

Erosion and Sediment Control Report

Pennsylvania Pipeline Project Twin Oaks Substation

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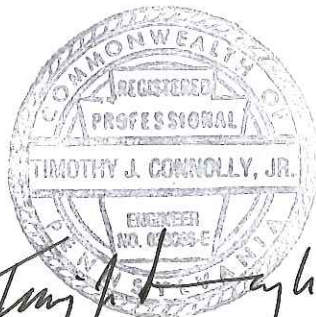
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- 1 USGS Location Map
- 2 E&S Plan Sheets
- 3 Construction Details
- 4 Soils Map, Soils Description, Limit of Soils Table, Geologic Formations Map

LIST OF ACRONYMS

ACRONYM	MEANING
ABACT	Antidegradation Best Available Combination of Technologies
BMPs	Best management practices
CFS	Compost filter socks
E&S	Erosion and sediment
E&SCP	Erosion and sediment control plan
ESCGP-2	Erosion and Sediment Control General Permit 2
EV	Exceptional value
FEMA	Federal Emergency Management Agency
HQ	High quality
LOD	Limit of disturbance
PADEP	Pennsylvania Department of Environmental Protection
PCSM	Post-Construction Stormwater Management
PPP	Pennsylvania Pipeline Project
ROW	Right-of-way
Tt	Tetra Tech, Inc.
UNT	Unnamed tributary
USGS	United States Geological Survey
WWF	Warm Water Fishes

1.0 INTRODUCTION

Tetra Tech, Inc. (Tt) has prepared this Erosion & Sediment Control Plan (E&SCP) for the activities associated with the installation of the Sunoco Pipeline, L.P. (Sunoco) – Pennsylvania Pipeline Project (PPP) – Twin Oaks Substation. The Project is located in Upper Chichester Township, Delaware County, Pennsylvania (PA). A site location map is provided in Attachment 1. This E&SCP, if properly implemented, will provide for effective E&SCs throughout construction. Work will be performed within the limit(s) of disturbance (LOD) as depicted on the E&SCP drawing.

1.1 PROJECT DESCRIPTION

The project involves construction at the Twin Oaks Pump Station expansion, which will be connected to the PPP twenty-inch diameter transmission pipeline. Construction activities will involve installation of a rock construction entrance, expansion of the Twin Oaks pump station pad, and site restoration. Pump station expansion activities include the installation of a launcher, receiver, knock out tank, and pipe supports. The proposed expansion will be constructed within a LOD of approximately 2.392 acres in Delaware County.

Past and present land use of the project area and surrounding area is an existing pad and surrounding meadow. Future land use will be a maintained gravel pad and access drives. Relevant topographic features including streams, streets, pipelines, structures, utility lines, fences, paving and other significant items along the pump station LOD are indicated on the plans, where applicable.

1.2 APPROACH AND OVERVIEW

This E&SCP was developed using Pennsylvania Department of Environmental Protection (PADEP) guidance documents and sound engineering judgment. When implemented properly, the E&SC practices identified herein will minimize uncontrolled surface water runoff from disturbed areas and minimize the migration of construction-generated sediment. The following general principals apply:

- Planning. Site topography, soil types, and potential effects of construction-related activities on E&S migration have been considered in developing this E&SCP. Areas of steep, erodible slopes and/or erodible soils, if encountered during construction activities, will not be disturbed without instituting proper engineering controls to minimize these concerns.
- Minimize Land Disturbance. To the extent possible and practical, disturbed areas and the duration of exposure to erosion elements will be minimized. Clearing of vegetation will be limited to only those areas of the site to be disturbed at a given time. Existing vegetation will be retained and protected to the extent possible.

Installation of E&SCs. E&SC best management practices (BMPs) will be constructed, stabilized, and functional before earth disturbance activities begin within the tributary areas of those BMPs.

- Maintenance of E&SCs. Until the site is stabilized, E&SCs will be properly maintained. Maintenance will entail inspections of E&SC features on a weekly basis and after runoff events. Preventative and corrective maintenance work, including clean out, repair, replacement, regrading, reseeding, and remulching will be performed as soon as practical. If E&SCs fail to perform as expected, replacements or modifications of those installed will be required.
- Stabilization of Disturbed Areas. If a cessation of earth disturbance activities lasts 4 days or longer, the site will be immediately seeded, mulched, or otherwise protected from accelerated E&S. BMPs will remain in place and be maintained until permanent stabilization is achieved. Disturbed areas will be stabilized as soon as is practical, including areas disturbed during the removal of BMPs. Temporary and permanent vegetation, mulch, gravel cover, repaving or a combination of these measures, will be employed immediately following the completion of backfilling and final grading activities.
- Floodplain. (See 25 PA Code §105.1) - A floodplain is the land adjoining a river or stream that has been or may be expected to be inundated by flood waters in a 100-year frequency flood. Unless otherwise specified, the boundary of the floodplain is as indicated on maps and flood insurance studies provided by Federal Emergency Management Agency (FEMA). In an area where no FEMA maps or studies have defined the boundary of the 100-year frequency floodplain, it is assumed absent evidence to the contrary, that the floodplain extends from (1) any perennial stream to 100 feet horizontally from the top of the bank, and (2) from any intermittent stream to 50 feet horizontally from the top of the bank of such intermittent stream.
- Floodway. The floodway is the channel of the watercourse and portions of the adjoining floodplains which are reasonably required to carry and discharge the 100-year frequency flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by FEMA. In an area where FEMA maps or studies have not been defined the boundary of the 100-year frequency floodway, it is assumed, absent evidence to the contrary, that the floodway extends from the stream to 50 feet from the top of the bank of the stream (See 25 PA Code § 105.1). The FEMA boundary is shown on the E&S drawings, when this information is available. When this information is not available, the floodway is shown as defined above for perennial and intermittent streams only.

2.0 SITE DESCRIPTION

SPLP is proposing to construct the Project in Upper Chichester Township, Delaware County, PA. The Twin Oaks Pump Station, which will be connected to the PPP twenty-inch diameter transmission pipeline, will be located on the Conchester Highway (SR 0322), Upper Chichester Township, PA at latitude 39.847544°, longitude -75.418382°. The Project will involve the installation of a rock construction entrance, expansion of the existing pad, conversion and expansion of the existing detention basin to a slow release basin, and site restoration. The proposed Project will be constructed within an LOD of approximately 2.392 acres in Delaware County.

Relevant topographic features including streams, streets, pipelines, structures, utility lines, fences, paving and other significant items along the gas line alignment are indicated on the construction plans, where applicable.

2.1 TOPOGRAPHY

The work zone is located on ground of varying elevations. Site elevations vary from approximately 106 feet (Site Entrance) to 114 feet (Southern edge of site) above mean sea level based on the Pennsylvania Spatial Data Access. The construction plans show the topography of the site and the surrounding area.

2.2 GEOLOGY AND SOILS

The soils and geologic formations surrounding the site are shown on the figures provided in Attachment 4. Attachment 4 also provides the soil descriptions and properties of the soils found at the site. In general, the following actions will be taken to counteract soil limitations:

- E&S BMPs will be in place and functional prior to earth disturbance to counteract erodible soils.
- Prompt stabilization practices will be implemented.
- Cut slopes will be stabilized as soon as possible with seed and mulch or erosion control blanket to prevent sliding.
- If a high groundwater table is encountered, water will be drained away from disturbed areas to a well vegetated area or a placed compost filter sock (CFS) prior to being discharged off the site. Water encountered during construction activities will be pumped through a pumped water filter bag to a well vegetated upland area. Saturated soils will be dried prior to being used on-site.
- Soils will be evaluated throughout the construction process to determine whether additional measures will need to be taken to make the soil suitable for its intended use on-site.
- Soil amendments will be added to site soils to promote vegetative growth.

- A wetland delineation and stream investigation has been conducted to determine the presence and location of hydric soils. No streams or wetlands have been identified within the LOD. There are streams and wetlands located on the property. To prevent sediment from leaving the site, E&SCs will be in place and functional prior to earth disturbances, and stabilization practices will be implemented in disturbed areas as soon as practical. Geologic formations or soil conditions that may have the potential to cause pollution after earth disturbance were not observed during pre-design field activities.

The site consists of **Made Land (Mc)**.

2.3 SURFACE WATER HYDROLOGY

The project area surface water runoff drains to the south to UNT to Baldwin Run, which are designated as Warm Water Fishery (WWF) under PA Code 25 Chapter 93.

This E&SCP contains BMPs to maintain the designated use of the receiving waters. The locations of the receiving waters relative to the project area can be seen on Attachment 1, USGS Project Location figure.

No streams and wetlands will be affected during construction.

3.0 EROSION AND SEDIMENT CONTROL PRACTICES

Two general types of E&SCs will be used on-site during construction: stabilization controls and structural controls. Stabilization controls are implemented as needed to preserve existing vegetation or disturbed areas. Structural controls are used to divert or convey runoff, prevent sediment migration, and reduce the erosive runoff forces. For the purposes of this plan, structural controls are mainly temporary; however, some of the controls may be permanent. The following sections describe the construction sequence and the E&SCs.

3.1 CONSTRUCTION SEQUENCE

Refer to the E&SCP drawings for the location of the proposed work and the associated BMPs. A generalized construction sequence is provided below. The construction sequence is intended to provide a general course of action in order to conform to the applicable regulatory agency requirements for temporary and permanent soil E&SCs. Necessary components for proper and complete execution of work pertaining to this plan, whether specifically mentioned or not, are to be performed by the contractor. It is not intended that the drawings and this report show detailed information on methods and materials. The contractor will comply with all requirements listed in this section, and will comply with the PA E&SC Manual. The contractor may be required to alter controls based on effectiveness of controls or differing conditions encountered in the field.

A preconstruction meeting is required prior to the start of any construction activity. The owner and/or operator will invite all contractors, the landowner, appropriate municipal officials; the E&SCP preparer, and a representative from the local PADEP or Conservation District to an on-site preconstruction meeting at least 7 days prior to construction commencement.

1. Locate staging areas and access points including construction entrances. Where needed, install appropriately sized CFS/silt fence in accordance with E&S details provided within the E&SC Plan under Standard Construction Details. Use of composite filter sock is required within HQ or exceptional value (EV) designated watersheds.
2. Rock-construction entrances are required when there is concern that sediment will be tracked off site by equipment travel or if there are nearby aquatic resources (e.g., road side ditches, wetlands, streams). Rock construction entrances will be required within HQ or EV watersheds (see the construction detail notes in regards to special sizes and requirements). Refer to the rock construction entrance detail in Attachment 3 of E&SC Plan for minimum required dimensions.
3. Install CFS/silt fence downslope of the topsoil and soil stockpiles.
4. Locate and stake out all special areas of concern or areas of avoidance (i.e., streams, wetlands).
5. Install CFS along the perimeters of the site as shown on the E&SPC plan drawings. Silt fence is not an alternate BMP in HQ/EV watersheds. Installation sizing and spacing will conform to the chart and details provided on the E&SC Detail Sheet.
6. Do not increase the total area of disturbance without prior approval.
7. Stockpile within the LOD in accordance with the details provided. Provide ABACT BMP controls around all topsoil stockpiles. Assure all stockpiles have appropriate CFS installed downslope.
8. Minimize total area of disturbance. Maintain temporary soil stockpiles within existing soil E&SCs. Should excavation enter streams/drainage-ways, follow specific details for these areas shown on the drawings and include the steps detailed in the specific sections below.
9. Grade surface to finished grade elevations as soon as practicable following completion of the pump station equipment installation. Immediately seed and mulch disturbed areas or gravel per the plan.
10. Maintain E&SC devices until site work is complete and a uniform 70-percent perennial vegetative cover is established.
11. Remove E&SC measures upon establishment of a uniform 70-percent vegetative cover over the disturbed area. Re-grade and revegetate areas disturbed during the removal of the soil E&SCs.

3.2 BEST MANAGEMENT PRACTICES

An effective method to minimize E&S migration is to promote and implement BMPs. BMPs are relatively simple, inexpensive, and cost-effective protocols to prevent E&S migration. The basic BMPs that are anticipated to be employed during the construction activities include:

- Minimizing disturbances to site areas, especially those currently covered with pavement or vegetation.
- Minimize the time that soil is exposed.
- Prevent the runoff from flowing across disturbed areas (divert the flow to vegetated areas).
- Stabilize disturbed soils as soon as possible.
- Slow down the runoff flowing across the site.
- Remove sediment from surface water runoff before it leaves the site.

3.3 SEQUENCE OF BMP INSTALLATION

General stabilization and structural controls will be used in E&SC practices to (1) divert stormwater flows away from exposed areas, (2) convey runoff, (3) prevent sediments from moving off-site, and (4) reduce the erosive forces of runoff waters. CFSs and other structural and non-structural controls that will be used during construction activities will include the following:

Vegetative Stabilization Controls

Grounds disturbed by any of the operations necessary to complete the work for this project are to be permanently seeded, or if specified, sodded, unless occupied by structures, gravel or paved. A temporary cessation of earth disturbance activities that lasts 4 days or longer requires temporary stabilization. Disturbed areas, which are at final grade, will be seeded and mulched immediately.

If seeding cannot be completed immediately after the area reaches final grade due to weather conditions, the disturbed area will be stabilized and mulched with straw at the rate of 3 tons per acre. This straw will be anchored using a method described under Mulching of this narrative.

Structural Controls

Temporary control facilities to be used during construction include the use of CFS and rock construction entrances. Other structural controls as described below may also be used as deemed necessary based on conditions encountered in the field. Installation guidelines and locations for the above devices are as

shown on the drawings and additional information can be found in the PA E&SC Manual. The temporary control measures that will be used on this Project include, but are not limited to:

- *Compost Filter Socks* - This temporary sedimentation control measure consists of wood or metal posts driven through a compost filled mesh tube. Filter socks will be located as needed on side-slope and down-slope boundaries of disturbed areas. Both ends of each CFS should be extended at least 8 feet upslope CFS will be sized using the PADEP Construction Detail provided in Attachment 3. CFSs will be used in drainage areas with siltation impaired waters.
- **Silt fence will not be used in drainage areas with HQ, EV, or Siltation impaired waters – (See Compost Filter Socks).**
- *Tarpaulin Covers* - Tarpaulin covers may be used, as necessary, to protect topsoil storage stockpiles from wind and precipitation erosion. Stockpile slopes will be 2:1 or less. A minimal amount of soil will be stockpiled so that the height of the stockpile is less than 35 feet.
- *Rock Construction Entrance* - Temporary access routes will be established to facilitate construction activities. The use of access routes will help confine truck and equipment traffic to specific corridors thus minimizing land disturbance and protecting vegetation. Site traffic during wet weather will be limited. No vehicles will be permitted in streams or rivers.
- *Wash Racks* - Wash racks may be used at rock construction entrances and will be designed to accommodate anticipated vehicular traffic in special protection watersheds. A water supply will be made available at wash racks to wash the wheels of vehicles exiting the site. Reasonable methods which are sanctioned by the PADEP as alternatives to installation of tire wash stations on public road access points for station projects in EV/HQ or siltation impaired watersheds include:
 - For paved surface public roads: use of a vacuum truck sweeper or sweeper with a catch bin attachment.
 - For dirt or gravel surface public roads: rigorous manual removal of mud/dirt from vehicle/equipment tires prior to exiting construction-site, supplemented by immediate recover, by manual or mechanical means, of soil which may become discharged onto public roadways, and dust control and/or compaction via rolling of the dirt public road surface will be implemented as needed.

A predicate for using the alternatives above is that the rock pad construction entrance will be extended to a minimum total length of 100 feet and will be constantly maintained including structure thickness to insure its effectiveness remains intact at all times.

Frequency of mechanical and/or manual controls will be dependent upon construction traffic intensity, weather, and soil moisture conditions. At a minimum for paved roads - any day in which construction traffic is exiting the rock construction entrance, the vacuum truck sweeper or sweeper with a catch bin attachment will clean the roadway at the end of the work day and prior to any forecasted rain event. The requirement is to not introduce sediment load from construction traffic onto public road surfaces and into road ditches which will flow into the special protection or siltation impaired water resources which are the subject of the increased protection measures.

Wash racks or alternative methods, as described above, must be used during construction because the site is located in a siltation impaired watershed. ABACT approved BMPs are to be used at all times for this site construction.

- *Pumped Water Filter Bag* - Pumped water filter bags may be used to filter water pumped from disturbed areas prior to discharging to surface waters. CFSs will be installed within 50 feet of any receiving surface water or where grassy area is not available. Filter bags will be installed according to the details shown in the PADEP Construction Detail provided in Attachment 3.
- *Erosion Control Blanket* - A manufactured erosion control blanket will be installed on all slopes 3:1 or steeper and within 50 feet of surface water or 100 feet of special protected water. The blanket will be biodegradable but capable of providing protection for 2 growing seasons. Straw or similar fiber material will be placed between two biodegradable nets. The top net will be heavyweight and UV stabilized; the bottom net will be a lightweight netting. Erosion control blankets will be anchored and stapled in place in accordance with the manufacturer's recommendations and the detail on the construction drawings. For slopes between 3:1 and 1:1, use erosion control blanket SC 150 as manufactured by North American Green or Owner approved equal material or equal method.
- *Public ROWs* - In an effort to reduce the tracking of sediment onto public ROWs, stabilized construction entrances of crushed stone located at points where traffic will be entering or leaving the site will be installed. Mud and soil accumulating on roadways, as a result of construction activities, will be removed with hand tools, such as shovels, and disposed of properly. The contractor will check the road a minimum of twice daily to verify cleanliness at road crossings and take necessary corrective action. Gravel will be used to limit dust and erodability.
- *Restoration* - All improved areas disturbed by construction will be restored.
- *Additional Requirements* - Any additional requirements to adequately control E&S pollution will be the responsibility of the contractor and will be considered incidental to construction activities.

3.4 PRIMARY CONSTRUCTION ACTIVITIES

Clearing and Grubbing

Brush, scrub growth, saplings and trees directed to be cut and removed will be completely removed from the site of the work, if encountered. The contractor will remove stumps and large roots and refill the depressions with suitable compacted earth fill where necessary to bring the grade back to its original elevation or final design grade. The contractor will protect exposed bare earth using mulch or other appropriate measures if clearing and grubbing operations are completed more than 4 days prior to pump station construction activities.

Grading and Topsoil Stockpiling

Before beginning excavation and/or filling work, the topsoil or gravel from all areas to be affected will be stripped and stockpiled in a separate stockpile from the other excavated soil material. After completion of the major construction work, the topsoil will then be replaced as the upper layer of backfill. In general, all topsoil stockpiles will be located within the LOD away from nearby streams and/or drainage ditches or watercourses. Temporary erosion protection devices such as CFS will be used to protect all stockpiled topsoil from being carried into nearby water courses by the action of any overland runoff water.

As topsoil stockpile(s) become(s) completely depleted, the disturbed area(s) will be graded and revegetated or finished with gravel. The CFS will be removed only after a uniform 70-percent perennial vegetative coverage has been established across the disturbed area.

Topsoil will not be placed when the subgrade is frozen or when it is excessively wet or dry, and will not be handled when in a frozen or muddy condition.

Vegetation

Grounds that are not gravely disturbed by any of the operations necessary to complete the work for this Project are to be permanently seeded, unless occupied by structures or paved. Any temporary cessation of earth disturbance activities, which lasts for 4 days or longer, requires temporary stabilization. Disturbed areas, which are at final grade, will be seeded and mulched immediately.

If seeding cannot be completed immediately after the area reaches final grade due to weather conditions, the disturbed area will be stabilized and mulched with straw at the rate of three tons per acre. This straw will be anchored using a method described under Mulching of this narrative.

Seeded areas will be inspected weekly and after each runoff event. Necessary repairs will be made by the end of the week.

Permanent Seeding

The site preparation and establishment of permanent cover will be conducted according to the following guidelines:

1. Install needed surface water control measures.
2. Hydroseed or follow Steps 3 through 6 below.
3. Perform all cultural operations at right angles to the slope.
4. Determine agricultural lime application rates by field pH testing. Perform testing at a rate of 1 test per acre (min.). In the absence of testing, apply at 6 tons per acre.
5. Apply dry 10-20-20 formulation of fertilizer at the rate of 678 lbs. per acre or at a rate determined by field testing.
6. Work in lime and fertilizer to a depth of 4 inches using suitable equipment.
7. Seed Mixture - The seed mixture will be:

TABLE 1: PENNDOT FORMULA W							
SCIENTIFIC NAME	COMMON NAME	REQUIRED VARIETIES	% BY WEIGHT	MINIMUM % PURITY	MINIMUM % GERMINATION	MAX % WEED	SEEDING RATE (LBS/1000 SF)
Festuca Arundinacea	Tall Fesuce	Festuca arundinacea var. Kentucky 31	70	98	85	0.15	7.5
Lotus Corniculatus	Birdsfoot Trefoil Mixture	A combination of varieties (Viking, Empire, Norcen, Dawn, Leo, Bull, Maitland) with no one variety exceeding 50% of the total Trefoil component.	20	98	80 ⁽¹⁾	0.10	2.0
Agrostis Alba	Redtop	Agrostis alba	10	92	80	0.15	1.0

⁽¹⁾ Recommended 10% hardseed and 70% normal sprouts.

8. If not hydroseeding, apply mulch.

Notes:

1. Spread seeds where indicated and at the rates specified in Table 1, or as otherwise indicated.
2. Spread seeds within April 1 to June 15 or August 16 to September 15.
3. Extend seeding dates where project conditions warrant. Apply full treatment or apply only 50% of the permanent seeding and soil supplements and apply the remaining 50% within the next seeding dates, as directed in writing.
4. Use tillage and soil supplements before permanent seeding on topsoiled areas, where temporary seeding or mulching has been applied.
 - a. On topsoiled areas, 1:3 (3:1) and flatter, loosen the surface to a depth of at least 50 mm (2 inches) by disking, harrowing, or other acceptable methods until the tillage is satisfactory. On untilled areas, 1:3 (3:1) and flatter, till only as directed. Also, till or scarify areas if the surface is glazed or crusted.
 - b. Correct surface irregularities by filling depressions and leveling rough or uneven areas. Remove metal objects, stones larger than 50 mm (2 inches) in any dimension, and other debris or objects deemed detrimental to maintenance operations.
5. Inoculate leguminous seed, such as Crownvetch and Birdsfoot Trefoil, with proper cultures, according to the manufacturer's directions.
6. At the rates specified in Table 1, sow seeds uniformly on the prepared areas by the helicopter, hydraulic placement, broadcasting, drilling, or hand seeding methods. Inspect seeding equipment and adjust the equipment, if required, to ensure the specified application rates. Periodically perform a check on the rate and uniformity of application, as directed. Prior to seed application of each designated seed formula, thoroughly clean-out seed tank by rinsing with clean water to prevent contamination from one seed formula to the next. Repeat rinsing cycle until tank is clean. Collect all non-applied seed derived from each clean-out event and remove as waste from the project.
7. After seeding, roll topsoiled areas that are to be mowed. Use a roller with a mass (weight) not more than 100 kg/m (65 pounds per foot). If soil is wet or frozen, roll only when directed.
8. Apply herbicides as directed, to areas that are to be mowed and where weed growth is prominent. The Representative will designate existing plants or groups of plants to be saved within these areas before herbicide application. If directed, more than one application may be required to control undesirable growth. Apply material with application personnel certified by the Department of Agriculture and with equipment specified in Section 108.05(c).
9. Final acceptance of seeding and soil supplement materials and installation are subject to the results of official sampling and testing as specified before use and installation and the resultant establishment of the specified vegetation. Remove non-approved materials from the project.
 - a. Reseed rejected areas with additional applications of the specified seed and soil supplement materials. Redress soil surfaces when directed. Perform reapplication of seed and soil supplements within the next applicable seeding date if necessary or as directed. When directed, reseed areas damaged by herbicide applications and mowing operations. NOTE: Reseeded areas will also require the application of appropriate mulch as specified in Section 805.
 - b. Seeded areas may be rejected based on the lack of actual grass seedling establishment exhibited in the area for the specified seed formula.
 - i. Table 1 formula seeded areas that exhibit less than 70% surface area coverage with the specified germinated grass seedlings after 90 days of growth may be rejected upon visual inspection. The seed germination and growth period is determined from the date of the seeding operation for the area when these operations are performed within the specified seeding dates.
 - ii. Special seed formula planted areas (seed mixtures not indicated in Table 1) may be rejected based on the lack of the specified seed germination and growth of less than 11 seedlings/m²

(9 seedlings/square yard) after 120 days of growth determined by visual inspection. The seed germination and growth period is determined from the date of the seeding operation of the area when these operations are performed within the specified seeding dates.

- iii. Seeded areas exhibiting soil surface erosion rills or gullies deeper than 250 mm (1-inch) may be rejected upon visual inspection. Redress and reseed designated eroded areas with specified materials and application rates as directed.
10. Maintain grass and legume ground cover areas, within the grading limits, until the entire project has been completed.
 - a. Control any noxious weed growth found within the right of way, by herbicide spraying and cutting. These plants are defined by the Pennsylvania Weed Control Act of 1982, P.L. 228, No. 74 and as amended by further legislation. Submit, for approval, a schedule of work and list of herbicide material to be used before starting this operation.
 - b. If a slope failure occurs on a slope previously completed, and requires further excavation and redressing to reestablish the slope, reapply the seeding and soil supplement work as specified for the original slope.
 11. Maintain turf grass areas within the grading limits, by mowing with approved equipment until the entire project has been completed.
 - a. Submit a proposed schedule of mowing operations that covers the length of the construction project for approval.

Liming Rates

Minimum 6 tons per acre at 100% effective neutralizing value (% ENV), unless the soil test determines that a lesser amount is needed. To determine the actual amount of regular lime to apply, divide the amount called for by the soil test by the % ENV for the product used. For example, if 6 tons per acre is needed and the env for the lime used is 88%, divide 6 by 0.88 resulting in 6.8 tons needing to be applied. For dolomitic lime, which has a significant amount of magnesium in it, divide the amount called for by the soil test by the % calcium carbonate equivalent (% CCE) listed for the product instead of the % ENV. The % CCE may be above 100% which accounts for the fact that magnesium has a greater effect per pound than the calcium in regular lime. Note: When a soil test requires more than 8,000 pounds of lime per acre, the lime must be mixed into the top 6 inches of soil.

Fertilization Rates

Prepare areas for seeding by uniformly applying supplements. Document bulk delivery. Blend the initial soil supplements into the soil at least 50 mm (2 inches), on topsoiled areas, by raking, disking, harrowing, or other acceptable methods. Blend the supplements into the soil during tillage operations. Apply slow-release nitrogen fertilizer to the surface of Formula W seeded areas before project completion. Apply soil supplements as shown in the following table, unless otherwise indicated:

Permanent Seeding Application Rate				
Soil Amendment	Per Acre	Per 1,000 sq. ft.	Per 1,000 sq. yds.	Notes
Agricultural Lime	3872 LBS.	89 LBS.	800 LBS.	or as per soil test; may not be required in agricultural fields
10-20-20 Fertilizer	678 LBS.	16 LBS.	140 LBS.	

38-0-0 Ureaform Fertilizer, OR	242 LBS.	6 LBS.	50 LBS.	
32-0-0 to 38-0-0 Sulfur Coated Urea Fertilizer, OR	286 LBS.	7 LBS.	59 LBS.	
31-0-0 IBDU Fertilizer	295 LBS.	7 LBS.	61 LBS.	

Temporary Seeding

Temporary grass cover will be established in the following areas:

- Where vegetative filters must be established below filter bags, a minimum distance of 10 feet will be seeded down slope of the trap outlet. Seed mixture for temporary cover will consist of 100-percent annual ryegrass. Seed will be applied at the rate of 40 lb. per acre or as recommended by a local recognized seed supplier and approved by the owner's representative. Prior to seeding, apply 1 ton of agricultural grade limestone per acre plus 10-10-10 fertilizer at the rate of 500 lb. per acre and work into soil.
- Where soil stockpiles are to be exposed for a period greater than four (4) days, the stockpile shall be seeded.

Temporary Seeding Application Rate				
Soil Amendment	Per Acre	Per 1,000 sq. ft.	Per 1,000 sq. yd.	Notes
Agricultural Lime	1 ton	40lb.	410 lb.	Typically not required for topsoil stockpiles
10-10-10 Fertilizer	500lb.	12.5 lb.	100lb.	Typically not required for topsoil stockpiles

Mulching

The purpose of mulch is to reduce runoff and erosion, prevent surface compaction or crusting, conserve moisture, aid in establishing plant cover, and control weeds. Mulch will be applied on any area subject to erosion, or which has unfavorable conditions for plant establishment and growth. The practice will be used alone or in conjunction with other structural and vegetative conservation practices, such as waterways, ponds, sedimentation traps or critical area planting. On sediment producing areas where the period of exposure is less than 2 months, mulch materials will be applied according to the following guidelines:

- Apply straw mulch at the rate of 3 tons per acre. Chemically treated or salted straw is not acceptable as mulch.
- Anchor straw mulch immediately after application by at least one of the following methods.

- A. "Crimp" straw mulch into the soil using tractor drawn equipment (straight bladed coulters or similar). This method is limited to slopes no steeper than 3:1. Operate machinery on the contour. Crimping of hay or straw by running it over with tracked machinery is not recommended.
- B. Uniformly apply asphalt, either emulsified or cut-back, containing no solvents or other diluting agents toxic to plant or animal life, at the rate of 31 gallons per 1,000 square feet.
- C. Use synthetic binders (chemical binders) as recommended by the manufacturer to anchor mulch provided sufficient documentation is provided to show that it is non-toxic to native plant and animal species.
- D. Staple lightweight plastic, fiber, or paper nets over the mulch according to the manufacturer's recommendations.

Mulched areas will be checked periodically and after each runoff event (e.g. rain, snowmelt, etc.) for damage until the desired purpose of the mulching is achieved. Damaged portions of the mulch or tie-down material will be repaired upon discovery.

Waste Considerations

The operator will remove from the site, recycle, or dispose of all building materials and wastes in accordance with PADEP's solid waste management regulations at 25 PA Code 260.1 et seq., 271.1 et seq., and 287.1 et seq. The contractor will not illegally bury, dump, or discharge building material or wastes at the site. Excess material brought into the site areas to facilitate construction access will be completely removed prior to rough grading and final surface stabilization. Expected construction wastes will consist of packaging material and sediment cleaned from BMPs. Packaging from the materials brought on-site will be disposed of by a licensed hauler. Sediment removed from BMPs will either be spread in a protected area to dry and then recycled as fill material or disposed of off-site. In cases where disposal is necessary, waste materials are to be disposed of at an approved PADEP waste disposal facility.

Thermal Impacts

Potential pollution to surface waters from thermal impacts will be minimized by minimizing clearing and retaining existing vegetation where possible during construction. Following construction, permanent seeding will occur around the pad as soon as practicable to facilitate vegetative growth.

Earth disturbance activities associated with the Project will be located within a WWF watershed. Accelerated E&S will be minimized to achieve zero net change in runoff between the pre and post-construction conditions. The extent of the disturbed area will be minimized, and the duration of disturbance will be minimized by stabilizing disturbed areas as soon as practicable. Due to the size and location of the pad, it is not anticipated that adverse thermal impacts to surface waters will occur. All runoff will be filtered through sand to clean and slow time of concentration to minimize thermal impacts before discharging.

The receiving streams are classified as not attaining their existing water quality of a WWF. Reasons listed were impaired aquatic life due to urban runoff/storm sewers – siltation, water/flow variability, and other unknown causes. BMPs will be used onsite to protect and maintain their existing use.

ABACT BMPs will be used onsite to protect and maintain the existing water quality of receiving waters.

The following ABACT E&S BMPs will be used onsite:

Wash racks or alternatives at rock construction entrances,

CFS used in place of silt fence,

Erosion control blanket on disturbed areas within 100 feet of a receiving surface waters, where applicable, and on slopes 3:1 or steeper.

Riparian Forest Buffers

Existing riparian forest buffers do not exist within the Project area.

Stormwater Runoff Analysis

This plan has been prepared to comply with the Upper Chichester Township Subdivision and Land Development Ordinance.

The site's pre-development and post-development drainage characteristics were modeled in accordance with local and state requirements. The runoff analysis calculations were performed utilizing the U.S. Soil Conservation Service (SCS) TR-55 Urban Hydrology for Small Watersheds. The 1, 2, 5, 10, 25, 50 and 100-year storm events have been analyzed for pre- and post-developed conditions. The rainfall depths (NOAA Atlas 14, Volume 2, Version 3) for each storm event are 2.68, 3.24, 4.11, 4.84, 5.93, 6.85 and 7.86 inches respectively, and follow the SCS 24-hour Type II rainfall distribution. Bentley PondPack V8i was used to perform the runoff analysis. The pre-development watershed features and runoff analysis is located in Appendix C. The post-development watershed features and runoff analysis is located in Appendix D.

A stormwater Best Management Practice (BMP) has been designed for the pump station to comply with the stormwater quality and quantity management requirements set forth in the Upper Chichester Township Stormwater Management Ordinance. The BMP also has been designed to meet state stormwater quality and quantity management requirements. Calculation worksheets (Worksheet #4 and #5) from Chapter 8 of the Pennsylvania Stormwater Best Management Practices Manual were used to ensure compliance with state requirements.

3.5 MAINTENANCE AND INSPECTION PROCEDURES

Maintenance to the temporary E&S structures will be performed by the contractor during the construction period. Maintenance for E&S devices will occur, at a minimum, as follows:

Compost Filter Socks

- Accumulated sediment will be removed as required, and in all cases where uniform accumulations are one-half the above ground height of the filter sock. Any accumulated earth behind the filter sock will be disposed of by the contractor in such a manner that the removed earth will not be excessively eroded and transported into a waterbody.
- The filter sock installation will be inspected weekly and after every runoff event. Loosened support stakes will be removed and new stakes driven. Filter socks will be maintained and repaired as per manufacturer specifications.
- Temporary E&SCs will be removed by the contractor only after a uniform 70-percent perennial vegetative coverage has been established across the disturbed area. Temporary E&SCs will be disposed of by the contractor at an approved PADEP disposal facility.

Rock Construction Entrances

- Rock construction entrance thickness will be constantly maintained to the specified dimensions by adding rock. A stockpile will be maintained on-site for this purpose.

Pumped Water Filter Bags

- Filter bags will be replaced when they become one-half full of sediment.
- Filter bags will be inspected daily. If any problem is detected, pumping will cease immediately and not resume until the problem is corrected.

Vegetation

- Seeded areas will be inspected weekly and after each runoff event. Necessary repairs will be made immediately.

Mulch

- Mulched areas will be checked periodically and after severe storms for damage until the desired purpose of the mulching is achieved. Damaged portions of the mulch or tie-down material will be repaired upon discovery.

Inspection and Maintenance

Until the site is stabilized, E&SC BMPs will be maintained properly. Preventative and corrective maintenance work, including clean-out, repair, replacement, regrading, reseeding, remulching, and renetting will be performed as soon as practical. If E&SC BMPs fail to perform as expected, replacement

BMPs, or modifications to those installed will be required. The following inspection and maintenance practices will be used to maintain E&SC on-site during activities.

- E&SC measures will be in-place and inspected at the end of the workday and after each runoff event. The contractor will immediately repair any deficiencies.
- Maintenance and inspection of sediment control facilities will conform to PADEP Chapter 102 and 105 rules and regulations.
- Sediment will be removed when it accumulates one-half the aboveground height of the CFS. All undercutting of erosion of the toe anchor will be repaired with compacted backfill material. Adhere to the manufacturer's recommendations for replacing filter socks due to weathering.
- Sediment removed from CFS and any other control devices will be mixed in with the other waste soil on the construction site and properly disposed of as discussed in Section 3.4.
- Sediment will be removed from the sediment removal facilities associated with wash racks as necessary. Sediment deposited on paved roadways will be removed and returned to the construction site daily, at a minimum.
- Re-vegetated areas will be inspected for bare spots, washouts, and healthy growth during the construction. Identified bare spots and washouts will be repaired as soon as practical.
- All soil stockpiles that are to remain more than 4 days will be seeded with temporary grass, as noted in the seeding specification on the construction drawings.
- The contractor will make certain that all runoff is directed to the sedimentation control devices.
- All sedimentation control measures will remain in place until the disturbed areas are stabilized and a uniform 70-percent perennial vegetative cover is established. Any area not achieving a 70-percent vegetative cover will be re-seeded and mulched.

If E&S BMPs are found to be inoperative or ineffective during an inspection, PADEP should be contacted within 24 hours, followed by the submission of a written noncompliance report to PADEP within 5 days of the initial contact.

Long-Term Maintenance

The owner will maintain the stormwater management facilities for this site. Maintenance of the stormwater management facilities includes, but is not limited to, the following:

1. The proposed stormwater detention system, private storm systems, and stormwater BMP's will be inspected and maintained by the property owner in accordance with the approved operation and maintenance program.
2. The stormwater BMP's are fixtures that can be altered or removed only after approval by the Municipality.
3. Annually inspect existing pipe inlets, channels, level spreaders and outfall protection areas to for erosion and sedimentation. Repair and clean stormwater structures as necessary.

3.6 ANTIDegradation

Earth disturbance activities associated with the Twin Oaks Pump Station Expansion Activities will be located within WWF watershed. A combination of non-discharge alternatives and the use of BMPs on-site will protect and maintain the existing water quality of the receiving waters.

Non-discharge alternatives were evaluated to minimize accelerated E&S and achieve zero net charge in runoff between the pre and post-construction conditions. The extent of the disturbed area will be minimized, and the duration of disturbance will be minimized by stabilizing disturbed areas as soon as practicable. ABACT BMPs will be used onsite to protect and maintain the existing water quality of receiving waters.

The following ABACT BMPs will be used onsite when in HQ or EV areas:

- Wash racks located at rock construction entrances,
- CFS used in place of silt fence in HQ watersheds,
- Erosion control blanket on disturbed areas within 100 feet of a receiving surface waters, where applicable, and on slopes 3:1 or steeper.

3.7 SITE RESTORATION

Past and present land use of the project area and surrounding area is meadowland. Future land use will be restored to a gravel pad and gravel rock construction entrance, and access road surrounded by meadowland in good condition. Primary receiving water outside the project area is UNT to Baldwin Run (WWF). Secondary waters include Baldwin Run (WWF). Location and types of soils are shown on the Soils Map and outlined in Section 2.3 of this narrative. In general, the following procedures will be implemented to counteract soil limitations:

- E&S BMPs will be in place and functional prior to earth disturbance to counteract erodible soils.
- Should a high water table be encountered during excavation procedures, the trench will be dewatered using a pumped water filter bag.
- Soils amendments will be added to soils that are found to be a poor source of topsoil.

Following completion of the Project, minor increases in stormwater runoff may occur. Ultimately, the site will be composed of restored areas and a gravel pad for the pump station. The restored areas will be vegetated to the equivalent of "meadow in good condition," and the gravel pad will consist of mostly non-compacted yard gravel, which will promote infiltration and evaporation.

4.0 REFERENCES

Erosion and Sediment Pollution Control Program Manual, Commonwealth of Pennsylvania, Department of Environmental Protection, Office of Water Management, March 2012.

Stormwater Management for Construction Activities - Developing Pollution Prevention Plans and Best Management Practices, United States Environmental Protection Agency, Office of Water, 1993.

Twin Oaks Quadrangle, Pennsylvania - Delaware County, Geological Survey, United States Department of Interior.

Web Soil Survey of Delaware County, Pennsylvania, United States Department of Agriculture, Soil Conservation Service, November, 2015.

Pennsylvania Stormwater Best Management Practices Manual Draft, Pennsylvania Department of Environmental Protection, Bureau of Watershed Management, November, 2009.

CLIENT: SUNOCO

JOB NO.: _____

SHEET 1 OF _____

DESCRIPTION: TWIN OAKS

CHK BY: _____

DATE: 9/29/16

SOIL TESTING SUMMARY:

1. TEST BORINGS - 10/2013

SPT METHOD

GB-01

108.6

7.5'

101.10 - GW LEVEL

GB-02

110.10

7.5

102.6 - GW

2/2014 - SINGLE RINGS - HAND QUER TO 7'

1T-01

108.5 SURFACE ELEV

4.0' TEST DEPTH

104.5 ELEV. TEST

0.06 = C =

1T-02

108.5

4.5

104.0

0.03 in/hr

5/2016 - DOUBLE RINGS

A #1

110.0 SURF ELEV

6' DEPTH

104.0 SOIL PROFILE

NO TEST C =

NO TEST ELEV. INFILT TEST

A #2

109.0

5'

104.0

0.0 in/hr

106.0

* RESULTS - GW IS LIKELY @ ELEV - 102.0 ±. INFILT IS NOT POSSIBLE ABOVE ELEVATION 104.0

2. SRC BASIN DESIGN:

DELTA Z VOLUME = 4781 FT³

C = 1.0 in/hr - ASSUMED

AREA SRC BMP - 1,250 SF

$Q = VA$

$Q = 1 \text{ in/hr} \times \left(\frac{1 \text{ ft}}{12 \text{ in}} \right) \times (3600 \text{ sec}) \times (1250)$

$Q = .0289 \text{ cfs}$

$Q = \frac{\text{VOL}}{\text{TIME}} = \frac{4781 \text{ cf}}{.0289 \text{ cfs}}$

$\text{TIME} = \frac{\text{VOL}}{Q} = 46 \text{ hrs}$

DEWATERING

CLIENT: SUNOCO

JOB NO.: _____

SHEET 2 OF _____DESCRIPTION: TWIN OAKSCHK BY: TCDATE: 9/29/16

3. SRC BASIN:

4" U-DRAIN - 1.34 CF/MIN/ LF PIPE

$$316 \text{ LF} \times \frac{1.34 \text{ CF}}{\text{LF}} = 423 \text{ CF/MIN}$$

$$\frac{423 \text{ FT}^3}{\text{MIN}} \times \frac{60 \text{ MIN}}{\text{HR}} = 25380 \text{ FT}^3/\text{HR} \quad \text{CAPACITY OK}$$



NOAA Atlas 14, Volume 2, Version 3
 Location name: Upper Chichester Twp,
 Pennsylvania, USA*
 Latitude: 39.8458°, Longitude: -75.4187°
 Elevation: m/ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
 NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aerials](#)

PF tabular

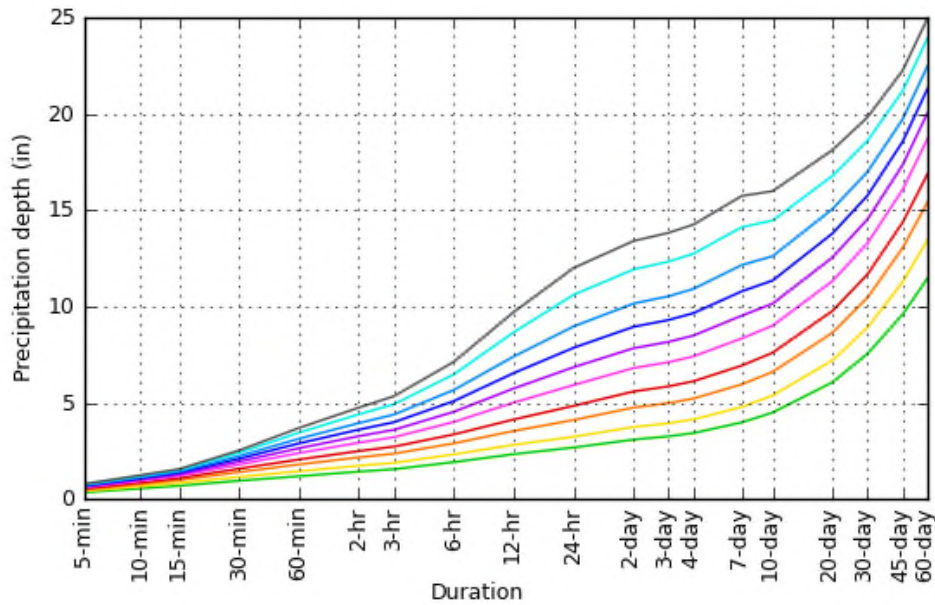
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.350 (0.321-0.383)	0.417 (0.381-0.455)	0.489 (0.447-0.534)	0.540 (0.492-0.590)	0.601 (0.545-0.657)	0.643 (0.580-0.703)	0.684 (0.614-0.750)	0.719 (0.641-0.791)	0.760 (0.671-0.842)	0.791 (0.692-0.880)
10-min	0.559 (0.512-0.612)	0.666 (0.610-0.728)	0.783 (0.715-0.856)	0.864 (0.787-0.944)	0.958 (0.868-1.05)	1.02 (0.923-1.12)	1.09 (0.975-1.19)	1.14 (1.02-1.25)	1.20 (1.06-1.33)	1.25 (1.09-1.39)
15-min	0.699 (0.640-0.765)	0.838 (0.767-0.916)	0.991 (0.905-1.08)	1.09 (0.995-1.19)	1.21 (1.10-1.33)	1.30 (1.17-1.42)	1.37 (1.23-1.51)	1.44 (1.28-1.58)	1.51 (1.34-1.68)	1.56 (1.37-1.74)
30-min	0.958 (0.877-1.05)	1.16 (1.06-1.26)	1.41 (1.28-1.54)	1.58 (1.44-1.73)	1.80 (1.63-1.97)	1.95 (1.76-2.13)	2.10 (1.89-2.31)	2.24 (2.00-2.46)	2.41 (2.13-2.67)	2.53 (2.22-2.82)
60-min	1.20 (1.09-1.31)	1.45 (1.33-1.59)	1.80 (1.65-1.97)	2.06 (1.88-2.25)	2.40 (2.17-2.62)	2.65 (2.38-2.89)	2.90 (2.60-3.18)	3.14 (2.80-3.46)	3.46 (3.05-3.83)	3.70 (3.23-4.11)
2-hr	1.43 (1.30-1.58)	1.74 (1.58-1.92)	2.17 (1.97-2.39)	2.50 (2.26-2.75)	2.93 (2.64-3.23)	3.27 (2.92-3.60)	3.61 (3.21-3.98)	3.95 (3.48-4.37)	4.41 (3.84-4.90)	4.75 (4.09-5.31)
3-hr	1.56 (1.42-1.72)	1.89 (1.72-2.08)	2.36 (2.15-2.60)	2.73 (2.47-3.00)	3.22 (2.89-3.54)	3.60 (3.22-3.96)	4.00 (3.54-4.40)	4.39 (3.86-4.85)	4.93 (4.27-5.47)	5.34 (4.58-5.96)
6-hr	1.93 (1.75-2.13)	2.33 (2.12-2.57)	2.90 (2.63-3.20)	3.36 (3.04-3.71)	4.01 (3.60-4.42)	4.54 (4.04-5.00)	5.09 (4.49-5.62)	5.67 (4.94-6.27)	6.48 (5.54-7.22)	7.13 (6.01-7.99)
12-hr	2.34 (2.13-2.60)	2.82 (2.57-3.14)	3.54 (3.21-3.94)	4.14 (3.73-4.59)	5.01 (4.47-5.55)	5.75 (5.08-6.37)	6.55 (5.71-7.27)	7.41 (6.37-8.25)	8.66 (7.28-9.70)	9.71 (8.01-10.9)
24-hr	2.68 (2.45-2.95)	3.24 (2.96-3.57)	4.11 (3.75-4.53)	4.84 (4.41-5.33)	5.93 (5.36-6.50)	6.85 (6.15-7.49)	7.86 (7.01-8.59)	8.97 (7.93-9.79)	10.6 (9.28-11.6)	12.0 (10.4-13.1)
2-day	3.10 (2.83-3.39)	3.75 (3.42-4.10)	4.75 (4.34-5.21)	5.59 (5.09-6.13)	6.81 (6.17-7.45)	7.84 (7.06-8.57)	8.95 (8.02-9.78)	10.2 (9.04-11.1)	11.9 (10.5-13.0)	13.4 (11.7-14.6)
3-day	3.26 (2.99-3.57)	3.94 (3.61-4.32)	4.99 (4.57-5.46)	5.86 (5.35-6.41)	7.11 (6.46-7.77)	8.17 (7.38-8.91)	9.30 (8.36-10.1)	10.5 (9.40-11.5)	12.3 (10.9-13.4)	13.8 (12.1-15.1)
4-day	3.43 (3.16-3.76)	4.14 (3.81-4.54)	5.22 (4.79-5.72)	6.12 (5.60-6.69)	7.41 (6.75-8.09)	8.49 (7.70-9.26)	9.66 (8.70-10.5)	10.9 (9.77-11.9)	12.7 (11.3-13.9)	14.3 (12.5-15.5)
7-day	3.99 (3.70-4.32)	4.79 (4.44-5.19)	5.96 (5.52-6.46)	6.94 (6.42-7.50)	8.35 (7.68-9.03)	9.53 (8.72-10.3)	10.8 (9.83-11.7)	12.2 (11.0-13.1)	14.1 (12.6-15.2)	15.7 (14.0-17.0)
10-day	4.50 (4.20-4.84)	5.38 (5.02-5.80)	6.61 (6.15-7.12)	7.60 (7.06-8.18)	9.01 (8.34-9.68)	10.2 (9.37-10.9)	11.3 (10.4-12.2)	12.6 (11.5-13.5)	14.5 (13.1-15.5)	16.0 (14.4-17.2)
20-day	6.07 (5.69-6.50)	7.21 (6.76-7.72)	8.64 (8.09-9.24)	9.78 (9.14-10.5)	11.3 (10.6-12.1)	12.5 (11.7-13.4)	13.8 (12.8-14.7)	15.1 (13.9-16.1)	16.8 (15.4-18.0)	18.1 (16.5-19.4)
30-day	7.55 (7.10-8.02)	8.92 (8.38-9.48)	10.5 (9.84-11.1)	11.7 (11.0-12.4)	13.3 (12.4-14.1)	14.5 (13.6-15.4)	15.8 (14.7-16.7)	17.0 (15.8-18.1)	18.6 (17.2-19.8)	19.8 (18.3-21.1)
45-day	9.59 (9.06-10.1)	11.3 (10.7-11.9)	13.0 (12.3-13.8)	14.4 (13.6-15.2)	16.1 (15.1-17.0)	17.3 (16.3-18.4)	18.6 (17.4-19.7)	19.7 (18.5-20.9)	21.2 (19.8-22.5)	22.2 (20.7-23.6)
60-day	11.5 (10.9-12.1)	13.5 (12.8-14.2)	15.4 (14.6-16.2)	16.9 (16.0-17.8)	18.7 (17.7-19.7)	20.0 (18.9-21.1)	21.3 (20.1-22.5)	22.5 (21.2-23.7)	23.9 (22.5-25.3)	25.0 (23.4-26.4)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

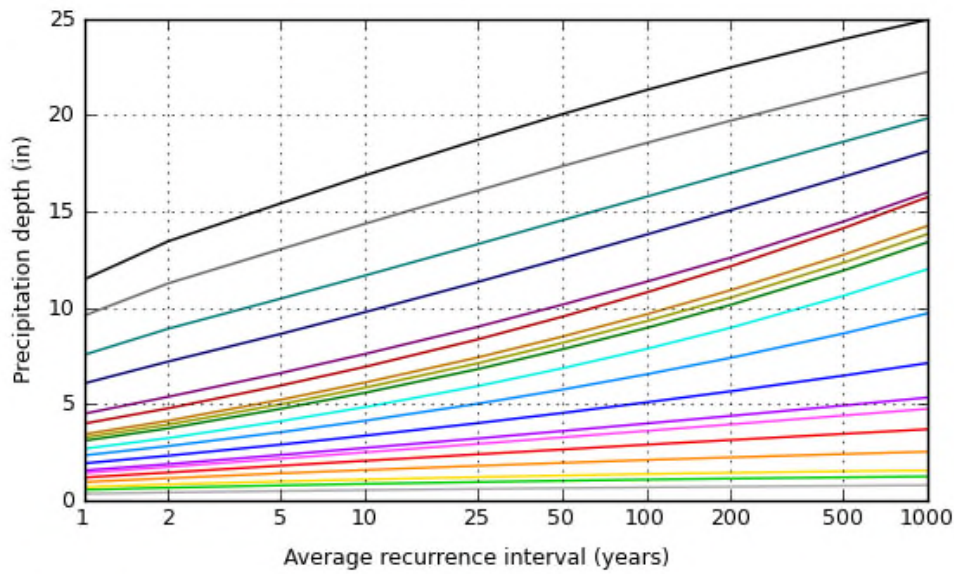
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PF graphical

PDS-based depth-duration-frequency (DDF) curves
 Latitude: 39.8458°, Longitude: -75.4187°



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000

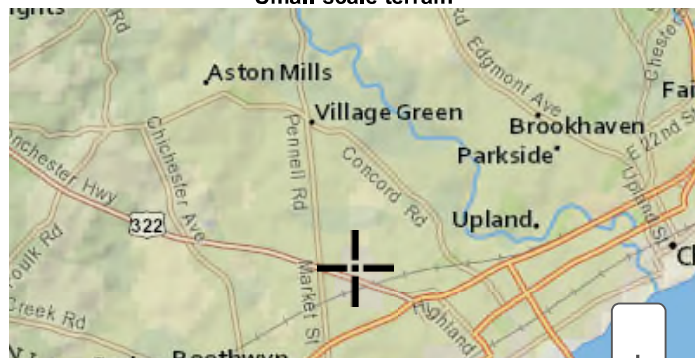


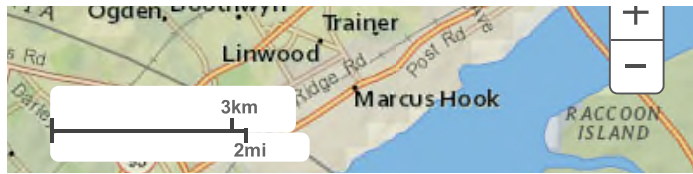
Duration	
5-min	2-day
10-min	3-day
15-min	4-day
30-min	7-day
60-min	10-day
2-hr	20-day
3-hr	30-day
6-hr	45-day
12-hr	60-day
24-hr	

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Maps & aerials

Small scale terrain





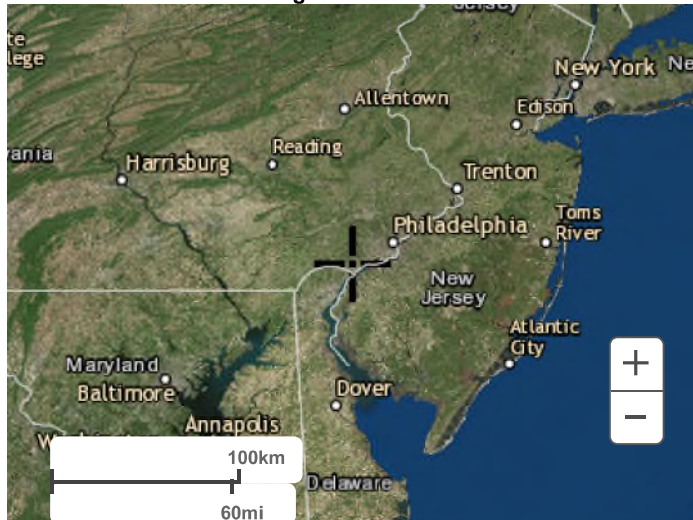
Large scale terrain



Large scale map



Large scale aerial



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1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
 NOAA, National Weather Service, Silver Spring, Maryland

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PF tabular

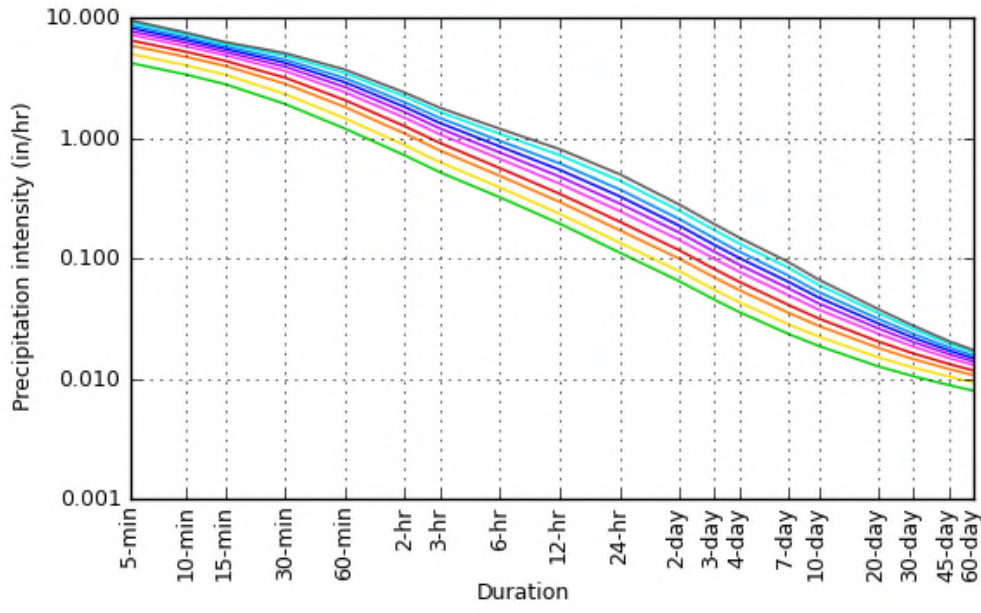
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.20 (3.85-4.60)	5.00 (4.57-5.46)	5.87 (5.36-6.41)	6.48 (5.90-7.08)	7.21 (6.54-7.88)	7.72 (6.96-8.44)	8.21 (7.37-9.00)	8.63 (7.69-9.49)	9.12 (8.05-10.1)	9.49 (8.30-10.6)
10-min	3.35 (3.07-3.67)	4.00 (3.66-4.37)	4.70 (4.29-5.14)	5.18 (4.72-5.66)	5.75 (5.21-6.28)	6.14 (5.54-6.72)	6.52 (5.85-7.15)	6.83 (6.10-7.52)	7.22 (6.37-7.99)	7.48 (6.54-8.32)
15-min	2.80 (2.56-3.06)	3.35 (3.07-3.66)	3.96 (3.62-4.33)	4.37 (3.98-4.78)	4.86 (4.40-5.31)	5.18 (4.68-5.67)	5.49 (4.93-6.02)	5.75 (5.13-6.33)	6.06 (5.34-6.70)	6.26 (5.47-6.96)
30-min	1.92 (1.75-2.10)	2.31 (2.12-2.53)	2.82 (2.57-3.08)	3.17 (2.88-3.46)	3.60 (3.26-3.93)	3.90 (3.52-4.27)	4.21 (3.78-4.61)	4.48 (3.99-4.93)	4.82 (4.25-5.33)	5.06 (4.43-5.63)
60-min	1.20 (1.09-1.31)	1.45 (1.33-1.59)	1.80 (1.65-1.97)	2.06 (1.88-2.25)	2.40 (2.17-2.62)	2.65 (2.38-2.89)	2.90 (2.60-3.18)	3.14 (2.80-3.46)	3.46 (3.05-3.83)	3.70 (3.23-4.11)
2-hr	0.716 (0.650-0.788)	0.870 (0.791-0.958)	1.09 (0.984-1.20)	1.25 (1.13-1.38)	1.47 (1.32-1.61)	1.64 (1.46-1.80)	1.81 (1.60-1.99)	1.98 (1.74-2.19)	2.20 (1.92-2.45)	2.38 (2.05-2.66)
3-hr	0.519 (0.473-0.571)	0.629 (0.573-0.692)	0.787 (0.716-0.866)	0.909 (0.823-0.999)	1.07 (0.963-1.18)	1.20 (1.07-1.32)	1.33 (1.18-1.47)	1.46 (1.28-1.61)	1.64 (1.42-1.82)	1.78 (1.52-1.98)
6-hr	0.322 (0.293-0.355)	0.388 (0.354-0.429)	0.484 (0.440-0.535)	0.562 (0.508-0.619)	0.670 (0.601-0.738)	0.758 (0.675-0.836)	0.850 (0.750-0.939)	0.947 (0.825-1.05)	1.08 (0.926-1.21)	1.19 (1.00-1.33)
12-hr	0.194 (0.177-0.216)	0.234 (0.213-0.261)	0.294 (0.267-0.327)	0.344 (0.310-0.381)	0.416 (0.371-0.461)	0.477 (0.422-0.528)	0.543 (0.474-0.603)	0.615 (0.529-0.685)	0.719 (0.604-0.805)	0.806 (0.665-0.907)
24-hr	0.112 (0.102-0.123)	0.135 (0.123-0.149)	0.171 (0.156-0.189)	0.202 (0.184-0.222)	0.247 (0.223-0.271)	0.285 (0.256-0.312)	0.328 (0.292-0.358)	0.374 (0.331-0.408)	0.442 (0.387-0.482)	0.500 (0.433-0.545)
2-day	0.064 (0.059-0.071)	0.078 (0.071-0.085)	0.099 (0.090-0.109)	0.116 (0.106-0.128)	0.142 (0.129-0.155)	0.163 (0.147-0.178)	0.186 (0.167-0.204)	0.212 (0.188-0.231)	0.248 (0.219-0.271)	0.279 (0.244-0.305)
3-day	0.045 (0.042-0.050)	0.055 (0.050-0.060)	0.069 (0.063-0.076)	0.081 (0.074-0.089)	0.099 (0.090-0.108)	0.113 (0.103-0.124)	0.129 (0.116-0.141)	0.146 (0.131-0.160)	0.171 (0.151-0.187)	0.192 (0.168-0.210)
4-day	0.036 (0.033-0.039)	0.043 (0.040-0.047)	0.054 (0.050-0.060)	0.064 (0.058-0.070)	0.077 (0.070-0.084)	0.088 (0.080-0.096)	0.101 (0.091-0.110)	0.114 (0.102-0.124)	0.133 (0.118-0.145)	0.148 (0.130-0.162)
7-day	0.024 (0.022-0.026)	0.028 (0.026-0.031)	0.035 (0.033-0.038)	0.041 (0.038-0.045)	0.050 (0.046-0.054)	0.057 (0.052-0.061)	0.064 (0.058-0.069)	0.072 (0.065-0.078)	0.084 (0.075-0.091)	0.094 (0.083-0.101)
10-day	0.019 (0.017-0.020)	0.022 (0.021-0.024)	0.028 (0.026-0.030)	0.032 (0.029-0.034)	0.038 (0.035-0.040)	0.042 (0.039-0.045)	0.047 (0.043-0.051)	0.053 (0.048-0.056)	0.060 (0.055-0.065)	0.067 (0.060-0.072)
20-day	0.013 (0.012-0.014)	0.015 (0.014-0.016)	0.018 (0.017-0.019)	0.020 (0.019-0.022)	0.024 (0.022-0.025)	0.026 (0.024-0.028)	0.029 (0.027-0.031)	0.031 (0.029-0.034)	0.035 (0.032-0.037)	0.038 (0.034-0.041)
30-day	0.010 (0.010-0.011)	0.012 (0.012-0.013)	0.015 (0.014-0.015)	0.016 (0.015-0.017)	0.018 (0.017-0.020)	0.020 (0.019-0.021)	0.022 (0.020-0.023)	0.024 (0.022-0.025)	0.026 (0.024-0.027)	0.028 (0.025-0.029)
45-day	0.009 (0.008-0.009)	0.010 (0.010-0.011)	0.012 (0.011-0.013)	0.013 (0.013-0.014)	0.015 (0.014-0.016)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.018 (0.017-0.019)	0.020 (0.018-0.021)	0.021 (0.019-0.022)
60-day	0.008 (0.008-0.008)	0.009 (0.009-0.010)	0.011 (0.010-0.011)	0.012 (0.011-0.012)	0.013 (0.012-0.014)	0.014 (0.013-0.015)	0.015 (0.014-0.016)	0.016 (0.015-0.016)	0.017 (0.016-0.018)	0.017 (0.016-0.018)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

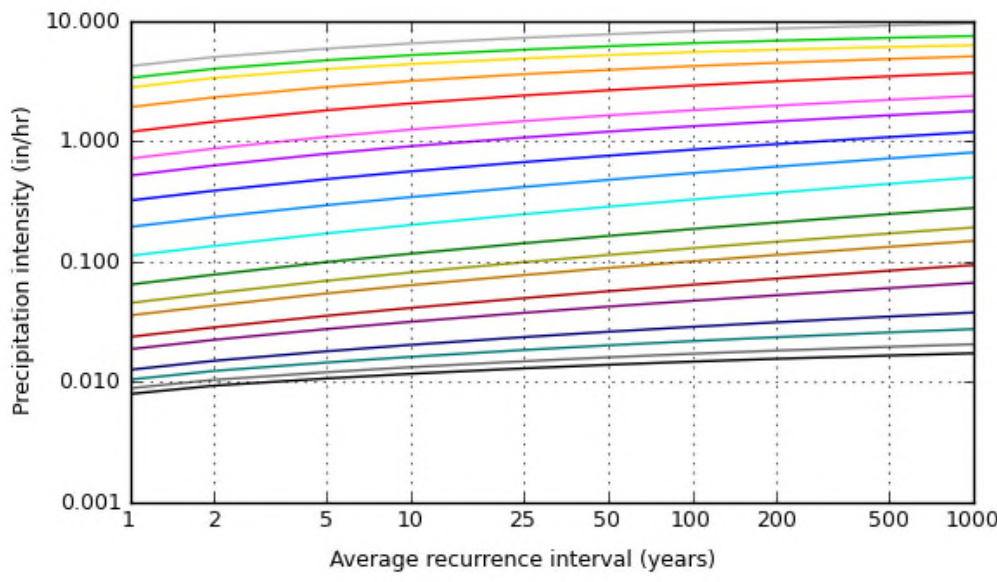
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PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 39.8458°, Longitude: -75.4187°



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000

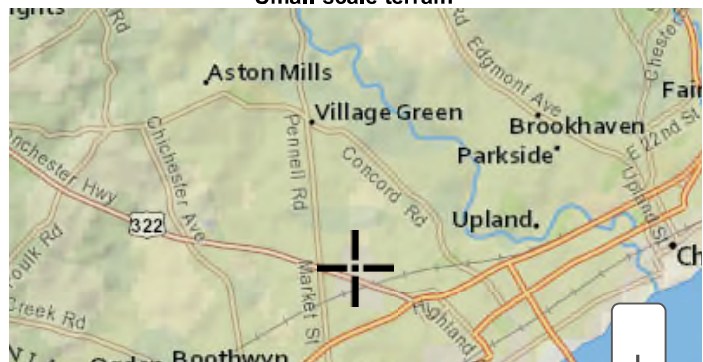


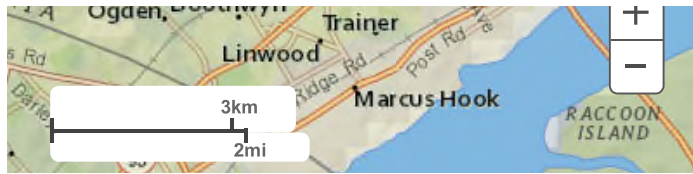
Duration
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10-min
15-min
30-min
60-min
2-hr
3-hr
6-hr
12-hr
24-hr
2-day
3-day
4-day
7-day
10-day
20-day
30-day
45-day
60-day

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Maps & aerials

Small scale terrain





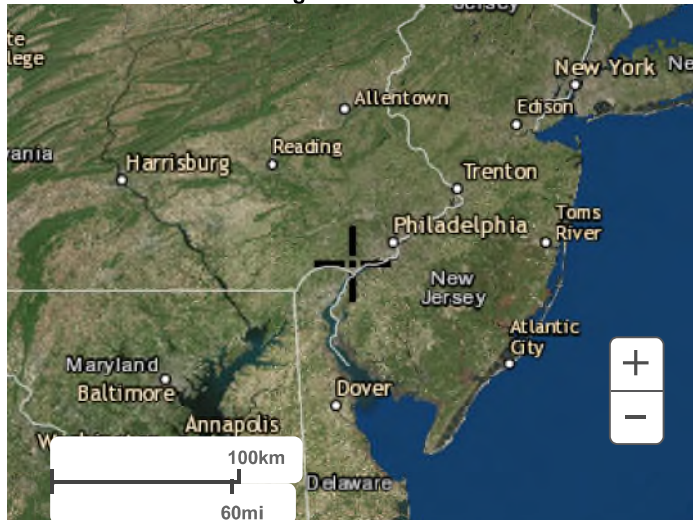
Large scale terrain



Large scale map



Large scale aerial

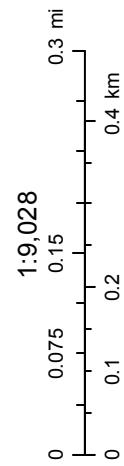


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APPENDIX A
SITE LOCATION MAPS

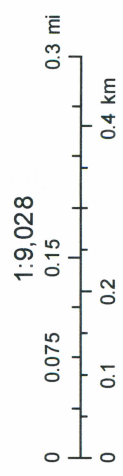


Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp.,
 NPCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand),

September 29, 2016



September 29, 2016



1:9,028

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand),

APPENDIX B

SOILS LOCATION MAP AND DESCRIPTIONS



Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Delaware County, Pennsylvania



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://soils.usda.gov/sqi/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nracs>) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

Custom Soil Resource Report

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: Web Mercator (EPSG:3857)

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

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
































Soil Survey Area: Delaware County, Pennsylvania
 Survey Area Data: Version 6, Feb 24, 2009

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

Date(s) aerial images were photographed: Jun 17, 2010—May 10, 2011

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

MAP LEGEND

 Area of Interest (AOI)	 Spoil Area
 Soil Map Unit Polygons	 Stony Spot
 Soil Map Unit Lines	 Very Stony Spot
 Soil Map Unit Points	 Wet Spot
 Special Point Features	 Other
 Blowout	 Special Line Features
 Borrow Pit	Water Features
 Clay Spot	 Streams and Canals
 Closed Depression	Transportation
 Gravel Pit	 Rails
 Gravelly Spot	 Interstate Highways
 Landfill	 US Routes
 Lava Flow	 Major Roads
 Marsh or swamp	 Local Roads
 Mine or Quarry	Background
 Miscellaneous Water	 Aerial Photography
 Perennial Water	
 Rock Outcrop	
 Saline Spot	
 Sandy Spot	
 Severely Eroded Spot	
 Sinkhole	
 Slide or Slip	
 Sodic Spot	

Map Unit Legend

Delaware County, Pennsylvania (PA045)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Mc	Made land, silt and clay materials	4.3	100.0%
Totals for Area of Interest		4.3	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Custom Soil Resource Report

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Delaware County, Pennsylvania

Mc—Made land, silt and clay materials

Map Unit Setting

Mean annual precipitation: 40 to 46 inches

Mean annual air temperature: 48 to 57 degrees F

Frost-free period: 161 to 215 days

Map Unit Composition

Made land: 95 percent

Description of Made Land

Setting

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Parent material: Loamy alluvium derived from igneous and metamorphic rock

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 6e

Hydrologic Soil Group: C

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APPENDIX C

PRE-DEVELOPED RUNOFF CALCULATIONS

Scenario: Pre-Development 1 year

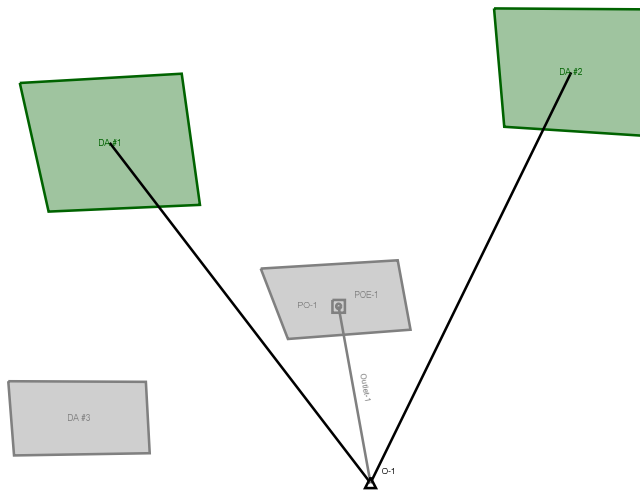


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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
DA #1	Pre-Development 1 year	1	0.206	12.150	2.24
DA #1	Pre-Development 2 year	2	0.294	12.150	3.29
DA #1	Pre-Development 5 year	5	0.445	12.150	5.04
DA #1	Pre-Development 10 year	10	0.579	12.150	6.58
DA #1	Pre-Development 25 year	25	0.788	12.150	8.95
DA #1	Pre-Development 50 year	50	0.971	12.150	10.98
DA #1	Pre-Development 100 year	100	1.177	12.150	13.24
DA #2	Pre-Development 1 year	1	0.082	12.050	1.19
DA #2	Pre-Development 2 year	2	0.126	12.000	1.94
DA #2	Pre-Development 5 year	5	0.206	12.000	3.29
DA #2	Pre-Development 10 year	10	0.280	12.000	4.53
DA #2	Pre-Development 25 year	25	0.399	12.000	6.50
DA #2	Pre-Development 50 year	50	0.505	12.000	8.22
DA #2	Pre-Development 100 year	100	0.625	12.000	10.16

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
O-1	Pre-Development 1 year	1	0.287	12.100	3.11
O-1	Pre-Development 2 year	2	0.421	12.050	4.75
O-1	Pre-Development 5 year	5	0.651	12.050	7.61
O-1	Pre-Development 10 year	10	0.859	12.050	10.17
O-1	Pre-Development 25 year	25	1.187	12.050	14.17
O-1	Pre-Development 50 year	50	1.476	12.050	17.64

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
O-1	Pre-Development 100 year	100	1.802	12.050	21.51

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 1 years

Label: Time-Depth - 1

Storm Event: 1 Year

Time-Depth Curve: 1 Year

Label	1 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	1 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.0	0.0	0.0	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.1
4.000	0.1	0.1	0.1	0.1	0.1
4.500	0.1	0.2	0.2	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.2
6.000	0.2	0.2	0.2	0.2	0.2
6.500	0.2	0.2	0.2	0.3	0.3
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.3	0.3	0.3	0.3	0.3
8.000	0.3	0.3	0.3	0.3	0.3
8.500	0.4	0.4	0.4	0.4	0.4
9.000	0.4	0.4	0.4	0.4	0.4
9.500	0.4	0.4	0.5	0.5	0.5
10.000	0.5	0.5	0.5	0.5	0.5
10.500	0.5	0.6	0.6	0.6	0.6
11.000	0.6	0.7	0.7	0.7	0.7
11.500	0.8	0.8	0.9	1.2	1.5
12.000	1.8	1.8	1.9	1.9	1.9
12.500	2.0	2.0	2.0	2.0	2.1
13.000	2.1	2.1	2.1	2.1	2.1
13.500	2.1	2.2	2.2	2.2	2.2
14.000	2.2	2.2	2.2	2.2	2.2
14.500	2.2	2.3	2.3	2.3	2.3
15.000	2.3	2.3	2.3	2.3	2.3
15.500	2.3	2.3	2.3	2.3	2.4
16.000	2.4	2.4	2.4	2.4	2.4
16.500	2.4	2.4	2.4	2.4	2.4

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 1 years

Label: Time-Depth - 1

Storm Event: 1 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	2.4	2.4	2.4	2.4	2.4
17.500	2.4	2.4	2.5	2.5	2.5
18.000	2.5	2.5	2.5	2.5	2.5
18.500	2.5	2.5	2.5	2.5	2.5
19.000	2.5	2.5	2.5	2.5	2.5
19.500	2.5	2.5	2.5	2.5	2.5
20.000	2.6	2.6	2.6	2.6	2.6
20.500	2.6	2.6	2.6	2.6	2.6
21.000	2.6	2.6	2.6	2.6	2.6
21.500	2.6	2.6	2.6	2.6	2.6
22.000	2.6	2.6	2.6	2.6	2.6
22.500	2.6	2.6	2.6	2.6	2.6
23.000	2.6	2.7	2.7	2.7	2.7
23.500	2.7	2.7	2.7	2.7	2.7
24.000	2.7	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 10 years

Label: Time-Depth - 1

Storm Event: 10 Year

Time-Depth Curve: 10 Year

Label	10 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	10 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.2	0.3	0.3
4.500	0.3	0.3	0.3	0.3	0.3
5.000	0.3	0.3	0.3	0.3	0.3
5.500	0.3	0.4	0.4	0.4	0.4
6.000	0.4	0.4	0.4	0.4	0.4
6.500	0.4	0.4	0.5	0.5	0.5
7.000	0.5	0.5	0.5	0.5	0.5
7.500	0.5	0.5	0.5	0.6	0.6
8.000	0.6	0.6	0.6	0.6	0.6
8.500	0.6	0.7	0.7	0.7	0.7
9.000	0.7	0.7	0.7	0.8	0.8
9.500	0.8	0.8	0.8	0.8	0.9
10.000	0.9	0.9	0.9	0.9	1.0
10.500	1.0	1.0	1.0	1.1	1.1
11.000	1.1	1.2	1.2	1.3	1.3
11.500	1.4	1.5	1.7	2.1	2.7
12.000	3.2	3.3	3.4	3.5	3.5
12.500	3.6	3.6	3.6	3.7	3.7
13.000	3.7	3.8	3.8	3.8	3.8
13.500	3.9	3.9	3.9	3.9	4.0
14.000	4.0	4.0	4.0	4.0	4.0
14.500	4.1	4.1	4.1	4.1	4.1
15.000	4.1	4.1	4.2	4.2	4.2
15.500	4.2	4.2	4.2	4.2	4.2
16.000	4.3	4.3	4.3	4.3	4.3
16.500	4.3	4.3	4.3	4.3	4.4

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 10 years

Label: Time-Depth - 1

Storm Event: 10 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	4.4	4.4	4.4	4.4	4.4
17.500	4.4	4.4	4.4	4.4	4.4
18.000	4.5	4.5	4.5	4.5	4.5
18.500	4.5	4.5	4.5	4.5	4.5
19.000	4.5	4.5	4.6	4.6	4.6
19.500	4.6	4.6	4.6	4.6	4.6
20.000	4.6	4.6	4.6	4.6	4.6
20.500	4.6	4.6	4.7	4.7	4.7
21.000	4.7	4.7	4.7	4.7	4.7
21.500	4.7	4.7	4.7	4.7	4.7
22.000	4.7	4.7	4.7	4.7	4.8
22.500	4.8	4.8	4.8	4.8	4.8
23.000	4.8	4.8	4.8	4.8	4.8
23.500	4.8	4.8	4.8	4.8	4.8
24.000	4.8	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 100 years

Label: Time-Depth - 1

Storm Event: 100 Year

Time-Depth Curve: 100 Year	
Label	100 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.1	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.2	0.2
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.3	0.3
3.000	0.3	0.3	0.3	0.3	0.3
3.500	0.3	0.3	0.3	0.4	0.4
4.000	0.4	0.4	0.4	0.4	0.4
4.500	0.4	0.4	0.5	0.5	0.5
5.000	0.5	0.5	0.5	0.5	0.5
5.500	0.6	0.6	0.6	0.6	0.6
6.000	0.6	0.6	0.7	0.7	0.7
6.500	0.7	0.7	0.7	0.7	0.8
7.000	0.8	0.8	0.8	0.8	0.8
7.500	0.9	0.9	0.9	0.9	0.9
8.000	0.9	1.0	1.0	1.0	1.0
8.500	1.0	1.1	1.1	1.1	1.1
9.000	1.2	1.2	1.2	1.2	1.3
9.500	1.3	1.3	1.3	1.4	1.4
10.000	1.4	1.5	1.5	1.5	1.6
10.500	1.6	1.6	1.7	1.7	1.8
11.000	1.8	1.9	2.0	2.1	2.1
11.500	2.2	2.4	2.8	3.4	4.5
12.000	5.2	5.4	5.5	5.6	5.7
12.500	5.8	5.8	5.9	6.0	6.0
13.000	6.1	6.1	6.2	6.2	6.2
13.500	6.3	6.3	6.4	6.4	6.4
14.000	6.4	6.5	6.5	6.5	6.6
14.500	6.6	6.6	6.6	6.7	6.7
15.000	6.7	6.7	6.8	6.8	6.8
15.500	6.8	6.8	6.9	6.9	6.9
16.000	6.9	6.9	7.0	7.0	7.0
16.500	7.0	7.0	7.0	7.1	7.1

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 100 years

Label: Time-Depth - 1

Storm Event: 100 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	7.1	7.1	7.1	7.1	7.2
17.500	7.2	7.2	7.2	7.2	7.2
18.000	7.2	7.3	7.3	7.3	7.3
18.500	7.3	7.3	7.3	7.3	7.4
19.000	7.4	7.4	7.4	7.4	7.4
19.500	7.4	7.4	7.5	7.5	7.5
20.000	7.5	7.5	7.5	7.5	7.5
20.500	7.5	7.5	7.6	7.6	7.6
21.000	7.6	7.6	7.6	7.6	7.6
21.500	7.6	7.6	7.7	7.7	7.7
22.000	7.7	7.7	7.7	7.7	7.7
22.500	7.7	7.7	7.7	7.8	7.8
23.000	7.8	7.8	7.8	7.8	7.8
23.500	7.8	7.8	7.8	7.8	7.9
24.000	7.9	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 2 years

Label: Time-Depth - 1

Storm Event: 2 Year

Time-Depth Curve: 2 Year	
Label	2 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	2 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.2
4.000	0.2	0.2	0.2	0.2	0.2
4.500	0.2	0.2	0.2	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.3
6.000	0.3	0.3	0.3	0.3	0.3
6.500	0.3	0.3	0.3	0.3	0.3
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.4	0.4	0.4	0.4	0.4
8.000	0.4	0.4	0.4	0.4	0.4
8.500	0.4	0.4	0.4	0.5	0.5
9.000	0.5	0.5	0.5	0.5	0.5
9.500	0.5	0.5	0.5	0.6	0.6
10.000	0.6	0.6	0.6	0.6	0.6
10.500	0.7	0.7	0.7	0.7	0.7
11.000	0.8	0.8	0.8	0.8	0.9
11.500	0.9	1.0	1.1	1.4	1.8
12.000	2.1	2.2	2.3	2.3	2.3
12.500	2.4	2.4	2.4	2.5	2.5
13.000	2.5	2.5	2.5	2.6	2.6
13.500	2.6	2.6	2.6	2.6	2.6
14.000	2.7	2.7	2.7	2.7	2.7
14.500	2.7	2.7	2.7	2.7	2.8
15.000	2.8	2.8	2.8	2.8	2.8
15.500	2.8	2.8	2.8	2.8	2.8
16.000	2.9	2.9	2.9	2.9	2.9
16.500	2.9	2.9	2.9	2.9	2.9

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 2 years

Label: Time-Depth - 1

Storm Event: 2 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	2.9	2.9	2.9	2.9	2.9
17.500	3.0	3.0	3.0	3.0	3.0
18.000	3.0	3.0	3.0	3.0	3.0
18.500	3.0	3.0	3.0	3.0	3.0
19.000	3.0	3.0	3.0	3.1	3.1
19.500	3.1	3.1	3.1	3.1	3.1
20.000	3.1	3.1	3.1	3.1	3.1
20.500	3.1	3.1	3.1	3.1	3.1
21.000	3.1	3.1	3.1	3.1	3.1
21.500	3.1	3.1	3.2	3.2	3.2
22.000	3.2	3.2	3.2	3.2	3.2
22.500	3.2	3.2	3.2	3.2	3.2
23.000	3.2	3.2	3.2	3.2	3.2
23.500	3.2	3.2	3.2	3.2	3.2
24.000	3.2	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 25 years

Label: Time-Depth - 1

Storm Event: 25 Year

Time-Depth Curve: 25 Year

Label	25 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	25 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.2	0.2
2.500	0.2	0.2	0.2	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.3	0.3	0.3	0.3
4.000	0.3	0.3	0.3	0.3	0.3
4.500	0.3	0.3	0.3	0.4	0.4
5.000	0.4	0.4	0.4	0.4	0.4
5.500	0.4	0.4	0.4	0.5	0.5
6.000	0.5	0.5	0.5	0.5	0.5
6.500	0.5	0.5	0.6	0.6	0.6
7.000	0.6	0.6	0.6	0.6	0.6
7.500	0.6	0.7	0.7	0.7	0.7
8.000	0.7	0.7	0.7	0.8	0.8
8.500	0.8	0.8	0.8	0.8	0.9
9.000	0.9	0.9	0.9	0.9	0.9
9.500	1.0	1.0	1.0	1.0	1.1
10.000	1.1	1.1	1.1	1.2	1.2
10.500	1.2	1.2	1.3	1.3	1.4
11.000	1.4	1.4	1.5	1.5	1.6
11.500	1.7	1.8	2.1	2.6	3.4
12.000	3.9	4.0	4.1	4.2	4.3
12.500	4.4	4.4	4.5	4.5	4.5
13.000	4.6	4.6	4.6	4.7	4.7
13.500	4.7	4.8	4.8	4.8	4.8
14.000	4.9	4.9	4.9	4.9	4.9
14.500	5.0	5.0	5.0	5.0	5.0
15.000	5.1	5.1	5.1	5.1	5.1
15.500	5.1	5.2	5.2	5.2	5.2
16.000	5.2	5.2	5.2	5.3	5.3
16.500	5.3	5.3	5.3	5.3	5.3

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 25 years

Label: Time-Depth - 1

Storm Event: 25 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	5.3	5.4	5.4	5.4	5.4
17.500	5.4	5.4	5.4	5.4	5.5
18.000	5.5	5.5	5.5	5.5	5.5
18.500	5.5	5.5	5.5	5.5	5.6
19.000	5.6	5.6	5.6	5.6	5.6
19.500	5.6	5.6	5.6	5.6	5.6
20.000	5.6	5.7	5.7	5.7	5.7
20.500	5.7	5.7	5.7	5.7	5.7
21.000	5.7	5.7	5.7	5.7	5.8
21.500	5.8	5.8	5.8	5.8	5.8
22.000	5.8	5.8	5.8	5.8	5.8
22.500	5.8	5.8	5.8	5.8	5.9
23.000	5.9	5.9	5.9	5.9	5.9
23.500	5.9	5.9	5.9	5.9	5.9
24.000	5.9	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 5 years

Label: Time-Depth - 1

Storm Event: 5 Year

Time-Depth Curve: 5 Year

Label	5 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	5 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.2	0.2	0.2
4.500	0.2	0.2	0.2	0.2	0.3
5.000	0.3	0.3	0.3	0.3	0.3
5.500	0.3	0.3	0.3	0.3	0.3
6.000	0.3	0.3	0.3	0.4	0.4
6.500	0.4	0.4	0.4	0.4	0.4
7.000	0.4	0.4	0.4	0.4	0.4
7.500	0.4	0.5	0.5	0.5	0.5
8.000	0.5	0.5	0.5	0.5	0.5
8.500	0.5	0.6	0.6	0.6	0.6
9.000	0.6	0.6	0.6	0.6	0.7
9.500	0.7	0.7	0.7	0.7	0.7
10.000	0.7	0.8	0.8	0.8	0.8
10.500	0.8	0.9	0.9	0.9	0.9
11.000	1.0	1.0	1.0	1.1	1.1
11.500	1.2	1.3	1.5	1.8	2.3
12.000	2.7	2.8	2.9	2.9	3.0
12.500	3.0	3.1	3.1	3.1	3.1
13.000	3.2	3.2	3.2	3.2	3.3
13.500	3.3	3.3	3.3	3.3	3.4
14.000	3.4	3.4	3.4	3.4	3.4
14.500	3.4	3.5	3.5	3.5	3.5
15.000	3.5	3.5	3.5	3.5	3.6
15.500	3.6	3.6	3.6	3.6	3.6
16.000	3.6	3.6	3.6	3.6	3.7
16.500	3.7	3.7	3.7	3.7	3.7

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 5 years

Label: Time-Depth - 1

Storm Event: 5 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	3.7	3.7	3.7	3.7	3.7
17.500	3.7	3.8	3.8	3.8	3.8
18.000	3.8	3.8	3.8	3.8	3.8
18.500	3.8	3.8	3.8	3.8	3.8
19.000	3.9	3.9	3.9	3.9	3.9
19.500	3.9	3.9	3.9	3.9	3.9
20.000	3.9	3.9	3.9	3.9	3.9
20.500	3.9	3.9	3.9	4.0	4.0
21.000	4.0	4.0	4.0	4.0	4.0
21.500	4.0	4.0	4.0	4.0	4.0
22.000	4.0	4.0	4.0	4.0	4.0
22.500	4.0	4.0	4.0	4.1	4.1
23.000	4.1	4.1	4.1	4.1	4.1
23.500	4.1	4.1	4.1	4.1	4.1
24.000	4.1	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 50 years

Label: Time-Depth - 1

Storm Event: 50 Year

Time-Depth Curve: 50 Year

Label	50 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	50 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.2	0.2
3.000	0.2	0.2	0.3	0.3	0.3
3.500	0.3	0.3	0.3	0.3	0.3
4.000	0.3	0.3	0.3	0.4	0.4
4.500	0.4	0.4	0.4	0.4	0.4
5.000	0.4	0.4	0.5	0.5	0.5
5.500	0.5	0.5	0.5	0.5	0.5
6.000	0.5	0.6	0.6	0.6	0.6
6.500	0.6	0.6	0.6	0.7	0.7
7.000	0.7	0.7	0.7	0.7	0.7
7.500	0.7	0.8	0.8	0.8	0.8
8.000	0.8	0.8	0.9	0.9	0.9
8.500	0.9	0.9	0.9	1.0	1.0
9.000	1.0	1.0	1.1	1.1	1.1
9.500	1.1	1.1	1.2	1.2	1.2
10.000	1.2	1.3	1.3	1.3	1.4
10.500	1.4	1.4	1.5	1.5	1.6
11.000	1.6	1.7	1.7	1.8	1.9
11.500	1.9	2.1	2.4	3.0	3.9
12.000	4.5	4.7	4.8	4.9	5.0
12.500	5.0	5.1	5.1	5.2	5.2
13.000	5.3	5.3	5.4	5.4	5.4
13.500	5.5	5.5	5.5	5.6	5.6
14.000	5.6	5.6	5.7	5.7	5.7
14.500	5.7	5.8	5.8	5.8	5.8
15.000	5.8	5.9	5.9	5.9	5.9
15.500	5.9	6.0	6.0	6.0	6.0
16.000	6.0	6.0	6.1	6.1	6.1
16.500	6.1	6.1	6.1	6.1	6.2

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 50 years

Label: Time-Depth - 1

Storm Event: 50 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	6.2	6.2	6.2	6.2	6.2
17.500	6.2	6.3	6.3	6.3	6.3
18.000	6.3	6.3	6.3	6.3	6.4
18.500	6.4	6.4	6.4	6.4	6.4
19.000	6.4	6.4	6.4	6.5	6.5
19.500	6.5	6.5	6.5	6.5	6.5
20.000	6.5	6.5	6.5	6.5	6.6
20.500	6.6	6.6	6.6	6.6	6.6
21.000	6.6	6.6	6.6	6.6	6.6
21.500	6.7	6.7	6.7	6.7	6.7
22.000	6.7	6.7	6.7	6.7	6.7
22.500	6.7	6.7	6.7	6.8	6.8
23.000	6.8	6.8	6.8	6.8	6.8
23.500	6.8	6.8	6.8	6.8	6.8
24.000	6.9	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 1 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours

Segment #3: TR-55 Channel Flow

Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.257 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.414 hours
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 1 years
Storm Event: 1 Year

==== SCS Channel Flow

$$T_c = \frac{R = Q_a / W_p}{V = (1.49 * (R^{2/3}) * (S_f^{-0.5})) / n}$$

$$(L_f / V) / 3600$$

R= Hydraulic radius
A_q= Flow area, square feet
W_p= Wetted perimeter, feet

Where:
V= Velocity, ft/sec
S_f= Slope, ft/ft
n= Manning's n
T_c= Time of concentration, hours
L_f= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
 $V = 16.1345 * (S_f^{0.5})$

T_c = Paved Surface:
 $V = 20.3282 * (S_f^{0.5})$

$$(L_f / V) / 3600$$

V= Velocity, ft/sec
S_f= Slope, ft/ft
T_c= Time of concentration, hours
L_f= Flow length, feet

==== SCS TR-55 Sheet Flow

$$T_c = \frac{(0.007 * ((n * L_f)^{0.8}))}{((P^{0.5}) * (S_f^{0.4}))}$$

T_c= Time of concentration, hours
n= Manning's n

Where:
L_f= Flow length, feet
P= 2yr, 24hr Rain depth, inches
S_f= Slope, %

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #1

Return Event: 2 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours
Segment #3: TR-55 Channel Flow	
Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.257 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.414 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 2 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = 16.1345 * (Sf**0.5)
Tc = Paved Surface:
V = 20.3282 * (Sf**0.5)
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = $(0.007 * ((n * Lf)^{0.8}) / ((P^{0.5}) * (Sf^{0.4}))$
Tc= Time of concentration, hours
n= Manning's n
Where: Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #1

Return Event: 5 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours

Segment #3: TR-55 Channel Flow

Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.257 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.414 hours
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #1

Return Event: 5 years
 Storm Event: 1 Year

==== SCS Channel Flow

Tc =
$$R = Qa / Wp$$

$$V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$$

(Lf / V) / 3600
 R= Hydraulic radius
 Aq= Flow area, square feet
 Wp= Wetted perimeter, feet
 V= Velocity, ft/sec
 Sf= Slope, ft/ft
 n= Manning's n
 Tc= Time of concentration, hours
 Lf= Flow length, feet

Where:

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:

$$V = 16.1345 * (Sf^{*0.5})$$

Tc = Paved Surface:

$$V = 20.3282 * (Sf^{*0.5})$$

(Lf / V) / 3600
 V= Velocity, ft/sec
 Sf= Slope, ft/ft
 Tc= Time of concentration, hours
 Lf= Flow length, feet

Where:

==== SCS TR-55 Sheet Flow

Tc =
$$(0.007 * ((n * Lf)^{*0.8})) / ((P^{*0.5}) * (Sf^{*0.4}))$$

Tc= Time of concentration, hours
 n= Manning's n
 Lf= Flow length, feet
 P= 2yr, 24hr Rain depth, inches
 Sf= Slope, %

Where:

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 10 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours

Segment #3: TR-55 Channel Flow

Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.257 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.414 hours
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 10 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = $16.1345 * (Sf^{*0.5})$
Tc = Paved Surface:
V = $20.3282 * (Sf^{*0.5})$
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = $(0.007 * ((n * Lf)^{*0.8}) / ((P^{*0.5}) * (Sf^{*0.4}))$
Tc= Time of concentration, hours
n= Manning's n
Where: Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 25 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours

Segment #3: TR-55 Channel Flow

Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.257 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.414 hours
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 25 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = $16.1345 * (Sf^{*0.5})$
Tc = Paved Surface:
V = $20.3282 * (Sf^{*0.5})$
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = $(0.007 * ((n * Lf)^{*0.8}) / ((P^{*0.5}) * (Sf^{*0.4}))$
Tc= Time of concentration, hours
n= Manning's n
Where: Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #1

Return Event: 50 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours

Segment #3: TR-55 Channel Flow

Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.257 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.414 hours
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 50 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = $16.1345 * (Sf^{*0.5})$
Tc = Paved Surface:
V = $20.3282 * (Sf^{*0.5})$
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = $(0.007 * ((n * Lf)^{*0.8}) / ((P^{*0.5}) * (Sf^{*0.4}))$
Tc= Time of concentration, hours
n= Manning's n
Where: Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 100 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours

Segment #3: TR-55 Channel Flow

Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.257 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.414 hours
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 100 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = 16.1345 * (Sf**0.5)
Tc = Paved Surface:
V = 20.3282 * (Sf**0.5)
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = $(0.007 * ((n * Lf)^{0.8}) / ((P^{0.5}) * (Sf^{0.4}))$
Tc= Time of concentration, hours
n= Manning's n
Where: Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 1 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.173 hours
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 1 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n$$

$$T_c = (L_f / V) / 3600$$

Where:

R= Hydraulic radius
A_q= Flow area, square feet
W_p= Wetted perimeter, feet
V= Velocity, ft/sec
S_f= Slope, ft/ft
n= Manning's n
T_c= Time of concentration, hours
L_f= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:

$$V = 16.1345 * (S_f^{0.5})$$

Paved Surface:

$$V = 20.3282 * (S_f^{0.5})$$

$$T_c = (L_f / V) / 3600$$

Where:

V= Velocity, ft/sec
S_f= Slope, ft/ft
T_c= Time of concentration, hours
L_f= Flow length, feet

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #2

Return Event: 2 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours
Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.173 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 2 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n$$

$$T_c = (L_f / V) / 3600$$

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
 $V = 16.1345 * (S_f^{0.5})$

Paved Surface:
 $V = 20.3282 * (S_f^{0.5})$

$$T_c = (L_f / V) / 3600$$

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 5 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.173 hours
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 5 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n$$

$$T_c = (L_f / V) / 3600$$

R= Hydraulic radius
A_q= Flow area, square feet
W_p= Wetted perimeter, feet
V= Velocity, ft/sec
S_f= Slope, ft/ft
n= Manning's n
T_c= Time of concentration, hours
L_f= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:

$$V = 16.1345 * (S_f^{0.5})$$

Paved Surface:

$$V = 20.3282 * (S_f^{0.5})$$

$$T_c = (L_f / V) / 3600$$

V= Velocity, ft/sec
S_f= Slope, ft/ft
T_c= Time of concentration, hours
L_f= Flow length, feet

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 10 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.173 hours
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 10 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n$$

$$T_c = (L_f / V) / 3600$$

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:

$$V = 16.1345 * (S_f^{0.5})$$

Paved Surface:

$$V = 20.3282 * (S_f^{0.5})$$

$$T_c = (L_f / V) / 3600$$

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 25 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.173 hours
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 25 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$T_c = \frac{V = (1.49 * (R^{2/3}) * (S_f^{-0.5})) / n}{(L_f / V) / 3600}$$

Where:
R= Hydraulic radius
A_q= Flow area, square feet
W_p= Wetted perimeter, feet
V= Velocity, ft/sec
S_f= Slope, ft/ft
n= Manning's n
T_c= Time of concentration, hours
L_f= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

$$V = 16.1345 * (S_f^{0.5})$$

$$T_c = \frac{V = 20.3282 * (S_f^{0.5})}{(L_f / V) / 3600}$$

Where:
V= Velocity, ft/sec
S_f= Slope, ft/ft
T_c= Time of concentration, hours
L_f= Flow length, feet

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 50 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.173 hours
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations

Label: DA #2

Return Event: 50 years

Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n$$

$$T_c = (L_f / V) / 3600$$

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:

$$V = 16.1345 * (S_f^{0.5})$$

Paved Surface:

$$V = 20.3282 * (S_f^{0.5})$$

$$T_c = (L_f / V) / 3600$$

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 100 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.173 hours
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 100 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n$$

$$T_c = (L_f / V) / 3600$$

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
 $V = 16.1345 * (S_f^{0.5})$

Paved Surface:
 $V = 20.3282 * (S_f^{0.5})$

$$T_c = (L_f / V) / 3600$$

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Equations

Unit Hydrograph Method (Computational Notes)

Definition of Terms

At	Total area (acres): $A_t = A_i + A_p$
Ai	Impervious area (acres)
Ap	Pervious area (acres)
CNi	Runoff curve number for impervious area
CNp	Runoff curve number for pervious area
fLoss	f loss constant infiltration (depth/time)
gKs	Saturated Hydraulic Conductivity (depth/time)
Md	Volumetric Moisture Deficit
Psi	Capillary Suction (length)
hK	Horton Infiltration Decay Rate (time^{-1})
fo	Initial Infiltration Rate (depth/time)
fc	Ultimate(capacity)Infiltration Rate (depth/time)
Ia	Initial Abstraction (length)
dt	Computational increment (duration of unit excess rainfall) Default dt is smallest value of $0.1333T_c$, r_{tm} , and t_h (Smallest dt is then adjusted to match up with T_p)
UDdt	User specified override computational main time increment (only used if UDdt is $\Rightarrow .1333T_c$)
D(t)	Point on distribution curve (fraction of P) for time step t
K	$2 / (1 + (T_r/T_p))$: default $K = 0.75$: (for $T_r/T_p = 1.67$)
Ks	Hydrograph shape factor = Unit Conversions * $K = ((1\text{hr}/3600\text{sec}) * (1\text{ft}/12\text{in}) * ((5280\text{ft})^2/\text{sq.mi})) * K$ Default $K_s = 645.333 * 0.75 = 484$
Lag	Lag time from center of excess runoff (dt) to T_p : $\text{Lag} = 0.6T_c$
P	Total precipitation depth, inches
Pa(t)	Accumulated rainfall at time step t
Pi(t)	Incremental rainfall at time step t
qp	Peak discharge (cfs) for 1in. runoff, for 1hr, for 1 sq.mi. = $(K_s * A * Q) / T_p$ (where $Q = 1\text{in. runoff}$, $A = \text{sq.mi.}$)
Qu(t)	Unit hydrograph ordinate (cfs) at time step t
Q(t)	Final hydrograph ordinate (cfs) at time step t
Rai(t)	Accumulated runoff (inches) at time step t for impervious area
Rap(t)	Accumulated runoff (inches) at time step t for pervious area
Rii(t)	Incremental runoff (inches) at time step t for impervious area
Rip(t)	Incremental runoff (inches) at time step t for pervious area
R(t)	Incremental weighted total runoff (inches)
Rtm	Time increment for rainfall table
Si	S for impervious area: $S_i = (1000/CN_i) - 10$
Sp	S for pervious area: $S_p = (1000/CN_p) - 10$
t	Time step (row) number
Tc	Time of concentration
Tb	Time (hrs) of entire unit hydrograph: $T_b = T_p + T_r$
Tp	Time (hrs) to peak of a unit hydrograph: $T_p = (dt/2) + \text{Lag}$
Tr	Time (hrs) of receding limb of unit hydrograph: $T_r = \text{ratio of } T_p$

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Equations

Unit Hydrograph Method

Computational Notes

Precipitation

Column (1)	Time for time step t
Column (2)	$D(t)$ = Point on distribution curve for time step t
Column (3)	$P_i(t) = P_a(t) - P_a(t-1)$: Col.(4) - Preceding Col.(4)
Column (4)	$P_a(t) = D(t) \times P$: Col.(2) x P

Pervious Area Runoff (using SCS Runoff CN Method)

	$Rap(t)$ = Accumulated pervious runoff for time step t
	If $(P_a(t))$ is $\leq 0.2Sp$ then use: $Rap(t) = 0.0$
	If $(P_a(t))$ is $> 0.2Sp$ then use:
	$Rap(t) = (Col.(4) - 0.2Sp) \times 2 / (Col.(4) + 0.8Sp)$
	$Rip(t)$ = Incremental pervious runoff for time step t
Column (5)	$Rip(t) = Rap(t) - Rap(t-1)$
Column (6)	$Rip(t) = Col.(5)$ for current row - $Col.(5)$ for preceding row.

Impervious Area Runoff

Column (7 & 8)...	Did not specify to use impervious areas.
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Incremental Weighted Runoff

Column (9)	$R(t) = (A_p/A_t) \times Rip(t) + (A_i/A_t) \times Rii(t)$
	$R(t) = (A_p/A_t) \times Col.(6) + (A_i/A_t) \times Col.(8)$

SCS Unit Hydrograph Method

Column (10)	$Q(t)$ is computed with the SCS unit hydrograph method using $R(t)$ and $Qu(t)$.
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TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 1 years
 Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.7 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres
<hr/>	
Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.140 hours
Flow (Peak, Computed)	2.25 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	2.24 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	78.453
Area (User Defined)	2.670 acres
Maximum Retention (Pervious)	2.7 in
Maximum Retention (Pervious, 20 percent)	0.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.9 in
Runoff Volume (Pervious)	0.207 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.206 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 1 years

Storm Event: 1 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	7.31 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.104 hours
Total unit time, Tb	1.380 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 1 years
 Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.7 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
10.700	0.00	0.00	0.00	0.00	0.00
10.950	0.01	0.01	0.01	0.01	0.02
11.200	0.02	0.03	0.03	0.04	0.04
11.450	0.05	0.06	0.07	0.08	0.11
11.700	0.15	0.22	0.33	0.51	0.77
11.950	1.12	1.52	1.89	2.15	2.24
12.200	2.17	1.97	1.71	1.46	1.24
12.450	1.06	0.92	0.81	0.71	0.63
12.700	0.57	0.51	0.47	0.43	0.40
12.950	0.38	0.36	0.34	0.32	0.31
13.200	0.29	0.28	0.27	0.26	0.26
13.450	0.25	0.24	0.24	0.23	0.22
13.700	0.22	0.21	0.21	0.20	0.20
13.950	0.19	0.19	0.19	0.18	0.18
14.200	0.17	0.17	0.17	0.17	0.16
14.450	0.16	0.16	0.16	0.16	0.15
14.700	0.15	0.15	0.15	0.15	0.15
14.950	0.15	0.14	0.14	0.14	0.14
15.200	0.14	0.14	0.14	0.13	0.13
15.450	0.13	0.13	0.13	0.13	0.13
15.700	0.12	0.12	0.12	0.12	0.12
15.950	0.12	0.12	0.11	0.11	0.11
16.200	0.11	0.11	0.11	0.11	0.11
16.450	0.11	0.10	0.10	0.10	0.10
16.700	0.10	0.10	0.10	0.10	0.10
16.950	0.10	0.10	0.10	0.10	0.10
17.200	0.10	0.10	0.10	0.10	0.09
17.450	0.09	0.09	0.09	0.09	0.09
17.700	0.09	0.09	0.09	0.09	0.09
17.950	0.09	0.09	0.09	0.09	0.09
18.200	0.09	0.09	0.09	0.08	0.08
18.450	0.08	0.08	0.08	0.08	0.08
18.700	0.08	0.08	0.08	0.08	0.08

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 1 years

Label: DA #1

Storm Event: 1 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
18.950	0.08	0.08	0.08	0.08	0.08
19.200	0.08	0.07	0.07	0.07	0.07
19.450	0.07	0.07	0.07	0.07	0.07
19.700	0.07	0.07	0.07	0.07	0.07
19.950	0.07	0.07	0.07	0.07	0.06
20.200	0.06	0.06	0.06	0.06	0.06
20.450	0.06	0.06	0.06	0.06	0.06
20.700	0.06	0.06	0.06	0.06	0.06
20.950	0.06	0.06	0.06	0.06	0.06
21.200	0.06	0.06	0.06	0.06	0.06
21.450	0.06	0.06	0.06	0.06	0.06
21.700	0.06	0.06	0.06	0.06	0.06
21.950	0.06	0.06	0.06	0.06	0.06
22.200	0.06	0.06	0.06	0.06	0.06
22.450	0.06	0.06	0.06	0.06	0.06
22.700	0.06	0.06	0.06	0.06	0.06
22.950	0.06	0.06	0.06	0.06	0.06
23.200	0.06	0.06	0.06	0.06	0.06
23.450	0.06	0.06	0.06	0.06	0.06
23.700	0.06	0.06	0.06	0.06	0.06
23.950	0.06	0.05	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 2 years
 Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.2 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres

Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.140 hours
Flow (Peak, Computed)	3.31 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	3.29 ft ³ /s

Drainage Area	
SCS CN (Composite)	78.453
Area (User Defined)	2.670 acres
Maximum Retention (Pervious)	2.7 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.3 in
Runoff Volume (Pervious)	0.296 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.294 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 2 years

Storm Event: 2 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.31 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.104 hours
Total unit time, Tb	1.380 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 2 years
 Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.2 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
9.950	0.00	0.00	0.00	0.00	0.00
10.200	0.01	0.01	0.01	0.01	0.01
10.450	0.02	0.02	0.02	0.02	0.03
10.700	0.03	0.03	0.03	0.04	0.04
10.950	0.05	0.05	0.06	0.06	0.07
11.200	0.07	0.08	0.09	0.10	0.11
11.450	0.12	0.13	0.15	0.18	0.22
11.700	0.29	0.41	0.59	0.86	1.26
11.950	1.77	2.33	2.84	3.18	3.29
12.200	3.16	2.84	2.46	2.08	1.76
12.450	1.50	1.30	1.13	1.00	0.88
12.700	0.79	0.71	0.65	0.59	0.55
12.950	0.52	0.49	0.46	0.44	0.42
13.200	0.40	0.38	0.37	0.36	0.35
13.450	0.34	0.33	0.32	0.31	0.30
13.700	0.30	0.29	0.28	0.28	0.27
13.950	0.26	0.26	0.25	0.25	0.24
14.200	0.24	0.23	0.23	0.22	0.22
14.450	0.22	0.22	0.21	0.21	0.21
14.700	0.21	0.20	0.20	0.20	0.20
14.950	0.20	0.19	0.19	0.19	0.19
15.200	0.19	0.18	0.18	0.18	0.18
15.450	0.18	0.17	0.17	0.17	0.17
15.700	0.17	0.16	0.16	0.16	0.16
15.950	0.16	0.15	0.15	0.15	0.15
16.200	0.15	0.15	0.14	0.14	0.14
16.450	0.14	0.14	0.14	0.14	0.14
16.700	0.14	0.14	0.13	0.13	0.13
16.950	0.13	0.13	0.13	0.13	0.13
17.200	0.13	0.13	0.13	0.13	0.13
17.450	0.13	0.12	0.12	0.12	0.12
17.700	0.12	0.12	0.12	0.12	0.12
17.950	0.12	0.12	0.12	0.12	0.12

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 2 years
 Storm Event: 2 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
18.200	0.11	0.11	0.11	0.11	0.11
18.450	0.11	0.11	0.11	0.11	0.11
18.700	0.11	0.11	0.11	0.11	0.10
18.950	0.10	0.10	0.10	0.10	0.10
19.200	0.10	0.10	0.10	0.10	0.10
19.450	0.10	0.10	0.09	0.09	0.09
19.700	0.09	0.09	0.09	0.09	0.09
19.950	0.09	0.09	0.09	0.09	0.09
20.200	0.08	0.08	0.08	0.08	0.08
20.450	0.08	0.08	0.08	0.08	0.08
20.700	0.08	0.08	0.08	0.08	0.08
20.950	0.08	0.08	0.08	0.08	0.08
21.200	0.08	0.08	0.08	0.08	0.08
21.450	0.08	0.08	0.08	0.08	0.08
21.700	0.08	0.08	0.08	0.08	0.08
21.950	0.08	0.08	0.08	0.08	0.08
22.200	0.08	0.08	0.08	0.08	0.08
22.450	0.08	0.08	0.08	0.08	0.08
22.700	0.08	0.08	0.08	0.08	0.08
22.950	0.08	0.08	0.08	0.08	0.07
23.200	0.07	0.07	0.07	0.07	0.07
23.450	0.07	0.07	0.07	0.07	0.07
23.700	0.07	0.07	0.07	0.07	0.07
23.950	0.07	0.07	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 5 years
 Storm Event: 5 Year

Storm Event	5 Year
Return Event	5 years
Duration	24.000 hours
Depth	4.1 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres
<hr/>	
Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.140 hours
Flow (Peak, Computed)	5.08 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	5.04 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	78.453
Area (User Defined)	2.670 acres
Maximum Retention (Pervious)	2.7 in
Maximum Retention (Pervious, 20 percent)	0.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.0 in
Runoff Volume (Pervious)	0.447 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.445 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 5 years

Storm Event: 5 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.31 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.104 hours
Total unit time, Tb	1.380 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 5 years
 Storm Event: 5 Year

Storm Event	5 Year
Return Event	5 years
Duration	24.000 hours
Depth	4.1 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
8.800	0.00	0.00	0.00	0.00	0.00
9.050	0.01	0.01	0.01	0.01	0.01
9.300	0.01	0.01	0.02	0.02	0.02
9.550	0.02	0.02	0.02	0.03	0.03
9.800	0.03	0.03	0.03	0.04	0.04
10.050	0.04	0.04	0.05	0.05	0.05
10.300	0.06	0.06	0.06	0.07	0.07
10.550	0.08	0.08	0.09	0.09	0.10
10.800	0.10	0.11	0.12	0.13	0.13
11.050	0.14	0.15	0.16	0.17	0.19
11.300	0.20	0.22	0.24	0.26	0.28
11.550	0.31	0.35	0.43	0.55	0.74
11.800	1.04	1.49	2.10	2.88	3.71
12.050	4.45	4.93	5.04	4.80	4.29
12.300	3.69	3.11	2.62	2.23	1.92
12.550	1.67	1.46	1.29	1.15	1.03
12.800	0.93	0.86	0.80	0.74	0.70
13.050	0.66	0.63	0.60	0.57	0.55
13.300	0.53	0.51	0.49	0.48	0.47
13.550	0.45	0.44	0.43	0.42	0.41
13.800	0.40	0.39	0.38	0.37	0.36
14.050	0.36	0.35	0.34	0.33	0.33
14.300	0.32	0.32	0.31	0.31	0.30
14.550	0.30	0.30	0.29	0.29	0.29
14.800	0.28	0.28	0.28	0.28	0.27
15.050	0.27	0.27	0.26	0.26	0.26
15.300	0.26	0.25	0.25	0.25	0.25
15.550	0.24	0.24	0.24	0.23	0.23
15.800	0.23	0.23	0.22	0.22	0.22
16.050	0.21	0.21	0.21	0.21	0.20
16.300	0.20	0.20	0.20	0.20	0.20
16.550	0.19	0.19	0.19	0.19	0.19
16.800	0.19	0.19	0.19	0.19	0.18

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 5 years
 Storm Event: 5 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
17.050	0.18	0.18	0.18	0.18	0.18
17.300	0.18	0.18	0.18	0.18	0.17
17.550	0.17	0.17	0.17	0.17	0.17
17.800	0.17	0.17	0.17	0.17	0.16
18.050	0.16	0.16	0.16	0.16	0.16
18.300	0.16	0.16	0.16	0.15	0.15
18.550	0.15	0.15	0.15	0.15	0.15
18.800	0.15	0.15	0.15	0.14	0.14
19.050	0.14	0.14	0.14	0.14	0.14
19.300	0.14	0.14	0.13	0.13	0.13
19.550	0.13	0.13	0.13	0.13	0.13
19.800	0.13	0.13	0.12	0.12	0.12
20.050	0.12	0.12	0.12	0.12	0.12
20.300	0.12	0.12	0.12	0.11	0.11
20.550	0.11	0.11	0.11	0.11	0.11
20.800	0.11	0.11	0.11	0.11	0.11
21.050	0.11	0.11	0.11	0.11	0.11
21.300	0.11	0.11	0.11	0.11	0.11
21.550	0.11	0.11	0.11	0.11	0.11
21.800	0.11	0.11	0.11	0.11	0.11
22.050	0.11	0.11	0.11	0.11	0.11
22.300	0.11	0.11	0.11	0.11	0.11
22.550	0.11	0.11	0.11	0.11	0.11
22.800	0.10	0.10	0.10	0.10	0.10
23.050	0.10	0.10	0.10	0.10	0.10
23.300	0.10	0.10	0.10	0.10	0.10
23.550	0.10	0.10	0.10	0.10	0.10
23.800	0.10	0.10	0.10	0.10	0.10

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 10 years
 Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	4.8 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres
<hr/>	
Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.140 hours
Flow (Peak, Computed)	6.64 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	6.58 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	78.453
Area (User Defined)	2.670 acres
Maximum Retention (Pervious)	2.7 in
Maximum Retention (Pervious, 20 percent)	0.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.6 in
Runoff Volume (Pervious)	0.582 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.579 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 10 years

Storm Event: 10 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.31 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.104 hours
Total unit time, Tb	1.380 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 10 years
 Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	4.8 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
7.950	0.00	0.00	0.00	0.00	0.00
8.200	0.00	0.01	0.01	0.01	0.01
8.450	0.01	0.01	0.01	0.01	0.02
8.700	0.02	0.02	0.02	0.02	0.03
8.950	0.03	0.03	0.03	0.03	0.04
9.200	0.04	0.04	0.04	0.05	0.05
9.450	0.05	0.05	0.05	0.06	0.06
9.700	0.06	0.06	0.07	0.07	0.07
9.950	0.07	0.08	0.08	0.09	0.09
10.200	0.09	0.10	0.10	0.11	0.12
10.450	0.12	0.13	0.13	0.14	0.15
10.700	0.16	0.16	0.17	0.18	0.19
10.950	0.21	0.22	0.23	0.24	0.26
11.200	0.27	0.29	0.31	0.33	0.36
11.450	0.39	0.42	0.46	0.52	0.62
11.700	0.79	1.06	1.47	2.06	2.87
11.950	3.88	4.95	5.89	6.47	6.58
12.200	6.24	5.56	4.77	4.01	3.37
12.450	2.86	2.46	2.13	1.86	1.64
12.700	1.45	1.30	1.18	1.08	1.00
12.950	0.94	0.88	0.83	0.79	0.75
13.200	0.71	0.68	0.66	0.64	0.62
13.450	0.60	0.59	0.57	0.55	0.54
13.700	0.53	0.51	0.50	0.49	0.48
13.950	0.47	0.45	0.44	0.43	0.42
14.200	0.42	0.41	0.40	0.39	0.39
14.450	0.38	0.38	0.37	0.37	0.37
14.700	0.36	0.36	0.35	0.35	0.35
14.950	0.34	0.34	0.34	0.33	0.33
15.200	0.33	0.32	0.32	0.32	0.31
15.450	0.31	0.31	0.30	0.30	0.29
15.700	0.29	0.29	0.28	0.28	0.28
15.950	0.27	0.27	0.27	0.26	0.26

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 10 years

Label: DA #1

Storm Event: 10 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
16.200	0.26	0.25	0.25	0.25	0.25
16.450	0.24	0.24	0.24	0.24	0.24
16.700	0.24	0.24	0.23	0.23	0.23
16.950	0.23	0.23	0.23	0.23	0.22
17.200	0.22	0.22	0.22	0.22	0.22
17.450	0.22	0.22	0.21	0.21	0.21
17.700	0.21	0.21	0.21	0.21	0.21
17.950	0.20	0.20	0.20	0.20	0.20
18.200	0.20	0.20	0.20	0.19	0.19
18.450	0.19	0.19	0.19	0.19	0.19
18.700	0.18	0.18	0.18	0.18	0.18
18.950	0.18	0.18	0.18	0.17	0.17
19.200	0.17	0.17	0.17	0.17	0.17
19.450	0.17	0.16	0.16	0.16	0.16
19.700	0.16	0.16	0.16	0.15	0.15
19.950	0.15	0.15	0.15	0.15	0.15
20.200	0.15	0.14	0.14	0.14	0.14
20.450	0.14	0.14	0.14	0.14	0.14
20.700	0.14	0.14	0.14	0.14	0.14
20.950	0.14	0.14	0.14	0.14	0.14
21.200	0.14	0.14	0.14	0.14	0.14
21.450	0.14	0.14	0.14	0.14	0.14
21.700	0.13	0.13	0.13	0.13	0.13
21.950	0.13	0.13	0.13	0.13	0.13
22.200	0.13	0.13	0.13	0.13	0.13
22.450	0.13	0.13	0.13	0.13	0.13
22.700	0.13	0.13	0.13	0.13	0.13
22.950	0.13	0.13	0.13	0.13	0.13
23.200	0.13	0.13	0.13	0.13	0.13
23.450	0.13	0.13	0.13	0.13	0.13
23.700	0.12	0.12	0.12	0.12	0.12
23.950	0.12	0.12	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 25 years
 Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres
<hr/>	
Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.140 hours
Flow (Peak, Computed)	9.04 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	8.95 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	78.453
Area (User Defined)	2.670 acres
Maximum Retention (Pervious)	2.7 in
Maximum Retention (Pervious, 20 percent)	0.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.6 in
Runoff Volume (Pervious)	0.793 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.788 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 25 years

Storm Event: 25 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.31 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.104 hours
Total unit time, Tb	1.380 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 25 years
 Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
6.900	0.00	0.00	0.00	0.00	0.00
7.150	0.00	0.01	0.01	0.01	0.01
7.400	0.01	0.01	0.01	0.01	0.02
7.650	0.02	0.02	0.02	0.02	0.02
7.900	0.03	0.03	0.03	0.03	0.03
8.150	0.03	0.03	0.04	0.04	0.04
8.400	0.04	0.04	0.05	0.05	0.05
8.650	0.06	0.06	0.06	0.06	0.07
8.900	0.07	0.07	0.08	0.08	0.08
9.150	0.09	0.09	0.09	0.10	0.10
9.400	0.10	0.11	0.11	0.11	0.11
9.650	0.12	0.12	0.12	0.13	0.13
9.900	0.14	0.14	0.15	0.15	0.16
10.150	0.17	0.17	0.18	0.19	0.20
10.400	0.20	0.21	0.22	0.23	0.24
10.650	0.25	0.27	0.28	0.29	0.31
10.900	0.32	0.34	0.35	0.37	0.39
11.150	0.41	0.44	0.46	0.49	0.52
11.400	0.56	0.60	0.64	0.70	0.79
11.650	0.94	1.18	1.57	2.14	2.97
11.900	4.09	5.45	6.88	8.11	8.85
12.150	8.95	8.45	7.50	6.41	5.38
12.400	4.51	3.82	3.27	2.83	2.47
12.650	2.17	1.92	1.72	1.56	1.43
12.900	1.32	1.23	1.15	1.09	1.03
13.150	0.98	0.93	0.89	0.86	0.83
13.400	0.81	0.78	0.76	0.74	0.72
13.650	0.70	0.68	0.67	0.65	0.63
13.900	0.62	0.60	0.59	0.58	0.56
14.150	0.55	0.54	0.53	0.52	0.51
14.400	0.50	0.50	0.49	0.48	0.48
14.650	0.47	0.47	0.46	0.46	0.45
14.900	0.45	0.45	0.44	0.44	0.43

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 25 years
 Storm Event: 25 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
15.150	0.43	0.42	0.42	0.41	0.41
15.400	0.40	0.40	0.39	0.39	0.39
15.650	0.38	0.38	0.37	0.37	0.36
15.900	0.36	0.35	0.35	0.34	0.34
16.150	0.33	0.33	0.33	0.32	0.32
16.400	0.32	0.31	0.31	0.31	0.31
16.650	0.31	0.31	0.30	0.30	0.30
16.900	0.30	0.30	0.29	0.29	0.29
17.150	0.29	0.29	0.29	0.28	0.28
17.400	0.28	0.28	0.28	0.28	0.27
17.650	0.27	0.27	0.27	0.27	0.27
17.900	0.26	0.26	0.26	0.26	0.26
18.150	0.26	0.25	0.25	0.25	0.25
18.400	0.25	0.25	0.24	0.24	0.24
18.650	0.24	0.24	0.24	0.23	0.23
18.900	0.23	0.23	0.23	0.23	0.22
19.150	0.22	0.22	0.22	0.22	0.22
19.400	0.21	0.21	0.21	0.21	0.21
19.650	0.21	0.20	0.20	0.20	0.20
19.900	0.20	0.20	0.19	0.19	0.19
20.150	0.19	0.19	0.19	0.18	0.18
20.400	0.18	0.18	0.18	0.18	0.18
20.650	0.18	0.18	0.18	0.18	0.18
20.900	0.18	0.18	0.18	0.18	0.18
21.150	0.18	0.18	0.18	0.18	0.18
21.400	0.18	0.17	0.17	0.17	0.17
21.650	0.17	0.17	0.17	0.17	0.17
21.900	0.17	0.17	0.17	0.17	0.17
22.150	0.17	0.17	0.17	0.17	0.17
22.400	0.17	0.17	0.17	0.17	0.17
22.650	0.17	0.17	0.17	0.17	0.17
22.900	0.17	0.16	0.16	0.16	0.16
23.150	0.16	0.16	0.16	0.16	0.16
23.400	0.16	0.16	0.16	0.16	0.16
23.650	0.16	0.16	0.16	0.16	0.16
23.900	0.16	0.16	0.16	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 50 years
 Storm Event: 50 Year

Storm Event	50 Year
Return Event	50 years
Duration	24.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres
<hr/>	
Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.140 hours
Flow (Peak, Computed)	11.10 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	10.98 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	78.453
Area (User Defined)	2.670 acres
Maximum Retention (Pervious)	2.7 in
Maximum Retention (Pervious, 20 percent)	0.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.4 in
Runoff Volume (Pervious)	0.976 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.971 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 50 years

Storm Event: 50 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.31 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.104 hours
Total unit time, Tb	1.380 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 50 years
 Storm Event: 50 Year

Storm Event	50 Year
Return Event	50 years
Duration	24.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
6.250	0.00	0.00	0.00	0.00	0.00
6.500	0.01	0.01	0.01	0.01	0.01
6.750	0.01	0.01	0.02	0.02	0.02
7.000	0.02	0.02	0.02	0.03	0.03
7.250	0.03	0.03	0.03	0.03	0.04
7.500	0.04	0.04	0.04	0.04	0.05
7.750	0.05	0.05	0.05	0.05	0.06
8.000	0.06	0.06	0.06	0.06	0.07
8.250	0.07	0.07	0.07	0.08	0.08
8.500	0.08	0.09	0.09	0.09	0.10
8.750	0.10	0.11	0.11	0.11	0.12
9.000	0.12	0.13	0.13	0.14	0.14
9.250	0.15	0.15	0.16	0.16	0.16
9.500	0.17	0.17	0.17	0.18	0.18
9.750	0.18	0.19	0.19	0.20	0.21
10.000	0.21	0.22	0.23	0.24	0.25
10.250	0.26	0.27	0.28	0.29	0.30
10.500	0.31	0.32	0.34	0.35	0.37
10.750	0.38	0.40	0.42	0.44	0.46
11.000	0.48	0.50	0.53	0.55	0.58
11.250	0.62	0.66	0.70	0.74	0.79
11.500	0.85	0.92	1.04	1.23	1.53
11.750	2.02	2.74	3.78	5.15	6.81
12.000	8.55	10.02	10.89	10.98	10.34
12.250	9.17	7.82	6.55	5.49	4.64
12.500	3.97	3.43	2.98	2.62	2.32
12.750	2.07	1.87	1.71	1.58	1.48
13.000	1.38	1.30	1.23	1.17	1.12
13.250	1.07	1.03	0.99	0.97	0.94
13.500	0.91	0.89	0.86	0.84	0.82
13.750	0.80	0.78	0.76	0.74	0.72
14.000	0.71	0.69	0.67	0.66	0.64
14.250	0.63	0.62	0.61	0.60	0.59

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 50 years

Label: DA #1

Storm Event: 50 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
14.500	0.58	0.58	0.57	0.57	0.56
14.750	0.55	0.55	0.54	0.54	0.53
15.000	0.53	0.52	0.51	0.51	0.50
15.250	0.50	0.49	0.49	0.48	0.48
15.500	0.47	0.46	0.46	0.45	0.45
15.750	0.44	0.44	0.43	0.43	0.42
16.000	0.41	0.41	0.40	0.40	0.39
16.250	0.39	0.38	0.38	0.38	0.37
16.500	0.37	0.37	0.37	0.36	0.36
16.750	0.36	0.36	0.36	0.35	0.35
17.000	0.35	0.35	0.35	0.34	0.34
17.250	0.34	0.34	0.34	0.33	0.33
17.500	0.33	0.33	0.33	0.32	0.32
17.750	0.32	0.32	0.32	0.31	0.31
18.000	0.31	0.31	0.31	0.30	0.30
18.250	0.30	0.30	0.30	0.29	0.29
18.500	0.29	0.29	0.29	0.28	0.28
18.750	0.28	0.28	0.28	0.27	0.27
19.000	0.27	0.27	0.27	0.26	0.26
19.250	0.26	0.26	0.26	0.25	0.25
19.500	0.25	0.25	0.25	0.24	0.24
19.750	0.24	0.24	0.24	0.23	0.23
20.000	0.23	0.23	0.23	0.22	0.22
20.250	0.22	0.22	0.22	0.22	0.22
20.500	0.22	0.21	0.21	0.21	0.21
20.750	0.21	0.21	0.21	0.21	0.21
21.000	0.21	0.21	0.21	0.21	0.21
21.250	0.21	0.21	0.21	0.21	0.21
21.500	0.21	0.21	0.21	0.21	0.21
21.750	0.20	0.20	0.20	0.20	0.20
22.000	0.20	0.20	0.20	0.20	0.20
22.250	0.20	0.20	0.20	0.20	0.20
22.500	0.20	0.20	0.20	0.20	0.20
22.750	0.20	0.20	0.20	0.20	0.20
23.000	0.19	0.19	0.19	0.19	0.19
23.250	0.19	0.19	0.19	0.19	0.19
23.500	0.19	0.19	0.19	0.19	0.19
23.750	0.19	0.19	0.19	0.19	0.19
24.000	0.19	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 100 years
 Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	7.9 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres
<hr/>	
Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.140 hours
Flow (Peak, Computed)	13.38 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	13.24 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	78.453
Area (User Defined)	2.670 acres
Maximum Retention (Pervious)	2.7 in
Maximum Retention (Pervious, 20 percent)	0.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.3 in
Runoff Volume (Pervious)	1.182 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.177 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 100 years

Storm Event: 100 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.31 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.104 hours
Total unit time, Tb	1.380 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 100 years
 Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	7.9 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	2.670 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
5.650	0.00	0.00	0.00	0.00	0.00
5.900	0.01	0.01	0.01	0.01	0.01
6.150	0.01	0.02	0.02	0.02	0.02
6.400	0.02	0.03	0.03	0.03	0.03
6.650	0.03	0.04	0.04	0.04	0.04
6.900	0.04	0.05	0.05	0.05	0.05
7.150	0.05	0.06	0.06	0.06	0.06
7.400	0.07	0.07	0.07	0.07	0.07
7.650	0.08	0.08	0.08	0.08	0.09
7.900	0.09	0.09	0.09	0.10	0.10
8.150	0.10	0.10	0.11	0.11	0.11
8.400	0.12	0.12	0.13	0.13	0.14
8.650	0.14	0.15	0.15	0.16	0.16
8.900	0.17	0.17	0.18	0.19	0.19
9.150	0.20	0.20	0.21	0.22	0.22
9.400	0.22	0.23	0.23	0.24	0.24
9.650	0.24	0.25	0.25	0.26	0.27
9.900	0.28	0.28	0.29	0.30	0.31
10.150	0.32	0.33	0.35	0.36	0.37
10.400	0.39	0.40	0.42	0.43	0.45
10.650	0.47	0.49	0.51	0.53	0.55
10.900	0.58	0.60	0.63	0.66	0.69
11.150	0.72	0.76	0.80	0.84	0.90
11.400	0.95	1.02	1.09	1.18	1.32
11.650	1.55	1.93	2.54	3.42	4.68
11.900	6.34	8.34	10.41	12.15	13.16
12.150	13.24	12.43	11.00	9.37	7.84
12.400	6.56	5.54	4.73	4.08	3.55
12.650	3.11	2.75	2.46	2.22	2.03
12.900	1.88	1.75	1.64	1.54	1.46
13.150	1.38	1.32	1.26	1.21	1.17
13.400	1.14	1.11	1.07	1.04	1.02
13.650	0.99	0.96	0.94	0.91	0.89

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 100 years
 Storm Event: 100 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
13.900	0.87	0.85	0.83	0.81	0.79
14.150	0.77	0.76	0.74	0.73	0.72
14.400	0.71	0.70	0.69	0.68	0.67
14.650	0.67	0.66	0.65	0.64	0.64
14.900	0.63	0.62	0.62	0.61	0.60
15.150	0.60	0.59	0.58	0.58	0.57
15.400	0.57	0.56	0.55	0.55	0.54
15.650	0.53	0.53	0.52	0.51	0.51
15.900	0.50	0.49	0.49	0.48	0.47
16.150	0.47	0.46	0.46	0.45	0.45
16.400	0.44	0.44	0.44	0.43	0.43
16.650	0.43	0.43	0.42	0.42	0.42
16.900	0.42	0.41	0.41	0.41	0.41
17.150	0.40	0.40	0.40	0.40	0.39
17.400	0.39	0.39	0.39	0.39	0.38
17.650	0.38	0.38	0.38	0.37	0.37
17.900	0.37	0.37	0.36	0.36	0.36
18.150	0.36	0.35	0.35	0.35	0.35
18.400	0.35	0.34	0.34	0.34	0.34
18.650	0.33	0.33	0.33	0.33	0.32
18.900	0.32	0.32	0.32	0.31	0.31
19.150	0.31	0.31	0.30	0.30	0.30
19.400	0.30	0.30	0.29	0.29	0.29
19.650	0.29	0.28	0.28	0.28	0.28
19.900	0.27	0.27	0.27	0.27	0.26
20.150	0.26	0.26	0.26	0.26	0.26
20.400	0.25	0.25	0.25	0.25	0.25
20.650	0.25	0.25	0.25	0.25	0.25
20.900	0.25	0.25	0.25	0.25	0.25
21.150	0.25	0.24	0.24	0.24	0.24
21.400	0.24	0.24	0.24	0.24	0.24
21.650	0.24	0.24	0.24	0.24	0.24
21.900	0.24	0.24	0.24	0.24	0.24
22.150	0.24	0.24	0.24	0.23	0.23
22.400	0.23	0.23	0.23	0.23	0.23
22.650	0.23	0.23	0.23	0.23	0.23
22.900	0.23	0.23	0.23	0.23	0.23
23.150	0.23	0.23	0.23	0.23	0.22
23.400	0.22	0.22	0.22	0.22	0.22
23.650	0.22	0.22	0.22	0.22	0.22
23.900	0.22	0.22	0.22	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 1 years
 Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.7 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.029 hours
Flow (Peak, Computed)	1.21 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.050 hours
Flow (Peak Interpolated Output)	1.19 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	1.687 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.6 in
Runoff Volume (Pervious)	0.082 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.082 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 1 years

Storm Event: 1 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	11.02 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 1 years
 Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.7 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.600	0.00	0.00	0.02	0.06	0.15
11.850	0.31	0.61	0.95	1.17	1.19
12.100	0.96	0.67	0.47	0.37	0.31
12.350	0.28	0.25	0.23	0.21	0.19
12.600	0.17	0.16	0.15	0.15	0.14
12.850	0.14	0.14	0.13	0.13	0.12
13.100	0.12	0.12	0.11	0.11	0.11
13.350	0.11	0.10	0.10	0.10	0.10
13.600	0.09	0.09	0.09	0.09	0.09
13.850	0.08	0.08	0.08	0.08	0.08
14.100	0.08	0.08	0.07	0.07	0.07
14.350	0.07	0.07	0.07	0.07	0.07
14.600	0.07	0.07	0.07	0.07	0.07
14.850	0.07	0.07	0.07	0.06	0.06
15.100	0.06	0.06	0.06	0.06	0.06
15.350	0.06	0.06	0.06	0.06	0.06
15.600	0.06	0.06	0.06	0.05	0.05
15.850	0.05	0.05	0.05	0.05	0.05
16.100	0.05	0.05	0.05	0.05	0.05
16.350	0.05	0.05	0.05	0.05	0.05
16.600	0.05	0.05	0.05	0.05	0.05
16.850	0.05	0.05	0.05	0.05	0.05
17.100	0.05	0.05	0.04	0.04	0.04
17.350	0.04	0.04	0.04	0.04	0.04
17.600	0.04	0.04	0.04	0.04	0.04
17.850	0.04	0.04	0.04	0.04	0.04
18.100	0.04	0.04	0.04	0.04	0.04
18.350	0.04	0.04	0.04	0.04	0.04
18.600	0.04	0.04	0.04	0.04	0.04
18.850	0.04	0.04	0.04	0.04	0.04
19.100	0.04	0.04	0.04	0.03	0.03
19.350	0.03	0.03	0.03	0.03	0.03
19.600	0.03	0.03	0.03	0.03	0.03

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 1 years
 Storm Event: 1 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
19.850	0.03	0.03	0.03	0.03	0.03
20.100	0.03	0.03	0.03	0.03	0.03
20.350	0.03	0.03	0.03	0.03	0.03
20.600	0.03	0.03	0.03	0.03	0.03
20.850	0.03	0.03	0.03	0.03	0.03
21.100	0.03	0.03	0.03	0.03	0.03
21.350	0.03	0.03	0.03	0.03	0.03
21.600	0.03	0.03	0.03	0.03	0.03
21.850	0.03	0.03	0.03	0.03	0.03
22.100	0.03	0.03	0.03	0.03	0.03
22.350	0.03	0.03	0.03	0.03	0.03
22.600	0.03	0.03	0.03	0.03	0.03
22.850	0.03	0.03	0.03	0.03	0.03
23.100	0.03	0.03	0.03	0.03	0.03
23.350	0.03	0.03	0.03	0.03	0.03
23.600	0.03	0.03	0.03	0.03	0.03
23.850	0.03	0.03	0.03	0.03	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 2 years
 Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.2 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.029 hours
Flow (Peak, Computed)	1.97 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.000 hours
Flow (Peak Interpolated Output)	1.94 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	1.687 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.9 in
Runoff Volume (Pervious)	0.127 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.126 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 2 years

Storm Event: 2 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	11.02 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 2 years
 Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.2 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.300	0.00	0.00	0.01	0.01	0.01
11.550	0.02	0.04	0.08	0.14	0.25
11.800	0.42	0.70	1.17	1.67	1.94
12.050	1.91	1.51	1.04	0.73	0.57
12.300	0.47	0.42	0.37	0.34	0.31
12.550	0.28	0.26	0.24	0.23	0.22
12.800	0.21	0.20	0.20	0.19	0.19
13.050	0.18	0.17	0.17	0.16	0.16
13.300	0.16	0.15	0.15	0.15	0.14
13.550	0.14	0.14	0.13	0.13	0.13
13.800	0.12	0.12	0.12	0.12	0.11
14.050	0.11	0.11	0.11	0.11	0.11
14.300	0.10	0.10	0.10	0.10	0.10
14.550	0.10	0.10	0.10	0.10	0.10
14.800	0.10	0.09	0.09	0.09	0.09
15.050	0.09	0.09	0.09	0.09	0.09
15.300	0.09	0.09	0.08	0.08	0.08
15.550	0.08	0.08	0.08	0.08	0.08
15.800	0.08	0.08	0.07	0.07	0.07
16.050	0.07	0.07	0.07	0.07	0.07
16.300	0.07	0.07	0.07	0.07	0.07
16.550	0.07	0.07	0.07	0.07	0.07
16.800	0.07	0.07	0.07	0.07	0.06
17.050	0.06	0.06	0.06	0.06	0.06
17.300	0.06	0.06	0.06	0.06	0.06
17.550	0.06	0.06	0.06	0.06	0.06
17.800	0.06	0.06	0.06	0.06	0.06
18.050	0.06	0.06	0.06	0.06	0.06
18.300	0.06	0.06	0.05	0.05	0.05
18.550	0.05	0.05	0.05	0.05	0.05
18.800	0.05	0.05	0.05	0.05	0.05
19.050	0.05	0.05	0.05	0.05	0.05
19.300	0.05	0.05	0.05	0.05	0.05

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 2 years
 Storm Event: 2 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
19.550	0.05	0.05	0.05	0.05	0.05
19.800	0.04	0.04	0.04	0.04	0.04
20.050	0.04	0.04	0.04	0.04	0.04
20.300	0.04	0.04	0.04	0.04	0.04
20.550	0.04	0.04	0.04	0.04	0.04
20.800	0.04	0.04	0.04	0.04	0.04
21.050	0.04	0.04	0.04	0.04	0.04
21.300	0.04	0.04	0.04	0.04	0.04
21.550	0.04	0.04	0.04	0.04	0.04
21.800	0.04	0.04	0.04	0.04	0.04
22.050	0.04	0.04	0.04	0.04	0.04
22.300	0.04	0.04	0.04	0.04	0.04
22.550	0.04	0.04	0.04	0.04	0.04
22.800	0.04	0.04	0.04	0.04	0.04
23.050	0.04	0.04	0.04	0.04	0.04
23.300	0.04	0.04	0.04	0.04	0.04
23.550	0.04	0.04	0.04	0.04	0.04
23.800	0.04	0.04	0.04	0.04	0.04

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 5 years
 Storm Event: 5 Year

Storm Event	5 Year
Return Event	5 years
Duration	24.000 hours
Depth	4.1 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.006 hours
Flow (Peak, Computed)	3.31 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.000 hours
Flow (Peak Interpolated Output)	3.29 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	1.687 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.5 in
Runoff Volume (Pervious)	0.207 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.206 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 5 years

Storm Event: 5 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	11.02 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 5 years
 Storm Event: 5 Year

Storm Event	5 Year
Return Event	5 years
Duration	24.000 hours
Depth	4.1 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
10.500	0.00	0.00	0.00	0.00	0.01
10.750	0.01	0.01	0.01	0.02	0.02
11.000	0.02	0.03	0.03	0.04	0.04
11.250	0.05	0.06	0.07	0.07	0.08
11.500	0.09	0.12	0.17	0.25	0.40
11.750	0.61	0.93	1.41	2.18	2.95
12.000	3.29	3.16	2.46	1.67	1.16
12.250	0.90	0.74	0.65	0.58	0.52
12.500	0.47	0.43	0.40	0.37	0.35
12.750	0.34	0.32	0.31	0.30	0.29
13.000	0.28	0.27	0.26	0.26	0.25
13.250	0.24	0.24	0.23	0.23	0.22
13.500	0.22	0.21	0.21	0.20	0.20
13.750	0.19	0.19	0.18	0.18	0.18
14.000	0.17	0.17	0.16	0.16	0.16
14.250	0.16	0.16	0.16	0.15	0.15
14.500	0.15	0.15	0.15	0.15	0.15
14.750	0.14	0.14	0.14	0.14	0.14
15.000	0.14	0.14	0.13	0.13	0.13
15.250	0.13	0.13	0.13	0.13	0.12
15.500	0.12	0.12	0.12	0.12	0.12
15.750	0.12	0.11	0.11	0.11	0.11
16.000	0.11	0.11	0.11	0.10	0.10
16.250	0.10	0.10	0.10	0.10	0.10
16.500	0.10	0.10	0.10	0.10	0.10
16.750	0.10	0.10	0.10	0.10	0.10
17.000	0.10	0.10	0.09	0.09	0.09
17.250	0.09	0.09	0.09	0.09	0.09
17.500	0.09	0.09	0.09	0.09	0.09
17.750	0.09	0.09	0.09	0.09	0.09
18.000	0.09	0.08	0.08	0.08	0.08
18.250	0.08	0.08	0.08	0.08	0.08
18.500	0.08	0.08	0.08	0.08	0.08

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 5 years
 Storm Event: 5 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
18.750	0.08	0.08	0.08	0.08	0.07
19.000	0.07	0.07	0.07	0.07	0.07
19.250	0.07	0.07	0.07	0.07	0.07
19.500	0.07	0.07	0.07	0.07	0.07
19.750	0.07	0.07	0.06	0.06	0.06
20.000	0.06	0.06	0.06	0.06	0.06
20.250	0.06	0.06	0.06	0.06	0.06
20.500	0.06	0.06	0.06	0.06	0.06
20.750	0.06	0.06	0.06	0.06	0.06
21.000	0.06	0.06	0.06	0.06	0.06
21.250	0.06	0.06	0.06	0.06	0.06
21.500	0.06	0.06	0.06	0.06	0.06
21.750	0.06	0.06	0.06	0.06	0.06
22.000	0.06	0.06	0.06	0.06	0.06
22.250	0.06	0.06	0.06	0.06	0.06
22.500	0.06	0.06	0.06	0.06	0.06
22.750	0.06	0.06	0.06	0.06	0.06
23.000	0.06	0.06	0.06	0.06	0.06
23.250	0.06	0.06	0.06	0.05	0.05
23.500	0.05	0.05	0.05	0.05	0.05
23.750	0.05	0.05	0.05	0.05	0.05
24.000	0.05	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 10 years
 Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	4.8 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.006 hours
Flow (Peak, Computed)	4.55 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.000 hours
Flow (Peak Interpolated Output)	4.53 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	1.687 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.0 in
Runoff Volume (Pervious)	0.281 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.280 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 10 years

Storm Event: 10 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	11.02 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 10 years
 Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	4.8 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
9.800	0.00	0.00	0.00	0.00	0.01
10.050	0.01	0.01	0.01	0.01	0.01
10.300	0.02	0.02	0.02	0.02	0.03
10.550	0.03	0.03	0.04	0.04	0.04
10.800	0.05	0.05	0.06	0.06	0.07
11.050	0.07	0.08	0.09	0.10	0.11
11.300	0.12	0.13	0.15	0.16	0.18
11.550	0.21	0.29	0.43	0.66	0.97
11.800	1.43	2.08	3.13	4.13	4.53
12.050	4.29	3.32	2.24	1.55	1.19
12.300	0.98	0.86	0.76	0.69	0.62
12.550	0.56	0.52	0.48	0.46	0.44
12.800	0.42	0.41	0.39	0.38	0.37
13.050	0.36	0.34	0.33	0.32	0.32
13.300	0.31	0.30	0.29	0.29	0.28
13.550	0.27	0.27	0.26	0.25	0.25
13.800	0.24	0.24	0.23	0.23	0.22
14.050	0.22	0.21	0.21	0.21	0.20
14.300	0.20	0.20	0.20	0.20	0.19
14.550	0.19	0.19	0.19	0.19	0.19
14.800	0.18	0.18	0.18	0.18	0.18
15.050	0.17	0.17	0.17	0.17	0.17
15.300	0.17	0.16	0.16	0.16	0.16
15.550	0.16	0.15	0.15	0.15	0.15
15.800	0.15	0.14	0.14	0.14	0.14
16.050	0.14	0.14	0.13	0.13	0.13
16.300	0.13	0.13	0.13	0.13	0.13
16.550	0.13	0.13	0.13	0.13	0.13
16.800	0.12	0.12	0.12	0.12	0.12
17.050	0.12	0.12	0.12	0.12	0.12
17.300	0.12	0.12	0.12	0.12	0.12
17.550	0.11	0.11	0.11	0.11	0.11
17.800	0.11	0.11	0.11	0.11	0.11

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 10 years
 Storm Event: 10 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
18.050	0.11	0.11	0.11	0.11	0.11
18.300	0.10	0.10	0.10	0.10	0.10
18.550	0.10	0.10	0.10	0.10	0.10
18.800	0.10	0.10	0.10	0.10	0.09
19.050	0.09	0.09	0.09	0.09	0.09
19.300	0.09	0.09	0.09	0.09	0.09
19.550	0.09	0.09	0.09	0.08	0.08
19.800	0.08	0.08	0.08	0.08	0.08
20.050	0.08	0.08	0.08	0.08	0.08
20.300	0.08	0.08	0.08	0.08	0.08
20.550	0.08	0.08	0.08	0.08	0.08
20.800	0.08	0.08	0.08	0.08	0.08
21.050	0.08	0.08	0.08	0.08	0.08
21.300	0.08	0.08	0.07	0.07	0.07
21.550	0.07	0.07	0.07	0.07	0.07
21.800	0.07	0.07	0.07	0.07	0.07
22.050	0.07	0.07	0.07	0.07	0.07
22.300	0.07	0.07	0.07	0.07	0.07
22.550	0.07	0.07	0.07	0.07	0.07
22.800	0.07	0.07	0.07	0.07	0.07
23.050	0.07	0.07	0.07	0.07	0.07
23.300	0.07	0.07	0.07	0.07	0.07
23.550	0.07	0.07	0.07	0.07	0.07
23.800	0.07	0.07	0.07	0.07	0.07

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 25 years
 Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.006 hours
Flow (Peak, Computed)	6.51 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.000 hours
Flow (Peak Interpolated Output)	6.50 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	1.687 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.8 in
Runoff Volume (Pervious)	0.400 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.399 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 25 years

Storm Event: 25 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	11.02 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 25 years
 Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
8.850	0.00	0.00	0.00	0.00	0.01
9.100	0.01	0.01	0.01	0.01	0.01
9.350	0.01	0.02	0.02	0.02	0.02
9.600	0.02	0.02	0.03	0.03	0.03
9.850	0.03	0.03	0.04	0.04	0.04
10.100	0.04	0.05	0.05	0.05	0.06
10.350	0.06	0.07	0.07	0.08	0.08
10.600	0.08	0.09	0.10	0.10	0.11
10.850	0.12	0.13	0.13	0.14	0.15
11.100	0.16	0.18	0.19	0.21	0.23
11.350	0.25	0.27	0.29	0.32	0.37
11.600	0.50	0.73	1.09	1.57	2.24
11.850	3.19	4.66	6.02	6.50	6.07
12.100	4.66	3.13	2.15	1.65	1.36
12.350	1.17	1.04	0.94	0.85	0.77
12.600	0.71	0.66	0.62	0.60	0.57
12.850	0.55	0.53	0.52	0.50	0.48
13.100	0.47	0.45	0.44	0.43	0.42
13.350	0.41	0.40	0.39	0.38	0.37
13.600	0.36	0.35	0.34	0.34	0.33
13.850	0.32	0.31	0.31	0.30	0.29
14.100	0.29	0.28	0.28	0.27	0.27
14.350	0.27	0.27	0.26	0.26	0.26
14.600	0.26	0.25	0.25	0.25	0.25
14.850	0.24	0.24	0.24	0.24	0.23
15.100	0.23	0.23	0.23	0.22	0.22
15.350	0.22	0.22	0.21	0.21	0.21
15.600	0.21	0.20	0.20	0.20	0.20
15.850	0.19	0.19	0.19	0.19	0.18
16.100	0.18	0.18	0.18	0.18	0.18
16.350	0.17	0.17	0.17	0.17	0.17
16.600	0.17	0.17	0.17	0.17	0.17
16.850	0.17	0.16	0.16	0.16	0.16

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 25 years
 Storm Event: 25 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
17.100	0.16	0.16	0.16	0.16	0.16
17.350	0.16	0.16	0.15	0.15	0.15
17.600	0.15	0.15	0.15	0.15	0.15
17.850	0.15	0.15	0.15	0.14	0.14
18.100	0.14	0.14	0.14	0.14	0.14
18.350	0.14	0.14	0.14	0.13	0.13
18.600	0.13	0.13	0.13	0.13	0.13
18.850	0.13	0.13	0.13	0.13	0.12
19.100	0.12	0.12	0.12	0.12	0.12
19.350	0.12	0.12	0.12	0.12	0.12
19.600	0.11	0.11	0.11	0.11	0.11
19.850	0.11	0.11	0.11	0.11	0.11
20.100	0.10	0.10	0.10	0.10	0.10
20.350	0.10	0.10	0.10	0.10	0.10
20.600	0.10	0.10	0.10	0.10	0.10
20.850	0.10	0.10	0.10	0.10	0.10
21.100	0.10	0.10	0.10	0.10	0.10
21.350	0.10	0.10	0.10	0.10	0.10
21.600	0.10	0.10	0.10	0.10	0.10
21.850	0.10	0.10	0.10	0.10	0.10
22.100	0.10	0.10	0.10	0.10	0.10
22.350	0.10	0.10	0.10	0.10	0.10
22.600	0.09	0.09	0.09	0.09	0.09
22.850	0.09	0.09	0.09	0.09	0.09
23.100	0.09	0.09	0.09	0.09	0.09
23.350	0.09	0.09	0.09	0.09	0.09
23.600	0.09	0.09	0.09	0.09	0.09
23.850	0.09	0.09	0.09	0.09	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 50 years
 Storm Event: 50 Year

Storm Event	50 Year
Return Event	50 years
Duration	24.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.006 hours
Flow (Peak, Computed)	8.23 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.000 hours
Flow (Peak Interpolated Output)	8.22 ft ³ /s
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	1.687 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.6 in
Runoff Volume (Pervious)	0.506 ac-ft
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.505 ac-ft
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 50 years

Storm Event: 50 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	11.02 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 50 years
 Storm Event: 50 Year

Storm Event	50 Year
Return Event	50 years
Duration	24.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
8.100	0.00	0.00	0.00	0.00	0.00
8.350	0.01	0.01	0.01	0.01	0.01
8.600	0.01	0.01	0.02	0.02	0.02
8.850	0.02	0.02	0.02	0.03	0.03
9.100	0.03	0.03	0.03	0.04	0.04
9.350	0.04	0.04	0.04	0.04	0.05
9.600	0.05	0.05	0.05	0.06	0.06
9.850	0.06	0.07	0.07	0.07	0.08
10.100	0.08	0.09	0.09	0.09	0.10
10.350	0.11	0.11	0.12	0.12	0.13
10.600	0.14	0.15	0.15	0.16	0.17
10.850	0.18	0.19	0.21	0.22	0.23
11.100	0.25	0.26	0.28	0.31	0.33
11.350	0.36	0.39	0.42	0.45	0.52
11.600	0.70	1.00	1.49	2.12	2.99
11.850	4.19	6.03	7.69	8.22	7.62
12.100	5.82	3.90	2.68	2.04	1.68
12.350	1.45	1.28	1.16	1.04	0.95
12.600	0.87	0.81	0.76	0.73	0.70
12.850	0.68	0.66	0.63	0.61	0.59
13.100	0.57	0.55	0.54	0.52	0.51
13.350	0.50	0.49	0.47	0.46	0.45
13.600	0.44	0.43	0.42	0.41	0.40
13.850	0.39	0.38	0.37	0.36	0.36
14.100	0.35	0.34	0.34	0.33	0.33
14.350	0.33	0.32	0.32	0.32	0.32
14.600	0.31	0.31	0.31	0.30	0.30
14.850	0.30	0.29	0.29	0.29	0.28
15.100	0.28	0.28	0.28	0.27	0.27
15.350	0.27	0.26	0.26	0.26	0.25
15.600	0.25	0.25	0.24	0.24	0.24
15.850	0.23	0.23	0.23	0.23	0.22
16.100	0.22	0.22	0.22	0.21	0.21

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 50 years
 Storm Event: 50 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
16.350	0.21	0.21	0.21	0.21	0.21
16.600	0.21	0.20	0.20	0.20	0.20
16.850	0.20	0.20	0.20	0.20	0.20
17.100	0.20	0.19	0.19	0.19	0.19
17.350	0.19	0.19	0.19	0.19	0.18
17.600	0.18	0.18	0.18	0.18	0.18
17.850	0.18	0.18	0.18	0.17	0.17
18.100	0.17	0.17	0.17	0.17	0.17
18.350	0.17	0.17	0.16	0.16	0.16
18.600	0.16	0.16	0.16	0.16	0.16
18.850	0.16	0.15	0.15	0.15	0.15
19.100	0.15	0.15	0.15	0.15	0.14
19.350	0.14	0.14	0.14	0.14	0.14
19.600	0.14	0.14	0.14	0.13	0.13
19.850	0.13	0.13	0.13	0.13	0.13
20.100	0.13	0.13	0.13	0.12	0.12
20.350	0.12	0.12	0.12	0.12	0.12
20.600	0.12	0.12	0.12	0.12	0.12
20.850	0.12	0.12	0.12	0.12	0.12
21.100	0.12	0.12	0.12	0.12	0.12
21.350	0.12	0.12	0.12	0.12	0.12
21.600	0.12	0.12	0.12	0.12	0.12
21.850	0.12	0.12	0.12	0.12	0.12
22.100	0.12	0.12	0.12	0.12	0.12
22.350	0.12	0.12	0.11	0.11	0.11
22.600	0.11	0.11	0.11	0.11	0.11
22.850	0.11	0.11	0.11	0.11	0.11
23.100	0.11	0.11	0.11	0.11	0.11
23.350	0.11	0.11	0.11	0.11	0.11
23.600	0.11	0.11	0.11	0.11	0.11
23.850	0.11	0.11	0.11	0.11	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 100 years
 Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	7.9 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.006 hours
Flow (Peak, Computed)	10.16 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.000 hours
Flow (Peak Interpolated Output)	10.16 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	1.687 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.5 in
Runoff Volume (Pervious)	0.627 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.625 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 100 years

Storm Event: 100 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	11.02 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 100 years
 Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	7.9 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.687 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
7.400	0.00	0.00	0.00	0.00	0.00
7.650	0.01	0.01	0.01	0.01	0.01
7.900	0.01	0.01	0.01	0.02	0.02
8.150	0.02	0.02	0.02	0.02	0.02
8.400	0.03	0.03	0.03	0.03	0.03
8.650	0.04	0.04	0.04	0.04	0.05
8.900	0.05	0.05	0.05	0.06	0.06
9.150	0.06	0.07	0.07	0.07	0.07
9.400	0.07	0.08	0.08	0.08	0.08
9.650	0.09	0.09	0.09	0.10	0.10
9.900	0.11	0.11	0.12	0.12	0.13
10.150	0.13	0.14	0.14	0.15	0.16
10.400	0.17	0.18	0.18	0.19	0.20
10.650	0.21	0.22	0.24	0.25	0.26
10.900	0.28	0.29	0.31	0.32	0.34
11.150	0.36	0.39	0.42	0.46	0.49
11.400	0.53	0.56	0.60	0.70	0.94
11.650	1.33	1.95	2.76	3.85	5.33
11.900	7.58	9.58	10.16	9.36	7.13
12.150	4.76	3.26	2.48	2.03	1.75
12.400	1.55	1.40	1.26	1.14	1.05
12.650	0.97	0.92	0.88	0.85	0.82
12.900	0.79	0.76	0.73	0.71	0.68
13.150	0.66	0.64	0.63	0.61	0.60
13.400	0.58	0.57	0.55	0.54	0.53
13.650	0.51	0.50	0.49	0.48	0.47
13.900	0.46	0.45	0.44	0.43	0.42
14.150	0.41	0.40	0.40	0.40	0.39
14.400	0.39	0.38	0.38	0.38	0.37
14.650	0.37	0.37	0.36	0.36	0.36
14.900	0.35	0.35	0.34	0.34	0.34
15.150	0.33	0.33	0.33	0.32	0.32
15.400	0.31	0.31	0.31	0.30	0.30

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 100 years
 Storm Event: 100 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
15.650	0.30	0.29	0.29	0.28	0.28
15.900	0.28	0.27	0.27	0.26	0.26
16.150	0.26	0.26	0.26	0.25	0.25
16.400	0.25	0.25	0.25	0.25	0.25
16.650	0.24	0.24	0.24	0.24	0.24
16.900	0.24	0.24	0.24	0.23	0.23
17.150	0.23	0.23	0.23	0.23	0.23
17.400	0.22	0.22	0.22	0.22	0.22
17.650	0.22	0.22	0.21	0.21	0.21
17.900	0.21	0.21	0.21	0.21	0.21
18.150	0.20	0.20	0.20	0.20	0.20
18.400	0.20	0.20	0.19	0.19	0.19
18.650	0.19	0.19	0.19	0.19	0.18
18.900	0.18	0.18	0.18	0.18	0.18
19.150	0.18	0.17	0.17	0.17	0.17
19.400	0.17	0.17	0.17	0.17	0.16
19.650	0.16	0.16	0.16	0.16	0.16
19.900	0.16	0.15	0.15	0.15	0.15
20.150	0.15	0.15	0.15	0.15	0.15
20.400	0.15	0.15	0.15	0.15	0.15
20.650	0.15	0.15	0.15	0.15	0.14
20.900	0.14	0.14	0.14	0.14	0.14
21.150	0.14	0.14	0.14	0.14	0.14
21.400	0.14	0.14	0.14	0.14	0.14
21.650	0.14	0.14	0.14	0.14	0.14
21.900	0.14	0.14	0.14	0.14	0.14
22.150	0.14	0.14	0.14	0.14	0.14
22.400	0.14	0.14	0.14	0.14	0.14
22.650	0.14	0.14	0.13	0.13	0.13
22.900	0.13	0.13	0.13	0.13	0.13
23.150	0.13	0.13	0.13	0.13	0.13
23.400	0.13	0.13	0.13	0.13	0.13
23.650	0.13	0.13	0.13	0.13	0.13
23.900	0.13	0.13	0.13	(N/A)	(N/A)

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Addition Summary

Label: O-1

Return Event: 1 years

Storm Event: 1 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1
<Catchment to Outflow Node>	DA #2

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	0.206	12.150	2.24
Flow (From)	DA #2	0.082	12.050	1.19
Flow (In)	O-1	0.287	12.100	3.11

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Addition Summary

Return Event: 2 years

Label: O-1

Storm Event: 2 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1
<Catchment to Outflow Node>	DA #2

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	0.294	12.150	3.29
Flow (From)	DA #2	0.126	12.000	1.94
Flow (In)	O-1	0.421	12.050	4.75

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Addition Summary

Label: O-1

Return Event: 5 years

Storm Event: 5 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1
<Catchment to Outflow Node>	DA #2

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	0.445	12.150	5.04
Flow (From)	DA #2	0.206	12.000	3.29
Flow (In)	O-1	0.651	12.050	7.61

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Addition Summary

Return Event: 10 years

Label: O-1

Storm Event: 10 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1
<Catchment to Outflow Node>	DA #2

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	0.579	12.150	6.58
Flow (From)	DA #2	0.280	12.000	4.53
Flow (In)	O-1	0.859	12.050	10.17

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Addition Summary

Label: O-1

Return Event: 25 years

Storm Event: 25 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1
<Catchment to Outflow Node>	DA #2

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	0.788	12.150	8.95
Flow (From)	DA #2	0.399	12.000	6.50
Flow (In)	O-1	1.187	12.050	14.17

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Addition Summary

Label: O-1

Return Event: 50 years

Storm Event: 50 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1
<Catchment to Outflow Node>	DA #2

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	0.971	12.150	10.98
Flow (From)	DA #2	0.505	12.000	8.22
Flow (In)	O-1	1.476	12.050	17.64

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

Subsection: Addition Summary

Label: O-1

Return Event: 100 years

Storm Event: 100 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1
<Catchment to Outflow Node>	DA #2

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	1.177	12.150	13.24
Flow (From)	DA #2	0.625	12.000	10.16
Flow (In)	O-1	1.802	12.050	21.51

TWIN OAKS ME2 - PRE-DEVELOPED CONDITIONS

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APPENDIX D

POST-DEVELOPED RUNOFF CALCULATIONS

Scenario: Post-Development 1 year

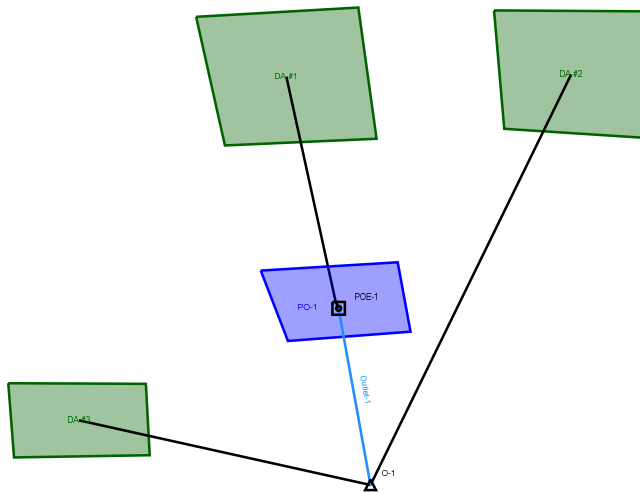


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TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
DA #1	Post-Development 1 year	1	0.321	11.950	5.72
DA #1	Post-Development 2 year	2	0.421	11.950	7.42
DA #1	Post-Development 5 year	5	0.581	11.950	10.08
DA #1	Post-Development 10 year	10	0.718	11.950	12.32
DA #1	Post-Development 25 year	25	0.924	11.950	15.63
DA #1	Post-Development 50 year	50	1.101	11.950	18.41
DA #1	Post-Development 100 year	100	1.295	11.950	21.45
DA #3	Post-Development 1 year	1	0.064	12.050	0.94
DA #3	Post-Development 2 year	2	0.096	12.000	1.51
DA #3	Post-Development 5 year	5	0.154	12.000	2.48
DA #3	Post-Development 10 year	10	0.207	12.000	3.36
DA #3	Post-Development 25 year	25	0.291	12.000	4.74
DA #3	Post-Development 50 year	50	0.366	12.000	5.95
DA #3	Post-Development 100 year	100	0.451	12.000	7.30
DA #2	Post-Development 1 year	1	0.040	12.200	0.38
DA #2	Post-Development 2 year	2	0.062	12.150	0.64
DA #2	Post-Development 5 year	5	0.101	12.150	1.10
DA #2	Post-Development 10 year	10	0.137	12.150	1.53
DA #2	Post-Development 25 year	25	0.195	12.150	2.20
DA #2	Post-Development 50 year	50	0.246	12.150	2.80
DA #2	Post-Development 100 year	100	0.305	12.150	3.47

Node Summary

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
O-1	Post-Development 1 year	1	0.212	12.050	1.29
O-1	Post-Development 2 year	2	0.314	12.050	2.08
O-1	Post-Development 5 year	5	0.494	12.050	3.46
O-1	Post-Development 10 year	10	0.656	12.050	4.72
O-1	Post-Development 25 year	25	0.909	12.050	6.69
O-1	Post-Development 50 year	50	1.167	12.000	8.43
O-1	Post-Development 100 year	100	1.485	12.050	10.70

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PO-1 (IN)	Post-Development 1 year	1	0.321	11.950	5.72	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 1 year	1	0.109	16.900	0.12	108.41	0.230
PO-1 (IN)	Post-Development 2 year	2	0.421	11.950	7.42	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 2 year	2	0.156	15.950	0.17	108.50	0.299
PO-1 (IN)	Post-Development 5 year	5	0.581	11.950	10.08	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 5 year	5	0.239	15.250	0.26	108.64	0.405
PO-1 (IN)	Post-Development 10 year	10	0.718	11.950	12.32	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 10 year	10	0.312	14.850	0.34	108.76	0.497

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PO-1 (IN)	Post-Development 25 year	25	0.924	11.950	15.63	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 25 year	25	0.423	14.450	0.47	108.94	0.639
PO-1 (IN)	Post-Development 50 year	50	1.101	11.950	18.41	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 50 year	50	0.555	13.000	1.04	109.04	0.717
PO-1 (IN)	Post-Development 100 year	100	1.295	11.950	21.45	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 100 year	100	0.729	12.450	2.15	109.13	0.786

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 1 years

Label: Time-Depth - 1

Storm Event: 1 Year

Time-Depth Curve: 1 Year

Label	1 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	1 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.0	0.0	0.0	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.1
4.000	0.1	0.1	0.1	0.1	0.1
4.500	0.1	0.2	0.2	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.2
6.000	0.2	0.2	0.2	0.2	0.2
6.500	0.2	0.2	0.2	0.3	0.3
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.3	0.3	0.3	0.3	0.3
8.000	0.3	0.3	0.3	0.3	0.3
8.500	0.4	0.4	0.4	0.4	0.4
9.000	0.4	0.4	0.4	0.4	0.4
9.500	0.4	0.4	0.5	0.5	0.5
10.000	0.5	0.5	0.5	0.5	0.5
10.500	0.5	0.6	0.6	0.6	0.6
11.000	0.6	0.7	0.7	0.7	0.7
11.500	0.8	0.8	0.9	1.2	1.5
12.000	1.8	1.8	1.9	1.9	1.9
12.500	2.0	2.0	2.0	2.0	2.1
13.000	2.1	2.1	2.1	2.1	2.1
13.500	2.1	2.2	2.2	2.2	2.2
14.000	2.2	2.2	2.2	2.2	2.2
14.500	2.2	2.3	2.3	2.3	2.3
15.000	2.3	2.3	2.3	2.3	2.3
15.500	2.3	2.3	2.3	2.3	2.4
16.000	2.4	2.4	2.4	2.4	2.4
16.500	2.4	2.4	2.4	2.4	2.4

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 1 years

Label: Time-Depth - 1

Storm Event: 1 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	2.4	2.4	2.4	2.4	2.4
17.500	2.4	2.4	2.5	2.5	2.5
18.000	2.5	2.5	2.5	2.5	2.5
18.500	2.5	2.5	2.5	2.5	2.5
19.000	2.5	2.5	2.5	2.5	2.5
19.500	2.5	2.5	2.5	2.5	2.5
20.000	2.6	2.6	2.6	2.6	2.6
20.500	2.6	2.6	2.6	2.6	2.6
21.000	2.6	2.6	2.6	2.6	2.6
21.500	2.6	2.6	2.6	2.6	2.6
22.000	2.6	2.6	2.6	2.6	2.6
22.500	2.6	2.6	2.6	2.6	2.6
23.000	2.6	2.7	2.7	2.7	2.7
23.500	2.7	2.7	2.7	2.7	2.7
24.000	2.7	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 10 years

Label: Time-Depth - 1

Storm Event: 10 Year

Time-Depth Curve: 10 Year

Label	10 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	10 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.2	0.3	0.3
4.500	0.3	0.3	0.3	0.3	0.3
5.000	0.3	0.3	0.3	0.3	0.3
5.500	0.3	0.4	0.4	0.4	0.4
6.000	0.4	0.4	0.4	0.4	0.4
6.500	0.4	0.4	0.5	0.5	0.5
7.000	0.5	0.5	0.5	0.5	0.5
7.500	0.5	0.5	0.5	0.6	0.6
8.000	0.6	0.6	0.6	0.6	0.6
8.500	0.6	0.7	0.7	0.7	0.7
9.000	0.7	0.7	0.7	0.8	0.8
9.500	0.8	0.8	0.8	0.8	0.9
10.000	0.9	0.9	0.9	0.9	1.0
10.500	1.0	1.0	1.0	1.1	1.1
11.000	1.1	1.2	1.2	1.3	1.3
11.500	1.4	1.5	1.7	2.1	2.7
12.000	3.2	3.3	3.4	3.5	3.5
12.500	3.6	3.6	3.6	3.7	3.7
13.000	3.7	3.8	3.8	3.8	3.8
13.500	3.9	3.9	3.9	3.9	4.0
14.000	4.0	4.0	4.0	4.0	4.0
14.500	4.1	4.1	4.1	4.1	4.1
15.000	4.1	4.1	4.2	4.2	4.2
15.500	4.2	4.2	4.2	4.2	4.2
16.000	4.3	4.3	4.3	4.3	4.3
16.500	4.3	4.3	4.3	4.3	4.4

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 10 years

Label: Time-Depth - 1

Storm Event: 10 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	4.4	4.4	4.4	4.4	4.4
17.500	4.4	4.4	4.4	4.4	4.4
18.000	4.5	4.5	4.5	4.5	4.5
18.500	4.5	4.5	4.5	4.5	4.5
19.000	4.5	4.5	4.6	4.6	4.6
19.500	4.6	4.6	4.6	4.6	4.6
20.000	4.6	4.6	4.6	4.6	4.6
20.500	4.6	4.6	4.7	4.7	4.7
21.000	4.7	4.7	4.7	4.7	4.7
21.500	4.7	4.7	4.7	4.7	4.7
22.000	4.7	4.7	4.7	4.7	4.8
22.500	4.8	4.8	4.8	4.8	4.8
23.000	4.8	4.8	4.8	4.8	4.8
23.500	4.8	4.8	4.8	4.8	4.8
24.000	4.8	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 100 years

Label: Time-Depth - 1

Storm Event: 100 Year

Time-Depth Curve: 100 Year

Label	100 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.1	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.2	0.2
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.3	0.3
3.000	0.3	0.3	0.3	0.3	0.3
3.500	0.3	0.3	0.3	0.4	0.4
4.000	0.4	0.4	0.4	0.4	0.4
4.500	0.4	0.4	0.5	0.5	0.5
5.000	0.5	0.5	0.5	0.5	0.5
5.500	0.6	0.6	0.6	0.6	0.6
6.000	0.6	0.6	0.7	0.7	0.7
6.500	0.7	0.7	0.7	0.7	0.8
7.000	0.8	0.8	0.8	0.8	0.8
7.500	0.9	0.9	0.9	0.9	0.9
8.000	0.9	1.0	1.0	1.0	1.0
8.500	1.0	1.1	1.1	1.1	1.1
9.000	1.2	1.2	1.2	1.2	1.3
9.500	1.3	1.3	1.3	1.4	1.4
10.000	1.4	1.5	1.5	1.5	1.6
10.500	1.6	1.6	1.7	1.7	1.8
11.000	1.8	1.9	2.0	2.1	2.1
11.500	2.2	2.4	2.8	3.4	4.5
12.000	5.2	5.4	5.5	5.6	5.7
12.500	5.8	5.8	5.9	6.0	6.0
13.000	6.1	6.1	6.2	6.2	6.2
13.500	6.3	6.3	6.4	6.4	6.4
14.000	6.4	6.5	6.5	6.5	6.6
14.500	6.6	6.6	6.6	6.7	6.7
15.000	6.7	6.7	6.8	6.8	6.8
15.500	6.8	6.8	6.9	6.9	6.9
16.000	6.9	6.9	7.0	7.0	7.0
16.500	7.0	7.0	7.0	7.1	7.1

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 100 years

Label: Time-Depth - 1

Storm Event: 100 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	7.1	7.1	7.1	7.1	7.2
17.500	7.2	7.2	7.2	7.2	7.2
18.000	7.2	7.3	7.3	7.3	7.3
18.500	7.3	7.3	7.3	7.3	7.4
19.000	7.4	7.4	7.4	7.4	7.4
19.500	7.4	7.4	7.5	7.5	7.5
20.000	7.5	7.5	7.5	7.5	7.5
20.500	7.5	7.5	7.6	7.6	7.6
21.000	7.6	7.6	7.6	7.6	7.6
21.500	7.6	7.6	7.7	7.7	7.7
22.000	7.7	7.7	7.7	7.7	7.7
22.500	7.7	7.7	7.7	7.8	7.8
23.000	7.8	7.8	7.8	7.8	7.8
23.500	7.8	7.8	7.8	7.8	7.9
24.000	7.9	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 2 years

Label: Time-Depth - 1

Storm Event: 2 Year

Time-Depth Curve: 2 Year	
Label	2 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	2 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.2
4.000	0.2	0.2	0.2	0.2	0.2
4.500	0.2	0.2	0.2	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.3
6.000	0.3	0.3	0.3	0.3	0.3
6.500	0.3	0.3	0.3	0.3	0.3
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.4	0.4	0.4	0.4	0.4
8.000	0.4	0.4	0.4	0.4	0.4
8.500	0.4	0.4	0.4	0.5	0.5
9.000	0.5	0.5	0.5	0.5	0.5
9.500	0.5	0.5	0.5	0.6	0.6
10.000	0.6	0.6	0.6	0.6	0.6
10.500	0.7	0.7	0.7	0.7	0.7
11.000	0.8	0.8	0.8	0.8	0.9
11.500	0.9	1.0	1.1	1.4	1.8
12.000	2.1	2.2	2.3	2.3	2.3
12.500	2.4	2.4	2.4	2.5	2.5
13.000	2.5	2.5	2.5	2.6	2.6
13.500	2.6	2.6	2.6	2.6	2.6
14.000	2.7	2.7	2.7	2.7	2.7
14.500	2.7	2.7	2.7	2.7	2.8
15.000	2.8	2.8	2.8	2.8	2.8
15.500	2.8	2.8	2.8	2.8	2.8
16.000	2.9	2.9	2.9	2.9	2.9
16.500	2.9	2.9	2.9	2.9	2.9

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 2 years

Label: Time-Depth - 1

Storm Event: 2 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	2.9	2.9	2.9	2.9	2.9
17.500	3.0	3.0	3.0	3.0	3.0
18.000	3.0	3.0	3.0	3.0	3.0
18.500	3.0	3.0	3.0	3.0	3.0
19.000	3.0	3.0	3.0	3.1	3.1
19.500	3.1	3.1	3.1	3.1	3.1
20.000	3.1	3.1	3.1	3.1	3.1
20.500	3.1	3.1	3.1	3.1	3.1
21.000	3.1	3.1	3.1	3.1	3.1
21.500	3.1	3.1	3.2	3.2	3.2
22.000	3.2	3.2	3.2	3.2	3.2
22.500	3.2	3.2	3.2	3.2	3.2
23.000	3.2	3.2	3.2	3.2	3.2
23.500	3.2	3.2	3.2	3.2	3.2
24.000	3.2	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 25 years

Label: Time-Depth - 1

Storm Event: 25 Year

Time-Depth Curve: 25 Year

Label	25 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	25 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.2	0.2
2.500	0.2	0.2	0.2	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.3	0.3	0.3	0.3
4.000	0.3	0.3	0.3	0.3	0.3
4.500	0.3	0.3	0.3	0.4	0.4
5.000	0.4	0.4	0.4	0.4	0.4
5.500	0.4	0.4	0.4	0.5	0.5
6.000	0.5	0.5	0.5	0.5	0.5
6.500	0.5	0.5	0.6	0.6	0.6
7.000	0.6	0.6	0.6	0.6	0.6
7.500	0.6	0.7	0.7	0.7	0.7
8.000	0.7	0.7	0.7	0.8	0.8
8.500	0.8	0.8	0.8	0.8	0.9
9.000	0.9	0.9	0.9	0.9	0.9
9.500	1.0	1.0	1.0	1.0	1.1
10.000	1.1	1.1	1.1	1.2	1.2
10.500	1.2	1.2	1.3	1.3	1.4
11.000	1.4	1.4	1.5	1.5	1.6
11.500	1.7	1.8	2.1	2.6	3.4
12.000	3.9	4.0	4.1	4.2	4.3
12.500	4.4	4.4	4.5	4.5	4.5
13.000	4.6	4.6	4.6	4.7	4.7
13.500	4.7	4.8	4.8	4.8	4.8
14.000	4.9	4.9	4.9	4.9	4.9
14.500	5.0	5.0	5.0	5.0	5.0
15.000	5.1	5.1	5.1	5.1	5.1
15.500	5.1	5.2	5.2	5.2	5.2
16.000	5.2	5.2	5.2	5.3	5.3
16.500	5.3	5.3	5.3	5.3	5.3

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 25 years

Label: Time-Depth - 1

Storm Event: 25 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	5.3	5.4	5.4	5.4	5.4
17.500	5.4	5.4	5.4	5.4	5.5
18.000	5.5	5.5	5.5	5.5	5.5
18.500	5.5	5.5	5.5	5.5	5.6
19.000	5.6	5.6	5.6	5.6	5.6
19.500	5.6	5.6	5.6	5.6	5.6
20.000	5.6	5.7	5.7	5.7	5.7
20.500	5.7	5.7	5.7	5.7	5.7
21.000	5.7	5.7	5.7	5.7	5.8
21.500	5.8	5.8	5.8	5.8	5.8
22.000	5.8	5.8	5.8	5.8	5.8
22.500	5.8	5.8	5.8	5.8	5.9
23.000	5.9	5.9	5.9	5.9	5.9
23.500	5.9	5.9	5.9	5.9	5.9
24.000	5.9	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 5 years

Label: Time-Depth - 1

Storm Event: 5 Year

Time-Depth Curve: 5 Year

Label	5 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	5 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.2	0.2	0.2
4.500	0.2	0.2	0.2	0.2	0.3
5.000	0.3	0.3	0.3	0.3	0.3
5.500	0.3	0.3	0.3	0.3	0.3
6.000	0.3	0.3	0.3	0.4	0.4
6.500	0.4	0.4	0.4	0.4	0.4
7.000	0.4	0.4	0.4	0.4	0.4
7.500	0.4	0.5	0.5	0.5	0.5
8.000	0.5	0.5	0.5	0.5	0.5
8.500	0.5	0.6	0.6	0.6	0.6
9.000	0.6	0.6	0.6	0.6	0.7
9.500	0.7	0.7	0.7	0.7	0.7
10.000	0.7	0.8	0.8	0.8	0.8
10.500	0.8	0.9	0.9	0.9	0.9
11.000	1.0	1.0	1.0	1.1	1.1
11.500	1.2	1.3	1.5	1.8	2.3
12.000	2.7	2.8	2.9	2.9	3.0
12.500	3.0	3.1	3.1	3.1	3.1
13.000	3.2	3.2	3.2	3.2	3.3
13.500	3.3	3.3	3.3	3.3	3.4
14.000	3.4	3.4	3.4	3.4	3.4
14.500	3.4	3.5	3.5	3.5	3.5
15.000	3.5	3.5	3.5	3.5	3.6
15.500	3.6	3.6	3.6	3.6	3.6
16.000	3.6	3.6	3.6	3.6	3.7
16.500	3.7	3.7	3.7	3.7	3.7

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 5 years

Label: Time-Depth - 1

Storm Event: 5 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	3.7	3.7	3.7	3.7	3.7
17.500	3.7	3.8	3.8	3.8	3.8
18.000	3.8	3.8	3.8	3.8	3.8
18.500	3.8	3.8	3.8	3.8	3.8
19.000	3.9	3.9	3.9	3.9	3.9
19.500	3.9	3.9	3.9	3.9	3.9
20.000	3.9	3.9	3.9	3.9	3.9
20.500	3.9	3.9	3.9	4.0	4.0
21.000	4.0	4.0	4.0	4.0	4.0
21.500	4.0	4.0	4.0	4.0	4.0
22.000	4.0	4.0	4.0	4.0	4.0
22.500	4.0	4.0	4.0	4.1	4.1
23.000	4.1	4.1	4.1	4.1	4.1
23.500	4.1	4.1	4.1	4.1	4.1
24.000	4.1	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 50 years

Label: Time-Depth - 1

Storm Event: 50 Year

Time-Depth Curve: 50 Year	
Label	50 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	50 years

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.2	0.2
3.000	0.2	0.2	0.3	0.3	0.3
3.500	0.3	0.3	0.3	0.3	0.3
4.000	0.3	0.3	0.3	0.4	0.4
4.500	0.4	0.4	0.4	0.4	0.4
5.000	0.4	0.4	0.5	0.5	0.5
5.500	0.5	0.5	0.5	0.5	0.5
6.000	0.5	0.6	0.6	0.6	0.6
6.500	0.6	0.6	0.6	0.7	0.7
7.000	0.7	0.7	0.7	0.7	0.7
7.500	0.7	0.8	0.8	0.8	0.8
8.000	0.8	0.8	0.9	0.9	0.9
8.500	0.9	0.9	0.9	1.0	1.0
9.000	1.0	1.0	1.1	1.1	1.1
9.500	1.1	1.1	1.2	1.2	1.2
10.000	1.2	1.3	1.3	1.3	1.4
10.500	1.4	1.4	1.5	1.5	1.6
11.000	1.6	1.7	1.7	1.8	1.9
11.500	1.9	2.1	2.4	3.0	3.9
12.000	4.5	4.7	4.8	4.9	5.0
12.500	5.0	5.1	5.1	5.2	5.2
13.000	5.3	5.3	5.4	5.4	5.4
13.500	5.5	5.5	5.5	5.6	5.6
14.000	5.6	5.6	5.7	5.7	5.7
14.500	5.7	5.8	5.8	5.8	5.8
15.000	5.8	5.9	5.9	5.9	5.9
15.500	5.9	6.0	6.0	6.0	6.0
16.000	6.0	6.0	6.1	6.1	6.1
16.500	6.1	6.1	6.1	6.1	6.2

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time-Depth Curve

Return Event: 50 years

Label: Time-Depth - 1

Storm Event: 50 Year

CUMULATIVE RAINFALL (in)

Output Time Increment = 0.100 hours

Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	6.2	6.2	6.2	6.2	6.2
17.500	6.2	6.3	6.3	6.3	6.3
18.000	6.3	6.3	6.3	6.3	6.4
18.500	6.4	6.4	6.4	6.4	6.4
19.000	6.4	6.4	6.4	6.5	6.5
19.500	6.5	6.5	6.5	6.5	6.5
20.000	6.5	6.5	6.5	6.5	6.6
20.500	6.6	6.6	6.6	6.6	6.6
21.000	6.6	6.6	6.6	6.6	6.6
21.500	6.7	6.7	6.7	6.7	6.7
22.000	6.7	6.7	6.7	6.7	6.7
22.500	6.7	6.7	6.7	6.8	6.8
23.000	6.8	6.8	6.8	6.8	6.8
23.500	6.8	6.8	6.8	6.8	6.8
24.000	6.9	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #1

Return Event: 1 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.011
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	1.05 ft/s
Segment Time of Concentration	0.026 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	165.00 ft
Is Paved?	False
Slope	0.012 ft/ft
Average Velocity	1.78 ft/s
Segment Time of Concentration	0.026 hours
Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	219.00 ft
Is Paved?	False
Slope	0.005 ft/ft
Average Velocity	1.08 ft/s
Segment Time of Concentration	0.056 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.108 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 1 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Qa / Wp$$
$$V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$$

$$Tc = (Lf / V) / 3600$$

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
 $V = 16.1345 * (Sf^{*0.5})$

Paved Surface:
 $V = 20.3282 * (Sf^{*0.5})$

$$Tc = (Lf / V) / 3600$$

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #1

Return Event: 2 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.011
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	1.05 ft/s
Segment Time of Concentration	0.026 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	165.00 ft
Is Paved?	False
Slope	0.012 ft/ft
Average Velocity	1.78 ft/s
Segment Time of Concentration	0.026 hours
Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	219.00 ft
Is Paved?	False
Slope	0.005 ft/ft
Average Velocity	1.08 ft/s
Segment Time of Concentration	0.056 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.108 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 2 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Qa / Wp$$
$$V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$$

$$Tc = (Lf / V) / 3600$$

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
 $V = 16.1345 * (Sf^{*0.5})$

Paved Surface:
 $V = 20.3282 * (Sf^{*0.5})$

$$Tc = (Lf / V) / 3600$$

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #1

Return Event: 5 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	100.00 ft
Manning's n	0.011
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	1.05 ft/s
Segment Time of Concentration	0.026 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	165.00 ft
Is Paved?	False
Slope	0.012 ft/ft
Average Velocity	1.78 ft/s
Segment Time of Concentration	0.026 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	219.00 ft
Is Paved?	False
Slope	0.005 ft/ft
Average Velocity	1.08 ft/s
Segment Time of Concentration	0.056 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.108 hours
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TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 5 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n$$

$$T_c = (L_f / V) / 3600$$

Where:

R= Hydraulic radius
A_q= Flow area, square feet
W_p= Wetted perimeter, feet
V= Velocity, ft/sec
S_f= Slope, ft/ft
n= Manning's n
T_c= Time of concentration, hours
L_f= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:

$$V = 16.1345 * (S_f^{0.5})$$

Paved Surface:

$$V = 20.3282 * (S_f^{0.5})$$

$$T_c = (L_f / V) / 3600$$

Where:

V= Velocity, ft/sec
S_f= Slope, ft/ft
T_c= Time of concentration, hours
L_f= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #1

Return Event: 10 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.011
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	1.05 ft/s
Segment Time of Concentration	0.026 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	165.00 ft
Is Paved?	False
Slope	0.012 ft/ft
Average Velocity	1.78 ft/s
Segment Time of Concentration	0.026 hours
Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	219.00 ft
Is Paved?	False
Slope	0.005 ft/ft
Average Velocity	1.08 ft/s
Segment Time of Concentration	0.056 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.108 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 10 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = 16.1345 * (Sf**0.5)
Tc = Paved Surface:
V = 20.3282 * (Sf**0.5)
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #1

Return Event: 25 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.011
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	1.05 ft/s
Segment Time of Concentration	0.026 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	165.00 ft
Is Paved?	False
Slope	0.012 ft/ft
Average Velocity	1.78 ft/s
Segment Time of Concentration	0.026 hours
Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	219.00 ft
Is Paved?	False
Slope	0.005 ft/ft
Average Velocity	1.08 ft/s
Segment Time of Concentration	0.056 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.108 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 25 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = 16.1345 * (Sf**0.5)
Tc = Paved Surface:
V = 20.3282 * (Sf**0.5)
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #1

Return Event: 50 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.011
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	1.05 ft/s
Segment Time of Concentration	0.026 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	165.00 ft
Is Paved?	False
Slope	0.012 ft/ft
Average Velocity	1.78 ft/s
Segment Time of Concentration	0.026 hours
Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	219.00 ft
Is Paved?	False
Slope	0.005 ft/ft
Average Velocity	1.08 ft/s
Segment Time of Concentration	0.056 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.108 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 50 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$T_c = \frac{V = (1.49 * (R^{2/3}) * (S_f^{-0.5})) / n}{(L_f / V) / 3600}$$

Where:
R= Hydraulic radius
A_q= Flow area, square feet
W_p= Wetted perimeter, feet
V= Velocity, ft/sec
S_f= Slope, ft/ft
n= Manning's n
T_c= Time of concentration, hours
L_f= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

$$V = 16.1345 * (S_f^{0.5})$$

$$T_c = \frac{V = 20.3282 * (S_f^{0.5})}{(L_f / V) / 3600}$$

Where:
V= Velocity, ft/sec
S_f= Slope, ft/ft
T_c= Time of concentration, hours
L_f= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 100 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	100.00 ft
Manning's n	0.011
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	1.05 ft/s
Segment Time of Concentration	0.026 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	165.00 ft
Is Paved?	False
Slope	0.012 ft/ft
Average Velocity	1.78 ft/s
Segment Time of Concentration	0.026 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	219.00 ft
Is Paved?	False
Slope	0.005 ft/ft
Average Velocity	1.08 ft/s
Segment Time of Concentration	0.056 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.108 hours
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TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #1

Return Event: 100 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$V = (1.49 * (R^{2/3}) * (S_f^{-0.5})) / n$$

$$T_c = (L_f / V) / 3600$$

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:

$$V = 16.1345 * (S_f^{0.5})$$

Paved Surface:

$$V = 20.3282 * (S_f^{0.5})$$

$$T_c = (L_f / V) / 3600$$

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #2

Return Event: 1 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours
Segment #3: TR-55 Channel Flow	
Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.256 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.414 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 1 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = 16.1345 * (Sf^{0.5})
Tc = Paved Surface:
V = 20.3282 * (Sf^{0.5})
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = $(0.007 * ((n * Lf)^{0.8}) / ((P^{0.5}) * (Sf^{0.4}))$
Tc= Time of concentration, hours
n= Manning's n
Where: Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #2

Return Event: 2 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours
Segment #3: TR-55 Channel Flow	
Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.256 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.414 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 2 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = 16.1345 * (Sf**0.5)
Tc = Paved Surface:
V = 20.3282 * (Sf**0.5)
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = $(0.007 * ((n * Lf)^{0.8}) / ((P^{0.5}) * (Sf^{0.4})))$
Tc= Time of concentration, hours
n= Manning's n
Where: Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #2

Return Event: 5 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours
Segment #3: TR-55 Channel Flow	
Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.256 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.414 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 5 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = $16.1345 * (Sf^{*0.5})$
Tc = Paved Surface:
V = $20.3282 * (Sf^{*0.5})$
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = $(0.007 * ((n * Lf)^{*0.8}) / ((P^{*0.5}) * (Sf^{*0.4}))$
Tc= Time of concentration, hours
n= Manning's n
Where: Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #2

Return Event: 10 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours
Segment #3: TR-55 Channel Flow	
Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.256 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.414 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 10 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = 16.1345 * (Sf**0.5)
Tc = Paved Surface:
V = 20.3282 * (Sf**0.5)
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = $(0.007 * ((n * Lf)^{0.8}) / ((P^{0.5}) * (Sf^{0.4})))$
Tc= Time of concentration, hours
n= Manning's n
Where: Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #2

Return Event: 25 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours
Segment #3: TR-55 Channel Flow	
Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.256 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.414 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 25 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = 16.1345 * (Sf**0.5)
Tc = Paved Surface:
V = 20.3282 * (Sf**0.5)
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = $(0.007 * ((n * Lf)^{0.8}) / ((P^{0.5}) * (Sf^{0.4}))$
Tc= Time of concentration, hours
n= Manning's n
Where: Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #2

Return Event: 50 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
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Segment #3: TR-55 Channel Flow	
Flow Area	1.5 ft ²
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Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.256 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.414 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 50 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc = $R = Qa / Wp$
 $V = (1.49 * (R^{2/3}) * (Sf^{0.5})) / n$
 $(Lf / V) / 3600$
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
V = 16.1345 * (Sf^{0.5})
Tc = Paved Surface:
V = 20.3282 * (Sf^{0.5})
 $(Lf / V) / 3600$
V= Velocity, ft/sec
Where: Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = $(0.007 * ((n * Lf)^{0.8}) / ((P^{0.5}) * (Sf^{0.4})))$
Tc= Time of concentration, hours
n= Manning's n
Where: Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #2

Return Event: 100 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.130
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.19 ft/s
Segment Time of Concentration	0.145 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	111.00 ft
Is Paved?	False
Slope	0.023 ft/ft
Average Velocity	2.45 ft/s
Segment Time of Concentration	0.013 hours
Segment #3: TR-55 Channel Flow	
Flow Area	1.5 ft ²
Hydraulic Length	443.00 ft
Manning's n	0.130
Slope	0.007 ft/ft
Wetted Perimeter	4.24 ft
Average Velocity	0.48 ft/s
Segment Time of Concentration	0.256 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.414 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #2

Return Event: 100 years
Storm Event: 1 Year

==== SCS Channel Flow

$$T_c = \frac{R = Q_a / W_p}{V = (1.49 * (R^{2/3}) * (S_f^{-0.5})) / n}$$

$$(L_f / V) / 3600$$

R= Hydraulic radius

A_q= Flow area, square feet

W_p= Wetted perimeter, feet

V= Velocity, ft/sec

Where:

S_f= Slope, ft/ft

n= Manning's n

T_c= Time of concentration, hours

L_f= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:

$$V = 16.1345 * (S_f^{0.5})$$

T_c =

Paved Surface:

$$V = 20.3282 * (S_f^{0.5})$$

$$(L_f / V) / 3600$$

V= Velocity, ft/sec

Where:

S_f= Slope, ft/ft

T_c= Time of concentration, hours

L_f= Flow length, feet

==== SCS TR-55 Sheet Flow

$$T_c = \frac{(0.007 * ((n * L_f)^{0.8}))}{((P^{0.5}) * (S_f^{0.4}))}$$

T_c= Time of concentration, hours

n= Manning's n

Where:

L_f= Flow length, feet

P= 2yr, 24hr Rain depth, inches

S_f= Slope, %

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #3

Return Event: 1 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.173 hours
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TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #3

Return Event: 1 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Qa / Wp$$
$$V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$$

$$Tc = (Lf / V) / 3600$$

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
 $V = 16.1345 * (Sf^{*0.5})$

Paved Surface:
 $V = 20.3282 * (Sf^{*0.5})$

$$Tc = (Lf / V) / 3600$$

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #3

Return Event: 2 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours
Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.173 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #3

Return Event: 2 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Qa / Wp$$
$$V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$$

$$Tc = (Lf / V) / 3600$$

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
 $V = 16.1345 * (Sf^{*0.5})$

Paved Surface:
 $V = 20.3282 * (Sf^{*0.5})$

$$Tc = (Lf / V) / 3600$$

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #3

Return Event: 5 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.173 hours
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TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #3

Return Event: 5 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Qa / Wp$$
$$V = (1.49 * (R^{2/3}) * (Sf^{*-0.5})) / n$$

$$Tc = (Lf / V) / 3600$$

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
 $V = 16.1345 * (Sf^{*0.5})$

Paved Surface:
 $V = 20.3282 * (Sf^{*0.5})$

$$Tc = (Lf / V) / 3600$$

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #3

Return Event: 10 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.173 hours
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TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #3

Return Event: 10 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n$$

$$T_c = (L_f / V) / 3600$$

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:

$$V = 16.1345 * (S_f^{0.5})$$

Paved Surface:

$$V = 20.3282 * (S_f^{0.5})$$

$$T_c = (L_f / V) / 3600$$

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #3

Return Event: 25 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours
Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.173 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #3

Return Event: 25 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$T_c = \frac{V = (1.49 * (R^{2/3}) * (S_f^{-0.5})) / n}{(L_f / V) / 3600}$$

Where:
R= Hydraulic radius
A_q= Flow area, square feet
W_p= Wetted perimeter, feet
V= Velocity, ft/sec
S_f= Slope, ft/ft
n= Manning's n
T_c= Time of concentration, hours
L_f= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

$$V = 16.1345 * (S_f^{0.5})$$

$$T_c = \frac{V = 20.3282 * (S_f^{0.5})}{(L_f / V) / 3600}$$

Where:
V= Velocity, ft/sec
S_f= Slope, ft/ft
T_c= Time of concentration, hours
L_f= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #3

Return Event: 50 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours
Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.173 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #3

Return Event: 50 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$V = (1.49 * (R^{2/3}) * (S_f^{-0.5})) / n$$

$$T_c = (L_f / V) / 3600$$

R= Hydraulic radius
A_q= Flow area, square feet
W_p= Wetted perimeter, feet
V= Velocity, ft/sec
S_f= Slope, ft/ft
n= Manning's n
T_c= Time of concentration, hours
L_f= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:
 $V = 16.1345 * (S_f^{0.5})$

Paved Surface:
 $V = 20.3282 * (S_f^{0.5})$

$$T_c = (L_f / V) / 3600$$

V= Velocity, ft/sec
S_f= Slope, ft/ft
T_c= Time of concentration, hours
L_f= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
 Label: DA #3

Return Event: 100 years
 Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	78.00 ft
Manning's n	0.130
Slope	0.038 ft/ft
2 Year 24 Hour Depth	3.2 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.092 hours
Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	25.00 ft
Is Paved?	True
Slope	0.020 ft/ft
Average Velocity	2.87 ft/s
Segment Time of Concentration	0.002 hours
Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	412.00 ft
Is Paved?	False
Slope	0.008 ft/ft
Average Velocity	1.44 ft/s
Segment Time of Concentration	0.079 hours
Time of Concentration (Composite)	
Time of Concentration (Composite)	0.173 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time of Concentration Calculations
Label: DA #3

Return Event: 100 years
Storm Event: 1 Year

==== SCS Channel Flow

$$R = Q_a / W_p$$
$$V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n$$

$$T_c = (L_f / V) / 3600$$

Where:

R= Hydraulic radius
A_q= Flow area, square feet
W_p= Wetted perimeter, feet
V= Velocity, ft/sec
S_f= Slope, ft/ft
n= Manning's n
T_c= Time of concentration, hours
L_f= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Unpaved surface:

$$V = 16.1345 * (S_f^{0.5})$$

Paved Surface:

$$V = 20.3282 * (S_f^{0.5})$$

$$T_c = (L_f / V) / 3600$$

Where:

V= Velocity, ft/sec
S_f= Slope, ft/ft
T_c= Time of concentration, hours
L_f= Flow length, feet

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Equations

Unit Hydrograph Method (Computational Notes)

Definition of Terms

At	Total area (acres): $A_t = A_i + A_p$
Ai	Impervious area (acres)
Ap	Pervious area (acres)
CNi	Runoff curve number for impervious area
CNp	Runoff curve number for pervious area
fLoss	f loss constant infiltration (depth/time)
gKs	Saturated Hydraulic Conductivity (depth/time)
Md	Volumetric Moisture Deficit
Psi	Capillary Suction (length)
hK	Horton Infiltration Decay Rate (time^{-1})
fo	Initial Infiltration Rate (depth/time)
fc	Ultimate(capacity)Infiltration Rate (depth/time)
Ia	Initial Abstraction (length)
dt	Computational increment (duration of unit excess rainfall) Default dt is smallest value of $0.1333T_c$, r_{tm} , and t_h (Smallest dt is then adjusted to match up with T_p)
UDdt	User specified override computational main time increment (only used if UDdt is $\Rightarrow .1333T_c$)
D(t)	Point on distribution curve (fraction of P) for time step t
K	$2 / (1 + (T_r/T_p))$: default $K = 0.75$: (for $T_r/T_p = 1.67$)
Ks	Hydrograph shape factor = Unit Conversions * $K = ((1\text{hr}/3600\text{sec}) * (1\text{ft}/12\text{in}) * ((5280\text{ft})^2/\text{sq.mi})) * K$ Default $K_s = 645.333 * 0.75 = 484$
Lag	Lag time from center of excess runoff (dt) to T_p : $\text{Lag} = 0.6T_c$
P	Total precipitation depth, inches
Pa(t)	Accumulated rainfall at time step t
Pi(t)	Incremental rainfall at time step t
qp	Peak discharge (cfs) for 1in. runoff, for 1hr, for 1 sq.mi. = $(K_s * A * Q) / T_p$ (where $Q = 1\text{in. runoff}$, $A = \text{sq.mi.}$)
Qu(t)	Unit hydrograph ordinate (cfs) at time step t
Q(t)	Final hydrograph ordinate (cfs) at time step t
Rai(t)	Accumulated runoff (inches) at time step t for impervious area
Rap(t)	Accumulated runoff (inches) at time step t for pervious area
Rii(t)	Incremental runoff (inches) at time step t for impervious area
Rip(t)	Incremental runoff (inches) at time step t for pervious area
R(t)	Incremental weighted total runoff (inches)
Rtm	Time increment for rainfall table
Si	S for impervious area: $S_i = (1000/CN_i) - 10$
Sp	S for pervious area: $S_p = (1000/CN_p) - 10$
t	Time step (row) number
Tc	Time of concentration
Tb	Time (hrs) of entire unit hydrograph: $T_b = T_p + T_r$
Tp	Time (hrs) to peak of a unit hydrograph: $T_p = (dt/2) + \text{Lag}$
Tr	Time (hrs) of receding limb of unit hydrograph: $T_r = \text{ratio of } T_p$

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Equations

Unit Hydrograph Method

Computational Notes

Precipitation

Column (1)	Time for time step t
Column (2)	$D(t)$ = Point on distribution curve for time step t
Column (3)	$P_i(t) = P_a(t) - P_a(t-1)$: Col.(4) - Preceding Col.(4)
Column (4)	$P_a(t) = D(t) \times P$: Col.(2) x P

Pervious Area Runoff (using SCS Runoff CN Method)

	$Rap(t)$ = Accumulated pervious runoff for time step t
	If $(P_a(t) \leq 0.2Sp)$ then use: $Rap(t) = 0.0$
	If $(P_a(t) > 0.2Sp)$ then use:
	$Rap(t) = (Col.(4) - 0.2Sp) \times 2 / (Col.(4) + 0.8Sp)$
	$Rip(t)$ = Incremental pervious runoff for time step t
Column (5)	$Rip(t) = Rap(t) - Rap(t-1)$
Column (6)	$Rip(t) = Col.(5)$ for current row - $Col.(5)$ for preceding row.

Impervious Area Runoff

Column (7 & 8)... Did not specify to use impervious areas.

Incremental Weighted Runoff

Column (9)	$R(t) = (A_p/A_t) \times Rip(t) + (A_i/A_t) \times Rii(t)$
	$R(t) = (A_p/A_t) \times Col.(6) + (A_i/A_t) \times Col.(8)$

SCS Unit Hydrograph Method

Column (10) $Q(t)$ is computed with the SCS unit hydrograph method using $R(t)$ and $Qu(t)$.

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 1 years
 Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.7 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres
<hr/>	
Computational Time Increment	0.014 hours
Time to Peak (Computed)	11.934 hours
Flow (Peak, Computed)	5.76 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.950 hours
Flow (Peak Interpolated Output)	5.72 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	89.244
Area (User Defined)	2.366 acres
Maximum Retention (Pervious)	1.2 in
Maximum Retention (Pervious, 20 percent)	0.2 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.6 in
Runoff Volume (Pervious)	0.322 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.321 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.108 hours
Computational Time Increment	0.014 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 1 years

Storm Event: 1 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	24.70 ft ³ /s
Unit peak time, Tp	0.072 hours
Unit receding limb, Tr	0.289 hours
Total unit time, Tb	0.362 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 1 years
 Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.7 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
6.700	0.00	0.00	0.00	0.00	0.00
6.950	0.00	0.00	0.00	0.01	0.01
7.200	0.01	0.01	0.01	0.01	0.01
7.450	0.01	0.01	0.01	0.01	0.01
7.700	0.01	0.01	0.01	0.01	0.01
7.950	0.02	0.02	0.02	0.02	0.02
8.200	0.02	0.02	0.02	0.02	0.02
8.450	0.02	0.03	0.03	0.03	0.03
8.700	0.03	0.03	0.03	0.04	0.04
8.950	0.04	0.04	0.04	0.04	0.04
9.200	0.05	0.05	0.05	0.05	0.05
9.450	0.05	0.05	0.05	0.05	0.06
9.700	0.06	0.06	0.06	0.07	0.07
9.950	0.07	0.07	0.08	0.08	0.08
10.200	0.09	0.09	0.10	0.10	0.10
10.450	0.11	0.11	0.12	0.12	0.13
10.700	0.14	0.14	0.15	0.16	0.17
10.950	0.17	0.18	0.19	0.21	0.22
11.200	0.24	0.25	0.27	0.29	0.31
11.450	0.33	0.35	0.46	0.67	0.96
11.700	1.44	1.95	2.67	3.68	5.26
11.950	5.72	5.17	4.09	2.22	1.35
12.200	1.03	0.89	0.80	0.74	0.68
12.450	0.63	0.56	0.52	0.48	0.45
12.700	0.43	0.42	0.41	0.39	0.38
12.950	0.37	0.35	0.34	0.33	0.32
13.200	0.31	0.30	0.30	0.29	0.28
13.450	0.28	0.27	0.26	0.25	0.25
13.700	0.24	0.24	0.23	0.23	0.22
13.950	0.22	0.21	0.21	0.20	0.20
14.200	0.20	0.20	0.19	0.19	0.19
14.450	0.19	0.19	0.19	0.18	0.18
14.700	0.18	0.18	0.18	0.17	0.17

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 1 years

Label: DA #1

Storm Event: 1 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
14.950	0.17	0.17	0.17	0.16	0.16
15.200	0.16	0.16	0.16	0.16	0.15
15.450	0.15	0.15	0.15	0.15	0.14
15.700	0.14	0.14	0.14	0.14	0.13
15.950	0.13	0.13	0.13	0.13	0.13
16.200	0.13	0.13	0.12	0.12	0.12
16.450	0.12	0.12	0.12	0.12	0.12
16.700	0.12	0.12	0.12	0.12	0.12
16.950	0.12	0.12	0.11	0.11	0.11
17.200	0.11	0.11	0.11	0.11	0.11
17.450	0.11	0.11	0.11	0.11	0.11
17.700	0.11	0.11	0.10	0.10	0.10
17.950	0.10	0.10	0.10	0.10	0.10
18.200	0.10	0.10	0.10	0.10	0.10
18.450	0.10	0.10	0.09	0.09	0.09
18.700	0.09	0.09	0.09	0.09	0.09
18.950	0.09	0.09	0.09	0.09	0.09
19.200	0.09	0.08	0.08	0.08	0.08
19.450	0.08	0.08	0.08	0.08	0.08
19.700	0.08	0.08	0.08	0.08	0.08
19.950	0.08	0.07	0.07	0.07	0.07
20.200	0.07	0.07	0.07	0.07	0.07
20.450	0.07	0.07	0.07	0.07	0.07
20.700	0.07	0.07	0.07	0.07	0.07
20.950	0.07	0.07	0.07	0.07	0.07
21.200	0.07	0.07	0.07	0.07	0.07
21.450	0.07	0.07	0.07	0.07	0.07
21.700	0.07	0.07	0.07	0.07	0.07
21.950	0.07	0.07	0.07	0.07	0.07
22.200	0.07	0.07	0.07	0.07	0.07
22.450	0.07	0.07	0.07	0.07	0.07
22.700	0.07	0.07	0.07	0.07	0.07
22.950	0.07	0.07	0.07	0.07	0.07
23.200	0.06	0.06	0.06	0.06	0.06
23.450	0.06	0.06	0.06	0.06	0.06
23.700	0.06	0.06	0.06	0.06	0.06
23.950	0.06	0.06	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 2 years
 Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.2 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres

Computational Time Increment	0.014 hours
Time to Peak (Computed)	11.934 hours
Flow (Peak, Computed)	7.51 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.950 hours
Flow (Peak Interpolated Output)	7.42 ft ³ /s

Drainage Area	
SCS CN (Composite)	89.244
Area (User Defined)	2.366 acres
Maximum Retention (Pervious)	1.2 in
Maximum Retention (Pervious, 20 percent)	0.2 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.1 in
Runoff Volume (Pervious)	0.422 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.421 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.108 hours
Computational Time Increment	0.014 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 2 years

Storm Event: 2 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	24.70 ft ³ /s
Unit peak time, Tp	0.072 hours
Unit receding limb, Tr	0.289 hours
Total unit time, Tb	0.362 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 2 years
 Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.2 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
5.800	0.00	0.00	0.00	0.00	0.00
6.050	0.00	0.00	0.00	0.01	0.01
6.300	0.01	0.01	0.01	0.01	0.01
6.550	0.01	0.01	0.01	0.01	0.01
6.800	0.01	0.01	0.02	0.02	0.02
7.050	0.02	0.02	0.02	0.02	0.02
7.300	0.02	0.02	0.02	0.02	0.03
7.550	0.03	0.03	0.03	0.03	0.03
7.800	0.03	0.03	0.03	0.03	0.03
8.050	0.03	0.04	0.04	0.04	0.04
8.300	0.04	0.04	0.05	0.05	0.05
8.550	0.05	0.05	0.05	0.06	0.06
8.800	0.06	0.06	0.07	0.07	0.07
9.050	0.07	0.07	0.08	0.08	0.08
9.300	0.08	0.08	0.08	0.08	0.08
9.550	0.09	0.09	0.09	0.09	0.10
9.800	0.10	0.10	0.11	0.11	0.12
10.050	0.12	0.12	0.13	0.13	0.14
10.300	0.15	0.15	0.16	0.16	0.17
10.550	0.18	0.18	0.19	0.20	0.21
10.800	0.22	0.23	0.24	0.25	0.27
11.050	0.28	0.30	0.32	0.34	0.36
11.300	0.39	0.41	0.44	0.47	0.50
11.550	0.64	0.93	1.33	1.97	2.65
11.800	3.58	4.89	6.90	7.42	6.67
12.050	5.24	2.84	1.72	1.31	1.13
12.300	1.02	0.94	0.86	0.79	0.71
12.550	0.66	0.60	0.57	0.55	0.53
12.800	0.51	0.50	0.48	0.46	0.44
13.050	0.43	0.41	0.40	0.39	0.38
13.300	0.37	0.37	0.36	0.35	0.34
13.550	0.33	0.32	0.31	0.31	0.30
13.800	0.29	0.29	0.28	0.27	0.27

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 2 years

Label: DA #1

Storm Event: 2 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
14.050	0.26	0.26	0.25	0.25	0.25
14.300	0.24	0.24	0.24	0.24	0.24
14.550	0.23	0.23	0.23	0.23	0.22
14.800	0.22	0.22	0.22	0.21	0.21
15.050	0.21	0.21	0.20	0.20	0.20
15.300	0.20	0.20	0.19	0.19	0.19
15.550	0.19	0.18	0.18	0.18	0.18
15.800	0.17	0.17	0.17	0.17	0.16
16.050	0.16	0.16	0.16	0.16	0.16
16.300	0.16	0.16	0.15	0.15	0.15
16.550	0.15	0.15	0.15	0.15	0.15
16.800	0.15	0.15	0.15	0.15	0.14
17.050	0.14	0.14	0.14	0.14	0.14
17.300	0.14	0.14	0.14	0.14	0.14
17.550	0.14	0.13	0.13	0.13	0.13
17.800	0.13	0.13	0.13	0.13	0.13
18.050	0.13	0.13	0.13	0.12	0.12
18.300	0.12	0.12	0.12	0.12	0.12
18.550	0.12	0.12	0.12	0.12	0.11
18.800	0.11	0.11	0.11	0.11	0.11
19.050	0.11	0.11	0.11	0.11	0.11
19.300	0.11	0.10	0.10	0.10	0.10
19.550	0.10	0.10	0.10	0.10	0.10
19.800	0.10	0.10	0.09	0.09	0.09
20.050	0.09	0.09	0.09	0.09	0.09
20.300	0.09	0.09	0.09	0.09	0.09
20.550	0.09	0.09	0.09	0.09	0.09
20.800	0.09	0.09	0.09	0.09	0.09
21.050	0.09	0.09	0.09	0.09	0.09
21.300	0.09	0.09	0.09	0.09	0.09
21.550	0.09	0.09	0.09	0.09	0.09
21.800	0.09	0.09	0.09	0.09	0.09
22.050	0.08	0.08	0.08	0.08	0.08
22.300	0.08	0.08	0.08	0.08	0.08
22.550	0.08	0.08	0.08	0.08	0.08
22.800	0.08	0.08	0.08	0.08	0.08
23.050	0.08	0.08	0.08	0.08	0.08
23.300	0.08	0.08	0.08	0.08	0.08
23.550	0.08	0.08	0.08	0.08	0.08
23.800	0.08	0.08	0.08	0.08	0.08

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 5 years
 Storm Event: 5 Year

Storm Event	5 Year
Return Event	5 years
Duration	24.000 hours
Depth	4.1 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres
<hr/>	
Computational Time Increment	0.014 hours
Time to Peak (Computed)	11.934 hours
Flow (Peak, Computed)	10.23 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.950 hours
Flow (Peak Interpolated Output)	10.08 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	89.244
Area (User Defined)	2.366 acres
Maximum Retention (Pervious)	1.2 in
Maximum Retention (Pervious, 20 percent)	0.2 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.0 in
Runoff Volume (Pervious)	0.582 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.581 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.108 hours
Computational Time Increment	0.014 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 5 years

Storm Event: 5 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	24.70 ft ³ /s
Unit peak time, Tp	0.072 hours
Unit receding limb, Tr	0.289 hours
Total unit time, Tb	0.362 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 5 years
 Storm Event: 5 Year

Storm Event	5 Year
Return Event	5 years
Duration	24.000 hours
Depth	4.1 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
4.850	0.00	0.00	0.00	0.00	0.00
5.100	0.00	0.01	0.01	0.01	0.01
5.350	0.01	0.01	0.01	0.01	0.01
5.600	0.01	0.01	0.02	0.02	0.02
5.850	0.02	0.02	0.02	0.02	0.02
6.100	0.02	0.02	0.03	0.03	0.03
6.350	0.03	0.03	0.03	0.03	0.03
6.600	0.03	0.03	0.04	0.04	0.04
6.850	0.04	0.04	0.04	0.04	0.04
7.100	0.04	0.05	0.05	0.05	0.05
7.350	0.05	0.05	0.05	0.05	0.06
7.600	0.06	0.06	0.06	0.06	0.06
7.850	0.06	0.06	0.06	0.07	0.07
8.100	0.07	0.07	0.07	0.08	0.08
8.350	0.08	0.08	0.09	0.09	0.09
8.600	0.10	0.10	0.10	0.11	0.11
8.850	0.11	0.12	0.12	0.12	0.13
9.100	0.13	0.13	0.13	0.13	0.13
9.350	0.14	0.14	0.14	0.14	0.14
9.600	0.15	0.15	0.15	0.16	0.17
9.850	0.17	0.18	0.18	0.19	0.19
10.100	0.20	0.21	0.22	0.22	0.23
10.350	0.24	0.25	0.26	0.27	0.28
10.600	0.29	0.30	0.31	0.33	0.34
10.850	0.36	0.37	0.39	0.40	0.42
11.100	0.45	0.47	0.51	0.54	0.58
11.350	0.61	0.65	0.69	0.73	0.94
11.600	1.35	1.92	2.82	3.76	5.03
11.850	6.78	9.47	10.08	8.99	7.03
12.100	3.80	2.30	1.74	1.51	1.35
12.350	1.25	1.14	1.05	0.94	0.87
12.600	0.80	0.76	0.73	0.70	0.68
12.850	0.66	0.63	0.61	0.59	0.57

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 5 years
 Storm Event: 5 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
13.100	0.55	0.53	0.52	0.51	0.49
13.350	0.48	0.47	0.46	0.44	0.43
13.600	0.42	0.41	0.40	0.40	0.39
13.850	0.38	0.37	0.36	0.35	0.34
14.100	0.34	0.33	0.33	0.32	0.32
14.350	0.32	0.32	0.31	0.31	0.31
14.600	0.30	0.30	0.30	0.29	0.29
14.850	0.29	0.28	0.28	0.28	0.27
15.100	0.27	0.27	0.27	0.26	0.26
15.350	0.26	0.25	0.25	0.25	0.24
15.600	0.24	0.24	0.23	0.23	0.23
15.850	0.22	0.22	0.22	0.21	0.21
16.100	0.21	0.21	0.21	0.21	0.21
16.350	0.20	0.20	0.20	0.20	0.20
16.600	0.20	0.20	0.20	0.20	0.19
16.850	0.19	0.19	0.19	0.19	0.19
17.100	0.19	0.19	0.18	0.18	0.18
17.350	0.18	0.18	0.18	0.18	0.18
17.600	0.18	0.17	0.17	0.17	0.17
17.850	0.17	0.17	0.17	0.17	0.17
18.100	0.16	0.16	0.16	0.16	0.16
18.350	0.16	0.16	0.16	0.16	0.15
18.600	0.15	0.15	0.15	0.15	0.15
18.850	0.15	0.15	0.15	0.14	0.14
19.100	0.14	0.14	0.14	0.14	0.14
19.350	0.14	0.14	0.13	0.13	0.13
19.600	0.13	0.13	0.13	0.13	0.13
19.850	0.13	0.12	0.12	0.12	0.12
20.100	0.12	0.12	0.12	0.12	0.12
20.350	0.12	0.12	0.12	0.12	0.12
20.600	0.12	0.12	0.12	0.12	0.12
20.850	0.12	0.12	0.12	0.12	0.12
21.100	0.12	0.12	0.11	0.11	0.11
21.350	0.11	0.11	0.11	0.11	0.11
21.600	0.11	0.11	0.11	0.11	0.11
21.850	0.11	0.11	0.11	0.11	0.11
22.100	0.11	0.11	0.11	0.11	0.11
22.350	0.11	0.11	0.11	0.11	0.11
22.600	0.11	0.11	0.11	0.11	0.11
22.850	0.11	0.11	0.11	0.11	0.11
23.100	0.11	0.11	0.11	0.11	0.11
23.350	0.11	0.10	0.10	0.10	0.10

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 5 years

Label: DA #1

Storm Event: 5 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
23.600	0.10	0.10	0.10	0.10	0.10
23.850	0.10	0.10	0.10	0.10	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 10 years
 Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	4.8 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres
Computational Time Increment	0.014 hours
Time to Peak (Computed)	11.934 hours
Flow (Peak, Computed)	12.51 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.950 hours
Flow (Peak Interpolated Output)	12.32 ft ³ /s
Drainage Area	
SCS CN (Composite)	89.244
Area (User Defined)	2.366 acres
Maximum Retention (Pervious)	1.2 in
Maximum Retention (Pervious, 20 percent)	0.2 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.6 in
Runoff Volume (Pervious)	0.718 ac-ft
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.718 ac-ft
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.108 hours
Computational Time Increment	0.014 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 10 years

Storm Event: 10 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	24.70 ft ³ /s
Unit peak time, Tp	0.072 hours
Unit receding limb, Tr	0.289 hours
Total unit time, Tb	0.362 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 10 years
 Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	4.8 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
4.250	0.00	0.00	0.00	0.00	0.00
4.500	0.01	0.01	0.01	0.01	0.01
4.750	0.01	0.01	0.01	0.01	0.02
5.000	0.02	0.02	0.02	0.02	0.02
5.250	0.02	0.02	0.02	0.03	0.03
5.500	0.03	0.03	0.03	0.03	0.03
5.750	0.03	0.04	0.04	0.04	0.04
6.000	0.04	0.04	0.04	0.04	0.05
6.250	0.05	0.05	0.05	0.05	0.05
6.500	0.05	0.05	0.06	0.06	0.06
6.750	0.06	0.06	0.06	0.06	0.07
7.000	0.07	0.07	0.07	0.07	0.07
7.250	0.07	0.08	0.08	0.08	0.08
7.500	0.08	0.08	0.08	0.09	0.09
7.750	0.09	0.09	0.09	0.09	0.10
8.000	0.10	0.10	0.10	0.10	0.11
8.250	0.11	0.11	0.12	0.12	0.13
8.500	0.13	0.13	0.14	0.14	0.15
8.750	0.15	0.15	0.16	0.16	0.17
9.000	0.17	0.17	0.18	0.18	0.18
9.250	0.18	0.19	0.19	0.19	0.19
9.500	0.19	0.19	0.20	0.20	0.21
9.750	0.22	0.22	0.23	0.24	0.24
10.000	0.25	0.26	0.27	0.28	0.29
10.250	0.30	0.31	0.32	0.33	0.34
10.500	0.35	0.36	0.38	0.39	0.41
10.750	0.43	0.45	0.47	0.49	0.50
11.000	0.52	0.55	0.58	0.61	0.66
11.250	0.70	0.75	0.79	0.84	0.88
11.500	0.93	1.20	1.72	2.43	3.55
11.750	4.70	6.26	8.38	11.62	12.32
12.000	10.93	8.52	4.60	2.78	2.10
12.250	1.82	1.63	1.51	1.38	1.27

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 10 years
 Storm Event: 10 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
12.500	1.14	1.05	0.96	0.91	0.87
12.750	0.85	0.81	0.79	0.76	0.73
13.000	0.70	0.68	0.66	0.64	0.62
13.250	0.61	0.59	0.58	0.56	0.55
13.500	0.53	0.52	0.51	0.50	0.48
13.750	0.47	0.46	0.45	0.44	0.43
14.000	0.42	0.41	0.40	0.40	0.39
14.250	0.39	0.39	0.38	0.38	0.37
14.500	0.37	0.37	0.36	0.36	0.36
14.750	0.35	0.35	0.34	0.34	0.34
15.000	0.33	0.33	0.33	0.32	0.32
15.250	0.31	0.31	0.31	0.30	0.30
15.500	0.30	0.29	0.29	0.28	0.28
15.750	0.28	0.27	0.27	0.27	0.26
16.000	0.26	0.25	0.25	0.25	0.25
16.250	0.25	0.25	0.24	0.24	0.24
16.500	0.24	0.24	0.24	0.24	0.23
16.750	0.23	0.23	0.23	0.23	0.23
17.000	0.23	0.23	0.22	0.22	0.22
17.250	0.22	0.22	0.22	0.22	0.21
17.500	0.21	0.21	0.21	0.21	0.21
17.750	0.21	0.21	0.20	0.20	0.20
18.000	0.20	0.20	0.20	0.20	0.19
18.250	0.19	0.19	0.19	0.19	0.19
18.500	0.19	0.19	0.18	0.18	0.18
18.750	0.18	0.18	0.18	0.18	0.17
19.000	0.17	0.17	0.17	0.17	0.17
19.250	0.17	0.16	0.16	0.16	0.16
19.500	0.16	0.16	0.16	0.15	0.15
19.750	0.15	0.15	0.15	0.15	0.15
20.000	0.15	0.14	0.14	0.14	0.14
20.250	0.14	0.14	0.14	0.14	0.14
20.500	0.14	0.14	0.14	0.14	0.14
20.750	0.14	0.14	0.14	0.14	0.14
21.000	0.14	0.14	0.14	0.14	0.14
21.250	0.14	0.14	0.14	0.14	0.14
21.500	0.14	0.14	0.13	0.13	0.13
21.750	0.13	0.13	0.13	0.13	0.13
22.000	0.13	0.13	0.13	0.13	0.13
22.250	0.13	0.13	0.13	0.13	0.13
22.500	0.13	0.13	0.13	0.13	0.13
22.750	0.13	0.13	0.13	0.13	0.13

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 10 years

Label: DA #1

Storm Event: 10 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
23.000	0.13	0.13	0.13	0.13	0.13
23.250	0.13	0.13	0.13	0.13	0.12
23.500	0.12	0.12	0.12	0.12	0.12
23.750	0.12	0.12	0.12	0.12	0.12
24.000	0.12	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 25 years
 Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres

Computational Time Increment	0.014 hours
Time to Peak (Computed)	11.934 hours
Flow (Peak, Computed)	15.90 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.950 hours
Flow (Peak Interpolated Output)	15.63 ft ³ /s

Drainage Area	
SCS CN (Composite)	89.244
Area (User Defined)	2.366 acres
Maximum Retention (Pervious)	1.2 in
Maximum Retention (Pervious, 20 percent)	0.2 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.7 in
Runoff Volume (Pervious)	0.925 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.924 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.108 hours
Computational Time Increment	0.014 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 25 years

Storm Event: 25 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	24.70 ft ³ /s
Unit peak time, Tp	0.072 hours
Unit receding limb, Tr	0.289 hours
Total unit time, Tb	0.362 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 25 years
 Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
3.550	0.00	0.00	0.00	0.00	0.01
3.800	0.01	0.01	0.01	0.01	0.01
4.050	0.01	0.01	0.02	0.02	0.02
4.300	0.02	0.02	0.02	0.02	0.03
4.550	0.03	0.03	0.03	0.03	0.03
4.800	0.03	0.04	0.04	0.04	0.04
5.050	0.04	0.04	0.04	0.05	0.05
5.300	0.05	0.05	0.05	0.05	0.06
5.550	0.06	0.06	0.06	0.06	0.06
5.800	0.07	0.07	0.07	0.07	0.07
6.050	0.07	0.08	0.08	0.08	0.08
6.300	0.08	0.09	0.09	0.09	0.09
6.550	0.09	0.09	0.10	0.10	0.10
6.800	0.10	0.10	0.11	0.11	0.11
7.050	0.11	0.11	0.11	0.12	0.12
7.300	0.12	0.12	0.12	0.13	0.13
7.550	0.13	0.13	0.13	0.14	0.14
7.800	0.14	0.14	0.14	0.14	0.15
8.050	0.15	0.15	0.16	0.16	0.17
8.300	0.17	0.18	0.18	0.19	0.19
8.550	0.20	0.20	0.21	0.21	0.22
8.800	0.22	0.23	0.24	0.24	0.25
9.050	0.25	0.26	0.26	0.26	0.26
9.300	0.27	0.27	0.27	0.27	0.27
9.550	0.28	0.28	0.29	0.30	0.30
9.800	0.31	0.32	0.33	0.34	0.35
10.050	0.36	0.37	0.39	0.40	0.41
10.300	0.43	0.44	0.46	0.47	0.48
10.550	0.50	0.52	0.54	0.56	0.59
10.800	0.61	0.63	0.66	0.68	0.71
11.050	0.74	0.78	0.83	0.88	0.94
11.300	1.00	1.05	1.12	1.17	1.24
11.550	1.58	2.27	3.20	4.65	6.12

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 25 years

Label: DA #1

Storm Event: 25 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.800	8.10	10.77	14.83	15.63	13.81
12.050	10.74	5.79	3.49	2.64	2.28
12.300	2.05	1.89	1.73	1.59	1.42
12.550	1.31	1.20	1.14	1.09	1.06
12.800	1.02	0.99	0.95	0.92	0.88
13.050	0.85	0.82	0.80	0.78	0.76
13.300	0.74	0.72	0.70	0.69	0.67
13.550	0.65	0.63	0.62	0.60	0.59
13.800	0.58	0.56	0.55	0.54	0.52
14.050	0.51	0.50	0.50	0.49	0.49
14.300	0.48	0.48	0.47	0.47	0.46
14.550	0.46	0.45	0.45	0.44	0.44
14.800	0.43	0.43	0.42	0.42	0.41
15.050	0.41	0.41	0.40	0.40	0.39
15.300	0.39	0.38	0.38	0.37	0.37
15.550	0.36	0.36	0.35	0.35	0.35
15.800	0.34	0.34	0.33	0.33	0.32
16.050	0.32	0.31	0.31	0.31	0.31
16.300	0.31	0.30	0.30	0.30	0.30
16.550	0.30	0.30	0.29	0.29	0.29
16.800	0.29	0.29	0.29	0.28	0.28
17.050	0.28	0.28	0.28	0.28	0.27
17.300	0.27	0.27	0.27	0.27	0.27
17.550	0.26	0.26	0.26	0.26	0.26
17.800	0.26	0.25	0.25	0.25	0.25
18.050	0.25	0.25	0.24	0.24	0.24
18.300	0.24	0.24	0.23	0.23	0.23
18.550	0.23	0.23	0.23	0.22	0.22
18.800	0.22	0.22	0.22	0.22	0.21
19.050	0.21	0.21	0.21	0.21	0.21
19.300	0.20	0.20	0.20	0.20	0.20
19.550	0.20	0.19	0.19	0.19	0.19
19.800	0.19	0.19	0.18	0.18	0.18
20.050	0.18	0.18	0.18	0.18	0.18
20.300	0.18	0.18	0.18	0.18	0.18
20.550	0.17	0.17	0.17	0.17	0.17
20.800	0.17	0.17	0.17	0.17	0.17
21.050	0.17	0.17	0.17	0.17	0.17
21.300	0.17	0.17	0.17	0.17	0.17
21.550	0.17	0.17	0.17	0.17	0.17
21.800	0.17	0.17	0.17	0.17	0.16
22.050	0.16	0.16	0.16	0.16	0.16

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 25 years

Label: DA #1

Storm Event: 25 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
22.300	0.16	0.16	0.16	0.16	0.16
22.550	0.16	0.16	0.16	0.16	0.16
22.800	0.16	0.16	0.16	0.16	0.16
23.050	0.16	0.16	0.16	0.16	0.16
23.300	0.16	0.16	0.16	0.16	0.15
23.550	0.15	0.15	0.15	0.15	0.15
23.800	0.15	0.15	0.15	0.15	0.15

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 50 years
 Storm Event: 50 Year

Storm Event	50 Year
Return Event	50 years
Duration	24.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres

Computational Time Increment	0.014 hours
Time to Peak (Computed)	11.934 hours
Flow (Peak, Computed)	18.75 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.950 hours
Flow (Peak Interpolated Output)	18.41 ft ³ /s

Drainage Area	
SCS CN (Composite)	89.244
Area (User Defined)	2.366 acres
Maximum Retention (Pervious)	1.2 in
Maximum Retention (Pervious, 20 percent)	0.2 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.6 in
Runoff Volume (Pervious)	1.102 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.101 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.108 hours
Computational Time Increment	0.014 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 50 years

Storm Event: 50 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	24.70 ft ³ /s
Unit peak time, Tp	0.072 hours
Unit receding limb, Tr	0.289 hours
Total unit time, Tb	0.362 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 50 years
 Storm Event: 50 Year

Storm Event	50 Year
Return Event	50 years
Duration	24.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
3.150	0.00	0.00	0.00	0.01	0.01
3.400	0.01	0.01	0.01	0.01	0.01
3.650	0.02	0.02	0.02	0.02	0.02
3.900	0.02	0.03	0.03	0.03	0.03
4.150	0.03	0.03	0.04	0.04	0.04
4.400	0.04	0.04	0.04	0.05	0.05
4.650	0.05	0.05	0.05	0.06	0.06
4.900	0.06	0.06	0.06	0.07	0.07
5.150	0.07	0.07	0.07	0.07	0.08
5.400	0.08	0.08	0.08	0.08	0.09
5.650	0.09	0.09	0.09	0.10	0.10
5.900	0.10	0.10	0.10	0.11	0.11
6.150	0.11	0.11	0.11	0.12	0.12
6.400	0.12	0.12	0.13	0.13	0.13
6.650	0.13	0.13	0.14	0.14	0.14
6.900	0.14	0.14	0.15	0.15	0.15
7.150	0.15	0.16	0.16	0.16	0.16
7.400	0.16	0.17	0.17	0.17	0.17
7.650	0.18	0.18	0.18	0.18	0.19
7.900	0.19	0.19	0.19	0.19	0.20
8.150	0.20	0.21	0.22	0.22	0.23
8.400	0.23	0.24	0.25	0.25	0.26
8.650	0.27	0.27	0.28	0.29	0.29
8.900	0.30	0.31	0.32	0.32	0.33
9.150	0.33	0.33	0.33	0.34	0.34
9.400	0.34	0.34	0.34	0.35	0.35
9.650	0.36	0.37	0.38	0.39	0.40
9.900	0.42	0.43	0.44	0.45	0.47
10.150	0.48	0.50	0.51	0.53	0.55
10.400	0.56	0.58	0.60	0.62	0.64
10.650	0.66	0.69	0.72	0.75	0.78
10.900	0.81	0.84	0.87	0.90	0.95
11.150	1.01	1.08	1.14	1.21	1.28

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 50 years
 Storm Event: 50 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.400	1.35	1.42	1.50	1.91	2.73
11.650	3.85	5.58	7.31	9.65	12.78
11.900	17.53	18.41	16.23	12.59	6.78
12.150	4.09	3.09	2.67	2.40	2.21
12.400	2.02	1.86	1.66	1.53	1.40
12.650	1.33	1.28	1.24	1.19	1.15
12.900	1.11	1.07	1.03	0.99	0.96
13.150	0.93	0.91	0.89	0.87	0.85
13.400	0.82	0.80	0.78	0.76	0.74
13.650	0.72	0.70	0.69	0.67	0.66
13.900	0.64	0.63	0.61	0.60	0.59
14.150	0.58	0.57	0.57	0.56	0.56
14.400	0.55	0.54	0.54	0.53	0.53
14.650	0.52	0.52	0.51	0.51	0.50
14.900	0.50	0.49	0.48	0.48	0.47
15.150	0.47	0.46	0.46	0.45	0.45
15.400	0.44	0.43	0.43	0.42	0.42
15.650	0.41	0.41	0.40	0.40	0.39
15.900	0.39	0.38	0.37	0.37	0.37
16.150	0.36	0.36	0.36	0.36	0.35
16.400	0.35	0.35	0.35	0.35	0.34
16.650	0.34	0.34	0.34	0.34	0.33
16.900	0.33	0.33	0.33	0.33	0.32
17.150	0.32	0.32	0.32	0.32	0.32
17.400	0.31	0.31	0.31	0.31	0.30
17.650	0.30	0.30	0.30	0.30	0.30
17.900	0.29	0.29	0.29	0.29	0.29
18.150	0.28	0.28	0.28	0.28	0.28
18.400	0.27	0.27	0.27	0.27	0.27
18.650	0.26	0.26	0.26	0.26	0.26
18.900	0.25	0.25	0.25	0.25	0.25
19.150	0.24	0.24	0.24	0.24	0.24
19.400	0.23	0.23	0.23	0.23	0.23
19.650	0.22	0.22	0.22	0.22	0.22
19.900	0.21	0.21	0.21	0.21	0.21
20.150	0.21	0.21	0.21	0.21	0.20
20.400	0.20	0.20	0.20	0.20	0.20
20.650	0.20	0.20	0.20	0.20	0.20
20.900	0.20	0.20	0.20	0.20	0.20
21.150	0.20	0.20	0.20	0.20	0.20
21.400	0.20	0.20	0.20	0.20	0.19
21.650	0.19	0.19	0.19	0.19	0.19

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 50 years

Label: DA #1

Storm Event: 50 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
21.900	0.19	0.19	0.19	0.19	0.19
22.150	0.19	0.19	0.19	0.19	0.19
22.400	0.19	0.19	0.19	0.19	0.19
22.650	0.19	0.19	0.19	0.19	0.19
22.900	0.18	0.18	0.18	0.18	0.18
23.150	0.18	0.18	0.18	0.18	0.18
23.400	0.18	0.18	0.18	0.18	0.18
23.650	0.18	0.18	0.18	0.18	0.18
23.900	0.18	0.18	0.18	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #1

Return Event: 100 years
 Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	7.9 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres

Computational Time Increment	0.014 hours
Time to Peak (Computed)	11.934 hours
Flow (Peak, Computed)	21.85 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.950 hours
Flow (Peak Interpolated Output)	21.45 ft ³ /s

Drainage Area	
SCS CN (Composite)	89.244
Area (User Defined)	2.366 acres
Maximum Retention (Pervious)	1.2 in
Maximum Retention (Pervious, 20 percent)	0.2 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.6 in
Runoff Volume (Pervious)	1.297 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.295 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.108 hours
Computational Time Increment	0.014 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #1

Return Event: 100 years

Storm Event: 100 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	24.70 ft ³ /s
Unit peak time, Tp	0.072 hours
Unit receding limb, Tr	0.289 hours
Total unit time, Tb	0.362 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 100 years
 Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	7.9 in
Time of Concentration (Composite)	0.108 hours
Area (User Defined)	2.366 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
2.800	0.00	0.00	0.00	0.01	0.01
3.050	0.01	0.01	0.01	0.02	0.02
3.300	0.02	0.02	0.02	0.03	0.03
3.550	0.03	0.03	0.03	0.04	0.04
3.800	0.04	0.04	0.04	0.05	0.05
4.050	0.05	0.05	0.05	0.06	0.06
4.300	0.06	0.06	0.06	0.07	0.07
4.550	0.07	0.07	0.08	0.08	0.08
4.800	0.08	0.08	0.09	0.09	0.09
5.050	0.09	0.10	0.10	0.10	0.10
5.300	0.11	0.11	0.11	0.11	0.12
5.550	0.12	0.12	0.12	0.13	0.13
5.800	0.13	0.13	0.14	0.14	0.14
6.050	0.14	0.15	0.15	0.15	0.15
6.300	0.16	0.16	0.16	0.16	0.17
6.550	0.17	0.17	0.17	0.18	0.18
6.800	0.18	0.18	0.19	0.19	0.19
7.050	0.19	0.20	0.20	0.20	0.20
7.300	0.21	0.21	0.21	0.21	0.22
7.550	0.22	0.22	0.22	0.23	0.23
7.800	0.23	0.24	0.24	0.24	0.24
8.050	0.25	0.25	0.26	0.26	0.27
8.300	0.28	0.29	0.29	0.30	0.31
8.550	0.32	0.33	0.33	0.34	0.35
8.800	0.36	0.37	0.37	0.38	0.39
9.050	0.40	0.40	0.41	0.41	0.41
9.300	0.42	0.42	0.42	0.42	0.42
9.550	0.43	0.44	0.44	0.46	0.47
9.800	0.48	0.49	0.51	0.52	0.54
10.050	0.55	0.57	0.58	0.60	0.62
10.300	0.64	0.66	0.68	0.70	0.73
10.550	0.75	0.78	0.80	0.84	0.87
10.800	0.90	0.94	0.97	1.00	1.04

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #1

Return Event: 100 years
 Storm Event: 100 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.050	1.08	1.14	1.21	1.29	1.36
11.300	1.45	1.53	1.62	1.69	1.78
11.550	2.27	3.25	4.56	6.59	8.62
11.800	11.35	14.97	20.47	21.45	18.87
12.050	14.62	7.87	4.74	3.58	3.09
12.300	2.77	2.56	2.34	2.15	1.92
12.550	1.77	1.62	1.54	1.48	1.43
12.800	1.38	1.33	1.28	1.24	1.19
13.050	1.15	1.11	1.08	1.05	1.03
13.300	1.00	0.98	0.95	0.93	0.90
13.550	0.88	0.85	0.84	0.81	0.80
13.800	0.78	0.76	0.74	0.73	0.71
14.050	0.69	0.68	0.67	0.66	0.65
14.300	0.65	0.64	0.63	0.63	0.62
14.550	0.62	0.61	0.60	0.60	0.59
14.800	0.58	0.58	0.57	0.57	0.56
15.050	0.55	0.55	0.54	0.53	0.53
15.300	0.52	0.52	0.51	0.50	0.50
15.550	0.49	0.48	0.48	0.47	0.46
15.800	0.46	0.45	0.44	0.44	0.43
16.050	0.43	0.42	0.42	0.42	0.41
16.300	0.41	0.41	0.41	0.40	0.40
16.550	0.40	0.40	0.40	0.39	0.39
16.800	0.39	0.39	0.38	0.38	0.38
17.050	0.38	0.38	0.37	0.37	0.37
17.300	0.37	0.36	0.36	0.36	0.36
17.550	0.35	0.35	0.35	0.35	0.35
17.800	0.34	0.34	0.34	0.34	0.33
18.050	0.33	0.33	0.33	0.32	0.32
18.300	0.32	0.32	0.32	0.31	0.31
18.550	0.31	0.31	0.30	0.30	0.30
18.800	0.30	0.30	0.29	0.29	0.29
19.050	0.29	0.28	0.28	0.28	0.28
19.300	0.27	0.27	0.27	0.27	0.27
19.550	0.26	0.26	0.26	0.26	0.25
19.800	0.25	0.25	0.25	0.25	0.24
20.050	0.24	0.24	0.24	0.24	0.24
20.300	0.24	0.24	0.24	0.24	0.24
20.550	0.23	0.23	0.23	0.23	0.23
20.800	0.23	0.23	0.23	0.23	0.23
21.050	0.23	0.23	0.23	0.23	0.23
21.300	0.23	0.23	0.23	0.23	0.23

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 100 years

Label: DA #1

Storm Event: 100 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
21.550	0.23	0.22	0.22	0.22	0.22
21.800	0.22	0.22	0.22	0.22	0.22
22.050	0.22	0.22	0.22	0.22	0.22
22.300	0.22	0.22	0.22	0.22	0.22
22.550	0.22	0.22	0.22	0.22	0.21
22.800	0.21	0.21	0.21	0.21	0.21
23.050	0.21	0.21	0.21	0.21	0.21
23.300	0.21	0.21	0.21	0.21	0.21
23.550	0.21	0.21	0.21	0.21	0.21
23.800	0.20	0.20	0.20	0.20	0.20

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 1 years
 Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.7 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres
<hr/>	
Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.191 hours
Flow (Peak, Computed)	0.38 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	0.38 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	0.827 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.6 in
Runoff Volume (Pervious)	0.040 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.040 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 1 years

Storm Event: 1 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	2.26 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.103 hours
Total unit time, Tb	1.379 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 1 years
 Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.7 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.650	0.00	0.00	0.01	0.01	0.04
11.900	0.08	0.13	0.21	0.28	0.34
12.150	0.38	0.38	0.35	0.31	0.27
12.400	0.23	0.20	0.18	0.16	0.14
12.650	0.13	0.12	0.11	0.10	0.09
12.900	0.08	0.08	0.08	0.07	0.07
13.150	0.07	0.06	0.06	0.06	0.06
13.400	0.06	0.05	0.05	0.05	0.05
13.650	0.05	0.05	0.05	0.05	0.05
13.900	0.04	0.04	0.04	0.04	0.04
14.150	0.04	0.04	0.04	0.04	0.04
14.400	0.04	0.04	0.04	0.04	0.04
14.650	0.03	0.03	0.03	0.03	0.03
14.900	0.03	0.03	0.03	0.03	0.03
15.150	0.03	0.03	0.03	0.03	0.03
15.400	0.03	0.03	0.03	0.03	0.03
15.650	0.03	0.03	0.03	0.03	0.03
15.900	0.03	0.03	0.03	0.03	0.03
16.150	0.03	0.03	0.02	0.02	0.02
16.400	0.02	0.02	0.02	0.02	0.02
16.650	0.02	0.02	0.02	0.02	0.02
16.900	0.02	0.02	0.02	0.02	0.02
17.150	0.02	0.02	0.02	0.02	0.02
17.400	0.02	0.02	0.02	0.02	0.02
17.650	0.02	0.02	0.02	0.02	0.02
17.900	0.02	0.02	0.02	0.02	0.02
18.150	0.02	0.02	0.02	0.02	0.02
18.400	0.02	0.02	0.02	0.02	0.02
18.650	0.02	0.02	0.02	0.02	0.02
18.900	0.02	0.02	0.02	0.02	0.02
19.150	0.02	0.02	0.02	0.02	0.02
19.400	0.02	0.02	0.02	0.02	0.02
19.650	0.02	0.02	0.02	0.02	0.02

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 1 years
 Storm Event: 1 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
19.900	0.02	0.02	0.02	0.02	0.02
20.150	0.02	0.02	0.02	0.01	0.01
20.400	0.01	0.01	0.01	0.01	0.01
20.650	0.01	0.01	0.01	0.01	0.01
20.900	0.01	0.01	0.01	0.01	0.01
21.150	0.01	0.01	0.01	0.01	0.01
21.400	0.01	0.01	0.01	0.01	0.01
21.650	0.01	0.01	0.01	0.01	0.01
21.900	0.01	0.01	0.01	0.01	0.01
22.150	0.01	0.01	0.01	0.01	0.01
22.400	0.01	0.01	0.01	0.01	0.01
22.650	0.01	0.01	0.01	0.01	0.01
22.900	0.01	0.01	0.01	0.01	0.01
23.150	0.01	0.01	0.01	0.01	0.01
23.400	0.01	0.01	0.01	0.01	0.01
23.650	0.01	0.01	0.01	0.01	0.01
23.900	0.01	0.01	0.01	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 2 years
 Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.2 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres
<hr/>	
Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.136 hours
Flow (Peak, Computed)	0.64 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	0.64 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	0.827 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.9 in
Runoff Volume (Pervious)	0.062 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.062 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 2 years

Storm Event: 2 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	2.26 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.103 hours
Total unit time, Tb	1.379 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 2 years
 Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.2 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.400	0.00	0.00	0.00	0.00	0.01
11.650	0.01	0.02	0.04	0.06	0.11
11.900	0.18	0.28	0.40	0.52	0.60
12.150	0.64	0.63	0.57	0.50	0.43
12.400	0.37	0.32	0.28	0.25	0.22
12.650	0.19	0.17	0.16	0.15	0.13
12.900	0.13	0.12	0.11	0.11	0.10
13.150	0.10	0.09	0.09	0.09	0.08
13.400	0.08	0.08	0.08	0.08	0.07
13.650	0.07	0.07	0.07	0.07	0.07
13.900	0.06	0.06	0.06	0.06	0.06
14.150	0.06	0.06	0.06	0.05	0.05
14.400	0.05	0.05	0.05	0.05	0.05
14.650	0.05	0.05	0.05	0.05	0.05
14.900	0.05	0.05	0.05	0.05	0.05
15.150	0.05	0.05	0.04	0.04	0.04
15.400	0.04	0.04	0.04	0.04	0.04
15.650	0.04	0.04	0.04	0.04	0.04
15.900	0.04	0.04	0.04	0.04	0.04
16.150	0.04	0.04	0.04	0.04	0.03
16.400	0.03	0.03	0.03	0.03	0.03
16.650	0.03	0.03	0.03	0.03	0.03
16.900	0.03	0.03	0.03	0.03	0.03
17.150	0.03	0.03	0.03	0.03	0.03
17.400	0.03	0.03	0.03	0.03	0.03
17.650	0.03	0.03	0.03	0.03	0.03
17.900	0.03	0.03	0.03	0.03	0.03
18.150	0.03	0.03	0.03	0.03	0.03
18.400	0.03	0.03	0.03	0.03	0.03
18.650	0.03	0.03	0.03	0.03	0.03
18.900	0.03	0.03	0.03	0.03	0.03
19.150	0.02	0.02	0.02	0.02	0.02
19.400	0.02	0.02	0.02	0.02	0.02

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 2 years
 Storm Event: 2 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
19.650	0.02	0.02	0.02	0.02	0.02
19.900	0.02	0.02	0.02	0.02	0.02
20.150	0.02	0.02	0.02	0.02	0.02
20.400	0.02	0.02	0.02	0.02	0.02
20.650	0.02	0.02	0.02	0.02	0.02
20.900	0.02	0.02	0.02	0.02	0.02
21.150	0.02	0.02	0.02	0.02	0.02
21.400	0.02	0.02	0.02	0.02	0.02
21.650	0.02	0.02	0.02	0.02	0.02
21.900	0.02	0.02	0.02	0.02	0.02
22.150	0.02	0.02	0.02	0.02	0.02
22.400	0.02	0.02	0.02	0.02	0.02
22.650	0.02	0.02	0.02	0.02	0.02
22.900	0.02	0.02	0.02	0.02	0.02
23.150	0.02	0.02	0.02	0.02	0.02
23.400	0.02	0.02	0.02	0.02	0.02
23.650	0.02	0.02	0.02	0.02	0.02
23.900	0.02	0.02	0.02	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 5 years
 Storm Event: 5 Year

Storm Event	5 Year
Return Event	5 years
Duration	24.000 hours
Depth	4.1 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres
<hr/>	
Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.136 hours
Flow (Peak, Computed)	1.11 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	1.10 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	0.827 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.5 in
Runoff Volume (Pervious)	0.101 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.101 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 5 years

Storm Event: 5 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	2.26 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.103 hours
Total unit time, Tb	1.379 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 5 years
 Storm Event: 5 Year

Storm Event	5 Year
Return Event	5 years
Duration	24.000 hours
Depth	4.1 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
10.650	0.00	0.00	0.00	0.00	0.00
10.900	0.00	0.01	0.01	0.01	0.01
11.150	0.01	0.01	0.02	0.02	0.02
11.400	0.02	0.03	0.03	0.04	0.04
11.650	0.06	0.08	0.11	0.17	0.26
11.900	0.39	0.56	0.75	0.93	1.06
12.150	1.10	1.06	0.96	0.84	0.71
12.400	0.60	0.52	0.45	0.39	0.35
12.650	0.31	0.28	0.25	0.23	0.21
12.900	0.19	0.18	0.17	0.16	0.16
13.150	0.15	0.14	0.14	0.13	0.13
13.400	0.12	0.12	0.12	0.11	0.11
13.650	0.11	0.11	0.10	0.10	0.10
13.900	0.10	0.09	0.09	0.09	0.09
14.150	0.09	0.08	0.08	0.08	0.08
14.400	0.08	0.08	0.08	0.08	0.08
14.650	0.07	0.07	0.07	0.07	0.07
14.900	0.07	0.07	0.07	0.07	0.07
15.150	0.07	0.07	0.07	0.07	0.07
15.400	0.06	0.06	0.06	0.06	0.06
15.650	0.06	0.06	0.06	0.06	0.06
15.900	0.06	0.06	0.06	0.06	0.05
16.150	0.05	0.05	0.05	0.05	0.05
16.400	0.05	0.05	0.05	0.05	0.05
16.650	0.05	0.05	0.05	0.05	0.05
16.900	0.05	0.05	0.05	0.05	0.05
17.150	0.05	0.05	0.05	0.05	0.05
17.400	0.05	0.05	0.05	0.05	0.04
17.650	0.04	0.04	0.04	0.04	0.04
17.900	0.04	0.04	0.04	0.04	0.04
18.150	0.04	0.04	0.04	0.04	0.04
18.400	0.04	0.04	0.04	0.04	0.04
18.650	0.04	0.04	0.04	0.04	0.04

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 5 years
 Storm Event: 5 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
18.900	0.04	0.04	0.04	0.04	0.04
19.150	0.04	0.04	0.04	0.04	0.04
19.400	0.04	0.03	0.03	0.03	0.03
19.650	0.03	0.03	0.03	0.03	0.03
19.900	0.03	0.03	0.03	0.03	0.03
20.150	0.03	0.03	0.03	0.03	0.03
20.400	0.03	0.03	0.03	0.03	0.03
20.650	0.03	0.03	0.03	0.03	0.03
20.900	0.03	0.03	0.03	0.03	0.03
21.150	0.03	0.03	0.03	0.03	0.03
21.400	0.03	0.03	0.03	0.03	0.03
21.650	0.03	0.03	0.03	0.03	0.03
21.900	0.03	0.03	0.03	0.03	0.03
22.150	0.03	0.03	0.03	0.03	0.03
22.400	0.03	0.03	0.03	0.03	0.03
22.650	0.03	0.03	0.03	0.03	0.03
22.900	0.03	0.03	0.03	0.03	0.03
23.150	0.03	0.03	0.03	0.03	0.03
23.400	0.03	0.03	0.03	0.03	0.03
23.650	0.03	0.03	0.03	0.03	0.03
23.900	0.03	0.03	0.03	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 10 years
 Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	4.8 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres
<hr/>	
Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.136 hours
Flow (Peak, Computed)	1.54 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	1.53 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	0.827 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.0 in
Runoff Volume (Pervious)	0.138 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.137 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 10 years

Storm Event: 10 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	2.26 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.103 hours
Total unit time, Tb	1.379 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 10 years
 Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	4.8 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
10.000	0.00	0.00	0.00	0.00	0.00
10.250	0.00	0.00	0.01	0.01	0.01
10.500	0.01	0.01	0.01	0.01	0.01
10.750	0.01	0.02	0.02	0.02	0.02
11.000	0.02	0.03	0.03	0.03	0.03
11.250	0.04	0.04	0.05	0.05	0.06
11.500	0.06	0.07	0.08	0.10	0.14
11.750	0.19	0.27	0.40	0.58	0.82
12.000	1.08	1.32	1.48	1.53	1.46
12.250	1.32	1.14	0.97	0.82	0.70
12.500	0.60	0.53	0.46	0.41	0.37
12.750	0.33	0.30	0.28	0.26	0.24
13.000	0.23	0.21	0.20	0.19	0.19
13.250	0.18	0.17	0.17	0.16	0.16
13.500	0.15	0.15	0.14	0.14	0.14
13.750	0.13	0.13	0.13	0.12	0.12
14.000	0.12	0.12	0.11	0.11	0.11
14.250	0.11	0.11	0.10	0.10	0.10
14.500	0.10	0.10	0.10	0.10	0.10
14.750	0.09	0.09	0.09	0.09	0.09
15.000	0.09	0.09	0.09	0.09	0.09
15.250	0.09	0.08	0.08	0.08	0.08
15.500	0.08	0.08	0.08	0.08	0.08
15.750	0.08	0.08	0.07	0.07	0.07
16.000	0.07	0.07	0.07	0.07	0.07
16.250	0.07	0.07	0.07	0.07	0.07
16.500	0.06	0.06	0.06	0.06	0.06
16.750	0.06	0.06	0.06	0.06	0.06
17.000	0.06	0.06	0.06	0.06	0.06
17.250	0.06	0.06	0.06	0.06	0.06
17.500	0.06	0.06	0.06	0.06	0.06
17.750	0.06	0.06	0.06	0.06	0.05
18.000	0.05	0.05	0.05	0.05	0.05

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 10 years

Label: DA #2

Storm Event: 10 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
18.250	0.05	0.05	0.05	0.05	0.05
18.500	0.05	0.05	0.05	0.05	0.05
18.750	0.05	0.05	0.05	0.05	0.05
19.000	0.05	0.05	0.05	0.05	0.05
19.250	0.05	0.05	0.05	0.04	0.04
19.500	0.04	0.04	0.04	0.04	0.04
19.750	0.04	0.04	0.04	0.04	0.04
20.000	0.04	0.04	0.04	0.04	0.04
20.250	0.04	0.04	0.04	0.04	0.04
20.500	0.04	0.04	0.04	0.04	0.04
20.750	0.04	0.04	0.04	0.04	0.04
21.000	0.04	0.04	0.04	0.04	0.04
21.250	0.04	0.04	0.04	0.04	0.04
21.500	0.04	0.04	0.04	0.04	0.04
21.750	0.04	0.04	0.04	0.04	0.04
22.000	0.04	0.04	0.04	0.04	0.04
22.250	0.04	0.04	0.04	0.04	0.04
22.500	0.04	0.04	0.04	0.04	0.04
22.750	0.04	0.04	0.04	0.04	0.03
23.000	0.03	0.03	0.03	0.03	0.03
23.250	0.03	0.03	0.03	0.03	0.03
23.500	0.03	0.03	0.03	0.03	0.03
23.750	0.03	0.03	0.03	0.03	0.03
24.000	0.03	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 25 years
 Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres
<hr/>	
Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.136 hours
Flow (Peak, Computed)	2.22 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	2.20 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	0.827 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.8 in
Runoff Volume (Pervious)	0.196 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.195 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 25 years

Storm Event: 25 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	2.26 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.103 hours
Total unit time, Tb	1.379 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 25 years
 Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
9.000	0.00	0.00	0.00	0.00	0.00
9.250	0.00	0.00	0.00	0.01	0.01
9.500	0.01	0.01	0.01	0.01	0.01
9.750	0.01	0.01	0.01	0.01	0.01
10.000	0.01	0.02	0.02	0.02	0.02
10.250	0.02	0.02	0.02	0.03	0.03
10.500	0.03	0.03	0.03	0.04	0.04
10.750	0.04	0.04	0.05	0.05	0.05
11.000	0.06	0.06	0.06	0.07	0.07
11.250	0.08	0.09	0.09	0.10	0.11
11.500	0.12	0.13	0.15	0.18	0.24
11.750	0.32	0.45	0.64	0.91	1.25
12.000	1.62	1.94	2.15	2.20	2.10
12.250	1.88	1.62	1.36	1.15	0.98
12.500	0.84	0.73	0.64	0.57	0.50
12.750	0.45	0.41	0.38	0.35	0.33
13.000	0.31	0.29	0.28	0.26	0.25
13.250	0.24	0.23	0.22	0.22	0.21
13.500	0.21	0.20	0.20	0.19	0.19
13.750	0.18	0.18	0.17	0.17	0.16
14.000	0.16	0.16	0.15	0.15	0.15
14.250	0.14	0.14	0.14	0.14	0.14
14.500	0.13	0.13	0.13	0.13	0.13
14.750	0.13	0.13	0.12	0.12	0.12
15.000	0.12	0.12	0.12	0.12	0.12
15.250	0.11	0.11	0.11	0.11	0.11
15.500	0.11	0.11	0.11	0.10	0.10
15.750	0.10	0.10	0.10	0.10	0.10
16.000	0.10	0.09	0.09	0.09	0.09
16.250	0.09	0.09	0.09	0.09	0.09
16.500	0.09	0.09	0.09	0.08	0.08
16.750	0.08	0.08	0.08	0.08	0.08
17.000	0.08	0.08	0.08	0.08	0.08

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 25 years
 Storm Event: 25 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
17.250	0.08	0.08	0.08	0.08	0.08
17.500	0.08	0.08	0.08	0.08	0.08
17.750	0.07	0.07	0.07	0.07	0.07
18.000	0.07	0.07	0.07	0.07	0.07
18.250	0.07	0.07	0.07	0.07	0.07
18.500	0.07	0.07	0.07	0.07	0.07
18.750	0.07	0.07	0.06	0.06	0.06
19.000	0.06	0.06	0.06	0.06	0.06
19.250	0.06	0.06	0.06	0.06	0.06
19.500	0.06	0.06	0.06	0.06	0.06
19.750	0.06	0.06	0.06	0.05	0.05
20.000	0.05	0.05	0.05	0.05	0.05
20.250	0.05	0.05	0.05	0.05	0.05
20.500	0.05	0.05	0.05	0.05	0.05
20.750	0.05	0.05	0.05	0.05	0.05
21.000	0.05	0.05	0.05	0.05	0.05
21.250	0.05	0.05	0.05	0.05	0.05
21.500	0.05	0.05	0.05	0.05	0.05
21.750	0.05	0.05	0.05	0.05	0.05
22.000	0.05	0.05	0.05	0.05	0.05
22.250	0.05	0.05	0.05	0.05	0.05
22.500	0.05	0.05	0.05	0.05	0.05
22.750	0.05	0.05	0.05	0.05	0.05
23.000	0.05	0.05	0.05	0.05	0.05
23.250	0.05	0.05	0.05	0.05	0.05
23.500	0.05	0.05	0.04	0.04	0.04
23.750	0.04	0.04	0.04	0.04	0.04
24.000	0.04	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 50 years
 Storm Event: 50 Year

Storm Event	50 Year
Return Event	50 years
Duration	24.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres
<hr/>	
Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.136 hours
Flow (Peak, Computed)	2.83 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	2.80 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	0.827 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.6 in
Runoff Volume (Pervious)	0.248 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.246 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 50 years

Storm Event: 50 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	2.26 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.103 hours
Total unit time, Tb	1.379 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 50 years
 Storm Event: 50 Year

Storm Event	50 Year
Return Event	50 years
Duration	24.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
8.300	0.00	0.00	0.00	0.00	0.00
8.550	0.00	0.00	0.00	0.00	0.01
8.800	0.01	0.01	0.01	0.01	0.01
9.050	0.01	0.01	0.01	0.01	0.01
9.300	0.02	0.02	0.02	0.02	0.02
9.550	0.02	0.02	0.02	0.02	0.02
9.800	0.02	0.03	0.03	0.03	0.03
10.050	0.03	0.03	0.03	0.04	0.04
10.300	0.04	0.04	0.05	0.05	0.05
10.550	0.05	0.06	0.06	0.06	0.07
10.800	0.07	0.07	0.08	0.08	0.09
11.050	0.09	0.10	0.10	0.11	0.12
11.300	0.13	0.14	0.15	0.16	0.17
11.550	0.19	0.21	0.26	0.33	0.44
11.800	0.61	0.86	1.20	1.63	2.10
12.050	2.50	2.75	2.80	2.66	2.37
12.300	2.03	1.71	1.44	1.22	1.05
12.550	0.91	0.80	0.70	0.62	0.56
12.800	0.51	0.47	0.43	0.40	0.38
13.050	0.36	0.34	0.32	0.31	0.29
13.300	0.28	0.27	0.27	0.26	0.25
13.550	0.25	0.24	0.23	0.23	0.22
13.800	0.22	0.21	0.21	0.20	0.20
14.050	0.19	0.19	0.18	0.18	0.18
14.300	0.17	0.17	0.17	0.17	0.16
14.550	0.16	0.16	0.16	0.16	0.15
14.800	0.15	0.15	0.15	0.15	0.15
15.050	0.15	0.14	0.14	0.14	0.14
15.300	0.14	0.14	0.13	0.13	0.13
15.550	0.13	0.13	0.13	0.13	0.12
15.800	0.12	0.12	0.12	0.12	0.12
16.050	0.11	0.11	0.11	0.11	0.11
16.300	0.11	0.11	0.11	0.11	0.10

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 50 years
 Storm Event: 50 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
16.550	0.10	0.10	0.10	0.10	0.10
16.800	0.10	0.10	0.10	0.10	0.10
17.050	0.10	0.10	0.10	0.10	0.10
17.300	0.10	0.09	0.09	0.09	0.09
17.550	0.09	0.09	0.09	0.09	0.09
17.800	0.09	0.09	0.09	0.09	0.09
18.050	0.09	0.09	0.09	0.09	0.08
18.300	0.08	0.08	0.08	0.08	0.08
18.550	0.08	0.08	0.08	0.08	0.08
18.800	0.08	0.08	0.08	0.08	0.08
19.050	0.08	0.08	0.07	0.07	0.07
19.300	0.07	0.07	0.07	0.07	0.07
19.550	0.07	0.07	0.07	0.07	0.07
19.800	0.07	0.07	0.07	0.07	0.07
20.050	0.06	0.06	0.06	0.06	0.06
20.300	0.06	0.06	0.06	0.06	0.06
20.550	0.06	0.06	0.06	0.06	0.06
20.800	0.06	0.06	0.06	0.06	0.06
21.050	0.06	0.06	0.06	0.06	0.06
21.300	0.06	0.06	0.06	0.06	0.06
21.550	0.06	0.06	0.06	0.06	0.06
21.800	0.06	0.06	0.06	0.06	0.06
22.050	0.06	0.06	0.06	0.06	0.06
22.300	0.06	0.06	0.06	0.06	0.06
22.550	0.06	0.06	0.06	0.06	0.06
22.800	0.06	0.06	0.06	0.06	0.06
23.050	0.06	0.06	0.06	0.06	0.05
23.300	0.05	0.05	0.05	0.05	0.05
23.550	0.05	0.05	0.05	0.05	0.05
23.800	0.05	0.05	0.05	0.05	0.05

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #2

Return Event: 100 years
 Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	7.9 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres

Computational Time Increment	0.055 hours
Time to Peak (Computed)	12.136 hours
Flow (Peak, Computed)	3.51 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	3.47 ft ³ /s

Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	0.827 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.5 in
Runoff Volume (Pervious)	0.307 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.305 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.414 hours
Computational Time Increment	0.055 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #2

Return Event: 100 years

Storm Event: 100 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	2.26 ft ³ /s
Unit peak time, Tp	0.276 hours
Unit receding limb, Tr	1.103 hours
Total unit time, Tb	1.379 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 100 years
 Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	7.9 in
Time of Concentration (Composite)	0.414 hours
Area (User Defined)	0.827 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
7.600	0.00	0.00	0.00	0.00	0.00
7.850	0.00	0.00	0.00	0.00	0.01
8.100	0.01	0.01	0.01	0.01	0.01
8.350	0.01	0.01	0.01	0.01	0.01
8.600	0.01	0.01	0.02	0.02	0.02
8.850	0.02	0.02	0.02	0.02	0.02
9.100	0.02	0.03	0.03	0.03	0.03
9.350	0.03	0.03	0.03	0.03	0.04
9.600	0.04	0.04	0.04	0.04	0.04
9.850	0.04	0.04	0.05	0.05	0.05
10.100	0.05	0.06	0.06	0.06	0.06
10.350	0.07	0.07	0.07	0.08	0.08
10.600	0.08	0.09	0.09	0.10	0.10
10.850	0.11	0.11	0.12	0.12	0.13
11.100	0.14	0.15	0.16	0.17	0.18
11.350	0.19	0.20	0.22	0.23	0.26
11.600	0.29	0.35	0.44	0.58	0.80
11.850	1.12	1.54	2.08	2.64	3.12
12.100	3.42	3.47	3.28	2.93	2.50
12.350	2.10	1.76	1.50	1.28	1.11
12.600	0.97	0.85	0.76	0.68	0.61
12.850	0.56	0.52	0.49	0.46	0.43
13.100	0.41	0.39	0.37	0.35	0.34
13.350	0.33	0.32	0.31	0.30	0.29
13.600	0.29	0.28	0.27	0.27	0.26
13.850	0.25	0.25	0.24	0.24	0.23
14.100	0.22	0.22	0.21	0.21	0.21
14.350	0.20	0.20	0.20	0.20	0.19
14.600	0.19	0.19	0.19	0.18	0.18
14.850	0.18	0.18	0.18	0.18	0.17
15.100	0.17	0.17	0.17	0.17	0.16
15.350	0.16	0.16	0.16	0.16	0.16
15.600	0.15	0.15	0.15	0.15	0.15

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #2

Return Event: 100 years
 Storm Event: 100 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
15.850	0.14	0.14	0.14	0.14	0.14
16.100	0.14	0.13	0.13	0.13	0.13
16.350	0.13	0.13	0.13	0.12	0.12
16.600	0.12	0.12	0.12	0.12	0.12
16.850	0.12	0.12	0.12	0.12	0.12
17.100	0.12	0.12	0.12	0.11	0.11
17.350	0.11	0.11	0.11	0.11	0.11
17.600	0.11	0.11	0.11	0.11	0.11
17.850	0.11	0.11	0.11	0.10	0.10
18.100	0.10	0.10	0.10	0.10	0.10
18.350	0.10	0.10	0.10	0.10	0.10
18.600	0.10	0.10	0.10	0.09	0.09
18.850	0.09	0.09	0.09	0.09	0.09
19.100	0.09	0.09	0.09	0.09	0.09
19.350	0.09	0.09	0.08	0.08	0.08
19.600	0.08	0.08	0.08	0.08	0.08
19.850	0.08	0.08	0.08	0.08	0.08
20.100	0.08	0.08	0.07	0.07	0.07
20.350	0.07	0.07	0.07	0.07	0.07
20.600	0.07	0.07	0.07	0.07	0.07
20.850	0.07	0.07	0.07	0.07	0.07
21.100	0.07	0.07	0.07	0.07	0.07
21.350	0.07	0.07	0.07	0.07	0.07
21.600	0.07	0.07	0.07	0.07	0.07
21.850	0.07	0.07	0.07	0.07	0.07
22.100	0.07	0.07	0.07	0.07	0.07
22.350	0.07	0.07	0.07	0.07	0.07
22.600	0.07	0.07	0.07	0.07	0.07
22.850	0.07	0.07	0.07	0.07	0.07
23.100	0.07	0.07	0.07	0.07	0.07
23.350	0.06	0.06	0.06	0.06	0.06
23.600	0.06	0.06	0.06	0.06	0.06
23.850	0.06	0.06	0.06	0.06	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #3

Return Event: 1 years
 Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.7 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.029 hours
Flow (Peak, Computed)	0.97 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.050 hours
Flow (Peak Interpolated Output)	0.94 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	72.775
Area (User Defined)	1.164 acres
Maximum Retention (Pervious)	3.7 in
Maximum Retention (Pervious, 20 percent)	0.7 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.7 in
Runoff Volume (Pervious)	0.064 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.064 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #3

Return Event: 1 years

Storm Event: 1 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.60 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 1 years
 Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.7 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.550	0.00	0.00	0.02	0.04	0.09
11.800	0.16	0.30	0.54	0.79	0.94
12.050	0.94	0.75	0.52	0.37	0.29
12.300	0.24	0.21	0.19	0.17	0.16
12.550	0.14	0.13	0.12	0.12	0.11
12.800	0.11	0.11	0.10	0.10	0.10
13.050	0.09	0.09	0.09	0.09	0.08
13.300	0.08	0.08	0.08	0.08	0.07
13.550	0.07	0.07	0.07	0.07	0.07
13.800	0.07	0.06	0.06	0.06	0.06
14.050	0.06	0.06	0.06	0.06	0.06
14.300	0.05	0.05	0.05	0.05	0.05
14.550	0.05	0.05	0.05	0.05	0.05
14.800	0.05	0.05	0.05	0.05	0.05
15.050	0.05	0.05	0.05	0.05	0.05
15.300	0.05	0.04	0.04	0.04	0.04
15.550	0.04	0.04	0.04	0.04	0.04
15.800	0.04	0.04	0.04	0.04	0.04
16.050	0.04	0.04	0.04	0.04	0.04
16.300	0.04	0.04	0.04	0.04	0.04
16.550	0.04	0.04	0.04	0.04	0.03
16.800	0.03	0.03	0.03	0.03	0.03
17.050	0.03	0.03	0.03	0.03	0.03
17.300	0.03	0.03	0.03	0.03	0.03
17.550	0.03	0.03	0.03	0.03	0.03
17.800	0.03	0.03	0.03	0.03	0.03
18.050	0.03	0.03	0.03	0.03	0.03
18.300	0.03	0.03	0.03	0.03	0.03
18.550	0.03	0.03	0.03	0.03	0.03
18.800	0.03	0.03	0.03	0.03	0.03
19.050	0.03	0.03	0.03	0.03	0.03
19.300	0.03	0.03	0.03	0.03	0.02
19.550	0.02	0.02	0.02	0.02	0.02

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 1 years
 Storm Event: 1 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
19.800	0.02	0.02	0.02	0.02	0.02
20.050	0.02	0.02	0.02	0.02	0.02
20.300	0.02	0.02	0.02	0.02	0.02
20.550	0.02	0.02	0.02	0.02	0.02
20.800	0.02	0.02	0.02	0.02	0.02
21.050	0.02	0.02	0.02	0.02	0.02
21.300	0.02	0.02	0.02	0.02	0.02
21.550	0.02	0.02	0.02	0.02	0.02
21.800	0.02	0.02	0.02	0.02	0.02
22.050	0.02	0.02	0.02	0.02	0.02
22.300	0.02	0.02	0.02	0.02	0.02
22.550	0.02	0.02	0.02	0.02	0.02
22.800	0.02	0.02	0.02	0.02	0.02
23.050	0.02	0.02	0.02	0.02	0.02
23.300	0.02	0.02	0.02	0.02	0.02
23.550	0.02	0.02	0.02	0.02	0.02
23.800	0.02	0.02	0.02	0.02	0.02

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #3

Return Event: 2 years
 Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.2 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.029 hours
Flow (Peak, Computed)	1.52 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.000 hours
Flow (Peak Interpolated Output)	1.51 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	72.775
Area (User Defined)	1.164 acres
Maximum Retention (Pervious)	3.7 in
Maximum Retention (Pervious, 20 percent)	0.7 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.097 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.096 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #3

Return Event: 2 years

Storm Event: 2 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.60 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 2 years
 Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.2 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.050	0.00	0.00	0.00	0.00	0.01
11.300	0.01	0.01	0.02	0.02	0.03
11.550	0.03	0.05	0.08	0.14	0.23
11.800	0.37	0.59	0.95	1.32	1.51
12.050	1.47	1.15	0.79	0.55	0.43
12.300	0.36	0.31	0.28	0.25	0.23
12.550	0.21	0.19	0.18	0.17	0.16
12.800	0.16	0.15	0.15	0.14	0.14
13.050	0.13	0.13	0.13	0.12	0.12
13.300	0.12	0.11	0.11	0.11	0.11
13.550	0.10	0.10	0.10	0.10	0.09
13.800	0.09	0.09	0.09	0.09	0.08
14.050	0.08	0.08	0.08	0.08	0.08
14.300	0.08	0.08	0.08	0.08	0.07
14.550	0.07	0.07	0.07	0.07	0.07
14.800	0.07	0.07	0.07	0.07	0.07
15.050	0.07	0.07	0.07	0.07	0.06
15.300	0.06	0.06	0.06	0.06	0.06
15.550	0.06	0.06	0.06	0.06	0.06
15.800	0.06	0.06	0.06	0.05	0.05
16.050	0.05	0.05	0.05	0.05	0.05
16.300	0.05	0.05	0.05	0.05	0.05
16.550	0.05	0.05	0.05	0.05	0.05
16.800	0.05	0.05	0.05	0.05	0.05
17.050	0.05	0.05	0.05	0.05	0.05
17.300	0.05	0.05	0.05	0.05	0.04
17.550	0.04	0.04	0.04	0.04	0.04
17.800	0.04	0.04	0.04	0.04	0.04
18.050	0.04	0.04	0.04	0.04	0.04
18.300	0.04	0.04	0.04	0.04	0.04
18.550	0.04	0.04	0.04	0.04	0.04
18.800	0.04	0.04	0.04	0.04	0.04
19.050	0.04	0.04	0.04	0.04	0.04

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 2 years
 Storm Event: 2 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
19.300	0.04	0.04	0.03	0.03	0.03
19.550	0.03	0.03	0.03	0.03	0.03
19.800	0.03	0.03	0.03	0.03	0.03
20.050	0.03	0.03	0.03	0.03	0.03
20.300	0.03	0.03	0.03	0.03	0.03
20.550	0.03	0.03	0.03	0.03	0.03
20.800	0.03	0.03	0.03	0.03	0.03
21.050	0.03	0.03	0.03	0.03	0.03
21.300	0.03	0.03	0.03	0.03	0.03
21.550	0.03	0.03	0.03	0.03	0.03
21.800	0.03	0.03	0.03	0.03	0.03
22.050	0.03	0.03	0.03	0.03	0.03
22.300	0.03	0.03	0.03	0.03	0.03
22.550	0.03	0.03	0.03	0.03	0.03
22.800	0.03	0.03	0.03	0.03	0.03
23.050	0.03	0.03	0.03	0.03	0.03
23.300	0.03	0.03	0.03	0.03	0.03
23.550	0.03	0.03	0.03	0.03	0.03
23.800	0.03	0.03	0.03	0.03	0.03

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #3

Return Event: 5 years
 Storm Event: 5 Year

Storm Event	5 Year
Return Event	5 years
Duration	24.000 hours
Depth	4.1 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.006 hours
Flow (Peak, Computed)	2.49 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.000 hours
Flow (Peak Interpolated Output)	2.48 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	72.775
Area (User Defined)	1.164 acres
Maximum Retention (Pervious)	3.7 in
Maximum Retention (Pervious, 20 percent)	0.7 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.6 in
Runoff Volume (Pervious)	0.154 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.154 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #3

Return Event: 5 years

Storm Event: 5 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.60 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 5 years
 Storm Event: 5 Year

Storm Event	5 Year
Return Event	5 years
Duration	24.000 hours
Depth	4.1 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
10.200	0.00	0.00	0.00	0.00	0.01
10.450	0.01	0.01	0.01	0.01	0.01
10.700	0.01	0.02	0.02	0.02	0.02
10.950	0.03	0.03	0.03	0.04	0.04
11.200	0.04	0.05	0.06	0.06	0.07
11.450	0.08	0.09	0.10	0.14	0.21
11.700	0.33	0.50	0.75	1.11	1.68
11.950	2.24	2.48	2.36	1.83	1.24
12.200	0.86	0.66	0.55	0.48	0.42
12.450	0.38	0.35	0.32	0.29	0.27
12.700	0.26	0.25	0.24	0.23	0.22
12.950	0.21	0.21	0.20	0.19	0.19
13.200	0.18	0.18	0.17	0.17	0.17
13.450	0.16	0.16	0.15	0.15	0.15
13.700	0.14	0.14	0.14	0.13	0.13
13.950	0.13	0.12	0.12	0.12	0.12
14.200	0.12	0.11	0.11	0.11	0.11
14.450	0.11	0.11	0.11	0.11	0.11
14.700	0.11	0.10	0.10	0.10	0.10
14.950	0.10	0.10	0.10	0.10	0.10
15.200	0.10	0.09	0.09	0.09	0.09
15.450	0.09	0.09	0.09	0.09	0.09
15.700	0.08	0.08	0.08	0.08	0.08
15.950	0.08	0.08	0.08	0.08	0.08
16.200	0.08	0.07	0.07	0.07	0.07
16.450	0.07	0.07	0.07	0.07	0.07
16.700	0.07	0.07	0.07	0.07	0.07
16.950	0.07	0.07	0.07	0.07	0.07
17.200	0.07	0.07	0.07	0.07	0.07
17.450	0.07	0.07	0.06	0.06	0.06
17.700	0.06	0.06	0.06	0.06	0.06
17.950	0.06	0.06	0.06	0.06	0.06
18.200	0.06	0.06	0.06	0.06	0.06

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 5 years

Label: DA #3

Storm Event: 5 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
18.450	0.06	0.06	0.06	0.06	0.06
18.700	0.06	0.06	0.06	0.05	0.05
18.950	0.05	0.05	0.05	0.05	0.05
19.200	0.05	0.05	0.05	0.05	0.05
19.450	0.05	0.05	0.05	0.05	0.05
19.700	0.05	0.05	0.05	0.05	0.05
19.950	0.05	0.05	0.05	0.04	0.04
20.200	0.04	0.04	0.04	0.04	0.04
20.450	0.04	0.04	0.04	0.04	0.04
20.700	0.04	0.04	0.04	0.04	0.04
20.950	0.04	0.04	0.04	0.04	0.04
21.200	0.04	0.04	0.04	0.04	0.04
21.450	0.04	0.04	0.04	0.04	0.04
21.700	0.04	0.04	0.04	0.04	0.04
21.950	0.04	0.04	0.04	0.04	0.04
22.200	0.04	0.04	0.04	0.04	0.04
22.450	0.04	0.04	0.04	0.04	0.04
22.700	0.04	0.04	0.04	0.04	0.04
22.950	0.04	0.04	0.04	0.04	0.04
23.200	0.04	0.04	0.04	0.04	0.04
23.450	0.04	0.04	0.04	0.04	0.04
23.700	0.04	0.04	0.04	0.04	0.04
23.950	0.04	0.04	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #3

Return Event: 10 years
 Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	4.8 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.006 hours
Flow (Peak, Computed)	3.37 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.000 hours
Flow (Peak Interpolated Output)	3.36 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	72.775
Area (User Defined)	1.164 acres
Maximum Retention (Pervious)	3.7 in
Maximum Retention (Pervious, 20 percent)	0.7 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.1 in
Runoff Volume (Pervious)	0.207 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.207 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #3

Return Event: 10 years

Storm Event: 10 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.60 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 10 years
 Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	4.8 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
9.400	0.00	0.00	0.00	0.00	0.00
9.650	0.00	0.01	0.01	0.01	0.01
9.900	0.01	0.01	0.01	0.01	0.01
10.150	0.02	0.02	0.02	0.02	0.02
10.400	0.02	0.03	0.03	0.03	0.03
10.650	0.04	0.04	0.04	0.05	0.05
10.900	0.05	0.06	0.06	0.07	0.07
11.150	0.08	0.08	0.09	0.10	0.11
11.400	0.12	0.13	0.15	0.17	0.24
11.650	0.34	0.52	0.76	1.11	1.59
11.900	2.36	3.09	3.36	3.16	2.44
12.150	1.64	1.13	0.87	0.72	0.62
12.400	0.55	0.50	0.45	0.41	0.38
12.650	0.35	0.33	0.32	0.31	0.29
12.900	0.28	0.28	0.27	0.26	0.25
13.150	0.24	0.23	0.23	0.22	0.22
13.400	0.21	0.21	0.20	0.20	0.19
13.650	0.19	0.18	0.18	0.18	0.17
13.900	0.17	0.16	0.16	0.16	0.15
14.150	0.15	0.15	0.15	0.15	0.14
14.400	0.14	0.14	0.14	0.14	0.14
14.650	0.14	0.13	0.13	0.13	0.13
14.900	0.13	0.13	0.13	0.13	0.12
15.150	0.12	0.12	0.12	0.12	0.12
15.400	0.12	0.11	0.11	0.11	0.11
15.650	0.11	0.11	0.11	0.11	0.10
15.900	0.10	0.10	0.10	0.10	0.10
16.150	0.10	0.10	0.09	0.09	0.09
16.400	0.09	0.09	0.09	0.09	0.09
16.650	0.09	0.09	0.09	0.09	0.09
16.900	0.09	0.09	0.09	0.09	0.09
17.150	0.09	0.09	0.09	0.08	0.08
17.400	0.08	0.08	0.08	0.08	0.08

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 10 years
 Storm Event: 10 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
17.650	0.08	0.08	0.08	0.08	0.08
17.900	0.08	0.08	0.08	0.08	0.08
18.150	0.08	0.08	0.08	0.07	0.07
18.400	0.07	0.07	0.07	0.07	0.07
18.650	0.07	0.07	0.07	0.07	0.07
18.900	0.07	0.07	0.07	0.07	0.07
19.150	0.07	0.07	0.07	0.06	0.06
19.400	0.06	0.06	0.06	0.06	0.06
19.650	0.06	0.06	0.06	0.06	0.06
19.900	0.06	0.06	0.06	0.06	0.06
20.150	0.06	0.06	0.06	0.06	0.06
20.400	0.06	0.06	0.06	0.06	0.06
20.650	0.05	0.05	0.05	0.05	0.05
20.900	0.05	0.05	0.05	0.05	0.05
21.150	0.05	0.05	0.05	0.05	0.05
21.400	0.05	0.05	0.05	0.05	0.05
21.650	0.05	0.05	0.05	0.05	0.05
21.900	0.05	0.05	0.05	0.05	0.05
22.150	0.05	0.05	0.05	0.05	0.05
22.400	0.05	0.05	0.05	0.05	0.05
22.650	0.05	0.05	0.05	0.05	0.05
22.900	0.05	0.05	0.05	0.05	0.05
23.150	0.05	0.05	0.05	0.05	0.05
23.400	0.05	0.05	0.05	0.05	0.05
23.650	0.05	0.05	0.05	0.05	0.05
23.900	0.05	0.05	0.05	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #3

Return Event: 25 years
 Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres

Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.006 hours
Flow (Peak, Computed)	4.75 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.000 hours
Flow (Peak Interpolated Output)	4.74 ft ³ /s

Drainage Area	
SCS CN (Composite)	72.775
Area (User Defined)	1.164 acres
Maximum Retention (Pervious)	3.7 in
Maximum Retention (Pervious, 20 percent)	0.7 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.0 in
Runoff Volume (Pervious)	0.292 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.291 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #3

Return Event: 25 years

Storm Event: 25 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.60 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 25 years
 Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
8.450	0.00	0.00	0.00	0.00	0.00
8.700	0.00	0.01	0.01	0.01	0.01
8.950	0.01	0.01	0.01	0.01	0.01
9.200	0.02	0.02	0.02	0.02	0.02
9.450	0.02	0.02	0.02	0.02	0.02
9.700	0.03	0.03	0.03	0.03	0.03
9.950	0.03	0.04	0.04	0.04	0.04
10.200	0.05	0.05	0.05	0.06	0.06
10.450	0.06	0.07	0.07	0.07	0.08
10.700	0.08	0.09	0.09	0.10	0.10
10.950	0.11	0.12	0.12	0.13	0.14
11.200	0.16	0.17	0.18	0.20	0.21
11.450	0.23	0.25	0.29	0.39	0.56
11.700	0.83	1.20	1.69	2.38	3.45
11.950	4.42	4.74	4.41	3.38	2.26
12.200	1.56	1.19	0.98	0.84	0.75
12.450	0.68	0.61	0.55	0.51	0.47
12.700	0.45	0.43	0.41	0.40	0.38
12.950	0.37	0.36	0.34	0.33	0.32
13.200	0.31	0.31	0.30	0.29	0.28
13.450	0.28	0.27	0.26	0.26	0.25
13.700	0.24	0.24	0.23	0.23	0.22
13.950	0.22	0.21	0.21	0.20	0.20
14.200	0.20	0.20	0.19	0.19	0.19
14.450	0.19	0.19	0.18	0.18	0.18
14.700	0.18	0.18	0.18	0.17	0.17
14.950	0.17	0.17	0.17	0.17	0.16
15.200	0.16	0.16	0.16	0.16	0.15
15.450	0.15	0.15	0.15	0.15	0.14
15.700	0.14	0.14	0.14	0.14	0.14
15.950	0.13	0.13	0.13	0.13	0.13
16.200	0.13	0.13	0.12	0.12	0.12
16.450	0.12	0.12	0.12	0.12	0.12

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 25 years
 Storm Event: 25 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
16.700	0.12	0.12	0.12	0.12	0.12
16.950	0.12	0.12	0.12	0.11	0.11
17.200	0.11	0.11	0.11	0.11	0.11
17.450	0.11	0.11	0.11	0.11	0.11
17.700	0.11	0.11	0.11	0.10	0.10
17.950	0.10	0.10	0.10	0.10	0.10
18.200	0.10	0.10	0.10	0.10	0.10
18.450	0.10	0.10	0.10	0.09	0.09
18.700	0.09	0.09	0.09	0.09	0.09
18.950	0.09	0.09	0.09	0.09	0.09
19.200	0.09	0.09	0.08	0.08	0.08
19.450	0.08	0.08	0.08	0.08	0.08
19.700	0.08	0.08	0.08	0.08	0.08
19.950	0.08	0.08	0.07	0.07	0.07
20.200	0.07	0.07	0.07	0.07	0.07
20.450	0.07	0.07	0.07	0.07	0.07
20.700	0.07	0.07	0.07	0.07	0.07
20.950	0.07	0.07	0.07	0.07	0.07
21.200	0.07	0.07	0.07	0.07	0.07
21.450	0.07	0.07	0.07	0.07	0.07
21.700	0.07	0.07	0.07	0.07	0.07
21.950	0.07	0.07	0.07	0.07	0.07
22.200	0.07	0.07	0.07	0.07	0.07
22.450	0.07	0.07	0.07	0.07	0.07
22.700	0.07	0.07	0.07	0.07	0.07
22.950	0.07	0.07	0.07	0.07	0.07
23.200	0.07	0.07	0.07	0.07	0.07
23.450	0.06	0.06	0.06	0.06	0.06
23.700	0.06	0.06	0.06	0.06	0.06
23.950	0.06	0.06	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #3

Return Event: 50 years
 Storm Event: 50 Year

Storm Event	50 Year
Return Event	50 years
Duration	24.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.006 hours
Flow (Peak, Computed)	5.95 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.000 hours
Flow (Peak Interpolated Output)	5.95 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	72.775
Area (User Defined)	1.164 acres
Maximum Retention (Pervious)	3.7 in
Maximum Retention (Pervious, 20 percent)	0.7 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.8 in
Runoff Volume (Pervious)	0.367 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.366 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #3

Return Event: 50 years

Storm Event: 50 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.60 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 50 years
 Storm Event: 50 Year

Storm Event	50 Year
Return Event	50 years
Duration	24.000 hours
Depth	6.9 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
7.700	0.00	0.00	0.00	0.00	0.00
7.950	0.00	0.00	0.01	0.01	0.01
8.200	0.01	0.01	0.01	0.01	0.01
8.450	0.01	0.01	0.02	0.02	0.02
8.700	0.02	0.02	0.02	0.02	0.02
8.950	0.03	0.03	0.03	0.03	0.03
9.200	0.03	0.03	0.04	0.04	0.04
9.450	0.04	0.04	0.04	0.04	0.05
9.700	0.05	0.05	0.05	0.05	0.06
9.950	0.06	0.06	0.07	0.07	0.07
10.200	0.08	0.08	0.08	0.09	0.09
10.450	0.10	0.10	0.11	0.11	0.12
10.700	0.12	0.13	0.14	0.15	0.15
10.950	0.16	0.17	0.18	0.19	0.21
11.200	0.22	0.24	0.26	0.28	0.30
11.450	0.32	0.34	0.40	0.54	0.76
11.700	1.12	1.59	2.22	3.09	4.42
11.950	5.60	5.95	5.49	4.19	2.80
12.200	1.92	1.46	1.20	1.04	0.92
12.450	0.83	0.74	0.67	0.62	0.57
12.700	0.54	0.52	0.50	0.48	0.47
12.950	0.45	0.43	0.42	0.40	0.39
13.200	0.38	0.37	0.36	0.35	0.35
13.450	0.34	0.33	0.32	0.31	0.30
13.700	0.30	0.29	0.28	0.28	0.27
13.950	0.27	0.26	0.25	0.25	0.24
14.200	0.24	0.24	0.23	0.23	0.23
14.450	0.23	0.23	0.22	0.22	0.22
14.700	0.22	0.21	0.21	0.21	0.21
14.950	0.21	0.20	0.20	0.20	0.20
15.200	0.20	0.19	0.19	0.19	0.19
15.450	0.18	0.18	0.18	0.18	0.18
15.700	0.17	0.17	0.17	0.17	0.16

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 50 years
 Storm Event: 50 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
15.950	0.16	0.16	0.16	0.16	0.15
16.200	0.15	0.15	0.15	0.15	0.15
16.450	0.15	0.15	0.15	0.15	0.15
16.700	0.14	0.14	0.14	0.14	0.14
16.950	0.14	0.14	0.14	0.14	0.14
17.200	0.14	0.14	0.13	0.13	0.13
17.450	0.13	0.13	0.13	0.13	0.13
17.700	0.13	0.13	0.13	0.13	0.13
17.950	0.12	0.12	0.12	0.12	0.12
18.200	0.12	0.12	0.12	0.12	0.12
18.450	0.12	0.12	0.11	0.11	0.11
18.700	0.11	0.11	0.11	0.11	0.11
18.950	0.11	0.11	0.11	0.11	0.10
19.200	0.10	0.10	0.10	0.10	0.10
19.450	0.10	0.10	0.10	0.10	0.10
19.700	0.10	0.09	0.09	0.09	0.09
19.950	0.09	0.09	0.09	0.09	0.09
20.200	0.09	0.09	0.09	0.09	0.09
20.450	0.09	0.09	0.09	0.09	0.09
20.700	0.09	0.09	0.09	0.09	0.09
20.950	0.09	0.09	0.09	0.09	0.09
21.200	0.09	0.08	0.08	0.08	0.08
21.450	0.08	0.08	0.08	0.08	0.08
21.700	0.08	0.08	0.08	0.08	0.08
21.950	0.08	0.08	0.08	0.08	0.08
22.200	0.08	0.08	0.08	0.08	0.08
22.450	0.08	0.08	0.08	0.08	0.08
22.700	0.08	0.08	0.08	0.08	0.08
22.950	0.08	0.08	0.08	0.08	0.08
23.200	0.08	0.08	0.08	0.08	0.08
23.450	0.08	0.08	0.08	0.08	0.08
23.700	0.08	0.08	0.08	0.08	0.08
23.950	0.08	0.08	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary
 Label: DA #3

Return Event: 100 years
 Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	7.9 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	11.983 hours
Flow (Peak, Computed)	7.31 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.000 hours
Flow (Peak Interpolated Output)	7.30 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	72.775
Area (User Defined)	1.164 acres
Maximum Retention (Pervious)	3.7 in
Maximum Retention (Pervious, 20 percent)	0.7 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.7 in
Runoff Volume (Pervious)	0.452 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.451 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.173 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph Summary

Label: DA #3

Return Event: 100 years

Storm Event: 100 Year

SCS Unit Hydrograph Parameters

Unit peak, qp	7.60 ft ³ /s
Unit peak time, Tp	0.116 hours
Unit receding limb, Tr	0.463 hours
Total unit time, Tb	0.578 hours

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 100 years
 Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	7.9 in
Time of Concentration (Composite)	0.173 hours
Area (User Defined)	1.164 acres

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
7.000	0.00	0.00	0.00	0.00	0.00
7.250	0.00	0.01	0.01	0.01	0.01
7.500	0.01	0.01	0.01	0.01	0.01
7.750	0.01	0.01	0.01	0.02	0.02
8.000	0.02	0.02	0.02	0.02	0.02
8.250	0.02	0.02	0.03	0.03	0.03
8.500	0.03	0.03	0.03	0.04	0.04
8.750	0.04	0.04	0.04	0.04	0.05
9.000	0.05	0.05	0.05	0.05	0.06
9.250	0.06	0.06	0.06	0.06	0.06
9.500	0.07	0.07	0.07	0.07	0.07
9.750	0.08	0.08	0.08	0.09	0.09
10.000	0.09	0.10	0.10	0.11	0.11
10.250	0.12	0.12	0.13	0.13	0.14
10.500	0.14	0.15	0.16	0.17	0.17
10.750	0.18	0.19	0.20	0.21	0.22
11.000	0.24	0.25	0.26	0.28	0.30
11.250	0.32	0.35	0.37	0.40	0.43
11.500	0.46	0.53	0.70	0.99	1.45
11.750	2.04	2.83	3.89	5.51	6.92
12.000	7.30	6.70	5.09	3.40	2.33
12.250	1.77	1.44	1.25	1.10	0.99
12.500	0.89	0.81	0.74	0.69	0.65
12.750	0.62	0.60	0.58	0.56	0.54
13.000	0.52	0.50	0.48	0.47	0.46
13.250	0.44	0.43	0.42	0.41	0.40
13.500	0.39	0.38	0.37	0.36	0.35
13.750	0.35	0.34	0.33	0.32	0.32
14.000	0.31	0.30	0.30	0.29	0.29
14.250	0.28	0.28	0.28	0.27	0.27
14.500	0.27	0.27	0.26	0.26	0.26
14.750	0.26	0.25	0.25	0.25	0.25
15.000	0.24	0.24	0.24	0.23	0.23

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: DA #3

Return Event: 100 years
 Storm Event: 100 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
15.250	0.23	0.23	0.22	0.22	0.22
15.500	0.22	0.21	0.21	0.21	0.21
15.750	0.20	0.20	0.20	0.19	0.19
16.000	0.19	0.19	0.18	0.18	0.18
16.250	0.18	0.18	0.18	0.18	0.18
16.500	0.18	0.17	0.17	0.17	0.17
16.750	0.17	0.17	0.17	0.17	0.17
17.000	0.17	0.16	0.16	0.16	0.16
17.250	0.16	0.16	0.16	0.16	0.16
17.500	0.16	0.16	0.15	0.15	0.15
17.750	0.15	0.15	0.15	0.15	0.15
18.000	0.15	0.15	0.14	0.14	0.14
18.250	0.14	0.14	0.14	0.14	0.14
18.500	0.14	0.14	0.13	0.13	0.13
18.750	0.13	0.13	0.13	0.13	0.13
19.000	0.13	0.13	0.13	0.12	0.12
19.250	0.12	0.12	0.12	0.12	0.12
19.500	0.12	0.12	0.12	0.11	0.11
19.750	0.11	0.11	0.11	0.11	0.11
20.000	0.11	0.11	0.11	0.11	0.10
20.250	0.10	0.10	0.10	0.10	0.10
20.500	0.10	0.10	0.10	0.10	0.10
20.750	0.10	0.10	0.10	0.10	0.10
21.000	0.10	0.10	0.10	0.10	0.10
21.250	0.10	0.10	0.10	0.10	0.10
21.500	0.10	0.10	0.10	0.10	0.10
21.750	0.10	0.10	0.10	0.10	0.10
22.000	0.10	0.10	0.10	0.10	0.10
22.250	0.10	0.10	0.10	0.10	0.10
22.500	0.10	0.10	0.10	0.10	0.09
22.750	0.09	0.09	0.09	0.09	0.09
23.000	0.09	0.09	0.09	0.09	0.09
23.250	0.09	0.09	0.09	0.09	0.09
23.500	0.09	0.09	0.09	0.09	0.09
23.750	0.09	0.09	0.09	0.09	0.09
24.000	0.09	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Addition Summary

Return Event: 1 years

Label: O-1

Storm Event: 1 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.064	12.050	0.94
Flow (From)	DA #2	0.040	12.200	0.38
Flow (From)	Outlet-1	0.109	16.900	0.12
Flow (In)	O-1	0.212	12.050	1.29

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Addition Summary

Return Event: 2 years

Label: O-1

Storm Event: 2 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.096	12.000	1.51
Flow (From)	DA #2	0.062	12.150	0.64
Flow (From)	Outlet-1	0.156	15.950	0.17
Flow (In)	O-1	0.314	12.050	2.08

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Addition Summary

Return Event: 5 years

Label: O-1

Storm Event: 5 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.154	12.000	2.48
Flow (From)	DA #2	0.101	12.150	1.10
Flow (From)	Outlet-1	0.239	15.250	0.26
Flow (In)	O-1	0.494	12.050	3.46

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Addition Summary

Return Event: 10 years

Label: O-1

Storm Event: 10 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.207	12.000	3.36
Flow (From)	DA #2	0.137	12.150	1.53
Flow (From)	Outlet-1	0.312	14.850	0.34
Flow (In)	O-1	0.656	12.050	4.72

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Addition Summary
 Label: O-1

Return Event: 25 years
 Storm Event: 25 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.291	12.000	4.74
Flow (From)	DA #2	0.195	12.150	2.20
Flow (From)	Outlet-1	0.423	14.450	0.47
Flow (In)	O-1	0.909	12.050	6.69

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Addition Summary
 Label: O-1

Return Event: 50 years
 Storm Event: 50 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.366	12.000	5.95
Flow (From)	DA #2	0.246	12.150	2.80
Flow (From)	Outlet-1	0.555	13.000	1.04
Flow (In)	O-1	1.167	12.000	8.43

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Addition Summary
 Label: O-1

Return Event: 100 years
 Storm Event: 100 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.451	12.000	7.30
Flow (From)	DA #2	0.305	12.150	3.47
Flow (From)	Outlet-1	0.729	12.450	2.15
Flow (In)	O-1	1.485	12.050	10.70

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 1 years
 Storm Event: 1 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	108.00	108.00	108.00	108.00	108.00
0.250	108.00	108.00	108.00	108.00	108.00
0.500	108.00	108.00	108.00	108.00	108.00
0.750	108.00	108.00	108.00	108.00	108.00
1.000	108.00	108.00	108.00	108.00	108.00
1.250	108.00	108.00	108.00	108.00	108.00
1.500	108.00	108.00	108.00	108.00	108.00
1.750	108.00	108.00	108.00	108.00	108.00
2.000	108.00	108.00	108.00	108.00	108.00
2.250	108.00	108.00	108.00	108.00	108.00
2.500	108.00	108.00	108.00	108.00	108.00
2.750	108.00	108.00	108.00	108.00	108.00
3.000	108.00	108.00	108.00	108.00	108.00
3.250	108.00	108.00	108.00	108.00	108.00
3.500	108.00	108.00	108.00	108.00	108.00
3.750	108.00	108.00	108.00	108.00	108.00
4.000	108.00	108.00	108.00	108.00	108.00
4.250	108.00	108.00	108.00	108.00	108.00
4.500	108.00	108.00	108.00	108.00	108.00
4.750	108.00	108.00	108.00	108.00	108.00
5.000	108.00	108.00	108.00	108.00	108.00
5.250	108.00	108.00	108.00	108.00	108.00
5.500	108.00	108.00	108.00	108.00	108.00
5.750	108.00	108.00	108.00	108.00	108.00
6.000	108.00	108.00	108.00	108.00	108.00
6.250	108.00	108.00	108.00	108.00	108.00
6.500	108.00	108.00	108.00	108.00	108.00
6.750	108.00	108.00	108.00	108.00	108.00
7.000	108.00	108.00	108.00	108.00	108.00
7.250	108.00	108.00	108.00	108.00	108.00
7.500	108.00	108.00	108.00	108.00	108.00
7.750	108.00	108.00	108.00	108.00	108.00
8.000	108.00	108.00	108.00	108.00	108.00
8.250	108.00	108.00	108.00	108.00	108.00
8.500	108.00	108.00	108.01	108.01	108.01
8.750	108.01	108.01	108.01	108.01	108.01
9.000	108.01	108.01	108.01	108.01	108.01
9.250	108.01	108.01	108.01	108.01	108.01
9.500	108.01	108.01	108.01	108.02	108.02
9.750	108.02	108.02	108.02	108.02	108.02
10.000	108.02	108.02	108.02	108.02	108.02

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 1 years
 Storm Event: 1 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.250	108.03	108.03	108.03	108.03	108.03
10.500	108.03	108.03	108.03	108.03	108.04
10.750	108.04	108.04	108.04	108.04	108.04
11.000	108.05	108.05	108.05	108.05	108.06
11.250	108.06	108.06	108.06	108.07	108.07
11.500	108.08	108.08	108.09	108.10	108.11
11.750	108.13	108.15	108.19	108.22	108.25
12.000	108.28	108.31	108.32	108.33	108.34
12.250	108.34	108.35	108.35	108.35	108.36
12.500	108.36	108.36	108.37	108.37	108.37
12.750	108.37	108.37	108.37	108.38	108.38
13.000	108.38	108.38	108.38	108.38	108.38
13.250	108.39	108.39	108.39	108.39	108.39
13.500	108.39	108.39	108.39	108.39	108.39
13.750	108.39	108.40	108.40	108.40	108.40
14.000	108.40	108.40	108.40	108.40	108.40
14.250	108.40	108.40	108.40	108.40	108.40
14.500	108.40	108.40	108.40	108.40	108.40
14.750	108.40	108.40	108.41	108.41	108.41
15.000	108.41	108.41	108.41	108.41	108.41
15.250	108.41	108.41	108.41	108.41	108.41
15.500	108.41	108.41	108.41	108.41	108.41
15.750	108.41	108.41	108.41	108.41	108.41
16.000	108.41	108.41	108.41	108.41	108.41
16.250	108.41	108.41	108.41	108.41	108.41
16.500	108.41	108.41	108.41	108.41	108.41
16.750	108.41	108.41	108.41	108.41	108.41
17.000	108.41	108.41	108.41	108.41	108.41
17.250	108.41	108.41	108.41	108.41	108.41
17.500	108.41	108.41	108.41	108.41	108.41
17.750	108.41	108.41	108.41	108.41	108.41
18.000	108.41	108.41	108.41	108.41	108.41
18.250	108.41	108.41	108.41	108.41	108.41
18.500	108.41	108.41	108.41	108.41	108.41
18.750	108.41	108.41	108.41	108.41	108.41
19.000	108.41	108.41	108.41	108.41	108.41
19.250	108.41	108.41	108.41	108.41	108.41
19.500	108.41	108.41	108.41	108.41	108.41
19.750	108.40	108.40	108.40	108.40	108.40
20.000	108.40	108.40	108.40	108.40	108.40
20.250	108.40	108.40	108.40	108.40	108.40

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation

Return Event: 1 years

Label: PO-1 (OUT)

Storm Event: 1 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.500	108.40	108.40	108.40	108.40	108.40
20.750	108.40	108.40	108.40	108.40	108.40
21.000	108.40	108.40	108.40	108.40	108.40
21.250	108.40	108.40	108.40	108.40	108.40
21.500	108.40	108.40	108.40	108.40	108.40
21.750	108.40	108.40	108.40	108.40	108.40
22.000	108.40	108.39	108.39	108.39	108.39
22.250	108.39	108.39	108.39	108.39	108.39
22.500	108.39	108.39	108.39	108.39	108.39
22.750	108.39	108.39	108.39	108.39	108.39
23.000	108.39	108.39	108.39	108.39	108.39
23.250	108.39	108.39	108.39	108.39	108.39
23.500	108.39	108.39	108.39	108.39	108.39
23.750	108.39	108.39	108.39	108.39	108.39
24.000	108.39	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 2 years
 Storm Event: 2 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	108.00	108.00	108.00	108.00	108.00
0.250	108.00	108.00	108.00	108.00	108.00
0.500	108.00	108.00	108.00	108.00	108.00
0.750	108.00	108.00	108.00	108.00	108.00
1.000	108.00	108.00	108.00	108.00	108.00
1.250	108.00	108.00	108.00	108.00	108.00
1.500	108.00	108.00	108.00	108.00	108.00
1.750	108.00	108.00	108.00	108.00	108.00
2.000	108.00	108.00	108.00	108.00	108.00
2.250	108.00	108.00	108.00	108.00	108.00
2.500	108.00	108.00	108.00	108.00	108.00
2.750	108.00	108.00	108.00	108.00	108.00
3.000	108.00	108.00	108.00	108.00	108.00
3.250	108.00	108.00	108.00	108.00	108.00
3.500	108.00	108.00	108.00	108.00	108.00
3.750	108.00	108.00	108.00	108.00	108.00
4.000	108.00	108.00	108.00	108.00	108.00
4.250	108.00	108.00	108.00	108.00	108.00
4.500	108.00	108.00	108.00	108.00	108.00
4.750	108.00	108.00	108.00	108.00	108.00
5.000	108.00	108.00	108.00	108.00	108.00
5.250	108.00	108.00	108.00	108.00	108.00
5.500	108.00	108.00	108.00	108.00	108.00
5.750	108.00	108.00	108.00	108.00	108.00
6.000	108.00	108.00	108.00	108.00	108.00
6.250	108.00	108.00	108.00	108.00	108.00
6.500	108.00	108.00	108.00	108.00	108.00
6.750	108.00	108.00	108.00	108.00	108.00
7.000	108.00	108.00	108.00	108.00	108.00
7.250	108.00	108.00	108.00	108.00	108.00
7.500	108.00	108.00	108.01	108.01	108.01
7.750	108.01	108.01	108.01	108.01	108.01
8.000	108.01	108.01	108.01	108.01	108.01
8.250	108.01	108.01	108.01	108.01	108.01
8.500	108.01	108.01	108.01	108.01	108.01
8.750	108.02	108.02	108.02	108.02	108.02
9.000	108.02	108.02	108.02	108.02	108.02
9.250	108.02	108.02	108.03	108.03	108.03
9.500	108.03	108.03	108.03	108.03	108.03
9.750	108.03	108.03	108.04	108.04	108.04
10.000	108.04	108.04	108.04	108.04	108.04

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 2 years
 Storm Event: 2 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.250	108.05	108.05	108.05	108.05	108.05
10.500	108.05	108.06	108.06	108.06	108.06
10.750	108.07	108.07	108.07	108.07	108.08
11.000	108.08	108.08	108.08	108.09	108.09
11.250	108.10	108.10	108.10	108.11	108.11
11.500	108.12	108.13	108.13	108.15	108.17
11.750	108.19	108.21	108.24	108.27	108.31
12.000	108.35	108.38	108.40	108.41	108.42
12.250	108.43	108.43	108.44	108.44	108.45
12.500	108.45	108.45	108.45	108.46	108.46
12.750	108.46	108.46	108.47	108.47	108.47
13.000	108.47	108.47	108.47	108.48	108.48
13.250	108.48	108.48	108.48	108.48	108.48
13.500	108.48	108.49	108.49	108.49	108.49
13.750	108.49	108.49	108.49	108.49	108.49
14.000	108.49	108.49	108.49	108.49	108.49
14.250	108.49	108.49	108.50	108.50	108.50
14.500	108.50	108.50	108.50	108.50	108.50
14.750	108.50	108.50	108.50	108.50	108.50
15.000	108.50	108.50	108.50	108.50	108.50
15.250	108.50	108.50	108.50	108.50	108.50
15.500	108.50	108.50	108.50	108.50	108.50
15.750	108.50	108.50	108.50	108.50	108.50
16.000	108.50	108.50	108.50	108.50	108.50
16.250	108.50	108.50	108.50	108.50	108.50
16.500	108.50	108.50	108.50	108.50	108.50
16.750	108.50	108.50	108.50	108.50	108.50
17.000	108.50	108.50	108.50	108.50	108.50
17.250	108.50	108.50	108.50	108.50	108.50
17.500	108.50	108.50	108.50	108.50	108.50
17.750	108.50	108.50	108.50	108.50	108.50
18.000	108.50	108.50	108.50	108.50	108.50
18.250	108.50	108.50	108.50	108.50	108.50
18.500	108.50	108.49	108.49	108.49	108.49
18.750	108.49	108.49	108.49	108.49	108.49
19.000	108.49	108.49	108.49	108.49	108.49
19.250	108.49	108.49	108.49	108.49	108.49
19.500	108.49	108.49	108.49	108.49	108.49
19.750	108.49	108.49	108.49	108.49	108.49
20.000	108.49	108.49	108.49	108.48	108.48
20.250	108.48	108.48	108.48	108.48	108.48

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 2 years
 Storm Event: 2 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.500	108.48	108.48	108.48	108.48	108.48
20.750	108.48	108.48	108.48	108.48	108.48
21.000	108.48	108.48	108.48	108.48	108.48
21.250	108.48	108.48	108.48	108.48	108.48
21.500	108.47	108.47	108.47	108.47	108.47
21.750	108.47	108.47	108.47	108.47	108.47
22.000	108.47	108.47	108.47	108.47	108.47
22.250	108.47	108.47	108.47	108.47	108.47
22.500	108.47	108.47	108.47	108.47	108.47
22.750	108.47	108.47	108.47	108.46	108.46
23.000	108.46	108.46	108.46	108.46	108.46
23.250	108.46	108.46	108.46	108.46	108.46
23.500	108.46	108.46	108.46	108.46	108.46
23.750	108.46	108.46	108.46	108.46	108.46
24.000	108.46	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 5 years
 Storm Event: 5 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	108.00	108.00	108.00	108.00	108.00
0.250	108.00	108.00	108.00	108.00	108.00
0.500	108.00	108.00	108.00	108.00	108.00
0.750	108.00	108.00	108.00	108.00	108.00
1.000	108.00	108.00	108.00	108.00	108.00
1.250	108.00	108.00	108.00	108.00	108.00
1.500	108.00	108.00	108.00	108.00	108.00
1.750	108.00	108.00	108.00	108.00	108.00
2.000	108.00	108.00	108.00	108.00	108.00
2.250	108.00	108.00	108.00	108.00	108.00
2.500	108.00	108.00	108.00	108.00	108.00
2.750	108.00	108.00	108.00	108.00	108.00
3.000	108.00	108.00	108.00	108.00	108.00
3.250	108.00	108.00	108.00	108.00	108.00
3.500	108.00	108.00	108.00	108.00	108.00
3.750	108.00	108.00	108.00	108.00	108.00
4.000	108.00	108.00	108.00	108.00	108.00
4.250	108.00	108.00	108.00	108.00	108.00
4.500	108.00	108.00	108.00	108.00	108.00
4.750	108.00	108.00	108.00	108.00	108.00
5.000	108.00	108.00	108.00	108.00	108.00
5.250	108.00	108.00	108.00	108.00	108.00
5.500	108.00	108.00	108.00	108.00	108.00
5.750	108.00	108.00	108.00	108.00	108.00
6.000	108.00	108.00	108.00	108.00	108.00
6.250	108.00	108.00	108.00	108.01	108.01
6.500	108.01	108.01	108.01	108.01	108.01
6.750	108.01	108.01	108.01	108.01	108.01
7.000	108.01	108.01	108.01	108.01	108.01
7.250	108.01	108.01	108.01	108.01	108.01
7.500	108.02	108.02	108.02	108.02	108.02
7.750	108.02	108.02	108.02	108.02	108.02
8.000	108.02	108.02	108.02	108.02	108.03
8.250	108.03	108.03	108.03	108.03	108.03
8.500	108.03	108.03	108.03	108.03	108.03
8.750	108.04	108.04	108.04	108.04	108.04
9.000	108.04	108.04	108.05	108.05	108.05
9.250	108.05	108.05	108.05	108.05	108.06
9.500	108.06	108.06	108.06	108.06	108.06
9.750	108.07	108.07	108.07	108.07	108.07
10.000	108.08	108.08	108.08	108.08	108.08

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 5 years
 Storm Event: 5 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.250	108.09	108.09	108.09	108.09	108.10
10.500	108.10	108.10	108.11	108.11	108.11
10.750	108.12	108.12	108.12	108.13	108.13
11.000	108.14	108.14	108.15	108.15	108.16
11.250	108.16	108.17	108.18	108.18	108.19
11.500	108.20	108.20	108.21	108.22	108.23
11.750	108.25	108.27	108.31	108.35	108.41
12.000	108.46	108.50	108.53	108.54	108.55
12.250	108.56	108.57	108.57	108.58	108.58
12.500	108.59	108.59	108.60	108.60	108.60
12.750	108.60	108.61	108.61	108.61	108.61
13.000	108.61	108.62	108.62	108.62	108.62
13.250	108.62	108.62	108.62	108.63	108.63
13.500	108.63	108.63	108.63	108.63	108.63
13.750	108.63	108.63	108.63	108.63	108.64
14.000	108.64	108.64	108.64	108.64	108.64
14.250	108.64	108.64	108.64	108.64	108.64
14.500	108.64	108.64	108.64	108.64	108.64
14.750	108.64	108.64	108.64	108.64	108.64
15.000	108.64	108.64	108.64	108.64	108.64
15.250	108.64	108.64	108.64	108.64	108.64
15.500	108.64	108.64	108.64	108.64	108.64
15.750	108.64	108.64	108.64	108.64	108.64
16.000	108.64	108.64	108.64	108.64	108.64
16.250	108.64	108.64	108.64	108.64	108.64
16.500	108.64	108.64	108.64	108.64	108.64
16.750	108.63	108.63	108.63	108.63	108.63
17.000	108.63	108.63	108.63	108.63	108.63
17.250	108.63	108.63	108.63	108.63	108.63
17.500	108.63	108.63	108.63	108.63	108.63
17.750	108.63	108.63	108.63	108.63	108.63
18.000	108.63	108.62	108.62	108.62	108.62
18.250	108.62	108.62	108.62	108.62	108.62
18.500	108.62	108.62	108.62	108.62	108.62
18.750	108.62	108.62	108.62	108.62	108.62
19.000	108.62	108.61	108.61	108.61	108.61
19.250	108.61	108.61	108.61	108.61	108.61
19.500	108.61	108.61	108.61	108.61	108.61
19.750	108.61	108.61	108.61	108.61	108.60
20.000	108.60	108.60	108.60	108.60	108.60
20.250	108.60	108.60	108.60	108.60	108.60

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation

Return Event: 5 years

Label: PO-1 (OUT)

Storm Event: 5 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.500	108.60	108.60	108.60	108.60	108.60
20.750	108.59	108.59	108.59	108.59	108.59
21.000	108.59	108.59	108.59	108.59	108.59
21.250	108.59	108.59	108.59	108.59	108.59
21.500	108.59	108.59	108.58	108.58	108.58
21.750	108.58	108.58	108.58	108.58	108.58
22.000	108.58	108.58	108.58	108.58	108.58
22.250	108.58	108.58	108.58	108.58	108.57
22.500	108.57	108.57	108.57	108.57	108.57
22.750	108.57	108.57	108.57	108.57	108.57
23.000	108.57	108.57	108.57	108.57	108.57
23.250	108.57	108.56	108.56	108.56	108.56
23.500	108.56	108.56	108.56	108.56	108.56
23.750	108.56	108.56	108.56	108.56	108.56
24.000	108.56	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 10 years
 Storm Event: 10 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	108.00	108.00	108.00	108.00	108.00
0.250	108.00	108.00	108.00	108.00	108.00
0.500	108.00	108.00	108.00	108.00	108.00
0.750	108.00	108.00	108.00	108.00	108.00
1.000	108.00	108.00	108.00	108.00	108.00
1.250	108.00	108.00	108.00	108.00	108.00
1.500	108.00	108.00	108.00	108.00	108.00
1.750	108.00	108.00	108.00	108.00	108.00
2.000	108.00	108.00	108.00	108.00	108.00
2.250	108.00	108.00	108.00	108.00	108.00
2.500	108.00	108.00	108.00	108.00	108.00
2.750	108.00	108.00	108.00	108.00	108.00
3.000	108.00	108.00	108.00	108.00	108.00
3.250	108.00	108.00	108.00	108.00	108.00
3.500	108.00	108.00	108.00	108.00	108.00
3.750	108.00	108.00	108.00	108.00	108.00
4.000	108.00	108.00	108.00	108.00	108.00
4.250	108.00	108.00	108.00	108.00	108.00
4.500	108.00	108.00	108.00	108.00	108.00
4.750	108.00	108.00	108.00	108.00	108.00
5.000	108.00	108.00	108.00	108.00	108.00
5.250	108.00	108.00	108.00	108.00	108.00
5.500	108.00	108.00	108.00	108.00	108.01
5.750	108.01	108.01	108.01	108.01	108.01
6.000	108.01	108.01	108.01	108.01	108.01
6.250	108.01	108.01	108.01	108.01	108.01
6.500	108.01	108.01	108.01	108.01	108.02
6.750	108.02	108.02	108.02	108.02	108.02
7.000	108.02	108.02	108.02	108.02	108.02
7.250	108.02	108.02	108.03	108.03	108.03
7.500	108.03	108.03	108.03	108.03	108.03
7.750	108.03	108.03	108.03	108.04	108.04
8.000	108.04	108.04	108.04	108.04	108.04
8.250	108.04	108.04	108.05	108.05	108.05
8.500	108.05	108.05	108.05	108.05	108.06
8.750	108.06	108.06	108.06	108.06	108.07
9.000	108.07	108.07	108.07	108.07	108.07
9.250	108.08	108.08	108.08	108.08	108.09
9.500	108.09	108.09	108.09	108.09	108.10
9.750	108.10	108.10	108.10	108.11	108.11
10.000	108.11	108.11	108.12	108.12	108.12

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 10 years
 Storm Event: 10 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.250	108.13	108.13	108.13	108.14	108.14
10.500	108.15	108.15	108.15	108.16	108.16
10.750	108.17	108.17	108.18	108.18	108.19
11.000	108.19	108.20	108.20	108.21	108.21
11.250	108.21	108.22	108.22	108.23	108.23
11.500	108.24	108.24	108.25	108.26	108.28
11.750	108.30	108.33	108.37	108.43	108.49
12.000	108.55	108.60	108.64	108.65	108.67
12.250	108.68	108.68	108.69	108.70	108.70
12.500	108.71	108.71	108.71	108.72	108.72
12.750	108.72	108.73	108.73	108.73	108.73
13.000	108.74	108.74	108.74	108.74	108.74
13.250	108.74	108.75	108.75	108.75	108.75
13.500	108.75	108.75	108.75	108.75	108.75
13.750	108.75	108.76	108.76	108.76	108.76
14.000	108.76	108.76	108.76	108.76	108.76
14.250	108.76	108.76	108.76	108.76	108.76
14.500	108.76	108.76	108.76	108.76	108.76
14.750	108.76	108.76	108.76	108.76	108.76
15.000	108.76	108.76	108.76	108.76	108.76
15.250	108.76	108.76	108.76	108.76	108.76
15.500	108.76	108.76	108.76	108.76	108.76
15.750	108.76	108.76	108.76	108.76	108.76
16.000	108.76	108.76	108.76	108.75	108.75
16.250	108.75	108.75	108.75	108.75	108.75
16.500	108.75	108.75	108.75	108.75	108.75
16.750	108.75	108.75	108.75	108.75	108.75
17.000	108.75	108.75	108.74	108.74	108.74
17.250	108.74	108.74	108.74	108.74	108.74
17.500	108.74	108.74	108.74	108.74	108.74
17.750	108.74	108.74	108.74	108.73	108.73
18.000	108.73	108.73	108.73	108.73	108.73
18.250	108.73	108.73	108.73	108.73	108.73
18.500	108.73	108.73	108.73	108.72	108.72
18.750	108.72	108.72	108.72	108.72	108.72
19.000	108.72	108.72	108.72	108.72	108.72
19.250	108.72	108.71	108.71	108.71	108.71
19.500	108.71	108.71	108.71	108.71	108.71
19.750	108.71	108.71	108.71	108.70	108.70
20.000	108.70	108.70	108.70	108.70	108.70
20.250	108.70	108.70	108.70	108.70	108.70

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation

Return Event: 10 years

Label: PO-1 (OUT)

Storm Event: 10 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.500	108.69	108.69	108.69	108.69	108.69
20.750	108.69	108.69	108.69	108.69	108.69
21.000	108.69	108.69	108.68	108.68	108.68
21.250	108.68	108.68	108.68	108.68	108.68
21.500	108.68	108.68	108.68	108.68	108.68
21.750	108.67	108.67	108.67	108.67	108.67
22.000	108.67	108.67	108.67	108.67	108.67
22.250	108.67	108.67	108.66	108.66	108.66
22.500	108.66	108.66	108.66	108.66	108.66
22.750	108.66	108.66	108.66	108.66	108.66
23.000	108.65	108.65	108.65	108.65	108.65
23.250	108.65	108.65	108.65	108.65	108.65
23.500	108.65	108.65	108.65	108.64	108.64
23.750	108.64	108.64	108.64	108.64	108.64
24.000	108.64	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 25 years
 Storm Event: 25 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	108.00	108.00	108.00	108.00	108.00
0.250	108.00	108.00	108.00	108.00	108.00
0.500	108.00	108.00	108.00	108.00	108.00
0.750	108.00	108.00	108.00	108.00	108.00
1.000	108.00	108.00	108.00	108.00	108.00
1.250	108.00	108.00	108.00	108.00	108.00
1.500	108.00	108.00	108.00	108.00	108.00
1.750	108.00	108.00	108.00	108.00	108.00
2.000	108.00	108.00	108.00	108.00	108.00
2.250	108.00	108.00	108.00	108.00	108.00
2.500	108.00	108.00	108.00	108.00	108.00
2.750	108.00	108.00	108.00	108.00	108.00
3.000	108.00	108.00	108.00	108.00	108.00
3.250	108.00	108.00	108.00	108.00	108.00
3.500	108.00	108.00	108.00	108.00	108.00
3.750	108.00	108.00	108.00	108.00	108.00
4.000	108.00	108.00	108.00	108.00	108.00
4.250	108.00	108.00	108.00	108.00	108.00
4.500	108.00	108.00	108.00	108.00	108.00
4.750	108.00	108.00	108.00	108.01	108.01
5.000	108.01	108.01	108.01	108.01	108.01
5.250	108.01	108.01	108.01	108.01	108.01
5.500	108.01	108.01	108.01	108.01	108.01
5.750	108.01	108.02	108.02	108.02	108.02
6.000	108.02	108.02	108.02	108.02	108.02
6.250	108.02	108.02	108.02	108.03	108.03
6.500	108.03	108.03	108.03	108.03	108.03
6.750	108.03	108.03	108.04	108.04	108.04
7.000	108.04	108.04	108.04	108.04	108.04
7.250	108.05	108.05	108.05	108.05	108.05
7.500	108.05	108.05	108.06	108.06	108.06
7.750	108.06	108.06	108.06	108.06	108.07
8.000	108.07	108.07	108.07	108.07	108.07
8.250	108.08	108.08	108.08	108.08	108.08
8.500	108.09	108.09	108.09	108.09	108.10
8.750	108.10	108.10	108.10	108.11	108.11
9.000	108.11	108.11	108.12	108.12	108.12
9.250	108.12	108.13	108.13	108.13	108.14
9.500	108.14	108.14	108.15	108.15	108.15
9.750	108.16	108.16	108.16	108.17	108.17
10.000	108.17	108.18	108.18	108.19	108.19

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 25 years
 Storm Event: 25 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.250	108.20	108.20	108.20	108.20	108.21
10.500	108.21	108.21	108.22	108.22	108.22
10.750	108.22	108.23	108.23	108.23	108.24
11.000	108.24	108.25	108.25	108.25	108.26
11.250	108.26	108.27	108.27	108.28	108.29
11.500	108.29	108.30	108.31	108.33	108.35
11.750	108.38	108.42	108.47	108.54	108.62
12.000	108.69	108.76	108.80	108.82	108.84
12.250	108.85	108.86	108.86	108.87	108.88
12.500	108.88	108.89	108.89	108.90	108.90
12.750	108.90	108.91	108.91	108.91	108.92
13.000	108.92	108.92	108.92	108.92	108.93
13.250	108.93	108.93	108.93	108.93	108.93
13.500	108.94	108.94	108.94	108.94	108.94
13.750	108.94	108.94	108.94	108.94	108.94
14.000	108.94	108.94	108.94	108.94	108.94
14.250	108.94	108.94	108.94	108.94	108.94
14.500	108.94	108.94	108.94	108.94	108.94
14.750	108.94	108.94	108.94	108.94	108.94
15.000	108.94	108.94	108.94	108.94	108.94
15.250	108.94	108.94	108.94	108.94	108.94
15.500	108.94	108.94	108.94	108.94	108.94
15.750	108.94	108.93	108.93	108.93	108.93
16.000	108.93	108.93	108.93	108.93	108.93
16.250	108.93	108.93	108.93	108.93	108.92
16.500	108.92	108.92	108.92	108.92	108.92
16.750	108.92	108.92	108.92	108.92	108.92
17.000	108.92	108.91	108.91	108.91	108.91
17.250	108.91	108.91	108.91	108.91	108.91
17.500	108.91	108.91	108.90	108.90	108.90
17.750	108.90	108.90	108.90	108.90	108.90
18.000	108.90	108.90	108.89	108.89	108.89
18.250	108.89	108.89	108.89	108.89	108.89
18.500	108.89	108.89	108.88	108.88	108.88
18.750	108.88	108.88	108.88	108.88	108.88
19.000	108.88	108.87	108.87	108.87	108.87
19.250	108.87	108.87	108.87	108.87	108.87
19.500	108.86	108.86	108.86	108.86	108.86
19.750	108.86	108.86	108.86	108.86	108.85
20.000	108.85	108.85	108.85	108.85	108.85
20.250	108.85	108.85	108.84	108.84	108.84

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation

Return Event: 25 years

Label: PO-1 (OUT)

Storm Event: 25 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.500	108.84	108.84	108.84	108.84	108.84
20.750	108.83	108.83	108.83	108.83	108.83
21.000	108.83	108.83	108.83	108.83	108.82
21.250	108.82	108.82	108.82	108.82	108.82
21.500	108.82	108.82	108.82	108.81	108.81
21.750	108.81	108.81	108.81	108.81	108.81
22.000	108.81	108.81	108.80	108.80	108.80
22.250	108.80	108.80	108.80	108.80	108.80
22.500	108.80	108.79	108.79	108.79	108.79
22.750	108.79	108.79	108.79	108.79	108.79
23.000	108.78	108.78	108.78	108.78	108.78
23.250	108.78	108.78	108.78	108.78	108.77
23.500	108.77	108.77	108.77	108.77	108.77
23.750	108.77	108.77	108.77	108.77	108.76
24.000	108.76	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 50 years
 Storm Event: 50 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	108.00	108.00	108.00	108.00	108.00
0.250	108.00	108.00	108.00	108.00	108.00
0.500	108.00	108.00	108.00	108.00	108.00
0.750	108.00	108.00	108.00	108.00	108.00
1.000	108.00	108.00	108.00	108.00	108.00
1.250	108.00	108.00	108.00	108.00	108.00
1.500	108.00	108.00	108.00	108.00	108.00
1.750	108.00	108.00	108.00	108.00	108.00
2.000	108.00	108.00	108.00	108.00	108.00
2.250	108.00	108.00	108.00	108.00	108.00
2.500	108.00	108.00	108.00	108.00	108.00
2.750	108.00	108.00	108.00	108.00	108.00
3.000	108.00	108.00	108.00	108.00	108.00
3.250	108.00	108.00	108.00	108.00	108.00
3.500	108.00	108.00	108.00	108.00	108.00
3.750	108.00	108.00	108.00	108.00	108.00
4.000	108.00	108.00	108.00	108.00	108.00
4.250	108.00	108.00	108.01	108.01	108.01
4.500	108.01	108.01	108.01	108.01	108.01
4.750	108.01	108.01	108.01	108.01	108.01
5.000	108.01	108.01	108.01	108.01	108.02
5.250	108.02	108.02	108.02	108.02	108.02
5.500	108.02	108.02	108.02	108.02	108.02
5.750	108.03	108.03	108.03	108.03	108.03
6.000	108.03	108.03	108.03	108.03	108.04
6.250	108.04	108.04	108.04	108.04	108.04
6.500	108.04	108.05	108.05	108.05	108.05
6.750	108.05	108.05	108.05	108.06	108.06
7.000	108.06	108.06	108.06	108.06	108.07
7.250	108.07	108.07	108.07	108.07	108.07
7.500	108.08	108.08	108.08	108.08	108.08
7.750	108.09	108.09	108.09	108.09	108.09
8.000	108.10	108.10	108.10	108.10	108.11
8.250	108.11	108.11	108.11	108.12	108.12
8.500	108.12	108.12	108.13	108.13	108.13
8.750	108.14	108.14	108.14	108.15	108.15
9.000	108.15	108.16	108.16	108.16	108.17
9.250	108.17	108.17	108.18	108.18	108.19
9.500	108.19	108.19	108.20	108.20	108.20
9.750	108.20	108.21	108.21	108.21	108.21
10.000	108.22	108.22	108.22	108.22	108.23

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 50 years
 Storm Event: 50 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.250	108.23	108.23	108.23	108.24	108.24
10.500	108.24	108.25	108.25	108.25	108.26
10.750	108.26	108.26	108.27	108.27	108.28
11.000	108.28	108.29	108.29	108.30	108.30
11.250	108.31	108.31	108.32	108.33	108.33
11.500	108.34	108.35	108.36	108.38	108.41
11.750	108.44	108.49	108.55	108.63	108.72
12.000	108.81	108.89	108.94	108.96	108.98
12.250	108.99	109.00	109.01	109.02	109.02
12.500	109.03	109.03	109.03	109.04	109.04
12.750	109.04	109.04	109.04	109.04	109.04
13.000	109.04	109.04	109.04	109.04	109.04
13.250	109.04	109.04	109.04	109.04	109.04
13.500	109.04	109.03	109.03	109.03	109.03
13.750	109.03	109.03	109.03	109.03	109.03
14.000	109.03	109.02	109.02	109.02	109.02
14.250	109.02	109.02	109.02	109.02	109.02
14.500	109.02	109.01	109.01	109.01	109.01
14.750	109.01	109.01	109.01	109.01	109.01
15.000	109.01	109.01	109.01	109.01	109.01
15.250	109.01	109.00	109.00	109.00	109.00
15.500	109.00	109.00	109.00	109.00	109.00
15.750	109.00	109.00	109.00	109.00	109.00
16.000	109.00	109.00	109.00	108.99	108.99
16.250	108.99	108.99	108.99	108.99	108.99
16.500	108.99	108.99	108.99	108.99	108.99
16.750	108.99	108.98	108.98	108.98	108.98
17.000	108.98	108.98	108.98	108.98	108.98
17.250	108.98	108.98	108.97	108.97	108.97
17.500	108.97	108.97	108.97	108.97	108.97
17.750	108.97	108.97	108.97	108.96	108.96
18.000	108.96	108.96	108.96	108.96	108.96
18.250	108.96	108.96	108.95	108.95	108.95
18.500	108.95	108.95	108.95	108.95	108.95
18.750	108.95	108.95	108.94	108.94	108.94
19.000	108.94	108.94	108.94	108.94	108.94
19.250	108.93	108.93	108.93	108.93	108.93
19.500	108.93	108.93	108.93	108.93	108.92
19.750	108.92	108.92	108.92	108.92	108.92
20.000	108.92	108.92	108.91	108.91	108.91
20.250	108.91	108.91	108.91	108.91	108.90

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation

Return Event: 50 years

Label: PO-1 (OUT)

Storm Event: 50 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.500	108.90	108.90	108.90	108.90	108.90
20.750	108.90	108.90	108.89	108.89	108.89
21.000	108.89	108.89	108.89	108.89	108.89
21.250	108.89	108.88	108.88	108.88	108.88
21.500	108.88	108.88	108.88	108.88	108.87
21.750	108.87	108.87	108.87	108.87	108.87
22.000	108.87	108.87	108.86	108.86	108.86
22.250	108.86	108.86	108.86	108.86	108.86
22.500	108.86	108.85	108.85	108.85	108.85
22.750	108.85	108.85	108.85	108.85	108.84
23.000	108.84	108.84	108.84	108.84	108.84
23.250	108.84	108.84	108.84	108.83	108.83
23.500	108.83	108.83	108.83	108.83	108.83
23.750	108.83	108.83	108.82	108.82	108.82
24.000	108.82	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 100 years
 Storm Event: 100 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	108.00	108.00	108.00	108.00	108.00
0.250	108.00	108.00	108.00	108.00	108.00
0.500	108.00	108.00	108.00	108.00	108.00
0.750	108.00	108.00	108.00	108.00	108.00
1.000	108.00	108.00	108.00	108.00	108.00
1.250	108.00	108.00	108.00	108.00	108.00
1.500	108.00	108.00	108.00	108.00	108.00
1.750	108.00	108.00	108.00	108.00	108.00
2.000	108.00	108.00	108.00	108.00	108.00
2.250	108.00	108.00	108.00	108.00	108.00
2.500	108.00	108.00	108.00	108.00	108.00
2.750	108.00	108.00	108.00	108.00	108.00
3.000	108.00	108.00	108.00	108.00	108.00
3.250	108.00	108.00	108.00	108.00	108.00
3.500	108.00	108.00	108.00	108.00	108.00
3.750	108.00	108.00	108.00	108.01	108.01
4.000	108.01	108.01	108.01	108.01	108.01
4.250	108.01	108.01	108.01	108.01	108.01
4.500	108.01	108.01	108.01	108.02	108.02
4.750	108.02	108.02	108.02	108.02	108.02
5.000	108.02	108.02	108.02	108.02	108.03
5.250	108.03	108.03	108.03	108.03	108.03
5.500	108.03	108.03	108.04	108.04	108.04
5.750	108.04	108.04	108.04	108.04	108.05
6.000	108.05	108.05	108.05	108.05	108.05
6.250	108.06	108.06	108.06	108.06	108.06
6.500	108.06	108.07	108.07	108.07	108.07
6.750	108.07	108.08	108.08	108.08	108.08
7.000	108.08	108.09	108.09	108.09	108.09
7.250	108.10	108.10	108.10	108.10	108.10
7.500	108.11	108.11	108.11	108.11	108.12
7.750	108.12	108.12	108.12	108.13	108.13
8.000	108.13	108.14	108.14	108.14	108.14
8.250	108.15	108.15	108.15	108.16	108.16
8.500	108.16	108.17	108.17	108.17	108.18
8.750	108.18	108.19	108.19	108.19	108.20
9.000	108.20	108.20	108.21	108.21	108.21
9.250	108.21	108.21	108.22	108.22	108.22
9.500	108.22	108.23	108.23	108.23	108.23
9.750	108.24	108.24	108.24	108.24	108.25
10.000	108.25	108.25	108.25	108.26	108.26

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 100 years
 Storm Event: 100 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.250	108.26	108.27	108.27	108.27	108.28
10.500	108.28	108.29	108.29	108.29	108.30
10.750	108.30	108.31	108.31	108.32	108.32
11.000	108.33	108.33	108.34	108.34	108.35
11.250	108.36	108.36	108.37	108.38	108.39
11.500	108.40	108.41	108.42	108.44	108.47
11.750	108.52	108.57	108.64	108.73	108.84
12.000	108.95	109.03	109.08	109.10	109.11
12.250	109.12	109.12	109.12	109.13	109.13
12.500	109.13	109.12	109.12	109.12	109.12
12.750	109.11	109.11	109.11	109.11	109.10
13.000	109.10	109.10	109.09	109.09	109.09
13.250	109.08	109.08	109.08	109.08	109.07
13.500	109.07	109.07	109.07	109.06	109.06
13.750	109.06	109.06	109.05	109.05	109.05
14.000	109.05	109.05	109.04	109.04	109.04
14.250	109.04	109.04	109.04	109.03	109.03
14.500	109.03	109.03	109.03	109.03	109.03
14.750	109.02	109.02	109.02	109.02	109.02
15.000	109.02	109.02	109.02	109.02	109.02
15.250	109.01	109.01	109.01	109.01	109.01
15.500	109.01	109.01	109.01	109.01	109.01
15.750	109.01	109.01	109.01	109.01	109.00
16.000	109.00	109.00	109.00	109.00	109.00
16.250	109.00	109.00	109.00	109.00	109.00
16.500	109.00	109.00	109.00	109.00	109.00
16.750	109.00	109.00	108.99	108.99	108.99
17.000	108.99	108.99	108.99	108.99	108.99
17.250	108.99	108.99	108.99	108.99	108.99
17.500	108.99	108.99	108.98	108.98	108.98
17.750	108.98	108.98	108.98	108.98	108.98
18.000	108.98	108.98	108.98	108.98	108.97
18.250	108.97	108.97	108.97	108.97	108.97
18.500	108.97	108.97	108.97	108.97	108.97
18.750	108.96	108.96	108.96	108.96	108.96
19.000	108.96	108.96	108.96	108.96	108.96
19.250	108.95	108.95	108.95	108.95	108.95
19.500	108.95	108.95	108.95	108.95	108.94
19.750	108.94	108.94	108.94	108.94	108.94
20.000	108.94	108.94	108.94	108.93	108.93
20.250	108.93	108.93	108.93	108.93	108.93

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Elevation
 Label: PO-1 (OUT)

Return Event: 100 years
 Storm Event: 100 Year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.500	108.93	108.92	108.92	108.92	108.92
20.750	108.92	108.92	108.92	108.92	108.92
21.000	108.91	108.91	108.91	108.91	108.91
21.250	108.91	108.91	108.91	108.91	108.90
21.500	108.90	108.90	108.90	108.90	108.90
21.750	108.90	108.90	108.89	108.89	108.89
22.000	108.89	108.89	108.89	108.89	108.89
22.250	108.89	108.88	108.88	108.88	108.88
22.500	108.88	108.88	108.88	108.88	108.88
22.750	108.87	108.87	108.87	108.87	108.87
23.000	108.87	108.87	108.87	108.87	108.87
23.250	108.86	108.86	108.86	108.86	108.86
23.500	108.86	108.86	108.86	108.86	108.85
23.750	108.85	108.85	108.85	108.85	108.85
24.000	108.85	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 1 years
 Storm Event: 1 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	0.000
3.500	0.000	0.000	0.000	0.000	0.000
3.750	0.000	0.000	0.000	0.000	0.000
4.000	0.000	0.000	0.000	0.000	0.000
4.250	0.000	0.000	0.000	0.000	0.000
4.500	0.000	0.000	0.000	0.000	0.000
4.750	0.000	0.000	0.000	0.000	0.000
5.000	0.000	0.000	0.000	0.000	0.000
5.250	0.000	0.000	0.000	0.000	0.000
5.500	0.000	0.000	0.000	0.000	0.000
5.750	0.000	0.000	0.000	0.000	0.000
6.000	0.000	0.000	0.000	0.000	0.000
6.250	0.000	0.000	0.000	0.000	0.000
6.500	0.000	0.000	0.000	0.000	0.000
6.750	0.000	0.000	0.000	0.000	0.000
7.000	0.000	0.000	0.000	0.000	0.000
7.250	0.000	0.000	0.000	0.000	0.000
7.500	0.000	0.000	0.000	0.000	0.000
7.750	0.000	0.000	0.000	0.000	0.000
8.000	0.000	0.000	0.000	0.000	0.000
8.250	0.000	0.000	0.000	0.000	0.000
8.500	0.001	0.001	0.001	0.001	0.001
8.750	0.001	0.001	0.001	0.001	0.001
9.000	0.001	0.001	0.001	0.001	0.001
9.250	0.001	0.001	0.001	0.001	0.001
9.500	0.002	0.002	0.002	0.002	0.002
9.750	0.002	0.002	0.002	0.002	0.002
10.000	0.002	0.003	0.003	0.003	0.003

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 1 years
 Storm Event: 1 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.250	0.003	0.003	0.003	0.004	0.004
10.500	0.004	0.004	0.004	0.005	0.005
10.750	0.005	0.006	0.006	0.006	0.007
11.000	0.007	0.007	0.008	0.008	0.009
11.250	0.010	0.010	0.011	0.012	0.013
11.500	0.014	0.015	0.017	0.020	0.025
11.750	0.032	0.045	0.066	0.088	0.111
12.000	0.133	0.152	0.164	0.171	0.176
12.250	0.180	0.183	0.186	0.188	0.191
12.500	0.193	0.195	0.196	0.198	0.199
12.750	0.201	0.202	0.203	0.204	0.206
13.000	0.207	0.208	0.209	0.210	0.210
13.250	0.211	0.212	0.213	0.214	0.214
13.500	0.215	0.216	0.216	0.217	0.218
13.750	0.218	0.219	0.219	0.220	0.220
14.000	0.220	0.221	0.221	0.222	0.222
14.250	0.222	0.223	0.223	0.223	0.224
14.500	0.224	0.224	0.225	0.225	0.225
14.750	0.225	0.226	0.226	0.226	0.226
15.000	0.227	0.227	0.227	0.227	0.228
15.250	0.228	0.228	0.228	0.228	0.228
15.500	0.229	0.229	0.229	0.229	0.229
15.750	0.229	0.229	0.229	0.229	0.230
16.000	0.230	0.230	0.230	0.230	0.230
16.250	0.230	0.230	0.230	0.230	0.230
16.500	0.230	0.230	0.230	0.230	0.230
16.750	0.230	0.230	0.230	0.230	0.230
17.000	0.230	0.230	0.230	0.230	0.230
17.250	0.230	0.230	0.230	0.230	0.230
17.500	0.230	0.230	0.230	0.230	0.230
17.750	0.230	0.230	0.230	0.230	0.229
18.000	0.229	0.229	0.229	0.229	0.229
18.250	0.229	0.229	0.229	0.229	0.229
18.500	0.229	0.229	0.229	0.228	0.228
18.750	0.228	0.228	0.228	0.228	0.228
19.000	0.228	0.228	0.228	0.227	0.227
19.250	0.227	0.227	0.227	0.227	0.227
19.500	0.226	0.226	0.226	0.226	0.226
19.750	0.226	0.226	0.225	0.225	0.225
20.000	0.225	0.225	0.225	0.225	0.224
20.250	0.224	0.224	0.224	0.224	0.224

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 1 years
 Storm Event: 1 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.500	0.223	0.223	0.223	0.223	0.223
20.750	0.223	0.222	0.222	0.222	0.222
21.000	0.222	0.222	0.221	0.221	0.221
21.250	0.221	0.221	0.221	0.220	0.220
21.500	0.220	0.220	0.220	0.220	0.219
21.750	0.219	0.219	0.219	0.219	0.219
22.000	0.218	0.218	0.218	0.218	0.218
22.250	0.218	0.217	0.217	0.217	0.217
22.500	0.217	0.217	0.216	0.216	0.216
22.750	0.216	0.216	0.216	0.215	0.215
23.000	0.215	0.215	0.215	0.215	0.214
23.250	0.214	0.214	0.214	0.214	0.214
23.500	0.213	0.213	0.213	0.213	0.213
23.750	0.213	0.212	0.212	0.212	0.212
24.000	0.212	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 2 years
 Storm Event: 2 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	0.000
3.500	0.000	0.000	0.000	0.000	0.000
3.750	0.000	0.000	0.000	0.000	0.000
4.000	0.000	0.000	0.000	0.000	0.000
4.250	0.000	0.000	0.000	0.000	0.000
4.500	0.000	0.000	0.000	0.000	0.000
4.750	0.000	0.000	0.000	0.000	0.000
5.000	0.000	0.000	0.000	0.000	0.000
5.250	0.000	0.000	0.000	0.000	0.000
5.500	0.000	0.000	0.000	0.000	0.000
5.750	0.000	0.000	0.000	0.000	0.000
6.000	0.000	0.000	0.000	0.000	0.000
6.250	0.000	0.000	0.000	0.000	0.000
6.500	0.000	0.000	0.000	0.000	0.000
6.750	0.000	0.000	0.000	0.000	0.000
7.000	0.000	0.000	0.000	0.000	0.000
7.250	0.000	0.000	0.000	0.000	0.000
7.500	0.001	0.001	0.001	0.001	0.001
7.750	0.001	0.001	0.001	0.001	0.001
8.000	0.001	0.001	0.001	0.001	0.001
8.250	0.001	0.001	0.001	0.001	0.001
8.500	0.001	0.001	0.002	0.002	0.002
8.750	0.002	0.002	0.002	0.002	0.002
9.000	0.002	0.002	0.003	0.003	0.003
9.250	0.003	0.003	0.003	0.003	0.003
9.500	0.004	0.004	0.004	0.004	0.004
9.750	0.004	0.005	0.005	0.005	0.005
10.000	0.005	0.006	0.006	0.006	0.006

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 2 years
 Storm Event: 2 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.250	0.007	0.007	0.007	0.008	0.008
10.500	0.009	0.009	0.009	0.010	0.010
10.750	0.011	0.012	0.012	0.013	0.014
11.000	0.014	0.015	0.016	0.017	0.019
11.250	0.020	0.021	0.023	0.025	0.026
11.500	0.029	0.031	0.035	0.041	0.052
11.750	0.068	0.084	0.101	0.125	0.154
12.000	0.183	0.207	0.223	0.232	0.238
12.250	0.243	0.247	0.250	0.253	0.256
12.500	0.259	0.261	0.263	0.265	0.267
12.750	0.268	0.270	0.272	0.273	0.274
13.000	0.276	0.277	0.278	0.279	0.280
13.250	0.281	0.282	0.283	0.284	0.284
13.500	0.285	0.286	0.287	0.287	0.288
13.750	0.289	0.289	0.290	0.290	0.291
14.000	0.291	0.292	0.292	0.292	0.293
14.250	0.293	0.293	0.294	0.294	0.294
14.500	0.295	0.295	0.295	0.296	0.296
14.750	0.296	0.296	0.296	0.297	0.297
15.000	0.297	0.297	0.297	0.298	0.298
15.250	0.298	0.298	0.298	0.298	0.298
15.500	0.298	0.299	0.299	0.299	0.299
15.750	0.299	0.299	0.299	0.299	0.299
16.000	0.299	0.299	0.299	0.299	0.299
16.250	0.299	0.299	0.299	0.299	0.298
16.500	0.298	0.298	0.298	0.298	0.298
16.750	0.298	0.298	0.298	0.298	0.298
17.000	0.298	0.298	0.297	0.297	0.297
17.250	0.297	0.297	0.297	0.297	0.297
17.500	0.297	0.296	0.296	0.296	0.296
17.750	0.296	0.296	0.296	0.296	0.295
18.000	0.295	0.295	0.295	0.295	0.295
18.250	0.294	0.294	0.294	0.294	0.294
18.500	0.294	0.293	0.293	0.293	0.293
18.750	0.293	0.292	0.292	0.292	0.292
19.000	0.291	0.291	0.291	0.291	0.291
19.250	0.290	0.290	0.290	0.290	0.289
19.500	0.289	0.289	0.289	0.288	0.288
19.750	0.288	0.288	0.287	0.287	0.287
20.000	0.287	0.286	0.286	0.286	0.285
20.250	0.285	0.285	0.285	0.284	0.284

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 2 years
 Storm Event: 2 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.500	0.284	0.284	0.283	0.283	0.283
20.750	0.282	0.282	0.282	0.282	0.281
21.000	0.281	0.281	0.281	0.280	0.280
21.250	0.280	0.279	0.279	0.279	0.279
21.500	0.278	0.278	0.278	0.278	0.277
21.750	0.277	0.277	0.276	0.276	0.276
22.000	0.276	0.275	0.275	0.275	0.274
22.250	0.274	0.274	0.274	0.273	0.273
22.500	0.273	0.273	0.272	0.272	0.272
22.750	0.272	0.271	0.271	0.271	0.270
23.000	0.270	0.270	0.270	0.269	0.269
23.250	0.269	0.269	0.268	0.268	0.268
23.500	0.267	0.267	0.267	0.267	0.266
23.750	0.266	0.266	0.266	0.265	0.265
24.000	0.265	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 5 years
 Storm Event: 5 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	0.000
3.500	0.000	0.000	0.000	0.000	0.000
3.750	0.000	0.000	0.000	0.000	0.000
4.000	0.000	0.000	0.000	0.000	0.000
4.250	0.000	0.000	0.000	0.000	0.000
4.500	0.000	0.000	0.000	0.000	0.000
4.750	0.000	0.000	0.000	0.000	0.000
5.000	0.000	0.000	0.000	0.000	0.000
5.250	0.000	0.000	0.000	0.000	0.000
5.500	0.000	0.000	0.000	0.000	0.000
5.750	0.000	0.000	0.000	0.000	0.000
6.000	0.000	0.000	0.000	0.000	0.000
6.250	0.000	0.000	0.001	0.001	0.001
6.500	0.001	0.001	0.001	0.001	0.001
6.750	0.001	0.001	0.001	0.001	0.001
7.000	0.001	0.001	0.001	0.001	0.001
7.250	0.001	0.001	0.002	0.002	0.002
7.500	0.002	0.002	0.002	0.002	0.002
7.750	0.002	0.002	0.002	0.003	0.003
8.000	0.003	0.003	0.003	0.003	0.003
8.250	0.003	0.003	0.004	0.004	0.004
8.500	0.004	0.004	0.004	0.005	0.005
8.750	0.005	0.005	0.005	0.006	0.006
9.000	0.006	0.006	0.007	0.007	0.007
9.250	0.008	0.008	0.008	0.008	0.009
9.500	0.009	0.010	0.010	0.010	0.011
9.750	0.011	0.012	0.012	0.013	0.013
10.000	0.014	0.014	0.015	0.015	0.016

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 5 years
 Storm Event: 5 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.250	0.017	0.018	0.019	0.019	0.020
10.500	0.021	0.022	0.024	0.025	0.026
10.750	0.028	0.029	0.031	0.032	0.034
11.000	0.036	0.039	0.041	0.044	0.047
11.250	0.050	0.054	0.058	0.062	0.067
11.500	0.073	0.077	0.082	0.088	0.098
11.750	0.111	0.129	0.153	0.186	0.226
12.000	0.266	0.298	0.320	0.331	0.338
12.250	0.344	0.349	0.354	0.358	0.361
12.500	0.364	0.367	0.370	0.372	0.374
12.750	0.376	0.378	0.379	0.381	0.383
13.000	0.384	0.385	0.387	0.388	0.389
13.250	0.390	0.391	0.392	0.393	0.394
13.500	0.395	0.395	0.396	0.397	0.397
13.750	0.398	0.399	0.399	0.399	0.400
14.000	0.400	0.401	0.401	0.401	0.402
14.250	0.402	0.402	0.402	0.403	0.403
14.500	0.403	0.403	0.403	0.404	0.404
14.750	0.404	0.404	0.404	0.404	0.404
15.000	0.404	0.404	0.404	0.405	0.405
15.250	0.405	0.405	0.405	0.404	0.404
15.500	0.404	0.404	0.404	0.404	0.404
15.750	0.404	0.404	0.404	0.404	0.403
16.000	0.403	0.403	0.403	0.403	0.402
16.250	0.402	0.402	0.402	0.401	0.401
16.500	0.401	0.401	0.401	0.400	0.400
16.750	0.400	0.400	0.399	0.399	0.399
17.000	0.398	0.398	0.398	0.398	0.397
17.250	0.397	0.397	0.396	0.396	0.396
17.500	0.396	0.395	0.395	0.395	0.394
17.750	0.394	0.394	0.393	0.393	0.393
18.000	0.392	0.392	0.392	0.391	0.391
18.250	0.391	0.390	0.390	0.389	0.389
18.500	0.389	0.388	0.388	0.388	0.387
18.750	0.387	0.386	0.386	0.386	0.385
19.000	0.385	0.384	0.384	0.384	0.383
19.250	0.383	0.382	0.382	0.381	0.381
19.500	0.381	0.380	0.380	0.379	0.379
19.750	0.378	0.378	0.377	0.377	0.376
20.000	0.376	0.376	0.375	0.375	0.374
20.250	0.374	0.373	0.373	0.372	0.372

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 5 years
 Storm Event: 5 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.500	0.371	0.371	0.370	0.370	0.369
20.750	0.369	0.369	0.368	0.368	0.367
21.000	0.367	0.366	0.366	0.365	0.365
21.250	0.364	0.364	0.364	0.363	0.363
21.500	0.362	0.362	0.361	0.361	0.360
21.750	0.360	0.359	0.359	0.359	0.358
22.000	0.358	0.357	0.357	0.356	0.356
22.250	0.356	0.355	0.355	0.354	0.354
22.500	0.353	0.353	0.352	0.352	0.352
22.750	0.351	0.351	0.350	0.350	0.349
23.000	0.349	0.349	0.348	0.348	0.347
23.250	0.347	0.346	0.346	0.346	0.345
23.500	0.345	0.344	0.344	0.343	0.343
23.750	0.343	0.342	0.342	0.341	0.341
24.000	0.341	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 10 years
 Storm Event: 10 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	0.000
3.500	0.000	0.000	0.000	0.000	0.000
3.750	0.000	0.000	0.000	0.000	0.000
4.000	0.000	0.000	0.000	0.000	0.000
4.250	0.000	0.000	0.000	0.000	0.000
4.500	0.000	0.000	0.000	0.000	0.000
4.750	0.000	0.000	0.000	0.000	0.000
5.000	0.000	0.000	0.000	0.000	0.000
5.250	0.000	0.000	0.000	0.000	0.000
5.500	0.000	0.000	0.000	0.001	0.001
5.750	0.001	0.001	0.001	0.001	0.001
6.000	0.001	0.001	0.001	0.001	0.001
6.250	0.001	0.001	0.001	0.001	0.001
6.500	0.001	0.002	0.002	0.002	0.002
6.750	0.002	0.002	0.002	0.002	0.002
7.000	0.002	0.002	0.003	0.003	0.003
7.250	0.003	0.003	0.003	0.003	0.003
7.500	0.004	0.004	0.004	0.004	0.004
7.750	0.004	0.005	0.005	0.005	0.005
8.000	0.005	0.005	0.006	0.006	0.006
8.250	0.006	0.007	0.007	0.007	0.007
8.500	0.008	0.008	0.008	0.009	0.009
8.750	0.009	0.010	0.010	0.011	0.011
9.000	0.011	0.012	0.012	0.013	0.014
9.250	0.014	0.015	0.015	0.016	0.017
9.500	0.017	0.018	0.019	0.019	0.020
9.750	0.021	0.022	0.023	0.024	0.025
10.000	0.026	0.027	0.028	0.029	0.030

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 10 years
 Storm Event: 10 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.250	0.032	0.033	0.035	0.037	0.038
10.500	0.040	0.042	0.045	0.047	0.049
10.750	0.052	0.055	0.058	0.062	0.065
11.000	0.069	0.074	0.076	0.079	0.081
11.250	0.084	0.087	0.090	0.093	0.097
11.500	0.100	0.104	0.110	0.119	0.131
11.750	0.147	0.170	0.200	0.241	0.290
12.000	0.337	0.375	0.401	0.415	0.424
12.250	0.431	0.437	0.442	0.447	0.451
12.500	0.455	0.458	0.461	0.463	0.466
12.750	0.468	0.470	0.472	0.474	0.476
13.000	0.477	0.479	0.480	0.481	0.483
13.250	0.484	0.485	0.486	0.487	0.488
13.500	0.489	0.490	0.490	0.491	0.492
13.750	0.492	0.493	0.493	0.494	0.494
14.000	0.494	0.495	0.495	0.495	0.495
14.250	0.496	0.496	0.496	0.496	0.496
14.500	0.496	0.497	0.497	0.497	0.497
14.750	0.497	0.497	0.497	0.497	0.497
15.000	0.497	0.497	0.497	0.497	0.497
15.250	0.496	0.496	0.496	0.496	0.496
15.500	0.496	0.495	0.495	0.495	0.495
15.750	0.495	0.494	0.494	0.494	0.493
16.000	0.493	0.493	0.492	0.492	0.492
16.250	0.491	0.491	0.490	0.490	0.490
16.500	0.489	0.489	0.488	0.488	0.488
16.750	0.487	0.487	0.486	0.486	0.486
17.000	0.485	0.485	0.484	0.484	0.483
17.250	0.483	0.482	0.482	0.481	0.481
17.500	0.481	0.480	0.480	0.479	0.479
17.750	0.478	0.478	0.477	0.477	0.476
18.000	0.476	0.475	0.475	0.474	0.474
18.250	0.473	0.472	0.472	0.471	0.471
18.500	0.470	0.470	0.469	0.469	0.468
18.750	0.467	0.467	0.466	0.466	0.465
19.000	0.465	0.464	0.463	0.463	0.462
19.250	0.462	0.461	0.460	0.460	0.459
19.500	0.459	0.458	0.457	0.457	0.456
19.750	0.455	0.455	0.454	0.454	0.453
20.000	0.452	0.452	0.451	0.450	0.450
20.250	0.449	0.448	0.448	0.447	0.446

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 10 years
 Storm Event: 10 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.500	0.446	0.445	0.444	0.444	0.443
20.750	0.443	0.442	0.441	0.441	0.440
21.000	0.439	0.439	0.438	0.437	0.437
21.250	0.436	0.436	0.435	0.434	0.434
21.500	0.433	0.432	0.432	0.431	0.431
21.750	0.430	0.429	0.429	0.428	0.428
22.000	0.427	0.426	0.426	0.425	0.424
22.250	0.424	0.423	0.423	0.422	0.421
22.500	0.421	0.420	0.420	0.419	0.418
22.750	0.418	0.417	0.417	0.416	0.416
23.000	0.415	0.414	0.414	0.413	0.413
23.250	0.412	0.411	0.411	0.410	0.410
23.500	0.409	0.409	0.408	0.407	0.407
23.750	0.406	0.406	0.405	0.405	0.404
24.000	0.403	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 25 years
 Storm Event: 25 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	0.000
3.500	0.000	0.000	0.000	0.000	0.000
3.750	0.000	0.000	0.000	0.000	0.000
4.000	0.000	0.000	0.000	0.000	0.000
4.250	0.000	0.000	0.000	0.000	0.000
4.500	0.000	0.000	0.000	0.000	0.000
4.750	0.000	0.000	0.001	0.001	0.001
5.000	0.001	0.001	0.001	0.001	0.001
5.250	0.001	0.001	0.001	0.001	0.001
5.500	0.001	0.001	0.001	0.002	0.002
5.750	0.002	0.002	0.002	0.002	0.002
6.000	0.002	0.002	0.002	0.003	0.003
6.250	0.003	0.003	0.003	0.003	0.003
6.500	0.004	0.004	0.004	0.004	0.004
6.750	0.004	0.005	0.005	0.005	0.005
7.000	0.005	0.006	0.006	0.006	0.006
7.250	0.007	0.007	0.007	0.007	0.008
7.500	0.008	0.008	0.009	0.009	0.009
7.750	0.010	0.010	0.010	0.011	0.011
8.000	0.012	0.012	0.012	0.013	0.013
8.250	0.014	0.014	0.015	0.016	0.016
8.500	0.017	0.017	0.018	0.019	0.020
8.750	0.020	0.021	0.022	0.023	0.024
9.000	0.025	0.026	0.027	0.028	0.030
9.250	0.031	0.032	0.034	0.035	0.036
9.500	0.038	0.039	0.041	0.042	0.044
9.750	0.046	0.048	0.050	0.052	0.054
10.000	0.057	0.059	0.062	0.065	0.068

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 25 years
 Storm Event: 25 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.250	0.071	0.074	0.076	0.078	0.080
10.500	0.081	0.083	0.085	0.088	0.090
10.750	0.092	0.094	0.097	0.100	0.102
11.000	0.105	0.108	0.111	0.114	0.117
11.250	0.121	0.125	0.129	0.133	0.138
11.500	0.142	0.148	0.156	0.167	0.182
11.750	0.204	0.233	0.272	0.324	0.385
12.000	0.444	0.494	0.526	0.544	0.555
12.250	0.564	0.571	0.578	0.583	0.589
12.500	0.593	0.597	0.600	0.604	0.606
12.750	0.609	0.612	0.614	0.616	0.618
13.000	0.620	0.622	0.623	0.625	0.626
13.250	0.628	0.629	0.630	0.631	0.632
13.500	0.633	0.634	0.635	0.635	0.636
13.750	0.637	0.637	0.637	0.638	0.638
14.000	0.638	0.639	0.639	0.639	0.639
14.250	0.639	0.639	0.639	0.639	0.639
14.500	0.639	0.639	0.639	0.639	0.639
14.750	0.639	0.639	0.639	0.639	0.638
15.000	0.638	0.638	0.638	0.637	0.637
15.250	0.637	0.637	0.636	0.636	0.636
15.500	0.635	0.635	0.634	0.634	0.633
15.750	0.633	0.632	0.632	0.631	0.631
16.000	0.630	0.630	0.629	0.628	0.628
16.250	0.627	0.627	0.626	0.625	0.625
16.500	0.624	0.623	0.623	0.622	0.621
16.750	0.621	0.620	0.619	0.619	0.618
17.000	0.617	0.617	0.616	0.615	0.615
17.250	0.614	0.613	0.612	0.612	0.611
17.500	0.610	0.609	0.609	0.608	0.607
17.750	0.606	0.606	0.605	0.604	0.603
18.000	0.603	0.602	0.601	0.600	0.599
18.250	0.599	0.598	0.597	0.596	0.595
18.500	0.595	0.594	0.593	0.592	0.591
18.750	0.590	0.590	0.589	0.588	0.587
19.000	0.586	0.585	0.584	0.584	0.583
19.250	0.582	0.581	0.580	0.579	0.578
19.500	0.577	0.576	0.576	0.575	0.574
19.750	0.573	0.572	0.571	0.570	0.569
20.000	0.568	0.567	0.566	0.565	0.564
20.250	0.563	0.563	0.562	0.561	0.560

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 25 years
 Storm Event: 25 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.500	0.559	0.558	0.557	0.556	0.555
20.750	0.554	0.553	0.552	0.552	0.551
21.000	0.550	0.549	0.548	0.547	0.546
21.250	0.545	0.544	0.543	0.543	0.542
21.500	0.541	0.540	0.539	0.538	0.537
21.750	0.536	0.535	0.535	0.534	0.533
22.000	0.532	0.531	0.530	0.529	0.529
22.250	0.528	0.527	0.526	0.525	0.524
22.500	0.523	0.523	0.522	0.521	0.520
22.750	0.519	0.518	0.518	0.517	0.516
23.000	0.515	0.514	0.513	0.513	0.512
23.250	0.511	0.510	0.509	0.508	0.508
23.500	0.507	0.506	0.505	0.504	0.504
23.750	0.503	0.502	0.501	0.500	0.499
24.000	0.499	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 50 years
 Storm Event: 50 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	0.000
3.500	0.000	0.000	0.000	0.000	0.000
3.750	0.000	0.000	0.000	0.000	0.000
4.000	0.000	0.000	0.000	0.000	0.000
4.250	0.000	0.001	0.001	0.001	0.001
4.500	0.001	0.001	0.001	0.001	0.001
4.750	0.001	0.001	0.001	0.001	0.001
5.000	0.001	0.002	0.002	0.002	0.002
5.250	0.002	0.002	0.002	0.002	0.002
5.500	0.003	0.003	0.003	0.003	0.003
5.750	0.003	0.003	0.004	0.004	0.004
6.000	0.004	0.004	0.004	0.005	0.005
6.250	0.005	0.005	0.006	0.006	0.006
6.500	0.006	0.007	0.007	0.007	0.008
6.750	0.008	0.008	0.008	0.009	0.009
7.000	0.010	0.010	0.010	0.011	0.011
7.250	0.012	0.012	0.013	0.013	0.014
7.500	0.014	0.015	0.015	0.016	0.016
7.750	0.017	0.018	0.018	0.019	0.020
8.000	0.020	0.021	0.022	0.023	0.023
8.250	0.024	0.025	0.026	0.027	0.028
8.500	0.029	0.030	0.032	0.033	0.034
8.750	0.036	0.037	0.039	0.041	0.042
9.000	0.044	0.046	0.048	0.050	0.052
9.250	0.054	0.057	0.059	0.062	0.064
9.500	0.067	0.069	0.072	0.075	0.076
9.750	0.078	0.079	0.081	0.082	0.084
10.000	0.086	0.088	0.089	0.091	0.093

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 50 years
 Storm Event: 50 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.250	0.095	0.097	0.099	0.102	0.104
10.500	0.106	0.108	0.111	0.113	0.116
10.750	0.119	0.122	0.125	0.128	0.131
11.000	0.134	0.138	0.141	0.145	0.149
11.250	0.154	0.158	0.163	0.168	0.174
11.500	0.179	0.186	0.195	0.208	0.228
11.750	0.254	0.289	0.334	0.394	0.467
12.000	0.537	0.596	0.634	0.655	0.668
12.250	0.679	0.687	0.693	0.699	0.703
12.500	0.707	0.709	0.711	0.713	0.714
12.750	0.715	0.716	0.717	0.717	0.717
13.000	0.717	0.717	0.717	0.716	0.716
13.250	0.715	0.715	0.714	0.714	0.713
13.500	0.712	0.712	0.711	0.710	0.709
13.750	0.708	0.708	0.707	0.706	0.705
14.000	0.704	0.703	0.703	0.702	0.701
14.250	0.700	0.699	0.699	0.698	0.697
14.500	0.697	0.696	0.695	0.695	0.694
14.750	0.694	0.693	0.692	0.692	0.691
15.000	0.691	0.690	0.690	0.689	0.689
15.250	0.688	0.688	0.688	0.687	0.687
15.500	0.686	0.686	0.685	0.685	0.685
15.750	0.684	0.684	0.683	0.683	0.682
16.000	0.682	0.681	0.681	0.680	0.679
16.250	0.679	0.678	0.678	0.677	0.676
16.500	0.676	0.675	0.675	0.674	0.673
16.750	0.673	0.672	0.671	0.671	0.670
17.000	0.669	0.669	0.668	0.667	0.666
17.250	0.666	0.665	0.664	0.663	0.663
17.500	0.662	0.661	0.661	0.660	0.659
17.750	0.658	0.657	0.657	0.656	0.655
18.000	0.654	0.653	0.653	0.652	0.651
18.250	0.650	0.649	0.649	0.648	0.647
18.500	0.646	0.645	0.644	0.643	0.643
18.750	0.642	0.641	0.640	0.639	0.638
19.000	0.637	0.636	0.635	0.635	0.634
19.250	0.633	0.632	0.631	0.630	0.629
19.500	0.628	0.627	0.626	0.625	0.624
19.750	0.623	0.622	0.621	0.620	0.619
20.000	0.618	0.617	0.616	0.615	0.614
20.250	0.613	0.612	0.611	0.610	0.609

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 50 years
 Storm Event: 50 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.500	0.608	0.607	0.606	0.605	0.604
20.750	0.603	0.602	0.601	0.600	0.599
21.000	0.598	0.597	0.596	0.596	0.595
21.250	0.594	0.593	0.592	0.591	0.590
21.500	0.589	0.588	0.587	0.586	0.585
21.750	0.584	0.583	0.582	0.581	0.580
22.000	0.579	0.578	0.578	0.577	0.576
22.250	0.575	0.574	0.573	0.572	0.571
22.500	0.570	0.569	0.568	0.567	0.567
22.750	0.566	0.565	0.564	0.563	0.562
23.000	0.561	0.560	0.559	0.558	0.558
23.250	0.557	0.556	0.555	0.554	0.553
23.500	0.552	0.551	0.551	0.550	0.549
23.750	0.548	0.547	0.546	0.545	0.544
24.000	0.544	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 100 years
 Storm Event: 100 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	0.000
3.500	0.000	0.000	0.000	0.000	0.000
3.750	0.000	0.000	0.001	0.001	0.001
4.000	0.001	0.001	0.001	0.001	0.001
4.250	0.001	0.001	0.001	0.001	0.001
4.500	0.001	0.002	0.002	0.002	0.002
4.750	0.002	0.002	0.002	0.002	0.003
5.000	0.003	0.003	0.003	0.003	0.003
5.250	0.003	0.004	0.004	0.004	0.004
5.500	0.004	0.005	0.005	0.005	0.005
5.750	0.006	0.006	0.006	0.006	0.007
6.000	0.007	0.007	0.008	0.008	0.008
6.250	0.009	0.009	0.010	0.010	0.010
6.500	0.011	0.011	0.012	0.012	0.013
6.750	0.013	0.014	0.014	0.015	0.016
7.000	0.016	0.017	0.018	0.018	0.019
7.250	0.020	0.021	0.021	0.022	0.023
7.500	0.024	0.025	0.026	0.027	0.028
7.750	0.029	0.030	0.031	0.032	0.033
8.000	0.034	0.036	0.037	0.038	0.040
8.250	0.041	0.043	0.045	0.046	0.048
8.500	0.050	0.052	0.054	0.057	0.059
8.750	0.061	0.064	0.067	0.070	0.073
9.000	0.075	0.077	0.078	0.080	0.081
9.250	0.083	0.085	0.086	0.088	0.090
9.500	0.091	0.093	0.095	0.097	0.098
9.750	0.100	0.102	0.104	0.106	0.108
10.000	0.110	0.112	0.114	0.116	0.119

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 100 years
 Storm Event: 100 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.250	0.121	0.124	0.126	0.129	0.131
10.500	0.134	0.137	0.140	0.143	0.146
10.750	0.149	0.153	0.156	0.160	0.164
11.000	0.168	0.172	0.176	0.181	0.185
11.250	0.190	0.196	0.202	0.208	0.214
11.500	0.221	0.229	0.240	0.256	0.278
11.750	0.309	0.349	0.401	0.473	0.558
12.000	0.641	0.707	0.746	0.764	0.773
12.250	0.778	0.782	0.784	0.785	0.786
12.500	0.785	0.784	0.783	0.781	0.778
12.750	0.776	0.774	0.772	0.769	0.767
13.000	0.764	0.762	0.760	0.757	0.755
13.250	0.752	0.750	0.748	0.746	0.743
13.500	0.741	0.739	0.737	0.735	0.733
13.750	0.731	0.730	0.728	0.726	0.724
14.000	0.723	0.721	0.719	0.718	0.716
14.250	0.715	0.714	0.712	0.711	0.710
14.500	0.709	0.708	0.707	0.706	0.705
14.750	0.704	0.703	0.702	0.701	0.700
15.000	0.700	0.699	0.698	0.697	0.697
15.250	0.696	0.695	0.695	0.694	0.694
15.500	0.693	0.692	0.692	0.691	0.691
15.750	0.690	0.690	0.689	0.689	0.688
16.000	0.688	0.687	0.687	0.686	0.686
16.250	0.685	0.685	0.684	0.684	0.684
16.500	0.683	0.683	0.682	0.682	0.681
16.750	0.681	0.681	0.680	0.680	0.679
17.000	0.679	0.678	0.678	0.677	0.676
17.250	0.676	0.675	0.675	0.674	0.674
17.500	0.673	0.672	0.672	0.671	0.671
17.750	0.670	0.669	0.669	0.668	0.667
18.000	0.667	0.666	0.666	0.665	0.664
18.250	0.663	0.663	0.662	0.661	0.661
18.500	0.660	0.659	0.658	0.658	0.657
18.750	0.656	0.655	0.655	0.654	0.653
19.000	0.652	0.651	0.651	0.650	0.649
19.250	0.648	0.647	0.647	0.646	0.645
19.500	0.644	0.643	0.642	0.641	0.640
19.750	0.640	0.639	0.638	0.637	0.636
20.000	0.635	0.634	0.633	0.632	0.631
20.250	0.630	0.629	0.629	0.628	0.627

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Time vs. Volume
 Label: PO-1

Return Event: 100 years
 Storm Event: 100 Year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.500	0.626	0.625	0.624	0.623	0.622
20.750	0.621	0.620	0.619	0.618	0.617
21.000	0.617	0.616	0.615	0.614	0.613
21.250	0.612	0.611	0.610	0.609	0.608
21.500	0.608	0.607	0.606	0.605	0.604
21.750	0.603	0.602	0.601	0.600	0.600
22.000	0.599	0.598	0.597	0.596	0.595
22.250	0.594	0.593	0.593	0.592	0.591
22.500	0.590	0.589	0.588	0.587	0.587
22.750	0.586	0.585	0.584	0.583	0.582
23.000	0.581	0.581	0.580	0.579	0.578
23.250	0.577	0.576	0.575	0.575	0.574
23.500	0.573	0.572	0.571	0.570	0.570
23.750	0.569	0.568	0.567	0.566	0.565
24.000	0.565	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Elevation-Area Volume Curve

Return Event: 1 years

Label: PO-1

Storm Event: 1 Year

Elevation (ft)	Planimeter (ft ²)	Area (acres)	A1+A2+sq (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
108.00	0.0	0.103	0.000	0.000	0.000
108.20	0.0	0.733	1.111	0.074	0.074
109.00	0.0	0.793	2.288	0.610	0.684
110.00	0.0	1.053	2.760	0.920	1.604

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Volume Equations
Label: PO-1

Return Event: 1 years
Storm Event: 1 Year

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

$$\text{Volume} = (1/3) * (\text{EL2} - \text{EL1}) * (\text{Area1} + \text{Area2} + \text{sqr}(\text{Area1} * \text{Area2}))$$

where: EL1, EL2 Lower and upper elevations of the increment
 Area1, Area2 Areas computed for EL1, EL2, respectively
 Volume Incremental volume between EL1 and EL2

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Elevation-Area Volume Curve

Return Event: 2 years

Label: PO-1

Storm Event: 1 Year

Elevation (ft)	Planimeter (ft ²)	Area (acres)	A1+A2+sq (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
108.00	0.0	0.103	0.000	0.000	0.000
108.20	0.0	0.733	1.111	0.074	0.074
109.00	0.0	0.793	2.288	0.610	0.684
110.00	0.0	1.053	2.760	0.920	1.604

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Volume Equations
Label: PO-1

Return Event: 2 years
Storm Event: 1 Year

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

$$\text{Volume} = (1/3) * (\text{EL2} - \text{EL1}) * (\text{Area1} + \text{Area2} + \text{sqr}(\text{Area1} * \text{Area2}))$$

where: EL1, EL2 Lower and upper elevations of the increment
 Area1, Area2 Areas computed for EL1, EL2, respectively
 Volume Incremental volume between EL1 and EL2

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Elevation-Area Volume Curve

Return Event: 5 years

Label: PO-1

Storm Event: 1 Year

Elevation (ft)	Planimeter (ft ²)	Area (acres)	A1+A2+sq (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
108.00	0.0	0.103	0.000	0.000	0.000
108.20	0.0	0.733	1.111	0.074	0.074
109.00	0.0	0.793	2.288	0.610	0.684
110.00	0.0	1.053	2.760	0.920	1.604

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Volume Equations
Label: PO-1

Return Event: 5 years
Storm Event: 1 Year

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

$$\text{Volume} = (1/3) * (\text{EL2} - \text{EL1}) * (\text{Area1} + \text{Area2} + \text{sqr}(\text{Area1} * \text{Area2}))$$

where: EL1, EL2 Lower and upper elevations of the increment
 Area1, Area2 Areas computed for EL1, EL2, respectively
 Volume Incremental volume between EL1 and EL2

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Elevation-Area Volume Curve

Return Event: 10 years

Label: PO-1

Storm Event: 1 Year

Elevation (ft)	Planimeter (ft ²)	Area (acres)	A1+A2+sq (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
108.00	0.0	0.103	0.000	0.000	0.000
108.20	0.0	0.733	1.111	0.074	0.074
109.00	0.0	0.793	2.288	0.610	0.684
110.00	0.0	1.053	2.760	0.920	1.604

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Volume Equations
Label: PO-1

Return Event: 10 years
Storm Event: 1 Year

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

$$\text{Volume} = (1/3) * (\text{EL2} - \text{EL1}) * (\text{Area1} + \text{Area2} + \text{sqr}(\text{Area1} * \text{Area2}))$$

where: EL1, EL2 Lower and upper elevations of the increment
 Area1, Area2 Areas computed for EL1, EL2, respectively
 Volume Incremental volume between EL1 and EL2

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Elevation-Area Volume Curve

Return Event: 25 years

Label: PO-1

Storm Event: 1 Year

Elevation (ft)	Planimeter (ft ²)	Area (acres)	A1+A2+sq (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
108.00	0.0	0.103	0.000	0.000	0.000
108.20	0.0	0.733	1.111	0.074	0.074
109.00	0.0	0.793	2.288	0.610	0.684
110.00	0.0	1.053	2.760	0.920	1.604

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Volume Equations
Label: PO-1

Return Event: 25 years
Storm Event: 1 Year

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

$$\text{Volume} = (1/3) * (\text{EL2} - \text{EL1}) * (\text{Area1} + \text{Area2} + \text{sqr}(\text{Area1} * \text{Area2}))$$

where: EL1, EL2 Lower and upper elevations of the increment
 Area1, Area2 Areas computed for EL1, EL2, respectively
 Volume Incremental volume between EL1 and EL2

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Elevation-Area Volume Curve

Return Event: 50 years

Label: PO-1

Storm Event: 1 Year

Elevation (ft)	Planimeter (ft ²)	Area (acres)	A1+A2+sq (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
108.00	0.0	0.103	0.000	0.000	0.000
108.20	0.0	0.733	1.111	0.074	0.074
109.00	0.0	0.793	2.288	0.610	0.684
110.00	0.0	1.053	2.760	0.920	1.604

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Volume Equations
Label: PO-1

Return Event: 50 years
Storm Event: 1 Year

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

$$\text{Volume} = (1/3) * (\text{EL2} - \text{EL1}) * (\text{Area1} + \text{Area2} + \text{sqr}(\text{Area1} * \text{Area2}))$$

where: EL1, EL2 Lower and upper elevations of the increment
 Area1, Area2 Areas computed for EL1, EL2, respectively
 Volume Incremental volume between EL1 and EL2

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Elevation-Area Volume Curve

Return Event: 100 years

Label: PO-1

Storm Event: 1 Year

Elevation (ft)	Planimeter (ft ²)	Area (acres)	A1+A2+sq (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
108.00	0.0	0.103	0.000	0.000	0.000
108.20	0.0	0.733	1.111	0.074	0.074
109.00	0.0	0.793	2.288	0.610	0.684
110.00	0.0	1.053	2.760	0.920	1.604

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Volume Equations
Label: PO-1

Return Event: 100 years
Storm Event: 1 Year

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

$$\text{Volume} = (1/3) * (\text{EL2} - \text{EL1}) * (\text{Area1} + \text{Area2} + \text{sqr}(\text{Area1} * \text{Area2}))$$

where: EL1, EL2 Lower and upper elevations of the increment
 Area1, Area2 Areas computed for EL1, EL2, respectively
 Volume Incremental volume between EL1 and EL2

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 1 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	108.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	110.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 2	Forward	TW	108.20	110.00
Rectangular Weir	Weir - 1	Forward	TW	109.00	110.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 1 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	109.00 ft
Weir Length	6.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
Structure ID: Orifice - 2	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	108.20 ft
Orifice Diameter	5.0 in
Orifice Coefficient	0.600
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 1 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Weir - 1 (Rectangular Weir)

 Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.00	(N/A)	0.00
109.00	0.00	(N/A)	0.00
109.50	6.36	(N/A)	0.00
110.00	18.00	(N/A)	0.00

Computation Messages

HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 H=.00; Htw=.00; Qfree=.00;
 H=.50; Htw=.00; Qfree=6.36;
 H=1.00; Htw=.00; Qfree=18.00;

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 1 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Orifice - 2 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	0.69	(N/A)	0.00
110.00	0.83	(N/A)	0.00

Computation Messages

HW & TW below invert
 Upstream HW & DNstream TW < Inv.El
 CRIT.DEPTH CONTROL Vh= .085ft
 Dcr= .215ft CRIT.DEPTH Hev= .00ft
 H =.59
 H =1.09
 H =1.59

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Composite Rating Curve
 Label: Composite Outlet Structure - 1

Return Event: 1 years
 Storm Event: 1 Year

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	7.05	(N/A)	0.00
110.00	18.83	(N/A)	0.00

Contributing Structures

None Contributing
None Contributing
Orifice - 2
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 2 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	108.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	110.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 2	Forward	TW	108.20	110.00
Rectangular Weir	Weir - 1	Forward	TW	109.00	110.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 2 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	109.00 ft
Weir Length	6.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
Structure ID: Orifice - 2	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	108.20 ft
Orifice Diameter	5.0 in
Orifice Coefficient	0.600
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 2 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Weir - 1 (Rectangular Weir)

 Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.00	(N/A)	0.00
109.00	0.00	(N/A)	0.00
109.50	6.36	(N/A)	0.00
110.00	18.00	(N/A)	0.00

Computation Messages

HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 H=.00; Htw=.00; Qfree=.00;
 H=.50; Htw=.00; Qfree=6.36;
 H=1.00; Htw=.00; Qfree=18.00;

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 2 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Orifice - 2 (Orifice-Circular)

 Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	0.69	(N/A)	0.00
110.00	0.83	(N/A)	0.00

Computation Messages

HW & TW below invert
 Upstream HW & DNstream TW < Inv.El
 CRIT.DEPTH CONTROL Vh= .085ft
 Dcr= .215ft CRIT.DEPTH Hev= .00ft
 H =.59
 H =1.09
 H =1.59

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Composite Rating Curve
 Label: Composite Outlet Structure - 1

Return Event: 2 years
 Storm Event: 1 Year

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	7.05	(N/A)	0.00
110.00	18.83	(N/A)	0.00

Contributing Structures

None Contributing
None Contributing
Orifice - 2
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 5 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	108.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	110.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 2	Forward	TW	108.20	110.00
Rectangular Weir	Weir - 1	Forward	TW	109.00	110.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 5 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	109.00 ft
Weir Length	6.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
Structure ID: Orifice - 2	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	108.20 ft
Orifice Diameter	5.0 in
Orifice Coefficient	0.600
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 5 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Weir - 1 (Rectangular Weir)

 Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.00	(N/A)	0.00
109.00	0.00	(N/A)	0.00
109.50	6.36	(N/A)	0.00
110.00	18.00	(N/A)	0.00

Computation Messages

HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 H=.00; Htw=.00; Qfree=.00;
 H=.50; Htw=.00; Qfree=6.36;
 H=1.00; Htw=.00; Qfree=18.00;

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 5 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Orifice - 2 (Orifice-Circular)

 Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	0.69	(N/A)	0.00
110.00	0.83	(N/A)	0.00

Computation Messages

HW & TW below invert
 Upstream HW & DNstream TW < Inv.El
 CRIT.DEPTH CONTROL Vh= .085ft
 Dcr= .215ft CRIT.DEPTH Hev= .00ft
 H =.59
 H =1.09
 H =1.59

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Composite Rating Curve
 Label: Composite Outlet Structure - 1

Return Event: 5 years
 Storm Event: 1 Year

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	7.05	(N/A)	0.00
110.00	18.83	(N/A)	0.00

Contributing Structures

None Contributing
None Contributing
Orifice - 2
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 10 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	108.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	110.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 2	Forward	TW	108.20	110.00
Rectangular Weir	Weir - 1	Forward	TW	109.00	110.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 10 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	109.00 ft
Weir Length	6.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
Structure ID: Orifice - 2	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	108.20 ft
Orifice Diameter	5.0 in
Orifice Coefficient	0.600
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 10 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Weir - 1 (Rectangular Weir)

 Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.00	(N/A)	0.00
109.00	0.00	(N/A)	0.00
109.50	6.36	(N/A)	0.00
110.00	18.00	(N/A)	0.00

Computation Messages

HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 H=.00; Htw=.00; Qfree=.00;
 H=.50; Htw=.00; Qfree=6.36;
 H=1.00; Htw=.00; Qfree=18.00;

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 10 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Orifice - 2 (Orifice-Circular)

 Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	0.69	(N/A)	0.00
110.00	0.83	(N/A)	0.00

Computation Messages

HW & TW below invert
 Upstream HW & DNstream TW < Inv.El
 CRIT.DEPTH CONTROL Vh= .085ft
 Dcr= .215ft CRIT.DEPTH Hev= .00ft
 H =.59
 H =1.09
 H =1.59

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Composite Rating Curve
 Label: Composite Outlet Structure - 1

Return Event: 10 years
 Storm Event: 1 Year

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	7.05	(N/A)	0.00
110.00	18.83	(N/A)	0.00

Contributing Structures

None Contributing
None Contributing
Orifice - 2
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 25 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	108.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	110.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 2	Forward	TW	108.20	110.00
Rectangular Weir	Weir - 1	Forward	TW	109.00	110.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 25 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	109.00 ft
Weir Length	6.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
Structure ID: Orifice - 2	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	108.20 ft
Orifice Diameter	5.0 in
Orifice Coefficient	0.600
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 25 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Weir - 1 (Rectangular Weir)

 Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.00	(N/A)	0.00
109.00	0.00	(N/A)	0.00
109.50	6.36	(N/A)	0.00
110.00	18.00	(N/A)	0.00

Computation Messages

HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 H=.00; Htw=.00; Qfree=.00;
 H=.50; Htw=.00; Qfree=6.36;
 H=1.00; Htw=.00; Qfree=18.00;

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 25 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Orifice - 2 (Orifice-Circular)

 Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	0.69	(N/A)	0.00
110.00	0.83	(N/A)	0.00

Computation Messages

HW & TW below invert
 Upstream HW & DNstream TW < Inv.El
 CRIT.DEPTH CONTROL Vh= .085ft
 Dcr= .215ft CRIT.DEPTH Hev= .00ft
 H =.59
 H =1.09
 H =1.59

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Composite Rating Curve
 Label: Composite Outlet Structure - 1

Return Event: 25 years
 Storm Event: 1 Year

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	7.05	(N/A)	0.00
110.00	18.83	(N/A)	0.00

Contributing Structures

None Contributing
None Contributing
Orifice - 2
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 50 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	108.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	110.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 2	Forward	TW	108.20	110.00
Rectangular Weir	Weir - 1	Forward	TW	109.00	110.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 50 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	109.00 ft
Weir Length	6.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
Structure ID: Orifice - 2	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	108.20 ft
Orifice Diameter	5.0 in
Orifice Coefficient	0.600
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 50 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Weir - 1 (Rectangular Weir)

 Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.00	(N/A)	0.00
109.00	0.00	(N/A)	0.00
109.50	6.36	(N/A)	0.00
110.00	18.00	(N/A)	0.00

Computation Messages

HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 H=.00; Htw=.00; Qfree=.00;
 H=.50; Htw=.00; Qfree=6.36;
 H=1.00; Htw=.00; Qfree=18.00;

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 50 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Orifice - 2 (Orifice-Circular)

 Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	0.69	(N/A)	0.00
110.00	0.83	(N/A)	0.00

Computation Messages

HW & TW below invert
 Upstream HW & DNstream TW < Inv.El
 CRIT.DEPTH CONTROL Vh= .085ft
 Dcr= .215ft CRIT.DEPTH Hev= .00ft
 H =.59
 H =1.09
 H =1.59

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Composite Rating Curve
 Label: Composite Outlet Structure - 1

Return Event: 50 years
 Storm Event: 1 Year

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	7.05	(N/A)	0.00
110.00	18.83	(N/A)	0.00

Contributing Structures

None Contributing
None Contributing
Orifice - 2
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 100 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	108.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	110.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 2	Forward	TW	108.20	110.00
Rectangular Weir	Weir - 1	Forward	TW	109.00	110.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Outlet Input Data

Return Event: 100 years

Label: Composite Outlet Structure - 1

Storm Event: 1 Year

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	109.00 ft
Weir Length	6.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
Structure ID: Orifice - 2	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	108.20 ft
Orifice Diameter	5.0 in
Orifice Coefficient	0.600
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 100 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Weir - 1 (Rectangular Weir)

 Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.00	(N/A)	0.00
109.00	0.00	(N/A)	0.00
109.50	6.36	(N/A)	0.00
110.00	18.00	(N/A)	0.00

Computation Messages

HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 HW & TW below Inv.El.=109.000
 H=.00; Htw=.00; Qfree=.00;
 H=.50; Htw=.00; Qfree=6.36;
 H=1.00; Htw=.00; Qfree=18.00;

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 100 years
 Storm Event: 1 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Orifice - 2 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	0.69	(N/A)	0.00
110.00	0.83	(N/A)	0.00

Computation Messages

HW & TW below invert
 Upstream HW & DNstream TW < Inv.El
 CRIT.DEPTH CONTROL Vh= .085ft
 Dcr= .215ft CRIT.DEPTH Hev= .00ft
 H =.59
 H =1.09
 H =1.59

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Composite Rating Curve
 Label: Composite Outlet Structure - 1

Return Event: 100 years
 Storm Event: 1 Year

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
108.00	0.00	(N/A)	0.00
108.20	0.00	(N/A)	0.00
108.50	0.17	(N/A)	0.00
109.00	0.50	(N/A)	0.00
109.50	7.05	(N/A)	0.00
110.00	18.83	(N/A)	0.00

Contributing Structures

None Contributing
None Contributing
Orifice - 2
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1
Orifice - 2 + Weir - 1

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 1 years
 Storm Event: 1 Year

Peak Discharge	0.12 ft ³ /s
Time to Peak	16.900 hours
Hydrograph Volume	0.109 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.850	0.00	0.01	0.03	0.04	0.06
12.100	0.07	0.07	0.08	0.08	0.08
12.350	0.08	0.09	0.09	0.09	0.09
12.600	0.09	0.09	0.09	0.09	0.10
12.850	0.10	0.10	0.10	0.10	0.10
13.100	0.10	0.10	0.10	0.10	0.10
13.350	0.10	0.10	0.11	0.11	0.11
13.600	0.11	0.11	0.11	0.11	0.11
13.850	0.11	0.11	0.11	0.11	0.11
14.100	0.11	0.11	0.11	0.11	0.11
14.350	0.11	0.11	0.11	0.11	0.11
14.600	0.11	0.11	0.11	0.11	0.11
14.850	0.11	0.11	0.11	0.11	0.11
15.100	0.11	0.11	0.11	0.11	0.12
15.350	0.12	0.12	0.12	0.12	0.12
15.600	0.12	0.12	0.12	0.12	0.12
15.850	0.12	0.12	0.12	0.12	0.12
16.100	0.12	0.12	0.12	0.12	0.12
16.350	0.12	0.12	0.12	0.12	0.12
16.600	0.12	0.12	0.12	0.12	0.12
16.850	0.12	0.12	0.12	0.12	0.12
17.100	0.12	0.12	0.12	0.12	0.12
17.350	0.12	0.12	0.12	0.12	0.12
17.600	0.12	0.12	0.12	0.12	0.12
17.850	0.12	0.12	0.12	0.12	0.12
18.100	0.12	0.12	0.12	0.12	0.12
18.350	0.12	0.12	0.12	0.12	0.12
18.600	0.12	0.12	0.12	0.12	0.12
18.850	0.12	0.12	0.12	0.11	0.11
19.100	0.11	0.11	0.11	0.11	0.11
19.350	0.11	0.11	0.11	0.11	0.11
19.600	0.11	0.11	0.11	0.11	0.11
19.850	0.11	0.11	0.11	0.11	0.11
20.100	0.11	0.11	0.11	0.11	0.11
20.350	0.11	0.11	0.11	0.11	0.11
20.600	0.11	0.11	0.11	0.11	0.11
20.850	0.11	0.11	0.11	0.11	0.11

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 1 years
 Storm Event: 1 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
21.100	0.11	0.11	0.11	0.11	0.11
21.350	0.11	0.11	0.11	0.11	0.11
21.600	0.11	0.11	0.11	0.11	0.11
21.850	0.11	0.11	0.11	0.11	0.11
22.100	0.11	0.11	0.11	0.11	0.11
22.350	0.11	0.11	0.11	0.11	0.11
22.600	0.11	0.11	0.11	0.11	0.11
22.850	0.11	0.11	0.11	0.11	0.11
23.100	0.11	0.11	0.11	0.11	0.10
23.350	0.10	0.10	0.10	0.10	0.10
23.600	0.10	0.10	0.10	0.10	0.10
23.850	0.10	0.10	0.10	0.10	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 2 years
 Storm Event: 2 Year

Peak Discharge	0.17 ft ³ /s
Time to Peak	15.950 hours
Hydrograph Volume	0.156 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.750	0.00	0.01	0.02	0.04	0.06
12.000	0.08	0.10	0.11	0.12	0.12
12.250	0.13	0.13	0.13	0.13	0.14
12.500	0.14	0.14	0.14	0.14	0.14
12.750	0.15	0.15	0.15	0.15	0.15
13.000	0.15	0.15	0.15	0.15	0.15
13.250	0.15	0.15	0.16	0.16	0.16
13.500	0.16	0.16	0.16	0.16	0.16
13.750	0.16	0.16	0.16	0.16	0.16
14.000	0.16	0.16	0.16	0.16	0.16
14.250	0.16	0.16	0.16	0.16	0.16
14.500	0.16	0.16	0.16	0.16	0.17
14.750	0.17	0.17	0.17	0.17	0.17
15.000	0.17	0.17	0.17	0.17	0.17
15.250	0.17	0.17	0.17	0.17	0.17
15.500	0.17	0.17	0.17	0.17	0.17
15.750	0.17	0.17	0.17	0.17	0.17
16.000	0.17	0.17	0.17	0.17	0.17
16.250	0.17	0.17	0.17	0.17	0.17
16.500	0.17	0.17	0.17	0.17	0.17
16.750	0.17	0.17	0.17	0.17	0.17
17.000	0.17	0.17	0.17	0.17	0.17
17.250	0.17	0.17	0.17	0.17	0.17
17.500	0.17	0.17	0.17	0.17	0.17
17.750	0.17	0.17	0.17	0.16	0.16
18.000	0.16	0.16	0.16	0.16	0.16
18.250	0.16	0.16	0.16	0.16	0.16
18.500	0.16	0.16	0.16	0.16	0.16
18.750	0.16	0.16	0.16	0.16	0.16
19.000	0.16	0.16	0.16	0.16	0.16
19.250	0.16	0.16	0.16	0.16	0.16
19.500	0.16	0.16	0.16	0.16	0.16
19.750	0.16	0.16	0.16	0.16	0.16
20.000	0.16	0.16	0.16	0.16	0.16
20.250	0.16	0.16	0.16	0.16	0.16
20.500	0.16	0.16	0.16	0.16	0.16
20.750	0.16	0.16	0.15	0.15	0.15

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 2 years
 Storm Event: 2 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
21.000	0.15	0.15	0.15	0.15	0.15
21.250	0.15	0.15	0.15	0.15	0.15
21.500	0.15	0.15	0.15	0.15	0.15
21.750	0.15	0.15	0.15	0.15	0.15
22.000	0.15	0.15	0.15	0.15	0.15
22.250	0.15	0.15	0.15	0.15	0.15
22.500	0.15	0.15	0.15	0.15	0.15
22.750	0.15	0.15	0.15	0.15	0.15
23.000	0.15	0.15	0.15	0.15	0.15
23.250	0.15	0.15	0.14	0.14	0.14
23.500	0.14	0.14	0.14	0.14	0.14
23.750	0.14	0.14	0.14	0.14	0.14
24.000	0.14	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 5 years
 Storm Event: 5 Year

Peak Discharge	0.26 ft ³ /s
Time to Peak	15.250 hours
Hydrograph Volume	0.239 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.500	0.00	0.00	0.01	0.01	0.02
11.750	0.03	0.04	0.06	0.08	0.11
12.000	0.14	0.17	0.19	0.20	0.20
12.250	0.21	0.21	0.22	0.22	0.22
12.500	0.23	0.23	0.23	0.23	0.23
12.750	0.24	0.24	0.24	0.24	0.24
13.000	0.24	0.24	0.25	0.25	0.25
13.250	0.25	0.25	0.25	0.25	0.25
13.500	0.25	0.25	0.25	0.25	0.26
13.750	0.26	0.26	0.26	0.26	0.26
14.000	0.26	0.26	0.26	0.26	0.26
14.250	0.26	0.26	0.26	0.26	0.26
14.500	0.26	0.26	0.26	0.26	0.26
14.750	0.26	0.26	0.26	0.26	0.26
15.000	0.26	0.26	0.26	0.26	0.26
15.250	0.26	0.26	0.26	0.26	0.26
15.500	0.26	0.26	0.26	0.26	0.26
15.750	0.26	0.26	0.26	0.26	0.26
16.000	0.26	0.26	0.26	0.26	0.26
16.250	0.26	0.26	0.26	0.26	0.26
16.500	0.26	0.26	0.26	0.26	0.26
16.750	0.26	0.26	0.26	0.26	0.26
17.000	0.26	0.26	0.26	0.26	0.26
17.250	0.26	0.25	0.25	0.25	0.25
17.500	0.25	0.25	0.25	0.25	0.25
17.750	0.25	0.25	0.25	0.25	0.25
18.000	0.25	0.25	0.25	0.25	0.25
18.250	0.25	0.25	0.25	0.25	0.25
18.500	0.25	0.25	0.25	0.25	0.25
18.750	0.25	0.25	0.25	0.24	0.24
19.000	0.24	0.24	0.24	0.24	0.24
19.250	0.24	0.24	0.24	0.24	0.24
19.500	0.24	0.24	0.24	0.24	0.24
19.750	0.24	0.24	0.24	0.24	0.24
20.000	0.24	0.24	0.24	0.24	0.23
20.250	0.23	0.23	0.23	0.23	0.23
20.500	0.23	0.23	0.23	0.23	0.23

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 5 years
 Storm Event: 5 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
20.750	0.23	0.23	0.23	0.23	0.23
21.000	0.23	0.23	0.23	0.23	0.23
21.250	0.23	0.23	0.23	0.22	0.22
21.500	0.22	0.22	0.22	0.22	0.22
21.750	0.22	0.22	0.22	0.22	0.22
22.000	0.22	0.22	0.22	0.22	0.22
22.250	0.22	0.22	0.22	0.22	0.22
22.500	0.22	0.22	0.22	0.22	0.21
22.750	0.21	0.21	0.21	0.21	0.21
23.000	0.21	0.21	0.21	0.21	0.21
23.250	0.21	0.21	0.21	0.21	0.21
23.500	0.21	0.21	0.21	0.21	0.21
23.750	0.21	0.21	0.21	0.21	0.21
24.000	0.20	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 10 years
 Storm Event: 10 Year

Peak Discharge	0.34 ft ³ /s
Time to Peak	14.850 hours
Hydrograph Volume	0.312 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.050	0.00	0.00	0.00	0.01	0.01
11.300	0.01	0.01	0.01	0.02	0.02
11.550	0.02	0.03	0.03	0.04	0.06
11.800	0.07	0.09	0.12	0.16	0.20
12.050	0.24	0.26	0.27	0.28	0.28
12.300	0.29	0.29	0.30	0.30	0.31
12.550	0.31	0.31	0.31	0.32	0.32
12.800	0.32	0.32	0.32	0.32	0.33
13.050	0.33	0.33	0.33	0.33	0.33
13.300	0.33	0.33	0.33	0.34	0.34
13.550	0.34	0.34	0.34	0.34	0.34
13.800	0.34	0.34	0.34	0.34	0.34
14.050	0.34	0.34	0.34	0.34	0.34
14.300	0.34	0.34	0.34	0.34	0.34
14.550	0.34	0.34	0.34	0.34	0.34
14.800	0.34	0.34	0.34	0.34	0.34
15.050	0.34	0.34	0.34	0.34	0.34
15.300	0.34	0.34	0.34	0.34	0.34
15.550	0.34	0.34	0.34	0.34	0.34
15.800	0.34	0.34	0.34	0.34	0.34
16.050	0.34	0.34	0.34	0.34	0.34
16.300	0.34	0.34	0.34	0.34	0.34
16.550	0.34	0.34	0.34	0.33	0.33
16.800	0.33	0.33	0.33	0.33	0.33
17.050	0.33	0.33	0.33	0.33	0.33
17.300	0.33	0.33	0.33	0.33	0.33
17.550	0.33	0.33	0.33	0.33	0.33
17.800	0.33	0.33	0.33	0.32	0.32
18.050	0.32	0.32	0.32	0.32	0.32
18.300	0.32	0.32	0.32	0.32	0.32
18.550	0.32	0.32	0.32	0.32	0.32
18.800	0.32	0.32	0.32	0.32	0.31
19.050	0.31	0.31	0.31	0.31	0.31
19.300	0.31	0.31	0.31	0.31	0.31
19.550	0.31	0.31	0.31	0.31	0.31
19.800	0.31	0.31	0.30	0.30	0.30
20.050	0.30	0.30	0.30	0.30	0.30

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 10 years
 Storm Event: 10 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
20.300	0.30	0.30	0.30	0.30	0.30
20.550	0.30	0.30	0.30	0.30	0.30
20.800	0.29	0.29	0.29	0.29	0.29
21.050	0.29	0.29	0.29	0.29	0.29
21.300	0.29	0.29	0.29	0.29	0.29
21.550	0.29	0.29	0.29	0.28	0.28
21.800	0.28	0.28	0.28	0.28	0.28
22.050	0.28	0.28	0.28	0.28	0.28
22.300	0.28	0.28	0.28	0.28	0.28
22.550	0.28	0.28	0.27	0.27	0.27
22.800	0.27	0.27	0.27	0.27	0.27
23.050	0.27	0.27	0.27	0.27	0.27
23.300	0.27	0.27	0.27	0.27	0.27
23.550	0.27	0.26	0.26	0.26	0.26
23.800	0.26	0.26	0.26	0.26	0.26

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 25 years
 Storm Event: 25 Year

Peak Discharge	0.47 ft ³ /s
Time to Peak	14.450 hours
Hydrograph Volume	0.423 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
10.300	0.00	0.00	0.00	0.00	0.01
10.550	0.01	0.01	0.01	0.01	0.01
10.800	0.02	0.02	0.02	0.02	0.02
11.050	0.03	0.03	0.03	0.03	0.04
11.300	0.04	0.04	0.04	0.05	0.05
11.550	0.06	0.06	0.07	0.08	0.10
11.800	0.12	0.15	0.19	0.24	0.30
12.050	0.34	0.37	0.38	0.39	0.40
12.300	0.41	0.41	0.42	0.42	0.43
12.550	0.43	0.43	0.44	0.44	0.44
12.800	0.44	0.44	0.45	0.45	0.45
13.050	0.45	0.45	0.45	0.46	0.46
13.300	0.46	0.46	0.46	0.46	0.46
13.550	0.46	0.46	0.46	0.46	0.46
13.800	0.46	0.46	0.47	0.47	0.47
14.050	0.47	0.47	0.47	0.47	0.47
14.300	0.47	0.47	0.47	0.47	0.47
14.550	0.47	0.47	0.47	0.47	0.47
14.800	0.47	0.47	0.47	0.47	0.47
15.050	0.47	0.47	0.46	0.46	0.46
15.300	0.46	0.46	0.46	0.46	0.46
15.550	0.46	0.46	0.46	0.46	0.46
15.800	0.46	0.46	0.46	0.46	0.46
16.050	0.46	0.46	0.46	0.46	0.46
16.300	0.46	0.45	0.45	0.45	0.45
16.550	0.45	0.45	0.45	0.45	0.45
16.800	0.45	0.45	0.45	0.45	0.45
17.050	0.45	0.45	0.45	0.45	0.44
17.300	0.44	0.44	0.44	0.44	0.44
17.550	0.44	0.44	0.44	0.44	0.44
17.800	0.44	0.44	0.44	0.44	0.43
18.050	0.43	0.43	0.43	0.43	0.43
18.300	0.43	0.43	0.43	0.43	0.43
18.550	0.43	0.43	0.43	0.42	0.42
18.800	0.42	0.42	0.42	0.42	0.42
19.050	0.42	0.42	0.42	0.42	0.42
19.300	0.42	0.42	0.41	0.41	0.41

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 25 years
 Storm Event: 25 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
19.550	0.41	0.41	0.41	0.41	0.41
19.800	0.41	0.41	0.41	0.41	0.41
20.050	0.40	0.40	0.40	0.40	0.40
20.300	0.40	0.40	0.40	0.40	0.40
20.550	0.40	0.40	0.39	0.39	0.39
20.800	0.39	0.39	0.39	0.39	0.39
21.050	0.39	0.39	0.39	0.39	0.39
21.300	0.38	0.38	0.38	0.38	0.38
21.550	0.38	0.38	0.38	0.38	0.38
21.800	0.38	0.38	0.38	0.37	0.37
22.050	0.37	0.37	0.37	0.37	0.37
22.300	0.37	0.37	0.37	0.37	0.37
22.550	0.37	0.36	0.36	0.36	0.36
22.800	0.36	0.36	0.36	0.36	0.36
23.050	0.36	0.36	0.36	0.36	0.36
23.300	0.35	0.35	0.35	0.35	0.35
23.550	0.35	0.35	0.35	0.35	0.35
23.800	0.35	0.35	0.35	0.35	0.34

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 50 years
 Storm Event: 50 Year

Peak Discharge	1.04 ft ³ /s
Time to Peak	13.000 hours
Hydrograph Volume	0.555 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
9.650	0.00	0.00	0.00	0.00	0.01
9.900	0.01	0.01	0.01	0.01	0.01
10.150	0.01	0.01	0.02	0.02	0.02
10.400	0.02	0.02	0.02	0.03	0.03
10.650	0.03	0.03	0.03	0.04	0.04
10.900	0.04	0.04	0.05	0.05	0.05
11.150	0.05	0.06	0.06	0.06	0.07
11.400	0.07	0.07	0.08	0.08	0.09
11.650	0.10	0.11	0.13	0.16	0.20
11.900	0.25	0.32	0.38	0.43	0.46
12.150	0.48	0.49	0.50	0.55	0.65
12.400	0.74	0.82	0.87	0.92	0.95
12.650	0.98	1.00	1.01	1.03	1.03
12.900	1.04	1.04	1.04	1.04	1.04
13.150	1.03	1.03	1.02	1.01	1.00
13.400	0.99	0.98	0.97	0.96	0.94
13.650	0.93	0.92	0.90	0.89	0.88
13.900	0.86	0.85	0.83	0.82	0.81
14.150	0.79	0.78	0.77	0.75	0.74
14.400	0.73	0.72	0.71	0.70	0.69
14.650	0.68	0.67	0.66	0.65	0.64
14.900	0.63	0.62	0.61	0.61	0.60
15.150	0.59	0.58	0.58	0.57	0.56
15.400	0.55	0.55	0.54	0.53	0.53
15.650	0.52	0.51	0.51	0.50	0.50
15.900	0.50	0.50	0.50	0.50	0.50
16.150	0.50	0.50	0.50	0.50	0.50
16.400	0.50	0.50	0.50	0.50	0.50
16.650	0.50	0.50	0.49	0.49	0.49
16.900	0.49	0.49	0.49	0.49	0.49
17.150	0.49	0.49	0.49	0.49	0.49
17.400	0.49	0.49	0.49	0.49	0.48
17.650	0.48	0.48	0.48	0.48	0.48
17.900	0.48	0.48	0.48	0.48	0.48
18.150	0.48	0.48	0.48	0.48	0.47
18.400	0.47	0.47	0.47	0.47	0.47
18.650	0.47	0.47	0.47	0.47	0.47

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 50 years
 Storm Event: 50 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
18.900	0.47	0.47	0.46	0.46	0.46
19.150	0.46	0.46	0.46	0.46	0.46
19.400	0.46	0.46	0.46	0.46	0.45
19.650	0.45	0.45	0.45	0.45	0.45
19.900	0.45	0.45	0.45	0.45	0.45
20.150	0.45	0.44	0.44	0.44	0.44
20.400	0.44	0.44	0.44	0.44	0.44
20.650	0.44	0.44	0.44	0.43	0.43
20.900	0.43	0.43	0.43	0.43	0.43
21.150	0.43	0.43	0.43	0.43	0.43
21.400	0.42	0.42	0.42	0.42	0.42
21.650	0.42	0.42	0.42	0.42	0.42
21.900	0.42	0.42	0.41	0.41	0.41
22.150	0.41	0.41	0.41	0.41	0.41
22.400	0.41	0.41	0.41	0.41	0.41
22.650	0.40	0.40	0.40	0.40	0.40
22.900	0.40	0.40	0.40	0.40	0.40
23.150	0.40	0.40	0.40	0.39	0.39
23.400	0.39	0.39	0.39	0.39	0.39
23.650	0.39	0.39	0.39	0.39	0.39
23.900	0.39	0.38	0.38	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 100 years
 Storm Event: 100 Year

Peak Discharge	2.15 ft ³ /s
Time to Peak	12.450 hours
Hydrograph Volume	0.729 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
9.000	0.00	0.00	0.00	0.00	0.01
9.250	0.01	0.01	0.01	0.01	0.01
9.500	0.01	0.01	0.02	0.02	0.02
9.750	0.02	0.02	0.02	0.02	0.03
10.000	0.03	0.03	0.03	0.03	0.03
10.250	0.04	0.04	0.04	0.04	0.04
10.500	0.05	0.05	0.05	0.05	0.05
10.750	0.06	0.06	0.06	0.06	0.07
11.000	0.07	0.07	0.08	0.08	0.08
11.250	0.09	0.09	0.10	0.10	0.10
11.500	0.11	0.12	0.12	0.14	0.15
11.750	0.18	0.21	0.26	0.32	0.40
12.000	0.47	0.87	1.51	1.80	1.95
12.250	2.03	2.09	2.12	2.14	2.15
12.500	2.14	2.12	2.10	2.07	2.03
12.750	2.00	1.96	1.92	1.89	1.85
13.000	1.81	1.77	1.73	1.69	1.65
13.250	1.62	1.58	1.54	1.51	1.47
13.500	1.44	1.40	1.37	1.34	1.31
13.750	1.28	1.25	1.22	1.19	1.16
14.000	1.13	1.11	1.08	1.06	1.03
14.250	1.01	0.99	0.97	0.95	0.93
14.500	0.91	0.89	0.87	0.86	0.84
14.750	0.83	0.81	0.80	0.78	0.77
15.000	0.76	0.75	0.73	0.72	0.71
15.250	0.70	0.69	0.68	0.67	0.66
15.500	0.65	0.64	0.63	0.62	0.61
15.750	0.60	0.59	0.59	0.58	0.57
16.000	0.56	0.55	0.54	0.54	0.53
16.250	0.52	0.52	0.51	0.50	0.50
16.500	0.50	0.50	0.50	0.50	0.50
16.750	0.50	0.50	0.50	0.50	0.50
17.000	0.50	0.50	0.50	0.50	0.50
17.250	0.50	0.50	0.50	0.50	0.50
17.500	0.50	0.49	0.49	0.49	0.49
17.750	0.49	0.49	0.49	0.49	0.49
18.000	0.49	0.49	0.49	0.49	0.49

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 100 years
 Storm Event: 100 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
18.250	0.49	0.49	0.49	0.49	0.48
18.500	0.48	0.48	0.48	0.48	0.48
18.750	0.48	0.48	0.48	0.48	0.48
19.000	0.48	0.48	0.48	0.48	0.47
19.250	0.47	0.47	0.47	0.47	0.47
19.500	0.47	0.47	0.47	0.47	0.47
19.750	0.47	0.47	0.47	0.46	0.46
20.000	0.46	0.46	0.46	0.46	0.46
20.250	0.46	0.46	0.46	0.46	0.46
20.500	0.45	0.45	0.45	0.45	0.45
20.750	0.45	0.45	0.45	0.45	0.45
21.000	0.45	0.45	0.45	0.44	0.44
21.250	0.44	0.44	0.44	0.44	0.44
21.500	0.44	0.44	0.44	0.44	0.44
21.750	0.44	0.43	0.43	0.43	0.43
22.000	0.43	0.43	0.43	0.43	0.43
22.250	0.43	0.43	0.43	0.43	0.42
22.500	0.42	0.42	0.42	0.42	0.42
22.750	0.42	0.42	0.42	0.42	0.42
23.000	0.42	0.42	0.41	0.41	0.41
23.250	0.41	0.41	0.41	0.41	0.41
23.500	0.41	0.41	0.41	0.41	0.41
23.750	0.41	0.40	0.40	0.40	0.40
24.000	0.40	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Elevation-Volume-Flow Table (Pond)

Return Event: 1 years

Label: PO-1

Storm Event: 1 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	108.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
108.00	0.00	0.000	0.103	0.00	0.00	0.00
108.20	0.00	0.074	0.733	0.00	0.00	35.83
108.50	0.17	0.297	0.755	0.00	0.17	144.02
109.00	0.50	0.684	0.793	0.00	0.50	331.66
109.50	7.05	1.112	0.918	0.00	7.05	545.09
110.00	18.83	1.604	1.053	0.00	18.83	795.23

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 1 years
 Storm Event: 1 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00	ft	
Volume (Initial)	0.000	ac-ft	
Flow (Initial Outlet)	0.00	ft ³ /s	
Flow (Initial Infiltration)	0.00	ft ³ /s	
Flow (Initial, Total)	0.00	ft ³ /s	
Time Increment	0.050	hours	
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	5.72	ft ³ /s	Time to Peak (Flow, In) 11.950 hours
Flow (Peak Outlet)	0.12	ft ³ /s	Time to Peak (Flow, Outlet) 16.900 hours
Peak Conditions			
Elevation (Water Surface, Peak)	108.41	ft	
Volume (Peak)	0.230	ac-ft	
Mass Balance (ac-ft)			
Volume (Initial)	0.000	ac-ft	
Volume (Total Inflow)	0.321	ac-ft	
Volume (Total Infiltration)	0.000	ac-ft	
Volume (Total Outlet Outflow)	0.109	ac-ft	
Volume (Retained)	0.211	ac-ft	
Volume (Unrouted)	-0.001	ac-ft	
Error (Mass Balance)	0.4	%	

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 2 years
 Storm Event: 2 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00	ft	
Volume (Initial)	0.000	ac-ft	
Flow (Initial Outlet)	0.00	ft ³ /s	
Flow (Initial Infiltration)	0.00	ft ³ /s	
Flow (Initial, Total)	0.00	ft ³ /s	
Time Increment	0.050	hours	
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	7.42	ft ³ /s	Time to Peak (Flow, In) 11.950 hours
Flow (Peak Outlet)	0.17	ft ³ /s	Time to Peak (Flow, Outlet) 15.950 hours
Peak Conditions			
Elevation (Water Surface, Peak)	108.50	ft	
Volume (Peak)	0.299	ac-ft	
Mass Balance (ac-ft)			
Volume (Initial)	0.000	ac-ft	
Volume (Total Inflow)	0.421	ac-ft	
Volume (Total Infiltration)	0.000	ac-ft	
Volume (Total Outlet Outflow)	0.156	ac-ft	
Volume (Retained)	0.264	ac-ft	
Volume (Unrouted)	-0.001	ac-ft	
Error (Mass Balance)	0.2	%	

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 5 years
 Storm Event: 5 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00 ft		
Volume (Initial)	0.000 ac-ft		
Flow (Initial Outlet)	0.00 ft ³ /s		
Flow (Initial Infiltration)	0.00 ft ³ /s		
Flow (Initial, Total)	0.00 ft ³ /s		
Time Increment	0.050 hours		
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	10.08 ft ³ /s	Time to Peak (Flow, In)	11.950 hours
Flow (Peak Outlet)	0.26 ft ³ /s	Time to Peak (Flow, Outlet)	15.250 hours
Peak Conditions			
Elevation (Water Surface, Peak)	108.64 ft		
Volume (Peak)	0.405 ac-ft		
Mass Balance (ac-ft)			
Volume (Initial)	0.000 ac-ft		
Volume (Total Inflow)	0.581 ac-ft		
Volume (Total Infiltration)	0.000 ac-ft		
Volume (Total Outlet Outflow)	0.239 ac-ft		
Volume (Retained)	0.340 ac-ft		
Volume (Unrouted)	-0.002 ac-ft		
Error (Mass Balance)	0.3 %		

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 10 years
 Storm Event: 10 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00 ft		
Volume (Initial)	0.000 ac-ft		
Flow (Initial Outlet)	0.00 ft ³ /s		
Flow (Initial Infiltration)	0.00 ft ³ /s		
Flow (Initial, Total)	0.00 ft ³ /s		
Time Increment	0.050 hours		
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	12.32 ft ³ /s	Time to Peak (Flow, In)	11.950 hours
Flow (Peak Outlet)	0.34 ft ³ /s	Time to Peak (Flow, Outlet)	14.850 hours
Peak Conditions			
Elevation (Water Surface, Peak)	108.76 ft		
Volume (Peak)	0.497 ac-ft		
Mass Balance (ac-ft)			
Volume (Initial)	0.000 ac-ft		
Volume (Total Inflow)	0.718 ac-ft		
Volume (Total Infiltration)	0.000 ac-ft		
Volume (Total Outlet Outflow)	0.312 ac-ft		
Volume (Retained)	0.402 ac-ft		
Volume (Unrouted)	-0.003 ac-ft		
Error (Mass Balance)	0.4 %		

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 25 years
 Storm Event: 25 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00	ft	
Volume (Initial)	0.000	ac-ft	
Flow (Initial Outlet)	0.00	ft ³ /s	
Flow (Initial Infiltration)	0.00	ft ³ /s	
Flow (Initial, Total)	0.00	ft ³ /s	
Time Increment	0.050	hours	
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	15.63	ft ³ /s	Time to Peak (Flow, In) 11.950 hours
Flow (Peak Outlet)	0.47	ft ³ /s	Time to Peak (Flow, Outlet) 14.450 hours
Peak Conditions			
Elevation (Water Surface, Peak)	108.94	ft	
Volume (Peak)	0.639	ac-ft	
Mass Balance (ac-ft)			
Volume (Initial)	0.000	ac-ft	
Volume (Total Inflow)	0.924	ac-ft	
Volume (Total Infiltration)	0.000	ac-ft	
Volume (Total Outlet Outflow)	0.423	ac-ft	
Volume (Retained)	0.497	ac-ft	
Volume (Unrouted)	-0.004	ac-ft	
Error (Mass Balance)	0.4	%	

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 50 years
 Storm Event: 50 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00 ft		
Volume (Initial)	0.000 ac-ft		
Flow (Initial Outlet)	0.00 ft ³ /s		
Flow (Initial Infiltration)	0.00 ft ³ /s		
Flow (Initial, Total)	0.00 ft ³ /s		
Time Increment	0.050 hours		
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	18.41 ft ³ /s	Time to Peak (Flow, In)	11.950 hours
Flow (Peak Outlet)	1.04 ft ³ /s	Time to Peak (Flow, Outlet)	13.000 hours
Peak Conditions			
Elevation (Water Surface, Peak)	109.04 ft		
Volume (Peak)	0.717 ac-ft		
Mass Balance (ac-ft)			
Volume (Initial)	0.000 ac-ft		
Volume (Total Inflow)	1.101 ac-ft		
Volume (Total Infiltration)	0.000 ac-ft		
Volume (Total Outlet Outflow)	0.555 ac-ft		
Volume (Retained)	0.542 ac-ft		
Volume (Unrouted)	-0.004 ac-ft		
Error (Mass Balance)	0.3 %		

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 100 years
 Storm Event: 100 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00	ft	
Volume (Initial)	0.000	ac-ft	
Flow (Initial Outlet)	0.00	ft ³ /s	
Flow (Initial Infiltration)	0.00	ft ³ /s	
Flow (Initial, Total)	0.00	ft ³ /s	
Time Increment	0.050	hours	
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	21.45	ft ³ /s	Time to Peak (Flow, In) 11.950 hours
Flow (Peak Outlet)	2.15	ft ³ /s	Time to Peak (Flow, Outlet) 12.450 hours
Peak Conditions			
Elevation (Water Surface, Peak)	109.13	ft	
Volume (Peak)	0.786	ac-ft	
Mass Balance (ac-ft)			
Volume (Initial)	0.000	ac-ft	
Volume (Total Inflow)	1.295	ac-ft	
Volume (Total Infiltration)	0.000	ac-ft	
Volume (Total Outlet Outflow)	0.729	ac-ft	
Volume (Retained)	0.563	ac-ft	
Volume (Unrouted)	-0.004	ac-ft	
Error (Mass Balance)	0.3	%	

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 1 years
 Storm Event: 1 Year

Peak Discharge	0.12 ft ³ /s
Time to Peak	16.900 hours
Hydrograph Volume	0.109 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.850	0.00	0.01	0.03	0.04	0.06
12.100	0.07	0.07	0.08	0.08	0.08
12.350	0.08	0.09	0.09	0.09	0.09
12.600	0.09	0.09	0.09	0.09	0.10
12.850	0.10	0.10	0.10	0.10	0.10
13.100	0.10	0.10	0.10	0.10	0.10
13.350	0.10	0.10	0.11	0.11	0.11
13.600	0.11	0.11	0.11	0.11	0.11
13.850	0.11	0.11	0.11	0.11	0.11
14.100	0.11	0.11	0.11	0.11	0.11
14.350	0.11	0.11	0.11	0.11	0.11
14.600	0.11	0.11	0.11	0.11	0.11
14.850	0.11	0.11	0.11	0.11	0.11
15.100	0.11	0.11	0.11	0.11	0.12
15.350	0.12	0.12	0.12	0.12	0.12
15.600	0.12	0.12	0.12	0.12	0.12
15.850	0.12	0.12	0.12	0.12	0.12
16.100	0.12	0.12	0.12	0.12	0.12
16.350	0.12	0.12	0.12	0.12	0.12
16.600	0.12	0.12	0.12	0.12	0.12
16.850	0.12	0.12	0.12	0.12	0.12
17.100	0.12	0.12	0.12	0.12	0.12
17.350	0.12	0.12	0.12	0.12	0.12
17.600	0.12	0.12	0.12	0.12	0.12
17.850	0.12	0.12	0.12	0.12	0.12
18.100	0.12	0.12	0.12	0.12	0.12
18.350	0.12	0.12	0.12	0.12	0.12
18.600	0.12	0.12	0.12	0.12	0.12
18.850	0.12	0.12	0.12	0.11	0.11
19.100	0.11	0.11	0.11	0.11	0.11
19.350	0.11	0.11	0.11	0.11	0.11
19.600	0.11	0.11	0.11	0.11	0.11
19.850	0.11	0.11	0.11	0.11	0.11
20.100	0.11	0.11	0.11	0.11	0.11
20.350	0.11	0.11	0.11	0.11	0.11
20.600	0.11	0.11	0.11	0.11	0.11
20.850	0.11	0.11	0.11	0.11	0.11

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)

Return Event: 1 years

Label: PO-1 (OUT)

Storm Event: 1 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
21.100	0.11	0.11	0.11	0.11	0.11
21.350	0.11	0.11	0.11	0.11	0.11
21.600	0.11	0.11	0.11	0.11	0.11
21.850	0.11	0.11	0.11	0.11	0.11
22.100	0.11	0.11	0.11	0.11	0.11
22.350	0.11	0.11	0.11	0.11	0.11
22.600	0.11	0.11	0.11	0.11	0.11
22.850	0.11	0.11	0.11	0.11	0.11
23.100	0.11	0.11	0.11	0.11	0.10
23.350	0.10	0.10	0.10	0.10	0.10
23.600	0.10	0.10	0.10	0.10	0.10
23.850	0.10	0.10	0.10	0.10	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 2 years
 Storm Event: 2 Year

Peak Discharge	0.17 ft ³ /s
Time to Peak	15.950 hours
Hydrograph Volume	0.156 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.750	0.00	0.01	0.02	0.04	0.06
12.000	0.08	0.10	0.11	0.12	0.12
12.250	0.13	0.13	0.13	0.13	0.14
12.500	0.14	0.14	0.14	0.14	0.14
12.750	0.15	0.15	0.15	0.15	0.15
13.000	0.15	0.15	0.15	0.15	0.15
13.250	0.15	0.15	0.16	0.16	0.16
13.500	0.16	0.16	0.16	0.16	0.16
13.750	0.16	0.16	0.16	0.16	0.16
14.000	0.16	0.16	0.16	0.16	0.16
14.250	0.16	0.16	0.16	0.16	0.16
14.500	0.16	0.16	0.16	0.16	0.17
14.750	0.17	0.17	0.17	0.17	0.17
15.000	0.17	0.17	0.17	0.17	0.17
15.250	0.17	0.17	0.17	0.17	0.17
15.500	0.17	0.17	0.17	0.17	0.17
15.750	0.17	0.17	0.17	0.17	0.17
16.000	0.17	0.17	0.17	0.17	0.17
16.250	0.17	0.17	0.17	0.17	0.17
16.500	0.17	0.17	0.17	0.17	0.17
16.750	0.17	0.17	0.17	0.17	0.17
17.000	0.17	0.17	0.17	0.17	0.17
17.250	0.17	0.17	0.17	0.17	0.17
17.500	0.17	0.17	0.17	0.17	0.17
17.750	0.17	0.17	0.17	0.16	0.16
18.000	0.16	0.16	0.16	0.16	0.16
18.250	0.16	0.16	0.16	0.16	0.16
18.500	0.16	0.16	0.16	0.16	0.16
18.750	0.16	0.16	0.16	0.16	0.16
19.000	0.16	0.16	0.16	0.16	0.16
19.250	0.16	0.16	0.16	0.16	0.16
19.500	0.16	0.16	0.16	0.16	0.16
19.750	0.16	0.16	0.16	0.16	0.16
20.000	0.16	0.16	0.16	0.16	0.16
20.250	0.16	0.16	0.16	0.16	0.16
20.500	0.16	0.16	0.16	0.16	0.16
20.750	0.16	0.16	0.15	0.15	0.15

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)

Return Event: 2 years

Label: PO-1 (OUT)

Storm Event: 2 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
21.000	0.15	0.15	0.15	0.15	0.15
21.250	0.15	0.15	0.15	0.15	0.15
21.500	0.15	0.15	0.15	0.15	0.15
21.750	0.15	0.15	0.15	0.15	0.15
22.000	0.15	0.15	0.15	0.15	0.15
22.250	0.15	0.15	0.15	0.15	0.15
22.500	0.15	0.15	0.15	0.15	0.15
22.750	0.15	0.15	0.15	0.15	0.15
23.000	0.15	0.15	0.15	0.15	0.15
23.250	0.15	0.15	0.14	0.14	0.14
23.500	0.14	0.14	0.14	0.14	0.14
23.750	0.14	0.14	0.14	0.14	0.14
24.000	0.14	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 5 years
 Storm Event: 5 Year

Peak Discharge	0.26 ft ³ /s
Time to Peak	15.250 hours
Hydrograph Volume	0.239 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.500	0.00	0.00	0.01	0.01	0.02
11.750	0.03	0.04	0.06	0.08	0.11
12.000	0.14	0.17	0.19	0.20	0.20
12.250	0.21	0.21	0.22	0.22	0.22
12.500	0.23	0.23	0.23	0.23	0.23
12.750	0.24	0.24	0.24	0.24	0.24
13.000	0.24	0.24	0.25	0.25	0.25
13.250	0.25	0.25	0.25	0.25	0.25
13.500	0.25	0.25	0.25	0.25	0.26
13.750	0.26	0.26	0.26	0.26	0.26
14.000	0.26	0.26	0.26	0.26	0.26
14.250	0.26	0.26	0.26	0.26	0.26
14.500	0.26	0.26	0.26	0.26	0.26
14.750	0.26	0.26	0.26	0.26	0.26
15.000	0.26	0.26	0.26	0.26	0.26
15.250	0.26	0.26	0.26	0.26	0.26
15.500	0.26	0.26	0.26	0.26	0.26
15.750	0.26	0.26	0.26	0.26	0.26
16.000	0.26	0.26	0.26	0.26	0.26
16.250	0.26	0.26	0.26	0.26	0.26
16.500	0.26	0.26	0.26	0.26	0.26
16.750	0.26	0.26	0.26	0.26	0.26
17.000	0.26	0.26	0.26	0.26	0.26
17.250	0.26	0.25	0.25	0.25	0.25
17.500	0.25	0.25	0.25	0.25	0.25
17.750	0.25	0.25	0.25	0.25	0.25
18.000	0.25	0.25	0.25	0.25	0.25
18.250	0.25	0.25	0.25	0.25	0.25
18.500	0.25	0.25	0.25	0.25	0.25
18.750	0.25	0.25	0.25	0.24	0.24
19.000	0.24	0.24	0.24	0.24	0.24
19.250	0.24	0.24	0.24	0.24	0.24
19.500	0.24	0.24	0.24	0.24	0.24
19.750	0.24	0.24	0.24	0.24	0.24
20.000	0.24	0.24	0.24	0.24	0.23
20.250	0.23	0.23	0.23	0.23	0.23
20.500	0.23	0.23	0.23	0.23	0.23

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)

Return Event: 5 years

Label: PO-1 (OUT)

Storm Event: 5 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
20.750	0.23	0.23	0.23	0.23	0.23
21.000	0.23	0.23	0.23	0.23	0.23
21.250	0.23	0.23	0.23	0.22	0.22
21.500	0.22	0.22	0.22	0.22	0.22
21.750	0.22	0.22	0.22	0.22	0.22
22.000	0.22	0.22	0.22	0.22	0.22
22.250	0.22	0.22	0.22	0.22	0.22
22.500	0.22	0.22	0.22	0.22	0.21
22.750	0.21	0.21	0.21	0.21	0.21
23.000	0.21	0.21	0.21	0.21	0.21
23.250	0.21	0.21	0.21	0.21	0.21
23.500	0.21	0.21	0.21	0.21	0.21
23.750	0.21	0.21	0.21	0.21	0.21
24.000	0.20	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 10 years
 Storm Event: 10 Year

Peak Discharge	0.34 ft ³ /s
Time to Peak	14.850 hours
Hydrograph Volume	0.312 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
11.050	0.00	0.00	0.00	0.01	0.01
11.300	0.01	0.01	0.01	0.02	0.02
11.550	0.02	0.03	0.03	0.04	0.06
11.800	0.07	0.09	0.12	0.16	0.20
12.050	0.24	0.26	0.27	0.28	0.28
12.300	0.29	0.29	0.30	0.30	0.31
12.550	0.31	0.31	0.31	0.32	0.32
12.800	0.32	0.32	0.32	0.32	0.33
13.050	0.33	0.33	0.33	0.33	0.33
13.300	0.33	0.33	0.33	0.34	0.34
13.550	0.34	0.34	0.34	0.34	0.34
13.800	0.34	0.34	0.34	0.34	0.34
14.050	0.34	0.34	0.34	0.34	0.34
14.300	0.34	0.34	0.34	0.34	0.34
14.550	0.34	0.34	0.34	0.34	0.34
14.800	0.34	0.34	0.34	0.34	0.34
15.050	0.34	0.34	0.34	0.34	0.34
15.300	0.34	0.34	0.34	0.34	0.34
15.550	0.34	0.34	0.34	0.34	0.34
15.800	0.34	0.34	0.34	0.34	0.34
16.050	0.34	0.34	0.34	0.34	0.34
16.300	0.34	0.34	0.34	0.34	0.34
16.550	0.34	0.34	0.34	0.33	0.33
16.800	0.33	0.33	0.33	0.33	0.33
17.050	0.33	0.33	0.33	0.33	0.33
17.300	0.33	0.33	0.33	0.33	0.33
17.550	0.33	0.33	0.33	0.33	0.33
17.800	0.33	0.33	0.33	0.32	0.32
18.050	0.32	0.32	0.32	0.32	0.32
18.300	0.32	0.32	0.32	0.32	0.32
18.550	0.32	0.32	0.32	0.32	0.32
18.800	0.32	0.32	0.32	0.32	0.31
19.050	0.31	0.31	0.31	0.31	0.31
19.300	0.31	0.31	0.31	0.31	0.31
19.550	0.31	0.31	0.31	0.31	0.31
19.800	0.31	0.31	0.30	0.30	0.30
20.050	0.30	0.30	0.30	0.30	0.30

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)

Return Event: 10 years

Label: PO-1 (OUT)

Storm Event: 10 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
20.300	0.30	0.30	0.30	0.30	0.30
20.550	0.30	0.30	0.30	0.30	0.30
20.800	0.29	0.29	0.29	0.29	0.29
21.050	0.29	0.29	0.29	0.29	0.29
21.300	0.29	0.29	0.29	0.29	0.29
21.550	0.29	0.29	0.29	0.28	0.28
21.800	0.28	0.28	0.28	0.28	0.28
22.050	0.28	0.28	0.28	0.28	0.28
22.300	0.28	0.28	0.28	0.28	0.28
22.550	0.28	0.28	0.27	0.27	0.27
22.800	0.27	0.27	0.27	0.27	0.27
23.050	0.27	0.27	0.27	0.27	0.27
23.300	0.27	0.27	0.27	0.27	0.27
23.550	0.27	0.26	0.26	0.26	0.26
23.800	0.26	0.26	0.26	0.26	0.26

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 25 years
 Storm Event: 25 Year

Peak Discharge	0.47 ft ³ /s
Time to Peak	14.450 hours
Hydrograph Volume	0.423 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
10.300	0.00	0.00	0.00	0.00	0.01
10.550	0.01	0.01	0.01	0.01	0.01
10.800	0.02	0.02	0.02	0.02	0.02
11.050	0.03	0.03	0.03	0.03	0.04
11.300	0.04	0.04	0.04	0.05	0.05
11.550	0.06	0.06	0.07	0.08	0.10
11.800	0.12	0.15	0.19	0.24	0.30
12.050	0.34	0.37	0.38	0.39	0.40
12.300	0.41	0.41	0.42	0.42	0.43
12.550	0.43	0.43	0.44	0.44	0.44
12.800	0.44	0.44	0.45	0.45	0.45
13.050	0.45	0.45	0.45	0.46	0.46
13.300	0.46	0.46	0.46	0.46	0.46
13.550	0.46	0.46	0.46	0.46	0.46
13.800	0.46	0.46	0.47	0.47	0.47
14.050	0.47	0.47	0.47	0.47	0.47
14.300	0.47	0.47	0.47	0.47	0.47
14.550	0.47	0.47	0.47	0.47	0.47
14.800	0.47	0.47	0.47	0.47	0.47
15.050	0.47	0.47	0.46	0.46	0.46
15.300	0.46	0.46	0.46	0.46	0.46
15.550	0.46	0.46	0.46	0.46	0.46
15.800	0.46	0.46	0.46	0.46	0.46
16.050	0.46	0.46	0.46	0.46	0.46
16.300	0.46	0.45	0.45	0.45	0.45
16.550	0.45	0.45	0.45	0.45	0.45
16.800	0.45	0.45	0.45	0.45	0.45
17.050	0.45	0.45	0.45	0.45	0.44
17.300	0.44	0.44	0.44	0.44	0.44
17.550	0.44	0.44	0.44	0.44	0.44
17.800	0.44	0.44	0.44	0.44	0.43
18.050	0.43	0.43	0.43	0.43	0.43
18.300	0.43	0.43	0.43	0.43	0.43
18.550	0.43	0.43	0.43	0.42	0.42
18.800	0.42	0.42	0.42	0.42	0.42
19.050	0.42	0.42	0.42	0.42	0.42
19.300	0.42	0.42	0.41	0.41	0.41

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)

Return Event: 25 years

Label: PO-1 (OUT)

Storm Event: 25 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
19.550	0.41	0.41	0.41	0.41	0.41
19.800	0.41	0.41	0.41	0.41	0.41
20.050	0.40	0.40	0.40	0.40	0.40
20.300	0.40	0.40	0.40	0.40	0.40
20.550	0.40	0.40	0.39	0.39	0.39
20.800	0.39	0.39	0.39	0.39	0.39
21.050	0.39	0.39	0.39	0.39	0.39
21.300	0.38	0.38	0.38	0.38	0.38
21.550	0.38	0.38	0.38	0.38	0.38
21.800	0.38	0.38	0.38	0.37	0.37
22.050	0.37	0.37	0.37	0.37	0.37
22.300	0.37	0.37	0.37	0.37	0.37
22.550	0.37	0.36	0.36	0.36	0.36
22.800	0.36	0.36	0.36	0.36	0.36
23.050	0.36	0.36	0.36	0.36	0.36
23.300	0.35	0.35	0.35	0.35	0.35
23.550	0.35	0.35	0.35	0.35	0.35
23.800	0.35	0.35	0.35	0.35	0.34

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 50 years
 Storm Event: 50 Year

Peak Discharge	1.04 ft ³ /s
Time to Peak	13.000 hours
Hydrograph Volume	0.555 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
9.650	0.00	0.00	0.00	0.00	0.01
9.900	0.01	0.01	0.01	0.01	0.01
10.150	0.01	0.01	0.02	0.02	0.02
10.400	0.02	0.02	0.02	0.03	0.03
10.650	0.03	0.03	0.03	0.04	0.04
10.900	0.04	0.04	0.05	0.05	0.05
11.150	0.05	0.06	0.06	0.06	0.07
11.400	0.07	0.07	0.08	0.08	0.09
11.650	0.10	0.11	0.13	0.16	0.20
11.900	0.25	0.32	0.38	0.43	0.46
12.150	0.48	0.49	0.50	0.55	0.65
12.400	0.74	0.82	0.87	0.92	0.95
12.650	0.98	1.00	1.01	1.03	1.03
12.900	1.04	1.04	1.04	1.04	1.04
13.150	1.03	1.03	1.02	1.01	1.00
13.400	0.99	0.98	0.97	0.96	0.94
13.650	0.93	0.92	0.90	0.89	0.88
13.900	0.86	0.85	0.83	0.82	0.81
14.150	0.79	0.78	0.77	0.75	0.74
14.400	0.73	0.72	0.71	0.70	0.69
14.650	0.68	0.67	0.66	0.65	0.64
14.900	0.63	0.62	0.61	0.61	0.60
15.150	0.59	0.58	0.58	0.57	0.56
15.400	0.55	0.55	0.54	0.53	0.53
15.650	0.52	0.51	0.51	0.50	0.50
15.900	0.50	0.50	0.50	0.50	0.50
16.150	0.50	0.50	0.50	0.50	0.50
16.400	0.50	0.50	0.50	0.50	0.50
16.650	0.50	0.50	0.49	0.49	0.49
16.900	0.49	0.49	0.49	0.49	0.49
17.150	0.49	0.49	0.49	0.49	0.49
17.400	0.49	0.49	0.49	0.49	0.48
17.650	0.48	0.48	0.48	0.48	0.48
17.900	0.48	0.48	0.48	0.48	0.48
18.150	0.48	0.48	0.48	0.48	0.47
18.400	0.47	0.47	0.47	0.47	0.47
18.650	0.47	0.47	0.47	0.47	0.47

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)

Return Event: 50 years

Label: PO-1 (OUT)

Storm Event: 50 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
18.900	0.47	0.47	0.46	0.46	0.46
19.150	0.46	0.46	0.46	0.46	0.46
19.400	0.46	0.46	0.46	0.46	0.45
19.650	0.45	0.45	0.45	0.45	0.45
19.900	0.45	0.45	0.45	0.45	0.45
20.150	0.45	0.44	0.44	0.44	0.44
20.400	0.44	0.44	0.44	0.44	0.44
20.650	0.44	0.44	0.44	0.43	0.43
20.900	0.43	0.43	0.43	0.43	0.43
21.150	0.43	0.43	0.43	0.43	0.43
21.400	0.42	0.42	0.42	0.42	0.42
21.650	0.42	0.42	0.42	0.42	0.42
21.900	0.42	0.42	0.41	0.41	0.41
22.150	0.41	0.41	0.41	0.41	0.41
22.400	0.41	0.41	0.41	0.41	0.41
22.650	0.40	0.40	0.40	0.40	0.40
22.900	0.40	0.40	0.40	0.40	0.40
23.150	0.40	0.40	0.40	0.39	0.39
23.400	0.39	0.39	0.39	0.39	0.39
23.650	0.39	0.39	0.39	0.39	0.39
23.900	0.39	0.38	0.38	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 100 years
 Storm Event: 100 Year

Peak Discharge	2.15 ft ³ /s
Time to Peak	12.450 hours
Hydrograph Volume	0.729 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
9.000	0.00	0.00	0.00	0.00	0.01
9.250	0.01	0.01	0.01	0.01	0.01
9.500	0.01	0.01	0.02	0.02	0.02
9.750	0.02	0.02	0.02	0.02	0.03
10.000	0.03	0.03	0.03	0.03	0.03
10.250	0.04	0.04	0.04	0.04	0.04
10.500	0.05	0.05	0.05	0.05	0.05
10.750	0.06	0.06	0.06	0.06	0.07
11.000	0.07	0.07	0.08	0.08	0.08
11.250	0.09	0.09	0.10	0.10	0.10
11.500	0.11	0.12	0.12	0.14	0.15
11.750	0.18	0.21	0.26	0.32	0.40
12.000	0.47	0.87	1.51	1.80	1.95
12.250	2.03	2.09	2.12	2.14	2.15
12.500	2.14	2.12	2.10	2.07	2.03
12.750	2.00	1.96	1.92	1.89	1.85
13.000	1.81	1.77	1.73	1.69	1.65
13.250	1.62	1.58	1.54	1.51	1.47
13.500	1.44	1.40	1.37	1.34	1.31
13.750	1.28	1.25	1.22	1.19	1.16
14.000	1.13	1.11	1.08	1.06	1.03
14.250	1.01	0.99	0.97	0.95	0.93
14.500	0.91	0.89	0.87	0.86	0.84
14.750	0.83	0.81	0.80	0.78	0.77
15.000	0.76	0.75	0.73	0.72	0.71
15.250	0.70	0.69	0.68	0.67	0.66
15.500	0.65	0.64	0.63	0.62	0.61
15.750	0.60	0.59	0.59	0.58	0.57
16.000	0.56	0.55	0.54	0.54	0.53
16.250	0.52	0.52	0.51	0.50	0.50
16.500	0.50	0.50	0.50	0.50	0.50
16.750	0.50	0.50	0.50	0.50	0.50
17.000	0.50	0.50	0.50	0.50	0.50
17.250	0.50	0.50	0.50	0.50	0.50
17.500	0.50	0.49	0.49	0.49	0.49
17.750	0.49	0.49	0.49	0.49	0.49
18.000	0.49	0.49	0.49	0.49	0.49

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Routed Hydrograph (total out)

Return Event: 100 years

Label: PO-1 (OUT)

Storm Event: 100 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
18.250	0.49	0.49	0.49	0.49	0.48
18.500	0.48	0.48	0.48	0.48	0.48
18.750	0.48	0.48	0.48	0.48	0.48
19.000	0.48	0.48	0.48	0.48	0.47
19.250	0.47	0.47	0.47	0.47	0.47
19.500	0.47	0.47	0.47	0.47	0.47
19.750	0.47	0.47	0.47	0.46	0.46
20.000	0.46	0.46	0.46	0.46	0.46
20.250	0.46	0.46	0.46	0.46	0.46
20.500	0.45	0.45	0.45	0.45	0.45
20.750	0.45	0.45	0.45	0.45	0.45
21.000	0.45	0.45	0.45	0.44	0.44
21.250	0.44	0.44	0.44	0.44	0.44
21.500	0.44	0.44	0.44	0.44	0.44
21.750	0.44	0.43	0.43	0.43	0.43
22.000	0.43	0.43	0.43	0.43	0.43
22.250	0.43	0.43	0.43	0.43	0.42
22.500	0.42	0.42	0.42	0.42	0.42
22.750	0.42	0.42	0.42	0.42	0.42
23.000	0.42	0.42	0.41	0.41	0.41
23.250	0.41	0.41	0.41	0.41	0.41
23.500	0.41	0.41	0.41	0.41	0.41
23.750	0.41	0.40	0.40	0.40	0.40
24.000	0.40	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Inflow Summary

Label: PO-1 (IN)

Return Event: 1 years

Storm Event: 1 Year

Summary for Hydrograph Addition at 'PO-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	0.321	11.950	5.72
Flow (In)	PO-1	0.321	11.950	5.72

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Inflow Summary

Return Event: 2 years

Label: PO-1 (IN)

Storm Event: 2 Year

Summary for Hydrograph Addition at 'PO-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	0.421	11.950	7.42
Flow (In)	PO-1	0.421	11.950	7.42

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Inflow Summary

Label: PO-1 (IN)

Return Event: 5 years

Storm Event: 5 Year

Summary for Hydrograph Addition at 'PO-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	0.581	11.950	10.08
Flow (In)	PO-1	0.581	11.950	10.08

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Inflow Summary

Label: PO-1 (IN)

Return Event: 10 years

Storm Event: 10 Year

Summary for Hydrograph Addition at 'PO-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	0.718	11.950	12.32
Flow (In)	PO-1	0.718	11.950	12.32

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Inflow Summary

Label: PO-1 (IN)

Return Event: 25 years

Storm Event: 25 Year

Summary for Hydrograph Addition at 'PO-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	0.924	11.950	15.63
Flow (In)	PO-1	0.924	11.950	15.63

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Inflow Summary

Label: PO-1 (IN)

Return Event: 50 years

Storm Event: 50 Year

Summary for Hydrograph Addition at 'PO-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	1.101	11.950	18.41
Flow (In)	PO-1	1.101	11.950	18.41

TWIN OAKS ME2 - POST-DEVELOPED CONDITIONS

Subsection: Pond Inflow Summary

Label: PO-1 (IN)

Return Event: 100 years

Storm Event: 100 Year

Summary for Hydrograph Addition at 'PO-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #1	1.295	11.950	21.45
Flow (In)	PO-1	1.295	11.950	21.45

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APPENDIX E

WORKSHEETS #4 AND #5

Stormwater BMP Information Chart 5.B revised March 15, 2016

Proposed Infiltration BMP(s) (site specific)	Infiltration Information					Drainage Information					BMP Information						
	Measured Infiltration Rate ⁹ in./hr.	Factor of Safety	Design Infiltration Rate in./hr.	Dewatering Time ¹ hrs.	Elevation of Limiting Zone - Water Table, Bedrock, etc. ²	Total Drainage Area to BMP sq. ft.	Total Impervious Drainage Area to BMP sq. ft.	Infiltration BMP Surface Area sq. ft.	Total Drainage Area Loading Ratio ⁶	Impervious Area Loading Ratio ⁷	Volume of Runoff Tributary to BMP During the 2yr/24hr Design Storm ⁵ cf	Calculated Infiltration Volume (from storms up to and including 2yr/24hr) cf	Calculated Managed Volume (from storms up to and including 2yr/24hr) ⁸ cf	Maximum water surface elevation in BMP from 2yr storm ³	Infiltration Elevation Bottom of Bed/ Basin ³	Elevation of Infiltration Test ⁴	Elevation of E&S Sediment Basin Bottom (if applies)
BMP 6.4.1 Pervious Pvmnt w. Infiltr. Bed																	
BMP 6.4.2 Infiltration Basin																	
BMP 6.4.3 Subsurface Infiltration Bed																	
BMP 6.4.4 Infiltration Trench																	
BMP 6.4.5 Rain Garden/Bioretentation																	
BMP 6.4.6 Dry Well / Seepage Pit																	
Other Slow Release	0.00	2	1.00*	46 hrs	103	103,063	65,460	33,901	3	2	19,738	0	5,000	108.45	108.0	105	N/A
BMP 6.4.7 Constructed Filter	0.00	2	1.00*	46 hrs	103	103,063	65,460	33,901	3	2	19,738	0	5,000	108.45	108.0	105	N/A
BMP 6.4.8 Vegetated Swale																	
BMP 6.4.9 Vegetated Filter Strip																	
BMP 6.4.10 Infiltr. Berm & Ret. Grading																	

*-Design infiltration rate is assumed based off filter media specifications with a factor of safety of 2 incorporated. To be field tested after construction.

All information to be based on the 2-year/24-hour storm

Provide page numbers from the stormwater narrative identifying the location of the above information.

¹ Can include active infiltration time - dewatering time should not exceed 72 hours after the 2-year/24-hour storm

² Depth to limiting zone is recommended to be at least 2 ft below infiltration testing elevation/proposed infiltration elevation.

³ A maximum of 2 feet of Hydraulic head is recommended.

⁴ Provide supporting field notes/documentation from soil evaluation.

⁵ This value should be greater than or equal to the Volume to be Infiltrated or Managed by the BMP.

⁶ A maximum of 8:1 is recommended.

⁷ A maximum of 5:1 is recommended; however, in carbonate geology areas, a maximum of 3:1 is recommended.

⁸ Calculated runoff volume that is managed in ways other than infiltration to address 25 PA Code Ch 102.8(g)(2)

⁹ The infiltration testing information should be located on the plan view of the PCSM Plan and should include infiltration test elevation and rate.

Any deviations from the recommendations above should be adequately justified by a qualified professional and included with the application.

NOTE: This chart is for summary purposes only and should be consistent with all design calculations and worksheets.

Appendix D. Worksheets

Worksheet 1. General Site Information

INSTRUCTIONS: Fill out Worksheet 1 for each watershed

Date: 9/28/2016
Project Name: SUNOCO LOGISTICS - TWIN OAKS STATION
Municipality: UPPER CHICHESTER TOWNSHIP
County: DELAWARE COUNTY
Total Area (acres): 2.392
Major River Basin: DELAWARE RIVER
Watershed: BALDWIN RUN
Sub-Basin:
Nearest Surface Water(s) to Receive Runoff: BALDWIN RUN
Chapter 93 – Designated Water Use/Existing Water Use: WWF

Impaired according to Category 4 or 5 of the Integrated Water Quality Monitoring and Assessment Report? Yes No

List Causes of Impairment: URBAN RUNOFF/STORM SEWERS

Is there an established TMDL that applies: Yes No

Total Maximum Daily Loads (TMDLS)

Is project subject to, or part of:

Municipal Separate Storm Sewer System (MS4) Requirements? Yes No

Existing or planned drinking water supply? Yes No

If yes, distance from proposed discharge (miles):

Approved Act 167 Plan? Yes No

Existing River Conservation Plan? Yes No

Worksheet 2. Sensitive Natural Resources from PA Stormwater Best Management Practices Chapter 5

INSTRUCTIONS

1. Provide Sensitive Resources Map according to non-structural BMP 5.4.1 in Chapter 5. This map should identify wetlands, woodlands, natural drainage ways, steep slopes, and other sensitive natural areas.

2. Summarize the existing extent of each sensitive resource in the Existing Sensitive Resources Table (below, using Acres). If none present, insert 0.

3. Summarize Total Protected Area as defined under BMPs in Chapter 5.

4. Do not count any area twice. For example, an area that is both a floodplain and a wetland may only be considered once.

EXISTING NATURAL SENSITIVE RESOURCE	MAPPED? Yes/no/n/a	TOTAL AREA (Ac.)	PROTECTED AREA (Ac.)
Waterbodies			
Floodplains			
Riparian Areas			
Wetlands			
Woodlands			
Natural Drainage Ways			
Steep Slopes, 15% - 25%			
Steep Slopes, over 25%			
Other:			
Other:			
TOTAL EXISTING:			

Worksheet 3. Nonstructural BMP Credits from PA Stormwater Best Management Practices Manual (SW BMP Manual)

PROTECTED AREA

- 1.1 Area of Protected Sensitive/Special Value Features (see WS 2) 0.000 Ac.
 - 1.2 Area of Riparian Forest Buffer Protection (see WS 2) 0.000 Ac.
 - 3.1 Area of Minimum Disturbance/Reduced Grading (See Chapter 8, page 21 – SW BMP Manual) 0.000 Ac
- TOTAL** 0.000 Ac

Site Area	Minus	Protected Area	=	Stormwater Management Area
<input style="width: 100px;" type="text" value="2.392"/>	-	<input style="width: 100px;" type="text" value="0.000"/>	=	<input style="width: 100px;" type="text" value="2.392"/>

This is the area that requires stormwater management

VOLUME CREDITS

3.1 Minimum Soil Compaction (See Chapter 8, page 22 – SW BMP Manual)

Lawn _____ ft² x 1/4" x 1/12 = _____ ft³

Meadow _____ ft² x 1/3" x 1/12 = _____ ft³

3.3 Protect Existing Trees (See Chapter 8, page 23 – SW BMP Manual)

For Trees within 100 feet of impervious area:

Tree Canopy _____ ft² x 1/2" x 1/12 = _____ ft³

5.1 Disconnect Roof Leaders to Vegetated Areas (See Chapter 8 page 25 – SW BMP Manual)

For runoff directed to areas protected under 5.8.1 and 5.8.2

Roof Area _____ ft² x 1/3" x 1/12 = _____ ft³

For all other disconnected roof areas

Roof Area _____ ft² x 1/4" x 1/12 = _____ ft³

5.2 Disconnect Non-Roof impervious to Vegetated Areas (See Chapter 8, page 26 – SW BMP Manual)

For Runoff directed to areas protected under 5.8.1 and 5.8.2

Impervious Area _____ ft² x 1/3" x 1/12 = _____ ft³

For all other disconnected roof areas

Impervious Area _____ ft² x 1/4" x 1/12 = _____ ft³

TOTAL NON-STRUCTURAL VOLUME CREDIT*

**For use on Worksheet 5*

Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: SUNOCO LOGISTICS - TWIN OAKS STATION
Drainage Area: BALDWIN RUN
2-Year Rainfall: 3.24 in

Total Site Area: 2.392 acres
Protected Site Area: 0.000 acres
Managed Area: 2.392 acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	la (0.2*S)	Q Runoff ¹ (in)	Runoff Volume ² (ft ³)
Woodland	C	0	0	70	4.286	0.8571	0	0
Meadow	C	96,739	2.221	71	4.085	0.8169	0.9022	7,274
Impervious	C	7,440	0.171	98	0.2041	0.0408	3.0073	1,865
TOTAL:		104,179	2.392					9,138

Developed Conditions

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	la (0.2*S)	Q Runoff ¹ (in)	Runoff Volume ² (ft ³)
NEW IMPERVIOUS	C	19,609	0.450	98	0.2041	0.0408	3.0073	4,914
GRASS	C	75,271	1.728	74	3.5135	0.7027	1.0640	6,674
EX. IMPERVIOUS	C	9,229	0.213	98	0.2041	0.0408	3.0073	2,330
TOTAL:		104,179	2.392					13,919

2-Year Volume Increase (ft³): 4,781

2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume

- Runoff (in) = $Q = (P-0.2S)^2 / (P+0.8S)$ where
 P = 2-Year Rainfall (in)
 S = $(1000/ CN)-10$
- Runoff Volume (CF) = Q x Area x 1/12
 Q = Runoff (in)
 Area = Land use area (sq. ft)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

Worksheet 5. Structural BMP Volume Credits

PROJECT: SUNOCO LOGISTICS - TWIN OAKS STATION
SUB-BASIN: BALDWIN RUN

Required Control Volume (ft³) – from Worksheet 4: 4,781

Non-structural Volume Credit (ft³) – from Worksheet 3: - 0
(maximum is 25% of required volume)

Structural Volume Reqmt (ft³) 4,781

(Required Control Volume minus Non-structural Credit)

Proposed BMPs from PA Stormwater Best Management Practices Manual Chapter 6	Area (ft ²)	Volume Reduction Permanently Removed (ft ³)
6.4.1 Porous Pavement		
6.4.2 Infiltration Basin		
6.4.3 Infiltration Bed		
6.4.4 Infiltration Trench		
6.4.5 Rain Garden/Bioretenation		
6.4.6 Dry Well / Seepage Pit		
6.4.7 Constructed Filter		
6.4.8 Vegetated Swale		
6.4.9 Vegetated Filter Strip		
6.4.10 Berm		
6.5.1 Vegetated Roof		
6.5.2 Capture and Re-use		
6.6.1 Constructed Wetlands		
6.6.2 Wet Pond / Retention Basin		
6.7.1 Riparian Buffer/Riparian Forest Buffer Restoration		
6.7.2 Landscape Restoration / Reforestation		
6.7.3 Soil Amendment		
6.8.1 Level Spreader		
6.8.2 Special Storage Areas		
Other SLOW RELEASE	33,900	5,000

Total Structural Volume (ft³): 5,000
Structural Volume Requirement (ft³): 4,781
DIFFERENCE <219>

Worksheet 10 – Water Quality Compliance for Nitrate

Does the site design incorporate the following BMPs to address nitrate pollution? A summary “yes” rating is achieved if at least 2 Primary BMPs for nitrate are provided across the site or 4 secondary BMPs for nitrate are provided across the site (or the equivalent) “provided across the site” is taken to mean the specifications for that BMP set forward in Sections 5 and 6 are satisfied.

Proposed BMPs from PA Stormwater Best Management Practices Manual Chapter 5 & 6

	Yes	No
Primary BMPs for Nitrate:	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.2 – Protect/Conserve/Enhance Riparian Buffers	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.5.4 – Cluster Uses at Each Site	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.1 – Minimize Total Disturbed Area	<input checked="" type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.3 – Re-Vegetate/Re-Forest Disturbed Areas (Native Species)	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.9.1 – Street Sweeping/Vacuuming	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.1 – Riparian Buffer Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.2 – Landscape Restoration	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
Secondary BMPs for Nitrate:	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.1 – Protect Sensitive/Special Value Features	<input checked="" type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.3 – Protect/Utilize Natural Drainage Features	<input checked="" type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.2 – Minimize Soil Compaction	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.4.5 – Rain Garden/Bioretenion	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.4.8 – Vegetated Swale	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.4.9 – Vegetated Filter Strip	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.6.1 – Constructed Wetland	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.1 – Riparian Buffer Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.2 – Landscape Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.3 – Soils Amendment/Restoration	<input type="checkbox"/>	<input type="checkbox"/>

PPP - Twin Oaks Pump Station

Project:

Date: 09/28/16

EXISTING CONDITIONS (SITE LOD)

2-year Rainfall		3.24									
Cover Type	Soil Type	Area (sf)	Area (ac)	CN	S	la (0.2*S)	0.8*S	Q Runoff (in)	Runoff Volume (cf)		
20% IMPERVIOUS	C	1859	0.043	71	4.085	0.8169	3.268	0.9022	140		
MEADOW	C	94880	2.178	71	4.085	0.8169	3.268	0.9022	7134		
80% IMPERVIOUS	C	7440	0.171	98	0.2041	0.0408	0.163	3.007	1865		
Total		104179	2.392	72.93					9138		
									0.210		

PROPOSED CONDITIONS (SITE LOD)

2-year Rainfall		3.24									
Cover Type	Soil Type	Area (sf)	Area (ac)	CN	S	la (0.2*S)	0.8*S	Q Runoff (in)	Runoff Volume (cf)		
IMPERVIOUS	C	19609	0.450	98	0.2041	0.0408	0.163	3.0073	4914		
EX. IMPERVIOUS	C	9299	0.213	98	0.2041	0.041	0.163	3.0073	2330		
GRASS	C	75271	1.728	74	3.5135	0.7027	2.8108	1.0640	6674		
WOODLANDS	C	0	0.000	65	5.385	1.0769	4.308	0.6199	0		
Total		104179	2.392	80.66					13919		
									0.320		

2yr Volume Increase (cf/ac) 4781 **0.109745276**

PROJECT: PPP - Twin Oaks Pump Station
 SUB-BASIN: Baldwin Run

Required Control Volume (ft3) - from Worksheet 4:	4,781
Non-structural Volume Credit (ft3) - from Worksheet 3:	N/A
Structural Volume Reqmt (ft3) <i>(Required Control Volume minus Non-structural Credit)</i>	4,781

Proposed BMP	Area (ft2)	Storage Volume (ft3)
6.4.1 Porous Pavement		
6.4.2 Infiltration Basin		
6.4.3 Infiltration Bed		
6.4.4 Infiltration Trench		
6.4.5 Rain Garden/Bioretenion		
6.4.6 Dry Well/Seepage Pit		
6.4.7 Constructed Filter		
6.4.8 Vegetated Swale		
6.4.9 Vegetated Filter Strip		
6.4.10 Berm		
6.5.1 Vegetated Roof		
6.5.2 Capture and Re-Use		
6.6.1 Constructed Wetlands		
6.6.2 Wet Pond/Retention Basin		
6.6.3 Dry Extended Detention Basin		
6.6.4 Water Quality Filters		
6.7.1 Riparian Buffer Restoration		
6.7.2 Landscape Restoration/Reforestation		
6.7.3 Soil Amendment		
6.8.1 Level Spreader		
6.8.2 Special Storage Areas		
<i>Other:</i> Slow Release	33,900	5,000
Total Structural Volume Provided (ft3):		5,000
Structural Volume Requirement (ft3):		4,781
DIFFERENCE:		-219

PPP - Twin Oaks Pump Station

Project:

Date: 09/28/16

PROPOSED CONDITIONS (VOLUME TO BASIN)

2-year Rainfall **3.24**

Cover Type	Soil Type	Area (sf)	Area (ac)	CN	S	la (0.2*S)	0.8*S	Q Runoff (in)	Runoff Volume (cf)
STONE SURFACE	C	63304	1.453	98	0.2041	0.0408	0.163	3.0073	15865
IMPERVIOUS	C	2156	0.049	98	0.2041	0.041	0.163	3.0073	540
GRASS	C	37592	0.863	74	3.5135	0.7027	2.8108	1.0640	3333
WOODLANDS	C	0	0.000	65	5.385	1.0769	4.308	0.6199	0
Total		103052	2.366	89.25					19738
									0.453

STANDARD E&S WORKSHEET #11

Channel Design Data

PROJECT NAME: Twin Oaks Pump Station
 LOCATION: _____
 PREPARED BY: _____ DATE: _____
 CHECKED BY: _____ DATE: _____

CHANNEL OR CHANNEL SECTION	A (min)	A (max)			
TEMPORARY OR PERMANENT? (T OR P)	P	P			
DESIGN STORM (2, 5, OR 10 YR)	10	10			
ACRES (AC)	0.32	0.32			
MULTIPLIER (1.6, 2.25, OR 2.75) ¹	2.75	2.75			
Q _r (REQUIRED CAPACITY) (CFS)	0.89	0.89			
Q (CALCULATED AT FLOW DEPTH d) (CFS)	0.89	0.89			
PROTECTIVE LINING ²	S-150	S-150			
n (MANNING'S COEFFICIENT) ²	0.055	0.055			
V _a (ALLOWABLE VELOCITY) (FPS)	---	---			
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.22	1.37			
τ _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	1.75	1.75			
τ _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.27	0.34			
CHANNEL BOTTOM WIDTH (FT)	2	2			
CHANNEL SIDE SLOPES (H:1)	2	2			
D (TOTAL DEPTH) (FT)	2	2			
CHANNEL TOP WIDTH @ D (FT)	10	10			
d (CALCULATED FLOW DEPTH) (FT)	0.28	0.26			
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	3.12	3.04			
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	7.1	7.7			
d ₅₀ STONE SIZE (IN)	---	---			
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.72	0.66			
R (HYDRAULIC RADIUS)	0.22	0.21			
S (BED SLOPE) ³ (FT/FT)	0.015	0.021			
S _c (CRITICAL SLOPE) (FT/FT)	0.023727	0.023556			
.7S _c (FT/FT)	0.0166089	0.016489			
1.3S _c (FT/FT)	0.0308451	0.030623			
STABLE FLOW? (Y/N)	Y	Y			
FREEBOARD BASED ON UNSTABLE FLOW (FT)	---	---			
FREEBOARD BASED ON STABLE FLOW (FT)	1.72	1.74			
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5			
DESIGN METHOD FOR PROTECTIVE LINING ⁵	S	S			
PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)					

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

**Erosion Control Materials Design Software
 Version 5.0**

**Project Name: Twin Oaks
 Project Number: 92138
 Channel Name: Channel A (Max Slope)**

Discharge	0.89
Peak Flow Period	24
Channel Slope	0.021
Channel Bottom Width	2
Left Side Slope	2
Right Side Slope	2
Low Flow Liner	
Retardance Class	C
Vegetation Type	Mix (Sod & Bunch)
Vegetation Density	Good 75-95%
Soil Type	Silt Loam

S150

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
S150 Unvegetated	Straight	0.89 cfs	1.37 ft/s	0.26 ft	0.055	1.75 lbs/ft ²	0.34 lbs/ft ²	5.16	STABLE	D

Unreinforced Vegetation - Class C - Mix (Sod & Bunch) - Good 75-95%

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	0.89 cfs	0.57 ft/s	0.51 ft	0.19	4.2 lbs/ft ²	0.67 lbs/ft ²	6.25	STABLE	--
Underlying Substrate	Straight	0.89 cfs	0.57 ft/s	0.51 ft	--	0.04 lbs/ft ²	0.001 lbs/ft ²	30.99	STABLE	--

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Channel Computations

Project Parameters	
Specify Manning's n:	0.19
Discharge:	0.89
Peak Flow Period:	24
Channel Slope:	0.021
Bottom Width:	2
Left Side Slope:	2
Right Side Slope:	2
Existing Channel Bend:	0
Bend Coefficient (Kb):	1.00
Retardance Class (A - E):	C
Vegetation Type:	Mix (Sod & Bunch)
Vegetation Density:	Good 75-95%
Soil Type:	Silt Loam
Channel Lining Options	
Protection Type	Permanent

Material Type	
Matting Type	S150
Manning's N value for selected Product	0.06
Cross-Sectional Area (A)	
$A = AL + AB + AR =$	0.65
$AL = (1/2) * Depth^2 * ZL =$	0.07
$AB = Bottom Width * Depth =$	0.52
$AR = (1/2) * Depth^2 * ZR =$	0.07
Wetted Perimeter (P)	
$P = PL + PB + PR =$	3.16
$PL = Depth * (ZL^2 + 1)^{0.5} =$	0.58
$PB = Channel Bottom Width =$	2
$PR = Depth * (ZR^2 + 1)^{0.5} =$	0.58
Hydraulic Radius (R)	
$R = A / P =$	0.21
Flow (Q)	
$Q = 1.486 / n * A * R^{2/3} * S^{1/2} =$	0.89
Velocity (V)	
$V = Q / A =$	1.37
Channel Shear Stress (Te)	
$Td = 62.4 * Depth * Slope =$	0.34
Channel Safety Factor = (Tp / Td)	5.16
Effective Stress on Blanket(Tdb)	
$Te = Td * (1-CF) * (ns/n)^2 =$	0
CF =	0
ns =	0

Soil Safety Factor	
Allowable Soil Shear (Ta) =	0
Soil Safety Factor = Ta / Te =	0
Conclusion: Stability of Mat	STABLE

Material Type	
Matting Type	Unreinforced Vegetation
Manning's N value for selected Product	0.19
Cross-Sectional Area (A)	
A = AL + AB + AR =	1.55
AL = (1/2) * Depth ² * ZL =	0.26
AB = Bottom Width * Depth =	1.03
AR = (1/2) * Depth ² * ZR =	0.26
Wetted Perimeter (P)	
P = PL + PB + PR =	4.29
PL = Depth * (ZL ² + 1)0.5 =	1.15
PB = Channel Bottom Width =	2
PR = Depth * (ZR ² + 1)0.5 =	1.15
Hydraulic Radius (R)	
R = A / P =	0.36
Flow (Q)	
Q = 1.486 / n * A * R ^{2/3} * S ^{1/2} =	0.89
Velocity (V)	
V = Q / A =	0.57
Channel Shear Stress (Te)	
Td = 62.4 * Depth * Slope =	0.67
Channel Safety Factor = (Tp / Td)	6.25
Effective Stress on Blanket(Tdb)	
Te = Td * (1-CF) * (ns/n) ² =	0
CF =	0.75
ns =	0.02
Soil Safety Factor	
Allowable Soil Shear (Ta) =	0.04
Soil Safety Factor = Ta / Te =	30.99
Conclusion: Stability of Mat	STABLE
Conclusion: Stability of Underlying soil	

Side Slope Liner Results

**Erosion Control Materials Design Software
 Version 5.0**

**Project Name: Twin Oaks
 Project Number: 92138
 Channel Name: Channel A (Min Slope)**

Discharge	0.89
Peak Flow Period	24
Channel Slope	0.015
Channel Bottom Width	2
Left Side Slope	2
Right Side Slope	2
Low Flow Liner	
Retardance Class	C
Vegetation Type	Mix (Sod & Bunch)
Vegetation Density	Good 75-95%
Soil Type	Silt Loam

S150

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
S150 Unvegetated	Straight	0.89 cfs	1.22 ft/s	0.28 ft	0.055	1.75 lbs/ft ²	0.27 lbs/ft ²	6.57	STABLE	D

Unreinforced Vegetation - Class C - Mix (Sod & Bunch) - Good 75-95%

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	0.89 cfs	0.5 ft/s	0.57 ft	0.198	4.2 lbs/ft ²	0.54 lbs/ft ²	7.85	STABLE	--
Underlying Substrate	Straight	0.89 cfs	0.5 ft/s	0.57 ft	--	0.04 lbs/ft ²	0.001 lbs/ft ²	41.98	STABLE	--

Erosion Control Materials Design Software Version 5.0

Channel Computations

Project Parameters	
Specify Manning's n:	0.2
Discharge:	0.89
Peak Flow Period:	24
Channel Slope:	0.015
Bottom Width:	2
Left Side Slope:	2
Right Side Slope:	2
Existing Channel Bend:	0
Bend Coefficient (Kb):	1.00
Retardance Class (A - E):	C
Vegetation Type:	Mix (Sod & Bunch)
Vegetation Density:	Good 75-95%
Soil Type:	Silt Loam
Channel Lining Options	
Protection Type	Permanent

Material Type	
Matting Type	S150
Manning's N value for selected Product	0.06
Cross-Sectional Area (A)	
$A = AL + AB + AR =$	0.73
$AL = (1/2) * \text{Depth}^2 * ZL =$	0.08
$AB = \text{Bottom Width} * \text{Depth} =$	0.57
$AR = (1/2) * \text{Depth}^2 * ZR =$	0.08
Wetted Perimeter (P)	
$P = PL + PB + PR =$	3.27
$PL = \text{Depth} * (ZL^2 + 1)^{0.5} =$	0.64
$PB = \text{Channel Bottom Width} =$	2
$PR = \text{Depth} * (ZR^2 + 1)^{0.5} =$	0.64
Hydraulic Radius (R)	
$R = A / P =$	0.22
Flow (Q)	
$Q = 1.486 / n * A * R^{2/3} * S^{1/2} =$	0.89
Velocity (V)	
$V = Q / A =$	1.22
Channel Shear Stress (Te)	
$Td = 62.4 * \text{Depth} * \text{Slope} =$	0.27
Channel Safety Factor = (Tp / Td)	6.57
Effective Stress on Blanket(Tdb)	
$Te = Td * (1 - CF) * (ns/n)^2 =$	0
CF =	0
ns =	0

Soil Safety Factor	
Allowable Soil Shear (Ta) =	0
Soil Safety Factor = Ta / Te =	0
Conclusion: Stability of Mat	STABLE

Material Type	
Matting Type	Unreinforced Vegetation
Manning's N value for selected Product	0.2
Cross-Sectional Area (A)	
A = AL + AB + AR =	1.8
AL = (1/2) * Depth ² * ZL =	0.33
AB = Bottom Width * Depth =	1.14
AR = (1/2) * Depth ² * ZR =	0.33
Wetted Perimeter (P)	
P = PL + PB + PR =	4.56
PL = Depth * (ZL ² + 1)0.5 =	1.28
PB = Channel Bottom Width =	2
PR = Depth * (ZR ² + 1)0.5 =	1.28
Hydraulic Radius (R)	
R = A / P =	0.39
Flow (Q)	
Q = 1.486 / n * A * R ^{2/3} * S ^{1/2} =	0.89
Velocity (V)	
V = Q / A =	0.5
Channel Shear Stress (Te)	
Td = 62.4 * Depth * Slope =	0.54
Channel Safety Factor = (Tp / Td)	7.85
Effective Stress on Blanket(Tdb)	
Te = Td * (1-CF) * (ns/n) ² =	0
CF =	0.75
ns =	0.02
Soil Safety Factor	
Allowable Soil Shear (Ta) =	0.04
Soil Safety Factor = Ta / Te =	41.98
Conclusion: Stability of Mat	STABLE
Conclusion: Stability of Underlying soil	

Side Slope Liner Results

APPENDIX F

BASIN SPILLWAY BLOCKED CALCULATIONS

Scenario: Post-Development 1 year

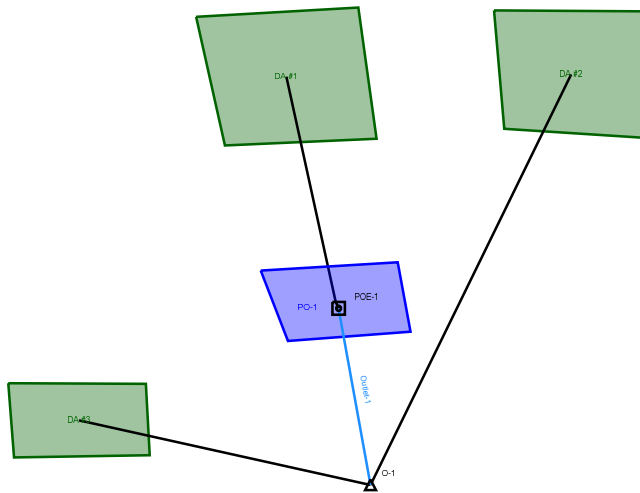


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TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
DA #1	Post-Development 1 year	1	0.321	11.950	5.72
DA #1	Post-Development 2 year	2	0.421	11.950	7.42
DA #1	Post-Development 5 year	5	0.581	11.950	10.08
DA #1	Post-Development 10 year	10	0.718	11.950	12.32
DA #1	Post-Development 25 year	25	0.924	11.950	15.63
DA #1	Post-Development 50 year	50	1.101	11.950	18.41
DA #1	Post-Development 100 year	100	1.295	11.950	21.45
DA #3	Post-Development 1 year	1	0.064	12.050	0.94
DA #3	Post-Development 2 year	2	0.096	12.000	1.51
DA #3	Post-Development 5 year	5	0.154	12.000	2.48
DA #3	Post-Development 10 year	10	0.207	12.000	3.36
DA #3	Post-Development 25 year	25	0.291	12.000	4.74
DA #3	Post-Development 50 year	50	0.366	12.000	5.95
DA #3	Post-Development 100 year	100	0.451	12.000	7.30
DA #2	Post-Development 1 year	1	0.040	12.200	0.38
DA #2	Post-Development 2 year	2	0.062	12.150	0.64
DA #2	Post-Development 5 year	5	0.101	12.150	1.10
DA #2	Post-Development 10 year	10	0.137	12.150	1.53
DA #2	Post-Development 25 year	25	0.195	12.150	2.20
DA #2	Post-Development 50 year	50	0.246	12.150	2.80
DA #2	Post-Development 100 year	100	0.305	12.150	3.47

Node Summary

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
O-1	Post-Development 1 year	1	0.103	12.050	1.23
O-1	Post-Development 2 year	2	0.158	12.050	1.98
O-1	Post-Development 5 year	5	0.254	12.050	3.29
O-1	Post-Development 10 year	10	0.368	12.050	4.48
O-1	Post-Development 25 year	25	0.715	12.000	6.36
O-1	Post-Development 50 year	50	1.017	12.000	8.05
O-1	Post-Development 100 year	100	1.353	12.050	10.47

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PO-1 (IN)	Post-Development 1 year	1	0.321	11.950	5.72	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 1 year	1	0.000	0.000	0.00	108.53	0.321
PO-1 (IN)	Post-Development 2 year	2	0.421	11.950	7.42	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 2 year	2	0.000	0.000	0.00	108.66	0.419
PO-1 (IN)	Post-Development 5 year	5	0.581	11.950	10.08	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 5 year	5	0.000	0.000	0.00	108.87	0.579
PO-1 (IN)	Post-Development 10 year	10	0.718	11.950	12.32	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 10 year	10	0.025	23.750	0.12	109.01	0.692

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PO-1 (IN)	Post-Development 25 year	25	0.924	11.950	15.63	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 25 year	25	0.230	14.950	0.42	109.03	0.711
PO-1 (IN)	Post-Development 50 year	50	1.101	11.950	18.41	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 50 year	50	0.404	13.100	0.96	109.08	0.745
PO-1 (IN)	Post-Development 100 year	100	1.295	11.950	21.45	(N/A)	(N/A)
PO-1 (OUT)	Post-Development 100 year	100	0.597	12.500	1.99	109.16	0.811

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Addition Summary

Label: O-1

Return Event: 1 years

Storm Event: 1 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.064	12.050	0.94
Flow (From)	DA #2	0.040	12.200	0.38
Flow (From)	Outlet-1	0.000	0.000	0.00
Flow (In)	O-1	0.103	12.050	1.23

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Addition Summary
 Label: O-1

Return Event: 2 years
 Storm Event: 2 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.096	12.000	1.51
Flow (From)	DA #2	0.062	12.150	0.64
Flow (From)	Outlet-1	0.000	0.000	0.00
Flow (In)	O-1	0.158	12.050	1.98

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Addition Summary

Label: O-1

Return Event: 5 years

Storm Event: 5 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.154	12.000	2.48
Flow (From)	DA #2	0.101	12.150	1.10
Flow (From)	Outlet-1	0.000	0.000	0.00
Flow (In)	O-1	0.254	12.050	3.29

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Addition Summary

Label: O-1

Return Event: 10 years

Storm Event: 10 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.207	12.000	3.36
Flow (From)	DA #2	0.137	12.150	1.53
Flow (From)	Outlet-1	0.025	23.750	0.12
Flow (In)	O-1	0.368	12.050	4.48

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Addition Summary
 Label: O-1

Return Event: 25 years
 Storm Event: 25 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.291	12.000	4.74
Flow (From)	DA #2	0.195	12.150	2.20
Flow (From)	Outlet-1	0.230	14.950	0.42
Flow (In)	O-1	0.715	12.000	6.36

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Addition Summary
 Label: O-1

Return Event: 50 years
 Storm Event: 50 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.366	12.000	5.95
Flow (From)	DA #2	0.246	12.150	2.80
Flow (From)	Outlet-1	0.404	13.100	0.96
Flow (In)	O-1	1.017	12.000	8.05

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Addition Summary
 Label: O-1

Return Event: 100 years
 Storm Event: 100 Year

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA #3
<Catchment to Outflow Node>	DA #2
Outlet-1	PO-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	DA #3	0.451	12.000	7.30
Flow (From)	DA #2	0.305	12.150	3.47
Flow (From)	Outlet-1	0.597	12.500	1.99
Flow (In)	O-1	1.353	12.050	10.47

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 1 years
 Storm Event: 1 Year

Peak Discharge	0.00 ft ³ /s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ac-ft

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
0.000	0.00	0.00	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 2 years
 Storm Event: 2 Year

Peak Discharge	0.00 ft ³ /s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ac-ft

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
0.000	0.00	0.00	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 5 years
 Storm Event: 5 Year

Peak Discharge	0.00 ft ³ /s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ac-ft

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
0.000	0.00	0.00	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 10 years
 Storm Event: 10 Year

Peak Discharge	0.12 ft ³ /s
Time to Peak	23.750 hours
Hydrograph Volume	0.025 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
20.900	0.00	0.01	0.02	0.02	0.03
21.150	0.04	0.04	0.05	0.05	0.06
21.400	0.06	0.07	0.07	0.07	0.08
21.650	0.08	0.08	0.09	0.09	0.09
21.900	0.10	0.10	0.10	0.10	0.10
22.150	0.11	0.11	0.11	0.11	0.11
22.400	0.11	0.11	0.11	0.12	0.12
22.650	0.12	0.12	0.12	0.12	0.12
22.900	0.12	0.12	0.12	0.12	0.12
23.150	0.12	0.12	0.12	0.12	0.12
23.400	0.12	0.12	0.12	0.12	0.12
23.650	0.12	0.12	0.12	0.12	0.12
23.900	0.12	0.12	0.12	(N/A)	(N/A)

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 25 years
 Storm Event: 25 Year

Peak Discharge	0.42 ft ³ /s
Time to Peak	14.950 hours
Hydrograph Volume	0.230 ac-ft

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
13.300	0.00	0.02	0.07	0.10	0.14
13.550	0.17	0.20	0.22	0.25	0.27
13.800	0.29	0.30	0.32	0.33	0.34
14.050	0.35	0.36	0.37	0.38	0.38
14.300	0.39	0.40	0.40	0.40	0.41
14.550	0.41	0.41	0.42	0.42	0.42
14.800	0.42	0.42	0.42	0.42	0.42
15.050	0.42	0.42	0.42	0.42	0.42
15.300	0.41	0.41	0.41	0.41	0.41
15.550	0.40	0.40	0.40	0.40	0.39
15.800	0.39	0.39	0.38	0.38	0.38
16.050	0.37	0.37	0.37	0.36	0.36
16.300	0.36	0.35	0.35	0.35	0.34
16.550	0.34	0.34	0.34	0.33	0.33
16.800	0.33	0.33	0.32	0.32	0.32
17.050	0.32	0.32	0.31	0.31	0.31
17.300	0.31	0.30	0.30	0.30	0.30
17.550	0.30	0.29	0.29	0.29	0.29
17.800	0.29	0.28	0.28	0.28	0.28
18.050	0.28	0.28	0.27	0.27	0.27
18.300	0.27	0.27	0.26	0.26	0.26
18.550	0.26	0.26	0.26	0.25	0.25
18.800	0.25	0.25	0.25	0.24	0.24
19.050	0.24	0.24	0.24	0.24	0.23
19.300	0.23	0.23	0.23	0.23	0.23
19.550	0.22	0.22	0.22	0.22	0.22
19.800	0.22	0.21	0.21	0.21	0.21
20.050	0.21	0.21	0.20	0.20	0.20
20.300	0.20	0.20	0.20	0.20	0.19
20.550	0.19	0.19	0.19	0.19	0.19
20.800	0.19	0.19	0.19	0.19	0.18
21.050	0.18	0.18	0.18	0.18	0.18
21.300	0.18	0.18	0.18	0.18	0.18
21.550	0.18	0.18	0.18	0.18	0.17
21.800	0.17	0.17	0.17	0.17	0.17
22.050	0.17	0.17	0.17	0.17	0.17
22.300	0.17	0.17	0.17	0.17	0.17

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Diverted Hydrograph
Label: Outlet-1

Return Event: 25 years
Storm Event: 25 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
22.550	0.17	0.17	0.17	0.17	0.17
22.800	0.17	0.17	0.17	0.16	0.16
23.050	0.16	0.16	0.16	0.16	0.16
23.300	0.16	0.16	0.16	0.16	0.16
23.550	0.16	0.16	0.16	0.16	0.16
23.800	0.16	0.16	0.16	0.16	0.16

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 50 years
 Storm Event: 50 Year

Peak Discharge	0.96 ft ³ /s
Time to Peak	13.100 hours
Hydrograph Volume	0.404 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
12.150	0.00	0.05	0.22	0.36	0.48
12.400	0.57	0.66	0.72	0.77	0.81
12.650	0.85	0.87	0.90	0.92	0.93
12.900	0.94	0.95	0.96	0.96	0.96
13.150	0.96	0.96	0.96	0.95	0.95
13.400	0.94	0.93	0.92	0.91	0.90
13.650	0.89	0.88	0.87	0.86	0.85
13.900	0.84	0.82	0.81	0.80	0.79
14.150	0.78	0.76	0.75	0.74	0.73
14.400	0.72	0.71	0.70	0.69	0.68
14.650	0.67	0.66	0.65	0.64	0.64
14.900	0.63	0.62	0.61	0.60	0.60
15.150	0.59	0.58	0.57	0.57	0.56
15.400	0.55	0.55	0.54	0.53	0.53
15.650	0.52	0.51	0.51	0.50	0.49
15.900	0.49	0.48	0.47	0.47	0.46
16.150	0.46	0.45	0.45	0.44	0.44
16.400	0.43	0.43	0.42	0.42	0.41
16.650	0.41	0.40	0.40	0.40	0.39
16.900	0.39	0.39	0.38	0.38	0.38
17.150	0.37	0.37	0.37	0.36	0.36
17.400	0.36	0.36	0.35	0.35	0.35
17.650	0.35	0.34	0.34	0.34	0.34
17.900	0.33	0.33	0.33	0.33	0.32
18.150	0.32	0.32	0.32	0.31	0.31
18.400	0.31	0.31	0.31	0.30	0.30
18.650	0.30	0.30	0.29	0.29	0.29
18.900	0.29	0.29	0.28	0.28	0.28
19.150	0.28	0.28	0.27	0.27	0.27
19.400	0.27	0.27	0.26	0.26	0.26
19.650	0.26	0.26	0.25	0.25	0.25
19.900	0.25	0.25	0.24	0.24	0.24
20.150	0.24	0.24	0.23	0.23	0.23
20.400	0.23	0.23	0.23	0.22	0.22
20.650	0.22	0.22	0.22	0.22	0.22
20.900	0.22	0.22	0.21	0.21	0.21
21.150	0.21	0.21	0.21	0.21	0.21

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 50 years
 Storm Event: 50 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
21.400	0.21	0.21	0.21	0.21	0.21
21.650	0.20	0.20	0.20	0.20	0.20
21.900	0.20	0.20	0.20	0.20	0.20
22.150	0.20	0.20	0.20	0.20	0.20
22.400	0.20	0.20	0.20	0.20	0.19
22.650	0.19	0.19	0.19	0.19	0.19
22.900	0.19	0.19	0.19	0.19	0.19
23.150	0.19	0.19	0.19	0.19	0.19
23.400	0.19	0.19	0.19	0.19	0.19
23.650	0.19	0.19	0.18	0.18	0.18
23.900	0.18	0.18	0.18	(N/A)	(N/A)

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 100 years
 Storm Event: 100 Year

Peak Discharge	1.99 ft ³ /s
Time to Peak	12.500 hours
Hydrograph Volume	0.597 ac-ft

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
12.000	0.00	0.64	1.27	1.58	1.73
12.250	1.83	1.89	1.94	1.97	1.98
12.500	1.99	1.98	1.96	1.94	1.91
12.750	1.89	1.86	1.83	1.80	1.76
13.000	1.73	1.70	1.66	1.63	1.60
13.250	1.56	1.53	1.50	1.47	1.44
13.500	1.40	1.37	1.34	1.31	1.28
13.750	1.26	1.23	1.20	1.17	1.15
14.000	1.12	1.10	1.07	1.05	1.03
14.250	1.00	0.98	0.96	0.94	0.92
14.500	0.91	0.89	0.87	0.86	0.84
14.750	0.83	0.81	0.80	0.79	0.77
15.000	0.76	0.75	0.74	0.72	0.71
15.250	0.70	0.69	0.68	0.67	0.66
15.500	0.65	0.64	0.63	0.62	0.61
15.750	0.61	0.60	0.59	0.58	0.57
16.000	0.56	0.56	0.55	0.54	0.53
16.250	0.53	0.52	0.51	0.51	0.50
16.500	0.49	0.49	0.48	0.48	0.47
16.750	0.47	0.46	0.46	0.46	0.45
17.000	0.45	0.44	0.44	0.43	0.43
17.250	0.43	0.42	0.42	0.42	0.41
17.500	0.41	0.41	0.40	0.40	0.40
17.750	0.39	0.39	0.39	0.39	0.38
18.000	0.38	0.38	0.37	0.37	0.37
18.250	0.37	0.36	0.36	0.36	0.36
18.500	0.35	0.35	0.35	0.35	0.34
18.750	0.34	0.34	0.34	0.33	0.33
19.000	0.33	0.33	0.32	0.32	0.32
19.250	0.32	0.31	0.31	0.31	0.31
19.500	0.30	0.30	0.30	0.30	0.29
19.750	0.29	0.29	0.29	0.29	0.28
20.000	0.28	0.28	0.28	0.27	0.27
20.250	0.27	0.27	0.27	0.26	0.26
20.500	0.26	0.26	0.26	0.26	0.25
20.750	0.25	0.25	0.25	0.25	0.25
21.000	0.25	0.25	0.25	0.24	0.24

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Diverted Hydrograph
 Label: Outlet-1

Return Event: 100 years
 Storm Event: 100 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
21.250	0.24	0.24	0.24	0.24	0.24
21.500	0.24	0.24	0.24	0.24	0.24
21.750	0.23	0.23	0.23	0.23	0.23
22.000	0.23	0.23	0.23	0.23	0.23
22.250	0.23	0.23	0.23	0.23	0.23
22.500	0.23	0.23	0.22	0.22	0.22
22.750	0.22	0.22	0.22	0.22	0.22
23.000	0.22	0.22	0.22	0.22	0.22
23.250	0.22	0.22	0.22	0.22	0.22
23.500	0.22	0.22	0.21	0.21	0.21
23.750	0.21	0.21	0.21	0.21	0.21
24.000	0.21	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Elevation-Volume-Flow Table (Pond)

Return Event: 1 years

Label: PO-1

Storm Event: 1 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	108.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
108.00	0.00	0.000	0.103	0.00	0.00	0.00
108.50	0.00	0.297	0.755	0.00	0.00	143.85
109.00	0.00	0.684	0.793	0.00	0.00	331.15
109.50	6.36	1.112	0.918	0.00	6.36	544.41
110.00	18.00	1.604	1.053	0.00	18.00	794.40

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 1 years
 Storm Event: 1 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00	ft	
Volume (Initial)	0.000	ac-ft	
Flow (Initial Outlet)	0.00	ft ³ /s	
Flow (Initial Infiltration)	0.00	ft ³ /s	
Flow (Initial, Total)	0.00	ft ³ /s	
Time Increment	0.050	hours	
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	5.72	ft ³ /s	Time to Peak (Flow, In) 11.950 hours
Flow (Peak Outlet)	0.00	ft ³ /s	Time to Peak (Flow, Outlet) 0.000 hours
Peak Conditions			
Elevation (Water Surface, Peak)	108.53	ft	
Volume (Peak)	0.321	ac-ft	
Mass Balance (ac-ft)			
Volume (Initial)	0.000	ac-ft	
Volume (Total Inflow)	0.321	ac-ft	
Volume (Total Infiltration)	0.000	ac-ft	
Volume (Total Outlet Outflow)	0.000	ac-ft	
Volume (Retained)	0.321	ac-ft	
Volume (Unrouted)	-0.001	ac-ft	
Error (Mass Balance)	0.2	%	

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 2 years
 Storm Event: 2 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00	ft	
Volume (Initial)	0.000	ac-ft	
Flow (Initial Outlet)	0.00	ft ³ /s	
Flow (Initial Infiltration)	0.00	ft ³ /s	
Flow (Initial, Total)	0.00	ft ³ /s	
Time Increment	0.050	hours	
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	7.42	ft ³ /s	Time to Peak (Flow, In) 11.950 hours
Flow (Peak Outlet)	0.00	ft ³ /s	Time to Peak (Flow, Outlet) 0.000 hours
Peak Conditions			
Elevation (Water Surface, Peak)	108.66	ft	
Volume (Peak)	0.419	ac-ft	
Mass Balance (ac-ft)			
Volume (Initial)	0.000	ac-ft	
Volume (Total Inflow)	0.421	ac-ft	
Volume (Total Infiltration)	0.000	ac-ft	
Volume (Total Outlet Outflow)	0.000	ac-ft	
Volume (Retained)	0.419	ac-ft	
Volume (Unrouted)	-0.002	ac-ft	
Error (Mass Balance)	0.5	%	

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 5 years
 Storm Event: 5 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00	ft	
Volume (Initial)	0.000	ac-ft	
Flow (Initial Outlet)	0.00	ft ³ /s	
Flow (Initial Infiltration)	0.00	ft ³ /s	
Flow (Initial, Total)	0.00	ft ³ /s	
Time Increment	0.050	hours	
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	10.08	ft ³ /s	Time to Peak (Flow, In) 11.950 hours
Flow (Peak Outlet)	0.00	ft ³ /s	Time to Peak (Flow, Outlet) 0.000 hours
Peak Conditions			
Elevation (Water Surface, Peak)	108.87	ft	
Volume (Peak)	0.579	ac-ft	
Mass Balance (ac-ft)			
Volume (Initial)	0.000	ac-ft	
Volume (Total Inflow)	0.581	ac-ft	
Volume (Total Infiltration)	0.000	ac-ft	
Volume (Total Outlet Outflow)	0.000	ac-ft	
Volume (Retained)	0.579	ac-ft	
Volume (Unrouted)	-0.002	ac-ft	
Error (Mass Balance)	0.3	%	

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 10 years
 Storm Event: 10 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00 ft		
Volume (Initial)	0.000 ac-ft		
Flow (Initial Outlet)	0.00 ft ³ /s		
Flow (Initial Infiltration)	0.00 ft ³ /s		
Flow (Initial, Total)	0.00 ft ³ /s		
Time Increment	0.050 hours		
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	12.32 ft ³ /s	Time to Peak (Flow, In)	11.950 hours
Flow (Peak Outlet)	0.12 ft ³ /s	Time to Peak (Flow, Outlet)	23.750 hours
Peak Conditions			
Elevation (Water Surface, Peak)	109.01 ft		
Volume (Peak)	0.692 ac-ft		
Mass Balance (ac-ft)			
Volume (Initial)	0.000 ac-ft		
Volume (Total Inflow)	0.718 ac-ft		
Volume (Total Infiltration)	0.000 ac-ft		
Volume (Total Outlet Outflow)	0.025 ac-ft		
Volume (Retained)	0.691 ac-ft		
Volume (Unrouted)	-0.001 ac-ft		
Error (Mass Balance)	0.1 %		

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 25 years
 Storm Event: 25 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00 ft		
Volume (Initial)	0.000 ac-ft		
Flow (Initial Outlet)	0.00 ft ³ /s		
Flow (Initial Infiltration)	0.00 ft ³ /s		
Flow (Initial, Total)	0.00 ft ³ /s		
Time Increment	0.050 hours		
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	15.63 ft ³ /s	Time to Peak (Flow, In)	11.950 hours
Flow (Peak Outlet)	0.42 ft ³ /s	Time to Peak (Flow, Outlet)	14.950 hours
Peak Conditions			
Elevation (Water Surface, Peak)	109.03 ft		
Volume (Peak)	0.711 ac-ft		
Mass Balance (ac-ft)			
Volume (Initial)	0.000 ac-ft		
Volume (Total Inflow)	0.924 ac-ft		
Volume (Total Infiltration)	0.000 ac-ft		
Volume (Total Outlet Outflow)	0.230 ac-ft		
Volume (Retained)	0.693 ac-ft		
Volume (Unrouted)	-0.001 ac-ft		
Error (Mass Balance)	0.1 %		

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 50 years
 Storm Event: 50 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00 ft		
Volume (Initial)	0.000 ac-ft		
Flow (Initial Outlet)	0.00 ft ³ /s		
Flow (Initial Infiltration)	0.00 ft ³ /s		
Flow (Initial, Total)	0.00 ft ³ /s		
Time Increment	0.050 hours		
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	18.41 ft ³ /s	Time to Peak (Flow, In)	11.950 hours
Flow (Peak Outlet)	0.96 ft ³ /s	Time to Peak (Flow, Outlet)	13.100 hours
Peak Conditions			
Elevation (Water Surface, Peak)	109.08 ft		
Volume (Peak)	0.745 ac-ft		
Mass Balance (ac-ft)			
Volume (Initial)	0.000 ac-ft		
Volume (Total Inflow)	1.101 ac-ft		
Volume (Total Infiltration)	0.000 ac-ft		
Volume (Total Outlet Outflow)	0.404 ac-ft		
Volume (Retained)	0.695 ac-ft		
Volume (Unrouted)	-0.002 ac-ft		
Error (Mass Balance)	0.1 %		

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Level Pool Pond Routing Summary
 Label: PO-1 (IN)

Return Event: 100 years
 Storm Event: 100 Year

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	108.00	ft	
Volume (Initial)	0.000	ac-ft	
Flow (Initial Outlet)	0.00	ft ³ /s	
Flow (Initial Infiltration)	0.00	ft ³ /s	
Flow (Initial, Total)	0.00	ft ³ /s	
Time Increment	0.050	hours	
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	21.45	ft ³ /s	Time to Peak (Flow, In) 11.950 hours
Flow (Peak Outlet)	1.99	ft ³ /s	Time to Peak (Flow, Outlet) 12.500 hours
Peak Conditions			
Elevation (Water Surface, Peak)	109.16	ft	
Volume (Peak)	0.811	ac-ft	
Mass Balance (ac-ft)			
Volume (Initial)	0.000	ac-ft	
Volume (Total Inflow)	1.295	ac-ft	
Volume (Total Infiltration)	0.000	ac-ft	
Volume (Total Outlet Outflow)	0.597	ac-ft	
Volume (Retained)	0.697	ac-ft	
Volume (Unrouted)	-0.002	ac-ft	
Error (Mass Balance)	0.1	%	

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 1 years
 Storm Event: 1 Year

Peak Discharge	0.00 ft ³ /s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
0.000	0.00	0.00	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 2 years
 Storm Event: 2 Year

Peak Discharge	0.00 ft ³ /s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ac-ft

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
0.000	0.00	0.00	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 5 years
 Storm Event: 5 Year

Peak Discharge	0.00 ft ³ /s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
0.000	0.00	0.00	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Pond Routed Hydrograph (total out)

Return Event: 10 years

Label: PO-1 (OUT)

Storm Event: 10 Year

Peak Discharge	0.12 ft ³ /s
Time to Peak	23.750 hours
Hydrograph Volume	0.025 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
20.900	0.00	0.01	0.02	0.02	0.03
21.150	0.04	0.04	0.05	0.05	0.06
21.400	0.06	0.07	0.07	0.07	0.08
21.650	0.08	0.08	0.09	0.09	0.09
21.900	0.10	0.10	0.10	0.10	0.10
22.150	0.11	0.11	0.11	0.11	0.11
22.400	0.11	0.11	0.11	0.12	0.12
22.650	0.12	0.12	0.12	0.12	0.12
22.900	0.12	0.12	0.12	0.12	0.12
23.150	0.12	0.12	0.12	0.12	0.12
23.400	0.12	0.12	0.12	0.12	0.12
23.650	0.12	0.12	0.12	0.12	0.12
23.900	0.12	0.12	0.12	(N/A)	(N/A)

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 25 years
 Storm Event: 25 Year

Peak Discharge	0.42 ft ³ /s
Time to Peak	14.950 hours
Hydrograph Volume	0.230 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
13.300	0.00	0.02	0.07	0.10	0.14
13.550	0.17	0.20	0.22	0.25	0.27
13.800	0.29	0.30	0.32	0.33	0.34
14.050	0.35	0.36	0.37	0.38	0.38
14.300	0.39	0.40	0.40	0.40	0.41
14.550	0.41	0.41	0.42	0.42	0.42
14.800	0.42	0.42	0.42	0.42	0.42
15.050	0.42	0.42	0.42	0.42	0.42
15.300	0.41	0.41	0.41	0.41	0.41
15.550	0.40	0.40	0.40	0.40	0.39
15.800	0.39	0.39	0.38	0.38	0.38
16.050	0.37	0.37	0.37	0.36	0.36
16.300	0.36	0.35	0.35	0.35	0.34
16.550	0.34	0.34	0.34	0.33	0.33
16.800	0.33	0.33	0.32	0.32	0.32
17.050	0.32	0.32	0.31	0.31	0.31
17.300	0.31	0.30	0.30	0.30	0.30
17.550	0.30	0.29	0.29	0.29	0.29
17.800	0.29	0.28	0.28	0.28	0.28
18.050	0.28	0.28	0.27	0.27	0.27
18.300	0.27	0.27	0.26	0.26	0.26
18.550	0.26	0.26	0.26	0.25	0.25
18.800	0.25	0.25	0.25	0.24	0.24
19.050	0.24	0.24	0.24	0.24	0.23
19.300	0.23	0.23	0.23	0.23	0.23
19.550	0.22	0.22	0.22	0.22	0.22
19.800	0.22	0.21	0.21	0.21	0.21
20.050	0.21	0.21	0.20	0.20	0.20
20.300	0.20	0.20	0.20	0.20	0.19
20.550	0.19	0.19	0.19	0.19	0.19
20.800	0.19	0.19	0.19	0.19	0.18
21.050	0.18	0.18	0.18	0.18	0.18
21.300	0.18	0.18	0.18	0.18	0.18
21.550	0.18	0.18	0.18	0.18	0.17
21.800	0.17	0.17	0.17	0.17	0.17
22.050	0.17	0.17	0.17	0.17	0.17
22.300	0.17	0.17	0.17	0.17	0.17

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Pond Routed Hydrograph (total out)

Label: PO-1 (OUT)

Return Event: 25 years

Storm Event: 25 Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
22.550	0.17	0.17	0.17	0.17	0.17
22.800	0.17	0.17	0.17	0.16	0.16
23.050	0.16	0.16	0.16	0.16	0.16
23.300	0.16	0.16	0.16	0.16	0.16
23.550	0.16	0.16	0.16	0.16	0.16
23.800	0.16	0.16	0.16	0.16	0.16

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 50 years
 Storm Event: 50 Year

Peak Discharge	0.96 ft ³ /s
Time to Peak	13.100 hours
Hydrograph Volume	0.404 ac-ft

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
12.150	0.00	0.05	0.22	0.36	0.48
12.400	0.57	0.66	0.72	0.77	0.81
12.650	0.85	0.87	0.90	0.92	0.93
12.900	0.94	0.95	0.96	0.96	0.96
13.150	0.96	0.96	0.96	0.95	0.95
13.400	0.94	0.93	0.92	0.91	0.90
13.650	0.89	0.88	0.87	0.86	0.85
13.900	0.84	0.82	0.81	0.80	0.79
14.150	0.78	0.76	0.75	0.74	0.73
14.400	0.72	0.71	0.70	0.69	0.68
14.650	0.67	0.66	0.65	0.64	0.64
14.900	0.63	0.62	0.61	0.60	0.60
15.150	0.59	0.58	0.57	0.57	0.56
15.400	0.55	0.55	0.54	0.53	0.53
15.650	0.52	0.51	0.51	0.50	0.49
15.900	0.49	0.48	0.47	0.47	0.46
16.150	0.46	0.45	0.45	0.44	0.44
16.400	0.43	0.43	0.42	0.42	0.41
16.650	0.41	0.40	0.40	0.40	0.39
16.900	0.39	0.39	0.38	0.38	0.38
17.150	0.37	0.37	0.37	0.36	0.36
17.400	0.36	0.36	0.35	0.35	0.35
17.650	0.35	0.34	0.34	0.34	0.34
17.900	0.33	0.33	0.33	0.33	0.32
18.150	0.32	0.32	0.32	0.31	0.31
18.400	0.31	0.31	0.31	0.30	0.30
18.650	0.30	0.30	0.29	0.29	0.29
18.900	0.29	0.29	0.28	0.28	0.28
19.150	0.28	0.28	0.27	0.27	0.27
19.400	0.27	0.27	0.26	0.26	0.26
19.650	0.26	0.26	0.25	0.25	0.25
19.900	0.25	0.25	0.24	0.24	0.24
20.150	0.24	0.24	0.23	0.23	0.23
20.400	0.23	0.23	0.23	0.22	0.22
20.650	0.22	0.22	0.22	0.22	0.22
20.900	0.22	0.22	0.21	0.21	0.21
21.150	0.21	0.21	0.21	0.21	0.21

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 50 years
 Storm Event: 50 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
21.400	0.21	0.21	0.21	0.21	0.21
21.650	0.20	0.20	0.20	0.20	0.20
21.900	0.20	0.20	0.20	0.20	0.20
22.150	0.20	0.20	0.20	0.20	0.20
22.400	0.20	0.20	0.20	0.20	0.19
22.650	0.19	0.19	0.19	0.19	0.19
22.900	0.19	0.19	0.19	0.19	0.19
23.150	0.19	0.19	0.19	0.19	0.19
23.400	0.19	0.19	0.19	0.19	0.19
23.650	0.19	0.19	0.18	0.18	0.18
23.900	0.18	0.18	0.18	(N/A)	(N/A)

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 100 years
 Storm Event: 100 Year

Peak Discharge	1.99 ft ³ /s
Time to Peak	12.500 hours
Hydrograph Volume	0.597 ac-ft

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
12.000	0.00	0.64	1.27	1.58	1.73
12.250	1.83	1.89	1.94	1.97	1.98
12.500	1.99	1.98	1.96	1.94	1.91
12.750	1.89	1.86	1.83	1.80	1.76
13.000	1.73	1.70	1.66	1.63	1.60
13.250	1.56	1.53	1.50	1.47	1.44
13.500	1.40	1.37	1.34	1.31	1.28
13.750	1.26	1.23	1.20	1.17	1.15
14.000	1.12	1.10	1.07	1.05	1.03
14.250	1.00	0.98	0.96	0.94	0.92
14.500	0.91	0.89	0.87	0.86	0.84
14.750	0.83	0.81	0.80	0.79	0.77
15.000	0.76	0.75	0.74	0.72	0.71
15.250	0.70	0.69	0.68	0.67	0.66
15.500	0.65	0.64	0.63	0.62	0.61
15.750	0.61	0.60	0.59	0.58	0.57
16.000	0.56	0.56	0.55	0.54	0.53
16.250	0.53	0.52	0.51	0.51	0.50
16.500	0.49	0.49	0.48	0.48	0.47
16.750	0.47	0.46	0.46	0.46	0.45
17.000	0.45	0.44	0.44	0.43	0.43
17.250	0.43	0.42	0.42	0.42	0.41
17.500	0.41	0.41	0.40	0.40	0.40
17.750	0.39	0.39	0.39	0.39	0.38
18.000	0.38	0.38	0.37	0.37	0.37
18.250	0.37	0.36	0.36	0.36	0.36
18.500	0.35	0.35	0.35	0.35	0.34
18.750	0.34	0.34	0.34	0.33	0.33
19.000	0.33	0.33	0.32	0.32	0.32
19.250	0.32	0.31	0.31	0.31	0.31
19.500	0.30	0.30	0.30	0.30	0.29
19.750	0.29	0.29	0.29	0.29	0.28
20.000	0.28	0.28	0.28	0.27	0.27
20.250	0.27	0.27	0.27	0.26	0.26
20.500	0.26	0.26	0.26	0.26	0.25
20.750	0.25	0.25	0.25	0.25	0.25
21.000	0.25	0.25	0.25	0.24	0.24

TWIN OAKS ME2 - SPILLWAY BLOCKED

Subsection: Pond Routed Hydrograph (total out)
 Label: PO-1 (OUT)

Return Event: 100 years
 Storm Event: 100 Year

HYDROGRAPH ORDINATES (ft³/s) Output Time Increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
21.250	0.24	0.24	0.24	0.24	0.24
21.500	0.24	0.24	0.24	0.24	0.24
21.750	0.23	0.23	0.23	0.23	0.23
22.000	0.23	0.23	0.23	0.23	0.23
22.250	0.23	0.23	0.23	0.23	0.23
22.500	0.23	0.23	0.22	0.22	0.22
22.750	0.22	0.22	0.22	0.22	0.22
23.000	0.22	0.22	0.22	0.22	0.22
23.250	0.22	0.22	0.22	0.22	0.22
23.500	0.22	0.22	0.21	0.21	0.21
23.750	0.21	0.21	0.21	0.21	0.21
24.000	0.21	(N/A)	(N/A)	(N/A)	(N/A)

TWIN OAKS ME2 - SPILLWAY BLOCKED

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INFILTRATION TESTING REPORT



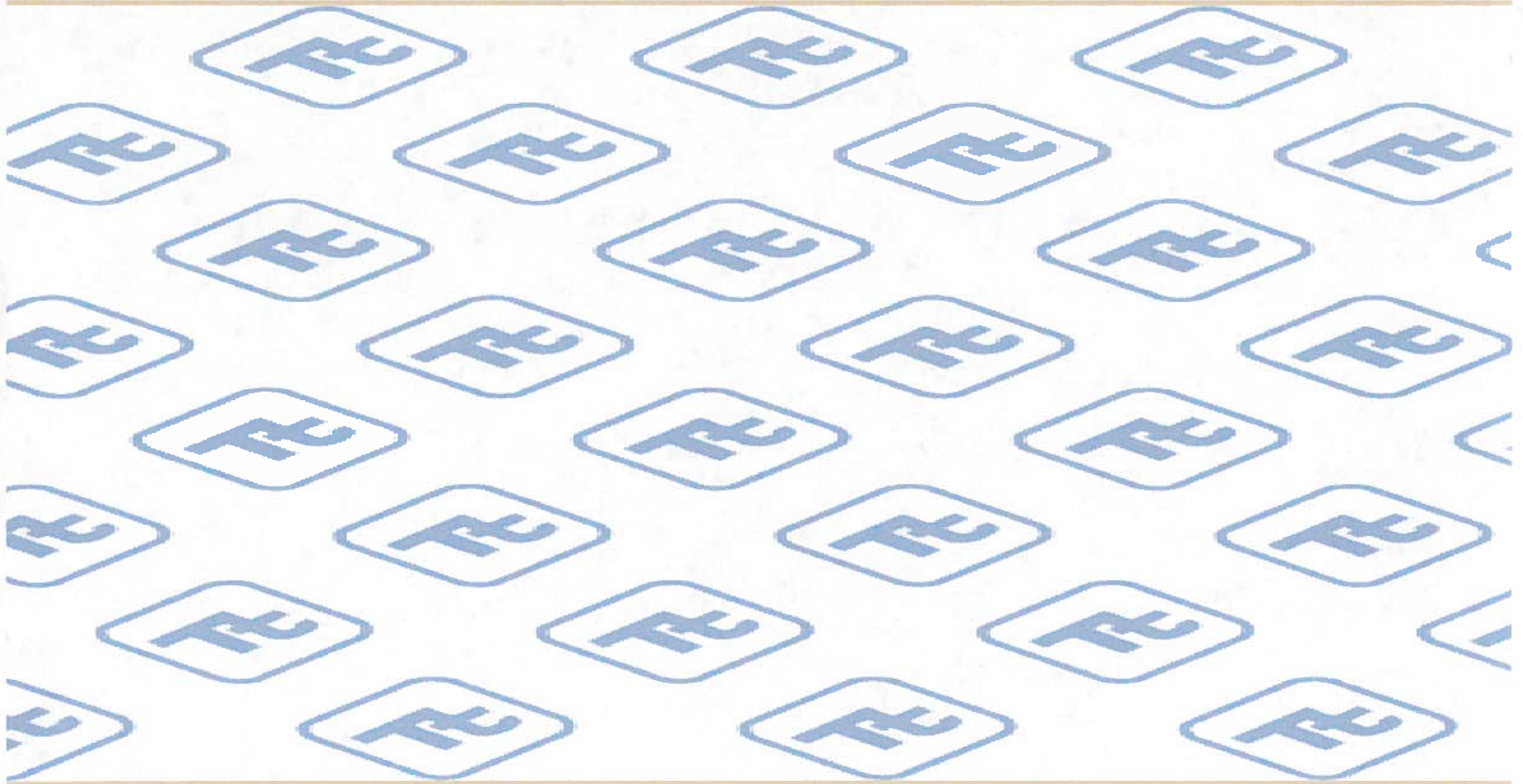
TETRA TECH

Geotechnical Subsurface Investigation Report

Twin Oaks Station

Mariner East Pipeline Project

Sunoco Pipeline LP



Prepared for:

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103IP2762

October 2013

Geotechnical Subsurface Investigation Report

Twin Oaks Station
Mariner East Pipeline Project
Sunoco Pipeline, LP

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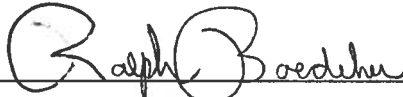
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1.0 INTRODUCTION

This report presents results of a geotechnical subsurface investigation performed for the proposed Sunoco Twin Oaks Station off of Conchester Highway (State Route 322) in Delaware County, Commonwealth of Pennsylvania. Purposes of this study were to investigate subsurface conditions within the project site, formulate foundation design criteria for the proposed site development, and offer pertinent geotechnical site recommendations for construction.

This geotechnical study represents an evaluation of subsurface conditions within the project site, and offers recommendations based on an exploration of subsurface soil conditions by means of Standard Penetration Test (SPT) Borings (ASTM D1586). The scope of this investigation included a test boring program, laboratory testing of representative soil samples, engineering analyses of the available data, and preparation of this engineering report. These services were provided under the supervision of a professional geotechnical engineer registered in the Commonwealth of Pennsylvania.

2.0 DESCRIPTIONS, INVESTIGATIONS, AND SUBSURFACE CONDITIONS

2.1 *General Site Description and Proposed Facility Development*

Proposed site development plans were provided to Tetra Tech, Inc. (Tetra Tech) by Rooney Engineering, Inc. (REI). The area of investigation is within an open, grass-covered field south of an existing Sunoco facility (refer to figure in Appendix A). Topography is relatively flat with small berms on the south and west perimeters of the site. Based on existing and proposed grades at the site, approximate net fills ranging from 0 to 1 foot and approximate net cuts ranging from 0 to 3 feet will be required within the general site area. General proposed yard grades for the Twin Oaks Station will range from elevation 109 to 112.

Proposed development at the site will consist of pipe systems and supports, a power distribution center (PDC) enclosure, a station flare system, and various other associated appurtenances. Anticipated foundation types and sizes, and their estimated maximum loadings provided by REI were used during this geotechnical evaluation; these are summarized as follows:

- Pipe Supports:
 - Type 1 Pier: 18-inch diameter, 4.5 feet below surface grades; 1 kip maximum axial load
 - Type 2 Pier: 24-inch diameter, 4.5 feet below surface grades; 1 kip maximum

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axial load

- PDC Enclosure: 46 by 14 feet prefabricated enclosure supported on 24-inch diameter piers, piers to be 4.5 feet below surface grades. Per request of Tetra Tech, the proposed pier diameter for the PDC enclosure was changed from 24-inches to 30-inches.
- Flare System: A flare stack supported on three 24-inch-diameter piers, each pier extending 4.5 feet below surface grades.

If actual design values vary appreciably from the above values, this office should be notified to determine if additional analyses are warranted.

2.2 Geotechnical Subsurface Investigation Program

Two Standard Penetration Test (SPT) borings were advanced during this investigation in the vicinity of the general proposed development areas. The boring locations were selected by REI and are depicted on a figure in Appendix A. Each boring was advanced to a depth of 25.5 feet for collection of representative soil samples and for identification of subsurface soil and groundwater conditions. The borings were advanced on August 26, 2013, using a track-mounted ATV drilling rig. SPT split-spoon samples (ASTM D1586) were collected from each boring at approximate 2.5-foot intervals to a depth of 10 feet, and thereafter at 5-foot intervals. In the SPT procedure, a 2-inch-outside diameter (O.D.) split-barrel sampler is driven into the soil a distance of 18 inches by a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler through the final 12-inch interval is termed the Standard Penetration Resistance (SPR) N-value. This value can be used as a qualitative indication of the in-place relative density of cohesionless (e.g., granular) soils. It is also a secondary indicator of the consistency of cohesive soils. Gravel, cobbles, and boulders may produce high blow counts not representative of the soil's relative density/consistency. This indication is qualitative because many factors can significantly affect the SPR value (i.e., drilling crew procedures, drill rigs, and hammer-rod assemblies, etc.).

Performance of the test borings was reviewed by a Tetra Tech geologist. Test boring logs developed (Appendix B) include encountered soil and groundwater data obtained from the borings. Pocket penetrometer field-index testing was conducted on collected cohesive split-spoon soil samples to estimate shear strength characteristics; these test results are also

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recorded in the boring logs. After completion of the borings, the boreholes were backfilled with the auger soil cuttings.

All soil samples collected during this investigation were inspected and described visually in Tetra Tech's geotechnical laboratory. Twelve Water Content Tests (ASTM: D2216) and Percent Finer than a No. 200 Sieve Tests (ASTM: D1140) were performed to assist in defining the general site stratigraphy, and to measure the amount of silt and clay particulate in the soil samples. Two Atterberg Limit Tests (ASTM D4318) were conducted to aid in classification of the cohesive soils encountered at the boring locations. Results of the grain-size analysis and Atterberg Limits testing were performed to determine the Unified Soil Classification System (USCS) designation for the soils encountered, which provides information regarding soil engineering behavior. A summary of the laboratory testing results appears in Appendix C. The soil samples collected during this investigation will be retained for a period of 3 months, after which they will be discarded unless further instructions are received regarding their disposition.

2.3 Subsurface Conditions

Subsurface conditions encountered at boring locations are described in detail in the test boring logs (Appendix B); they are also depicted graphically on a generalized stratigraphic profile in Appendix D. The profile is a visual aid depicting general subsurface soil and groundwater conditions. Subsurface conditions between boring locations were interpolated, and may not reflect actual conditions. Generalized descriptions of the various subsurface soil strata encountered are as follows:

- *Topsoil/Rootmat*: An 8-inch-thick surficial topsoil/root mat layer was encountered at both boring locations; thicker and/or thinner layers may be encountered at other areas of the property, away from boring locations.
- *Stratum A – Fine-Grained Soils*: Stratum A can generally be described as a brown to orange brown to gray, silty clay with varying amounts of fine sand and a trace of fine gravel (USCS: CL). Stratum A extends to a depth ranging from approximately 4.0 to 8.0 feet below ground surfaces at boring locations. SPR values ranged from 5 to 12 blows per final foot of spoon penetration, with an average SPR value of 8, indicating a medium stiff consistency. The plasticity characteristics of this stratum were determined

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via two sets of Atterberg Limits determinations: the liquid limit ranges from 27 to 30%, the plastic limits are 19%, and the plasticity index ranges from 8 to 11%, indicating that these soils are clays of medium plasticity. The in situ moisture content of the Stratum A soils tested for Atterberg Limits are either at or below their plastic limit, indicating that these soils are generally in a semi-solid state and thus considered pre-consolidated. Index pocket penetrometer test results of the Stratum A clay range from 1.5 tons per square foot (tsf) to greater than 4.0 tsf. Laboratory and field SPR data indicate the soils of Stratum A have relatively moderate shear strength and low compressibility characteristics.

- *Stratum B – Coarse-Grained Soils:* Underlying Stratum A, Stratum B can generally be described as an orange brown to brown, fine to medium sand with a little silt and trace fine gravel (USCS: SM, visual). Thickness of Stratum B ranged from 10.0 to 13.3 feet; SPR values ranged from 6 to 27 blows per final foot of spoon penetration, with an average SPR value of 10 blows, indicating a loose relative density. Laboratory and field SPR test data indicate the granular soils of Stratum B have relatively moderate shear strength and low compressibility characteristics.
- *Stratum C – Coarse-Grained Soils:* Underlying Stratum B, Stratum C can generally be described as a multi-colored “apparent” decomposed rock. Decomposed rock is a weathered, friable soil material that still exhibits some of the relic structure of the parent rock. The decomposed rock has weathered to a multi-colored fine to medium sand with a little clay, with trace mica (USCS: SC, visual). Each boring terminated within Stratum C with a penetrated thickness of 7.5 feet at both boring locations. SPR values ranged from 8 to 17 blows per final foot of spoon penetration, with an average SPR value of 12 blows, indicating a medium dense relative density. Laboratory and field SPR test data indicate the granular soils of Stratum C have relatively moderate shear strength and low compressibility characteristics.

2.4 Groundwater

Apparent groundwater was encountered at each boring location at a depth of 7.5 feet below existing ground surfaces, corresponding to an elevation range of 102 to 103. Groundwater

elevations fluctuate throughout a given year, depending on actual field porosity and variations in seasonal and annual precipitation.

2.5 Regional Geology

Tetra Tech reviewed available Commonwealth of Pennsylvania Geologic Survey maps and data to identify the regional geology in the area of the Twin Oaks Station. The Twin Oaks Station is within the southwestern part of the Lowland and Intermediate Upland Section of the Coastal Plain (specifically, the undifferentiated Pennsauken and Bridgeton Formations), which generally consists of a flat upper terrace surface cut by numerous short streams. Most of these stream valleys are narrow and steep sided, but some have wider bottoms and less steep side slopes. The upper terrace surface is underlain by unconsolidated to poorly consolidated sand and gravel. The valleys cut through the upper sands and gravels, and their slopes are composed of metamorphic rocks. Local relief is very low in this section, and elevations range from sea level to 200 feet. The floodplain of the Delaware River is included in this Section.

Here the Section is defined by occurrence of yellow to dark red-brown feldspathic quartz sands and thin beds of fine to coarse gravel, flat surface, and continuity with other parts of the section. Bedrock is not anticipated in the shallow deposits. Encounter with bedrock in the form of metamorphic Wissahickon Schist formation is expected approximately 0 to .5 to 0.75 mile south and east of these two stations, but at greater depths.

3.0 GEOTECHNICAL EVALUATION AND DESIGN RECOMMENDATIONS

Tetra Tech evaluated the subsurface conditions at the project site for suitability of the proposed site development. Tetra Tech believes that site subsurface conditions are suitable for placement of the proposed structures within certain limitations. Design of the site's proposed foundation systems and other aspects of the proposed site development that would be influenced by geotechnical conditions are discussed in the following sections. Recommendations regarding general site construction are offered in Section 4.0.

3.1 Shallow Foundation Systems – Pipe Support, Flare Station and PDC Enclosure Piers

After completion of site preparation and bulk grading work, as indicated in Section 4.0, proposed shallow foundation systems will be placed on or within the undisturbed soils of Stratum A or B.

Sunoco Twin Oaks Station

Based on field and laboratory testing of soils encountered during this evaluation, as well as foundation and foundation loading information provided by REI, an engineering analysis indicates that the pier foundations may be designed for a maximum net allowable soil bearing pressure of 3,000 pounds per square foot (psf).

Based on a net allowable soil bearing load of 3,000 psf, estimated maximum total pier foundation settlement will be approximately 0.25 inch or less. Because of presence of the subsurface granular soils (Stratua B and C) and the generally unsaturated and semi-solid condition of subsurface cohesive soils (Stratum A), it is estimated that approximately 90% of dead-load induced settlement will occur quickly (elastic settlement), and will be built out during construction. It is noted that the maximum load of 1.0 kip on the pipe support piers will result in an actual soil bearing load of 565 psf and 318 psf for the 18-inch and 24-inch pipe support piers, respectively, inducing negligible estimated settlement.

Because the pier foundations will be exposed to freezing conditions, they should be placed at least 48 inches below final site grades. The pier foundations for the PDC enclosure should have a minimum diameter of 30 inches regardless of soil bearing pressure to avoid localized shear distortion of the soil.

3.2 Seismic Design

Based on the subsurface conditions encountered during the test boring program, Tetra Tech recommends utilization of a site Class E for seismic design purposes. The site class definition is defined by Section 1613.3.2 of the 2012 International Building Code.

4.0 GENERAL CONSTRUCTION RECOMMENDATIONS

4.1 Site Preparation

At the start of construction, all vegetation and topsoil should be stripped and entirely removed from all proposed bulk grading areas. Prior to placement of fill, the subgrade of the fill areas should be proof-rolled with a minimum 15-ton roller in the presence of a qualified soils technician. Proof-rolling will increase the density of exposed subgrade areas that will have been loosened or disturbed during stripping and clearing operations. Proof-rolling will also expose potential localized soft and yielding areas. The exposed surfaces should be compacted to a visually firm and stable condition. Subgrade compaction will facilitate placement and

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compacting of embankment fill at the required densities. Proof-rolling should also occur at final “cut” area grades.

Any localized soft and unstable areas encountered during the proof-rolling program that cannot be adequately stabilized and compacted should be undercut and replaced using procedures discussed in Section 4.2. Because ponding water may destabilize soil during construction, soil subgrade disturbance should be minimized by providing positive surface drainage and limiting construction traffic on exposed subgrade soils.

4.2 Embankment Fill

Embankment fill material should be placed in horizontal thin lifts with a compacted thickness no greater than 8 inches. Each thin lift of fill material should be compacted to a minimum 92% of its maximum dry density, as determined by the Modified Proctor Test (ASTM D1557). Compacted embankment fill should be placed at moisture contents to facilitate compaction (typically at +/- 2-3% of optimum moisture, per ASTM D1557). Placement and compaction of the embankment fill should be monitored and tested on a full-time basis by a qualified geotechnical technician.

The clayey soils of Stratum A are considered moisture sensitive and typically have an in-situ moisture content exceeding what may be required to achieve specified compaction. These soils may have to be initially dried (e.g., repeatedly scarified and turned over) and compacted during favorable weather conditions.

4.3 Shallow Foundation Construction

All foundations should be placed on dry, non-frozen, firm soil. When excessively wet or frozen soil is encountered at the foundation base, this material should be undercut to suitable bearing materials. The undercut zone may be replaced in accordance with the compacted embankment fill recommendations. AASHTO No. 57 Stone could also be used as backfill within foundation undercut zones—placed in maximum 12-inch lifts and compacted using a vibratory plate compactor.

During excavation of foundations, disturbance of the subgrade soils may occur; therefore, compaction of the foundation subgrades should occur prior to placement of any reinforcing steel or concrete. All foundation excavations should be reviewed to verify the quality of the bearing

material. Foundation excavations should be reviewed by a qualified geotechnical technician working under the supervision of a geotechnical engineer familiar with the recommendations of this report. Subgrade review should occur prior to placement of reinforcing steel or concrete, and should verify presence of suitable bearing soils.

All foundation excavations should be protected from ponding water and freezing conditions, and backfilled as soon as practical after placement of the foundation concrete. Backfilling should follow the embankment fill compaction recommendations offered in Section 4.2.

4.4 Site Work Quality Control and Assurance

All site clearing, grading, embankment fill placement, and foundation excavation/construction should be monitored by a qualified geotechnical technician working under the supervision of a geotechnical engineer. The technician should observe and document site preparation and proof-rolling, embankment fill construction, foundation subgrades, and foundation construction—and should conduct appropriate field tests, as necessary, to verify that construction is being performed in accordance with applicable plans, specifications, and acceptable construction practice. The conclusions and recommendations in this report are based on the premise of competent field engineering and monitoring during construction.

5.0 REPRESENTATIONS

This report was prepared in accordance with generally accepted engineering principles and practices, and is based on soil and groundwater conditions encountered during the field exploration. No warranty, expressed or implied, is made. Although generalized subsurface conditions have been inferred through interpolation and/or extrapolation of acquired field and laboratory data, actual subsurface conditions between soil boring locations are unknown. As a result, recommendations in this report may require modifications based on subsurface conditions actually encountered during construction. Tetra Tech should be notified if conditions encountered during construction differ from those shown by the test borings, thus possibly requiring re-evaluation of recommendations offered in this report.

Construction bidders should thoroughly familiarize themselves with the on-site subsurface soil and groundwater conditions described herein. Tetra Tech and REI assume no responsibility for

Geotechnical Subsurface Investigation

Sunoco Twin Oaks Station

interpretation or deductions by the awarded contractor based on information in this report. Variations in subsurface conditions are expected.

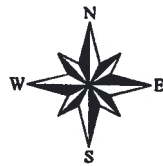
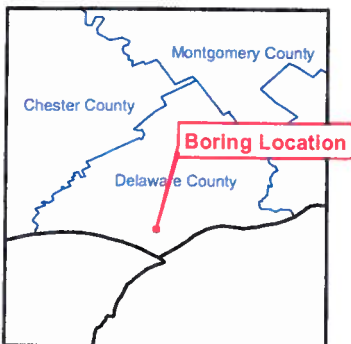
APPENDIX A

Test Boring Locations



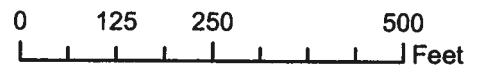
Source: Topo data from USGS DLG, Roads from DelDOT

S:\05-Projects\Winacomp\Tt - Roanoke (RE)\GIS\Boring Map - Twin Oaks.mxd



Tetra Tech, Inc.
 Phone: (302) 738-7551
 Toll Free: (800) 462-0910
www.tetrattech.com

Figure
 Boring Locations - Twin Oaks Station
 Sunoco Mariner East Project
 Delaware County, PA



1 inch = 250 feet

This map is provided by Tetra Tech solely for display and reference purposes and is subject to change without notice. No claims, either real or assumed, as to the absolute accuracy or precision of any data contained herein are made by Tetra Tech, nor will Tetra Tech be held responsible for any use of this document for purposes other than which it was intended.

APPENDIX B

Test Boring Logs

FIELD DESCRIPTION AND LOGGING SYSTEM FOR SOIL EXPLORATION

NONCOHESIVE SOILS (Sand, Gravel & Combinations)

Density	
Very Loose	- 5 blows/ft. or less
Loose	- 6 to 10 blows/ft.
Medium Dense	- 11 to 30 blows/ft.
Dense	- 31 to 50 blows/ft.
Very Dense	- 51 blows/ft. or more

Particle Size Identification

Boulders	- 8 in. diameter or more
Cobbles	- 3 to 8 in. diameter
Gravel	- Coarse - 3 in. to 3/4 in. sieve
	- Fine - 3/4 in. to No. 4 sieve (4.75mm - 2.00mm)
Sand	- Coarse - No. 4 to No. 10 sieve (4.75mm - 2.00mm)
	- Medium - No. 10 to No. 40 sieve (2.00mm - 0.425mm)
	- Fine - No. 40 to No. 200 sieve (0.425mm - 0.074mm)
Silt/Clay	- Less Than a No. 200 sieve (<0.074mm)

Relative Proportions

<u>Description Term</u>	<u>Percent</u>
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

COHESIVE SOILS (Silt, Clay & Combinations)

Consistency	
Very Soft	- 3 blows/ft. or less
Soft	- 4 to 5 blows/ft.
Medium Stiff	- 6 to 10 blows/ft.
Stiff	- 11 to 15 blows/ft.
Very Stiff	- 16 to 30 blows/ft.
Hard	- 31 blows/ft. or more

Plasticity

Degree of Plasticity	Plasticity Index
None to Slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to Very High	>22

Visual Description on Drillers' Logs are made by drillers visual inspection.

Standard Penetration. Driving a 2.0" O.D., 1-3/8" I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30.0 inches. It is customary to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6.0 inches of penetration on the drill log (i.e., 6/8/9). The standard penetration test results can be obtained by adding the last two numbers (i.e., 8+9=17 blows/ft.).

Groundwater observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc., may cause changes in the water levels indicated on the logs.

APPENDIX C

Laboratory Testing Summary

**LABORATORY TESTING SUMMARY
SUNOCO MARINER EAST
TWIN OAKS STATION**

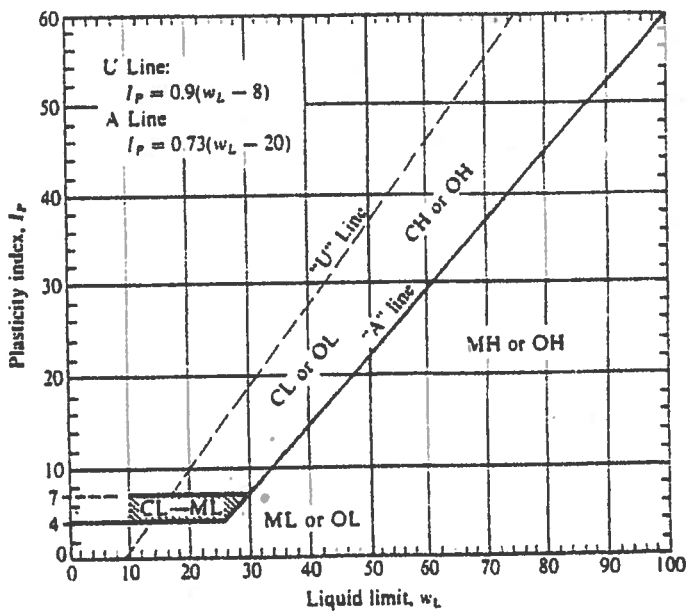
Test Boring No.	Sample No.	Stratum	Depth of Sample (ft.)		Water Content, % (ASTM D2216)	Percent Silts/Clays, % (ASTM D1140)	Atterburg Limits (ASTM D4318)		USCS Classif. (ASTM D2487)
			From	To			Liquid Limit, %	Plastic Limit, %	
GB-01	1	A	1.0	2.5	16.3	61.2	-	-	-
	2	A	3.5	5.0	16.5	91.8	30	19	CL
	3	A	6.0	7.5	12.7	55.8	-	-	-
	4	B	9.0	10.5	21.8	19.8	-	-	-
	5	B	14.0	15.5	14.0	10.7	-	-	-
	6	C	19.0	20.5	34.1	23.8	-	-	-
GB-02	1	A	1.0	2.5	19.3	63.2	27	19	CL
	2	B	3.5	5.0	18.4	9.3	-	-	-
	3	B	6.0	7.5	20.8	16.3	-	-	-
	4	B	9.0	10.5	12.6	9.6	-	-	-
	5	B	14.0	15.5	14.0	10.7	-	-	-
	6	C	19.0	20.5	25.6	23.0	-	-	-

Notes:

- 1) Sample depths based on feet below grade at time of exploration.

Unified soil classification [Casagrande (1948)]

Major divisions		Group symbols	Typical names	Laboratory classification criteria		
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines		
		Gravels with fines (Appreciable amount of fines)	GM+	Silty gravels, gravel-sand-silt mixtures	Limits plotting in hatched zone with I_p between 4 and 7 are <i>borderline</i> cases requiring use of dual symbols	
			GC			Clayey gravels, gravel-sand-clay mixtures
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			SP	Poorly graded sands, gravelly sands, little or no fines		
		Sands with fines (Appreciable amount of fines)	SM+	Silty sands, sand-silt mixtures	Limits plotting in hatched zone with I_p between 4 and 7 are <i>borderline</i> cases requiring use of dual symbols	
						SC
					Atterberg limits below A line or I_p less than 4	Atterberg limits above A line with I_p greater than 7
					Atterberg limits above A line with I_p greater than 7	
Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent GW, GP, SW, SP More than 12 percent GM, GC, SM, SC Borderline cases requiring dual symbols ‡						
Fine-grained soils (More than half of material is smaller than No. 200 sieve)	Silt and clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	For all soils plotting nearly on A line use dual symbols, i.e., $I_p = 29.5, w_L = 60$ gives CH-OH or CH-MH. When w_L is near 50 use CL, CH, ML, MH. Take near as ± 2 percent.		
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
		OL	Organic silts and organic silty clays of low plasticity			
	Silt and clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
		CH	Inorganic clays of high plasticity, fat clays			
		OH	Organic clays of medium to high plasticity, organic silts			
		Highly organic soils	Pt		Peat and other highly organic soils	



† Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits: suffix d used when w_L is 28 or less and the I_p is 6 or less; suffix u used when w_L is greater than 28.
 ‡ Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

APPENDIX D

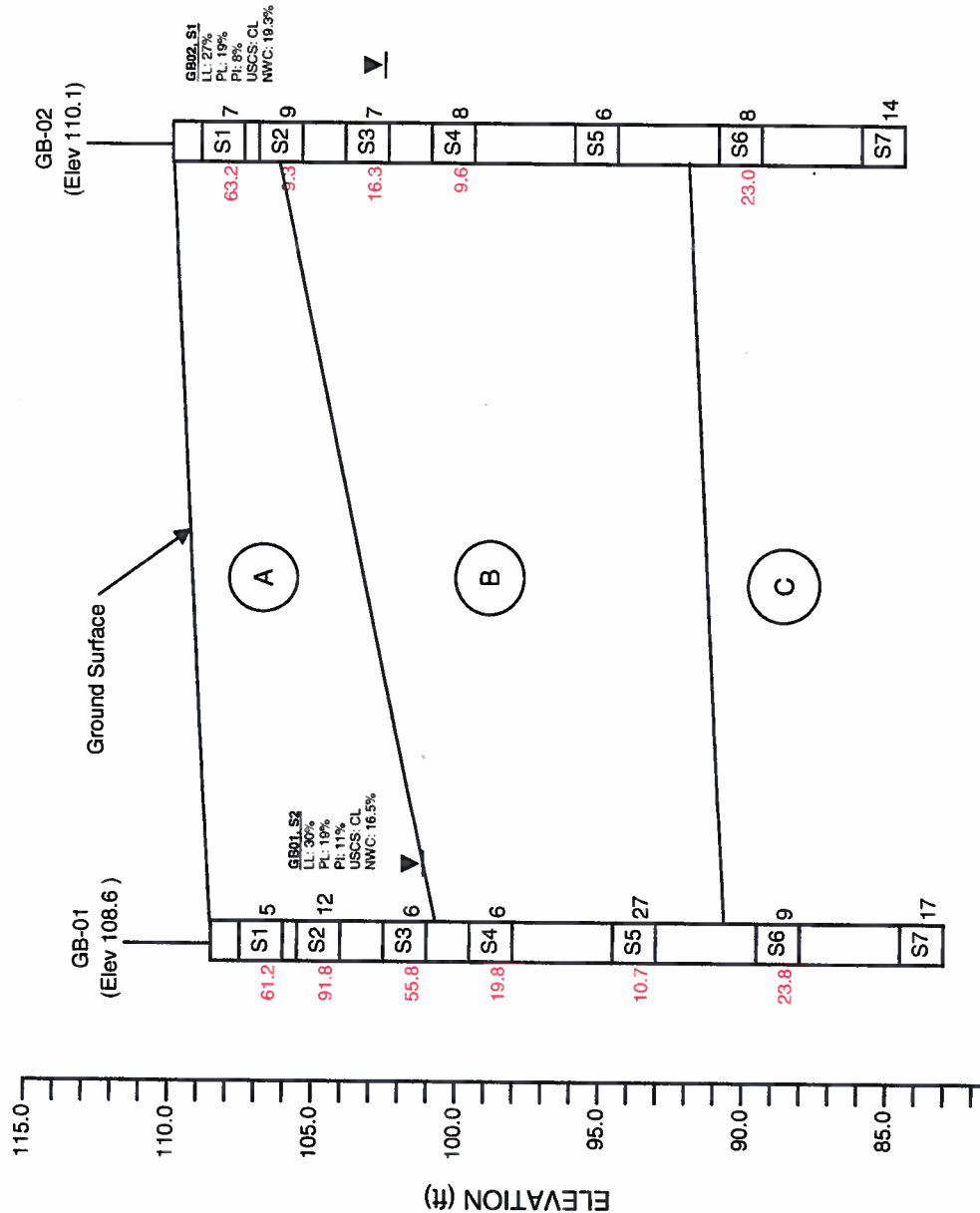
Generalized Stratigraphic Profile



TETRA TECH

TWIN OAKS STATION

GENERALIZED STRATIGRAPHIC PROFILE (GB01 and GB02)



GENERALIZED STRATUM DESCRIPTIONS

STRATUM A: BROWN TO ORANGE BROWN TO GRAY, MEDIUM STIFF SILTY CLAY OF MEDIUM PLASTICITY, WITH VARYING AMOUNTS OF FINE SAND AND TRACE FINE GRAVEL (USCS: CL).

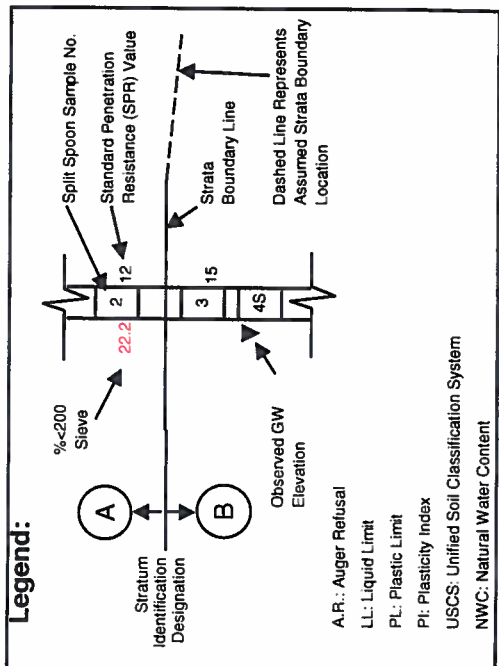
STRATUM B: ORANGE BROWN TO BROWN, LOOSE FINE TO MEDIUM SAND WITH A LITTLE SILT AND TRACE FINE GRAVEL (USCS: SM, VISUAL).

STRATUM C: DECOMPOSED ROCK WEATHERED IN PLACE TO A MEDIUM DENSE MULTI-COLORED FINE TO MEDIUM SAND WITH A LITTLE CLAY AND TRACE MICA (USCS: SC, VISUAL).

NOTES:

1) The profiles shown are based on Tetra Tech's description of the samples. The test borings represent subsurface conditions encountered at each test boring location, and the profile is based on straight-line interpolation between borings. Conditions between boring locations are relatively unknown.

2) Vertical Scale: As indicated; Horizontal Scale: Not to Scale.





February 11, 2014
103IP2762

Mr. Kyle Beck, P.E.
Rooney Engineering, Inc.
12201 E. Arapahoe Road, Suite C-10
Centennial, CO 80112

***Subject: Infiltration Testing Results – Twin Oaks Station
Sunoco Mariner East Pipeline Project***

Dear Kyle:

In accordance with your request, Tetra Tech, Inc. (Tetra Tech) performed infiltration testing at the proposed Twin Oaks Station project site. The site is currently undeveloped land, situated within a Sunoco distribution and storage facility, adjacent to Conchester Highway in Twin Oaks, Commonwealth of Pennsylvania.

Tetra Tech conducted two Infiltration tests on February 6, 2014, within a stormwater management (SWM) pond area proposed to undergo development activities at the site. Based on a preliminary grading plan developed by Rooney Engineering, Inc. (REI), the SWM Pond has a floor (pond bottom) elevation of 105, which corresponds to a depth ranging from 4 to 4.5 feet below ground surface (bgs). The preliminary grading plan and approximate locations of the infiltration tests (designated IT-01 and IT-02) are attached.

To evaluate subsurface conditions at test locations, two hand-auger exploratory borings were initially advanced at off-set locations to IT-01 and IT-02 to approximately 8 feet bgs. Based on observation of the exploratory borings, subsurface soils can be described generally as brown to orange-brown sandy Silty Clay (Unified Soil Classification System [USCS]: CL). The soils were also visually classified as Clay Loam and Clay in accordance with U.S. Department of Agriculture (USDA) soil classification. Apparent encounter with groundwater occurred at each boring location at approximately 7 feet bgs. Mottling and other evidence indicating presence of a seasonal high water table were observed in the borings at approximately 7 feet bgs.

Infiltration testing via a single-ring, falling head testing method (see attachment titled Falling Head Single Ring Infiltration Test) occurred at approximately 4.0 and 4.5 feet bgs at locations IT-01 and IT-02, respectively. Our understanding is that the Township has approved use of this test method. Results of the infiltration testing are summarized in the attached Infiltration Testing Tables. The infiltration rate at IT-01 was calculated as 0.06 inch per hour via the time weighted average method for calculating infiltration, and as 0.00 inches per hour using the last hourly measurement. The infiltration rate at IT-02 was calculated as 0.03 inch per hour via the time weighted average method for calculating infiltration, and as 0.00 inches per hour using the last hourly measurement.



TETRA TECH

Tetra Tech's services accorded with generally accepted engineering practice. No warranty, expressed or implied, is given. We appreciate the opportunity to provide our professional services to you. If you have any questions regarding the testing we performed, please contact me at (302) 283-2274, or via E-mail at ralph.boedeker@tetrattech.com.

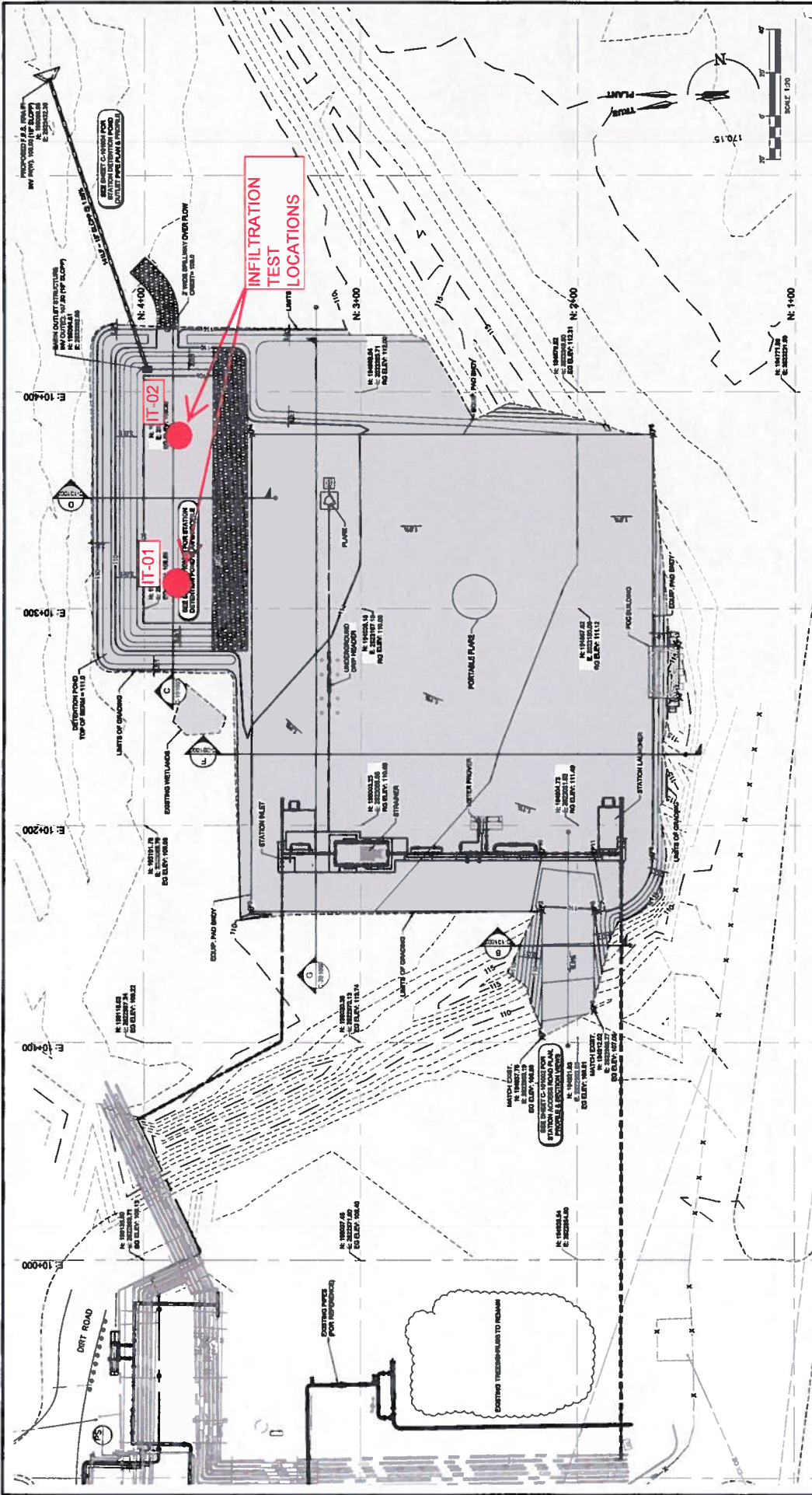
Sincerely,

Ralph Boedeker, P.E. (DE, MD, PA, VA)
Manager, Geotechnical Engineering Department



Attachments

- Infiltration Test Locations
- Infiltration Testing Tables
- Falling Head Single Ring Infiltration Test Procedures
- Unified Soil Classification Sheet
- USDA Soil Classification Sheet



REV	DATE	BY	DESCRIPTION
1	01/20/13	JMJ	ISSUED FOR CONSTRUCTION
0	12/20/12	JMJ	ISSUED FOR CONSTRUCTION

TWIN OAKS ETHANE STATION
 CIVIL
 STATION EQUIPMENT PAD
 GRADING PLAN

Suncore Logistics
 Partners L.P.

PREPARED BY: J. BERRY
 CHECKED BY: K. BECK
 APPROVED BY: Z. BECK
 DATE: 07/23/2014
 SCALE: 1/8" = 1'-0"

OLD DRAWING NO. 02896-TM4-C-101001
 REV. NO. 1

POINT #	DESCRIPTION	ELEVATION	NORTHING	EASTING	POINT TABLE
P1	MATCH EXIST.	108.27	10827.750	32228.150	10827.750
P2	ACCESS ROAD	108.27	10827.750	32228.150	10827.750
P3	SCARP SHOULDER CORNER	111.50	10827.750	32228.150	111.50
P4	SCARP SHOULDER CORNER	111.50	10827.750	32228.150	111.50
P5	SCARP SHOULDER CORNER	111.50	10827.750	32228.150	111.50
P6	P.O.C.	111.50	10827.750	32228.150	111.50
P7	P.O.C.	111.50	10827.750	32228.150	111.50

POINT #	DESCRIPTION	ELEVATION	NORTHING	EASTING	POINT TABLE
P1	MATCH EXIST.	108.27	10827.750	32228.150	10827.750
P2	ACCESS ROAD	108.27	10827.750	32228.150	10827.750
P3	SCARP SHOULDER CORNER	111.50	10827.750	32228.150	111.50
P4	SCARP SHOULDER CORNER	111.50	10827.750	32228.150	111.50
P5	SCARP SHOULDER CORNER	111.50	10827.750	32228.150	111.50
P6	P.O.C.	111.50	10827.750	32228.150	111.50
P7	P.O.C.	111.50	10827.750	32228.150	111.50

ITEM	CUT (CY)	FILL (CY)	NET (CY)
CLEARING & GRUBBING	118.37	0	-118.37
CONCRETE FOR EQUIPMENT PAD & ACCESS ROAD	189.77	189.77	0
EARTHWORK	17.74	189.77	-172.03
GRAVEL FOR EQUIPMENT PAD & ACCESS ROAD	0	189.77	-189.77

- NOTES:**
- ALL CONSTRUCTION IS SUBJECT TO EROSION CONTROL MEASURES. PLEASE SEE LAND DISTURBANCE PLAN FOR EROSION CONTROL MEASURES.
 - EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO ACTUAL CONSTRUCTION. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
 - PROPOSED ELEVATIONS ARE IN PROPOSED GRADES, PLUS APPROXIMATE PROFILES AS SHOWN ON THE SHEET C-10101.

INFILTRATION TEST DATA SHEET

PROJECT NAME: Sunoco - Twin Oaks Station



PROJECT NUMBER: 103IP2762
 TEST DATE: February 6, 2014
 TEST LOCATION: IT-1
 TEST DEPTH: 4.00 ft

TIME	DEPTH TO WATER BELOW GROUND SURFACE	HYDRAULIC HEAD	Δ HYDRAULIC HEAD	PERMEABILITY (K _m)	COMMENTS
10:23	0.45 ft	3.55 ft			
10:38	0.45 ft	3.55 ft	0.00 ft		
10:53	0.45 ft	3.55 ft	0.00 ft		
11:08	0.45 ft	3.55 ft	0.00 ft		
11:23	0.46 ft	3.54 ft	0.01 ft	0.01 ft/hr	0.12 in/hr
11:38	0.46 ft	3.54 ft	0.00 ft		
11:53	0.46 ft	3.54 ft	0.00 ft		
12:08	0.46 ft	3.54 ft	0.00 ft		
12:23	0.46 ft	3.54 ft	0.00 ft	0.00 ft/hr	0.00 in/hr
12:38	0.47 ft	3.53 ft	0.01 ft		
12:53	0.47 ft	3.53 ft	0.00 ft		
13:08	0.47 ft	3.53 ft	0.00 ft		
13:23	0.47 ft	3.53 ft	0.00 ft	0.01 ft/hr	0.12 in/hr
13:38	0.47 ft	3.53 ft	0.00 ft		
13:53	0.47 ft	3.53 ft	0.00 ft		
14:08	0.48 ft	3.52 ft	0.01 ft		
14:23	0.48 ft	3.52 ft	0.00 ft	0.01 ft/hr	0.12 in/hr
14:38	0.48 ft	3.52 ft	0.00 ft		
14:53	0.48 ft	3.52 ft	0.00 ft		
15:08	0.48 ft	3.52 ft	0.00 ft		
15:23	0.48 ft	3.52 ft	0.00 ft	0.00 ft/hr	0.00 in/hr

There are generally two acceptable methods to calculate steady state infiltration rates:

1. Time Weighted Average: 0.06 in/hr
2. Final Test Hour Reading: 0.00 in/hr

INFILTRATION TEST DATA SHEET



PROJECT NAME: Sunoco - Twin Oaks Station
PROJECT NUMBER: 103JP2762
TEST DATE: February 6, 2014
TEST LOCATION: IT-2
TEST DEPTH: 4.50 ft

TIME	DEPTH TO WATER BELOW GROUND SURFACE	HYDRAULIC HEAD	Δ HYDRAULIC HEAD	PERMEABILITY (K _m)	COMMENTS
10:20	1.27 ft	3.23 ft			
10:35	1.27 ft	3.23 ft	0.00 ft		
10:50	1.27 ft	3.23 ft	0.00 ft		
11:05	1.27 ft	3.23 ft	0.00 ft		
11:20	1.27 ft	3.23 ft	0.00 ft	0.00 ft/hr	0.00 in/hr
11:35	1.27 ft	3.23 ft	0.00 ft		
11:50	1.27 ft	3.23 ft	0.00 ft		
12:05	1.28 ft	3.22 ft	0.01 ft		
12:20	1.28 ft	3.22 ft	0.00 ft	0.01 ft/hr	0.12 in/hr
12:35	1.28 ft	3.22 ft	0.00 ft		
12:50	1.28 ft	3.22 ft	0.00 ft		
13:05	1.28 ft	3.22 ft	0.00 ft		
13:20	1.28 ft	3.22 ft	0.00 ft	0.00 ft/hr	0.00 in/hr
13:35	1.28 ft	3.22 ft	0.00 ft		
13:50	1.28 ft	3.22 ft	0.00 ft		
14:05	1.28 ft	3.22 ft	0.00 ft		
14:20	1.28 ft	3.22 ft	0.00 ft	0.00 ft/hr	0.00 in/hr
14:35	1.28 ft	3.22 ft	0.00 ft		
14:50	1.28 ft	3.22 ft	0.00 ft		
15:05	1.28 ft	3.22 ft	0.00 ft		
15:20	1.28 ft	3.22 ft	0.00 ft	0.00 ft/hr	0.00 in/hr

There are generally two acceptable methods to calculate steady state infiltration rates:

1. Time Weighted Average: 0.03 in/hr
2. Final Test Hour Reading: 0.00 in/hr

HYNE

**Falling Head
Single Ring Infiltration Test**

Tools and Supplies:

- | | |
|---|---|
| <input type="checkbox"/> 15 gallons of clean water per test | <input type="checkbox"/> Hand Auger 4-inch bucket (with extensions) |
| <input type="checkbox"/> 4 inch diameter thin wall PVC pipe | <input type="checkbox"/> Driving Block |
| <input type="checkbox"/> Sledge Hammer | <input type="checkbox"/> 5 gallon buckets |
| <input type="checkbox"/> 3- inch hand auger bucket | <input type="checkbox"/> Water level indicator |
| <input type="checkbox"/> Shovels Flat/Round | <input type="checkbox"/> Gator/ATV (as necessary) |

Procedure:

- A. Unless directed otherwise, advance one soil boring at each test location. The boring should extend to groundwater. Accurately measure depth to groundwater and depth of each soil change. Pay close attention to soils for mottling. Contact office to determine test depth. Note: This step can be omitted if test borings were advanced during a previous site visit.
- B. Advance a 4-inch diameter soil boring to the specified test depth. Check boring log to ensure that soil at bottom of excavation is soil type to be tested.
- C. Cut thin wall PVC to length (approximately 1 to 2' longer than desired test depth).
- D. Push/drive PVC to bottom of soil boring.
- E. Using 3-inch auger, clean out bottom of test hole to remove any soils that caved in during PVC placement. Drive PVC casing an additional 2 inches to ensure that bottom of test hole does not extend beyond the bottom of the PVC pipe.
- F. Collect initial test information using water level indicator
1. Determine the total depth to the bottom of the hole from top of pipe and record.
 2. Determine riser height above ground and record.
 3. Subtract 2 feet from total depth (See F.1.) and record.
- G. Start Test
1. Set up water level indicator at depth determined in F.3.
 2. Fill tube with water until water level indicator alarms. To minimize soil scouring, slowly pour water down the inside of the casing wall.
 3. Record exact depth to water with water level indicator.
-
- H. Run Test:
1. Pre-soak (1 hour or less).
 - a. Record depth to water every 15 minutes for first hour (pre-soak).
 - b. At the end of first hour refill pipe with water to level determined in Step F.3.

Falling Head Single Ring Infiltration Test

2. Infiltration testing (four, one hour tests)

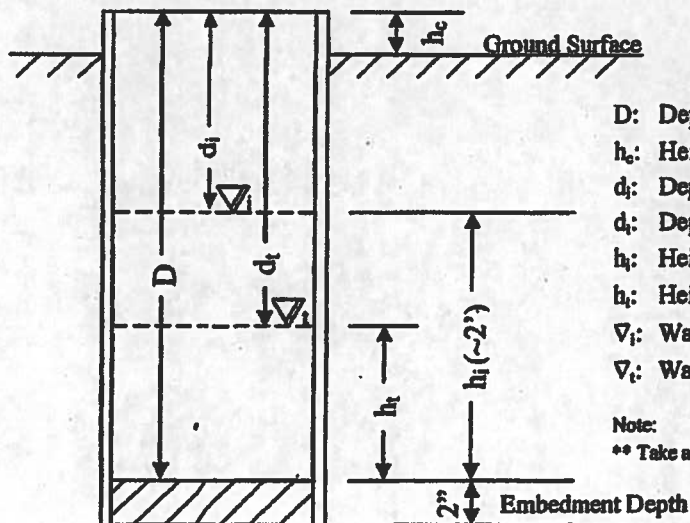
- a. Test starts after completing Step H.1.b.
- b. Record depth of water every 15 minutes (or more frequently) for one hour, or until water drains from pipe (which ever occurs first).
- c. Refill pipe with water to level determined in Step F.3.
- d. Repeat steps H.2.b. and c. three additional times (four test runs).
- e. Testing concludes after pre-soak and four test runs are completed.

I. Calculations

Infiltration rate is calculated as inches per hour.

Determine the water level drop recorded during each one hour test (note that the water level indicator is marked in tenths of a foot. A conversion to inches is required). Multiply the water level drop recorded in tenths of a foot by 1.2 to get water level drop in inches.

All data should be recorded on pre-made forms.



- D : Depth from top of casing to bottom of boring.
- h_c : Height of casing above ground surface.
- d_i : Depth to water at time $t=0$.
- d_t : Depth to water at time t .
- h_i : Height of water at time $t=0$.
- h_t : Height of water at time t .
- V_i : Water level at time $t=0$.
- V_t : Water level at time t .

Note:

** Take all measurements to 1/100 inch

UNIFIED SOIL CLASSIFICATION SYSTEM [Casagrande (1948)]

Major Divisions		Group Symbols	Typical Descriptions	Laboratory Classifications			
Coarse Grained Soils (More than half of material is larger than No. 200 sieve)	Gravels More than half of coarse fraction is larger than No. 4 sieve size	Clean gravel (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4: $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3 Not meeting C_u or C_c requirements for GW		
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines			
		Gravel with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below A Line or I_p less than 4	Limits plotting in hatched zone with I_p between 4 and 7 are borderline cases requiring use of dual symbols	
			GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above A line with I_p greater than 7		
	Sands (More than half of coarse fraction is smaller than No. 4 Sieve)	Clean sands (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6: $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3 Not meeting C_u or C_c requirements for SW		
			SP	Poorly graded sands, gravelly sands, little or no fines			
		Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures	Atterberg limits below A Line or I_p less than 4	Limits Plotting in hatched zone with I_p between 4 and 7 are borderline cases requiring use of dual symbols	
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above A line with I_p greater than 7		

Determine Percentage of sand and gravel from grain size curve. Depending on Percentage of fines (fraction smaller than No. 200 sieve), coarse-grained soils are classified as follows:
 Less than 5 percent GW, GP, SW, SP
 More than 12 percent GM, GC, SM, SC
 5 to 12 percent Borderline cases requiring dual symbols⁽¹⁾

Major Divisions	Group Symbols	Typical Descriptions	
Fine-grained soils (More than half of material is smaller than No. 200 sieve)	Sils and clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
	Sils and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
	Highly organic soils	Pt	Peat and other highly organic soils

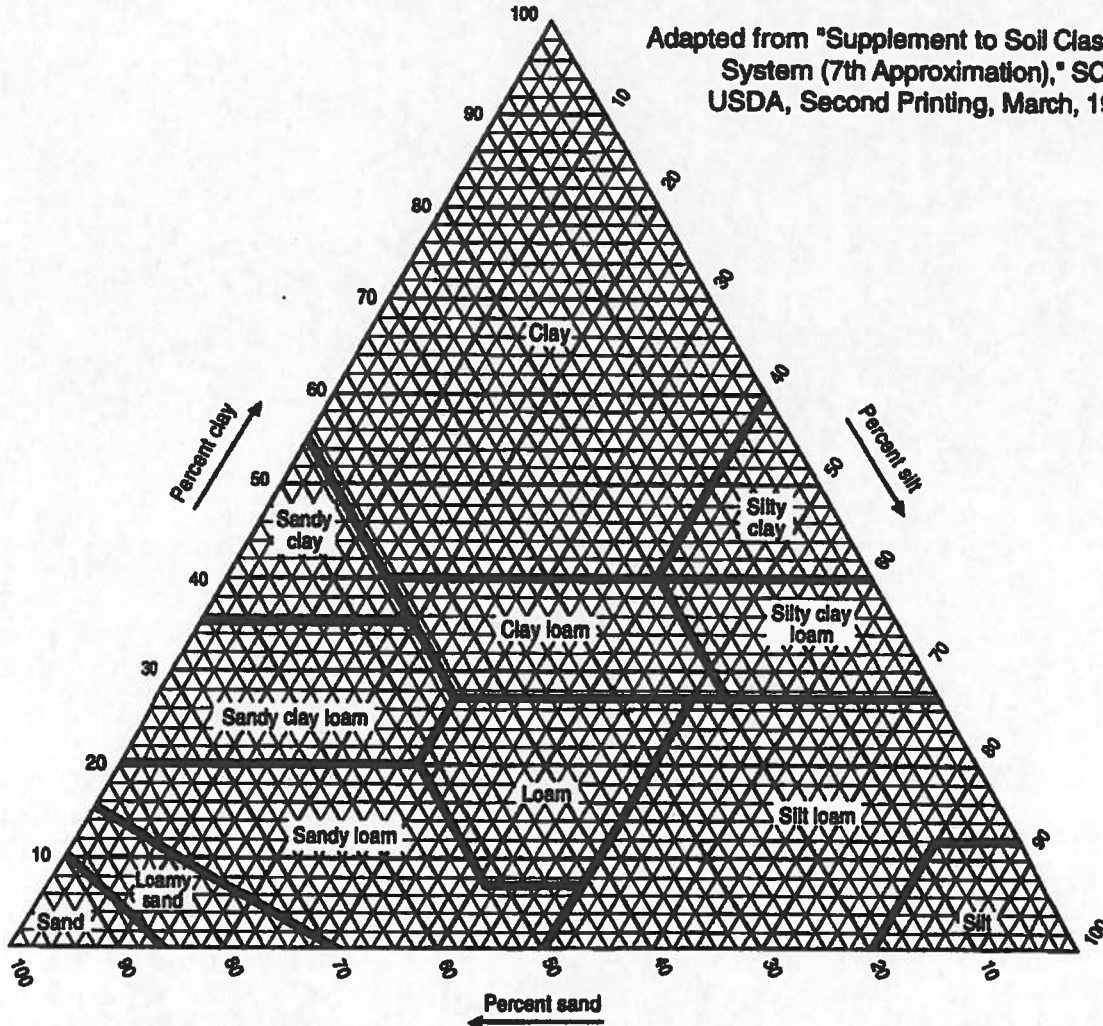
For soils plotting nearly on A line use dual symbols i.e., $I_p = 29.5$, $w_L = 60$ gives CH-MH. When w_L is near 50 use CL-CH or ML-MH. Take near as ± 2 percent.

The Plasticity Chart plots Plasticity Index (PI) on the y-axis (0 to 60) against Liquid Limit (LL) on the x-axis (0 to 100). The A Line is defined by $PI = 0.73(LL - 20)$ and the U Line by $PI = 0.9(LL - 8)$. The chart is divided into several regions: CL-ML (hatched), ML or OL, CL or OL, CH or OH, and MH or OH. A diagonal dashed line separates the CL-ML region from the others.

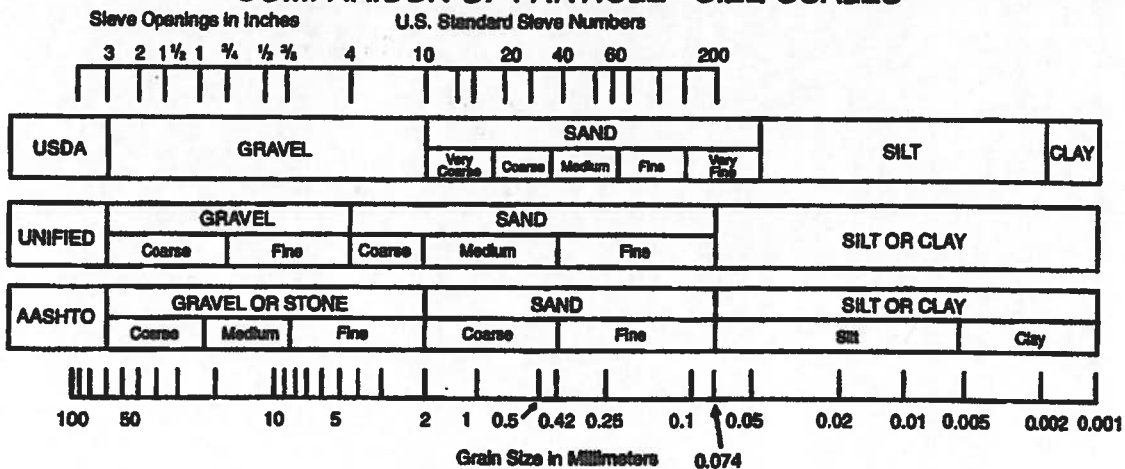
(1) Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC. well-graded gravel-sand mixture with clay binder.

USDA SOIL CLASSIFICATION SYSTEM

Adapted from "Supplement to Soil Classification System (7th Approximation)," SCS, USDA, Second Printing, March, 1967



COMPARISON OF PARTICLE - SIZE SCALES



Soil triangle of the basic soil textural classes. (U.S. Soil Conservation Service.) 298-D-2782.

TRIP REPORT

Date: May 24, 2016

To: Tim Connelly, P.E.

From: Jim Coffman

Subject: Summary of Soil infiltration Testing
Twin Oaks Pump Station Project
Sunoco Logistics Partners, L.P.
Delaware County, Aston, PA

This trip report provides results of a soil infiltration test that was completed at the Twin Oaks Pump Station operated by Sunoco Logistics Partners, L.P. in Delaware County, Aston, Pennsylvania.

1.0 PURPOSE

This report presents the field data and results of one double-ring soil infiltration test and two exploration (lithology) test pits conducted to support stormwater management system design at the abovementioned pump station. The infiltration test location, named Location #2, is listed with the field coordinates (latitude and longitude) in Table 1 and shown on the attached figure.

2.0 FIELD ACTIVITIES

The infiltration test was conducted by Jim Coffman of Tetra Tech, Inc., on May 12, 2016. The test location was positioned in the field using coordinates entered into a handheld, WAAS-enabled GPS unit. Separate exploration test pits for logging lithology were also conducted to 5 feet depth at Location #2 (next to the test location), and to 6 feet depth at another location named Location #1. No infiltration test was requested at Location #1 (only the exploration test pit). Location #1 was also located in the field by similar means as Location #2, and field coordinates for it are also provided in Table 1, and its location is shown on the attached figure. Locations 1 and 2 were located on generally flat land surface in short-grassed areas on opposite sides (west and east sides, respectively) of the infiltration basin. Photographs of testing locations are attached at the end of this report.

The infiltration tests were performed in accordance with the procedure specified in the 2006 Pennsylvania Stormwater Best Management Practices (BMP) Manual. The test locations were prepared with the assistance of a backhoe, with care taken to minimize disturbance of the soil surface to be tested. A double-ring infiltrometer was used for testing and consisted of 10-inch and 6-inch diameter sections of steel casing. After digging to the target depth, the test surface was leveled, and any loose soil or fallen vegetation was removed. The rings were driven approximately 4 inches into the soil (6-inch water columns). The infiltration test depth was 36 inches below ground surface.

The test location was pre-soaked for 1 hour. The test was then conducted with measurements at 30-minute intervals, based on the observed water level during the pre-soak period. Pre-soak and test information was recorded on an infiltration test sheet; a copy of the test sheet is attached to this report.

During the testing, ambient temperature was in the low 70 degrees Fahrenheit, and no precipitation was observed in the area at the time of testing and no significant rainfall had occurred in the area 24 hours prior to the testing according to local weather reports.

Exploration test pits were excavated next to the test location at Location #2 and also at Location #1 to characterize the soil, determine the depth to bedrock (if encountered), and inspect for evidence of high water table. The test pit at Location #2 was machine-excavated to 2 feet below the infiltration test depth (5 feet below the ground surface). The test pit at Location #1 was machine-excavated to 6 feet below the ground surface at Location #1. Descriptions of the soil were recorded by the Tetra Tech geologist on field logs, which were based on the form example in the BMP manual. Copies of the field logs are attached to this report.

3.0 RESULTS

3.1 SOILS DESCRIPTION

The observed soils generally consisted of brown to orange-brown, moist clayey silt loam with little very fine sand and rounded quartz-rich gravel and sub-angular schist rock fragments. From 18- to 24-inches depth, debris (plastic sheeting) was also observed at Location #1. Soil appeared mottled gray, red, and orange throughout the soil columns at both locations; however, the mottling observed had irregular patterns (discontinuous short streaks and spots) and did not exhibit continuous color patterns (e.g. narrow layering) more commonly associated with an in-situ former high water table. Therefore, given the irregular mottling patterns and the soil being fill material, the observed mottling is likely a result of slow draining of the soil at the property and related to the existing pattern of the material derived from where the fill originated, rather than from seasonal high-water table conditions within the depths of the test pits. No standing water or water table, or bedrock, were observed in either of the exploration pits. Small grass roots were present in the upper six inches of the pits.

According to United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey¹ data, the locations mapped in the Made Land group (Mc soil symbol) with silt and clay soil. Soils from this group are described as weathered unstable fill (acid loamy human transported material derived from sedimentary rock).

¹ <http://websoilsurvey.nrcs.usda.gov/>. Accessed May 11, 2016.

3.2 INFILTRATION TEST RESULTS

Table 1 provided below summarizes the infiltration rate (inches per hour) from the test data. No infiltration (zero) occurred during either the presoak period or test period. Based on the presoak, the test required a 30-minute test cycle.

Table 1
Summary of Infiltration Test Result and Work Locations
Twin Oaks Pump Station Project
Delaware County, Aston, PA
Sunoco Logistics Partners, L.P.

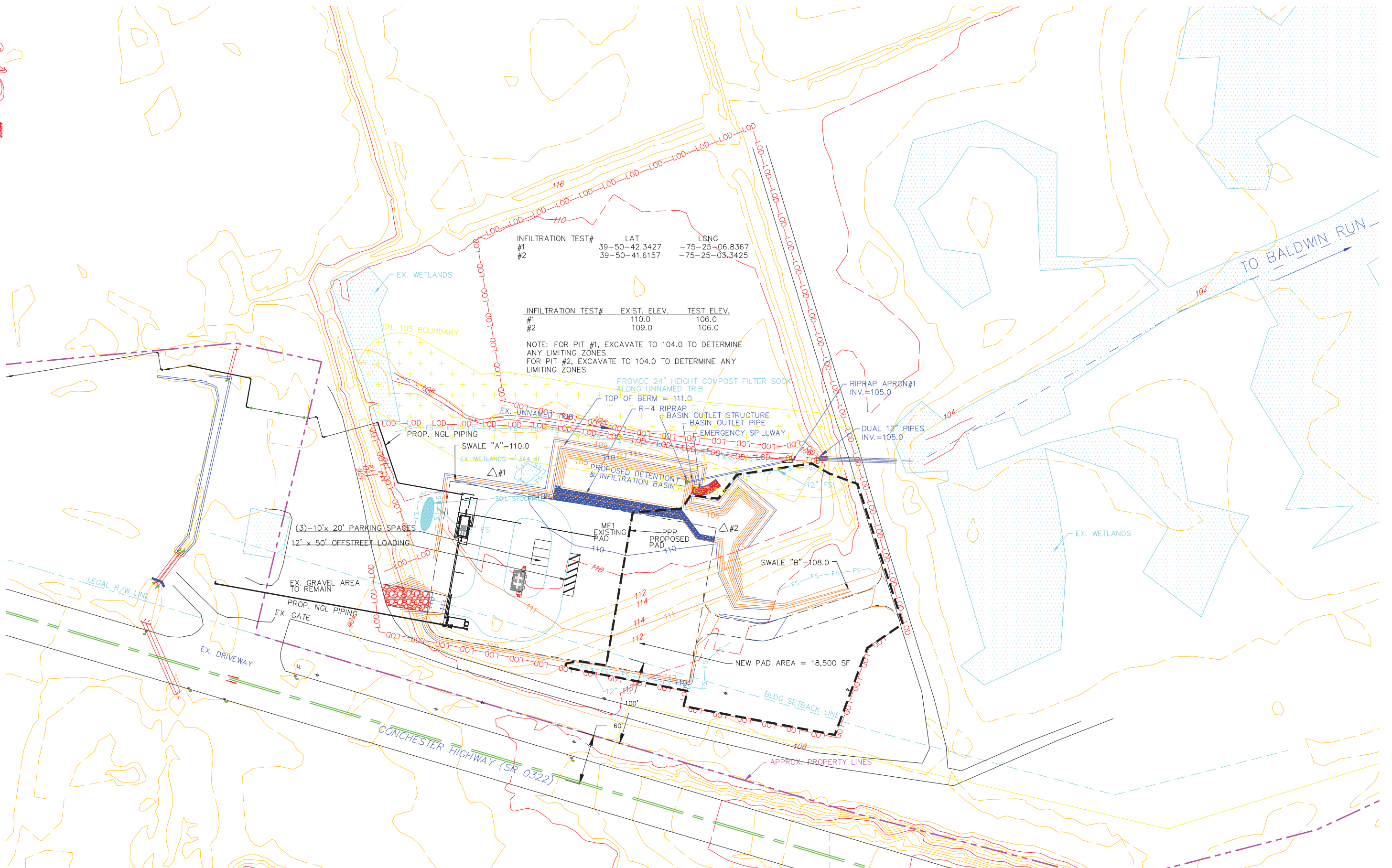
Location #	Location Data ¹		Test Depth (inches)	Infiltration Test Result (inches/hour)
	LATITUDE_WGS_84	LONGITUDE_WGS_84		
1	39°50'42.34" N	75°25'06.84" W	No Test	No Test
2	39°50'41.62" N	75°25'03.34" W	36	0

Note

¹ Field coordinates

ATTACHMENTS

SITE FIGURE



INFILTRATION TEST#	LAT	LONG
#1	39-50-42.3427	-75-25-06.8367
#2	39-50-41.6157	-75-25-03.3425

INFILTRATION TEST#	EXIST. ELEV.	TEST ELEV.
#1	110.0	106.0
#2	109.0	106.0

NOTE: FOR PIT #1, EXCAVATE TO 104.0 TO DETERMINE ANY LIMITING ZONES.
FOR PIT #2, EXCAVATE TO 104.0 TO DETERMINE ANY LIMITING ZONES.

3
OF
9



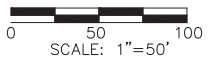
www.tetrattech.com
1134 TWIN STACKS DRIVE
DALLAS, PA 18612
T: (570) 674-8648 | F: (570) 674-8651

MARK	DATE	DESCRIPTION	BY

PPP - TWIN OAKS PUMP STATION
UPPER CHICHESTER TOWNSHIP, DELAWARE COUNTY

E&S PLAN - E&S CONTROL

DATE: 03/11/16
PROJECT NO.: IC-PB-00136
DRAWN BY: GZ
CHECKED BY: TC
SCALE: 1"=50'
FILE: TWIN OAKS
NAME: ES3
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SOIL LOGS

TC TETRA TECH **Soil Log**

Tested By: J. Coffman Project: Twin Oaks Project No.: 112IC05958
 Test Pit: #1 Elevation: 110 to 104 Equipment Used: backhoe
 Geology: Soil Date: 5/12/16 Land Use: grass field/edge of pad Weather: Sunny 70s
drain foundation
60' W of SW corner of basin

Additional Comments

Horizon	Upper Boundary	Lower Boundary	Soil Textural Class	Type, Size, Coarse Fragments, etc.	Soil Color	Color Patterns	Pores, Roots, Rock Structure	Depth to Bedrock	Depth to Water	Comments
C	0	30"	silt loam	vf. sand medium gravel - fine to medium at 10" (fragments rounded)	Dark brown with small black spots (rounded)	Org. Bed gray reddish mottling	Shallow grass roots found (quartz) gravel rounded rock frags	—	—	debris 18" 24" (plastic sheeting) moist soil
C	30"	72"	clayey silt loam	15-18" " "	Org - B.R.N	" "		—	—	

Horizon:	USDA Definition	Soil Textural Class	Boundary		Notes:
			Use depth and classification	Classification as Follows:	
O	Organic debris	Use ternary diagram from US Department of Agriculture Soil Conservation Service	Abrupt	Clear	C Horizon - Made Land (Fill) Photos: 6-8.
A	Dark colored, mixed mineral organic matter		Gradual	Diffuse	
B	Maximum accumulation of silicate clay minerals				
C	Weathered parent material				
R	Layer of consolidated rock beneath the soil				

Tested By: J. Coffman Project: Twin Oaks Project No.: 112IC05958
 Test Pit: #2 Date: 5/12/16 Elevation: 109-104 Equipment Used: backhoe
 Geology: Soil Soil Type: clays, lt brn Land Use: pump sta./impoundment Weather: Sunny 70s

Additional Comments

Horizon	Upper Boundary	Lower Boundary	Soil Textural Class	Type, Size, Coarse Fragments, etc.	Soil Color	Color Patterns	Roots, Rock Structure	Depth to Bedrock	Depth to Water	Comments
C	0"	60"	clayey silt loam	very fine sand small gravel & small silt fragments	org - brn gray streak	org - brn gray mottling red mottling	rounded gravel quartz shallow grass roots	—	—	moist
										Int. test PElev 106

Horizon:	USDA Definition	Soil Textural Class	Boundary	Notes:
O	Organic debris	Use ternary diagram from	Use depth and classification	C Horizon - Made Land (fill) Photos: 1-5, 9.
A	Dark colored, mixed mineral organic matter	US Department of Agriculture Soil Conservation Service	Classification as Follows:	
B	Maximum accumulation of silicate clay minerals		Abrupt	
C	Weathered parent material		Clear	
R	Layer of consolidated rock beneath the soil		Gradual	
			Diffuse	

INFILTRATION TEST DATA SHEET



INFILTRATION TEST DATA SHEET

Tetra Tech, Inc.

PROJECT NAME: Twin Oaks TEST AREA ID: #2
 PROJECT NUMBER: 12IC05958 PERSONNEL: S. Coffman

TEST METHOD: Double Ring Infiltrometer Percolation
 Single Ring Infiltrometer

INNER RING INSIDE DIAMETER/HEIGHT: 10"/10"
 OUTER RING INSIDE DIAMETER/HEIGHT: 6"/10"

Location Coordinates or Description:
grass field ~ 40' E of SE basin corner

PERCOLATION HOLE DIAMETER: _____ (If performing an open hole perc test)

DATE(s): 5/12/16

Distance from the bottom of the inner ring/hole to measuring point (minimum water column of 6-8 inches): 6"

MEASURING POINT: Ring Rim Indicator Mark DEPTH OF TEST: 3'

TIME	ELAPSED TIME SINCE START OF TEST (minutes)	WATER LEVEL DROP, INNER RING OR PERCOLATION HOLE (inches)	VOLUME OF WATER ADDED AT EACH CYCLE, INNER RING (liters)	REMARKS
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PRESOAK DATA

0955	0	-----	8.0	start of presoak
1025	30			
1055	60			end of presoak

TEST DATA

1055	0	-----	0	start of test period
1125	30	0	0	
1155	60	0	0	
1225	90	0	0	
1255	120	0	0	end of test period

PHOTOGRAPHS



Location #1 Exploration Test Pit



Location #2 Exploration Test Pit



Location #2 Exploration Test Pit



Location #2 Infiltration Test