APPENDIX A

OVERLAY DISTRICTS AND WATERSHED MAPS

A1.1: ACT 167 RELEASE RATE DISTRICTS

A1.2: SPECIAL ZONING DISTRICTS

A1.3: PUBLIC HEALTH AND SAFETY WATERSHEDS

A1.4: COMMONWEALTH IMPAIRED WATERS

A1.5: CITY OF PITTSBURGH MS4 AND CSS AREAS

A1.6: LANDSLIDE PRONE OVERLAY DISTRICT

A1.7: UNDERMINED AREA OVERLAY DISTRICT

FIGURE A1.1: ACT 167 RELEASE RATE DISTRICTS

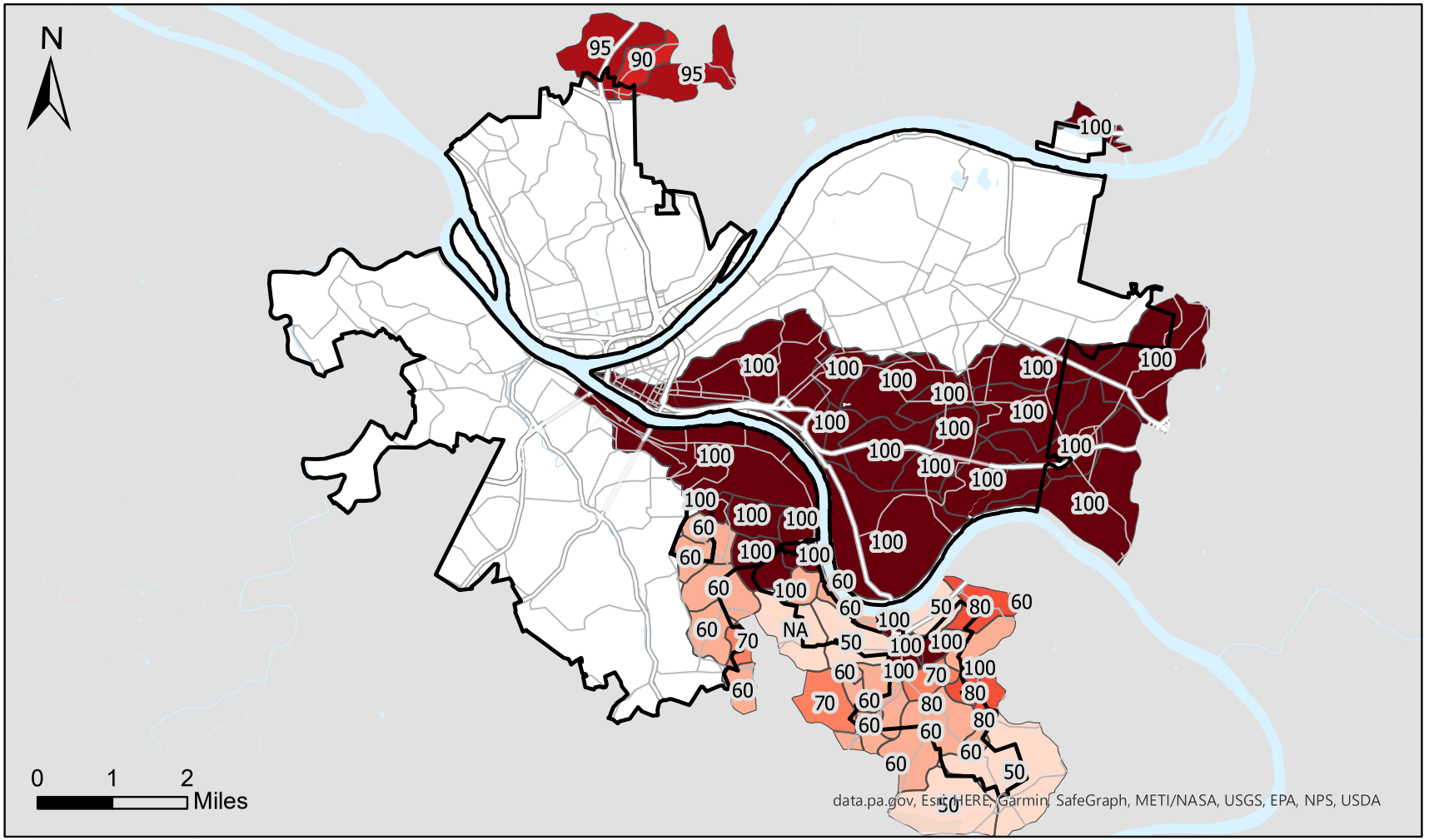


FIGURE A1.2: SPECIAL ZONING DISTRICTS

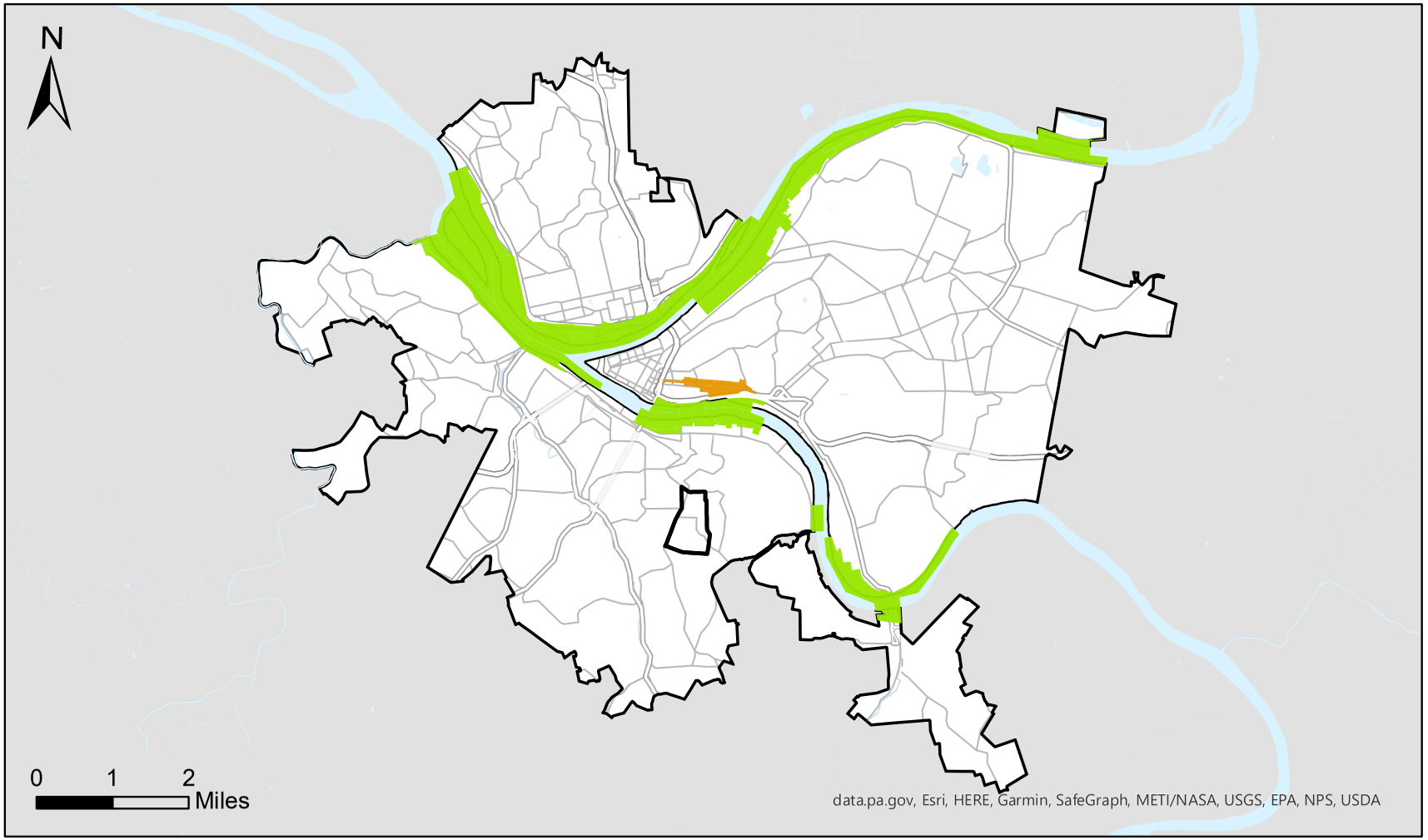
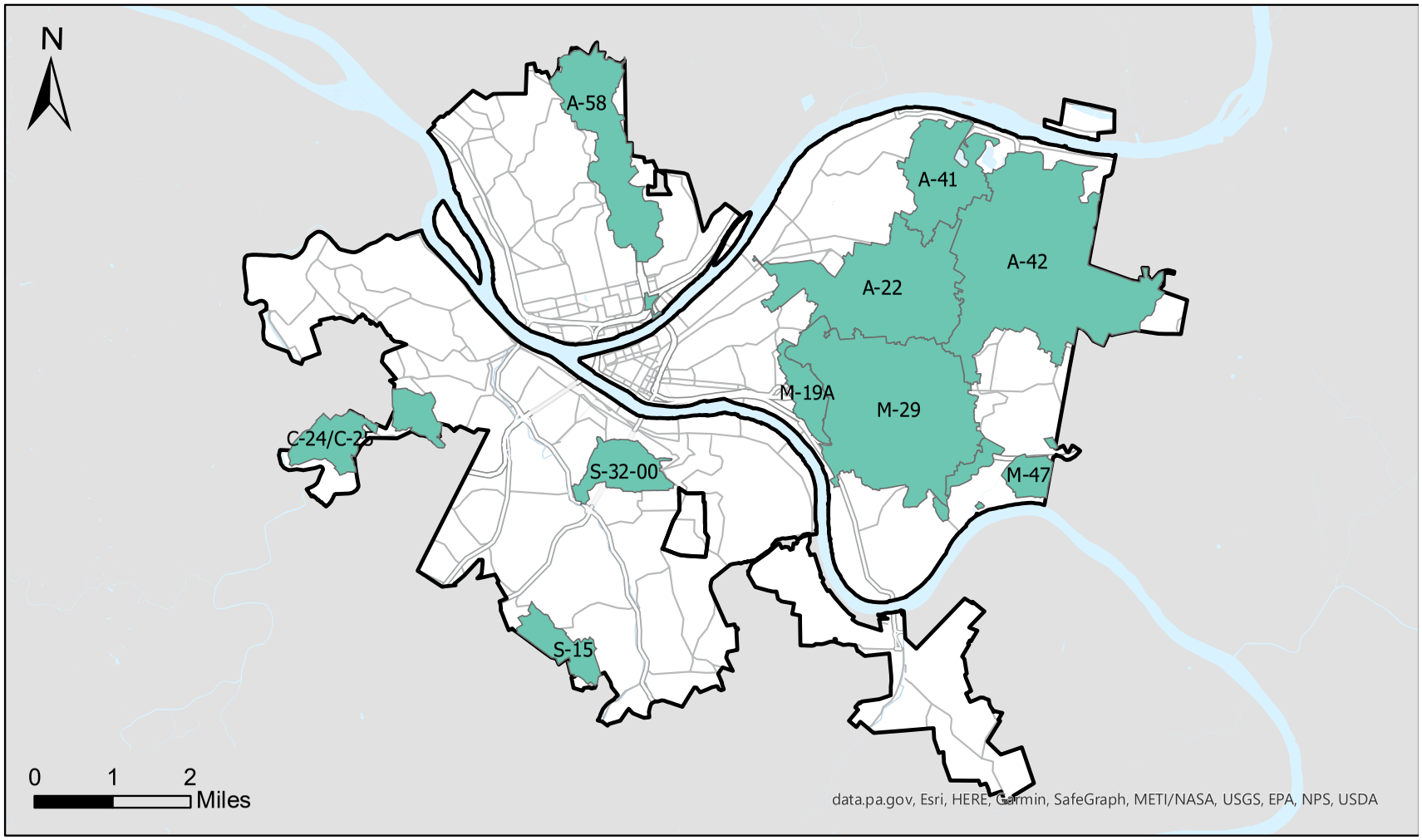


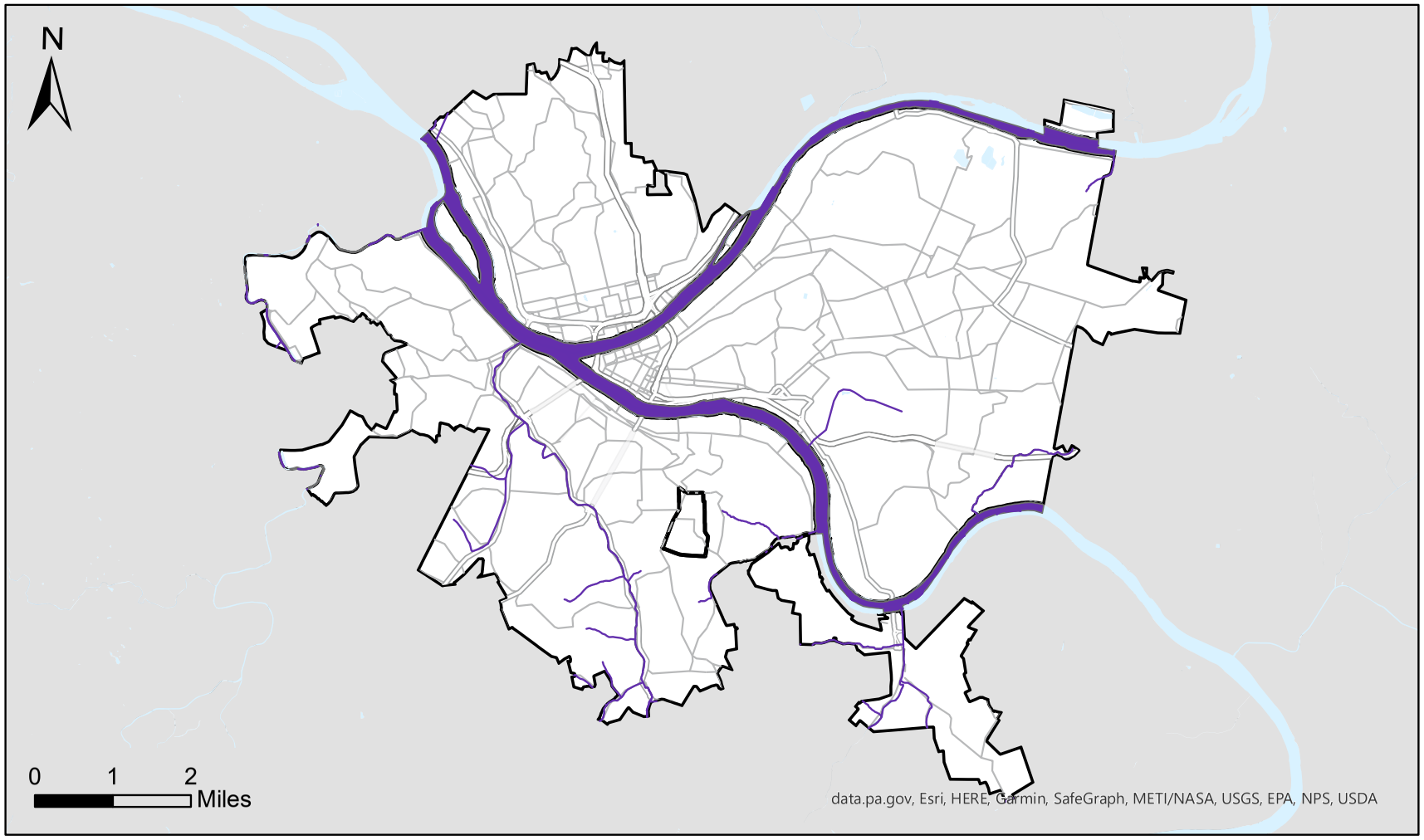
FIGURE A1.3: PUBLIC HEALTH AND SAFETY WATERSHEDS



Legend

- Public Health and Safety Sewersheds
- Major Roads

FIGURE A1.4: COMMONWEALTH IMPAIRED WATERS



See full list of Commonwealth Designated Impaired Waters here:
https://gis.dep.pa.gov/IRStorymap2020/

FIGURE A1.5: CITY OF PITTSBURGH MS4 AND CSS AREAS

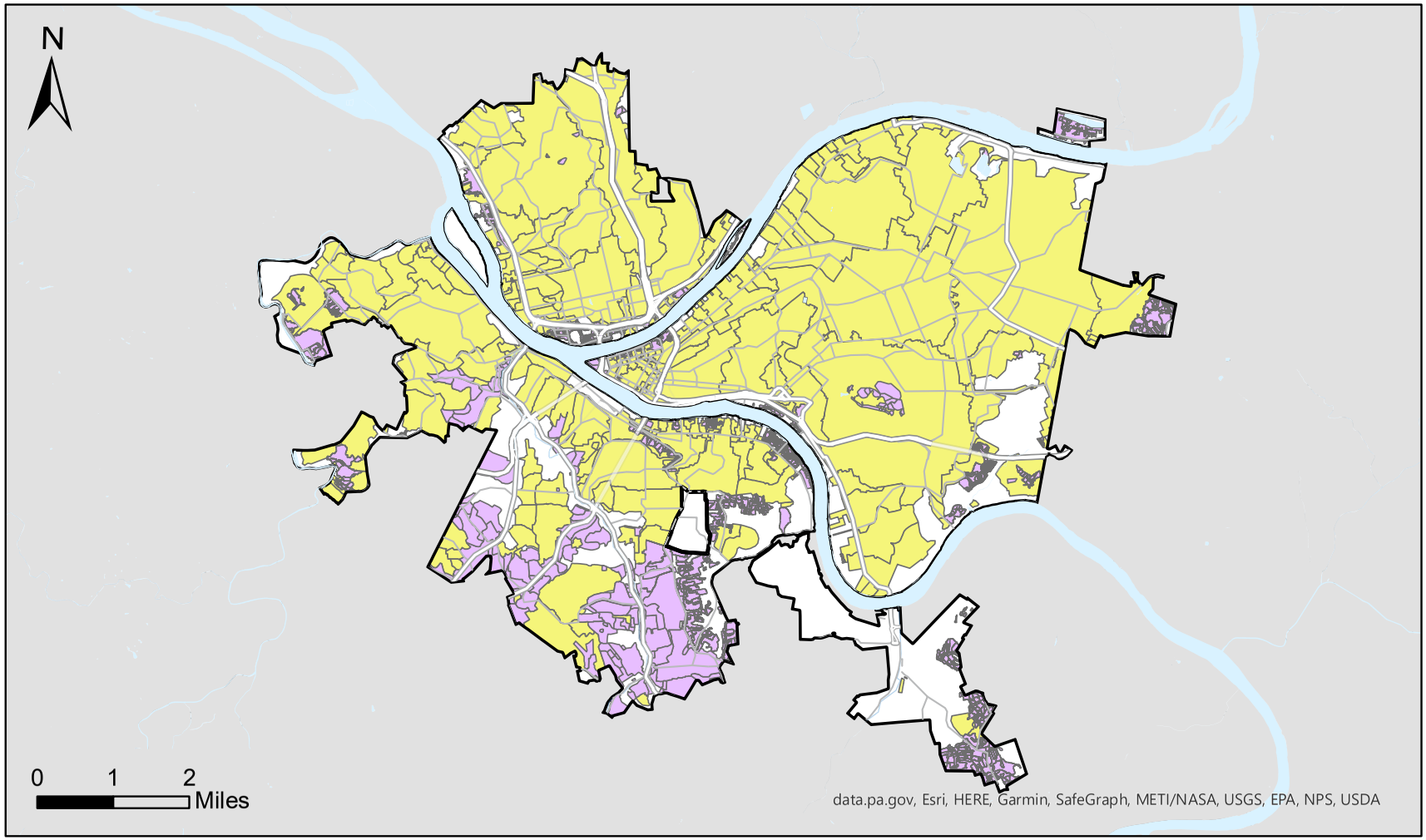


FIGURE A1.6: LANDSLIDE PRONE OVERLAY DISTRICT

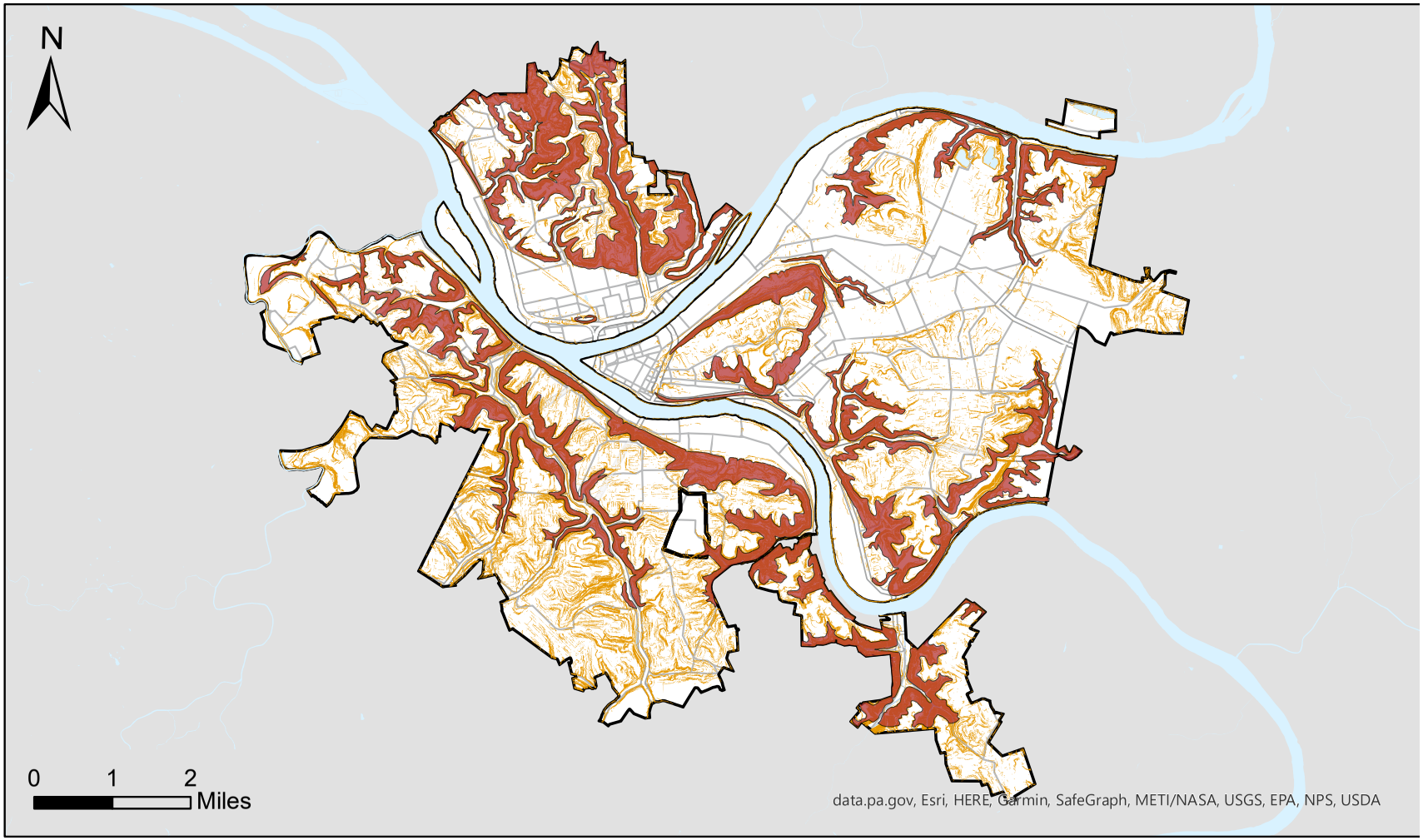
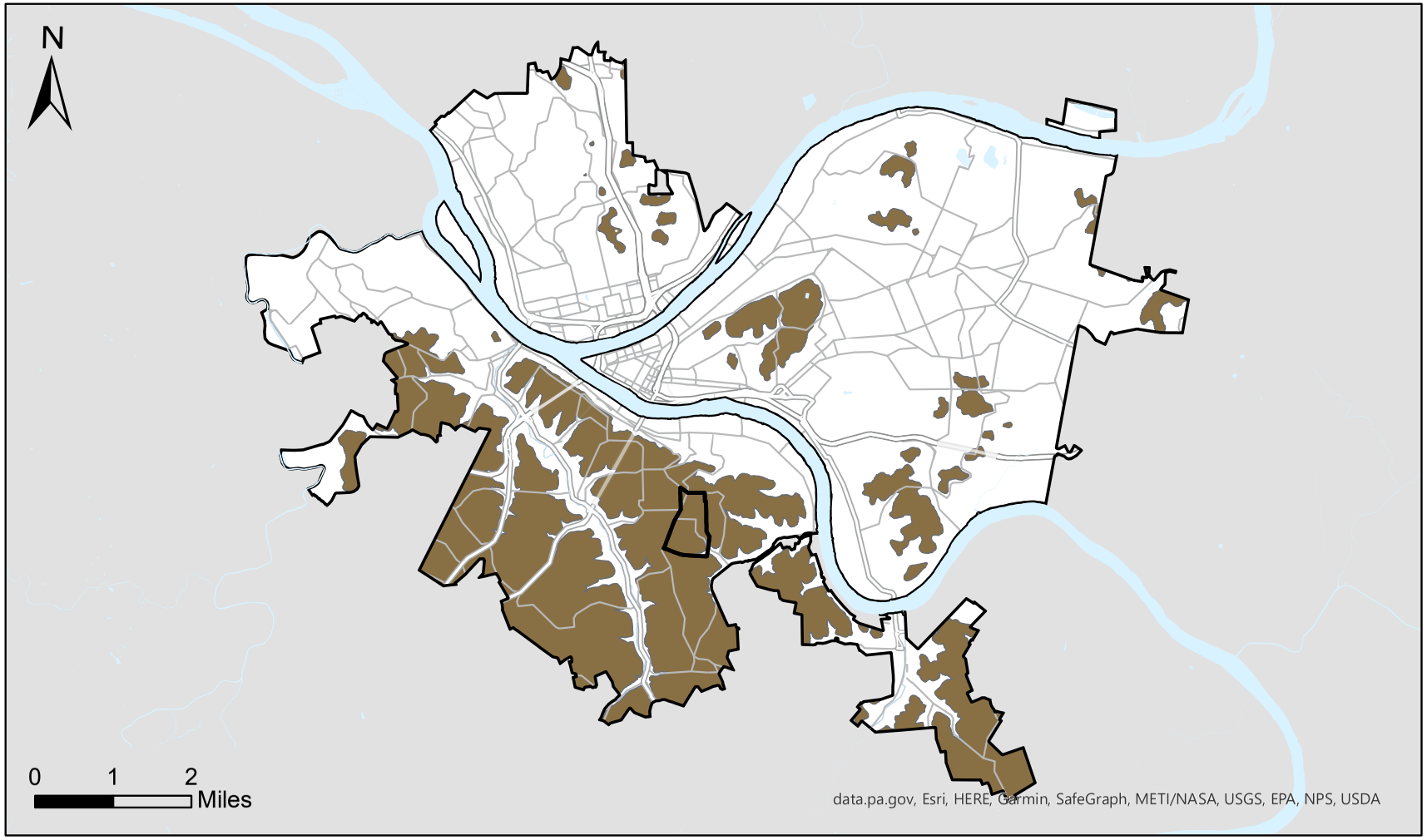


FIGURE A1.7: UNDERMINED AREA OVERLAY DISTRICTS



Legend

- Undermined Area Overlay District
- Major Roads

APPENDIX B

INFILTRATION TESTING AND GEOTECHNICAL REQUIREMENTS AND INFILTRATION WAIVER FORM

INTRODUCTION

The following sections detail requirements for infiltration testing and geotechnical assessment reporting as part of the SWM site plan submission. All SWM site plan submission are required to submit infiltration testing results and a geotechnical report in accordance with the following guidelines.

GEOTECHNICAL ASSESSMENT

Environmental "Hot Spot" Determination Procedures

Infiltration through contaminated soils may cause the pollution of ground and surface waters, so environmental "hot spots" need to be properly addressed during the design of stormwater best management practices (BMPs). To determine possible environmental hot spot contamination the applicant shall perform the following:

1. Provide Title search, aerial photographs, soil surveys, topographic maps, city and state regulatory databases, and a review of state and local records for projects generally following the latest ASTM standard E1527 available.
2. Listed below are common examples of prior land uses with the potential to have contaminated soil. Contaminated soil can cause contamination of groundwater and surface waters and infiltration BMPs should not be designed in such soils, unless the designer can prove that infiltration will not cause transport of contaminants.
    a. Sites designed as CERCLA (superfund) sites
    b. Natural resource minors
    c. Reuse of historic fill materials (refer to the January 2020 PADEP Clean Fill Policy)
    d. Auto recycler facilities and junk yards
    e. Commercial laundry and dry cleaning
    f. Commercial nurseries
    g. Vehicle fueling stations, service and maintenance areas
    h. Toxic chemical manufacturing and storage
    i. Petroleum storage and refining
    j. Public works storage areas

k. Airports and deicing facilities, railroads and rail yards, marinas and ports
l. Heavy manufacturing and power generation
m. Metal production, planting and engraving operations
n. Landfills and hazardous waste material disposal
o. Sites on subsurface material such as fly ash known to contain mobile heavy metals and toxins
p. Potential for contamination based on prior land use does not exempt the applicant from conducting infiltration testing and geotechnical soil characterization, which are required for all SWM site plan submissions.

Test Pits/Soil Borings Analysis and Methods

For large infiltration BMPs:

1. The professional may use a combination of test pits and test borings to characterize site soils on a subject site. Test pits and test borings shall be conducted for each proposed BMP and within 25 horizontal feet of the proposed BMP footprint.
2. Infiltration footprint areas below 2,500 square feet shall have one a minimum of (1) test pit or one (1) soil boring to characterize site soils.
3. Infiltration footprint areas between 2,501-5,000 square feet shall have a minimum of two (2) test pits or two (2) soil borings to characterize site soils.
4. Infiltration footprint areas between 5,001-10,000 square feet shall have a minimum of three (3) test pits or three (3) soil borings to characterize site soils.
5. One (1) additional test pit or one (1) additional soil boring for each increase in infiltration surface area of 5,000 square feet (e.g., four (4) test pits or four (4) soil borings for area between 10,001-15,000 square feet; five (5) test pits or five (5) soil borings for area between 15,001-20,000 square feet, etc.)

For linear infiltration BMPs:

1. A linear infiltration BMPs is defined as a having a footprint area with a length to width ratio of 4:1 or higher.
2. A minimum of one (1) test pit or one (1) soil boring to characterize site soils shall be completed to represent the first 100 linear feet of infiltration area.
3. A minimum of one (1) additional test pit or one (1) additional soil boring shall be completed for each additional 200 linear feet of infiltration area.

Depth of Test Pits/Soil Borings

Test pits and soil borings shall be excavated to a depth of four (4) to six (6) feet below the bottom of the planned BMP bottom elevation or a depth of two times the maximum potential water depth in the BMP, whichever is greater.

INFILTRATION TESTING

Infiltration tests shall consist of either a double ring infiltrometer test in a test pit or a borehole infiltration test and follow the guidelines for each method as described below. Infiltration tests shall be performed within one (1) vertical foot depth of the proposed bottom elevation of the stormwater BMP and within 25 horizontal feet of the proposed BMP footprint.

For large infiltration areas:

1. One (1) infiltration test per facility shall be conducted when the infiltration footprint area is less than 5,000 square feet.
2. One (1) additional infiltration test shall be conducted for each increase in infiltration footprint area of 5,000 square feet.
3. For small, linear infiltration areas:
    a. One (1) infiltration test shall be conducted for every 100 linear feet.
    b. A minimum of one (1) additional infiltration test shall be conducted for every additional 200 linear feet.

Double Ring Infiltrometer Test

Requirements for double ring infiltrometer testing are as follows:

1. The diameter of the inner testing ring must be a minimum of 6 inches.
2. All double ring infiltrometer tests must be performed in a test pit with a maximum of two tests per pit.
3. Tests shall be spaced as evenly as possible between and within test pits.
4. All tests must have a minimum depth of water of 4 inches when filled.
5. A presoaking period of 1 hour is required before the beginning of each test. The rings shall be refilled once at the 30-minute mark during the presoak.
6. The frequency of test readings is determined by the inner-ring change in depth during the last 30 minutes of the presoak. Both rings must be refilled to the designated mark once readings are recorded.
    a. Readings shall be taken at 10-minute intervals for an inner-ring change of 2 inches or more.
    b. Readings shall be taken at 30-minute intervals for an inner-ring change less than 2 inches.
7. Testing may be terminated after a minimum of eight readings or once a stabilized infiltration rate is measured. A stabilized infiltration rate is reached when the inner-ring change in depth for four consecutive readings are all within 0.25 inches of each other.
8. All testing must be in accordance with ASTM D3385-09 unless specified otherwise above.

Cased Borehole Infiltration Test

Requirements for cased borehole infiltration testing are as follows:

1. Infiltration tests cannot be completed within the same borehole as those used for soil characterization but must be completed within a 25-foot radius of a soil borehole
2. Inner diameter of the pipe used for testing must be a minimum of 4 inches.
3. Borehole casing must be installed in accordance with ASTM D6151-018.
4. Only one test may be performed per borehole, regardless of the depth of tests proposed.
5. Presoaking period of one hour is required before the beginning of each test. Casings shall be filled with water at a low rate as not to disturb sediment with a minimum depth of 6 inches at the beginning of the presoak. Refill to the casing to the starting depth once at the 30-minute mark during the presoak.
6. The frequency of test readings is determined by the water change in depth within casing during the last 30 minutes of the presoak. The casing must be refilled to the designated mark once readings are recorded.
    a. Readings shall be taken at 10-minute intervals for a water level change of 2 inches or more.
    b. Readings shall be taken at 30-minute intervals for a water level change less than 2 inches.
7. Water levels shall remain a constant level of at least 12 inches from the bottom of the borehole through the duration of the test. All water added must be recorded as a volume with the time of addition.
8. Testing may be terminated after a minimum of eight readings or once a stabilized infiltration rate is measured. A stabilized infiltration rate is reached when the inner-ring change in depth for four consecutive readings are all within 0.25 inches of each other.
9. All testing must be in accordance with ASTM D6391-11 unless specified otherwise above.

Infiltration Factor of Safety for Design Calculations

Stormwater BMPs are required to be sized based on a design infiltration rate and applying a factor of safety to the actual (i.e., measured) infiltration rate. A factor of safety of two (2) is to be used for design purposes for all measured infiltration rates. This means that actual (field measured) infiltration rate should be divided by 2 to obtain the design infiltration rate. The measured and design infiltration rates shall be clearly indicated as part of all design calculations within the SWM site plan submission.

GEOTECHNICAL REPORT REQUIREMENTS

Geotechnical Report must be stamped and signed by a Pennsylvania State Licensed Professional Engineer or Professional Geologist. The geotechnical report will include, but is not necessarily limited to, the following:

1. Project and site description
    a. Purpose and scope of the geotechnical exploration
    b. Site Vicinity map or image displaying site location relative to known landslide prone slopes, steep slopes, and undermined areas (Allegheny County Landslide Portal - Map Tools (arcgis.com)); City of Pittsburgh zoning map can be found at: https://gis.pittsburghpa.gov/pghzoning/
    c. Description of proposed stormwater facility/facilities
    d. Previous studies relevant to the geotechnical exploration
    e. Topographic and hydrogeological setting
    f. Relevant site information (water bodies, landslide prone slopes or steep slopes, nearby structures, etc.)
    g. Environmental "hotspot" contamination information
2. Method of Exploration
    a. Boring method and diameter
    b. Drilling method and equipment
    c. Infiltration testing method (borehole, double ring infiltrometer, well permeameter)
    d. Samples collected for laboratory testing
3. Weather information at time of testing and during previous 24 hours, including temperature and rainfall data.
4. Results (Test boring logs and infiltration test results); summary table that includes:
    a. Test ID
    b. Test Date
    c. Test type
    d. Test Depth (ft)
    e. Infiltration rate (if relevant)
    f. Percolation rate (if relevant
    g. Depth to bedrock (if encountered)
    h. Depth to groundwater (if encountered)
    i. Soil description summary
5. Conclusions, including interpretation of testing results (e.g., whether the site is suitable for intended use, and recommendations to mitigate or avoid geologic or environmental hazards associated with stormwater management or other aspects of the project)
6. Authentication of results, analyses, and conclusions by a Pennsylvania State Licensed Professional Engineer or Professional Geologist.

7. Attachments
   a. Final location map showing as-drilled boring and infiltration testing locations
   b. Boring logs including:
      i. Blow counts
      ii. Lithology – description of each individual split spoon sample in accordance with ASTM D2487-17 and a brief verbal description with a particular focus on observed lensing or bedding
      iii. Depth to groundwater
      iv. Depth and description of native soil or fill
      v. Depth to bedrock
      vi. Percent passing 200 sieve for all laboratory grain size analysis results
      vii. Hydraulic conductivity, where estimated, based upon laboratory grain size analysis results for drainage wells (see item e. below)
   c. Infiltration test results, including:
      i. Name, contact information, and qualifications of the person conducting the infiltration test, including professional license information
      ii. The number and method(s) of infiltration tests performed
      iii. A description of each presoak test, including the depth of water used and whether the excavation could maintain a head
      iv. A description of infiltration test, including method used, the dimensions of the excavation (e.g., the test pit dimensions or pipe interior diameter and depth), and the depth and volume of water used
      v. All time and volume measurements (i.e., infiltration test data tables)
      vi. Infiltration rate calculations and recommended design infiltration rate and the factor of safety used to develop this recommended design infiltration rate.
   d. Well permeameter test construction diagram (4-inch PVC), complete with all relevant dimensions (for drainage well and infiltration column tests only)
   e. Laboratory results – Grain size analyses and calculation of hydraulic conductivity (for sandy sediments where d10 is between 0.1 and 3.0 mm) using the equation:

      $K = C \times (d10)2$
      Where:
      C = Hazen's Empirical Coefficient (1.0 to 1.5)
      d10 = effective grain size, or the diameter of the 10th percentile grain size of the material

f. Photographic logs, including photographs of lithological profiles from test pits (if applicable) as well as photographs of pre- and post- testing conditions. Photographs of locations will show site context, so the location of testing locations can be discerned from the photographs.

Infiltration Waivers

If infiltration is infeasible and non-infiltration BMPs are proposed, the applicant shall submit an infiltration waiver request to the designated SWM site plan reviewer.

Infiltration Waiver Requirements

In order to receive an infiltration waiver, the applicant is required to provide the following:

- Project information (name, location/address, project number),
- Map of the site including property boundaries and limits of disturbance,
- Date of request,
- Signed and sealed geotechnical report,
- Clarification if the project area is in an environmental hotspot, undermined area, or is landslide prone with locations of each indicated on the map of the site,
- Type of infiltration test performed,
- Infiltration tests location/distance from the proposed BMP,
- Depth of infiltration tests,
- Summary of infiltration rates (for each test location),
- Detailed explanation why infiltration is infeasible at the project site/BMP area.

Exceptions may be made to the above list if the proposed development site is fully within a known landslide prone area or undermined area or based on other technical data and justification provided by a qualified licensed professional.

INFILTRATION WAIVER REQUEST FORM

An infiltration waiver request form is required for projects where infiltration is not feasible for the management of stormwater. In addition to this Form, supporting documentation including a signed and sealed geotechnical report and project site map with defined limit of disturbance (LOD) must be submitted.

Project Site Information

Project Name	
Project Address Line 1	
Project Address Line 2	
Project City	
Project State	
Project Zip	

Property Owner Information

Property Owner First Name	
Property Owner Last Name	
Property Owner Organization	
Property Owner Address:	
Property Owner Email:	
Property Owner Phone Number:	

	Yes	**No**
Is the project area a stormwater hotspot (i.e. a location where activities or practices exist that have the potential to produce relatively high levels of stormwater pollutants)?		

Indicate the type(s) of infiltration test(s) performed.	

	Yes	**No**
Were infiltration tests performed within 25 feet of the proposed stormwater management practice(s)? If no, additional infiltration testing may be required.		

List tested infiltration rates below (before applying a factor of safety).
(Submit infiltration testing logs, calculations, methodology and testing location plan. Use additional sheet of paper if space below is insufficient.)

Test Location (ID, label, etc.)	**Measured Infiltration Rate (inches/hour)**

INFILTRATION WAIVER REQUEST FORM

Please explain why subsurface conditions under the stormwater management areas is not suitable for infiltration.

APPENDIX C

APPROVED PLANT LIST

INTRODUCTION

This appendix is intended to be used by BMP designers to develop planting plans for vegetated BMPs in conjunction with vegetation requirements listed in Section 4. Plant species used in BMPs shall be selected from the tables in this appendix unless substitutions are approved by city. Note that multiple cultivars are available for a broad range of species. Cultivars may differ in characteristics and environmental tolerances.

Tree selection shall include consideration of spring dig/fall hazards in relation to project construction schedules. Trees that cannot be dug in time for scheduled construction may need to be planted in the following year or replaced with an approved substitution.

Instructions

Each table in this appendix provides a list of species that may be used based on type of plant (i.e., trees, shrubs, and herbaceous). For each species listed, the following information, where available and applicable, is provided.

Characteristics

Form – This only applies to trees and describes the overall shape of the tree canopy.
Height – Each species has a typical range that is reached at maturity if site conditions support the growth requirements of the plant.

Width – The ultimate width, or spread, of a plant at maturity determines the spacing and number of plants needed in a system.

Foliage Texture – Consider for visual interest.

Flowering Period – Consider for visual interest and wildlife value. Early blooming species can provide food for early migrants while late-blooming species can extend the seasonal availability of resources.

Flower Color – Consider for visual interest. Not relevant as an aesthetic factor for species with inconspicuous flowers.

Fall Leaf Color – Consider for visual interest. Not relevant as an aesthetic factor if fall coloration is unremarkable.

Native to US/Nativar – Native species are open-pollinated straight species with high genetic diversity; native cultivars ("nativar") are genetic variants that have been cultivated for specific traits. Cultivars have less genetic diversity and some may not provide all the wildlife benefits of

straight species, although they provide other ecosystem services, such as uptake and evapotranspiration of stormwater runoff.

Wildlife Value – Plant selection for BMPs shall include consideration of habitat for wildlife to the extent feasible. Vegetated BMPs can contribute to enhanced urban ecosystems for migratory songbirds and invertebrates by providing food, nesting materials and sites, and roosting sites. Wildlife value is indicated where known. Nativars have not been thoroughly studied, but some have shown reduced value to invertebrates as a food source (e.g., red- and purple-leaved varieties have different leaf chemistry that deters some insect feeding); for that reason, preference has been given to straight species.

Environmental Tolerances

Hydrologic Zone Elevation – Plant selection for BMPs shall take into consideration species characteristics in relation to the hydrology of engineered systems, which is a function of the designed maximum ponding depth, infiltration rate, drawdown time, stormwater soil mix, and steepness of side slopes. Select plants based on location within the following four zones:

Inflow/Entry Zone – High stress zone: plants must be able to tolerate salt spray, soil salt, high energy flow, sedimentation, and pollutants.

Lowest Zone – Deepest zone with the greatest amount of ponding; plants must be able to tolerate inundation.

Middle Zone – In systems with side slopes (i.e., rain gardens), this is the highest limit of ponding; plants must be able to tolerate fluctuating water levels and soil moisture.

Highest Zone – In systems with side slopes (i.e., rain gardens); above ordinary ponding elevation, periodic/extended drought.

Light Requirements – Plants have different requirements and tolerances for sunlight and shade that must be considered when developing a planting design for BMPs.

Soil Salinity Tolerance – BMPs adjacent to pavements treated with deicing chemicals expose plants to potential salt damage. Plants with high salt tolerance shall be used in the right-of-way. Note that a plant's tolerance to soil salt may differ from its tolerance to salt spray.

pH Tolerance – Plant species have optimal pH ranges in which they thrive. For a majority of species, the optimal pH range is between 5.5 and 7; however, many plants can still grow outside of their adapted pH range. Note that pH tolerances are provided only in the Wetland Plants tables since wet ponds and constructed wetlands can receive runoff with high levels of dissolved nutrients that can directly affect the pH level in the water.

TREES - MEDIUM TO LARGE

Plant Name		Characteristics									Environmental Tolerances		
Botanical Name	Common Name	Form	Height	Width	Foliage Texture	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/ Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Acer rubrum	Red Maple	Oval / Round	35–75'	30-50'	Coarse	Mar–Apr	Red	Red, Orange, Yellow	✓	✓	Lowest–Highest	Part Shade	Low
Acer rubrum 'Bowhall'	'Bowhall' Red Maple	Oval / Columnar	45–50'	18–25'	Coarse	Mar–Apr	Red	Red, Orange, Yellow	✓	X	Lowest–Highest	Part Shade	Low
Acer saccharum	Sugar Maple	Oval / Round	50–80'	35–50'	Coarse	April	Yellow, Green	Orange, Red	✓	X	Highest	Full Sun–Part Shade	Low
Acer x freemani	Freeman Maple	Oval / Columnar	40–60'	20–40'	Coarse	April	Green, Yellow, Red	Red, Orange	✓	X	Lowest–Highest	Full Sun	Low
Aesculus x carnea	Red Horse Chestnut	Oval / Round	30–40'	25–35'	Fine	May	Red	Green	X	X	Highest	Full Sun–Part Shade	Medium
Betula nigra	River Birch	Oval / Pyramidal	40–50'	25–35'	Coarse	Apr–May	Brown	Yellow	✓	✓	Lowest–Highest	Full Sun–Part Shade	Medium–Low
Betula nigra 'Cully' Heritage	Heritage River Birch	Oval / Pyramidal	40–70'	25–35'	Coarse	Apr–May	Brown	Yellow	✓	X	Lowest–Highest	Full Sun–Part Shade	Medium–Low
Betula nigra 'Dura Heat'	'Dura-Heat' River Birch	Oval / Pyramidal	30–40'	25-30'	Coarse	Apr–May	Brown, Green	Yellow	✓	X	Lowest–Highest	Full Sun–Part Shade	Medium–Low
Carpinus betulus	European Hornbeam	Round	40–60'	30–40'	Coarse	March	Yellow (male), Green (female)	Yellow, Orange	X	X	Highest	Full Sun–Part Shade	Low

MEDIUM TO LARGE TREES (CONT.)

Plant Name		Characteristics									Environmental Tolerances		
Botanical Name	Common Name	Form	Height	Width	Foliage Texture	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Celtis occidentalis	Common Hackberry	Oval	40–60'	40–60'	Coarse	Apr–May	Green	Yellow	✓	✓	Highest	Full Sun–Part Shade	Medium
Celtis occidentalis 'Prairie Pride'	'Prairie Pride' Common Hackberry	Oval	40–55'	40–50'	Coarse	Apr–May	Green	Yellow	X	X	Highest	Full Sun–Part Shade	Medium
Cercidiphyllum japonicum	Katsura Tree	Round	40–60'	25–60'	Coarse	Mar–Apr	Green	Yellow, Orange	X	X	Highest	Full Sun–Part Shade	Medium
Chamaecyparis thyoides	Atlantic White Cedar	Columnar	30–50'	30–40'	Fine	X	Green	Green	✓	✓	Lowest–Highest	Full Sun–Part Shade	Medium
Cladrastis kentukea	Yellowwood	Round	30–50'	40–55'	Coarse	May	White, Pink	Yellow	✓	✓	Highest	Full Sun	High
Fagus sylvatica	European Beech	Oval / Round	50–60'	35–50'	Coarse	Apr–May	Green	Orange, Gold, Bronze	X	X	Highest	Full Sun	Low
Ginkgo biloba (male only)	Maidenhair Tree	Columnar	40–50'	20–30'	Coarse	April	Green (male)	Yellow	X	X	Highest	Full Sun	High
Ginkgo biloba 'Autumn Gold' (male only)	'Autumn Gold' Maidenhair Tree	Columnar	40–50'	20–30'	Coarse	April	Green (male)	Yellow	X	X	Highest	Full Sun	High
Gleditsia tricanthos 'Inermis'	Thornless Honeylocust	Round / Vase	35–45'	25–35'	Fine	May–June	Green, White	Yellow	✓	X	Lowest–Highest	Full Sun	High

MEDIUM TO LARGE TREES (CONT.)

Plant Name		Characteristics									Environmental Tolerances		
Botanical Name	Common Name	Form	Height	Width	Foliage Texture	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Juniperus virginiana	Eastern Red Cedar	Columnar	30–50'	10–20'	Fine	X	Green	Green	✓	✓	Highest	Full Sun	High
Liquidambar styraciflua 'Rotundiloba'	'Rotundiloba' Sweet Gum	Columnar	60–70'	20–30'	Coarse	Apr–May	Green	Orange, Gold, Bronze	X	X	Lowest–Highest	Full Sum	High
Liriodendron tulipifera	Tulip Tree	Oval/ Pyramidal	60–90'	20–50'	Coarse	May–June	Yellow, Orange	Yellow, Gold	✓	✓	Highest	Full Sun–Part Shade	Low
Magnolia virginiana	Sweetbay Magnolia	Oval / Vase	15–35'	10–20'	Coarse	May–June	White	Green	✓	✓	Lowest–Highest	Full Sun–Part Shade	Low
Magnolia grandiflora	Southern Magnolia	Oval / Pyramidal	60–80'	30–50'	Coarse	May–June	White	Green	✓	✓	Lowest–Highest	Full Sun–Part Shade	High
Metasequoia glyptostroboides	Dawn Redwood	Oval / Pyramidal	70–100'	15–25'	Fine	X	X	Red, Bronze	X	X	Lowest–Highest	Full Sun	Low
Nyssa sylvatica	Blackgum (Black Tupelo, Sour Gum)	Oval / Pyramidal	40–50'	30–40'	Coarse	May–June	Green, White	Orange, Yellow, Purple, Red	✓	✓	Lowest–Highest	Full Sun	Medium
Nyssa sylvatica 'Wildfire'	Blackgum (Black Tupelo, Sour Gum)	Oval / Pyramidal	40–50'	30–40'	Coarse	May–June	Green, White	Orange, Yellow, Purple, Red	✓	X	Lowest–Highest	Full Sun	Medium
Ostrya virginiana	Eastern Hop Hornbeam	Round	25–40'	20–30'	Coarse	April	Red-brown (male), Light Green (female)	Yellow	✓	✓	Highest	Full Sun–Part Shade	Low
Platanus x acerifolia	London Planetree	Round	70–85'	50–70'	Coarse	April	Red	Yellow	X	X	Lowest–Highest	Full Sun	Medium

MEDIUM TO LARGE TREES (CONT.)

Plant Name		Characteristics									Environmental Tolerances		
Botanical Name	Common Name	Form	Height	Width	Foliage Texture	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Prunus sargentii 'Columnaris'	'Columnaris' Sargent Cherry	Oval / Columnar	20–30'	15-20'	Coarse	April	Pink	Orange, Red	X	X	Highest	Full Sun–Part Shade	Medium
Prunus sargentii 'Spire'	'Spire' Sargent Cherry	Oval / Columnar	10–15'	25–30'	Coarse	April	Pinky	Orange, Red	X	X	Highest	Full Sun–Part Shade	Medium
Quercus imbricaria	Shingle Oak	Pyramidal / Round	40–60'	40–60'	Coarse	April	Yellow, Green	Red, Yellow, Brown	✓	X	Highest	Full Sun	High
Quercus muehlenbergii	Chinkapin Oak (Chinquapin Oak)	Round	40–60'	50–70'	Coarse	April	Yellow, Green	Yellow, Brown	✓	X	Highest	Full Sun	Medium
Quercus palustris 'Pringreen'	'Pringreen' Pin Oak	Columnar	50–60'	12–15'	Coarse	April	Green	Red, Scarlet	X	X	Lowest–Highest	Full Sun	Low
Quercus phellos	Willow Oak	Oval / Round	40–75'	25–50'	Coarse	April	Yellow, Green	Yellow, Gold, Brown	✓	✓	Lowest–Highest	Full Sun	High
Quercus rubra	Red Oak	Round	50–75'	50–75'	Coarse	May	Yellow, Green	Brown, Red	✓	✓	Highest	Full Sun	High
Quercus shumardii	Shumard Oak	Round	40–60'	30–40'	Coarse	April	Green	Brown, Red	✓	✓	Middle–Highest	Full Sun	Medium
Taxodium distichum	Bald Cypress	Pyramidal	50–70'	20–45'	Fine	X	Brown	Orange, Brown	✓	✓	Lowest–Highest	Full Sun	Medium
Tilia americana	Basswood, American Linden	Oval / Round	60–80'	40–60'	Coarse	June	Yellow	Yellow	✓	✓	Middle–Highest	Full Sun	Low
Tilia americana 'Legend'	'Legend' American Linden	Oval / Pyramidal	40'	30'	Coarse	June	Yellow	Yellow	X	X	Middle–Highest	Full Sun	Low

SHRUBS

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Aronia arbutifolia	Red Chokeberry (Chokeberry)	6–10'	3–5'	May	White	Red	✓	✓	Lowest–Highest	Full Sun–Part Shade	High
Aronia arbutifolia 'Brilliantissima'	Brilliantissima Red Chokeberry (Chokeberry)	6–8'	3–4'	April	White	Red	X	X	Lowest–Highest	Full Sun–Part Shade	High
Aronia melanocarpa	Black Chokeberry (Chokeberry)	3–6'	3–6'	May	White	Red	✓	✓	Lowest–Highest	Full Sun–Part Shade	High
Aronia melanocarpa 'Viking'	Viking Black Chokeberry (Chokeberry)	3–6'	3–6'	May	White	Red	X	X	Lowest–Highest	Full Sun–Part Shade	High
Aronia melanocarpa 'Autumn Magic'	'Autumn Magic' Black Chokeberry (Chokeberry)	3–6'	4–7'	May	White	Red	X	X	Lowest–Highest	Full Sun–Part Shade	High
Aronia melanocarpa var. 'Elata'	'Elata' Black Chokeberry (Chokeberry)	5–8'	6–10'	May	White	Red	X	X	Lowest–Highest	Full Sun–Part Shade	High
Clethra alnifolia	Summersweet	3–8'	4–6'	July–Aug	White	Red	✓	✓	Lowest	Full Sun–Part Shade	Low
Cornus alba	Tatarian Dogwood	8–10'	8–10'	May–June	Yellow, White	Red	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Cornus alba 'Sibirica'	'Sibirica' Tatarian Dogwood	4–7'	3–5'	May–June	Yellow, White	Red	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Cornus alba 'Elegantissima'	'Elegantissima' Tatarian Dogwood (Red-barked Dogwood)	8–13'	8–13'	May–June	White	Red	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Cornus sericea	Red Twig Dogwood (Red Osier Dogwood)	6–10'	6–10'	May	White	Maroon, Red	✓	✓	Lowest–Highest	Full Sun–Part Shade	Low
Cornus sericea 'Kelseyi'	'Kelseyi' Red Twig Dogwood (Red Osier Dogwood)	2–3'	2–3'	May	White	Maroon, Red	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Cornus sericea 'Flaviramea'	'Flaviramea' Yellow Twig Dogwood (Yellow Osier Dogwood)	5–6'	5–6'	May–June	White	Yellow	X	X	Lowest–Highest	Full Sun–Part Shade	Low

SHRUBS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Cornus sericea 'Isanti'	'Isanti' Red Twig Dogwood (Red Osier Dogwood)	4–5'	4–7'	May–June	White	Red	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Diervilla lonicera	Northern Bush Honeysuckle	1–3'	1–3'	June–Aug	Yellow, Red, Orange, Purple	Yellow, Red	✓	X	Highest	Part Shade–Shade	Medium
Diervilla lonicera 'Copper'	'Copper' Dwarf Bush Honeysuckle	2–3'	2–3'	June	Yellow	Bronze, Orange, Red	✓	X	Highest	Full Sun–Part Shade	Medium
Fothergilla gardenii	Dwarf Fothergilla	1½ –3'	2–4'	May	White	Bronze, Orange, Red	✓	X	Highest	Full Sun–Part Shade	Low
Fothergilla gardenii 'Mount Airy'	'Mount Airy' Dwarf Fothergilla	3–5'	3–5'	Apr–May	White	Bronze, Orange, Red	✓	X	Highest	Full Sun–Part Shade	Low
Hamamelis virginiana	Witch Hazel	15–20'	15–20'	Oct–Dec	Yellow	Soft Yellow	✓	X	Lowest	Full Sun–Part Shade	High
Hamamelis virginiana 'Little Suzie'	'Little Suzie' Witch Hazel	4–5'	4–5'	Oct–Dec	Yellow	Soft Yellow	✓	X	Lowest	Full Sun–Part Shade	High
Hypericum densiflorum	St. John's Wort	2–6'	3–6'	June–Aug	Yellow	Green, Orange, Yellow	✓	X	Lowest	Full Sun	High
Hypericum frondosum	Golden St. John's Wort	3–4'	3–4'	June–July	Yellow	Green, Orange, Yellow	✓	X	Lowest	Full Sun	High
Hypericum frondosum 'Sunburst'	'Sunburst' Golden St. John's Wort	3–4'	3–4'	June–July	Yellow	Red, Brown, Maroon	✓	X	Lowest	Full Sun–Part Shade	High
Hypericum kalmianum	Kalm St. John's Wort	2–3'	2–3'	July–Aug	Yellow	Red, Brown, Maroon	✓	X	Lowest	Full Sun–Part Shade	High
Hypericum prolificum	Shrubby St. John's Wort	1–5'	1–4'	June–Aug	Yellow	Gold, Yellow	✓	X	Lowest	Full Sun–Part Shade	High

SHRUBS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Ilex verticillata	Winterberry (Holly)	3–12'	3–12'	June–July	Green, White	Green, Brown	✓	X	Lowest	Full Sun–Part Shade	High
Ilex verticillata 'Winter Gold'	'Winter Gold' Winterberry (Holly)	5–8'	5–8'	May–June	Green, White	Green, Brown	✓	X	Lowest	Full Sun–Part Shade	High
Ilex verticillata 'Winter Red'	'Winter Red' Winterberry (Holly)	6–8'	6–8'	June–July	White	Red, Maroon	✓	X	Lowest	Full Sun–Part Shade	High
Ilex verticillata 'Nana' or 'Red Sprite'	'Nana' or 'Red Sprite' Winterberry (Holly)	2½–3	2½–3	June–July	White	Red, Maroon	✓	X	Lowest	Full Sun–Part Shade	High
Ilex verticillata 'Maryland Beauty'	'Maryland Beauty' Winterberry (Holly)	5–7'	5–7'	May	Green, White	Red, Maroon	✓	X	Lowest	Full Sun–Part Shade	High
Ilex verticillata 'Southern Gentleman'	'Southern Gentleman' Winterberry (Holly); male pollinator	6'	3–5'	Apr–May	White	Yellow-Green, Purple, Bronze	✓	X	Lowest	Full Sun–Part Shade	High
Itea virginica	Virginia Sweetspire	4–5'	4–5'	May–June	White	Red, Orange, Gold	✓	X	Lowest–Highest	Full Sun–Part Shade	Low
Itea virginica 'Henry's Garnet'	'Henry's Garnet' Virginia Sweetspire	3–4'	3–4'	May–June	White	Red, Orange, Gold	✓	X	Lowest–Highest	Full Sun–Part Shade	Low
Itea virginica 'Little Henry'	'Little Henry' Virginia Sweetspire	2–3'	2–3'	June–July	White	Red, Orange, Gold	✓	X	Lowest–Highest	Full Sun–Part Shade	Low
Juniperus horizontalis	Creeping Juniper	6–12"	5–8'	X	X	Blue, Green (Needled Evergreen)	✓	X	Highest	Full Sun	High
Juniperus horizontalis 'Blue Chip'	'Blue Chip' Creeping Juniper	6–9"	8'–10'	X	X	Blue, Green (Needled Evergreen)	✓	X	Highest	Full Sun	High

SHRUBS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Juniperus horizontalis 'Bar Harbor'	'Bar Harbor' Creeping Juniper	9–12"	5–6'	X	X	Silver-Blue, Purple, Green (Needled Evergreen)	✓	X	Highest	Full Sun	High
Juniperus horizontalis 'Blue Rug'	'Blue Rug' Creeping Juniper	4–6"	6–8'	X	X	Silver-Blue, Purple, Green (Needled Evergreen)	✓	X	Highest	Full Sun	High
Juniperus virginiana 'Grey Owl'	Grey Owl Red Cedar	2–3'	4–6'	X	X	Silver-Gray, Green (Needled Evergreen)	✓	X	Highest	Full Sun	High
Myrica pensylvanica	Bayberry (Northern Bayberry)	5–10'	5–10'	May	Green, Yellow	Brown	✓	✓	Lowest	Full Sun–Part Shade	High
Physocarpus opulifolius	Ninebark	5–8'	4–6'	May–June	White, Pink	Purple	✓	X	Lowest–Highest	Full Sun–Part Shade	Low
Physocarpus opulifolius 'Summer Wine'	'Summer Wine' Ninebark	4–6'	4–6'	May–June	White, Pink	Red, Maroon	✓	X	Lowest–Highest	Full Sun–Part Shade	Low
Physocarpus opulifolius 'Amber Jubilee'	'Amber Jubilee' Ninebark (Eastern Ninebark)	6'	4'	May–June	Yellow, Orange, Red	Yellow, Green, Purple	✓	X	Lowest–Highest	Full Sun–Part Shade	Low
Physocarpus opulifolius 'Little Devil'	'Little Devil' Ninebark	3–4'	3–4'	May–June	White, Pink	Red, Maroon	✓	X	Lowest–Highest	Full Sun–Part Shade	Medium
Rhus aromatica	Fragrant Sumac	2–6'	6–10'	April	Yellow	Red, Orange	✓	X	Highest	Full Sun	High
Rhus aromatica 'Gro-Low'	'Gro-Low' Fragrant Sumac	1½–2'	6–8'	Apr–May	Yellow	Red, Orange	✓	X	Highest	Full Sun	High
Rosa carolina	Carolina Rose (Pasture Rose)	3–6'	5–10'	May	Pink	Red	✓	✓	Lowest–Highest	Full Sun	High

SHRUBS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Spiraea betulifolia 'Tor'	'Tor' Spirea (Birchleaf Spirea, White Spiraea)	2–3'	2–3'	May–June	White	Orange, Red, Purple	X	X	Lowest–Highest	Full Sun	Low
Spiraea japonica	Japanese Spiraea	4–6'	5–7'	June–July	Pink	Yellow, Brown	X	X	Lowest–Highest	Full Sun	Low
Spiraea japonica 'Little Princess'	'Little Princess' Japanese Spiraea	1½–2'	2–3'	May–July	Pink	Red	X	X	Lowest–Highest	Full Sun	Low
Spiraea japonica 'Neon Flash'	'Neon Flash' Japanese Spiraea	3'	3'	May–Sep	Red	Copper, Maroon	X	X	Lowest–Highest	Full Sun	Low
Viburnum dentatum	Arrowwood Viburnum	6–10'	6–10'	May–June	White	Orange, Maroon, Purple	✓	✓	Lowest–Highest	Full Sun–Part Shade	High
Viburnum dentatum 'Chistom' or 'Blue Muffin'	'Chistom' or 'Blue Muffin' Arrowwood Viburnum	3–5'	3–5'	May–June	White, Blue	Orange, Maroon, Purple	✓	X	Lowest–Highest	Full Sun–Part Shade	High
Viburnum dentatum 'KLMseventeen' or 'Little Joe'	'KLMseventeen' or 'Little Joe' Arrowwood Viburnum	4–5'	4–5'	May–June	White, Blue	Orange, Maroon, Purple	✓	X	Lowest–Highest	Full Sun–Part Shade	High
Viburnum dentatum 'Blue Blaze'	'Blue Blaze' Arrowwood Viburnum	5–6'	5–6'	April	White	Red	✓	X	Lowest–Highest	Full Sun–Part Shade	High
Viburnum lentago	Nannyberry Viburnum	14–16'	6–12'	May	White	Green-yellow, Red-purple	✓	✓	Lowest–Highest	Full Sun–Part Shade	High
Viburnum nudum	Possumhaw Viburnum (Smooth Witherod)	12–20'	12–20'	June–July	White	Red, Maroon	✓	✓	Lowest	Full Sun–Part Shade	High
Viburnum nudum 'Bulk' or 'Brandywine'	Possumhaw Viburnum (Smooth Witherod)	5–12'	5–12'	Apr–May	White	Red, Maroon	✓	X	Lowest	Full Sun–Part Shade	High
Viburnum nudum 'Winterthur'	Possumhaw Viburnum (Smooth Witherod)	5–12'	5–12'	Apr–May	White	Red-Purple, Maroon	✓	X	Lowest	Full Sun–Part Shade	High
Viburnum prunifolium	Blackhaw Viburnum	12–15'	6–12'	May–June	White	Red, Purple	✓	✓	Lowest–Highest	Full Sun–Part Shade	High

SHRUBS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Viburnum seiboldii '*Wavecrest*'	'Wavecreast' Wayfaringtree Viburnum (Variegated Wayfaringtree Viburnum)	15–18'	15–18'	May	White	Dark Red	✓	X	Lowest–Middle	Full Sun–Part Shade	High
Viburnum trilobum	Cranberry Bush	8–12'	8–12'	Apr–May	White	Maroon, Red	✓	✓	Lowest–Highest	Full Sun–Part Shade	Medium
Viburnum trilobum '*Alfredo*'	'Alfedo' American Cranberry Bush	6–12'	6–12'	Apr–June	White	Maroon, Red	✓	X	Lowest–Highest	Full Sun–Part Shade	Medium
Viburnum trilobum '*Bailey Compact*'	'Bailey Compact' American Cranberry Bush	6'	6'	May	White	Red	✓	X	Lowest–Highest	Full Sun–Part Shade	Medium
Viburnum trilobum '*Compactum*'	Dwarf American Cranberry Bush	6'	6'	Apr–June	White	Red	✓	X	Lowest–Highest	Full Sun–Part Shade	Medium

HERBACEOUS – GRASSES & FERNS

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Acorus gramineus	Japanese Sweet Flag	6–12"	6–12"	June–July	Green, Yellow	Green, Yellow	X	X	Lowest–Highest	Full Sun–Part Shade	High
Bouteloua gracilis	Blue Grama Grass	9–24"	18–24"	July–Oct	Yellow	Orange, Red	✓	X	Highest	Full Sun–Part Shade	High
Calamagrostis acutiflora 'Avalanche'	'Avalanche' Feather Reed Grass	36"–60"	12"–24"	June–Oct	Purple, Green	Purple	X	X	Lowest–Highest	Full Sun	Low
Calamagrostis acutiflora 'Karl Foerster'	'Karl Foerster' Feather Reed Grass	36"–60"	18–24"	May–Oct	Pink, Purple	Gold, Purple, Pink	X	X	Lowest–Highest	Full Sun	Low
Calamagrostis acutiflora 'Overdam'	'Overdam' Feather Reed Grass	30–36"	18–24"	July–Oct	Green, Pink	Green, Tan	X	X	Lowest–Highest	Full Sun	Low
Carex amphibola	Creek Sedge (Eastern Narrowleaf Sedge)	8–12"	8–12"	Mar–June	Green	Gold, Tan	✓	X	Lowest	Part Shade–Full Shade	Low
Carex cherokeensis	Cherokee Sedge	6–12"	6–12"	Apr–June	Green, White	Gold, Tan	✓	X	Lowest	Full Sun–Part Shade	Low
Carex emoryi	Riverbank Sedge	18-24"	12-24"	July–Aug	Green	Gold, Tan	✓	X	Lowest	Full Sun–Part Shade	Low
Carex flacca (glauca)	Blue (Glaucous) Sedge	6–12"	12–18"	June–July	Green, White	Green, Tan	X	X	Lowest	Full Sun–Part Shade	Medium
Carex flacca (glauca) 'Blue Zinger'	'Blue Zinger' (Glaucous) Sedge	8–16"	12–24"	July–Aug	Blue, Green	Blue, Gray	X	X	Lowest	Part Shade–Full Shade	Low

HERBACEOUS – GRASSES & FERNS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Carex flaccosperma	Blue Wood Sedge	6–10"	6–12"	May–June	Green, White	Green	✓	X	Lowest	Part Shade–Full Shade	High
Carex laxiculmis	Bunny Blue Sedge	8–12"	8–12"	May–June	Blue, Green	Green	✓	X	Lowest	Part Shade–Full Shade	High
Carex laxiculmis 'Hobb'	'Hobb' Bunny Blue® Sedge (Spreading Sedge)	8–12"	12–16"	May–June	Silver, Blue	Green	✓	✓	Lowest	Part Shade–Full Shade	High
Carex morrowii	Japanese Sedge	12–36"	24"	Apr–July	Green, Yellow	Gold, Tan	X	X	Lowest	Part Sun–Full Shade	High
Carex morrowii 'Variegata'	Varigated Japanese Sedge	12–18"	18–24"	Apr–July	Brown	Green, White	X	X	Lowest	Part Shade–Full Shade	High
Carex morrowii 'Ice Dance'	'Ice Dance' Japanese Sedge	12–15"	12–18"	Apr–July	Brown	Green	X	X	Lowest	Part Shade–Full Shade	High

HERBACEOUS – GRASSES & FERNS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Carex morrowii 'Ice Ballet'	Japanese Sedge	9–12"	12–24"	Apr–July	Brown	Green	X	X	Lowest	Part Shade–Full Shade	High
Carex morrowii 'Silver Sceptre'	Silver Sceptre Japanese Sedge	9–12"	12–18"	Apr–July	Brown	Green, White	X	X	Lowest	Part Shade–Full Shade	High
Carex oshimensis	Japanese Sedge	10–20"	10–20"	May	Brown	Green, White	X	X	Lowest	Full Sun–Part Shade	Medium
Carex oshimensis 'Evergold'	Evergold Japanese Sedge	9–12"	12–18"	May	Brown	Green, White	X	X	Lowest	Part Shade	Medium
Carex oshimensis 'Everoro'	'Everoro' Japanese Sedge	12"–18"	12"–18"	May	Brown	Green, White	X	X	Lowest	Part Shade	Medium
Carex oshimensis 'Everillo'	'Everillo' Japanese Sedge	12–18"	12–18"	May	Brown	Green, White	X	X	Lowest	Full Sun–Full Shade	Medium
Carex oshimensis 'Everest'	'Everest' Japanese Sedge	12–24"	12–24"	May	Brown	Green, White	X	X	Lowest	Part Shade	Medium
Carex pensylvanica	Pennsylvania Sedge (Oak Sedge)	6–12"	6–12"	May	Green, Brown	Gold, Tan	✓	X	Highest	Part Shade–Full Shade	High
Carex stricta	Tussock Sedge	12–36"	12–24"	May–June	Red, Brown	Green	✓	X	Inflow, Lowest	Full Sun–Part Shade	Medium

HERBACEOUS – GRASSES & FERNS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Carex vulpinoidea	Fox Sedge	12–36"	12–24"	May–July	Green	Gold, Tan	✓	X	Inflow, Lowest	Full Sun–Part Shade	High
Chasmanthium latifolium	Northern Sea Oats (Inland Sea Oats, River Oats)	24–60"	12–30"	Aug–Sept	Green	Gold, Tan	✓	X	Lowest–Highest	Full Sun–Part Shade	High
Chasmanthium latifolium 'River Mist'	'River Mist' Northern Sea Oats	24–36"	24–36"	Aug–Sept	Silver, White	Gold, Tan	✓	X	Lowest–Highest	Full Sun–Part Shade	High
Dennstaedtia punctilobula	Hay-scented Fern	18–24"	24–36"	X	X	Yellow	✓	X	Lowest–Highest	Part Shade–Full Shade	High
Deschampsia cespitosa	Tufted Hair Grass	24–36"	12–24"	July–Sept	Green, Pur[le, White	Green, Yellow	✓	X	Lowest	Part Shade	Medium
Deschampsia cespitosa 'Goldtau'	'Goldtau' Tufted Hair Grass	12–24"	24–30"	July–Sept	Dark Green, Gold, Yellow	Gold, Yellow	✓	X	Lowest	Part Shade–Full Shade	High
Deschampsia cespitosa 'Schottland'	Scottish Tufted Hair Grass	34-48"	34-48"	May–June	Green, Tan	Tan	X	X	Lowest	Full Sun–Part Shade	Medium
Deschampsia cespitosa 'Pixie Fountain'	'Pixie Fountain' Tufted Hair Grass	18–24"	12–18"	July–Sept	Silver, White, Brown	Brown	X	X	Lowest	Part Shade	High

HERBACEOUS – GRASSES & FERNS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Deschampsia cespitosa 'Tardiflora'	'Tardiflora' Tufted Hair Grass	24–36"	24–36"	July–Sept	Green, Gold, Purple, Silver	Tan	X	X	Lowest	Part Shade	High
Dryopteris marginalis	Eastern Woodfern	18–24"	18–24"	X	X	Yellow	✓	X	Lowest	Part Shade	Medium
Eragrostis spectabilis	Purple Love Grass	12–24"	12–24"	July–Aug	Red, Purple	Red, Orange	✓	X	Highest	Full Sun	High
Festuca glauca	Blue Fescue	9–12"	12–18"	June–July	Green, Purple	Green, Yellow	X	X	Highest	Full Sun	High
Festuca glauca 'Elijah Blue'	'Elijah Blue' Blue Fescue	10–14"	6–9"	June–July	Green, Purple	Blue	X	X	Highest	Full Sun	High
Festuca glauca 'Beyond Blue'	'Beyond Blue' Fescue	10–12"	15–18"	June–July	Tan	Blue	X	X	Highest	Full Sun	High
Festuca longifolia	Hard Fescue	<12"	<12"	Mar–June	Green	Green, Gray	X	X	Lowest–Highest	Part Shade–Full Shade	Low
Festuca rubra	Red Fescue	12–36"	12–36"	April–Sept	Yellow	Green, Gray	□	X	Highest	Full Sun	Low
Helictotrichon sempervirens	Blue Oat Grass	24–36"	24–36"	June	Blue, Brown	Gold, Tan	X	X	Highest	Full Sun	Medium
Helictotrichon sempervirens 'Saphiresprudel'	Saphiresprudel Blue Oat Grass	24–36"	18–24"	May–June	Blue, Green	Blue, Brown, Tan	X	X	Highest	Full Sun	Medium
Juncus effusus	Common Rush	24–36"	24–36"	June–Aug	Green, Yellow	Yellow, Brown	✓	X	Inflow, Lowest	Full Sun	Low

HERBACEOUS – GRASSES & FERNS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Juncus effusus 'Quartz Creek'	'Quartz Creek' Corkscrew Rush	18–36"	18–36"	June–Aug	Green, Yellow, Tan	Yellow	✓	X	Inflow, Lowest	Full Sun	Low
Leymus arenarius	Blue Dune Grass	18–36"	18–36"	July–Sept	Yellow, White	Blue Green	✓	X	Lowest–Highest	Full Sun–Part Shade	High
Leymus arenarius 'Blue Dune'	'Blue Dune' Lyme Grass (Sand ryegrass)	24–36"	24–36"	May–Aug	Green, Blue	Blue, Gray, Tan	X	X	Lowest–Highest	Full Sun	High
Liriope muscari	Lily Turf	12"–18"	9–12"	Aug–Sept	Lavender	Green	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Liriope muscari 'Big Blue'	'Big Blue' Lily Turf	12–24"	12–24"	Aug–Sept	Lavender	Green	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Liriope muscari 'Royal Purple'	'Royal Purple' Lily Turf	10–15"	9–18"	Aug–Sept	Purple	Green	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Liriope muscari 'Variegata'	Varigated Lily Turf	12–20"	12–24"	August	Purple	Green	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Muhlenbergia capillaris	Pink Muhly Grass	24–36"	24–36"	Sept–Nov	Pink, Red	Pink, Red	✓	X	Highest	Full Sun–Part Shade	High
Muhlenbergia capillaris 'White Cloud'	'White Cloud' Pink Muhly Grass	36–48"	24–36"	Sept–Nov	White	Pink, Red	X	X	Highest	Full Sun–Part Shade	High

HERBACEOUS – GRASSES & FERNS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Muhlenbergia reveronchii	Ruby Muhly Grass	24–36"	18–24"	Aug–Nov	White, Pink, Brown	Pink, Red	✓	X	Highest	Full Sun–Part Shade	High
Panicum virgatum	Switch Grass	36–72"	24–36"	July–Feb	Pink	Yellow, Orange	✓	X	Inflow, Lowest	Full Sun–Part Shade	Low
Panicum virgatum 'Heavy Metal'	'Heavy Metal' Switch Grass	48–60"	12–24"	July–Feb	Pink	Yellow, Orange	X	X	Inflow, Lowest	Full Sun–Part Shade	Medium
Panicum virgatum 'Cape Breeze'	'Cape Breeze' Switch Grass	24–30"	18–24"	July–Feb	Blue, Green, Yellow	Burgundy, Red	X	X	Inflow, Lowest	Full Sun–Part Shade	Medium
Panicum virgatum 'Rotstrahlbusch'	'Rotstrahlbusch' Red Switch Grass	48–60"	24–36"	July–Feb	Pink	Burgundy, Red	X	X	Inflow, Lowest	Full Sun–Part Shade	Low
Panicum virgatum 'Ruby Ribbon'	'Ruby Ribbon' Switch Grass	36–48"	24–30"	July–Feb	Purple	Blue, Green, Red, Purple	X	X	Inflow, Lowest	Full Sun–Part Shade	Low
Panicum virgatum 'Shenandoah'	'Shenandoah' Switch Grass	36–48"	36–48"	July–Feb	Red, Pink	Beige	X	X	Inflow, Lowest	Full Sun–Part Shade	Low
Pennisetum alopecuroides	Fountain Grass	30–60"	30–60"	July–Feb	Silver, Pink, White	Gold, Yellow	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Pennisetum alopecuroides 'Hameln'	'Hameln' Fountain Grass	18–30"	18–30"	Aug–Oct	Pink, White	Orange, Bronze, Beige	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Pennisetum alopecuroides 'Little Bunny'	'Little Bunny' Fountain Grass	12–18"	18–24"	Aug–Oct	Green, White	Gold, Beige	X	X	Lowest–Highest	Full Sun–Part Shade	Low

HERBACEOUS – GRASSES & FERNS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Pennisetum alopecuroides 'Piglet'	'Piglet' Fountain Grass	9–12"	12–24"	Aug–Oct	Pink, White	Purple, Pink, White	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Pennisetum alopecuroides 'Burgundy Bunny'	'Burgundy Bunny' Dwarf Fountain Grass	12–18"	12–18"	Aug–Oct	White	Burgundy, Beige	X	X	Lowest–Highest	Full Sun	Medium
Pennisetum orientale	Oriental Fountain Grass	24–36"	24–36"	June–Aug	Pink, White	Yellow, Tan	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Pennisetum orientale 'Karly Rose'	'Karly Rose' Oriental Fountain Grass	24–36"	24–36"	June–Aug	Rose-Purple	Yellow, Tan	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Pennisetum orientale 'Tall Tails'	'Tall Tails' Oriental Fountain Grass	48–60"	24–36"	Jun–Sep	Pink, White	Yellow, Tan	X	X	Lowest–Highest	Full Sun–Part Shade	Low
Schizachyrium scoparium	Little Bluestem	24–48"	18–24"	Aug–Feb	Purple, Bronze	Bronze, Orange	✓	X	Highest	Full Sun	Low
Schizachyrium scoparium 'Standing Ovation'	'Standing Ovation' Little Bluestem	36–48"	12–18"	Aug–Oct	Silver	Orange, Red, Yellow, Purple, Brown	X	X	Highest	Full Sun	Low
Schizachyrium scoparium 'The Blues'	'The Blues' Little Bluestem	24–48"	18–24"	Aug–Oct	Purple, Bronze	Burgundy, Red	X	X	Highest	Full Sun	Low

HERBACEOUS – FLOWERS

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Agastache rupestris 'Apache Sunset'	'Apache Sunset' Threadleaf Giant Hyssop	18–24"	12–18"	July–Sept	Pink, Orange	X	X	✓	Highest	Full Sun–Part Shade	Low
Amsonia hubrichtii	Blue Star	24–36"	24–36"	Apr–May	White, Blue	Gold	✓	✓	Highest	Full Sun–Part Shade	High
Aquilegia canadensis	Columbine	24–36"	12-18"	Apr–May	Pink, Yellow, Red	X	✓	✓	Highest	Full Sun–Part Shade	High
Asclepias incarnata	Swamp Milkweed (Pink Milkweed)	24–60"	24–60"	June–Oct	Pink, Purple	X	✓	✓	Lowest	Full Sun–Part Shade	Low
Asclepias incarnata 'Cinderella'	'Cinderella' Swamp Milkweed (Butterfly Weed)	36–48"	18–36"	July–Aug	Pink	X	X	✓	Lowest	Full Sun–Part Shade	Low
Asclepias incarnata 'Ice Ballet'	'Ice Ballet' Swamp Milkweed	36–42"	18–24"	July–Aug	White	X	X	✓	Lowest	Full Sun	Low
Asclepias incarnata 'Soulmate'	'Soulmate' Swamp Milkweed	36–42"	18–24"	July–Aug	Rose pink	X	X	✓	Lowest	Full Sun	Low
Asclepias tuberosa	Butterfly Weed	12–30"	18–36"	June–Aug	Yellow, Orange	X	✓	✓	Lowest–Highest	Full Sun	High
Astilbe sp.	Astilbe	12–36"	18–36"	May–July	Red, Pink, White, Purple	X	✓	✓	Lowest	Part Shade–Full Shade	High
Allium sp.	Flowering Onion	6–36"	6–12"	May–June	Blue, Pink, Purple, Red, White, Yellow	X	✓	✓	Highest	Full Sun	Low
Allium sp. 'Summer Beauty'	'Summer Beauty' Summer Beauty Onion	12–18"	18–24"	July–Aug	Purple	X	X	✓	Highest	Full Sun	Low

HERBACEOUS – FLOWERS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Allium sp. 'Millenium'	'Millenium' Ornamental Onion	12–18"	12–18"	July–Aug	Pink, Purple	X	X	✓	Highest	Full Sun	Low
Baptisia australis	Blue False Indigo	36–48"	36–48"	May–June	Indigo Blue	X	✓	✓	Highest	Full Sun–Part Shade	High
Baptisia australis var. Minor	Minor Dwarf Blue False Indigo	18–24"	12–24"	May–June	Purple, Blue	X	X	✓	Highest	Full Sun–Part Shade	High
Calamintha nepeta	Calamint	12–24"	12–24"	June–Oct	White	X	X	✓	Highest	Full Sun	High
Calamintha nepeta ssp. glandulosa 'White Cloud'	'White Cloud' Lesser Calamint	12–24"	12–24"	June–Oct	White	X	X	✓	Highest	Full Sun–Part Shade	High
Calamintha nepeta 'Montrose White'	'Montrose White' Calamint	12–18"	12–18"	June–Oct	White	X	X	✓	Highest	Full Sun	High
Chelone lyonii	Turtlehead (Pink Turtlehead, Lyon's Turtlehead, Shellflower)	24–48"	18–30"	July–Sept	Pink	X	✓	✓	Lowest	Full Sun–Part Shade	Low
Coreopsis grandiflora	Large-flowered Tickseed	12–36"	12–36"	June–Sept	Yellow	X	✓	✓	Highest	Full Sun	High
Coreopsis grandiflora 'Baby Sun'	'Baby Sun' Large-flowered Tickseed	20"	20"	June–Sept	Yellow, Gold, Burgundy	X	X	✓	Highest	Full Sun	High
Coreopsis grandiflora 'Early Sunrise'	'Early Sunrise' Large-flowered Tickseed	18–24"	18–24"	May–Aug	Yellow	X	X	✓	Highest	Full Sun	High
Coreopsis grandiflora 'Sunfire'	'Sunfire' Large-flowered Tickseed (Butter Daisy)	18"	18–20"	May–Aug	Yellow, Gold, Burgundy	X	X	✓	Highest	Full Sun	High
Coreopsis grandiflora 'Sunray'	'Sunray' Large-flowered Tickseed (Threadleaf Coreopsis)	18–24"	18–24"	June–Sept	Yellow	X	X	✓	Highest	Full Sun	High
Coreopsis lanceolata 'Sterntaler'	'Sterntaler' Lance-leaf Tickseed	16–18"	12–16"	June–Sept	Yellow, Red	X	X	✓	Highest	Full Sun	High

HERBACEOUS – FLOWERS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Coreopsis verticillata	Whorled Tickseed (Threadleaf Coreopsis)	30–36"	18–24"	June–Sept	Yellow	X	✓	✓	Highest	Full Sun	High
Coreopsis verticillata '*Moonbeam*'	'Moonbeam' Whorled Tickseed (Threadleaf Coreopsis)	18–24"	18–24"	June–Aug	Yellow	X	X	✓	Highest	Full Sun	High
Coreopsis verticillata '*Zagreb*'	'Zagrab' Whorled Tickseed (Threadleaf Coreopsis)	12–18"	12–18"	May–June	Yellow	X	X	✓	Highest	Full Sun	High
Coreopsis verticillata '*Route 66*'	'Route 66' Whorled Tickseed (Threadleaf Coreopsis)	24–28"	24–28"	June–Sept	Yellow, Red	X	X	✓	Highest	Full Sun	High
Coreopsis pubescens	Star Tickseed	9–12"	6–8"	June–Sept	Yellow, Orange	X	✓	✓	Highest	Full Sun	High
Coreopsis pubescens '*Sunshine Superman*'	Sunshine Superman Star Tickseed	9–12"	6–8"	June–Sept	Yellow, Orange	X	X	✓	Highest	Full Sun	High
Crocus vernus	Spring Crocus	3–6"	3–6"	April	Purple, White	X	X	✓	Highest	Full Sun–Part Shade	Low
Crocus vernus '*Pickwick*'	'Pickwick' Spring Crocus	3–6"	3–6"	April	Silver, Lilac	X	X	✓	Highest	Full Sun–Part Shade	Low
Echinacea purpurea	Purple Coneflower (Eastern Purple Coneflower)	24–60"	18–24"	June–Aug	Purple, Pink	X	✓	✓	Highest	Full Sun–Part Shade	High
Echinacea purpurea '*Evening Glow*'	'Evening Glow' Purple Coneflower (Eastern Purple Coneflower)	24–36"	12–24"	July–Aug	Purple, Red, White, Yellow	X	X	✓	Highest	Full Sun–Part Shade	Low
Echinacea purpurea '*Magnus*'	'Magnus' Purple Coneflower (Eastern Purple Coneflower)	30–36"	12–18"	June–Aug	Rose purple	X	X	✓	Highest	Full Sun–Part Shade	Low
Echinacea purpurea '*White Swan*'	'White Swan' Purple Coneflower (Eastern Purple Coneflower)	24–36"	12–24"	June–Aug	White, Copper, Orrange	X	X	✓	Highest	Full Sun–Part Shade	Low

HERBACEOUS – FLOWERS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Echinacea purpurea 'Ruby Star'	'Ruby Star' Purple Coneflower (Eastern Purple Coneflower)	24–36"	18–24"	July–Aug	Purple	X	X	✓	Highest	Full Sun–Part Shade	Low
Echinacea purpurea 'Green Envy'	'Green Envy' Purple Coneflower (Eastern Purple Coneflower)	24–36"	18–24"	July–Aug	Green, Purple	X	X	✓	Highest	Full Sun–Part Shade	Low
Eupatorium coelestinum	Mistflower	18–36"	18–36"	July–Oct	Blue	X	✓	✓	Lowest–Highest	Full Sun–Part Shade	Low
Eupatorium (Eutrochium) dubium	Joe Pye Weed	36–48"	12–36"	July–Sept	Pink, White	Red, Gold, Orange	✓	✓	Lowest	Full Sun–Part Shade	Low
Eutrochium dubium 'Little Joe'	'Litte Joe' Pye Weed	36–48"	12–36"	July–Sept	Purple, Pink	Purple, Pink	✓	✓	Lowest	Full Sun–Part Shade	High
Eutrochium purpureum	Sweet Joe Pye Weed	60–84"	24–48"	July–Sept	Pink, White	Red, Gold, Orange	✓	✓	Lowest–Highest	Full Sun–Part Shade	High
Eutrochium purpureum ssp. Maculatum 'Gateway'	'Gateway' Spotted Joe Pye Weed	48–60"	36–60"	July–Sept	Pink	Pink	X	✓	Lowest–Highest	Full Sun–Part Shade	High
Eutrochium purpureum 'Phantom'	'Phantom' Spotted Joe Pye Weed	24–48"	12–24"	July–Sept	Pink, Red	Pink, Red	X	✓	Lowest–Highest	Full Sun–Part Shade	High
Eutrochium purpureum 'Purple Bush'	'Purple Bush' Spotted Joe Pye Weed (Sweet Joe Pye Weed)	60–84"	24–48"	July–Sept	Purple, Pink	Purple, Pink	X	✓	Lowest–Highest	Full Sun–Part Shade	High
Eurybia (Aster divaricatus) divaricata	White Wood Aster	12–30"	12–30"	Aug–Sept	White, Yellow, Red	Green	✓	✓	Highest	Part Shade–Full Shade	Medium
Eurybia divaricata 'Eastern Star'	'Eastern Star' White Wood Aster	12–18"	12–18"	Aug–Sept	White	White	X	✓	Highest	Part Shade–Full Shade	Low
Galanthus nivalis	Snowdrop	6–9"	3–6"	February	White	X	X	✓	Highest	Full Sun–Part Shade	Low
Geranium macrorrhizum	Bigroot Geranium	12–18"	12–24"	May–June	Violet, White, Pink	X	X	✓	Highest	Full Sun–Part Shade	Low

HERBACEOUS – FLOWERS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Geranium macrorrhizum 'Bevan's Variety'	'Bevan's Variety' Bigroot Geranium	9–12"	18–24"	Apr–July	Magenta, Red	Red, Bronze	X	✓	Highest	Full Sun–Full Shade	Low
Geranium macrorrhizum 'Ingwersen's Variety'	'Ingwersen's Variety' Bigroot Geranium	12–18"	15"	Apr–July	Pink	Red, Purple	X	✓	Highest	Full Sun–Full Shade	Low
Geranium maculatum 'Album'	'Album' Wild Geranium (Spotted Geranium, Cranesbill)	12–24"	12–24"	Mar–July	White, Purple, Pink	X	X	✓	Highest	Part Shade–Full Shade	High
Helleborus niger	Hellebore (Christmas Rose)	9–12"	12–18"	Feb–Mar	White, Pink	X	X	✓	Highest	Full Sun–Part Shade	High
Hemercallis (Lilium) spp.	Daylily	12–36"	12–24"	May–Sept	Yellow, Orange, Red	X	X	✓	Highest	Part Shade	Low
Heuchera americana	Coral Bells (American alumroot)	18"	18"	June–Sept	White	X	✓	✓	Highest	Full Sun–Part Shade	High
Heuchera americana 'Dale's Strain'	'Dale's Strain' Coral Bells	18"	18"	June–Sept	White	X	X	✓	Highest	Full Sun–Part Shade	High
Heuchera americana 'Green Spice'	'Green Spice' Coral Bells	18"	18"	June–Sept	White	X	X	✓	Highest	Full Sun–Part Shade	High
Heuchera americana 'Marvelous Marble'	'Marvelous Marble' Coral Bells	8–12"	12"	May–Aug	Green, Purple	X	✓	✓	Highest	Full Sun–Part Shade	High
Hibiscus coccineus	Scarlet Rose Hibiscus / Mallow	36–72"	24–36"	June–Sept	Red	X	✓	✓	Lowest	Full Sun–Part Shade	High
Hibiscus moscheutos	Hardy Hibiscus (Swamp Rose Mallow)	24–36"	12–24"	July–Sept	Red, Pink, White	X	✓	✓	Lowest	Full Sun–Part Shade	High
Hibiscus moscheutos 'Cranberry Crush'	'Cranberry Crush' Hardy Hibiscus (Swamp Rose Mallow)	36–48"	36–48"	July–Sept	Red	X	X	✓	Lowest	Full Sun–Part Shade	High

HERBACEOUS – FLOWERS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Hibiscus moscheutos 'Luna Red'	'Luna Red' Hardy Hibiscus (Swamp Rose Mallow)	24–36"	18–24"	July–Sept	Burgundy Red	X	X	✓	Lowest	Full Sun	High
Iris versicolor	Blue Flag (Northern Blue Flag) Iris	24–30"	24–30"	May–July	Purple, Blue	X	✓	✓	Inflow, Lowest	Full Sun–Part Shade	High
Leucanthemum sp.	Shasta Daisy	36–48"	24–36"	July–Sept	White	X	X	✓	Lowest–Highest	Full Sun	High
Liatris spicata	Blazing Star	24–48"	9–18"	July–Sept	Red, Purple	X	✓	✓	Lowest–Highest	Full Sun	High
Liatris spicata 'Kobold'	'Kobold' Blazing Star	24–30"	6–12"	July–Aug	Purple	X	X	✓	Lowest–Highest	Full Sun	High
Liatris spicata 'Gayfeather'	'Gayfeather' Blazing Star	36–60"	24"	July–Aug	Purple, Pink	X	X	✓	Lowest–Highest	Full Sun–Part Shade	High
Monarda bradburiana	Eastern Bee Balm	12–24"	12–24"	May	Purple, Pink, White	X	✓	✓	Highest	Full Sun–Part Shade	High
Monarda didyma	Bee Balm (Bergamot, Oswego Tea)	24–48"	24–36"	July–Aug	Red	X	✓	✓	Highest	Full Sun–Part Shade	High
Monarda didyma 'Coral Reef'	'Coral Reef' Bee Balm	24–30"	36"	July–Aug	Coral-Pink	X	X	✓	Highest	Full Sun–Part Shade	High
Monarda didyma 'Jacob Cline'	'Jacob Cline' Bee Balm	36–60"	24"	July–Aug	Red	X	X	✓	Highest	Full Sun–Part Shade	High
Monarda didyma 'Marshall's Delight'	'Marshall's Delight' Bee Balm	24–48"	24"	July–Aug	Rose-Pink	X	✓	✓	Highest	Full Sun	High
Monarda fistulosa	Wild Bergamot	24–48"	24–36"	July–Sept	Pink, Lavender	X	✓	✓	Highest	Full Sun–Part Shade	High
Narcissus minor	Trumpet Daffodil	4–5"	3–6"	Mar–Apr	Yellow	X	X	✓	Highest	Full Sun–Part Shade	Low

HERBACEOUS – FLOWERS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Packera aurea	Golden Ragwort (Golden Groundsel, Squaw Weed)	6–30"	6–18"	April	Yellow	X	✓	✓	Lowest	Full Sun–Part Shade	High
Packera obovata	Groundleaf Groundsel	12–18"	6–12"	Apr–June	Yellow	X	✓	✓	Lowest	Full Sun–Part Shade	High
Penstemon digitalis	Beardtongue (Foxglove)	36–60"	18–24"	Apr–June	White	Red, Gold, Orange	✓	✓	Highest	Full Sun	Low
Penstemon digitalis 'Husker Red'	'Husker Red' Beardtongue (Foxglove)	24–36"	12–24"	Apr–June	White, Pink	X	X	✓	Highest	Full Sun	Low
Penstemon digitalis 'Pocahontas'	'Pocahontas' Beardtongue (Foxglove)	36–48"	24–36"	Apr–June	Lavender Pink, Burgundy	X	X	✓	Highest	Full Sun	Low
Penstemon digitalis 'Dark Towers'	'Dark Towers' Beardtongue (Foxglove)	18–36"	12–24"	May–June	Pink, Red	X	✓	✓	Highest	Full Sun	Low
Perovskia atriplicifolia	Russian Sage	36–60"	24–48"	July–Oct	Lavender, Blue	Silver, Blue	X	✓	Highest	Full Sun	Low
Phlox paniculata	Garden Phlox	24–48"	24–36"	July–Sept	Pink, Purple, White	X	✓	✓	Highest	Full Sun–Part Shade	High
Phlox paniculata 'David'	'David' Garden Phlox	36–48"	24–36"	July–Sept	White	X	X	✓	Highest	Full Sun–Part Shade	High
Phlox paniculata 'David's Lavendar'	'David's Lavendar' Garden Phlox	36–48"	24–36"	July–Sept	Lavender	X	X	✓	Highest	Full Sun–Part Shade	High
Phlox paniculata 'Jeana'	'Jeana' Garden Phlox	48–60"	24–36"	Aug–Oct	Pink	X	X	✓	Highest	Full Sun–Part Shade	High
Phlox paniculata 'Blue Paradise'	'Blue Paradise' Garden Phlox	24-36"	24"	July–Aug	Violet-Blue	X	X	✓	Highest	Full Sun–Part Shade	High
Phlox paniculata 'Zenith'	'Zenith' Garden Phlox	24-36"	24"	July–Aug	Pink, White	X	X	✓	Highest	Full Sun–Part Shade	High

HERBACEOUS – FLOWERS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Phlox paniculata 'Wanda'	'Wanda' Garden Phlox	24-36"	24"	July–Aug	Pink	X	X	✓	Highest	Full Sun–Part Shade	High
Physostegia virginiana	Obedient Plant	36–48"	24–36"	June–Sept	Pink, White	X	✓	✓	Lowest	Full Sun–Part Shade	High
Physostegia virginiana 'Pink Manners'	'Pink Mannars' Obedient Plant	24–36"	18–24"	June–Sept	Pink	X	X	✓	Lowest	Full Sun–Part Shade	High
Physostegia virginiana 'Vivid'	'Vivid' Obedient Plant	12–24"	12–18"	June–Sept	Pink	X	X	✓	Lowest	Full Sun	High
Physostegia virginiana 'Miss Manners'	'Miss Manners' Obedient Plant	24–30"	24–30"	June–Sept	White	X		✓	Lowest	Full Sun	High
Pycnanthemum muticum	Mountain Mint (Short-toothed Mountain Mint, Clustered Mountain Mint)	12–36"	12–36"	July–Sept	Pink	X	✓	✓	Lowest–Highest	Full Sun–Part Shade	High
Rudbeckia fulgida	Black-eyed Susan (Orange Coneflower)	24–36"	24–30"	June–Oct	Yellow, Orange	X	✓	✓	Highest	Full Sun	Low
Rudbeckia hirta	Black-eyed Susan (Gloriosa Daisy)	24–36"	12–24"	June–Sept	Yellow, Orange	X	✓	✓	Highest	Full Sun	Low
Rudbeckia subtomentosa	Sweet Coneflower	36–60"	12–24"	July–Oct	Yellow, Orange	X	✓	✓	Highest	Full Sun	Low
Rudbeckia triloba	Brown-eyed Susan	24–36"	12–18"	July–Oct	Yellow	X	✓	✓	Highest	Full Sun	Low
Salvia nemorosa	Sage	12–36"	12–36"	June–Sept	Violet-Blue	X	X	✓	Highest	Full Sun	Low
Salvia nemorosa 'Caradonna'	'Caradonna' Sage (May Night Sage)	12–24"	12–24"	June–Sept	Violet-Blue	X	X	✓	Highest	Full Sun	Low
Salvia nemorosa 'Blue Hill'	'Blue Hill' Garden Sage (Blauh✓gel)	18–30"	12–15"	June–Aug	Violet-Blue	X	X	✓	Highest	Full Sun	Low

HERBACEOUS – FLOWERS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Salvia nemorosa 'May Night'	May Night Garden Sage (Mainacht)	18–24"	12"	July–Sept	Violet-Blue	X	X	✓	Highest	Full Sun	Low
Salvia nemorosa 'April Night'	'April Night' Garden Sage	12–14"	18–20"	June–Sept	Purple, Blue	X	X	✓	Highest	Full Sun	Low
Sedum rupestre	Stonecrop (Sedum)	6–10"	8–12"	May–Oct	Chartreuse, Gold, Yellow	Orange, Red	✓	X	Highest	Full Sun	High
Sedum rupestre 'Angelina'	'Angelina' Stonecrop (Sedum)	6–10"	8–12"	May–Oct	Chartreuse, Gold, Yellow	Orange, Red	X	X	Highest	Full Sun	High
Sedum ternatum	Three-leaved Stonecrop (Sedum)	3–6"	6–9"	May–June	White	Copper, Green	✓	X	Highest	Full Sun–Part Shade	High
Sedum ternatum 'Larinem Park'	Three-leaved Stonecrop (Shale Barrens, Whorled Sedum)	2–6"	12–18"	Apr–May	White	Copper, Green	X	X	Highest	Full Sun–Part Shade	High
Sedum x 'Autumn Joy'	'Autumn Joy' Stonecrop (Sedum)	12–18"	24–36"	Apr–June	Pink	Copper, Red	X	X	Highest	Full Sun	High
Sedum x 'Autumn Fire'	'Autumn Fire' Stonecrop (Sedum)	24–36"	24"	August	Rose-Pink	Bronze, Red	X	X	Highest	Full Sun	High
Sedum x 'Dynamite'	'Dynamite' Stonecrop (Sedum)	24–36"	24"	August	Rose-Pink	Bronze, Red	X	X	Highest	Full Sun	High
Sedum x 'Cherry Chocolate'	'Cherry Chocolate' Stonecrop (Sedum)	24–36"	24"	August	Rose-Pink	Bronze, Red	X	X	Highest	Full Sun	High
Solidago rugosa	Roughleaf Goldenrod (Wrinkleleaf goldenrod, Roughstem goldenrod)	36–72'	36–72'	September	Yellow	X	✓	✓	Lowest–Highest	Full Sun	High
Solidago rugosa 'Fireworks'	'Fireworks' Rough Goldenrod	30–36"	30-36"	Sept–Oct	Yellow	X	X	✓	Lowest–Highest	Full Sun	High
Solidago sphacelata	Goldenrod (Autumn Goldenrod)	12–18"	12–18"	Aug–Sept	Yellow	X	✓	✓	Highest	Full Sun	High

HERBACEOUS – FLOWERS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Solidago sphacelata 'Golden Fleece'	'Golden Fleece' Goldenrod (Autumn Goldenrod)	18-24"	24–36"	Aug–Sept	Gold, Yellow	X	X	✓	Highest	Full Sun–Part Shade	High
Solidago sphacelata 'Little Lemon'	'Little Lemon' Goldenrod (Autumn Goldenrod)	12–18"	18–24"	Aug–Sept	Yellow	X	X	✓	Highest	Full Sun	High
Symphyotrichum cordifolium (cordifolius)	Blue Wood Aster (Heart-leaved Aster)	24–60"	18–24"	Aug–Sept	Blue, Yellow	X	✓	✓	Highest	Full Sun–Part Shade	Low
Symphyotrichum cordifolium (cordifolius) 'Avondale'	'Avondale' Blue Wood Aster	24–36"	18–24"	Aug–Oct	Light Blue	X	X	✓	Highest	Full Sun–Part Shade	Low
Symphyotrichum laeve (laevis)	Smooth Aster	24–48"	12–24"	Sept–Oct	Violet, White, Yellow	X	✓	✓	Highest	Full Sun	Low
Symphyotrichum laeve (laevis) 'Bluebird'	'Bluebird' Smooth Aster	18–36"	24–30"	Sept–Oct	Violet, Yellow	X	X	✓	Highest	Full Sun	Low
Symphyotrichum novae-angliae	New England Aster	36–72"	24–36"	Aug–Sept	Purple	X	✓	✓	Highest	Full Sun	Low
Symphyotrichum novae-angliae 'Purple Dome'	'Purple Dome' New England Aster	18–24"	24–36"	Aug–Sept	Dark Purple	X	X	✓	Highest	Full Sun	Low
Symphyotrichum novi-angilae 'Woods Purple'	'Wood Purple' New York Aster (Michaelmas Daisy)	36–60"	36"	Aug–Oct	Light Blue	X	X	✓	Highest	Full Sun	Low
Symphyotrichum novi-belgii	New York Aster	36–48"	36–48"	Aug–Oct	Lavender	X	✓	✓	Highest	Full Sun–Part Shade	Low
Symphyotrichum oblongifolium	Aromatic Aster	12–36"	12–36"	Aug–Sept	Purple, Blue	X	✓	✓	Highest	Full Sun–Part Shade	Low
Symphyotrichum oblongifolium 'Raydon's Favorite'	'Raydon's Favorite' Aromatic Aster	24–36"	12"	Sept–Nov	Lavender	X	X	✓	Highest	Full Sun–Part Shade	Low

HERBACEOUS – FLOWERS (CONT.)

Plant Name		Characteristics							Environmental Tolerances		
Botanical Name	Common Name	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Zone Elevation	Light Requirements	Soil Salinity Tolerance
Symphyotrichum oblongifolium 'October Skies'	'October Skies' Aromatic Aster	18–24"	18–24"	Aug–Oct	Blue, Violet-Blue	X	X	✓	Highest	Full Sun	Low
Thermopsis villosa (caroliniana)	Carolina Lupine (Aaron's rod)	36–60"	24–36"	July	Yellow	X	✓	✓	Highest	Full Sun	High
Vernonia fasciculata	Prairie Ironweed (Smooth Ironweed)	24–48"	18–36"	July–Sept	Purple	X	✓	✓	Lowest	Full Sun	High
Vernonia lettermanii 'Iron Butterfly'	'Iron Butterfly' Ironweed	30–36"	30–36"	Aug–Oct	Purple	X	X	✓	Highest	Full Sun	High
Vernonia noveboracensis	New York Ironweed	48–72"	36–48"	Aug–Sept	Purple	X	✓	✓	Lowest	Full Sun	High
Veronica spicata	Spiked Speedwell	24–36"	24–30"	June–Aug	Blue	X	X	✓	Highest	Full Sun	Medium
Veronica spicata 'Glory'	'Glory' Spiked Speedwell	9–12"	6–9"	June–Aug	Dark Violet-Blue	X	X	✓	Highest	Full Sun	Medium
Veronica spicata 'Rotfuchs'	'Rotfuchs' Spiked Speedwell	12–18"	12–18"	June–Aug	Pink, Red	X	X	✓	Highest	Full Sun	Medium
Veronica spicata 'Noah Williams'	'Noah Williams' Speedwell	18–24"	18–24"	June–Aug	White	X	X	✓	Highest	Full Sun	Medium

WETLAND PLANTS

Plant Name		Characteristics								Environmental Tolerances				
Botanical Name	Common Name	Plant Type	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Condition	Wetland Indicator Status	Light Requirements	Water/Soil Salinity Tolerance	pH Tolerance
Acorus americanus	Sweetflag	Herbaceous–Broadleaf	24–48"	12"	Apr–June	Green-Yellow	X	✓	✓	Permanently Saturated	FACU	Full Sun–Part Shade	Low	5.6–7.2
Alisma subcordata	Water Plantain	Herbaceous–Broadleaf	36"	24"	June–Oct	White	X	✓	✓	0–6" of Inundation	OBL	Full Sun	Low	5.0–7.0
Caltha palustris	Marsh Marigold	Herbaceous–Broadleaf	12"	12"	May	Yellow	X	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Full Shade–Part Shade	Low	4.9–6.8
Carex comosa	Bristly Sedge	Herbaceous–Grass	24–48"	18–36"	May–July	N/A	X	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Full Sun–Part Shade	Low	4.6–7.5
Carex crinita	Fringed Sedge	Herbaceous–Grass	36–48"	12–24"	May–June	N/A	X	✓	✓	0–6" of Inundation, Permanently Saturated, Seasonally Saturated	OBL	Full Sun–Part Shade	Low	4.0–7.6
Carex hystericina	Porcupine Sedge	Herbaceous–Grass	24–36"	24–36"	June–Aug	N/A	X	✓	✓	0–6" of Inundation, Permanently Saturated, Seasonally Saturated	OBL	Full Sun–Part Shade	Moderate	--
Carex intumescens	Bladdar Sedge	Herbaceous–Grass	12–24"	12–18"	June–Aug	White	X	✓	✓	0–6" of Inundation, Permanently Saturated, Seasonally Saturated	FACW	Part Shade–Full Shade	Low	4.8–6.9
Carex lacustris	Lake Bank Sedge	Herbaceous–Grass	12–24"	12–18"	May	Brown	X	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Full Sun–Full Shade	Low	5.6–6.8

WETLAND PLANTS (CONT.)

Plant Name		Characteristics								Environmental Tolerances				
Botanical Name	Common Name	Plant Type	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Condition	Wetland Indicator Status	Light Requirements	Water/Soil Salinity Tolerance	pH Tolerance
Carex lupulina	Hop Sedge	Herbaceous–Grass	36–48"	12–24"	June–Aug	Green	X	✓	✓	0–6" of Inundation, Permanently Saturated	FACW+	Full Sun–Full Shade	Low	6.2–7.0
Carex lurida	Lurid Sedge	Herbaceous–Grass	24–36"	24–36"	Mar–May	White	X	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Part Shade–Full Sun	Low	4.9–6.8
Carex scoparia	Pointed Broom Sedge	Herbaceous–Grass	12–30"	12–24"	June–Aug	Yellow	X	✓	✓	0–6" of Inundation, Permanently Saturated	FACW	Full Sun–Part Shade	Low	4.6–6.9
Carex stricta	Tussock Sedge	Herbaceous–Grass	12-24"	12-24"	May	Silver	Light brown	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Full Sun–Part Shade	Low	3.0–7.0
Carex vulpinodes	Fox Sedge	Herbaceous–Grass	12–24"	12–24"	July–Aug	White	X	✓	✓	0–6" of Inundation, Permanently Saturated, Seasonally Saturated	OBL	Part Sun	Moderate	6.8–8.9
Glyceria striata	Fowl Managrass	Herbaceous–Grass	24-42"	24-36"	June–July	Green	Light brown	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Full Sun–Full Shade	Low	4.0–8.0
Hisbiscus mosheutos	Swamp Rose-mallow	Herbaceous–Broadleaf	48–72"	48–72"	July–Aug	Pink, White	X	✓	✓	0–6" of Inundation, Permanently Saturated, Seasonally Saturated	OBL	Full Sun	Low	4.0–7.0
Iris prismatica	Blue Iris	Herbaceous–Broadleaf	12–36"	12–24"	May–July	Blue-Purple	X	✓	✓	Permanently Saturated, Seasonally Saturated	OBL	Full Sun–Part Shade	Moderate	<6.8

WETLAND PLANTS (CONT.)

Plant Name		Characteristics								Environmental Tolerances				
Botanical Name	Common Name	Plant Type	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Condition	Wetland Indicator Status	Light Requirements	Water/Soil Salinity Tolerance	pH Tolerance
Iris versicolor	Blue Flag Iris	Herbaceous–Broadleaf	24–30"	24–30"	May–June	Blue-Purple	X	✓	✓	Permanently Saturated, Seasonally Saturated	OBL	Full Sun–Part Shade	High	<6.8
Juncus effusus	Soft Rush	Herbaceous–Grass	24-48"	24-48"	June–Aug	Brown	Yellow, Brown	✓	✓	0–6" of Inundation, Permanently Saturated	FACW+, OBL	Full Sun–Part Shade	High	5.5–8.0
Justica americana	Water Willow	Herbaceous–Broadleaf	12-24"	12-24"	June–Sept	Pink, White	Yellow	✓	✓	6–12" of Inundation, 0–6" of Inundation, Permanently Saturated	OBL	Full Sun	Low	5.4–7.6
Leersia oryzoides	Rice Cut Grass	Herbaceous–Grass	36–72"	36–48"	June–Oct	Green	X	✓	✓	6–12" of Inundation, 0–6" of Inundation, Permanently Saturated	OBL	Full Sun–Part Shade	Low	5.1–8.8
Lobelia cardinalis	Cardinal Flower	Herbaceous–Broadleaf	24-48"	12-24"	May–Oct	Red	Burgundy	✓	✓	Permanently Saturated, Seasonally Saturated	FACW+	Full Sun–Part Shade	Moderate	5.8–7.8
Lobelia syphilitica	Great Blue Lobelia	Herbaceous–Broadleaf	24–48"	12–24"	July–Oct	Blue	X	✓	✓	Permanently Saturated, Seasonally Saturated	FACW+	Full Sun–Part Shade	Moderate	6.0–8.0

WETLAND PLANTS (CONT.)

Plant Name		Characteristics								Environmental Tolerances				
Botanical Name	Common Name	Plant Type	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Condition	Wetland Indicator Status	Light Requirements	Water/Soil Salinity Tolerance	pH Tolerance
Ludwigia palustris	Marsh Purslane	Herbaceous–Broadleaf	6"	12"	July–Sept	Green	X	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Full Sun	Low	5.0–8.5
Mimulus ringens	Monkey Flower	Herbaceous–Broadleaf	24–48"	6–12"	July–Sept	Blue	X	✓	✓	0–6" of Inundation, Permanently Saturated, Seasonally Saturated	OBL	Full Sun–Part Shade	Moderate	6.5–7.5
Nelumbo lutea	Native Yellow Waterlily	Herbaceous–Broadleaf	36–72"	36–48"	June–July	Yellow	X	✓	✓	1–6' of Inundation	OBL	Full Sun	Low	5.5–8.2
Nuphar lutea	Spatterdock	Herbaceous–Broadleaf	18"	18"	May–Oct	Yellow	X	✓	✓	1–6' of Inundation	OBL	Full Sun–Part Shade	Low	--
Nymphaea odorata	Native White Waterlily	Herbaceous–Broadleaf	6–8"	60–84"	Mar–Oct	White	X	✓	✓	1–6' of Inundation	OBL	Full Sun	Low	--
Orontium aquaticum	Golden Club	Herbaceous–Broadleaf	12–24"	18–24"	Apr–June	White	X	✓	✓	1–6' of Inundation, 6–12" of Inundation	OBL	Full Sun–Part Shade	Low	6.0–6.8
Osmunda regalis	Royal Fern	Herbaceous–Broadleaf	24–36"	24–36"	N/A	N/A	X	✓	✓	Permanently Saturated	OBL	Full Shade–Part Shade	None	4.0–6.0
Peltandra virginica	Arrow Arum	Herbaceous–Broadleaf	18–24"	18–24"	Apr–June	Green-White	X	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Full Sun–Part Shade	None	5.0–8.8
Pontederia cordata	Pickerelweed	Herbaceous–Broadleaf	24–48"	18–24"	June–Oct	Purple	X	✓	✓	Permanently Saturated, Seasonally Saturated	OBL	Full Sun	Low	4.9–8.7
Rosa palustris	Swamp Rose	Deciduous shrub	3-6'	3-6'	June–July	Pink	Red, Orange	✓	✓	Permanently Saturated	OBL	Full Sun	None	4.0–7.0

WETLAND PLANTS (CONT.)

Plant Name		Characteristics								Environmental Tolerances				
Botanical Name	Common Name	Plant Type	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Condition	Wetland Indicator Status	Light Requirements	Water/Soil Salinity Tolerance	pH Tolerance
Sagittaria latifolia	Duck Potato	Herbaceous–Broadleaf	12–48"	12–36"	July–Sept	White	X	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Full Sun–Part Shade	None	4.7–8.9
Saururus cernuus	Lizard's Tail	Herbaceous–Broadleaf	12"–24"	12"–24"	June–Sept	White	X	✓	✓	6–12" of Inundation, 0–6" of Inundation, Permanently Saturated	OBL	Full Sun–Part Shade	None	6.0–6.8
Scirpus cyperinus	Woolgrass	Herbaceous–Grass	36–60"	24–48"	June–July	N/A	X	✓	✓	0–6" of Inundation, Permanently Saturated, Seasonally Saturated	OBL	Full Sun–Part Shade	None	4.8–7.2
Scirpus atrovirens	Green Bulrush	Herbaceous–Grass	48–60"	36–48"	June–July	N/A	X	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Full Sun	None	4.0–8.0
Bolboschoenus fluviatilis	River Bulrush	Herbaceous–Grass	36–72"	24–48"	June–July	N/A	X	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Full Sun–Part Shade	None	--
Schoenoplectus acutus	Hardstem Bulush	Herbaceous–Grass	72"	24–36"	Apr–May	N/A	X	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Full Sun	Low	5.2–8.5

WETLAND PLANTS (CONT.)

Plant Name		Characteristics								Environmental Tolerances				
Botanical Name	Common Name	Plant Type	Height	Width	Bloom Time	Bloom Color	Fall Leaf Color	Native to US/Nativar	Wildlife Value	Hydrologic Condition	Wetland Indicator Status	Light Requirements	Water/Soil Salinity Tolerance	pH Tolerance
Schoenoplectus tabernaemontani	Softstem Bulrush	Herbaceous–Grass	48–96"	36–48"	May–Sept	N/A	X	✓	✓	0–6" of Inundation, Permanently Saturated	OBL	Full Sun	Low	5.4–7.5
Sparganium eurycarpum	Greater Bur-reed	Herbaceous–Broadleaf	24–84"	24–36"	June–July	Green	X	✓	✓	1–6' of Inundation, 0–6" of Inundation, Permanently Saturated	OBL	Full Sun–Part Shade	None	5.0–8.5
Symphyotrichum puniceum	Purple-stemmed Aster	Herbaceous–Broadleaf	72–96"	24–36"	Aug–Sept	Purple	X	✓	✓	Permanently Saturated, Seasonally Saturated	OBL	Full Sun	None	4.5–7.5
Typha latifolia	Broadleaf Cattail	Herbaceous–Broadleaf	48–72"	48–72"	June–July	Green-Yellow	X	✓	✓	1–6' of Inundation, 6–12" of Inundation, 0-6" of Inundation, Permanently Saturated, Seasonally Saturated	OBL	Full Sun–Part Shade	Low	5.5–8.7
Verbena hastata	Blue Vervain	Herbaceous–Broadleaf	24–72"	12–30"	June–Sept	Purple	X	✓	✓	Seasonally Saturated	FACW	Full Sun	None	6.5–7.0
Zizania aquatica	Wild Rice	Herbaceous–Grass	36–120"	36–48"	June–Aug	Green	X	✓	✓	1–6' of Inundation, 0–6" of Inundation, Permanently Saturated	OBL	Full Sun	Low	6.4–7.4
Zizia aurea	Golden Alexander	Herbaceous–Broadleaf	18–36"	18–24"	May–June	Yellow	X	✓	✓	Seasonally Saturated	FAC	Full Sun–Part Shade	Moderate	7.0–8.5

APPENDIX D

SWM PLAN SUBMISSION WORKSHEET & CHECKLISTS

CONCEPTUAL STORMWATER MANAGEMENT PLAN SUBMISSION PACKAGE CHECKLIST

CONCEPTUAL STORMWATER PLAN REVIEW WORKSHEET

STORMWATER MANAGEMENT SITE PLAN SUBMISSION PACKAGE CHECKLIST

CONCEPTUAL STORMWATER MANAGEMENT PLAN SUBMISSION PACKAGE CHECKLIST

Applicant Name:				
Submission Date (mm/dd/yyyy):				
Project Site Name:				
Application Type:		New Submission		Resubmission

Check the box provided for all items completed and/or provided. Enclose this checklist with the Conceptual Stormwater Management (SWM) Plan Submission Package Transmittal.

#	Conceptual SWM Plan Submission Review Package Component	Check If Included	Check if Not Applicable
1	Conceptual SWM Plan Review Worksheet and Required Attachments		
2	Conceptual SWM Plan		
3	Documentation of Rainwater Points for Performance Points System		
4	Infiltration Testing and Geotechnical Investigation Report*		
5	Documentation of Eligibility for Hardship Waiver		
6	Conceptual SWM Plan Review Fee**		

*Encouraged but not required for Conceptual SWM Plan approval.

**Refer to Fee Schedule: https://pittsburghpa.gov/dcp/fees

CONCEPTUAL STORMWATER MANAGEMENT PLAN REVIEW WORKSHEET			
Applicant Information			
Applicant First Name:			
Applicant Last Name:			
Applicant Organization:			
Applicant Address:			
Applicant Email:			
Applicant Phone Number:			
Project Site Information			
Project Name:			
Project Address Line 1:			
Project Address Line 2:			
Project City:		**Project Zip Code:**	
Project Parcel IDs:			
Property Owner First Name:			
Property Last First Name:			
Property Owner Organization:			
Property Owner Address:			
Property Owner Email:			
Design Professional First Name:			
Design Professional Last Name:			
Design Professional Organization:			
Design Professional Email:			
Design Professional Phone Number:			

CONCEPTUAL STORMWATER MANAGEMENT PLAN REVIEW WORKSHEET

Site Analysis		
	Yes	**No**
Location has Act 167 Stormwater Management Plan?		
Project in an area covered by the City Public Health and Safety Release Rate map?		
Project in an Act 167 Watershed?		
Project in Riverfront (RIV) or Uptown Public Realm Zoning District?		
Known contaminants existing on site?		
Type of Sewershed Receiving Post-Development Stormwater Discharge	Combine Sewer System (CSS)	
	Municipal Separate Sewer System	
	Non-sewered Area	
Description of existing land use(s) (i.e. buildings, impervious areas, pervious area, vegetation, predevelopment hydrology):		

Project Information	
Zoning Application Number	
Earth Disturbance Area *(Square feet to the nearest 1 square foot)*	
Existing Impervious Area *(Square feet to the nearest 1 square foot)*	
Post Development Impervious Area *(Square feet to the nearest 1 square foot)*	
Change in Impervious Area *(Square feet to the nearest 1 square foot)*	

CONCEPTUAL STORMWATER MANAGEMENT PLAN REVIEW WORKSHEET

Additional Application Information

	Yes	No
Do you intend to pursue alternative compliance for this project?		
Do you intend to pursue hardship waivers/expedited review for this project?		
Do you intend to pursue same-owner volume trading and/or banking for this project?		
Do you intend to pursue same-owner rate control offsetting for this project?		
Do you intend to pursue innovation review for this project?		
Do you intend to pursue incentives for this project?		
If so, what type(s) of incentives (volume control, rate control, and/or technology)?		

Attachments

	Included	NA
Narrative of Overall Stormwater Management Approach		
Site Photos (at least one color photograph from each side of the parcel(s) looking into the site)		
If you intend to pursue alternative compliance for this project, provide a brief description of your approach and why it is necessary for the project.		
If you intend to pursue hardship waivers/expedited review for this project, provide proof of qualification as an attachment.		
If you intend to pursue same-owner volume trading, volume banking, or rate control offsetting for this project, explain your approach, map trading areas, and provide proof of same-ownership.		
If you intend to pursue innovation review for this project, provide a brief description of the innovative approach(es).		
If you intend to pursue incentives for this project, provide a brief description of the approach.		

STORMWATER MANAGEMENT SITE PLAN SUBMISSION PACKAGE CHECKLIST

Applicant Name:				
Submission Date (mm/dd/yyyy):				
SW Plan Review Project Number:				
Project Site Name:				
Application Type:		New Submission		Resubmission

Check the box provided for all items completed and/or provided. Enclose this checklist with the Conceptual Stormwater Management (SWM) Plan Submission Package Transmittal.

#	SWM Site Plan Submission Review Package Component	Check If Included	Check if Not Applicable
1	SWM Site Plan		
2	SWM Site Plan Report		
3	Volume Control Offset and/or Rate Offsets Strategy and Supporting Documentation		
4	Volume, Rate, and Technology Incentives Strategy and Supporting Information		
5	Documentation of Rainwater Points for Performance Points System		
6	Innovation Track Review Request and Supporting Documentation		
7	SWM Plan Review Fee**		

**Refer to Fee Schedule: https://pittsburghpa.gov/pli/pli-fees/?&title=pli-fees

APPENDIX E

GENERAL DRAFTING REQUIREMENTS

#	Requirement
1	Name of owner and designer
2	Site address
3	Plan drawing scale at one inch equals 50 feet or larger (i.e., one inch equals 40 feet, one inch equals 30 feet, etc.) scale. Drawings must be submitted on twenty-four-inch by thirty-six-inch sheets.
4	Location map including site location within watershed(s). Drawn to a scale of a minimum of one inch equals 2,000 feet, relating the plan to municipal boundaries, at least two intersections of road center line or other identifiable landmarks.
5	Location of existing and proposed property lines, rights-of-ways with widths labeled, building lines and setbacks
6	Street lines, street names, lot names, easements, other land divisions, and their purposes and confirmed locations
7	Existing site conditions and features including: • Environmentally sensitive areas (e.g., brownfield, area with steep slopes) • Existing contours at intervals of one or two feet • Wetlands, streams, rivers and riparian areas • Undermined areas • Groundwater seeps and springs • Native vegetation including trees greater than six inches diameter at breast height, woodlands
8	Topography of site and adjacent areas within 25 feet of the site: • Existing topography (2-foot contours or smaller) • Proposed topography (2-foot contours or smaller), differentiated from existing topography
9	Location/outline of all existing structures to remain within 25 feet of the limit of disturbance
10	Locations of existing active and abandoned utilities including: • On-lot disposal systems (i.e., septic systems) • Wells • Stormwater management facilities • Storm and sanitary sewers • Waterlines • Electrical lines • Light poles • Utility easements within 25 feet of the project site property line
11	Limits of earth disturbance (LOD) labeled with area in square feet. LOD should including areas likely to be disturbed by construction activities and installation of erosion and sediment control measures
12	Delineation of impervious surfaces and proposed disconnected impervious areas within the proposed LOD
13	Identification of proposed site improvements consistent with improvements shown on Zoning Site Plan submission including: • Buildings • Parking lots • Landscaping
14	Location of all proposed water and fire utility connections, including proposed sizes, if known
15	Location of all proposed sanitary sewer and stormwater connections, including proposed sizes, if known (sewer connections made directly into inlets and manholes are not permitted)
16	Location of all existing and proposed drainage structures and their connections to BMPs or sewer (connection points must be included within the LOD)
17	Extent and boundaries of 100-year floodplain in relation to the project
18	Representation of post-development hydrology of the site with flow lines and/or drainage areas including proposed discharge points from property and type of discharge (diffused, concentrated, piped, etc.)

APPENDIX F

OPERATIONS AND MAINTENANCE

OPERATIONS AND MAINTENANCE PLAN CHECKLIST

SAMPLE OPERATIONS AND MAINTENANCE PLAN

BMPS OPERATIONS AND MAINTENANCE TASKS AND FREQUENCIES

OPERATIONS AND MAINTENANCE PLAN CHECKLIST

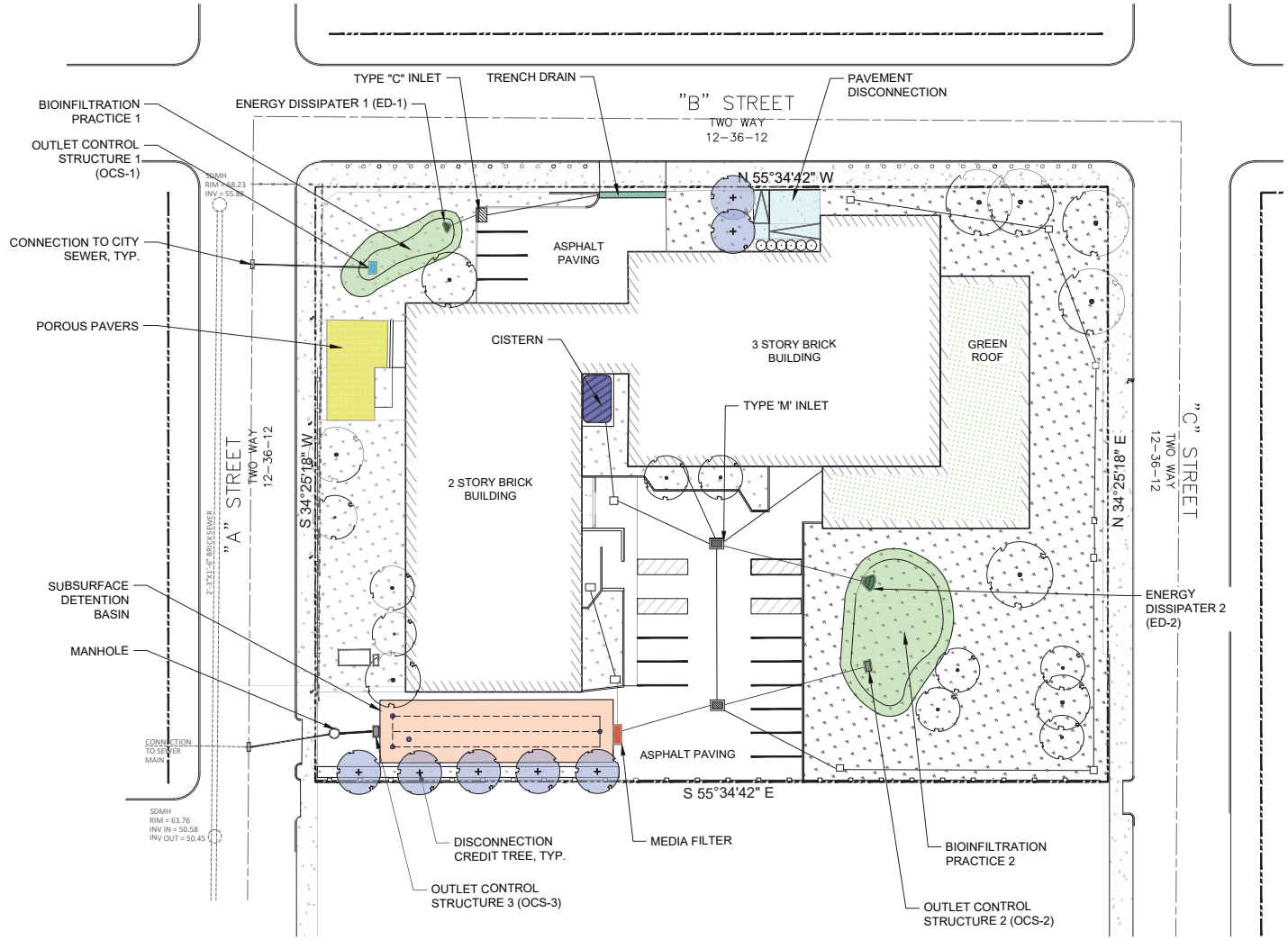
Project Site Information	
Project Name:	
Project Address Line 1:	
Project Address Line 2:	
Project City:	
Project State:	
Project Zip Code:	

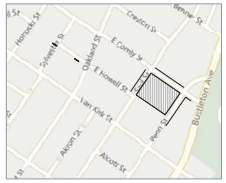
Project Site Information	
Property Owner First Name:	
Property Owner Last Name:	
Property Owner Organization:	
Property Owner Address:	
Property Owner Email:	
Property Owner Phone Number:	

BMP Maintenance Guide Checklist

Item	Description	Requirement	Included
11"x17" Site Map	See Site Map Example	Required	
Non-technical Narrative of Stormwater Management Approach	Description of the overall stormwater management strategy including a list of all BMPs on site and any other key features that require maintenance	Required	
BMP Maintenance Form(s)*	Separate BMP Maintenance Schedule Form required for each form. Forms list the recommended routine maintenance activities and frequency for each BMP. Property owners must document all maintenance activities for the useful life of each BMP. The "Maintenance Date" section is used to indicated the date when maintenance is completed for each BMP.	Required	
BMP Maintenance Report(s), photo log(s), and receipt(s) for work performed	Additional documentation of BMP maintenance should be kept for documentation of compliance with maintenance requirements.	Strongly Recommended	

*Additional maintenance may be necessary due to site specific conditions. The property owner is responsible for maintaining the performance of their BMPs even if additional measures are necessary. The stormwater design professional must review maintenance activities and frequencies for each BMP and make changes as appropriate.





SITE LOCATION MAP
NTS

LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING FENCING
- SOLID PIPING
- PAVING STRIPPING
- SUBSURFACE DETENTION
- EXISTING STORM WATER UTILITY
- BUILDING BOUNDARY
- BUILDING STEP
- STREET STRIPPING
- SITE WALL
- CURB
- PERFORATED PIPING
- PAVEMENT RESTORATION
- GAS UTILITY
- WATER UTILITY
- TURF BOUNDARY

SMP MAINTENANCE GUIDE SITE MAP COLOR LEGEND

- PERMEABLE PAVERS
- SUMP MANHOLE, MANHOLE
- GREEN ROOF
- INLET, TRENCH DRAIN
- TREE DISCONNECT CREDIT AREA, PAVEMENT DISCONNECTION AREA
- SUBSURFACE DETENTION BASIN
- BIOINFILTRATION BASIN
- OUTLET CONTROL STRUCTURE
- RIPRAP APRONL
- CISTERN
- MEDIA FILTER

LEGEND

- PROPERTY BOUNDARY
- METAL FENCE
- PAVING STRIPING LINE
- EXISTING TREE
- SHRUB
- RAIN GARDEN
- STORMWATER CREDIT TREE
- CITY SEWER CONNECTION
- BOLLARD
- 4' OPEN MOUTH GRATE INLET
- 4' HIGHWAY INLET
- 4' GREEN CITY INLET
- GREEN CITY DUAL CATCH BASIN
- LIGHT POLE
- ENERGY DISSIPATER
- PARKING METER
- ASPHALT PAVING
- GREEN ROOF
- GRASS AND LANDSCAPED AREAS
- POROUS PAVERS
- CISTERN
- CONCRETE PAVEMENT
- SOLID PIPE
- PERFORATED PIPE

SCALE: 1" = 20'

Owner
Z A&E FIRM
ONE ALLEGHENY PLAZA
100 SYCAMORE ST, Suite 100
PITTSBURGH, PA 19106
(XXX) XXX-XXX
www.ZA&E.com

Owner
A REDEVELOP CORP.
1000 Steeler Drive
Pittsburgh, PA 10000
(111) 222-3333
www.Aredevelop.com

Project
A PROPERTY REDEVELOPMENT
CITY OF PITTSBURGH
PITTSBURGH COUNTY

Milestone
NOT FOR CONSTRUCTION

Rev.	Description	Date
△		

Design Professional

AN ENGINEER, P.E.
PA Professional Engineer No. 000000

Project #:	0
Date:	02/20/2022
Scale:	1" = 20'
Format:	24" x 36" (ARCH D)
Drawn By:	AA
Checked By:	ZZ

Sheet Title:
SMP MAINTENANCE GUIDE SITE MAP

Sheet Number:
M101
of

MAINTENANCE TASKS AND FREQUENCIES FOR BIOINFILTRATION/BIORETENTION

Component	Task	Frequency
General	Maintain records of all inspections and maintenance activities.	Ongoing
General	Evaluate drain down time of the BMP after a minimum 1" of precipitation in no more than a 24 hr. period to ensure less than 72 hr. drain down time.	Ongoing
Structures	Inspect inlet controls, outlet structures, and storage areas for trash and sediment accumulation.	Monthly during the first year to determine on-going maintenance frequency
Structures	Inspect underdrains and cleanouts for sediment accumulation, blockage and overall function.	Quarterly
Structures	Clean overflow structures.	Minimum monthly or as needed based on observations
Vegetation	Water post installation for survival.	Daily for two weeks after planting preferably during early part of the day to prevent persistently wet vegetation
Vegetation	Water for long term establishment.	Every four days during periods of four or more days without rain, June through August for the first year after installation
Vegetation	Inspect for disease and distress.	Twice a month during the first year after installation
Vegetation	Inspect for long term overall health and establishment, and replace as necessary.	Quarterly
Vegetation	Treat diseased plants and remove source of decline (viral, bacterial or fungal sources or pest/ inspect) herbivory. Practice integrated pest management to the greatest extent feasible.	As needed
Soil or growing media	Inspect soil for erosion; repair as needed.	Quarterly
Soil or growing media	Remove trash, litter and debris from infiltration areas.	Monthly
Soil or growing media	Remulch depleted areas where required.	As needed

MAINTENANCE TASKS AND FREQUENCIES FOR SUBSURFACE INFILTRATION/DETENTION		
Component	**Task**	**Frequency**
General	Maintain records of inspections and maintenance activities.	Ongoing
Upstream contributing areas	Inspect erosion control and flow spreading devices for proper function until source of sediment is stabilized.	Biweekly and after major storm events
Inlet and outlet structures and storage areas	Perform onboarding inspect for trash and sediment accumulation.	Monthly during the first year post installation to determine routine maintenance frequency
Inlet and outlet structures and storage areas	Conduct routine inspections.	Minimum quarterly
Gutter, catch basin, and pretreatment areas	Clean out gutter and catch basins to reduce sediment loads.	As needed
Gutter, catch basin, and pretreatment areas	Remove of floatables and petroleum products.	Quarterly or as needed based on inspections
Intermediate sump boxes, filter chambers, and pretreatment areas	Remove sediment and debris and replace filters.	As needed
Detention chambers	Clean sediment chambers.	As needed
Pipe/ vault system	Remove sediment to ensure that sediment depth does not reach a maximum depth of 4" below outlet invert elevation.	As needed
Grid system	Remove per manufacturer's or site specific requirements.	As needed

MAINTENANCE TASKS AND FREQUENCIES FOR POROUS PAVEMENT		
Component	**Task**	**Frequency**
General	Maintain records of inspections and maintenance activities.	Ongoing
Upstream contributing areas	Inspect erosion control and flow spreading devices for proper function until source of sediment is stabilized.	Biweekly and after major storm events
Grass pavers or grid pavement systems	Mow grass.	As needed
Porous asphalt or concrete systems	Vacuum using regenerative or commercial vacuum sweeper to remove ingrained sediments. (Note: conventional street sweeper are not appropriate)	As needed
Inlet structures conveying drainage to subsurface storage at or below porous pavement structures if present	Clean structure for trash, sediment and debris.	Twice a year

MAINTENANCE TASKS AND FREQUENCIES FOR GREEN ROOFS

Component	Task	Frequency
General	Maintain records of inspections and maintenance activities.	Ongoing
Vegetation	Water post installation for survival	Two week after plant installation preferably at end of day
Vegetation	Water for long term establishment	Every four days during periods of four or more days without rain, June through August for the first year after installation
Vegetation	Weed invasive or non-desirable species by hand. Use chemical controls only if absolutely warranted and plant cover can be maintained at 90%.	Minimum four times during the growing season in the first two years, and as needed thereafter
Vegetation	Inspect for disease or distress and establishment. Plant cover must be 90% during the growing season. If plant cover declines below this threshold, determine cause and replant as necessary.	Minimum twice a month during the first year after installation and quarterly during the growing season thereafter
Vegetation	Inspect root development for establishment. If root zones if poorly developed, investigate cause (nutrient levels, moisture, exposure, etc.) and possible remedial action	Four times during the growing season
Vegetation	Manually remove residual plant materials from past growing season to 4 to 6 inches above the ground as applicable	Annually in early spring
Growing media	Inspect for erosion by wind or water. Channelized erosion may indicate issues with underlying drainage system or growing media. Extended ponding may also indicate issues with drainage. Replace growing media upon taking corrective measures with drainage issue as warranted.	Quarterly
Growing media	Test for soluble nitrogen content	Annually
Permanent Irrigation systems if used	Inspect and adjust irrigation rates for optimal plant establishment and survivability and water use efficiency	Quarterly during the growing season
Roof drains	Clear roof drains from sediment, debris or detrital vegetation. Mitigate source of erosion.	As needed

MAINTENANCE TASKS AND FREQUENCIES FOR PONDS AND WET BASINS		
Component	**Task**	**Frequency**
General	Maintain records of inspections and maintenance activities.	Ongoing
General	Inspect basin for potential problems, including: subsidence, erosion, cracking, or tree growth on the embankment; damage to the emergency spillway; sediment accumulation around the outlet; inadequacy of the inlet/outlet channel erosion control measures; changes in the condition of the pilot channel; and erosion within the practice and its banks	Annually
Vegetation	Water vegetation for post installation.	Daily for eight weeks
Vegetation	Water vegetation for long term establishment.	Every four days during periods of four or more days without rain, June through August for the first year after installation.
Vegetation	Inspect for sign of disease and distress.	Biweekly for the first year after installation during the growing period
Vegetation	Remove invasive vegetation or undesirable vegetation.	As needed, minimum monthly during the growing season
Vegetation	Mow/ trim detention basin vegetation, excluding aquatic bench and buffer.	As needed
Vegetation	Fertilize and control pest and diseases to perimeter grassed areas as required. Note that care should be taken with fertilizer of pesticide applications to prevent the introduction of excess pollutants into the basin.	As needed
Structures	Inspect inlet controls, outlet structures, and storage areas for trash and sediment accumulation.	Monthly for the first year after installation to determine ongoing maintenance frequency.
Structures	Remove trash and debris from forebay, pond and outlet structure.	As needed
Structures	Inspect outlet control structure for clogging	Quarterly and after every storm greater than one inch
Structures	Inspect and clean proprietary filters and treatment systems per manufacturers' instructions.	As needed
Water	Treat basin for mosquito larvae if stagnant water remains for longer than 72 hrs.	As needed
Basin storage and pretreatment areas	Dredge large volumes of sediment and organic debris from basin and forebay areas. Accumulated sediment must never occupy greater than 50% of the forebay volume.	As needed (at least once every five to ten years)

MAINTENANCE TASKS AND FREQUENCIES FOR DRY BASINS		
Component	**Task**	**Frequency**
General	Maintain records of inspections and maintenance activities.	Ongoing
General	Inspect basin for potential problems, including: subsidence, erosion, cracking, or tree growth on the embankment; damage to the emergency spillway; sediment accumulation around the outlet; inadequacy of the inlet/outlet channel erosion control measures; changes in the condition of the pilot channel; and erosion within the practice and its banks	Annually
Vegetation	Water vegetation for post installation.	Daily for eight weeks
Vegetation	Remove invasive vegetation or undesirable vegetation	As needed, minimum monthly during the growing season
Vegetation	Mow/ trim detention basin vegetation.	As needed
Vegetation	Fertilize and control pest and diseases to perimeter grassed areas as required. Note that care should be taken with fertilizer of pesticide applications to prevent the introduction of excess pollutants into the basin.	As needed
Structures	Inspect inlet controls, outlet structures, and storage areas for trash and sediment accumulation.	Monthly for the first year after installation to determine ongoing maintenance frequency.
Structures	Remove trash and debris from outlet and inlet structures.	As needed
Infiltration/ detention area	Remove trash and debris from infiltration/ detention areas and outlet and inlet structures.	As needed

MAINTENANCE TASKS AND FREQUENCIES FOR MEDIA FILTERS		
Component	**Task**	**Frequency**
General	Maintain records of inspections and maintenance activities.	Ongoing
Proprietary systems	Inspect and clean proprietary filters and treatment systems per manufacturers' instructions.	As needed
Infiltration surfaces	Remove accumulated sediment.	Minimum biannually or as needed based sediment loading
Inflow and outflow pipes	Hydraulic cleaning of inflow and outflow pipes.	As warranted based on CCTV inspection performed every 3 years
Inlet	Vacuuming cleaning of accumulated sediment within inlets.	Minimum twice a year or as needed based on rate of sediment accumulation

MAINTENANCE TASKS AND FREQUENCIES FOR CISTERNS

Component	Task	Frequency
General	Maintain records of inspections and maintenance activities.	Ongoing
Cistern, inlet, pretreatment and outlet structures	Inspect for trash and sediment accumulation	Monthly for the first year after installation to determine ongoing maintenance frequency.
Cistern and pretreatment and structures	Inspect cistern and control structures. Remove floating debris and accumulated petroleum products.	Quarterly
Cistern	Brush the inside surfaces and thoroughly disinfect. Prior to freezing weather, to avoid structural damage perform winterization of cisterns as per manufacturer's requirements or design professional's specifications.	Annually
Inflow and pretreatment structures	Regularly clean out gutters, gutter screening, first-flush chamber, and catch basins to reduce sediment load to the cistern. Clean intermediate sump boxes, replace filters, and otherwise clean pretreatment areas in directly connected systems. Remove sediment and debris from cisterns according to the manufacturer's recommendations or the site-specific maintenance plan. Test sediment for toxicants in compliance with current disposal requirements if land uses in the catchment include commercial or industrial zones, or if indications of pollution are present.	As needed

APPENDIX G

DEFINITIONS

DEFINITIONS

1. **95TH PERCENTILE RAINFALL EVENT.** The measured precipitation depth accumulated over a twenty-four-hour period for the period of record that ranks as the 95th percentile rainfall depth based on the range of all daily event occurrences during this period.
2. **ACT 167.** The city is empowered to regulate land use activities that affect Runoff and surface and groundwater quality and quantity by the authority of the Commonwealth of Pennsylvania's Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. Section 680.1, et seq., as amended, the "Storm Water Management Act."
3. **ACT 167 PLAN.** A plan prepared under the authority of Pennsylvania's Storm Water Management Act of October 4, 1978.
4. **AGRICULTURAL ACTIVITY.** Activities associated with agriculture such as agricultural cultivation, agricultural operation, and animal heavy use areas. This includes the work of producing crops including tillage, land clearing, plowing, disking, harrowing, planting, harvesting crops or pasturing and raising of livestock and installation of conservation measures. Construction of new buildings or Impervious Area is not considered an agricultural activity.
5. **APPLICANT.** A landowner, Developer, or other person who has filed an application to the city for approval to engage in any regulated activity at a Project Site in the city.
6. **BEST MANAGEMENT PRACTICE (BMP).** Activities, facilities, designs, measures, or procedures used to manage stormwater impacts from regulated activities, to meet State Water Quality Requirements, to promote groundwater recharge, and to otherwise meet the purposes of Title 13. Stormwater BMPs are commonly grouped into one (1) of two (2) broad categories: "structural" or "non-structural." Structural BMPs or measures are those that consist of a physical device or practice that is installed to capture and treat stormwater Runoff. Non-structural BMPs or measures refer to operational and/or behavior-related practices that attempt to minimize the contact of pollutants with stormwater Runoff.
7. **CHANNEL.** A natural stream that conveys water; a ditch or open channel excavated for the flow of water.
8. **CITY.** The city of Pittsburgh, Allegheny County, Pennsylvania, and any related city agency, bureau, or department.
9. **COMBINED SEWER.** Portions of the Sewer System which were designed and built to carry sanitary sewage and/or industrial waste in a manner combined with stormwater Discharge.
10. **COMBINED SEWER OVERFLOW.** Intermittent overflow or other untreated discharge from a combined sewer system during periods of heavy rainfall.
11. **CONDUIT.** Any channel intended for the conveyance of water, whether open or closed.
12. **CONFLUENCE.** Points where watercourses join together.
13. **CONSERVATION DISTRICT.** A conservation district, as defined in Section 3(c) of the Conservation District Law (3 P. S. § 851(c)) that has the authority under a delegation agreement executed with DEP to administer and enforce all or a portion of the regulations promulgated under PA Code Title 25, Chapter 102.
14. **CONVEYANCE.** Any structure that carries a flow. (v) The ability of a pipe, culvert, swale or similar facility to carry the peak flow from the design storm.
15. **COUNTY.** The County of Allegheny, Pennsylvania.
16. **CULVERT.** A pipe, conduit or similar structure including appurtenant works which carries water under or through an embankment or fill.

17. **CURVE NUMBER (CN, RUNOFF CURVE NUMBER).** Parameter used in Soil Cover Complex Method (NRCS Runoff Curve Number Method) for estimating stormwater runoff from rainfall.
18. **DAM.** Any artificial barrier, together with its appurtenant works, constructed for the purpose of impounding or storing water, or a structure for highway, railroad or other purposes which may impound water.
19. **DEP.** The Pennsylvania Department of Environmental Protection.
20. **DESIGN STORM.** The magnitude and temporal distribution of precipitation from a storm event measured in probability of occurrence (e.g., a 5-year storm) and duration (e.g., twenty-four (24) hours) used in the design and evaluation of stormwater management systems. Also see Return Period.
21. **DESIGN STORM METHOD.** A method of calculating stormwater management needs, also known as Volume Control-Guideline 1 (CG-1) in the PA BMP Manual 3 , requiring detailed modeling based on site conditions.
22. **DESIGNATED PLAN REVIEWER.** A Qualified Professional as defined herein, that has been designated by the city to be the reviewer of Stormwater Management (SWM) Site Plans for the city and shall be understood to be the reviewer where indicated as the city within Title 13.
23. **DETENTION VOLUME.** The volume of runoff that is captured and released into the Waters of the Commonwealth at a controlled rate.
24. **DEVELOPER.** Any landowner, agent of such landowner or tenant with the permission of such landowner, who seeks to make or makes or causes to be made a subdivision or land Development or to undertake any regulated activities at a site in the city.
25. **DEVELOPMENT.** Any activity, construction, alteration, change in land use or similar action that affects stormwater runoff characteristics.
26. **DEVELOPMENT SITE (SITE).** See Project Site.
27. **DIAMETER AT BREAST HEIGHT (DBH).** The diameter of the trunk of a tree, measured four and one-half (4.5) feet above ground level. For trees with co-dominant (forked) stems, the trunk is measured below the fork and above the trunk flare, at the point of the smallest diameter. For multi-stemmed trees, the diameter is considered to be the sum of the diameters of all of the stems that contribute significantly to the crown.
28. **DISCHARGE.** A volume of fluid flowing from a conduit or channel, or being released from detention storage, per unit of time, commonly expressed as cubic feet per second (cfs), million gallons per day (mgd), gallons per minute (gpm), or cubic meters per second (cms).
29. **DISTURBED AREA.** An unstabilized land area where an Earth Disturbance Activity is occurring or has occurred.
30. **DRAINAGE.** Interception and removal of excess surface water or groundwater from land by artificial or natural means.
31. **DRAINAGE AREA.** The contributing area to a single drainage basin, expressed in acres, square miles, or other units of area; also called a catchment area, watershed, or river basin, the area served by a drainage system or by a watercourse receiving storm and surface water.
32. **EARTH DISTURBANCE ACTIVITY.** A construction or other human activity which disturbs the surface of the land, including, but not limited to: clearing and grubbing; planting; grading; demolition; excavations; embankments; road construction or full depth repair; building construction; and the moving, depositing, stockpiling, or storing of soil, rock, or earth materials.

33. **ENCROACHMENT.** Any structure or activity which in any manner changes, expands or diminishes the course, current or cross section of any watercourse, floodway or body of water.

34. **EROSION.** The natural process by which the surface of the land is worn away by water, wind, or chemical action.

35. **E&S.** Erosion and sediment

36. **EROSION AND SEDIMENT (E&S) CONTROL PLAN.** A site-specific plan consisting of both drawings and a narrative that identifies BMPs to minimize accelerated erosion and sedimentation before, during and after earth disturbance activities.

37. **EXISTING CONDITION.** The dominant land cover during the five-year period immediately preceding a proposed regulated activity.

38. **FEMA.** Federal Emergency Management Agency.

39. **FLOOD.** A general but temporary condition of partial or complete inundation of normally dry land areas from the overflow of streams, rivers, and other waters of the commonwealth.

40. **FLOODPLAIN.** Any land area susceptible to inundation by water from any natural source or delineated by applicable FEMA maps and studies as being a special flood hazard area, as identified per the Floodplain Overlay District in Title Nine. Also includes areas that comprise Group 13 Soils, as listed in Appendix A of the Pennsylvania DEP Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by DEP).

41. **FLOODWAY.** The channel of the watercourse and those portions of the adjoining Floodplains that are reasonably required to carry and Discharge the 100-year flood. Unless otherwise specified, as identified per the Floodplain Overlay District in Title Nine. In an area where no FEMA maps or studies have defined the boundary of the 100-year floodway, it is assumed—absent evidence to the contrary—that the floodway extends from the stream to fifty (50) feet from the top of the bank of the stream.

42. **GREEN INFRASTRUCTURE.** Systems and practices that use or mimic natural processes to infiltrate, evapotranspire, or reuse stormwater on the site where it is generated.

43. **GROUNDWATER.** Water beneath the earth's surface that supplies wells and springs and is within the saturated zone of soil and rock.

44. **GROUNDWATER RECHARGE.** The replenishment of existing natural underground water supplies from precipitation or overland flow.

45. **HIGH POLLUTANT LOADING HOTSPOT.** Areas in which historic or current land use or activities have contaminated the soil underlying the site such that infiltration of stormwater would likely cause groundwater contamination due to leaching.

46. **HYDROLOGIC SOIL GROUP (HSG).** Infiltration rates of soils vary widely and are affected by subsurface Permeability as well as surface intake rates. Soils are classified into four (4) HSGs (A, B, C, and D) according to their minimum infiltration rate, which is obtained for bare soil after prolonged wetting. The NRCS defines the four (4) groups and provides a list of most of the soils in the United States and their group classification. The soils in the area of the development site may be identified from a soil survey report that can be obtained from local NRCS offices or conservation district offices. Soils become less pervious as the HSG varies from A to D (NRCS 1, 2).

47. **HYDROLOGY.** The science dealing with the waters of the earth and their distribution and circulation through the atmosphere. Engineering hydrology deals with the application of hydrologic concepts to the design of projects for use and control of water.

48. **IMPERVIOUS SURFACE (IMPERVIOUS AREA).** A surface that prevents the infiltration of water into the ground. Impervious surfaces (or areas) shall include, but not be limited to: roofs; additional indoor living spaces, patios, garages, storage sheds and similar structures; and any streets or sidewalks. Decks, parking areas, and driveway areas are counted as Impervious Areas if they directly prevent infiltration. Gravel is considered impervious unless compaction or infiltration tests are provided in accordance with requirements of the city of Pittsburgh Stormwater Design Manual.

49. **INLET.** The upstream end of any structure through which water may flow.

50. **IN-LIEU FEE.** Fee that Developers or property owners may pay to achieve alternative compliance if unable to comply with volume control regulations with onsite management. Fee amount is commensurate with the cost of meeting management requirements off-site.

51. **INVASIVE SPECIES.** Plant species that are not native to the state, grow aggressively, and spread and displace Native Vegetation per DCNR's most-recently published invasive species list.

52. **INFILTRATION.** Movement of surface water into the soil, where it is absorbed by plant roots, evaporated into the atmosphere, or percolated downward to recharge groundwater.

53. **KARST.** A type of topography or landscape characterized by features including but not limited to surface depressions, sinkholes, rock pinnacles/ uneven bedrock surface, underground drainage, and caves. Karst is formed on carbonate rocks, such as limestone or dolomite.

54. **LAND DEVELOPMENT (DEVELOPMENT).** Any activity, construction, alteration, change in land use or similar action that affects stormwater runoff characteristics. The definitions in the "Subdivision Regulations and Standards of the City Planning Commission," the Special Definitions for the Riverfront Overlay District of the Zoning Code, and/or the definition in Chapter 926 of the Zoning Code may apply.

55. **LOW IMPACT DEVELOPMENT (LID).** Site design approaches and small-scale stormwater management practices that promote the use of natural systems for infiltration, evapotranspiration, and reuse of rainwater. LID can be applied to new development, urban retrofits, and revitalization projects. LID utilizes design techniques that infiltrate, filter, evaporate, and store runoff close to its source. Rather than rely on costly large-scale conveyance and treatment systems, LID addresses stormwater through a variety of small, cost-effective landscape features located on-site.

56. **LANDSLIDE-PRONE AREA.** Any area delineated on the city of Pittsburgh landslide-prone overlay district map and /or which is determined by a geotechnical study to be landslide prone.

57. **MANNING'S EQUATION.** An equation for calculation of velocity of flow (e.g., feet per second) and flow rate (e.g., cubic feet per second) in open channels based upon channel shape, roughness, depth of flow and slope. Manning's Equation assumes steady, gradually varied flow.

58. **MUNICIPAL SEPARATE STORM SEWER (MS4).** A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains), which is all of the following:

    a. Owned or operated by a state, city, town, borough, township, county, district, association, or other public body (created under state law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes;

b. Designed or used for collecting or conveying stormwater;
c. Not a combined sewer; and
d. Not part of a publicly owned treatment works as defined at 40 CFR 122.2.

59. **MS4**. Municipal separate storm sewer system; a conveyance or system of conveyances that is owned by a state, city, town, village, or other public entity that discharges to waters of the Commonwealth; is designed or used to collect or convey stormwater (including storm drains, pipes, ditches, etc.); is not a combined sewer; and is not part of a publicly owned treatment works (sewage treatment plant).

60. **NATIVE VEGETATION.** Plant species that have historically grown in Pennsylvania and are not invasive species as defined herein.

61. **NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES).** The national system for the issuance of permits under Section 402 of the Federal Clean Water Act (33 U.S.C. § 1342), including a state or interstate program which has been approved in whole or in part by the EPA, including the regulations codified in PA Code Chapter 92 (relating to National Pollutant Discharge Elimination System permitting, monitoring and compliance) and as specified in Pa. Code Chapter 102.

62. **NONPOINT SOURCE POLLUTION.** Any source of water pollution that does not meet the legal definition of "point source" in Section 502(14) of the Clean Water Act.

63. **NONSTRUCTURAL BMPs.** Planning and design approaches, operational and/or behavior-related practices which minimize stormwater runoff generation resulting from an alteration of the land surface or limit contact of pollutants with stormwater runoff.

64. **NRCS.** USDA Natural Resources Conservation Service (previously Soil Conservation Service).

65. **OPEN CHANNEL.** A drainage element in which stormwater flows with an open surface. Open channels include, but shall not be limited to, natural and man-made drainageways, swales, streams, ditches, canals, and pipes flowing partly full. Open channels may include closed conduits so long as the flow is not under pressure.

66. **OUTFALL.** Points or areas at which stormwater runoff leaves a site, which may include streams, storm sewers, swales or other well defined natural or artificial drainage features, as well as areas of dispersed overland flows.

67. **OUTLET STRUCTURE.** A structure designed to control the volume of stormwater runoff that passes through it during a specific length of time.

68. **PA BMP MANUAL.** The Pennsylvania Department of Environmental Protection's Stormwater Best Management Practices Manual, most recent version.

69. **PEAK DISCHARGE /FLOW/RATE OF RUNOFF.** The maximum rate of flow of water at a given point and time resulting from a specific storm event.

70. **PERFORMANCE STANDARD.** A standard which establishes an end result or outcome which is to be achieved but does not prescribe specific means for achieving it.

71. **PERMEABILITY.** The rate at which water will move through a saturated soil.

72. **PERVIOUS AREA.** Any area not defined as impervious.

73. **POINT OF INTEREST.** A point of hydrological and hydraulic importance used for analysis.

74. **PREFERRED STORMWATER MANAGEMENT TECHNOLOGIES.** Stormwater management practices that can provide additional co-benefits, increased reliability, or better performance than other technologies. Preferred Stormwater Management Technologies must be in accordance with the City of Pittsburgh Stormwater Design Manual.

75. **PROJECT SITE.** The specific area of land where any regulated activities in the city are planned, conducted, or maintained.
76. **QUALIFIED PROFESSIONAL.** Any person licensed by the Pennsylvania Department of State or otherwise qualified under Pennsylvania law to perform the work required by Title 13.
77. **RATE CONTROL.** SWM controls used to manage the peak flows for the purposes of channel protection and flood mitigation.
78. **RATIONAL METHOD (RATIONAL FORMULA).** A rainfall-runoff relation used to estimate peak flow.
79. **RECORD DRAWING.** Construction drawings revised to represent as-built conditions.
80. **REDEVELOPMENT.** Any physical improvement to a previously developed lot that involves earthmoving, removal, or addition of impervious surfaces.
81. **REGULATED ACTIVITIES.** Any earth disturbance activities or any activities that involve the alteration or development of land in a manner that may affect stormwater runoff.
82. **REGULATED EARTH DISTURBANCE ACTIVITY.** Activity involving earth disturbance subject to regulation under PA Code Title 25, Chapters 92 and 102, or the Clean Streams Law.
83. **RELEASE RATE.** The percentage of Existing Conditions peak rate of runoff from a site or Subarea to which the proposed conditions peak rate of runoff must be reduced to protect downstream areas.
84. **RELEASE RATE DISTRICT.** A watershed or portion of a watershed for which a release rate has been established by an adopted Act 167 Stormwater Management Plan.
85. **RESERVOIR.** Any basin, either natural or artificial, which contains or will contain the water impounded by a Dam.
86. **RETENTION VOLUME/REMOVED RUNOFF.** The volume of runoff that is captured and not released directly into the surface waters of this Commonwealth during or after a storm event.
87. **RETURN PERIOD.** The average interval, in years, within which a storm event of a given magnitude can be expected to occur one time. For example, the 25-year return period rainfall would be expected to occur on average once every 25 years; or stated in another way, the probability of a 25-year storm occurring in any one (1) year is 0.04 (i.e., a four-percent chance).
88. **RIPARIAN BUFFER.** A permanent vegetated area of trees and shrubs located adjacent to streams, lakes, ponds and wetlands.
89. **RUNOFF.** Any part of precipitation that flows over the land.
90. **RUNOFF CHARACTERISTICS.** The surface components of any watershed which affect the rate, amount, and direction of stormwater runoff. These may include but are not limited to: vegetation, soils, slopes, and man-made landscape alterations.
91. **SANITARY SEWER.** Portions of the Sewer System which were designed and built to carry sanitary sewage and/or industrial waste separately from storm water Discharge, or portions of the Sewer System so designated as a Sanitary Sewer by resolution of PWSA.
92. **SCS.** Soil Conservation Service, U.S. Department of Agriculture.
93. **SEDIMENT.** Soils or other materials transported by surface water as a product of Erosion.

94. **SEDIMENTATION.** The process by which mineral or organic matter is accumulated or deposited by moving wind, water, or gravity.

95. **SIMPLIFIED METHOD.** A method of calculating stormwater management needs, also known as Volume Control-Guideline 2 (CG-2) in the PA BMP Manual 3, which is independent of site conditions.

96. **STATE WATER QUALITY REQUIREMENTS.** The regulatory requirements to protect, maintain, reclaim, and restore water quality under PA Code Title 25 and the Clean Streams Law.

97. **STORM SEWER.** A sewer that carries intercepted surface runoff, street water, and other washwaters, or drainage, but excludes sewage and industrial wastes.

98. **STORM SEWER DISCHARGE.** Flow from a storm sewer that is discharged into a receiving stream.

99. **STORMWATER.** Drainage runoff from the surface of the land resulting from precipitation or snow or ice melt.

100. **STORMWATER COLLECTION SYSTEM.** Natural or engineered structures which collect and transport stormwater through or from a drainage area to the point of final outlet, including but not limited to, any of the following: conduits and appurtenant features, canals, channels, ditches, streams, culverts, streets and pumping stations.

101. **STORMWATER MANAGEMENT (SWM) SITE PLAN.** The plan prepared by the Developer or the Developer's representative indicating how stormwater runoff will be managed at the development site in accordance Title 13.

102. **STORMWATER PERMIT.** An official document issued by the building code official that authorizes performance of work regulated by this ordinance.

103. **STREAM.** A channel or conveyance of surface water having a defined bed and banks, whether natural or artificial, with perennial or intermittent flow.

104. **STREAMBANK, TOP OF.** The first substantial break in slope between the edge of the bed of the stream and the surrounding terrain.

105. **SUBAREA.** A portion of the watershed that has similar hydrological characteristics and drains to a common point.

106. **TIME OF CONCENTRATION.** The time period necessary for surface runoff to reach the outlet of a Subarea from the hydraulically most remote point in the tributary drainage area.

107. **UNDERMINED AREA.** Area where coal or other minerals have been mined, removing the lateral support and leaving underground voids where the accumulation of water can occur and/or can increase acid mine drainage.

108. **USDA.** United States Department of Agriculture

109. **VOLUME OF STORMWATER RUNOFF.** Quantity of water normally measured in inches, cubic feet, or acre-feet, measured or determined analytically from (1) runoff coefficients; (2) rainfall/runoff ratios; and (3) areas underneath hydrographs.

110. **WATERS OF THIS COMMONWEALTH.** Any and all rivers, streams, creeks, rivulets, impoundments, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of this Commonwealth.

111. **WATERCOURSE.** See Stream.

112. **WATERSHED.** Region or land area drained by a river, watercourse, or other surface water of this Commonwealth to a downstream point.

113. **WATERSHED STORM WATER MANAGEMENT PLAN (OR WATERSHED PLAN).** The plan for management of stormwater runoff throughout a designated watershed as required by the Pennsylvania Storm Water Management Act.

114. **WETLAND.** Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and similar areas.