Table 7.4. Permeable Pavement Design Criteria

Level 1 Design	Level 2 Design
Tv = (1)(Rv)(A) / 12 – the volume reduced by an upstream BMP [1]	Tv = (1.1)(Rv)(A) / 12
Soil infiltration is less than 0.5 in./hr.	Soil infiltration rate must exceed 0.5 in./hr to remove underdrain requirement, or use a drawdown design in accordance with **Section 6**.
Underdrain required	1. No underdrain; ***OR*** 2. If an underdrain is used, provide a 12-inch (minimum) stone reservoir infiltration sump below the underdrain invert that meets the drawdown requirements of Section 6; ***OR*** 3. The Tv stone reservoir volume has at least a 48-hour drain time, as regulated by a control structure.
CDA[1] = The permeable pavement area plus upgradient parking, as long as the ratio of external contributing area to permeable pavement does not exceed 2.5:1.	• CDA = The permeable pavement area; ***OR*** • If option 3 above is used, CDA ratio may be 2.5:1.

[1] The contributing drainage area to the permeable pavements should be limited to paved surfaces in order to avoid sediment wash-on. When pervious areas are conveyed to permeable pavement, sediment source controls and/or pre-treatment must be provided strip or sump should be used. The pre-treatment may qualify for a runoff reduction credit if designed accordingly.

Table 7.7. Different Permeable Pavement Specifications

Material	Specification	Notes
Permeable Interlocking Concrete Pavers	Surface open area: 5% to 15%. Thickness: 3.125 inches for vehicles. Compressive strength: 55 Mpa. Open void fill media: aggregate	Must conform to ASTM C936 specifications. Reservoir layer required to support the structural load.
Concrete Grid Pavers	Open void content: 20% to 50%. Thickness: 3.5 inches. Compressive strength: 35 Mpa. Open void fill media: aggregate, topsoil and grass, coarse sand.	Must conform to ASTM C 1319 specifications. Reservoir layer required to support the structural load.
Plastic Reinforced Grid Pavers	Void content: depends on fill material. Compressive strength: varies, depending on fill material. Open void fill media: aggregate, topsoil and grass, coarse sand.	Reservoir layer required to support the structural load.
Pervious Concrete	Void content: 15% to 25 %. Thickness: typically 4 to 8 inches. Compressive strength: 2.8 to 28 Mpa. Open void fill media: None	May not require a reservoir layer to support the structural load, but a layer may be included to increase the storage or infiltration.
Porous Asphalt	Void content: 15% to 20 %. Thickness: typically 3 to 7 in. (depending on traffic load). Open void fill media: None.	Reservoir layer required to support the structural load.

CONSTRUCTION NOTES:

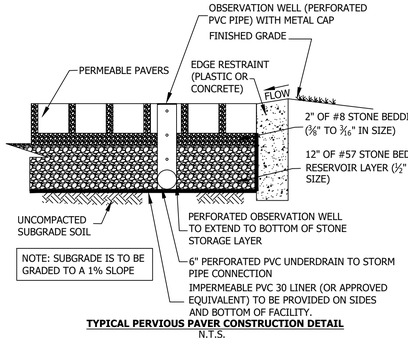
THE PERMEABLE PAVEMENT HAS BEEN DESIGNED IN ACCORDANCE WITH VIRGINIA DEQ/DCR STORMWATER DESIGN SPECIFICATION No. 7, VERSION 2.0 DATED JAN. 1, 2013 AND FAIRFAX COUNTY PFM SECTION 6-1304. THE CONTRACTOR SHALL CONSTRUCT THE PERMEABLE PAVEMENT FACILITY IN ACCORDANCE WITH THESE SPECIFICATIONS. THE CONTRACTOR SHALL PROVIDE MATERIAL DELIVERY TICKETS AND CERTIFICATIONS AND A SIGNED CERTIFICATION THAT THE FACILITY WAS CONSTRUCTED IN ACCORDANCE WITH THESE PLANS AND THE SPECIFICATIONS REFERENCED ABOVE. REFER TO SHEET C-0705 FOR VIRGINIA DEQ/DCR CONSTRUCTION SEQUENCE AND CONSTRUCTION INSPECTION RECOMMENDATIONS.

MAINTENANCE NOTES:

THE OWNER SHOULD BE AWARE THAT A MAINTENANCE AGREEMENT IS REQUIRED TO BE EXECUTED AND RECORDED IN LAND RECORDS BETWEEN THE OWNER AND THE LOCAL JURISDICTION. THE OWNER SHOULD MAKE HIMSELF FULLY AWARE OF ALL CONSTRUCTION, INSPECTION AND MAINTENANCE OBLIGATIONS CONTAINED IN THE AGREEMENT AND THE SPECIFICATIONS REFERENCED ABOVE. REFER TO SHEET C-0705 FOR VIRGINIA DEQ/DCR MAINTENANCE AND MAINTENANCE INSPECTION RECOMMENDATIONS.

NOTE:

1. PERMEABLE PAVEMENT FACILITY WILL BE PRIVATELY OWNED AND MAINTAINED
2. IF BEDROCK IS ENCOUNTERED, THE EXCAVATION FOR THE FACILITY SHALL EXTEND A MINIMUM OF 2' DOWN BELOW THE BMP SYSTEM INTO UNDERLYING BEDROCK.



TYPICAL PERVIOUS PAVER CONSTRUCTION DETAIL
N.T.S.

NOTE:

1. SEASONALLY HIGH GROUNDWATER FOUND WITHIN PAVER SECTION DEPTH. SECTION TO BE WRAPPED IN IMPERMEABLE LINING

VA DEQ STORMWATER DESIGN SPECIFICATION NO. 7 **PERMEABLE PAVEMENT**

- Micro-scale and small-scale permeable pavement installations are acceptable if they are designed according to the Level 1 criteria (i.e., they possess an impermeable bottom liner and an underdrain).
- The stone used in the reservoir layer should be carbonate in nature to provide extra chemical buffering capacity.

Table 7.6. Material Specifications for Underneath the Pavement Surface

Material	Specification	Notes
Bedding Layer	PC: None PA: 2 in. of No. 57 stone IP: 2 in. of No. 8 stone over 4 inches of No. 57 stone	ASTM D448 size No. 8 stone (e.g. 3/8 to 3/16 inch in size). Should be washed and clean and free of all fines.
Reservoir Layer	PC: No. 57 stone PA: No. 2 stone IP: No. 2, 3, or 4 stone	ASTM D448 size No. 57 stone (e.g. 1 1/2 to 1/2 inch in size); No. 2 Stone (e.g. 3 inch to 3/4 inch in size). Depth is based on the pavement structural and hydraulic requirements. Should be washed and clean and free of all fines.
Underdrain	Use 4 to 6 inch diameter perforated PVC (AASHTO M 252) pipe, with 3/8-inch perforations at 6 inches on center; each underdrain installed at a minimum 0.5% slope located 20 feet or less from the next pipe (or equivalent corrugated HDPE may be used for smaller load-bearing applications). Perforated pipe installed for the full length of the permeable pavement cell, and non-perforated pipe, as needed, is used to connect with the storm drain system. T's and Y's installed as needed, depending on the underdrain configuration. Extend cleanout pipes to the surface with vented caps at the Ts and Ys.	
Filter Layer	The underlying native soils should be separated from the stone reservoir by a thin, 2 to 4 inch layer of choker stone (e.g. No. 8) covered by a 6 to 8 inch layer of coarse sand (e.g. ASTM C 33, gradation).	The sand should be placed between the stone reservoir and the choker stone, which should be placed on top of the underlying native soils.
Filter Fabric (optional)	Use an appropriate filter fabric for the particular application based on AASHTO M288-06 Filter Fabric should have a Flow Rate greater than 125 gpm/sq. ft. (ASTM D4491), and an Apparent Opening Size (AOS) equivalent to a US # 70 or # 80 sieve (ASTM D4751). The geotextile AOS selection is based on the percent passing the No. 200 sieve in "A" Soil subgrade, using FHWA or AASHTO selection criteria.	
Impermeable Liner	Use a thirty mil (minimum) PVC Geomembrane liner covered by 8 to 12 oz./sq. yd.2 non-woven geotextile. NOTE: THIS IS USED ONLY FOR KARST REGIONS.	
Observation Well	Use a perforated 4 to 6 inch vertical PVC pipe (AASHTO M 252) with a lockable cap, installed flush with the surface.	

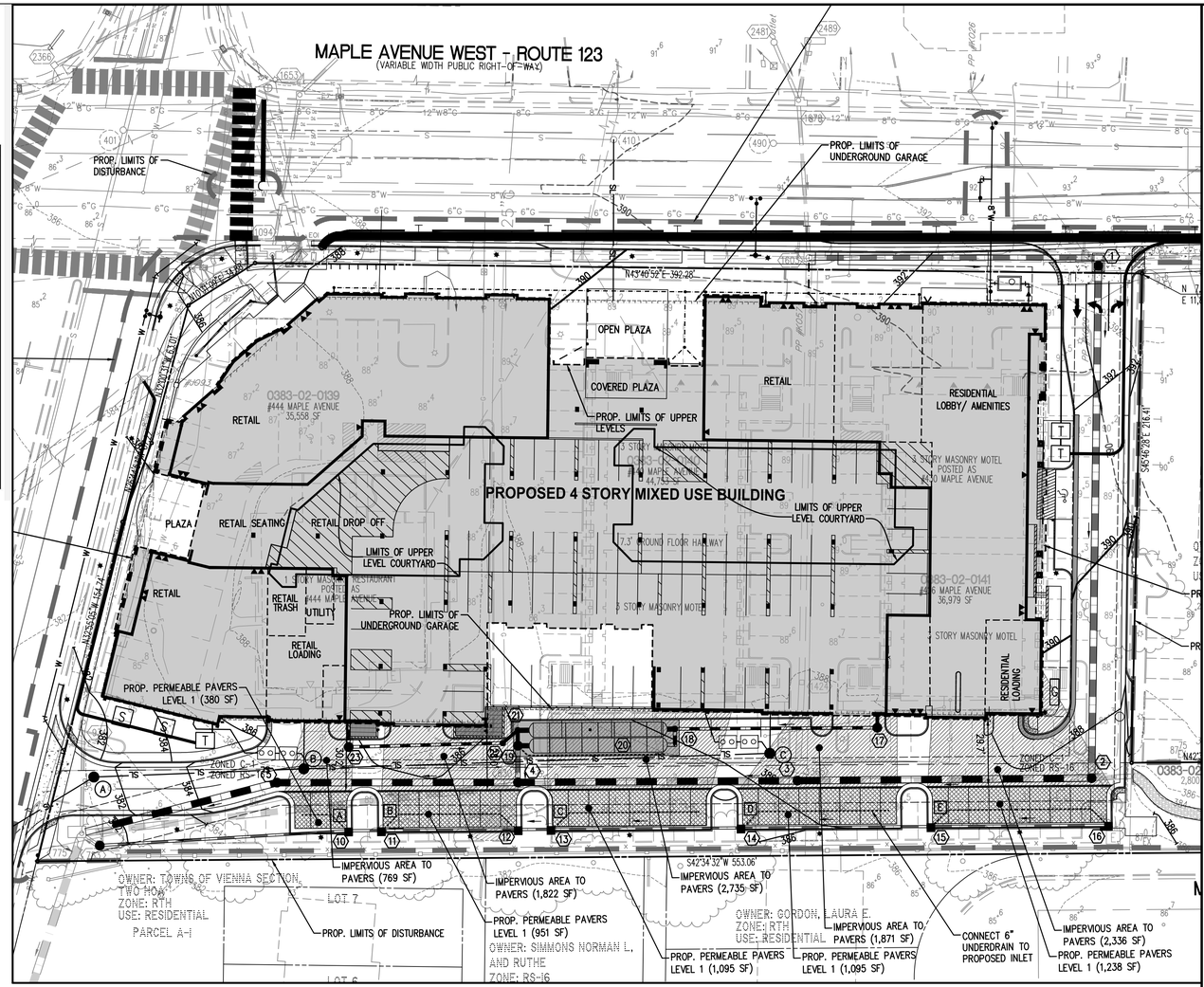
Certified properties[1]	ASTM	PVC 10	PVC 20	PVC 30	PVC 40	PVC 50	PVC 60
Thickness: mil (mm)	D 5199	10 ± 0.5 (0.25 ± 0.013)	20 ± 1 (0.51 ± 0.03)	30 ± 1.5 (0.76 ± 0.04)	40 ± 2 (1.02 ± 0.05)	50 ± 2.5 (1.27 ± 0.06)	60 ± 3 (1.52 ± 0.08)
Tensile properties[2] Strength at break: lbf/in (N/m)	D 882[4] (min.)	24 (4.2)	48 (8.4)	73 (12.8)	97 (17.0)	116 (20.3)	137 (24.0)
Elongation		250%	360%	380%	430%	430%	450%
Modulus at 100%: lbf/in (N/m)		10 (1.8)	21 (3.7)	32 (5.6)	40 (7.0)	50 (8.8)	60 (10.5)
Tear strength: lb (N)	D 1004[4] (min.)	2.5 (11)	6 (27)	8 (35)	10 (44)	13 (58)	15 (67)
Dimensional stability	D 1204[4] (max chg)	4%	4%	3%	3%	3%	3%
Low temp. impact: °F (°C)	D 1790[4] (pass)	-10 (-23)	-15 (-26)	-20 (-29)	-20 (-29)	-20 (-29)	-20 (-29)
Index properties[3]	**ASTM**	**PVC 10**	**PVC 20**	**PVC 30**	**PVC 40**	**PVC 50**	**PVC 60**
Specific gravity: g/cc	D 792 (typical)	1.2	1.2	1.2	1.2	1.2	1.2
Water extraction loss (max)	D 1239[4] (max loss)	0.15%	0.15%	0.15%	0.20%	0.20%	0.20%
Volatile loss	D 1203[4] (max loss)	1.5%	0.9%	0.7%	0.5%	0.5%	0.5%
Soil burial Break strength	G 160[4] (max chg)	5%	5%	5%	5%	5%	5%
Elongation		20%	20%	20%	20%	20%	20%
Modulus at 100%		20%	20%	20%	20%	20%	20%
Hydrostatic resistance: psi (kPa)	D 751[4]	42 (290)	68 (470)	100 (690)	120 (830)	150 (1030)	180 (1240)
Avg. plasticizer molecular weight	D 2138 / D 2124	>400	>400	>400	>400	>400	>400
Index properties	**ASTM**	**PVC 10**	**PVC 20**	**PVC 30**	**PVC 40**	**PVC 50**	**PVC 60**
Shear strength[5]: lbf/in (kN/m)	D 882[4]	20 (3.47)	38.4 (6.7)	58.4 (10)	77.6 (14)	96 (17)	116 (20)
Peel strength[5]: lbf/in (kN/m)	D 882[4]	10 (1.8)	12.5 (2.2)	15 (2.6)	15 (2.6)	15 (2.6)	15 (2.6)

1. PGI 1103 replaces PGI 1197 Specification effective 1/1/03 • 2. Certified properties are tested by lot as specified in PGI 1103 Appendix A. • 3. Metric values are converted from US values and are rounded to the available significant digits. • 4. Modifications or further details of test are described in PGI 1103 Appendix B. • 5. Index properties are tested once per formulation as specified in PGI 1103 Appendix A. • 6. Adipates and chlorinated secondary plasticizers shall not be used.

Table 2. PGI-1104, Material Specification for Flexible PVC Geomembranes for Containment.

Plasticizer migration from plasticized PVC into other polymeric materials has not been studied as extensively as plasticizer migration into air or liquid because of the small potential for this phenomenon. The main concern of plasticizer migration into another polymeric material is the change in the engineering properties of the receiving material which can alter the mechanical properties of the plasticized PVC. Wilson (1995) concludes that plasticizer structure plays a major role on plasticizer migration from plasticized PVC to other polymeric materials. Also, Wilson (1995) shows that increasing the plasticizer molecular weight and decreasing the linearity of plasticizer reduces the migration potential.

Three relevant internal molecular properties of a plasticizer that control plasticizer retention are plasticizer (Wilson 1995) molecular weight, linearity and polarity.



PERMEABLE PAVEMENT PLAN

1"=30'

(IN FEET)
1 INCH = 30'

PERMEABLE PAVER DESIGN SCHEDULE						
FACILITY	DESIGN LEVEL	IMPERVIOUS DRAINAGE AREA (SF)	MIN. REQ. Tv (CF)	SURFACE AREA PROVIDED (SF)	GRAVEL DEPTH (TREATMENT) (FT)	VOLUME PROVIDED (TREATMENT) (CF)	UNDERDRAIN?
PARKING BAY 'A'	1	1,149	91	380	1.00	152	YES

PERMEABLE PAVER DESIGN SCHEDULE						
FACILITY	DESIGN LEVEL	IMPERVIOUS DRAINAGE AREA (SF)	MIN. REQ. Tv (CF)	SURFACE AREA PROVIDED (SF)	GRAVEL DEPTH (TREATMENT) (FT)	VOLUME PROVIDED (TREATMENT) (CF)	UNDERDRAIN?
PARKING BAY 'B'	1	2,773	220	951	1.00	380	YES

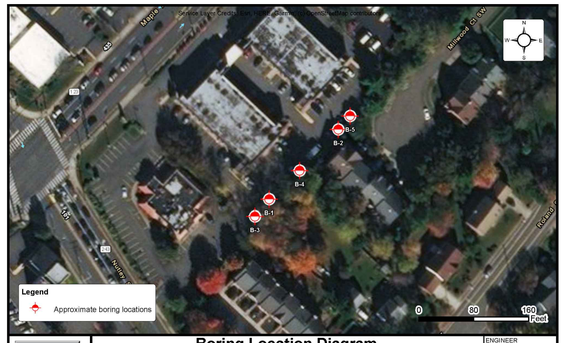
PERMEABLE PAVER DESIGN SCHEDULE						
FACILITY	DESIGN LEVEL	IMPERVIOUS DRAINAGE AREA (SF)	MIN. REQ. Tv (CF)	SURFACE AREA PROVIDED (SF)	GRAVEL DEPTH (TREATMENT) (FT)	VOLUME PROVIDED (TREATMENT) (CF)	UNDERDRAIN?
PARKING BAY 'C'	1	3,830	304	1,095	1.00	438	YES

PERMEABLE PAVER DESIGN SCHEDULE						
FACILITY	DESIGN LEVEL	IMPERVIOUS DRAINAGE AREA (SF)	MIN. REQ. Tv (CF)	SURFACE AREA PROVIDED (SF)	GRAVEL DEPTH (TREATMENT) (FT)	VOLUME PROVIDED (TREATMENT) (CF)	UNDERDRAIN?
PARKING BAY 'D'	1	2,966	235	1,095	1.00	438	YES

PERMEABLE PAVER DESIGN SCHEDULE						
FACILITY	DESIGN LEVEL	IMPERVIOUS DRAINAGE AREA (SF)	MIN. REQ. Tv (CF)	SURFACE AREA PROVIDED (SF)	GRAVEL DEPTH (TREATMENT) (FT)	VOLUME PROVIDED (TREATMENT) (CF)	UNDERDRAIN?
PARKING BAY 'E'	1	3,574	283	1,238	1.00	495	YES

NOTES: DESIGN INFITLRATION RATE = 0.50 IN/HR
GRAVEL POROSITY = 0.40
LEVEL 1 Tv = 1 inch depth

INFILTRATION TESTING:



Boring Location Diagram
444 MAPLE AVENUE W

444 MAPLE AVENUE W, VIENNA, VA
HEKEMIAN & CO., INC.

ENGINEER: TEL:
SCALE: 1 " = 80 '
PROJECT NO.: 01.28963
SHEET: 1 OF 1
DATE: 5/8/2019

INFILTRATION TEST RECORD/CALCULATION SHEET

Job No: 28963 Job Name: 444 Maple Avenue W Date: 04/23/19

Boring No: B-3
Perc Hole Depth (in.): 31.80
Reference Depths for Test (in): 12"= 19.80 24"= 7.80

Test Intervals/Duration (Hrs.)	0.00	1.00	2.00	3.00	4.00
Duration	0.00	0.04	2.00	3.00	4.00
Actual Test Time (Start/Finish)	8:18	10:18	11:18	12:18	13:18
Measured Depth to water (in.)	0.96	0.96	0.96	0.96	0.96
Measured Depth Added or inital (in.)	0.96	0.96	0.96	0.96	
Head (in.)	30.84	30.84	30.84	30.84	
Fall (in.)		0.00	0.00	0.00	0.00

Calculated Infiltration Rate (in./hr.): Avg. Fall Over 4 Hours: 0.00
Comments: Material at perculation depth classified as SANDY SILT (ML)

Boring No: B-4
Perc Hole Depth (in.): 36.48
Reference Depths for Test (in): 12"= 24.5 24"= 12.48

Test Intervals/Duration (Hrs.)	0.00	1.00	2.00	3.00	4.00
Duration	0.00	1.00	2.00	3.00	4.00
Actual Test Time (Start/Finish)	9:22	10:22	11:22	12:22	13:22
Measured Depth to water (in.)	14.52	12.48	12.48	12.48	12.48
Measured Depth Added or inital (in.)	12.48	12.48	12.48	12.48	
Head (in.)	24.00	24.00	24.00	24.00	
Fall (in.)		0.00	0.00	0.00	0.00

Calculated Infiltration Rate (in./hr.): Avg. Fall Over 4 Hours: 0.00
Comments: Material at perculation depth classified as SANDY SILT (ML)

INFILTRATION TEST RECORD/CALCULATION SHEET

Job No: 28963 Job Name: 444 Maple Avenue W Date: 04/23/19

Boring No: B-5
Perc Hole Depth (in.): 35.40
Reference Depths for Test (in): 12"= 23.40 24"= 11.40

Test Intervals/Duration (Hrs.)	0.00	1.00	2.00	3.00	4.00
Duration	0.00	0.04	2.00	3.00	4.00
Actual Test Time (Start/Finish)	9:27	10:27	11:27	12:27	13:27
Measured Depth to water (in.)	16.44	11.16	11.40	11.16	11.16
Measured Depth Added or inital (in.)	11.16	11.16	11.16	11.16	
Head (in.)	24.24	24.24	24.24	24.24	
Fall (in.)		0.00	0.24	0.00	0.00

Calculated Infiltration Rate (in./hr.): Avg. Fall Over 4 Hours: 0.00
Comments: Material at perculation depth classified as SANDY SILT (ML)

Town of Vienna
Approved
06/09/2021

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV'D BY	APPROVED	DATE

PERMEABLE PAVEMENT PLAN, COMPUTATIONS AND DETAILS

444 MAPLE AVENUE WEST
SITE PLAN
TOWN OF VIENNA, VIRGINIA

WALTER L. PHILLIPS, INCORPORATED
ESTABLISHED 1945
Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

KAREN L. S. WHITE
Lic. No.041850
05/25/21

DRAWN: DL
CHECKED: KW
DATE: SUB01: 9/13/2019, SUB02: 05/07/2020, SUB03: 4/19/2021
SUB04: 05/25/2021
SCALE: NONE

3rd Party Construction Inspection Checklist and Certification: Permeable Pavement

DEQ Spec. No. 7 & PFM 6-1304

Project Name _____ Construction Firm _____

Co. Plan Number _____ 3rd Party Inspection Firm: _____

Site Address: _____ 3rd Party Inspector's Name: _____

Latitude / Longitude: _____ °N _____ °W Contact Info / Phone Number _____

BMP ID Number as shown on plan and general location on the site _____

- A certification is required for all SWM/BMP facilities under PFM 6-1300 et. seq.
- A Virginia licensed professional engineer or licensed professional meeting the exemption requirements of the Code of Virginia §54.1-401 must sign the certification at the end of this checklist.

Instructions:

- Check each item as complete, or write in "N/A" for those items that are not applicable.
- Fill in blanks for requested information on dimensions, materials, etc.
- Provide one or more photos for applicable items; checkboxes indicate items that *require* photos.

Pre-Installation Meeting and Site Preparation

CHECK	PHOTO	DESCRIPTION	DATE OF INSPECTION / COMMENTS
☐		**Pre-installation Meeting with** **- contractor designated to install the facility** **- 3rd party inspector (or designee)** **A review of checklist and tentative schedule for interim inspections and sign-offs has been discussed**	
☐		**Contributing drainage areas are stabilized and not eroding.**	
☐	☐	**Stormwater runoff is diverted around the excavation area to a stabilized conveyance.**	

Excavation

CHECK	PHOTO	DESCRIPTION	DATE OF INSPECTION / COMMENTS
☐		**Horizontal location of BMP is in accordance with the approved plans.**	
☐		**Subgrade surface free of rocks, roots, and large voids. (Voids may be filled with base aggregate.)**	
☐		**For level 2 permeable pavement: Excavation bottom is scarified.**	
☐		**No groundwater seepage or standing water is present. Any standing water is dewatered to an acceptable dewatering device, and the design consultant has been notified.**	
☐	☐	**Excavation of facility has achieved proper elevations and grade per approved plans.**	

Filter Layer and Underdrain Placement

CHECK	PHOTO	DESCRIPTION	DATE OF INSPECTION / COMMENTS
☐		**All aggregates (stone, sand, etc., as required) are clean, washed, and conform to specifications.**	
☐	☐	**Perforated underdrain size and spacing per approved plans.** **Pipe Diameter_____ Inches** **Material_____** **Pipe Spacing_____ ft. Slope_____%** **Perforation Size/Spacing _____/_____ ft.**	
☐		**Filter layer and initial reservoir layer aggregates spread (not dumped) to avoid aggregate segregation per approved plans.** **Depth of filter layer _____ ft.**	
☐	☐	**Impermeable liner (when required) is placed in accordance with manufacturer specifications, per approved plans.**	
☐		**Underdrain, observation well(s), and underdrain fittings (45° wyes, cap at upstream end, etc.) installed per approved plans.** **Number of Observation Wells_____**	

Stone Reservoir Aggregate Placement

CHECK	PHOTO	DESCRIPTION	DATE OF INSPECTION / COMMENTS
☐		**Sides covered with geotextile with no tears, holes, or excessive wrinkles.**	
☐	☐	**Stone reservoir layer aggregate placement, compaction, and thickness, are per approved plans.** **Depth of reservoir layer aggregate _____ Inches**	

Bedding Layer and Pavement Installation

CHECK	PHOTO	DESCRIPTION	DATE OF INSPECTION / COMMENTS
☐	☐	**Pre-treatment structures (when required) are installed per approved plans.** **Type of pretreatment _____**	
☐		**Concentrated flow is not being discharged directly onto the permeable pavement.**	
☐		**Pavement surface is even and runoff spreads evenly across surface.**	
☐		**Flow reduction orifice or cap placed on the end of the pavement underdrain per approved plans.**	
☐	☐	**Permeable pavement block systems which require edge restraints are installed flush with the paver blocks per approved plans.** **Size of Edge Restraints_____** **Type of Edge Restraints_____**	
☐		**Aggregate layer for the installation of the underdrain system is per approved plans.** **Depth of aggregate layer_____ ft.** **Size of aggregate layer_____**	
☐		**Signs installed per PFM 6-1304.3B**	
☐		**For porous asphalt and pervious concrete pavement, the full permeability of paved surface has been properly tested (clean water applied at a min. rate of 5 gpm over the entire surface), and all water infiltrated directly without puddle formation or surface runoff.**	
☐	☐	**Provide a photo of the BMP facility after completion of construction.**	

Final Certification

I do hereby certify that this as-built information for the stormwater management/BMP facility was inspected by me (or by an individual under my responsible charge) and conforms to the approved plans, except as indicated.

Signature:_____ Date:_____

License Number (Seal):_____

("Certify" means to state or declare a professional opinion based on sufficient and appropriate onsite inspections and material tests conducted during construction)

SECTION 8: CONSTRUCTION

Experience has shown that proper installation is absolutely critical to the effective operation of a permeable pavement system.

8.1 Necessary Erosion & Sediment Controls

- All permeable pavement areas should be fully protected from sediment intrusion by silt fence or construction fencing, particularly if they are intended to infiltrate runoff.
- Permeable pavement areas should remain outside the limit of disturbance during construction to prevent soil compaction by heavy equipment. Permeable pavement areas should be clearly marked on all construction documents and grading plans. To prevent soil compaction, heavy vehicular and foot traffic should be kept out of permeable pavement areas during and immediately after construction.
- During construction, care should be taken to avoid tracking sediments onto any permeable pavement surface to avoid clogging.
- Any area of the site intended ultimately to be a permeable pavement area should generally not be used as the site of a temporary sediment basin. Where locating a sediment basin on an area intended for permeable pavement is unavoidable, the invert of the sediment basin must be a minimum of 2 feet above the final design elevation of the bottom of the aggregate reservoir course. All sediment deposits in the excavated area should be carefully removed prior to installing the sub-base, base and surface materials.

8.2. Permeable Pavement Construction Sequence

The following is a typical construction sequence to properly install permeable pavement, which may need to be modified to depending on whether Porous Asphalt (PA), Pervious Concrete (PC) or Interlocking Paver (IP) designs are employed.

Step 1. Construction of the permeable pavement shall only begin after the entire contributing drainage area has been stabilized. The proposed site should be checked for existing utilities prior to any excavation. Do not install the system in rain or snow, and do not install frozen aggregate materials.

Step 2. As noted above, temporary erosion and sediment (E&S) controls are needed during installation to divert stormwater away from the permeable pavement area until it is completed. Special protection measures such as erosion control fabrics may be needed to protect vulnerable side slopes from erosion during the excavation process. The proposed permeable pavement area must be kept free from sediment during the entire construction process. Construction materials that are contaminated by sediments must be removed and replaced with clean materials.

Step 3. Where possible, excavators or backhoes should work from the sides to excavate the reservoir layer to its appropriate design depth and dimensions. For micro-scale and small-scale pavement applications, excavating equipment should have arms with adequate extension so they do not have to work inside the footprint of the permeable pavement area (to avoid compaction). Contractors can use a cell construction approach, whereby the proposed permeable pavement area is split into 500 to 1000 sq. ft. temporary cells with a 10 to 15 foot earth bridge in between, so that cells can be excavated from the side. Excavated material should be placed away from the open excavation so as to not jeopardize the stability of the side walls.

Step 4. The native soils along the bottom and sides of the permeable pavement system should be scarified or tilled to a depth of 3 to 4 inches prior to the placement of the filter layer or filter fabric. In large scale paving applications with weak soils, the soil subgrade may need to be compacted to 95% of the Standard Proctor Density to achieve the desired load-bearing capacity. (NOTE: This effectively eliminates the infiltration function of the installation, and it must be addressed during hydrologic design.)

Step 5. The filter layer should be installed on the bottom of the reservoir layer and, where appropriate, filter fabric can be placed on the sides.

Step 6. Provide a minimum of 2 inches of aggregate above and below the underdrains. The underdrains should slope down towards the outlet at a grade of 0.5% or steeper. The up-gradient end of underdrains in the reservoir layer should be capped. Where an underdrain pipe is connected to a structure, there should be no perforations within 1 foot of the structure. Ensure that there are no perforations in clean-outs and observation wells within 1 foot of the surface.

Step 7. Spread 6-inch lifts of the appropriate clean, washed stone aggregate. Place at least 4 inches of additional aggregate above the underdrain, and then compact it using a vibratory roller in static mode until there is no visible movement of the aggregate. Do not crush the aggregate with the roller.

Step 8. Install over-drain if required and connect into outlet conveyance system.

Step 9. Install the desired depth of the bedding layer, depending on the type of pavement, as follows:

- **Pervious Concrete:** No bedding layer is used.
- **Porous Asphalt:** The bedding layer for porous asphalt pavement consists of 1 to 2 inches of clean, washed ASTM D 448 No.57 stone. The filter course must be leveled and pressed (choked) into the reservoir base with at least four (4) passes of a 10-ton steel drum static roller.
- **Interlocking Pavers:** The bedding layer for open-jointed pavement blocks should consist of 2 inches of washed ASTM D 448 No.8 stone.

Step 10. Install paving materials in accordance with manufacturer or industry specifications for the particular type of pavement.

- **Installation of Porous Asphalt.** The following has been excerpted from various documents, most notably Jackson (2007).
  1. Install porous asphalt pavement similarly to regular asphalt pavement. The pavement should be laid in a single lift over the filter course. The laying temperature should be between 230°F and 260°F, with a minimum air temperature of 50°F, to ensure that the surface does not stiffen before compaction.
  2. Complete compaction of the surface course when the surface is cool enough to resist a 10-ton roller. One or two passes of the roller are required for proper compaction. More rolling could cause a reduction in the porosity of the pavement.
  3. The mixing plant must provide certification of the aggregate mix, abrasion loss factor, and asphalt content in the mix. Test the asphalt mix for its resistance to stripping by water using ASTM 1664. If the estimated coating area is not above 95%, additional anti-stripping agents must be added to the mix.
  4. Transport the mix to the site in a clean vehicle with smooth dump beds sprayed with a non-petroleum release agent. Cover the mix during transportation to control cooling.
  5. Test the full permeability of the pavement surface by application of clean water at a rate of at least five gallons per minute over the entire surface. All water must infiltrate directly, without puddle formation or surface runoff.
  6. Inspect the facility 18 to 30 hours after a significant rainfall (greater than 1/2 inch) or artificial flooding, to determine that the facility is draining properly.
- **Installation of Pervious Concrete.** The basic installation sequence for pervious concrete is outlined by the American Concrete Institute (2008). It is strongly recommended that concrete installers successfully complete a recognized pervious concrete installers training program, such as the Pervious Concrete Contractor Certification Program offered by the NRMCA. The basic installation procedure is as follows:
  1. Drive the concrete truck as close to the project site as possible.
  2. Water the underlying aggregate (reservoir layer) before the concrete is placed, so that the aggregate does not draw moisture from the freshly laid pervious concrete.
  3. After the concrete is placed, approximately 3/8 to 1/2-inch is struck off, using a vibratory screed. This is to allow for compaction of the concrete pavement.
  4. Compact the pavement with a steel pipe roller. Care should be taken so that over-compaction does not occur.
  5. Cut joints for the concrete to a depth of 1/4 inch.
  6. The curing process is very important for pervious concrete. Cover the pavement with plastic sheeting within 20 minutes of the strike-off, and keep it covered for at least seven (7) days. Do not allow traffic on the pavement during this time period.

  Installation of Interlocking Pavers. The basic installation process is described in greater detail by Smith (2006). The basic installation process is described in greater detail by Smith (Smith 2011). Permeable paver job foremen should successfully complete the PICP Installer Technician Course training program offered by the Interlocking Concrete Pavement Institute. The following installation method also applies to clay paving units. Contact manufacturers of composite units for installation specifications.
  1. Moisten, place and level the No. 2 stone sub-base and compact it in minimum 12-inch thick lifts with four passes of a 10-ton steel drum static roller until there is no visible movement. The first two passes are in vibratory mode with the final two passes in static mode. The filter aggregate should be moist to facilitate movement into the reservoir course.
  2. Place edge restraints before the base layer, bedding and pavers are installed. Permeable interlocking pavement systems require edge restraints to prevent vehicle loads from moving the pavers. Edge restraints may be standard concrete curbs or curb and gutters.,

3. Moisten, place and level the No. 57 base stone in a single lift (4 inches thick). Compact it into the reservoir course beneath with at least four (4) passes of a 10-ton steel drum static roller until there is no visible movement. The first two passes are in vibratory mode, with the final two passes in static mode.
4. Place and screed the bedding course material (typically No. 8 stone, 2 inches thick).
5. Pavers may be placed by hand or with mechanical installers.
6. Fill gaps at the edge of the paved areas with cut pavers or edge units. When cut pavers are needed, cut the pavers with a paver splitter or masonry saw. Cut pavers no smaller than one-third (1/3) of the full unit size, if subject to tire movement.
7. Fill the joints and openings with stone. Joint openings must be filled with No. 8, 89 or 9 stone per the paver manufacturer's recommendation. Sweep and remove excess stones from the paver surface.
8. Compact and seat the pavers into the bedding course with a minimum low-amplitude 5,000 lbf, 75- to 95-Hz plate compactor. Do not compact within 6 feet of the unrestrained edges of the pavers.
9. Thoroughly sweep the surface after construction to remove all excess aggregate.
10. Inspect the area for settlement. Any paving units that settle must be reset and re-inspected.
11. The contractor should return to the site within 6 months to top up the paver joints with stones.

8.3. Construction Inspection

Inspections before, during and after construction are needed to ensure that permeable pavement is built in accordance with these specifications. Use a detailed inspection checklist that requires sign-offs by qualified individuals at critical stages of construction and to ensure that the contractor's interpretation of the plan is consistent with the designer's intent. The basic elements of a permeable pavement construction checklist are provided at the end of this design specification.

Once the final construction inspection has been completed, log the GPS coordinates for each facility and submit them for entry into the local BMP maintenance tracking database.

It may be advisable to divert the runoff from the first few runoff-producing storms away from larger permeable pavement applications, particularly when up-gradient conventional asphalt areas drain to the permeable pavement. This can help reduce the input of fine particles that are often produced shortly after conventional asphalt is laid down.

SECTION 9: MAINTENANCE

9.1. Maintenance Agreements

The Virginia Stormwater Management regulations (9 VAC 25-870) specify the circumstances under which a maintenance agreement must be executed between the owner and the VSMP authority, and sets forth inspection requirements, compliance procedures if maintenance is

neglected, notification to the local program upon transfer of ownership, and right-of-entry for local program personnel.

- The regulations require that all post-construction BMPs, including Permeable Pavement installations, must be covered by a long term maintenance agreement and drainage easement to allow inspection and maintenance.
- The maintenance agreements should note which conventional parking lot maintenance tasks must be *avoided* (see **Section 9.2** below). Signs should be posted on larger parking lots to indicate their stormwater function and special maintenance requirements. When micro-scale or small-scale permeable pavement are installed on private residential lots, homeowners should be provided a simple document that explains the purpose of the Permeable Pavement and outlines (1) the routine maintenance needs, (2) the long-term maintenance plan, and (3) the basic parameters of the deed restriction, drainage easement or other mechanism enforceable by the VSMP Authority to help ensure that the permeable pavement system is maintained and functioning.
- The mechanism should, if possible, grant authority for the VSMP authority to access the property for inspection or corrective action.

9.2. Maintenance Tasks

It is difficult to prescribe the specific types or frequency of maintenance tasks that are needed to maintain the hydrologic function of permeable pavement systems over time. Most installations work reasonably well year after year with little or no maintenance, whereas some have problems right from the start.

The following tasks **must be avoided** on all permeable pavements:

- sanding
- re-sealing
- re-surfacing
- power washing
- storage of snow piles containing sand
- storage of mulch or soil materials
- construction staging on unprotected pavement

A preventative maintenance task for large-scale applications involves regenerative air vacuum sweeping on a frequency consistent with the use and loadings encountered in the parking lot. Many consider an annual, dry-weather sweeping in the spring months to be important. The contract for sweeping should specify that a vacuum sweeper be used that does not use water spray, since spraying may lead to subsurface clogging. Vacuum settings for large-scale interlocking paver applications should be calibrated so they *do not* pick up the small stones between pavement blocks.

Table 7.8. Recommended Maintenance Tasks for Permeable Pavement Practices

Maintenance Task	Frequency[1]
• For the first 6 months following construction, the practice and contributing drainage area should be inspected at least twice after storm events that exceed 1/2 inch of rainfall.	After installation

Conduct any needed repairs or stabilization.	
• Mow grass in grid paver applications	At least 1 time every 1-2 months during the growing season
• Stabilize the CDA to prevent erosion • Remove any soil or sediment deposited on pavement. • Replace or repair any necessary pavement surface areas that are degenerating or spalling	As needed
• Vacuum pavement with a standard street sweeper to prevent clogging	2-4 times per year (depending on use)
• Conduct a maintenance inspection • Spot weeding of grass applications	Annually
• Remove any accumulated sediment in pre-treatment cells and inflow points	Once every 2 to 3 years
• Conduct maintenance using a regenerative street sweeper • Replace any necessary joint material	If clogged

[1] Required frequency of maintenance will depend on pavement use, traffic loads, and surrounding land use.

9.3. Maintenance Inspections

It is highly recommended that a spring maintenance inspection and cleanup be conducted at each permeable pavement site, particularly at large-scale applications.

Maintenance of permeable pavement is driven by annual inspections that evaluate the condition and performance of the practice. Any permeable pavement installation that captures external drainage area (run-on) should be inspected more frequently during the first year (four seasons) to ensure that there are no unexpected loads of sediment or pavement particulates from the contributing area. If so, the property owner should assess ways to limit the contributions, or the maintenance schedule should be adjusted to ensure the pavement does not become clogged.

The following are suggested routine annual maintenance inspection points for permeable pavements:

- The drawdown rate should be measured at the observation well for three (3) days following a storm event in excess of 1/2-inch in depth. If standing water is still observed in the well after three days, this is a clear sign that clogging is a problem.
- Inspect the surface of the permeable pavement for evidence of sediment deposition, organic debris, staining or ponding that may indicate surface clogging. If any signs of clogging are noted, schedule a vacuum sweeper (no brooms or water spray) to remove deposited material. Then, test sections by pouring water from a five gallon bucket to ensure they work.
- Inspect the structural integrity of the pavement surface, looking for signs of surface deterioration, such as slumping, cracking, spalling or broken pavers. Replace or repair affected areas, as necessary.
- Check inlets, pretreatment cells and any flow diversion structures for sediment buildup and structural damage. Note if any sediment needs to be removed.
- Inspect the condition of the observation well and make sure it is still capped.

- Generally inspect any contributing drainage area for any controllable sources of sediment or erosion.

An example maintenance inspection checklist for permeable pavement can be accessed in **Appendix 9-C** of **Chapter 9** of the *Virginia Stormwater Management Handbook* (2nd edition, 2013). Based on inspection results, specific maintenance tasks will be triggered and scheduled to keep the facility in operating condition.

SECTION 10: COMMUNITY & ENVIRONMENTAL CONCERNS

Compliance with the Americans with Disabilities Act (ADA). Porous concrete and porous asphalt are generally considered to be ADA compliant. Most localities also consider interlocking concrete pavers to be complaint, if designers ensure that surface openings between pavers do not exceed 1/2 inch. However, some forms of interlocking pavers may not be suitable for handicapped parking spaces. Interlocking concrete pavers interspersed with other hardscape features (e.g., concrete walkways) *can* be used in creative designs to address ADA issues.

Groundwater Protection. While well-drained soils enhance the ability of permeable pavement to reduce stormwater runoff volumes, they may also increase the risk that stormwater pollutants might migrate into groundwater aquifers. Designers should avoid the use of infiltration-based permeable pavement in areas known to provide groundwater recharge to aquifers used for water supply. In these source water protection areas, designers should include liners and underdrains in large-scale permeable pavement applications (i.e., when the proposed surface area exceeds 10,000 square feet).

Stormwater Hotspots. Designers should also certify that the proposed permeable pavement area will not accept any runoff from a severe stormwater hotspot. Stormwater hotspots are operations or activities that are known to produce higher concentrations of stormwater pollutants and/or have a greater risk of spills, leaks or illicit discharges. Examples include certain industrial activities, gas stations, public works areas, petroleum storage areas (for a complete list of hotspots where infiltration is restricted or prohibited, see Stormwater Design Specification No. 8: Infiltration). For potential hotspots, restricted infiltration means that a minimum of 50% of the total T_v must be treated by a filtering or bioretention practice prior to the permeable pavement system. For known severe hotspots, the risk of groundwater contamination from spills, leaks or discharges is so great that infiltration of stormwater or snowmelt through permeable pavement is *prohibited.*

Underground Injection Control Permits. The Safe Drinking Water Act regulates the infiltration of stormwater in certain situations pursuant to the Underground Injection Control (UIC) Program, which is administered either by the EPA or a delegated state groundwater protection agency. In general, the EPA (2008) has determined that permeable pavement installations are not classified as Class V injection wells, since they are always wider than they are deep. There may be an exception in karst terrain if the discharge from permeable pavement is directed to an improved sinkhole, although this would be uncommon. More guidance on stormwater design in

Town of Vienna
Approved
06/09/2021

NOTES:
1. THIS SHEET PROVIDES SOME GENERAL RECOMMENDATIONS FROM THE VIRGINIA DEQ THAT SHALL BE FOLLOWED FOR PROPER CONSTRUCTION OF THE PERMEABLE PAVEMENT.
2. THIS SHEET ALSO PROVIDES A COPY OF THE THIRD PARTY INSPECTION CHECKLIST THAT SHALL BE COMPLETED AND SUBMITTED TO THE OWNER.
3. THIS SHEET ALSO PROVIDES SOME GENERAL RECOMMENDATIONS FOR MAINTENANCE AND MAINTENANCE INSPECTIONS OF THESE FACILITIES. NOTE THAT THE PROPERTY OWNER IS REQUIRED TO EXECUTE A STORMWATER MANAGEMENT FACILITY MAINTENANCE AGREEMENT WITH THE TOWN OF VIENNA WHICH CONTAINS FURTHER CONSTRUCTION, MAINTENANCE, AND INSPECTION REQUIREMENTS

WALTER L. PHILLIPS INCORPORATED
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ESTABLISHED 1945

COMMONWEALTH OF VIRGINIA — KAREN L. S. WHITE — Lic. No.041850 — PROFESSIONAL ENGINEER — 05/25/21

DATE: SUB01: 9/13/2019, SUB02: 05/07/2020, SUB03: 4/19/2021, SUB04: 05/25/2021
SCALE: NONE
DRAWN: DL
CHECKED: KW

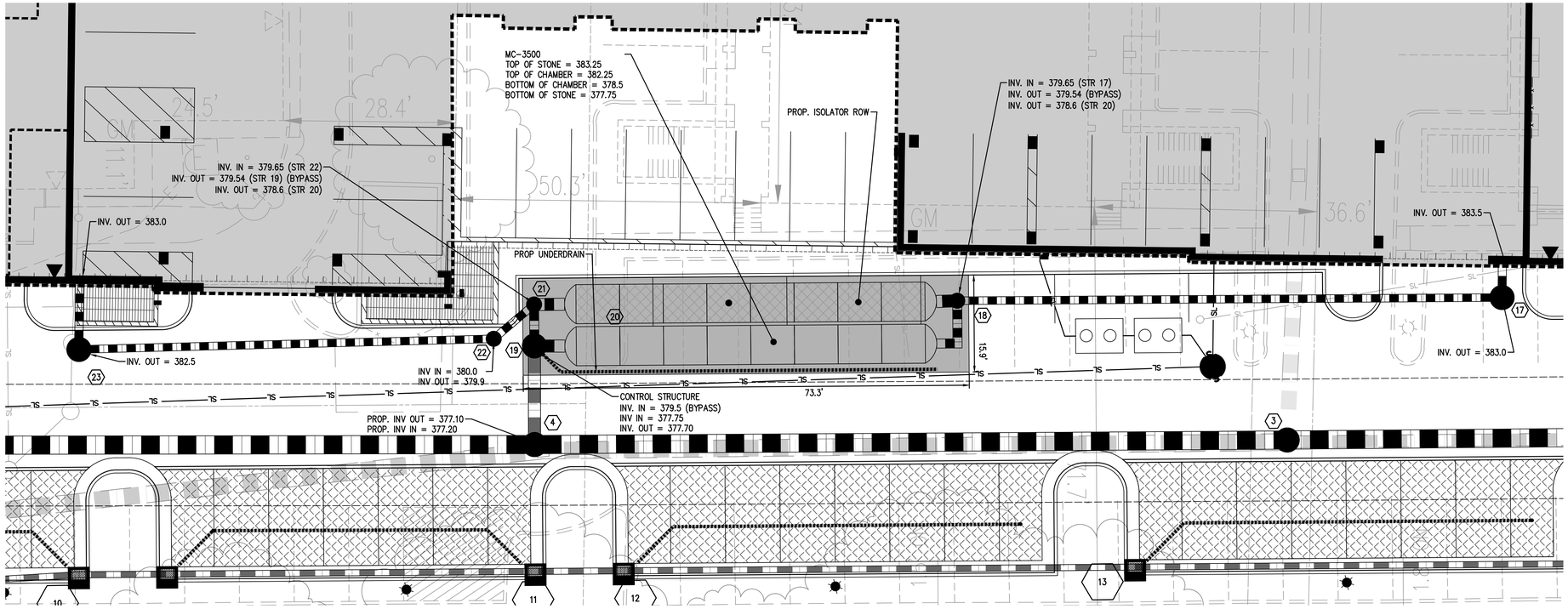
REVISION APPROVED BY			
NO.	DESCRIPTION	DATE	APPROVED

PERMEABLE PAVEMENT SPECIFICATIONS

444 MAPLE AVENUE WEST

SITE PLAN

TOWN OF VIENNA, VIRGINIA



SCALE: 1"=10'

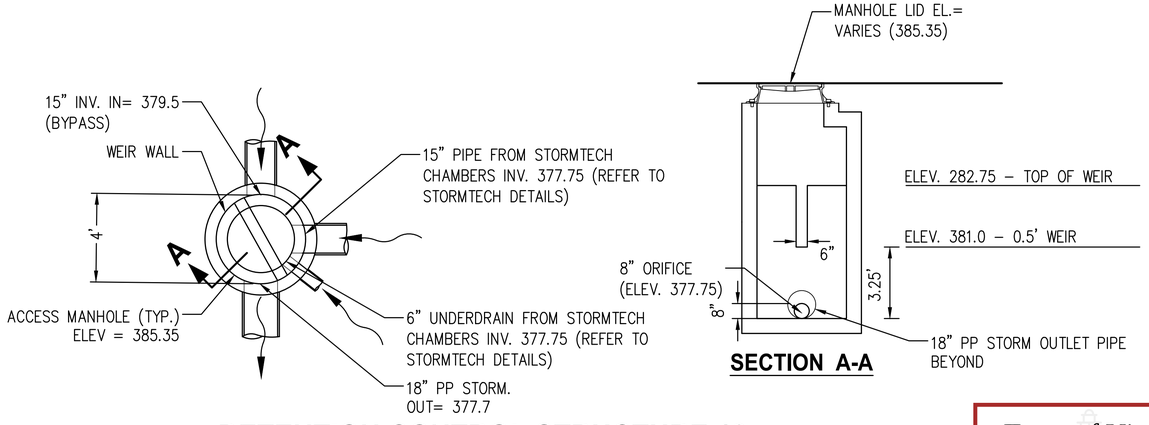
STORMWATER FACILITY CONSTRUCTION NOTES:

1. ALL STORMWATER MANAGEMENT AND WATER QUALITY FACILITIES WILL BE PRIVATELY OWNED AND MAINTAINED.
2. ALL STORMWATER FACILITIES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE VIRGINIA DEQ SPECIFICATIONS AND LOCAL JURISDICTION'S REGULATIONS AND MANUALS. THIS INCLUDES MATERIALS, CONSTRUCTION METHODS AND SEQUENCE. IN THE EVENT OF A CONFLICT BETWEEN THE PLANS, DEQ OR LOCAL JURISDICTION, THE LOCAL JURISDICTION'S REQUIREMENTS SHALL GOVERN.
3. THE DETAILS FROM THE MANUFACTURER OF THE STORMWATER FACILITIES SHOWN ARE CURRENT AT THE TIME OF PLAN PREPARATION. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE LATEST DETAILS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONSTRUCT THE FACILITIES IN STRICT CONFORMANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
4. ALL STORMWATER STRUCTURES, INCLUDING ACCESS MANHOLES, SHALL BE DESIGNED BY A LICENSED STRUCTURAL ENGINEER FOR HS-20 LOADING UNLESS OTHERWISE NOTED.
5. A PRE-CONSTRUCTION MEETING IS REQUIRED BETWEEN THE CONTRACTOR, STORMWATER FACILITY MANUFACTURER IF ANY, AND GEOTECHNICAL ENGINEER OF RECORD.
6. THE CONTRACTOR SHALL PROVIDE MATERIAL CERTIFICATIONS AND DELIVERY SLIPS AND A SIGNED CERTIFICATION THAT THE FACILITY WAS CONSTRUCTED IN ACCORDANCE WITH THESE PLANS.
7. THE INSTALLATION OF ALL STORMWATER DETENTION AND WATER QUALITY FACILITIES SHALL BE INSPECTED BY A LICENSED PROFESSIONAL IN ACCORDANCE WITH THE DEQ SPECIFICATIONS IF APPLICABLE AS WELL AS THE JURISDICTION'S REQUIREMENTS. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE LICENSED PROFESSIONAL SELECTED BY THE OWNER TO ARRANGE FOR THE NECESSARY INSPECTIONS.
8. IF BEDROCK IS ENCOUNTERED, THE EXCAVATION FOR THE FACILITY SHALL EXTEND A MINIMUM OF 2' BELOW THE STORMWATER FACILITY INTO UNDERLYING BEDROCK OR AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER OF RECORD.
9. THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT GEOTECHNICAL ENGINEER OF RECORD TO HAVE HIM VERIFY THE ALLOWABLE BEARING PRESSURE FOR THE STORMWATER FACILITY SUBGRADE UNDER SATURATED CONDITIONS ONCE THE SUBGRADE HAS BEEN EXPOSED DURING CONSTRUCTION. THE CONTRACTOR SHALL UNDERCUT UNSUITABLE SUBGRADE SOILS IF ANY AND INSTALL GRAVEL BEDDING AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER OF RECORD BASED ON THE SUBGRADE BEARING PRESSURE AND DEPTH OF COVER OVER THE FACILITY.
10. STORMWATER FACILITIES SHALL NOT BE PLACED INTO OPERATION UNTIL ALL AREAS DRAINING TO THE FACILITY HAVE BEEN STABILIZED TO PREVENT SOIL INTRUSION INTO THE FACILITY.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND MAINTENANCE OF THE STORMWATER FACILITIES AT LEAST UNTIL THE PROJECT IS SUBSTANTIALLY COMPLETE (UNLESS OTHERWISE SPECIFIED BY THE CONTRACTOR'S CONTRACT WITH THE OWNER).

STORMWATER FACILITY INSPECTION AND MAINTENANCE NOTES

1. THE OWNER SHOULD BE AWARE THAT THE STORMWATER DETENTION AND WATER QUALITY FACILITIES ARE SUBJECT TO A MAINTENANCE AGREEMENT WITH THE LOCAL JURISDICTION COMMITTING THE OWNER TO PROPERLY CONSTRUCTING, INSPECTING, AND MAINTAINING THE FACILITIES. THE AGREEMENT DETAILS THE SPECIFIC INSPECTION AND MAINTENANCE REQUIREMENTS WHICH THE OWNER SHOULD BECOME FAMILIAR WITH.
2. THE OWNER IS REQUIRED TO OR SHOULD HAVE THE FACILITIES INSPECTED AND MAINTAINED ON AN ANNUAL BASIS. THE JURISDICTION MAY REQUIRE THE SUBMISSION OF REPORTS ON ALL INSPECTIONS AND MAINTENANCE ACTIVITIES.
3. THE LOCAL JURISDICTION IS REQUIRED UNDER VIRIGINIA REGULATIONS TO PERFORM THEIR OWN INSPECTION OF STORMWATER FACILITIES AT LEAST ONCE EVERY FIVE YEARS. THE JURISDICTION WILL NOTIFY THE OWNER OF ANY NOTED DEFICIENCIES, WHAT ACTIONS ARE REQUIRED, AND BY WHEN. THE MAINTENANCE AGREEMENT ALLOWS THE JURISDICTION TO CORRECT DEFICIENCIES, AT THE OWNER'S EXPENSE, IF THE OWNER FAILS TO DO SO WITHIN THE SPECIFIED TIMEFRAME.
4. THE OWNER SHOULD BE AWARE THAT NO ALTERATIONS ARE ALLOWED TO THE FACILITY WITHOUT PROCESSING A PLAN AND CONSTRUCTION PERMIT THROUGH THE JURISDICTION.

10 0 5 10 20 40
(IN FEET)
1 INCH = 10'



SECTION A-A

DETENTION CONTROL STRUCTURE 19

SCALE: NA

NOTE: THIS PLAN IS FOR DIMENSION PURPOSES ONLY. STRUCTURE TO BE DESIGNED BY A STRUCTURAL ENGINEER

Town of Vienna
Approved
06/09/2021

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DATE: SUB01: 9/13/2018, SUB02: 05/07/2020, SUB03: 4/19/2021
SUB04: 05/25/2021

SCALE: NONE | DRAWN: DL | CHECKED: KW

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
PROFESSIONAL ENGINEER
05/25/21

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV.' BY	APPROVED	DATE

STORMWATER DETAILS

444 MAPLE AVENUE WEST

SITE PLAN

TOWN OF VIENNA, VIRGINIA

File No. FM-18 Tax Map No. 038-3 Job No. 07-036 Cadd Dwg. File: Q: \sdskproj\07036\dwg\Engineering\site Plan\07036C-0706.dwg Xref: site plan\07036B-0002

SHEET: C-0706

DRAINAGE AREA A 1-YR DISCHARGE RATE

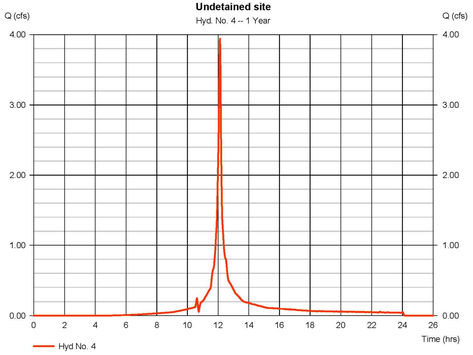
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Monday, 04 / 20 / 2020

Hyd. No. 4

Undetained site

Hydrograph type	= SCS Runoff	Peak discharge	= 3.950 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 11,336 cuft
Drainage area	= 1.600 ac	Curve number	= 93
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.62 in	Distribution	= Custom
Storm duration	= NOAA Type C Rainfall 1 Min interpolated.dst	Storage Indic.	= 484



DRAINAGE AREA B 1-YR DISCHARGE RATE

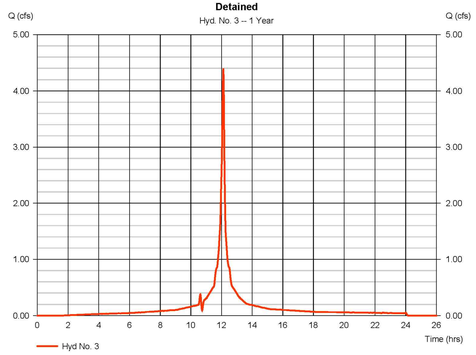
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Monday, 04 / 20 / 2020

Hyd. No. 3

Detained

Hydrograph type	= SCS Runoff	Peak discharge	= 4.395 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 13,868 cuft
Drainage area	= 1.550 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.62 in	Distribution	= Custom
Storm duration	= NOAA Type C Rainfall 1 Min interpolated.dst	Storage Indic.	= 484



DRAINAGE AREA A 1-YR ROUTING

Hydrograph Report

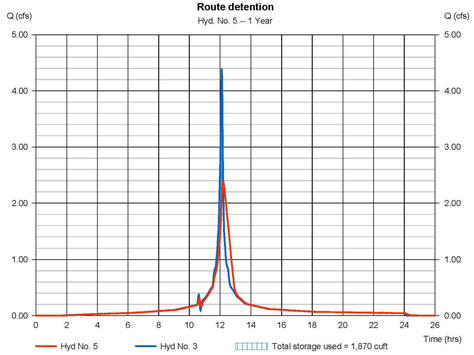
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Monday, 04 / 20 / 2020

Hyd. No. 5

Route detention

Hydrograph type	= Reservoir	Peak discharge	= 2.381 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.20 hrs
Time interval	= 1 min	Hyd. volume	= 13,866 cuft
Inflow hyd. No.	= 3 - Detained	Max. Elevation	= 380.71 ft
Reservoir name	= MC-3500	Max. Storage	= 1,870 cuft

Storage Indication method used.



NOTES

1. SEE SHEET C-0708 AND C-0708A FOR STORMTECH DETAILS.
2. SEE SHEET C-0703 FOR SITE STORMWATER QUANTITY COMPUTATIONS.

STORMWATER DETENTION SUMMARY

POST-DEVELOPMENT DRAINAGE AREA A 1-YR DISCHARGE = 3.95 CFS
(AFTER RUNOFF REDUCTION)

POST-DEVELOPMENT DRAINAGE AREA B 1-YEAR DISCHARGE = 4.40 CFS

POST-DEVELOPMENT DRAINAGE AREA B 1-YR DISCHARGE = 2.38 CFS
(AFTER DETENTION ROUTING)

TOTAL 1-YEAR DISCHARGE FROM SITE (AFTER RUNOFF REDUCTION & ROUTING) = 6.33 CFS

TOTAL ALLOWABLE DISCHARGE FROM SITE = 6.49 CFS
(FROM ENERGY BALANCE EQUATION SEE C-0702)

SINCE THE 1-YEAR POST DEVELOPMENT FLOW FROM THE SITE HAS BEEN REDUCED TO 6.33 CFS, WHICH IS LESS THAN THE MAXIMUM ALLOWABLE DISCHARGE FROM THE SITE OF 6.49 CFS (SEE SHEET C-0702), IT IS THE OPINION OF THE SUBMITTING ENGINEER THAT THE CHANNEL PROTECTION CONTROL REQUIREMENTS SET FORTH IN THE STATE AND COUNTY STORMWATER REGULATIONS HAVE BEEN SATISFIED. SEE THE NARRATIVE ON SHEET C-0702 FOR ADDITIONAL INFORMATION.

STORMWATER DETENTION SUMMARY

POST-DEVELOPMENT DRAINAGE AREA A 10-YR DISCHARGE = 8.10 CFS
(AFTER RUNOFF REDUCTION)

POST-DEVELOPMENT DRAINAGE AREA B 10-YEAR DISCHARGE = 8.27 CFS

POST-DEVELOPMENT DRAINAGE AREA B 10-YR DISCHARGE = 7.99 CFS
(AFTER DETENTION ROUTING)

TOTAL 10-YEAR DISCHARGE FROM SITE (AFTER RUNOFF REDUCTION & ROUTING) 16.09 CFS

TOTAL ALLOWABLE DISCHARGE FROM SITE = 16.11 CFS
(FROM ENERGY BALANCE EQUATION SEE C-0702)

SINCE THE PROVIDED DETENTION REDUCES THE 10-YEAR POST DEVELOPMENT FLOW FROM THE SITE TO 16.09 CFS, WHICH IS LESS THAN THE MAXIMUM ALLOWABLE DISCHARGE FROM THE SITE OF 16.11 CFS (SEE SHEET C-0702), IT IS THE OPINION OF THE SUBMITTING ENGINEER THAT THE FLOOD CONTROL REQUIREMENTS SET FORTH IN THE STATE AND COUNTY STORMWATER REGULATIONS HAVE BEEN SATISFIED. SEE THE NARRATIVE ON SHEET C-0702 FOR ADDITIONAL INFORMATION.

DRAINAGE AREA A 10-YR DISCHARGE RATE

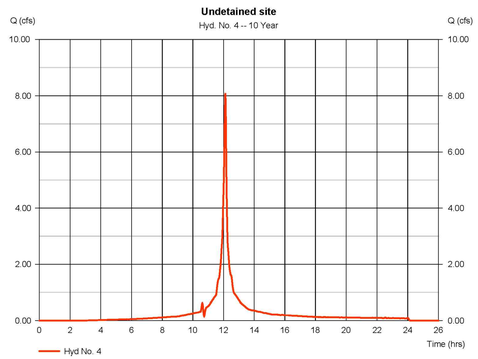
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Monday, 04 / 20 / 2020

Hyd. No. 4

Undetained site

Hydrograph type	= SCS Runoff	Peak discharge	= 8.097 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 24,379 cuft
Drainage area	= 1.600 ac	Curve number	= 93
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.87 in	Distribution	= Custom
Storm duration	= NOAA Type C Rainfall 1 Min interpolated.dst	Storage Indic.	= 484



DRAINAGE AREA B 10-YR DISCHARGE RATE

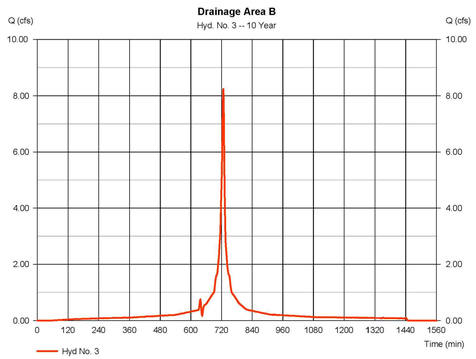
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Wednesday, 08 / 28 / 2019

Hyd. No. 3

Drainage Area B

Hydrograph type	= SCS Runoff	Peak discharge	= 8.269 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 26,884 cuft
Drainage area	= 1.550 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.87 in	Distribution	= Custom
Storm duration	= NOAA Type C Rainfall 1 Min interpolated.dst	Storage Indic.	= 484



DRAINAGE AREA A 10-YR ROUTING

Hydrograph Report

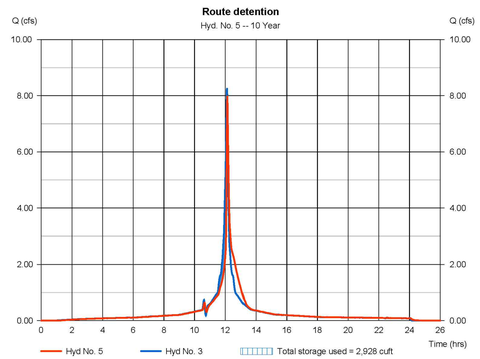
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Monday, 04 / 20 / 2020

Hyd. No. 5

Route detention

Hydrograph type	= Reservoir	Peak discharge	= 7.990 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 26,883 cuft
Inflow hyd. No.	= 3 - Detained	Max. Elevation	= 382.90 ft
Reservoir name	= MC-3500	Max. Storage	= 2,928 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Monday, 04 / 20 / 2020

Pond No. 3 - MC-3500

Pond Data

UG Chambers -Invert elev. = 378.50 ft, Rise x Span = 3.50 x 5.60 ft, Barrel Len = 121.89 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Encasement -Invert elev. = 377.75 ft, Width = 7.17 ft, Height = 5.50 ft, Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	377.75	n/a	0	0
0.55	378.30	n/a	192	192
1.10	378.85	n/a	335	528
1.65	379.40	n/a	414	941
2.20	379.95	n/a	404	1,346
2.75	380.50	n/a	388	1,734
3.30	381.05	n/a	363	2,097
3.85	381.60	n/a	324	2,421
4.40	382.15	n/a	244	2,664
4.95	382.70	n/a	192	2,857
5.50	383.25	n/a	192	3,049

Culvert / Orifice Structures

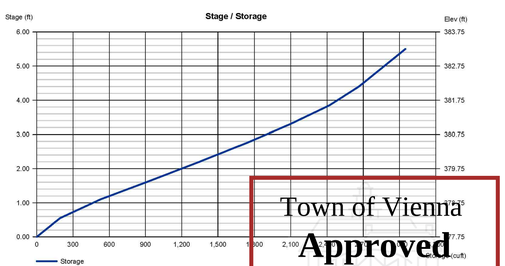
	[A]	[B]	[C]	[Prf/Rsr]
Rise (in)	= 18.00	8.00	0.00	0.00
Span (in)	= 18.00	8.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 377.74	377.75	0.00	0.00
Length (ft)	= 10.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.00	0.50	0.00	0.00
Crest El. (ft)	= 382.75	381.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Town of Vienna
Approved
06/09/2021

STORMWATER MANAGMENT HYDROGRAPHS

444 MAPLE AVENUE WEST

SITE PLAN

TOWN OF VIENNA, VIRGINIA

WALTER L. PHILLIPS INCORPORATED
Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com
ESTABLISHED 1945

DATE: SUB01: 9/13/2019, SUB02: 05/07/2020, SUB03: 4/19/2021, SUB04: 05/25/2021
SCALE: NONE
DRAWN: DL
CHECKED: KW

KAREN L. S. WHITE
Lic. No.041850
05/25/21
COMMONWEALTH OF VIRGINIA
LICENSED PROFESSIONAL ENGINEER

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	JIM CLARK 240-463-0124 JAMES.CLARK@ADS-PIPE.COM
ADS SALES REP:	TIM GIMPLE 540-235-4519 TIM.GIMPLE@ADS-PIPE.COM
PROJECT NO:	S128612

ADVANCED DRAINAGE SYSTEMS, INC.

SiteASSIST by StormTech
FOR STORMTECH INSTRUCTIONS, DOWNLOAD THE INSTALLATION APP

444 MAPLE AVENUE

VIENNA, VA

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT

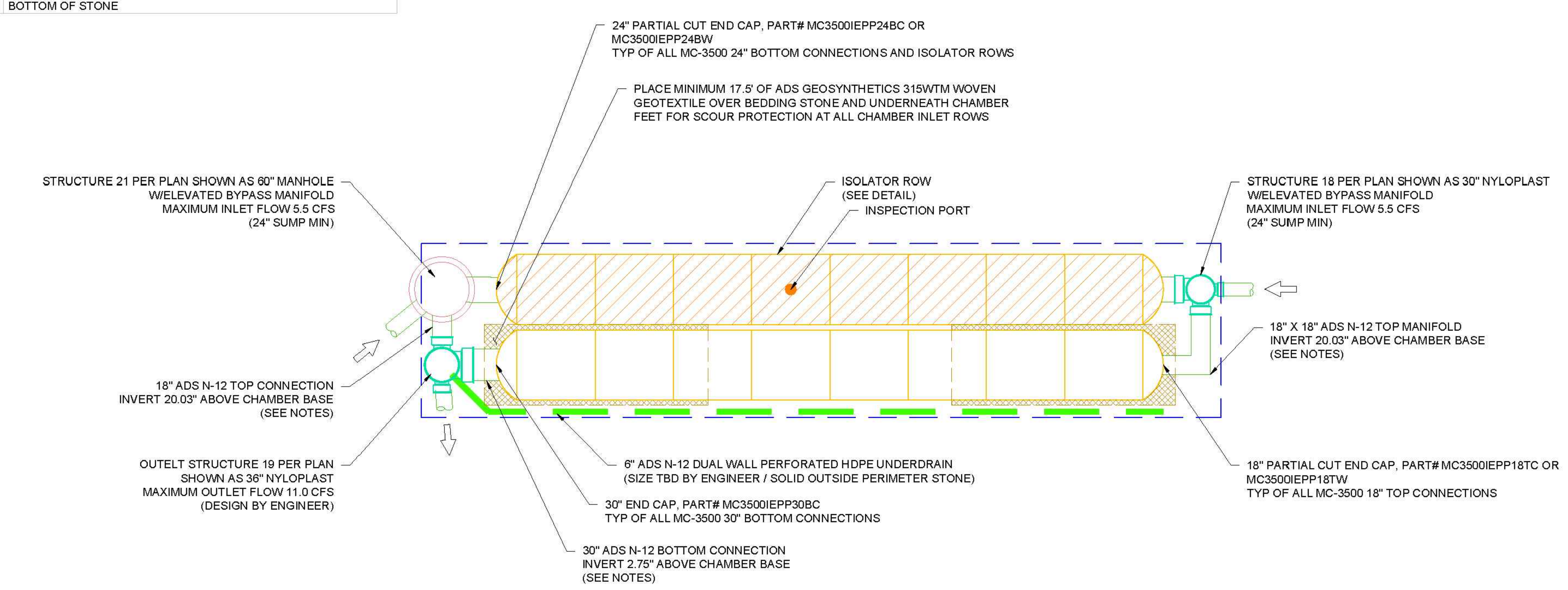
16	STORMTECH MC-3500 CHAMBERS
4	STORMTECH MC-3500 END CAPS
12	STONE ABOVE (in)
18	STONE BELOW (in)
40	% STONE VOID
3,659	**INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) ABOVE ELEVATION 377.75**
1.92	INSTALLED ISOLATOR ROW WQ FLOW (CFS)
1,167	SYSTEM AREA (ft^2)
178	SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS

390.25	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED)
384.25	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)
383.75	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC)
383.75	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)
383.75	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT)
383.25	TOP OF STONE
382.25	TOP OF MC-3500 CHAMBER
380.17	18" TOP MANIFOLD / CONNECTION INVERT
378.73	30" BOTTOM CONNECTION INVERT
378.67	24" ISOLATOR ROW CONNECTION INVERT
378.50	BOTTOM OF MC-3500 CHAMBER
377.75	UNDERDRAIN INVERT
377.00	BOTTOM OF STONE

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- THE SITE DESIGN ENGINEER MUST REVIEW THE PROXIMITY OF THE CHAMBERS TO THE RETAINING WALL AND CONSIDER EFFECTS OF POSSIBLE SATURATED SOILS ON THE RETAINING WALL'S INTEGRITY.

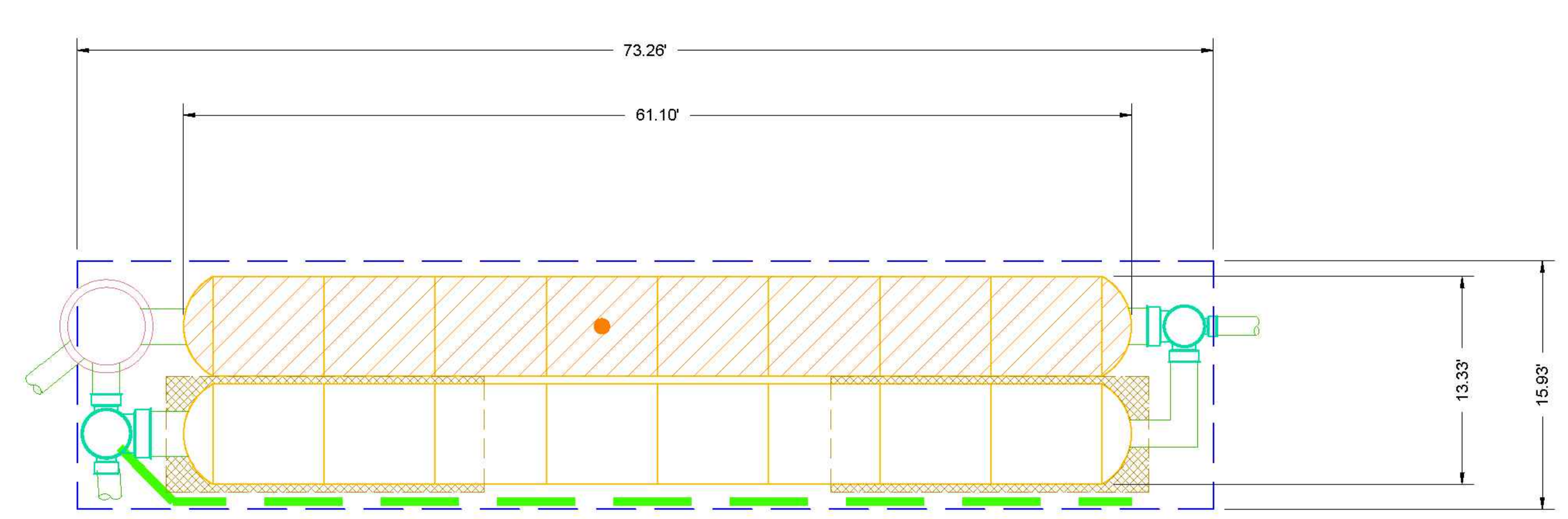


24" PARTIAL CUT END CAP, PART# MC3500IEPP24BC OR MC3500IEPP24BW
TYP OF ALL MC-3500 24" BOTTOM CONNECTIONS AND ISOLATOR ROWS
PLACE MINIMUM 17.5' OF ADS GEOSYNTHETICS 315WTM WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS
STRUCTURE 21 PER PLAN SHOWN AS 60" MANHOLE W/ELEVATED BYPASS MANIFOLD MAXIMUM INLET FLOW 5.5 CFS (24" SUMP MIN)
ISOLATOR ROW (SEE DETAIL)
INSPECTION PORT
STRUCTURE 18 PER PLAN SHOWN AS 30" NYLOPLAST W/ELEVATED BYPASS MANIFOLD MAXIMUM INLET FLOW 5.5 CFS (24" SUMP MIN)
18" X 18" ADS N-12 TOP MANIFOLD INVERT 20.03" ABOVE CHAMBER BASE (SEE NOTES)
18" ADS N-12 TOP CONNECTION INVERT 20.03" ABOVE CHAMBER BASE (SEE NOTES)
OUTELT STRUCTURE 19 PER PLAN SHOWN AS 36" NYLOPLAST MAXIMUM OUTLET FLOW 11.0 CFS (DESIGN BY ENGINEER)
6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN (SIZE TBD BY ENGINEER / SOLID OUTSIDE PERIMETER STONE)
30" END CAP, PART# MC3500IEPP30BC
TYP OF ALL MC-3500 30" BOTTOM CONNECTIONS
30" ADS N-12 BOTTOM CONNECTION INVERT 2.75" ABOVE CHAMBER BASE (SEE NOTES)
18" PARTIAL CUT END CAP, PART# MC3500IEPP18TC OR MC3500IEPP18TW
TYP OF ALL MC-3500 18" TOP CONNECTIONS

444 MAPLE AVENUE
VIENNA, VA

StormTech
4640 TRUEMAN BLVD
HILLIARD, OH 43026

SHEET 2 OF 7



444 MAPLE AVENUE
VIENNA, VA

StormTech
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HILLIARD, OH 43026

SHEET 3 OF 7

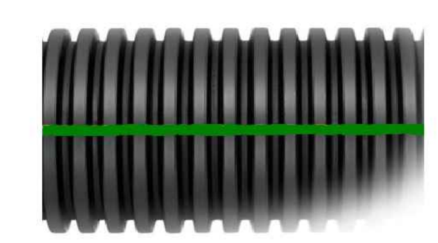
Project: **REV2 - 444 MAPLE AVE. - S128612**

StormTech
Detention • Retention • Water Quality
A division of ADS

Chamber Model -	MC-3500	
Units -	**Imperial**	Click Here for Metric
Number of Chambers -	16	
Number of End Caps -	4	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	377.00	ft
Amount of Stone Above Chambers -	12	in
Amount of Stone Below Chambers -	18	in
Amount of Stone Between Chambers -	6	in
Area of system -	1167	sf Min. Area - 858 sf min. area

☑ Include Perimeter Stone in Calculations

Height of System *(inches)*	Incremental Single Chamber *(cubic feet)*	Incremental Single End Cap *(cubic feet)*	Incremental Chambers *(cubic feet)*	Incremental End Cap *(cubic feet)*	Incremental Stone *(cubic feet)*	Incremental Ch, EC and Stone *(cubic feet)*	Cumulative System (cubic feet)	Elevation (feet)
75	0.00	0.00	0.00	0.00	38.90	38.90	4008.89	383.25
74	0.00	0.00	0.00	0.00	38.90	38.90	3969.99	383.17
73	0.00	0.00	0.00	0.00	38.90	38.90	3931.09	383.08
72	0.00	0.00	0.00	0.00	38.90	38.90	3892.19	383.00
71	0.00	0.00	0.00	0.00	38.90	38.90	3853.29	382.92
70	0.00	0.00	0.00	0.00	38.90	38.90	3814.39	382.83
69	0.00	0.00	0.00	0.00	38.90	38.90	3775.49	382.75
68	0.00	0.00	0.00	0.00	38.90	38.90	3736.59	382.67
67	0.00	0.00	0.00	0.00	38.90	38.90	3697.69	382.58
66	0.00	0.00	0.00	0.00	38.90	38.90	3658.79	382.50
65	0.00	0.00	0.00	0.00	38.90	38.90	3619.89	382.42
64	0.00	0.00	0.00	0.00	38.90	38.90	3580.99	382.33
63	0.06	0.00	0.93	0.00	38.53	39.46	3542.09	382.25
62	0.19	0.02	3.11	0.10	37.62	40.82	3502.63	382.17
61	0.29	0.04	4.70	0.15	36.96	41.81	3461.81	382.08
60	0.40	0.05	6.46	0.21	36.23	42.90	3420.00	382.00
59	0.69	0.07	10.99	0.27	34.39	45.66	3377.10	381.92
58	1.03	0.09	16.45	0.35	32.18	48.98	3331.44	381.83
57	1.25	0.11	19.99	0.43	30.73	51.15	3282.46	381.75
56	1.42	0.13	22.76	0.51	29.60	52.86	3231.30	381.67
55	1.57	0.14	25.17	0.58	28.60	54.35	3178.45	381.58
54	1.71	0.16	27.31	0.65	27.71	55.68	3124.10	381.50
53	1.83	0.18	29.26	0.73	26.91	56.89	3068.42	381.42
52	1.94	0.20	31.00	0.80	26.18	57.98	3011.53	381.33
51	2.04	0.22	32.65	0.87	25.49	59.02	2953.54	381.25
50	2.13	0.23	34.16	0.94	24.86	59.96	2894.53	381.17
49	2.22	0.25	35.59	1.00	24.26	60.85	2834.57	381.08
48	2.31	0.27	36.91	1.06	23.71	61.68	2773.72	381.00
47	2.38	0.28	38.16	1.12	23.19	62.47	2712.04	380.92
46	2.46	0.29	39.35	1.18	22.69	63.21	2649.57	380.83
45	2.53	0.31	40.45	1.23	22.23	63.91	2586.36	380.75
44	2.59	0.32	41.50	1.28	21.79	64.57	2522.45	380.67
43	2.66	0.33	42.50	1.34	21.37	65.20	2457.88	380.58
42	2.72	0.35	43.44	1.39	20.97	65.80	2392.68	380.50
41	2.77	0.36	44.34	1.44	20.59	66.37	2326.88	380.42
40	2.82	0.37	45.19	1.49	20.23	66.91	2260.51	380.33
39	2.88	0.38	46.01	1.54	19.88	67.43	2193.60	380.25
38	2.92	0.40	46.79	1.58	19.55	67.92	2126.17	380.17
37	2.97	0.41	47.52	1.63	19.24	68.39	2058.25	380.08
36	3.01	0.42	48.20	1.67	18.95	68.82	1989.86	380.00
35	3.05	0.43	48.85	1.72	18.67	69.24	1921.04	379.92
34	3.09	0.44	49.51	1.76	18.39	69.66	1851.80	379.83
33	3.13	0.45	50.09	1.80	18.14	70.04	1782.13	379.75
32	3.17	0.46	50.65	1.84	17.90	70.40	1712.10	379.67
31	3.20	0.47	51.19	1.88	17.67	70.74	1641.70	379.58
30	3.23	0.48	51.70	1.92	17.45	71.07	1570.96	379.50
29	3.26	0.49	52.18	1.96	17.24	71.38	1499.89	379.42
28	3.29	0.50	52.64	1.99	17.05	71.68	1428.50	379.33
27	3.32	0.51	53.09	2.03	16.85	71.97	1356.82	379.25
26	3.34	0.51	53.51	2.06	16.67	72.24	1284.85	379.17
25	3.37	0.52	53.90	2.09	16.51	72.49	1212.61	379.08
24	3.39	0.53	54.28	2.12	16.34	72.74	1140.12	379.00
23	3.41	0.54	54.63	2.15	16.19	72.97	1067.38	378.92
22	3.44	0.54	54.99	2.17	16.03	73.20	994.42	378.83
21	3.46	0.55	55.32	2.20	15.89	73.41	921.22	378.75
20	3.48	0.56	55.66	2.22	15.75	73.63	847.80	378.67
19	3.51	0.59	56.08	2.38	15.52	73.98	774.18	378.58
18	0.00	0.00	0.00	0.00	38.90	38.90	700.20	378.50
17	0.00	0.00	0.00	0.00	38.90	38.90	661.30	378.42
16	0.00	0.00	0.00	0.00	38.90	38.90	622.40	378.33
15	0.00	0.00	0.00	0.00	38.90	38.90	583.50	378.25
14	0.00	0.00	0.00	0.00	38.90	38.90	544.60	378.17
13	0.00	0.00	0.00	0.00	38.90	38.90	505.70	378.08
12	0.00	0.00	0.00	0.00	38.90	38.90	466.80	378.00
11	0.00	0.00	0.00	0.00	38.90	38.90	427.90	377.92
10	0.00	0.00	0.00	0.00	38.90	38.90	389.00	377.83
9	0.00	0.00	0.00	0.00	38.90	38.90	350.10	377.75
8	0.00	0.00	0.00	0.00	38.90	38.90	311.20	377.67
7	0.00	0.00	0.00	0.00	38.90	38.90	272.30	377.58
6	0.00	0.00	0.00	0.00	38.90	38.90	233.40	377.50
5	0.00	0.00	0.00	0.00	38.90	38.90	194.50	377.42
4	0.00	0.00	0.00	0.00	38.90	38.90	155.60	377.33
3	0.00	0.00	0.00	0.00	38.90	38.90	116.70	377.25
2	0.00	0.00	0.00	0.00	38.90	38.90	77.80	377.17
1	0.00	0.00	0.00	0.00	38.90	38.90	38.90	377.08



THE MOST ADVANCED NAME IN DRAINAGE SYSTEMS

ADS

April 27, 2020

Dan Leber
Walter L. Phillips
Falls Church, VA

Re: 444 Maple Avenue Stormtech Review Letter

Mr. Leber:

Advanced Drainage Systems has reviewed the plans for this project with ADS Detail REV2 dated 4.24.20. We found it meets the fill height min/max requirements for the MC3500 Chambers in accordance with AASHTO LFRD 12.12 and required by Prince William County. The Chambers have also been designed in accordance with ASTM F2787, "Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers"

The Chambers supplied for this project shall meet **ASTM F2418-16** "Standard Specification for Polypropylene Corrugated Wall Stormwater Collection Chambers", with Designation SS.

We have also reviewed the Isolator Rows Water Quality and it is also properly sized to treat the 1" WQv.

Advanced Drainage Systems will conduct a pre-construction meeting prior to installation of all ADS Detention system.

Thank you for using Advanced Drainage Systems.

Sincerely,

James M. Clark, P.E.
Sales Engineer

ADVANCED DRAINAGE SYSTEMS, INC., 4640 TRUEMAN BLVD., HILLIARD, OH 43026 PHONE: 800/733-7473
E-mail: info@ads-pipe.com Web site: www. ads-pipe.com

Town of Vienna
Approved
06/09/2021

WALTER L. PHILLIPS
INCORPORATED
ESTABLISHED 1945
Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

SCALE: NONE
DATE: SUB01: 9/13/2019, SUB02: 05/07/2020, SUB03: 4/19/2021
SUB04: 05/25/2021
DRAWN: DL
CHECKED: KW

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
05/25/21
PROFESSIONAL ENGINEER

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

REVISION APPROVED BY

STORMTECH DETAIL

444 MAPLE AVENUE WEST

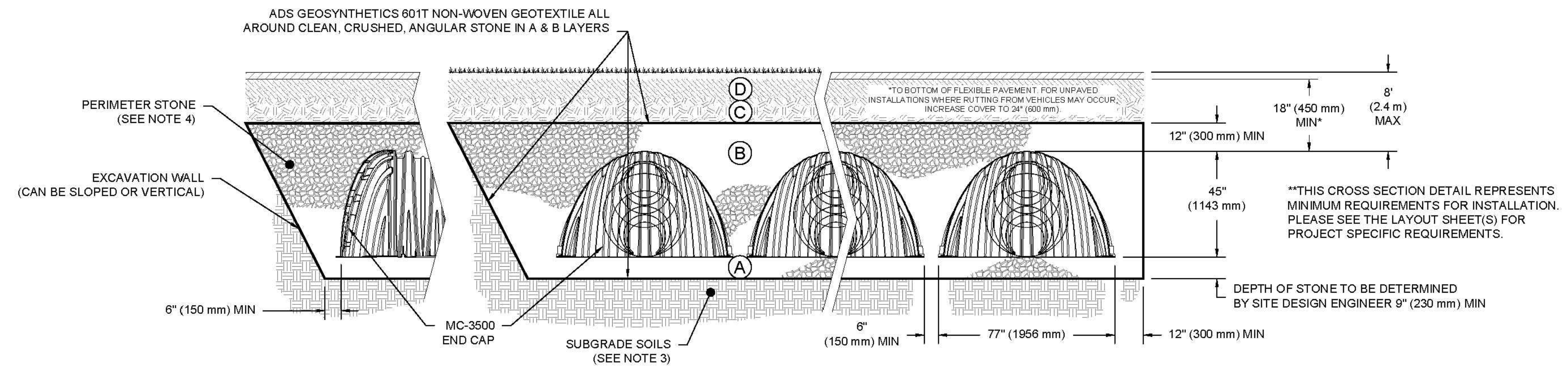
SITE PLAN

TOWN OF VIENNA, VIRGINIA

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



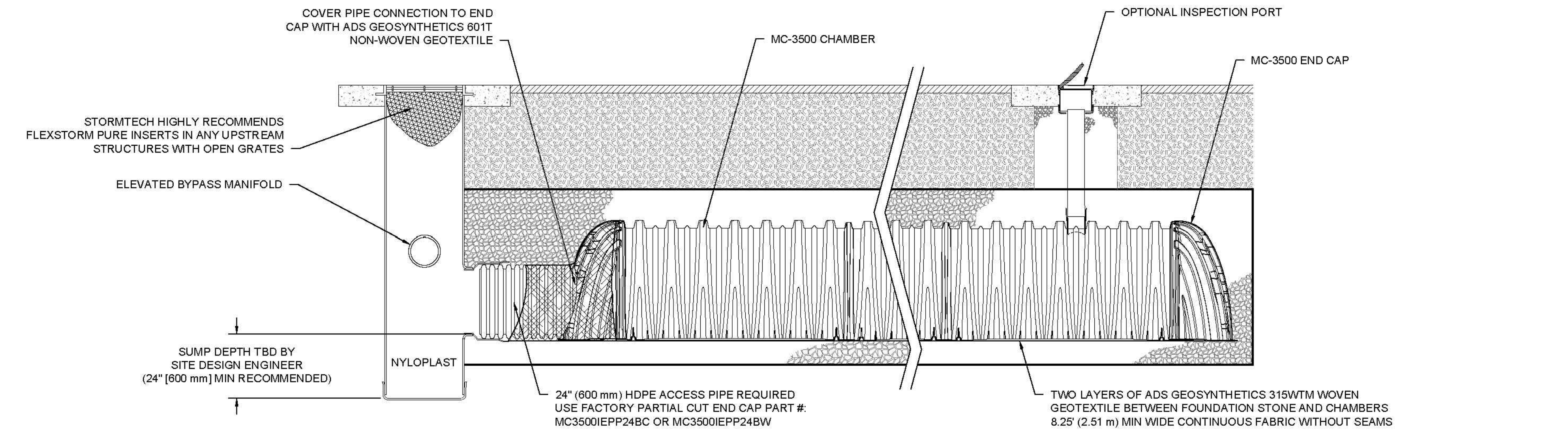
NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

444 MAPLE AVENUE, VIENNA, VA — DATE: 4-15-19 — DRAWN: RJW — PROJECT #: S126612 — CHECKED: ALS

StormTech — ADS, 4640 TRUEMAN BLVD, HILLIARD, OH 43026

SHEET 4 OF 7



MC-3500 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

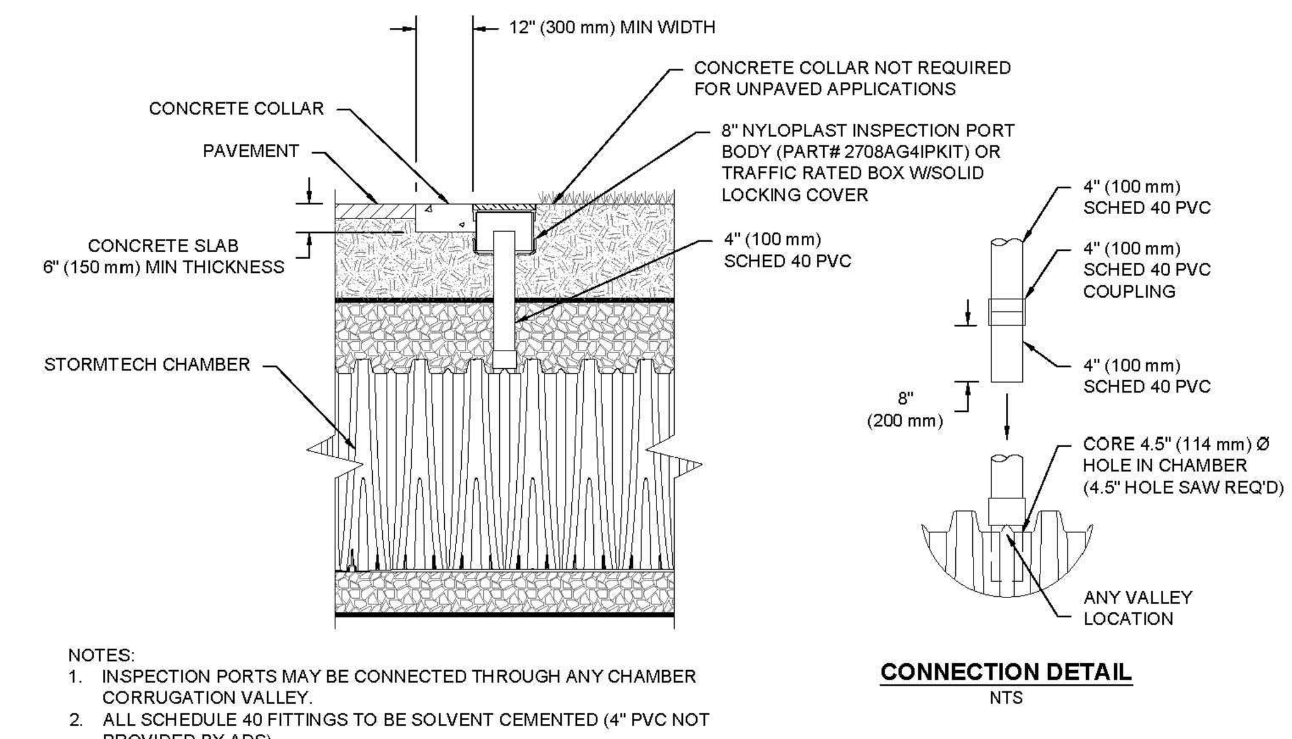
STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



NOTES:
1. INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.
2. ALL SCHEDULE 40 FITTINGS TO BE SOLVENT CEMENTED (4" PVC NOT PROVIDED BY ADS).

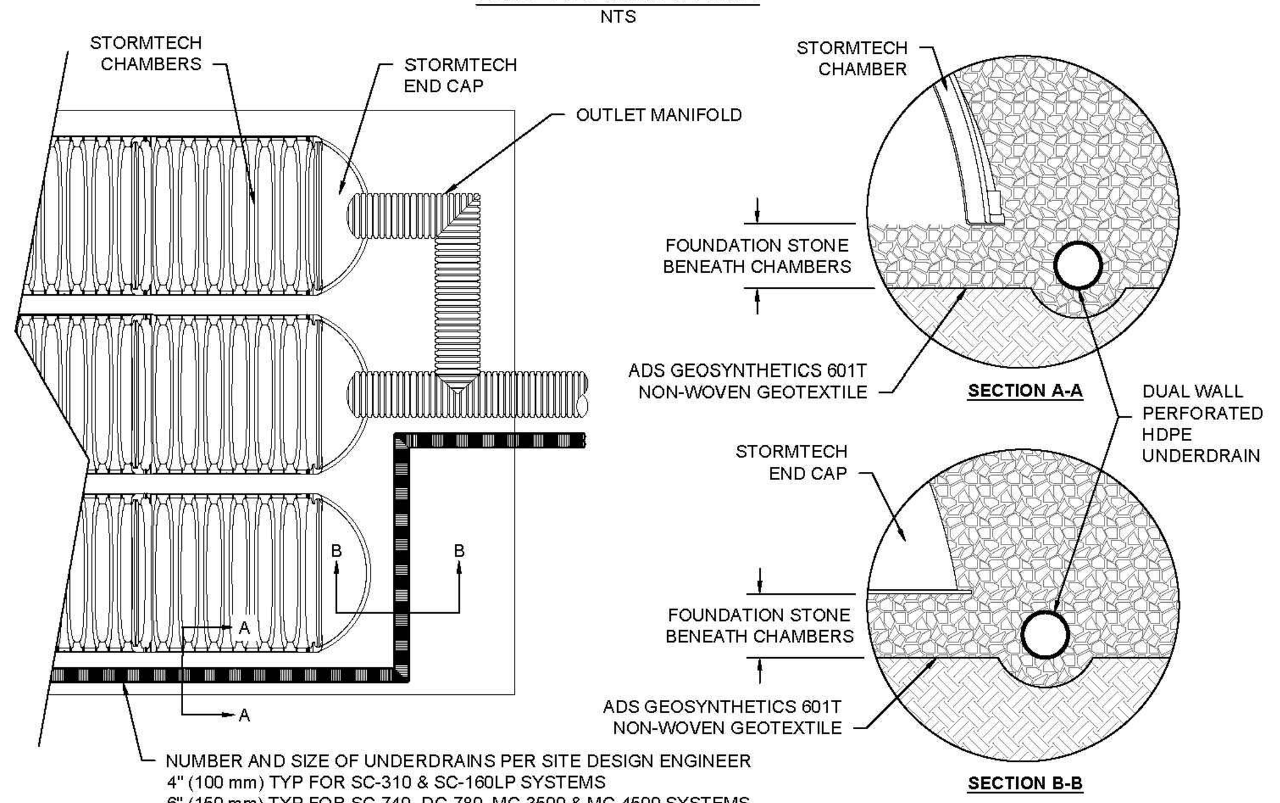
4" PVC INSPECTION PORT DETAIL
NTS

444 MAPLE AVENUE, VIENNA, VA — DATE: 4-15-19 — DRAWN: RJW — PROJECT #: S126612 — CHECKED: ALS

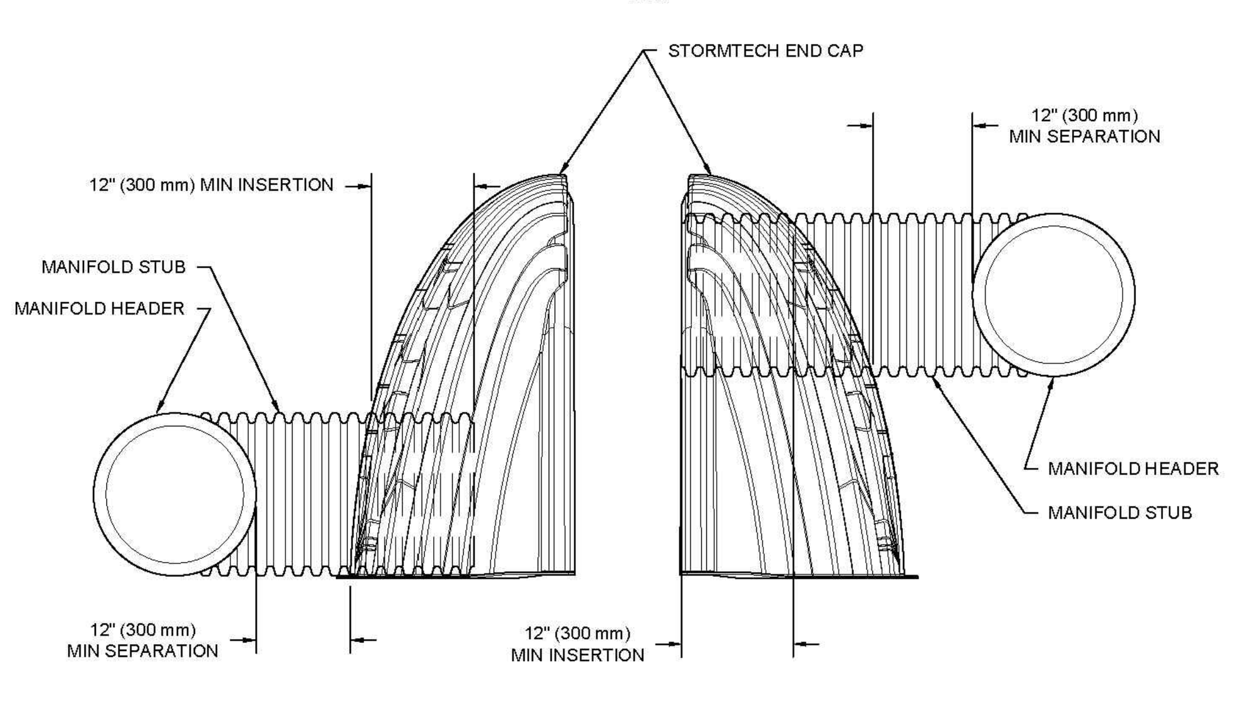
StormTech — ADS, 4640 TRUEMAN BLVD, HILLIARD, OH 43026

SHEET 5 OF 7

UNDERDRAIN DETAIL
NTS

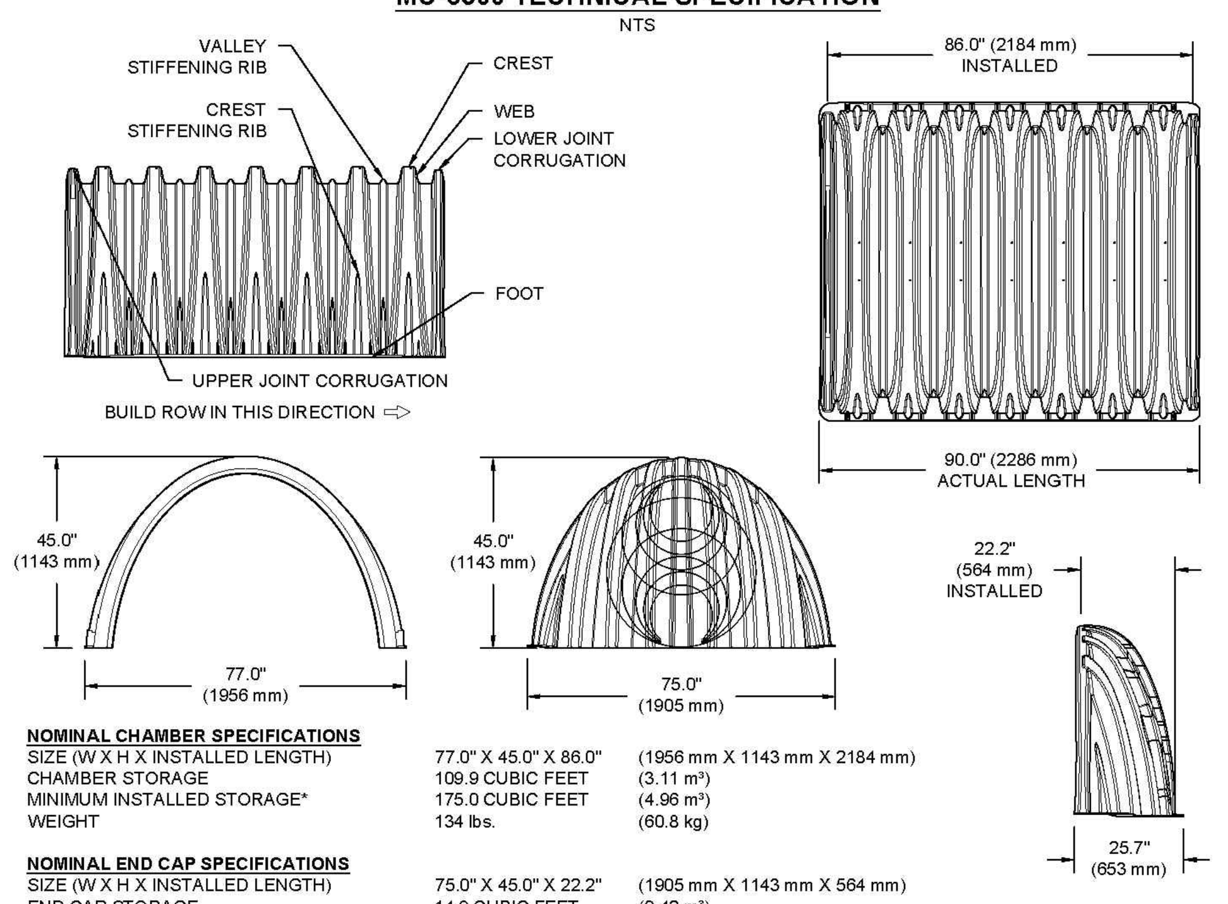


MC-SERIES END CAP INSERTION DETAIL
NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

MC-3500 TECHNICAL SPECIFICATION
NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m^3)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m^3)
WEIGHT	134 lbs.	(60.8 kg)

NOMINAL END CAP SPECIFICATIONS

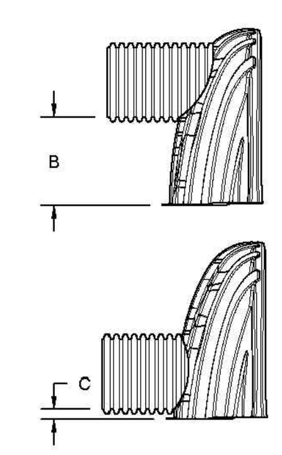
SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m^3)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m^3)
WEIGHT	49 lbs.	(22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" (152 mm) STONE BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP18BW			
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP24BW			
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



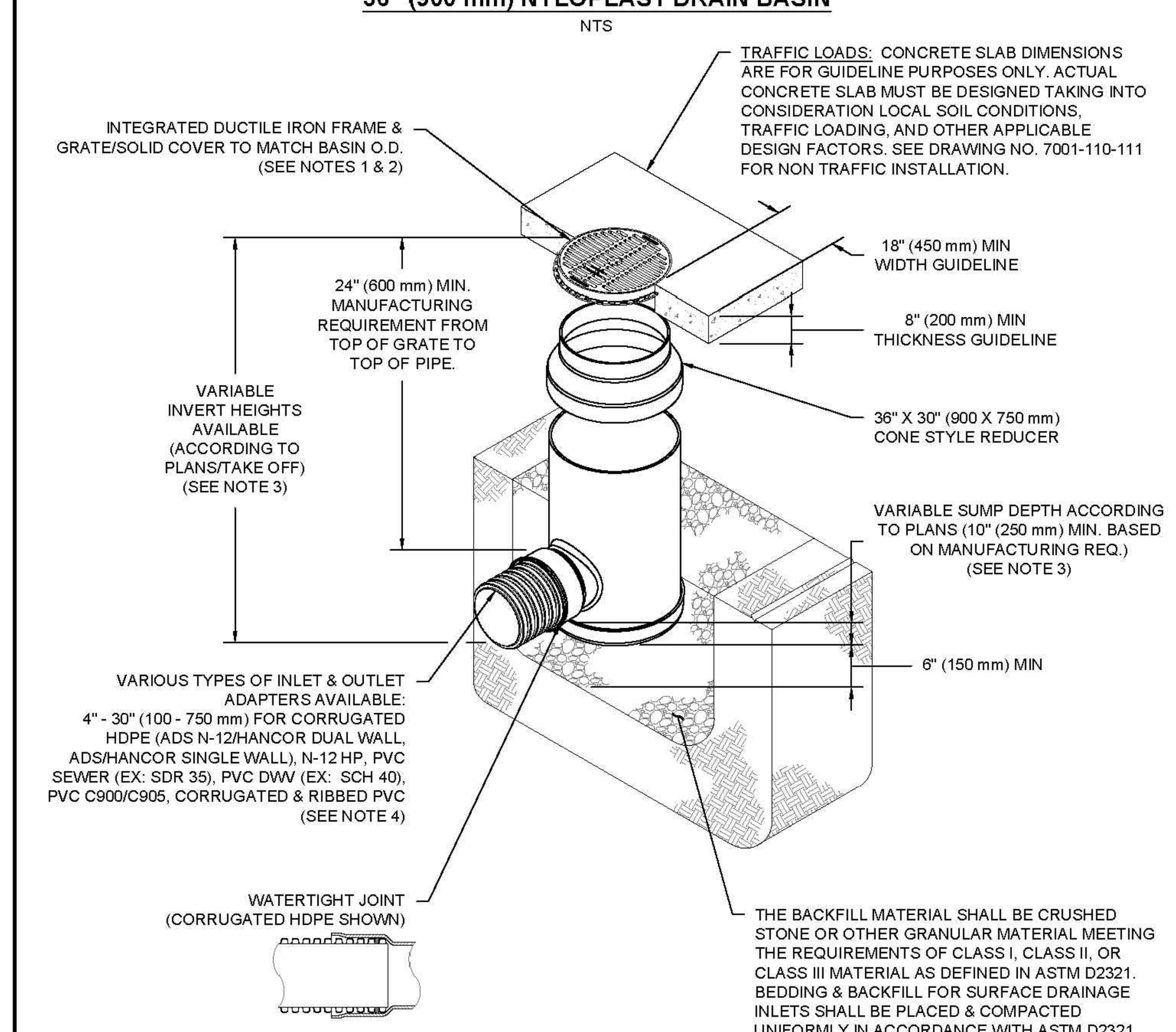
CUSTOM PARTIAL CUT INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

444 MAPLE AVENUE, VIENNA, VA — DATE: 4-15-19 — DRAWN: RJW — PROJECT #: S126612 — CHECKED: ALS

StormTech — ADS, ADVANCED DRAINAGE SYSTEMS, INC., 4640 TRUEMAN BLVD, HILLIARD, OH 43026

SHEET 6 OF 7

36" (900 mm) NYLOPLAST DRAIN BASIN
NTS

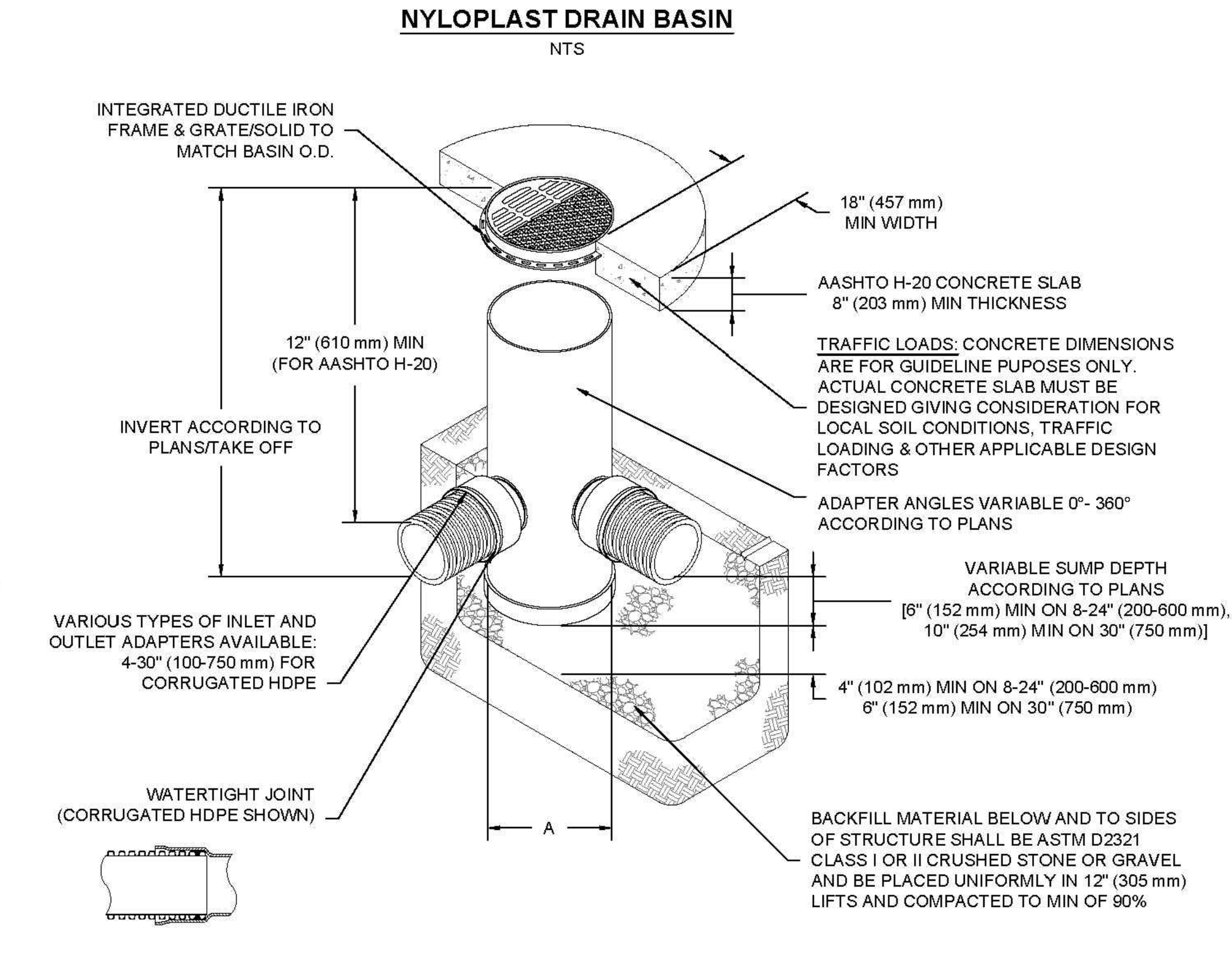


NOTES

1. GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
2. FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" (2.13 m) DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065.
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP, & PVC SEWER.
5. ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.

GRATE OPTION	LOAD RATING	PART #	DWG #
PEDESTRIAN	MEETS H-20	3099CGP	7001-110-220
STANDARD	MEETS H-20	3099CGS	7001-110-221
SOLID COVER	MEETS H-20	3099CGC	7001-110-222
DOME	N/A	3099CGD	7001-110-223

NYLOPLAST DRAIN BASIN
NTS



NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

444 MAPLE AVENUE, VIENNA, VA — DATE: 4-15-19 — DRAWN: RJW — PROJECT #: S126612 — CHECKED: ALS

Nyloplast — ADS, 4640 TRUEMAN BLVD, HILLIARD, OH 43026

SHEET 7 OF 7

Town of Vienna
Approved
06/09/2021

STORMTECH DETAIL

444 MAPLE AVENUE WEST

SITE PLAN

TOWN OF VIENNA, VIRGINIA

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

COMMONWEALTH OF VIRGINIA — KAREN L. S. WHITE, Lic. No.041850 — 05/25/21 — PROFESSIONAL ENGINEER

WALTER L. PHILLIPS INCORPORATED — ESTABLISHED 1945
Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

SCALE: NONE — DATE: SUB01: 9/13/2019, SUB02: 05/07/2020, SUB03: 4/19/2021, SUB04: 05/25/2021 — DRAWN: DL — CHECKED: KW

STORM SEWER INLET COMPUTATIONS

INLET																													SAG INLETS ONLY			
NUMBER	TYPE	LENGTH (FT.)	STATION	DRAINAGE AREA (AC.)	C	CA	Σ CA	intensity	Q INCR. (CFS)	Q_b, CARRYOVER (CFS)	Qt, GUTTERFLOW	S, GUTTER SLOPE (FT/FT)	Sx, CROSS SLOPE (FT/FT)	T, (SPREAD)	W (FT)	W/T	Sw (FT/FT)	Sw/Sx	Eo (App. 9C-8)	a = 12W(SW-SX) + LOCAL DEPRESSION	S' w= a/(12W)	Se= Sx + S' w(Eo) (FT/FT)	COMPUTED LENGTH, Lt, (FT) (App. 9C-17)	L, SPECIFIED LENGTH (FT)	L/Lt	E (App. 9C-18)	Q_i, INTERCEPTED (CFS)	Q_b, CARRYOVER (CFS)	d (FT)	h (FT)	d/h	T, SPREAD @ SAG (FT)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
10	DI-2A	2	0+00	0.04	0.87	0.03	0.03	6.78	0.24	0.00	0.24	0.01	0.03	1.53	2.00	1.31	0.08	2.69	-	-	-	-	-	2	-	-	0.24	0.00	0.08	0.46	0.1747	2.58
11	DI-2A	2	0+00	0.03	0.9	0.03	0.03	6.78	0.18	0.00	0.18	0.02	0.04	1.27	2.00	1.58	0.08	2.38	-	-	-	-	-	2	-	-	0.18	0.00	0.08	0.46	0.1747	2.29
12	DI-2A	2	0+00	0.05	0.86	0.04	0.04	6.78	0.29	0.00	0.29	0.03	0.01	1.37	2.00	1.46	0.08	6.41	-	-	-	-	-	2	-	-	0.29	0.00	0.08	0.46	0.1747	6.15
13	DI-2A	2	0+00	0.1	0.85	0.09	0.09	6.78	0.58	0.00	0.58	0.02	0.02	2.00	2.00	1.00	0.08	3.79	-	-	-	-	-	2	-	-	0.58	0.00	0.08	0.46	0.17	3.64
14	DI-2A	2	0+00	0.09	0.89	0.08	0.08	6.78	0.54	0.00	0.54	0.02	0.02	1.95	2.00	1.03	0.08	4.90	-	-	-	-	-	2	-	-	0.54	0.00	0.08	0.46	0.1747	4.71
15	DI-2A	2	0+00	0.05	0.9	0.05	0.05	6.78	0.31	0.00	0.31	0.03	0.01	1.45	2.00	1.38	0.08	6.41	-	-	-	-	-	2	-	-	0.31	0.00	0.08	0.46	0.1747	6.15
16	DI-2B	4	0+00	0.25	0.85	0.21	0.21	6.78	1.44	0.00	1.44	0.02	0.02	5.15	2.00	0.39	0.08	4.90	-	-	-	-	-	4	-	-	1.44	0.00	0.08	0.46	0.1747	4.71

HGL COMPUTATIONS

Inlet Station	Structure Type (M,I)	Outlet Water Surface Elevation	D_o (in)	Q_o	L_o	Sf_o	H_f	Junction Loss V_o	H_o	D_i (in)	Q_i	V_i	Q_iV_i	$V_i^2/2g$	H_i	Angle (°)	H_{delta}	Ht	1.3Ht	.5(Ht)	Final H	Inlet Water Surface Elevation	Max Water Surface Elevation	Difference	Fix?
1*	*	2*	3*	4*	5*	6	7	8	9	*	10*	11	12		13	14*	15	16	17	18	19	20	*		
18	M	382.93	24	4.14	3	0.000	0.00	1.32	0.01	15	4.14	3.37	13.93	0.18	0.06		---	0.07	---	0.03	0.04	382.97	386.15	3.18	OK
17	M	384.00	15	4.14	90	0.004	0.37	3.37	0.04	15	4.14	3.37	13.93	0.18	0.06	90	0.12	0.23	---	0.11	0.48	384.48	386.92	2.44	OK
			#N/A	#N/A	#N/A	---	---	---	---	#N/A	#N/A	---	---	---	---		---	---	---	---	---	---		---	---
21	M	382.93	24	4.13	5	0.000	0.00	1.31	0.01	15	4.13	3.37	13.90	0.18	0.06		---	0.07	---	0.03	0.04	382.97	385.40	2.43	OK
22	M	383.00	15	4.13	9	0.004	0.04	3.37	0.04	15	4.14	3.37	13.93	0.18	0.06	50	0.08	0.19	---	0.09	0.13	383.13	385.70	2.57	OK
23	M	383.50	15	4.14	68	0.004	0.28	3.37	0.04	15	4.14	3.37	13.93	0.18	0.06	90	0.12	0.23	---	0.11	0.39	383.89	385.85	1.96	OK
4	M	379.50	36	63.24	107	0.009	0.96	8.95	0.31	36	55.25	7.82	431.78	0.95	0.33		---	0.64	---	0.32	1.28	380.78	384.90	4.12	OK
19	M	380.78	18	7.99	16	0.006	0.09	4.52	0.08	#N/A	#N/A	---	---	---	---		---	0.08	---	0.04	0.13	380.91	385.35	4.44	OK
			#N/A	#N/A	#N/A	---	---	---	---	#N/A	#N/A	---	---	---	---		---	---	---	---	---	---		---	---
10	I	379.30	15	3.20	110	0.002	0.27	2.61	0.03	12	2.99	3.81	11.39	0.23	0.08		---	0.11	0.14	0.07	0.34	379.64	385.10	5.46	OK
11	I	379.64	12	2.99	15	0.007	0.10	3.81	0.06	12	2.84	3.62	10.27	0.20	0.07		---	0.13	0.17	0.08	0.19	379.83	385.00	5.17	OK
12	I	380.20	12	2.84	61	0.006	0.39	3.62	0.05	12	2.58	3.29	8.48	0.17	0.06		---	0.11	0.14	0.07	0.46	380.66	384.60	3.94	OK
13	I	380.66	12	2.58	15	0.005	0.08	3.29	0.04	12	2.06	2.62	5.41	0.11	0.04		---	0.08	0.10	0.05	0.13	380.79	384.40	3.61	OK
14	I	381.5	12	2.06	84	0.003	0.28	2.62	0.03	12	1.59	2.03	3.22	0.06	0.02		---	0.05	0.06	0.03	0.31	381.81	385.7	3.89	OK
15	I	382.50	12	1.59	84	0.002	0.17	2.03	0.02	12	1.33	1.69	2.25	0.04	0.02		---	0.03	0.04	0.02	0.19	382.69	386.90	4.21	OK
16	I	383.40	12	1.33	79	0.001	0.11	1.69	0.01	#N/A	#N/A	---	---	---	---		---	0.01	0.01	0.01	0.12	383.52	387.20	3.68	OK
			#N/A	#N/A	#N/A	---	---	---	---	#N/A	#N/A	---	---	---	---		---	---	---	---	---	---		---	---
5	M	378.10	36	63.24	89	0.009	0.80	8.95	0.31	36	63.24	8.95	565.70	1.24	0.43	15	0.12	0.87	---	0.43	1.24	379.34	384.90	5.56	OK
4	M	379.50	36	63.24	107	0.009	0.96	8.95	0.31	36	55.25	7.82	431.78	0.95	0.33		---	0.64	---	0.32	1.28	380.78	386.20	5.42	OK
3	M	380.85	36	55.25	124	0.007	0.85	7.82	0.24	36	55.25	7.82	431.78	0.95	0.33		---	0.57	---	0.28	1.14	381.99	386.35	4.36	OK
2	M	382.25	36	55.25	130	0.007	0.89	7.82	0.24	36	50.08	7.08	354.79	0.78	0.27	90	0.55	1.06	---	0.53	1.42	383.67	387.70	4.03	OK
1	M	384.65	36	50.08	227	0.006	1.28	7.08	0.19	24	17.74	5.65	100.16	0.50	0.17	90	0.35	0.71	---	0.36	1.64	386.29	393.20	6.91	OK
1603	I	386.29	24	17.74	126	0.006	0.77	5.65	0.12	#N/A	#N/A	---	---	---	---		---	0.12	---	0.06	0.84	387.13	391.08	3.95	OK

EX. STORM SEWER COMPUTATIONS

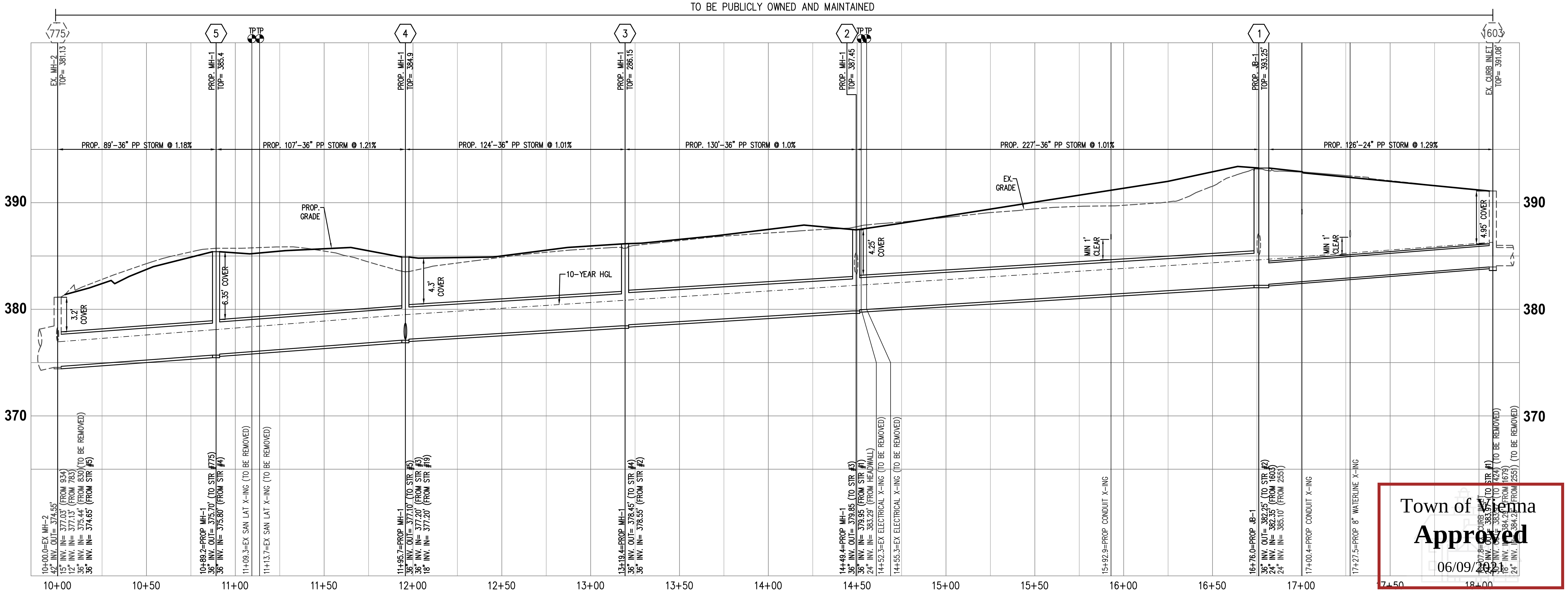
FROM POINT	TO POINT	AREA "A" ACRES	AREA ACCUM-ULATED	CURVE NUMBER CN	RUNOFF Q INCRE-MENT C.F.S.	RUNOFF Q ACCUM-ULATED C.F.S.	INVERT ELEV'S UPPER END	INVERT ELEV'S LOWER END	LENGTH FT.	SLOPE FT./FT.	MANNING'S 'n'	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	NORMAL DEPTH IN.	CAPA-CITY %
1603	1424	0.33	11.96	85	1.76	49.92	383.97	382.71	188	0.0067	0.013	30	33.53				148.9%
1424	1365	0.52	12.48	98	2.77	52.69	382.39	380.96	44	0.0326	0.013	30	73.84	16.41	2.68	18.67	71.4%
1388	1365	0.29	13.97	98	1.55	6.72	382.77	380.87	125	0.0152	0.013	24	27.80	7.31	17.11	8.01	24.2%
1365	830	0.22	14.19	98	1.17	60.59	380.12	378.14	123	0.0161	0.013	33	66.98	12.82	9.59	24.49	90.5%
830	775	0.80	14.99	98	4.27	64.85	377.49	375.44	195	0.0105	0.013	36	68.28	11.04	17.67	27.89	95.0%

PROP. STORM SEWER COMPUTATIONS

FROM POINT	TO POINT	AREA "A" ACRES	AREA ACCUM-ULATED	CURVE NUMBER CN	RUNOFF Q INCRE-MENT C.F.S.	RUNOFF Q ACCUM-ULATED C.F.S.	INVERT ELEV'S UPPER END	INVERT ELEV'S LOWER END	LENGTH FT.	SLOPE FT./FT.	MANNING'S 'n'	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	NORMAL DEPTH IN.	CAPA-CITY %
1603	1	0.36	4.12	85	1.92	17.74	383.97	382.35	126	0.0129	0.013	24	25.58	8.83	14.27	14.65	69.4%
1	2	0.00	11.63	-	0.00	50.08	382.25	379.95	227	0.0101	0.013	36	67.03	10.43	21.75	23.13	74.7%
2	3	1.20	12.83	85	5.17	55.25	379.85	378.55	130	0.0100	0.013	36	66.59	10.57	12.30	24.94	83.0%
3	4	0.00	12.83	-	0.00	55.25	378.45	377.20	124	0.0101	0.013	36	66.86	10.61	11.69	24.87	82.6%
4	5	1.55	14.38	-	7.99	63.24	377.10	375.80	107	0.0121	0.013	36	73.40	11.72	9.13	25.68	86.1%
5	775	0.00	14.38	-	0.00	63.24	375.70	374.65	89	0.0118	0.013	36	72.33	11.58	7.69	25.98	87.4%
RD	17	0.78	0.78	98	4.14	4.14	383.50	383.10	6	0.0727	0.013	15	17.34	11.65	0.47	4.97	23.8%
17	18	0.00	0.78	-	0.00	4.14	383.00	379.65	90	0.0372	0.013	15	12.41	9.14	9.84	5.94	33.3%
18	20	0.00	0.78	-	0.00	4.14	378.60	378.50	3	0.0333	0.013	24	41.18	8.43	0.36	5.12	10.0%
19	4	0.00	0.78	-	0.00	7.99	377.70	377.20	16	0.0313	0.013	18	18.50	10.13	1.58	8.24	43.2%
RD	23	0.78	0.78	98	4.14	4.14	383.00	382.60	11	0.0370	0.013	15	12.37	9.12	1.19	5.95	33.4%
23	22	0.00	0.78	-	0.00	4.14	382.50	380.00	68	0.0367	0.013	15	12.32	9.09	7.49	5.96	33.6%
22	21	0.00	0.78	-	0.00	4.13	379.90	379.65	9	0.0287	0.013	15	10.90	8.31	1.05	6.38	37.9%
21	20	0.00	0.78	-	0.00	4.13	378.60	378.50	5	0.0200	0.013	24	31.90	7.03	0.71	5.82	12.9%
16	15	0.25	0.25	97	1.33	1.33	382.60	381.80	79	0.0101	0.013	12	3.57	4.23	18.66	5.05	37.3%
15	14	0.05	0.30	95	0.26	1.59	381.70	380.80	84	0.0107	0.013	12	3.67	4.53	18.54	5.50	43.3%
14	13	0.09	0.39	95	0.47	2.06	380.70	379.80	84	0.0107	0.013	12	3.67	4.83	17.38	6.40	56.2%
13	12	0.10	0.49	95	0.52	2.58	379.70	379.50	15	0.0133	0.013	12	4.09	5.54	2.71	6.88	63.0%
12	11	0.05	0.54	96	0.26	2.84	379.40	378.70	61	0.0115	0.013	12	3.80	5.34	11.43	7.70	74.8%
11	10	0.03	0.57	94	0.15	2.99	378.60	378.40	15	0.0138	0.013	12	4.16	5.80	2.50	7.49	71.8%
10	783	0.04	0.61	95	0.21	3.20	378.30	377.63	110	0.0061	0.013	15	5.02	4.36	25.23	8.66	63.8%

NOTE:

CONTRACTOR TO USE POLYPROPYLENE PIPE (PP) MEETING VDOT SPEC. PC-1. USE ADS HP STORM OR EQUIVALENT.



SCALE: HOR. 1" = 30'
VERT. 1" = 5'

30 0 15 30 60 120
(IN FEET)
1 INCH = 30'

Town of Vienna
Approved
06/09/2021

STORM SEWER PROFILES

444 MAPLE AVENUE WEST

SITE PLAN

TOWN OF VIENNA, VIRGINIA

Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

WALTER L. PHILLIPS
INCORPORATED
ESTABLISHED 1945

DATE: SUB01: 9/13/2019, SUB02: 05/07/2020, SUB03: 4/19/2021
SUB04: 05/25/2021

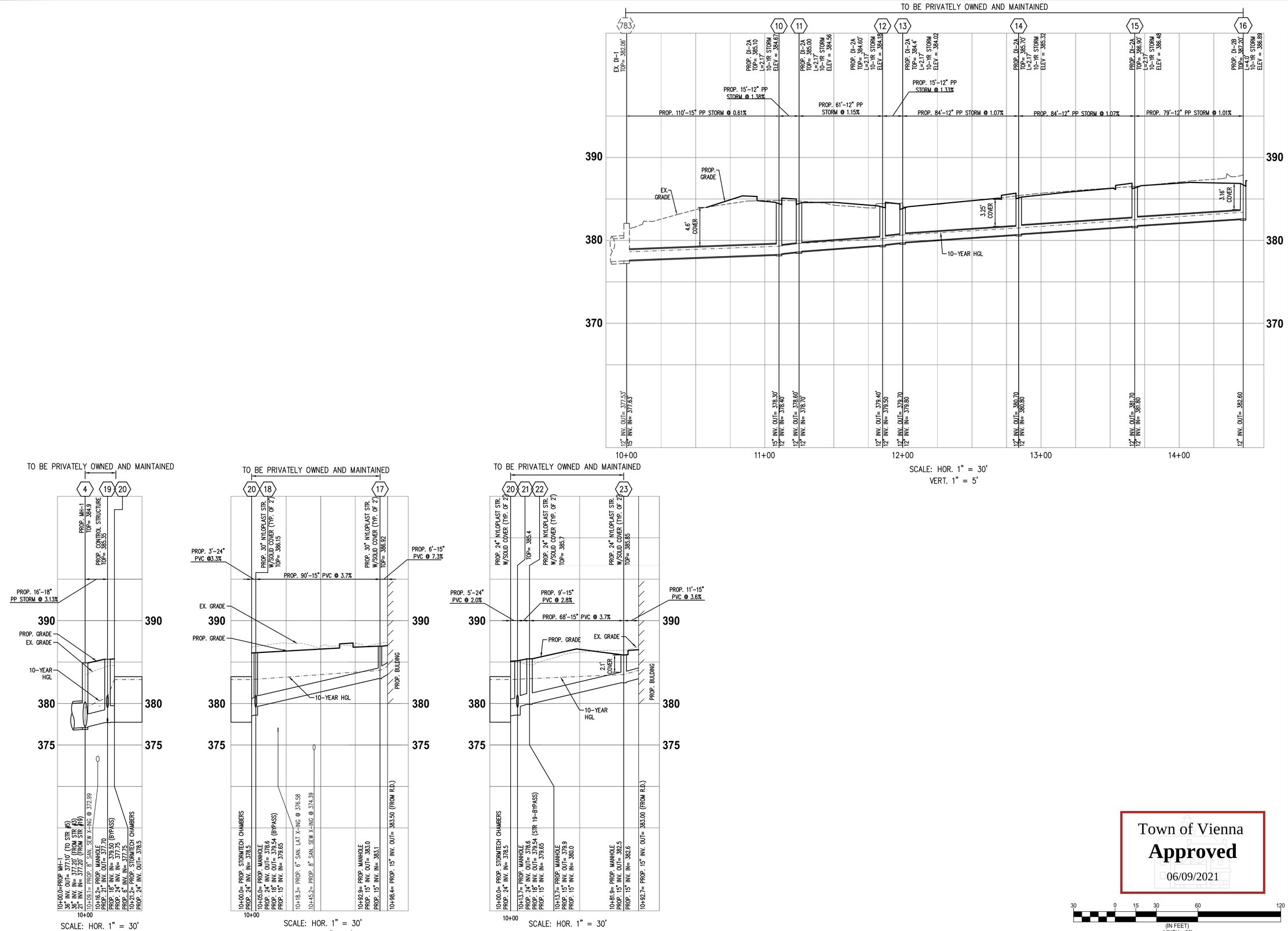
SCALE: HOR. 1" = 30'
VERT. 1" = 5'

DRAWN: DL
CHECKED: KW

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
05/25/21
PROFESSIONAL ENGINEER

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE
	REVISION APPROVED BY				

SHEET: C-0801



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SCALE: HOR. 1" = 30' VERT. 1" = 5'

KAREN L. S. WHITE Lic. No.041850 COMMONWEALTH OF VIRGINIA REGISTERED PROFESSIONAL ENGINEER 05/25/21

REVISION APPROVED BY

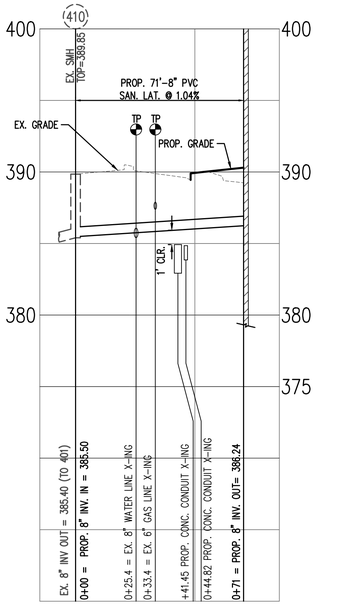
NO.	DESCRIPTION	DATE	REV.: BY	APPROVED

STORM SEWER PROFILES

444 MAPLE AVENUE WEST

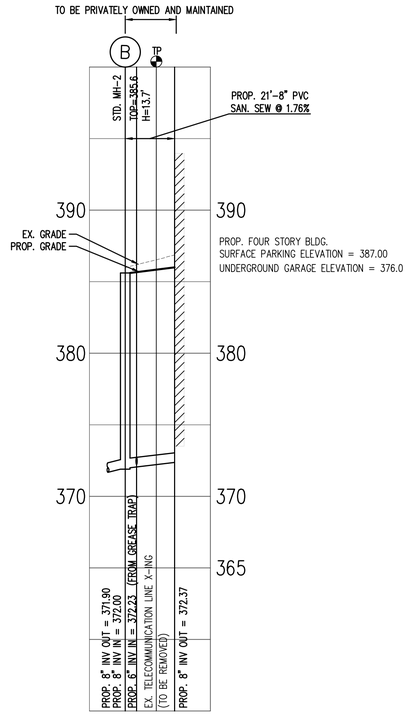
SITE PLAN

TOWN OF VIENNA, VIRGINIA



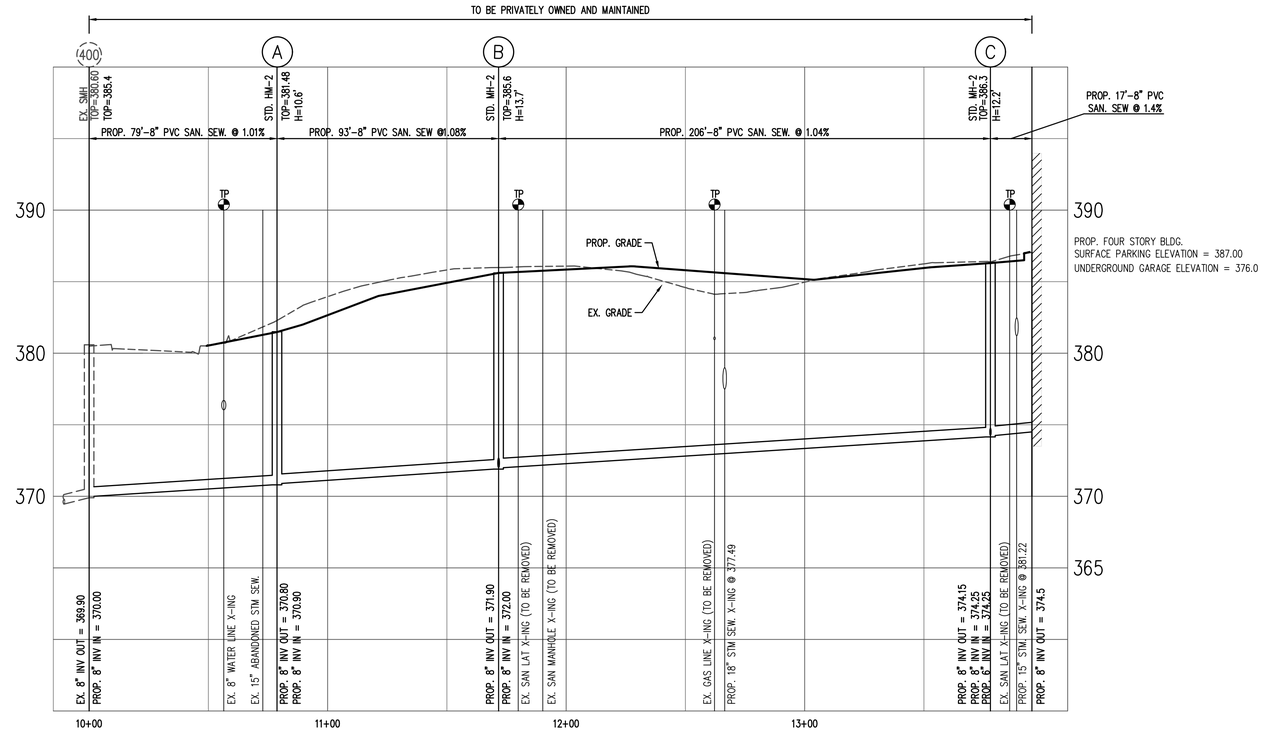
PROPOSED 8" SANITARY LINE (NORTH)

SCALE: HOR. 1" = 30'
VERT. 1" = 5'



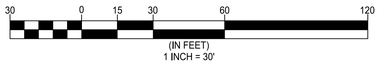
PROPOSED 8" SANITARY LINE

SCALE: HOR. 1" = 30'
VERT. 1" = 5'



PROPOSED 8" SANITARY LINE

SCALE: HOR. 1" = 30'
VERT. 1" = 5'



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SCALE: HOR. 1" = 30'
VERT. 1" = 5'

DRAWN: DL

CHECKED: KW

COMMONWEALTH OF VIRGINIA
PROFESSIONAL ENGINEER
KAREN L. S. WHITE
Lic. No.041850
05/25/21

REVISION APPROVED BY

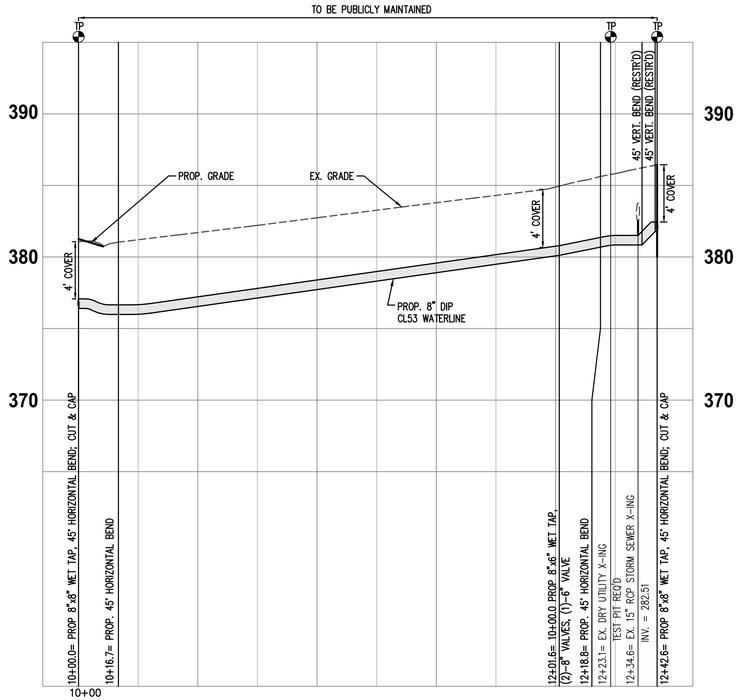
NO.	DESCRIPTION	DATE	REV.' BY	APPROV.	DATE

SANITARY SEWER PROFILES

444 MAPLE AVENUE WEST

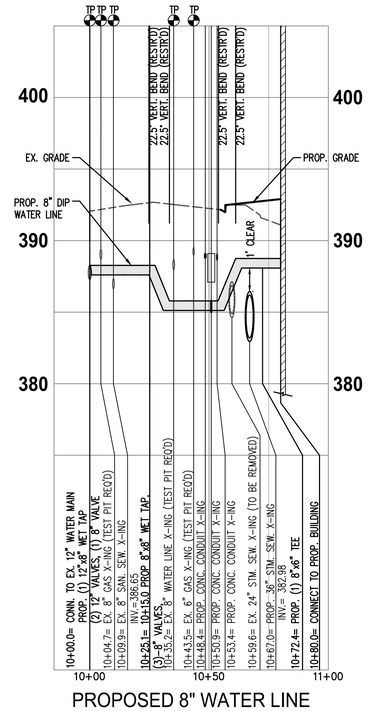
SITE PLAN

TOWN OF VIENNA, VIRGINIA



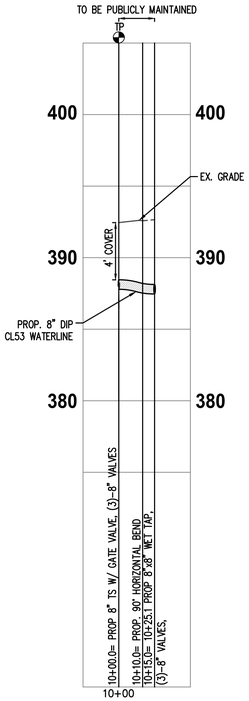
EXISTING 8" WATERLINE RELOCATION

SCALE: HOR. 1" = 30'
VERT. 1" = 5'



PROPOSED 8" WATER LINE

SCALE: HOR. 1" = 30'
VERT. 1" = 5'

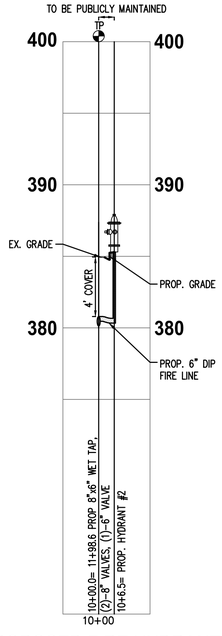


PROP 8" WATERLINE

SCALE: HOR. 1" = 30'
VERT. 1" = 5'

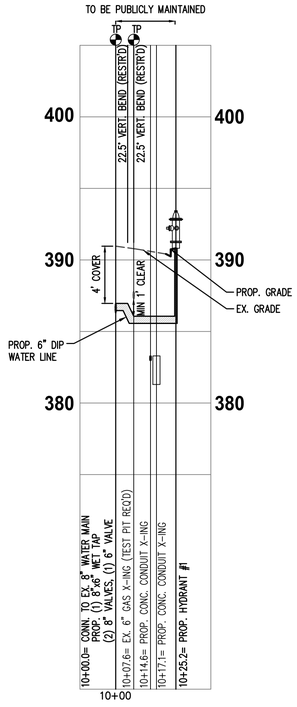
TOWN OF VIENNA WATER MAIN CONSTRUCTION NOTES

1. WATER MAIN CONSTRUCTION SHALL COMPLY WITH THE LATEST ISSUE OF THE TOWN OF VIENNA PUBLIC INFRASTRUCTURE MANUAL (PIM), VIRGINIA STATE WATERWORKS REGULATIONS, VDOT ROAD & BRIDGE SPECIFICATIONS & STANDARDS, AND FAIRFAX COUNTY PUBLIC FACILITY MANUAL (PFM).
2. THREE (3) DAYS PRIOR TO COMMENCING THE WATER MAIN CONSTRUCTION, THE DEVELOPER/OWNER SHALL NOTIFY THE TOWN OF VIENNA, DEPARTMENT OF PUBLIC WORKS, WATER & SEWER DIVISION, 703-255-6380.
3. ALL WATER MAINS SHALL HAVE A MINIMUM COVER OF FOUR (4) FEET UNLESS OTHERWISE APPROVED BY THE TOWN OF VIENNA.
4. BACKFLOW PREVENTER IS ABSOLUTELY REQUIRED FOR TEMPORARY CONSTRUCTION, IRRIGATION SYSTEMS OR VEHICLE WASH AREAS, WHERE AS REQUIRED BY THE STATE WATERWORKS REGULATIONS.
5. THE DEVELOPER AGREES TO ACCEPT FULL RESPONSIBILITY AND ALL COSTS FOR THE INSTALLATION OF WATER MAINS AND APPURTENANCES, INCLUDING ANY ADJUSTMENTS IN ALIGNMENT AND GRADE OR RELOCATION TO EXISTING WATER FACILITIES DUE TO THE DEVELOPMENT OF THIS PROPERTY, ANY REPAIR AND MAINTENANCE REQUIRED PRIOR TO FINISH GRADING AND SURFACING OF THE STREETS AND/OR EASEMENTS. FINAL ACCEPTANCE WILL NOT BE CONSIDERED OR GRANTED UNTIL AFTER THE STREETS HAVE BEEN SURFACED OR THE EASEMENTS FINALLY GRANTED.
6. ALL TS, BENDS AND VALVES NEED TO BE CONNECTED WITH MEGALUGS RETAINER GLANDS AND BLOCKED.
7. BEFORE THE START OF CONSTRUCTION, THE DEVELOPER MUST PROVIDE THE FOLLOWING INFORMATION AND/OR EVIDENCE OF COMPLIANCE WITH ALL APPLICABLE REGULATIONS AND LAWS:
   a. IF ANY EASEMENTS ARE NEEDED, TWO (2) COPIES OF THE RECORDED EASEMENT MUST BE PROVIDED, INCLUDING THE PLACE, DATE AND REFERENCE OF THE RECORDED EASEMENT.
   b. WRITTEN NOTICE OF THE TENTATIVE STARTING DATE OF CONSTRUCTION, WHICH MUST BE A MINIMUM OF ONE (1) WEEK FOLLOWING THE DATE OF NOTICE, IS NEEDED. IN ADDITION, THE DEVELOPER MUST PROVIDE THE NAMES AND PHONE NUMBERS OF TWO (2) EMERGENCY CONTACTS.
8. WATER VALVES SHALL ONLY BE OPERATED BY THE TOWN OF VIENNA PERSONNEL. THE CONTRACTOR IS REQUIRED TO PROVIDE TWO (2) WORKING DAYS NOTICE OF ANY SHUTDOWN REQUIRED. WATER DISRUPTIONS TO EXISTING CUSTOMERS SHALL BE KEPT TO A MINIMUM WHICH MAY REQUIRE THE CONTRACTOR TO INSTALL INSERTING VALVES.
9. TOWN WORKING HOURS FOR WATER & SEWER ARE MONDAY THROUGH FRIDAY, 7:00AM -3:30PM, WITH THE EXCEPTION OF HOLIDAYS. ANY INSPECTION OR SHUT DOWNS OUTSIDE OF WORKING HOURS SHALL REQUIRE ADDITIONAL FEES.
10. ALL VALVE COVERS SHALL BE STAMPED, WATER.
11. ALL FIRE HYDRANTS SHALL BE MUELLER.
12. DEVELOPER IS RESPONSIBLE FOR ALL ADJUSTMENTS DUE TO FIELD CONDITIONS.



PROPOSED FIRE HYDRANT #2

SCALE: HOR. 1" = 30'
VERT. 1" = 5'



PROPOSED FIRE HYDRANT #1

SCALE: HOR. 1" = 30'
VERT. 1" = 5'

NOTES

1. TEST PITS ARE TO BE PERFORMED AT LEAST TWO WEEKS PRIOR TO CONSTRUCTION.
2. SEE SHEET C-0404 FOR UTILITY PLAN AND C-0404B FOR METER VAULT ENLARGEMENT
3. SEE SHEET C-0404B FOR VAULT AND METER DETAILS.
4. DEFLECTIONS AS SHOWN DO NOT PRECLUDE ADDITIONAL VERTICAL BENDS FROM BEING REQUIRED IN THE FIELD AT THE DISCRETION OF THE INSPECTOR.
5. MECHANICAL JOINT AND APPURTENANCE RESTRAINTS (EBAA IRON, INC. MEGALUG OR APPROVED EQUAL) ARE TO BE PROVIDED PER TOWN OF VIENNA SPECIFICATIONS AND WITH INSTALLATION LENGTHS PER THE MANUFACTURER RECOMMENDATIONS.
6. WATERLINE DEPTH MAY BE ADJUSTED IN THE FIELD UNDER COORDINATION WITH THE TOWN OF VIENNA INSPECTOR.
7. EXISTING 8" WATERLINE IN NUTLEY ST IS TO BE RELOCATED. ANY EXISTING SERVICES ON THE SOUTH SIDE OF NUTLEY ST MUST BE CONNECTED TO THE RELOCATED WATERLINE UPON COMPLETION AND ACCEPTANCE BY TOWN OF VIENNA.
8. TOWN OF VIENNA MAY REQUIRE ADDITIONAL INSERT VALVES TO AVOID WATER SHUT DOWNS FOR EXTENDED PERIODS. CONTRACTOR TO COORDINATE WITH TOWN OF VIENNA INSPECTOR PRIOR TO WATER SHUTOFFS NECESSARY FOR INSTALLATION AND ABANDONMENT.

Town of Vienna
Approved
06/09/2021

30 0 15 30 60 120
(IN FEET)
1 INCH = 30'

WATERLINE PROFILES

444 MAPLE AVENUE WEST

SITE PLAN

TOWN OF VIENNA, VIRGINIA

WALTER L. PHILLIPS INCORPORATED
ESTABLISHED 1945
Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

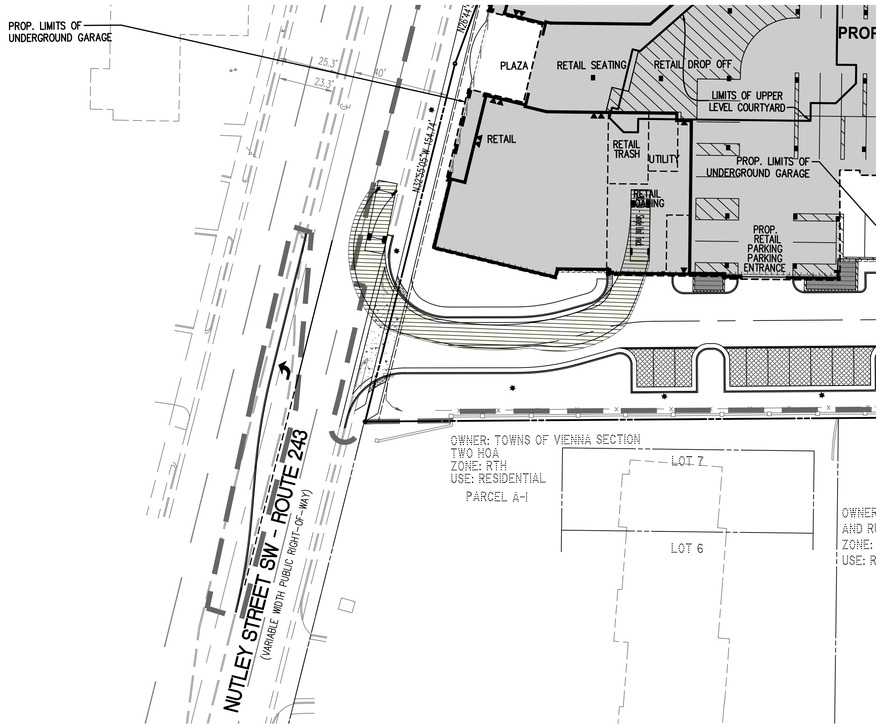
DATE: SUB01: 9/13/2019, SUB02: 05/07/2020, SUB03: 4/19/2021
SUB04: 05/25/2021

SCALE: HOR. 1" = 30'
VERT. 1" = 5'

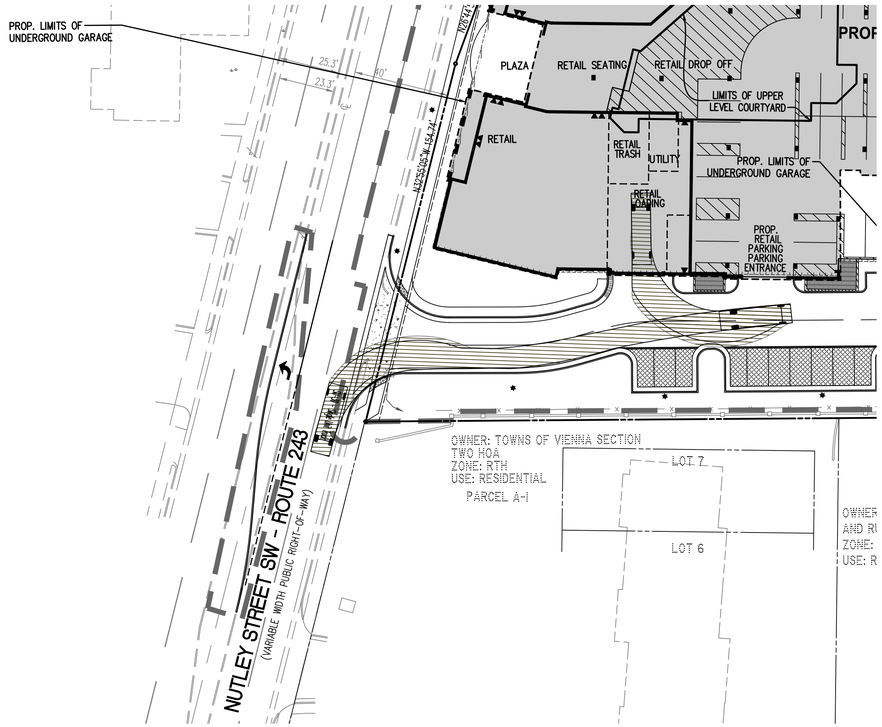
DRAWN: DL
CHECKED: KW

COMMONWEALTH OF VIRGINIA — KAREN L. S. WHITE — Lic. No.041850 — PROFESSIONAL ENGINEER — 05/25/21

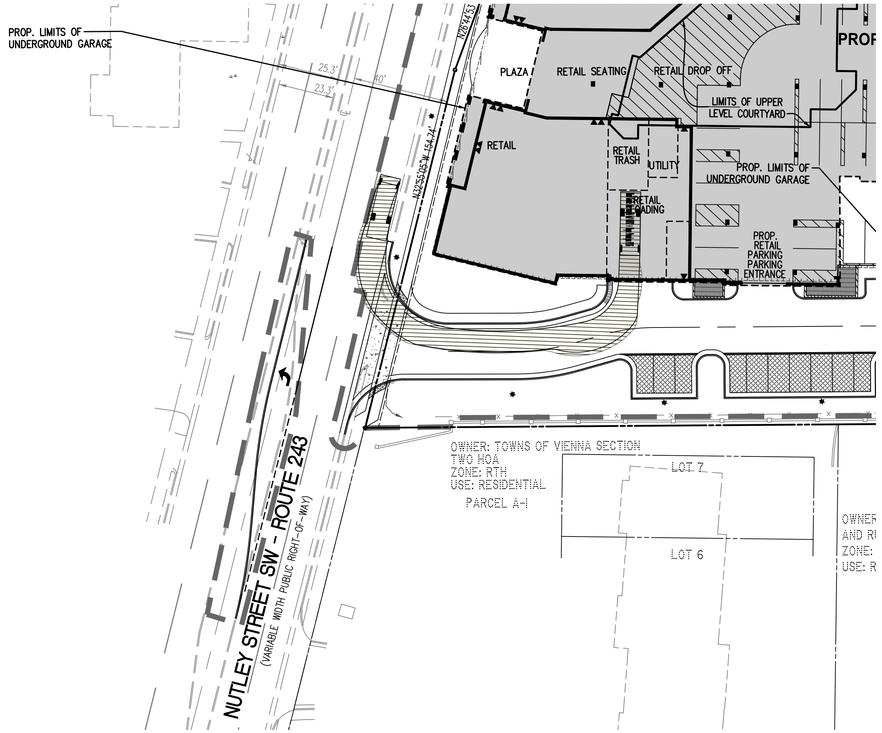
REVISION APPROVED BY			
NO.	DESCRIPTION	DATE	REV'D BY
			APPROVED



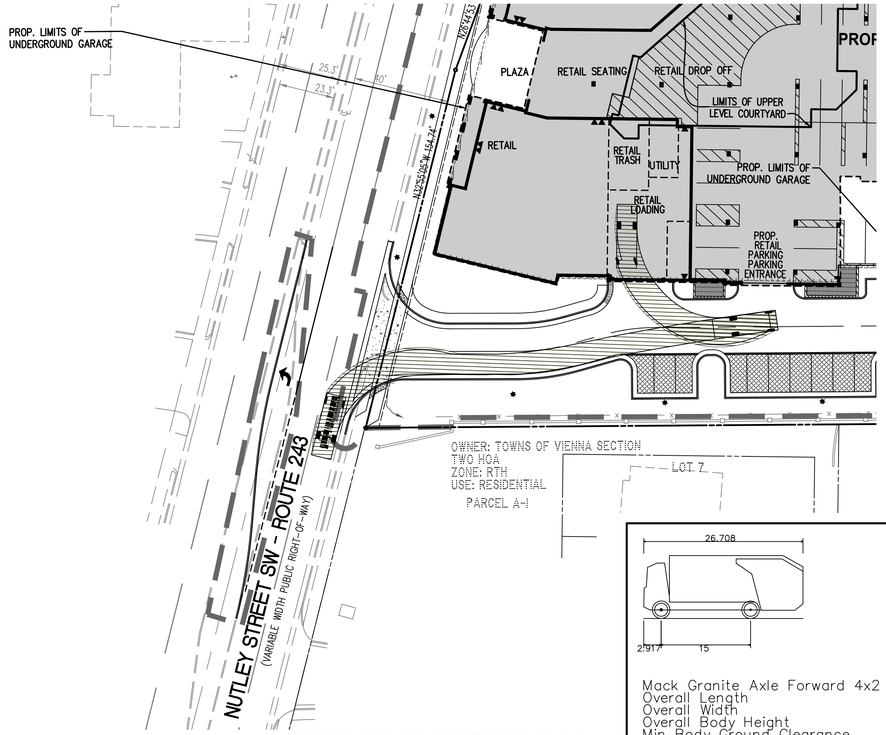
RETAIL LOADING - EXITING (SU-30)



RETAIL LOADING - ENTERING (SU-30)



RETAIL TRASH - EXITING (PL16)

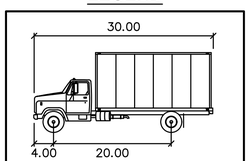


RETAIL TRASH -ENTERING (PL16)

30 0 15 30 60 120

(IN FEET)
1 INCH = 30'

LEGEND



SU–30 feet

Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8

Mack Granite Axle Forward 4x2 GU712 + W	
Overall Length	26.708ft
Overall Width	8.375ft
Overall Body Height	10.546ft
Min Body Ground Clearance	1.376ft
Track Width	8.375ft
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	29.300ft

Town of Vienna
Approved
06/09/2021

VEHICLE MOVEMENTS

444 MAPLE AVENUE WEST

SITE PLAN

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SCALE: 1" = 30'

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
PROFESSIONAL ENGINEER
05/25/21

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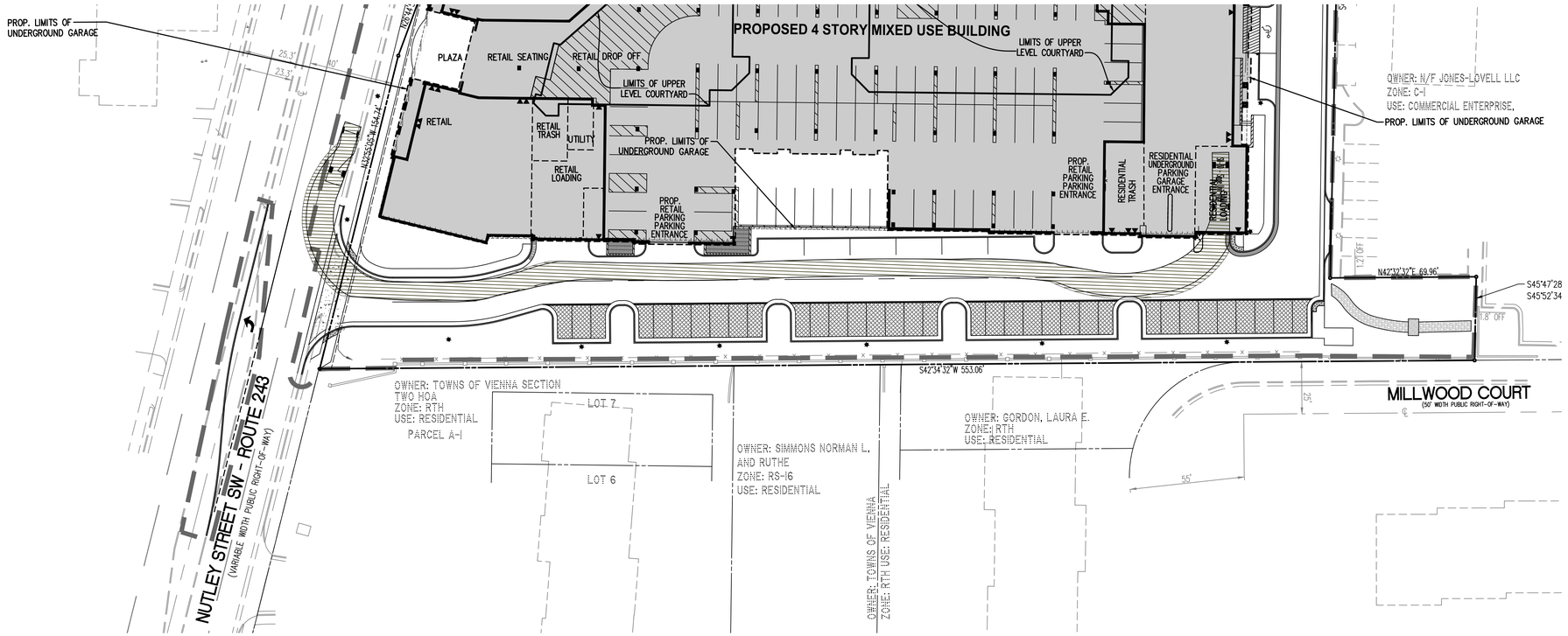
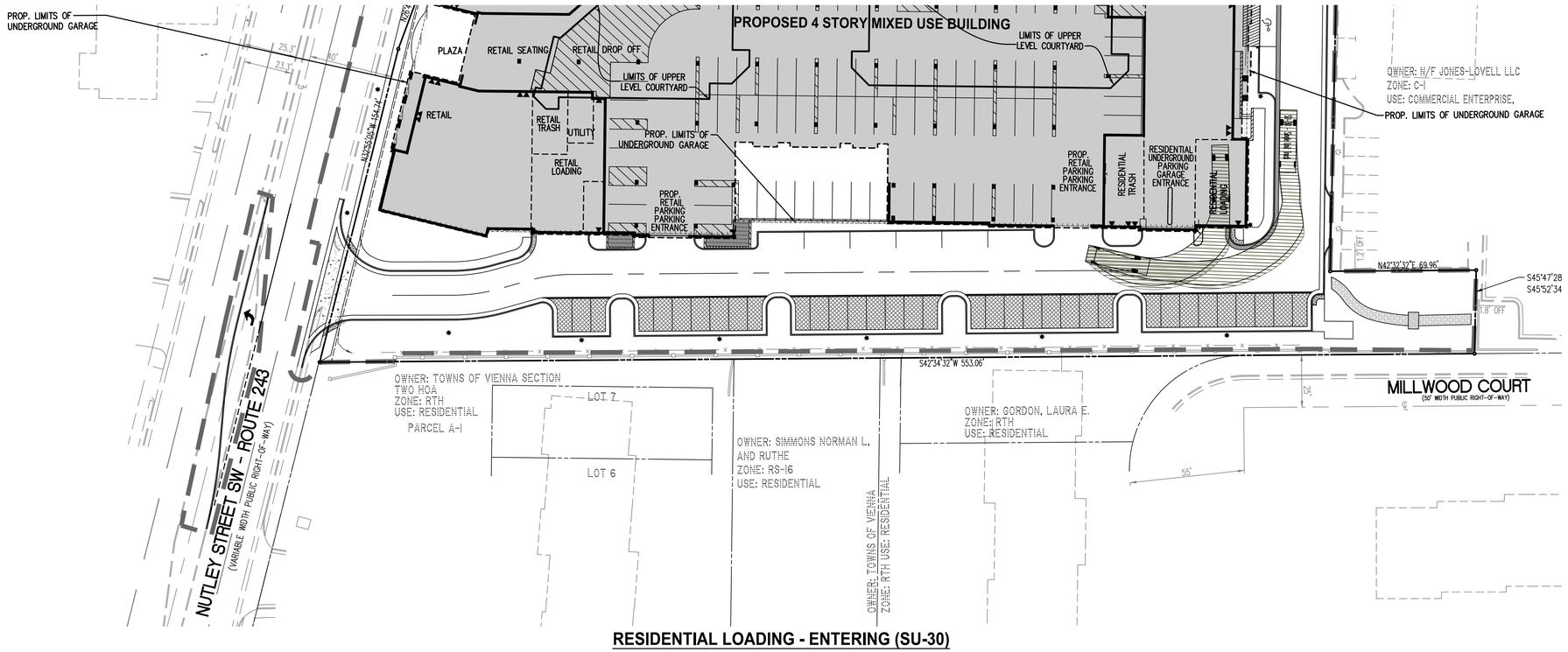
NO.	DESCRIPTION	DATE	REV.: BY	APPROVED

SHEET: C-1001

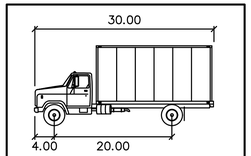


RESIDENTIAL LOADING - EXITING (SU-30)



RESIDENTIAL LOADING - ENTERING (SU-30)

LEGEND



SU-30 feet

Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8

30 0 15 30 60 120
(IN FEET)
1 INCH = 30'

Town of Vienna
Approved
06/09/2021

VEHICLE MOVEMENTS

444 MAPLE AVENUE WEST
SITE PLAN
TOWN OF VIENNA, VIRGINIA

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KAREN L. S. WHITE
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05/25/21

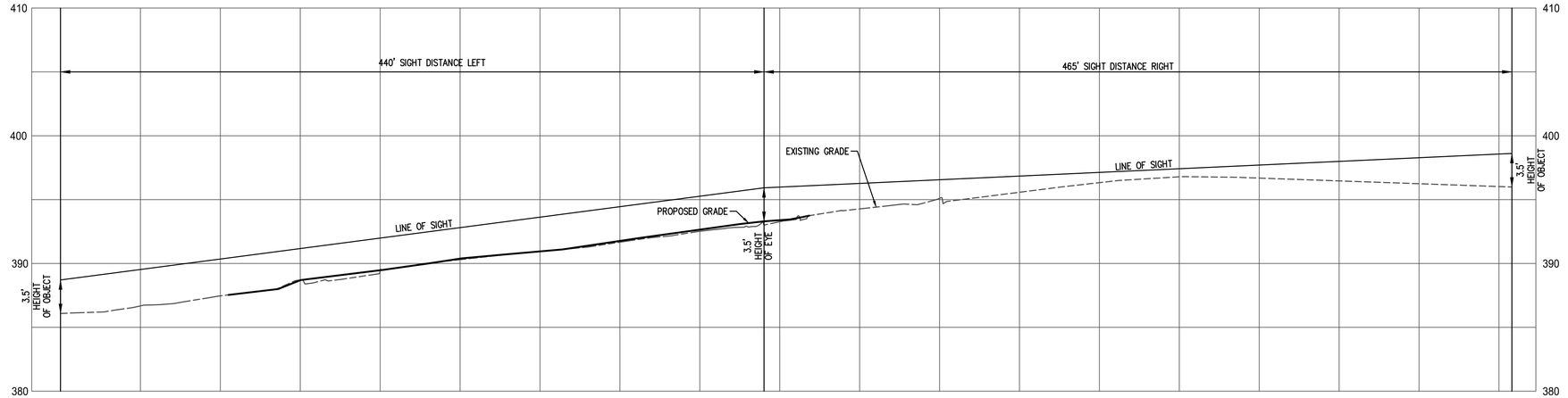
DRAWN: DL
CHECKED: KW
DATE: SUB01: 9/13/2018, SUB02: 05/07/2020, SUB03: 4/19/2021
SUB04: 05/25/2021
SCALE: 1" = 30'

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV.' BY	APPROVED

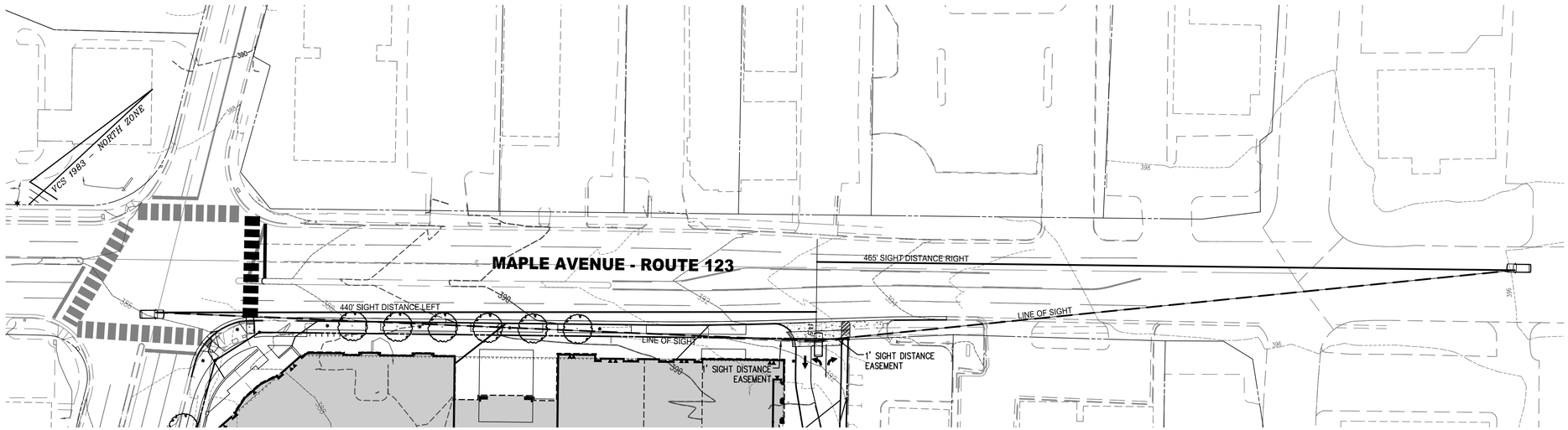
File No. FM-18 Tax Map No. 038-3 Job No. 07-036 Cadd Dwg. File: Q: \sdskproj\07036\dwg\Engineering\site Plan\07036C-1001.dwg Xref: site plan\07036B-0002

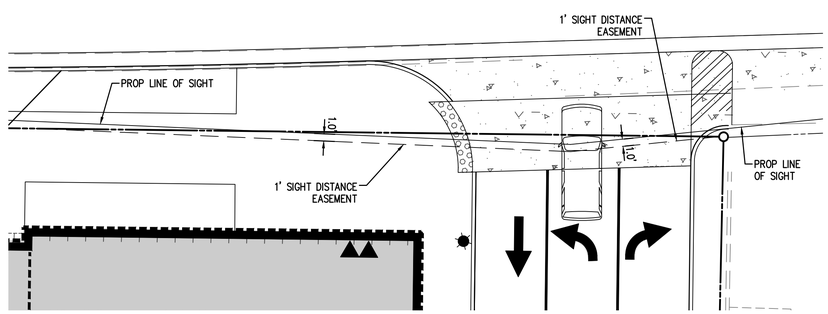
SHEET: C-1002



SIGHT DISTANCE MAPLE AVE W

SCALE: HOR. 1" = 40'
VERT. 1" = 5'
POSTED SPEED: 30 MPH
DESIGN SPEED: 35 MPH





SIGHT DISTANCE EASEMENT BLOW UP

SCALE: 1" = 10'

10 0 5 10 20 40
(IN FEET)
1 INCH = 10'

40 0 20 40 80 160
(IN FEET)
1 INCH = 40'

NOTES

PROP STREET TREES ALONG MAPLE AVE FRONTAGE TO BE MAINTAINED IN ORDER TO PREVENT LIMBS FROM OBSTRUCTING LINE OF SIGHT DOWN MAPLE AVE.

Town of Vienna
Approved
06/09/2021

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SUB04: 05/25/2021

SCALE: HOR. 1" = 40'
VERT. 1" = 5'

DRAWN: DL
CHECKED: KW

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

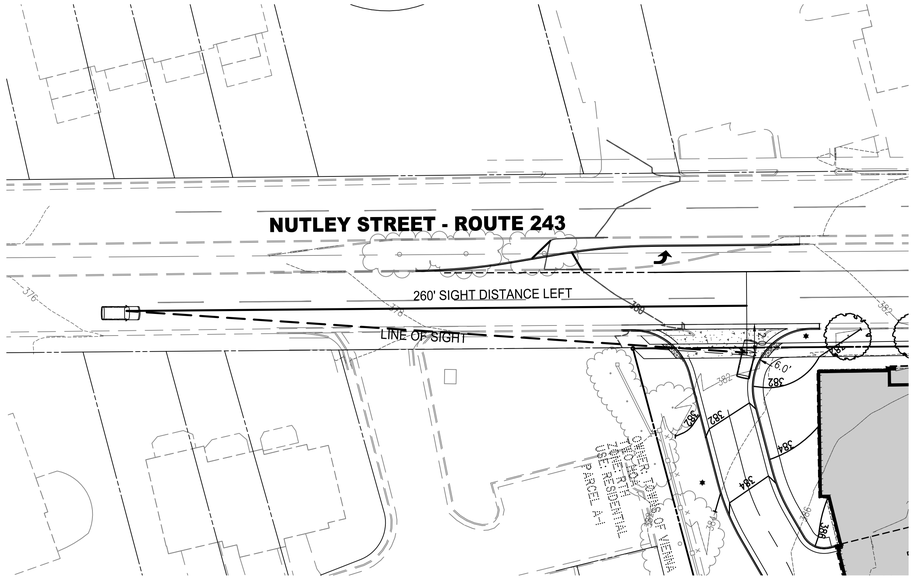
SIGHT DISTANCE PLAN & PROFILE - MAPLE AVENUE

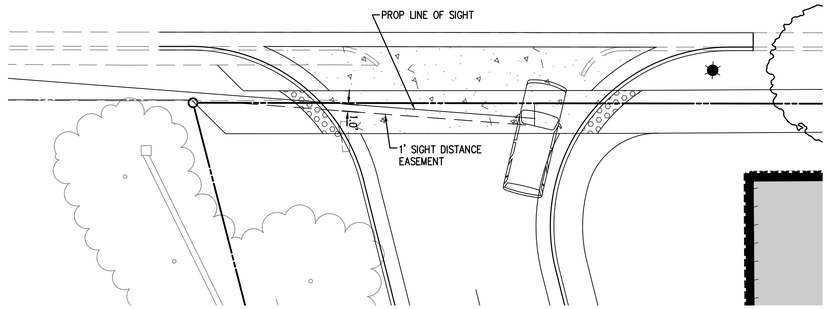
444 MAPLE AVENUE WEST

SITE PLAN

TOWN OF VIENNA, VIRGINIA

SHEET: C-1101



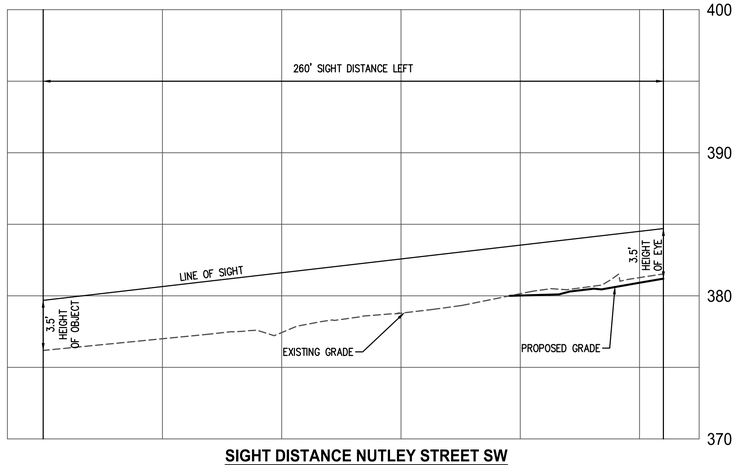


SIGHT DISTANCE EASEMENT BLOW UP

SCALE: 1" = 10'

NOTES

SIGHT DISTANCE MODIFIED FROM VDOT STANDARD DUE EXISTING ENTRANCE LOCATION BEING MAINTAINED AND URBAN SETTING. TABLE 12 OF THE TRANSPORTATION DESIGN STANDARDS FOR TYSONS CORNER UTILIZED FOR SIGHT DISTANCE DETERMINATION.



SIGHT DISTANCE NUTLEY STREET SW

SCALE: HOR. 1" = 30'
VERT. 1" = 5'
POSTED SPEED: 35 MPH
DESIGN SPEED: 35 MPH

10 0 5 10 20 40
(IN FEET)
1 INCH = 10'

30 0 15 30 60 120
(IN FEET)
1 INCH = 30'

Town of Vienna
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CHECKED: KW

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
05/25/21
PROFESSIONAL ENGINEER

REVISION APPROVED BY

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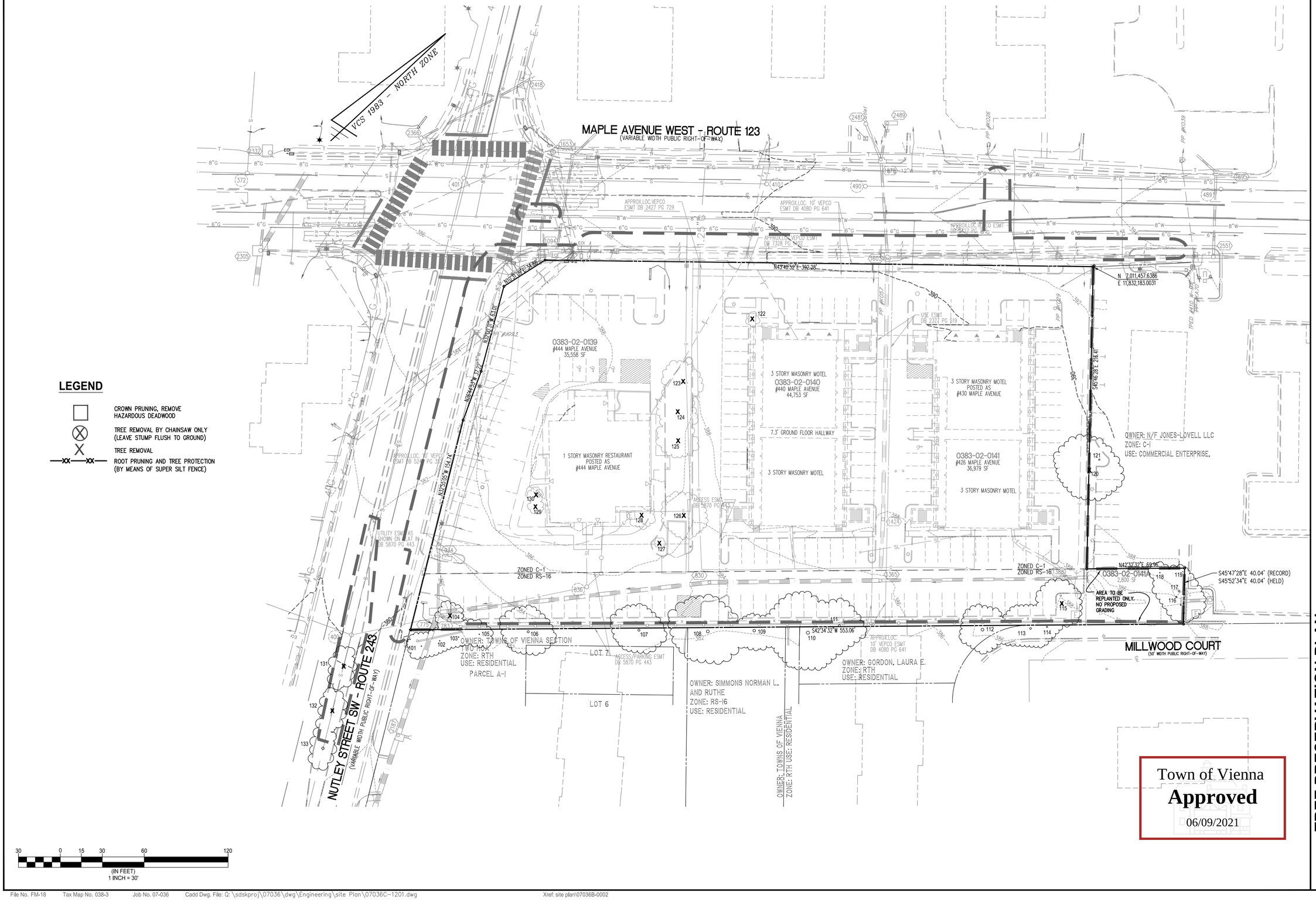
SIGHT DISTANCE PLAN & PROFILE - NUTLEY STREET

444 MAPLE AVENUE WEST

SITE PLAN

TOWN OF VIENNA, VIRGINIA



LEGEND

- CROWN PRUNING, REMOVE HAZARDOUS DEADWOOD
- TREE REMOVAL BY CHAINSAW ONLY (LEAVE STUMP FLUSH TO GROUND)
- TREE REMOVAL
- ROOT PRUNING AND TREE PROTECTION (BY MEANS OF SUPER SILT FENCE)

30 0 15 30 60 120
(IN FEET)
1 INCH = 30'

Town of Vienna
Approved
06/09/2021

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SUB04: 05/25/2021

SCALE: 1" = 30'

DRAWN: DL

CHECKED: KW

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV.: BY	APPROVED	DATE

TREE PRESERVATION PLAN

444 MAPLE AVENUE WEST

SITE PLAN

TOWN OF VIENNA, VIRGINIA

File No. FM-18 Tax Map No. 038-3 Job No. 07-036 Cadd Dwg. File: Q: \sdskproj\07036\dwg\Engineering\site Plan\07036C-1201.dwg Xref: site plan\07036B-0002

SHEET: C-1201