

Stormwater Pollution Prevention Plan

1600 Lebanon Pike

1590/1600/1602/1604 Lebanon Pike
Nashville,
Davidson County, Tennessee

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Prepared for:

1600 Lebanon Partners
45 Annandale
Nashville, TN 37215

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1.0 EXECUTIVE SUMMARY

This SWPPP has been prepared for activities associated with the construction of a new multi-family development including 17 townhouses and an apartment complex, construction of associated parking, and miscellaneous landscaping at the project site located at 1590, 1600, 1602, and 1604 Lebanon Pike, Nashville, TN. This SWPPP includes the elements necessary to comply with the national baseline general permit for construction activities enacted by the U.S. Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES) program and all local governing agency requirements as specified by Nashville / Davidson County. This SWPPP must be implemented at the start of construction.

This SWPPP has been developed in accordance with the “Tennessee Department of the Environment and Conservation (TDEC) State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity” General Permit Number TNR100000, effective September 30, 2016 through September 30, 2021. The SWPPP and accompanying plans identify and detail stormwater management (SWM), pollution prevention, and erosion and sediment control measures necessary during and following completion of construction.

This SWPPP and the accompanying plans entitled “1600 Lebanon Pike” have been submitted as a set. These engineering drawings are considered an integral part of this SWPPP, therefore this SWPPP is not considered complete without them. References made herein to “the plans” or to a specific “sheet” refer to these drawings.

This report considers the impacts associated with the intended development with the purpose of:

1. Maintaining existing drainage patterns as much as possible while continuing the conveyance of upland watershed runoff;
2. Controlling increases in the rate of stormwater runoff resulting from the proposed development so as not to adversely alter downstream conditions; and
3. Mitigating potential stormwater quality impacts and preventing soil erosion and sedimentation resulting from stormwater runoff generated both during and after construction.

The analysis and design completed and documented in this report is intended to be part of the application made for a grading permit from the Metro Water Services (MWS) Stormwater Division.

1.1 Project Description

BNA Investments is proposing the construction of a new multi-family residential development including an apartment complex, 17 townhouses, and associated parking. The property is located at 1590, 1600, 1602, and 1604 Lebanon Pike, Nashville, TN 37210.

This SWPPP includes post-construction stormwater management practices as well as erosion and sediment controls.

This project is located within a regulated, traditional land use control Municipal Separate Stormwater Sewer System (MS4).

Runoff from the project site will discharge via sheet flow at the northeastern corner of the property. The storm water travels via overland flow to an unnamed stream approximately 450 feet northeast of the property line.

Project construction activities will consist of site grading and construction of the proposed upgrades to the property. Construction phase pollutant sources anticipated at the site are disturbed (exposed) soil, vehicle fuels and lubricants, chemicals associated with building construction, and building materials. Without adequate control there is the potential for each type of pollutant to be transported by stormwater.

1.1 Stormwater Pollution Controls

The proposed measures outlined herein have been designed to mitigate erosion and pollution to adjacent properties due to surface runoff. These measures have been designed and evaluated in accordance with the following standards and guidelines:

- Tennessee Erosion and Sediment Control Handbook – 4th Edition (August 2012).
- Supplemental Best Management Practices (BMP) Manual

1.1 Conclusion

This SWPPP has been prepared in conformance with the current Tennessee Standards and Specifications for Erosion and Sediment Control and Supplemental BMP Manual.

It is our opinion that the proposed development will not adversely impact adjacent or downstream properties if the erosion control measures are properly constructed and maintained in accordance with the requirements outlined herein.

2.0 SWPPP IMPLEMENTATION RESPONSIBILITIES

A summary of the responsibilities and obligations of all parties involved with compliance with the TDEC General Permit TNR100000 conditions is outlined in the subsequent sections. For a complete listing of the definitions, responsibilities, and obligations, refer to the TDEC General Permit TNR100000 presented in Appendix A.

2.1 Definitions

1. “Owner” or “Operator” means the person, persons, or legal entity which owns or leases the property on which the construction activity is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications. There may be

occasions during the course of a project in which there are multiple Owners/Operators, all of which will need to file and maintain the appropriate SWPPP documents and plans, including without limitation, the Notice of Intent (NOI), Notice of Coverage (NOC) and Notice of Termination (NOT).

2. “Owner’s/Operator’s Engineer” shall be that person or entity retained by an Owner/Operator to design and oversee the implementation of the SWPPP.
3. “Contractor” shall be that person or entity identified as such in the construction contract with the Owner/Operator. The term “Contractor” shall also include the Contractor’s authorized representative, as well as any and all subcontractors retained by the Contractor.
4. “Qualified Inspector” means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), licensed Landscape Architect, or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of and at the same company as, the licensed Professional Engineer or licensed Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that an individual performing a site inspection has passed the TDEC Level 1 Certification.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

5. “Qualified Professional” means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, licensed Landscape Architect, or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics in order to prepare a SWPPP that conforms to the Department’s technical standards. All components of the SWPPP that involve the practice of engineering, shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of Tennessee.
6. “Trained Contractor” means an employee from a contracting (construction) company that has received training, which has been endorsed by the Department, from a Soil and Water Conservation District, CPESC, Inc. or other Department endorsed entity, in proper erosion and sediment control principles.

It can also mean an employee from the contracting (construction) company that meets the “qualified inspector” qualifications (e.g. licensed Professional Engineer,

Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they meet or exceed TDEC requirements).

The “trained contractor” will be responsible for the day to day implementation of the SWPPP.

2.2 Owner’s/Operator's Responsibilities

1. Retain the services of a “Qualified Professional”, as defined under Section 2.1, to provide the services outlined in Section 2.3 “Owner’s/Operator’s Engineer’s Responsibilities”.
2. Pay any and all fees, get all permits as required by Nashville / Davidson County.
3. Retain the services of an independent certified materials testing and inspection firm operating under the direction of a licensed Professional Engineer to perform regular tests, inspections, and certifications of the construction materials used in the construction of all post-construction stormwater management practices.
4. Prior to the commencement of construction activity, identify the contractor(s) and subcontractor(s) that will be responsible for implementing the erosion and sediment control measures and stormwater management practices described in this SWPPP. Have each of these contractors and subcontractors identify at least one “Trained Contractor”, as defined under Section 2.1, that will be responsible for the implementation of the SWPPP. Ensure that the Contractor has at least one “Trained Contractor” on site on a daily basis when soil disturbance activities are being performed.
5. Schedule a pre-construction meeting which shall include the necessary Metro Water Services representative(s), Owner’s/Operator’s Engineer, Contractor, and their subcontractors to discuss responsibilities as they relate to the implementation of this SWPPP.
6. Require the Contractor to fully implement the SWPPP prepared for the site by the Owner’s/Operator’s Engineer to ensure that the provisions of the SWPPP are implemented from the commencement of construction activity until all areas of disturbance have achieved final stabilization.
7. Maintain a copy of the General Permit (TN100000), NOI, NOC, SWPPP, inspection reports, Spill Prevention, Countermeasures, and Cleanup (“SPCC”) Plan, inspection records, and other required records on the job site so that they may be made available to the regulatory agencies.

8. Post at the site, in a publicly accessible location, a copy of the General Permit (TN100000) and the twice weekly inspection reports.
9. Prepare a written summary of projects status with respect to compliance with the general permit at a minimum frequency of every three months during which coverage under the permit exists. The summary should address the status of achieving the overall goal of the SWPPP. The summary shall be maintained at the site in a publicly accessible location.
10. Prior to completion of all site work, ensure one of the following:
 - a) the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,
 - b) for post-construction stormwater management practice(s) that are privately owned, the Owner/Operator has a deed restriction in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan,
 - c) for post-construction stormwater management practice(s) that are owned by a public or private institution (e.g. school, college, university), or government agency or authority, the Owner/Operator has policy and procedures are in place that ensure operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.
11. Request and receive all SWPPP records from the Owner's/Operator's Engineer and archive those records for a minimum of five years after the completion of work.
12. Require the implementation of the Post-Construction Inspections and Maintenance procedures outlined in Section 7.1.5.
13. The Owner/Operator must keep the SWPPP current at all times. At a minimum, the Owner/Operator shall amend the SWPPP:
 - a) Whenever the current provisions prove to be ineffective in minimizing pollutants in stormwater discharges from the project site;
 - b) Whenever there is a change in design, construction, or operation at the construction site that has or could have an effect on the discharge of pollutants; and
 - c) To address issues or deficiencies identified during an inspection by the "qualified inspector," the Department, or other Regulatory Authority.

2.3 Owner's/Operator's Engineers Responsibilities

1. Prepare the SWPPP using good engineering practices, best management practices, and in compliance with all federal, state, and local regulatory requirements.
2. Provide copies of the SWPPP to Metro Water Services once all signatures and attachments are complete.
3. Prepare a construction Site Log Book to be used in maintaining a record of all inspection reports generated throughout the duration of construction.
4. Participate in a pre-construction meeting with the Metro Water Services representative, Owner/Operator, Contractor, and their sub-contractors to discuss responsibilities as they relate to the implementation of this SWPPP.
5. Enter Contractor's information in Section 2.5 "SWPPP Participants" once a Contractor is selected by the Owner/Operator.
6. Retain the services of a TN licensed land surveyor to perform an as-built topographic survey of the completed post-construction stormwater management facilities. All new stormwater management facilities, including detention ponds, shall be contained within a maintenance easement and recorded on the final plan. If a stormwater management facility is not constructed, no As-Built Survey is required.
7. Conduct an initial assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment control measures described within this SWPPP have been adequately installed and implemented to ensure overall preparedness of the site.
8. Provide on-site inspections to determine compliance with the SWPPP. Site inspections shall occur at an interval twice per week and at least 72 hours apart. An inspection report shall be completed at the completion of each inspection and included with the onsite SWPPP documents. A sample inspection form is provided in Appendix A.
9. Review the Contractor's SWPPP records on a periodic basis to ensure compliance with the requirements for daily reports and inspections and maintenance logs.
10. Maintain the construction Site Log Book throughout the duration of construction.
11. Update the SWPPP each time there is a significant modification to the pollution prevention measures or a change of the principal Contractor working on the project who may disturb site soil.

12. Based on the as-built survey and material testing certifications performed by others, perform evaluations of the completed stormwater management facilities to determine whether they were constructed in accordance with this SWPPP.
13. Conduct a final site assessment and prepare a certification letter to the Owner/Operator indicating that, upon review of the material testing and inspection reports prepared by the firm retained by the Owner/Operator, completion of the topographic survey, and evaluation of the completed stormwater management facilities, the stormwater management facilities have been constructed substantially in accordance with the contract documents and should function as designed.
14. Transfer the SWPPP documents, along with all permit certificates, construction Site Log Book, and written records required by the General Permit to the Owner/Operator for archiving.

2.4 Contractor's Responsibilities

1. Identify at least one Trained Contractor that will be responsible for implementation of this SWPPP. Ensure that at least one Trained Individual is on site on a daily basis when soil disturbance activities are being performed.
2. Provide the names and addresses of all subcontractors working on the project site. Require all subcontractors who will be involved with construction activities that will result in soil disturbance to identify at least one Trained Contractor that will be on site on a daily basis when soil disturbance activities are being performed; and to sign a copy of the Contractor's Certification Form and forward to the Owner's/Operator's Engineer for inclusion into the Site Log Book. This information must be retained as part of the Site Log Book.
3. Maintain a Spill Prevention and Response Plan in accordance with requirements outlined in Section 5.4 of this SWPPP. This plan shall be provided to the Owner's/Operator's Engineer for inclusion in the Site Log Book.
4. Participate in a pre-construction meeting which shall include the Metro Water Services representative, Owner/Operator, Owner's/Operator's Engineer, and all subcontractors to discuss responsibilities as they relate to the implementation of this SWPPP.
5. Implement site stabilization (temporary and permanent), erosion and sediment control measures, and other requirements of the SWPPP.
6. Conduct daily inspections of erosion and sediment control measures installed at the site to ensure that they remain in effective operating condition at all times. Prepare, and retain written documentation of inspections as well as of all repairs/maintenance activities performed. This information must be retained as part of the Site Log Book.

7. Maintain a record of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated. A log for keeping such records is provided in Appendix A.
8. Begin implementing corrective actions within one business day of receipt of notification by the Qualified Inspector that deficiencies exist with the erosion and sedimentation control measures employed at the site. Corrective actions shall be completed within a reasonable time frame.

2.5 SWPPP Participants

1. Owner's/Operator's Engineer: S + H Group, LLC
2606 Eugenia Avenue, Suite D
Nashville, TN 37211
Phone: (615) 647-8775
2. Owner/Operator: 1600 Lebanon Partners
45 Annandale
Nashville, TN 37215
Phone: (615) 423-3522
3. Contractor: TBD

3.0 SITE CHARACTERISTICS

3.1 Land Use

The subject site for the proposed construction is located at the addresses of 1590, 1600, 1602, and 1604 Lebanon Pike, Nashville, TN 37210. The subject site is identified as tax parcel numbers 09400004400, 09400004500, 09400020200, and 09400020300. The total parcel size is approximately 2.94 (+/-) acres.

The subject site is currently partially developed with existing surface runoff carrying via overland flow to the northeast corner of the project location. Runoff contributes to an unnamed stream approximately 450 feet to the north via overland flow. The project will not be affecting existing stormwater drainage patterns and will continue to be directed to the north end of the lot where it will exit the property via overland sheet flow.

3.2 Soils

The United States Department of Agriculture (USDA) Soil Conservation Service (SCS) Soil Survey for Davidson County was reviewed and provided surficial soil conditions for the study area. The SCS identified the presence of Stiversville-Urban land complex soil type across the project site. Soil data provided by the SCS is presented in Table 1.

Table 1: USDA Soil Data

MAP SYMBOL/ DESCRIPTION	HYDRO- LOGIC SOIL GROUP	SLOPE (%)	SOIL PROFILE		K Sat (in/hr)	N DEPTH TO WATER TABLE (IN)	DEPTH TO BEDROCK (IN)
			DEPTH (IN)	USDA TEXTURE			
SvD – Stiversville- Urban land complex	A	3-25	0-8 8-53 53-63	Loam Clay loam Bedrock	0.00 – 0.20	>80	39-59

The Soil Conservation Service defines the hydrologic soil groups as follows:

- Type A Soils: Soils having a high infiltration rate and low runoff potential when thoroughly wet. These soils consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a moderate rate of water transmission.
- Type B Soils: Soils having a moderate infiltration rate when thoroughly wet and consists mainly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately course textures. These soils have a moderate rate of water transmission.
- Type C Soils: Soils having a low infiltration rate when thoroughly wet and consists chiefly of soils with a layer that impedes downward movement of water and soils

with moderately fine-to-fine texture. These soils have a low rate of water transmission.

- **Type D Soils:** Soils having a very low infiltration rate and high runoff potential when thoroughly wet. These soils consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high-water table, soils that have a clay pan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very low rate of water transmission.

The soils information for the study area is presented in Appendix B.

3.3 Groundwater

Depth to groundwater is noted as being 39-59 inches in the Stiversville-Urban land complex soil region, according to USDA Soil Conservation Service Soil Survey for Davidson County as shown in Table 1 “USDA Soil Data”.

3.4 Topography

The overall subject site has fairly steep sloping in the northeast end of the site, with slopes ranging from approximately 3-31 percent. Site elevations range from approximately 530 feet above sea level to 477 feet above sea level.

3.5 Wetlands

According to the National Wetlands Inventory (NWI) mapping¹, there are no wetlands in the project vicinity. The nearest NWI wetland is a freshwater pond (PUBFh) located approximately 0.13 miles away to the north of the project site.

3.6 Surface Waters and Flood Plains

According to the most recently available GIS data there are no mapped regulated streams on the subject site and no portion of the subject site is located in the 100-year FEMA Flood Zone.

3.7 Rainfall Data

Rainfall data utilized in the modeling and analysis was taken from National Weather Service (NWS) Technical Paper 40 (TP-40), Rainfall Frequency Atlas of the U.S. Weather Bureau, published by the U.S. Department of Commerce. Rainfall data specific to the portion of Nashville, TN under consideration, for various 24-hour storm events, are presented in Table 2:

¹ National Wetlands Inventory, Wetlands Digital Data, Available online at <http://www.fws.gov/wetlands/Data/Mapper.html>, site accessed 6/19/19.

Table 2: Rainfall Data

STORM EVENT	24-HOUR RAINFALL
2-year	3.39–inches
5-year	4.50–inches
10-year	5.23–inches
25-year	6.16–inches
50-year	6.85–inches
100-year	7.53–inches

These values were used to evaluate the pre- and post-development stormwater runoff conditions.

3.8 Pervious and Impervious Areas

The following comparison of the existing and proposed impervious areas was also used for the stormwater calculations. A summary of the existing and proposed (acres) conditions are presented in Table 3:

Table 3: Existing and Proposed Impervious Area

	Existing (Acres)	Proposed (Acres)
Total Lot Area	2.94	2.94
Total Pervious	2.78	1.13
Total Impervious	0.16	1.81

3.9 Percolation Testing

An infiltration test was not performed at the project site.

4.0 CONSTRUCTION SEQUENCE

Described below are the major construction activities that are the subject of this SWPPP. They are presented in the order (or sequence) they are expected to begin, but each activity will not necessarily be completed before the next begins. Also, these activities could occur in a different order if necessary, to maintain adequate erosion and sediment control.

The Contractor will be responsible for implementing the following erosion and sediment control measures. The Contractor may designate these tasks to certain subcontractors as the contractor sees fit, but the ultimate responsibility for implementing these controls and ensuring their proper function remains with the Contractor. The order of activities will be as follows:

1. Prior to the commencement and earth moving the contractor is to verify that all EPSC measures have been installed in accordance with the plans and specifications.

2. Selectively clear only the areas required for the installation of the stabilized construction entrances/exits and erosion and sediment control measures.
3. Install stabilized construction entrances/exits for all construction entrances/exits. This will be the first construction work on the project. This project is surrounded by paved roads that will remain in place throughout the duration of the project. It is intended that all construction vehicles will remain on existing pavement, so no construction entrance/exit is proposed.
4. Install sediment control barriers down slope from construction activities that disturb site soil. Refer to the plans for the slit-fence location.
5. Transplant all identified trees and shrubs.
6. Begin clearing and grubbing operations. Clearing and grubbing shall be done only in areas where earthwork will be performed and only in areas where construction is planned to commence within 15 days after clearing and grubbing.
7. Frequent watering of the excavation and fill areas shall be done to minimize wind erosion.
8. Commence site grading and other construction activities.
9. Install stormwater infrastructure including conveyance systems and detention basins. All detention area shall be protected from construction traffic and other construction site sediments through the use of silt fence.
10. Disturbed areas of the site, where construction activity has ceased for more than 15 days, shall be temporarily or permanently seeded, mulched, and watered in accordance to the seeding schedule on the plans.
11. Remove stabilized construction entrance(s) only prior to final stabilization (These areas are to be removed last).
12. Carry out final grading, seeding, mulching, and landscaping.
13. Complete final ground stabilization including the placement of sod.
14. Remove silt fencing only after all exposed tributary surfaces are stabilized.
15. Complete on-site final stabilization.
16. Remove temporary sediment controls only after all paving is complete and exposed surfaces are completely stabilized, and cleanout all stormwater collection conveyance, and treatment facilities.

5.0 CONSTRUCTION PHASE POLLUTION CONTROLS

The SWPPP and accompanying plans identify the temporary and permanent erosion and sediment control measures that have been incorporated into the design of this project. These measures will be implemented during construction, to minimize soil erosion and control sediment transport off-site, and after construction, to control the quality and quantity of stormwater runoff from the developed site.

Erosion control measures, designed to minimize soil loss, and sediment control measures, intended to retain eroded soil and prevent it from reaching water bodies or adjoining properties, have been developed in accordance with the following documents:

- Tennessee Erosion and Sediment Control Handbook – 4th Edition (August 2012).

The SWPPP and accompanying plans outline the construction scheduling for implementing the erosion and sediment control measures. The SWPPP and accompanying plans include limitations on the duration of soil exposure, criteria and specifications for placement and installation of the erosion and sediment control measures, a maintenance schedule, and specifications for the implementation of erosion and sediment control practices and procedures.

Temporary and permanent erosion and sediment control measures that shall be applied during construction generally include:

1. Minimizing soil erosion and sedimentation by stabilization of disturbed areas and by removing sediment from construction-site discharges.
2. Preservation of existing vegetation as much as possible. Following the completion of construction activities in any portion of the site permanent vegetation shall be established on all exposed soils.
3. Site preparation activities shall be planned to minimize the area and duration of soil disruption.
4. Permanent traffic corridors shall be established and “routes of convenience” shall be avoided.

5.1 Temporary Erosion and Sediment Control Measures

Temporary erosion and sediment control measures are included as part of the construction documents and are designed to control the rainfall from a 5-year, 24-hour return interval storm. These generally include the following:

1. Stabilized Construction Entrance

Prior to construction, stabilized construction entrances will be installed, as shown on the detail plan, to reduce the tracking of sediment onto public roadways. For this project the exiting driveway shall be used to minimize ground disturbance.

Construction traffic must enter and exit the site at the stabilized construction entrance. The intent is to trap dust and mud that would otherwise be carried off-site by construction traffic.

The entrance shall be maintained in a condition, which will control tracking of sediment onto public rights-of-way or streets. When necessary, the placement of additional aggregate atop the filter fabric will be done to assure the minimum thickness is maintained. All sediments and soils spilled, dropped, or washed onto the public rights-of-way must be removed immediately. Periodic inspection and needed maintenance shall be provided after each substantial rainfall event.

2. Dust Control

Water trucks or hoses shall be used as needed during construction to reduce dust generated on the site. Dust control must be provided by the general Contractor to a degree that is acceptable to the Owner, and in compliance with the applicable local and state dust control requirements.

3. Temporary Soil Stockpile

Materials, such as topsoil, will be temporarily stockpiled (if necessary) on the site during the construction process. Stockpiles shall be located in an area away from storm drainage, water bodies and/or courses, and will be properly protected from erosion by a surrounding silt fence barrier.

4. Silt Fencing

Prior to the initiation of and during construction activities, a geotextile filter fabric (or silt fence) will be established along the perimeter of areas to be disturbed as a result of the construction, which lie up gradient of water courses or adjacent properties. These barriers may extend into non-impact areas to ensure adequate protection of adjacent lands.

Clearing and grubbing will be performed only as necessary for the installation of the sediment control barrier. To ensure effectiveness of the silt fencing, daily site personnel will perform inspections and inspections immediately after significant storm events. Maintenance of the fence will be performed as needed. Trapped sediment is to be removed from sediment controls at or before 50% design capacity.

5. Temporary Seeding

Within 15 days after construction activity ceases on any particular area of the site, all disturbed areas where there will not be construction for longer than 15 days shall be temporarily seeded and mulched to minimize erosion and sediment loss. Temporary seeding shall be performed in accordance with the Tennessee Erosion and Sediment Control Handbook. The table below provides temporary seeding guidelines:

Species	Rate (lb/acre)
Rye	120
Seeding dates	
East	Above 2500 feet: Feb. 15 - May 15 Below 2500 feet: Feb. 1- May 1
Middle	Jan. 1 - May 1
West	Dec. 1 - Apr. 15
Soil amendments	
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.	
Mulch	
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.	
Maintenance	
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.	

5.2 Permanent Erosion and Sediment Control Measures

Permanent erosion and sediment control measures are included as part of the construction documents and include the following:

1. Establishment of Permanent Vegetation

Disturbed areas that will be vegetated must be seeded in accordance with the contract documents. The type of seed, mulch, and maintenance measures as described in the contract documents shall also be followed.

All areas at final grade must be seeded and mulched within 14 days after completion of the major construction activity. All seeded areas should be protected with mulch.

Final site stabilization is achieved when all soil-disturbing activities at the site has been completed and a uniform, perennial vegetative cover with a density of 80 percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

Permanent stabilization includes sod and or seeding based on the requirement of the Tennessee Erosion and Sediment control handbook and as outline in the table below. The project site is located within Region II.

Zone		Best	Marginal	Rate/Mix (lb/ac PLS)
Region I	Poorly drained soils	Feb 1 – Mar 20 Sept 1 – Sept 30	Mar 20 – Apr 30 Sept 30 – Oct 31	80 Pensacola bahiagrass 30 Bermudagrass (hulled) 20 Korean lespedeza** 10 Kobe lespedeza**
	Well drained soils	Apr 1 – July 15		50 Pensacola bahiagrass 15 Bermudagrass (hulled) 30 Korean lespedeza** 15 Foxtail millet**
	High maintenance	Apr 1 – July 15		40 Bermudagrass (hulled)
Region II	Low maintenance; Slopes and Poor, shallow soils	Aug 25 – Sept 15 Feb 15 – Mar 21	Sept 15 – Oct 25 Mar 21 – Apr 15	100 Pensacola bahiagrass 40 Bermudagrass (hulled) 20 Korean lespedeza** 10 Kobe lespedeza**
	Low maintenance; Moderate slopes; soils >6 in. depth	Aug 25 – Sept 15 Feb 15 – Mar 21	Sept 15 – Oct 25 Mar 21 – Apr 15	80 Pensacola bahiagrass 30 Bermudagrass (hulled) 20 Korean lespedeza** 10 Kobe lespedeza**
	High maintenance	Aug 15 – Oct 15	Feb 15 – Apr 15	200 KY 31 fescue**

5.3 Other Pollutant Controls

Control of sediments has been described previously. Other aspects of this SWPPP are listed below:

1. Solid Waste Disposal

No solid materials, including building materials, are allowed to be discharged from the site with stormwater. All solid waste, including disposable materials incidental to the major construction activities, must be collected and placed in containers. The containers will be emptied periodically by a contract trash disposal service and hauled away from the site.

Substances that have the potential for polluting surface and/or groundwater must be controlled by whatever means necessary in order to ensure that they do not discharge from the site. As an example, special care must be exercised during equipment fueling and servicing operations. If a spill occurs, it must be contained and disposed so that it will not flow from the site or enter groundwater, even if this requires removal, treatment, and disposal of soil. In this regard, potentially polluting substances should be handled in a manner consistent with the impact they represent.

2. Sanitary Facilities

Temporary sanitary facilities will be provided by the Contractor throughout the construction phase. They must be utilized by all construction personnel and will be serviced by a commercial Contractor. These facilities must comply with state and local sanitary or septic system regulations.

3. Water Source

Non-stormwater components of site discharge must be clean water. Water used for construction, which discharges from the site, must originate from a public water supply or private well approved by the Health Department. Water used for construction that does not originate from an approved public supply must not discharge from the site. It can be retained in the ponds until it infiltrates and evaporates.

4. Long-Term Pollutant Controls

In addition to the permanent stormwater management facilities, identified on the accompanying plans, stormwater pollutant control measures installed during construction that will also provide benefits after construction include temporary sediment basins and rip-rapped outfalls. Temporary sediment basins that do not interfere with normal operations and appear to provide long-term benefits may be left in place after construction is completed, as directed by the Operator.

5.4 Construction Housekeeping Practices

During the construction phase, the general Contractor will implement the following measures:

1. Material resulting from the clearing and grubbing operation will be stockpiled up slope from adequate sedimentation controls.
2. The general Contractor will designate areas for equipment cleaning, maintenance, and repair. The general Contractor and subcontractors will utilize those areas.
3. The use of detergents for large scale washing is prohibited (i.e., vehicles, buildings, pavement surfaces, etc.)
4. Spill Prevention and Response

A Spill Prevention and Response Plan shall be developed for the site by the Contractor. The plan shall detail the steps needed to be followed in the event of an accidental spill and shall identify contact names and phone numbers of people and agencies that must be notified.

The plan shall include Material Safety Data Sheets (MSDS) for all materials to be stored on-site. All workers on-site will be required to be trained on safe handling

and spill prevention procedures for all materials used during construction. Regular tailgate safety meetings shall be held and all workers that are expected on the site during the week shall be required to attend.

5. Material Storage

Construction materials shall be stored in a dedicated staging area. The staging area shall be located in an area that minimizes the impacts of the construction materials effecting stormwater quality.

Chemicals, paints, solvents, fertilizers, and other toxic material must be stored in waterproof containers. Except during application, the contents must be kept in trucks or within storage facilities. Runoff containing such material must be collected, removed from the site, treated and disposed at an approved solid waste or chemical disposal facility.

6.0 STORMWATER MANAGEMENT PLAN

The goals of this Stormwater Management Plan are to analyze the peak rate of runoff under pre- and post-development conditions, to maintain the pre-development rate of runoff in order to minimize impacts to adjacent or downstream properties, and to minimize the impact of the quality to runoff exiting the site.

These objectives will be met by applying Best Management Practices (BMPs) to limit peak runoff rates.

6.1 Stormwater Management Systems

The existing site is predominantly pervious, as shown above in Table 3. The proposed construction disturbs enough area (greater than one acre) to warrant an erosion control plan, but the total additional impervious area added to the project site ultimately does not affect the stormwater flows for the project area.

The site was analyzed in pre and post-developed conditions and it was determined that the change in discharge rate because of the additional impervious post development stormwater controls will be mitigated by a series of bioretention ponds.

6.2 Hydrologic and Hydraulic Analysis

This report presents the pre-development and post-development features and conditions associated with surface water runoff within the study area. For both cases, the drainage patterns, drainage structures, soil types, and ground cover types are considered in this study.

1. Methodology

The methodology used for the hydrologic and hydraulic analysis was obtained from the United States Department of Agriculture (USDA) Soil Conservation Service's (SCS) Technical Release No. 20, as utilized by the application program HydroCAD. HydroCAD, developed by Applied Microcomputer Systems of Chocorua, New Hampshire, is a Computer-Aided-Design (CAD) program for analyzing the hydrologic and hydraulic characteristics of a given watershed and associated stormwater management facilities. It utilizes the latest techniques to predict the consequences of any given storm.

HydroCAD has the capability of computing hydrographs (which represents discharge rates characteristic of specified watershed conditions, precipitation, and geologic factors) combining hydrographs and routing flows through pipes, streams and ponds. Documentation for HydroCAD can be found on their website: <http://www.hydrocad.net/>.

For this analysis, the watershed and drainage system were broken down into a network consisting of four types of components as described below:

1. Subcatchment: A relatively homogeneous area of land, which produces a volume and rate of runoff unique to that area.
2. Reach: Uniform streams, channels or pipes that convey stormwater from one point to another.
3. Pond: Natural or man-made impoundment, which temporarily stores stormwater runoff and empties in a manner determined by its geometry and the hydraulic structure located at its outlets.
4. Link: A multi-purpose mechanism used to introduce a hydrograph from another file.

Subcatchments, reaches, ponds and links are represented by hexagons, squares, triangles, and broken boxes respectively, on the watershed routing diagrams provided with the computations included in Appendix C and Appendix D.

2. Analysis

The analysis of hydrologic and hydraulic conditions and proposed stormwater management facilities, servicing the study area, was performed by dividing the tributary watershed into relative homogeneous sub-catchments. The separation of the watershed into sub-catchments was dictated by watershed conditions, methods of collection, conveyance, and points of discharge. Watershed characteristics for each subcatchment were then assessed from United States Geological Service (USGS) 7.5-minute topographic maps, aerial photographs, a topographical survey, soil surveys, site investigations, and land use maps.

Proposed stormwater management facilities were designed and evaluated in accordance with the *TDEC Erosion & Sediment Control Handbook* and local regulatory requirements. The hydrologic and hydraulic analysis considered the SCS, Type II 24-hour storm events identified in Table 3.

Table 4: Design Events

Facility	24 Hour Storm Event
Bioretention Ponds and Detention Ponds	2-year
	5-year
	10-year
	25-year
	50-year
	100-year

3. Study Area and Design Points (DP)

The study area consists of an overall watershed that encompasses the project site. The project site is light to moderately sloping from south to north, and ultimately to the south east corner of the property. The project site was broken down into smaller watersheds, or subcatchments, to allow for analysis of runoff conditions for pervious and impervious areas. Subcatchments contribute to two Design Points (DP) located across the site, where stormwater leaves the project site.

A description of the design points and descriptions of each subcatchment are in Section 6.3 Pre-Development Watershed Conditions. Section 6.4 discusses the Post-Development Conditions as well as the proposed stormwater management features. Figures showing the watersheds and subcatchments are provided at the beginning of each of the hydraulic calculation section for pre- and post- watershed conditions.

6.3 Pre-Development Watershed Conditions

The Study Area Subcatchment Map has been provided in Appendix C. The results of the computer modeling used to analyze the overall watershed under pre-development conditions are presented in Appendix C. The pre-development discharge rates are presented in Table 5.

6.4 Post-Development Watershed Conditions

The proposed construction at the project site will increase the impervious area of the property. The analysis of post-development conditions considered existing drainage patterns, soil types, ground cover to remain, planned site development, site grading and, stormwater management facilities proposed as part of site improvements. While the design points have remained unchanged between the existing and proposed conditions, the percentage of impervious area has been updated to account for the increased runoff.

The breakdown of subcatchments for post-development conditions is presented in Appendix D. The results of the computer modeling used to analyze the overall watershed under post-development conditions are presented in Appendix D. A summary of the post-development discharge rates is presented in Table 5.

6.5 Hydrologic and Hydraulic Calculations

Comparison of pre- and post-development watershed conditions demonstrates that the peak rate of runoff from the subject site will not be increase and therefore will not pose a significant adverse impact to the adjacent or downstream properties or receiving water courses. Table 4 “Summary of Pre- and Post-Development Peak Discharge Rates” summarizes the results of the analyses for such comparison.

Table 5: Summary of Pre- & Post-Development Peak Discharge Rates

Pre- vs. Post-Development Discharge Rate (cfs)												
Design Point (DP)	2- year		5-year		10-year		25-year		50-year		100-year	
	24-hour Storm		24-hour Storm		24-hour Storm		24-hour Storm		24-hour Storm		24-hour Storm	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	0.11	0.02	1.13	0.24	2.16	0.50	3.72	0.92	5.02	1.79	6.39	5.35
2	0.18	0.00	0.79	0.05	1.33	0.09	2.11	0.16	2.75	0.22	3.42	0.28

The results of the computer modeling used to analyze the stormwater management system under pre- and post-development conditions are presented in Appendix C and Appendix D, respectively.

7.0 INSPECTIONS, MAINTENANCE, AND REPORTING

7.1 Inspection and Maintenance Requirements

7.1.1 Pre-Construction Inspection and Certification

Prior to the commencement of construction, the Owner's/Operator's Engineer shall conduct an assessment of the site and certify that the appropriate erosion and sediment control measures have been adequately installed and implemented. The Contractor shall contact the Owner's/Operator's Engineer once the erosion and sediment control measures have been installed.

7.1.2 Construction Phase Inspections and Maintenance

A Qualified Inspector, as defined in the General Permit TNR-100000, shall conduct regular site inspections between the time this SWPPP is implemented and final site stabilization. Site inspections shall occur at an interval of at least once every seven calendar days.

The purpose of site inspections is to assess performance of pollutant controls. Based on these inspections, the qualified inspector will decide whether it is necessary to modify this SWPPP, add or relocate sediment barriers, or whatever else may be needed in order to prevent pollutants from leaving the site via stormwater runoff. The general contractor has the duty to cause pollutant control measures to be repaired, modified, maintained, supplemented, or whatever else is necessary in order to achieve effective pollutant control.

Examples of particular items to evaluate during site inspections are listed below. This list is not intended to be comprehensive. During each inspection the inspector must evaluate overall pollutant control system performance as well as particular details of individual system components. Additional factors should be considered as appropriate to the circumstances.

1. Locations where vehicles enter and exit the site must be inspected for evidence of off-site sediment tracking. A stabilized construction entrance will be constructed where vehicles enter and exit. This entrance will be maintained or supplemented as necessary to prevent sediment from leaving the site on vehicles.
2. Sediment barriers must be inspected and, if necessary, they must be enlarged or cleaned in order to provide additional capacity. All material from behind sediment barriers will be stockpiled on the up slope side. Additional sediment barriers must be constructed as needed.
3. Inspections will evaluate disturbed areas and areas used for storing materials that are exposed to rainfall for evidence of, or the potential for, pollutants entering the drainage system. If necessary, the materials must be covered or original covers must be repaired or supplemented.
4. Grassed areas will be inspected to confirm that a healthy stand of grass is maintained. The site has achieved final stabilization once all areas are covered with building foundation or pavement, or have a stand of grass with at least 80 percent density. The density of 80 percent or greater must be maintained to be considered

as stabilized. Areas must be watered, fertilized, and reseeded as needed to achieve this goal.

5. All discharge points must be inspected to determine whether erosion control measures are effective in preventing significant impacts to receiving waters.
6. The system shall be maintained and inspected according to the "Post-Construction Inspections and Maintenance" as outlined in Section I-01 of the "Tennessee Guide to Selection & Design of Stormwater BMPs".
7. Maintenance of the systems may include but not be limited to excavation and replacement of the infiltration bed every 5 years.

The inspection reports must be completed entirely and additional remarks should be included if needed to fully describe a situation. An important aspect of the inspection report is the description of additional measures that need to be taken to enhance plan effectiveness. The inspection report must identify whether the site was in compliance with the SWPPP at the time of inspection and specifically identify all incidents of non-compliance.

Within one business day of the completion of an inspection, the qualified inspector shall notify the Owner/Operator and appropriate contractor (or subcontractor) of any corrective actions that need to be taken. The contractor (or subcontractor) shall begin implementing corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

In addition to the inspections performed by the Owner's/Operator's Engineer, the Contractor shall perform routine inspections that include a visual check of all erosion and sediment control measures. All inspections and maintenance shall be performed in accordance with the inspection and maintenance schedule provided on the accompanying plans. Sediment removed from erosion and sediment control measures will be exported from the site, stockpiled for later use, or used immediately for general non-structural fill.

It is the responsibility of the general contractor to assure the adequacy of site pollutant discharge controls. Actual physical site conditions or contractor practices could make it necessary to install more structural controls than are shown on the accompanying plans. (For example, localized concentrations of runoff could make it necessary to install additional sediment barriers.) Assessing the need for additional controls and implementing them or adjusting existing controls will be a continuing aspect of this SWPPP until the site achieves final stabilization.

7.1.3 Temporary Suspension of Construction Activities

For construction sites where soil disturbance activities have been temporarily suspended (e.g. Winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the frequency of Qualified Inspector inspections can be reduced to once every 30 calendar days. Prior to reducing the frequency of inspections, the Owner/Operator shall notify the Nashville Metro contact person in writing.

7.1.4 Partial Project Completion

For construction sites where soil disturbance activities have been shut down with partial project completion, all areas disturbed as of the project shutdown date have achieved final stabilization, and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational, the Qualified Inspector inspections can stop. Prior to the shutdown, the Owner/Operator shall notify the Nashville Metro contact person in writing

7.1.5 Post-Construction Inspections and Maintenance

Inspections and maintenance of post-construction stormwater management facilities shall be performed by a Qualified Inspector, as defined herein, and shall be conducted on an annual basis to ensure that the stormwater management systems are in place and operable. Inspections and maintenance include checking all cleanouts and removing any sediment that has collected in the system. The following areas of the system shall at a minimum be checked.

General System:

1. All cleanouts from downspouts.
2. All cleanouts related to the stormwater management system and identified in the plans.
3. All grates related to the storm water management system.
4. Visual inspection of the detention basins.
5. Visual inspection of the level spreaders

As Needed:

1. Inspect to insure that all vegetation is healthy and replace as necessary to ensure desired density.
2. Inspect and remove leaves and debris from inlets and outlets.
3. Inspect sumps for detention basin and clean if necessary.

Annually:

1. Spring inspection and cleanup
2. Inspect and replace vegetation as necessary
3. Inspect level spreaders, sumps and StormTech system.

Records shall be kept for all annual inspection in accordance to the Reporting Requirement in Section 7.2.

If any portion of the systems is found to be damaged or not be functioning as designed the owner shall contract the engineer of record and or replace the portion of the system to meet the original design specifications.

7.2 Reporting Requirements

7.2.1 Inspection and Maintenance Reports

Inspection/maintenance reports shall be prepared prior to and during construction in accordance with the schedule outlined herein. The reports shall be prepared to identify and document the maintenance of the erosion and sediment control measures. A sample inspection form is provided in Appendix A and shall only be prepared if required by Nashville Metro.

Specifically, each inspection shall record the following information:

1. Date and time of inspection.
2. Name and title of person(s) performing inspection.
3. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection.
4. A description of the condition of the runoff at all points of discharge (including conveyance systems and overland flow) from the construction site. This shall include identification of any discharges of sediment from the construction site.
5. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any discharges of sediment to the surface waterbody.
6. Identification of all erosion and sediment control practices that need repair or maintenance.
7. Identification of all erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or repaired.
8. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection.
9. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards.
10. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s).
11. Digital photographs, with date stamp, which show the condition of all practices that have been identified as needing corrective action or have undergone corrective action, must be attached to the associated inspection report.

7.2.2 Site Log Book

The Owner/Operator shall retain a copy of the SWPPP at the construction-site from the date of initiation of construction activities to the date of final stabilization.

During construction, the Owner's/Operator's Engineer shall maintain a record of all SWPPP inspection reports at the site in the Site Log Book. The Site Log Book shall be maintained on-site and made available to the permitting authority.

7.2.3 Post Construction Records and Archiving

Following construction, the Owner/Operator shall retain copies of the SWPPP, the complete construction Site Log Book, and records of all data used to complete the NOI to be covered by this permit, for a period of at least five years from the date that the site is finally stabilized.

8.0 CONCLUSION

S+H Group, LLC has completed a Stormwater Pollution Prevention Plan for the planned construction at 1590, 1600, 1602, and 1604 Lebanon Pike, Nashville, Davidson County Tennessee. The analysis included the review of watershed conditions, hydrologic and hydraulic analysis using computer modeling, and an evaluation of the proposed improvements across the subject site.

The Stormwater Management Plan allows for the maintenance of existing drainage patterns while continuing the conveyance of stormwater runoff from upland watershed areas.

The Stormwater Management Plan controls decrease in the stormwater rate of runoff resulting from the proposed development without adversely affecting downstream conditions. This is demonstrated by comparing pre- and post-development flows for various storm events. Table 5 "Summary of Pre- and Post-Development Peak Discharge Rates" summarizes the results of the analyses for such comparison.

The comparison of pre- and post-development watershed rate of runoff demonstrates that off-site peak flow conditions at the design points will pose no significant adverse impacts to the adjacent or downstream properties or receiving water courses.

Stormwater quality will be enhanced through the implementation of the proposed erosion and sediment control measures and maintenance practices outlines herein.

In conclusion, it is our opinion that the proposed development will not adversely impact adjacent or downstream properties if the stormwater management facilities are properly constructed and maintained in accordance with the requirements outlines herein.

**OWNER'S CERTIFICATION OF THE
STORMWATER POLLUTION PREVENTION PLAN**

**GENERAL PERMIT FOR STORMWATER DISCHARGES
FROM CONSTRUCTION ACTIVITIES**

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage this system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."



Signature of Owner

Nick Adler

Printed Name

Developer

Title

5/20/2020

Date