs 2.416 af

Link 8L: (new Link) Inflow=31.46 cfs 3.020 af
Primary=31.46 cfs 3.020 af

Total Runoff Area = 7.834 ac Runoff Volume = 3.020 af Average Runoff Depth = 4.63"
58.23% Pervious = 4.562 ac 41.77% Impervious = 3.272 ac

Summary for Subcatchment OS-1: OS-1

Runoff = 0.30 cfs @ 12.13 hrs, Volume= 0.015 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.054	71	>75% Grass cover, Good, HSG C
	0.054		100.00% Pervious Area

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

Summary for Subcatchment OS-2: OS-2

Runoff = 1.24 cfs @ 12.13 hrs, Volume= 0.064 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.223	71	>75% Grass cover, Good, HSG C
	0.223		100.00% Pervious Area

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

Summary for Subcatchment OS-3: OS-3

Runoff = 5.38 cfs @ 12.39 hrs, Volume= 0.525 af, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	1.836	71	>75% Grass cover, Good, HSG C
	1.836		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
1.1	17	0.1760	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
18.6	258	0.0310	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.1	17	0.1760	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.2	20	0.0750	1.92		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
27.0	312	Total			

Summary for Subcatchment S-1: S-1

Runoff = 7.99 cfs @ 12.31 hrs, Volume= 0.713 af, Depth> 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.917	98	Parking and drive lane
*	0.822	71	>75% Grass cover, Good, HSG C
	1.739	85	Weighted Average
	0.822		47.27% Pervious Area
	0.917		52.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	141	0.0355	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
10.3	151	0.0464	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.1	35	0.1330	5.47		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.5	98	0.0224	3.04		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
21.8	425	Total			

Summary for Subcatchment S-2: S-2

Runoff = 7.98 cfs @ 12.23 hrs, Volume= 0.600 af, Depth> 4.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.700	98	Existing parking and roof, new roof
*	0.831	71	>75% Grass cover, Good, HSG C
	1.531	83	Weighted Average
	0.831		54.28% Pervious Area
	0.700		45.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	168	0.0417	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
3.0	61	0.1640	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.9	65	0.0231	1.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
15.6	294	Total			

Summary for Subcatchment S-3: S-3

Runoff = 7.69 cfs @ 12.22 hrs, Volume= 0.557 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.670	98	Impervious Surfaces
*	0.718	71	>75% Grass cover, Good, HSG C
	1.388	84	Weighted Average
	0.718		51.73% Pervious Area
	0.670		48.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	160	0.0313	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.4	102	0.0176	1.24		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
14.1	262	Total			

Summary for Subcatchment S-4: S-4

Runoff = 5.90 cfs @ 12.13 hrs, Volume= 0.359 af, Depth> 6.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.663	98	Impervious Surfaces
*	0.020	71	>75% Grass cover, Good, HSG C
	0.683	97	Weighted Average
	0.020		2.93% Pervious Area
	0.663		97.07% Impervious Area

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

Summary for Subcatchment S-5: S-5

Runoff = 3.22 cfs @ 12.13 hrs, Volume= 0.188 af, Depth> 5.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.322	98	Impervious Areas
*	0.058	71	>75% Grass cover, Good, HSG C
	0.380	94	Weighted Average
	0.058		15.26% Pervious Area
	0.322		84.74% Impervious Area

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

Summary for Link 2L: (new Link)

Inflow Area = 2.113 ac, 0.00% Impervious, Inflow Depth > 3.43" for 100-yr event
Inflow = 5.76 cfs @ 12.38 hrs, Volume= 0.604 af
Primary = 5.76 cfs @ 12.38 hrs, Volume= 0.604 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Summary for Link 7L: (new Link)

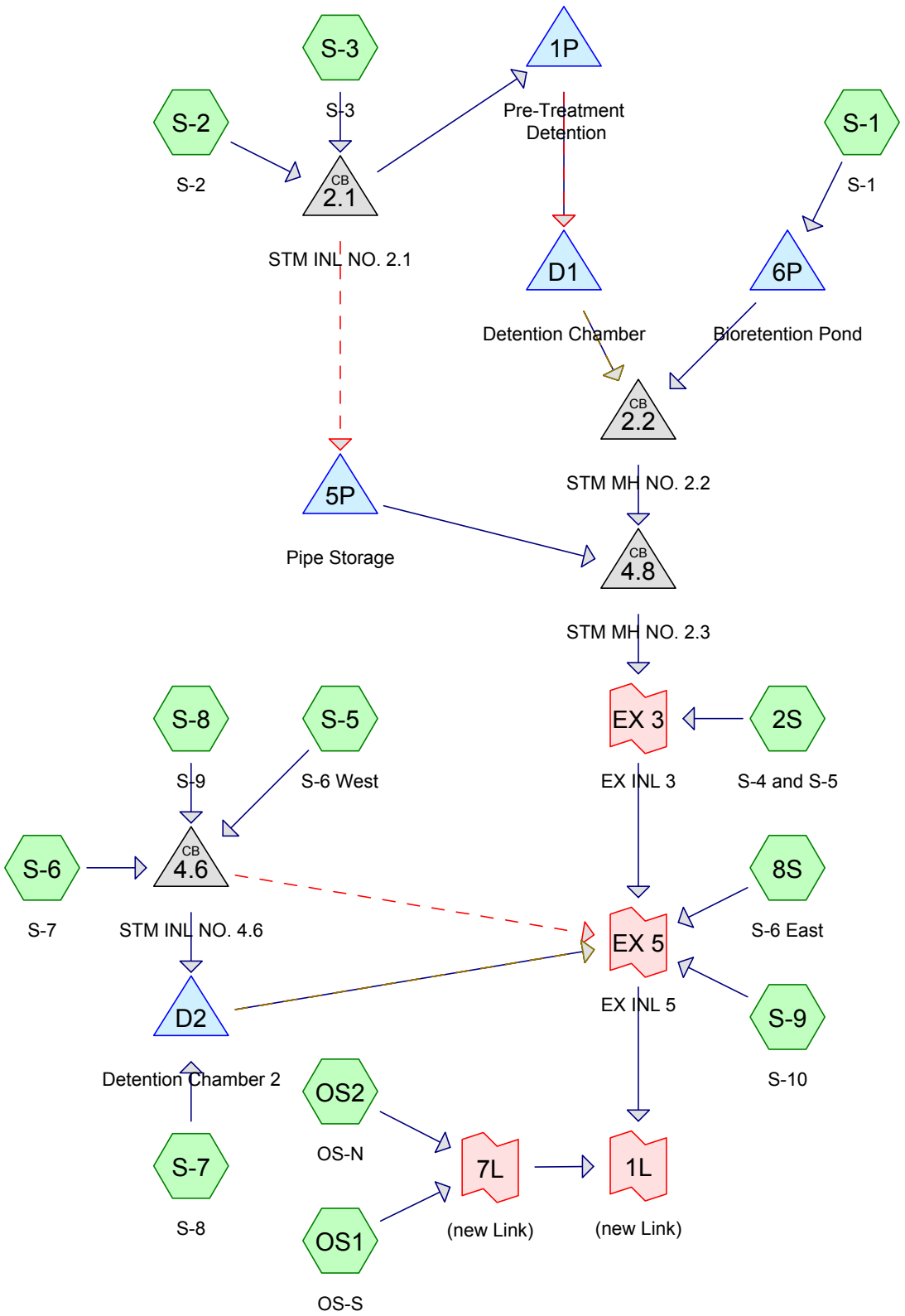
Inflow Area = 5.721 ac, 57.19% Impervious, Inflow Depth > 5.07" for 100-yr event
Inflow = 27.11 cfs @ 12.19 hrs, Volume= 2.416 af
Primary = 27.11 cfs @ 12.19 hrs, Volume= 2.416 af, Atten= 0%, Lag= 0.0 min

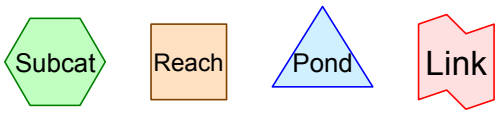
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Summary for Link 8L: (new Link)

Inflow Area = 7.834 ac, 41.77% Impervious, Inflow Depth > 4.63" for 100-yr event
Inflow = 31.46 cfs @ 12.23 hrs, Volume= 3.020 af
Primary = 31.46 cfs @ 12.23 hrs, Volume= 3.020 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs





Routing Diagram for 18-8488 Proposed
Prepared by {enter your company name here}, Printed 6/13/2018
HydroCAD® 10.00-20 s/n 02918 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.715	71	>75% Grass cover, Good, HSG C (2S, 8S, OS1, OS2, S-1, S-2, S-5, S-6, S-7, S-8, S-9)
0.281	71	>75% Grass cover, Good, HSG C-Offsite (S-1, S-2)
0.797	98	Existing Pavement (2S)
0.821	98	Existing parking and roof, new roof (S-3)
2.234	98	Pavement (2S, OS1, S-1, S-2, S-5, S-6, S-7, S-8, S-9)
0.664	98	Pavement and roof (8S)
7.512	**87**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.996	HSG C	2S, 8S, OS1, OS2, S-1, S-2, S-5, S-6, S-7, S-8, S-9
0.000	HSG D	
4.516	Other	2S, 8S, OS1, S-1, S-2, S-3, S-5, S-6, S-7, S-8, S-9
7.512		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchme Numbers
0.000	0.000	2.996	0.000	0.000	2.996	>75% Grass cover, Good	
0.000	0.000	0.000	0.000	0.797	0.797	Existing Pavement	
0.000	0.000	0.000	0.000	0.821	0.821	Existing parking and roof, new roof	
0.000	0.000	0.000	0.000	2.234	2.234	Pavement	
0.000	0.000	0.000	0.000	0.664	0.664	Pavement and roof	
0.000	**0.000**	**2.996**	**0.000**	**4.516**	**7.512**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	S-5	0.00	0.00	65.0	0.0100	0.011	15.0	0.0	0.0
2	S-5	0.00	0.00	222.0	0.0100	0.011	15.0	0.0	0.0
3	S-6	0.00	0.00	277.0	0.0100	0.011	15.0	0.0	0.0
4	1P	880.80	880.80	10.0	0.0000	0.011	12.0	0.0	0.0
5	1P	882.70	882.50	10.0	0.0200	0.011	12.0	0.0	0.0
6	2.1	880.92	880.80	25.0	0.0048	0.011	18.0	0.0	0.0
7	2.1	882.00	881.90	18.0	0.0056	0.011	15.0	0.0	0.0
8	2.2	880.80	880.75	29.0	0.0017	0.011	12.0	0.0	0.0
9	4.6	878.50	878.40	17.9	0.0056	0.011	12.0	0.0	0.0
10	4.6	879.90	879.50	22.0	0.0182	0.011	18.0	0.0	0.0
11	4.8	880.75	880.41	154.0	0.0022	0.011	18.0	0.0	0.0
12	5P	881.60	881.55	14.0	0.0036	0.011	6.0	0.0	0.0
13	6P	882.00	881.30	117.0	0.0060	0.011	6.0	0.0	0.0
14	D1	880.80	880.80	18.6	0.0000	0.011	6.0	0.0	0.0
15	D1	881.80	881.80	18.6	0.0000	0.011	12.0	0.0	0.0
16	D2	878.30	878.30	17.7	0.0000	0.011	6.0	0.0	0.0
17	D2	879.30	879.10	12.2	0.0164	0.011	12.0	0.0	0.0

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: S-4 and S-5 Runoff Area=1.365 ac 65.57% Impervious Runoff Depth>1.65"
Flow Length=300' Tc=14.1 min CN=WQ Runoff=2.36 cfs 0.187 af

Subcatchment8S: S-6 East Runoff Area=0.684 ac 97.08% Impervious Runoff Depth>2.21"
Tc=6.0 min CN=WQ Runoff=2.12 cfs 0.126 af

SubcatchmentOS1: OS-S Runoff Area=0.249 ac 9.64% Impervious Runoff Depth>0.66"
Tc=6.0 min CN=WQ Runoff=0.23 cfs 0.014 af

SubcatchmentOS2: OS-N Runoff Area=0.529 ac 0.00% Impervious Runoff Depth>0.48"
Flow Length=241' Tc=16.9 min CN=71 Runoff=0.23 cfs 0.021 af

SubcatchmentS-1: S-1 Runoff Area=1.507 ac 32.12% Impervious Runoff Depth>1.05"
Flow Length=234' Tc=15.2 min CN=WQ Runoff=1.57 cfs 0.132 af

SubcatchmentS-2: S-2 Runoff Area=0.610 ac 77.38% Impervious Runoff Depth>1.86"
Flow Length=369' Tc=15.8 min CN=WQ Runoff=1.13 cfs 0.094 af

SubcatchmentS-3: S-3 Runoff Area=0.821 ac 100.00% Impervious Runoff Depth>2.26"
Tc=6.0 min CN=98 Runoff=2.60 cfs 0.155 af

SubcatchmentS-5: S-6 West Runoff Area=1.063 ac 63.03% Impervious Runoff Depth>1.60"
Flow Length=485' Tc=10.1 min CN=WQ Runoff=2.04 cfs 0.142 af

SubcatchmentS-6: S-7 Runoff Area=0.327 ac 66.97% Impervious Runoff Depth>1.67"
Flow Length=433' Tc=8.6 min CN=WQ Runoff=0.70 cfs 0.046 af

SubcatchmentS-7: S-8 Runoff Area=0.156 ac 82.69% Impervious Runoff Depth>1.95"
Tc=6.0 min CN=WQ Runoff=0.43 cfs 0.025 af

SubcatchmentS-8: S-9 Runoff Area=0.060 ac 95.00% Impervious Runoff Depth>2.17"
Tc=6.0 min CN=WQ Runoff=0.18 cfs 0.011 af

SubcatchmentS-9: S-10 Runoff Area=0.141 ac 57.45% Impervious Runoff Depth>1.51"
Tc=6.0 min CN=WQ Runoff=0.30 cfs 0.018 af

Pond 1P: Pre-TreatmentDetention Peak Elev=882.17' Storage=1,879 cf Inflow=3.43 cfs 0.249 af
Primary=2.29 cfs 0.244 af Secondary=0.00 cfs 0.000 af Outflow=2.29 cfs 0.244 af

Pond 2.1: STM INL NO. 2.1 Peak Elev=882.18' Inflow=3.43 cfs 0.249 af
Primary=3.43 cfs 0.249 af Secondary=0.00 cfs 0.000 af Outflow=3.43 cfs 0.249 af

Pond 2.2: STM MH NO. 2.2 Peak Elev=881.41' Inflow=0.81 cfs 0.236 af
12.0" Round Culvert n=0.011 L=29.0' S=0.0017 '/' Outflow=0.81 cfs 0.236 af

Pond 4.6: STM INL NO. 4.6 Peak Elev=880.56' Inflow=2.88 cfs 0.199 af
Primary=2.88 cfs 0.199 af Secondary=0.00 cfs 0.000 af Outflow=2.88 cfs 0.199 af

Pond 4.8: STM MH NO. 2.3 Peak Elev=881.25' Inflow=0.81 cfs 0.236 af
18.0" Round Culvert n=0.011 L=154.0' S=0.0022 '/' Outflow=0.81 cfs 0.236 af

Pond 5P: Pipe Storage Peak Elev=881.60' Storage=0.000 af Inflow=0.00 cfs 0.000 af
6.0" Round Culvert n=0.011 L=14.0' S=0.0036 '/' Outflow=0.00 cfs 0.000 af

Pond 6P: Bioretention Pond Peak Elev=884.66' Storage=5,769 cf Inflow=1.57 cfs 0.132 af
Outflow=0.00 cfs 0.000 af

Pond D1: Detention Chamber Peak Elev=882.14' Storage=0.218 af Inflow=2.29 cfs 0.244 af
Primary=0.81 cfs 0.236 af Secondary=0.00 cfs 0.000 af Outflow=0.81 cfs 0.236 af

Pond D2: Detention Chamber 2 Peak Elev=880.33' Storage=0.114 af Inflow=3.26 cfs 0.224 af
Primary=1.23 cfs 0.202 af Secondary=0.95 cfs 0.019 af Outflow=2.18 cfs 0.221 af

Link 1L: (new Link) Inflow=6.90 cfs 0.823 af
Primary=6.90 cfs 0.823 af

Link 7L: (new Link) Inflow=0.34 cfs 0.035 af
Primary=0.34 cfs 0.035 af

Link EX 3: EX INL 3 Inflow=3.03 cfs 0.424 af
Primary=3.03 cfs 0.424 af

Link EX 5: EX INL 5 Inflow=6.56 cfs 0.788 af
Primary=6.56 cfs 0.788 af

Total Runoff Area = 7.512 ac Runoff Volume = 0.971 af Average Runoff Depth = 1.55"
39.88% Pervious = 2.996 ac 60.12% Impervious = 4.516 ac

Summary for Subcatchment 2S: S-4 and S-5

Runoff = 2.36 cfs @ 12.22 hrs, Volume= 0.187 af, Depth> 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.098	98	Pavement
*	0.407	71	>75% Grass cover, Good, HSG C
*	0.797	98	Existing Pavement
*	0.063	71	>75% Grass cover, Good, HSG C
	1.365		Weighted Average
	0.470		34.43% Pervious Area
	0.895		65.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	208	0.0505	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.2	92	0.0200	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
14.1	300	Total			

Summary for Subcatchment 8S: S-6 East

Runoff = 2.12 cfs @ 12.13 hrs, Volume= 0.126 af, Depth> 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.664	98	Pavement and roof
*	0.020	71	>75% Grass cover, Good, HSG C
	0.684		Weighted Average
	0.020		2.92% Pervious Area
	0.664		97.08% Impervious Area

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

Summary for Subcatchment OS1: OS-S

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.014 af, Depth> 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.024	98	Pavement
*	0.225	71	>75% Grass cover, Good, HSG C
	0.249		Weighted Average
	0.225		90.36% Pervious Area
	0.024		9.64% Impervious Area

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

Summary for Subcatchment OS2: OS-N

Runoff = 0.23 cfs @ 12.29 hrs, Volume= 0.021 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.529	71	>75% Grass cover, Good, HSG C
	0.529		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	28	0.1070	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
13.0	183	0.0383	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
2.0	30	0.1170	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
16.9	241	Total			

Summary for Subcatchment S-1: S-1

Runoff = 1.57 cfs @ 12.24 hrs, Volume= 0.132 af, Depth> 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.484	98	Pavement
*	0.822	71	>75% Grass cover, Good, HSG C
*	0.201	71	>75% Grass cover, Good, HSG C-Offsite
	1.507		Weighted Average
	1.023		67.88% Pervious Area
	0.484		32.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	158	0.0443	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
2.8	36	0.0700	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.4	18	0.0150	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
1.1	22	0.2500	0.33		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
15.2	234	Total			

Summary for Subcatchment S-2: S-2

Runoff = 1.13 cfs @ 12.24 hrs, Volume= 0.094 af, Depth> 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.472	98	Pavement
*	0.058	71	>75% Grass cover, Good, HSG C
*	0.080	71	>75% Grass cover, Good, HSG C-Offsite
	0.610		Weighted Average
	0.138		22.62% Pervious Area
	0.472		77.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	216	0.0463	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.5	31	0.0200	1.03		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
1.0	53	0.0110	0.90		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
0.5	69	0.0110	2.13		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.8	369	Total			

Summary for Subcatchment S-3: S-3

Runoff = 2.60 cfs @ 12.13 hrs, Volume= 0.155 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.821	98	Existing parking and roof, new roof
	0.821		100.00% Impervious Area

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

Summary for Subcatchment S-5: S-6 West

Runoff = 2.04 cfs @ 12.17 hrs, Volume= 0.142 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.670	98	Pavement
*	0.393	71	>75% Grass cover, Good, HSG C
	1.063		Weighted Average
	0.393		36.97% Pervious Area
	0.670		63.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	102	0.0392	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.2	96	0.0200	1.29		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
0.2	65	0.0100	6.22	7.63	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
0.6	222	0.0100	6.22	7.63	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
10.1	485	Total			

Summary for Subcatchment S-6: S-7

Runoff = 0.70 cfs @ 12.16 hrs, Volume= 0.046 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.219	98	Pavement
*	0.108	71	>75% Grass cover, Good, HSG C
	0.327		Weighted Average
	0.108		33.03% Pervious Area
	0.219		66.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	89	0.0449	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.0	67	0.0164	1.10		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
0.7	277	0.0100	6.22	7.63	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
8.6	433	Total			

Summary for Subcatchment S-7: S-8

Runoff = 0.43 cfs @ 12.13 hrs, Volume= 0.025 af, Depth> 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.129	98	Pavement
*	0.027	71	>75% Grass cover, Good, HSG C
	0.156		Weighted Average
	0.027		17.31% Pervious Area
	0.129		82.69% Impervious Area

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

Summary for Subcatchment S-8: S-9

Runoff = 0.18 cfs @ 12.13 hrs, Volume= 0.011 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.057	98	Pavement
*	0.003	71	>75% Grass cover, Good, HSG C
	0.060		Weighted Average
	0.003		5.00% Pervious Area
	0.057		95.00% Impervious Area

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

Summary for Subcatchment S-9: S-10

Runoff = 0.30 cfs @ 12.13 hrs, Volume= 0.018 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 1-yr Rainfall=2.49"

	Area (ac)	CN	Description
*	0.081	98	Pavement
*	0.060	71	>75% Grass cover, Good, HSG C
	0.141		Weighted Average
	0.060		42.55% Pervious Area
	0.081		57.45% Impervious Area

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

Summary for Pond 1P: Pre-Treatment Detention

Inflow Area = 1.431 ac, 90.36% Impervious, Inflow Depth > 2.09" for 1-yr event
Inflow = 3.43 cfs @ 12.14 hrs, Volume= 0.249 af
Outflow = 2.29 cfs @ 12.16 hrs, Volume= 0.244 af, Atten= 33%, Lag= 1.3 min
Primary = 2.29 cfs @ 12.16 hrs, Volume= 0.244 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 882.17' @ 12.48 hrs Surf.Area= 1,368 sf Storage= 1,879 cf

Plug-Flow detention time= 49.1 min calculated for 0.244 af (98% of inflow)
Center-of-Mass det. time= 36.9 min (801.2 - 764.3)

Volume	Invert	Avail.Storage	Storage Description
#1	880.80'	4,104 cf	**72.0" W x 36.0" H Box Pipe Storage** L= 228.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.80'	**12.0" Round Culvert** L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.80' / 880.80' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Secondary	882.70'	**12.0" Round Culvert** L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 882.70' / 882.50' S= 0.0200 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.30 cfs @ 12.16 hrs HW=881.94' TW=881.70' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.30 cfs @ 2.92 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.80' TW=880.80' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 2.1: STM INL NO. 2.1

Inflow Area = 1.431 ac, 90.36% Impervious, Inflow Depth > 2.09" for 1-yr event
Inflow = 3.43 cfs @ 12.14 hrs, Volume= 0.249 af
Outflow = 3.43 cfs @ 12.14 hrs, Volume= 0.249 af, Atten= 0%, Lag= 0.0 min
Primary = 3.43 cfs @ 12.14 hrs, Volume= 0.249 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 882.18' @ 12.46 hrs
Flood Elev= 883.88'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.92'	**18.0" Round Culvert** L= 25.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 880.92' / 880.80' S= 0.0048 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Secondary	882.00'	**15.0" Round Culvert** L= 18.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 882.00' / 881.90' S= 0.0056 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#3	Device 2	882.20'	**18.0" W x 3.0" H Vert. Orifice/Grate 1 YR Retention** C= 0.600

Primary OutFlow Max=3.32 cfs @ 12.14 hrs HW=882.09' TW=881.88' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 3.32 cfs @ 3.10 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.92' TW=881.60' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
└─**3=Orifice/Grate 1 YR Retention** (Controls 0.00 cfs)

Summary for Pond 2.2: STM MH NO. 2.2

Inflow Area = 2.938 ac, 60.48% Impervious, Inflow Depth > 0.96" for 1-yr event
Inflow = 0.81 cfs @ 12.55 hrs, Volume= 0.236 af
Outflow = 0.81 cfs @ 12.55 hrs, Volume= 0.236 af, Atten= 0%, Lag= 0.0 min
Primary = 0.81 cfs @ 12.55 hrs, Volume= 0.236 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 881.41' @ 12.54 hrs
Flood Elev= 884.28'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.80'	**12.0" Round Culvert** L= 29.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.80' / 880.75' S= 0.0017 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.81 cfs @ 12.55 hrs HW=881.41' TW=881.25' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.81 cfs @ 2.33 fps)

Summary for Pond 4.6: STM INL NO. 4.6

Inflow Area = 1.450 ac, 65.24% Impervious, Inflow Depth > 1.64" for 1-yr event
Inflow = 2.88 cfs @ 12.17 hrs, Volume= 0.199 af
Outflow = 2.88 cfs @ 12.17 hrs, Volume= 0.199 af, Atten= 0%, Lag= 0.0 min
Primary = 2.88 cfs @ 12.17 hrs, Volume= 0.199 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 880.56' @ 12.21 hrs
Flood Elev= 883.42'

Device	Routing	Invert	Outlet Devices
#1	Primary	878.50'	**12.0" Round Culvert** L= 17.9' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 878.50' / 878.40' S= 0.0056 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Secondary	879.90'	**18.0" Round Culvert** L= 22.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 879.90' / 879.50' S= 0.0182 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#3	Device 2	881.85'	**10.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 2	882.10'	**5.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=2.84 cfs @ 12.17 hrs HW=880.44' TW=880.08' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.84 cfs @ 3.62 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=878.50' TW=877.84' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond 4.8: STM MH NO. 2.3

Inflow Area = 2.938 ac, 60.48% Impervious, Inflow Depth > 0.96" for 1-yr event
Inflow = 0.81 cfs @ 12.55 hrs, Volume= 0.236 af
Outflow = 0.81 cfs @ 12.55 hrs, Volume= 0.236 af, Atten= 0%, Lag= 0.0 min
Primary = 0.81 cfs @ 12.55 hrs, Volume= 0.236 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 881.25' @ 12.55 hrs
Flood Elev= 881.88'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.75'	**18.0" Round Culvert** L= 154.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.75' / 880.41' S= 0.0022 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=0.81 cfs @ 12.55 hrs HW=881.25' TW=880.74' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.81 cfs @ 2.37 fps)

Summary for Pond 5P: Pipe Storage

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 881.60' @ 0.00 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	881.60'	0.012 af	**38.0" W x 24.0" H, R=31.2" Elliptical RCP_Elliptical 38x24** L= 100.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	881.60'	**6.0" Round Culvert** L= 14.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 881.60' / 881.55' S= 0.0036 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=881.60' TW=880.75' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 6P: Bioretention Pond

Inflow Area =		1.507 ac, 32.12% Impervious, Inflow Depth > 1.05" for 1-yr event			
Inflow	=	1.57 cfs @	12.24 hrs,	Volume=	0.132 af
Outflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 100%, Lag= 0.0 min
Primary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 884.66' @ 24.00 hrs Surf.Area= 9,427 sf Storage= 5,769 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	884.00'	49,337 cf	**Pond (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
884.00	8,034	0	0
885.00	10,143	9,089	9,089
886.00	19,028	14,586	23,674
887.00	32,297	25,663	49,337

Device	Routing	Invert	Outlet Devices
#1	Primary	882.00'	**6.0" Round Culvert** L= 117.0' RCP, groove end projecting, Ke= 0.200

			Inlet / Outlet Invert= 882.00' / 881.30' S= 0.0060 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf
#2	Device 1	885.00'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=884.00' TW=880.80' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.00 cfs of 0.84 cfs potential flow)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond D1: Detention Chamber

Inflow Area =	1.431 ac, 90.36% Impervious, Inflow Depth > 2.05" for 1-yr event			
Inflow =	2.29 cfs @	12.16 hrs, Volume=	0.244 af	
Outflow =	0.81 cfs @	12.55 hrs, Volume=	0.236 af, Atten= 65%, Lag= 23.4 min	
Primary =	0.81 cfs @	12.55 hrs, Volume=	0.236 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Starting Elev= 880.80' Surf.Area= 0.050 ac Storage= 0.150 af
Peak Elev= 882.14' @ 12.55 hrs Surf.Area= 0.050 ac Storage= 0.218 af (0.067 af above start)

Plug-Flow detention time= 359.9 min calculated for 0.086 af (35% of inflow)
Center-of-Mass det. time= 55.9 min (857.1 - 801.2)

Volume	Invert	Avail.Storage	Storage Description
#1	877.80'	0.301 af	**96.0" W x 72.0" H Box Pipe Storage** L= 273.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.80'	**6.0" Round Culvert** L= 18.6' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.80' / 880.80' S= 0.0000 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	880.80'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Secondary	881.80'	**12.0" Round Culvert** L= 18.6' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 881.80' / 881.80' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#4	Device 3	882.20'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Device 3	882.70'	**8.0" Vert. Orifice/Grate** C= 0.600
#6	Device 3	883.50'	**8.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=0.81 cfs @ 12.55 hrs HW=882.14' TW=881.41' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.81 cfs of 0.90 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.81 cfs @ 4.12 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.80' TW=880.80' (Dynamic Tailwater)
└─**3=Culvert** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  ├─**5=Orifice/Grate** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond D2: Detention Chamber 2

Inflow Area = 1.606 ac, 66.94% Impervious, Inflow Depth > 1.67" for 1-yr event
Inflow = 3.26 cfs @ 12.16 hrs, Volume= 0.224 af
Outflow = 2.18 cfs @ 12.25 hrs, Volume= 0.221 af, Atten= 33%, Lag= 5.8 min
Primary = 1.23 cfs @ 12.25 hrs, Volume= 0.202 af
Secondary = 0.95 cfs @ 12.25 hrs, Volume= 0.019 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Starting Elev= 878.30' Surf.Area= 0.023 ac Storage= 0.068 af
Peak Elev= 880.33' @ 12.25 hrs Surf.Area= 0.023 ac Storage= 0.114 af (0.046 af above start)

Plug-Flow detention time= 172.4 min calculated for 0.153 af (68% of inflow)
Center-of-Mass det. time= 26.3 min (798.2 - 771.9)

Volume	Invert	Avail.Storage	Storage Description
#1	875.30'	0.136 af	**96.0" W x 72.0" H Box Pipe Storage** L= 123.5'

Device	Routing	Invert	Outlet Devices
#1	Primary	878.30'	**6.0" Round Culvert** L= 17.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 878.30' / 878.30' S= 0.0000 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	878.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Secondary	879.30'	**12.0" Round Culvert** L= 12.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 879.30' / 879.10' S= 0.0164 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#4	Device 3	879.80'	**15.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 3	880.85'	**15.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#6	Device 3	881.10'	**8.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=1.23 cfs @ 12.25 hrs HW=880.32' TW=878.26' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 1.23 cfs @ 6.25 fps)
  └─**2=Orifice/Grate** (Passes 1.23 cfs of 1.26 cfs potential flow)

Secondary OutFlow Max=0.94 cfs @ 12.25 hrs HW=880.32' TW=878.26' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.94 cfs of 2.93 cfs potential flow)
  ├─**4=Orifice/Grate** (Orifice Controls 0.94 cfs @ 3.01 fps)
  ├─**5=Orifice/Grate** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Link 1L: (new Link)

Inflow Area = 7.512 ac, 60.12% Impervious, Inflow Depth > 1.31" for 1-yr event
Inflow = 6.90 cfs @ 12.19 hrs, Volume= 0.823 af
Primary = 6.90 cfs @ 12.19 hrs, Volume= 0.823 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link 7L: (new Link)

Inflow Area = 0.778 ac, 3.08% Impervious, Inflow Depth > 0.54" for 1-yr event
Inflow = 0.34 cfs @ 12.16 hrs, Volume= 0.035 af
Primary = 0.34 cfs @ 12.16 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link EX 3: EX INL 3

Inflow Area = 4.303 ac, 62.10% Impervious, Inflow Depth > 1.18" for 1-yr event
Inflow = 3.03 cfs @ 12.23 hrs, Volume= 0.424 af
Primary = 3.03 cfs @ 12.23 hrs, Volume= 0.424 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

1-yr 3 Point manual elevation table, To= 0.00 hrs, dt= 12.00 hrs, feet =
880.42 880.76 880.42

Summary for Link EX 5: EX INL 5

Inflow Area = 6.734 ac, 66.71% Impervious, Inflow Depth > 1.40" for 1-yr event
Inflow = 6.56 cfs @ 12.19 hrs, Volume= 0.788 af
Primary = 6.56 cfs @ 12.19 hrs, Volume= 0.788 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

1-yr 3 Point manual elevation table, To= 0.00 hrs, dt= 12.00 hrs, feet =
877.84 878.27 877.84

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: S-4 and S-5 Runoff Area=1.365 ac 65.57% Impervious Runoff Depth>1.94"
Flow Length=300' Tc=14.1 min CN=WQ Runoff=2.78 cfs 0.221 af

Subcatchment8S: S-6 East Runoff Area=0.684 ac 97.08% Impervious Runoff Depth>2.55"
Tc=6.0 min CN=WQ Runoff=2.43 cfs 0.145 af

SubcatchmentOS1: OS-S Runoff Area=0.249 ac 9.64% Impervious Runoff Depth>0.86"
Tc=6.0 min CN=WQ Runoff=0.31 cfs 0.018 af

SubcatchmentOS2: OS-N Runoff Area=0.529 ac 0.00% Impervious Runoff Depth>0.67"
Flow Length=241' Tc=16.9 min CN=71 Runoff=0.34 cfs 0.029 af

SubcatchmentS-1: S-1 Runoff Area=1.507 ac 32.12% Impervious Runoff Depth>1.29"
Flow Length=234' Tc=15.2 min CN=WQ Runoff=1.96 cfs 0.162 af

SubcatchmentS-2: S-2 Runoff Area=0.610 ac 77.38% Impervious Runoff Depth>2.17"
Flow Length=369' Tc=15.8 min CN=WQ Runoff=1.32 cfs 0.110 af

SubcatchmentS-3: S-3 Runoff Area=0.821 ac 100.00% Impervious Runoff Depth>2.61"
Tc=6.0 min CN=98 Runoff=2.98 cfs 0.178 af

SubcatchmentS-5: S-6 West Runoff Area=1.063 ac 63.03% Impervious Runoff Depth>1.89"
Flow Length=485' Tc=10.1 min CN=WQ Runoff=2.41 cfs 0.167 af

SubcatchmentS-6: S-7 Runoff Area=0.327 ac 66.97% Impervious Runoff Depth>1.97"
Flow Length=433' Tc=8.6 min CN=WQ Runoff=0.82 cfs 0.054 af

SubcatchmentS-7: S-8 Runoff Area=0.156 ac 82.69% Impervious Runoff Depth>2.27"
Tc=6.0 min CN=WQ Runoff=0.49 cfs 0.030 af

SubcatchmentS-8: S-9 Runoff Area=0.060 ac 95.00% Impervious Runoff Depth>2.51"
Tc=6.0 min CN=WQ Runoff=0.21 cfs 0.013 af

SubcatchmentS-9: S-10 Runoff Area=0.141 ac 57.45% Impervious Runoff Depth>1.78"
Tc=6.0 min CN=WQ Runoff=0.35 cfs 0.021 af

Pond 1P: Pre-TreatmentDetention Peak Elev=882.34' Storage=2,106 cf Inflow=3.90 cfs 0.278 af
Primary=2.43 cfs 0.273 af Secondary=0.00 cfs 0.000 af Outflow=2.43 cfs 0.273 af

Pond 2.1: STM INL NO. 2.1 Peak Elev=882.35' Inflow=3.94 cfs 0.289 af
Primary=3.90 cfs 0.278 af Secondary=0.28 cfs 0.011 af Outflow=3.94 cfs 0.289 af

Pond 2.2: STM MH NO. 2.2 Peak Elev=881.52' Inflow=0.86 cfs 0.264 af
12.0" Round Culvert n=0.011 L=29.0' S=0.0017 '/' Outflow=0.86 cfs 0.264 af

Pond 4.6: STM INL NO. 4.6 Peak Elev=880.94' Inflow=3.39 cfs 0.234 af
Primary=3.39 cfs 0.234 af Secondary=0.00 cfs 0.000 af Outflow=3.39 cfs 0.234 af

Pond 4.8: STM MH NO. 2.3 Peak Elev=881.40' Inflow=1.13 cfs 0.275 af
18.0" Round Culvert n=0.011 L=154.0' S=0.0022 '/' Outflow=1.13 cfs 0.275 af

Pond 5P: Pipe Storage Peak Elev=881.99' Storage=0.002 af Inflow=0.28 cfs 0.011 af
6.0" Round Culvert n=0.011 L=14.0' S=0.0036 '/' Outflow=0.27 cfs 0.011 af

Pond 6P: Bioretention Pond Peak Elev=884.80' Storage=7,062 cf Inflow=1.96 cfs 0.162 af
Outflow=0.00 cfs 0.000 af

Pond D1: Detention Chamber Peak Elev=882.30' Storage=0.225 af Inflow=2.43 cfs 0.273 af
Primary=0.84 cfs 0.264 af Secondary=0.03 cfs 0.001 af Outflow=0.86 cfs 0.264 af

Pond D2: Detention Chamber 2 Peak Elev=880.59' Storage=0.120 af Inflow=3.83 cfs 0.263 af
Primary=1.31 cfs 0.229 af Secondary=1.23 cfs 0.031 af Outflow=2.54 cfs 0.260 af

Link 1L: (new Link) Inflow=8.22 cfs 0.969 af
Primary=8.22 cfs 0.969 af

Link 7L: (new Link) Inflow=0.50 cfs 0.047 af
Primary=0.50 cfs 0.047 af

Link EX 3: EX INL 3 Inflow=3.63 cfs 0.496 af
Primary=3.63 cfs 0.496 af

Link EX 5: EX INL 5 Inflow=7.73 cfs 0.922 af
Primary=7.73 cfs 0.922 af

Total Runoff Area = 7.512 ac Runoff Volume = 1.148 af Average Runoff Depth = 1.83"
39.88% Pervious = 2.996 ac 60.12% Impervious = 4.516 ac

Summary for Subcatchment 2S: S-4 and S-5

Runoff = 2.78 cfs @ 12.22 hrs, Volume= 0.221 af, Depth> 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.098	98	Pavement
*	0.407	71	>75% Grass cover, Good, HSG C
*	0.797	98	Existing Pavement
*	0.063	71	>75% Grass cover, Good, HSG C
	1.365		Weighted Average
	0.470		34.43% Pervious Area
	0.895		65.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	208	0.0505	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.2	92	0.0200	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
14.1	300	Total			

Summary for Subcatchment 8S: S-6 East

Runoff = 2.43 cfs @ 12.13 hrs, Volume= 0.145 af, Depth> 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.664	98	Pavement and roof
*	0.020	71	>75% Grass cover, Good, HSG C
	0.684		Weighted Average
	0.020		2.92% Pervious Area
	0.664		97.08% Impervious Area

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

Summary for Subcatchment OS1: OS-S

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.018 af, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.024	98	Pavement
*	0.225	71	>75% Grass cover, Good, HSG C
	0.249		Weighted Average
	0.225		90.36% Pervious Area
	0.024		9.64% Impervious Area

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

Summary for Subcatchment OS2: OS-N

Runoff = 0.34 cfs @ 12.28 hrs, Volume= 0.029 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.529	71	>75% Grass cover, Good, HSG C
	0.529		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	28	0.1070	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
13.0	183	0.0383	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
2.0	30	0.1170	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
16.9	241	Total			

Summary for Subcatchment S-1: S-1

Runoff = 1.96 cfs @ 12.24 hrs, Volume= 0.162 af, Depth> 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.484	98	Pavement
*	0.822	71	>75% Grass cover, Good, HSG C
*	0.201	71	>75% Grass cover, Good, HSG C-Offsite
	1.507		Weighted Average
	1.023		67.88% Pervious Area
	0.484		32.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	158	0.0443	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
2.8	36	0.0700	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.4	18	0.0150	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
1.1	22	0.2500	0.33		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
15.2	234	Total			

Summary for Subcatchment S-2: S-2

Runoff = 1.32 cfs @ 12.24 hrs, Volume= 0.110 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.472	98	Pavement
*	0.058	71	>75% Grass cover, Good, HSG C
*	0.080	71	>75% Grass cover, Good, HSG C-Offsite
	0.610		Weighted Average
	0.138		22.62% Pervious Area
	0.472		77.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	216	0.0463	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.5	31	0.0200	1.03		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
1.0	53	0.0110	0.90		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
0.5	69	0.0110	2.13		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.8	369	Total			

Summary for Subcatchment S-3: S-3

Runoff = 2.98 cfs @ 12.13 hrs, Volume= 0.178 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.821	98	Existing parking and roof, new roof
	0.821		100.00% Impervious Area

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

Summary for Subcatchment S-5: S-6 West

Runoff = 2.41 cfs @ 12.17 hrs, Volume= 0.167 af, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.670	98	Pavement
*	0.393	71	>75% Grass cover, Good, HSG C
	1.063		Weighted Average
	0.393		36.97% Pervious Area
	0.670		63.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	102	0.0392	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.2	96	0.0200	1.29		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
0.2	65	0.0100	6.22	7.63	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
0.6	222	0.0100	6.22	7.63	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
10.1	485	Total			

Summary for Subcatchment S-6: S-7

Runoff = 0.82 cfs @ 12.16 hrs, Volume= 0.054 af, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.219	98	Pavement
*	0.108	71	>75% Grass cover, Good, HSG C
	0.327		Weighted Average
	0.108		33.03% Pervious Area
	0.219		66.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	89	0.0449	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.0	67	0.0164	1.10		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
0.7	277	0.0100	6.22	7.63	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
8.6	433	Total			

Summary for Subcatchment S-7: S-8

Runoff = 0.49 cfs @ 12.13 hrs, Volume= 0.030 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.129	98	Pavement
*	0.027	71	>75% Grass cover, Good, HSG C
	0.156		Weighted Average
	0.027		17.31% Pervious Area
	0.129		82.69% Impervious Area

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

Summary for Subcatchment S-8: S-9

Runoff = 0.21 cfs @ 12.13 hrs, Volume= 0.013 af, Depth> 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.057	98	Pavement
*	0.003	71	>75% Grass cover, Good, HSG C
	0.060		Weighted Average
	0.003		5.00% Pervious Area
	0.057		95.00% Impervious Area

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

Summary for Subcatchment S-9: S-10

Runoff = 0.35 cfs @ 12.13 hrs, Volume= 0.021 af, Depth> 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 2-yr Rainfall=2.84"

	Area (ac)	CN	Description
*	0.081	98	Pavement
*	0.060	71	>75% Grass cover, Good, HSG C
	0.141		Weighted Average
	0.060		42.55% Pervious Area
	0.081		57.45% Impervious Area

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

Summary for Pond 1P: Pre-Treatment Detention

Inflow Area = 1.431 ac, 90.36% Impervious, Inflow Depth > 2.33" for 2-yr event
Inflow = 3.90 cfs @ 12.13 hrs, Volume= 0.278 af
Outflow = 2.43 cfs @ 12.16 hrs, Volume= 0.273 af, Atten= 38%, Lag= 2.1 min
Primary = 2.43 cfs @ 12.16 hrs, Volume= 0.273 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 882.34' @ 12.41 hrs Surf.Area= 1,368 sf Storage= 2,106 cf

Plug-Flow detention time= 49.9 min calculated for 0.272 af (98% of inflow)
Center-of-Mass det. time= 38.4 min (801.0 - 762.6)

Volume	Invert	Avail.Storage	Storage Description
#1	880.80'	4,104 cf	**72.0" W x 36.0" H Box Pipe Storage** L= 228.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.80'	**12.0" Round Culvert** L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.80' / 880.80' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Secondary	882.70'	**12.0" Round Culvert** L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 882.70' / 882.50' S= 0.0200 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.45 cfs @ 12.16 hrs HW=882.15' TW=881.88' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.45 cfs @ 3.12 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.80' TW=880.80' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 2.1: STM INL NO. 2.1

Inflow Area = 1.431 ac, 90.36% Impervious, Inflow Depth > 2.42" for 2-yr event
Inflow = 3.94 cfs @ 12.14 hrs, Volume= 0.289 af
Outflow = 3.94 cfs @ 12.14 hrs, Volume= 0.289 af, Atten= 0%, Lag= 0.0 min
Primary = 3.90 cfs @ 12.13 hrs, Volume= 0.278 af
Secondary = 0.28 cfs @ 12.37 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 882.35' @ 12.37 hrs
Flood Elev= 883.88'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.92'	**18.0" Round Culvert** L= 25.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 880.92' / 880.80' S= 0.0048 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Secondary	882.00'	**15.0" Round Culvert** L= 18.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 882.00' / 881.90' S= 0.0056 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#3	Device 2	882.20'	**18.0" W x 3.0" H Vert. Orifice/Grate 1 YR Retention** C= 0.600

Primary OutFlow Max=3.74 cfs @ 12.13 hrs HW=882.23' TW=882.03' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 3.74 cfs @ 3.05 fps)

Secondary OutFlow Max=0.28 cfs @ 12.37 hrs HW=882.35' TW=881.97' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.28 cfs of 0.48 cfs potential flow)
└─**3=Orifice/Grate 1 YR Retention** (Orifice Controls 0.28 cfs @ 1.24 fps)

Summary for Pond 2.2: STM MH NO. 2.2

Inflow Area = 2.938 ac, 60.48% Impervious, Inflow Depth > 1.08" for 2-yr event
Inflow = 0.86 cfs @ 12.50 hrs, Volume= 0.264 af
Outflow = 0.86 cfs @ 12.50 hrs, Volume= 0.264 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.50 hrs, Volume= 0.264 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 881.52' @ 12.47 hrs
Flood Elev= 884.28'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.80'	**12.0" Round Culvert** L= 29.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.80' / 880.75' S= 0.0017 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.87 cfs @ 12.50 hrs HW=881.52' TW=881.40' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.87 cfs @ 2.02 fps)

Summary for Pond 4.6: STM INL NO. 4.6

Inflow Area = 1.450 ac, 65.24% Impervious, Inflow Depth > 1.93" for 2-yr event
Inflow = 3.39 cfs @ 12.17 hrs, Volume= 0.234 af
Outflow = 3.39 cfs @ 12.17 hrs, Volume= 0.234 af, Atten= 0%, Lag= 0.0 min
Primary = 3.39 cfs @ 12.17 hrs, Volume= 0.234 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 880.94' @ 12.21 hrs
Flood Elev= 883.42'

Device	Routing	Invert	Outlet Devices
#1	Primary	878.50'	**12.0" Round Culvert** L= 17.9' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 878.50' / 878.40' S= 0.0056 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Secondary	879.90'	**18.0" Round Culvert** L= 22.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 879.90' / 879.50' S= 0.0182 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#3	Device 2	881.85'	**10.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 2	882.10'	**5.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=3.35 cfs @ 12.17 hrs HW=880.82' TW=880.32' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.35 cfs @ 4.26 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=878.50' TW=877.84' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond 4.8: STM MH NO. 2.3

Inflow Area = 2.938 ac, 60.48% Impervious, Inflow Depth > 1.12" for 2-yr event
Inflow = 1.13 cfs @ 12.47 hrs, Volume= 0.275 af
Outflow = 1.13 cfs @ 12.47 hrs, Volume= 0.275 af, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.47 hrs, Volume= 0.275 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 881.40' @ 12.46 hrs
Flood Elev= 881.88'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.75'	**18.0" Round Culvert** L= 154.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.75' / 880.41' S= 0.0022 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=1.13 cfs @ 12.47 hrs HW=881.40' TW=881.06' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.13 cfs @ 2.26 fps)

Summary for Pond 5P: Pipe Storage

Inflow	=	0.28 cfs @	12.37 hrs,	Volume=	0.011 af
Outflow	=	0.27 cfs @	12.45 hrs,	Volume=	0.011 af, Atten= 5%, Lag= 4.7 min
Primary	=	0.27 cfs @	12.45 hrs,	Volume=	0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 881.99' @ 12.45 hrs Surf.Area= 0.006 ac Storage= 0.002 af

Plug-Flow detention time= 5.3 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 5.0 min (750.5 - 745.5)

Volume	Invert	Avail.Storage	Storage Description
#1	881.60'	0.012 af	**38.0" W x 24.0" H, R=31.2" Elliptical RCP_Elliptical 38x24** L= 100.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	881.60'	**6.0" Round Culvert** L= 14.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 881.60' / 881.55' S= 0.0036 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

Primary OutFlow Max=0.27 cfs @ 12.45 hrs HW=881.99' TW=881.40' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.27 cfs @ 2.23 fps)

Summary for Pond 6P: Bioretention Pond

Inflow Area = 1.507 ac, 32.12% Impervious, Inflow Depth > 1.29" for 2-yr event

Inflow	=	1.96 cfs @	12.24 hrs,	Volume=	0.162 af
Outflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 100%, Lag= 0.0 min
Primary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 884.80' @ 24.00 hrs Surf.Area= 9,712 sf Storage= 7,062 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	884.00'	49,337 cf	**Pond (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
884.00	8,034	0	0
885.00	10,143	9,089	9,089
886.00	19,028	14,586	23,674
887.00	32,297	25,663	49,337

Device	Routing	Invert	Outlet Devices
#1	Primary	882.00'	**6.0" Round Culvert** L= 117.0' RCP, groove end projecting, Ke= 0.200

			Inlet / Outlet Invert= 882.00' / 881.30' S= 0.0060 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf
#2	Device 1	885.00'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=884.00' TW=880.80' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.00 cfs of 0.84 cfs potential flow)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond D1: Detention Chamber

Inflow Area =	1.431 ac, 90.36% Impervious, Inflow Depth > 2.29" for 2-yr event			
Inflow =	2.43 cfs @	12.16 hrs, Volume=	0.273 af	
Outflow =	0.86 cfs @	12.50 hrs, Volume=	0.264 af, Atten= 64%, Lag= 20.0 min	
Primary =	0.84 cfs @	12.51 hrs, Volume=	0.264 af	
Secondary =	0.03 cfs @	12.50 hrs, Volume=	0.001 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Starting Elev= 880.80' Surf.Area= 0.050 ac Storage= 0.150 af
Peak Elev= 882.30' @ 12.50 hrs Surf.Area= 0.050 ac Storage= 0.225 af (0.075 af above start)

Plug-Flow detention time= 333.9 min calculated for 0.114 af (42% of inflow)
Center-of-Mass det. time= 59.1 min (860.1 - 801.0)

Volume	Invert	Avail.Storage	Storage Description
#1	877.80'	0.301 af	**96.0" W x 72.0" H Box Pipe Storage** L= 273.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.80'	**6.0" Round Culvert** L= 18.6' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.80' / 880.80' S= 0.0000 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	880.80'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Secondary	881.80'	**12.0" Round Culvert** L= 18.6' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 881.80' / 881.80' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#4	Device 3	882.20'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Device 3	882.70'	**8.0" Vert. Orifice/Grate** C= 0.600
#6	Device 3	883.50'	**8.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=0.84 cfs @ 12.51 hrs HW=882.30' TW=881.51' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.84 cfs of 0.93 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.84 cfs @ 4.26 fps)

Secondary OutFlow Max=0.03 cfs @ 12.50 hrs HW=882.30' TW=881.52' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.03 cfs of 0.57 cfs potential flow)
  ├─**4=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.06 fps)
  ├─**5=Orifice/Grate** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond D2: Detention Chamber 2

Inflow Area = 1.606 ac, 66.94% Impervious, Inflow Depth > 1.97" for 2-yr event
Inflow = 3.83 cfs @ 12.16 hrs, Volume= 0.263 af
Outflow = 2.54 cfs @ 12.26 hrs, Volume= 0.260 af, Atten= 34%, Lag= 5.8 min
Primary = 1.31 cfs @ 12.26 hrs, Volume= 0.229 af
Secondary = 1.23 cfs @ 12.26 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Starting Elev= 878.30' Surf.Area= 0.023 ac Storage= 0.068 af
Peak Elev= 880.59' @ 12.26 hrs Surf.Area= 0.023 ac Storage= 0.120 af (0.052 af above start)

Plug-Flow detention time= 158.1 min calculated for 0.192 af (73% of inflow)
Center-of-Mass det. time= 25.2 min (795.5 - 770.3)

Volume	Invert	Avail.Storage	Storage Description
#1	875.30'	0.136 af	**96.0" W x 72.0" H Box Pipe Storage** L= 123.5'

Device	Routing	Invert	Outlet Devices
#1	Primary	878.30'	**6.0" Round Culvert** L= 17.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 878.30' / 878.30' S= 0.0000 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	878.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Secondary	879.30'	**12.0" Round Culvert** L= 12.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 879.30' / 879.10' S= 0.0164 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#4	Device 3	879.80'	**15.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 3	880.85'	**15.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#6	Device 3	881.10'	**8.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=1.31 cfs @ 12.26 hrs HW=880.59' TW=878.67' (Dynamic Tailwater)
└─**1=Culvert** (Controls 1.31 cfs)
  └─**2=Orifice/Grate** (Orifice Controls 1.31 cfs @ 6.66 fps)

Secondary OutFlow Max=1.22 cfs @ 12.26 hrs HW=880.59' TW=878.67' (Dynamic Tailwater)
└─**3=Culvert** (Passes 1.22 cfs of 3.76 cfs potential flow)
  ├─**4=Orifice/Grate** (Orifice Controls 1.22 cfs @ 3.91 fps)
  ├─**5=Orifice/Grate** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Link 1L: (new Link)

Inflow Area = 7.512 ac, 60.12% Impervious, Inflow Depth > 1.55" for 2-yr event
Inflow = 8.22 cfs @ 12.18 hrs, Volume= 0.969 af
Primary = 8.22 cfs @ 12.18 hrs, Volume= 0.969 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link 7L: (new Link)

Inflow Area = 0.778 ac, 3.08% Impervious, Inflow Depth > 0.73" for 2-yr event
Inflow = 0.50 cfs @ 12.16 hrs, Volume= 0.047 af
Primary = 0.50 cfs @ 12.16 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link EX 3: EX INL 3

Inflow Area = 4.303 ac, 62.10% Impervious, Inflow Depth > 1.38" for 2-yr event
Inflow = 3.63 cfs @ 12.23 hrs, Volume= 0.496 af
Primary = 3.63 cfs @ 12.23 hrs, Volume= 0.496 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

2-yr 3 Point manual elevation table, To= 0.00 hrs, dt= 12.00 hrs, feet =
880.42 881.09 880.42

Summary for Link EX 5: EX INL 5

Inflow Area = 6.734 ac, 66.71% Impervious, Inflow Depth > 1.64" for 2-yr event
Inflow = 7.73 cfs @ 12.18 hrs, Volume= 0.922 af
Primary = 7.73 cfs @ 12.18 hrs, Volume= 0.922 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

2-yr 3 Point manual elevation table, To= 0.00 hrs, dt= 12.00 hrs, feet =
877.84 878.69 877.84

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: S-4 and S-5 Runoff Area=1.365 ac 65.57% Impervious Runoff Depth>3.03"
Flow Length=300' Tc=14.1 min CN=WQ Runoff=4.35 cfs 0.344 af

Subcatchment8S: S-6 East Runoff Area=0.684 ac 97.08% Impervious Runoff Depth>3.78"
Tc=6.0 min CN=WQ Runoff=3.54 cfs 0.216 af

SubcatchmentOS1: OS-S Runoff Area=0.249 ac 9.64% Impervious Runoff Depth>1.69"
Tc=6.0 min CN=WQ Runoff=0.64 cfs 0.035 af

SubcatchmentOS2: OS-N Runoff Area=0.529 ac 0.00% Impervious Runoff Depth>1.45"
Flow Length=241' Tc=16.9 min CN=71 Runoff=0.81 cfs 0.064 af

SubcatchmentS-1: S-1 Runoff Area=1.507 ac 32.12% Impervious Runoff Depth>2.22"
Flow Length=234' Tc=15.2 min CN=WQ Runoff=3.50 cfs 0.279 af

SubcatchmentS-2: S-2 Runoff Area=0.610 ac 77.38% Impervious Runoff Depth>3.31"
Flow Length=369' Tc=15.8 min CN=WQ Runoff=2.00 cfs 0.168 af

SubcatchmentS-3: S-3 Runoff Area=0.821 ac 100.00% Impervious Runoff Depth>3.85"
Tc=6.0 min CN=98 Runoff=4.33 cfs 0.264 af

SubcatchmentS-5: S-6 West Runoff Area=1.063 ac 63.03% Impervious Runoff Depth>2.97"
Flow Length=485' Tc=10.1 min CN=WQ Runoff=3.80 cfs 0.263 af

SubcatchmentS-6: S-7 Runoff Area=0.327 ac 66.97% Impervious Runoff Depth>3.06"
Flow Length=433' Tc=8.6 min CN=WQ Runoff=1.27 cfs 0.083 af

SubcatchmentS-7: S-8 Runoff Area=0.156 ac 82.69% Impervious Runoff Depth>3.44"
Tc=6.0 min CN=WQ Runoff=0.74 cfs 0.045 af

SubcatchmentS-8: S-9 Runoff Area=0.060 ac 95.00% Impervious Runoff Depth>3.73"
Tc=6.0 min CN=WQ Runoff=0.31 cfs 0.019 af

SubcatchmentS-9: S-10 Runoff Area=0.141 ac 57.45% Impervious Runoff Depth>2.83"
Tc=6.0 min CN=WQ Runoff=0.56 cfs 0.033 af

Pond 1P: Pre-TreatmentDetention Peak Elev=882.86' Storage=2,815 cf Inflow=4.68 cfs 0.374 af
Primary=2.92 cfs 0.365 af Secondary=0.13 cfs 0.002 af Outflow=2.92 cfs 0.367 af

Pond 2.1: STM INL NO. 2.1 Peak Elev=882.89' Inflow=5.79 cfs 0.432 af
Primary=4.68 cfs 0.374 af Secondary=1.15 cfs 0.058 af Outflow=5.79 cfs 0.432 af

Pond 2.2: STM MH NO. 2.2 Peak Elev=881.81' Inflow=1.42 cfs 0.424 af
12.0" Round Culvert n=0.011 L=29.0' S=0.0017 '/' Outflow=1.42 cfs 0.424 af

Pond 4.6: STM INL NO. 4.6 Peak Elev=882.16' Inflow=5.31 cfs 0.365 af
Primary=4.82 cfs 0.361 af Secondary=0.65 cfs 0.004 af Outflow=5.31 cfs 0.365 af

Pond 4.8: STM MH NO. 2.3 Peak Elev=881.67' Inflow=2.27 cfs 0.482 af
18.0" Round Culvert n=0.011 L=154.0' S=0.0022 '/' Outflow=2.27 cfs 0.482 af

Pond 5P: Pipe Storage Peak Elev=882.65' Storage=0.006 af Inflow=1.15 cfs 0.058 af
6.0" Round Culvert n=0.011 L=14.0' S=0.0036 '/' Outflow=0.86 cfs 0.058 af

Pond 6P: Bioretention Pond Peak Elev=885.03' Storage=9,407 cf Inflow=3.50 cfs 0.279 af
Outflow=0.17 cfs 0.068 af

Pond D1: Detention Chamber Peak Elev=882.74' Storage=0.247 af Inflow=2.92 cfs 0.367 af
Primary=0.91 cfs 0.334 af Secondary=0.51 cfs 0.021 af Outflow=1.42 cfs 0.355 af

Pond D2: Detention Chamber 2 Peak Elev=881.22' Storage=0.134 af Inflow=5.55 cfs 0.406 af
Primary=1.44 cfs 0.314 af Secondary=3.54 cfs 0.088 af Outflow=4.98 cfs 0.402 af

Link 1L: (new Link) Inflow=15.43 cfs 1.580 af
Primary=15.43 cfs 1.580 af

Link 7L: (new Link) Inflow=1.17 cfs 0.099 af
Primary=1.17 cfs 0.099 af

Link EX 3: EX INL 3 Inflow=6.25 cfs 0.826 af
Primary=6.25 cfs 0.826 af

Link EX 5: EX INL 5 Inflow=14.29 cfs 1.481 af
Primary=14.29 cfs 1.481 af

Total Runoff Area = 7.512 ac Runoff Volume = 1.813 af Average Runoff Depth = 2.90"
39.88% Pervious = 2.996 ac 60.12% Impervious = 4.516 ac

Summary for Subcatchment 2S: S-4 and S-5

Runoff = 4.35 cfs @ 12.22 hrs, Volume= 0.344 af, Depth> 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.098	98	Pavement
*	0.407	71	>75% Grass cover, Good, HSG C
*	0.797	98	Existing Pavement
*	0.063	71	>75% Grass cover, Good, HSG C
	1.365		Weighted Average
	0.470		34.43% Pervious Area
	0.895		65.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	208	0.0505	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.2	92	0.0200	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
14.1	300	Total			

Summary for Subcatchment 8S: S-6 East

Runoff = 3.54 cfs @ 12.13 hrs, Volume= 0.216 af, Depth> 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.664	98	Pavement and roof
*	0.020	71	>75% Grass cover, Good, HSG C
	0.684		Weighted Average
	0.020		2.92% Pervious Area
	0.664		97.08% Impervious Area

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

Summary for Subcatchment OS1: OS-S

Runoff = 0.64 cfs @ 12.13 hrs, Volume= 0.035 af, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.024	98	Pavement
*	0.225	71	>75% Grass cover, Good, HSG C
	0.249		Weighted Average
	0.225		90.36% Pervious Area
	0.024		9.64% Impervious Area

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

Summary for Subcatchment OS2: OS-N

Runoff = 0.81 cfs @ 12.27 hrs, Volume= 0.064 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.529	71	>75% Grass cover, Good, HSG C
	0.529		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	28	0.1070	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
13.0	183	0.0383	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
2.0	30	0.1170	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
16.9	241	Total			

Summary for Subcatchment S-1: S-1

Runoff = 3.50 cfs @ 12.24 hrs, Volume= 0.279 af, Depth> 2.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.484	98	Pavement
*	0.822	71	>75% Grass cover, Good, HSG C
*	0.201	71	>75% Grass cover, Good, HSG C-Offsite
	1.507		Weighted Average
	1.023		67.88% Pervious Area
	0.484		32.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	158	0.0443	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
2.8	36	0.0700	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.4	18	0.0150	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
1.1	22	0.2500	0.33		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
15.2	234	Total			

Summary for Subcatchment S-2: S-2

Runoff = 2.00 cfs @ 12.24 hrs, Volume= 0.168 af, Depth> 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.472	98	Pavement
*	0.058	71	>75% Grass cover, Good, HSG C
*	0.080	71	>75% Grass cover, Good, HSG C-Offsite
	0.610		Weighted Average
	0.138		22.62% Pervious Area
	0.472		77.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	216	0.0463	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.5	31	0.0200	1.03		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
1.0	53	0.0110	0.90		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
0.5	69	0.0110	2.13		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.8	369	Total			

Summary for Subcatchment S-3: S-3

Runoff = 4.33 cfs @ 12.13 hrs, Volume= 0.264 af, Depth> 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.821	98	Existing parking and roof, new roof
	0.821		100.00% Impervious Area

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

Summary for Subcatchment S-5: S-6 West

Runoff = 3.80 cfs @ 12.17 hrs, Volume= 0.263 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.670	98	Pavement
*	0.393	71	>75% Grass cover, Good, HSG C
	1.063		Weighted Average
	0.393		36.97% Pervious Area
	0.670		63.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	102	0.0392	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.2	96	0.0200	1.29		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
0.2	65	0.0100	6.22	7.63	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
0.6	222	0.0100	6.22	7.63	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
10.1	485	Total			

Summary for Subcatchment S-6: S-7

Runoff = 1.27 cfs @ 12.16 hrs, Volume= 0.083 af, Depth> 3.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.219	98	Pavement
*	0.108	71	>75% Grass cover, Good, HSG C
	0.327		Weighted Average
	0.108		33.03% Pervious Area
	0.219		66.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	89	0.0449	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.0	67	0.0164	1.10		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
0.7	277	0.0100	6.22	7.63	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
8.6	433	Total			

Summary for Subcatchment S-7: S-8

Runoff = 0.74 cfs @ 12.13 hrs, Volume= 0.045 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.129	98	Pavement
*	0.027	71	>75% Grass cover, Good, HSG C
	0.156		Weighted Average
	0.027		17.31% Pervious Area
	0.129		82.69% Impervious Area

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

Summary for Subcatchment S-8: S-9

Runoff = 0.31 cfs @ 12.13 hrs, Volume= 0.019 af, Depth> 3.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.057	98	Pavement
*	0.003	71	>75% Grass cover, Good, HSG C
	0.060		Weighted Average
	0.003		5.00% Pervious Area
	0.057		95.00% Impervious Area

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

Summary for Subcatchment S-9: S-10

Runoff = 0.56 cfs @ 12.13 hrs, Volume= 0.033 af, Depth> 2.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 10-yr Rainfall=4.09"

	Area (ac)	CN	Description
*	0.081	98	Pavement
*	0.060	71	>75% Grass cover, Good, HSG C
	0.141		Weighted Average
	0.060		42.55% Pervious Area
	0.081		57.45% Impervious Area

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

Summary for Pond 1P: Pre-Treatment Detention

Inflow Area = 1.431 ac, 90.36% Impervious, Inflow Depth > 3.13" for 10-yr event
Inflow = 4.68 cfs @ 12.13 hrs, Volume= 0.374 af
Outflow = 2.92 cfs @ 12.18 hrs, Volume= 0.367 af, Atten= 38%, Lag= 2.8 min
Primary = 2.92 cfs @ 12.17 hrs, Volume= 0.365 af
Secondary = 0.13 cfs @ 12.28 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 882.86' @ 12.31 hrs Surf.Area= 1,368 sf Storage= 2,815 cf

Plug-Flow detention time= 49.8 min calculated for 0.367 af (98% of inflow)
Center-of-Mass det. time= 38.2 min (795.4 - 757.2)

Volume	Invert	Avail.Storage	Storage Description
#1	880.80'	4,104 cf	**72.0" W x 36.0" H Box Pipe Storage** L= 228.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.80'	**12.0" Round Culvert** L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.80' / 880.80' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Secondary	882.70'	**12.0" Round Culvert** L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 882.70' / 882.50' S= 0.0200 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.93 cfs @ 12.17 hrs HW=882.71' TW=882.32' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.93 cfs @ 3.73 fps)

Secondary OutFlow Max=0.13 cfs @ 12.28 hrs HW=882.85' TW=882.62' (Dynamic Tailwater)
└─**2=Culvert** (Outlet Controls 0.13 cfs @ 2.51 fps)

Summary for Pond 2.1: STM INL NO. 2.1

Inflow Area = 1.431 ac, 90.36% Impervious, Inflow Depth > 3.62" for 10-yr event
Inflow = 5.79 cfs @ 12.14 hrs, Volume= 0.432 af
Outflow = 5.79 cfs @ 12.14 hrs, Volume= 0.432 af, Atten= 0%, Lag= 0.0 min
Primary = 4.68 cfs @ 12.13 hrs, Volume= 0.374 af
Secondary = 1.15 cfs @ 12.15 hrs, Volume= 0.058 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 882.89' @ 12.27 hrs
Flood Elev= 883.88'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.92'	**18.0" Round Culvert** L= 25.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 880.92' / 880.80' S= 0.0048 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Secondary	882.00'	**15.0" Round Culvert** L= 18.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 882.00' / 881.90' S= 0.0056 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#3	Device 2	882.20'	**18.0" W x 3.0" H Vert. Orifice/Grate 1 YR Retention** C= 0.600

Primary OutFlow Max=4.55 cfs @ 12.13 hrs HW=882.69' TW=882.53' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 4.55 cfs @ 2.75 fps)

Secondary OutFlow Max=1.14 cfs @ 12.15 hrs HW=882.78' TW=882.36' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.14 cfs of 2.05 cfs potential flow)
└─**3=Orifice/Grate 1 YR Retention** (Orifice Controls 1.14 cfs @ 3.04 fps)

Summary for Pond 2.2: STM MH NO. 2.2

Inflow Area = 2.938 ac, 60.48% Impervious, Inflow Depth > 1.73" for 10-yr event
Inflow = 1.42 cfs @ 12.42 hrs, Volume= 0.424 af
Outflow = 1.42 cfs @ 12.42 hrs, Volume= 0.424 af, Atten= 0%, Lag= 0.0 min
Primary = 1.42 cfs @ 12.42 hrs, Volume= 0.424 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 881.81' @ 12.40 hrs
Flood Elev= 884.28'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.80'	**12.0" Round Culvert** L= 29.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.80' / 880.75' S= 0.0017 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.43 cfs @ 12.42 hrs HW=881.81' TW=881.67' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.43 cfs @ 2.25 fps)

Summary for Pond 4.6: STM INL NO. 4.6

Inflow Area = 1.450 ac, 65.24% Impervious, Inflow Depth > 3.02" for 10-yr event
Inflow = 5.31 cfs @ 12.17 hrs, Volume= 0.365 af
Outflow = 5.31 cfs @ 12.17 hrs, Volume= 0.365 af, Atten= 0%, Lag= 0.0 min
Primary = 4.82 cfs @ 12.15 hrs, Volume= 0.361 af
Secondary = 0.65 cfs @ 12.18 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 882.16' @ 12.18 hrs
Flood Elev= 883.42'

Device	Routing	Invert	Outlet Devices
#1	Primary	878.50'	**12.0" Round Culvert** L= 17.9' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 878.50' / 878.40' S= 0.0056 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Secondary	879.90'	**18.0" Round Culvert** L= 22.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 879.90' / 879.50' S= 0.0182 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#3	Device 2	881.85'	**10.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 2	882.10'	**5.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=4.83 cfs @ 12.15 hrs HW=882.08' TW=881.03' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 4.83 cfs @ 6.15 fps)

Secondary OutFlow Max=0.63 cfs @ 12.18 hrs HW=882.15' TW=878.91' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.63 cfs of 12.49 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.42 cfs @ 2.00 fps)
  └─**4=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.21 cfs @ 0.77 fps)

Summary for Pond 4.8: STM MH NO. 2.3

Inflow Area = 2.938 ac, 60.48% Impervious, Inflow Depth > 1.97" for 10-yr event
Inflow = 2.27 cfs @ 12.40 hrs, Volume= 0.482 af
Outflow = 2.27 cfs @ 12.40 hrs, Volume= 0.482 af, Atten= 0%, Lag= 0.0 min
Primary = 2.27 cfs @ 12.40 hrs, Volume= 0.482 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 881.67' @ 12.39 hrs
Flood Elev= 881.88'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.75'	**18.0" Round Culvert** L= 154.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.75' / 880.41' S= 0.0022 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=2.27 cfs @ 12.40 hrs HW=881.67' TW=881.25' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 2.27 cfs @ 2.84 fps)

Summary for Pond 5P: Pipe Storage

Inflow	=	1.15 cfs @	12.15 hrs,	Volume=	0.058 af
Outflow	=	0.86 cfs @	12.32 hrs,	Volume=	0.058 af, Atten= 25%, Lag= 10.0 min
Primary	=	0.86 cfs @	12.32 hrs,	Volume=	0.058 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 882.65' @ 12.32 hrs Surf.Area= 0.007 ac Storage= 0.006 af

Plug-Flow detention time= 5.0 min calculated for 0.058 af (100% of inflow)
Center-of-Mass det. time= 5.0 min (754.2 - 749.2)

Volume	Invert	Avail.Storage	Storage Description
#1	881.60'	0.012 af	**38.0" W x 24.0" H, R=31.2" Elliptical RCP_Elliptical 38x24** L= 100.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	881.60'	**6.0" Round Culvert** L= 14.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 881.60' / 881.55' S= 0.0036 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

Primary OutFlow Max=0.86 cfs @ 12.32 hrs HW=882.65' TW=881.67' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.86 cfs @ 4.39 fps)

Summary for Pond 6P: Bioretention Pond

Inflow Area =		1.507 ac, 32.12% Impervious, Inflow Depth > 2.22" for 10-yr event			
Inflow	=	3.50 cfs @	12.24 hrs,	Volume=	0.279 af
Outflow	=	0.17 cfs @	15.05 hrs,	Volume=	0.068 af, Atten= 95%, Lag= 169.0 min
Primary	=	0.17 cfs @	15.05 hrs,	Volume=	0.068 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 885.03' @ 15.05 hrs Surf.Area= 10,418 sf Storage= 9,407 cf

Plug-Flow detention time= 427.0 min calculated for 0.068 af (25% of inflow)
Center-of-Mass det. time= 267.5 min (1,064.1 - 796.6)

Volume	Invert	Avail.Storage	Storage Description
#1	884.00'	49,337 cf	**Pond (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
884.00	8,034	0	0
885.00	10,143	9,089	9,089
886.00	19,028	14,586	23,674
887.00	32,297	25,663	49,337

Device	Routing	Invert	Outlet Devices
#1	Primary	882.00'	**6.0" Round Culvert** L= 117.0' RCP, groove end projecting, Ke= 0.200

			Inlet / Outlet Invert= 882.00' / 881.30' S= 0.0060 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf
#2	Device 1	885.00'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.17 cfs @ 15.05 hrs HW=885.03' TW=881.37' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.17 cfs of 1.01 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.17 cfs @ 0.58 fps)

Summary for Pond D1: Detention Chamber

Inflow Area =	1.431 ac, 90.36% Impervious, Inflow Depth > 3.07" for 10-yr event			
Inflow =	2.92 cfs @	12.18 hrs, Volume=	0.367 af	
Outflow =	1.42 cfs @	12.42 hrs, Volume=	0.355 af, Atten= 51%, Lag= 14.7 min	
Primary =	0.91 cfs @	12.42 hrs, Volume=	0.334 af	
Secondary =	0.51 cfs @	12.42 hrs, Volume=	0.021 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Starting Elev= 880.80' Surf.Area= 0.050 ac Storage= 0.150 af
Peak Elev= 882.74' @ 12.42 hrs Surf.Area= 0.050 ac Storage= 0.247 af (0.097 af above start)

Plug-Flow detention time= 288.0 min calculated for 0.205 af (56% of inflow)
Center-of-Mass det. time= 59.9 min (855.4 - 795.4)

Volume	Invert	Avail.Storage	Storage Description
#1	877.80'	0.301 af	**96.0" W x 72.0" H Box Pipe Storage** L= 273.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.80'	**6.0" Round Culvert** L= 18.6' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.80' / 880.80' S= 0.0000 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	880.80'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Secondary	881.80'	**12.0" Round Culvert** L= 18.6' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 881.80' / 881.80' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#4	Device 3	882.20'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Device 3	882.70'	**8.0" Vert. Orifice/Grate** C= 0.600
#6	Device 3	883.50'	**8.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=0.91 cfs @ 12.42 hrs HW=882.73' TW=881.81' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.91 cfs of 1.01 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.91 cfs @ 4.64 fps)

Secondary OutFlow Max=0.51 cfs @ 12.42 hrs HW=882.74' TW=881.81' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.51 cfs of 1.84 cfs potential flow)
  ├─**4=Orifice/Grate** (Orifice Controls 0.50 cfs @ 2.57 fps)
  ├─**5=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.64 fps)
  └─**6=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond D2: Detention Chamber 2

Inflow Area = 1.606 ac, 66.94% Impervious, Inflow Depth > 3.03" for 10-yr event
Inflow = 5.55 cfs @ 12.14 hrs, Volume= 0.406 af
Outflow = 4.98 cfs @ 12.21 hrs, Volume= 0.402 af, Atten= 10%, Lag= 3.9 min
Primary = 1.44 cfs @ 12.21 hrs, Volume= 0.314 af
Secondary = 3.54 cfs @ 12.21 hrs, Volume= 0.088 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Starting Elev= 878.30' Surf.Area= 0.023 ac Storage= 0.068 af
Peak Elev= 881.22' @ 12.21 hrs Surf.Area= 0.023 ac Storage= 0.134 af (0.066 af above start)

Plug-Flow detention time= 130.4 min calculated for 0.334 af (82% of inflow)
Center-of-Mass det. time= 23.7 min (790.1 - 766.3)

Volume	Invert	Avail.Storage	Storage Description
#1	875.30'	0.136 af	**96.0" W x 72.0" H Box Pipe Storage** L= 123.5'

Device	Routing	Invert	Outlet Devices
#1	Primary	878.30'	**6.0" Round Culvert** L= 17.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 878.30' / 878.30' S= 0.0000 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	878.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Secondary	879.30'	**12.0" Round Culvert** L= 12.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 879.30' / 879.10' S= 0.0164 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#4	Device 3	879.80'	**15.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 3	880.85'	**15.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#6	Device 3	881.10'	**8.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=1.44 cfs @ 12.21 hrs HW=881.22' TW=878.91' (Dynamic Tailwater)
└─**1=Culvert** (Controls 1.44 cfs)
  └─**2=Orifice/Grate** (Orifice Controls 1.44 cfs @ 7.31 fps)

Secondary OutFlow Max=3.50 cfs @ 12.21 hrs HW=881.22' TW=878.91' (Dynamic Tailwater)
└─**3=Culvert** (Passes 3.50 cfs of 5.49 cfs potential flow)
  ├─**4=Orifice/Grate** (Orifice Controls 1.71 cfs @ 5.47 fps)
  ├─**5=Orifice/Grate** (Orifice Controls 0.73 cfs @ 2.35 fps)
  └─**6=Sharp-Crested Vee/Trap Weir** (Weir Controls 1.06 cfs @ 1.12 fps)

Summary for Link 1L: (new Link)

Inflow Area = 7.512 ac, 60.12% Impervious, Inflow Depth > 2.52" for 10-yr event
Inflow = 15.43 cfs @ 12.19 hrs, Volume= 1.580 af
Primary = 15.43 cfs @ 12.19 hrs, Volume= 1.580 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link 7L: (new Link)

Inflow Area = 0.778 ac, 3.08% Impervious, Inflow Depth > 1.53" for 10-yr event
Inflow = 1.17 cfs @ 12.16 hrs, Volume= 0.099 af
Primary = 1.17 cfs @ 12.16 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link EX 3: EX INL 3

Inflow Area = 4.303 ac, 62.10% Impervious, Inflow Depth > 2.30" for 10-yr event
Inflow = 6.25 cfs @ 12.24 hrs, Volume= 0.826 af
Primary = 6.25 cfs @ 12.24 hrs, Volume= 0.826 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

10-yr 3 Point manual elevation table, To= 0.00 hrs, dt= 12.00 hrs, feet =
880.42 881.28 880.42

Summary for Link EX 5: EX INL 5

Inflow Area = 6.734 ac, 66.71% Impervious, Inflow Depth > 2.64" for 10-yr event
Inflow = 14.29 cfs @ 12.19 hrs, Volume= 1.481 af
Primary = 14.29 cfs @ 12.19 hrs, Volume= 1.481 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

10-yr 3 Point manual elevation table, To= 0.00 hrs, dt= 12.00 hrs, feet =
877.84 878.93 877.84

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: S-4 and S-5 Runoff Area=1.365 ac 65.57% Impervious Runoff Depth>5.39"
Flow Length=300' Tc=14.1 min CN=WQ Runoff=7.75 cfs 0.613 af

Subcatchment8S: S-6 East Runoff Area=0.684 ac 97.08% Impervious Runoff Depth>6.33"
Tc=6.0 min CN=WQ Runoff=5.83 cfs 0.361 af

SubcatchmentOS1: OS-S Runoff Area=0.249 ac 9.64% Impervious Runoff Depth>3.72"
Tc=6.0 min CN=WQ Runoff=1.44 cfs 0.077 af

SubcatchmentOS2: OS-N Runoff Area=0.529 ac 0.00% Impervious Runoff Depth>3.43"
Flow Length=241' Tc=16.9 min CN=71 Runoff=1.97 cfs 0.151 af

SubcatchmentS-1: S-1 Runoff Area=1.507 ac 32.12% Impervious Runoff Depth>4.39"
Flow Length=234' Tc=15.2 min CN=WQ Runoff=7.05 cfs 0.551 af

SubcatchmentS-2: S-2 Runoff Area=0.610 ac 77.38% Impervious Runoff Depth>5.74"
Flow Length=369' Tc=15.8 min CN=WQ Runoff=3.46 cfs 0.292 af

SubcatchmentS-3: S-3 Runoff Area=0.821 ac 100.00% Impervious Runoff Depth>6.42"
Tc=6.0 min CN=98 Runoff=7.08 cfs 0.439 af

SubcatchmentS-5: S-6 West Runoff Area=1.063 ac 63.03% Impervious Runoff Depth>5.32"
Flow Length=485' Tc=10.1 min CN=WQ Runoff=6.82 cfs 0.471 af

SubcatchmentS-6: S-7 Runoff Area=0.327 ac 66.97% Impervious Runoff Depth>5.43"
Flow Length=433' Tc=8.6 min CN=WQ Runoff=2.26 cfs 0.148 af

SubcatchmentS-7: S-8 Runoff Area=0.156 ac 82.69% Impervious Runoff Depth>5.90"
Tc=6.0 min CN=WQ Runoff=1.26 cfs 0.077 af

SubcatchmentS-8: S-9 Runoff Area=0.060 ac 95.00% Impervious Runoff Depth>6.27"
Tc=6.0 min CN=WQ Runoff=0.51 cfs 0.031 af

SubcatchmentS-9: S-10 Runoff Area=0.141 ac 57.45% Impervious Runoff Depth>5.15"
Tc=6.0 min CN=WQ Runoff=1.03 cfs 0.061 af

Pond 1P: Pre-TreatmentDetention Peak Elev=883.80' Storage=4,098 cf Inflow=7.97 cfs 0.600 af
Primary=3.44 cfs 0.514 af Secondary=2.88 cfs 0.077 af Outflow=6.08 cfs 0.591 af

Pond 2.1: STM INL NO. 2.1 Peak Elev=884.03' Inflow=9.62 cfs 0.731 af
Primary=7.97 cfs 0.600 af Secondary=1.65 cfs 0.131 af Outflow=9.62 cfs 0.731 af

Pond 2.2: STM MH NO. 2.2 Peak Elev=883.19' Inflow=4.54 cfs 0.917 af
12.0" Round Culvert n=0.011 L=29.0' S=0.0017 '/' Outflow=4.54 cfs 0.917 af

Pond 4.6: STM INL NO. 4.6 Peak Elev=882.47' Inflow=9.45 cfs 0.650 af
Primary=5.12 cfs 0.594 af Secondary=4.34 cfs 0.056 af Outflow=9.45 cfs 0.650 af

Pond 4.8: STM MH NO. 2.3 Peak Elev=882.24' Inflow=5.76 cfs 1.048 af
18.0" Round Culvert n=0.011 L=154.0' S=0.0022 '/' Outflow=5.76 cfs 1.048 af

Pond 5P: Pipe Storage Peak Elev=883.46' Storage=0.011 af Inflow=1.65 cfs 0.131 af
6.0" Round Culvert n=0.011 L=14.0' S=0.0036 '/' Outflow=1.30 cfs 0.131 af

Pond 6P: Bioretention Pond Peak Elev=885.41' Storage=14,036 cf Inflow=7.05 cfs 0.551 af
Outflow=1.05 cfs 0.340 af

Pond D1: Detention Chamber Peak Elev=883.64' Storage=0.293 af Inflow=6.08 cfs 0.591 af
Primary=0.94 cfs 0.439 af Secondary=3.06 cfs 0.138 af Outflow=3.72 cfs 0.577 af

Pond D2: Detention Chamber 2 Peak Elev=881.30' Storage=0.136 af Inflow=6.31 cfs 0.671 af
Primary=1.36 cfs 0.459 af Secondary=4.92 cfs 0.206 af Outflow=6.28 cfs 0.666 af

Link 1L: (new Link) Inflow=29.88 cfs 3.034 af
Primary=29.88 cfs 3.034 af

Link 7L: (new Link) Inflow=2.82 cfs 0.229 af
Primary=2.82 cfs 0.229 af

Link EX 3: EX INL 3 Inflow=12.14 cfs 1.661 af
Primary=12.14 cfs 1.661 af

Link EX 5: EX INL 5 Inflow=27.06 cfs 2.805 af
Primary=27.06 cfs 2.805 af

Total Runoff Area = 7.512 ac Runoff Volume = 3.273 af Average Runoff Depth = 5.23"
39.88% Pervious = 2.996 ac 60.12% Impervious = 4.516 ac

Summary for Subcatchment 2S: S-4 and S-5

Runoff = 7.75 cfs @ 12.22 hrs, Volume= 0.613 af, Depth> 5.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.098	98	Pavement
*	0.407	71	>75% Grass cover, Good, HSG C
*	0.797	98	Existing Pavement
*	0.063	71	>75% Grass cover, Good, HSG C
	1.365		Weighted Average
	0.470		34.43% Pervious Area
	0.895		65.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	208	0.0505	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.2	92	0.0200	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
14.1	300	Total			

Summary for Subcatchment 8S: S-6 East

Runoff = 5.83 cfs @ 12.13 hrs, Volume= 0.361 af, Depth> 6.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.664	98	Pavement and roof
*	0.020	71	>75% Grass cover, Good, HSG C
	0.684		Weighted Average
	0.020		2.92% Pervious Area
	0.664		97.08% Impervious Area

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

Summary for Subcatchment OS1: OS-S

Runoff = 1.44 cfs @ 12.13 hrs, Volume= 0.077 af, Depth> 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.024	98	Pavement
*	0.225	71	>75% Grass cover, Good, HSG C
	0.249		Weighted Average
	0.225		90.36% Pervious Area
	0.024		9.64% Impervious Area

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

Summary for Subcatchment OS2: OS-N

Runoff = 1.97 cfs @ 12.26 hrs, Volume= 0.151 af, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.529	71	>75% Grass cover, Good, HSG C
	0.529		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	28	0.1070	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
13.0	183	0.0383	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
2.0	30	0.1170	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
16.9	241	Total			

Summary for Subcatchment S-1: S-1

Runoff = 7.05 cfs @ 12.23 hrs, Volume= 0.551 af, Depth> 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.484	98	Pavement
*	0.822	71	>75% Grass cover, Good, HSG C
*	0.201	71	>75% Grass cover, Good, HSG C-Offsite
	1.507		Weighted Average
	1.023		67.88% Pervious Area
	0.484		32.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	158	0.0443	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
2.8	36	0.0700	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.4	18	0.0150	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
1.1	22	0.2500	0.33		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
15.2	234	Total			

Summary for Subcatchment S-2: S-2

Runoff = 3.46 cfs @ 12.24 hrs, Volume= 0.292 af, Depth> 5.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.472	98	Pavement
*	0.058	71	>75% Grass cover, Good, HSG C
*	0.080	71	>75% Grass cover, Good, HSG C-Offsite
	0.610		Weighted Average
	0.138		22.62% Pervious Area
	0.472		77.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	216	0.0463	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
0.5	31	0.0200	1.03		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
1.0	53	0.0110	0.90		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
0.5	69	0.0110	2.13		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.8	369	Total			

Summary for Subcatchment S-3: S-3

Runoff = 7.08 cfs @ 12.13 hrs, Volume= 0.439 af, Depth> 6.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.821	98	Existing parking and roof, new roof
	0.821		100.00% Impervious Area

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

Summary for Subcatchment S-5: S-6 West

Runoff = 6.82 cfs @ 12.17 hrs, Volume= 0.471 af, Depth> 5.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.670	98	Pavement
*	0.393	71	>75% Grass cover, Good, HSG C
	1.063		Weighted Average
	0.393		36.97% Pervious Area
	0.670		63.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	102	0.0392	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.2	96	0.0200	1.29		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
0.2	65	0.0100	6.22	7.63	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
0.6	222	0.0100	6.22	7.63	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
10.1	485	Total			

Summary for Subcatchment S-6: S-7

Runoff = 2.26 cfs @ 12.16 hrs, Volume= 0.148 af, Depth> 5.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.219	98	Pavement
*	0.108	71	>75% Grass cover, Good, HSG C
	0.327		Weighted Average
	0.108		33.03% Pervious Area
	0.219		66.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	89	0.0449	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.84"
1.0	67	0.0164	1.10		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.84"
0.7	277	0.0100	6.22	7.63	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
8.6	433	Total			

Summary for Subcatchment S-7: S-8

Runoff = 1.26 cfs @ 12.13 hrs, Volume= 0.077 af, Depth> 5.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.129	98	Pavement
*	0.027	71	>75% Grass cover, Good, HSG C
	0.156		Weighted Average
	0.027		17.31% Pervious Area
	0.129		82.69% Impervious Area

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

Summary for Subcatchment S-8: S-9

Runoff = 0.51 cfs @ 12.13 hrs, Volume= 0.031 af, Depth> 6.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.057	98	Pavement
*	0.003	71	>75% Grass cover, Good, HSG C
	0.060		Weighted Average
	0.003		5.00% Pervious Area
	0.057		95.00% Impervious Area

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

Summary for Subcatchment S-9: S-10

Runoff = 1.03 cfs @ 12.13 hrs, Volume= 0.061 af, Depth> 5.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
MSE 24-hr 4 100-yr Rainfall=6.66"

	Area (ac)	CN	Description
*	0.081	98	Pavement
*	0.060	71	>75% Grass cover, Good, HSG C
	0.141		Weighted Average
	0.060		42.55% Pervious Area
	0.081		57.45% Impervious Area

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

Summary for Pond 1P: Pre-Treatment Detention

Inflow Area = 1.431 ac, 90.36% Impervious, Inflow Depth > 5.03" for 100-yr event
Inflow = 7.97 cfs @ 12.14 hrs, Volume= 0.600 af
Outflow = 6.08 cfs @ 12.17 hrs, Volume= 0.591 af, Atten= 24%, Lag= 2.2 min
Primary = 3.44 cfs @ 12.14 hrs, Volume= 0.514 af
Secondary = 2.88 cfs @ 12.19 hrs, Volume= 0.077 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 883.80' @ 12.29 hrs Surf.Area= 1,368 sf Storage= 4,098 cf

Plug-Flow detention time= 45.0 min calculated for 0.591 af (99% of inflow)
Center-of-Mass det. time= 35.7 min (784.0 - 748.2)

Volume	Invert	Avail.Storage	Storage Description
#1	880.80'	4,104 cf	**72.0" W x 36.0" H Box Pipe Storage** L= 228.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.80'	**12.0" Round Culvert** L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.80' / 880.80' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Secondary	882.70'	**12.0" Round Culvert** L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 882.70' / 882.50' S= 0.0200 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=3.44 cfs @ 12.14 hrs HW=883.50' TW=882.97' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.44 cfs @ 4.38 fps)

Secondary OutFlow Max=2.89 cfs @ 12.19 hrs HW=883.70' TW=883.25' (Dynamic Tailwater)
↑—**2=Culvert** (Outlet Controls 2.89 cfs @ 4.57 fps)

Summary for Pond 2.1: STM INL NO. 2.1

[58] Hint: Peaked 0.15' above defined flood level

Inflow Area =	1.431 ac, 90.36% Impervious, Inflow Depth > 6.13" for 100-yr event				
Inflow =	9.62 cfs @	12.14 hrs,	Volume=	0.731 af	
Outflow =	9.62 cfs @	12.14 hrs,	Volume=	0.731 af,	Atten= 0%, Lag= 0.0 min
Primary =	7.97 cfs @	12.14 hrs,	Volume=	0.600 af	
Secondary =	1.65 cfs @	12.14 hrs,	Volume=	0.131 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 884.03' @ 12.17 hrs
Flood Elev= 883.88'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.92'	**18.0" Round Culvert** L= 25.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 880.92' / 880.80' S= 0.0048 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Secondary	882.00'	**15.0" Round Culvert** L= 18.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 882.00' / 881.90' S= 0.0056 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#3	Device 2	882.20'	**18.0" W x 3.0" H Vert. Orifice/Grate 1 YR Retention** C= 0.600

Primary OutFlow Max=7.70 cfs @ 12.14 hrs HW=883.93' TW=883.49' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 7.70 cfs @ 4.36 fps)

Secondary OutFlow Max=1.63 cfs @ 12.14 hrs HW=883.93' TW=883.11' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.63 cfs of 7.26 cfs potential flow)
└─**3=Orifice/Grate 1 YR Retention** (Orifice Controls 1.63 cfs @ 4.34 fps)

Summary for Pond 2.2: STM MH NO. 2.2

Inflow Area =	2.938 ac, 60.48% Impervious, Inflow Depth > 3.74" for 100-yr event				
Inflow =	4.54 cfs @	12.37 hrs,	Volume=	0.917 af	
Outflow =	4.54 cfs @	12.37 hrs,	Volume=	0.917 af,	Atten= 0%, Lag= 0.0 min
Primary =	4.54 cfs @	12.37 hrs,	Volume=	0.917 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 883.19' @ 12.35 hrs
Flood Elev= 884.28'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.80'	**12.0" Round Culvert** L= 29.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.80' / 880.75' S= 0.0017 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=4.47 cfs @ 12.37 hrs HW=883.17' TW=882.24' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 4.47 cfs @ 5.69 fps)

Summary for Pond 4.6: STM INL NO. 4.6

Inflow Area = 1.450 ac, 65.24% Impervious, Inflow Depth > 5.38" for 100-yr event
Inflow = 9.45 cfs @ 12.17 hrs, Volume= 0.650 af
Outflow = 9.45 cfs @ 12.17 hrs, Volume= 0.650 af, Atten= 0%, Lag= 0.0 min
Primary = 5.12 cfs @ 12.17 hrs, Volume= 0.594 af
Secondary = 4.34 cfs @ 12.16 hrs, Volume= 0.056 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 882.47' @ 12.16 hrs
Flood Elev= 883.42'

Device	Routing	Invert	Outlet Devices
#1	Primary	878.50'	**12.0" Round Culvert** L= 17.9' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 878.50' / 878.40' S= 0.0056 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Secondary	879.90'	**18.0" Round Culvert** L= 22.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 879.90' / 879.50' S= 0.0182 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#3	Device 2	881.85'	**10.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 2	882.10'	**5.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=5.10 cfs @ 12.17 hrs HW=882.46' TW=881.29' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 5.10 cfs @ 6.50 fps)

Secondary OutFlow Max=4.23 cfs @ 12.16 hrs HW=882.46' TW=879.23' (Dynamic Tailwater)
└─**2=Culvert** (Passes 4.23 cfs of 14.05 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.70 cfs @ 3.34 fps)
  └─**4=Sharp-Crested Vee/Trap Weir** (Weir Controls 3.54 cfs @ 1.96 fps)

Summary for Pond 4.8: STM MH NO. 2.3

[58] Hint: Peaked 0.36' above defined flood level

Inflow Area = 2.938 ac, 60.48% Impervious, Inflow Depth > 4.28" for 100-yr event
Inflow = 5.76 cfs @ 12.37 hrs, Volume= 1.048 af
Outflow = 5.76 cfs @ 12.37 hrs, Volume= 1.048 af, Atten= 0%, Lag= 0.0 min
Primary = 5.76 cfs @ 12.37 hrs, Volume= 1.048 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 882.24' @ 12.37 hrs
Flood Elev= 881.88'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.75'	**18.0" Round Culvert** L= 154.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.75' / 880.41' S= 0.0022 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=5.75 cfs @ 12.37 hrs HW=882.24' TW=881.51' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 5.75 cfs @ 4.07 fps)

Summary for Pond 5P: Pipe Storage

Inflow	=	1.65 cfs @	12.14 hrs,	Volume=	0.131 af
Outflow	=	1.30 cfs @	12.22 hrs,	Volume=	0.131 af, Atten= 21%, Lag= 5.1 min
Primary	=	1.30 cfs @	12.22 hrs,	Volume=	0.131 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 883.46' @ 12.31 hrs Surf.Area= 0.004 ac Storage= 0.011 af

Plug-Flow detention time= 6.0 min calculated for 0.131 af (100% of inflow)
Center-of-Mass det. time= 5.6 min (762.5 - 756.8)

Volume	Invert	Avail.Storage	Storage Description
#1	881.60'	0.012 af	**38.0" W x 24.0" H, R=31.2" Elliptical RCP_Elliptical 38x24** L= 100.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	881.60'	**6.0" Round Culvert** L= 14.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 881.60' / 881.55' S= 0.0036 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

Primary OutFlow Max=1.30 cfs @ 12.22 hrs HW=883.41' TW=882.05' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.30 cfs @ 6.63 fps)

Summary for Pond 6P: Bioretention Pond

Inflow Area =		1.507 ac, 32.12% Impervious, Inflow Depth > 4.39" for 100-yr event			
Inflow	=	7.05 cfs @	12.23 hrs,	Volume=	0.551 af
Outflow	=	1.05 cfs @	13.80 hrs,	Volume=	0.340 af, Atten= 85%, Lag= 94.2 min
Primary	=	1.05 cfs @	13.80 hrs,	Volume=	0.340 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 885.41' @ 12.92 hrs Surf.Area= 13,813 sf Storage= 14,036 cf

Plug-Flow detention time= 210.5 min calculated for 0.339 af (62% of inflow)
Center-of-Mass det. time= 118.2 min (908.1 - 789.8)

Volume	Invert	Avail.Storage	Storage Description
#1	884.00'	49,337 cf	**Pond (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
884.00	8,034	0	0
885.00	10,143	9,089	9,089
886.00	19,028	14,586	23,674
887.00	32,297	25,663	49,337

Device	Routing	Invert	Outlet Devices
#1	Primary	882.00'	**6.0" Round Culvert** L= 117.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 882.00' / 881.30' S= 0.0060 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf
#2	Device 1	885.00'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.05 cfs @ 13.80 hrs HW=885.33' TW=881.83' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.05 cfs @ 5.37 fps)
  └─**2=Orifice/Grate** (Passes 1.05 cfs of 5.97 cfs potential flow)

Summary for Pond D1: Detention Chamber

Inflow Area =	1.431 ac, 90.36% Impervious, Inflow Depth > 4.95" for 100-yr event			
Inflow =	6.08 cfs @	12.17 hrs, Volume=	0.591 af	
Outflow =	3.72 cfs @	12.36 hrs, Volume=	0.577 af, Atten= 39%, Lag= 11.3 min	
Primary =	0.94 cfs @	12.24 hrs, Volume=	0.439 af	
Secondary =	3.06 cfs @	12.35 hrs, Volume=	0.138 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Starting Elev= 880.80' Surf.Area= 0.050 ac Storage= 0.150 af
Peak Elev= 883.64' @ 12.34 hrs Surf.Area= 0.050 ac Storage= 0.293 af (0.142 af above start)

Plug-Flow detention time= 223.1 min calculated for 0.426 af (72% of inflow)
Center-of-Mass det. time= 56.5 min (840.5 - 784.0)

Volume	Invert	Avail.Storage	Storage Description
#1	877.80'	0.301 af	**96.0" W x 72.0" H Box Pipe Storage** L= 273.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.80'	**6.0" Round Culvert** L= 18.6' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 880.80' / 880.80' S= 0.0000 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	880.80'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Secondary	881.80'	**12.0" Round Culvert** L= 18.6' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 881.80' / 881.80' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#4	Device 3	882.20'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Device 3	882.70'	**8.0" Vert. Orifice/Grate** C= 0.600
#6	Device 3	883.50'	**8.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=0.94 cfs @ 12.24 hrs HW=883.49' TW=882.50' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.94 cfs of 1.04 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.94 cfs @ 4.77 fps)

Secondary OutFlow Max=2.98 cfs @ 12.35 hrs HW=883.63' TW=883.18' (Dynamic Tailwater)
└─**3=Culvert** (Passes 2.98 cfs of 3.16 cfs potential flow)
  ├─**4=Orifice/Grate** (Orifice Controls 0.63 cfs @ 3.21 fps)
  ├─**5=Orifice/Grate** (Orifice Controls 1.12 cfs @ 3.21 fps)
  └─**6=Sharp-Crested Vee/Trap Weir** (Weir Controls 1.23 cfs @ 1.18 fps)

Summary for Pond D2: Detention Chamber 2

Inflow Area =	1.606 ac, 66.94% Impervious, Inflow Depth > 5.01" for 100-yr event			
Inflow =	6.31 cfs @	12.14 hrs, Volume=	0.671 af	
Outflow =	6.28 cfs @	12.15 hrs, Volume=	0.666 af, Atten= 1%, Lag= 0.8 min	
Primary =	1.36 cfs @	12.16 hrs, Volume=	0.459 af	
Secondary =	4.92 cfs @	12.15 hrs, Volume=	0.206 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
Starting Elev= 878.30' Surf.Area= 0.023 ac Storage= 0.068 af
Peak Elev= 881.30' @ 12.15 hrs Surf.Area= 0.023 ac Storage= 0.136 af (0.068 af above start)

Plug-Flow detention time= 107.0 min calculated for 0.598 af (89% of inflow)
Center-of-Mass det. time= 22.4 min (785.7 - 763.3)

Volume	Invert	Avail.Storage	Storage Description
#1	875.30'	0.136 af	**96.0" W x 72.0" H Box Pipe Storage** L= 123.5'

Device	Routing	Invert	Outlet Devices
#1	Primary	878.30'	**6.0" Round Culvert** L= 17.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 878.30' / 878.30' S= 0.0000 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	878.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Secondary	879.30'	**12.0" Round Culvert** L= 12.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 879.30' / 879.10' S= 0.0164 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#4	Device 3	879.80'	**15.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 3	880.85'	**15.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#6	Device 3	881.10'	**8.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=1.36 cfs @ 12.16 hrs HW=881.30' TW=879.23' (Dynamic Tailwater)
└─**1=Culvert** (Controls 1.36 cfs)
  └─**2=Orifice/Grate** (Orifice Controls 1.36 cfs @ 6.92 fps)

Secondary OutFlow Max=4.90 cfs @ 12.15 hrs HW=881.30' TW=879.23' (Dynamic Tailwater)
└─**3=Culvert** (Passes 4.90 cfs of 5.68 cfs potential flow)
  ├─**4=Orifice/Grate** (Orifice Controls 1.76 cfs @ 5.64 fps)
  ├─**5=Orifice/Grate** (Orifice Controls 0.85 cfs @ 2.72 fps)
  └─**6=Sharp-Crested Vee/Trap Weir** (Weir Controls 2.29 cfs @ 1.45 fps)

Summary for Link 1L: (new Link)

Inflow Area = 7.512 ac, 60.12% Impervious, Inflow Depth > 4.85" for 100-yr event
Inflow = 29.88 cfs @ 12.16 hrs, Volume= 3.034 af
Primary = 29.88 cfs @ 12.16 hrs, Volume= 3.034 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link 7L: (new Link)

Inflow Area = 0.778 ac, 3.08% Impervious, Inflow Depth > 3.53" for 100-yr event
Inflow = 2.82 cfs @ 12.16 hrs, Volume= 0.229 af
Primary = 2.82 cfs @ 12.16 hrs, Volume= 0.229 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link EX 3: EX INL 3

Inflow Area = 4.303 ac, 62.10% Impervious, Inflow Depth > 4.63" for 100-yr event
Inflow = 12.14 cfs @ 12.27 hrs, Volume= 1.661 af
Primary = 12.14 cfs @ 12.27 hrs, Volume= 1.661 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

100-yr 3 Point manual elevation table, To= 0.00 hrs, dt= 12.00 hrs, feet =
880.42 881.54 880.42

Summary for Link EX 5: EX INL 5

Inflow Area = 6.734 ac, 66.71% Impervious, Inflow Depth > 5.00" for 100-yr event
Inflow = 27.06 cfs @ 12.16 hrs, Volume= 2.805 af
Primary = 27.06 cfs @ 12.16 hrs, Volume= 2.805 af, Atten= 0%, Lag= 0.0 min

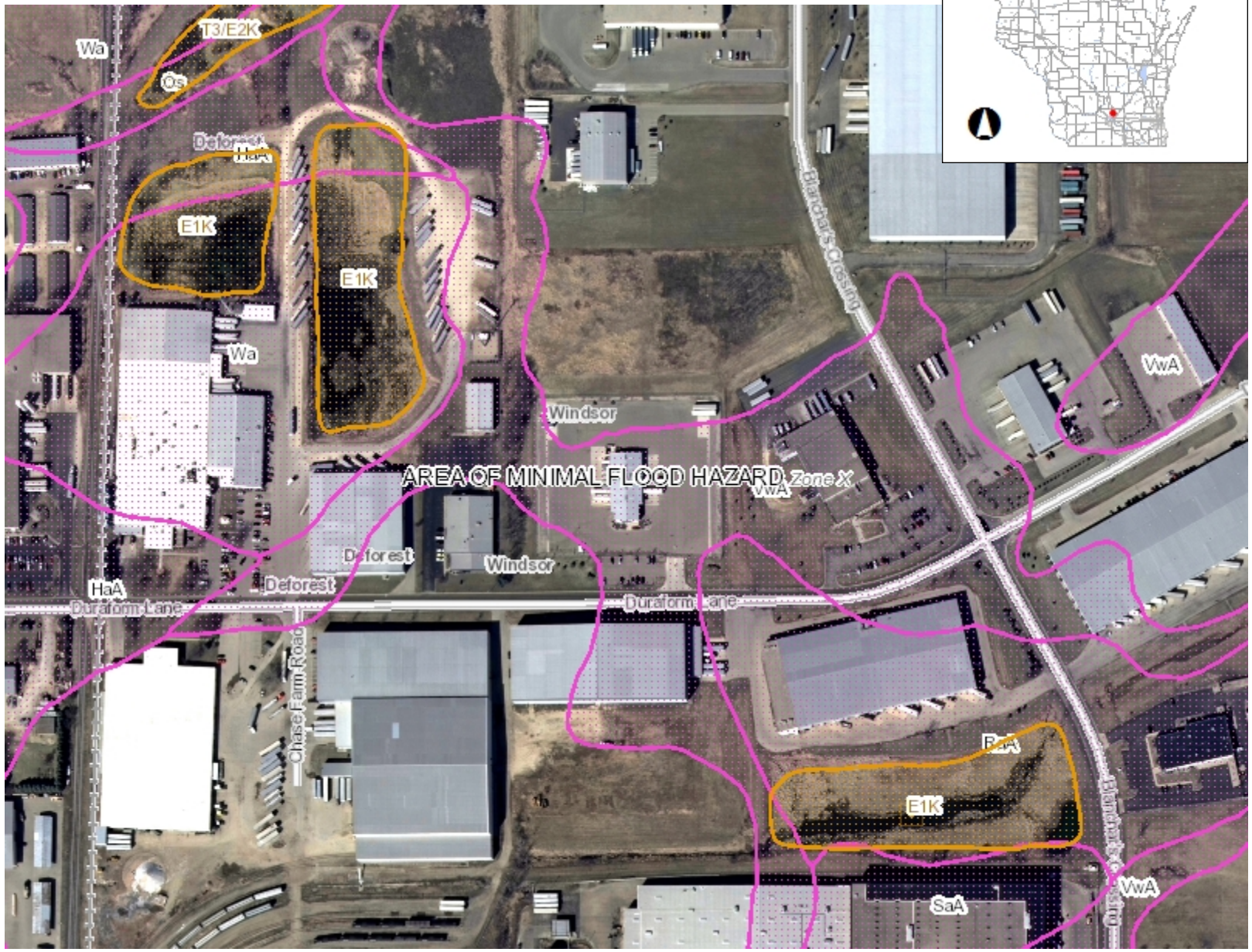
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

100-yr 3 Point manual elevation table, To= 0.00 hrs, dt= 12.00 hrs, feet =
877.84 879.25 877.84

APPENDIX 8

WDNR SURFACE WATER DATA MAP

Surface Water Data Viewer Map



Legend

- Cross-Sections
- Flood Hazard Boundaries
  - Other Boundaries
  - Limit Lines
  - SFHA / Flood Zone Boundary
- Flood Hazard Zones
  - 1% Annual Chance Flood Hazard
  - Regulatory Floodway
  - Special Floodway
  - Area of Undetermined Flood Hazard
  - 0.2% Annual Chance Flood Hazard
  - Future Conditions 1% Annual Chance Flood Hazard
  - Area with Reduced Risk Due to Levee
- Wetland Class Points
  - Dammed pond
  - Excavated pond
  - Filled excavated pond
  - Filled/drained wetland
  - Wetland too small to delineate
- Filled Points
- Wetland Class Areas
  - Wetland
  - Upland
- Filled Areas
- NRCS Wetspots
- Maximum Extent Wetland Indicators
- County Boundary
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway

Notes

0.1 0 0.06 0.1 Miles

NAD_1983_HARN_Wisconsin_TM

1: 3,960

DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: http://dnr.wi.gov/legal/

APPENDIX 9

STORM WATER MANAGEMENT MAINTENANCE AGREEMENT - DRAFT

AGREEMENT FOR MAINTENANCE OF STORMWATER MANAGEMENT MEASURES

This space is reserved for recording data

Return to:
Christine Capstran – Clerk
Village of Windsor
4084 Mueller Road
DeForest, Wisconsin 53532

Parcel Number(s):
196/0910-323-0556-0

RECITALS:

A. Old Dominion Freight Line, Inc. is the owner of property in the Village of Windsor, County of Dane, State of Wisconsin, more particularly described on Exhibit A attached hereto ("Property").

B. The Village requires Owner to record this Agreement regarding maintenance of stormwater management measures to be located on the Property. Owner agrees to maintain the stormwater management measures and to grant to the Village the rights set forth below.

NOW, THEREFORE, in consideration of the agreement herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the owner agrees as follows:

1. Maintenance. Owner and its successors and assigns shall be responsible to repair and maintain the stormwater management measures located on the Property in good condition and in working order and such that the measures comply with approved plans on file with the Village of Windsor. Said maintenance shall be at the Owner's sole cost and expense. Owner will conduct such maintenance or repair work in accordance with all applicable laws, codes, regulations, and similar requirements. Specific maintenance tasks are more particularly described on Exhibit B.

2. Grant of Rights to Village. If Owner fails to maintain the stormwater management measures as required in Section 1, then Village shall have the right, after providing Owner with written notice of the maintenance issue ("Maintenance Notice") and thirty (30) days to comply with the Village's maintenance request, to enter the Property in order to conduct the maintenance specified in the Maintenance Notice. Village will conduct such maintenance work in accordance with all applicable laws, codes, regulations, and similar requirements and will not unreasonably interfere with Owner's use of the Property. All costs and expenses incurred by the Village in conducting such maintenance may be charged to the owner of the Property by placing the amount on the tax roll for the Property as a special assessment in accordance with Section 66.0703, Wis. Stats. and applicable portions of the Village of Windsor Ordinances.

3. Term/Termination. The term of this Agreement shall commence on the date that this Agreement is recorded with the Register of Deeds Office, Wisconsin, and except as otherwise herein specifically provided, shall continue in perpetuity. Notwithstanding the foregoing, this Agreement may be terminated by recording with the Register of Deeds Office for Dane County, Wisconsin, a written instrument of termination signed by the Village and all of the then-owners of the Property.

4. Miscellaneous.

   (a) Notices. Any notice, request or demand required or permitted under this Agreement shall be in writing and shall be deemed given when personally served or three (3) days after the same has been deposited with the United States Post Office, registered or certified mail, return receipt requested, postage prepaid and addressed as follows:

   If to Owner: Old Dominion Freight Line, Inc.
   4380 Duraform Lane
   Windsor, WI 53598

   If to Village: Village of Windsor

4048 Mueller Road
DeForest, Wisconsin 53532

Any party may change its address for the receipt of notice by written notice to the other.

(b) Governing Law. This Agreement shall be governed and construed in accordance with the laws of the State of Wisconsin.

(c) Amendments or Further Agreements to be in Writing. This Agreement may not be modified in whole or in part unless such agreement is in writing and signed by all parties bound hereby.

(d) Covenants Running with the Land. All of the easements, restrictions, covenants and agreements set forth in this Agreement are intended to be and shall be construed as covenants running with the land, binding upon, inuring to the benefit of, and enforceable by the parties hereto and their respective successors and assigns.

(e) Partial Invalidity. If any provisions, or portions thereof, of this Agreement or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, the remainder of this Agreement, or the application of such provision, or portion thereof, to any other persons or circumstances shall not be affected thereby and each provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

X_____
Village of Windsor Signature

_____
Print or type name

State of WI, County of _____; Subscribed and sworn before me on _____ by the above named person(s).

_____
Notary Public

Print or type name: _____

My Commission Expires:_____

X_____
Owner Signature

_____
Print or type name

State of WI, County of _____; Subscribed and sworn before me on _____ by the above named person(s).

_____
Notary Public

Print or type name: _____

My Commission Expires:_____

DRAFTED BY: JSD Professional Services, Inc.
Matt Haase, P.E.
Kyle Hoff, E.I.T.
161 Horizon Dr., Suite 101
Verona, WI 53593

EXHIBIT A

Legal Description

Lot Two (2), Certified Survey Map No. 10994, recorded in Volume 66 of Dane County Certified Surveys, Page 36 - 40 as Document No. 3879522, located in the Northeast Quarter of the Southwest Quarter of Section 32, Town 09 North, Range 10 East, Village of Windsor, Dane County, Wisconsin.

Parcel No.: 196/0910-323-0556-0

Address: 4380 Duraform Lane, DeForest, WI 53598

EXHIBIT B

Maintenance Provisions

An initial installation certification (as-built) stamped by a P.E. registered in the state of Wisconsin shall be submitted to Village of Windsor upon completion of construction. The as-built shall be of sufficient detail to show the system is functioning as designed. A statement by the certifying P.E. along with a drawing and digital photographs will suffice.

Rain Garden(s) and/or Bioretention Basin(s)

An initial installation certification (as-built) stamped by a P.E. registered in the state of Wisconsin shall be submitted to the Village Engineer upon completion of construction. The as-built shall be of sufficient detail to show the system was constructed and is functioning as designed. A statement by the certifying P.E. along with a drawing and digital photographs will suffice.

Owner shall install a Rain Garden/Bioretention System in accordance with plans approved by Village Engineer. Bioretention for infiltration shall also be installed in accordance with WDNR Conservation Practice Standard #1004.

Any alterations to approved Rain Garden/ Bioretention System shall be approved by the Village Engineer.

Owner shall maintain records of installation, inspections, cleaning, replacement, and any other maintenance in accordance with Village of Deforest General Ordinances. Visual Inspection of the Rain Garden/ Bioretention System shall be performed, at a minimum, annually.

Maintenance shall be required when system shows standing water beyond 72 hours of rain event. Cleaning shall consist of removal of sediment, two (2) foot undercut, undercut replacement with material consisting of 30% compost and 70% sand and restoration in-kind. Restoration of plant material shall be by plugging, not seeding alone.

Storm Sewer System

The owner shall maintain all components of the storm sewer system located onsite.

Installation and maintenance shall be in accordance with the manufacturer's guidelines. Any alterations to the approved storm sewer shall be approved by the Village Engineer.

At a minimum, the storm sewer system shall be inspected annually and cleaned as needed to maintain design capacity.

Owner shall maintain records of installation, inspections, cleaning, replacement, and any other maintenance in accordance with Village of Deforest General Ordinances.

Riprap

Riprap should be inspected after all storm events for displaced stones and erosion. All necessary repairs should be made immediately. Accumulated sediment should be removed periodically.

Madison Regional Office
161 Horizon Drive, Suite 101
Verona, WI 53593
Ph: 608.848.5060
Fax: 608.848.2255

Milwaukee Regional Office
W238 N2610 Busse Rd
Waukesha, WI 53188
Ph: 262.513.0666
Fax: 262.513.1232

Kenosha Regional Office
6520 67th Street
Kenosha, WI 53142
Ph: 262.925.8367
Fax: 262.925.8362

Fox Valley Regional Office
3215 West Lawrence Street, Suite #6
Appleton, WI 54914
Ph: 920-733-2800
Fax: 920-733-2801

Wausau Regional Office
7402 Stone Ridge Drive, Suite 4
Weston, WI 54476
Ph: (715) 298-6330
Fax: (715) 298-6326

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

www.jsdinc.com