Cape Cod Hospital – Project 2022
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CAPE COD COMMISSION

Application Cover Sheet

Cape Cod Commission
3225 Main Street, PO Box 226
Barnstable, MA 02630
Tel: (508) 362-3828 • Fax: (508) 362-3136

For Commission Use Only
Date Received:
Fee ($):
Check No:
File No:

A Type of Application (check all that apply)

- [✓] Development of Regional Impact (DRI)
- [ ] DRI Scoping
- [ ] DRI Exemption
- [ ] Hardship Exemption
- [ ] Jurisdictional Determination
- [ ] Request for Joint MEPA/DRI Review
- [ ] Decision Extension
- [ ] Decision Modification

B Project Information

Project Name: Cape Cod Hospital - Project 2022
Total Site Acreage: Approx. 17 acres
Project/Property Location: Cape Cod Hospital - 27 Park Street, Hyannis
Zoning: Medical Service (MS) District

Brief Project Description:

Include total square footage of proposed and existing development, gross floor area, number of lots existing or to be created, specific uses, description of existing conditions, as applicable (attach additional sheets if necessary).

Cape Cod Hospital proposes a six-story addition to the southwest corner of the existing hospital which includes a new cancer care center (2 stories), three stories of inpatient beds, and an education/collaboration center. This redevelopment project also includes numerous site improvements, including new and improved infrastructure to serve the Hospital, parking, new access/egress, stormwater management, and landscaping. Total gross square footage for the new addition is approx. 199,295 sf. The project also involves removal of the Whitcomb Pavilion, Cape Cod Medical Center and a portion of the existing hospital building resulting in a net new square footage of approximately 122,542 sf.

C Owner(s) of Record

List the following information for all involved parcels. Provide copies of each Deed and Purchase and Sale Agreement and/or evidence of leasehold interest, if applicable, for all involved parcels. Proof of ownership/legal rights for Applicant(s) to proceed with the proposed development must be documented prior to the Commission deeming any application complete. List the local, state, or federal agencies from which permits or other actions have been/will be filed (attach additional sheets if necessary).

Map/Parcel	Owner's Name	Lot & Plan	Land Court Certificate of Title #	Registry of Deeds Book/Page #
Barnstable: 342/001 and 342/039	Cape Cod Hospital		Please see Exhibit 7 of Application Materials for Title References	
Yarmouth: 28/62.1				

There **ARE / ARE NOT** (circle one) court claims, pending or completed, involving this property (if yes, please attach relevant information).

Is there an existing CCC Decision for the Property? [✓] yes [ ] no (if so, recording information for decision, please attach relevant information).

D Certification

I hereby certify that all information provided on this application form and in the required attachments is true and accurate to the best of my knowledge. I agree to notify the Cape Cod Commission of any changes on the information provided in this application, in writing, as soon as is practicable. I understand failure to provide the required information and any fees may result in a procedural denial of my project.
NOTE: For wireless communication facilities, a licensed carrier should be either an applicant or a co-applicant.

APPLICANT
Applicant(s) Name: Cape Cod Hospital Tel: _____ Fax: _____
Address: 27 Park Street, Hyannis MA 02601
Signature: _____ Date: _____

CO-APPLICANT
Co-Applicant(s) Name: _____ Tel: _____ Fax: _____
Address: _____
Signature: _____ Date: _____

CONTACT
Contact: Eliza Cox, Esq., Nutter McClennen & Fish, LLP Tel: 508-790-5431 Fax: 508-771-8079
Address: 1471 Iyannough Road, Hyannis MA 02601
Signature: Eliza Cox Date: 8/19/19

PROPERTY OWNER
Property Owner: Cape Cod Hospital Tel: _____ Fax: _____
Address: 27 Park Street, Hyannis MA 02601
Signature: _____ Date: _____

BILLABLE ENTITY
Name: Eliza Cox, Esq., Nutter McClennen & Fish, LLP Tel: 508-790-5431 Fax: 508-771-8079
Address: 1471 Iyannough Road, Hyannis MA 02601

CAPE COD HOSPITAL – PROJECT 2022

Executive Summary

Cape Cod Hospital, a 501(c)(3) charitable non-profit organization, proposes a six-story addition to the southwest corner of Cape Cod Hospital. The addition consists of approximately 200,000 square feet of gross floor area and includes a new cancer care center (2 stories), three stories of inpatient beds, and an education/collaboration center, together with substantial infrastructure and site improvements, including without limitation: parking, access/egress improvements, storm-water management, and landscaping. Cape Cod Medical Center and Whitcomb Pavilion, both of which are located within the Cape Cod Hospital's approximately 17-acre parcel, are proposed to be demolished to allow for the proposed addition and site improvements.

Programmatically, with the addition, the Hospital will increase its licensed bed capacity from 259 to 299 beds, representing a net increase of 4 critical care beds and 36 medical / surgical beds. The fifth floor, which is proposed to be shelled out initially, could accommodate an additional 36 bed medical/surgical unit in the future. The project responds to increased demand for oncology services by increasing capacity for medical oncology treatment (chemotherapy) from 19 patient bays to 36 patient bays, with the ability for additional future expansion. The Hospital's radiation therapy program will also be upgraded with a new linear accelerator, updated CT simulation equipment and dedicated brachytherapy equipment. The second floor of the addition also includes outdoor space and a roof garden for cancer patients and their families/caregivers. The sixth floor of the addition proposes an education/collaboration center for Hospital staff, together with outdoor space. The project also improves interior circulation within the Hospital building by improving connections to the emergency department area and to the Mugar tower. All of the new patient rooms will be private rooms and the addition will provide improved working spaces for physicians, nurses and staff. Please see Tab 3 of the application materials for a detailed overview of the project's programmatic improvements.

The project is a true redevelopment in that all work is proposed on existing disturbed areas of the Hospital campus. Where possible, the project introduces additional plantings within the interior of the property, including bio-infiltration storm-water areas. The Hospital has been adding parking spaces within the campus and on surrounding Hospital-owned lots, and additional parking spaces are shown on the project plans. Furthermore, the project includes a new building entrance which will include valet services, thereby increasing the number of valet locations on the campus. Once constructed, valet services will be available at the new addition, at the Mugar building entrance, and at what is currently the main Hospital entrance.

As described in the design narrative (Tab 10 of the application materials), the project design is directly driven by its function and operational needs, together with its location on the Campus. The massing has been broken down by variations in the color, shape, with the introduction of outdoor spaces on the 2nd and 6th floors, and by breaking down the project into three functional volumes.

The Hospital campus is located within a designated Community Activity Center Placetype and within an approved Growth Incentive Zone. Accordingly, the project is

appropriately situated in an area designated for growth and with adequate infrastructure to accommodate growth. Although the project does not meet the Commission's literal definition of "infrastructure" or a "capital facility," the project is similar to an infrastructure project in that provides a critically important service in response to the community's healthcare needs. Any project-related impacts are mitigated by the project's location within a Community Activity Center and a Growth Incentive Zone and should be evaluated in light of the critically important community health services that Cape Cod Hospital provides. Cape Cod Hospital is designated as a sole community provider hospital and serves as the region's safety net provider. The Hospital provides service 24 hours a day, 365 days a year, and accepts all patients, regardless of their ability to pay.

This project a tremendous investment by Cape Cod Hospital in this campus and in furtherance of its mission to coordinate and deliver the highest quality accessible health services, which enhance the health of all Cape Cod residents and visitors. An enormous amount of planning has been incorporated into the project's design, taking into account community, patient, and caregiver needs, together with the logistics of where to site the building on the campus and all of the various, and complex, utility, programmatic, equipment, and infrastructure needs for this addition. This addition will enable the Hospital to continue to recruit exceptional providers, improve its technology and infrastructure, continue important collaborations like the one recently established with the Dana Farber Cancer Institute, and pursue new programs, such as Trauma care (as described in the Project Overview), all to the benefit of this community.

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Cape Cod Hospital Project 2022 – Project Overview

Background

Cape Cod Hospital (CCH) is a primary affiliate of Cape Cod Healthcare (CCHC) and one of two acute care hospitals in the CCHC system. Our mission is to coordinate and deliver the highest quality accessible health services, which enhance the health of all Cape Cod residents and visitors. As a regional medical center, Cape Cod Hospital provides inpatient, outpatient and emergency care for approximately 214,000 year-round residents of Barnstable County, as well as patients from surrounding local areas and numerous national and international visitors. The unique demographics of the Cape present challenges to our healthcare system to provide access and ensure capacity for those needing medical care. The median age of residents, at 51 years old, is well above the Massachusetts median age of 39.4. Barnstable County has a significantly higher percentage of seniors (ACS survey 2012-2016 at 27.8% compared to Massachusetts at 15.1%). This translates to higher utilization of healthcare services, particularly inpatient services. In addition, the seasonal influx of visitors can more than double the year-round population in peak summer months. As the "season" now extends to include spring, summer and fall, particularly on weekends, the Hospital must be prepared to address those patient needs. Prevalence of respiratory illness and flu also impact bed requirements, particularly in the winter and spring months. In FY18, CCH discharged 19,646 patients, including 15,291 inpatients, 3,423 observation patients and 932 psychiatric patients. The CCH Emergency Department had 79,588 patient visits in FY18.

It is our strategic goal to provide a full array of comprehensive medical services to the community. This allows patients to receive high quality medical care close to home without incurring higher costs and the inconvenience of travel to Boston. Our most recent inpatient market share data (FY17 CHIA) demonstrates that approximately 8,000 patients leave the Cape annually for inpatient care at other hospitals. Cape Cod Hospital and Falmouth Hospital will continue to develop and expand services so that more patients choose to obtain care locally. This is advantageous to patients as well as to the economic viability of our region, as we will highlight in a later section of this document.

Cape Cod Hospital is designated as a sole community provider hospital and serves as the region's safety net provider. The Hospital provides service 24/7, 365 days a year and accepts all patients, regardless of their ability to pay. Given the patient population, the Hospital is heavily reliant on government payers, such as Medicare and Medicaid. The payer mix for CCH Inpatient Service exceeds 80% for Medicare and Medicaid combined and is trending upward. This demonstrates the reliance on our hospital by the more vulnerable members of our community.

The Proposed Project

Cape Cod Hospital has undergone significant expansion and renovation since it opened in 1920. Patient rooms have been added or adapted, but the oldest current patient rooms date from 1948. Advancements in patient care techniques and utilization of diagnostic equipment in patient rooms require larger and better-equipped rooms. Patient expectations for privacy, quiet and family space has led to a new standard of private rooms. All 120 patient rooms in the Cape Cod Hospital Mugar wing, added in 2001-2009, are private.

To remain competitive, the Hospital must recruit exceptional providers and staff, integrate across our system and clinically align with other providers. We must stay current with technology and equipment advancements, and carefully maintain facilities and infrastructure.

Cape Cod Hospital has developed its key service lines to meet the medical needs of our community. Given the age of our local population, we have developed comprehensive services for Cardiovascular, Oncology, Orthopedics, Neurosurgery, Medical and Surgical care.

Our programs consistently achieve high quality outcomes for clinical care. The Centers for Medicare and Medicaid Services (CMS) annually evaluates hospitals based on 57 quality measures. CCH received a 5-star rating in CMS' Hospital Compare evaluation. CCH has received a "A" score for the Leapfrog Hospital Safety Survey for seven consecutive years. CCH has also been named "America's 100 Great Community Hospitals" by *Becker's Hospital Review* for eight straight years.

However, the current facilities that house our cardiovascular, oncology and some of the medical/surgical units need to be updated, improved and expanded. As the community has embraced enhanced programs, we have outgrown the space in the existing Hospital. Patient rooms, space for diagnostic equipment, storage, physician and nurse workspace are currently limited. Over the past decade the hospital has renovated areas where possible to ensure compliance with current standards and address growth in patient volumes. However, the cardiovascular, oncology and surgical suites are essentially "landlocked" in the current configuration. The creation of the proposed new patient floors and the new cancer center will address our current and future needs. Further, it will allow us to redefine the care we deliver at Cape Cod Hospital.

The proposed new building will offer expanded 28 bed Critical Care/Intensive Care service and one additional inpatient floor dedicated to the Cardiovascular service. The co-location of the inpatient CVICU on Level 3 and CV Med/Surg unit on Level 4 will enable Cape Cod Hospital to provide enhanced collaboration and more efficient care to cardiovascular patients and their families. The 12-bed CVICU will meet the demand for cardiovascular services through a flexible and continuous ribbon of patient rooms, adjoining the 16-bed ICU on the same floor. The two

units are contiguous and will be able to flex to meet the census demands of patient care between ICU and CVICU. The design of the proposed ICU and CVICU patient rooms will limit cross contamination and enhance infection prevention.

The 36-bed proposed CV Medical/Surgical Unit for the new addition will replace the existing 12-bed and 24-bed CV med/surg units housed in a 1950's building on the Cape Cod Hospital campus. The new unit will transform the way medical care is delivered at Cape Cod Hospital and will recognize the role of the family as a partnership to support patient well-being. Focus on patient and family experience and staff efficiency are the key drivers in the design. The new units will exceed the minimum 2018 FGI Guidelines, enable clinical teams to collaborate more effectively, and provide space for emerging technologies, as well as amenities for families on the units and within the patient room.

The proposed CV Medical/Surgical patient rooms are comprised of all private rooms with private shower in the patient toilet room. Distinguishing characteristics of the patient room include a family zone with sleep sofa or chair, a hand-wash sink adjacent to the door to the room to facilitate hand hygiene and prevent the spread of pathogens, and high NRC ceilings and sound insulation within partitions between patient rooms and toilet rooms.

Importantly, the design will address the following components of a high-performance patient room:

- Safety: Fall prevention intervention using resilient non-slip flooring, adequate space for bedside transfer and transfers to toilet and showers, basin-less showers designed and pitched to maximize fast drainage, and accessible grab bars within the patient room and toilet.
- Technology: Integrated patient room systems such as lighting, entertainment, and nurse call combined in an easily accessible single command center to enhance the patient's experience by providing control over one's environment.
- Decibel levels: CCH recognizes that excessive noise contributes to sleep deprivation, diminishing self-healing and emotional well-being. The addition will conform to FGI 1.2-6.1 Acoustic Design guidelines for exterior environmental sound and interior sound within all occupied building space.
- Chemical management: Antimicrobial chemicals used in the manufacturing of materials, finishes, and fabrics have been identified by the Centers for Disease Control and Prevention as harmful. CCH is committed to eliminating the use of these materials.

With the new addition, the hospital will increase its licensed bed capacity from 259 to 299 beds, a net increase of 4 critical care beds and 36 medical/surgical beds. The fifth floor of the new building has the same design and layout as the medical/surgical fourth floor but will initially be shelled rather than finished space. This floor could be completed as a 36 bed medical/surgical unit. This ensures Cape Cod Hospital will have the ability to service future growth needs of our aging population, as well as needs generated by development of new programs.

The Hospital is developing a Trauma program and plans to apply for certification as a Level III Trauma Center within the next two years. Recruitment is currently underway for the Trauma Program Director and a second acute care surgeon. These physicians will provide the foundation for the trauma service, and will work cooperatively with the neurosurgeons, orthopedic surgeons and general surgeons on the CCH medical staff. The Hospital is currently developing infrastructure and policies required for certification. The Level III Trauma Program must be certified by both the American College of Surgeons and the MA Department of Public Health. Once certified, the Trauma program is expected to generate additional inpatient admissions and surgical cases and that volume has been considered in the design of the Project. CCH will be able to care for Level III trauma cases that are currently being transported off Cape to certified trauma centers in Boston or Providence, RI.

In early 2019, Cape Cod Healthcare was accepted as a member of the Dana-Farber Cancer Care Collaborative. This clinical affiliation was achieved after the Hospital underwent a rigorous assessment of our medical oncology program, including a review of medical staff, nursing, pharmacy, quality and information technology. CCH will collaborate with the Dana-Farber Cancer Institute to share best practices, enhance protocols and pathways and support recruitment of physicians and staff. Our cancer patients will have increased access to specialists, current research and clinical trials. As a result, the Hospital will be able to serve a greater number of cancer patients locally, while improving coordination of care for those that may also need tertiary care. Cancer patients can be treated here on Cape Cod, close to their families and support systems.

The demand for oncology services on Cape Cod is increasing, but the existing oncology space at CCH has constrained program development. The new Cancer Center will incorporate patient-centered design to increase capacity for medical oncology treatment (chemotherapy) from 19 patient bays to 36 patient bays, with potential to expand further, if needed. Proper space for practitioners, as well as pharmacy, laboratory, patient education and family support areas has been incorporated into the design. Our radiation therapy program will be upgraded with a new linear accelerator, updated CT simulation equipment and dedicated brachytherapy equipment.

The Planning Effort

The Cape Cod Hospital Project Planning Team includes the Hospital's clinical and administrative leaders, facilities team, architect, contractor, legal advisers and various specialized building consultants. The core planning team has solicited significant input on design, space planning, workflow, technology needs and equipment for our clinical caregivers. This effort included the input of physicians, nurses, pharmacy technologists, certified nurse assistants and others. As part of the planning process, the Hospital conducted user group meetings for each of the primary service areas. In addition to clinical staff, housekeeping, food service, support, bio-medical and environmental services, security, information technology and communications staff were engaged.

The Hospital team conducted more than six site visits to acute care and cancer specialty hospitals to view and discuss design, space and workflow solutions. These visits to leading local and regional hospitals highlighted state-of-the-art solutions and innovative approaches and informed the design process.

The Hospital has and will continue to engage patients and their families through the Hospital's Patient and Family Advisory Council (PFAC). The PFAC has been instrumental in helping the Hospital to understand the patient's perspective and identify factors that result in a positive patient experience.

The Hospital regularly conducts patient satisfaction surveys for our inpatient, outpatient, emergency and cancer services. Using survey tools and methodology provided by Press Ganey Associates, the Hospital receives patient feedback on medical care, communications, facility and customer service. The patient feedback from these surveys was also considered as part of this planning process.

Finally, the Hospital also engaged the consulting firm Mad Pow to assist with planning of the new Cancer Center. The purpose of this engagement was to help ensure that the experiences and needs of patients, their families and staff are incorporated in the design and the overall cancer care program. This patient-centered design process included patient, caregiver and staff discussions, as well as participatory design workshops with the Hospital and Tsoi Kobus Architects. These sessions informed the design of the space, workflow and processes for the new Cancer Center.

Community Contribution

Cape Cod Healthcare, as a not-for-profit health system, has an obligation and a duty to invest in programs that address community needs. CCHC invests more than $25 million annually to support community health initiatives, including charity care, hospital-based programs and grants to community-based organizations. These programs support access, chronic and infectious disease management, behavioral health and substance use disorder treatment, and population health and wellness. The Community Health Committee, comprised of representatives of community organizations, oversees the CCHC Annual Strategic Grant process. The CCHC Community Benefits Department actively collaborates with over 45 community agencies, non-profit organizations and federally qualified health centers on Cape Cod.

The recent CCHC Community Health Needs Assessment identified key social determinants of health that CCH and CCHC will support in FY20-FY22, including housing, transportation and healthcare workforce development. CCHC recently invested $1 million into The Cape Cod Community College Nursing School to support educational and employment opportunities in the region.

In the past decade, CCHC has invested over $300 million in facilities development, at Cape Cod Hospital and Falmouth Hospital, outpatient centers situated across the region, and four new urgent care centers. We continue to recruit to support the expansion of primary and specialty care, to ensure access for patients and reduce the cost of care.

In addition to the Cape Cod Commission and local town regulatory approvals, the Hospital is also seeking approval of this Project from the MA Department of Public Health. As part of the Determination of Need (DON) process, the Hospital will undertake a Community-based Health Initiative (CHI) process. The Hospital will engage with local partners to identify and plan programs to address the most pressing community health needs, social determinants of health and issues of health equity.

Upon approval of the Project, the Hospital will commit significant community benefits funding to be invested in the community via a grant process. This data-driven and outcomes-based grant process will be overseen by the Community Health Committee. The total community benefits investment for this Project is expected to be in the range of $8 million over five years. A portion of this funding will be allocated to statewide initiatives, but approximately 75% will be invested in the local region.

Economic Overview

Cape Cod Healthcare currently employs 5,598 people throughout the system, including 2,618 people employed at Cape Cod Hospital. The proposed Project is expected to result in the addition of 56-68 non-physician FTEs. This will equate to 80-90 new jobs at CCH. This estimate includes necessary coverage for three shifts each day. These new jobs will include registered nurses and aides, facilities/environmental/engineering, security, food service, housekeeping, and other support staff.

Based on current operations of similar sized units in the existing hospital, the addition of the new fourth floor medical/surgical unit is expected to generate approximately $6M in new expense per year, including salaries, supplies, utilities, equipment and required services.

This project is also expected to generate 250-300 construction related jobs over the duration of this project. The expected average duration of these jobs is approximately 3-6 months with an average salary of $25 per hour, however some jobs will continue longer.

The proposed Project is integral to the continued success of Cape Cod Hospital and Cape Cod Healthcare. It will ensure the Hospital will remain viable as a community asset, preserve current employment and contribute to the economic viability of the region.

Accordingly, the Cape Cod Healthcare Board of Trustees has approved the cost of the Project at $180.3M. The project has the full support of the Board and CCHC's CEO, leadership, physicians and staff.

Economic Impact Study

In 2015, CCHC contracted with UMASS Donahue Institute to conduct an economic impact study. The goal of this study was to better understand the economic impact Cape Cod Healthcare has on the region and to update demographic forecasts that inform CCHC's strategic planning efforts. The study utilized the IMPLAN modeling system, a statistical methodology frequently used by the U.S. Bureau of Economic Analyses and state governments. CCHC provided the necessary staffing and expense inputs for the years 2008-2014. The GDP analyses was based on expenses, not revenues. Expenses that were spent outside the market were excluded. As CCHC sources much of its medical equipment, drugs and supplies from outside the Cape market this had the effect of reducing the impact somewhat. However, even with this methodology consideration, the economic impact was significant.

Here is a brief overview of the findings of that 2015 study:

- The healthcare and social assistance segment accounted for $1.16B or 11% of Barnstable County's GDP of $10.5B.
- CCHC, as an organization, represented 7% of the region's GDP.
- The economic impact of CCHC equaled direct effects plus indirect effects and induced effects.
- CCHC's spending had a positive impact on the local economy.
- Every $1 spent by CCHC in the local region generated $1.52 in the community.
- From FY08 to FY14, CCHC invested $264M in capital expenditures for technology, equipment and upgraded plant.
- CCHC was responsible for generating 20% of total jobs created in the region from 2008-2014.
- 87% of CCHC employees lived in Barnstable County.
- Average annual wage per job at CCHC, excluding physicians, was $75,241.
- This wage provided greater opportunity for employees to afford stable housing and a reasonable standard of living.

Finally, as documented in the Cape Cod Commission's Cape Cod Regional Policy Plan, 18% of the region's job are in health-care-related fields. Health care is among the top three industries for the region. Health-care jobs provide year-round employment with good wages. This type of employment stabilizes the economy, contributes to lower unemployment and provides families with better ability to afford comparatively high local housing costs.

CAPE COD HOSPITAL – NEW TOWER ADDITION

REVIEW GOALS AND OBJECTIVES OF THE REGIONAL POLICY PLAN

NATURAL SYSTEMS	
Water Resources	
Goal: *To Maintain a sustainable supply of high quality untreated drinking water and protect, preserve, or restore the ecological integrity of Cape Cod's fresh and marine surface water resources.*	
Objectives	**Project Methodology or Not Applicable/Material**
WR1 - Protect and preserve groundwater quality	• Project is connected to municipal sewer system. • Site-wide nitrogen loading estimated at 0.75 ppm. • Project is not within a wellhead protection area. • Project includes upgrading Cape Cod Hospital's fuel oil tanks which supply its emergency generator and emergency backup boiler fuel to meet current safety code capacity requirements. • Existing tanks will be removed and replaced with new double wall fiberglass reinforced plastic tanks with double wall piping and leak detection. • Site is designed to comply with State storm-water management guidelines with low impact storm-water design components and infiltration of all storm-water from the project area onsite to recharge the aquifer.
WR2 - Protect, preserve and restore fresh water resources	Not Applicable. Project is not within a mapped Fresh Water Recharge Area.
WR3 - Protect, preserve and restore marine water resources	Although the site is located within a Marine Water Recharge Area, consistent with the objective, the Project does not increase the site wide nitrogen loading. See Nitrogen Loading Calculations.

WR4 - Manage and treat Stormwater to protect and preserve water quality	With this redevelopment, rain gardens are proposed where practicable to reduce TSS prior to sub-surface infiltration. Sub-surface infiltration is designed to accommodate 25 year storm, with pre-treatment through deep sump catch basins and deep sump hooded manholes prior to infiltration to meet TSS removal standards. Roof runoff will be directly infiltrated in separate infiltration fields.
WR5 - Manage groundwater withdrawals and discharges to maintain hydrologic balance and protect surface and groundwater resources	This is not applicable/material. The Project is connected to the municipal sewer and water systems and there are no on-site wells.
Ocean Resources	
Goal: *To protect, preserve or restore the quality and natural values and functions of ocean resources*	
Objectives	**Project Methodology**
OR 1 - Locate development away from sensitive resource areas and habitats	Not Applicable / Material
OR2 - Preserve and protect ocean habitat and the species it supports	Not Applicable / Material
OR3 - Protect significant human use areas and vistas	Although visible from the Hyannis Harbor, the building is designed so that it does not result in any adverse visual impacts from the Harbor.
Wetland Resources	
Goal: *To protect, preserve, or restore the quality and natural values and functions of inland and coastal wetlands and their buffers*	
Objectives	**Project Methodology**
WET1 - Protect wetlands and their buffers from vegetation and grade changes	No wetlands will be altered. Redevelopment work within existing disturbed buffer areas is minimized.
WET2 - Protect wetlands from changes in hydrology	Storm-water from the redevelopment area is proposed to be infiltrated on-site.
WET3 - Protect wetlands from Stormwater discharges	Storm-water from the redevelopment area is proposed to be infiltrated on-site.

WET4 - Promote the restoration of degraded wetland resource areas	Not applicable. There are no on-site wetlands. Closest wetlands are located across the public ways from subject property.
Wildlife and Plant Habitat	
Goal: *To protect, preserve, or restore wildlife and plant habitat to maintain the region's natural diversity*	
Objectives	**Project Methodology**
WPH1 - Maintain existing plant and wildlife populations and species diversity	Not Applicable / Material
WPH2 - Restore degraded habitats through use of native plan communities	Not Applicable / Material
WPH3 - Protect and preserve rare species habitat, vernal pools, 350-foot buffers to vernal pools	Not Applicable / Material
WPH4 - Manage invasive species	Not Applicable / Material
WPH5 - Promote best management practices to protect wildlife and plan habitat from the adverse impacts of development	Not Applicable / Material
Open Space	
Goal: *To conserve, preserves or enhance a network of open space that contributes to the region's natural and community resources and systems*	
Objectives	**Project Methodology**
OS1 - Protect and preserve natural cultural and recreational resources	Not Applicable / Material
OS2 - Maintain or increase the connectivity of open space	Not Applicable / Material
OS3 - Protect or provide open space appropriate to context	Not Applicable / Material
BUILT SYSTEMS	
Community Design	
Goal: *To protect and enhance the unique character of the region's built and natural environment based on the local context*	
Objectives	**Project Methodology**

CD1 - Promote context sensitive building and site design	The site classification is community activity center and is within the Hyannis Growth Incentive Zone. The project is a redevelopment and expansion of Cape Cod Hospital. The project is needed for the Hospital to meet the community's current and future needs. Much like the current Hospital campus, the design of the building reflects the functions within the various building masses. Exterior parking lot lighting will be dark sky compliant.
CD2 - Minimize the amount of newly disturbed land and impervious surfaces	As a campus redevelopment, the project will enhance the open area by clustering the massing around the southwest corner of the existing Hospital. The footprint of the building will replace the Davenport building, and the removal of the Whitcomb Building and Cape Cod Medical will expand the landscape parking area. The project is a redevelopment, multi-story structure, consistent with the objective.
CD3 - Avoid adverse visual impacts from infrastructure to scenic resources	There will be a louvered screen on the top of the building to mask new cooling towers. The addition will screen the existing mechanical elements from Lewis Bay Road.
Coastal Resiliency	
Goal: *To prevent or minimize human suffering and loss of life and property or environmental damage resulting from storms, flooding, erosion, and relative sea level rise*	
CR1 - Minimize development in the floodplain	No development is proposed within a V zone. The Project proposes removal of existing development within the flood zone X.
CR2 - Plan for sea level rise, erosion, and floods	As described in the Coastal Resiliency Narrative, the proposed addition is designed to plan for sea level rise and flooding.
CR3 - Reduce vulnerability of built environment to coastal hazards	With proposed removal of the most vulnerable existing buildings, together with building design, and infrastructure improvements, the Project reduces vulnerability to coastal hazards.
Capital Facilities and Infrastructure	

Goal: *to guide the development of capital facilities and infrastructure necessary to meet the region's needs while protecting regional resources*	
Objectives	**Project Methodology**
CAP1 - Ensure capital facilities and infrastructure promote long term sustainability and resiliency	Although the Project does not meet the Cape Cod Commission's definition of a "capital facility" or "infrastructure," the Project is, essentially, an infrastructure improvement in that it provides needed service that benefits and supports residents and visitors of Cape Cod. Not only will the Project respond to the community's health needs, but it also includes infrastructure upgrades to the Hospital, as a whole, including upgrading its emergency generator and back-up boiler fuel tanks to meet current safety code requirements. As described in the application materials, substantial diligence was undertaken to determine and design for community needs in a manner that promotes long-term sustainability and resiliency.
CAP2 - Coordinate the siting of capital facilities and infrastructure to enhance the efficient provision of services and facilities that respond to the needs of the region	See above note; notwithstanding that the Project does not qualify as a "capital facility" or "infrastructure" under the RPP, the Project is appropriately sited on the Cape Cod Hospital campus and will allow the Hospital, a non-profit, community hospital, to further improve its patient care including, cancer care, ICU beds, and CV ICU beds to service and in response to healthcare needs of the region. The Hospital is also developing a Trauma program with plans to apply for certification as a Level III Trauma Center within the next several years. The additional volume associated with that certification is accounted for in the design of the Project.
Transportation	
Goal: *To provide and promote a safe, reliable, and multi-modal transportation system*	
Objectives	**Project Methodology**
TR1 - Improve safety and eliminate hazards for all users of Cape Cod's transportation system	Access to the site is provided in a way that minimizes potential conflicts and provides adequate sight lines and visibility. In addition, the proposed project has identified safety deficient

	intersections in the vicinity of the site and is proposing measures to improve the safety issues identified.
TR2 - Provide and promote a balanced and efficient transportation system that includes healthy transportation options and appropriate connections for all users	The proposed tower is an enhancement to the campus and will benefit from existing systems that are in place regarding Transportation Demand Management (TDM). This includes a shuttle that connects to all area transportation hubs (ferry/airport/train/bus). In addition, a series of new pedestrian facilities are proposed which will tie into existing pedestrian infrastructure that is already well-established in this area.
TR3 - Provide an efficient and reliable transportation system that will serve the current and future needs of the region and its people	This is a significant project of community benefit that will enhance access to necessary medical services for the community. While the project traffic report has conservatively assumed an increase, it should be understood that these medical services are already needed and are being sought throughout Cape Cod and beyond. Expanding services on the hospital campus should reduce the needs for residents and visitors to drive great distances to get similar services and, therefore, this project, which provides additional access to state of the art medical treatment on Cape Cod is a tremendous regional benefit. As demonstrated in the TIAS, the conservative projections of potential traffic are relatively minor and do not create much impact at study area intersections. To the extent needed, a waiver from congestion payments is sought.
Energy	
Goal: *To provide an adequate, reliable and diverse supply of energy to serve the communities and economics of Cape Cod*	
Objectives	**Project Methodology**
EN1 - Support renewable energy development that is context-sensitive	Currently, Cape Cod Healthcare has power purchase agreements at six off-Cape solar installations which collectively generate 11.53MW of solar.

EN2 - Increase resiliency of energy generation and delivery	New infrastructure is proposed to be underground. As part of the project, Cape Cod Hospital's fuel oil tanks, which supply its emergency generator and emergency backup boiler fuel, will be upgraded to meet current safety code capacity requirements. The project also includes infrastructure at the Hospital for a future 800kw cogeneration package.
EN3 - Minimize energy consumption through planning and design (energy efficient and conservation measures)	The Project will be designed to meet LEED silver-level certification requirements but will not be submitted to LEED for certification. This objective is also met via building and design elements (see Tab 16) and via site design elements (e.g., electric vehicle charging stations, pavement shading, and energy efficient lighting).
Waste Management	
Goal: *To promote a sustainable solid waste management system for the region that protects public health, safety and the environment and supports the economy*	
Objectives	**Project Methodology**
WM1 - Reduce waste and waste disposal by promoting waste diversion and other Zero-Waste initiatives	Cape Cod Hospital maintains corporate protocols on recycling and waste diversion measures.
WM2 - Support an integrated solid waste management system	A Construction Waste Management Plan is included in the application materials.
COMMUNITY SYSTEMS	
Cultural Heritage	
Goal: *To protect and preserve the significant cultural, historic, and archeological values and resources of Cape Cod*	
Objectives	**Project Methodology**
CH1 - Protect and reserve forms, layouts, scale, massing, and key character defining features of historic resources, including traditional development patterns of villages and neighborhoods	The Project is outside the boundaries of the Hyannis Main Street Waterfront Historic District. The size, scale and design of the proposed addition are consistent with the rest of the hospital.

CH2 - Protect and preserve archaeological resources and assets from alteration or relocation	The Project is a true redevelopment project, located on existing disturbed and impervious portions of the Cape Cod Hospital Campus.
CH3 - Preserve and enhance public access and rights to and along the shore	Not Applicable / Material
CH4 - Protect and preserve traditional agricultural and maritime development and uses	Not Applicable / Material
Economy	
Goal: *To promote a sustainable regional economy comprised of a broad range of businesses providing employment opportunities to a diverse workforce*	
Objectives	**Project Methodology**
EC1 - Protect and build on the Cape's competitive advantages	Consistent with this Objective, the Project is appropriately (and necessarily) proposed at Cape Cod Hospital which is located within the Hyannis Growth Incentive Zone and within a designated Community Activity Center placetype. Consistent with the Placetype emphasis, the Project provides critical services to residents and visitors.
EC2 - Use resources and infrastructure efficiently	The Project is a redevelopment of an existing site. It is accessible by multiple modes of transportation. It shares infrastructure with proximate developments. New utilities are located underground. Although the Project does not meet the CCC's definition of infrastructure, the Project is essentially a critical infrastructure development that benefits the region, and its residents and visitors. The Project is fully consistent with the Placetype's emphasis of siting infrastructure and capital facilities in a Community Activity Center.
EC3 - Foster a balanced and diverse mix of business and industry	Healthcare accounts for a substantial portion of the County's GDP and is a critical component of the region's economic mix. Cape Cod Hospital provides high-quality employment opportunities and attracts other health-related businesses/service providers to the region.

EC4 - Encourage industries that provide living wage jobs to a diverse workforce	Cape Cod Healthcare is the region's largest employer. Health-care jobs provide year-round employment with good wages. The Project is anticipated to result in the addition of 56-68 non-physician FTE's, together with 250-300 construction related jobs over the duration of the project.
EC5 - Expand economic activity and regional wealth through exports, value added, import substitution, and local ownership	As described in the Project Overview, Cape Cod Healthcare is critically important to the region's GPD. Its investment in the community results in a net increase in regional economic activity. In addition, Cape Cod Healthcare invests more than $25 million annually to support community health initiatives, including charity care, hospital-based programs and grants to community-based organizations. As part of the Determination of Need approval process for the Project, the Hospital will commit significant community benefits funding to be invested in the community via a grant process. The total community benefits investment for this Project is expected to be in the range of $8 million over five years, of which approximately 75% will be invested in the local region.
Housing	
Goal: *To promote the production of an adequate supply of ownership and rental housing that is safe, healthy and attainable for people with different income levels and diverse needs*	
Objectives	**Project Methodology**
HOU1 - Promote an increase in housing diversity and choice	Not Applicable / Material
HOU2 - Promote an increase in year-round housing supply	Not Applicable / Material
HOU3 - Protect and improve existing housing stock	Not Applicable / Material
HOU4 - Increase housing affordability	Not Applicable / Material

Cape Cod Hospital – Project 2022

27 Park Street, Hyannis

Anticipated Land Use Permits

- ✓ Cape Cod Commission – Development of Regional Impact
- ✓ Site Plan Review – Towns of Barnstable and Yarmouth
- ✓ Federal Aviation Administration – Form 7460
- ✓ US EPA – NPDES General Construction Stormwater Permit / NOI
- ✓ Barnstable Conservation Commission – Notice of Intent / Order of Conditions
- ✓ Town of Barnstable – Special Permit (building height in feet)
- ✓ Barnstable Board of Health – Chapter 326 Fuel & Chemical Storage Tanks – Approval Received on June 25, 2019
- ✓ MA DEP – Underground Fuel Tanks – 310 CMR 80 Underground Storage Tank (UST) Systems
- ✓ Town of Barnstable Licensing Division – G.L. c. 148, § 13 Underground Storage License
- ✓ Yarmouth Conservation Commission – Request for Determination of Applicability (for site work)
- ✓ Barnstable – Building Permit

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Town of Barnstable
Assessing Division
367 Main Street, Hyannis MA 02601
www.townofbarnstable.us

Office: 508-862-4022
FAX: 508-862-4722

Edward F O'Neil, MAA
Director of Assessing

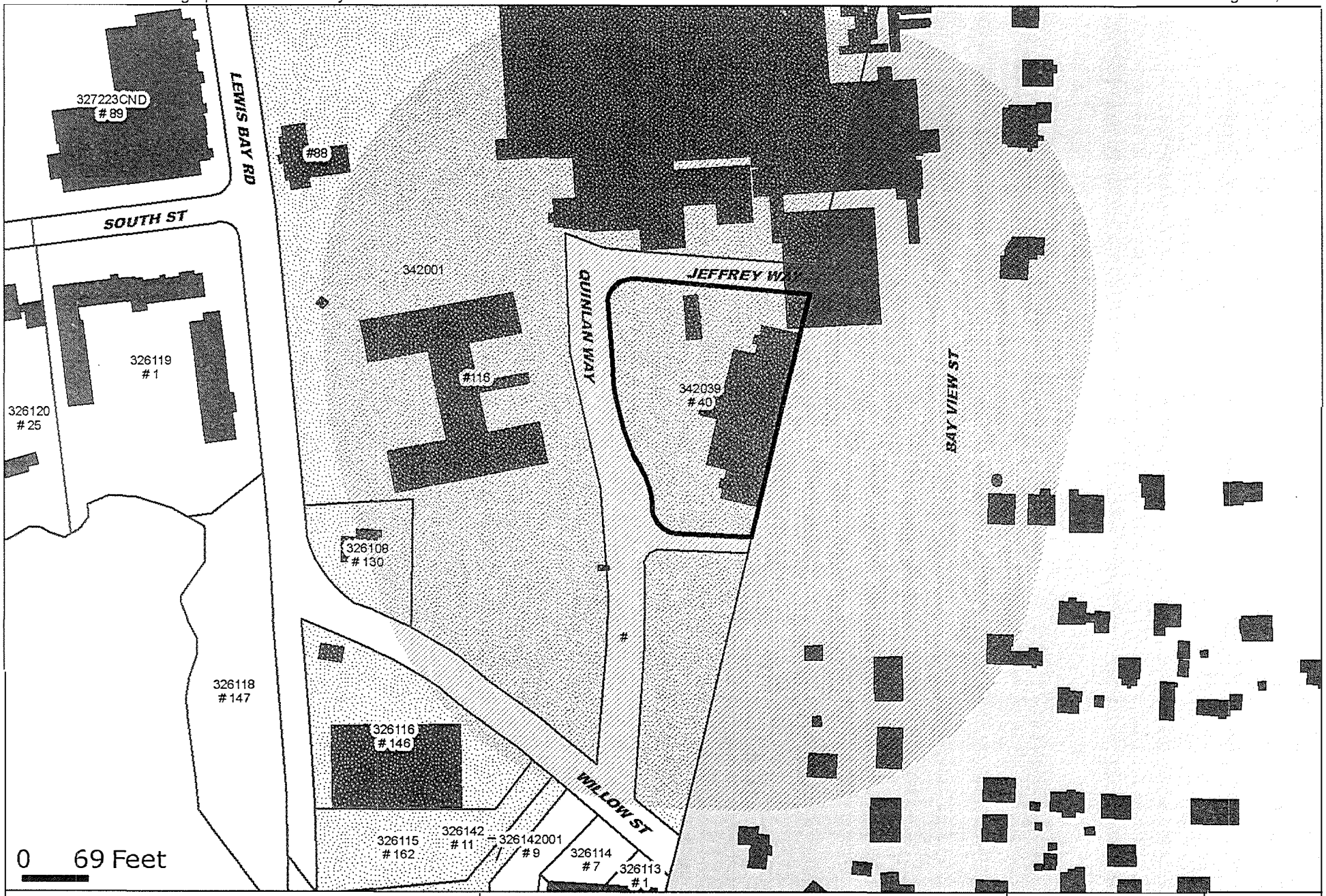
ABUTTERS LIST CERTIFICATION

DATE: August 15, 2019

RE: Abutters List
For Parcel(s) : 342-039

As requested, I hereby certify the names and addresses as submitted on the attached sheet(s) as required under Chapter 40A, Section 11 of the Massachusetts General Laws for the above referenced parcels as they appear on the most recent tax list with mailing addresses supplied.

Board of Assessors
Town of Barnstable



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Map: 342 Parcel: 039 **Cape Cod Commission DRI**

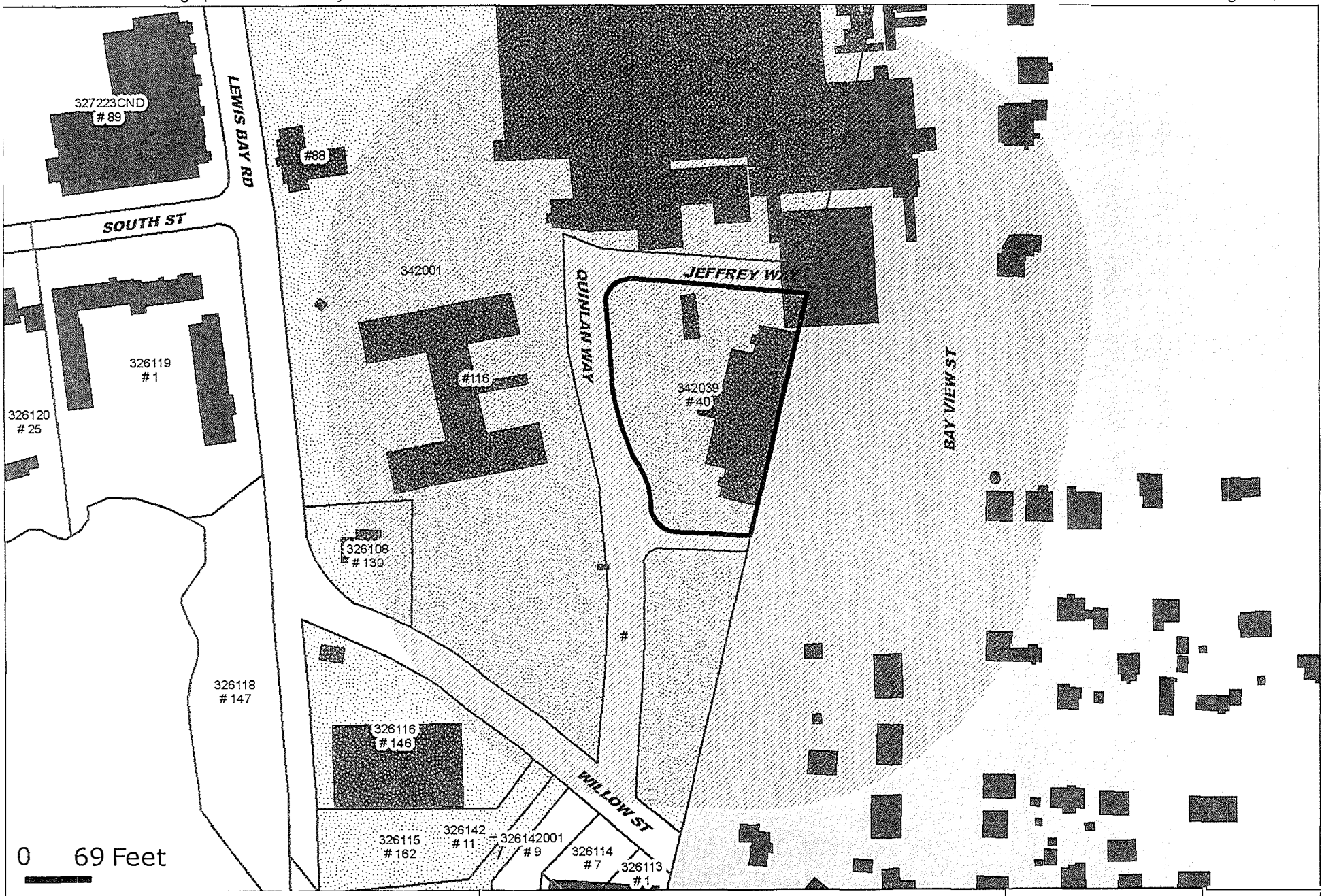
Abutter List Type - Abutters within 300 feet of subject parcel

Selected Parcel

Abutters

Buffer

N W E S



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Map: 342 Parcel: 039 **Cape Cod Commission DRI**

Abutter List Type - Abutters within 300 feet of subject parcel

Selected Parcel

Abutters

Buffer

N W E S

Cape Cod Commission DRI Abutter List for Map & Parcel(s): '342039'

butters within 300 feet of subject parcel

Total Count: 6

Close

Map & Parcel	Owner1	Owner2	Address1	Address 2	Mailing CityStateZip	Country	Deed
326108	BBSS REALTY LLC		32 LOVERS LANE		SOUTHBOROUGH, MA 01772		19920/320
326115	KURKER, WAYNE G TR	162 LEWIS BAY ROAD REALTY TRST	HYANNIS MARINA		HYANNIS, MA 02601		29661/212
326116	KURKER, WAYNE G TR	146 LEWIS BAY ROAD REALTY TRUST	C/O HYANNIS MARINA	1 WILLOW STREET	HYANNIS, MA 02601		29661/200
326142	KURKER, WAYNE TR	S & L REALTY TRUST	1 WILLOW STREET		HYANNIS, MA 02601		20977/11
342001	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601		28816/326
342039	CAPE COD HOSPITAL	C/O DIR OF FINANCE	CAPE COD HEALTHCARE	25 COMMUNICATION WAY	HYANNIS, MA 02601		12772/227

his list by itself does NOT constitute a certified list of abutters and is provided only as an aid to the determination of abutters. If a certified list of abutters is required, contact the ssessing Division to have this list certified. The owner and address data on this list is from the Town of Barnstable Assessor's database as of 8/8/2019 .

;ape Cod Commission DRI Abutter List for Map & 'arcel(s): '342039'

butters within 300 feet of subject parcel

'otai Count: 6 Close

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Total Count: 6   **Close**

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'otal Count: 6




Close

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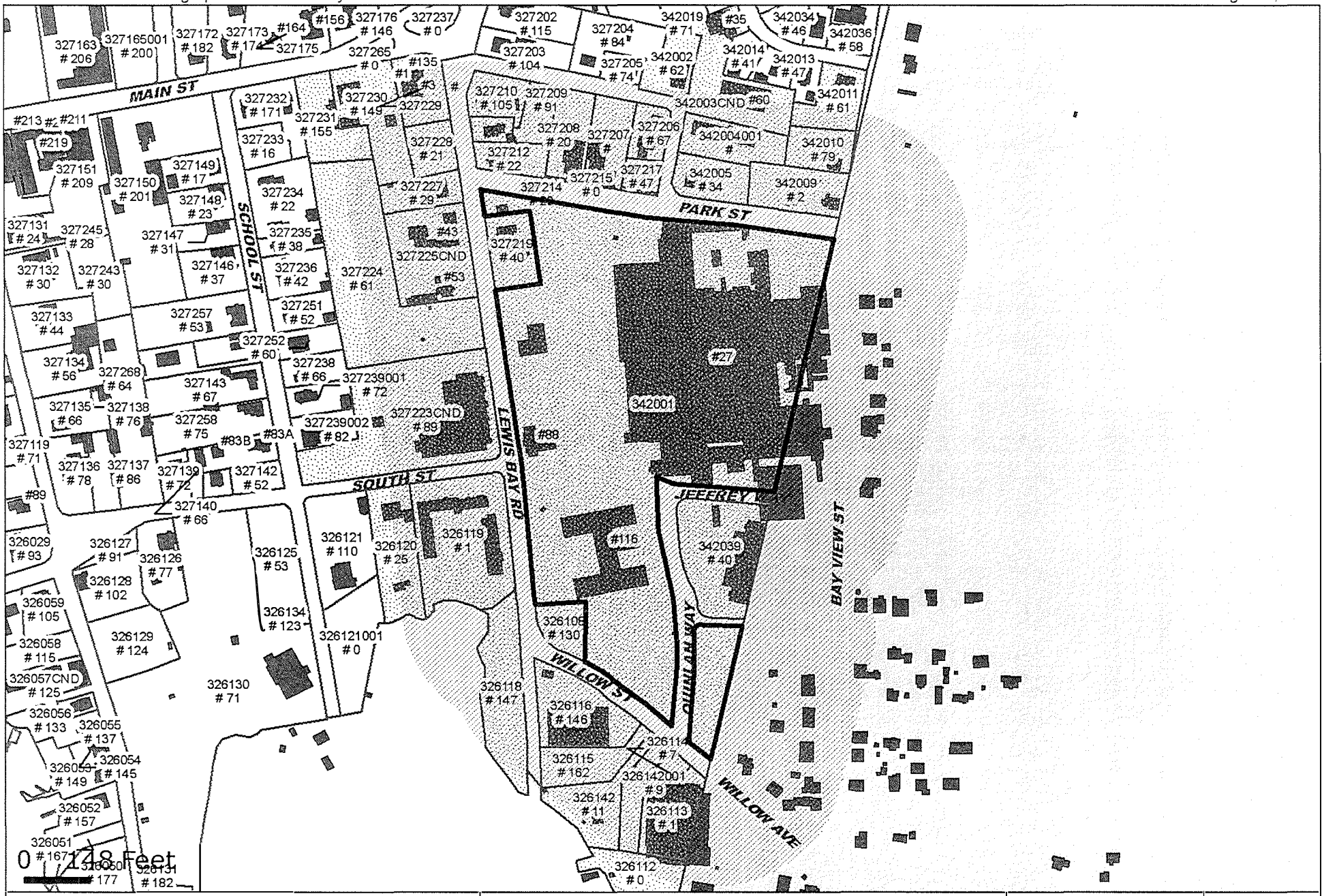
ABUTTERS LIST CERTIFICATION

DATE: August 15, 2019

RE: Abutters List
For Parcel(s) : 342-001

As requested, I hereby certify the names and addresses as submitted on the attached sheet(s) as required under Chapter 40A, Section 11 of the Massachusetts General Laws for the above referenced parcels as they appear on the most recent tax list with mailing addresses supplied.

Board of Assessors
Town of Barnstable



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Map: 342 Parcel: 001 **Cape Cod Commission DRI**

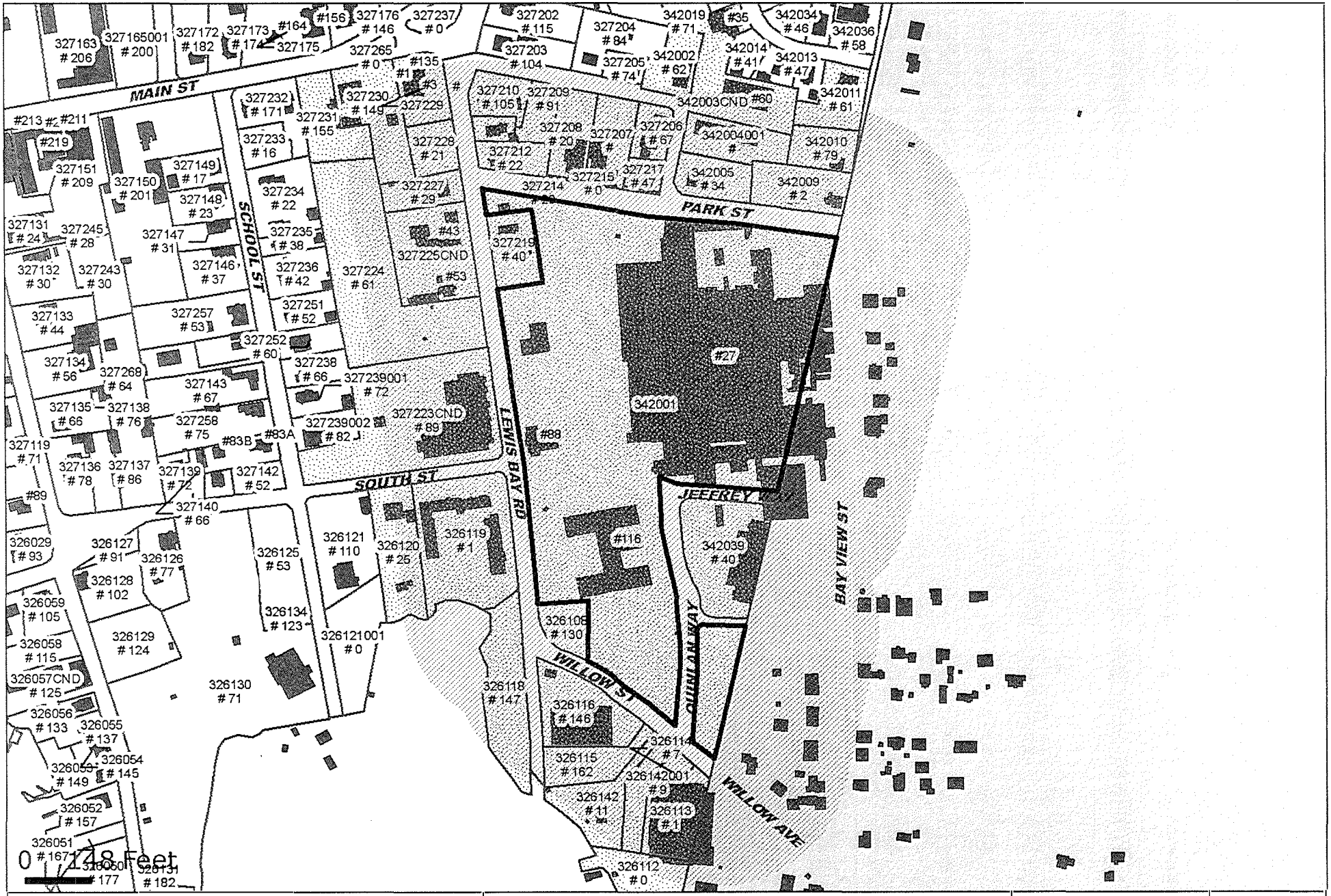
Abutter List Type - Abutters within 300 feet of subject parcel

Selected Parcel

Abutters

Buffer

N W E S



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Map: 342 Parcel: 001 **Cape Cod Commission DRI**

Abutter List Type - Abutters within 300 feet of subject parcel

Selected Parcel

Abutters

Buffer

N W E S

ape Cod Commission DRI Abutter List for Map & Parcel(s): '342001'

butters within 300 feet of subject parcel

otal Count: 96 Close

Map & Parcel	Owner1	Owner2	Address1	Address 2	Mailing CityStateZip	Country	Deed
326108	BBSS REALTY LLC		32 LOVERS LANE		SOUTHBOROUGH, MA 01772		19920/320
326112	KURKER, WAYNE TR	HYANNIS MARINE SVCE REALTY TRUST	21 ARLINGTON ST		HYANNIS, MA 02601		19021/200
326113	DAVID, STEPHEN T TR	C/O HYANNIS MARINE	1 WILLOW STREET		HYANNIS, MA 02601		5420/101
326114	KURKER, WAYNE G TR	7 WILLOW STREET REALTY TRUST	1 WILLOW STREET		HYANNIS, MA 02601		C209577
326115	KURKER, WAYNE G TR	162 LEWIS BAY ROAD REALTY TRST	HYANNIS MARINA		HYANNIS, MA 02601		29661/212
326116	KURKER, WAYNE G TR	146 LEWIS BAY ROAD REALTY TRUST	C/O HYANNIS MARINA	1 WILLOW STREET	HYANNIS, MA 02601		29661/200
326118	BARNSTABLE, TOWN OF (LDG)		367 MAIN STREET		HYANNIS, MA 02601		NONE
326119	HYANNIS BLDG & DEV ASSOC		1 SOUTH ST		HYANNIS, MA 02601		C21468
326120	THOMPSON, GLEED JR & MARIAN G		1413 HOLLOW ROAD		CLINTON CORNERS, NY 12514		28584/30
326142	KURKER, WAYNE TR	S & L REALTY TRUST	1 WILLOW STREET		HYANNIS, MA 02601		20977/11
326142001	KURKER, DELORES TR	C/O S & L REALTY TRUST	1 WILLOW ST		HYANNIS, MA 02601		6602/305
327206	BIG YELLOW LP	C/O BIG PINK LP	PO BOX 64		HYANNIS PORT, MA 02647		12097/213
327207	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601		26133/72
327208	GOSS MEDICAL BUILDING INC	C/O CAPE COD HEALTHCARE	25 COMMUNICATION WAY		HYANNIS, MA 02601		1360/631
327209	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601		9219/61
327210	DONAHUE, MARK L TR	%CAPE COD HOSPITAL	27 PARK STREET		HYANNIS, MA 02601		29975/65
327211	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601		13610/128
327212	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601		9219/61
327214	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601		
327215	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601		C4951
327216	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601		C4951
327217	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601		11906/163
327219	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601		31264/232
32722300A	SONOFNELL LLC		115 BAXTERS NECK ROAD		MARSTONS MILLS, MA 02648		28297/341
32722300B	LEWIS BAY INVESTMENT GROUP LLC		540 MAIN ST SUITE 18		HYANNIS, MA 02601		28329/290
32722300C	SONS OF SAMSON LLC		89 LEWIS BAY ROAD UNIT 3		HYANNIS, MA 02601		31061/113
32722300D	PCCC REALTY LLC		9 ROLLING RIDGE LANE		SANDWICH, MA 02563		30929/57

32722300E	BLANCH, IVAN AGUIRRE		89 LEWIS BAY ROAD UNIT 201	HYANNIS, MA 02601	30541/47
32722300F	NOWAK, CYNTHIA		89 LEWIS BAY ROAD # 202	HYANNIS, MA 02601	26670/328
32722300G	MADDEN, KEVIN J		89 LEWIS BAY ROAD UNIT 203	HYANNIS, MA 02601	28907/130
32722300H	PLEDGER, LEE		89 LEWIS BAY ROAD #204	HYANNIS, MA 02601	26533/56
32722300I	SIMMONS, LINDA-RAE		613 COLLEGE HIGHWAY	SOUTHWICK, MA 01077-9592	28594/244
32722300J	JONES, CATHLEEN A		89 LEWIS BAY RD, UNIT 206	HYANNIS, MA 02601	27899/46
32722300K	SULLIVAN, MARK & PAMELA		89 LEWIS BAY ROAD, UNIT 207	HYANNIS, MA 02601	25988/218
32722300L	CONNOR, PATRICK & EMILY		68 CENTER STREET	HYANNIS, MA 02601	30409/91
32722300M	MACPHERSON, BRITTNI TRYON	%SUTON, DARIJAN	89 LEWIS BAY ROAD UNIT 209	HYANNIS, MA 02601	27535/99
32722300N	WORCESTER CITY CAMPUS CORPORATION		333 SOUTH STREET, SUITE 290	SHREWSBURY, MA 01545	29102/125
32722300O	CAPLAN, LAWRENCE P & SUELLEN A		12121 BEAR RIVER ROAD	BOYNTON BEACH, FL 33473	31053/261
32722300P	THOMAS, SCOTT R & LINDA L		54 ANGUS WAY	CENTERVILLE, MA 02632	31099/293
32722300Q	BUCK, BRIAN & BRENDA		89 LEWIS BAY RD., UNIT 213	HYANNIS, MA 02601	25714/171
32722300R	GIBB, PETER J & ELIZABETH F TRS	GIBB FAMILY TRUST	89 LEWIS BAY ROAD #215	HYANNIS, MA 02601	28411/255
32722300S	WORCESTER CITY CAMPUS CORPORATION		333 SOUTH STREET, SUITE 290	SHREWSBURY, MA 01545	29102/128
32722300T	RIGGS, BARBARA A ET AL	BARBARA A RIGGS LIVING TRUST	89 LEWIS BAY ROAD UNIT 302	HYANNIS, MA 02601	31392/275
32722300U	VOKEY, RONALD G & BARRY, JANET	%VOKEY, RONALD G & BARRY, JANET	7 FOREST CIRCLE	WALTHAM, MA 02154	30995/135
32722300V	KHAN, SAMAD		89 LEWIS BAY ROAD UNIT 304	HYANNIS, MA 02601	28318/188
32722300W	SHAUGHNESSY, HAROLD J JR & PATRICIA A		89 LEWIS BAY ROAD UNIT 305	HYANNIS, MA 02601	29081/332
32722300X	BURGESS, STEPHEN A & JEANNE E		89 LEWIS BAY ROAD UNIT 306	HYANNIS, MA 02601	30331/73
32722300Y	CANNON, RICHARD K ESTATE OF	%WORCESTER CITY CAMPUS CORPORATION	333 SOUTH STREET	SHREWSBURY, MA 01545	31998/279
32722300Z	ROOKWOOD PARKVIEW PROPERTIES LLC		37 WALNUT STREET SUITE 200	WELLESLEY, MA 02481	30761/251
3272230AA	PAOLICELLI, VINCENT & CHUNXIA		515 TRUMP PARK	SHRUB OAK, NY 10588	27767/38
3272230AB	MCKENNA, DENNIS E		35 EVELYN WAY	CANTON, MA 02021	27655/106
3272230AC	SCHNIPKE, GREGORY C & LEBLANC, MARIE TRS	SCHNIPKE-LEBLANC REALTY TRUST OF 2000	89 LEWIS BAY ROAD UNIT 311	HYANNIS, MA 02601	28679/75
3272230AD	MASSAURO, MICHAEL A & FRANCIS J TRS	LBC REALTY TRUST	92 WINTER STREET	ASHLAND, MA 01721	28668/194

3272230AE	TAVARES, JOAO		89 LEWIS BAY ROAD, UNIT 313		HYANNIS, MA 02601	27936/244
3272230AF	EVANS, JOHN L & GERALDINE A TRS	JL EVANS & GA EVANS FAMILY RE TRUST	19837 N 90TH AVENUE		PEORIA, AZ 85382	28827/143
3272230AG	BOYLE, DEIRDRE		86 STARBUCK LANE		YARMOUTH PORT, MA 02675-2418	26690/181
3272230AH	WALLACE, ROBERT W		89 LEWIS BAY ROAD, UNIT 402		HYANNIS, MA 02601	25718/148
3272230AI	CATON, DEE		89 LEWIS BAY ROAD #403		HYANNIS, MA 02601	27950/315
3272230AJ	LLOYD, PETER A		139 LAKEVIEW DRIVE		CENTERVILLE, MA 02632	28737/129
3272230AK	WORCESTER CITY CAMPUS CORPORATION		333 SOUTH ST SUITE 290		SHREWSBURY, MA 01545	29912/6
3272230AL	SURRO, BENJAMIN G		89 LEWIS BAY ROAD, UNIT 406		HYANNIS, MA 02601	26740/302
3272230AM	CANNON, RICHARD K ESTATE OF	%WORCESTER CITY CAMPUS CORPORATION	333 SOUTH STREET		SHREWSBURY, MA 01545	31998/279
3272230AN	MAGEE, KEVIN F		89 LEWIS BAY ROAD UNIT 408		HYANNIS, MA 02601	30598/348
3272230AO	MAGUIRE, JAMES M TR	409 REALTY TRUST	PO BOX 1887		HYANNIS, MA 02601	27175/113
3272230AP	BROWNLEE, SCOTT C		64 BARBERRY LANE		MARSTONS MILLS, MA 02648	29916/125
3272230AQ	SHEFLER, GEORGE & SHELLY M		1611 OTTER DRIVE		TOMS RIVER, NJ 08755	25928/318
3272230AR	LEEK, AMY R		89 LEWIS BAY ROAD UNIT 412		HYANNIS, MA 02601	31578/160
3272230AS	LAVIGNE, KATE M TR	TARK REALTY TRUST	13 HIGHLAND ROAD		EAST DENNIS, MA 02641	29964/95
3272230AT	MACPHERSON, BEN WALLACE & DEBRA ANN		89 LEWIS BAY ROAD, UNIT 415		HYANNIS, MA 02601	25920/123
327224	WOODS HOLE, MARTHA'S VINEYARD &	NANTUCKET STEAMSHIP AUTHORITY	ATTN: WAYNE LASA, TREAS	PO BOX 284	WOODS HOLE, MA 02543	7398/133
32722500A	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500B	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500C	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500D	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500E	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500F	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500G	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500H	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500J	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152

32722500L	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
327227	TAYLOR, WILLIAM H		29 LEWIS BAY RD		HYANNIS, MA 02601	15887/238
327228	ASH, KEITH CHARLES TR	21 LEWIS BAY ROAD REALTY TRUST	7 CENTRAL STREET		SOUTH EASTON, MA 02375-1040	23072/207
327229	SULLIVAN, RICHARD L		8 MONADNOCK ROAD		WELLESLEY, MA 02481	29150/91
327230	BEECHER, JOSEPH MICHAEL & KELLER,	JENNIFER F TRS	320 ORCHID AVENUE		CORONA DEL MAR, CA 92625	29677/346
327231	WOODS HOLE, MARTHA'S VINEYARD &	NANTUCKET STEAMSHIP AUTHORITY	ATTN: WAYNE LASA, TREAS	PO BOX 284	WOODS HOLE, MA 02543	7398/133
342001	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	28816/326
342002	CAPE COD HEALTHCARE, INC		27 PARK STREET		HYANNIS, MA 02601	30889/176
34200300A	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	12368/306
34200300B	CAPE COD HEALTHCARE INC		27 PARK STREET		HYANNIS, MA 02601	30156/331
342004001	CHIOTELLIS, PHILIP N & LAVINIA		P O BOX 317		OSTERVILLE, MA 02655	C72952
342005	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	12461/291
342009	CAPE COD HOSPITAL		21 PARK STREET		HYANNIS, MA 02601	27495/301
342010	CHIOTELLIS, LAVINIA M		771 SEA VIEW AVENUE		OSTERVILLE, MA 02655	7983/1
342011	CHIOTELLIS, LAVINIA M		771 SEAVIEW AVENUE		OSTERVILLE, MA 02655	29058/119
342039	CAPE COD HOSPITAL	C/O DIR OF FINANCE	CAPE COD HEALTHCARE	25 COMMUNICATION WAY	HYANNIS, MA 02601	12772/227

his list by itself does NOT constitute a certified list of abutters and is provided only as an aid to the determination of abutters. If a certified list of abutters is required, contact the ssessing Division to have this list certified. The owner and address data on this list is from the Town of Barnstable Assessor's database as of 8/8/2019 .

Cape Cod Commission DRI Abutter List for Map & Parcel(s): '342001'

Abutters within 300 feet of subject parcel

Total Count: 96

Close

Map & Parcel	Owner1	Owner2	Address1	Address 2	Mailing CityStateZip	Country Deed
326108	BBSS REALTY LLC		32 LOVERS LANE		SOUTHBOROUGH, MA 01772	19920/320
326112	KURKER, WAYNE TR	HYANNIS MARINE SVCE REALTY TRUST	21 ARLINGTON ST		HYANNIS, MA 02601	19021/200
326113	DAVID, STEPHEN T TR	C/O HYANNIS MARINE	1 WILLOW STREET		HYANNIS, MA 02601	5420/101
326114	KURKER, WAYNE G TR	7 WILLOW STREET REALTY TRUST	1 WILLOW STREET		HYANNIS, MA 02601	C209577
326115	KURKER, WAYNE G TR	162 LEWIS BAY ROAD REALTY TRST	HYANNIS MARINA		HYANNIS, MA 02601	29661/212
326116	KURKER, WAYNE G TR	146 LEWIS BAY ROAD REALTY TRUST	C/O HYANNIS MARINA	1 WILLOW STREET	HYANNIS, MA 02601	29661/200
326118	BARNSTABLE, TOWN OF (LDG)		367 MAIN STREET		HYANNIS, MA 02601	NONE
326119	HYANNIS BLDG & DEV ASSOC		1 SOUTH ST		HYANNIS, MA 02601	C21468
326120	THOMPSON, GLEED JR & MARIAN G		1413 HOLLOW ROAD		CLINTON CORNERS, NY 12514	28584/30
326142	KURKER, WAYNE TR	S & L REALTY TRUST	1 WILLOW STREET		HYANNIS, MA 02601	20977/11
326142001	KURKER, DELORES TR	C/O S & L REALTY TRUST	1 WILLOW ST		HYANNIS, MA 02601	6602/305
327206	BIG YELLOW LP	C/O BIG PINK LP	PO BOX 64		HYANNIS PORT, MA 02647	12097/213
327207	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	26133/72
327208	GOSS MEDICAL BUILDING INC	C/O CAPE COD HEALTHCARE	25 COMMUNICATION WAY		HYANNIS, MA 02601	1360/631
327209	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	9219/61
327210	DONAHUE, MARK L TR	%CAPE COD HOSPITAL	27 PARK STREET		HYANNIS, MA 02601	29975/65
327211	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	13610/128
327212	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	9219/61
327214	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	
327215	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	C4951
327216	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	C4951
327217	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	11906/163
327219	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	31264/232
32722300A	SONOFNELL LLC		115 BAXTERS NECK ROAD		MARSTONS MILLS, MA 02648	28297/341
32722300B	LEWIS BAY INVESTMENT GROUP LLC		540 MAIN ST SUITE 18		HYANNIS, MA 02601	28329/290
32722300C	SONS OF SAMSON LLC		89 LEWIS BAY ROAD UNIT 3		HYANNIS, MA 02601	31061/113
32722300D	PCCC REALTY LLC		9 ROLLING RIDGE LANE		SANDWICH, MA 02563	30929/57

32722300E	BLANCH, IVAN AGUIRRE		89 LEWIS BAY ROAD UNIT 201	HYANNIS, MA 02601	30541/47
32722300F	NOWAK, CYNTHIA		89 LEWIS BAY ROAD # 202	HYANNIS, MA 02601	26670/328
32722300G	MADDEN, KEVIN J		89 LEWIS BAY ROAD UNIT 203	HYANNIS, MA 02601	28907/130
32722300H	PLEDGER, LEE		89 LEWIS BAY ROAD #204	HYANNIS, MA 02601	26533/56
32722300I	SIMMONS, LINDA-RAE		613 COLLEGE HIGHWAY	SOUTHWICK, MA 01077-9592	28594/244
32722300J	JONES, CATHLEEN A		89 LEWIS BAY RD, UNIT 206	HYANNIS, MA 02601	27899/46
32722300K	SULLIVAN, MARK & PAMELA		89 LEWIS BAY ROAD, UNIT 207	HYANNIS, MA 02601	25988/218
32722300L	CONNOR, PATRICK & EMILY		68 CENTER STREET	HYANNIS, MA 02601	30409/91
32722300M	MACPHERSON, BRITTNI TRYON	%SUTON, DARIJAN	89 LEWIS BAY ROAD UNIT 209	HYANNIS, MA 02601	27535/99
32722300N	WORCESTER CITY CAMPUS CORPORATION		333 SOUTH STREET, SUITE 290	SHREWSBURY, MA 01545	29102/125
32722300O	CAPLAN, LAWRENCE P & SUELLEN A		12121 BEAR RIVER ROAD	BOYNTON BEACH, FL 33473	31053/261
32722300P	THOMAS, SCOTT R & LINDA L		54 ANGUS WAY	CENTERVILLE, MA 02632	31099/293
32722300Q	BUCK, BRIAN & BRENDA		89 LEWIS BAY RD., UNIT 213	HYANNIS, MA 02601	25714/171
32722300R	GIBB, PETER J & ELIZABETH F TRS	GIBB FAMILY TRUST	89 LEWIS BAY ROAD #215	HYANNIS, MA 02601	28411/255
32722300S	WORCESTER CITY CAMPUS CORPORATION		333 SOUTH STREET, SUITE 290	SHREWSBURY, MA 01545	29102/128
32722300T	RIGGS, BARBARA A ET AL	BARBARA A RIGGS LIVING TRUST	89 LEWIS BAY ROAD UNIT 302	HYANNIS, MA 02601	31392/275
32722300U	VOKEY, RONALD G & BARRY, JANET	%VOKEY, RONALD G & BARRY, JANET	7 FOREST CIRCLE	WALTHAM, MA 02154	30995/135
32722300V	KHAN, SAMAD		89 LEWIS BAY ROAD UNIT 304	HYANNIS, MA 02601	28318/188
32722300W	SHAUGHNESSY, HAROLD J JR & PATRICIA A		89 LEWIS BAY ROAD UNIT 305	HYANNIS, MA 02601	29081/332
32722300X	BURGESS, STEPHEN A & JEANNE E		89 LEWIS BAY ROAD UNIT 306	HYANNIS, MA 02601	30331/73
32722300Y	CANNON, RICHARD K ESTATE OF	%WORCESTER CITY CAMPUS CORPORATION	333 SOUTH STREET	SHREWSBURY, MA 01545	31998/279
32722300Z	ROOKWOOD PARKVIEW PROPERTIES LLC		37 WALNUT STREET SUITE 200	WELLESLEY, MA 02481	30761/251
3272230AA	PAOLICELLI, VINCENT & CHUNXIA		515 TRUMP PARK	SHRUB OAK, NY 10588	27767/38
3272230AB	MCKENNA, DENNIS E		35 EVELYN WAY	CANTON, MA 02021	27655/106
3272230AC	SCHNIPKE, GREGORY C & LEBLANC, MARIE TRS	SCHNIPKE-LEBLANC REALTY TRUST OF 2000	89 LEWIS BAY ROAD UNIT 311	HYANNIS, MA 02601	28679/75
3272230AD	MASSAURO, MICHAEL A & FRANCIS J TRS	LBC REALTY TRUST	92 WINTER STREET	ASHLAND, MA 01721	28668/194

3272230AE	TAVARES, JOAO		89 LEWIS BAY ROAD, UNIT 313		HYANNIS, MA 02601	27936/244
3272230AF	EVANS, JOHN L & GERALDINE A TRS	JL EVANS & GA EVANS FAMILY RE TRUST	19837 N 90TH AVENUE		PEORIA, AZ 85382	28827/143
3272230AG	BOYLE, DEIRDRE		86 STARBUCK LANE		YARMOUTH PORT, MA 02675-2418	26690/181
3272230AH	WALLACE, ROBERT W		89 LEWIS BAY ROAD, UNIT 402		HYANNIS, MA 02601	25718/148
3272230AI	CATON, DEE		89 LEWIS BAY ROAD #403		HYANNIS, MA 02601	27950/315
3272230AJ	LLOYD, PETER A		139 LAKEVIEW DRIVE		CENTERVILLE, MA 02632	28737/129
3272230AK	WORCESTER CITY CAMPUS CORPORATION		333 SOUTH ST SUITE 290		SHREWSBURY, MA 01545	29912/6
3272230AL	SURRO, BENJAMIN G		89 LEWIS BAY ROAD, UNIT 406		HYANNIS, MA 02601	26740/302
3272230AM	CANNON, RICHARD K ESTATE OF	%WORCESTER CITY CAMPUS CORPORATION	333 SOUTH STREET		SHREWSBURY, MA 01545	31998/279
3272230AN	MAGEE, KEVIN F		89 LEWIS BAY ROAD UNIT 408		HYANNIS, MA 02601	30598/348
3272230AO	MAGUIRE, JAMES M TR	409 REALTY TRUST	PO BOX 1887		HYANNIS, MA 02601	27175/113
3272230AP	BROWNLEE, SCOTT C		64 BARBERRY LANE		MARSTONS MILLS, MA 02648	29916/125
3272230AQ	SHEFLER, GEORGE & SHELLY M		1611 OTTER DRIVE		TOMS RIVER, NJ 08755	25928/318
3272230AR	LEEK, AMY R		89 LEWIS BAY ROAD UNIT 412		HYANNIS, MA 02601	31578/160
3272230AS	LAVIGNE, KATE M TR	TARK REALTY TRUST	13 HIGHLAND ROAD		EAST DENNIS, MA 02641	29964/95
3272230AT	MACPHERSON, BEN WALLACE & DEBRA ANN		89 LEWIS BAY ROAD, UNIT 415		HYANNIS, MA 02601	25920/123
327224	WOODS HOLE, MARTHA'S VINEYARD &	NANTUCKET STEAMSHIP AUTHORITY	ATTN: WAYNE LASA, TREAS	PO BOX 284	WOODS HOLE, MA 02543	7398/133
32722500A	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500B	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500C	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500D	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500E	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500F	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500G	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500H	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
32722500J	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152

32722500L	43-53 LEWIS BAY LLC		600 LORING AVENUE		SALEM, MA 01970	29321/152
327227	TAYLOR, WILLIAM H		29 LEWIS BAY RD		HYANNIS, MA 02601	15887/238
327228	ASH, KEITH CHARLES TR	21 LEWIS BAY ROAD REALTY TRUST	7 CENTRAL STREET		SOUTH EASTON, MA 02375-1040	23072/207
327229	SULLIVAN, RICHARD L		8 MONADNOCK ROAD		WELLESLEY, MA 02481	29150/91
327230	BEECHER, JOSEPH MICHAEL & KELLER,	JENNIFER F TRS	320 ORCHID AVENUE		CORONA DEL MAR, CA 92625	29677/346
327231	WOODS HOLE, MARTHA'S VINEYARD &	NANTUCKET STEAMSHIP AUTHORITY	ATTN: WAYNE LASA, TREAS	PO BOX 284	WOODS HOLE, MA 02543	7398/133
342001	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	28816/326
342002	CAPE COD HEALTHCARE, INC		27 PARK STREET		HYANNIS, MA 02601	30889/176
34200300A	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	12368/306
34200300B	CAPE COD HEALTHCARE INC		27 PARK STREET		HYANNIS, MA 02601	30156/331
342004001	CHIOTELLIS, PHILIP N & LAVINIA		P O BOX 317		OSTERVILLE, MA 02655	C72952
342005	CAPE COD HOSPITAL		27 PARK STREET		HYANNIS, MA 02601	12461/291
342009	CAPE COD HOSPITAL		21 PARK STREET		HYANNIS, MA 02601	27495/301
342010	CHIOTELLIS, LAVINIA M		771 SEA VIEW AVENUE		OSTERVILLE, MA 02655	7983/1
342011	CHIOTELLIS, LAVINIA M		771 SEAVIEW AVENUE		OSTERVILLE, MA 02655	29058/119
342039	CAPE COD HOSPITAL	C/O DIR OF FINANCE	CAPE COD HEALTHCARE	25 COMMUNICATION WAY	HYANNIS, MA 02601	12772/227

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Abutting Properties for
BAYVIEW ST WEST YARMOUTH, MA
02673
28/ 52.1/ / /
(300 feet)

Location:
36/ 13/ / /
62 BAYVIEW ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Location:
36/ 8/ / /
30 BAYVIEW ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Location:
28/ 52.1/ / /
BAYVIEW ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Location:
28/ 56/ / /
70 BAYVIEW ST
Owner:
VELLONE MCCANN CYNTHIA A TR
SHOOT FLYING HILL NOMINEE TRUST
329 MAIN ST
CENTERVILLE, MA 02632-2911

Location:
28/ 43/ / /
113 BAYVIEW ST
Owner:
WORDELL LORING W JR
P O BOX 394
HYANNIS, MA 02601

Location:
28/ 46/ / /
101 BAYVIEW ST
Owner:
WHOLLEY JANET
PISACRETA JOANN
1200 SALEM ST UNIT 184
LYNNFIELD, MA 01940

Location:
28/ 57/ / /
72 BAYVIEW ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Location:
28/ 84/ / /
120 BAYVIEW ST
Owner:
BRYANT DEBORAH L
120 BAYVIEW ST
WEST YARMOUTH, MA 02673

Location:
36/ 12/ / /
56 BAYVIEW ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Location:
36/ 9/ / /
34 BAYVIEW ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Location:
36/ 14/ / /
66 BAYVIEW ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Location:
28/ 45/ / /
105 BAYVIEW ST
Owner:
DEMAO SAMUEL J JR
17 LINDEN CIR
GEORGETOWN, MA 01883

Location:
28/ 41/ / /
10 WILLOW AVE
Owner:
CALLAHAN DENNIS
7 GRANVILLE ST
DORCHESTER CENTER, MA 02124-5218

Location:
28/ 44/ / /
109 BAYVIEW ST
Owner:
CONOVER JEFFREY D
CONOVER MICHELLE R
109 BAYVIEW ST
WEST YARMOUTH, MA 02673

Location:
28/ 17/ / /
21 ARLINGTON ST
Owner:
KURKER WAYNE TR
HYANNIS MARINE SERVICE RLTY
TRUST
21 ARLINGTON ST
HYANNIS, MA 02601

Location:
28/ 75/ / /
12 &14 ROSETTA ST
Owner:
WEST YARMOUTH SERIES LLC
C/O WEST YARMOUTH SERIES LLC
PO BOX 342
HYANNIS, MA 02601

Location:
36/ 11/ / /
50 BAYVIEW ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Location:
36/ 10/ / /
40 BAYVIEW ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Location:
36/ 15/ / /
68A &68B BAYVIEW ST
Owner:
VELLONE MCCANN CYNTHIA A TR
SHOOT FLYING HILL NOMINEE TR
329 MAIN ST
CENTERVILLE, MA 02632-2911

Location:
28/ 40.1/ / /
22 WILLOW AVE
Owner:
YUSKAITIS LUKE D
22 WILLOW AVE
WEST YARMOUTH, MA 02673

Location:
28/ 42/ / /
115 BAYVIEW ST
Owner:
WORDELL LORING W JR
401 RIVER RD
MARSTONS MILLS, MA 02630

Location:
28/ 58.1.1/ / /
ROSETTA ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Location:
28/ 18/ / /
6 ARLINGTON ST
Owner:
KURKER WAYNE TR
ARLINGTON STREET RLTY TRUST
1 WILLOW ST, HY MARINE
HYANNIS, MA 02601

Location:
28/ 76/ / /
6 ROSETTA ST
Owner:
HUIE EVA
HUIE STEVEN J
6 ROSETTA ST
WEST YARMOUTH, MA 02673

Location:
28/ 82/ / /
8 ALBION ST
Owner:
DIMONTE MANAGEMENT II LLC
17 RABBIT LN
HYANNIS , MA 02601

Location:
28/ 80/ / /
114 BAYVIEW ST
Owner:
NETTO AUGUSTO
TATARA JESSICA
17 UNCLE ALS WAY
HYANNIS, MA 02601

Location:
28/ 67/ / /
100 BAYVIEW ST
Owner:
FRANTZEN WILLIAM TRS
WHITE OES REALTY TRUST
20 SUMMIT PATH
FRAMINGHAM, MA 01701

Location:
28/ 69/ / /
7 ROSETTA ST
Owner:
ADAMO JOSEPH J
ADAMO DOREEN S
326 MENEMSHA LN
WYNANTSKILL, NY 121983439

Location:
28/ 71/ / /
11 ROSETTA ST
Owner:
LEBRAS PAUL
LEBRAS BARBARA F
1675 7TH ST
SARASOTA, FL 34236

Location:
28/ 61/ / /
7 TRENTON ST
Owner:
CORRIGAN RALPH
CORRIGAN J A & MYERS J & A
22 RUTH ST
TRUMBULL, CT 06611-3730

Location:
28/ 83/ / /
12 ALBION ST
Owner:
WEST YARMOUTH SERIES THREE LLC
P O BOX 342
HYANNIS, MA 02601

Location:
28/ 58.3/ / /
74 BAYVIEW ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Location:
28/ 81/ / /
6 ALBION ST
Owner:
SEVITS KYLE J
WILBURN JESSIE R
6 ALBION ST
WEST YARMOUTH, MA 02673

Location:
28/ 79/ / /
110 BAYVIEW ST
Owner:
DANNER JOHN M
18 GABLE LN
PLYMOUTH, MA 02360

Location:
28/ 66/ / /
6 TRENTON ST
Owner:
WHITE KIMBERLY S
WHITE ROBERT P JR
167 COLUMBUS WAY
MARCO ISLAND, FL 34145

Location:
28/ 65/ / /
10 TRENTON ST
Owner:
KOSIBA FRANK J
KOSIBA ADRIANA P
185 K ST
SOUTH BOSTON, MA 02127

Location:
28/ 64/ / /
14 TRENTON ST
Owner:
KASPAROV VIKTOR A
KASPAROV LILLIAN R
716 NEPONSET ST
NORWOOD, MA 02062

Location:
28/ 60/ / /
5 TRENTON ST
Owner:
FOSTER ARLENE
5 TRENTON ST
WEST YARMOUTH, MA 02673

Location:
28/ 37/ / /
125 BAYVIEW ST
Owner:
EVANS MYRNA K TR
M K EVANS FAMILY TRUST
125 BAYVIEW ST
WEST YARMOUTH, MA 02673

Location:
28/ 58.4/ / /
86 BAYVIEW ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Location:
28/ 77/ / /
4 ROSETTA ST
Owner:
WHITE ROBERT P JR
WHITE KIMBERLY S
167 COLUMBUS WAY
MARCO ISLAND, FL 34145

Location:
28/ 78/ / /
108 BAYVIEW ST
Owner:
GAVIN KENNETH J TR
KENNETH J GAVIN REV TRUST
108 BAYVIEW ST
WEST YARMOUTH, MA 02673

Location:
28/ 68/ / /
5 ROSETTA ST
Owner:
GIDDINGS DWIGHT
T FALINE/ADVENTURE RLTY TRU
22 FLICKER LN
MARSTONS MILLS, MA 02648-134

Location:
28/ 70/ / /
9 ROSETTA ST
Owner:
SZEGDA JOHN
SZEGDA GAIL A
219 LOWER RD
BREWSTER, MA 02631

Location:
28/ 62/ / /
11 TRENTON ST
Owner:
MITCHELL RUTH M
C/O BRETT MITCHELL
P O BOX 173
BASS HARBOR, ME 04653

Location:
28/ 59/ / /
1 &3 TRENTON ST
Owner:
FACCHINI RICHARD A JR
22 ATWATER PL
SPRINGFIELD, MA 01107

Location:
36/ 3/ / /
44 BAYVIEW ST
Owner:
CAPE COD HOSPITAL
25 COMMUNICATION WAY
HYANNIS, MA 02601

Please use this signature to certify this list of properties
abutting within 300' of the parcel located at:
Bayview St., West Yarmouth, MA 02673
Assessors Map 28, Lot 52.1

Andy Machado

Andy Machado, Director of Assessing

Cape Cod Hospital – Project 2022

27 Park Street, Hyannis

Title Information / Summary

Land Court Title References (copies are in Sub-Tab "A")

- Certificate of Title Nos. 4951 and 127325
- Land Court Plans: 16459-A and Lot 8 on 23133-C

Registry of Deeds Title References (copies are in Sub-Tab "B")

- Recorded Deeds: 375/46, 557/282, 1491/655, 786/448, 1462/656, 7837/141, 1346/609, 12772/227, 15787/336, 13156/81, and 3840/11
- Recorded Plan: 604/62

FORM C

25/21.

Original Certificate of Title.

Doc. 10,856
No. 4951.

Entered pursuant to a decree of the Land Court, dated at Boston, in the County of Suffolk and Commonwealth of Massachusetts, the sixth day of February in the year nineteen hundred and thirty-nine, and numbered 16459 on the files of said Court.

Copy of Decree.

COMMONWEALTH OF MASSACHUSETTS. LAND COURT.

In the matter of the Petition of Cape Cod Hospital

numbered 16459 after consideration, the Court doth adjudge and decree that said

Cape Cod Hospital,

a duly existing corporation having an usual place of business

in Barnstable,

in the County of Barnstable and Commonwealth of Massachusetts ~~xxxxxx~~

is

the owner in fee simple,

Address of Owner: Hyannis, Mass.

of that certain parcel of land situate in

Barnstable and Yarmouth,

in the County of Barnstable and Commonwealth of Massachusetts bounded and described as follows:

Northerly by Park Street three hundred fifty-nine and 16/100 (359.16) feet;

Northeasterly by the junction of said Park Street and Bay View Street measuring on the southwesterly curving line thereof thirty-four and 49/100 (34.49) feet;

Easterly by said Bay View Street three hundred thirty-six and 69/100 (336.69) feet;

Southerly ninety-six and 85/100 (96.85) feet,

Easterly one hundred ten and 50/100 (110.50) feet,

Southeasterly one hundred sixty-four and 95/100 (164.95) feet,

Westerly one hundred ninety-nine and 75/100 (199.75) feet, and

Southerly ninety-seven and 98/100 (97.98) feet by land now or formerly of Hattie C. Gleason et al; and

Westerly by the easterly line of a Way as shown on the plan hereinafter mentioned four hundred seven and 50/100 (407.50) feet.

All of said boundaries are determined by the Court to be located as shown upon plan numbered 16459-A, which will be filed with the original certificate of title issued on this decree, the same being compiled from a plan drawn by Nelson Bearse, Civil Engineer, dated February 23, 1937, and additional data on file in the Land Registration Office, all as modified and approved by the Court.

There is appurtenant to the land hereby registered the right to use said Way in common with others entitled thereto as set forth in a deed given by Edward F. Gleason et al to the Cape Cod Hospital, dated June 1, 1920, duly recorded in Book 375, Page 46.

And the Court doth adjudge and decree that said land be brought under the operation and provisions of Chapter 185 of the General Laws, and that the title of said

Cape Cod Hospital

to said land

be confirmed and registered; subject, however, to any of the encumbrances mentioned in Section forty-six of said Chapter, which may be subsisting, and subject also ~~to~~ to a sewer assessment by the Town of Barnstable as set forth in an order, duly recorded on December 24, 1937.

WITNESS, ~~CHARLES EMERSON DAVIS~~ John E. Fenton, Esquire, Judge of the Land Court, at Boston, in said County of Suffolk, the sixth day of February, in the year nineteen hundred and thirty-nine, at ten o'clock and 30 minutes in the fore noon.

Attest, with the Seal of said Court, CHARLES A. SOUTHWORTH, *Recorder*, [SEAL.]

A true copy. Attest, with the Seal of said Court, CHARLES A. SOUTHWORTH, *Recorder*, [SEAL.]

Received for Transcription at Barnstable County Registry District, February 7, 19 39 at 8 o'clock and 15 minutes a.m.

A true copy. Attest, with the Seal of said Court,

Nathaniel P Coleman

Assistant Recorder.

LAND COURT CASE NO.16459.

MEMORANDUM OF ENCUMBRANCES ON THE LAND DESCRIBED IN THIS CERTIFICATE. 4951

Document Number	Kind	Running in Favor of	Terms	Date of Instrument	Date of Registration	Signature of Assistant Recorder	Discharge
			Alteration & Layout of Park Street - See Doc.		Year & Month D. H. M. A.M. or P.M.		
26680	Reg & Unreg Taking	Town of Barnstable	Rights over 15 ft strip Land Vs. newly alte- line Driveway St. in newly direction over land plan 16459-A	Mar 24-50	1950 Apr 13 11 15 am	Thomas Hughes Woodward Atty	
136,198	Easement & Vote Reg & Unreg	Cape & Vineyard Elec Co. Co. et als		Jan 5-70	1970 Jan 26 12 50 P.m.	Thomas L Sears	DISCHARGED Aug. 24, 1972 BY DOC. NO. 163,800 ATTEST: ASST RECORDER
133442	Mtge & Vote	The Cape Cod Co. & T.	LOT Land $1,200,000 PRINC. & INT. PAYABLE AS STATED IN MTGE. LOT NO. Land on pl. 16459-B	Nov 27-70	1970 Nov 23 1 25 P.m.	Thomas L Sears Stephen Weeks	DISCHARGED April 12, 1977 BY DOC. NO. 219,092 - 219,098 incl ATTEST: ASST. RECORDER
163,801	Mtge.	Cape Cod Five Cent Sav. et als	$1,142,000.	Aug 24-72 July 26-72	1972 Aug 24 3 45 PM		Stephen Weeks
202,740	Variance Notice of	Cape Cod Hospital, Inc,	land, Pl. 16459-A	12-11-75	1975 Dec 18 2 42 P.M.	Stephen Weeks	
217706	LIEN BOND		RE: LAND PL. 16459-A CHAIRMAN, VICE-CHAIRMAN OR TREAS. EACH AUTHORIZED	2-28-77	1977 FEB. 28 3 24 pm	Stephen Weeks	
217707	VOTE	CAPE COD HOSPITAL	SEE DOC FOR NAMES. LOT NO. LAND ON PL. 16459-A	2-23-77	1977 FEB 28 3 24 pm	Stephen Weeks	DISCHARGED Feb. 5 1991 BY DOC. NO. 521,918 ATTEST: ASST. RECORDER
217708	MTGE	THE EQUITABLE LIFE ASSURANCE SOCIETY OF THE U.S. ET ALI	$ 9,500,000.00	2-28-77	1977 FEB 28 3 25 pm	Stephen Weeks	
219090	Vote		See Doc.	3 - 77	1977 Apr 12 1 47 PM	Stephen Weeks	
219091	Certificate		See Doc.	3 - 77	1977 Apr 12 1 47 PM	Stephen Weeks	
238449	Mtg.		See Doc.	6-29-78	1978 July 12 11 46 AM	Stephen Weeks	

[SEE OVER]

MEMORANDUM OF ENCUMBRANCES ON THE LAND DESCRIBED IN THIS CERTIFICATE. 4951

Document Number	Kind	Running in Favor of	Terms	Date of Instrument	Date of Registration	Signature of Assistant Recorder	Discharge
					Year & Month / D. / H. / M. / A.M. or P.M.		
238450	assign.	Equitable Life Insurance Society of the U.S.	re: Mtge Doc. 217,708	5-17-78	1978 July 12 11 46 AM	Stephen Decker	
238451	Amend.		amending Mtge Doc. 217,708	6-30-78	1978 July 12 11 46 AM	Stephen Decker	
241182	FIN. STATE.	THE EQUITABLE LIFE ASSURANCE SOCIETY OF THE UNITED STATES	SEE DOC.		1978 SEPT 14 9 14 am	Stephen Decker	DISCHARGED Feb. 5 1991 BY DOC. NO. 521,917 ATTEST: ASST. RECORDER
317929	Continuation Statement	The Equitable Life Assurance Society of the United States	re Fin State Dc. 241,182		1983 Aug. 29 10 44 AM	Stephen Decker	
465,329	Continuation Statement	Equitable Life Assurance Society of the United States	re: Fin. State Doc. 241,182		1988 Aug 12 2 38 pm	Jr Z Neuhs	
507663	Vote	Cape Cod Hospital	See Doc,	6-6-90	1990 Jun 6 8 50 am	Jr Z Neuhs	
507664	Mtge.	Shawmut Bank, N.A. as Trustee	LOT NO. Land Payable as stated in mtge.	6-6-90	1990 Jun 6 8 50 am	Jr Z Neuhs	DISCHARGED Jul 29 1993 BY DOC. NO. 589079 ATTEST: ASST. RECORDER
507665	Financing Statement	Shawmut Bank, N.A. as Trustee	See Doc,		1990 Jun 6 8 50 am	Jr Z Neuhs	DISCHARGED Jul 29 1993 BY DOC. NO. 589078 ATTEST: ASST. RECORDER
528666	Order	Cape Cod Hospital	Order for new Mtg after loss.	5-31-91	1991 June 5 9 27 am	Jr Z Neuhs	
528667	Vote		See Doc.	4-9-91	1991 June 5 9 27 am	Jr Z Neuhs	
528668	Fin. State	Massachusetts Health and Educational Facilities Authority	See Doc.		1991 June 5 9 27 am	Jr Z Neuhs	

MEMORANDA OF ENCUMBRANCES ON THE LAND DESCRIBED IN THIS CERTIFICATE 4951

DOCUMENT NUMBER	KIND	RUNNING IN FAVOR OF	TERMS	DATE OF INSTRUMENT DATE AND TIME OF REGISTRATION	SIGNATURE OF ASSISTANT RECORDER	DISCHARGE
583,872	L	SEMCO MFG. Inc	Land, Pl. 16459-A Completion 6-3-93	6-2-93 2:44pm		DISCHARGED Aug 30 1993 BY DOC. NO. 591811 ATTEST: ASST. RECORD
622,541	L	G. Brouillette & Son Inc.	Land, Pl. 16459-A Completion 10-15-94	8-17-94 8-25-94 3:03pm		DISCH 3-14-02 DOC. NO. 864,600 ATTEST: ASST. RECORDER
628,083	L	G. Brouillette & Son Inc	Rei N.Contract 622541 $24,439.07	11-14-94 11-14-94 12:19pm		
631518	N	CapeCod Hospital	Decision/Variance Land, Pl. 16459-A	1-4-95 1-4-95 3:43pm		
632258	CO	G. Brouillette & Son Inc	Complaint Rei: Doc 622541 & Doc 628083	1-13-95 1-19-95 9:28am		
638834	N		Variance Land 16459-A	4-27-95 5-4-95 3:36pm		
841019	L	K+J Interiors Inc	$30,996.- Land 16459-A	8-13-01 8-15-01 12:38		DISCH 9-19-01 DOC. NO. 844095 ATTEST: ASST. RECORDER
841020	L	K+J Interiors Inc	Stak of Acct L 841019	8-13-01 8-15-01 12:38		

MEMORANDA OF ENCUMBRANCES ON THE LAND DESCRIBED IN THIS CERTIFICATE 4951

DOCUMENT NUMBER	KIND	RUNNING IN FAVOR OF	TERMS	DATE OF INSTRUMENT DATE AND TIME OF REGISTRATION	SIGNATURE OF ASSISTANT RECORDER	DISCHARGE
851803	M	State Street Bank & Trust Co as TR	Land 16459-A $119,925,000.00	11-28-01 11-28-01 3:25		
851804	FS	State Street Bank & Trust Co as TR	See Doc	11-28-01 3:25		
851805	M	State Street Bank & Trust Co as TR	Land 16459-A	11-28-01 11-28-01 3:25		DISCHARGED Sept. 26, 2014 BY DOC. NO. 1254,897 ATTEST: ASST. RECORDER
851806	FS	State Street Bank & Trust Co as Tr	See Doc	11-28-01 3:25		
989,558	M	Cape Cod Healthcare Inc.	See doc	12-21-04 12-23-04 12:49		
989,559	A	US Bank NA	851,803	12-21-04 12-23-04 12:49		
989,560	A/FS		851,804	12-23-04 12:49		
1,092,243	M	US BANK NA (AS TR)	LAND 16459-A	6-18-08 6-18-08 1206		

MEMORANDA OF ENCUMBRANCES ON THE LAND DESCRIBED IN THIS CERTIFICATE 4951

DOCUMENT NUMBER	KIND	RUNNING IN FAVOR OF	TERMS	DATE OF INSTRUMENT DATE AND TIME OF REGISTRATION	SIGNATURE OF ASSISTANT RECORDER	DISCHARGE
1106424	M	US Bank NA	land 16459-A $1.00	2-11-09 2-11-09 1:28		
1106694	L		CLP Resources Inc	2-12-09 2-17-09 1:04		DISCH 5-22-09 DOC. NO. 1114304 ATTEST: ASST. RECORDER
1106695	L		CLP Resources Inc	2-12-09 2-17-09 1:04		
1185271 (1)	AS	Bank of America NA	M 851,805	02-23-2012 02-23-2012 3:08 pm		
1185271 (2)	A		M 851,805	02-23-2012 02-23-2012 3:08 pm		
1185291 (1)	N		agreement M 851,803	02-24-2012 02-24-2012 10:12 am		
1185291 (2)	N		agreement M 851,805	02-24-2012 02-24-2012 10:12 am		
1185291 (3)	N		agreement M 1,106,424	02-24-2012 02-24-2012 10:12 am		

MEMORANDA OF ENCUMBRANCES ON THE LAND DESCRIBED IN THIS CERTIFICATE 4951

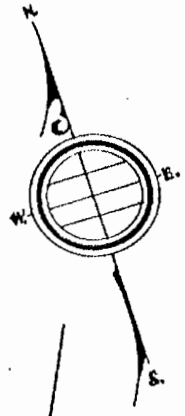
DOCUMENT NUMBER	KIND	RUNNING IN FAVOR OF	TERMS	DATE OF INSTRUMENT DATE AND TIME OF REGISTRATION	SIGNATURE OF ASSISTANT RECORDER	DISCHARGE
1206915	N	Cape Cod Commission	Decision see doc	10-11-2012 11-21-2012 10:15am		
1231670	A		1,206,915	9-10-2013 9-26-2013 2:04		
1235844	A		1,206,915	11-6-2013 11-22-2013 2:45		
1254631	M	US Bank, N.A. (as TR)	Land 16459-A $1.00	9-23-2014 9-23-2014 2:22		
1254896	N		re: 1,185,291 Termination Agreement	9-23-2014 9-26-2014 2:49		
1266452	C/CP		N 1,206,915	3-20-15 4-2-15 1:5		Corrected 10/9/15
279777	C/CP		N 1,206,915	09-25-2015 10-08-2015 2:43 pm		

16459 A

PLAN OF LAND IN BARNSTABLE and YARMOUTH

Nelson Bearse, Civil Engineer

FEBRUARY 23, 1937



PARK STREET

35.00

S 66° 52' 00" E

359.16

R=25.13

T=21.13

T=21.13

BAY VIEW STREET

165.73

S 17° 42' 00" W

336.69

172.94

TOWN LINE

BARNSTABLE

YARMOUTH

Hattie C. Gleason et al

WAY

N 13° 15' 00" E

407.50

97.98

N 73° 15' 50" W

L.C.B.

96.85

L.C.B.

N 73° 15' 50" W

Hattie C. Gleason et al

N 7° 59' 10" E

199.75

S 7° 59' 10" W

110.50

L.C.B.

164.95

136.46

R= 286.88

L.C.B.

R= 252.96

Hattie C. Gleason et al

Copy of part of plans filed as 16459A, 16459B

LAND REGISTRATION OFFICE

NOV 12 1937

Scale of this plan 60 feet to an inch

C.B. Humphrey, Engineer for Court

Book 1044 Page 5
Doc. No. 558,823
Ctf. No. 127325

TRANSFER CERTIFICATE OF TITLE

From Transfer Certificate No. 121970 Originally Registered November 20, 1990, in Registration Book 999 Page 50 for the Registry District of Barnstable County.

THIS IS TO CERTIFY that Cape Cod Hospital, having a business address of 27 Park Street, Hyannis, Massachusetts 02601, is the owner(s) in fee simple

of that land situated in Yarmouth and Barnstable

in the County of Barnstable and Commonwealth of Massachusetts, bounded and described as follows:

LOT 2

PLAN 23133-A

Lots 3, Pl 23133-A subdivided see Lots 5, 6 + 7 on Pl. 23133-B

Lot 7, Pl 23133-B subdivided See plan 23133-C (filed herewith (pending))

And it is further certified that said land is under the operation and provisions of Chapter 185 of the General Laws, and that the title of said

Cape Cod Hospital

to said land is registered under said Chapter, subject, however, to any of the encumbrances mentioned in Section forty-six of said Chapter, which may be subsisting.

WITNESS, JOHN E. FENTON, JR., Chief Justice of the Land Court, at Barnstable, in said County of Barnstable,

the twenty-fourth day of July in the year nineteen hundred

and ninety-two, at 3 o'clock and 13 minutes.

Attest, with the Seal of said Court,

JOHN F. MEADE, Assistant Recorder.

Land Court Case No. 23133

MEMORANDA OF ENCUMBRANCES ON THE LAND DESCRIBED IN THIS CERTIFICATE 127325

DOCUMENT NUMBER	KIND	RUNNING IN FAVOR OF	TERMS	DATE OF INSTRUMENT DATE AND TIME OF REGISTRATION	SIGNATURE OF ASSISTANT RECORDER	DISCHARGE
518,454	Mtge.	East Coast Mtge. Corp.	Lot 2, $97,300.	11/30/90 12/6/90 11:01a.m.		DISCHARGED Aug. 7, 1992 BY DOC. NO. 559,806 ATTEST: ASST. RECORDER
518,455	Assign.	Braintree Savings Bank	Assigning Mtge. Doc. 518,454.	11/30/90 12/6/90 11:01a.m.		
558,824	Special Permit & Decision	Cape Cod Hospital	Re: Lot 2, Pl. 23133-A.	7/22/92 7/24/92 3:13p.m.		
599,904	CJML		See Doc.	11-4-93 11-29-93 9:06am		
599,905	CJML		See Doc.	11-2-93 11-29-93 9:01am		
624,579	DD	Town of Barnstable	LOT: 6 PLAN: 23133-B SEE CTF NO: 135061	8-12-94 9-23-94 10:18am		
787,725	L	Millis Plumbing Co. Inc	7 23133-B	12-15-99 12-17-99 3:02		"13Y BOND" DISCHARGED 6-6-2001 BY DOC. NO. 834285 ATTEST: ASST. RECORDER
789958	L	Millis Plumbing Co. Inc.	L 787,925	1-7-00 1-12-00 12:01p.m.		

MEMORANDA OF ENCUMBRANCES ON THE LAND DESCRIBED IN THIS CERTIFICATE 127325

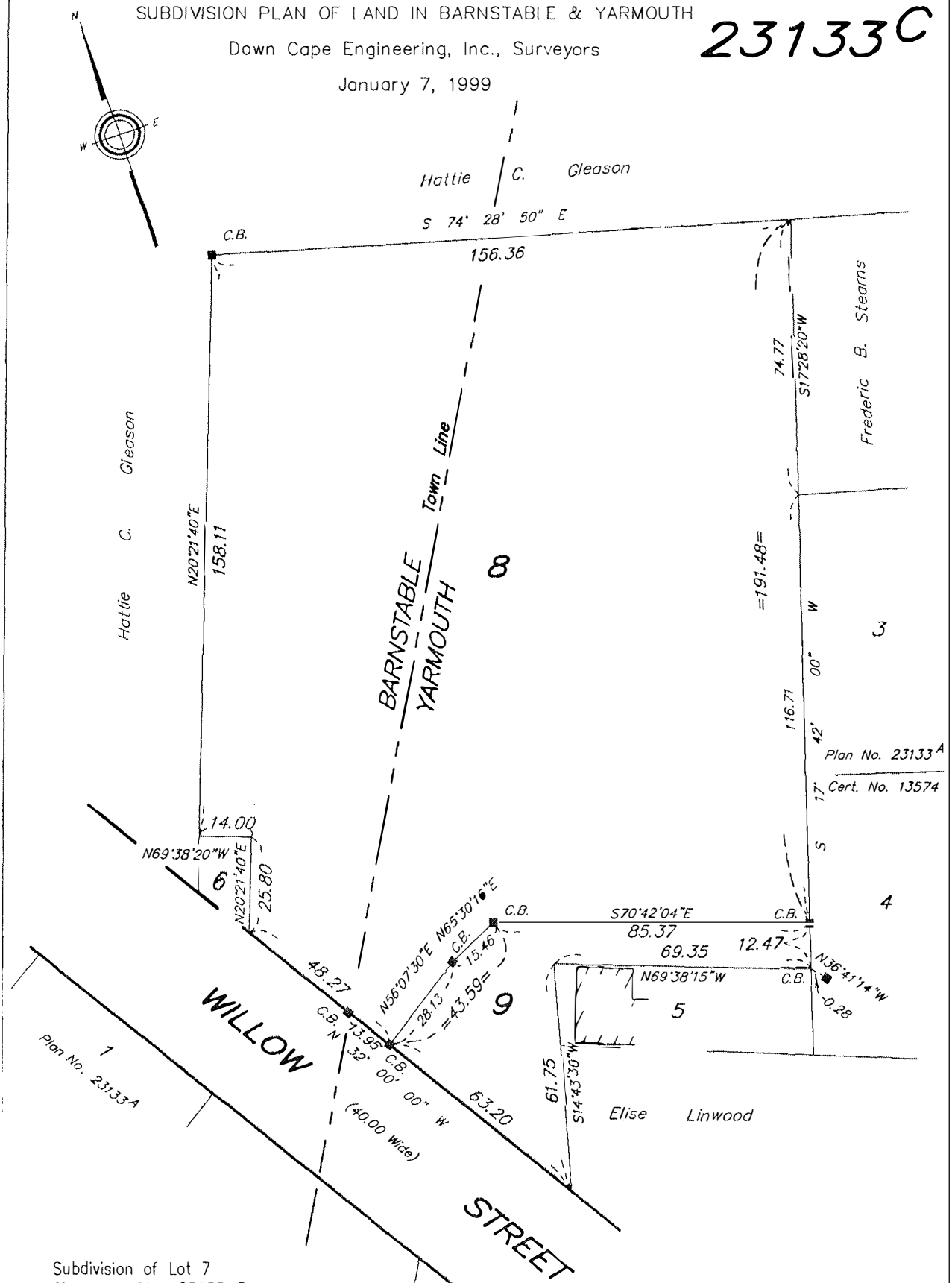
DOCUMENT NUMBER	KIND	RUNNING IN FAVOR OF	TERMS	DATE OF INSTRUMENT DATE AND TIME OF REGISTRATION	SIGNATURE OF ASSISTANT RECORDER	DISCHARGE
797096	N		Complaint L-797725	4-7-00 4-11-00 8:55	[signature]	
835088	DD	Luke D. Yurkaitis	9 23133-C & 5 23133-B #1 See Of 161841	9-25-00 6-15-01 10:21 am	[signature]	

SUBDIVISION PLAN OF LAND IN BARNSTABLE & YARMOUTH

Down Cape Engineering, Inc., Surveyors

January 7, 1999

23133C



Subdivision of Lot 7
Shown on Plan 23133-B
Filed with Cert. of Title No. 127325
Registry District Of Barnstable County

Separate certificates of title may be issued for land shown hereon as Lots 8 and 9
By the Court.

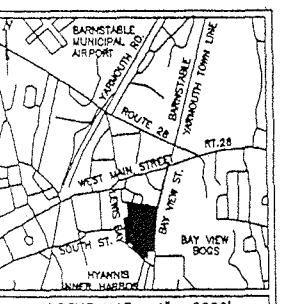
Recorder

APRIL 10, 2000

Abutters are shown as on original decree plan.

Copy of part of plan filed in
LAND REGISTRATION OFFICE
APRIL 10, 2000

FOR REGISTRY USE ONLY



LOCUS MAP: 1" = 2000'

I, _____ CLERK OF THE TOWN OF BARNSTABLE, HEREBY CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE BARNSTABLE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

DATE _____ TOWN CLERK

DATE OF APPLICATION - 11-22-04

DATE OF APPROVAL - 1-11-05

BARNSTABLE PLANNING BOARD

APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

DATE: 2-28-05 See Book 20511/31

_____

_____

_____

_____

_____

ENDORSEMENT DOES NOT CONSTITUTE A DECISION BY THE PLANNING BOARDS AS TO RIGHTS OF OTHERS, IF ANY, OVER THE RESCINDED WAYS SHOWN ON THE PLAN.

THIS PLAN IS NOT A SUBDIVISION WITHIN THE MEANING OF SECTION 6 OF CH. 41A OF THE GENERAL LAWS.

off 508-362-4541
fax 508 362-9880

town cape engineering, inc.

CIVIL ENGINEERS
LAND SURVEYORS

939 main st. yarmouthport, ma 02675

I, JANE E. HARRIS CLERK OF THE TOWN OF YARMOUTH, HEREBY CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE BARNSTABLE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

1-2-05 DATE

Jane E. Harris TOWN CLERK

DATE OF APPLICATION - DEFINITIVE 12-02-04

DATE OF APPROVAL - DEFINITIVE 01-05-05

YARMOUTH PLANNING BOARD

APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

DATE: 02-02-05 See Book 20511/28

_____

_____

_____

_____

NO DWELLING OR UNIT SHALL BE BUILT ON ANY LOT WITHOUT FIRST SECURING, FROM THE HEALTH DEPARTMENT, THE DISPOSAL WORKS CONSTRUCTION PERMIT REQUIRED FOR THE INSTALLATION OF A SUBSURFACE SEWAGE SYSTEM. (HOSPITAL ON TOWN SEWER)

THIS PLAN IS SUBJECT TO A COVENANT AND AGREEMENT FILED WITH THE REGISTRY OF DEEDS.

NOTE:
ENDORSEMENT IS NOT A DETERMINATION AS TO CONFORMANCE WITH ZONING REGULATIONS

SITE DATA:

1. ASSESSORS MAP DESIGNATIONS:
   TOWN OF BARNSTABLE ASSESSORS MAP 342 PARCELS 1 & 39
   TOWN OF YARMOUTH ASSESSORS MAP 28 PARCELS 39.1.1 & 47-55
   TOWN OF YARMOUTH ASSESSORS MAP 36 PARCEL 1
2. PROPERTY OWNER:
   CAPE COD HOSPITAL, INC.
   27 PARK STREET, HYANNIS, MA. 02601
   TELEPHONE: 1-508-771-1800
3. PROPERTY IS DESCRIBED IN DOCUMENTS AT BARNSTABLE COUNTY REGISTRY OF DEEDS:
   LAND COURT CASE 16459 CTF. 4951, L.C.C. 23133 CTF. 135061

DEED BOOK 375	PAGE 46	DEED BOOK 786	PAGE 609	DEED BOOK 12772	PAGE 227
DEED BOOK 557	PAGE 282	DEED BOOK 1462	PAGE 656	DEED BOOK 15787	PAGE 336
DEED BOOK 1491	PAGE 655	DEED BOOK 7387	PAGE 141	DEED BOOK 13156	PAGE 081
DEED BOOK 786	PAGE 448	DEED BOOK 1346	PAGE 609	DEED BOOK 3840	PAGE 11

PLAN BOOK 212	PAGE 71	PLAN BOOK 495	PAGE 35		
PLAN BOOK 212	PAGE 73	PLAN BOOK 203	PAGE 37		
PLAN BOOK 205	PAGE 85	PLAN BOOK 95	PAGE 123		
PLAN BOOK 472	PAGE 40	PLAN BOOK 92	PAGE 93		
PLAN BOOK 22	PAGE 115	PLAN BOOK 161	PAGE 97		
PLAN BOOK 375	PAGE 96	PLAN BOOK 171	PAGE 71		

BARNSTABLE ZONING: PRD (PROFESSIONAL RESIDENTIAL DISTRICT)		YARMOUTH REGULATIONS: (ZONING DISTRICT: R-25) (MSOD)
MIN. LOT AREA:	7500 SQ. FT	25,000 SF MIN. LOT SIZE
MIN. LOT FRONTAGE:	75 FT.	150' MIN. FRONTAGE
MIN. LOT WIDTH:	---	SETBACKS 30/15/20
MIN. FRONT SETBACK:	20 FT.	25% MAX. BUILDING COVERAGE
MIN. SIDE/REAR SETBACK:	7.5 FT.	NOT IN (AQUIFER PROTECTION DISTRICT)
MAX. BUILDING HEIGHT:	30 FT# (HOSPITALS EXEMPT)	
MAX. LOT COVERAGE:	25% (SEE VARIANCES)	

4. PROPERTY IS WITHIN AN AP - AQUIFER PROTECTION DISTRICT
5. PROPERTY IS PARTIALLY WITHIN FEMA DESIGNATED FLOOD ZONES A9 (EL.10) AND ZONE B. THE PORTIONS OF PROPERTY WHERE BUILDINGS ARE LOCATED ARE NOT IN A FLOOD HAZARD AREA.
6. BARNSTABLE PORTION OF PROPERTY IS LOCATED IN THE HYANNIS FIRE DISTRICT.
7. PROPERTY DOES NOT CONTAIN WETLANDS.

NOTE:
THE PURPOSE OF THIS PLAN IS TO RESCIND THE INTERNAL ROADWAYS AND COMBINE THE VARIOUS PARCELS INTO ONE CONSOLIDATED CAMPUS PERIMETER. THE REGISTERED PARCELS ARE TO BE WITHDRAWN FROM LAND COURT SO THAT THE ENTIRE PARCEL IS TO BECOME RECORDED LAND.

NOTE:
QUINLAN WAY, JEFFREY WAY AND ALEX WAY ARE ALL PRIVATE WAYS 30' WIDE (SEE PB 63 PG 47) AND ARE HEREBY RESCINDED AND MADE PART OF THE HOSPITAL CAMPUS AREA.

LAND COURT WITHDRAWAL INFORMATION:

TOTAL AREA OF SITE = 739,529± SF.
TOTAL AREA L.C.C. 16459A = 159,297± S.F.
TOTAL AREA OF LOT 8 AS SHOWN ON L.C.C. 23133 C = 30,713± S.F.
PERCENTAGE OF SITE TO BE WITHDRAWN = 25.7%

I CERTIFY THAT THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRARS OF DEEDS AS ADOPTED 8/19/75 & AMENDED 1/7/88.

10/29/04
DATE

DANIEL A. OJALA, L.S.

DEFINITIVE PLAN OF LAND IN (HYANNIS) BARNSTABLE, MA AND (WEST) YARMOUTH, MA

BEING A WITHDRAWAL OF
LOT 8 AS SHOWN ON L.C.C. 23133 C
AND
PARCEL SHOWN ON L.C.C. 16459 A
AND
A RESCISSION OF
QUINLAN, JEFFREY & ALEX WAYS
AS SHOWN ON PLAN RECORDED BOOK 63 PAGE 47

PREPARED FOR:
CAPE COD HOSPITAL
27 PARK STREET, HYANNIS, MA 02601

SCALE: 1" = 50'
DATE: OCTOBER 29, 2004

50 0 50 100 150

RECEIVED AND RECORDED
DEC MAY 28 P.M. 80
BARNSTABLE COUNTY REGISTRY OF DEEDS
JOHN F. KERRY

BOOK 604 PAGE 62

Barnstable ss. June 10, 1920. Then personally appeared the above named Arvid Lampi and acknowledged the foregoing instrument to be his free act and deed, before me.
Paul M. Swift Notary Public
My commission expires: Dec. 23, 1925
Barnstable, ss. Received June 11, 1920 and is recorded.

Know all Men by these Presents
that I, Howard Lo. Small, of Bourne, in the County of Barnstable and the Commonwealth of Massachusetts, hereby constitute and appoint Fred Lo. Small of said Bourne, true and lawful Attorney, for me and in my name and stead; to sell and convey any or all Real Estate to which I now have title or to which I may hereafter acquire title; and in my name to execute, partition deeds to convey any or all the Estate, both Real and Personal, of my father, Isaac Small, deceased, to which I may be entitled. Hereby granting unto Fred Lo. Small, said Attorney, full power and authority in my name and behalf to sign, seal, acknowledge, and deliver any and all deeds or other instruments in writing which he may deem necessary or proper in the premises; and otherwise to act in and concerning the premises as fully and effectually as I might do if personally present. In witness whereof, I hereunto set my hand and seal this Twenty-ninth day of March in the year of our Lord one thousand nine hundred and Twenty
Signed and Sealed
in presence of
E. S. Ellis
Howard Lo. Small (Lss)
Commonwealth of Massachusetts
Barnstable, ss. March 29, 1920. Then personally appeared the above-named Howard Lo. Small, and acknowledged the foregoing instrument to be his free act and deed, before me,-
(Lss) Edward S. Ellis Notary Public
for the Commonwealth of Massachusetts
My Commission Expires October 8, 1926
Barnstable, ss. Received June 12, 1920 and is recorded

Know all Men by these Presents
that we, Edward F. Gleason and Hattie Lo. Prior, both of Boston in the County of Suffolk and Commonwealth of Massachusett, being unmarried, in consideration of thirty-five thousand dollars, ($35,000.00) paid by Lape Cod Hospital, a corporation duly established under the laws of Massachusetts and having its usual place of business at Hyannis in the Town and County of Barnstable and Commonwealth aforesaid the receipt whereof is hereby acknowledged, do hereby give, grant, bargain, sell and convey unto the said Lape Cod Hospital, a certain

(See Vote in Book 733, Page 58)

parcel of land with the buildings thereon, situated in Hyannis, in said Town and County of Barnstable and Commonwealth aforesaid and bounded and described as follows;- to wit:- Beginning at the northeast corner of the granted premises at the junction of Bay View and Park Streets: thence westerly by Park Street about three hundred and eighty-one (381) feet to a corner and monument to be erected on the line of the western fence of land occupied by Frank A. Bayley: thence southerly by other land of the grantors about four hundred and eight (408) feet to a monument to be erected: thence easterly by other land of the grantors about three hundred and forty-seven (347) feet to Bay View Street: thence northerly by said Bay View Street about three hundred and fifty-eight (358) feet to the point of beginning and containing four acres be the same more or less: together with the full liberty at all times hereafter to pass and repass to and from the granted premises over other land of the grantors more particularly bounded and described as follows: beginning at the northwest corner of the parcel hereinbefore described: thence southerly by said parcel about four hundred and eight (408) feet to other land of the grantors: thence westerly by other land of the grantors thirty-five (35) feet: thence northerly by other land of the grantors in a line parallel to the eastern boundary line about four hundred and eight (408) feet to Park Street: thence easterly by Park Street thirty-five (35) feet to the point of beginning. "And further for the consideration aforesaid, the said Edward F. Gleason and Hattie L. Prior for themselves and their heirs, agree to give to the said Cape Cod Hospital the first right to buy all the land owned by the grantors on April 7th. 1920, adjoining the granted premises and lying between the same and Lamp Street and all the land fronting on Bay View Street, in preference to any one else and for a price equal to that which the said grantors can obtain from any other party: and the grantors agree that they will not sell any part of said premises to any other person without first giving the said Cape Cod Hospital a written notice thirty (30) days at least in advance of such sale: but the said grantors reserve the right to convey their interest in said premises to each other, subject to said rights of purchasers. This conveyance is made subject to all taxes assessed for the year 1920. To have and to hold the granted premises, with all the privileges and appurtenances thereto belonging, to the said Cape Cod Hospital and its successors and assigns, to their own use and behoof forever. And we hereby for ourselves and our heirs, executors, and administrators, covenant with the grantee and its successors and assigns, that we are lawfully seized in fee-simple of the granted premises; that they are free from all incumbrances

Subject to taxes assessed in 1920, Page 163

except as aforesaid that we have good right to sell and convey the same as aforesaid; and that we will and our heirs, executors, and administrators shall warrant and defend the same to the grantee and its successors and assigns forever against the lawful claims and demands of all persons In witness whereof we the said Edward F. Gleason and Hattie L. Prior hereunto set our hands and seals this first day of June in the year one thousand nine hundred and twenty.

Signed and sealed in the presence of Leonore E. Baker — Edward F. Gleason (Lss) Hattie L. Prior (Lss)

Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $1.00 Cancelled
Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled	Revenue Stamp $2.00 Cancelled

Commonwealth of Massachusetts

Barnstable, ss. June 11, 1920 Then personally appeared the above-named Edward F. Gleason and Hattie L. Prior and acknowledged the foregoing instrument to their free act and deed, before me-

John D. W. Bodfish Notary Public
My Commission Expires December 30, 1921

Barnstable, ss. Received June 12, 1920 and is recorded

Know all Men by these Presents

that Cape Cod Hospital, a corporation duly established under the laws of Massachusetts and having its usual place of business at Hyannis, in the Town and County of Barnstable and Commonwealth of Massachusetts in consideration of thirty-two thousand dollars ($32,000) to it paid by Edward F. Gleason and Hattie L. Prior of Boston, in the County of Suffolk and Commonwealth aforesaid the receipt whereof is hereby acknowledged, do hereby give, grant, bargain, sell and convey unto the said Edward F. Gleason and Hattie L. Prior, a certain parcel of land with the buildings thereon, situated in Hyannis, in said Town and County of Barnstable and Commonwealth aforesaid and bounded and described as follows;- to wit:- Beginning at the northeast corner of the granted premises at the junction of Bay View and Park Streets: thence westerly by Park Street about three hundred and eighty-one (381) feet to a corner and monument to be erected on the line of the western fence of land occupied by Frank A. Bayley: thence southerly by other land of the grantors about four hundred and eight (408) feet to a monument to be erected: thence easterly by other land of the grantors about three hundred and forty-seven (347) feet to Bay View Street: thence northerly by

(See Discharge in Book 390, Page 322)
(See Assignment in Book 357, Page 467)
(See Assignment in Book 352, Page 97)
" " " 352 " 98
" " " 352 " 99
" " " 352 " 100

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also known as Hattie C. Gleason,

I, HATTIE P. GLEASON, of that part of the Town of Barnstable known as Hyannis, and I, EDWARD F. GLEASON, of said Barnstable (Hyannis)

, Barnstable County, Massachusetts,

being ~~married~~ to each other for consideration paid, grant to CAPE COD HOSPITAL INC., a corporation duly established under the laws of the Commonwealth of Massachusetts, having its principal place of business in said Barnstable (Hyannis),

with quitclaim covenants

the land in two (2) certain lots or parcels of land, the first of which
[Description and encumbrances, if any]
is situated in the Town of Barnstable, Barnstable County, Massachusetts, in the Village of Hyannis, and the second of which parcels is situated partly in said Hyannis, but principally in the Town of Yarmouth in said County in that part called West Yarmouth, the said first parcel being shown as Lot 1 and the second parcel as Lot 2 on a plan entitled "Plan of Land in Barnstable and Yarmouth, Mass. to be conveyed to Cape Cod Hospital, scale 1' = 40 feet, dated June 1939, Leslie F. Rogers, Eng'r."

Parcel 1 is bounded and described as follows:-

Beginning on the Southerly side of Park Street, so-called, in said Hyannis, at a stone bound and by land of the grantee;

thence running South 13° 15' West by land of the grantee about four hundred seven and 50/100 (407.50) feet to a cement bound;

thence turning and running South 73° 15' 50" East by land of the grantee about ninety-five and 70/100 (95.70) feet to a cement bound;

thence turning and running South 07° 59' 10" West by land of the grantee about one hundred thirty-three and 54/100 (133.54) feet to a cement bound and other land of the grantor;

thence turning and running North 73° 15' 50" West by said other land of the grantor about one hundred forty-three and 95/100 (143.95) feet to a cement bound;

thence turning and running North 13° 15' East by said other land of the grantor about two hundred twenty-two and 82/100 (222.82) feet to a cement bound;

thence turning and running North 76° 45' West by said other land of the grantor about one hundred and five (105) feet to a cement bound;

thence turning and running North 13° 15' East by said other land of the grantor about three hundred eight and 66/100 (308.66) feet to a cement bound;

thence turning and running North 65° 31' 10" West by said other land of the grantor about two hundred eighty-eight and 40/100 (288.40) feet to Lewis Bay Road, so-called;

thence turning and running North 07° 59' 30" East by said Lewis Bay Road sixty-two and 57/100 (62.57) feet;

thence turning and running South 65° 31' 10" East through a stone bound and by land of Harriet B. Haskins Estate, land of George H. Palmer, land of Florence B. Pierce and land of May S. Colburn about four hundred seven and 17/100 (407.17) feet to a cement bound and said Park Street, so called;

thence turning and running South 24° 30' 20" West by said Park Street about twenty-six and 85/100 (26.85) feet to a stone bound;

thence turning and running South 65° 42' 10" East by said Park Street about thirty-five and 12/100 (35.12) feet to the first mentioned bound and point of beginning;

and containing 72,730 square feet, more or less.

Parcel 2 is bounded and described as follows:-

Beginnning on the Westerly side of Bay View Street, so-called, in said West Yarmouth, and at the Southeasterly corner of said land of the grantee;

thence running South 17° 42' West by said Bay View Street about one hundred thirty-two (132) feet to a cement bound and said other land of the grantor;

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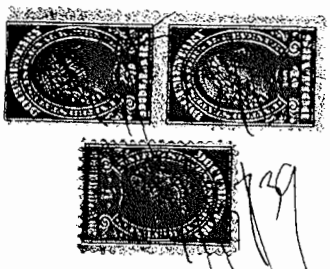
thence turning and running North 73° 15' 50" West by said other land of the grantor about one hundred thirty-one and 48/100 (131.48) feet to a cement bound;

thence turning and running Northeasterly in a curved line, radius 336.93, arc 56.93 feet, by said land of the grantee to a Land Court bound;

thence turning and running North 07° 59' 10" East by said land of the grantee about one hundred ten and 50/100 (110.50) feet to a Land Court bound;

thence turning and running South 73° 15' 50" East by said land of the grantee about ninety-eight and 13/100 (98.13) feet through a stone bound to said Bay View Street and the point of beginning;

and containing 11,944 square feet, more or less.



I, Edward F. Gleason, husband of said grantor, Hattie P. Gleason

release to said grantee all rights of tenancy by the curtesy and other interests therein, and I, Hattie P. Gleason, wife of said grantor, Edward F. Gleason, release to said grantee all rights of dower and homestead and other interest therein.

Witness our hand and seal s this 13th day of September 19 39.

Hattie P. Gleason

Hattie P. Gleason

Edward F. Gleason

The Commonwealth of Massachusetts

Barnstable, ss. September 13th 19 39.

Then personally appeared the above named Hattie P. Gleason

and acknowledged the foregoing instrument to be her free act and deed, before me

Notary Public

My commission expires 12/21/ 19 39.

Barnstable, ss., Received September 13, 1939, and is recorded.

2-$5.00 Rec'd & Canceled H.C. & T. 9/13/39.
1-$1.00 " " " " " " 9/13/39.

RUSHINGTON, INC., 21182

a corporation duly established under the laws of Massachusetts,

and having its usual place of business at Barnstable,

Barnstable County, Massachusetts, for consideration paid,

grants to CAPE COD HOSPITAL, a Massachusetts corporation

of Lewis Bay Road, Barnstable (Hyannis) Massachusetts, with quitclaim covenants

Parcel 1. The land with the buildings and improvements thereon situated in that part of Barnstable, Barnstable County, Massachusetts known as Hyannis, and bounded and described as follows:

BEGINNING at a point marked by a concrete bound in the easterly sideline of Lewis Bay Road at the boundary between the Parcel 1 and Parcel 2 hereinafter described; and thence running

SOUTH 77° 08' 35" EAST by the land last mentioned and land now or late of Cape Cod Hospital Inc., 298.16 feet to the westerly sideline of Quinlan Way; thence running

SOUTH 12° 23' 00" WEST by the westerly sideline of said Way, 174.75 feet to a point; thence running in a

SOUTHERLY direction by the westerly sideline of said Way by a curve to the left with a radius of 286.20 feet, a distance of 122.28 feet to a point; thence running in a

SOUTHERLY direction by the westerly sideline of said Way by a curve to the right with a radius of 209.42 feet, a distance of 34.27 feet to a point in the northerly sideline of said Way; thence running

NORTH 76° 59' 55" WEST by the northerly sideline of said Way, 6.17 feet to a point marked by a stone bound at land now of late of Mary C. Walsh; thence continuing

NORTH 76° 59' 55" WEST by the land last mentioned and land now or late of William J. & Catherine E. Hansen, 311.16 feet to the easterly sideline of said Lewis Bay Road; thence running

NORTH 13° 56' 30" EAST by said Road, 94.90 feet; thence running

NORTH 08° 53' 25" EAST by said Road, 91.03 feet; and thence running

NORTH 06° 57' 05" EAST by said Road, 139.47 feet to the point and place of BEGINNING.

Said premises are shown as a parcel marked "2.2± Acres" on a plan entitled "Plan of Land, Hyannis-Barnstable, Mass. property of Lewis Bay Realty Corp.", dated June 1967, drawn by Whitney & Bassett - Architects & Engineers, Hyannis, Mass., recorded with Barnstable County Registry of Deeds in Plan Book 212, Page 71.

Said premises are also shown as lot 3 on a plan entitled "Plan of Land Barnstable & Yarmouth, Mass. As Surveyed for Hattie C. Gleason", dated September, 1963, by said Whitney & Bassett, recorded with said Deeds in Plan Book 203, Page 37.

Said premises are hereby conveyed together with the right and easement to use Quinlan Way, Jeffrey Way, and Alex Way in Barnstable and Yarmouth, as shown on said plans recorded with said Deeds in Plan Book 212, Page 71 and in Plan Book 203, Page 37, and also as shown on a plan recorded with said Deeds in Plan Book 212, Page 73, for all purposes for which public ways are used in said Towns, and together with the right to use for the purposes of drainage the 8" pipes and appurtenant catch basins shown on said plans recorded in Plan Book 212, Pages 71 and 73, all in common with others lawfully entitled to the use thereof.

BOOK 1491 PAGE 655

Said premises are hereby conveyed subject to the right of Cape Cod Medical Center, Inc., as appurtenant to lot 4 shown on said plan recorded in Plan Book 203, Page 37, to use the Bituminous Concrete-Traveled Way as shown on said plan recorded in Plan Book 212, Page 71, and the sewer line and utility lines as shown thereon and as set forth in a grant by Lewis Bay Realty Corp. to Cape Cod Medical Center, Inc. dated June 15, 1966, recorded with said Deeds, Book 1338, Page 630, and defined by instrument between said parties dated July 27, 1967, recorded with said Deeds, Book 1374, Page 607, and subject to rights, easements, agreements and restrictions of record, insofar as now in force and applicable.

Parcel 2. The land with the buildings and improvements thereon situated in said Hyannis and bounded and described as follows:

BEGINNING at the same point of beginning as above described and thence running

SOUTH 77° 08' 35" EAST by Parcel 1 herein described, 223.09 feet; thence running

NORTH 12° 23' 00" EAST by lot 8 as shown on the plan hereinafter referred to 278.30 feet; thence running

NORTH 81° 03' 25" WEST by lot 9 as shown on said plan, 147.81 feet; thence running

NORTH 83° 17' 15" WEST by land now or formerly of Frank M. Rapp et ux, 100 feet to a concrete bound on the easterly sideline of Lewis Bay Road; thence running

SOUTH 07° 12' 30" WEST by said easterly sideline of Lewis Bay Road, 117.41 feet; thence running

SOUTH 06° 57' 05" WEST by said easterly sideline, 141.40 feet to the point and place of BEGINNING.

Said premises are shown as Lot 7 on a plan entitled "Plan of Land Hyannis - Barnstable, Mass. Property of Lewis Bay Realty Corp.", dated August 1966, by Whitney & Bassett - Architects & Engineers, Hyannis, Mass., recorded with Barnstable County Registry of Deeds in Plan Book 205, Page 85.

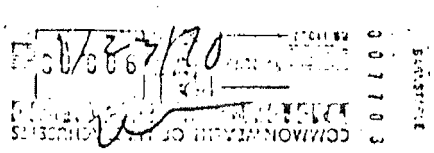
Said premises are hereby conveyed subject to rights, easements, agreements and restrictions of record insofar as now in force and applicable.

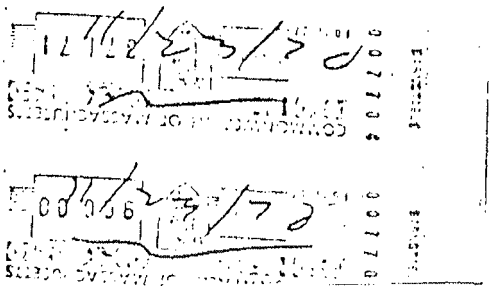
And also including in the premises hereby conveyed all right, title and interest, if any, of the Grantor in and to the fee and soil of Lewis Bay Road abutting said premises and of all of Quinlan Way, Jeffrey Way and Alex Way shown on said plan recorded in Plan Book 203, Page 37; reserving, however, to the Grantor, as appurtenant to its remaining land in Barnstable and Yarmouth, the right and easement to use and improve all of said ways for all purposes for which streets and ways are now or may hereafter customarily be used in Barnstable and Yarmouth.

Said Parcel 1 is hereby conveyed subject to a mortgage given by the Grantor to The National Shawmut Bank of Boston dated August 9, 1967, recorded with said Deeds, Book 1374, Page 619, assigned to The Prudential Insurance Company of America by instrument dated September 12, 1968, recorded with said Deeds, Book 1413, Page 44, and said Parcel 2 is hereby conveyed subject to a mortgage given by Lewis Bay Realty Corp. to Boston Safe Deposit & Trust Company et al., Trustees, dated September 14, 1966, recorded with said Deeds, Book 1346, Page 613, and by acceptance hereof the Grantee hereby assumes and agrees to pay and perform both of said mortgages and the obligations secured thereby.

The consideration for this deed is $1,508,855.96 including the unpaid principal balance of $497,860.60 of said mortgage on Parcel 1. and the unpaid principal balance of $58,254.07 of said mortgage on Parcel 2.

For title to Parcel 1 reference is made to Book 1374, Page 614, and for title to Parcel 2 reference is made to Certificate of Merger and deed of Lewis Bay Realty Corp. to the grantor of even delivery and record herewith.





In witness whereof, the said RUSHINGTON, INC.

has caused its corporate seal to be hereto affixed and these presents to be signed, acknowledged and delivered in its name and behalf by William J. Cotter

its Treasurer hereto duly authorized, this 23rd

day of November in the year one thousand nine hundred and seventy.

Signed and sealed in presence of

Edward C. Mendler, Jr.

RUSHINGTON, INC.

by William J. Cotter

Its Treasurer

The Commonwealth of Massachusetts

Barnstable ss. November 23, 19 70

Then personally appeared the above named William J. Cotter

and acknowledged the foregoing instrument to be the free act and deed of ~~the~~ RUSHINGTON, INC.

before me

Edward C. Mendler, Jr.

Notary Public—~~Justice of the Peace~~

Edward C. Mendler, Jr.
NOTARY PUBLIC
My Commission
Expires Nov. 2, 1973

~~My commission expires~~

BOOK 1491 PAGE 657

BOOK 1491 PAGE 658

RUSHINGTON, INC.

CLERK'S CERTIFICATE

I, the undersigned, John M. Newkirk, Jr., hereby certify as follows:

1. Dr. Robert D. Watt is President, William J. Cotter is Treasurer and I am Clerk of Rushington, Inc.

2. On October 30, 1970 the following votes were duly adopted by the Stockholders and Board of Directors of said Corporation:

VOTED: That the President and Treasurer of this corporation are, and each of them is, hereby authorized to execute and deliver, a purchase and sale agreement or agreements providing for the sale of all or any part of the land of the corporation, together with the buildings and improvements thereon and the sale of all or any part of the contents therein, situated in the Town of Yarmouth and/or Barnstable, Barnstable County, Massachusetts, and also to execute and deliver, in such name and behalf, a deed or deeds to all or any part of said land, buildings and improvements, and a bill or bills of sale to all or any part to said contents, all such instruments to be in such form and to contain such terms and conditions as said officers, or either of them, may determine upon--all as conclusively evidenced by such execution and delivery.

3. The foregoing vote remains in full force and effect.

WITNESS my hand and the corporate seal of Rushington, Inc. this 23rd day of November 1970.

CORPORATE SEAL

John M. Newkirk, Jr., Clerk

REC'D NOV 23 1970

786

448

husband xxxxxx xxxxxxxxxxxx

xxxxxxxxxxx

Witness my hand and seal this 13th day of June 19 51.

Hattie C. Gleason

786

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The Commonwealth of Massachusetts

Barnstable, ss. June 13th, 19 51

Then personally appeared the above named Hattie C. Gleason

and acknowledged the foregoing instrument to be her free act and deed, before me

Poul M. Swift

Notary Public—~~My Commission Expires~~

My commission expires: 12/24/ 1953.

Barnstable, ss., Received June 26, 1951, and is recorded.

I, Mary E. Day,

of Newton, Middlesex County, Massachusetts the holder of a mortgage by

George F. Steamas of Boston, Suffolk County, Massachusetts

to said Mary E. Day

dated December 14, 1925

recorded with Barnstable County Registry of Deeds,

Book 427 Page 117

for consideration paid, release to Ellis L. Gates, surviving Trustee of Vineyard Sound Trust

all interest acquired under said mortgage in the following described portions of the mortgaged premises

A lot of registered land situated in Hyannis, Massachusetts shown as Lot 112 on plan 7615-B filed with Certificate of Title No. 1261 in the Registry District of Barnstable County (made by A. C. Peters, dated April 1926 and entitled "Plan Showing Hyannis Harbor, for Vineyard Sound Trust, Willard Welsh & Ellis L. Gates, Trustees"); and with said lot the fee of the portion or portions of the way or ways abutting that lot to the center line thereof, and, in common with others entitled, the right of travel between that lot and Ocean Street over the ways.

Said lot 112 is bounded and described as follows:

NORTHWESTERLY by Bay Shore Road, 80 feet;

NORTHEASTERLY by lot 113, as shown on said plan, 120 feet, more or less;

SOUTHEASTERLY by Lewis Bay, as shown on said plan, 80 feet, more or less; and

SOUTHWESTERLY by lot 111, as shown on said plan, 125 feet, more or less.

(See mortgage in Book 427, Page 117)

Witness my hand and seal this 9th day of May 19 51.

MARY E. DAY

By Frank A. Day Atty.

The Commonwealth of Massachusetts

Suffolk ss. Boston - May 17th 19 51.

Then personally appeared the above named Frank A. Day

and acknowledged the foregoing instrument to be the free act and deed, of Mary E. Day before me

Notary Public—~~My Commission Expires~~

My Commission expires March 30, 1956

HOOPER NOTARY PUBLIC

c1930

We, Otto W. Swanson of Belmont, Middlesex County, Massachusetts and Eileen D. Cobb, formerly known as Eileen D. Swanson, now of Barnstable, Barnstable County, Massachusetts

~~husband and wife~~ for consideration paid, grant to Cape Cod Hospital, a Massachusetts charitable corporation, having its usual place of business at Barnstable (Hyannis), Barnstable County, Massachusetts (mailing address: 27 Park Street, Hyannis, Massachusetts).

with quitclaim covenants

the land in Yarmouth, Barnstable County, Massachusetts, with the buildings thereon,

(Description and encumbrances, if any)

known and numbered 81 Bay View Street and being more particularly bounded and described as follows:

NORTHERLY by lot 6 as shown on a plan hereinafter mentioned, 100 feet;

EASTERLY by Bay View Street, so-called, a Town Way, as shown on said plan, 55 feet;

SOUTHEASTERLY BY THE CORNER OF SAID Bay View Street and an unnamed way, by an arc of 32.56 feet;

SOUTHERLY by said unnamed way, 70 feet;

SOUTHWESTERLY by the corner of said unnamed way and a similar way, by an arc of 32.56 feet; and,

WESTERLY by an unnamed way and a portion of Lot 4 as shown on said plan, 55 feet.

Said parcel is shown as lot 7 on a plan entitled "Plan of Cottage Lots at Bay View Village, Barnstable and Yarmouth, Massachusetts, dated February 1940, Property of Hattie C. Gleason" which plan is recorded in the Barnstable Registry of Deeds in Plan Book 63, Page 47.

~~Subject to restrictions recorded in said Deeds in Book 69~~
~~Page 130 and to taxes not due and payable.~~

Being the same premises conveyed to us be deed recorded in said Deeds in Book 1376 at Page 904.

The consideration for this deed being $ 26,500.00 , Massachusetts deed excise stamps in the amount of $60.40 are hereto affixed.

BARNSTABLE CANCELLED 05/7 6040 2/27/70

husband
wife of said grantor

release to said grantee all rights of tenancy by the curtesy and other interests therein
dower and homestead

Witness our hand s and seal this third day of December 19 69

Otto W. Swanson

Eileen D. Cobb

The Commonwealth of Massachusetts

Middlesex ss. December 3, 19 69

Then personally appeared the above-named Otto W. Swanson

and acknowledged the foregoing instrument to be his free act and deed, before me

Robert W. Carrig
Notary Public

My Commission expires May 21, 1976 19

BOOK 1462 PAGE 657

REC'D FEB 2 - 1970 AND RECORDED

MASSACHUSETTS QUITCLAIM DEED SHORT FORM (INDIVIDUAL)

BOOK 7837 PAGE 141

03097

We, Thomas J. Roche and Patricia A. Roche

of West Roxbury, Suffolk County, Massachusetts,

being unmarried, for consideration paid, and in full consideration of Two Hundred Fifty-six Thousand and no/100 Dollars ($256,000.00)

grants to Cape Cod Hospital, Post Office Box 640, 27 Park Street,

of Hyannis, Massachusetts with quitclaim covenants

~~the~~ the~~s~~

The land with the buildings located thereon situated in the village of Hyannis, Town of Barnstable, Barnstable County, Massachusetts bounded and described as follows:

See Exhibit A attached hereto and incorporated herein by reference.

For our title see Bk. 7419 Pg. 251.

CANCELLED
01/92
BARNSTABLE REC 01
TAX
CHCK 875.52
5572A000 15:51 EXCISE TAX 875.52

CANCELLED
JAN 15 '92
583.68

Witness our hand s and seal s this 15th day of January 1992

Thomas J. Roche

Patricia A. Roche

The Commonwealth of Massachusetts

Barnstable, ss. January 15, 1992

Then personally appeared the above named Thomas J. Roche and Patricia A. Roche and acknowledged the foregoing instrument to be ~~his~~ their free act and deed, before me

Kendra L. Atkinson
Notary Public—Justice of the Peace

My commission expires 7/31 1998

(*Individual—Joint Tenants—Tenants in Common.)

CHAPTER 183 SEC. 6 AS AMENDED BY CHAPTER 497 OF 1969

Every deed presented for record shall contain or have endorsed upon it the full name, residence and post office address of the grantee and a recital of the amount of the full consideration thereof in dollars or the nature of the other consideration therefor, if not delivered for a specific monetary sum. The full consideration shall mean the total price for the conveyance without deduction for any liens or encumbrances assumed by the grantee or remaining thereon. All such endorsements and recitals shall be recorded as part of the deed. Failure to comply with this section shall not affect the validity of any deed. No register of deeds shall accept a deed for recording unless it is in compliance with the requirements of this section.

EXHIBIT A

Two parcels of land with the buildings located thereon situated in Barnstable (Hyannis), Barnstable County, Massachusetts bounded and described as follows:

Parcel I:

Southwesterly	by Willow Street One Hundred Fifty and 68/100 (150.68) feet;
Easterly	by Quinlan Way Ninety and 04/100 (90.04) feet, Forty-nine and 96/100 (49.96) feet, and Twenty-four and 29/100 (24.29) feet;
Northerly	by Lot 3 One Hundred and no/100 (100.00) feet;
Easterly	by Lot 3 One Hundred Sixteen and no/100 feet; and
Westerly	by land now or formerly of Mary C. Walsh One Hundred Seventy-seven and 71/100 feet.

Containing 16,557 square feet of land.

Said lot is shown as Lot 4 on plan entitled "Plan of Land in (Hyannis) Barnstable, Massachusetts prepared for Cape Cod Hospital scale 1" = 40' July 7, 1983" which plan is recorded with Barnstable County Registry of Deeds in Plan Book 375, Page 96.

Parcel II:

Beginning at a point Easterly on Willow Street which point is 9/100 feet N140-39'-40" from a cement bound in said street thence n 140-39'-40" E one hundred twenty-four and 36/100 feet and everywhere following the Easterly line of property now of Anna Shuley and/or Mary Doody to the Southerly line of land now or formerly of Hattie C. Gleason thence turning and running S 76°-02-03 E one hundred ninety-five and 64/100 feet everywhere following said Southerly line of Land now or formerly of Hattie C. Gleason to a stone bound; thence turning and running S 10° -36' W one hundred forty-four and 44/100 feet to a cement bound; thence turning and running 518° -08' W forty-nine and 96/100 feet to a cement bound; thence running 526° -08' W and ninety and 4/100 feet to a point in the Easterly line of Willow St., thence running N 32° -15W by said Willow Street one hundred fifty and 68/100 feet to a cement bound in the Easterly side of said Willow Street, thence running by the same course fifty-one and 17/100

feet to a stone bound in the said Easterly side of Willow Street; thence turning and running N50° -40" W by the Easterly side of Willow Street forty-one and 53/100 feet to the point of beginning. Be all of said measurements more or less or however otherwise bounded and described.

The above parcel is shown as Lots 1 and 2 on a plan entitled "Plan of land - Hyannis Barnstable, Massachusetts, property of Louis D. Ricci" by Whitney & Bassett dated Feb., 1957 recorded with Barnstable County Registry of Deeds in Plan Book 171, Page 71.

Excepting therefrom the land shown as Lot 2 on plan recorded with Barnstable County Registry of Deeds in Plan Book 171, Page 71.

5422R

RECORDED JAN 15 92

LEWIS BAY REALTY CORP., a corporation duly established under the laws of Massachusetts and having an usual place of business at Yarmouth, Barnstable County, Massachusetts, for consideration paid, grants to CAPE COD HOSPITAL, INC., a Massachusetts charitable corporation with an usual place of business in Barnstable (Hyannis), Barnstable County, Massachusetts, with QUITCLAIM COVENANTS, three certain parcels of vacant land in Banrstable (Hyannis), Barnstable County, Massachusetts, shown as Lots 8 and 9 and the fee in so much of Quinlan Way as lies north of the southerly line of Lot 8 extended in an easterly direction to other land of Cape Cod Hospital, Inc. on a plan entitled "Plan of Land Hyannis-Barnstable, Mass. Property of Lewis Bay Realty Corp" dated August 1966 drawn by Whitney & Bassett-Architects & Engineers, Hyannis, Mass. to be recorded herewith being more particularly bounded and described as follows:

Plan Book 205 Page 86

Parcel I (Lot 8)

Northerly by other land of the Grantee, one hundred five and 07/100 (105.07) feet;

Easterly by said other land of the Grantee, two hundred twenty-two and 89/100 (222.89) feet;

Southerly by the end of Quinlan Way being the third parcel hereinafter described, thirty (30) feet;

Easterly again by the Westerly sideline of said Quinlan way, fifty-six (56) feet;

Southerly again by other land of the Grantor, seventy-five and 07/100 (75.07) feet; and

Westerly by other land of the Grantor, being Lot 7, two hundred seventy-eight and 30/100 (278.30) feet.

Containing 27,540 square feet, more or less.

Parcel II (Lot 9)

Northerly by other land of the Grantee, one hundred eighty-three and 06/100 (183.06) feet;

Easterly by other land of the Grantee, three hundred eight and 53/100 (308.53) feet;

Southerly by other land of the Grantor, being Lot 7, one hundred forty-seven and 81/100 (147.81) feet; and

Westerly by land of Frank N. Rapp et ux, Earl H. Webster et ux and Conrad Nobili et ux, all as shown on said plan, three hundred fifty-four and 62/100 (354.62) feet.

Containing 54,190 square feet, more or less.

Parcel III

Northerly by Lot 8 as shown on said plan, thirty (30) feet;

Easterly by other land of the Grantee, fifty-six (56) feet;

Southerly by a line being the extension of the Southerly boundary of Lot 8 on said plan in an Easterly direction to other land of the Grantee, thirty (30) feet; and

Westerly by Lot 8 on said plan, fifty-six (56) feet.

Containing 1,680 square feet, more or less.

Reserving to the Grantor a right of way for all purposes over Quinlan Way.

Said Parcel III is conveyed subject to a right of way for all purposes of all persons now or hereafter entitled thereto.

It is expressly understood and agreed that no right of way is conveyed over any of the remaining land of the Grantor including the ways shown on said plan. Said parcels I, II and III are and each of them is conveyed subject to the following restriction which shall remain in force until August 1, 1996, for the benefit of the remaining land of the Grantor, namely: In the event the Grantee or its successors or assigns shall receive a bona fide offer for the purchase of the granted premises or any part thereof and should it or its successors or assigns wish to sell or trnasfer, said premises or the part thereof desired to be sold or transferred shall first be offered to the Grantor, its successors or assigns at the same price and under the same terms and conditions for which the Grantee or its successors or assigns shall have received a bona fide offer. Should the Grantor desire to exercise its option to repurchase as above provided, it shall within fifteen (15) days of the receipt of the notice of intention to sell or transfer send written notice by registered mail, postage prepaid, to the last known address of the Grantee, its successors or assigns, indicating its desire to purchase, and the Grantor shall have thirty (30) days

in which to complete such repurchase starting from the date of said registered mail notice to the Grantee, its successors or assigns, provided nevertheless, the right ot receive such notice and to take action with respect to the same shall at all times be vested in the Grantor or in a single designated successor or assign.

For Grantor's title see deed of Robert D. Watt dated June 14, 1965, recorded in Barnstable Deeds in Book 1304 Page 203 and deed of Boston Safe Deposit & Trust Company et al, Trustees, dated November 9, 1965, recorded in Barnstable Deeds in Book 1322 Page 383.

IN WITNESS WHEREOF, the said Lewis Bay Realty Corp. has caused its corporate seal to be hereto affixed and these presents to be signed, acknowledged and delivered in its name and behalf by John M. Newkirk, Jr., its President, hereto duly authorized this 13th day of ~~August~~ September in the year one thousand nine hundred and sixty-six.

LEWIS BAY REALTY CORP.

BY _____
President

THE COMMONWEALTH OF MASSACHUSETTS

Barnstable, ss. ~~August~~ September 13, 1966

Then personally appeared the above named John M. Newkirk, Jr. President, and acknowledged the foregoing instrument to be the free act and deed of the Lewis Bay Realty Corp., before me

_____
Notary Public

My commission expires: December 3, 1970

DOCUMENTARY 20 20 20

I, WILLIAM J. COTTER, Clerk pro tem of Lewis Bay Realty Corp. hereby certify that at a meeting of the Stockholders and Directors of the Corporation duly called and held at the office of John M. Newkirk, Jr., North Road, West Yarmouth, Massachusetts, on July 29, 1966, a quorum being present and acting throughout, it was

VOTED: That John M. Newkirk, Jr., President, be and he hereby is authorized in the name of and on behalf of Lewis Bay Realty Corp. to execute, seal with the corporate seal, acknowledge and deliver to Cape Cod Hospital, Inc., a deed of the vacant land situated in Barnstable (Hyannis), Barnstable County, Massachusetts, shown as Lots 8 and 9 and the fee in so much of Quinlan Way as lies north of the southerly sideline of Lot 8 extended in an easterly direction to other land of Cape Cod Hospital, Inc., all as shown on a plan entitled "Plan of Land, Hyannis, Mass. Property of Lewis Bay Realty Corp. dated August 1966 drawn by Whitney & Bassett, Architects & Engineers, Hyannis, Mass." to be recorded, said deed to be in such form and contain such agreements and restrictions as he in his sole discretion shall approve, his execution thereof to be conclusive evidence of such approval.

I further certify that John M. Newkirk, Jr. is President of Lewis Bay Realty Corp. and that said vote is still in full force and effect.

ATTEST:

William J. Cotter
Clerk pro tem, Lewis Bay Realty Corp.

LEWIS BAY REALTY CORP. 1966 MASS.

Dated: September 13, 1966

REC'D SEP 14 1966 AND RECORDED

QUITCLAIM DEED

Paul Wylan, John Goodman and Peter Wylan, co-partners d/b/a Cape Cod Medical Center, having an address of c/o Marilyn Leugers, P.O. Box 755, Harwich, Massachusetts 02645 in consideration of Two Million Five Hundred Thousand and 00/100 ($2,500,000.00) Dollars paid grant to Cape Cod Hospital, 27 Park Street, Hyannis, Massachusetts 02601 with QUITCLAIM COVENANTS three certain parcels of land together with the buildings thereon situate in Barnstable (Hyannis) and Yarmouth, Barnstable County, Massachusetts bounded and described as follows:

PARCEL I:

(with an address of 40 Quinlin way, Hyannis, MA 02601)

EASTERLY	by Jeffrey Way, as shown on the hereinafter described plan two hundred nineteen and 82/100 (219.82) feet;
SOUTHEASTERLY	by an arc at Jeffrey Way, there measuring thirty-one and 93/100 (31.93) feet as shown on said plan;
SOUTHERLY	by Jeffrey Way, as shown on said plan, one hundred thirty and 90/100 (130.90) feet;
SOUTHWESTERLY	by an arc at the intersection of Jeffrey Way and Quinlan Way as shown on said plan, thirty-three and 39/100 (33.39) feet;
WESTERLY	by two arcs and a straight line as shown on said plan measuring forty-eight and 14/100 (48.14) feet; one hundred nine and 49/100 (109.49) feet; and eight-two and 89/100 (82.89) feet, respectively;
NORTHWESTERLY	by the intersection of Quinlan Way and Jeffrey Way as shown on said plan, by an arc measuring twenty-eight and 02/100 (28.02) feet;
NORTHERLY	by Jeffrey Way as shown on said plan, one hundred ninety and 78/100 (190.78) feet; and
NORTHEASTERLY	by an arc in Jeffrey Way as shown on said plan, thirty-eight and 26/100 (38.26) feet.

4

Containing 1.3 acres more or less and being shown as Lot 4 on the plan hereinafter described.

PARCEL II:

(with an address of Alex Road, Yarmouth, MA 02673)

NORTHWESTERLY	by Jeffrey Way, fifty-five and no/100 (55.00) feet;
NORTHERLY	by a curved line at the intersection of Jeffrey Way and Alex Way, twenty-three and 21/100 (23.21) feet;
NORTHEASTERLY	by Alex Way, seventy and 44/100 (70.44) feet;
EASTERLY	by a curved line at the intersection of Alex Way and Bay View Street, twenty-three and 21/100 (23.21) feet;
SOUTHEASTERLY	by Bay View Street, fifty-five and no/100 (55.00) feet; and
SOUTHWESTERLY	by land now or formerly of Charles W. Rackliffe, one hundred and no/100 (100.00) feet.

Being shown as Lot 5 on the plan hereinafter described.

CANCELLED
BARNSTABLE COUNTY
REGISTRY OF DEEDS
COUNTY EXCISE TAX
DATE 01.11.'00 TUE
TAX $5193.00
TOTAL $5193.00
CHECK $5193.00
CLERK 1 NO.006234
TIME 11:00 1111

Parcels I and II above described are shown on a plan entitled "Plan of land in Barnstable and Yarmouth, Massachusetts as surveyed for Hattis C. Gleason Scale: 1" = 40' September 1963 Whitney and Bassett, Architects and Engineers, Hyannis, Massachusetts", which said plan is recorded at the Barnstable County Registry of Deeds in Plan Book 203, Page 37. Grantors also convey to grantee all grantors' right, title and interest in the lots depicted as Quinlin Way, Jeffrey Way and Alex Way as shown on the aforesaid plan.

PARCEL III:

(with an address of 93 Bay View Street, Yarmouth, MA 02673)

SOUTHEASTERLY	by Bay View Street, as shown on plan hereinafter described, there measuring seventy (70) feet;
SOUTHWESTERLY	by Lot 11 as shown on said plan, there measuring one hundred (100) feet;

NORTHWESTERLY by a portion of Lot 12 as shown on said plan, there measuring seventy (70) feet; and

NORTHEASTERLY by Lot 9 as shown on said plan, there measuring one hundred (100) feet.

Containing 7,000 square feet of land, more or less, and being Lot 10 as shown on a plan entitled "Plan of Cottage Lots at Bay View Village, Barnstable & Yarmouth, Mass. near the Village of Hyannis, February 1940, Scale 1' = 40', Leslie F. Rodgers, Hyannis, Property of Hattie C. Gleason" which said plan is duly recorded with the Barnstable County Registry of Deeds in Plan Book 63, Page 47.

Said premises are conveyed together with and subject to rights, reservations and restrictions of record insofar as the same may be now in force and applicable including the rights and easements set forth in a grant from Lewis Bay Realty Corp. to Cape Cod Medical Center, Inc. dated the 15th day of June, 1966, recorded at the Barnstable County Registry of deeds in Book 1338, Page 630.

For grantors' title see deed of Cape Cod Medical Center, Inc. to the grantors dated February 4, 1985 and recorded with the Barnstable County Registry of Deeds in Book 4407, Page 126.

WITNESS OUR HANDS AND SEALS,

Date: January 7, 2000

Paul Wylan by Marilyn Leugers, his attorney

Paul Wylan by his attorney Marilyn Leugers pursuant to Power of Attorney dated May 13, 1998 and recorded herewith.

Date: January 7, 2000

John Goodman

John Goodman

Date: January 7, 2000

Peter Wylan by Marilyn Leugers, his attorney

Peter Wylan by his attorney Marilyn Leugers pursuant to Power of Attorney dated December 8, 1999, and recorded herewith.

CANCELLED

REG OF DEEDS
REG # 01
BARNSTABLE
01/11/00 11:47AM 01
000000 #
FEE $650.00
CASH $8550.00

CANCELLED

BARNSTABLE COUNTY
REGISTRY OF DEEDS
COUNTY EXCISE TAX
DATE 01.11.'00 TUE
TAX $507.00
TOTAL $507.00
CHECK $507.00
CLERK 1 NO.006223
TIME 10:58 1111

COMMONWEALTH OF MASSACHUSETTS

Barnstable. ss. January 7, 2000

Then appeared the above-named Marilyn Leugers and as attorney for Paul Wylan pursuant to a power of attorney dated May 13, 1998, acknowledged the foregoing instrument to be the free act and deed of Paul Wylan and the free act and deed of herself on behalf of and as attorney for Paul Wylan, before me,

Patrick M. Butler, Notary Public
My commission expires: 10/21/2005

COMMONWEALTH OF MASSACHUSETTS

Barnstable, ss. January 7, 2000

Then personally appeared the above-named John Goodman and acknowledged the foregoing instrument to be his free act and deed, before me,

Patrick M. Butler, Notary Public
My commission expires: 10/21/2005

COMMONWEALTH OF MASSACHUSETTS

Barnstable. ss. January 7, 2000

Then appeared the above-named Marilyn Leugers and as attorney for Peter Wylan pursuant to a power of attorney dated December 8, 1999, acknowledged the foregoing instrument to be the free act and deed of Peter Wylan and the free act and deed of herself on behalf of and as attorney for Peter Wylan, before me,

Patrick M. Butler, Notary Public
My commission expires: 10/21/2005

BARNSTABLE REGISTRY OF DEEDS

Bk 15787 Pg336 #93536
10-23-2002 @ 01:12p

QUITCLAIM DEED

I, GEORGE A. RACKLIFFE, surviving tenant by the entirety, of 127 Patriots Way, Barnstable, Barnstable County, Massachusetts 02630, in consideration of TWO HUNDRED THIRTY-EIGHT THOUSAND FIVE HUNDRED AND NO/100 ($238,500.00) DOLLARS paid, grant to CAPE COD HOSPITAL of 27 Park Street, Barnstable (Hyannis), Barnstable County, Massachusetts 02601, with QUITCLAIM COVENANTS, the land together with the buildings thereon situated in Yarmouth (West), Barnstable County, Massachusetts more particularly bounded and described as follows:

SOUTHEASTERLY by Bay View Street, there measuring seventy (70) feet;

SOUTHWESTERLY by Lot 10 as shown on plan hereinafter mentioned there measuring one hundred (100) feet;

NORTHEASTERLY by a 30' private way, there measuring seventy (70) feet; and

NORTHEASTERLY by Lot 8 as shown on said plan, there measuring one hundred (100) feet.

Containing 7000 square feet of land, more or less, and being LOT 9 as shown on plan entitled "Plan of Cottage Lots at Bay View Village, Barnstable & Yarmouth, Mass. near the village of Hyannis, Feb. 1940, scale: 1" = 40', Leslie F. Rogers, Hyannis, Property of Hattie C. Gleason", duly recorded with Barnstable County Registry of Deeds in Plan Book 63 Page 47.

For title see Deed recorded in Book 6944 Page 345 with the Barnstable County Registry of Deeds.

See also Death Certificate of Barbara J. C. Rackliffe recorded in Book 14885 Page 217 with the Barnstable County Registry of Deeds.

HAYES & HAYES
ATTORNEYS-AT-LAW, P.C.
23 EAST MAIN STREET
P.O. BOX 2155
HYANNIS, MA 02601-2155
(508) 775-0080

2

Property Address: 91 Bay View Street, West Yarmouth, MA 02673

WITNESS my hand and seal this 23 day of October, 2002.

George A. Rackliffe

COMMONWEALTH OF MASSACHUSETTS

Barnstable, ss. October 23, 2002

Then personally appeared the above named George A. Rackliffe, and acknowledged the foregoing to be his free act and deed, before me,

Notary Public

My Commission Expires: 5/8/09

REG OF DEEDS
REG # 01
BARNSTABLE
CANCELLED
10/23/02 1:24PM 01
000000 #8105
FEE $815.67
CASH $815.67

BARNSTABLE COUNTY
REGISTRY OF DEEDS
COUNTY EXCISE TAX
CANCELLED
DATE 10.23.'02 WED
TAX $543.78
TOTAL $543.78
CHECK $543.78
CLERK 1 NO.034173
TIME 13:03 1111

HAYES & HAYES
ATTORNEYS-AT-LAW, P.C.
23 EAST MAIN STREET
P.O. BOX 2155
HYANNIS, MA 02601-2155
(508) 775-0080

BK13156 PG081 47065
07-31-2000 @ 02:39

99 Bay View St., Yarmouth

QUITCLAIM DEED

Nancy L. Johnson, Trustee of The Nancy L. Johnson Investment Trust, under Declaration of Trust dated September 3, 1999, and recorded with the Barnstable County Registry of Deeds in Book 12729, Page 305;

for consideration paid of ONE HUNDRED FIFTY SEVEN THOUSAND FIVE HUNDRED AND NO/100 ($157,500.00) DOLLAR

grant to CAPE COD HOSPITAL, a Massachusetts not-for-profit corporation having a usual business address of 27 Park Street, Hyannis, MA 02601

with quitclaim covenants

the land in Yarmouth (West), Barnstable County, Massachusetts, bounded and described as follows:

Beginning at a cement bound at Bay View Street and land of Frederick Stearns, it being the South-west corner of the granted premises:

Thence	running westerly by land of said Strearns one hundred (100) feet more or less to Lot 12 on plan, hereinafter mentioned;
Thence	running northerly by said Lot 12 seventy five 75) feet more or less to Lot 10 as shown on said plan;
Thence	running easterly by said Lot 10 one hundred (100) feet more or less to Bay View Street;
Thence	running southerly by Bay View Street seventy (70) feet more or less to the cement bound at land of said Stearns.

Shown as Lot 11 on plan entitled "Plan of Cottage Lots at Bay View Village, Barnstable and Yarmouth, Mass., near the village of Hyannis, Feb. 1940, Scale 1" = 40', Leslie F. Rogers, Hyannis, property of Hattie C. Gleason," recorded with the Barnstable County Registry of Deeds in Book 63, Page 47.

Containing 7,250 square feet of land more or less, according to said plan.

BARNSTABLE COUNTY
REGISTRY OF DEEDS
COMMONWEALTH EXCISE TAX

DATE 07.31.'00 MON

TAX $359.10
TOTAL $359.10
CHECK $359.10
CLERK 1 NO.012103
TIME 13:36 1111

CANCELLED

REGISTRY OF DEEDS
Regist # 01
BARNSTABLE

07/31/00 1:46PM 01
000000 #5366

FEE $538.65
CASH $538.65

CANCELLED

(3)

For title see deed recorded in Book 12729, Page 329.

WITNESS my hand and seal this 31st day of July, 2000.

Nancy L. Johnson, Trustee of
The Nancy L. Johnson Investment Trust

COMMONWEALTH OF MASSACHUSETTS

Barnstable, ss. Date: July 31st, 2000

Then personally appeared the above named Nancy L. Johnson, Trustee of the Nancy L. Johnson Investment Trust, and acknowledged the foregoing instrument to be her free act and deed, as Trustee as aforesaid, before me,

Notary Public:
My Commission Expires: 2/17/06

883923

TRUSTEE'S CERTIFICATE

99 Bayview St Yarmouth

The undersigned, Nancy L. Johnson, Trustee of The Nancy L. Johnson Investment Trust (the "Trust"), under Declaration of Trust dated September 3, 1999, recorded with the Barnstable County Registry of Deeds in Book 12729, Page 305, hereby certifies as follows:

1. She is the sole Trustee of said Trust;

2. That said Trust has not been altered, amended, revoked, or terminated;

3. That all of the beneficiaries of the Trust are of legal age and competent and have directed the Trustee to execute and deliver to Cape Cod Hospital (the "Buyer") all documents in connection with the conveyance by the Trust to the Buyer of the property known as and numbered 97 and 99 Bay View Street, West Yarmouth, Massachusetts, more particularly described in Exhibit A attached hereto (the "Property"), including, without limitation, a Quitclaim Deed, all on such terms and conditions as said Trustee deems necessary and appropriate, as conclusively evidenced by the execution thereof.

Executed as a sealed instrument this 31st day of July, 2000.

Nancy L. Johnson, Trustee

Nancy L. Johnson, Trustee of
The Nancy L. Johnson Investment Trust

COMMONWEALTH OF MASSACHUSETTS

Barnstable, ss. July 31, 2000

Then personally appeared the above named Nancy L. Johnson, Trustee of the Nancy L. Johnson Investment Trust, and acknowledged the foregoing to be her free act and deed, as Trustee as aforesaid, before me,

Cheryl Ann Dawes

Notary Public
My Commission expires: 2/17/06

884036

BARNSTABLE REGISTRY OF DEEDS

BOOK 3840 PAGE 011

33363

I, MARY C.WALSH, of Barnstable (Hyannis),

~~XX~~ Barnstable County, Massachusetts
in consideration of Fifteen Thousand Dollars

grant to CAPE COD HOSPITAL, a non-profit corporation

of 27 Park Street, Hyannis, MA 02601 with quitclaim covenants
the land in Barnstable (Hyannis), Barnstable County, Massachusetts, bounded and described as follows:

Beginning at a point at the southeasterly corner of the granted premises, on the westerly side of Quinlan Way, a private way shown on plan hereinafter mentioned, and at other land of the grantor; thence running

North 72° 51' 38" West by other land of the grantor, 100.00 feet; thence running

North 00° 57' 22" West by other land of the grantor, 116.00 feet to land of Cape Cod Hospital; thence running

South 76° 59' 55" East by said land of Cape Cod Hospital, 120.64 feet to Quinlan Way; thence running

South 9° 37' 10" West by Quinlan Way, 120 feet to the point of beginning.

Being shown as Lot 3 on plan entitled "Plan of Land in (Hyannis), Barnstable, Mass. prepared for Cape Cod Hospital... July 7, 1983..." to be recorded herewith.

Being a portion of the premises conveyed to me by deed of Dorothy F.Rooney dated August 7, 1962, recorded with Barnstable Deeds in Book 1168, page 286.

See Plan Book 375 Page 96.

Executed as a sealed instrument this eighteenth day of August, 1983.

Mary C. Walsh

COMMONWEALTH OF MASSACHUSETTS
DEEDS EXCISE
CANCELLED
AUG 22 '83
$ 54.20
P.B. 11037

The Commonwealth of Massachusetts

Barnstable ss. August 18, 1983

Then personally appeared the above named Mary C.Walsh

and acknowledged the foregoing instrument to be ~~her~~ free act and deed.

Before me, Janet A. M. Farrell
Notary Public
My commission expires Nov. 25, 1988

NOTARY PUBLIC

RECORDED AUG 22 83

Cape Cod Hospital

New Tower Addition – 27 Park Street, Hyannis

Filing Fee Calculation

Area of New Building Construction: 122,542 sf

- Gross Floor Area of New Tower: 199,295 sf
- Gross Floor Area of Buildings Demolished: 76,753 sf

Section 16(a)(i)[1](b) of the Enabling Regulations: $0.56 per sf

Section 16(a)(ii) of the Enabling Regulations:

- ✓ 15% reduction for Economic Center (GIZ)
- ✓ 15% reduction for redevelopment
- ✓ 10% reduction for non-profit charitable organization

Fee Calculation: (122,542 x 0.56) x .60 = **$41,174.11**

4538309.1

LINK: Exhibit 9-Photos Renderings CCH.pdf

Cape Cod Hospital - New Addition
Design Narration for Cape Cod Commission

TSOI KOBUS DESIGN

Context

The Cape Cod Hospital new cancer center and bed addition is located in the southwest corner of the hospital complex, 187 feet from the Mugar building at its closest point. The Mugar building is located towards the southeast corner of the complex, but not as far south as the new addition. By staggering the two buildings in plan, the patient rooms on the sides facing the opposite building still have mostly unobstructed views of the cape.

Towards the northeast corner of the complex is the main cupola of the original hospital, 384 feet away from the northeast corner of the new building. Finally, the closest point of the highest parapet on the existing main building and entrance, north of the new addition, is about 150 feet.

The top of the penthouse of the new addition is 99'-4" above the 1st floor slab, which is at the same level as the existing hospital. This height is 6 inches less than the top of the Mugar penthouse, which is 99'-10". The top of the flagpole on the Mugar roof is 27'-3" taller than the new addition. The cupola dome is 86' high, which is 13'-4" less than the height of the new building, and the top of the parapet on the existing main building is at 55'-8".

The new addition is most visible from Lewis Bay Rd., where the hospital's Gleason House and landscaping will remain in the foreground, softening the view of the new building from the street.

Volumetric Design

The addition is composed of three functional volumes: 1) the cancer center on the 1st and 2nd floors, 2) inpatient beds on the 3rd, 4th and 5th floors, and 3) an education center on the top floor along with the penthouse, which screens all of the mechanical equipment from view. The three distinct volumes stack vertically to provide security separation as well as zoned operation and organized patient circulation.

The geometric design follows the functional composition while presenting a somewhat faceted impression to the neighborhood. Instead of the simple extrusion of the footprint, the new building expresses the shape of each functional block with a distinct profile while still appearing as a unified composition.

The 1st floor cancer center has a rectangular profile and the largest footprint, acting as a podium for the new building. The 2nd floor detaches from the podium below and floors above to downscale the massing. The entry and lobby welcome patients and their families with a human-scaled canopy and vestibule.

The main body of the addition, which "floats" above the recessed, glass-enclosed 2nd floor, creates the illusion of lightness. These three inpatient floors have distinct north

and south façades. The north façade, which is facing the existing campus, has a flat, calm face to blend in with the rest of the campus. However, the south façade is intentionally bent with an open "V" shape, which not only metaphorically welcomes visitors with outstretched arms, but also brings elongated vistas into the patient rooms.

The "eyebrow" shape of the canopy at the top of the building is the formal pinnacle of the design. It not only evokes the lighthouse of Cape Cod Healthcare's identity; it also stands as a beacon in the community for healing.

Material Composition

The material palette of the building is inspired by nature but also serves a sustainable purpose. Clay-based terracotta is a particularly natural, environmentally friendly, and robust material that maintains its appearance after many decades. The terracotta panels dominate the façade, respecting the existing hospital context of brick and stucco. There are two different colors of terracotta. A medium blue-grey terracotta envelops the plinth of the building, giving it weight and connecting it to the earth. Limestone-colored terracotta clads the majority of the new building, expressing lightness and, from a distance, helping it fade into the Cape horizon.

The wood-look, aluminum-panel soffit of the "eyebrow" on the top floor highlights its nature-based design while being able to withstand Cape Cod's harsh environment. This material is repeated at the main-entrance canopy and 2nd floor exterior soffit. Patients and visitors experience this familiar, "warm" material upon entering the building and while enjoying the 2nd-floor roof terrace.

The patient and visitor experience is further enriched on the inpatient bed floors by having natural light and views at the ends of the primary corridors. These windows are expressed on the exterior by a vertical "light slot" framed by blue aluminum panels that help to integrate the three patient bed floors while reflecting light and color into the corridors.

Fenestration Design

The fenestration design in the addition is a composition of solid and void forms. The 2nd floor of the cancer center and 6th-floor education center are completely transparent with continuous glass facades. These horizontal voids are connected to the vertical west-facing "light slot", defining the edge of the solid forms.

The 1st floor of the cancer center has minimum window openings due to the location of the two concrete-enclosed linear accelerators in the southwest corner. The repetitive window pattern on the north and east facades reflects the cancer center clinical layout. The south and north entries are formed with glass-enclosed volumes to welcome patients and families with natural light.

The 3rd through 5th floors contain both intensive care and medical/surgical inpatient rooms. These two types of inpatient rooms have dissimilar modules because of the difference in Department of Public Health requirements, equipment demands, and patient care. Therefore, a randomized window pattern was developed to accommodate the programmatic needs, allowing all three inpatient floors to have a consistent fenestration without compromising the design integrity.

Lighting and Landscape Design

All new exterior lighting will be downlighting and dark-sky compliant. The maximum height of proposed light poles will be less than 20 feet.

The site design will use native plants found in surrounding natural areas and materials that are contextually appropriate and suited to the site. Planting is being designed to increase biodiversity, reduce potable water use for irrigation, increase drought tolerance, and minimize maintenance requirements, and it will provide habitat and create connections between the site and its surrounding ecosystems. The site design will increase the area of open space on site and maintain existing open space.

A central open space proposed at the main entry is a large "island" that extends from Lewis Bay Rd. to the primary porte cochere on the south side of the new building. This area will be a "rain garden", planted with native plants and capturing rainwater that will be released gradually over time. The 2nd-floor patient terrace will be planted with shrubs and small trees on mounds to serve as a wind screen and shading for occupants. Evergreen shrubs will be planted along the edge of the 6th-floor terrace.

The site design provides planted buffers around the entire perimeter of the site and within the interior of the campus, and the majority of the mature trees will be preserved.

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LIGHTING FIXTURE SCHEDULE

CCC Submission

Cape Cod Hospital

Not for bidding or construction unless fully incorporated into contract documents by Architect and/or Engineer.

Date Issued: 9- Aug-2019

Lam Project # 18078

Written by: PW

Checked by: SJF

Fixture Type		Description	Fixture (Manufacturers and Models)	Light Source	Fixt. Load (W) (Typical)	Voltage	Controls	Location / Use	Notes
G	---	Ground surface or recessed mounting	Suffixes, like A, B, C, etc. are typically used to denote a variant of a fixture type. Please note that the nomenclature is not absolute. Refer to the individual specifications for each fixture type.						Mounting heights, special notes, references to other documents, instructions to the Contractor, etc. are typically listed in the Notes column.
M	---	Media or Mesh							
P	---	Pendant (usually a discreet unit)							
R	---	Recessed							
S	---	Surface mounted (typically to ceiling)							
T	---	Track or track mounted							
W	---	Wall mounted							
Y	---	Exterior + Mount, (i.e. YG would be exterior ground mount)							

YG1A-12'	Created 17-Jul-2019	Pole mounted LED parking lot fixture with 'BLC' optics. 12'-0" mounting height to bottom of fixture. 5 year warranty and 100,000 hour rated life to L70. IP65 rated	Lithonia D-Series Size 0	3000K LED 3586 lm Delivered	38 W	120V-277V	Integral Dimmable Driver	Parking Lot	Provide dimmable driver compatible with supplied controls system. Steel pole to be sized with concrete base detail per civil drawings so that light source is no more than 12'-0" above grade to meet local lighting standards.
YG1B-16'	Created 17-Jul-2019	Pole mounted LED parking lot fixture with 'T2M' optics. 16'-0" mounting height to bottom of fixture. 5 year warranty and 100,000 hour rated life to L70. IP65 rated	Lithonia D-Series Size 0	3000K LED 4387 lm Delivered	38 W	120V-277V	Integral Dimmable Driver	Parking Lot	Provide dimmable driver compatible with supplied controls system. Steel pole to be sized with concrete base detail per civil drawings so that light source is no more than 16'-0" above grade to meet local lighting standards.
YG1B-19'	Created 17-Jul-2019	Pole mounted LED parking lot fixture with 'T2M' optics. 19'-0" mounting height to bottom of fixture. 5 year warranty and 100,000 hour rated life to L70. IP65 rated	Lithonia D-Series Size 0	3000K LED 4387 lm Delivered	38 W	120V-277V	Integral Dimmable Driver	Parking Lot	Provide dimmable driver compatible with supplied controls system. Steel pole to be sized with concrete base detail per civil drawings so that light source is no more than 19'-0" above grade to meet local lighting standards.
YG1C-16'	Created 17-Jul-2019	Pole mounted LED parking lot fixture with 'T4M' optics. 16'-0" mounting height to bottom of fixture. 5 year warranty and 100,000 hour rated life to L70. IP65 rated	Lithonia D-Series Size 0	3000K LED 4281 lm Delivered	38 W	120V-277V	Integral Dimmable Driver	Parking Lot	Provide dimmable driver compatible with supplied controls system. Steel pole to be sized with concrete base detail per civil drawings so that light source is no more than 16'-0" above grade to meet local lighting standards.
YG1D-16'	Created 17-Jul-2019	Pole mounted LED parking lot fixture with 'TFTM' optics. 16'-0" mounting height to bottom of fixture. 5 year warranty and 100,000 hour rated life to L70. IP65 rated	Lithonia D-Series Size 0	3000K LED 4373 lm Delivered	38 W	120V-277V	Integral Dimmable Driver	Parking Lot	Provide dimmable driver compatible with supplied controls system. Steel pole to be sized with concrete base detail per civil drawings so that light source is no more than 16'-0" above grade to meet local lighting standards.

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LIGHTING FIXTURE SCHEDULE

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Date Issued: 9- Aug-2019

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Fixture Type		Description	Fixture (Manufacturers and Models)	Light Source	Fixt. Load (W) (Typical)	Voltage	Controls	Location / Use	Notes
YG1D-19'	Created 17-Jul-2019	Pole mounted LED parking lot fixture with 'TFTM' optics. 19'-0" mounting height to bottom of fixture. 5 year warranty and 100,000 hour rated life to L70. IP65 rated	Lithonia D-Series Size 0	3000K LED 4373 lm Delivered	38 W	120V-277V	Integral Dimmable Driver	Parking Lot	Provide dimmable driver compatible with supplied controls system. Steel pole to be sized with concrete base detail per civil drawings so that light source is no more than 19'-0" above grade to meet local lighting standards.
YG2	Deleted 27-Mar-2019	Not Used							
YG3	Deleted 27-Mar2019	Not Used							
YG4	Updated 27-Mar2019	Ground mounted 8" diameter x 42" high round stainless steel bollard with lighted top. Mounted in reinforced concrete pier per civil drawings.	Hess Cento 360 Series	3000K LED	18W	120V-277V	Integral Dimmable Driver	Main Entry	Provide dimmable driver compatible with supplied controls system. Mounted in reinforced concrete pier per civil drawings.
YG5	Deleted 17Jul-2019	Not Used							
YG6	Created 17-Jul-2019	Pole top mounted LED pedestrian scale area light with symmetrical light distribution. Cast aluminum construction with marine grade die castings. 12'-0" mounting height to top of fixture. Fits 3" O.D. pole top. IP65 rated	Bega 77142 Series	3000K LED	24 W	120V-277V	Integral Dimmable Driver	Sidewalks at Main Entry	Provide dimmable driver compatible with supplied controls system. Steel pole to be sized with concrete base detail per civil drawings so that light source is no more than 12'-0" above grade to meet local lighting standards.
YR1	Created 25-Mar-2019	Recessed exterior 4" round LED downlight with 45-deg cutoff from source. 16-gauge galvinized steel construction. 5 year warranty and 60,000 hour rated life to L70. Wet location rated	Gotham Evo Series	3000K LED	12.8 W	120V-277V	Integral Dimmable Driver	Main Entry Dropoff Canopy	Provide dimmable driver compatible with supplied controls system.
YS1	Deleted 17-Jul-2019	Not Used							
YS2	Created 25-Mar-2019	Surface mounted exterior LED downlight with neutral housing - no more than 4" wide. Wet location rated. Finish to match canopy structure. IP65 rated	BEGA 33223 Series	3000K LED	5.8 W	120V-277V	Integral Dimmable Driver	North Entry Canopy	Provide dimmable driver compatible with supplied controls system. Provide mounting clips, hardware, etc as required to attach to canopy structure.
YW1	Created 25-Mar-2019	Wall mounted exterior LED downlight with redundant driver to meet egress lighting standards. IP65 rated	PIL MIMIK 10 Series	3000K LED	13 W	120V-277V	Integral Dimmable Driver	Egress Doors	Provide dimmable driver compatible with supplied controls system. Mounted on building at appx. 8'-0" elevation.

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LIGHTING FIXTURE SCHEDULE
CCC Submission
Cape Cod Hospital

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Written by: PW
Checked by: SJF

Fixture Type		Description	Fixture (Manufacturers and Models)	Light Source	Fixt. Load (W) (Typical)	Voltage	Controls	Location / Use	Notes
YW2	Created 25-Mar-2019	Wall mounted exterior LED downlight with Type III forward throw optics. Wet location rated	BEGA 22360 Series	3000K LED	15.4 W	120V-277V	Integral Dimmable Driver	West Facade	Provide dimmable driver compatible with supplied controls system. Mounted on building at appx. 20'-0" elevation.
YW3	Deleted 17-Jul-2019	Not Used							
YW4	Created 17-Jul-2019	Wall mounted exterior LED downlight with Type III forward throw optics. IP68 rated	We-ef Lighting QLS 420 Series	3000K LED	15 W	120V-277V	Integral Dimmable Driver	Loading Dock	Provide dimmable driver compatible with supplied controls system. Mounted on building at appx. 20'-0" elevation.

This information is provided for the use of the Architect and their consultants in the production of their detailed drawings and specifications. Assurances of code compliance, conformity with environmental conditions and other building systems, voltage selection, design of wiring, supports, switching, emergency and exit lighting, engineering calculations or details, and preparation of cost and power consumption estimates are the responsibility of others. Information provided by Lam Partners Inc may require coordination and development by others to a level of detail suitable for incorporation into contract documents. Lam Partners Inc's documents are not intended or represented to be suitable for reuse on extensions of the Project or on any other project, nor are they to be relied upon by anyone other than the Architect and the Architect's consultants for the Project. Lam Partners Inc is not responsible for construction means, methods, sequences, techniques, safety programs, or procedures, or the failure of any contractor to comply with the requirements of the contract documents. There are no warranties of merchantability or fitness for a particular purpose or any other warranties or guarantees whatsoever, express or implied, with respect to any materials, documents, or designs provided by Lam Partners Inc.

Cape Cod Hospital
CCC Submission
[Lam Project # 18078]

Site Lighting Cut Sheets

2019-08-09

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D-Series Size 0
LED Area Luminaire

Catalog Number

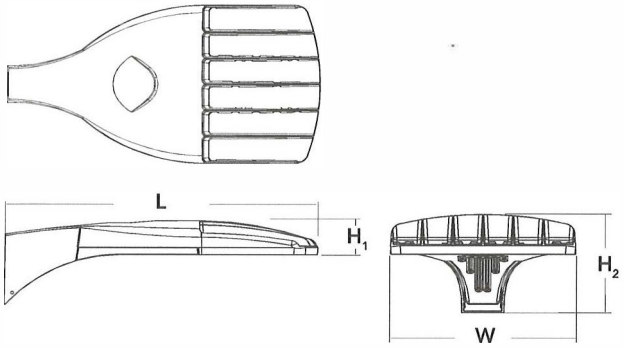
Notes

Type

YG1
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Specifications

EPA:	0.95 ft² (.09 m²)
Length:	26" (66.0 cm)
Width:	13" (33.0 cm)
Height$_1$:	3" (7.62 cm)
Height$_2$:	7" (17.8 cm)
Weight (max):	16 lbs (7.25 kg)



Introduction

The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment. The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire. The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 400W metal halide with typical energy savings of 70% and expected service life of over 100,000 hours.

A+ Capable options indicated by this color background.

Ordering Information

EXAMPLE: DSX0 LED P6 40K T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX0 LED

Series	LEDs	Color temperature	Distribution	Voltage	Mounting
DSX0 LED	**Forward optics** P1 P4 P7 P2 P5 P3 P6 **Rotated optics** P10[1] P12[1] P11[1] P13[1]	30K 3000 K 40K 4000 K 50K 5000 K	T1S Type I short T2S Type II short T2M Type II medium T3S Type III short T3M Type III medium T4M Type IV medium TFTM Forward throw medium T5VS Type V very short T5S Type V short T5M Type V medium T5W Type V wide BLC Backlight control[2] LCCO Left corner cutoff[2] RCCO Right corner cutoff[2]	MVOLT[3,4] 120[4] 208[4] 240[4] 277[4] 347[4,5] 480[4,5]	**Shipped included** SPA Square pole mounting RPA Round pole mounting WBA Wall bracket SPUMBA Square pole universal mounting adaptor[6] RPUMBA Round pole universal mounting adaptor[6] **Shipped separately** KMA8 DDBXD U Mast arm mounting bracket adaptor (specify finish)

Control options		Other options	Finish
Shipped installed NLTAIR2 nLight AIR generation 2 enabled[8,9] PIRHN Network, high/low motion/ambient sensor[10] PER NEMA twist-lock receptacle only (control ordered separate) [11] PER5 Five-pin receptacle only (control ordered separate) [11,12] PER7 Seven-pin receptacle only (leads exit fixture) (control ordered separate) [11,12] DMG 0-10V dimming extend out back of housing for external control (control ordered separate) PIR High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 5fc[13,14] PIRH High/low, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc[13,14] PIR1FC3V High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc[13,14] PIRH1FC3V High/low, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc[13,14] FAO Field adjustable output[15]		**Shipped installed** HS House-side shield [6] SF Single fuse (120, 277, 347 V) [4] DF Double fuse (208, 240, 480 V) [4] L90 Left rotated optics [1] R90 Right rotated optics [1] DDL Diffused drop lens [16] **Shipped separately** BS Bird spikes [17] EGS External glare shield [17]	DDBXD Dark bronze DBLXD Black DNAXD Natural aluminum DWHXD White DDBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DWHGXD Textured white

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Ordering Information

Accessories

Ordered and shipped separately.

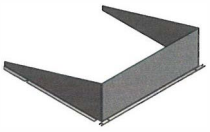
DLL127F 1.5 JU	Photocell - SSL twist-lock (120-277V) [18]
DLL347F 1.5 CUL JU	Photocell - SSL twist-lock (347V) [18]
DLL480F 1.5 CUL JU	Photocell - SSL twist-lock (480V) [18]
DSHORT SBK U	Shorting cap [18]
DSX0HS20C U	House-side shield for P1, P2, P3 and P4 [16]
DSX0HS 30C U	House-sideshield for P10, P11, P12 and P13 [16]
DSX0HS 40C U	House-sideshield for P5, P6 AND P7 [16]
DSX0DDL U	Diffused drop lens (polycarbonate) [16]
PUM BA DDBXD U*	Square and round pole universal mounting bracket adaptor (specify finish) [19]
KMAB DDBXD U	Mast arm mounting bracket adaptor (specify finish) [6]

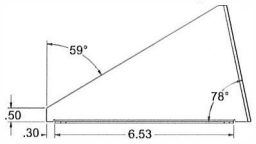
For more control options, visit DTL and ROAM online.
Link to nLight Air 2

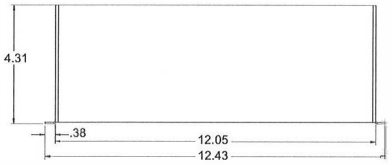
NOTES

1 P10, P11, P12 and P13 and rotated options (L90 or R90) only available together.
2 Not available with HS or DDL.
3 MVOLT driver operates on any line voltage from 120-277V (50/60 Hz).
4 Single fuse (SF) requires 120V, 277V or 347V. Double fuse (DF) requires 208V, 240V or 480V.
5 Not available in P4, P7 or P13. Not available with BL30, BL50 or PNMT options.
6 Universal mounting brackets intended for retrofit on existing pre-drilled poles only. 1.5 G vibration load rating per ANCI C136.31.
7 Must order fixture with SPA mounting. Must be ordered as a separate accessory; see Accessories information. For use with 2-3/8" mast arm (not included).
8 Must be ordered with PIRHN.
9 Sensor cover available only in dark bronze, black, white and natural aluminum colors.
10 Must be ordered with NLTAIR2. For more information on nLight Air 2 visit this link.
11 Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See accessories. Shorting Cap included.
12 If ROAM® node required, it must be ordered and shipped as a separate line item from Acuity Brands Controls. Shorting Cap included.
13 Reference Motion Sensor table on page 3.
14 Reference PER Table on page 3 to see functionality.
15 Not available with other dimming controls options.
16 Not available with BLC, LCCO and RCCO distribution. Must be ordered with fixture for factory pre-drilling.
17 Must be ordered with fixture for factory pre-drilling.
18 Requires luminaire to be specified with PER, PER5 or PER7 option. See PER Table on page 3.
19 For retrofit use only.

EGS – External Glare Shield

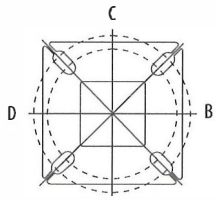




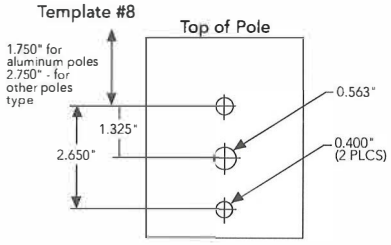


Drilling

HANDHOLE ORIENTATION
(from top of pole)



Template #8



Tenon Mounting Slipfitter

Tenon O.D.	Single Unit	2 at 180°	2 at 90°	3 at 120°	3 at 90°	4 at 90°
2-3/8"	AST20-190	AST20-280	AST20-290	AST20-320	AST20-390	AST20-490
2-7/8"	AST25-190	AST25-280	AST25-290	AST25-320	AST25-390	AST25-490
4"	AST35-190	AST35-280	AST35-290	AST35-320	AST35-390	AST35-490

Mounting Option	Drilling Template	Single	2 @ 180°	2 @ 90°	3 @ 90°	3 @ 120°	4 @ 90°
Head Location		Side B	Side B & D	Side B & C	Side B, C & D	Round Pole Only	Side A, B, C & D
Drill Nomenclature	#8	DM19AS	DM28AS	DM29AS	DM39AS	DM32AS	DM49AS

		Minimum Acceptable Outside Pole Dimension					
SPA	#8	2-7/8"	2-7/8"	3.5"	3.5"		3.5"
RPA	#8	2-7/8"	2-7/8"	3.5"	3.5"	3"	3.5"
SPUMBA	#5	2-7/8"	3"	4"	4"		4"
RPUMBA	#5	2-7/8"	3.5"	5"	5"	3.5"	5"

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Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit Lithonia Lighting's D-Series Area Size 0 h

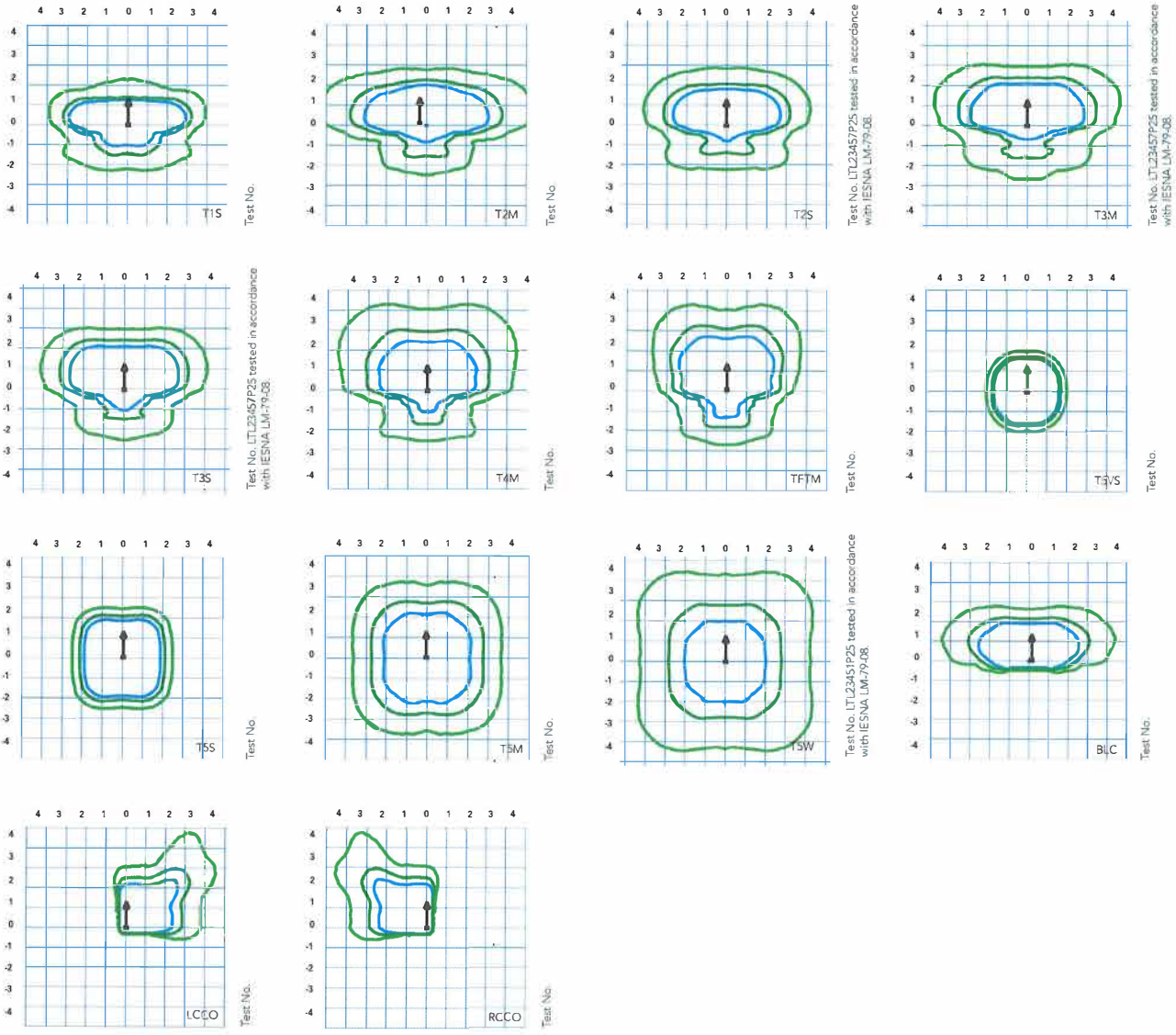
YG1

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Isofootcandle plots for the DSX0 LED 40C 1000 40K. Distances are in units of mounting height (20').

LEGEND

- 0.1 fc
- 0.5 fc
- 1.0 fc



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Performance Data

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

		Lumen Multiplier
0°C	32°F	1.04
5°C	41°F	1.04
10°C	50°F	1.03
15°C	50°F	1.02
20°C	68°F	1.01
25°C	**77°C**	**1.00**
30°C	86°F	0.99
35°C	95°F	0.98
40°C	104°F	0.97

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a **25°C ambient**, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	Lumen Maintenance Factor
25,000	0.96
50,000	0.92
100,000	0.85

Motion Sensor Default Settings						
Option	Dimmed State	High Level (when triggered)	Photocell Operation	Dwell Time	Ramp-up Time	Ramp-down Time
PIR or PIRH	3V (37%) Output	10V (100%) Output	Enabled @ 5FC	5 min	3 sec	5 min
*PIR1FC3V or PIRH1FC3V	3V (37%) Output	10V (100%) Output	Enabled @ 1FC	5 min	3 sec	5 min
*for use with separate Dusk to Dawn or timer.						

Electrical Load

	Performance			Wattage	120	208	240	277	347	480
Forward Optics (Non-Rotated)	P1	20	530	38	0.32	0.18	0.15	0.15	0.10	0.08
	P2	20	700	49	0.41	0.23	0.20	0.19	0.14	0.11
	P3	20	1050	71	0.60	0.37	0.32	0.27	0.21	0.15
	P4	20	1400	92	0.77	0.45	0.39	0.35	0.28	0.20
	P5	40	700	89	0.74	0.43	0.38	0.34	0.26	0.20
	P6	40	1050	134	1.13	0.65	0.55	0.48	0.39	0.29
	P7	40	1300	166	1.38	0.80	0.69	0.60	0.50	0.37
Rotated Optics (Requires L90 or R90)	P10	30	530	53	0.45	0.26	0.23	0.21	0.16	0.12
	P11	30	700	72	0.60	0.35	0.30	0.27	0.20	0.16
	P12	30	1050	104	0.88	0.50	0.44	0.39	0.31	0.23
	P13	30	1300	128	1.08	0.62	0.54	0.48	0.37	0.27

Controls Options

Nomenclature	Description	Functionality	Primary control device	Notes
FAO	Field adjustable output device installed inside the lumiaire; wired to the driver dimming leads.	Allows the lumiaire to be manually dimmed, effectively trimming the light output.	FAO device	Cannot be used with other controls options that need the 0-10V leads
DS	Drivers wired independantly for 50/50 luminaire operation	The luminaire is wired to two separate circuits, allowing for 50/50 operation.	Independently wired drivers	Requires two seperately switched circuits. Consider nLight AIR as a more cost effective alternative.
PER5 or PER7	Twist-lock photocell receptacle	Compatible with standard twist-lock photocells for dusk to dawn operation, or advanced control nodes that provide 0-10V dimming signals.	Twist-lock photocells such as DLL Elite or advanced control nodes such as ROAM.	Pins 4 & 5 to dimming leads on driver, Pins 6 & 7 are capped inside luminaire
PIR or PIRH	Motion sensors with integral photocell. PIR for 8-15' mounting; PIRH for 15-30' mounting	Luminaires dim when no occupancy is detected.	Acuity Controls SBOR	Also available with PIRH1FC3V when the sensor photocell is used for dusk-to-dawn operation.
NLTAIR2 PIRHN	nLight AIR enabled luminaire for motion sensing, photocell and wireless communication.	Motion and ambient light sensing with group response. Scheduled dimming with motion sensor over-ride when wirelessly connected to the nLight Eclypse.	nLight Air rSDGR	nLight AIR sensors can be programmed and commissioned from the ground using the CIAIRity Pro app.

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Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Forward Optics

Power Package	LED Count	Drive Current	System Watts	Dist. Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)				
					Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
P1	20	530	38W	T1S	4,369	1	0	1	115	4,706	1	0	1	124	4,766	1	0	1	125
				T2S	4,364	1	0	1	115	4,701	1	0	1	124	4,761	1	0	1	125
				T2M	4,387	1	0	1	115	4,726	1	0	1	124	4,785	1	0	1	126
				T3S	4,248	1	0	1	112	4,577	1	0	1	120	4,634	1	0	1	122
				T3M	4,376	1	0	1	115	4,714	1	0	1	124	4,774	1	0	1	126
				T4M	4,281	1	0	1	113	4,612	1	0	2	121	4,670	1	0	2	123
				TFTM	4,373	1	0	1	115	4,711	1	0	2	124	4,771	1	0	2	126
				T5VS	4,548	2	0	0	120	4,900	2	0	0	129	4,962	2	0	0	131
				T5S	4,552	2	0	0	120	4,904	2	0	0	129	4,966	2	0	0	131
				T5M	4,541	3	0	1	120	4,891	3	0	1	129	4,953	3	0	1	130
				T5W	4,576	3	0	2	120	4,929	3	0	2	130	4,992	3	0	2	131
				BLC	3,586	1	0	1	94	3,863	1	0	1	102	3,912	1	0	1	103
				LCCO	2,668	1	0	1	70	2,874	1	0	2	76	2,911	1	0	2	77
				RCCO	2,668	1	0	1	70	2,874	1	0	2	76	2,911	1	0	2	77
P2	20	700	49W	T1S	5,570	1	0	1	114	6,001	1	0	1	122	6,077	2	0	2	124
				T2S	5,564	1	0	2	114	5,994	1	0	2	122	6,070	2	0	2	124
				T2M	5,593	1	0	1	114	6,025	1	0	1	123	6,102	1	0	1	125
				T3S	5,417	1	0	2	111	5,835	1	0	2	119	5,909	2	0	2	121
				T3M	5,580	1	0	2	114	6,011	1	0	2	123	6,087	1	0	2	124
				T4M	5,458	1	0	2	111	5,880	1	0	2	120	5,955	1	0	2	122
				TFTM	5,576	1	0	2	114	6,007	1	0	2	123	6,083	1	0	2	124
				T5VS	5,799	2	0	0	118	6,247	2	0	0	127	6,327	2	0	0	129
				T5S	5,804	2	0	0	118	6,252	2	0	0	128	6,332	2	0	1	129
				T5M	5,789	3	0	1	118	6,237	3	0	1	127	6,316	3	0	1	129
				T5W	5,834	3	0	2	119	6,285	3	0	2	128	6,364	3	0	2	130
				BLC	4,572	1	0	1	93	4,925	1	0	1	101	4,987	1	0	1	102
				LCCO	3,402	1	0	2	69	3,665	1	0	2	75	3,711	1	0	2	76
				RCCO	3,402	1	0	2	69	3,665	1	0	2	75	3,711	1	0	2	76
P3	20	1050	71W	T1S	7,833	2	0	2	110	8,438	2	0	2	119	8,545	2	0	2	120
				T2S	7,825	2	0	2	110	8,429	2	0	2	119	8,536	2	0	2	120
				T2M	7,865	2	0	2	111	8,473	2	0	2	119	8,580	2	0	2	121
				T3S	7,617	2	0	2	107	8,205	2	0	2	116	8,309	2	0	2	117
				T3M	7,846	2	0	2	111	8,452	2	0	2	119	8,559	2	0	2	121
				T4M	7,675	2	0	2	108	8,269	2	0	2	116	8,373	2	0	2	118
				TFTM	7,841	2	0	2	110	8,447	2	0	2	119	8,554	2	0	2	120
				T5VS	8,155	3	0	0	115	8,785	3	0	0	124	8,896	3	0	0	125
				T5S	8,162	3	0	1	115	8,792	3	0	1	124	8,904	3	0	1	125
				T5M	8,141	3	0	2	115	8,770	3	0	2	124	8,881	3	0	2	125
				T5W	8,204	3	0	2	116	8,838	4	0	2	124	8,950	4	0	2	126
				BLC	6,429	1	0	2	91	6,926	1	0	2	98	7,013	1	0	2	99
				LCCO	4,784	1	0	2	67	5,153	1	0	2	73	5,218	1	0	2	73
				RCCO	4,784	1	0	2	67	5,153	1	0	2	73	5,218	1	0	2	73
P4	20	1400	92W	T1S	9,791	2	0	2	106	10,547	2	0	2	115	10,681	2	0	2	116
				T2S	9,780	2	0	2	106	10,536	2	0	2	115	10,669	2	0	2	116
				T2M	9,831	2	0	2	107	10,590	2	0	2	115	10,724	2	0	2	117
				T3S	9,521	2	0	2	103	10,256	2	0	2	111	10,386	2	0	2	113
				T3M	9,807	2	0	2	107	10,565	2	0	2	115	10,698	2	0	2	116
				T4M	9,594	2	0	2	104	10,335	2	0	3	112	10,466	2	0	3	114
				TFTM	9,801	2	0	2	107	10,558	2	0	2	115	10,692	2	0	2	116
				T5VS	10,193	3	0	1	111	10,981	3	0	1	119	11,120	3	0	1	121
				T5S	10,201	3	0	1	111	10,990	3	0	1	119	11,129	3	0	1	121
				T5M	10,176	4	0	2	111	10,962	4	0	2	119	11,101	4	0	2	121
				T5W	10,254	4	0	3	111	11,047	4	0	3	120	11,186	4	0	3	122
				BLC	8,036	1	0	2	87	8,656	1	0	2	94	8,766	1	0	2	95
				LCCO	5,979	1	0	2	65	6,441	1	0	2	70	6,523	1	0	3	71
					5,979	1	0	2	65	6,441	1	0	2	70	6,523	1	0	3	71

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Performance Data

Lumen Output

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Forward Optics

Power Package	LED Count	Drive Current	System Watts	Dist. Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)				
					Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
P5	40	700	89W	T1S	10,831	2	0	2	122	11,668	2	0	2	131	11,816	2	0	2	133
				T2S	10,820	2	0	2	122	11,656	2	0	2	131	11,803	2	0	2	133
				T2M	10,876	2	0	2	122	11,716	2	0	2	132	11,864	2	0	2	133
				T3S	10,532	2	0	2	118	11,346	2	0	2	127	11,490	2	0	2	129
				T3M	10,849	2	0	2	122	11,687	2	0	2	131	11,835	2	0	2	133
				T4M	10,613	2	0	3	119	11,434	2	0	3	128	11,578	2	0	3	130
				TFTM	10,842	2	0	2	122	11,680	2	0	2	131	11,828	2	0	2	133
				T5VS	11,276	3	0	1	127	12,148	3	0	1	136	12,302	3	0	1	138
				T5S	11,286	3	0	1	127	12,158	3	0	1	137	12,312	3	0	1	138
				T5M	11,257	4	0	2	126	12,127	4	0	2	136	12,280	4	0	2	138
				T5W	11,344	4	0	3	127	12,221	4	0	3	137	12,375	4	0	3	139
				BLC	8,890	1	0	2	100	9,576	1	0	2	108	9,698	1	0	2	109
				LCCO	6,615	1	0	3	74	7,126	1	0	3	80	7,216	1	0	3	81
				RCCO	6,615	1	0	3	74	7,126	1	0	3	80	7,216	1	0	3	81
P6	40	1050	134W	T1S	14,805	3	0	3	110	15,949	3	0	3	119	16,151	3	0	3	121
				T2S	14,789	3	0	3	110	15,932	3	0	3	119	16,134	3	0	3	120
				T2M	14,865	3	0	3	111	16,014	3	0	3	120	16,217	3	0	3	121
				T3S	14,396	3	0	3	107	15,509	3	0	3	116	15,705	3	0	3	117
				T3M	14,829	2	0	3	111	15,975	3	0	3	119	16,177	3	0	3	121
				T4M	14,507	2	0	3	108	15,628	3	0	3	117	15,826	3	0	3	118
				TFTM	14,820	2	0	3	111	15,965	3	0	3	119	16,167	3	0	3	121
				T5VS	15,413	4	0	1	115	16,604	4	0	1	124	16,815	4	0	1	125
				T5S	15,426	3	0	1	115	16,618	4	0	1	124	16,828	4	0	1	126
				T5M	15,387	4	0	2	115	16,576	4	0	2	124	16,786	4	0	2	125
				T5W	15,506	4	0	3	116	16,704	4	0	3	125	16,915	4	0	3	126
				BLC	12,151	1	0	2	91	13,090	1	0	2	98	13,255	1	0	2	99
				LCCO	9,041	1	0	3	67	9,740	1	0	3	73	9,863	1	0	3	74
				RCCO	9,041	1	0	3	67	9,740	1	0	3	73	9,863	1	0	3	74
P7	40	1300	166W	T1S	17,023	3	0	3	103	18,338	3	0	3	110	18,570	3	0	3	112
				T2S	17,005	3	0	3	102	18,319	3	0	3	110	18,551	3	0	3	112
				T2M	17,092	3	0	3	103	18,413	3	0	3	111	18,646	3	0	3	112
				T3S	16,553	3	0	3	100	17,832	3	0	3	107	18,058	3	0	3	109
				T3M	17,051	3	0	3	103	18,369	3	0	3	111	18,601	3	0	3	112
				T4M	16,681	3	0	3	100	17,969	3	0	3	108	18,197	3	0	3	110
				TFTM	17,040	3	0	3	103	18,357	3	0	4	111	18,590	3	0	4	112
				T5VS	17,723	4	0	1	107	19,092	4	0	1	115	19,334	4	0	1	116
				T5S	17,737	4	0	2	107	19,108	4	0	2	115	19,349	4	0	2	117
				T5M	17,692	4	0	2	107	19,059	4	0	2	115	19,301	4	0	2	116
				T5W	17,829	5	0	3	107	19,207	5	0	3	116	19,450	5	0	3	117
				BLC	13,971	2	0	2	84	15,051	2	0	2	91	15,241	2	0	2	92
				LCCO	10,396	1	0	3	63	11,199	1	0	3	67	11,341	1	0	3	68
					10,396	1	0	3	63	11,199	1	0	3	67	11,341	1	0	3	68

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Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Rotated Optics

Power Package	LED Count	Drive Current	System Watts	Dist. Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)				
					Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
P10	30	530	53W	T1S	6,727	2	0	2	127	7,247	3	0	3	137	7,339	3	0	3	138
				T2S	6,689	3	0	3	126	7,205	3	0	3	136	7,297	3	0	3	138
				T2M	6,809	3	0	3	128	7,336	3	0	3	138	7,428	3	0	3	140
				T3S	6,585	3	0	3	124	7,094	3	0	3	134	7,183	3	0	3	136
				T3M	6,805	3	0	3	128	7,331	3	0	3	138	7,424	3	0	3	140
				T4M	6,677	3	0	3	126	7,193	3	0	3	136	7,284	3	0	3	137
				TFTM	6,850	3	0	3	129	7,379	3	0	3	139	7,472	3	0	3	141
				T5VS	6,898	3	0	0	130	7,431	3	0	0	140	7,525	3	0	0	142
				T5S	6,840	2	0	1	129	7,368	2	0	1	139	7,461	2	0	1	141
				T5M	6,838	3	0	1	129	7,366	3	0	2	139	7,460	3	0	2	141
				T5W	6,777	3	0	2	128	7,300	3	0	2	138	7,393	3	0	2	139
				BLC	5,626	2	0	2	106	6,060	2	0	2	114	6,137	2	0	2	116
				LCCO	4,018	1	0	2	76	4,328	1	0	2	82	4,383	1	0	2	83
				RCCO	4,013	3	0	3	76	4,323	3	0	3	82	4,377	3	0	3	83
P11	30	700	72W	T1S	8,594	3	0	3	119	9,258	3	0	3	129	9,376	3	0	3	130
				T2S	8,545	3	0	3	119	9,205	3	0	3	128	9,322	3	0	3	129
				T2M	8,699	3	0	3	121	9,371	3	0	3	130	9,490	3	0	3	132
				T3S	8,412	3	0	3	117	9,062	3	0	3	126	9,177	3	0	3	127
				T3M	8,694	3	0	3	121	9,366	3	0	3	130	9,484	3	0	3	132
				T4M	8,530	3	0	3	118	9,189	3	0	3	128	9,305	3	0	3	129
				TFTM	8,750	3	0	3	122	9,427	3	0	3	131	9,546	3	0	3	133
				T5VS	8,812	3	0	0	122	9,493	3	0	0	132	9,613	3	0	0	134
				T5S	8,738	3	0	1	121	9,413	3	0	1	131	9,532	3	0	1	132
				T5M	8,736	3	0	2	121	9,411	3	0	2	131	9,530	3	0	2	132
				T5W	8,657	4	0	2	120	9,326	4	0	2	130	9,444	4	0	2	131
				BLC	7,187	3	0	3	100	7,742	3	0	3	108	7,840	3	0	3	109
				LCCO	5,133	1	0	2	71	5,529	1	0	2	77	5,599	1	0	2	78
				RCCO	5,126	3	0	3	71	5,522	3	0	3	77	5,592	3	0	3	78
P12	30	1050	104W	T1S	12,149	3	0	3	117	13,088	3	0	3	126	13,253	3	0	3	127
				T2S	12,079	4	0	4	116	13,012	4	0	4	125	13,177	4	0	4	127
				T2M	12,297	3	0	3	118	13,247	3	0	3	127	13,415	3	0	3	129
				T3S	11,891	4	0	4	114	12,810	4	0	4	123	12,972	4	0	4	125
				T3M	12,290	3	0	3	118	13,239	4	0	4	127	13,407	4	0	4	129
				T4M	12,058	4	0	4	116	12,990	4	0	4	125	13,154	4	0	4	126
				TFTM	12,369	4	0	4	119	13,325	4	0	4	128	13,494	4	0	4	130
				T5VS	12,456	3	0	1	120	13,419	3	0	1	129	13,589	4	0	1	131
				T5S	12,351	3	0	1	119	13,306	3	0	1	128	13,474	3	0	1	130
				T5M	12,349	4	0	2	119	13,303	4	0	2	128	13,471	4	0	2	130
				T5W	12,238	4	0	3	118	13,183	4	0	3	127	13,350	4	0	3	128
				BLC	10,159	3	0	3	98	10,944	3	0	3	105	11,083	3	0	3	107
				LCCO	7,256	1	0	3	70	7,816	1	0	3	75	7,915	1	0	3	76
				RCCO	7,246	3	0	3	70	7,806	4	0	4	75	7,905	4	0	4	76
P13	30	1300	128W	T1S	14,438	3	0	3	113	15,554	3	0	3	122	15,751	3	0	3	123
				T2S	14,355	4	0	4	112	15,465	4	0	4	121	15,660	4	0	4	122
				T2M	14,614	3	0	3	114	15,744	4	0	4	123	15,943	4	0	4	125
				T3S	14,132	4	0	4	110	15,224	4	0	4	119	15,417	4	0	4	120
				T3M	14,606	4	0	4	114	15,735	4	0	4	123	15,934	4	0	4	124
				T4M	14,330	4	0	4	112	15,438	4	0	4	121	15,633	4	0	4	122
				TFTM	14,701	4	0	4	115	15,836	4	0	4	124	16,037	4	0	4	125
				T5VS	14,804	4	0	1	116	15,948	4	0	1	125	16,150	4	0	1	126
				T5S	14,679	3	0	1	115	15,814	3	0	1	124	16,014	3	0	1	125
				T5M	14,676	4	0	2	115	15,810	4	0	2	124	16,010	4	0	2	125
				T5W	14,544	4	0	3	114	15,668	4	0	3	122	15,866	4	0	3	124
				BLC	7919	3	0	3	62	8531	3	0	3	67	8639	3	0	3	67
				LCCO	5145	1	0	2	40	5543	1	0	2	43	5613	1	0	2	44
					5139	3	0	3	40	5536	3	0	3	43	5606	3	0	3	44

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YG1

Lam Partners
ARCHITECTURAL LIGHTING DESIGN

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and system-level interoperability.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is A+ Certified when ordered with DTL® controls marked by a shaded background. DTL DLL equipped luminaires meet the A+ specification for luminaire to photocontrol interoperability1
- This luminaire is part of an A+ Certified solution for ROAM® or XPoint™ Wireless control networks, providing out-of-the-box control compatibility with simple commissioning, when ordered with drivers and control options marked by a shaded background[1]

To learn more about A+, visit www.acuitybrands.com/aplus.

1. See ordering tree for details.
2. A+ Certified Solutions for ROAM require the order of one ROAM node per luminaire. Sold Separately: Link to Roam; Link to DTL DLL

FEATURES & SPECIFICATIONS

INTENDED USE

The sleek design of the D-Series Size 0 reflects the embedded high performance LED technology. It is ideal for many commercial and municipal applications, such as parking lots, plazas, campuses, and pedestrian areas.

CONSTRUCTION

Single-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Modular design allows for ease of maintenance and future light engine upgrades. The LED driver is mounted in direct contact with the casting to promote low operating temperature and long life. Housing is completely sealed against moisture and environmental contaminants (IP65). Low EPA (0.95 ft^2) for optimized pole wind loading.

FINISH

Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Available in both textured and non-textured finishes.

OPTICS

Precision-molded proprietary acrylic lenses are engineered for superior area lighting distribution, uniformity, and pole spacing. Light engines are available in 3000 K, 4000 K or 5000 K (70 CRI) configurations. The D-Series Size 0 has zero uplight and qualifies as a Nighttime Friendly™ product, meaning it is consistent with the LEED® and Green Globes™ criteria for eliminating wasteful uplight.

ELECTRICAL

Light engine(s) configurations consist of high-efficacy LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (up to L85/100,000 hours at 25°C). Class 1 electronic drivers are designed to have a power factor >90%, THD <20%, and an expected life of 100,000 hours with <1% failure rate. Easily serviceable 10kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).

STANDARD CONTROLS

The DSX0 LED area luminaire has a number of control options. Dusk to dawn controls can be utilized via optional NEMA twist-lock photocell receptacles. Integrated motion sensors with on-board photocells feature field-adjustable programing and are suitable for mounting heights up to 30 feet.

nLIGHT AIR CONTROLS

The DSX0 LED area luminaire is also available with nLight® AIR for the ultimate in wireless control. This powerful controls platform provides out-of-the-box basic motion sensing and photocontrol functionality and is suitable for mounting heights up to 40 feet. Once commissioned using a smartphone and the easy-to-use CLAIRITY app, nLight AIR equipped luminaries can be grouped, resulting in motion sensor and photocell group response without the need for additional equipment. Scheduled dimming with motion sensor over-ride can be achieved when used with the nLight Eclypse. Additional information about nLight Air can be found here.

INSTALLATION

Included mounting block and integral arm facilitate quick and easy installation. Stainless steel bolts fasten the mounting block securely to poles and walls, enabling the D-Series Size 0 to withstand up to a 3.0 G vibration load rating per ANSI C136.31. The D-Series Size 0 utilizes the AERIS™ series pole drilling pattern (template #8). Optional terminal block and NEMA photocontrol receptacle are also available.

LISTINGS

UL Listed for wet locations. Light engines are IP66 rated; luminaire is IP65 rated. Rated for -40°C minimum ambient. U.S. Patent No. D672,492 S. International patent pending.

DesignLights Consortium® (DLC) Premium qualified product and DLC qualified product. Not all versions of this product may be DLC Premium qualified or DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.

International Dark-Sky Association (IDA) Fixture Seal of Approval (FSA) is available for all products on this page utilizing 3000K color temperature only.

WARRANTY

5-year limited warranty. Complete warranty terms located at: www.acuitybrands.com/resources/terms-and-conditions

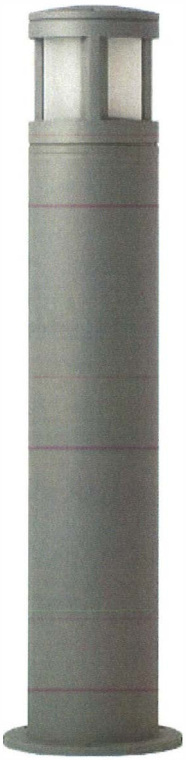
Note: Actual performance may differ as a result of end-user environment and application.
All values are design or typical values, measured under laboratory conditions at 25 °C.
Specifications subject to change without notice.

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CENTO 900 - 360 LED

Specification

A simple beacon with three windows for 360° illumination is the basis of CENTO's styling. Translucent acrylic lens creates soft diffused illumination. Housing is precision machined from heavy wall extruded aluminum. Housing and extruded aluminum shaft are finished in finely textured paint. Luminaire is available in three heights. All hardware is stainless steel.



Model	Lamp	Color Temperature	Volt	Mounting	Finish	Option
CN900/360	LED - Standard output	WW -3000K	UNV - 120-277V	D - Bollard	SG - Silver Grey	DIM - 0-10vDC Dimming
	HP/LED - High output	NW - 4000K			DG - Dark Grey	N - None
					GG - Graphite Grey	
					BLK - Matte Black	
					BRZ - Dark Bronze	
					CC - Custom Color	

Ordering Information

CN900/360	**UNV**	**D**

Specifications are subject to change without notification

CENTO 900 - 360 LED

Specification

HOUSING

Luminaire consists of cylindrical housing, base, and top cap precision machined from 6060 aluminum. Cylindrical housing with three lens apertures for 360° illumination is machined from tubing with nominal wall thickness of 0.60" and mounts over the precision-machined luminaire base with three concealed socket head cap screws. Cylindrical matte acrylic lens mounts to the base inside the housing. Luminaire top cap mounts to the cylindrical housing with three captive socket head caps screws and provides access to luminaire for relamping. Luminaire base and top cap are grooved to accept one-piece silicone gasket to provide weather-tight seal to the lens. Luminaire mounts to 0.197" thick wall extruded aluminum shaft with three concealed socket head cap screws. All hardware is stainless steel.

OPTICS

LED light engine with electrical disconnect is top mounted to the machined aluminum top cap, which acts as a heat sink for thermal management. LED is positioned within the matte acrylic cylindrical lens providing 360-degree distribution through the housing apertures.

ELECTRICAL

Input voltage to universal LED driver is 120v through 277v AC, 50/60 Hz. Drive current to LEDs is 350 mA for standard output and 450 mA for high output models.

LED DELIVERED LUMENS / SYSTEM WATTS

Standard Output:18 watts
3000K: 469 lumens
4000K: 505 lumens

High Output: 28 watts
3000K: 667 lumens
4000K: 830 lumens

NOTE : Due to rapid and continuous advances in LED technology, LED luminaire data is subject to change without notice and at the discretion of HessAmerica. Consult factory for current technical data.

MOUNTING

Bollard mounts to anchor base plate assembly with three M10 x 20mm stainless steel socket head cap screws and washers. Anchor base assembly consists of three /2" x 15" x 3" hot-dip galvanized anchor rods secured to a mounting plate and embedded as an assembly in concrete foundation (by others).

FINISH

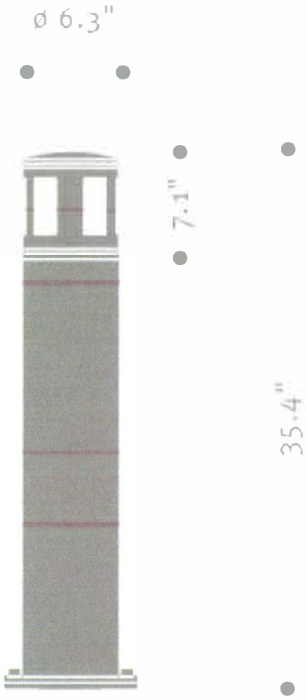
Standard finishes are finely textured matte silver grey metallic, dark grey, graphite grey, matte black, or dark bronze. Special colors available on request.

WARRANTY

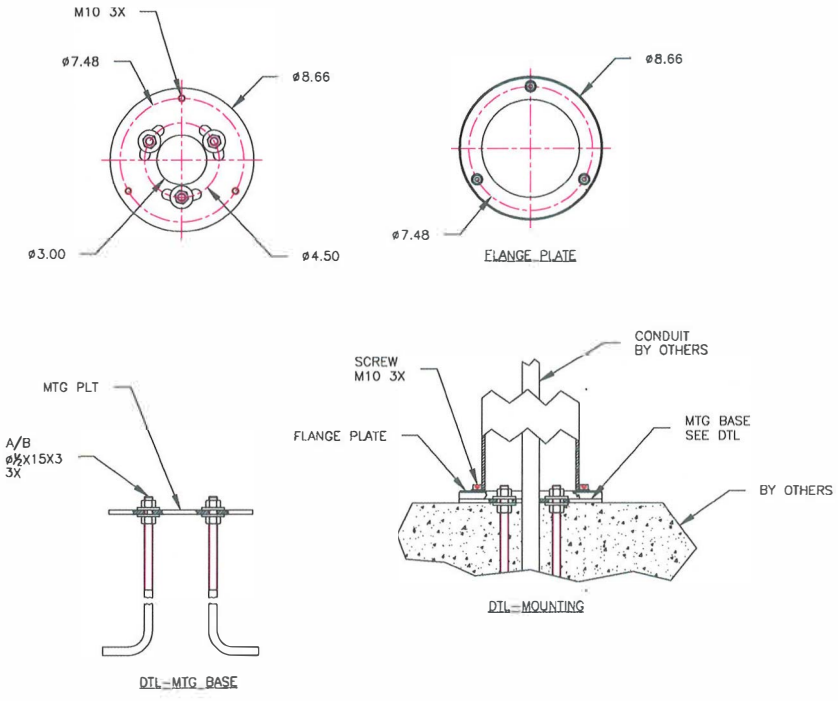
Limited product warranty period including LEDs is five years. Driver shall carry the manufacturer's limited warranty.

Additional information

Dimensions



Mounting detail



YG6

Lam Partners
ARCHITECTURAL LIGHTING DESIGN

Pole top luminaires with symmetrical light distribution

Housing/fitter: Die-cast aluminum construction with a spun aluminum cap. The fixture slip fits a 3" O.D. pole top or tenon and is secured by four (4) socket head stainless steel set screws threaded into stainless steel inserts. Die castings are marine grade, copper free (≤ 0.3% copper content) A360.0 aluminum alloy.

Enclosure: Molded 1/8" clear high impact acrylic lens with white, aluminum louver stack.

Electrical: 23.4 W LED luminaire, 27 total system watts, -30° C start temperature. Integral 120V through 277V electronic LED driver, 0-10V dimming. Standard LED color temperature is 4000K with a >80 CRI. Available in 3000K (>80 CRI); add suffix K3 to order.
Note: Due to the dynamic nature of LED technology, LED luminaire data on this sheet is subject to change at the discretion of BEGA-US. For the most current technical data, please refer to www.bega-us.com.

Finish: All BEGA standard finishes are polyester powder coat with minimum 3 mil thickness. Available in four standard BEGA colors: Black (BLK); White (WHT); Bronze (BRZ); Silver (SLV). To specify, add appropriate suffix to catalog number. Custom colors supplied on special order.

UL listed for US and Canadian Standards, suitable for wet locations. Protection class: IP65.

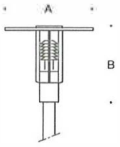
Weight: 22.0 lbs.

EPA (Effective projection area): 1.3 sq. ft.

Luminaire Lumens: 1697

Type:
BEGA Product:
Project:
Voltage:
Color:
Options:
Modified:





	Lamp	A	B
77142	23.4W LED	25⅝	23⅝

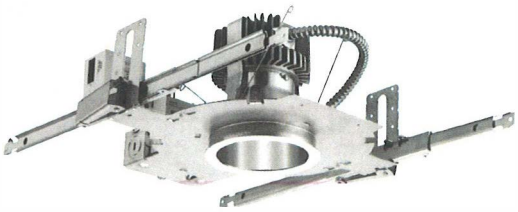
*recommended for use with 8' to 12' poles

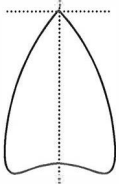
BEGA 1000 BEGA Way, Carpinteria, CA 93013 (805) 684-0533 FAX (805) 566-9474 www.bega-us.com
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gotham®

YR1
Lam Partners

Luminaire Type:
Catalog Number
(autopopulated):





Gotham Architectural Downlighting
LED Downlights

4" Evo®
Downlight

Solid-State Lighting

FEATURES

OPTICAL SYSTEM
- Self-flanged or flangeless semi-specular, matte-diffuse or specular finishing trim
- Patented Bounding Ray™ optical design (U.S. Patent No. 5,800,050)
- 45° cutoff to source and source image
- Top-down flash characteristic
- Polycarbonate lens integral to light engine

MECHANICAL SYSTEM
- 16-gauge galvanized steel construction; maximum 1-1/2" ceiling thickness
- Telescopic mounting bars maximum of 32" and minimum of 15", preinstalled, 4" vertical adjustment
- Toolless adjustments post installation
- Junction box capacity: 8 (4 in, 4 out) 12AWG rated for 90°C
- Light engine and driver accessible through aperture
- Injection molded mud ring included with flangeless trims. Ships separately. Installs independently of the mounting frame to reduce cracks in plaster due to vibration.

ELECTRICAL SYSTEM
- Fully serviceable and upgradeable lensed LED light engine
- 70% lumen maintenance at 60,000 hours
- Tested according to LM-79 and LM-80 standards
- Overload and short circuit protected
- 2.5 SDCM; 85 CRI typical, 90+ CRI optional

LISTINGS
- Fixtures are CSA certified to meet US and Canadian standards; wet location, covered ceiling ENERGY STAR® certified product.

WARRANTY
- 5-year limited warranty. Complete warranty terms located at: www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Note: Actual performance may differ as a result of end user environment and application.
All values are design or typical values, measured under laboratory conditions at 25° C.

WATTAGE CONSUMPTION MATRIX			
LUMENS	**LM ACTUAL**	**WATTAGE**	**LUMENS per WATT**
750	849	10.3	82.4
1000	1,189	12.8	92.9
1500	1,509	17.3	87.2
2000	2,109	23.5	89.6
2500	2,576	28.9	89.1
3000	3,112	36.9	84.3

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® control networks when ordered with drivers marked by a shaded background*.
- This luminaire is part of an A+ Certified solution for nLight® control networks, providing advanced control functionality at the luminaire level, when selection includes driver and control options marked by a shaded background*

To learn more about A+, visit www.acuitybrands.com/aplus.

*See ordering tree for details

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4" EVO Downlight

Solid-State Lighting

ORDERING INFORMATION

A+ Capable options indicated by this color background.

Design2Ship Quick Ship Program: Options in green text qualify for Design2Ship — 5 business days from order entry to ship. Refer to Design2Ship Brochure for complete program details. **Maximum Order Quantity: 100 units; 50 for Chicago Plenum.**

EXAMPLE: EVO 35/10 4AR MWD LSS MVOLT EZ1

Series	Color temperature	Nominal lumen values	Aperture/Trim color	Trim Style	Distribution	Finish	Voltage
EVO	**27/** 2700 K **30/** 3000 K **35/** 3500 K **40/** 4000 K **50/** 5000 K	**07** 750 lumens **10** 1000 lumens **15** 1500 lumens **20** 2000 lumens **25** 2500 lumens **30** 3000 lumens	**4AR** Clear **4PR** Pewter **4WTR** Wheat **4GR** Gold **4WR**[1] White **4BR**[1] Black **4WRAMF**[1] White anti-microbial	**(blank)** Self-flanged **FL** Flangeless	**MD** Medium (0.9 s/mh) **MWD** Medium wide (1.0 s/mh) **WD** Wide (1.2 s/mh)	**LSS** Semi-specular **LD** Matte-diffuse **LS** Specular	**MVOLT** **120** **277** **347**[2]

Driver[3]	
GZ10	0-10V driver dims to 10%
GZ1	0-10V driver dims to 1%
EZ10	eldoLED 0-10V ECOdrive. Linear dimming to 10% min.
EZ1	eldoLED 0-10V ECOdrive. Linear dimming to 1% min.
EZB	eldoLED 0-10V SOLOdrive. Logarithmic dimming to <1%.
EDAB[4]	eldoLED SOLOdrive DALI. Logarithmic dimming to <1%.
EDXB[4]	eldoLED POWERdrive DMX with RDM (remote device management). Square Law dimming to <1%. Includes termination resistor. Refer to DMXR Manual.
EXA1	XPoint Wireless, eldoLED 0-10V ECOdrive. Linear dimming to 1%. Refer to XPoint tech sheet.
EXAB	XPoint Wireless, eldoLED 0-10V SOLOdrive. Logarithmic dimming to <1%. Refer to XPoint tech sheet.
ECOS2[4,5]	Lutron® Hi-Lume® 2-wire forward-phase driver. Minimum dimming level 1%. Minimum lumen 1000/Maximum lumen 3000. 120V only.
ECOS3[4]	Lutron® Hi-Lume® 3-wire or EcoSystem® dimming driver. Minimum dimming level 1%. Minimum lumen 1000/Maximum lumen 4500.

Options			
SF	Single fuse. Specify 120V or 277V.	**NPS80EZ**[9]	nLight® dimming pack controls 0-10V eldoLED drivers (EZ_).
TRW[6]	White painted flange	**NPS80EZER**[9]	nLight® dimming pack controls 0-10V eldoLED drivers (EZ_). ER controls fixtures on emergency circuit.
TRBL[7]	Black painted flange	**N80**[10]	nLight® Lumen Compensation
EL[8]	Emergency battery pack with integral test switch	**BGTD**	Bodine generator transfer device. Specify 120V or 277V.
ELR[8]	Emergency battery pack with remote test switch	**CRI90**	High CRI (90+).
ELSD[8]	Emergency battery pack with self-diagnostics, integral test switch	**CP**[11]	Chicago plenum. Specify 120V or 277V.
ELRSD[8]	Emergency battery pack with self-diagnostics, remote test switch	**RRL__**	RELOC®-ready luminaire connectors enable a simple and consistent factory installed option across all ABL luminaire brands. Refer to RRL for complete nomenclature.
E10WCP[8]	Emergency battery pack, 10W Constant Power, CA Title 20 compliant with integral test switch	**NLTAIR2**[12]	nLight® Air enabled
E10WCPR[8]	Emergency battery pack, 10W Constant Power, CA Title 20 compliant with remote test switch	**NLTAIRER2**[12]	nLight® AIR Dimming Pack Wireless Controls. Controls fixtures on emergency circuit
NPP160[8]	nLight® network power/relay pack with 0-10V dimming for non-eldoLED drivers (GZ10, GZ1).		
NPP160ER[8]	nLight® network power/relay pack with 0-10V dimming for non-eldoLED drivers (GZ10, GZ1). ER controls fixtures on emergency circuit.		

ACCESSORIES

ACCESSORIES order as separate catalog numbers (shipped separately)

SCA4	Sloped ceiling adapter. Degree of slope must be specified (5D, 10D, 15D, 20D, 25D, 30D). Ex: SCA4 10D. Refer to TECH-190.
CTA4-8 YK	Ceiling thickness adapter (extends mounting frame to accommodate ceiling thickness up to 5"). Adds ~4" to fixture height.
ISO BC	0-10V wallbox dimmer. Refer to ISD-BC.

NOTES

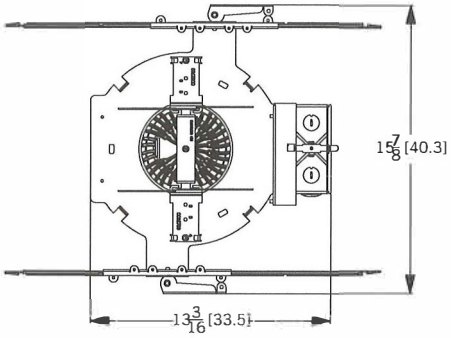
ORDERING NOTES

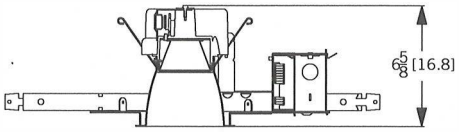
1. Not available with finishes.
2. Not available with GZ10, GZ1, EL or ELR options.
3. Refer to TECH-240 for compatible dimmers.
4. Not available with nLight® and XPoint options.
5. Specify voltage 120V.
6. Not available with white reflector. Not applicable with FL option.
7. Not available with black reflector. Not applicable with FL option.
8. For dimensional changes, refer to TECH-140. Access above ceiling required. Not available with 347V.
9. Specify voltage. For use with generator supply EM power. Will require an emergency hot feed and normal hot feed.
10. Fixture begins at 80% light level. Must be specified with NPS80EZ or NPS80EZER.
11. ELR not available. CP, ECOS2/ECOS3 with EL-2000 lumen max.
12. Not available DALI or DMX drivers. Not available with CP, NPS80EZ, NPS80EZER, NPP16D, NPP16DER or N80 options. Not recommended for metal ceiling installations.

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DIMENSIONAL DATA

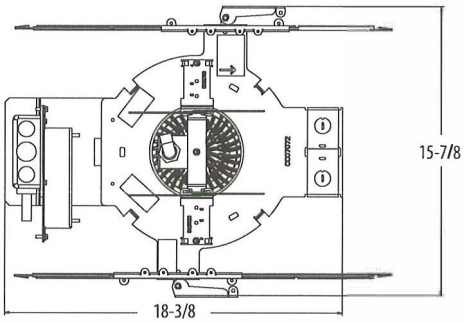
All dimensions are inches (centimeters) unless otherwise noted.

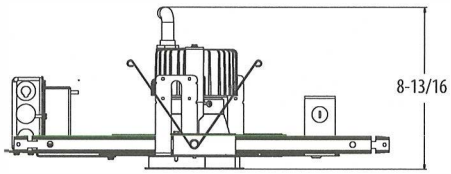




Aperture: 4-5/16" (11)
Ceiling Opening: 5-1/8" (13) self-flanged
5-1/4" (13.3) flangeless
Overlap trim: 5-7/16" (13.8)

DIMENSIONS FOR CHICAGO PLENUM





ELECTRICAL

HOW TO ESTIMATE DELIVERED LUMENS IN EMERGENCY MODE

Use the formula below to estimate the delivered lumens in emergency mode

Delivered Lumens = 1.25 x P x LPW

P = Ouput power of emergency driver. P = 10W for PS1055CP

LPW = Lumen per watt rating of the luminaire. This information is available on the ABL luminaire spec sheet.
The LPW rating is also available at Designlight Consortium.

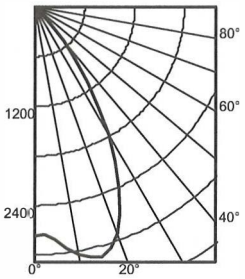
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PHOTOMETRY

Distribution Curve	Distribution Data	Output Data	Coefficient of Utilization	Illuminance: Single Luminaire 30" Above Floor

EVO 35/30 4AR LS

INPUT WATTS: 36.9, DELIVERED LUMENS: 3112, LM/W=84.3 , 1.07 S/MH, TEST NO. LTL27791



	Ave	Lumens
0	2763	
5	2824	278
15	3133	869
25	2417	1090
35	1117	694
45	186	168
55	6	8
65	2	2
75	3	2
85	2	2
90	0	

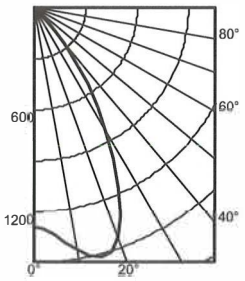
Zone	Lumens	% Lamp
0° - 30°	2236.6	71.9
0° - 40°	2930.3	94.2
0° - 60°	3106.1	99.8
0° - 90°	3111.9	100.0
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.0	0.0
90° - 180°	0.0	0.0
0° - 180°	3111.9	*100.0

*Efficiency

pf / pc / pw	80% 50%	80% 30%	80% 10%	70% 50%	70% 30%	70% 10%	50% 50%	50% 30%	50% 10%
0	119	119	119	116	116	116	111	111	111
1	111	108	106	109	106	104	105	103	101
2	103	99	96	101	98	95	98	95	93
3	96	91	87	95	90	87	92	88	85
4	90	84	80	89	84	80	87	82	79
5	84	78	74	83	78	74	81	77	73
6	79	73	69	78	72	68	77	72	68
7	74	68	64	73	68	64	72	67	63
8	70	64	60	69	63	59	68	63	59
9	66	60	56	65	60	56	64	59	55
10	62	56	52	62	56	52	61	56	52

EVO 35/15 4AR LS

INPUT WATTS: 17.3, DELIVERED LUMENS: 1509, LM/W=87.2, 1.08 S/MH, TEST NO. LTL27786



	Ave	Lumens
0	1290	
5	1338	132
15	1521	423
25	1167	527
35	546	338
45	92	85
55	2	4
65	1	1
75	0	0
85	0	0
90	0	

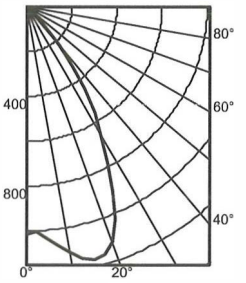
Zone	Lumens	% Lamp
0° - 30°	1081.0	71.6
0° - 40°	1419.3	94.0
0° - 60°	1507.8	99.9
0° - 90°	1509.3	100.0
90° - 180°	0.0	0.0
0° - 180°	1509.3	*100.0

*Efficiency

pf / pc / pw	80% 50%	80% 30%	80% 10%	70% 50%	70% 30%	70% 10%	50% 50%	50% 30%	50% 10%
0	119	119	119	116	116	116	111	111	111
1	111	108	106	109	106	104	105	103	101
2	103	99	96	101	98	95	98	95	93
3	96	91	87	95	90	87	92	88	85
4	90	84	80	89	84	80	87	82	79
5	84	78	74	83	78	74	81	77	73
6	79	73	69	78	72	68	76	72	68
7	74	68	64	73	68	64	72	67	63
8	70	64	59	69	63	59	68	63	59
9	66	60	56	65	59	56	64	59	55
10	62	56	52	61	56	52	61	56	52

EVO 35/10 4AR LS

INPUT WATTS: 12.8, DELIVERED LUMENS: 1189, LM/W=92.9, 1.08 S/MH, TEST NO. LTL27785



	Ave	Lumens
0	1012	
5	1035	102
15	1169	325
25	910	411
35	449	276
45	80	71
55	2	3
65	2	1
75	0	0
85	0	0
90	0	

Zone	Lumens	% Lamp
0° - 30°	838.3	70.5
0° - 40°	1114.0	93.7
0° - 60°	1188.4	99.9
0° - 90°	1189.3	100.0
90° - 180°	0.0	0.0
0° - 180°	1189.3	*100.0

*Efficiency

pf / pc / pw	80% 50%	80% 30%	80% 10%	70% 50%	70% 30%	70% 10%	50% 50%	50% 30%	50% 10%
0	119	119	119	116	116	116	111	111	111
1	111	108	106	109	106	104	105	103	101
2	103	99	96	101	98	95	98	95	92
3	96	91	87	95	90	86	92	88	85
4	90	84	80	88	83	79	86	82	78
5	84	78	74	83	77	73	81	76	73
6	78	72	68	78	72	68	76	71	67
7	74	68	63	73	67	63	72	67	63
8	69	63	59	69	63	59	68	62	59
9	65	59	55	65	59	55	64	59	55
10	61	56	52	61	55	52	60	55	51

LUMEN OUTPUT MULTIPLIER - CRI	
CRI	**FACTOR**
80 CRI	1
90 CRI	0.79

LUMEN OUTPUT MULTIPLIER - CCT	
CRI	**FACTOR**
5000 K	1.101
4000 K	1.035
3500 K	1
3000 K	0.973
2700 K	0.938

LUMEN OUTPUT MULTIPLIER - TRIM FINISH						
FINISH	**CLEAR (AR)**	**PEWTER (PR)**	**WHEAT (WTR)**	**GOLD (GR)**	**WHITE (WR/WRAMF)**	**BLACK (BR)**
Specular (LS)	1.00	0.88	0.83	0.95	N/A	N/A
Semi-specular (LSS)	0.95	0.84	0.79	0.90	N/A	N/A
Matte-diffuse (LO)	0.85	0.73	0.69	0.80	N/A	N/A
Paint	N/A	N/A	N/A	N/A	0.87	0.73

PHOTOMETRY NOTES

- Tested in accordance with IESNA LM-79-08.
- Tested to current IES and NEMA standards under stabilized laboratory conditions.
- CRI: 85 typical.

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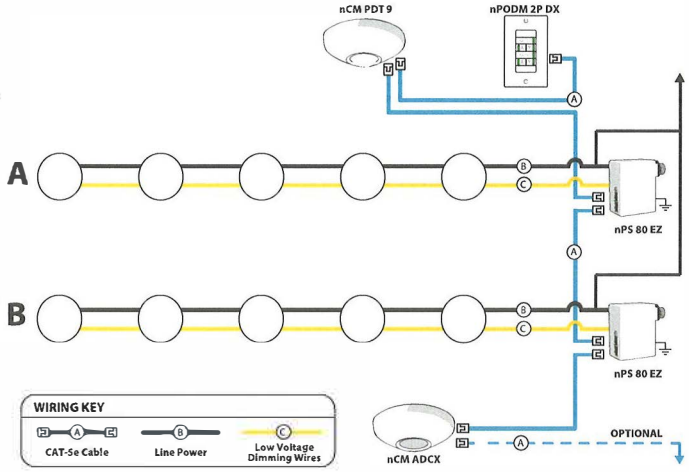
Choose Wall Controls.
nLIGHT o ers multiple styles of wall controls – each with varying features and user experience.



Push-Button WallPod
Traditional tactile buttons and LED user feedback



Graphic WallPod
Full color touch screen provides a sophisticated look and feel



EXAMPLE
Group Fixture Control*
*Application diagram applies for fixtures with eldoLED drivers only.

nPS 80 EZ Dimming/Control Pack (qty 2 required)
nPODM 2P DX Dual On/Off/Dim Push-Button WallPod
nCM ADCX Daylight Sensor with Automatic Dimming Control
nCM PDT 9 Dual Technology Occupancy Sensor

Description: This design provides a dual on/off/dim wall station that enables manual control of the fixtures in Row A and Row B separately. Additionally, a daylight harvesting sensor is provided so the lights in row B can be configured to dim automatically when daylight is available. An occupancy sensor turns off all lights when the space is vacant.

nLight® Control Accessories:
Order as separate catalog number. Visit www.sensorswitch.com/nLight for complete listing of nLight® controls.

WallPod stations	Model number
On/Off	nPODM [color]
On/Off & Raise/Lower	nPODM DX [color]
Graphic Touchscreen	nPOD GFX [color]
Photocell controls	**Model number**
Dimming	nCM ADCX

Occupancy sensors	Model number
Small motion 360°, ceiling (PIR / dual tech)	nCM 9 / nCM PDT 9
Large motion 360°, ceiling (PIR / dual tech)	nCM 10 / nCM PDT 10
Wide view (PIR / dual tech)	nWV 16 / nWV PDT 16
Wall Switch w/ Raise/Lower (PIR / dual tech)	nWSX LV DX / nWSX PDT LV DX
Cat-5 cables (plenum rated)	**Model number**
10', CAT5 10FT	CAT5 10FT J1
15', CAT5 15FT	CAT5 15FT J1

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YS2
Lam Partners
ARCHITECTURAL LIGHTING DESIGN

LED wall luminaire - directed light

Type:
BEGA Product:
Project:
Modified:

Application
This luminaire features flush mounted glass which distributes the light onto the installation surface uniformly with a wide-spread light distribution. Luminaire can be mounted with the light output upwards or downwards.

Materials
Luminaire housing constructed of die-cast marine grade, copper free (≤0.3% copper content) A360.0 aluminum alloy
Clear safety glass with optical texture
High temperature silicone gasket
Mechanically captive stainless steel fasteners

NRTL listed to North American Standards, suitable for wet locations
Protection class IP65
Weight: 1.8lbs

Electrical

Operating voltage	120-277V AC
Minimum start temperature	-30° C
LED module wattage	3.0W
System wattage	5.8W
Controllability	0-10V dimmable
Color rendering index	Ra > 80
Luminaire lumens	348 lumens (3000K)
Lifetime at Ta = 15° C	>500,000 h (L70)
Lifetime at Ta = 50° C	166,000 h (L70)

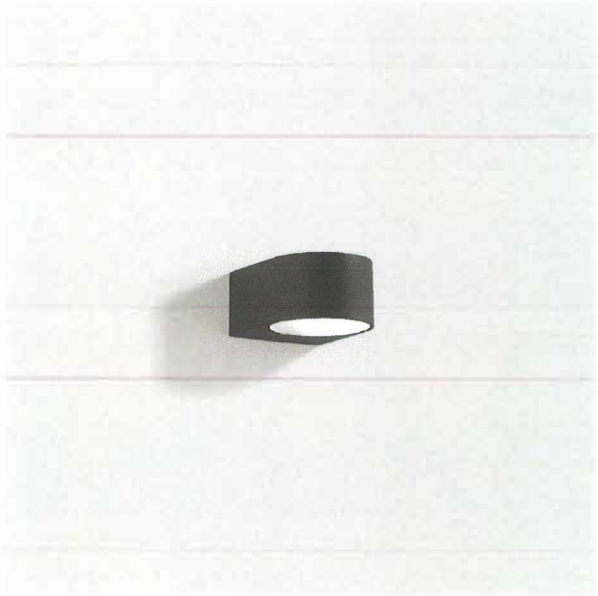
LED color temperature

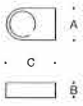
☐ 4000K - Product number + **K4**
☐ 3500K - Product number + **K35**
☐ 3000K - Product number + **K3**
☐ 2700K - Product number + **K27**

BEGA can supply you with suitable LED replacement modules for up to 20 years after the purchase of LED luminaires - see website for details

Finish
All BEGA standard finishes are matte, textured polyester powder coat with minimum 3 mil thickness.

Available colors ☐ Black (BLK) ☐ White (WHT) ☐ RAL:
☐ Bronze (BRZ) ☐ Silver (SLV) ☐ CUS:





LED wall luminaire · directed light

	LED	A	B	C	Required wiring box
33223	3.0W	4	2 3/8	5 1/8	**19542**

BEGA 1000 BEGA Way, Carpinteria, CA 93013 (805) 684-0533 info@bega-us.com

Due to the dynamic nature of lighting products and the associated technologies, luminaire data on this sheet is subject to change at the discretion of BEGA North America. For the most current technical data, please refer to bega-us.com
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Updated 09/05/18

PRISM YW1
Lam Partners

MIMIK 20 FLAT M EGRESS

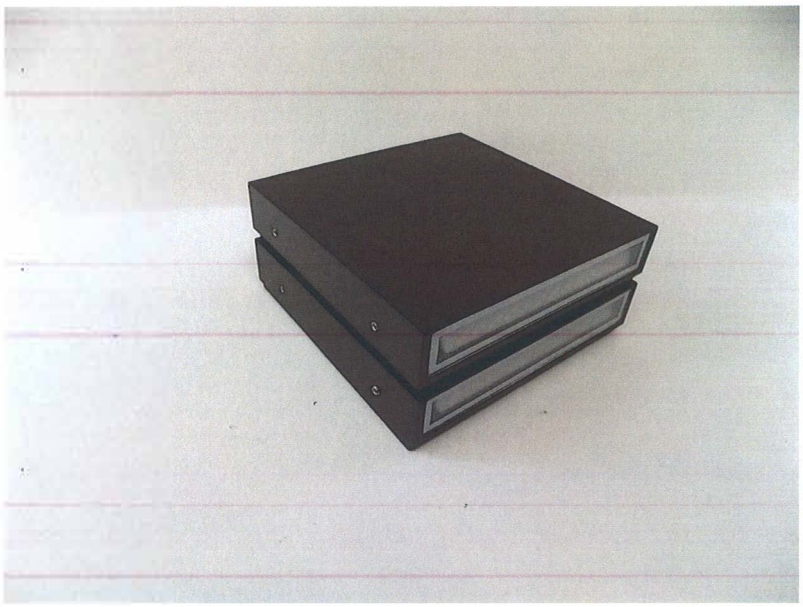
13W

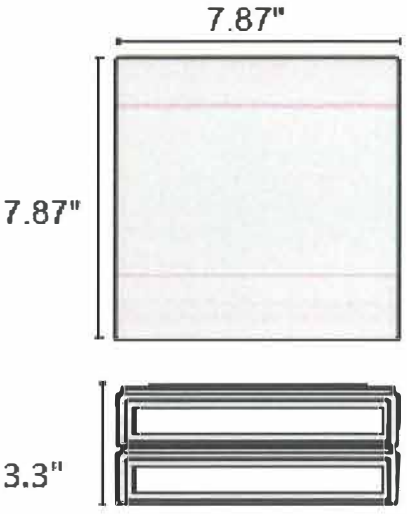
LED

Wall mounted low profile luminaire designed for general direct illumination. Full cut-off. Housing and faceplate in copper free die cast aluminum. Fasteners in stainless steel. Micro-prismatic tempered glass diffuser for maximum visual comfor and optimal distribution. UV stabilized silicone gasket seal between the wall and the back plate, between the double fixtures, and between the housing and the faceplate(s) ensures weather tight IP65 rating. Integral 0-10V dimming driver included.

Custom finishes available on request.

- Designed to have 2 LED Arrays and 2 drivers independent of each other.
- Designed with two seperate wire leads out the back so one can be wired to the Egress circuit as required.
- Total delivered lumen package as shown for each CCT.
- This fixture complies with Egress redundancy requirements. Refer to local code jurisdiction for exact interpretation.
- Universal voltage standard 120/277V.





WEIGHT 8.9lbs

code	source	kelvin	delivered lumens	finish	cULus	IP
MIMIK 20 FLAT M EGRESS						
071178-EG	25LED 13W	3000K	864	Iron Grey	Wet	65
071180-EG	25LED 13W	3000K	864	Aluminum Metallic	Wet	65
071200-EG	25LED 13W	3000K	864	Textured White	Wet	65
071182-EG	25LED 13W	4000K	960	Iron Grey	Wet	65
071184-EG	25LED 13W	4000K	960	Aluminum Metallic	Wet	65
071201-EG	25LED 13W	4000K	960	Textured White	Wet	65

PRODUCT CODE
PROJECT
TYPE

PRISMA® ARCHITECTURAL

PERFORMANCE IN LIGHTING USA, inc.
2621 Keys Pointe
Conyers, Georgia 30013 - USA
voice 770.822.2115 - fax 770.822.9925

web www.pil-usa.com
e-mail info@pil-usa.com

YW2

Lam Partners ARCHITECTURAL LIGHTING DESIGN

LED wall luminaire - light output on one side

Type:
BEGA Product:
Project:
Modified:

Application
This LED wall mounted luminaire has light output in one direction. Arranged individually or in groups, it is a great design element for a host of lighting applications. Downward orientation only.

Materials
Luminaire housing and constructed of die-cast marine grade, copper free (≤0.3% copper content) A360.0 aluminum alloy
Matte safety glass
High temperature silicone gasket
Mechanically captive stainless steel fasteners

NRTL listed to North American Standards, suitable for wet locations
Protection class IP65
Weight: 4.2 lbs

Electrical

Operating voltage	120-277V AC
Minimum start temperature	-20° C
LED module wattage	15.4 W
System wattage	20.5 W
Controllability	0-10V, TRIAC, and ELV dimmable
Color rendering index	Ra > 80
Luminaire lumens	1024 lumens (3000K)
Lifetime at Ta = 15° C	>500,000 h (L70)
Lifetime at Ta = 35° C	242,000 h (L70)

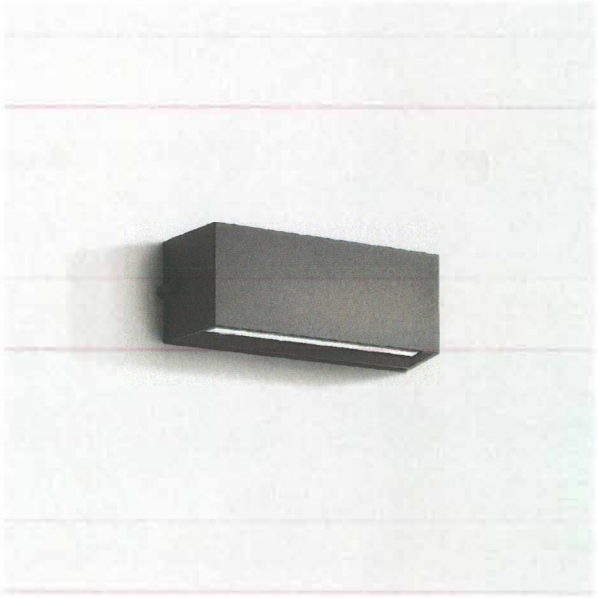
LED color temperature

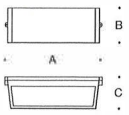
☐ 4000K - Product number + **K4**
☐ 3500K - Product number + **K35**
☐ 3000K - Product number + **K3** ***(EXPRESS)***
☐ 2700K - Product number + **K27**

BEGA can supply you with suitable LED replacement modules for up to 20 years after the purchase of LED luminaires - see website for details

Finish
All BEGA standard finishes are matte, textured polyester powder coat with minimum 3 mil thickness.

Available colors ☐ Black (BLK) ☐ White (WHT) ☐ RAL:
☐ Bronze (BRZ) ☐ Silver (SLV) ☐ CUS:





LED wall luminaire · light output on one side

		LED	A	B	C
22360	ADA	15.4 W	12 ½	4 ⅜	4

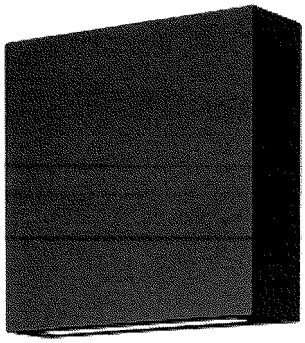
BEGA 1000 BEGA Way, Carpinteria, CA 93013 (805) 684-0533 info@bega-us.com

Due to the dynamic nature of lighting products and the associated technologies, luminaire data on this sheet is subject to change at the discretion of BEGA North America. For the most current technical data, please refer to bega-us.com
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Updated 08/24/18

QLS420 LED

620-3124

YW4 Lam Partners



Description

IP66, Class I. IK07. Surface mounted LED wall luminaire. Marine-grade, die-cast aluminum alloy. 5CE superior corrosion protection including PCS hardware. Silicone rubber gasket. Safety glass lens. Integral EC electronic converter. CAD-optimised optics for superior illumination and glare control. OLC® One LED Concept. Factory installed LED circuit board. 0-10V on request. Suitable for installation over 4" recessed junction box.

Beam Type	rectangular, forward-throw beam [R45]
Light Source	LED-6/12W / 700 mA - 3000 K
CRI	80
Gear Type	electronic gear

Nominal Luminous Flux (lm)	
LED Lumens	246 lm
LEDs	6
Total Lumens	1476 lm
Tj	85 °C

Delivered Lumens Flux (lm)	
LED Lumens	167.5 lm
Total Lumens	1004.7 lm
Ta	25 °C

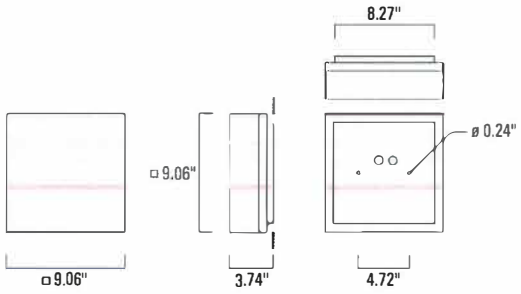
Rated Input Power	15 W

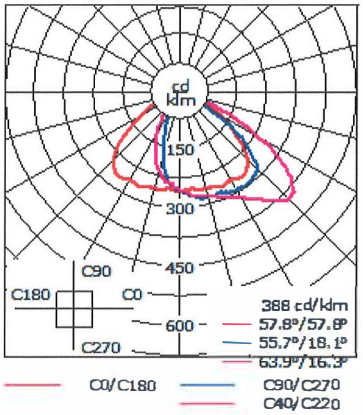
WE-EF LIGHTING USA LLC
410-D Keystone Drive | Warrendale PA 15086 | U.S.A. | Tel +1 724 742 0030 | Fax +1 724 742 0035 | info.usa@we-ef.com | www.we-ef.com | 11-07-2019 14:38

QLS420 LED

620-3124

YW4 Lam Partners





Material Specification

Body:	Luminaire body and lens frame constructed in die cast aluminum.
Weight (lbs):	15.00
Lens:	Clear tempered glass lens.
Colours:	RAL9004 Black RAL9007 Grey Metallic RAL9016 White RAL8019 Dark Bronze
Quick Ship	Quickship features a one week ship time for Steplights and two week ship time for the rest of our Core products. All applicable information must be included for orders to be processed and colours must be in one of our 4 standard finishes. A maximum order quantity of 30 pieces applies.
Gasket:	Silicone rubber gasket
Fasteners:	PCS polymer coated stainless steel
Ingress protection:	IP66
Impact protection:	IK07
Corrosion protection:	5CE
Mounting:	Suitable for installation over a standard 4" recessed junction box.
Listings:	ETL listed. Suitable for wet locations.

Electrical Specification

Power supply:	Integral [ECG] LED driver in 120-277V, 0-10V
Driver / Ballast:	Integral EC electronic converter
Cable:	Two cable entries

WE-EF LIGHTING USA LLC
410-D Keystone Drive | Warrendale PA 15086 | U.S.A. | Tel +1 724 742 0030 | Fax +1 724 742 0035 | info.usa@we-ef.com | www.we-ef.com | 11-07-2019 14:38

QLS420 LED

620-3124

YW4

Lam Partners

ARCHITECTURAL LIGHTING DESIGN

Lifetime

LED >60,000 h @ Ta 25°C/77°F (L70/B10). Control gear >50.000 h Ta 25°C/77°F

WE-EF LIGHTING USA LLC

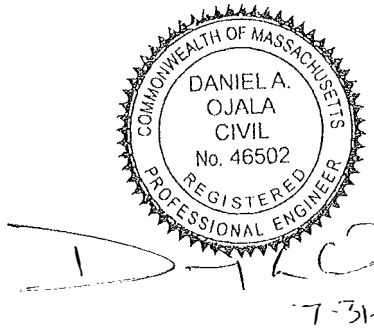
410-D Keystone Drive | Warrendale PA 15086 | U.S.A. | Tel +1 724 742 0030 | Fax +1 724 742 0035 | info.usa@we-ef.com | www.we-ef.com | 11-07-2019 14:38

down cape engineering, inc.
CIVIL ENGINEERS & LAND SURVEYORS
939 MAIN ST / ROUTE 6A YARMOUTHPORT, MA 02675
(508) 362-4541 FAX (508) 362-9880

STORMWATER REPORT

Project 2022

#27 Park Street
Hyannis, MA



DATE: 7-31-2019

PREPARED FOR: Cape Cod Hospital

STORMWATER REPORT

 # 27 PARK STREET, HYANNIS, CAPE COD HOSPITAL

TABLE OF CONTENTS

1. Overview of Stormwater Management System/Compliance
2. Stormwater Operations and Maintenance Plan (also see full size project plans for system layout)
3. Drainage Calculations with Drainage Area sketch plan
4. Construction General Permit filing and construction period SWPPP

down cape engineering, inc.
CIVIL ENGINEERS & LAND SURVEYORS
939 MAIN ST / ROUTE 6A YARMOUTHPORT, MA 02675
(508) 362-4541 FAX (508) 362-9880

STORMWATER NARRATIVE:
Cape Cod Hospital- Project 2022
#27 Park Street, Hyannis, MA 7-31-19 **© 2019 down cape engineering, inc.**

OVERVIEW OF STORMWATER MANAGEMENT SYSTEM/ NARRATIVE INDICATING STORMWATER STANDARDS COMPLIANCE:

The drainage systems specified for proposed addition and related parking areas at the Cape Cod Hospital have been designed in accordance with Town of Barnstable Subdivision Rules and Regulations, the State Stormwater Management Guidelines, and the Cape Cod Commission guidelines. The project consists of a Hospital addition associated utilities and parking. Full compliance with all Stormwater Standards is met by the design. The proposed use is an institutional type use in a MS Business zoning district located in a downtown zoning district in Hyannis (Barnstable), MA, and is connected to municipal sewer. The site is not a "Land Use with Higher Potential Pollutant Load" per the State Stormwater Management Guidelines, so infiltration is utilized. The underlying material is sand, hydrologic group A under the guidelines.
During construction, the existing drainage systems, a temporary construction period stormwater area, and the installation of a silt fence near the downgradient border and construction aprons will provide full protection of the adjacent roadways and the wetland resources across the street from the property. The erosion control fence is to be inspected after every rain event and is to be maintained until the site is stabilized and ready for occupancy. A Stormwater Pollution Prevention plan has been prepared and a NPDES General Permit for Storm Water Discharges form Construction Activities (Construction General Permit, or CGP), will be obtained and submitted during the Notice of Intent process.

The proposed rain gardens overflow to deep sump hooded catch basins installed in an off-line configurations, and the design meets the 44% TSS removal prior to infiltration. The systems are designed to contain and infiltrate the design storm event onsite and provide the required Total Suspended Solids (TSS) removal mandated by the State Stormwater Management Guidelines. The parking lot is to be swept free of sand each spring, on or about April 1st.

Best Management Practices incorporated in the project are as follows:

-Bioretention Areas/Rain Gardens (90% TSS Removal)
-Deep Sump Hooded Catch Basins offline (25% TSS Removal)
-Infiltration Trenches/Pit (80% TSS Removal)
-Street Sweeping (10% TSS Removal)

Compliance with the 10 State Stormwater Standards (in order in bold with explanation in lighter font following the numbered Standards) is as follows:

1. **No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.**
   The project prevents existing stormwater from entering waters of the Commonwealth, and no new outfalls are proposed. All additions and parking areas are infiltrated onsite. Only existing clean roof runoff from interior areas of the Hospital discharge roof runoff to an existing outfall pipe, so this standard is met and exceeded. The local regulation require a 25 year storm be infiltrated 100% onsite, exceeding the State requirements.

2. **Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.**
   The sandy soils permit onsite infiltration, as shown by the attached calculations, the proposed drainage system will infiltrate a 25 year storm event onsite per the attached calculations, so this Standard is easily met by the proposal. Coastal storm flowage is expected on the Southern fringe of the site but the standard is met nonetheless.

3. **Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.**
   Local Town of Barnstable requirements call for all stormwater to be infiltrated onsite for commercial sites, and the proposed development complies with this standard, so the annual recharge is easily met. Rain gardens are utilized wherever practicable, and the impervious surfaces are all infiltrated onsite to recharge the aquifer.

4. **Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:**

   a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
   b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and
   c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

   A long term pollution prevention plan is attached, in excess of the correct volumes are captured, and pretreatment is provided per the Handbook, so compliance with #4 is assured.

5. For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00. The typical parking areas and roof of the Hospital redevelopment is not applicable to

higher potential pollutant loads per the Handbook, so this standard is "Not Applicable" for this site. (note that 44% TSS removal pretreatment is provided prior to infiltration).

6. Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply. The site is not within a Zone 2 to a public well, and no new stormwater discharges are proposed, and 44% TSS removal prior to infiltration is provided, hence the project is compliant with the standard.

7. A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions. This project does not qualify as a redevelopment, and fully complies with the standards.

8. A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented. A Stormwater Pollution Prevention plan has been prepared and a NPDES General Permit for Storm Water Discharges form Construction Activities (Construction General Permit, or CGP), will be obtained and submitted during the Notice of Intent process. A reduced copy of the SWPPP is attached.

9. A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed. The long term O&M plan is attached.

10. All illicit discharges to the stormwater management system are prohibited. No illicit discharges are allowed or planned related to this site. Additional documentation will be filed per the stormwater instructions.

As shown above and in the following calculations, the development Project 2022 at #27 Park Street is compliant with the State Stormwater Management Guidelines.

STORMWATER
OPERATIONS AND MAINTENANCE PLAN:
Cape Cod Hospital

#27 Park Street, Hyannis, MA

DATE: 7-31-19

Prepared by: down cape engineering, inc.
939 Route 6a Yarmouthport, MA 02675
Ph. 1-508-362-4541
Fax 1-508-362-9880

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

 # 27 PARK STREET, HYANNIS, CAPE COD HOSPITAL

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1. Owner of Stormwater System and Responsible Party for Operation and Maintenance
2. Overview of Stormwater Management System
3. Schedule of Inspection and Maintenance of System
4. Source Control Best Management Practices
5. Plans of Stormwater BMPs location for maintenance
6. Emergency Spill Contingency Plan
7. Pollution prevention plan
8. Estimated operations and maintenance budget
9. Operations and maintenance Log Forms
10. Overview of Construction Period Stormwater Management System
11. Plans of Construction Period Pollution Prevention and Erosion and Sedimentation Control

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

 # 27 PARK STREET, HYANNIS, CAPE COD HOSPITAL

OWNER OF STORMWATER SYSTEM AND RESPONSIBLE PARTY FOR OPERATIONS AND MAINTENANCE:

OWNER:

Cape Cod Hospital
Attn: William Hafferty
P.O.Box 640
27 Park Street
Hyannis, MA 02601
Phone: 1-508-862-5104

RESPONSIBLE PARTY:

Cape Cod Hospital
Attn: William Hafferty
P.O.Box 640
27 Park Street
Hyannis, MA 02601
Phone: 1-508-862-5104

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

 # 27 PARK STREET, HYANNIS, CAPE COD HOSPITAL

OVERVIEW OF STORMWATER MANAGEMENT SYSTEM:

The drainage systems specified for proposed redevelopment area have been designed in accordance with Town of Barnstable Subdivision Rules and Regulations and engineering department guidelines. The system has been designed to fully comply with the Stormwater Stormwater Management Guidelines.
The system utilizes various drainage systems. In many areas curb inlets lead to traprock swales leading to vegetated rain garden drainage area. Deep sump hooded catch basins leading to stone filled infiltration trenches and leach pits are used for overflow infiltration. The proposed uses are a typical parking lots, and are not a "Land Use with Higher Potential Pollutant Load" per the State Stormwater Management Guidelines, and onsite infiltration of the full design storm is utilized. The underlying material is sand, hydrologic group A under the guidelines.
During construction, the existing drainage systems and temporary retention areas and the installation of silt controls near the down gradient border will provide protection. The erosion control fence and retention area is to be inspected after every rain event and is to be maintained until the site is stabilized.
Where practicable, the stormwater is directed to swales and a rain garden, overflow to deep sump hooded catch basins installed in an off-line configurations, removing in excess of the 44% TSS removal prior to direct infiltration. The system is designed to contain and infiltrate the design storm event onsite and provide the required Total Suspended Solids (TSS) removal mandated by the State Stormwater Management Guidelines. The parking lot is to be swept free of sand each spring, on or about April 1st.

Best Management Practices incorporated in the project are as follows:

-Deep Sump Hooded Catch Basins offline (25% TSS Removal)
-Secondary offline deep sump hooded basin (25% TSS Removal)
-Infiltration Trenches/Pit/Rain garden (80% TSS Removal)
-Street Sweeping (10% TSS Removal)

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

27 PARK STREET, HYANNIS, CAPE COD HOSPITAL

SCHEDULE OF INSPECTION AND MAINTENANCE OF STORMWATER MANAGEMENT SYSTEM:

SCHEDULE OF INSPECTION AND MAINTENANCE:

The stormwater management system proposed for the site requires regular inspection and maintenance to ensure proper operation and effectiveness.

1. It is recommended that the stormwater system proposed for the site be inspected twice annually, and sediment removed from the catch basins as required. The inspection should involve physical inspection of the catch basins and manholes for sediment buildup and inspecting the trenches for solids carryover. If significant solids are found in the basins (more than 2'), basins shall be mechanically cleaned and the sediment disposed of offsite in compliance with all local, state, and federal regulations. If slow infiltration is noted during storm events, the infiltration trenches or drywells should be repaired or rebuilt as necessary to restore function. If standing water is observed in the bottom of the bioinfiltration areas, any fines shall be removed and the bottom scarified to increase infiltration as needed to prevent standing water more than 72 hours after a rain event. Trash shall be removed from bioinfiltration areas as required. Plants shall be inspected annually and replanted if dead.

2. The parking areas shall be swept free of sand after the last snowfall of each season, generally on or about April 1st.

3. Any soils tracked into public ways shall be promptly swept up.

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

 # 27 PARK STREET, HYANNIS, CAPE COD HOSPITAL

SOURCE CONTROL BEST MANAGEMENT PRACTICES:

1. The pavement should be swept after the last snowfall of the season (sweep on or about April 1st) and when necessary to remove accumulated debris, trenches and drywells to be inspected annually.
2. No illicit discharges of any type are allowed into the storm water drainage system or septic/sewer system. Personnel should be instructed in proper disposal of any cleaning materials, paints, chemicals, or other potentially harmful substances utilized on or about the property.

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

34 PARK STREET, HYANNIS, CAPE COD HOSPITAL

EMERGENCY SPILL CONTIGENCY PLAN:

1. The owner of the facility shall have a designated person with overall responsibility for spill response.

2. A summary of this plan shall be posted in a prominent location in the building. The Summary shall identify the phone numbers of regulatory agencies and individuals to be contacted in the event of a spill.

3. In the event of a spill, the following shall be notified:

a) Hyannis Fire Department (for a gasoline or hazardous materials spill)	1-508- 775-1300
b) Department of Environmental Protection Emergency Response	1-508-946-2850
c) Barnstable Water Pollution Control	1-508-790-6335
d) Barnstable Board of Health	1-508-862-4664
e) Barnstable Conservation Department	1-508-862-4093

4. Notification of authorities for the cleanup of spills shall be done immediately upon discovery of a spill.

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

34 PARK STREET, HYANNIS, CAPE COD HOSPITAL

POLLUTION PREVENTION PLAN:

#34 Park Street, Hyannis, MA

1. **Construction Period: During Construction, fueling of vehicles shall be limited to the paved surface of the site, and a spill control kit shall be stored onsite during construction. No maintenance of construction vehicles is allowed onsite except for refueling and greasing of fittings.**

2. **Any loose debris shall be cleaned up daily.**

3. **Illicit discharges to the stormwater management system or waters of the Commonwealth are prohibited, and personnel shall be instructed that no such discharges are allowed.**

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

34 PARK STREET, HYANNIS, CAPE COD HOSPITAL

ESTIMATED OPERATIONS AND MAINTENANCE BUDGET:

Inspections: Twice yearly inspection of drainage system:
Visual inspection, probe sediment depth, review for signs of drainage issues, ...Est. $250/visit x 2 = $500/year.

Catch Basin Cleaning: Est. 8 basins/year: $1,600.00

Street Sweeping: Est. $2,000/visit.

CONSTRUCTION PERIOD STORMATER POLLUTION PREVENTION INSPECTION AND MAINTENANCE LOG FORM-

Project Name: #27Park Street, Hyannis, MA
Owner: Cape Cod Hospital
Attn: William Hafferty
Phone: 508-862-5104

Date	Description of Inspection or Maintenance (sweep lot, clean basins, remove silt from temp areas, etc.)	Person	Comments

Long Term Stormwater Maintenance/Evaluation Checklist
#27 Park Stree, Hyannis, MA 02601 Date: 7-31-2019

Best Management Practice	Maintenance Item and Key Items to Check	Frequency of Inspection	Date Inspected	Insp. Initials	Frequency of Cleaning	Cleaning or Repair Needed? ☐ Yes ☐ No	Date of Cleaning or Repair	Performed By:
Street Sweeping	Vacuum Sweeper all paved surfaces	1X per year	/ /		1X per year	☐ Yes ☐ No	/ /	
Deep Sump and Hooded Catch Basins	Remove sediment 1X / YR if req.'d	4X per year	/ /		1X per year if req.'d	☐ Yes ☐ No	/ /	
Bioinfiltration Swales	Inspect Inlets, vegetation, overflow outlets, drain time <4 days, remove trash 2X/YR.remove sediment as req.	2X per year	/ /		2X first year then 1X per year	☐ Yes ☐ No	/ /	
Infiltration Fields	Inspect for signs of backup	1X per year	/ /		replace as req.'d	☐ Yes ☐ No	/ /	
Other:						☐ Yes ☐ No	/ /	

Note: Duplicate Checklist Form as required.

off 508-362-4541
fax 508 362-9880

down cape engineering, inc.
CIVIL ENGINEERS
LAND SURVEYORS
939 Main Street — YARMOUTHPORT, MASS.

LONG TERM STORMATER POLLUTION PREVENTION
INSPECTION AND MAINTENANCE LOG FORM-

Project Name: #27 Park Street, Hyannis, MA
Owner: Cape Cod Hospital
Attn: William Hafferty
Phone: 508-862-5104

Date	Description of Inspection or Maintenance (sweep lot, clean basins, plant maintenance in rain gardens, etc.)	Person	Comments

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

27 PARK STREET, HYANNIS, CAPE COD HOSPITAL

CONSTRUCTION PERIOD STORMWATER OPERATIONS AND MAINTENANCE PLAN:

#27 Park Street, Hyannis, MA

OVERVIEW OF CONSTRUCTION PERIOD STORMWATER MANAGEMENT SYSTEM:

The construction period drainage system for the proposed development area will be to excavate and utilize a proposed temporary retention area in an interim area south of the addition. This area as well as the existing drainage systems until the final drainage areas can be constructed. These systems can continue to be utilized while the site is redeveloped. The underlying material is sand, hydrologic group A under the guidelines.
During construction, the existing drainage system and the installation of silt controls near the down gradient border will provide protection. The erosion control fence is to be inspected after every rain event and is to be maintained until the site is stabilized.
See attached SWPPP and CGP filing for additional information.

down cape engineering, inc.
CIVIL ENGINEERS & LAND SURVEYORS
939 MAIN ST / ROUTE 6A YARMOUTHPORT, MA 02675
(508) 362-4541 FAX (508) 362-9880

COMMONWEALTH OF MASSACHUSETTS
DANIEL A. OJALA
CIVIL
No. 46502
REGISTERED PROFESSIONAL ENGINEER

7-31-19

DRAINAGE CALCULATIONS:
Cape Cod Hospital- Project 2022
#27 Park Street, Hyannis, MA 7-31-19 **© 2019 down cape engineering, inc.**

DRAINAGE CALCULATIONS:

The drainage systems specified for proposed addition and related parking areas at the Project 2022 Addition to the Cape Cod Hospital have been designed in accordance with Town of Barnstable Subdivision Rules and Regulations, the State Stormwater Management Guidelines, and the Cape Cod Commission guidelines. The project consists of a Hospital addition associated utilities and parking. Full compliance with all Stormwater Standards is met by the design. The underlying material is sand, hydrologic group A under the guidelines, multiple testhole and soil borings were performed on the site.

The proposed rain gardens overflow to deep sump hooded catch basins installed in an off-line configurations, and the design meets the 44% TSS removal prior to infiltration. The systems are designed to contain and infiltrate the design storm event onsite and provide the required Total Suspended Solids (TSS) removal mandated by the State Stormwater Management Guidelines.

The drainage areas are as delineated on the attached Drainage Area Sketch Plan, which covers the 17 acre main campus, the relevant areas under consideration/modification are shown as DA1- DA12.

The roof drainage is collected and infiltrated directly to recharge the aquifer, the main roof is shown on the attached Drainage Area Sketch Plan as Drainage Area 4, or DA4.

The Northern portions of the site are handled by systems designed during the Emergency Center addition, the southern end of the main parking's infiltration system is being adjusted by removing a section on the south and adding a section of leaching field on the North. The contributing drainage area for this system is shown as DA1 on the plan and attached HydroCAD calculations.

The drainage was designed utilizing bioretention where practicable, and deep sump hooded catch basins with secondary deep sump hooded manholes to remove the 44% TSS removal mandated by the State Stormwater Management guidelines. HydroCAD was utilized to model the stage/storage/discharge of the systems. The attached calculations indicate the systems are capable of fully infiltrating a 100 year storm onsite, as well as the design 25 year storm event. The main roof of the hospital utilizes an existing drain line which outfalls to the Hyannis inner harbor, this was installed in 1973, all discharges except for clean roof runoff have been eliminated from this line, and all new and redeveloped roof areas are being infiltrated directly onsite.

The southern parking areas which are redeveloped continue to utilize the extensive subsurface leaching, and have additional leaching fields or trenches attached as necessary. The bottom of the leaching systems are designed to maintain the required two feet of separation above the adjusted groundwater levels. As expected in an area adjacent tidal waters, the groundwater levels drop from north to south across the campus.

Drainage areas DA10, DA11, and DA12 are unchanged and the systems are functioning well, so calculations for these areas were not included. DA EC1, EC3, EC3, and EC4 are existing unchanged systems from the Emergency Center redevelopment, so are not included in the calculations either.

Best Management Practices incorporated in the project are as follows:

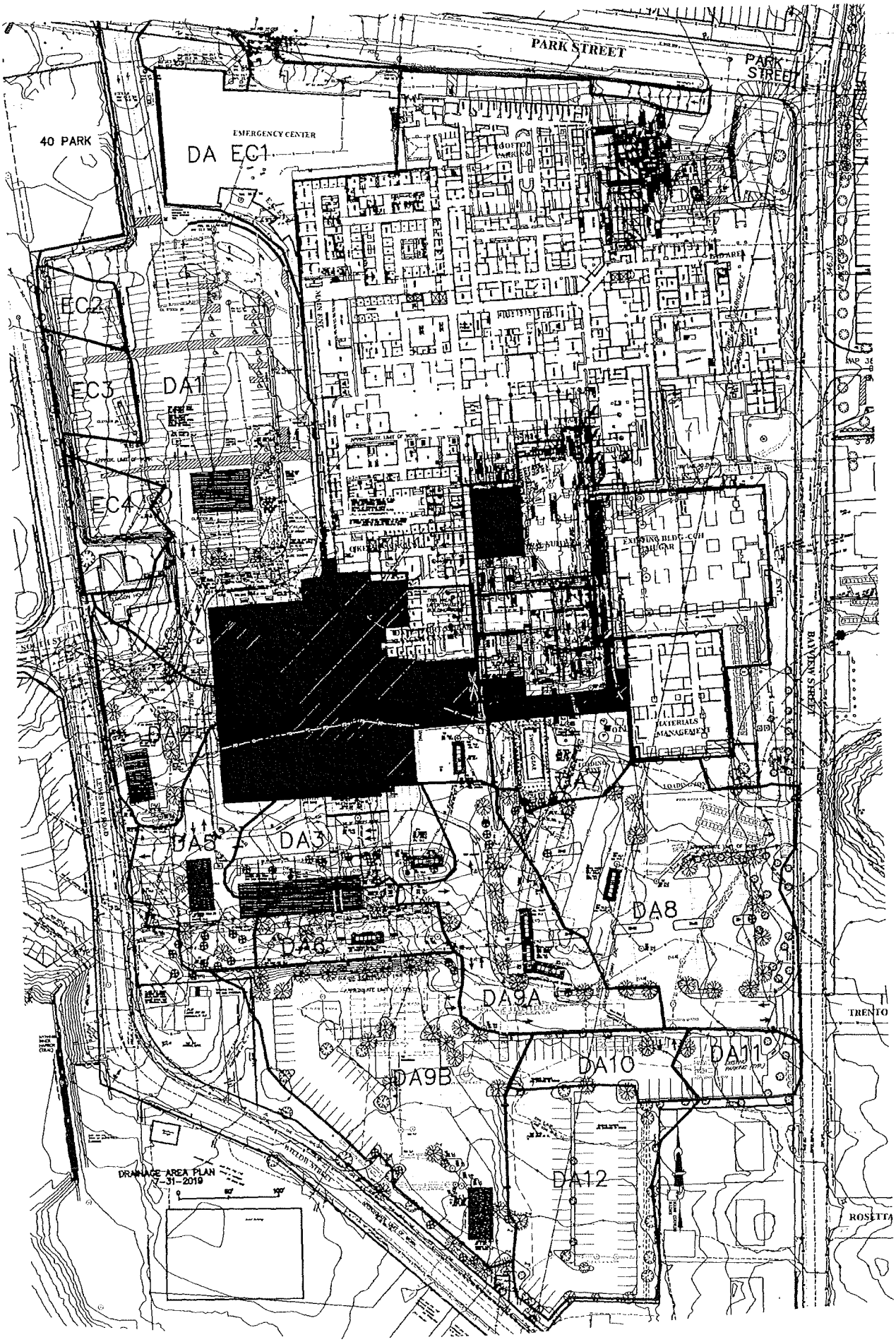
-Bioretention Areas/Rain Gardens (90% TSS Removal)
-Deep Sump Hooded Catch Basins offline (25% TSS Removal)
-Infiltration Trenches/Pit (80% TSS Removal)
-Street Sweeping (10% TSS Removal)

Compliance with the 10 State Stormwater Standards is shown with an attached summary.

The HydroCAD calculations show the highest modeled levels reached during a 100 year reoccurance events do not overtop the drainage structures, showing a very conservative and safe drainage design.

The predevelopment flow is mainly contained onsite, and the situation is improved by the newer fully compliant systems as shown in the attached calculations.

As shown in the following calculations, the development Project 2022 at #27 Park Street is compliant with the State Stormwater Management Guidelines, and local and regional standards.


PARK STREET
PARK STREET
40 PARK
EMERGENCY CENTER
DA EC1
EC2
EC3
DA1
EC4
DA
DA5
DA3
DA6
DA7
DA8
DA9A
DA9B
DA10
DA11
DA12
BAYVIEW STREET
TRENTO
ROSETTA
DRAINAGE AREA PLAN
7-31-2019

7/31/2019

HYDRO-CAD DRAINAGE ANALYSIS INFORMATION
STAGE-DISCHARGE AND STAGE STORAGE TABLE DA1

LEACHING FIELD - SEE PLAN SECTION
3/4" - 1-1/2" WASHED STONE FOR SIZE SELECTED
-FIELD ONLY THIS DESIGN

INPUT VARIABLES:

LENGTH OF FIELD:	98	(FT.)
WIDTH OF FIELD:	60	(FT.)
INVERT OF STRUCTURES:	12.3	(EL. ABOVE DATUM)
STONE VOID RATIO, E:	0.31	(FT3/FT3)
TOWN LEACH RATE:	0.7	(GPM/SF)

CALCULATED VALUES:

TOP OF PRECAST STRUCTURES ELEV.:	14.30	BOTTOM CATCH BASINS	7.63
		BOTTOM FIELD EL.	11.30

ELEVATION (FT)	STORAGE (CU.FT.)	DISCHARGE (CFS)
11.30	0.0	9.18
12.30	1822.8	9.48
13.30	3645.6	9.79
14.30	5468.4	10.10 (OVER)

7/31/2019

HYDRO-CAD DRAINAGE ANALYSIS INFORMATION

STAGE-DISCHARGE AND STAGE STORAGE TABLE DA2

LEACHING FIELD - SEE PLAN SECTION
3/4" - 1-1/2" WASHED STONE FOR SIZE SELECTED
-FIELD ONLY THIS DESIGN

INPUT VARIABLES:

LENGTH OF FIELD:	50	(FT.)
WIDTH OF FIELD:	24	(FT.)
INVERT OF STRUCTURES:	14	(EL. ABOVE DATUM)
EFFECTIVE DIAMETER PITS:	14	(STONE + LPIT O.A. DIA)
STONE VOID RATIO, E:	0.31	(FT3/FT3)
TOWN LEACH RATE:	0.7	(GPM/SF)

CALCULATED VALUES:

TOP OF PRECAST STRUCTURES ELEV.:	16.00	BOTTOM CATCH BASINS ELEV.	9.33
		BOTTOM FIELD EL.	13.00

ELEVATION (FT)	STORAGE (CU.FT.)	DISCHARGE (CFS)
13.00	0.0	1.87
14.00	372.0	2.03
15.00	744.0	2.19
16.00	1116.0	2.34 (OVER)

7/31/2019

HYDRO-CAD DRAINAGE ANALYSIS INFORMATION
STAGE-DISCHARGE AND STAGE STORAGE TABLE DA3

LEACHING TRENCH - SEE PLAN SECTION
3/4" - 1-1/2" WASHED STONE FOR SIZE SELECTED
TRENCH ONLY THIS DESIGN

INPUT VARIABLES:

LENGTH OF TRENCH:	64	(FT.)
WIDTH OF TRENCH:	12	(FT.)
INVERT OF STRUCTURES:	13.5	(EL. ABOVE DATUM)
STONE VOID RATIO, E:	0.31	(FT3/FT3)
TOWN LEACH RATE:	0.7	(GPM/SF)

CALCULATED VALUES:

TOP OF PRECAST STRUCTURES ELEV.:	15.50	BOTTOM CATCH BASINS	8.83
		BOTTOM TRENCH EL.	11.50

ELEVATION (FT)	STORAGE (CU.FT.)	DISCHARGE (CFS)
11.50	0.0	1.20
12.50	238.1	1.40
13.50	476.2	1.60
14.50	714.2	1.80
15.50	952.3	2.00

7/31/2019

HYDRO-CAD DRAINAGE ANALYSIS INFORMATION
STAGE-DISCHARGE AND STAGE STORAGE TABLE DA4

LEACHING FIELD - SEE PLAN SECTION
3/4" - 1-1/2" WASHED STONE FOR SIZE SELECTED
-FIELD ONLY THIS DESIGN

INPUT VARIABLES:

LENGTH OF FIELD:	120	(FT.)
WIDTH OF FIELD:	35	(FT.)
INVERT OF STRUCTURES:	13	(EL. ABOVE DATUM)
STONE VOID RATIO, E:	0.31	(FT3/FT3)
TOWN LEACH RATE:	0.7	(GPM/SF)

CALCULATED VALUES:

TOP OF PRECAST STRUCTURES ELEV.:	15.00	BOTTOM CATCH BASINS	8.33
		BOTTOM FIELD EL.	12.00

ELEVATION (FT)	STORAGE (CU.FT.)	DISCHARGE (CFS)
12.00	0.0	6.56
13.00	1302.0	6.93
14.00	2604.0	7.31
15.00	3906.0	7.68 (OVER)

7/31/2019

HYDRO-CAD DRAINAGE ANALYSIS INFORMATION
STAGE-DISCHARGE AND STAGE STORAGE TABLE DA5

LEACHING FIELD - SEE PLAN SECTION
3/4" - 1-1/2" WASHED STONE FOR SIZE SELECTED
-FIELD ONLY THIS DESIGN

INPUT VARIABLES:

LENGTH OF FIELD:	50	(FT.)
WIDTH OF FIELD:	24	(FT.)
INVERT OF STRUCTURES:	12	(EL. ABOVE DATUM)
STONE VOID RATIO, E:	0.31	(FT3/FT3)
TOWN LEACH RATE:	0.7	(GPM/SF)

CALCULATED VALUES:

TOP OF PRECAST STRUCTURES ELEV.:	14.00	BOTTOM CATCH BASINS	7.33
		BOTTOM FIELD EL.	11.00

ELEVATION (FT)	STORAGE (CU.FT.)	DISCHARGE (CFS)
11.00	0.0	1.87
12.00	372.0	2.03
13.00	744.0	2.19
14.00	1116.0	2.34 (OVER)

7/31/2019

HYDRO-CAD DRAINAGE ANALYSIS INFORMATION
STAGE-DISCHARGE AND STAGE STORAGE TABLE DA6

LEACHING TRENCH - SEE PLAN SECTION
3/4" - 1-1/2" WASHED STONE FOR SIZE SELECTED
TRENCH ONLY THIS DESIGN

INPUT VARIABLES:

LENGTH OF TRENCH:	32	(FT.)
WIDTH OF TRENCH:	12	(FT.)
INVERT OF STRUCTURES:	11.5	(EL. ABOVE DATUM)
STONE VOID RATIO, E:	0.31	(FT3/FT3)
TOWN LEACH RATE:	0.7	(GPM/SF)

CALCULATED VALUES:

TOP OF PRECAST STRUCTURES ELEV.:	13.50	BOTTOM CATCH BASINS	6.83
		BOTTOM FIELD EL.	9.50

ELEVATION (FT)	STORAGE (CU.FT.)	DISCHARGE (CFS)
9.50	0.0	0.46
10.50	119.0	0.60
11.50	238.1	0.80
12.50	357.1	0.90
13.50	476.2	1.00

7/31/2019

HYDRO-CAD DRAINAGE ANALYSIS INFORMATION
STAGE-DISCHARGE AND STAGE STORAGE TABLE DA7

LEACHING TRENCH - SEE PLAN SECTION
3/4" - 1-1/2" WASHED STONE FOR SIZE SELECTED
TRENCH ONLY THIS DESIGN

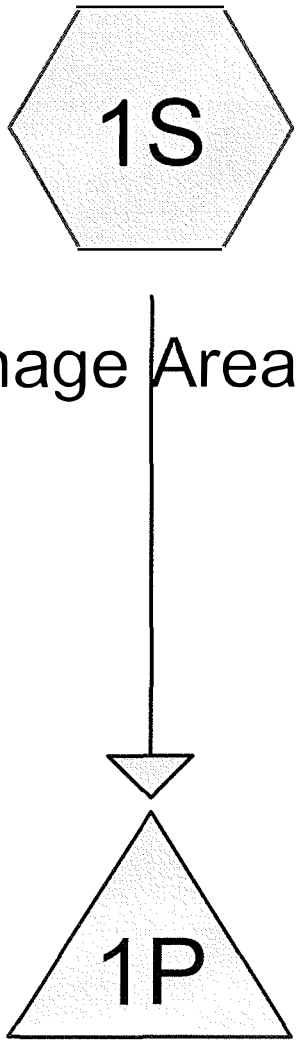
INPUT VARIABLES:

LENGTH OF TRENCH:	85	(FT.)
WIDTH OF TRENCH:	12	(FT.)
INVERT OF STRUCTURES:	10	(EL. ABOVE DATUM)
STONE VOID RATIO, E:	0.31	(FT3/FT3)
TOWN LEACH RATE:	0.7	(GPM/SF)

CALCULATED VALUES:

TOP OF PRECAST STRUCTURES ELEV.:	12.00	BOTTOM CATCH BASINS	5.33
		BOTTOM TRENCH EL.	8.00

ELEVATION (FT)	STORAGE (CU.FT.)	DISCHARGE (CFS)
8.00	0.0	1.59
9.00	316.2	1.86
10.00	632.4	2.12
11.00	948.6	2.39
12.00	1264.8	2.65



Infiltration Storage Model

Subcat Reach Pond Link

Drainage Diagram for 17-005 CCH Project 2022 DA1
Prepared by down cape engineering, inc. 7/31/2019
HydroCAD® 8.00 s/n 004007 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.129	32	Woods/grass comb., Good, HSG A (1S)
1.814	98	Paved parking (1S)
1.943		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA1 Runoff Area=84,624 sf Runoff Depth>4.75"
Tc=5.0 min CN=94 Runoff=10.84 cfs 0.769 af

Pond 1P: Infiltration Storage Model Peak Elev=11.51' Storage=377 cf Inflow=10.84 cfs 0.769 af
Outflow=9.24 cfs 0.768 af

Total Runoff Area = 1.943 ac Runoff Volume = 0.769 af Average Runoff Depth = 4.75"
6.62% Pervious Area = 0.129 ac 93.38% Impervious Area = 1.814 ac

Subcatchment 1S: Drainage Area DA1

Time of Concentration

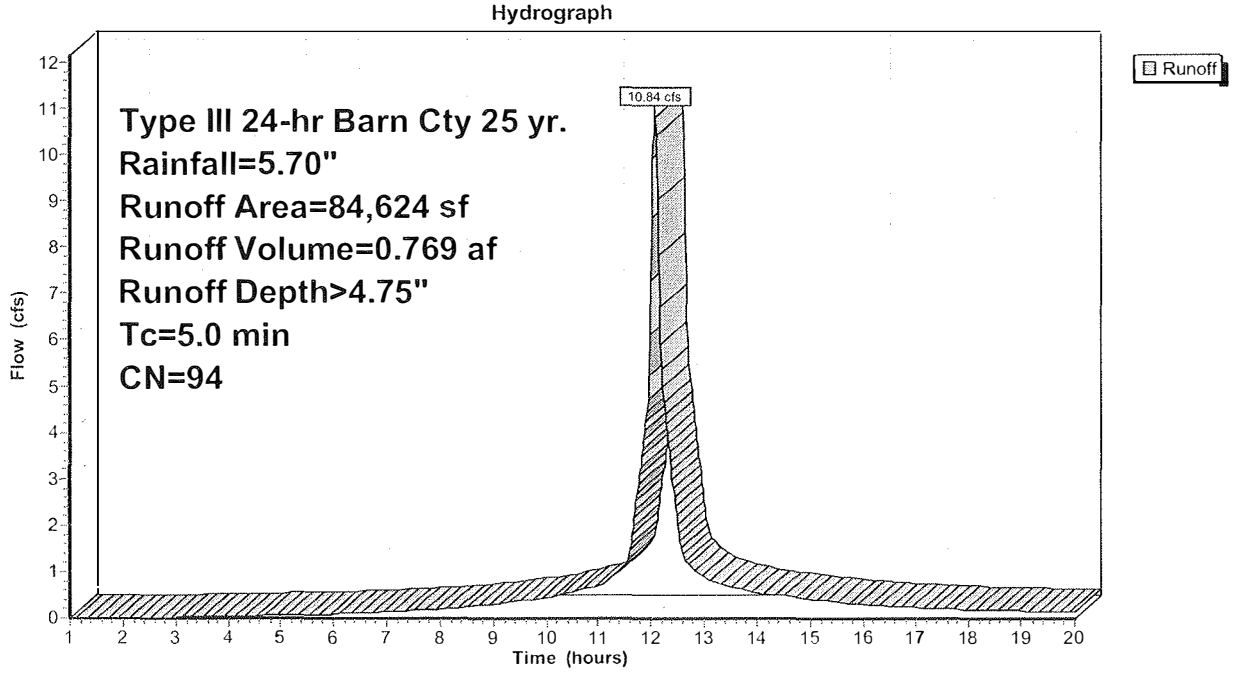
Runoff = 10.84 cfs @ 12.07 hrs, Volume= 0.769 af, Depth> 4.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 25 yr. Rainfall=5.70"

Area (sf)	CN	Description
79,024	98	Paved parking
5,600	32	Woods/grass comb., Good, HSG A
84,624	94	Weighted Average
5,600		Pervious Area
79,024		Impervious Area

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

Subcatchment 1S: Drainage Area DA1



Hydrograph for Subcatchment 1S: Drainage Area DA1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.06	0.00	0.00
1.20	0.07	0.00	0.00
1.40	0.08	0.00	0.00
1.60	0.09	0.00	0.00
1.80	0.10	0.00	0.00
2.00	0.11	0.00	0.00
2.20	0.13	0.00	0.00
2.40	0.14	0.00	0.00
2.60	0.15	0.00	0.01
2.80	0.16	0.00	0.01
3.00	0.18	0.00	0.02
3.20	0.19	0.01	0.02
3.40	0.20	0.01	0.02
3.60	0.22	0.01	0.03
3.80	0.23	0.01	0.03
4.00	0.25	0.02	0.04
4.20	0.26	0.02	0.04
4.40	0.28	0.03	0.05
4.60	0.29	0.03	0.05
4.80	0.31	0.04	0.06
5.00	0.32	0.05	0.07
5.20	0.34	0.05	0.07
5.40	0.36	0.06	0.08
5.60	0.37	0.07	0.08
5.80	0.39	0.08	0.09
6.00	0.41	0.09	0.09
6.20	0.43	0.10	0.10
6.40	0.45	0.11	0.11
6.60	0.47	0.12	0.12
6.80	0.49	0.13	0.13
7.00	0.52	0.15	0.14
7.20	0.54	0.16	0.15
7.40	0.57	0.18	0.16
7.60	0.59	0.20	0.17
7.80	0.62	0.21	0.19
8.00	0.65	0.23	0.20
8.20	0.68	0.26	0.22
8.40	0.71	0.28	0.24
8.60	0.75	0.31	0.26
8.80	0.79	0.34	0.29
9.00	0.83	0.37	0.31
9.20	0.87	0.40	0.34
9.40	0.92	0.44	0.37
9.60	0.97	0.48	0.39
9.80	1.02	0.52	0.42
10.00	1.08	0.57	0.45
10.20	1.14	0.62	0.49
10.40	1.20	0.67	0.54
10.60	1.27	0.73	0.60
10.80	1.34	0.80	0.65
11.00	1.42	0.87	0.71
11.20	1.52	0.95	0.84
11.40	1.63	1.06	1.04
11.60	1.79	1.20	1.48
11.80	2.13	1.52	3.29
12.00	2.85	2.21	**7.30**
12.20	3.57	2.91	**5.36**
12.40	3.91	3.23	3.00
12.60	4.07	3.39	1.34
12.80	4.18	3.50	1.08
13.00	4.27	3.59	0.88
13.20	4.36	3.67	0.77
13.40	4.43	3.75	0.72
13.60	4.50	3.82	0.66
13.80	4.56	3.88	0.61
14.00	4.62	3.94	0.56
14.20	4.68	3.99	0.52
14.40	4.73	4.04	0.50
14.60	4.78	4.09	0.47
14.80	4.83	4.14	0.45
15.00	4.87	4.18	0.42
15.20	4.91	4.22	0.40
15.40	4.95	4.26	0.37
15.60	4.99	4.29	0.35
15.80	5.02	4.33	0.32
16.00	5.05	4.36	0.30
16.20	5.08	4.39	0.28
16.40	5.11	4.41	0.27
16.60	5.13	4.44	0.26
16.80	5.16	4.47	0.25
17.00	5.18	4.49	0.24
17.20	5.21	4.51	0.22
17.40	5.23	4.53	0.21
17.60	5.25	4.56	0.20
17.80	5.27	4.58	0.19
18.00	5.29	4.59	0.18
18.20	5.31	4.61	0.17
18.40	5.33	4.63	0.17
18.60	5.34	4.65	0.17
18.80	5.36	4.66	0.16
19.00	5.38	4.68	0.16
19.20	5.39	4.70	0.16
19.40	5.41	4.71	0.15
19.60	5.42	4.73	0.15
19.80	5.44	4.74	0.15
20.00	**5.45**	**4.76**	0.14

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 1.943 ac, Inflow Depth > 4.75" for Barn Cty 25 yr. event
Inflow = 10.84 cfs @ 12.07 hrs, Volume= 0.769 af
Outflow = 9.24 cfs @ 12.12 hrs, Volume= 0.768 af, Atten= 15%, Lag= 2.7 min
Primary = 9.24 cfs @ 12.12 hrs, Volume= 0.768 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 11.51' @ 12.12 hrs Surf.Area= 0 sf Storage= 377 cf

Plug-Flow detention time=1.2 min calculated for 0.767 af (100% of inflow)
Center-of-Mass det. time=0.2 min (740.7 - 740.6)

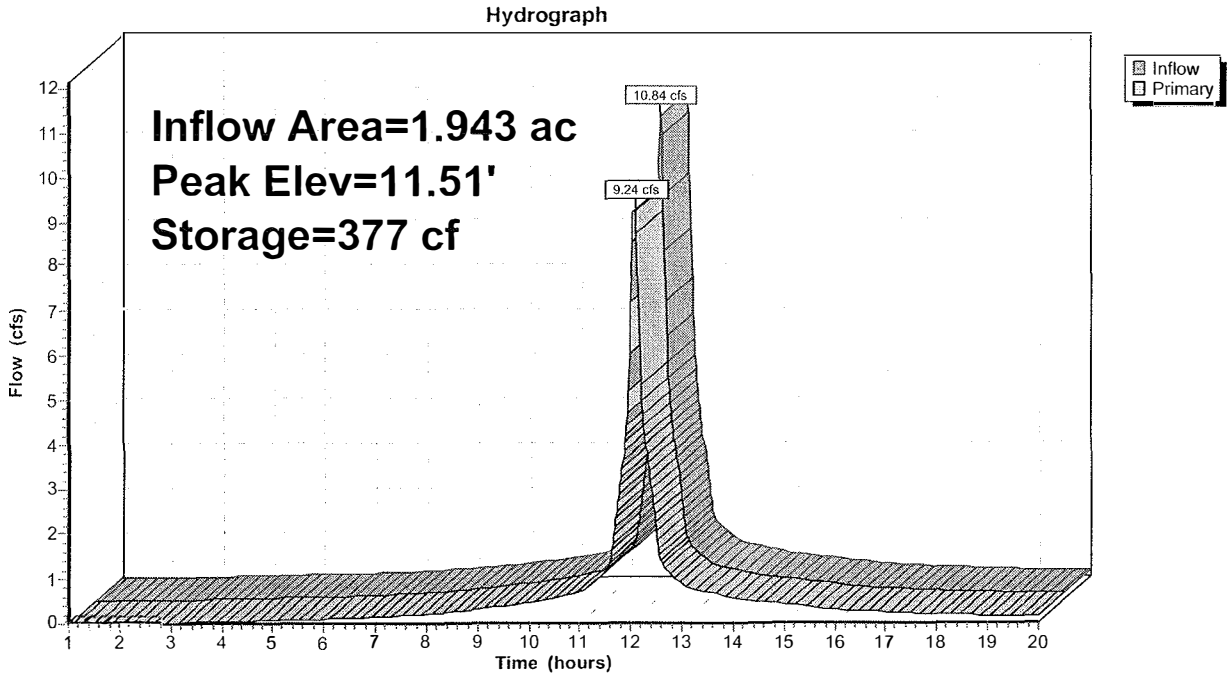
Volume	Invert	Avail.Storage	Storage Description
#1	11.30'	5,468 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
11.30	0
12.30	1,823
13.30	3,645
14.30	5,468

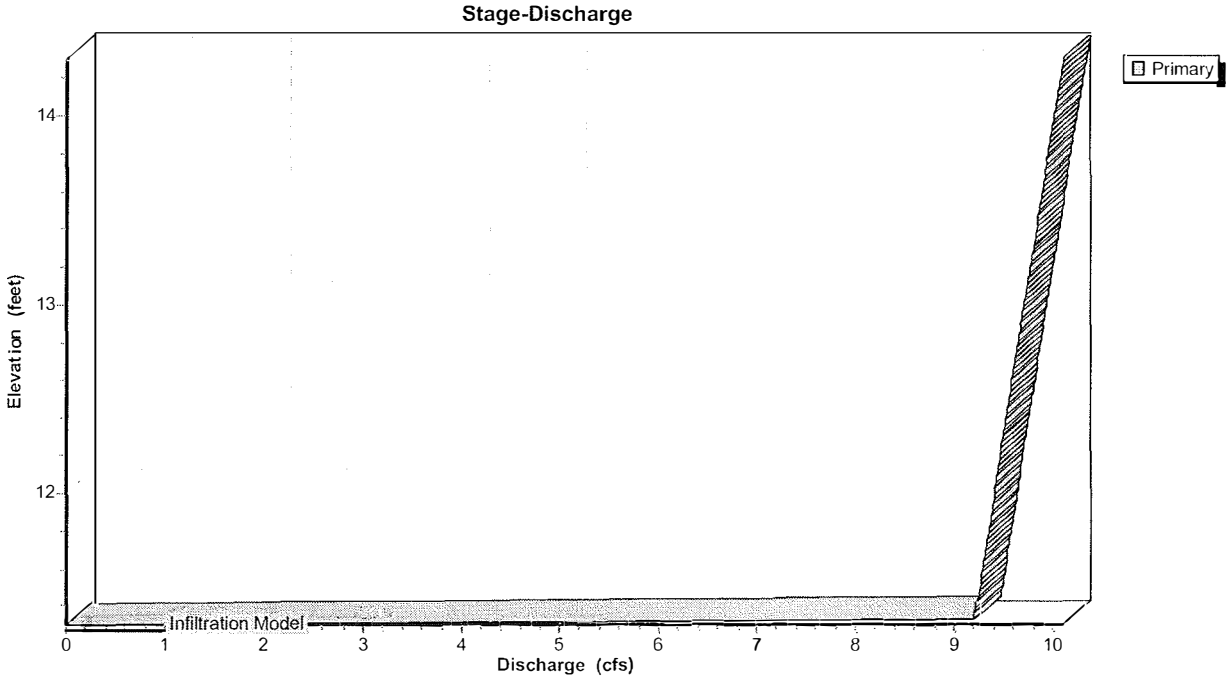
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model**
			Elev. (feet) 11.20 11.30 12.30 13.30 14.30
			Disch. (cfs) 0.000 9.180 9.480 9.790 10.100

Primary OutFlow Max=9.24 cfs @ 12.12 hrs HW=11.50' (Free Discharge)
↑—**1=Infiltration Model** (Custom Controls 9.24 cfs)

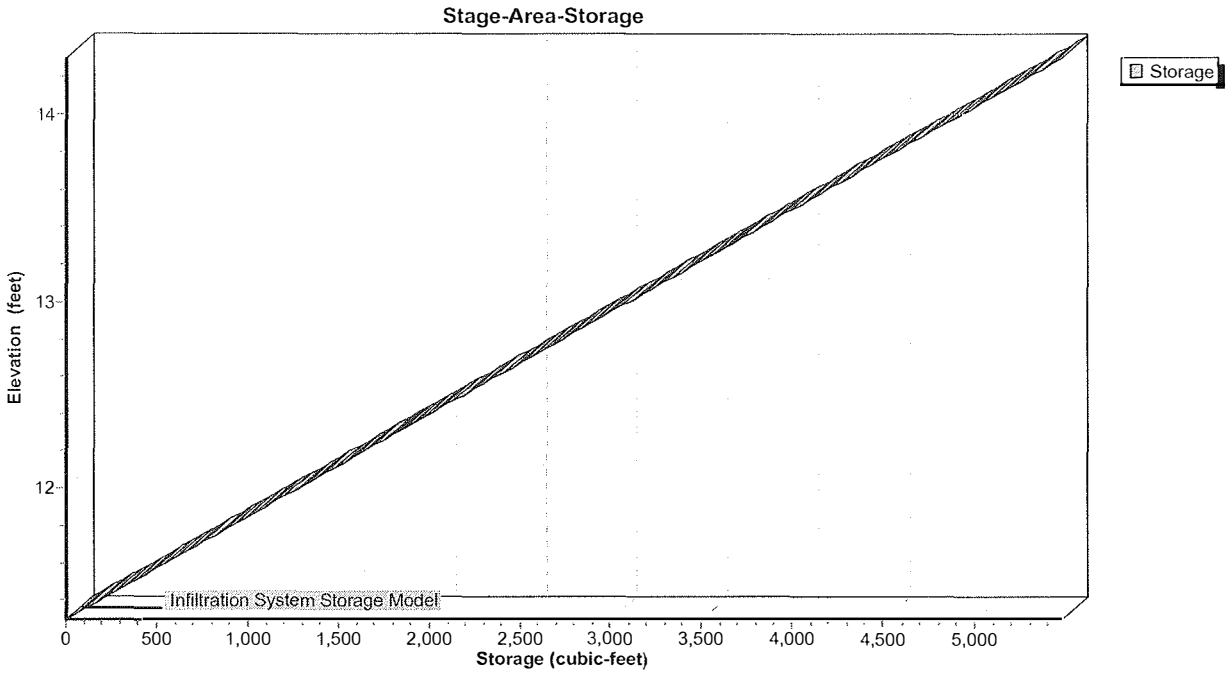
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

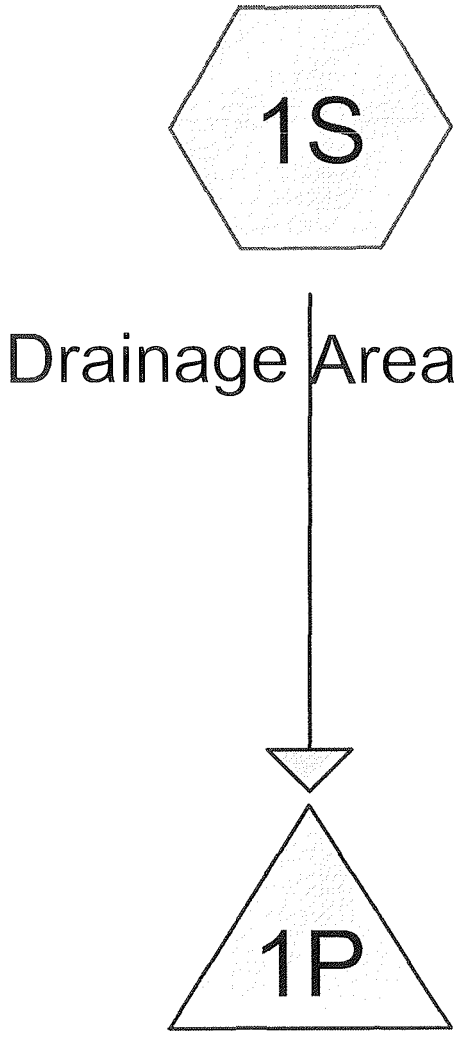
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	11.30	0.00
1.20	0.00	0	11.30	0.00
1.40	0.00	0	11.30	0.00
1.60	0.00	0	11.30	0.00
1.80	0.00	0	11.30	0.00
2.00	0.00	0	11.30	0.00
2.20	0.00	0	11.30	0.00
2.40	0.00	0	11.30	0.00
2.60	0.01	0	11.30	0.01
2.80	0.01	0	11.30	0.01
3.00	0.02	0	11.30	0.02
3.20	0.02	0	11.30	0.02
3.40	0.02	0	11.30	0.02
3.60	0.03	0	11.30	0.03
3.80	0.03	0	11.30	0.03
4.00	0.04	0	11.30	0.04
4.20	0.04	0	11.30	0.04
4.40	0.05	0	11.30	0.05
4.60	0.05	0	11.30	0.05
4.80	0.06	0	11.30	0.06
5.00	0.07	0	11.30	0.07
5.20	0.07	0	11.30	0.07
5.40	0.08	0	11.30	0.08
5.60	0.08	0	11.30	0.08
5.80	0.09	1	11.30	0.09
6.00	0.09	1	11.30	0.09
6.20	0.10	1	11.30	0.10
6.40	0.11	1	11.30	0.11
6.60	0.12	1	11.30	0.12
6.80	0.13	1	11.30	0.13
7.00	0.14	1	11.30	0.14
7.20	0.15	1	11.30	0.15
7.40	0.16	1	11.30	0.16
7.60	0.17	1	11.30	0.17
7.80	0.19	1	11.30	0.19
8.00	0.20	1	11.30	0.20
8.20	0.22	1	11.30	0.22
8.40	0.24	1	11.30	0.24
8.60	0.26	2	11.30	0.26
8.80	0.29	2	11.30	0.29
9.00	0.31	2	11.30	0.31
9.20	0.34	2	11.30	0.34
9.40	0.37	2	11.30	0.37
9.60	0.39	2	11.30	0.39
9.80	0.42	3	11.30	0.42
10.00	0.45	3	11.30	0.45
10.20	0.49	3	11.30	0.49
10.40	0.54	3	11.30	0.54
10.60	0.60	4	11.30	0.60
10.80	0.65	4	11.30	0.65
11.00	0.71	4	11.30	0.70
11.20	0.84	5	11.30	0.84
11.40	1.04	6	11.30	1.04
11.60	1.48	9	11.30	1.47
11.80	3.29	19	11.31	3.27
12.00	**7.30**	**43**	**11.32**	**7.22**
12.20	**5.36**	**32**	**11.32**	**5.35**
12.40	3.00	18	11.31	3.02
12.60	1.34	8	11.30	1.35
12.80	1.08	6	11.30	1.08
13.00	0.88	5	11.30	0.88
13.20	0.77	5	11.30	0.77
13.40	0.72	4	11.30	0.72
13.60	0.66	4	11.30	0.66
13.80	0.61	4	11.30	0.61
14.00	0.56	3	11.30	0.56
14.20	0.52	3	11.30	0.52
14.40	0.50	3	11.30	0.50
14.60	0.47	3	11.30	0.47
14.80	0.45	3	11.30	0.45
15.00	0.42	3	11.30	0.42
15.20	0.40	2	11.30	0.40
15.40	0.37	2	11.30	0.37
15.60	0.35	2	11.30	0.35
15.80	0.32	2	11.30	0.32
16.00	0.30	2	11.30	0.30
16.20	0.28	2	11.30	0.28
16.40	0.27	2	11.30	0.27
16.60	0.26	2	11.30	0.26
16.80	0.25	1	11.30	0.25
17.00	0.24	1	11.30	0.24
17.20	0.22	1	11.30	0.22
17.40	0.21	1	11.30	0.21
17.60	0.20	1	11.30	0.20
17.80	0.19	1	11.30	0.19
18.00	0.18	1	11.30	0.18
18.20	0.17	1	11.30	0.17
18.40	0.17	1	11.30	0.17
18.60	0.17	1	11.30	0.17
18.80	0.16	1	11.30	0.16
19.00	0.16	1	11.30	0.16
19.20	0.16	1	11.30	0.16
19.40	0.15	1	11.30	0.15
19.60	0.15	1	11.30	0.15
19.80	0.15	1	11.30	0.15
20.00	0.14	1	11.30	0.14

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
11.30	0.00	12.38	9.50	13.46	9.84
11.32	9.19	12.40	9.51	13.48	9.85
11.34	9.19	12.42	9.52	13.50	9.85
11.36	9.20	12.44	9.52	13.52	9.86
11.38	9.20	12.46	9.53	13.54	9.86
11.40	9.21	12.48	9.54	13.56	9.87
11.42	9.22	12.50	9.54	13.58	9.88
11.44	9.22	12.52	9.55	13.60	9.88
11.46	9.23	12.54	9.55	13.62	9.89
11.48	9.23	12.56	9.56	13.64	9.90
11.50	9.24	12.58	9.57	13.66	9.90
11.52	9.25	12.60	9.57	13.68	9.91
11.54	9.25	12.62	9.58	13.70	9.91
11.56	9.26	12.64	9.59	13.72	9.92
11.58	9.26	12.66	9.59	13.74	9.93
11.60	9.27	12.68	9.60	13.76	9.93
11.62	9.28	12.70	9.60	13.78	9.94
11.64	9.28	12.72	9.61	13.80	9.95
11.66	9.29	12.74	9.62	13.82	9.95
11.68	9.29	12.76	9.62	13.84	9.96
11.70	9.30	12.78	9.63	13.86	9.96
11.72	9.31	12.80	9.64	13.88	9.97
11.74	9.31	12.82	9.64	13.90	9.98
11.76	9.32	12.84	9.65	13.92	9.98
11.78	9.32	12.86	9.65	13.94	9.99
11.80	9.33	12.88	9.66	13.96	9.99
11.82	9.34	12.90	9.67	13.98	10.00
11.84	9.34	12.92	9.67	14.00	10.01
11.86	9.35	12.94	9.68	14.02	10.01
11.88	9.35	12.96	9.68	14.04	10.02
11.90	9.36	12.98	9.69	14.06	10.03
11.92	9.37	13.00	9.70	14.08	10.03
11.94	9.37	13.02	9.70	14.10	10.04
11.96	9.38	13.04	9.71	14.12	10.04
11.98	9.38	13.06	9.72	14.14	10.05
12.00	9.39	13.08	9.72	14.16	10.06
12.02	9.40	13.10	9.73	14.18	10.06
12.04	9.40	13.12	9.73	14.20	10.07
12.06	9.41	13.14	9.74	14.22	10.08
12.08	9.41	13.16	9.75	14.24	10.08
12.10	9.42	13.18	9.75	14.26	10.09
12.12	9.43	13.20	9.76	14.28	10.09
12.14	9.43	13.22	9.77	14.30	**10.10**
12.16	9.44	13.24	9.77		
12.18	9.44	13.26	9.78		
12.20	9.45	13.28	9.78		
12.22	9.46	13.30	9.79		
12.24	9.46	13.32	9.80		
12.26	9.47	13.34	9.80		
12.28	9.47	13.36	9.81		
12.30	9.48	13.38	9.81		
12.32	9.49	13.40	9.82		
12.34	9.49	13.42	9.83		
12.36	9.50	13.44	9.83		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
11.30	0	12.38	1,969	13.46	3,937
11.32	36	12.40	2,005	13.48	3,973
11.34	73	12.42	2,042	13.50	4,010
11.36	109	12.44	2,078	13.52	4,046
11.38	146	12.46	2,115	13.54	4,083
11.40	182	12.48	2,151	13.56	4,119
11.42	219	12.50	2,187	13.58	4,155
11.44	255	12.52	2,224	13.60	4,192
11.46	292	12.54	2,260	13.62	4,228
11.48	328	12.56	2,297	13.64	4,265
11.50	365	12.58	2,333	13.66	4,301
11.52	401	12.60	2,370	13.68	4,338
11.54	438	12.62	2,406	13.70	4,374
11.56	474	12.64	2,442	13.72	4,411
11.58	510	12.66	2,479	13.74	4,447
11.60	547	12.68	2,515	13.76	4,484
11.62	583	12.70	2,552	13.78	4,520
11.64	620	12.72	2,588	13.80	4,557
11.66	656	12.74	2,625	13.82	4,593
11.68	693	12.76	2,661	13.84	4,629
11.70	729	12.78	2,698	13.86	4,666
11.72	766	12.80	2,734	13.88	4,702
11.74	802	12.82	2,770	13.90	4,739
11.76	839	12.84	2,807	13.92	4,775
11.78	875	12.86	2,843	13.94	4,812
11.80	912	12.88	2,880	13.96	4,848
11.82	948	12.90	2,916	13.98	4,885
11.84	984	12.92	2,953	14.00	4,921
11.86	1,021	12.94	2,989	14.02	4,958
11.88	1,057	12.96	3,026	14.04	4,994
11.90	1,094	12.98	3,062	14.06	5,030
11.92	1,130	13.00	3,098	14.08	5,067
11.94	1,167	13.02	3,135	14.10	5,103
11.96	1,203	13.04	3,171	14.12	5,140
11.98	1,240	13.06	3,208	14.14	5,176
12.00	1,276	13.08	3,244	14.16	5,213
12.02	1,313	13.10	3,281	14.18	5,249
12.04	1,349	13.12	3,317	14.20	5,286
12.06	1,385	13.14	3,353	14.22	5,322
12.08	1,422	13.16	3,390	14.24	5,359
12.10	1,458	13.18	3,426	14.26	5,395
12.12	1,495	13.20	3,463	14.28	5,432
12.14	1,531	13.22	3,499	14.30	**5,468**
12.16	1,568	13.24	3,536		
12.18	1,604	13.26	3,572		
12.20	1,641	13.28	3,609		
12.22	1,677	13.30	3,645		
12.24	1,714	13.32	3,681		
12.26	1,750	13.34	3,718		
12.28	1,787	13.36	3,754		
12.30	1,823	13.38	3,791		
12.32	1,859	13.40	3,827		
12.34	1,896	13.42	3,864		
12.36	1,932	13.44	3,900		



Infiltration Storage Model

Subcat Reach Pond Link

Drainage Diagram for 17-005 CCH Project 2022 DA1
Prepared by down cape engineering, inc. 7/31/2019
HydroCAD® 8.00 s/n 004007 ● 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.129	32	Woods/grass comb., Good, HSG A (1S)
1.814	98	Paved parking (1S)
1.943		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA1 Runoff Area=84,624 sf Runoff Depth>6.74"
Tc=5.0 min CN=94 Runoff=15.07 cfs 1 092 af

Pond 1P: Infiltration Storage Model Peak Elev=12.45' Storage=2,097 cf Inflow=15.07 cfs 1.092 af
Outflow=9.53 cfs 1.087 af

Total Runoff Area = 1.943 ac Runoff Volume = 1.092 af Average Runoff Depth = 6.74"
6.62% Pervious Area = 0.129 ac 93.38% Impervious Area = 1.814 ac

Subcatchment 1S: Drainage Area DA1

Time of Concentration

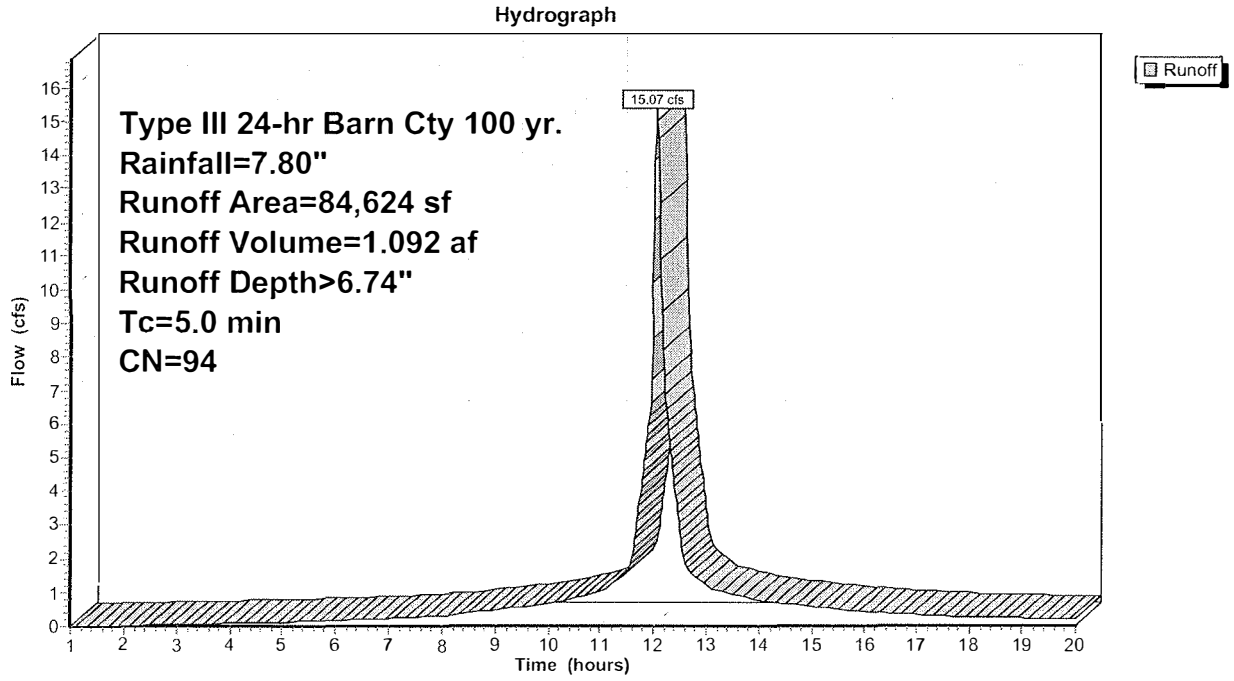
Runoff = 15.07 cfs @ 12.07 hrs, Volume= 1.092 af, Depth> 6.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 100 yr. Rainfall=7.80"

Area (sf)	CN	Description
79,024	98	Paved parking
5,600	32	Woods/grass comb., Good, HSG A
84,624	94	Weighted Average
5,600		Pervious Area
79,024		Impervious Area

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

Subcatchment 1S: Drainage Area DA1



Hydrograph for Subcatchment 1S: Drainage Area DA1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	11.80	2.91	2.26	4.62
1.20	0.09	0.00	0.00	12.00	3.90	3.23	**10.19**
1.40	0.11	0.00	0.00	12.20	4.89	4.20	**7.42**
1.60	0.12	0.00	0.00	12.40	5.35	4.65	4.15
1.80	0.14	0.00	0.00	12.60	5.56	4.87	1.85
2.00	0.16	0.00	0.01	12.80	5.72	5.02	1.49
2.20	0.17	0.00	0.02	13.00	5.85	5.15	1.21
2.40	0.19	0.01	0.02	13.20	5.96	5.26	1.06
2.60	0.20	0.01	0.03	13.40	6.06	5.36	0.99
2.80	0.22	0.01	0.04	13.60	6.16	5.45	0.92
3.00	0.24	0.02	0.05	13.80	6.25	5.54	0.84
3.20	0.26	0.02	0.05	14.00	6.33	5.62	0.77
3.40	0.28	0.03	0.06	14.20	6.40	5.69	0.72
3.60	0.30	0.04	0.07	14.40	6.47	5.76	0.69
3.80	0.32	0.04	0.08	14.60	6.54	5.83	0.65
4.00	0.34	0.05	0.08	14.80	6.60	5.89	0.62
4.20	0.36	0.06	0.09	15.00	6.66	5.95	0.58
4.40	0.38	0.07	0.10	15.20	6.72	6.01	0.55
4.60	0.40	0.08	0.10	15.40	6.77	6.06	0.51
4.80	0.42	0.09	0.11	15.60	6.82	6.11	0.48
5.00	0.44	0.10	0.12	15.80	6.87	6.16	0.44
5.20	0.47	0.12	0.13	16.00	6.91	6.20	0.41
5.40	0.49	0.13	0.13	16.20	6.95	6.24	0.39
5.60	0.51	0.14	0.14	16.40	6.99	6.28	0.37
5.80	0.54	0.16	0.15	16.60	7.03	6.31	0.35
6.00	0.56	0.18	0.16	16.80	7.06	6.35	0.34
6.20	0.59	0.19	0.17	17.00	7.09	6.38	0.32
6.40	0.61	0.21	0.18	17.20	7.13	6.41	0.31
6.60	0.64	0.23	0.20	17.40	7.16	6.44	0.29
6.80	0.67	0.25	0.21	17.60	7.19	6.47	0.28
7.00	0.71	0.27	0.23	17.80	7.21	6.50	0.26
7.20	0.74	0.30	0.24	18.00	7.24	6.53	0.25
7.40	0.77	0.33	0.26	18.20	7.26	6.55	0.24
7.60	0.81	0.35	0.27	18.40	7.29	6.57	0.24
7.80	0.85	0.38	0.29	18.60	7.31	6.60	0.23
8.00	0.89	0.41	0.31	18.80	7.33	6.62	0.23
8.20	0.93	0.45	0.33	19.00	7.36	6.64	0.22
8.40	0.98	0.49	0.37	19.20	7.38	6.67	0.22
8.60	1.03	0.53	0.40	19.40	7.40	6.69	0.21
8.80	1.08	0.57	0.44	19.60	7.42	6.71	0.21
9.00	1.14	0.62	0.47	19.80	7.44	6.73	0.20
9.20	1.20	0.67	0.51	20.00	**7.46**	**6.75**	0.20
9.40	1.26	0.73	0.55				
9.60	1.33	0.78	0.58				
9.80	1.40	0.85	0.62				
10.00	1.47	0.91	0.66				
10.20	1.55	0.99	0.72				
10.40	1.64	1.07	0.79				
10.60	1.74	1.15	0.86				
10.80	1.84	1.25	0.94				
11.00	1.95	1.35	1.01				
11.20	2.08	1.47	1.21				
11.40	2.24	1.62	1.48				
11.60	2.45	1.82	2.10				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 1.943 ac, Inflow Depth > 6.74" for Barn Cty 100 yr. event
Inflow = 15.07 cfs @ 12.07 hrs, Volume= 1.092 af
Outflow = 9.53 cfs @ 12.16 hrs, Volume= 1.087 af, Atten= 37%, Lag= 5.3 min
Primary = 9.53 cfs @ 12.16 hrs, Volume= 1.087 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 12.45' @ 12.16 hrs Surf.Area= 0 sf Storage= 2,097 cf

Plug-Flow detention time=2.4 min calculated for 1.086 af (99% of inflow)
Center-of-Mass det. time=0.6 min (733.7 - 733.1)

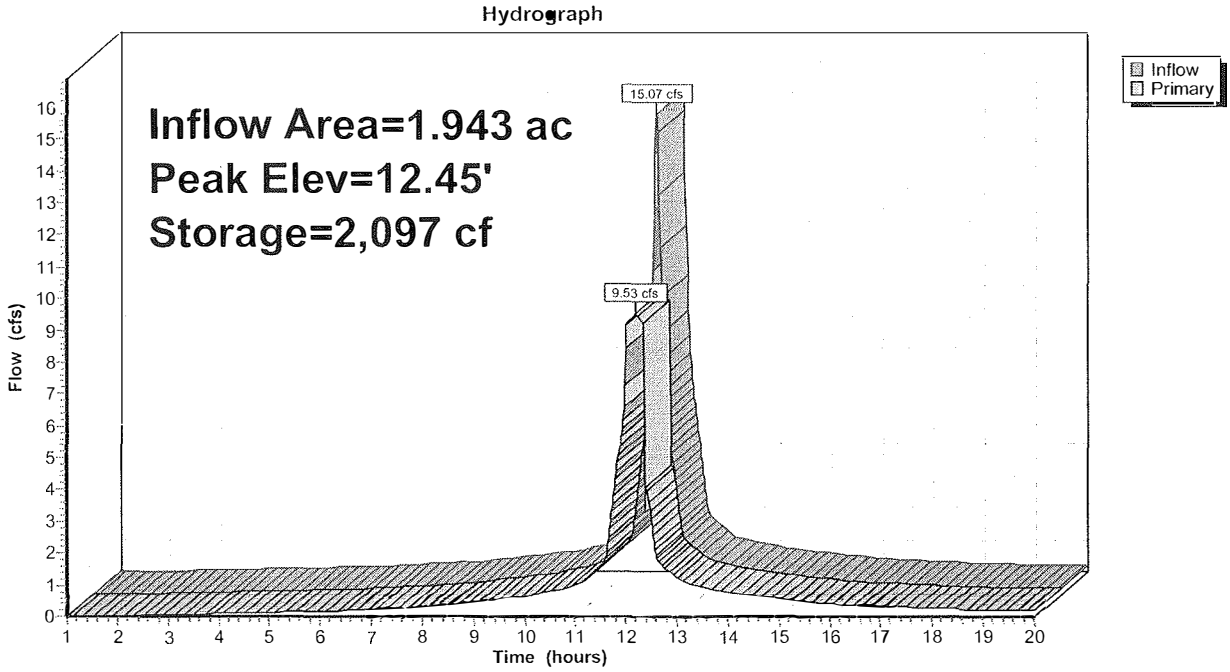
Volume	Invert	Avail.Storage	Storage Description
#1	11.30'	5,468 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
11.30	0
12.30	1,823
13.30	3,645
14.30	5,468

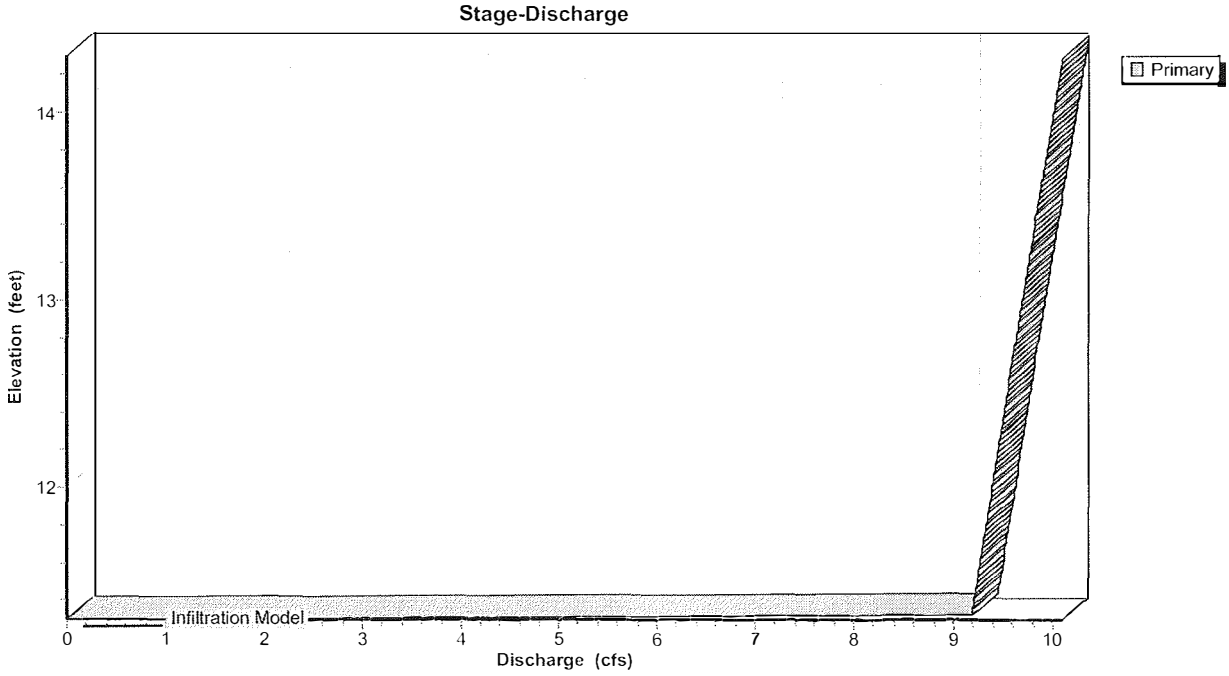
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model** Elev. (feet) 11.20 11.30 12.30 13.30 14.30 Disch. (cfs) 0.000 9.180 9.480 9.790 10.100

Primary OutFlow Max=9.53 cfs @ 12.16 hrs HW=12.45' (Free Discharge)
↑**1=Infiltration Model** (Custom Controls 9.53 cfs)

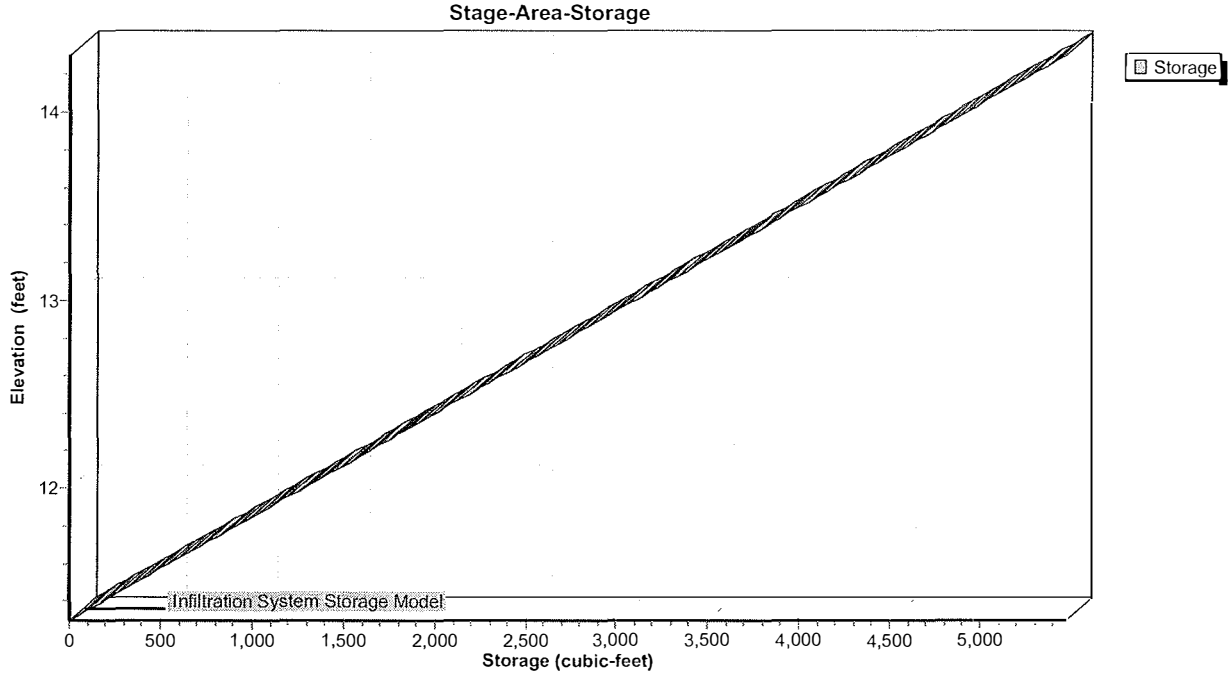
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

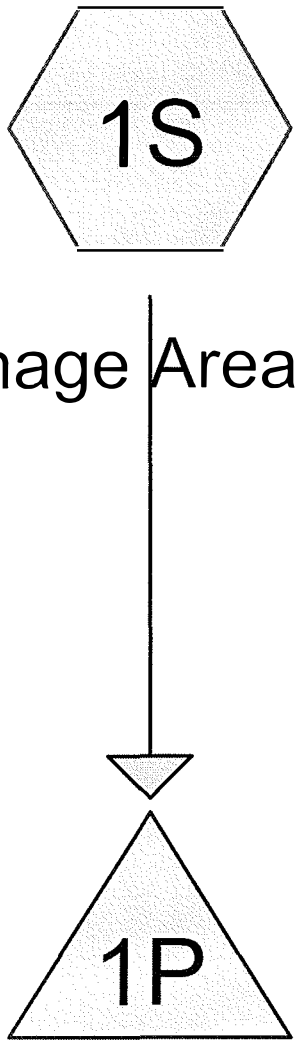
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	11.30	0.00
1.20	0.00	0	11.30	0.00
1.40	0.00	0	11.30	0.00
1.60	0.00	0	11.30	0.00
1.80	0.00	0	11.30	0.00
2.00	0.01	0	11.30	0.01
2.20	0.02	0	11.30	0.02
2.40	0.02	0	11.30	0.02
2.60	0.03	0	11.30	0.03
2.80	0.04	0	11.30	0.04
3.00	0.05	0	11.30	0.05
3.20	0.05	0	11.30	0.05
3.40	0.06	0	11.30	0.06
3.60	0.07	0	11.30	0.07
3.80	0.08	0	11.30	0.08
4.00	0.08	0	11.30	0.08
4.20	0.09	1	11.30	0.09
4.40	0.10	1	11.30	0.10
4.60	0.10	1	11.30	0.10
4.80	0.11	1	11.30	0.11
5.00	0.12	1	11.30	0.12
5.20	0.13	1	11.30	0.13
5.40	0.13	1	11.30	0.13
5.60	0.14	1	11.30	0.14
5.80	0.15	1	11.30	0.15
6.00	0.16	1	11.30	0.16
6.20	0.17	1	11.30	0.17
6.40	0.18	1	11.30	0.18
6.60	0.20	1	11.30	0.20
6.80	0.21	1	11.30	0.21
7.00	0.23	1	11.30	0.23
7.20	0.24	1	11.30	0.24
7.40	0.26	2	11.30	0.26
7.60	0.27	2	11.30	0.27
7.80	0.29	2	11.30	0.29
8.00	0.31	2	11.30	0.31
8.20	0.33	2	11.30	0.33
8.40	0.37	2	11.30	0.37
8.60	0.40	2	11.30	0.40
8.80	0.44	3	11.30	0.44
9.00	0.47	3	11.30	0.47
9.20	0.51	3	11.30	0.51
9.40	0.55	3	11.30	0.55
9.60	0.58	3	11.30	0.58
9.80	0.62	4	11.30	0.62
10.00	0.66	4	11.30	0.66
10.20	0.72	4	11.30	0.71
10.40	0.79	5	11.30	0.79
10.60	0.86	5	11.30	0.86
10.80	0.94	6	11.30	0.94
11.00	1.01	6	11.30	1.01
11.20	1.21	7	11.30	1.20
11.40	1.48	9	11.30	1.48
11.60	2.10	12	11.31	2.09
11.80	4.62	27	11.32	4.60
12.00	**10.19**	**77**	**11.34**	**9.19**
12.20	**7.42**	**1,920**	**12.35**	**9.50**
12.40	4.15	24	11.31	4.08
12.60	1.85	11	11.31	1.86
12.80	1.49	9	11.30	1.49
13.00	1.21	7	11.30	1.21
13.20	1.06	6	11.30	1.06
13.40	0.99	6	11.30	0.99
13.60	0.92	5	11.30	0.92
13.80	0.84	5	11.30	0.84
14.00	0.77	5	11.30	0.77
14.20	0.72	4	11.30	0.72
14.40	0.69	4	11.30	0.69
14.60	0.65	4	11.30	0.65
14.80	0.62	4	11.30	0.62
15.00	0.58	3	11.30	0.58
15.20	0.55	3	11.30	0.55
15.40	0.51	3	11.30	0.51
15.60	0.48	3	11.30	0.48
15.80	0.44	3	11.30	0.44
16.00	0.41	2	11.30	0.41
16.20	0.39	2	11.30	0.39
16.40	0.37	2	11.30	0.37
16.60	0.35	2	11.30	0.35
16.80	0.34	2	11.30	0.34
17.00	0.32	2	11.30	0.32
17.20	0.31	2	11.30	0.31
17.40	0.29	2	11.30	0.29
17.60	0.28	2	11.30	0.28
17.80	0.26	2	11.30	0.26
18.00	0.25	1	11.30	0.25
18.20	0.24	1	11.30	0.24
18.40	0.24	1	11.30	0.24
18.60	0.23	1	11.30	0.23
18.80	0.23	1	11.30	0.23
19.00	0.22	1	11.30	0.22
19.20	0.22	1	11.30	0.22
19.40	0.21	1	11.30	0.21
19.60	0.21	1	11.30	0.21
19.80	0.20	1	11.30	0.20
20.00	0.20	1	11.30	0.20

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
11.30	0.00	12.38	9.50	13.46	9.84
11.32	9.19	12.40	9.51	13.48	9.85
11.34	9.19	12.42	9.52	13.50	9.85
11.36	9.20	12.44	9.52	13.52	9.86
11.38	9.20	12.46	9.53	13.54	9.86
11.40	9.21	12.48	9.54	13.56	9.87
11.42	9.22	12.50	9.54	13.58	9.88
11.44	9.22	12.52	9.55	13.60	9.88
11.46	9.23	12.54	9.55	13.62	9.89
11.48	9.23	12.56	9.56	13.64	9.90
11.50	9.24	12.58	9.57	13.66	9.90
11.52	9.25	12.60	9.57	13.68	9.91
11.54	9.25	12.62	9.58	13.70	9.91
11.56	9.26	12.64	9.59	13.72	9.92
11.58	9.26	12.66	9.59	13.74	9.93
11.60	9.27	12.68	9.60	13.76	9.93
11.62	9.28	12.70	9.60	13.78	9.94
11.64	9.28	12.72	9.61	13.80	9.95
11.66	9.29	12.74	9.62	13.82	9.95
11.68	9.29	12.76	9.62	13.84	9.96
11.70	9.30	12.78	9.63	13.86	9.96
11.72	9.31	12.80	9.64	13.88	9.97
11.74	9.31	12.82	9.64	13.90	9.98
11.76	9.32	12.84	9.65	13.92	9.98
11.78	9.32	12.86	9.65	13.94	9.99
11.80	9.33	12.88	9.66	13.96	9.99
11.82	9.34	12.90	9.67	13.98	10.00
11.84	9.34	12.92	9.67	14.00	10.01
11.86	9.35	12.94	9.68	14.02	10.01
11.88	9.35	12.96	9.68	14.04	10.02
11.90	9.36	12.98	9.69	14.06	10.03
11.92	9.37	13.00	9.70	14.08	10.03
11.94	9.37	13.02	9.70	14.10	10.04
11.96	9.38	13.04	9.71	14.12	10.04
11.98	9.38	13.06	9.72	14.14	10.05
12.00	9.39	13.08	9.72	14.16	10.06
12.02	9.40	13.10	9.73	14.18	10.06
12.04	9.40	13.12	9.73	14.20	10.07
12.06	9.41	13.14	9.74	14.22	10.08
12.08	9.41	13.16	9.75	14.24	10.08
12.10	9.42	13.18	9.75	14.26	10.09
12.12	9.43	13.20	9.76	14.28	10.09
12.14	9.43	13.22	9.77	14.30	**10.10**
12.16	9.44	13.24	9.77		
12.18	9.44	13.26	9.78		
12.20	9.45	13.28	9.78		
12.22	9.46	13.30	9.79		
12.24	9.46	13.32	9.80		
12.26	9.47	13.34	9.80		
12.28	9.47	13.36	9.81		
12.30	9.48	13.38	9.81		
12.32	9.49	13.40	9.82		
12.34	9.49	13.42	9.83		
12.36	9.50	13.44	9.83		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
11.30	0	12.38	1,969	13.46	3,937
11.32	36	12.40	2,005	13.48	3,973
11.34	73	12.42	2,042	13.50	4,010
11.36	109	12.44	2,078	13.52	4,046
11.38	146	12.46	2,115	13.54	4,083
11.40	182	12.48	2,151	13.56	4,119
11.42	219	12.50	2,187	13.58	4,155
11.44	255	12.52	2,224	13.60	4,192
11.46	292	12.54	2,260	13.62	4,228
11.48	328	12.56	2,297	13.64	4,265
11.50	365	12.58	2,333	13.66	4,301
11.52	401	12.60	2,370	13.68	4,338
11.54	438	12.62	2,406	13.70	4,374
11.56	474	12.64	2,442	13.72	4,411
11.58	510	12.66	2,479	13.74	4,447
11.60	547	12.68	2,515	13.76	4,484
11.62	583	12.70	2,552	13.78	4,520
11.64	620	12.72	2,588	13.80	4,557
11.66	656	12.74	2,625	13.82	4,593
11.68	693	12.76	2,661	13.84	4,629
11.70	729	12.78	2,698	13.86	4,666
11.72	766	12.80	2,734	13.88	4,702
11.74	802	12.82	2,770	13.90	4,739
11.76	839	12.84	2,807	13.92	4,775
11.78	875	12.86	2,843	13.94	4,812
11.80	912	12.88	2,880	13.96	4,848
11.82	948	12.90	2,916	13.98	4,885
11.84	984	12.92	2,953	14.00	4,921
11.86	1,021	12.94	2,989	14.02	4,958
11.88	1,057	12.96	3,026	14.04	4,994
11.90	1,094	12.98	3,062	14.06	5,030
11.92	1,130	13.00	3,098	14.08	5,067
11.94	1,167	13.02	3,135	14.10	5,103
11.96	1,203	13.04	3,171	14.12	5,140
11.98	1,240	13.06	3,208	14.14	5,176
12.00	1,276	13.08	3,244	14.16	5,213
12.02	1,313	13.10	3,281	14.18	5,249
12.04	1,349	13.12	3,317	14.20	5,286
12.06	1,385	13.14	3,353	14.22	5,322
12.08	1,422	13.16	3,390	14.24	5,359
12.10	1,458	13.18	3,426	14.26	5,395
12.12	1,495	13.20	3,463	14.28	5,432
12.14	1,531	13.22	3,499	14.30	**5,468**
12.16	1,568	13.24	3,536		
12.18	1,604	13.26	3,572		
12.20	1,641	13.28	3,609		
12.22	1,677	13.30	3,645		
12.24	1,714	13.32	3,681		
12.26	1,750	13.34	3,718		
12.28	1,787	13.36	3,754		
12.30	1,823	13.38	3,791		
12.32	1,859	13.40	3,827		
12.34	1,896	13.42	3,864		
12.36	1,932	13.44	3,900		



Infiltration Storage Model

Subcat Reach Pond Link

Drainage Diagram for 17-005 CCH Project 2022 DA3
Prepared by down cape engineering, inc. 7/31/2019
HydroCAD® 8.00 s/n 004007 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.153	32	Woods/grass comb., Good, HSG A (1S)
0.213	98	Paved parking (1S)
0.367		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA2 Runoff Area=15,986 sf Runoff Depth>4.00"
Tc=5.0 min CN=70 Runoff=1.91 cfs 0.122 af

Pond 1P: Infiltration Storage Model Peak Elev=13.03' Storage=12 cf Inflow=1.91 cfs 0.122 af
Outflow=1.88 cfs 0.122 af

Total Runoff Area = 0.367 ac Runoff Volume = 0.122 af Average Runoff Depth = 4.00"
41.82% Pervious Area = 0.153 ac 58.18% Impervious Area = 0.213 ac

Subcatchment 1S: Drainage Area DA2

Time of Concentration

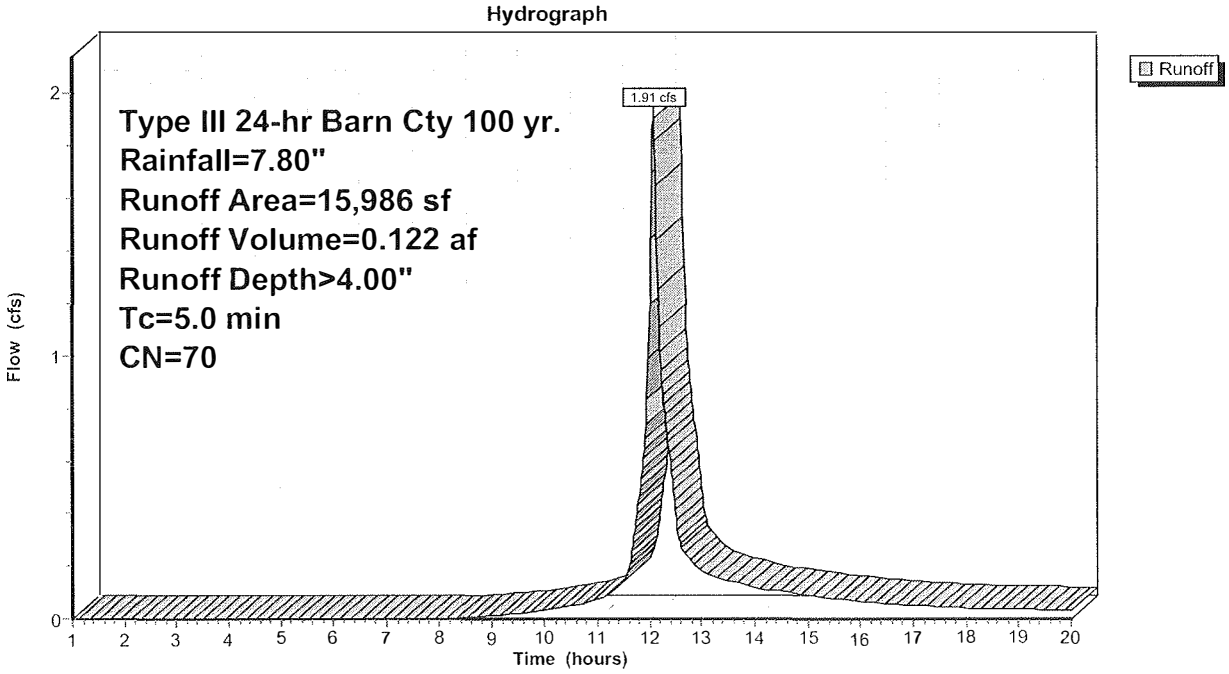
Runoff = 1.91 cfs @ 12.08 hrs, Volume= 0.122 af, Depth> 4.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 100 yr. Rainfall=7.80"

Area (sf)	CN	Description
9,300	98	Paved parking
6,686	32	Woods/grass comb., Good, HSG A
15,986	70	Weighted Average
6,686		Pervious Area
9,300		Impervious Area

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

Subcatchment 1S: Drainage Area DA2



Hydrograph for Subcatchment 1S: Drainage Area DA2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	11.80	2.91	0.67	0.47
1.20	0.09	0.00	0.00	12.00	3.90	1.26	**1.20**
1.40	0.11	0.00	0.00	12.20	4.89	1.95	**1.02**
1.60	0.12	0.00	0.00	12.40	5.35	2.30	0.60
1.80	0.14	0.00	0.00	12.60	5.56	2.46	0.27
2.00	0.16	0.00	0.00	12.80	5.72	2.59	0.22
2.20	0.17	0.00	0.00	13.00	5.85	2.69	0.18
2.40	0.19	0.00	0.00	13.20	5.96	2.77	0.16
2.60	0.20	0.00	0.00	13.40	6.06	2.86	0.15
2.80	0.22	0.00	0.00	13.60	6.16	2.93	0.14
3.00	0.24	0.00	0.00	13.80	6.25	3.00	0.13
3.20	0.26	0.00	0.00	14.00	6.33	3.07	0.12
3.40	0.28	0.00	0.00	14.20	6.40	3.13	0.11
3.60	0.30	0.00	0.00	14.40	6.47	3.18	0.11
3.80	0.32	0.00	0.00	14.60	6.54	3.24	0.10
4.00	0.34	0.00	0.00	14.80	6.60	3.29	0.10
4.20	0.36	0.00	0.00	15.00	6.66	3.34	0.09
4.40	0.38	0.00	0.00	15.20	6.72	3.39	0.09
4.60	0.40	0.00	0.00	15.40	6.77	3.43	0.08
4.80	0.42	0.00	0.00	15.60	6.82	3.47	0.07
5.00	0.44	0.00	0.00	15.80	6.87	3.51	0.07
5.20	0.47	0.00	0.00	16.00	6.91	3.54	0.06
5.40	0.49	0.00	0.00	16.20	6.95	3.58	0.06
5.60	0.51	0.00	0.00	16.40	6.99	3.61	0.06
5.80	0.54	0.00	0.00	16.60	7.03	3.64	0.06
6.00	0.56	0.00	0.00	16.80	7.06	3.67	0.05
6.20	0.59	0.00	0.00	17.00	7.09	3.70	0.05
6.40	0.61	0.00	0.00	17.20	7.13	3.72	0.05
6.60	0.64	0.00	0.00	17.40	7.16	3.75	0.05
6.80	0.67	0.00	0.00	17.60	7.19	3.77	0.04
7.00	0.71	0.00	0.00	17.80	7.21	3.80	0.04
7.20	0.74	0.00	0.00	18.00	7.24	3.82	0.04
7.40	0.77	0.00	0.00	18.20	7.26	3.84	0.04
7.60	0.81	0.00	0.00	18.40	7.29	3.86	0.04
7.80	0.85	0.00	0.00	18.60	7.31	3.88	0.04
8.00	0.89	0.00	0.00	18.80	7.33	3.90	0.04
8.20	0.93	0.00	0.00	19.00	7.36	3.92	0.04
8.40	0.98	0.00	0.00	19.20	7.38	3.94	0.03
8.60	1.03	0.01	0.01	19.40	7.40	3.95	0.03
8.80	1.08	0.01	0.01	19.60	7.42	3.97	0.03
9.00	1.14	0.02	0.01	19.80	7.44	3.99	0.03
9.20	1.20	0.02	0.01	20.00	**7.46**	**4.01**	0.03
9.40	1.26	0.03	0.02				
9.60	1.33	0.05	0.02				
9.80	1.40	0.06	0.03				
10.00	1.47	0.08	0.03				
10.20	1.55	0.10	0.04				
10.40	1.64	0.12	0.05				
10.60	1.74	0.15	0.05				
10.80	1.84	0.18	0.06				
11.00	1.95	0.22	0.07				
11.20	2.08	0.27	0.09				
11.40	2.24	0.34	0.12				
11.60	2.45	0.43	0.19				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 0.367 ac, Inflow Depth > 4.00" for Barn Cty 100 yr. event
Inflow = 1.91 cfs @ 12.08 hrs, Volume= 0.122 af
Outflow = 1.88 cfs @ 12.08 hrs, Volume= 0.122 af, Atten= 2%, Lag= 0.5 min
Primary = 1.88 cfs @ 12.08 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 13.03' @ 12.08 hrs Surf.Area= 0 sf Storage= 12 cf

Plug-Flow detention time=(not calculated: outflow precedes inflow)
Center-of-Mass det. time=0.0 min (789.5 - 789.5)

Volume	Invert	Avail.Storage	Storage Description
#1	13.00'	1,116 cf	**Infiltration System Storage Model** Listed below

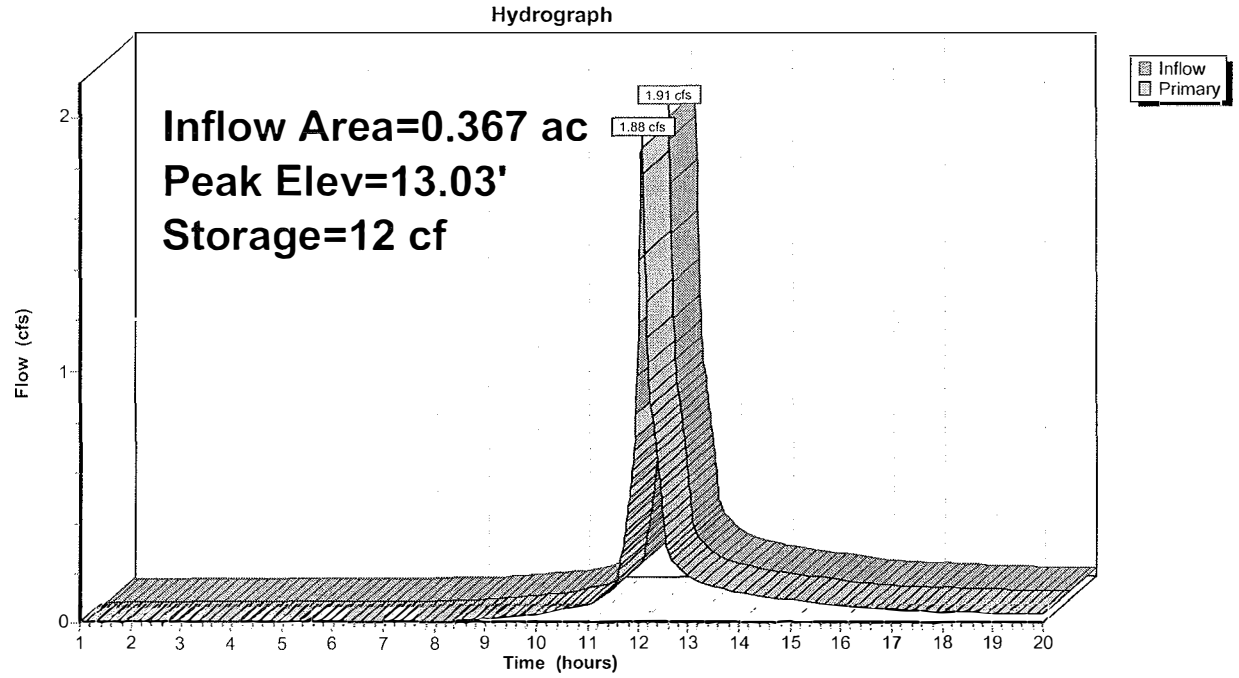
Elevation (feet)	Cum.Store (cubic-feet)
13.00	0
14.00	372
15.00	744
16.00	1,116

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model**

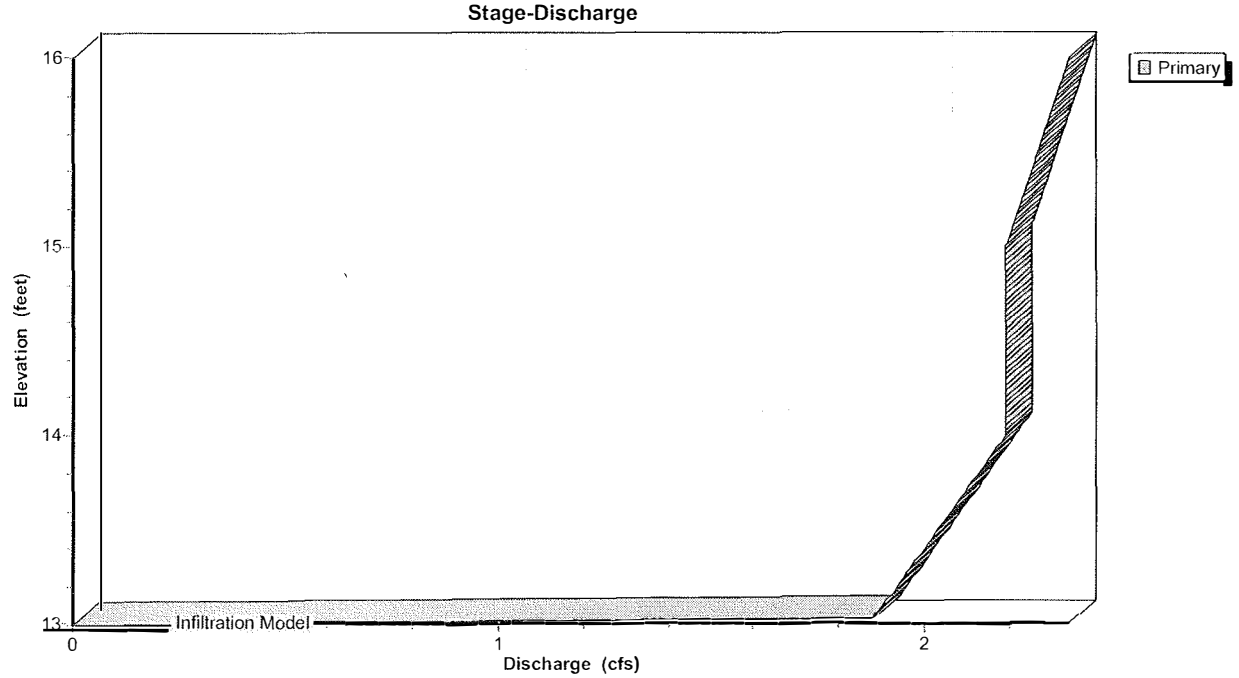
Elev. (feet) 12.90 13.00 14.00 15.00 16.00
Disch. (cfs) 0.000 1.870 2.190 2.190 2.340

Primary OutFlow Max=1.88 cfs @ 12.08 hrs HW=13.03' (Free Discharge)
↑**1=Infiltration Model** (Custom Controls 1.88 cfs)

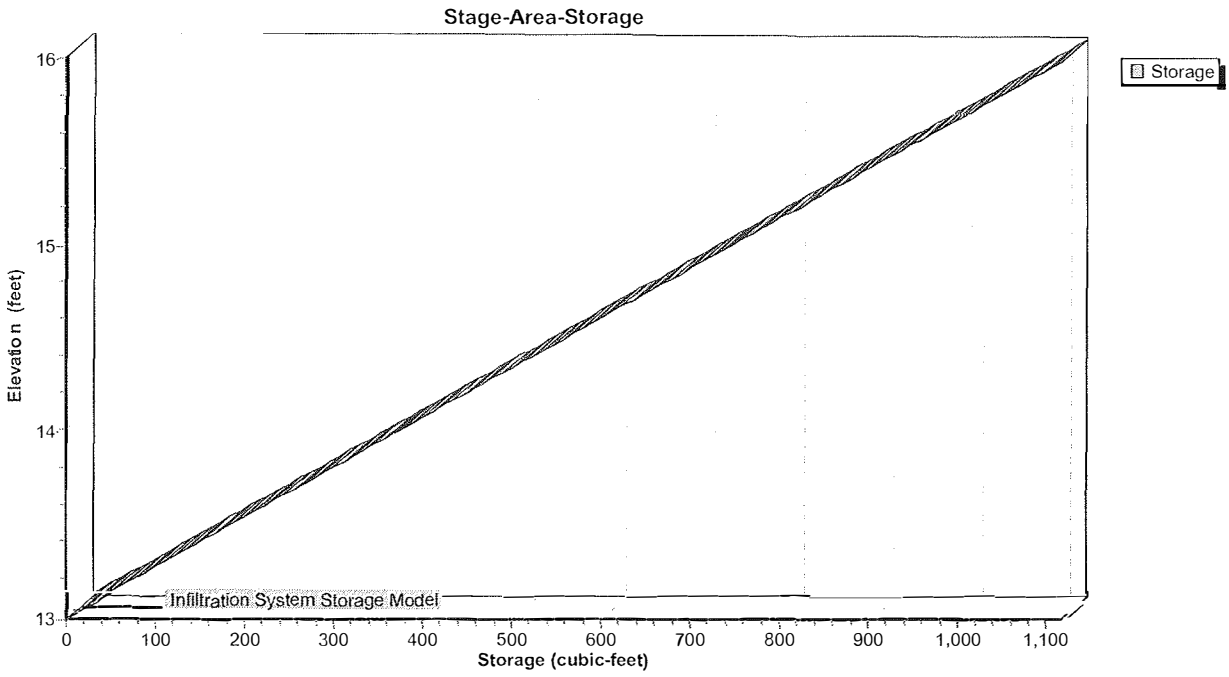
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	13.00	0.00
1.20	0.00	0	13.00	0.00
1.40	0.00	0	13.00	0.00
1.60	0.00	0	13.00	0.00
1.80	0.00	0	13.00	0.00
2.00	0.00	0	13.00	0.00
2.20	0.00	0	13.00	0.00
2.40	0.00	0	13.00	0.00
2.60	0.00	0	13.00	0.00
2.80	0.00	0	13.00	0.00
3.00	0.00	0	13.00	0.00
3.20	0.00	0	13.00	0.00
3.40	0.00	0	13.00	0.00
3.60	0.00	0	13.00	0.00
3.80	0.00	0	13.00	0.00
4.00	0.00	0	13.00	0.00
4.20	0.00	0	13.00	0.00
4.40	0.00	0	13.00	0.00
4.60	0.00	0	13.00	0.00
4.80	0.00	0	13.00	0.00
5.00	0.00	0	13.00	0.00
5.20	0.00	0	13.00	0.00
5.40	0.00	0	13.00	0.00
5.60	0.00	0	13.00	0.00
5.80	0.00	0	13.00	0.00
6.00	0.00	0	13.00	0.00
6.20	0.00	0	13.00	0.00
6.40	0.00	0	13.00	0.00
6.60	0.00	0	13.00	0.00
6.80	0.00	0	13.00	0.00
7.00	0.00	0	13.00	0.00
7.20	0.00	0	13.00	0.00
7.40	0.00	0	13.00	0.00
7.60	0.00	0	13.00	0.00
7.80	0.00	0	13.00	0.00
8.00	0.00	0	13.00	0.00
8.20	0.00	0	13.00	0.00
8.40	0.00	0	13.00	0.00
8.60	0.01	0	13.00	0.01
8.80	0.01	0	13.00	0.01
9.00	0.01	0	13.00	0.01
9.20	0.01	0	13.00	0.01
9.40	0.02	0	13.00	0.02
9.60	0.02	0	13.00	0.02
9.80	0.03	0	13.00	0.03
10.00	0.03	0	13.00	0.03
10.20	0.04	0	13.00	0.04
10.40	0.05	0	13.00	0.05
10.60	0.05	0	13.00	0.05
10.80	0.06	0	13.00	0.06
11.00	0.07	0	13.00	0.07
11.20	0.09	1	13.00	0.09
11.40	0.12	1	13.00	0.12
11.60	0.19	1	13.00	0.19
11.80	0.47	3	13.01	0.46
12.00	**1.20**	**7**	**13.02**	**1.19**
12.20	**1.02**	**6**	**13.02**	**1.02**
12.40	0.60	4	13.01	0.60
12.60	0.27	2	13.00	0.27
12.80	0.22	1	13.00	0.22
13.00	0.18	1	13.00	0.18
13.20	0.16	1	13.00	0.16
13.40	0.15	1	13.00	0.15
13.60	0.14	1	13.00	0.14
13.80	0.13	1	13.00	0.13
14.00	0.12	1	13.00	0.12
14.20	0.11	1	13.00	0.11
14.40	0.11	1	13.00	0.11
14.60	0.10	1	13.00	0.10
14.80	0.10	1	13.00	0.10
15.00	0.09	1	13.00	0.09
15.20	0.09	1	13.00	0.09
15.40	0.08	0	13.00	0.08
15.60	0.07	0	13.00	0.07
15.80	0.07	0	13.00	0.07
16.00	0.06	0	13.00	0.06
16.20	0.06	0	13.00	0.06
16.40	0.06	0	13.00	0.06
16.60	0.06	0	13.00	0.06
16.80	0.05	0	13.00	0.05
17.00	0.05	0	13.00	0.05
17.20	0.05	0	13.00	0.05
17.40	0.05	0	13.00	0.05
17.60	0.04	0	13.00	0.04
17.80	0.04	0	13.00	0.04
18.00	0.04	0	13.00	0.04
18.20	0.04	0	13.00	0.04
18.40	0.04	0	13.00	0.04
18.60	0.04	0	13.00	0.04
18.80	0.04	0	13.00	0.04
19.00	0.04	0	13.00	0.04
19.20	0.03	0	13.00	0.03
19.40	0.03	0	13.00	0.03
19.60	0.03	0	13.00	0.03
19.80	0.03	0	13.00	0.03
20.00	0.03	0	13.00	0.03

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
13.00	0.00	14.08	2.19	15.16	2.21
13.02	1.88	14.10	2.19	15.18	2.22
13.04	1.88	14.12	2.19	15.20	2.22
13.06	1.89	14.14	2.19	15.22	2.22
13.08	1.90	14.16	2.19	15.24	2.23
13.10	1.90	14.18	2.19	15.26	2.23
13.12	1.91	14.20	2.19	15.28	2.23
13.14	1.91	14.22	2.19	15.30	2.23
13.16	1.92	14.24	2.19	15.32	2.24
13.18	1.93	14.26	2.19	15.34	2.24
13.20	1.93	14.28	2.19	15.36	2.24
13.22	1.94	14.30	2.19	15.38	2.25
13.24	1.95	14.32	2.19	15.40	2.25
13.26	1.95	14.34	2.19	15.42	2.25
13.28	1.96	14.36	2.19	15.44	2.26
13.30	1.97	14.38	2.19	15.46	2.26
13.32	1.97	14.40	2.19	15.48	2.26
13.34	1.98	14.42	2.19	15.50	2.26
13.36	1.99	14.44	2.19	15.52	2.27
13.38	1.99	14.46	2.19	15.54	2.27
13.40	2.00	14.48	2.19	15.56	2.27
13.42	2.00	14.50	2.19	15.58	2.28
13.44	2.01	14.52	2.19	15.60	2.28
13.46	2.02	14.54	2.19	15.62	2.28
13.48	2.02	14.56	2.19	15.64	2.29
13.50	2.03	14.58	2.19	15.66	2.29
13.52	2.04	14.60	2.19	15.68	2.29
13.54	2.04	14.62	2.19	15.70	2.29
13.56	2.05	14.64	2.19	15.72	2.30
13.58	2.06	14.66	2.19	15.74	2.30
13.60	2.06	14.68	2.19	15.76	2.30
13.62	2.07	14.70	2.19	15.78	2.31
13.64	2.07	14.72	2.19	15.80	2.31
13.66	2.08	14.74	2.19	15.82	2.31
13.68	2.09	14.76	2.19	15.84	2.32
13.70	2.09	14.78	2.19	15.86	2.32
13.72	2.10	14.80	2.19	15.88	2.32
13.74	2.11	14.82	2.19	15.90	2.32
13.76	2.11	14.84	2.19	15.92	2.33
13.78	2.12	14.86	2.19	15.94	2.33
13.80	2.13	14.88	2.19	15.96	2.33
13.82	2.13	14.90	2.19	15.98	2.34
13.84	2.14	14.92	2.19	16.00	**2.34**
13.86	2.15	14.94	2.19		
13.88	2.15	14.96	2.19		
13.90	2.16	14.98	2.19		
13.92	2.16	15.00	2.19		
13.94	2.17	15.02	2.19		
13.96	2.18	15.04	2.20		
13.98	2.18	15.06	2.20		
14.00	2.19	15.08	2.20		
14.02	2.19	15.10	2.21		
14.04	2.19	15.12	2.21		
14.06	2.19	15.14	2.21		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
13.00	0	14.08	402	15.16	804
13.02	7	14.10	409	15.18	811
13.04	15	14.12	417	15.20	818
13.06	22	14.14	424	15.22	826
13.08	30	14.16	432	15.24	833
13.10	37	14.18	439	15.26	841
13.12	45	14.20	446	15.28	848
13.14	52	14.22	454	15.30	856
13.16	60	14.24	461	15.32	863
13.18	67	14.26	469	15.34	870
13.20	74	14.28	476	15.36	878
13.22	82	14.30	484	15.38	885
13.24	89	14.32	491	15.40	893
13.26	97	14.34	498	15.42	900
13.28	104	14.36	506	15.44	908
13.30	112	14.38	513	15.46	915
13.32	119	14.40	521	15.48	923
13.34	126	14.42	528	15.50	930
13.36	134	14.44	536	15.52	937
13.38	141	14.46	543	15.54	945
13.40	149	14.48	551	15.56	952
13.42	156	14.50	558	15.58	960
13.44	164	14.52	565	15.60	967
13.46	171	14.54	573	15.62	975
13.48	179	14.56	580	15.64	982
13.50	186	14.58	588	15.66	990
13.52	193	14.60	595	15.68	997
13.54	201	14.62	603	15.70	1,004
13.56	208	14.64	610	15.72	1,012
13.58	216	14.66	618	15.74	1,019
13.60	223	14.68	625	15.76	1,027
13.62	231	14.70	632	15.78	1,034
13.64	238	14.72	640	15.80	1,042
13.66	246	14.74	647	15.82	1,049
13.68	253	14.76	655	15.84	1,056
13.70	260	14.78	662	15.86	1,064
13.72	268	14.80	670	15.88	1,071
13.74	275	14.82	677	15.90	1,079
13.76	283	14.84	684	15.92	1,086
13.78	290	14.86	692	15.94	1,094
13.80	298	14.88	699	15.96	1,101
13.82	305	14.90	707	15.98	1,109
13.84	312	14.92	714	16.00	**1,116**
13.86	320	14.94	722		
13.88	327	14.96	729		
13.90	335	14.98	737		
13.92	342	15.00	744		
13.94	350	15.02	751		
13.96	357	15.04	759		
13.98	365	15.06	766		
14.00	372	15.08	774		
14.02	379	15.10	781		
14 04	387	15.12	789		
14.06	394	15.14	796		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA2 Runoff Area=15,986 sf Runoff Depth>2.38"
Tc=5.0 min CN=70 Runoff=1.13 cfs 0.073 af

Pond 1P: Infiltration Storage Model Peak Elev=13.02' Storage=7 cf Inflow=1.13 cfs 0.073 af
Outflow=1.13 cfs 0.073 af

Total Runoff Area = 0.367 ac Runoff Volume = 0.073 af Average Runoff Depth = 2.38"
41.82% Pervious Area = 0.153 ac 58.18% Impervious Area = 0.213 ac

Subcatchment 1S: Drainage Area DA2

Time of Concentration

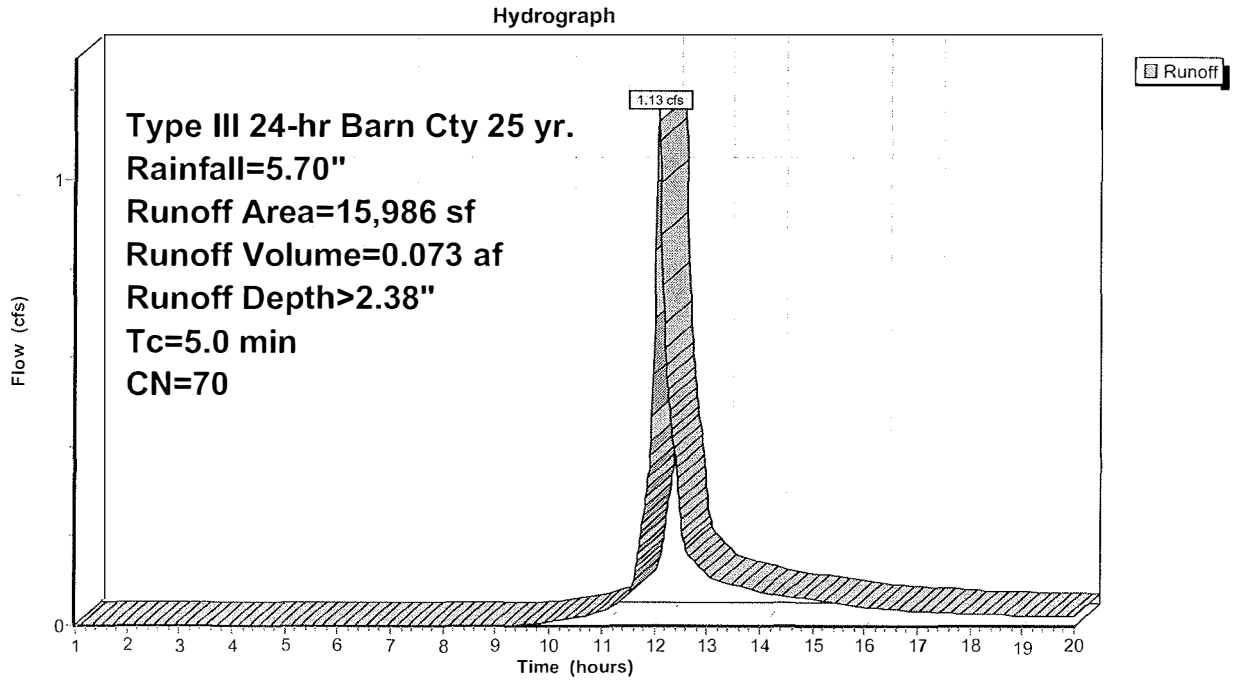
Runoff = 1.13 cfs @ 12.08 hrs, Volume= 0.073 af, Depth> 2.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 25 yr. Rainfall=5.70"

Area (sf)	CN	Description
9,300	98	Paved parking
6,686	32	Woods/grass comb., Good, HSG A
15,986	70	Weighted Average
6,686		Pervious Area
9,300		Impervious Area

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

Subcatchment 1S: Drainage Area DA2



Hydrograph for Subcatchment 1S: Drainage Area DA2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.06	0.00	0.00	11.80	2.13	0.29	0.25
1.20	0.07	0.00	0.00	12.00	2.85	0.63	**0.69**
1.40	0.08	0.00	0.00	12.20	3.57	1.05	**0.62**
1.60	0.09	0.00	0.00	12.40	3.91	1.27	0.38
1.80	0.10	0.00	0.00	12.60	4.07	1.37	0.17
2.00	0.11	0.00	0.00	12.80	4.18	1.45	0.14
2.20	0.13	0.00	0.00	13.00	4.27	1.52	0.12
2.40	0.14	0.00	0.00	13.20	4.36	1.57	0.10
2.60	0.15	0.00	0.00	13.40	4.43	1.62	0.10
2.80	0.16	0.00	0.00	13.60	4.50	1.67	0.09
3.00	0.18	0.00	0.00	13.80	4.56	1.72	0.08
3.20	0.19	0.00	0.00	14.00	4.62	1.76	0.08
3.40	0.20	0.00	0.00	14.20	4.68	1.80	0.07
3.60	0.22	0.00	0.00	14.40	4.73	1.84	0.07
3.80	0.23	0.00	0.00	14.60	4.78	1.87	0.07
4.00	0.25	0.00	0.00	14.80	4.83	1.91	0.06
4.20	0.26	0.00	0.00	15.00	4.87	1.94	0.06
4.40	0.28	0.00	0.00	15.20	4.91	1.97	0.06
4.60	0.29	0.00	0.00	15.40	4.95	2.00	0.05
4.80	0.31	0.00	0.00	15.60	4.99	2.03	0.05
5.00	0.32	0.00	0.00	15.80	5.02	2.05	0.05
5.20	0.34	0.00	0.00	16.00	5.05	2.07	0.04
5.40	0.36	0.00	0.00	16.20	5.08	2.10	0.04
5.60	0.37	0.00	0.00	16.40	5.11	2.12	0.04
5.80	0.39	0.00	0.00	16.60	5.13	2.14	0.04
6.00	0.41	0.00	0.00	16.80	5.16	2.16	0.04
6.20	0.43	0.00	0.00	17.00	5.18	2.17	0.03
6.40	0.45	0.00	0.00	17.20	5.21	2.19	0.03
6.60	0.47	0.00	0.00	17.40	5.23	2.21	0.03
6.80	0.49	0.00	0.00	17.60	5.25	2.22	0.03
7.00	0.52	0.00	0.00	17.80	5.27	2.24	0.03
7.20	0.54	0.00	0.00	18.00	5.29	2.25	0.03
7.40	0.57	0.00	0.00	18.20	5.31	2.27	0.03
7.60	0.59	0.00	0.00	18.40	5.33	2.28	0.02
7.80	0.62	0.00	0.00	18.60	5.34	2.29	0.02
8.00	0.65	0.00	0.00	18.80	5.36	2.31	0.02
8.20	0.68	0.00	0.00	19.00	5.38	2.32	0.02
8.40	0.71	0.00	0.00	19.20	5.39	2.33	0.02
8.60	0.75	0.00	0.00	19.40	5.41	2.34	0.02
8.80	0.79	0.00	0.00	19.60	5.42	2.36	0.02
9.00	0.83	0.00	0.00	19.80	5.44	2.37	0.02
9.20	0.87	0.00	0.00	20.00	**5.45**	**2.38**	0.02
9.40	0.92	0.00	0.00				
9.60	0.97	0.00	0.00				
9.80	1.02	0.01	0.01				
10.00	1.08	0.01	0.01				
10.20	1.14	0.02	0.01				
10.40	1.20	0.03	0.02				
10.60	1.27	0.04	0.02				
10.80	1.34	0.05	0.03				
11.00	1.42	0.07	0.03				
11.20	1.52	0.09	0.04				
11.40	1.63	0.12	0.06				
11.60	1.79	0.17	0.09				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 0.367 ac, Inflow Depth > 2.38" for Barn Cty 25 yr. event
Inflow = 1.13 cfs @ 12.08 hrs, Volume= 0.073 af
Outflow = 1.13 cfs @ 12.08 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.1 min
Primary = 1.13 cfs @ 12.08 hrs, Volume= 0.073 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 13.02' @ 12.08 hrs Surf.Area= 0 sf Storage= 7 cf

Plug-Flow detention time=0.1 min calculated for 0.073 af (100% of inflow)
Center-of-Mass det. time=0.1 min (801.3 - 801.3)

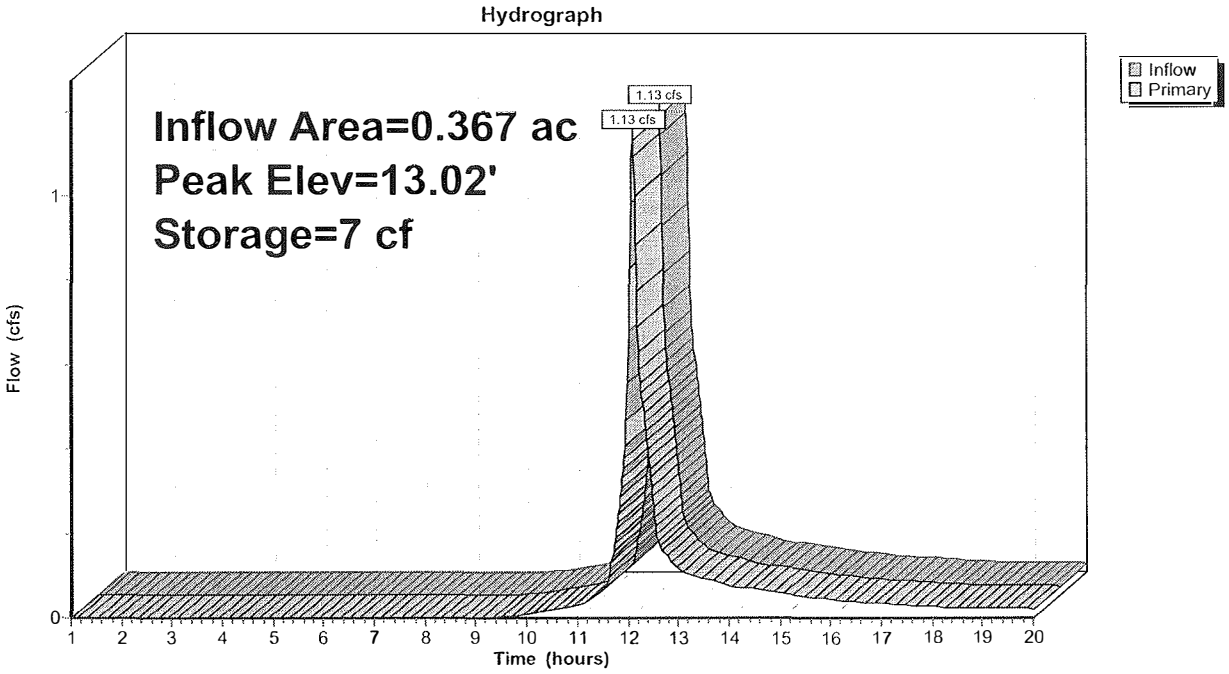
Volume	Invert	Avail.Storage	Storage Description
#1	13.00'	1,116 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
13.00	0
14.00	372
15.00	744
16.00	1,116

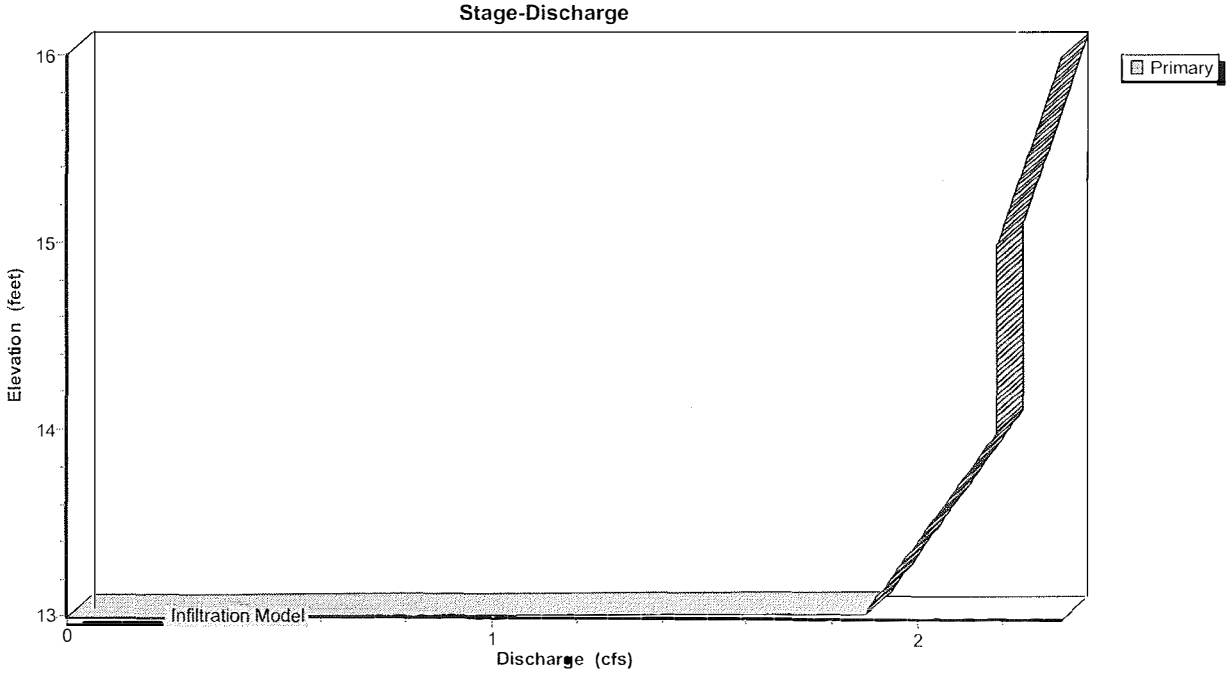
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model** Elev. (feet) 12.90 13.00 14.00 15.00 16.00 Disch. (cfs) 0.000 1.870 2.190 2.190 2.340

Primary OutFlow Max=1.88 cfs @ 12.08 hrs HW=13.02' (Free Discharge)
↑**1=Infiltration Model** (Custom Controls 1.88 cfs)

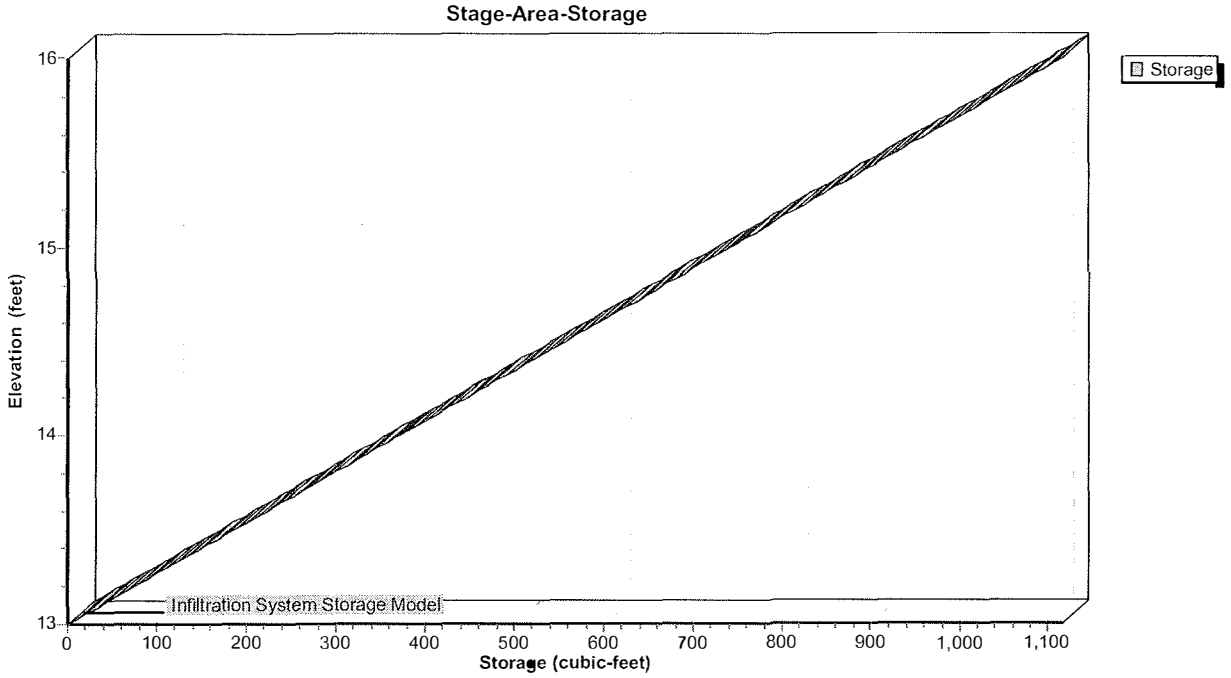
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

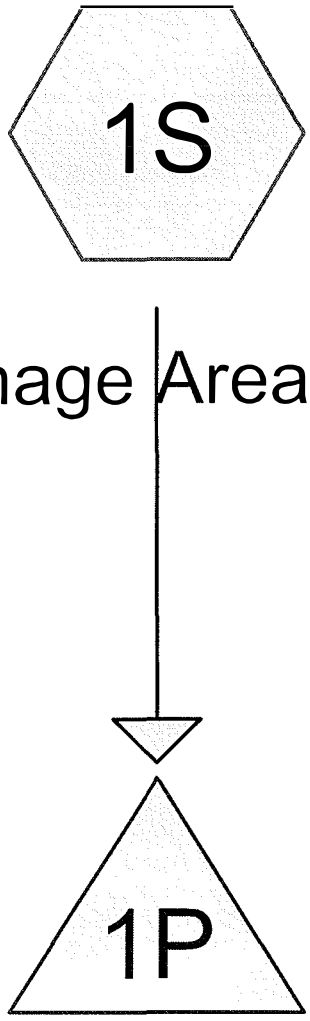
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	13.00	0.00
1.20	0.00	0	13.00	0.00
1.40	0.00	0	13.00	0.00
1.60	0.00	0	13.00	0.00
1.80	0.00	0	13.00	0.00
2.00	0.00	0	13.00	0.00
2.20	0.00	0	13.00	0.00
2.40	0.00	0	13.00	0.00
2.60	0.00	0	13.00	0.00
2.80	0.00	0	13.00	0.00
3.00	0.00	0	13.00	0.00
3.20	0.00	0	13.00	0.00
3.40	0.00	0	13.00	0.00
3.60	0.00	0	13.00	0.00
3.80	0.00	0	13.00	0.00
4.00	0.00	0	13.00	0.00
4.20	0.00	0	13.00	0.00
4.40	0.00	0	13.00	0.00
4.60	0.00	0	13.00	0.00
4.80	0.00	0	13.00	0.00
5.00	0.00	0	13.00	0.00
5.20	0.00	0	13.00	0.00
5.40	0.00	0	13.00	0.00
5.60	0.00	0	13.00	0.00
5.80	0.00	0	13.00	0.00
6.00	0.00	0	13.00	0.00
6.20	0.00	0	13.00	0.00
6.40	0.00	0	13.00	0.00
6.60	0.00	0	13.00	0.00
6.80	0.00	0	13.00	0.00
7.00	0.00	0	13.00	0.00
7.20	0.00	0	13.00	0.00
7.40	0.00	0	13.00	0.00
7.60	0.00	0	13.00	0.00
7.80	0.00	0	13.00	0.00
8.00	0.00	0	13.00	0.00
8.20	0.00	0	13.00	0.00
8.40	0.00	0	13.00	0.00
8.60	0.00	0	13.00	0.00
8.80	0.00	0	13.00	0.00
9.00	0.00	0	13.00	0.00
9.20	0.00	0	13.00	0.00
9.40	0.00	0	13.00	0.00
9.60	0.00	0	13.00	0.00
9.80	0.01	0	13.00	0.01
10.00	0.01	0	13.00	0.01
10.20	0.01	0	13.00	0.01
10.40	0.02	0	13.00	0.02
10.60	0.02	0	13.00	0.02
10.80	0.03	0	13.00	0.03
11.00	0.03	0	13.00	0.03
11.20	0.04	0	13.00	0.04
11.40	0.06	0	13.00	0.06
11.60	0.09	1	13.00	0.09
11.80	0.25	1	13.00	0.25
12.00	**0.69**	**4**	**13.01**	**0.68**
12.20	**0.62**	**4**	**13.01**	**0.63**
12.40	0.38	2	13.01	0.38
12.60	0.17	1	13.00	0.17
12.80	0.14	1	13.00	0.14
13.00	0.12	1	13.00	0.12
13.20	0.10	1	13.00	0.10
13.40	0.10	1	13.00	0.10
13.60	0.09	1	13.00	0.09
13.80	0.08	0	13.00	0.08
14.00	0.08	0	13.00	0.08
14.20	0.07	0	13.00	0.07
14.40	0.07	0	13.00	0.07
14.60	0.07	0	13.00	0.07
14.80	0.06	0	13.00	0.06
15.00	0.06	0	13.00	0.06
15.20	0.06	0	13.00	0.06
15.40	0.05	0	13.00	0.05
15.60	0.05	0	13.00	0.05
15.80	0.05	0	13.00	0.05
16.00	0.04	0	13.00	0.04
16.20	0.04	0	13.00	0.04
16.40	0.04	0	13.00	0.04
16.60	0.04	0	13.00	0.04
16.80	0.04	0	13.00	0.04
17.00	0.03	0	13.00	0.03
17.20	0.03	0	13.00	0.03
17.40	0.03	0	13.00	0.03
17.60	0.03	0	13.00	0.03
17.80	0.03	0	13.00	0.03
18.00	0.03	0	13.00	0.03
18.20	0.03	0	13.00	0.03
18.40	0.02	0	13.00	0.02
18.60	0.02	0	13.00	0.02
18.80	0.02	0	13.00	0.02
19.00	0.02	0	13.00	0.02
19.20	0.02	0	13.00	0.02
19.40	0.02	0	13.00	0.02
19.60	0.02	0	13.00	0.02
19.80	0.02	0	13.00	0.02
20.00	0.02	0	13.00	0.02

Stage-Discharge for Pond 1P: Infiltration Storage Model

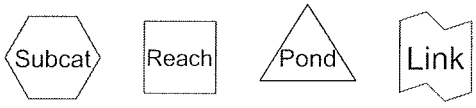
Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
13.00	0.00	14.08	2.19	15.16	2.21
13.02	1.88	14.10	2.19	15.18	2.22
13.04	1.88	14.12	2.19	15.20	2.22
13.06	1.89	14.14	2.19	15.22	2.22
13.08	1.90	14.16	2.19	15.24	2.23
13.10	1.90	14.18	2.19	15.26	2.23
13.12	1.91	14.20	2.19	15.28	2.23
13.14	1.91	14.22	2.19	15.30	2.23
13.16	1.92	14.24	2.19	15.32	2.24
13.18	1.93	14.26	2.19	15.34	2.24
13.20	1.93	14.28	2.19	15.36	2.24
13.22	1.94	14.30	2.19	15.38	2.25
13.24	1.95	14.32	2.19	15.40	2.25
13.26	1.95	14.34	2.19	15.42	2.25
13.28	1.96	14.36	2.19	15.44	2.26
13.30	1.97	14.38	2.19	15.46	2.26
13.32	1.97	14.40	2.19	15.48	2.26
13.34	1.98	14.42	2.19	15.50	2.26
13.36	1.99	14.44	2.19	15.52	2.27
13.38	1.99	14.46	2.19	15.54	2.27
13.40	2.00	14.48	2.19	15.56	2.27
13.42	2.00	14.50	2.19	15.58	2.28
13.44	2.01	14.52	2.19	15.60	2.28
13.46	2.02	14.54	2.19	15.62	2.28
13.48	2.02	14.56	2.19	15.64	2.29
13.50	2.03	14.58	2.19	15.66	2.29
13.52	2.04	14.60	2.19	15.68	2.29
13.54	2.04	14.62	2.19	15.70	2.29
13.56	2.05	14.64	2.19	15.72	2.30
13.58	2.06	14.66	2.19	15.74	2.30
13.60	2.06	14.68	2.19	15.76	2.30
13.62	2.07	14.70	2.19	15.78	2.31
13.64	2 07	14.72	2.19	15.80	2.31
13.66	2.08	14.74	2.19	15.82	2.31
13.68	2.09	14.76	2.19	15.84	2.32
13.70	2.09	14.78	2.19	15.86	2.32
13.72	2.10	14.80	2.19	15.88	2.32
13.74	2.11	14.82	2.19	15.90	2.32
13.76	2.11	14.84	2.19	15.92	2.33
13.78	2.12	14.86	2.19	15.94	2.33
13.80	2.13	14.88	2.19	15.96	2.33
13.82	2.13	14.90	2.19	15.98	2.34
13.84	2.14	14.92	2.19	16.00	**2.34**
13.86	2.15	14.94	2.19		
13.88	2.15	14.96	2.19		
13.90	2.16	14.98	2.19		
13.92	2.16	15.00	2.19		
13.94	2.17	15.02	2.19		
13.96	2.18	15.04	2.20		
13.98	2.18	15.06	2.20		
14.00	2.19	15.08	2.20		
14.02	2.19	15.10	2.21		
14.04	2.19	15.12	2.21		
14.06	2.19	15.14	2.21		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
13.00	0	14.08	402	15.16	804
13.02	7	14.10	409	15.18	811
13.04	15	14.12	417	15.20	818
13.06	22	14.14	424	15.22	826
13.08	30	14.16	432	15.24	833
13.10	37	14.18	439	15.26	841
13.12	45	14.20	446	15.28	848
13.14	52	14.22	454	15.30	856
13.16	60	14.24	461	15.32	863
13.18	67	14.26	469	15.34	870
13.20	74	14.28	476	15.36	878
13.22	82	14.30	484	15.38	885
13.24	89	14.32	491	15.40	893
13.26	97	14.34	498	15.42	900
13.28	104	14.36	506	15.44	908
13.30	112	14.38	513	15.46	915
13.32	119	14.40	521	15.48	923
13.34	126	14.42	528	15.50	930
13.36	134	14.44	536	15.52	937
13.38	141	14.46	543	15.54	945
13.40	149	14.48	551	15.56	952
13.42	156	14.50	558	15.58	960
13.44	164	14.52	565	15.60	967
13.46	171	14.54	573	15.62	975
13.48	179	14.56	580	15.64	982
13.50	186	14.58	588	15.66	990
13.52	193	14.60	595	15.68	997
13.54	201	14.62	603	15.70	1,004
13.56	208	14.64	610	15.72	1,012
13.58	216	14.66	618	15.74	1,019
13.60	223	14.68	625	15.76	1,027
13.62	231	14.70	632	15.78	1,034
13.64	238	14.72	640	15.80	1,042
13.66	246	14.74	647	15.82	1,049
13.68	253	14.76	655	15.84	1,056
13.70	260	14.78	662	15.86	1,064
13.72	268	14.80	670	15.88	1,071
13.74	275	14.82	677	15.90	1,079
13.76	283	14.84	684	15.92	1,086
13.78	290	14.86	692	15.94	1,094
13.80	298	14.88	699	15.96	1,101
13.82	305	14.90	707	15.98	1,109
13.84	312	14.92	714	16.00	**1,116**
13.86	320	14.94	722		
13.88	327	14.96	729		
13.90	335	14.98	737		
13.92	342	15.00	744		
13.94	350	15.02	751		
13.96	357	15.04	759		
13.98	365	15.06	766		
14.00	372	15.08	774		
14.02	379	15.10	781		
14.04	387	15.12	789		
14.06	394	15.14	796		



Infiltration Storage Model



Drainage Diagram for 17-005 CCH Project 2022 DA3
Prepared by down cape engineering, inc. 7/31/2019
HydroCAD® 8.00 s/n 004007 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.167	32	Woods/grass comb., Good, HSG A (1S)
0.369	98	Paved parking (1S)
0.537		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA3 Runoff Area=23,372 sf Runoff Depth>4.78"
Tc=5.0 min CN=77 Runoff=3.29 cfs 0.214 af

Pond 1P: Infiltration Storage Model Peak Elev=14.89' Storage=806 cf Inflow=3.29 cfs 0.214 af
Outflow=1.88 cfs 0.214 af

Total Runoff Area = 0.537 ac Runoff Volume = 0.214 af Average Runoff Depth = 4.78"
31.20% Pervious Area = 0.167 ac 68.80% Impervious Area = 0.369 ac

Subcatchment 1S: Drainage Area DA3

Time of Concentration

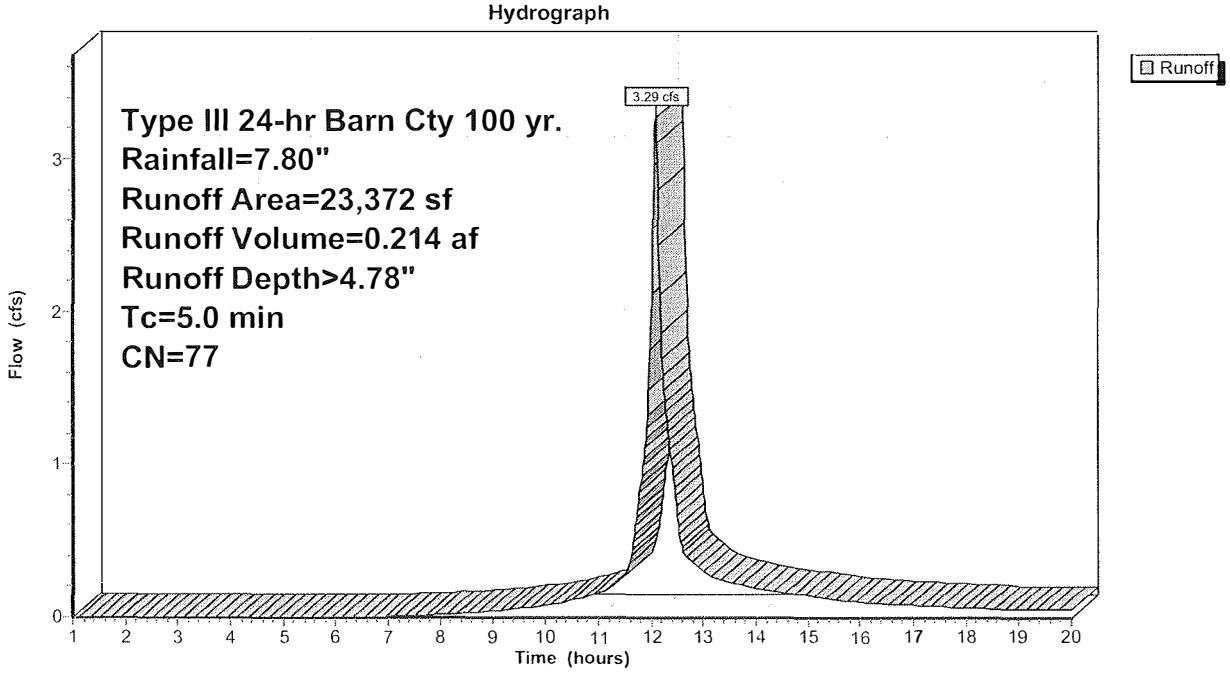
Runoff = 3.29 cfs @ 12.07 hrs, Volume= 0.214 af, Depth> 4.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 100 yr. Rainfall=7.80"

Area (sf)	CN	Description
16,081	98	Paved parking
7,291	32	Woods/grass comb., Good, HSG A
23,372	77	Weighted Average
7,291		Pervious Area
16,081		Impervious Area

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

Subcatchment 1S: Drainage Area DA3



Hydrograph for Subcatchment 1S: Drainage Area DA3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	11.80	2.91	1.01	0.87
1.20	0.09	0.00	0.00	12.00	3.90	1.73	**2.12**
1.40	0.11	0.00	0.00	12.20	4.89	2.53	**1.70**
1.60	0.12	0.00	0.00	12.40	5.35	2.92	0.98
1.80	0.14	0.00	0.00	12.60	5.56	3.10	0.44
2.00	0.16	0.00	0.00	12.80	5.72	3.24	0.36
2.20	0.17	0.00	0.00	13.00	5.85	3.35	0.29
2.40	0.19	0.00	0.00	13.20	5.96	3.44	0.26
2.60	0.20	0.00	0.00	13.40	6.06	3.53	0.24
2.80	0.22	0.00	0.00	13.60	6.16	3.62	0.22
3.00	0.24	0.00	0.00	13.80	6.25	3.69	0.21
3.20	0.26	0.00	0.00	14.00	6.33	3.77	0.19
3.40	0.28	0.00	0.00	14.20	6.40	3.83	0.18
3.60	0.30	0.00	0.00	14.40	6.47	3.89	0.17
3.80	0.32	0.00	0.00	14.60	6.54	3.95	0.16
4.00	0.34	0.00	0.00	14.80	6.60	4.01	0.15
4.20	0.36	0.00	0.00	15.00	6.66	4.06	0.14
4.40	0.38	0.00	0.00	15.20	6.72	4.11	0.14
4.60	0.40	0.00	0.00	15.40	6.77	4.16	0.13
4.80	0.42	0.00	0.00	15.60	6.82	4.21	0.12
5.00	0.44	0.00	0.00	15.80	6.87	4.25	0.11
5.20	0.47	0.00	0.00	16.00	6.91	4.29	0.10
5.40	0.49	0.00	0.00	16.20	6.95	4.32	0.10
5.60	0.51	0.00	0.00	16.40	6.99	4.36	0.09
5.80	0.54	0.00	0.00	16.60	7.03	4.39	0.09
6.00	0.56	0.00	0.00	16.80	7.06	4.42	0.09
6.20	0.59	0.00	0.00	17.00	7.09	4.45	0.08
6.40	0.61	0.00	0.00	17.20	7.13	4.48	0.08
6.60	0.64	0.00	0.00	17.40	7.16	4.51	0.07
6.80	0.67	0.00	0.00	17.60	7.19	4.53	0.07
7.00	0.71	0.00	0.01	17.80	7.21	4.56	0.07
7.20	0.74	0.01	0.01	18.00	7.24	4.58	0.06
7.40	0.77	0.01	0.01	18.20	7.26	4.60	0.06
7.60	0.81	0.01	0.01	18.40	7.29	4.62	0.06
7.80	0.85	0.02	0.01	18.60	7.31	4.65	0.06
8.00	0.89	0.03	0.02	18.80	7.33	4.67	0.06
8.20	0.93	0.03	0.02	19.00	7.36	4.69	0.06
8.40	0.98	0.04	0.03	19.20	7.38	4.71	0.05
8.60	1.03	0.05	0.03	19.40	7.40	4.73	0.05
8.80	1.08	0.07	0.04	19.60	7.42	4.75	0.05
9.00	1.14	0.08	0.04	19.80	7.44	4.77	0.05
9.20	1.20	0.10	0.05	20.00	**7.46**	**4.79**	0.05
9.40	1.26	0.12	0.06				
9.60	1.33	0.14	0.06				
9.80	1.40	0.17	0.07				
10.00	1.47	0.20	0.08				
10.20	1.55	0.23	0.09				
10.40	1.64	0.27	0.11				
10.60	1.74	0.31	0.12				
10.80	1.84	0.36	0.14				
11.00	1.95	0.42	0.16				
11.20	2.08	0.49	0.19				
11.40	2.24	0.58	0.25				
11.60	2.45	0.71	0.37				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 0.537 ac, Inflow Depth > 4.78" for Barn Cty 100 yr. event
Inflow = 3.29 cfs @ 12.07 hrs, Volume= 0.214 af
Outflow = 1.88 cfs @ 12.18 hrs, Volume= 0.214 af, Atten= 43%, Lag= 6.4 min
Primary = 1.88 cfs @ 12.18 hrs, Volume= 0.214 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 14.89' @ 12.18 hrs Surf.Area= 0 sf Storage= 806 cf

Plug-Flow detention time=(not calculated: outflow precedes inflow)
Center-of-Mass det. time=1.9 min (778.8 - 776.9)

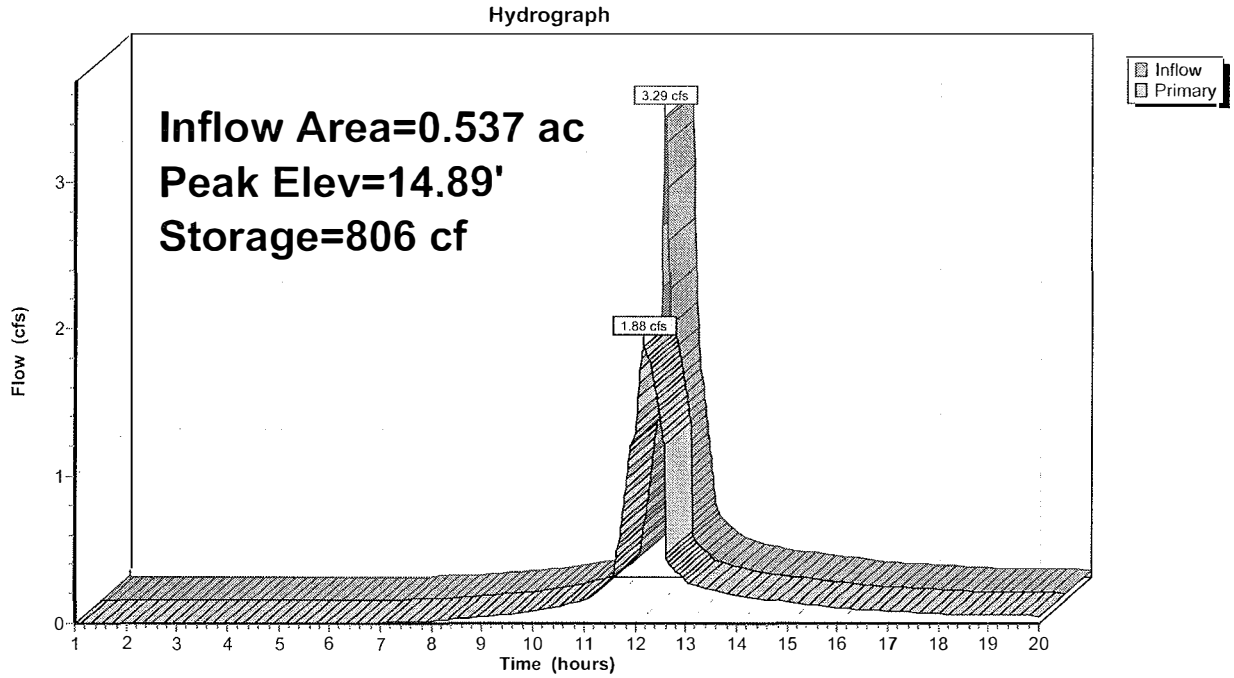
Volume	Invert	Avail.Storage	Storage Description
#1	11.50'	952 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
11.50	0
12.50	238
13.50	476
14.50	714
15.50	952

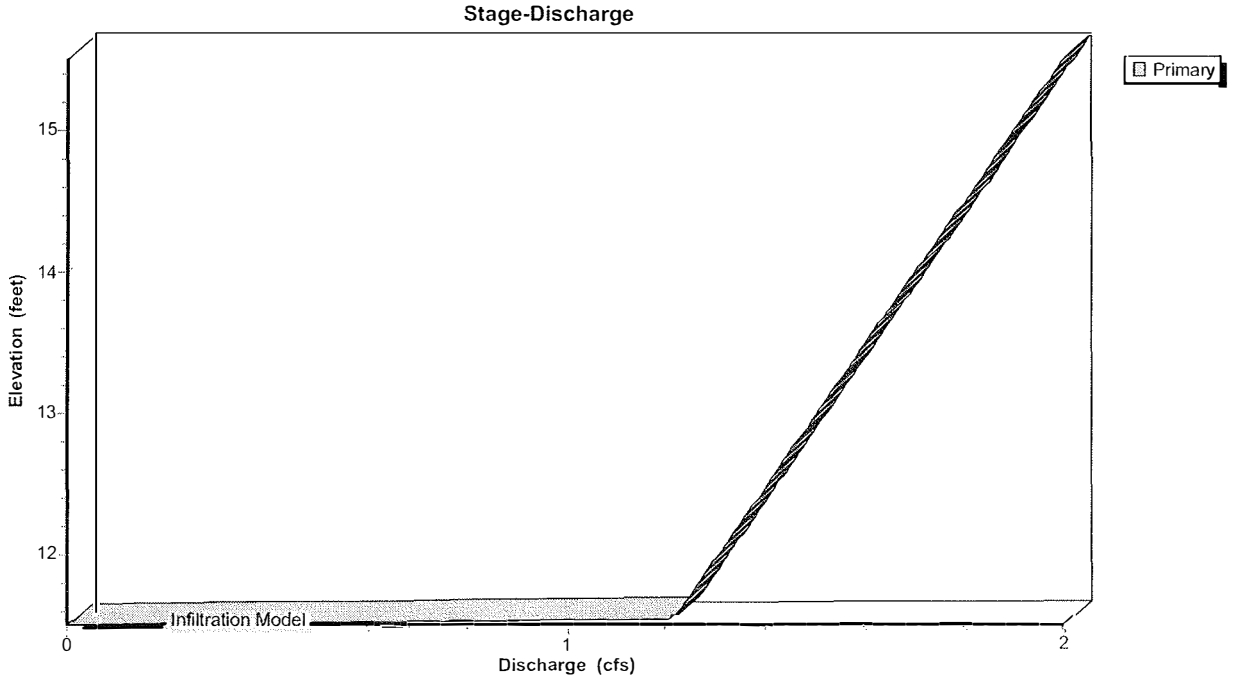
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model**
			Elev. (feet) 11.40 11.50 12.50 13.50 14.50 15.50
			Disch. (cfs) 0.000 1.200 1.400 1.600 1.800 2.000

Primary OutFlow Max=1.88 cfs @ 12.18 hrs HW=14.88' (Free Discharge)
↑**1=Infiltration Model** (Custom Controls 1.88 cfs)

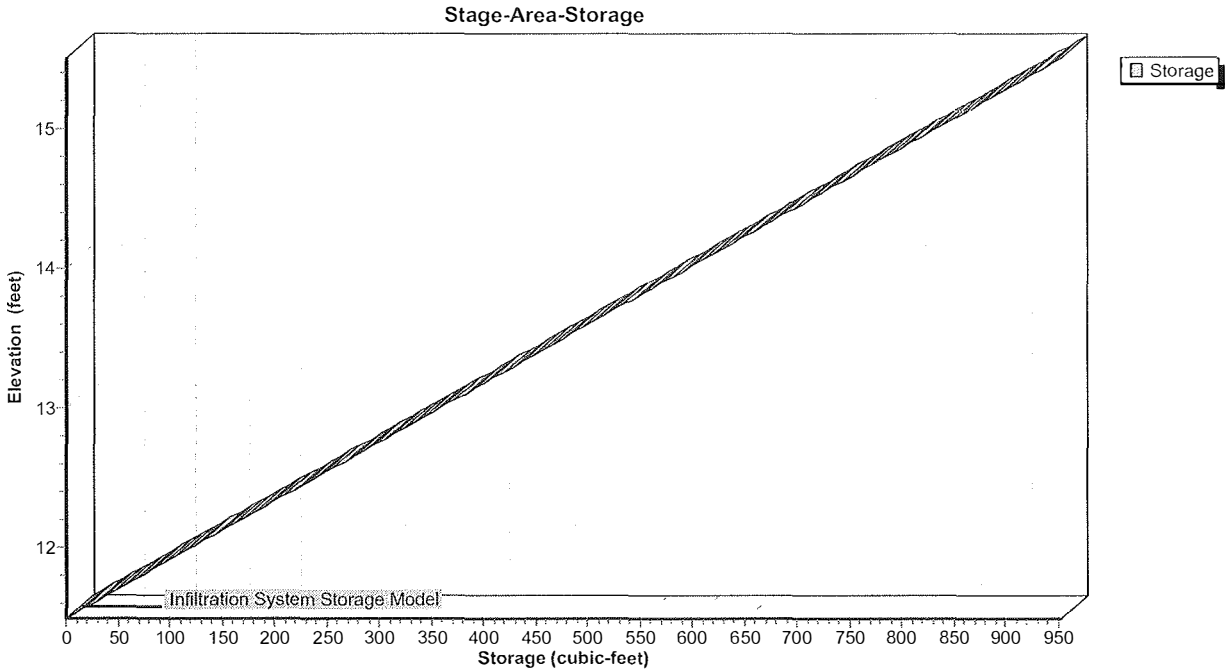
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	11.50	0.00
1.20	0.00	0	11.50	0.00
1.40	0.00	0	11.50	0.00
1.60	0.00	0	11.50	0.00
1.80	0.00	0	11.50	0.00
2.00	0.00	0	11.50	0.00
2.20	0.00	0	11.50	0.00
2.40	0.00	0	11.50	0.00
2.60	0.00	0	11.50	0.00
2.80	0.00	0	11.50	0.00
3.00	0.00	0	11.50	0.00
3.20	0.00	0	11.50	0.00
3.40	0.00	0	11.50	0.00
3.60	0.00	0	11.50	0.00
3.80	0.00	0	11.50	0.00
4.00	0.00	0	11.50	0.00
4.20	0.00	0	11.50	0.00
4.40	0.00	0	11.50	0.00
4.60	0.00	0	11.50	0.00
4.80	0.00	0	11.50	0.00
5.00	0.00	0	11.50	0.00
5.20	0.00	0	11.50	0.00
5.40	0.00	0	11.50	0.00
5.60	0.00	0	11.50	0.00
5.80	0.00	0	11.50	0.00
6.00	0.00	0	11.50	0.00
6.20	0.00	0	11.50	0.00
6.40	0.00	0	11.50	0.00
6.60	0.00	0	11.50	0.00
6.80	0.00	0	11.50	0.00
7.00	0.01	0	11.50	0.01
7.20	0.01	0	11.50	0.01
7.40	0.01	0	11.50	0.01
7.60	0.01	0	11.50	0.01
7.80	0.01	0	11.50	0.01
8.00	0.02	0	11.50	0.02
8.20	0.02	0	11.50	0.02
8.40	0.03	0	11.50	0.03
8.60	0.03	0	11.50	0.03
8.80	0.04	0	11.50	0.04
9.00	0.04	0	11.50	0.04
9.20	0.05	0	11.50	0.05
9.40	0.06	0	11.50	0.06
9.60	0.06	0	11.50	0.06
9.80	0.07	1	11.50	0.07
10.00	0.08	1	11.50	0.08
10.20	0.09	1	11.50	0.09
10.40	0.11	1	11.50	0.11
10.60	0.12	1	11.50	0.12
10.80	0.14	1	11.50	0.14
11.00	0.16	1	11.51	0.15
11.20	0.19	2	11.51	0.19
11.40	0.25	2	11.51	0.25
11.60	0.37	3	11.51	0.36
11.80	0.87	7	11.53	0.87
12.00	**2.12**	**107**	**11.95**	**1.29**
12.20	**1.70**	**799**	**14.86**	**1.87**
12.40	0.98	471	13.48	1.60
12.60	0.44	4	11.52	0.48
12.80	0.36	3	11.51	0.36
13.00	0.29	2	11.51	0.29
13.20	0.26	2	11.51	0.26
13.40	0.24	2	11.51	0.24
13.60	0.22	2	11.51	0.22
13.80	0.21	2	11.51	0.21
14.00	0.19	1	11.51	0.19
14.20	0.18	1	11.51	0.18
14.40	0.17	1	11.51	0.17
14.60	0.16	1	11.51	0.16
14.80	0.15	1	11.51	0.15
15.00	0.14	1	11.50	0.14
15.20	0.14	1	11.50	0.14
15.40	0.13	1	11.50	0.13
15.60	0.12	1	11.50	0.12
15.80	0.11	1	11.50	0.11
16.00	0.10	1	11.50	0.10
16.20	0.10	1	11.50	0.10
16.40	0.09	1	11.50	0.09
16.60	0.09	1	11.50	0.09
16.80	0.09	1	11.50	0.09
17.00	0.08	1	11.50	0.08
17.20	0.08	1	11.50	0.08
17.40	0.07	1	11.50	0.07
17.60	0.07	1	11.50	0.07
17.80	0.07	1	11.50	0.07
18.00	0.06	0	11.50	0.06
18.20	0.06	0	11.50	0.06
18.40	0.06	0	11.50	0.06
18.60	0.06	0	11.50	0.06
18.80	0.06	0	11.50	0.06
19.00	0.06	0	11.50	0.06
19.20	0.05	0	11.50	0.05
19.40	0.05	0	11.50	0.05
19.60	0.05	0	11.50	0.05
19.80	0.05	0	11.50	0.05
20.00	0.05	0	11.50	0.05

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
11.50	0.00	12.58	1.42	13.66	1.63	14.74	1.85
11.52	1.20	12.60	1.42	13.68	1.64	14.76	1.85
11.54	1.21	12.62	1.42	13.70	1.64	14.78	1.86
11.56	1.21	12.64	1.43	13.72	1.64	14.80	1.86
11.58	1.22	12.66	1.43	13.74	1.65	14.82	1.86
11.60	1.22	12.68	1.44	13.76	1.65	14.84	1.87
11.62	1.22	12.70	1.44	13.78	1.66	14.86	1.87
11.64	1.23	12.72	1.44	13.80	1.66	14.88	1.88
11.66	1.23	12.74	1.45	13.82	1.66	14.90	1.88
11.68	1.24	12.76	1.45	13.84	1.67	14.92	1.88
11.70	1.24	12.78	1.46	13.86	1.67	14.94	1.89
11.72	1.24	12.80	1.46	13.88	1.68	14.96	1.89
11.74	1.25	12.82	1.46	13.90	1.68	14.98	1.90
11.76	1.25	12.84	1.47	13.92	1.68	15.00	1.90
11.78	1.26	12.86	1.47	13.94	1.69	15.02	1.90
11.80	1.26	12.88	1.48	13.96	1.69	15.04	1.91
11.82	1.26	12.90	1.48	13.98	1.70	15.06	1.91
11.84	1.27	12.92	1.48	14.00	1.70	15.08	1.92
11.86	1.27	12.94	1.49	14.02	1.70	15.10	1.92
11.88	1.28	12.96	1.49	14.04	1.71	15.12	1.92
11.90	1.28	12.98	1.50	14.06	1.71	15.14	1.93
11.92	1.28	13.00	1.50	14.08	1.72	15.16	1.93
11.94	1.29	13.02	1.50	14.10	1.72	15.18	1.94
11.96	1.29	13.04	1.51	14.12	1.72	15.20	1.94
11.98	1.30	13.06	1.51	14.14	1.73	15.22	1.94
12.00	1.30	13.08	1.52	14.16	1.73	15.24	1.95
12.02	1.30	13.10	1.52	14.18	1.74	15.26	1.95
12.04	1.31	13.12	1.52	14.20	1.74	15.28	1.96
12.06	1.31	13.14	1.53	14.22	1.74	15.30	1.96
12.08	1.32	13.16	1.53	14.24	1.75	15.32	1.96
12.10	1.32	13.18	1.54	14.26	1.75	15.34	1.97
12.12	1.32	13.20	1.54	14.28	1.76	15.36	1.97
12.14	1.33	13.22	1.54	14.30	1.76	15.38	1.98
12.16	1.33	13.24	1.55	14.32	1.76	15.40	1.98
12.18	1.34	13.26	1.55	14.34	1.77	15.42	1.98
12.20	1.34	13.28	1.56	14.36	1.77	15.44	1.99
12.22	1.34	13.30	1.56	14.38	1.78	15.46	1.99
12.24	1.35	13.32	1.56	14.40	1.78	15.48	2.00
12.26	1.35	13.34	1.57	14.42	1.78	15.50	**2.00**
12.28	1.36	13.36	1.57	14.44	1.79		
12.30	1.36	13.38	1.58	14.46	1.79		
12.32	1.36	13.40	1.58	14.48	1.80		
12.34	1.37	13.42	1.58	14.50	1.80		
12.36	1.37	13.44	1.59	14.52	1.80		
12.38	1.38	13.46	1.59	14.54	1.81		
12.40	1.38	13.48	1.60	14.56	1.81		
12.42	1.38	13.50	1.60	14.58	1.82		
12.44	1.39	13.52	1.60	14.60	1.82		
12.46	1.39	13.54	1.61	14.62	1.82		
12.48	1.40	13.56	1.61	14.64	1.83		
12.50	1.40	13.58	1.62	14.66	1.83		
12.52	1.40	13.60	1.62	14.68	1.84		
12.54	1.41	13.62	1.62	14.70	1.84		
12.56	1.41	13.64	1.63	14.72	1.84		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
11.50	0	12.58	257	13.66	514	14.74	771
11.52	5	12.60	262	13.68	519	14.76	776
11.54	10	12.62	267	13.70	524	14.78	781
11.56	14	12.64	271	13.72	528	14.80	785
11.58	19	12.66	276	13.74	533	14.82	790
11.60	24	12.68	281	13.76	538	14.84	795
11.62	29	12.70	286	13.78	543	14.86	800
11.64	33	12.72	290	13.80	547	14.88	804
11.66	38	12.74	295	13.82	552	14.90	809
11.68	43	12.76	300	13.84	557	14.92	814
11.70	48	12.78	305	13.86	562	14.94	819
11.72	52	12.80	309	13.88	566	14.96	823
11.74	57	12.82	314	13.90	571	14.98	828
11.76	62	12.84	319	13.92	576	15.00	833
11.78	67	12.86	324	13.94	581	15.02	838
11.80	71	12.88	328	13.96	585	15.04	843
11.82	76	12.90	333	13.98	590	15.06	847
11.84	81	12.92	338	14.00	595	15.08	852
11.86	86	12.94	343	14.02	600	15.10	857
11.88	90	12.96	347	14.04	605	15.12	862
11.90	95	12.98	352	14.06	609	15.14	866
11.92	100	13.00	357	14.08	614	15.16	871
11.94	105	13.02	362	14.10	619	15.18	876
11.96	109	13.04	367	14.12	624	15.20	881
11.98	114	13.06	371	14.14	628	15.22	885
12.00	119	13.08	376	14.16	633	15.24	890
12.02	124	13.10	381	14.18	638	15.26	895
12.04	129	13.12	386	14.20	643	15.28	900
12.06	133	13.14	390	14.22	647	15.30	904
12.08	138	13.16	395	14.24	652	15.32	909
12.10	143	13.18	400	14.26	657	15.34	914
12.12	148	13.20	405	14.28	662	15.36	919
12.14	152	13.22	409	14.30	666	15.38	923
12.16	157	13.24	414	14.32	671	15.40	928
12.18	162	13.26	419	14.34	676	15.42	933
12.20	167	13.28	424	14.36	681	15.44	938
12.22	171	13.30	428	14.38	685	15.46	942
12.24	176	13.32	433	14.40	690	15.48	947
12.26	181	13.34	438	14.42	695	15.50	**952**
12.28	186	13.36	443	14.44	700		
12.30	190	13.38	447	14.46	704		
12.32	195	13.40	452	14.48	709		
12.34	200	13.42	457	14.50	714		
12.36	205	13.44	462	14.52	719		
12.38	209	13.46	466	14.54	724		
12.40	214	13.48	471	14.56	728		
12.42	219	13.50	476	14.58	733		
12.44	224	13.52	481	14.60	738		
12.46	228	13.54	486	14.62	743		
12.48	233	13.56	490	14.64	747		
12.50	238	13.58	495	14.66	752		
12.52	243	13.60	500	14.68	757		
12.54	248	13.62	505	14.70	762		
12.56	252	13.64	509	14.72	766		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA3 Runoff Area=23,372 sf Runoff Depth>3.00"
Tc=5.0 min CN=77 Runoff=2.09 cfs 0.134 af

Pond 1P: Infiltration Storage Model Peak Elev=12.66' Storage=276 cf Inflow=2.09 cfs 0.134 af
Outflow=1.43 cfs 0.135 af

Total Runoff Area = 0.537 ac Runoff Volume = 0.134 af Average Runoff Depth = 3.00"
31.20% Pervious Area = 0.167 ac 68.80% Impervious Area = 0.369 ac

Subcatchment 1S: Drainage Area DA3

Time of Concentration

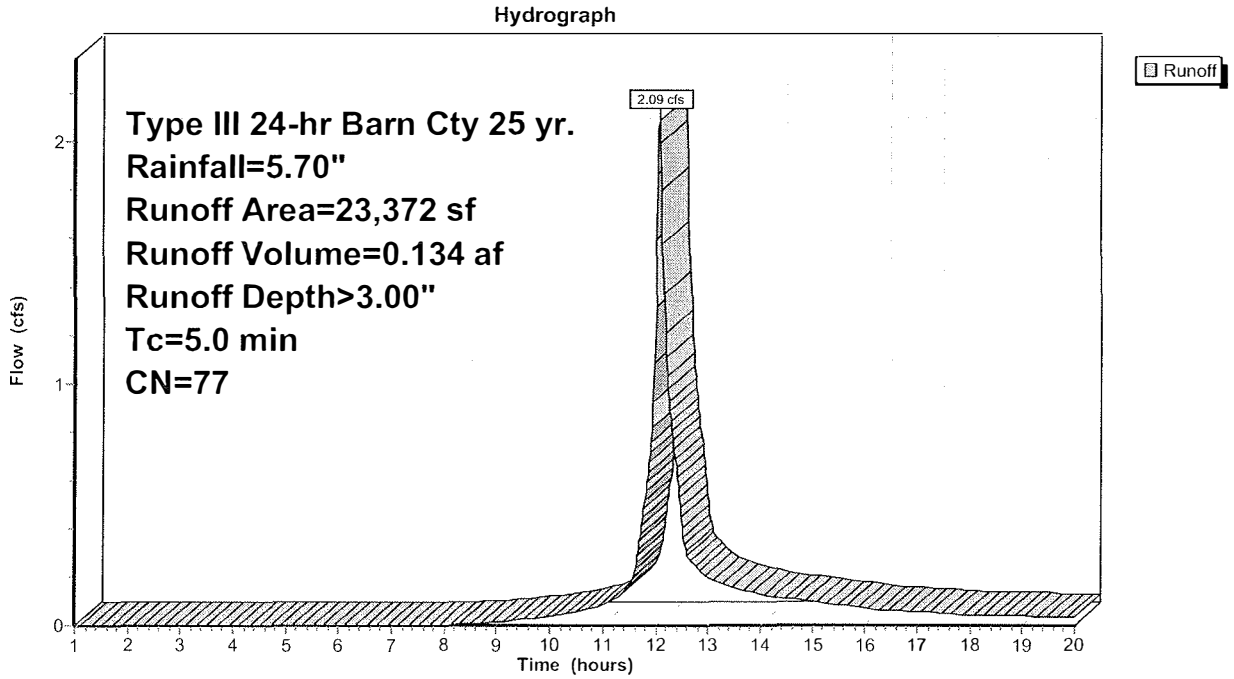
Runoff = 2.09 cfs @ 12.08 hrs, Volume= 0.134 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 25 yr. Rainfall=5.70"

Area (sf)	CN	Description
16,081	98	Paved parking
7,291	32	Woods/grass comb., Good, HSG A
23,372	77	Weighted Average
7,291		Pervious Area
16,081		Impervious Area

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

Subcatchment 1S: Drainage Area DA3



Hydrograph for Subcatchment 1S: Drainage Area DA3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.06	0.00	0.00	11.80	2.13	0.52	0.52
1.20	0.07	0.00	0.00	12.00	2.85	0.97	**1.32**
1.40	0.08	0.00	0.00	12.20	3.57	1.48	**1.11**
1.60	0.09	0.00	0.00	12.40	3.91	1.74	0.65
1.80	0.10	0.00	0.00	12.60	4.07	1.86	0.30
2.00	0.11	0.00	0.00	12.80	4.18	1.95	0.24
2.20	0.13	0.00	0.00	13.00	4.27	2.03	0.20
2.40	0.14	0.00	0.00	13.20	4.36	2.09	0.17
2.60	0.15	0.00	0.00	13.40	4.43	2.15	0.16
2.80	0.16	0.00	0.00	13.60	4.50	2.21	0.15
3.00	0.18	0.00	0.00	13.80	4.56	2.26	0.14
3.20	0.19	0.00	0.00	14.00	4.62	2.31	0.13
3.40	0.20	0.00	0.00	14.20	4.68	2.36	0.12
3.60	0.22	0.00	0.00	14.40	4.73	2.40	0.11
3.80	0.23	0.00	0.00	14.60	4.78	2.44	0.11
4.00	0.25	0.00	0.00	14.80	4.83	2.48	0.10
4.20	0.26	0.00	0.00	15.00	4.87	2.51	0.10
4.40	0.28	0.00	0.00	15.20	4.91	2.55	0.09
4.60	0.29	0.00	0.00	15.40	4.95	2.58	0.09
4.80	0.31	0.00	0.00	15.60	4.99	2.61	0.08
5.00	0.32	0.00	0.00	15.80	5.02	2.64	0.08
5.20	0.34	0.00	0.00	16.00	5.05	2.67	0.07
5.40	0.36	0.00	0.00	16.20	5.08	2.69	0.07
5.60	0.37	0.00	0.00	16.40	5.11	2.71	0.06
5.80	0.39	0.00	0.00	16.60	5.13	2.74	0.06
6.00	0.41	0.00	0.00	16.80	5.16	2.76	0.06
6.20	0.43	0.00	0.00	17.00	5.18	2.78	0.06
6.40	0.45	0.00	0.00	17.20	5.21	2.80	0.05
6.60	0.47	0.00	0.00	17.40	5.23	2.82	0.05
6.80	0.49	0.00	0.00	17.60	5.25	2.83	0.05
7.00	0.52	0.00	0.00	17.80	5.27	2.85	0.05
7.20	0.54	0.00	0.00	18.00	5.29	2.87	0.04
7.40	0.57	0.00	0.00	18.20	5.31	2.88	0.04
7.60	0.59	0.00	0.00	18.40	5.33	2.90	0.04
7.80	0.62	0.00	0.00	18.60	5.34	2.91	0.04
8.00	0.65	0.00	0.00	18.80	5.36	2.93	0.04
8.20	0.68	0.00	0.00	19.00	5.38	2.94	0.04
8.40	0.71	0.00	0.01	19.20	5.39	2.95	0.04
8.60	0.75	0.01	0.01	19.40	5.41	2.97	0.04
8.80	0.79	0.01	0.01	19.60	5.42	2.98	0.04
9.00	0.83	0.02	0.01	19.80	5.44	3.00	0.04
9.20	0.87	0.02	0.02	20.00	**5.45**	**3.01**	0.03
9.40	0.92	0.03	0.02				
9.60	0.97	0.04	0.03				
9.80	1.02	0.05	0.03				
10.00	1.08	0.07	0.04				
10.20	1.14	0.08	0.04				
10.40	1.20	0.10	0.05				
10.60	1.27	0.12	0.06				
10.80	1.34	0.15	0.07				
11.00	1.42	0.18	0.08				
11.20	1.52	0.22	0.11				
11.40	1.63	0.27	0.14				
11.60	1.79	0.34	0.21				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 0.537 ac, Inflow Depth > 3.00" for Barn Cty 25 yr. event
Inflow = 2.09 cfs @ 12.08 hrs, Volume= 0.134 af
Outflow = 1.43 cfs @ 12.15 hrs, Volume= 0.135 af, Atten= 32%, Lag= 4.8 min
Primary = 1.43 cfs @ 12.15 hrs, Volume= 0.135 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 12.66' @ 12.15 hrs Surf.Area= 0 sf Storage= 276 cf

Plug-Flow detention time=(not calculated: outflow precedes inflow)
Center-of-Mass det. time=0.6 min (788.3 - 787.8)

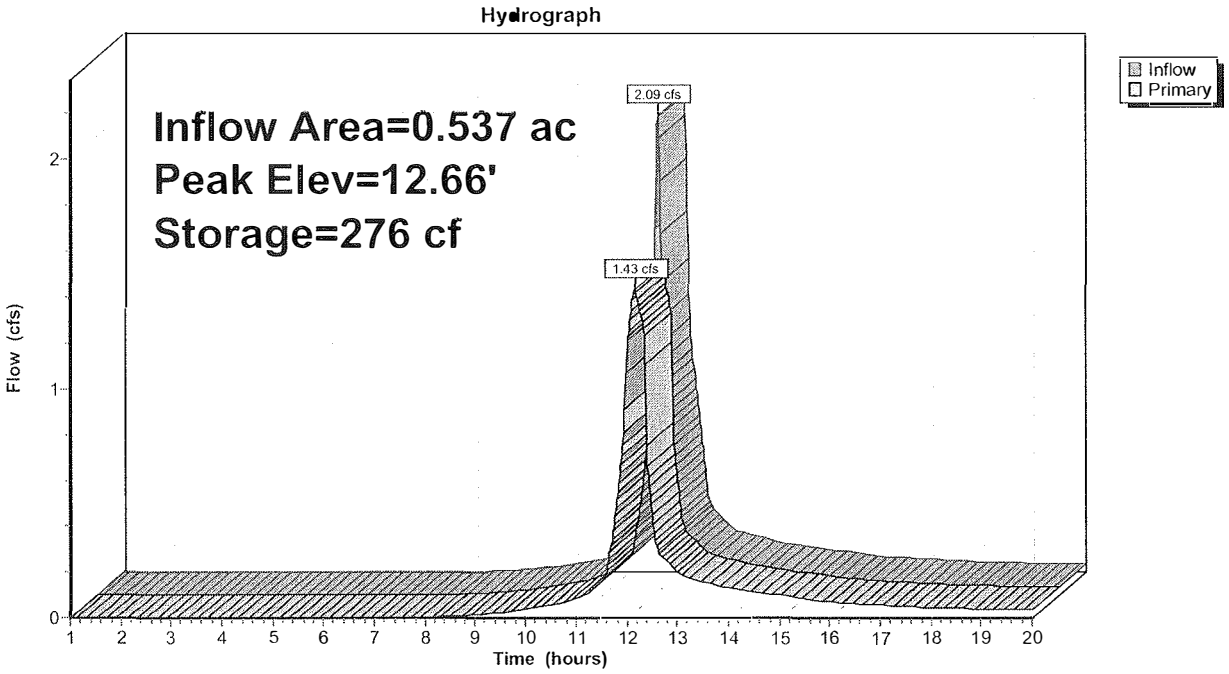
Volume	Invert	Avail.Storage	Storage Description
#1	11.50'	952 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
11.50	0
12.50	238
13.50	476
14.50	714
15.50	952

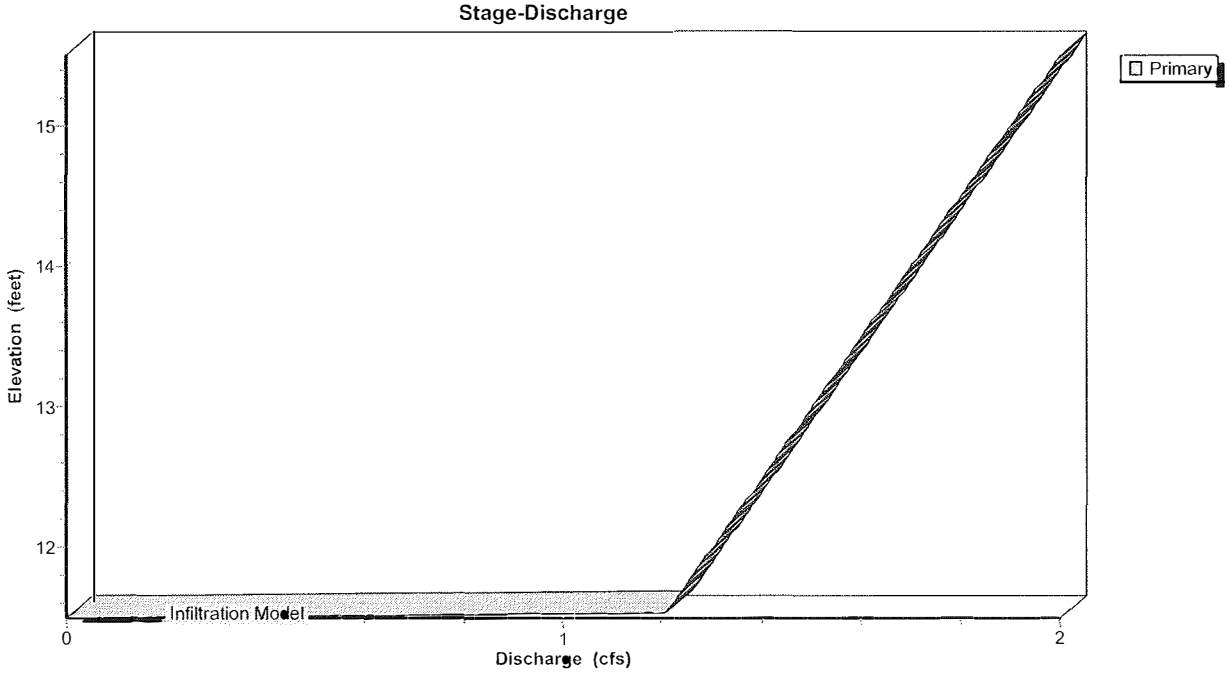
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model**
			Elev. (feet) 11.40 11.50 12.50 13.50 14.50 15.50
			Disch. (cfs) 0.000 1.200 1.400 1.600 1.800 2.000

Primary OutFlow Max=1.43 cfs @ 12.15 hrs HW=12.65' (Free Discharge)
↑—**1=Infiltration Model** (Custom Controls 1.43 cfs)

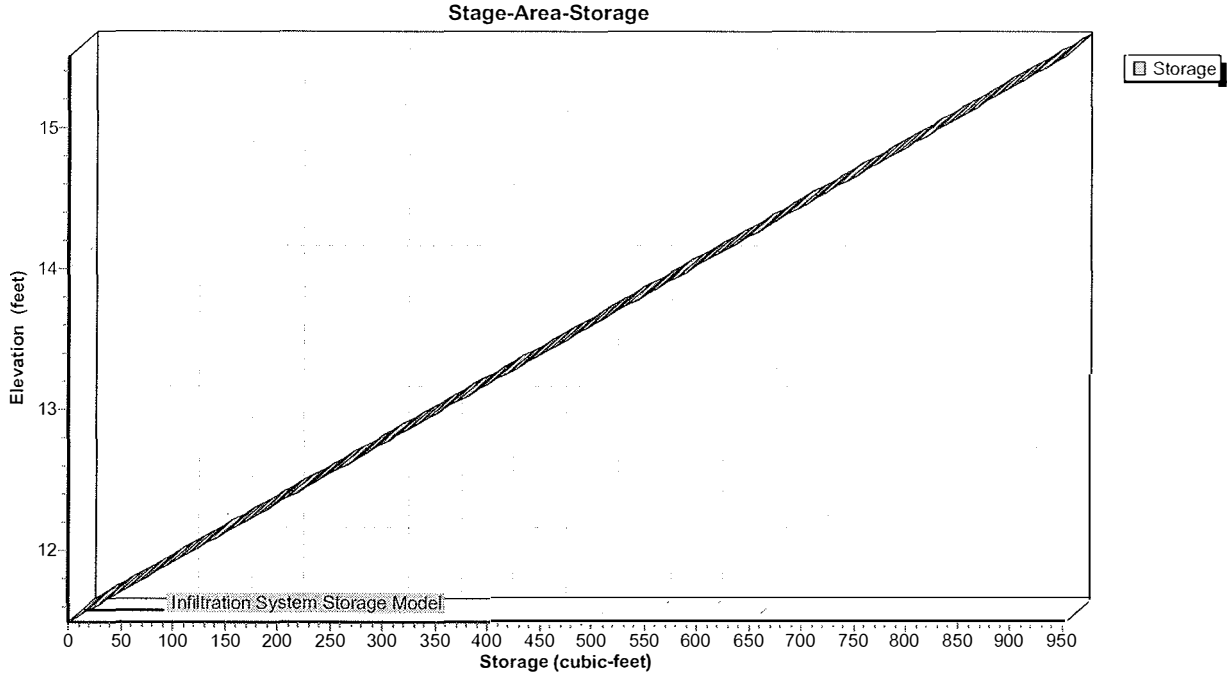
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	11.50	0.00
1.20	0.00	0	11.50	0.00
1.40	0.00	0	11.50	0.00
1.60	0.00	0	11.50	0.00
1.80	0.00	0	11.50	0.00
2.00	0.00	0	11.50	0.00
2.20	0.00	0	11.50	0.00
2.40	0.00	0	11.50	0.00
2.60	0.00	0	11.50	0.00
2.80	0.00	0	11.50	0.00
3.00	0.00	0	11.50	0.00
3.20	0.00	0	11.50	0.00
3.40	0.00	0	11.50	0.00
3.60	0.00	0	11.50	0.00
3.80	0.00	0	11.50	0.00
4.00	0.00	0	11.50	0.00
4.20	0.00	0	11.50	0.00
4.40	0.00	0	11.50	0.00
4.60	0.00	0	11.50	0.00
4.80	0.00	0	11.50	0.00
5.00	0.00	0	11.50	0.00
5.20	0.00	0	11.50	0.00
5.40	0.00	0	11.50	0.00
5.60	0.00	0	11.50	0.00
5.80	0.00	0	11.50	0.00
6.00	0.00	0	11.50	0.00
6.20	0.00	0	11.50	0.00
6.40	0.00	0	11.50	0.00
6.60	0.00	0	11.50	0.00
6.80	0.00	0	11.50	0.00
7.00	0.00	0	11.50	0.00
7.20	0.00	0	11.50	0.00
7.40	0.00	0	11.50	0.00
7.60	0.00	0	11.50	0.00
7.80	0.00	0	11.50	0.00
8.00	0.00	0	11.50	0.00
8.20	0.00	0	11.50	0.00
8.40	0.01	0	11.50	0.01
8.60	0.01	0	11.50	0.01
8.80	0.01	0	11.50	0.01
9.00	0.01	0	11.50	0.01
9.20	0.02	0	11.50	0.02
9.40	0.02	0	11.50	0.02
9.60	0.03	0	11.50	0.03
9.80	0.03	0	11.50	0.03
10.00	0.04	0	11.50	0.04
10.20	0.04	0	11.50	0.04
10.40	0.05	0	11.50	0.05
10.60	0.06	0	11.50	0.06
10.80	0.07	1	11.50	0.07
11.00	0.08	1	11.50	0.08
11.20	0.11	1	11.50	0.10
11.40	0.14	1	11.50	0.14
11.60	0.21	2	11.51	0.21
11.80	0.52	4	11.52	0.51
12.00	**1.32**	**12**	**11.55**	**1.21**
12.20	**1.11**	**247**	**12.54**	**1.41**
12.40	0.65	5	11.52	0.66
12.60	0.30	2	11.51	0.30
12.80	0.24	2	11.51	0.24
13.00	0.20	2	11.51	0.20
13.20	0.17	1	11.51	0.17
13.40	0.16	1	11.51	0.16
13.60	0.15	1	11.51	0.15
13.80	0.14	1	11.50	0.14
14.00	0.13	1	11.50	0.13
14.20	0.12	1	11.50	0.12
14.40	0.11	1	11.50	0.12
14.60	0.11	1	11.50	0.11
14.80	0.10	1	11.50	0.10
15.00	0.10	1	11.50	0.10
15.20	0.09	1	11.50	0.09
15.40	0.09	1	11.50	0.09
15.60	0.08	1	11.50	0.08
15.80	0.08	1	11.50	0.08
16.00	0.07	1	11.50	0.07
16.20	0.07	1	11.50	0.07
16.40	0.06	0	11.50	0.06
16.60	0.06	0	11.50	0.06
16.80	0.06	0	11.50	0.06
17.00	0.06	0	11.50	0.06
17.20	0.05	0	11.50	0.05
17.40	0.05	0	11.50	0.05
17.60	0.05	0	11.50	0.05
17.80	0.05	0	11.50	0.05
18.00	0.04	0	11.50	0.04
18.20	0.04	0	11.50	0.04
18.40	0.04	0	11.50	0.04
18.60	0.04	0	11.50	0.04
18.80	0.04	0	11.50	0.04
19.00	0.04	0	11.50	0.04
19.20	0.04	0	11.50	0.04
19.40	0.04	0	11.50	0.04
19.60	0.04	0	11.50	0.04
19.80	0.04	0	11.50	0.04
20.00	0.03	0	11.50	0.03

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
11.50	0.00	12.58	1.42	13.66	1.63	14.74	1.85
11.52	1.20	12.60	1.42	13.68	1.64	14.76	1.85
11.54	1.21	12.62	1.42	13.70	1.64	14.78	1.86
11.56	1.21	12.64	1.43	13.72	1.64	14.80	1.86
11.58	1.22	12.66	1.43	13.74	1.65	14.82	1.86
11.60	1.22	12.68	1.44	13.76	1.65	14.84	1.87
11.62	1.22	12.70	1.44	13.78	1.66	14.86	1.87
11.64	1.23	12.72	1.44	13.80	1.66	14.88	1.88
11.66	1.23	12.74	1.45	13.82	1.66	14.90	1.88
11.68	1.24	12.76	1.45	13.84	1.67	14.92	1.88
11.70	1.24	12.78	1.46	13.86	1.67	14.94	1.89
11.72	1.24	12.80	1.46	13.88	1.68	14.96	1.89
11.74	1.25	12.82	1.46	13.90	1.68	14.98	1.90
11.76	1.25	12.84	1.47	13.92	1.68	15.00	1.90
11.78	1.26	12.86	1.47	13.94	1.69	15.02	1.90
11.80	1.26	12.88	1.48	13.96	1.69	15.04	1.91
11.82	1.26	12.90	1.48	13.98	1.70	15.06	1.91
11.84	1.27	12.92	1.48	14.00	1.70	15.08	1.92
11.86	1.27	12.94	1.49	14.02	1.70	15.10	1.92
11.88	1.28	12.96	1.49	14.04	1.71	15.12	1.92
11.90	1.28	12.98	1.50	14.06	1.71	15.14	1.93
11.92	1.28	13.00	1.50	14.08	1.72	15.16	1.93
11.94	1.29	13.02	1.50	14.10	1.72	15.18	1.94
11.96	1.29	13.04	1.51	14.12	1.72	15.20	1.94
11.98	1.30	13.06	1.51	14.14	1.73	15.22	1.94
12.00	1.30	13.08	1.52	14.16	1.73	15.24	1.95
12.02	1.30	13.10	1.52	14.18	1.74	15.26	1.95
12.04	1.31	13.12	1.52	14.20	1.74	15.28	1.96
12.06	1.31	13.14	1.53	14.22	1.74	15.30	1.96
12.08	1.32	13.16	1.53	14.24	1.75	15.32	1.96
12.10	1.32	13.18	1.54	14.26	1.75	15.34	1.97
12.12	1.32	13.20	1.54	14.28	1.76	15.36	1.97
12.14	1.33	13.22	1.54	14.30	1.76	15.38	1.98
12.16	1.33	13.24	1.55	14.32	1.76	15.40	1.98
12.18	1.34	13.26	1.55	14.34	1.77	15.42	1.98
12.20	1.34	13.28	1.56	14.36	1.77	15.44	1.99
12.22	1.34	13.30	1.56	14.38	1.78	15.46	1.99
12.24	1.35	13.32	1.56	14.40	1.78	15.48	2.00
12.26	1.35	13.34	1.57	14.42	1.78	15.50	**2.00**
12.28	1.36	13.36	1.57	14.44	1.79		
12.30	1.36	13.38	1.58	14.46	1.79		
12.32	1.36	13.40	1.58	14.48	1.80		
12.34	1.37	13.42	1.58	14.50	1.80		
12.36	1.37	13.44	1.59	14.52	1.80		
12.38	1.38	13.46	1.59	14.54	1.81		
12.40	1.38	13.48	1.60	14.56	1.81		
12.42	1.38	13.50	1.60	14.58	1.82		
12.44	1.39	13.52	1.60	14.60	1.82		
12.46	1.39	13.54	1.61	14.62	1.82		
12.48	1.40	13.56	1.61	14.64	1.83		
12.50	1.40	13.58	1.62	14.66	1.83		
12.52	1.40	13.60	1.62	14.68	1.84		
12.54	1.41	13.62	1.62	14.70	1.84		
12.56	1.41	13.64	1.63	14.72	1.84		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
11.50	0	12.58	257	13.66	514	14.74	771
11.52	5	12.60	262	13.68	519	14.76	776
11.54	10	12.62	267	13.70	524	14.78	781
11.56	14	12.64	271	13.72	528	14.80	785
11.58	19	12.66	276	13.74	533	14.82	790
11.60	24	12.68	281	13.76	538	14.84	795
11.62	29	12.70	286	13.78	543	14.86	800
11.64	33	12.72	290	13.80	547	14.88	804
11.66	38	12.74	295	13.82	552	14.90	809
11.68	43	12.76	300	13.84	557	14.92	814
11.70	48	12.78	305	13.86	562	14.94	819
11.72	52	12.80	309	13.88	566	14.96	823
11.74	57	12.82	314	13.90	571	14.98	828
11.76	62	12.84	319	13.92	576	15.00	833
11.78	67	12.86	324	13.94	581	15.02	838
11.80	71	12.88	328	13.96	585	15.04	843
11.82	76	12.90	333	13.98	590	15.06	847
11.84	81	12.92	338	14.00	595	15.08	852
11.86	86	12.94	343	14.02	600	15.10	857
11.88	90	12.96	347	14.04	605	15.12	862
11.90	95	12.98	352	14.06	609	15.14	866
11.92	100	13.00	357	14.08	614	15.16	871
11.94	105	13.02	362	14.10	619	15.18	876
11.96	109	13.04	367	14.12	624	15.20	881
11.98	114	13.06	371	14.14	628	15.22	885
12.00	119	13.08	376	14.16	633	15.24	890
12.02	124	13.10	381	14.18	638	15.26	895
12.04	129	13.12	386	14.20	643	15.28	900
12.06	133	13.14	390	14.22	647	15.30	904
12.08	138	13.16	395	14.24	652	15.32	909
12.10	143	13.18	400	14.26	657	15.34	914
12.12	148	13.20	405	14.28	662	15.36	919
12.14	152	13.22	409	14.30	666	15.38	923
12.16	157	13.24	414	14.32	671	15.40	928
12.18	162	13.26	419	14.34	676	15.42	933
12.20	167	13.28	424	14.36	681	15.44	938
12.22	171	13.30	428	14.38	685	15.46	942
12.24	176	13.32	433	14.40	690	15.48	947
12.26	181	13.34	438	14.42	695	15.50	**952**
12.28	186	13.36	443	14.44	700		
12.30	190	13.38	447	14.46	704		
12.32	195	13.40	452	14.48	709		
12.34	200	13.42	457	14.50	714		
12.36	205	13.44	462	14.52	719		
12.38	209	13.46	466	14.54	724		
12.40	214	13.48	471	14.56	728		
12.42	219	13.50	476	14.58	733		
12.44	224	13.52	481	14.60	738		
12.46	228	13.54	486	14.62	743		
12.48	233	13.56	490	14.64	747		
12.50	238	13.58	495	14.66	752		
12.52	243	13.60	500	14.68	757		
12.54	248	13.62	505	14.70	762		
12.56	252	13.64	509	14.72	766		



Infiltration Storage Model

Subcat Reach Pond Link

Drainage Diagram for 17-005 CCH Project 2022 DA4
Prepared by down cape engineering, inc. 7/31/2019
HydroCAD® 8.00 s/n 004007 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.000	32	Woods/grass comb., Good, HSG A (1S)
1.154	98	Roof Area (1S)
1.154		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA4 Runoff Area=50,255 sf Runoff Depth>7.21"
Tc=5.0 min CN=98 Runoff=9.12 cfs 0.694 af

Pond 1P: Infiltration Storage Model Peak Elev=12.59' Storage=814 cf Inflow=9.12 cfs 0.694 af
Outflow=6.78 cfs 0.694 af

Total Runoff Area = 1.154 ac Runoff Volume = 0.694 af Average Runoff Depth = 7.21"
0.00% Pervious Area = 0.000 ac 100.00% Impervious Area = 1.154 ac

Subcatchment 1S: Drainage Area DA4

Time of Concentration

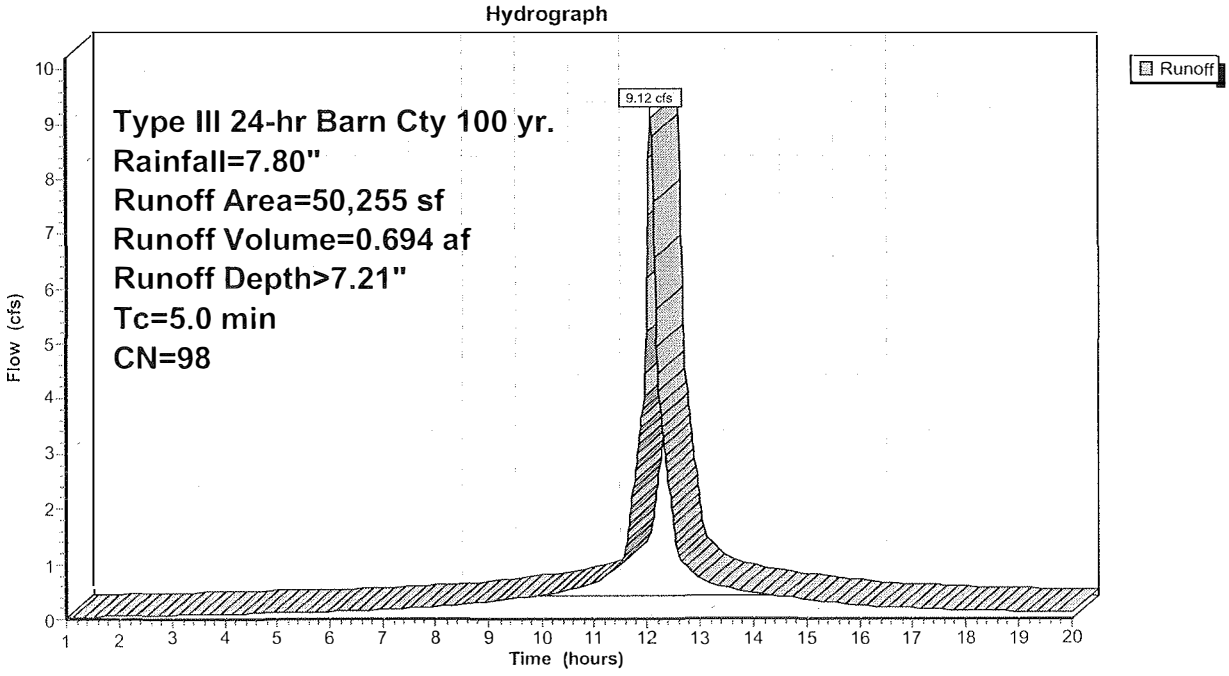
Runoff = 9.12 cfs @ 12.07 hrs, Volume= 0.694 af, Depth> 7.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 100 yr. Rainfall=7.80"

Area (sf)	CN	Description
50,255	98	Roof Area
0	32	Woods/grass comb., Good, HSG A
50,255	98	Weighted Average
50,255		Impervious Area

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

Subcatchment 1S: Drainage Area DA4



Hydrograph for Subcatchment 1S: Drainage Area DA4

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.01	0.02	11.80	2.91	2.68	2.84
1.20	0.09	0.01	0.03	12.00	3.90	3.67	**6.20**
1.40	0.11	0.02	0.04	12.20	4.89	4.65	**4.47**
1.60	0.12	0.02	0.04	12.40	5.35	5.11	2.49
1.80	0.14	0.03	0.05	12.60	5.56	5.33	1.11
2.00	0.16	0.04	0.05	12.80	5.72	5.48	0.89
2.20	0.17	0.05	0.06	13.00	5.85	5.61	0.73
2.40	0.19	0.06	0.06	13.20	5.96	5.72	0.64
2.60	0.20	0.07	0.07	13.40	6.06	5.82	0.59
2.80	0.22	0.09	0.07	13.60	6.16	5.92	0.55
3.00	0.24	0.10	0.08	13.80	6.25	6.01	0.50
3.20	0.26	0.11	0.08	14.00	6.33	6.09	0.46
3.40	0.28	0.13	0.08	14.20	6.40	6.16	0.43
3.60	0.30	0.14	0.09	14.40	6.47	6.23	0.41
3.80	0.32	0.16	0.09	14.60	6.54	6.30	0.39
4.00	0.34	0.17	0.10	14.80	6.60	6.36	0.37
4.20	0.36	0.19	0.10	15.00	6.66	6.42	0.35
4.40	0.38	0.21	0.10	15.20	6.72	6.48	0.33
4.60	0.40	0.23	0.11	15.40	6.77	6.53	0.31
4.80	0.42	0.25	0.11	15.60	6.82	6.58	0.29
5.00	0.44	0.27	0.12	15.80	6.87	6.63	0.26
5.20	0.47	0.29	0.12	16.00	6.91	6.67	0.24
5.40	0.49	0.31	0.12	16.20	6.95	6.71	0.23
5.60	0.51	0.33	0.13	16.40	6.99	6.75	0.22
5.80	0.54	0.35	0.13	16.60	7.03	6.79	0.21
6.00	0.56	0.37	0.13	16.80	7.06	6.82	0.20
6.20	0.59	0.40	0.14	17.00	7.09	6.85	0.19
6.40	0.61	0.42	0.15	17.20	7.13	6.89	0.18
6.60	0.64	0.45	0.16	17.40	7.16	6.92	0.18
6.80	0.67	0.48	0.17	17.60	7.19	6.95	0.17
7.00	0.71	0.51	0.18	17.80	7.21	6.97	0.16
7.20	0.74	0.54	0.19	18.00	7.24	7.00	0.15
7.40	0.77	0.57	0.20	18.20	7.26	7.02	0.14
7.60	0.81	0.61	0.20	18.40	7.29	7.05	0.14
7.80	0.85	0.65	0.21	18.60	7.31	7.07	0.14
8.00	0.89	0.68	0.22	18.80	7.33	7.10	0.14
8.20	0.93	0.72	0.24	19.00	7.36	7.12	0.13
8.40	0.98	0.77	0.26	19.20	7.38	7.14	0.13
8.60	1.03	0.82	0.28	19.40	7.40	7.16	0.13
8.80	1.08	0.87	0.30	19.60	7.42	7.18	0.12
9.00	1.14	0.92	0.32	19.80	7.44	7.20	0.12
9.20	1.20	0.98	0.34	20.00	**7.46**	**7.23**	0.12
9.40	1.26	1.05	0.37				
9.60	1.33	1.11	0.39				
9.80	1.40	1.18	0.41				
10.00	1.47	1.25	0.43				
10.20	1.55	1.33	0.46				
10.40	1.64	1.42	0.51				
10.60	1.74	1.51	0.55				
10.80	1.84	1.62	0.60				
11.00	1.95	1.72	0.64				
11.20	2.08	1.85	0.76				
11.40	2.24	2.01	0.92				
11.60	2.45	2.22	1.30				

Pond 1P: Infiltration Storage Model

Roof runoff clean- direct infiltration provided

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.154 ac, Inflow Depth > 7.21" for Barn Cty 100 yr. event
Inflow = 9.12 cfs @ 12.07 hrs, Volume= 0.694 af
Outflow = 6.78 cfs @ 12.14 hrs, Volume= 0.694 af, Atten= 26%, Lag= 4.0 min
Primary = 6.78 cfs @ 12.14 hrs, Volume= 0.694 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 12.59' @ 12.14 hrs Surf.Area= 0 sf Storage= 814 cf

Plug-Flow detention time=(not calculated: outflow precedes inflow)
Center-of-Mass det. time=0.5 min (714.3 - 713.8)

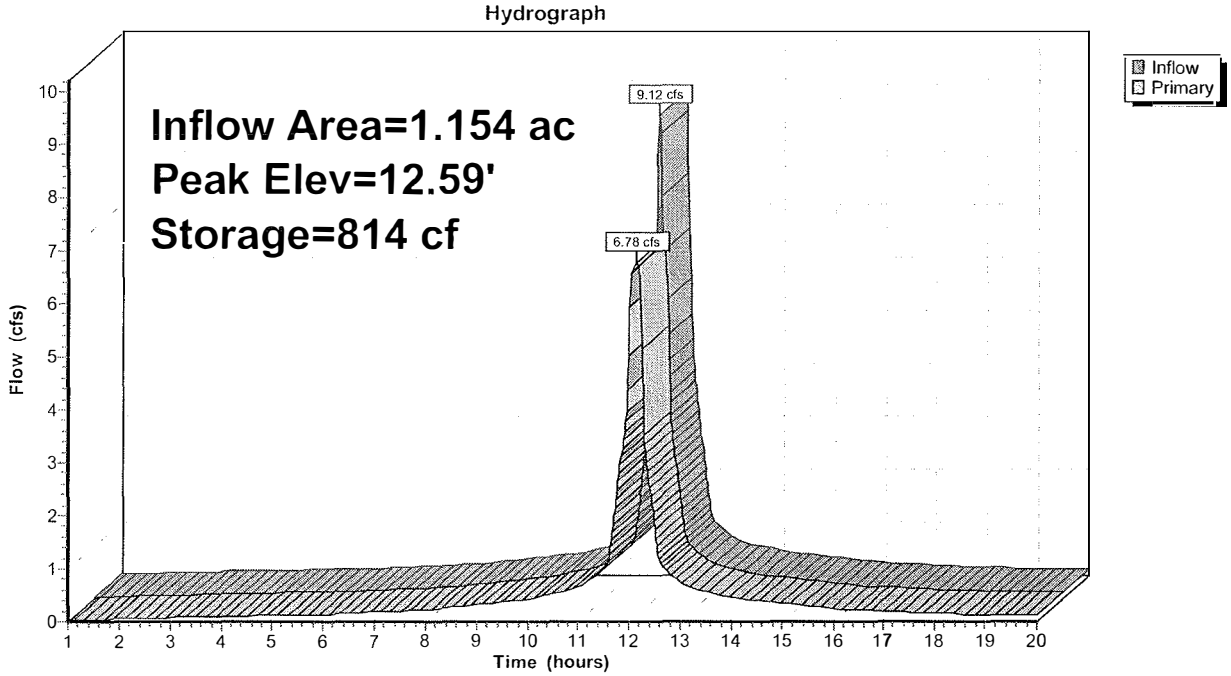
Volume	Invert	Avail.Storage	Storage Description
#1	11.90'	3,906 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
11.90	0
13.00	1,302
14.00	2,604
15.00	3,906

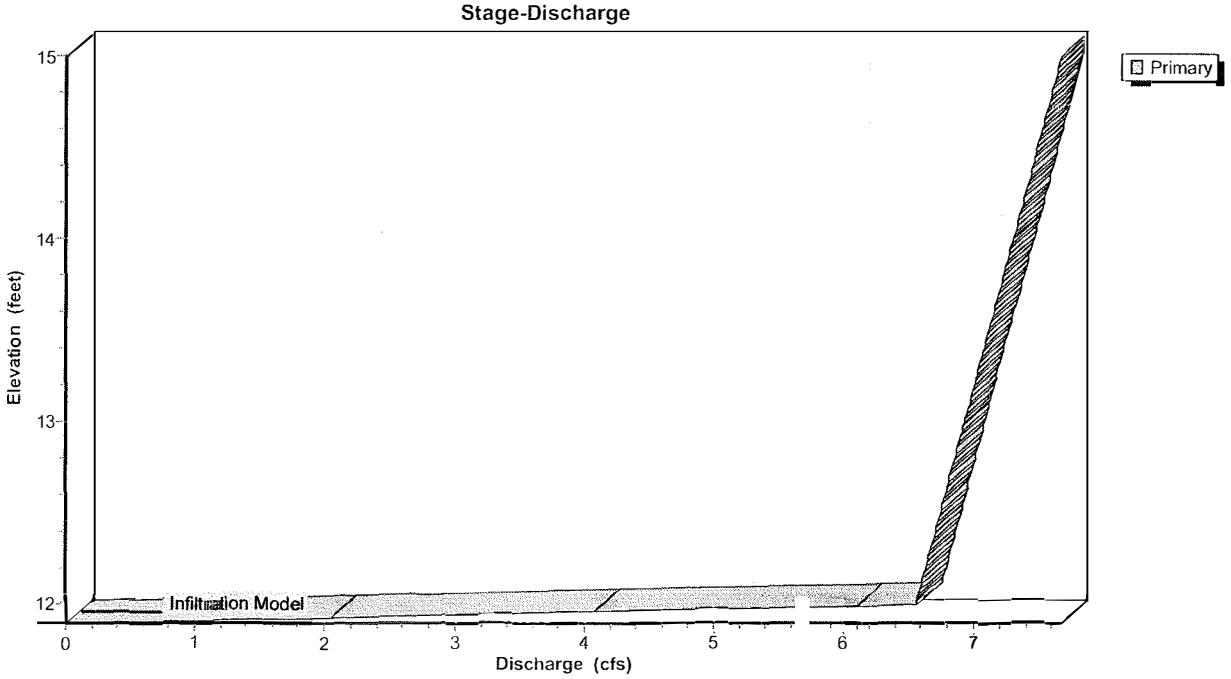
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model**
			Elev. (feet) 11.90 12.00 13.00 14.00 15.00
			Disch. (cfs) 0.000 6.560 6.930 7.310 7.680

Primary OutFlow Max=6.78 cfs @ 12.14 hrs HW=12.58' (Free Discharge)
↑—**1=Infiltration Model** (Custom Controls 6.78 cfs)

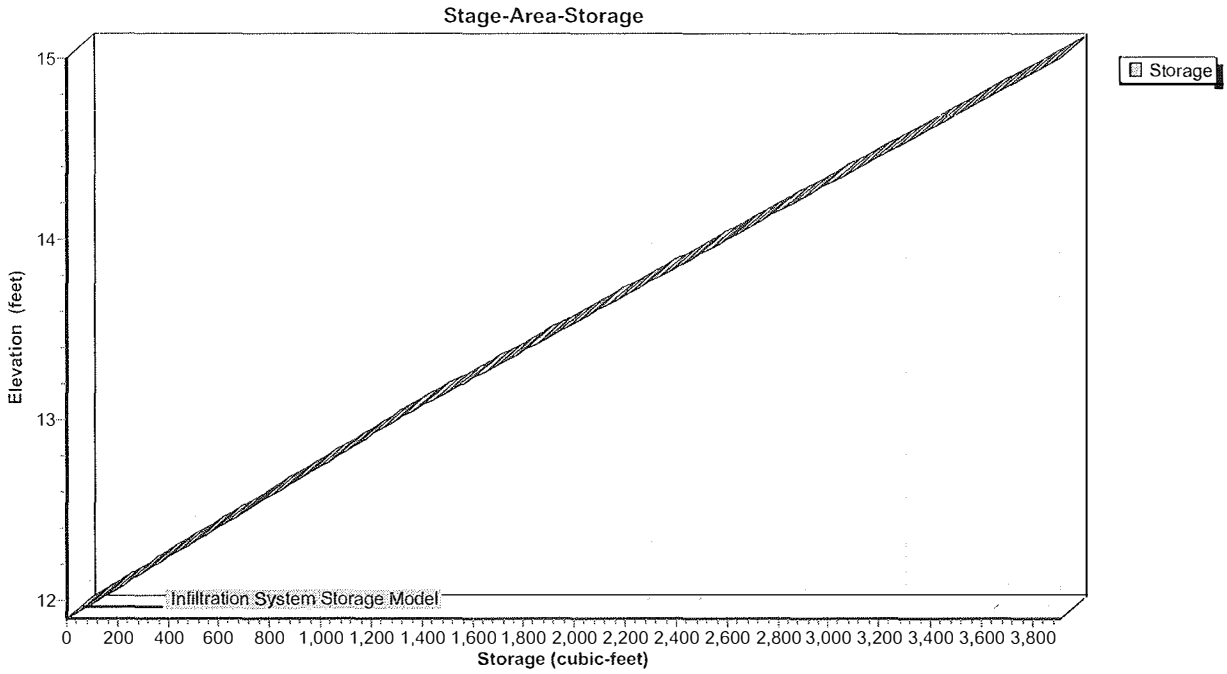
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.02	0	11.90	0.01
1.20	0.03	1	11.90	0.03
1.40	0.04	1	11.90	0.04
1.60	0.04	1	11.90	0.04
1.80	0.05	1	11.90	0.05
2.00	0.05	1	11.90	0.05
2.20	0.06	1	11.90	0.06
2.40	0.06	1	11.90	0.06
2.60	0.07	1	11.90	0.07
2.80	0.07	1	11.90	0.07
3.00	0.08	1	11.90	0.08
3.20	0.08	1	11.90	0.08
3.40	0.08	2	11.90	0.08
3.60	0.09	2	11.90	0.09
3.80	0.09	2	11.90	0.09
4.00	0.10	2	11.90	0.10
4.20	0.10	2	11.90	0.10
4.40	0.10	2	11.90	0.10
4.60	0.11	2	11.90	0.11
4.80	0.11	2	11.90	0.11
5.00	0.12	2	11.90	0.12
5.20	0.12	2	11.90	0.12
5.40	0.12	2	11.90	0.12
5.60	0.13	2	11.90	0.13
5.80	0.13	2	11.90	0.13
6.00	0.13	2	11.90	0.13
6.20	0.14	3	11.90	0.14
6.40	0.15	3	11.90	0.15
6.60	0.16	3	11.90	0.16
6.80	0.17	3	11.90	0.17
7.00	0.18	3	11.90	0.18
7.20	0.19	3	11.90	0.19
7.40	0.20	4	11.90	0.19
7.60	0.20	4	11.90	0.20
7.80	0.21	4	11.90	0.21
8.00	0.22	4	11.90	0.22
8.20	0.24	4	11.90	0.24
8.40	0.26	5	11.90	0.26
8.60	0.28	5	11.90	0.28
8.80	0.30	5	11.90	0.30
9.00	0.32	6	11.90	0.32
9.20	0.34	6	11.91	0.34
9.40	0.37	7	11.91	0.37
9.60	0.39	7	11.91	0.39
9.80	0.41	7	11.91	0.41
10.00	0.43	8	11.91	0.43
10.20	0.46	8	11.91	0.46
10.40	0.51	9	11.91	0.51
10.60	0.55	10	11.91	0.55
10.80	0.60	11	11.91	0.59
11.00	0.64	12	11.91	0.64
11.20	0.76	14	11.91	0.75
11.40	0.92	17	11.91	0.92
11.60	1.30	23	11.92	1.27
11.80	2.84	51	11.94	2.80
12.00	**6.20**	**107**	**11.99**	**5.95**
12.20	**4.47**	**514**	**12.33**	**6.68**
12.40	2.49	46	11.94	2.53
12.60	1.11	20	11.92	1.13
12.80	0.89	16	11.91	0.90
13.00	0.73	13	11.91	0.73
13.20	0.64	11	11.91	0.64
13.40	0.59	11	11.91	0.59
13.60	0.55	10	11.91	0.55
13.80	0.50	9	11.91	0.51
14.00	0.46	8	11.91	0.46
14.20	0.43	8	11.91	0.43
14.40	0.41	7	11.91	0.41
14.60	0.39	7	11.91	0.39
14.80	0.37	7	11.91	0.37
15.00	0.35	6	11.91	0.35
15.20	0.33	6	11.90	0.33
15.40	0.31	6	11.90	0.31
15.60	0.29	5	11.90	0.29
15.80	0.26	5	11.90	0.27
16.00	0.24	4	11.90	0.24
16.20	0.23	4	11.90	0.23
16.40	0.22	4	11.90	0.22
16.60	0.21	4	11.90	0.21
16.80	0.20	4	11.90	0.20
17.00	0.19	4	11.90	0.19
17.20	0.18	3	11.90	0.19
17.40	0.18	3	11.90	0.18
17.60	0.17	3	11.90	0.17
17.80	0.16	3	11.90	0.16
18.00	0.15	3	11.90	0.15
18.20	0.14	3	11.90	0.14
18.40	0.14	3	11.90	0.14
18.60	0.14	2	11.90	0.14
18.80	0.14	2	11.90	0.14
19.00	0.13	2	11.90	0.13
19.20	0.13	2	11.90	0.13
19.40	0.13	2	11.90	0.13
19.60	0.12	2	11.90	0.12
19.80	0.12	2	11.90	0.12
20.00	0.12	2	11.90	0.12

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
11.90	0.00	12.98	6.92	14.06	7.33
11.92	1.31	13.00	6.93	14.08	7.34
11.94	2.62	13.02	6.94	14.10	7.35
11.96	3.94	13.04	6.95	14.12	7.35
11.98	5.25	13.06	6.95	14.14	7.36
12.00	6.56	13.08	6.96	14.16	7.37
12.02	6.57	13.10	6.97	14.18	7.38
12.04	6.57	13.12	6.98	14.20	7.38
12.06	6.58	13.14	6.98	14.22	7.39
12.08	6.59	13.16	6.99	14.24	7.40
12.10	6.60	13.18	7.00	14.26	7.41
12.12	6.60	13.20	7.01	14.28	7.41
12.14	6.61	13.22	7.01	14.30	7.42
12.16	6.62	13.24	7.02	14.32	7.43
12.18	6.63	13.26	7.03	14.34	7.44
12.20	6.63	13.28	7.04	14.36	7.44
12.22	6.64	13.30	7.04	14.38	7.45
12.24	6.65	13.32	7.05	14.40	7.46
12.26	6.66	13.34	7.06	14.42	7.47
12.28	6.66	13.36	7.07	14.44	7.47
12.30	6.67	13.38	7.07	14.46	7.48
12.32	6.68	13.40	7.08	14.48	7.49
12.34	6.69	13.42	7.09	14.50	7.50
12.36	6.69	13.44	7.10	14.52	7.50
12.38	6.70	13.46	7.10	14.54	7.51
12.40	6.71	13.48	7.11	14.56	7.52
12.42	6.72	13.50	7.12	14.58	7.52
12.44	6.72	13.52	7.13	14.60	7.53
12.46	6.73	13.54	7.14	14.62	7.54
12.48	6.74	13.56	7.14	14.64	7.55
12.50	6.75	13.58	7.15	14.66	7.55
12.52	6.75	13.60	7.16	14.68	7.56
12.54	6.76	13.62	7.17	14.70	7.57
12.56	6.77	13.64	7.17	14.72	7.58
12.58	6.77	13.66	7.18	14.74	7.58
12.60	6.78	13.68	7.19	14.76	7.59
12.62	6.79	13.70	7.20	14.78	7.60
12.64	6.80	13.72	7.20	14.80	7.61
12.66	6.80	13.74	7.21	14.82	7.61
12.68	6.81	13.76	7.22	14.84	7.62
12.70	6.82	13.78	7.23	14.86	7.63
12.72	6.83	13.80	7.23	14.88	7.64
12.74	6.83	13.82	7.24	14.90	7.64
12.76	6.84	13.84	7.25	14.92	7.65
12.78	6.85	13.86	7.26	14.94	7.66
12.80	6.86	13.88	7.26	14.96	7.67
12.82	6.86	13.90	7.27	14.98	7.67
12.84	6.87	13.92	7.28	15.00	**7.68**
12.86	6.88	13.94	7.29		
12.88	6.89	13.96	7.29		
12.90	6.89	13.98	7.30		
12.92	6.90	14.00	7.31		
12.94	6.91	14.02	7.32		
12.96	6.92	14.04	7.32		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
11.90	0	12.98	1,278	14.06	2,682
11.92	24	13.00	1,302	14.08	2,708
11.94	47	13.02	1,328	14.10	2,734
11.96	71	13.04	1,354	14.12	2,760
11.98	95	13.06	1,380	14.14	2,786
12.00	118	13.08	1,406	14.16	2,812
12.02	142	13.10	1,432	14.18	2,838
12.04	166	13.12	1,458	14.20	2,864
12.06	189	13.14	1,484	14.22	2,890
12.08	213	13.16	1,510	14.24	2,916
12.10	237	13.18	1,536	14.26	2,943
12.12	260	13.20	1,562	14.28	2,969
12.14	284	13.22	1,588	14.30	2,995
12.16	308	13.24	1,614	14.32	3,021
12.18	331	13.26	1,641	14.34	3,047
12.20	355	13.28	1,667	14.36	3,073
12.22	379	13.30	1,693	14.38	3,099
12.24	402	13.32	1,719	14.40	3,125
12.26	426	13.34	1,745	14.42	3,151
12.28	450	13.36	1,771	14.44	3,177
12.30	473	13.38	1,797	14.46	3,203
12.32	497	13.40	1,823	14.48	3,229
12.34	521	13.42	1,849	14.50	3,255
12.36	544	13.44	1,875	14.52	3,281
12.38	568	13.46	1,901	14.54	3,307
12.40	592	13.48	1,927	14.56	3,333
12.42	615	13.50	1,953	14.58	3,359
12.44	639	13.52	1,979	14.60	3,385
12.46	663	13.54	2,005	14.62	3,411
12.48	687	13.56	2,031	14.64	3,437
12.50	710	13.58	2,057	14.66	3,463
12.52	734	13.60	2,083	14.68	3,489
12.54	758	13.62	2,109	14.70	3,515
12.56	781	13.64	2,135	14.72	3,541
12.58	805	13.66	2,161	14.74	3,567
12.60	829	13.68	2,187	14.76	3,594
12.62	852	13.70	2,213	14.78	3,620
12.64	876	13.72	2,239	14.80	3,646
12.66	900	13.74	2,265	14.82	3,672
12.68	923	13.76	2,292	14.84	3,698
12.70	947	13.78	2,318	14.86	3,724
12.72	971	13.80	2,344	14.88	3,750
12.74	994	13.82	2,370	14.90	3,776
12.76	1,018	13.84	2,396	14.92	3,802
12.78	1,042	13.86	2,422	14.94	3,828
12.80	1,065	13.88	2,448	14.96	3,854
12.82	1,089	13.90	2,474	14.98	3,880
12.84	1,113	13.92	2,500	15.00	**3,906**
12.86	1,136	13.94	2,526		
12.88	1,160	13.96	2,552		
12.90	1,184	13.98	2,578		
12.92	1,207	14.00	2,604		
12.94	1,231	14.02	2,630		
12.96	1,255	14.04	2,656		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA4 Runoff Area=50,255 sf Runoff Depth>5.21"
Tc=5.0 min CN=98 Runoff=6.65 cfs 0.501 af

Pond 1P: Infiltration Storage Model Peak Elev=12.00' Storage=121 cf Inflow=6.65 cfs 0.501 af
Outflow=6.57 cfs 0.501 af

Total Runoff Area = 1.154 ac Runoff Volume = 0.501 af Average Runoff Depth = 5.21"
0.00% Pervious Area = 0.000 ac 100.00% Impervious Area = 1.154 ac

Subcatchment 1S: Drainage Area DA4

Time of Concentration

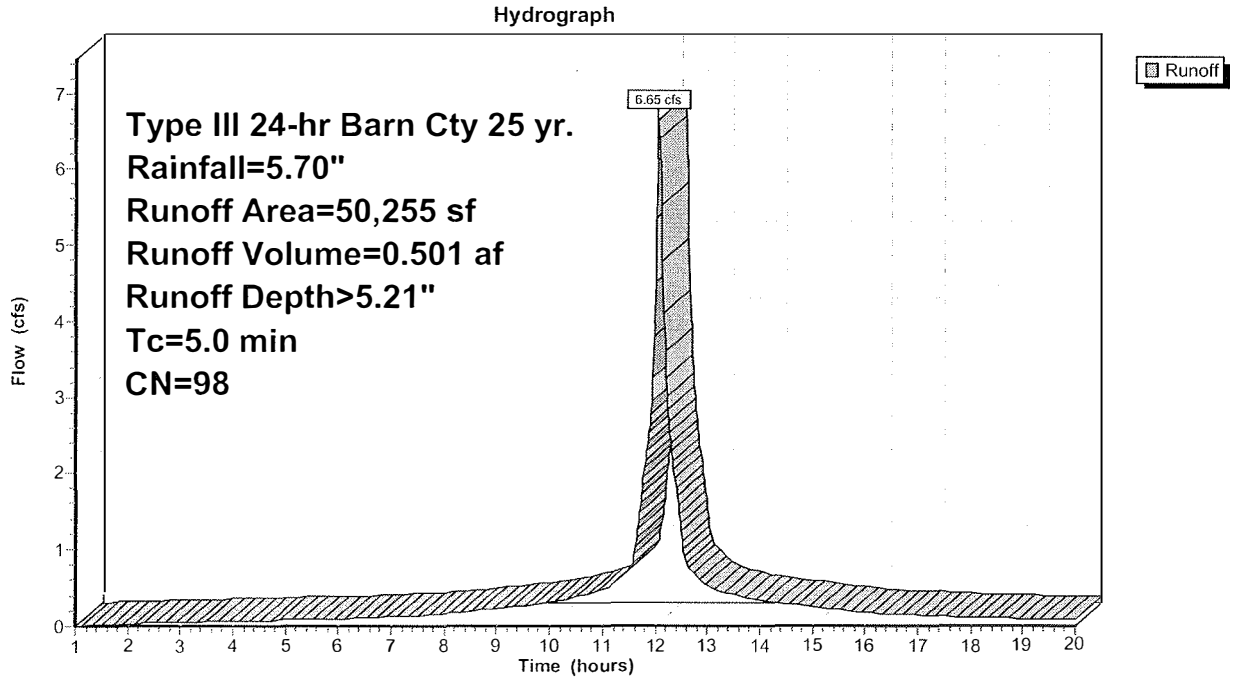
Runoff = 6.65 cfs @ 12.07 hrs, Volume= 0.501 af, Depth> 5.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 25 yr. Rainfall=5.70"

Area (sf)	CN	Description
50,255	98	Roof Area
0	32	Woods/grass comb., Good, HSG A
50,255	98	Weighted Average
50,255		Impervious Area

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

Subcatchment 1S: Drainage Area DA4



Hydrograph for Subcatchment 1S: Drainage Area DA4

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.06	0.00	0.01	11.80	2.13	1.90	2.07
1.20	0.07	0.00	0.01	12.00	2.85	2.62	**4.52**
1.40	0.08	0.01	0.02	12.20	3.57	3.34	**3.26**
1.60	0.09	0.01	0.02	12.40	3.91	3.67	1.82
1.80	0.10	0.01	0.03	12.60	4.07	3.83	0.81
2.00	0.11	0.02	0.03	12.80	4.18	3.95	0.65
2.20	0.13	0.02	0.03	13.00	4.27	4.04	0.53
2.40	0.14	0.03	0.04	13.20	4.36	4.12	0.46
2.60	0.15	0.04	0.04	13.40	4.43	4.19	0.43
2.80	0.16	0.05	0.04	13.60	4.50	4.26	0.40
3.00	0.18	0.05	0.05	13.80	4.56	4.33	0.37
3.20	0.19	0.06	0.05	14.00	4.62	4.39	0.34
3.40	0.20	0.07	0.05	14.20	4.68	4.44	0.32
3.60	0.22	0.08	0.06	14.40	4.73	4.49	0.30
3.80	0.23	0.09	0.06	14.60	4.78	4.54	0.28
4.00	0.25	0.10	0.06	14.80	4.83	4.59	0.27
4.20	0.26	0.11	0.07	15.00	4.87	4.63	0.25
4.40	0.28	0.13	0.07	15.20	4.91	4.67	0.24
4.60	0.29	0.14	0.07	15.40	4.95	4.71	0.22
4.80	0.31	0.15	0.08	15.60	4.99	4.75	0.21
5.00	0.32	0.16	0.08	15.80	5.02	4.78	0.19
5.20	0.34	0.18	0.08	16.00	5.05	4.81	0.18
5.40	0.36	0.19	0.08	16.20	5.08	4.84	0.17
5.60	0.37	0.21	0.09	16.40	5.11	4.87	0.16
5.80	0.39	0.22	0.09	16.60	5.13	4.90	0.15
6.00	0.41	0.24	0.09	16.80	5.16	4.92	0.15
6.20	0.43	0.25	0.10	17.00	5.18	4.95	0.14
6.40	0.45	0.27	0.10	17.20	5.21	4.97	0.13
6.60	0.47	0.29	0.11	17.40	5.23	4.99	0.13
6.80	0.49	0.31	0.12	17.60	5.25	5.01	0.12
7.00	0.52	0.33	0.12	17.80	5.27	5.03	0.12
7.20	0.54	0.35	0.13	18.00	5.29	5.05	0.11
7.40	0.57	0.38	0.14	18.20	5.31	5.07	0.10
7.60	0.59	0.40	0.14	18.40	5.33	5.09	0.10
7.80	0.62	0.43	0.15	18.60	5.34	5.11	0.10
8.00	0.65	0.46	0.16	18.80	5.36	5.12	0.10
8.20	0.68	0.49	0.17	19.00	5.38	5.14	0.10
8.40	0.71	0.52	0.19	19.20	5.39	5.16	0.09
8.60	0.75	0.55	0.20	19.40	5.41	5.17	0.09
8.80	0.79	0.59	0.22	19.60	5.42	5.19	0.09
9.00	0.83	0.63	0.23	19.80	5.44	5.20	0.09
9.20	0.87	0.67	0.25	20.00	**5.45**	**5.22**	0.09
9.40	0.92	0.72	0.26				
9.60	0.97	0.76	0.28				
9.80	1.02	0.81	0.29				
10.00	1.08	0.87	0.31				
10.20	1.14	0.92	0.34				
10.40	1.20	0.99	0.37				
10.60	1.27	1.05	0.40				
10.80	1.34	1.13	0.43				
11.00	1.42	1.21	0.46				
11.20	1.52	1.30	0.55				
11.40	1.63	1.41	0.67				
11.60	1.79	1.57	0.95				

Pond 1P: Infiltration Storage Model

Roof runoff clean- direct infiltration provided

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.154 ac, Inflow Depth > 5.21" for Barn Cty 25 yr. event
Inflow = 6.65 cfs @ 12.07 hrs, Volume= 0.501 af
Outflow = 6.57 cfs @ 12.07 hrs, Volume= 0.501 af, Atten= 1%, Lag= 0.3 min
Primary = 6.57 cfs @ 12.07 hrs, Volume= 0.501 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 12.00' @ 12.08 hrs Surf.Area= 0 sf Storage= 121 cf

Plug-Flow detention time=0.3 min calculated for 0.500 af (100% of inflow)
Center-of-Mass det. time=0.3 min (718.1 - 717.8)

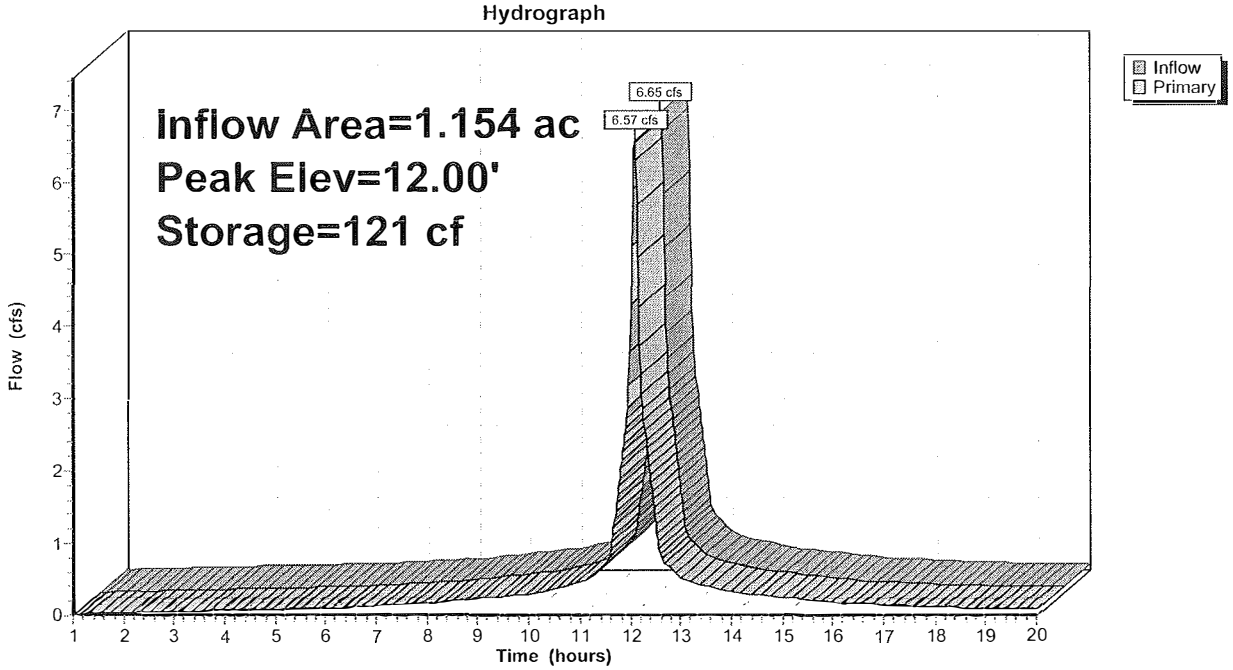
Volume	Invert	Avail.Storage	Storage Description
#1	11.90'	3,906 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
11.90	0
13.00	1,302
14.00	2,604
15.00	3,906

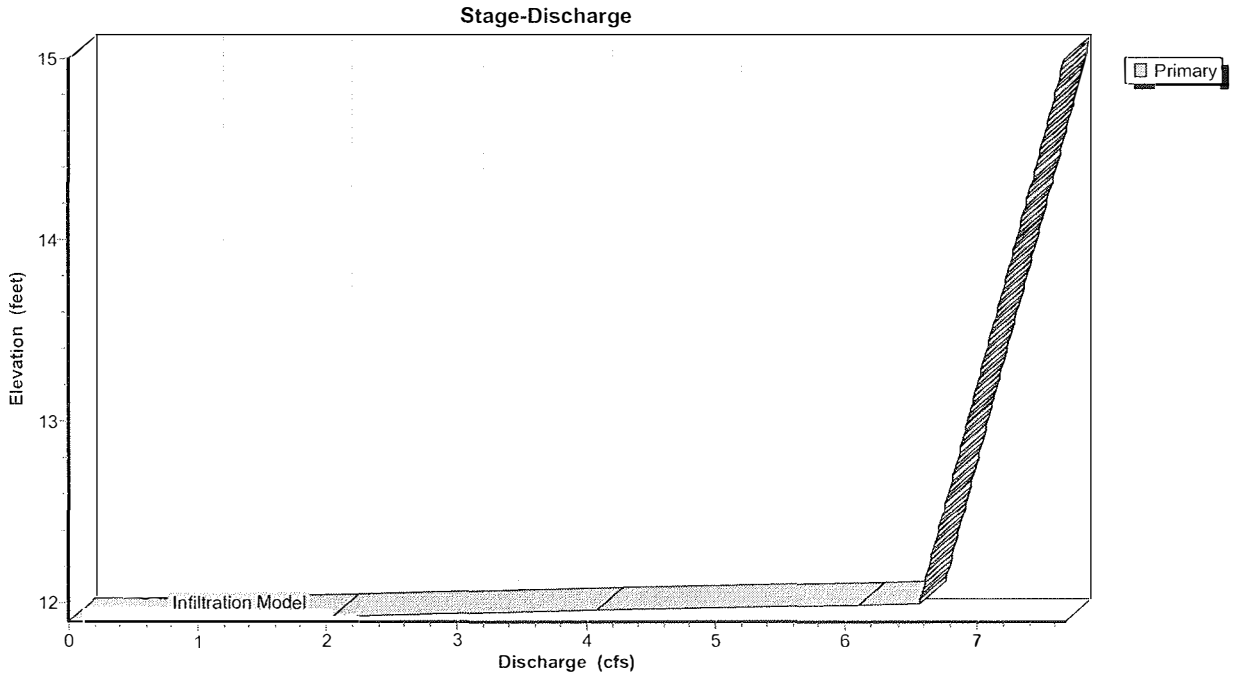
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model**
			Elev. (feet) 11.90 12.00 13.00 14.00 15.00
			Disch. (cfs) 0.000 6.560 6.930 7.310 7.680

Primary OutFlow Max=6.56 cfs @ 12.07 hrs HW=12.00' (Free Discharge)
↑**1=Infiltration Model** (Custom Controls 6.56 cfs)

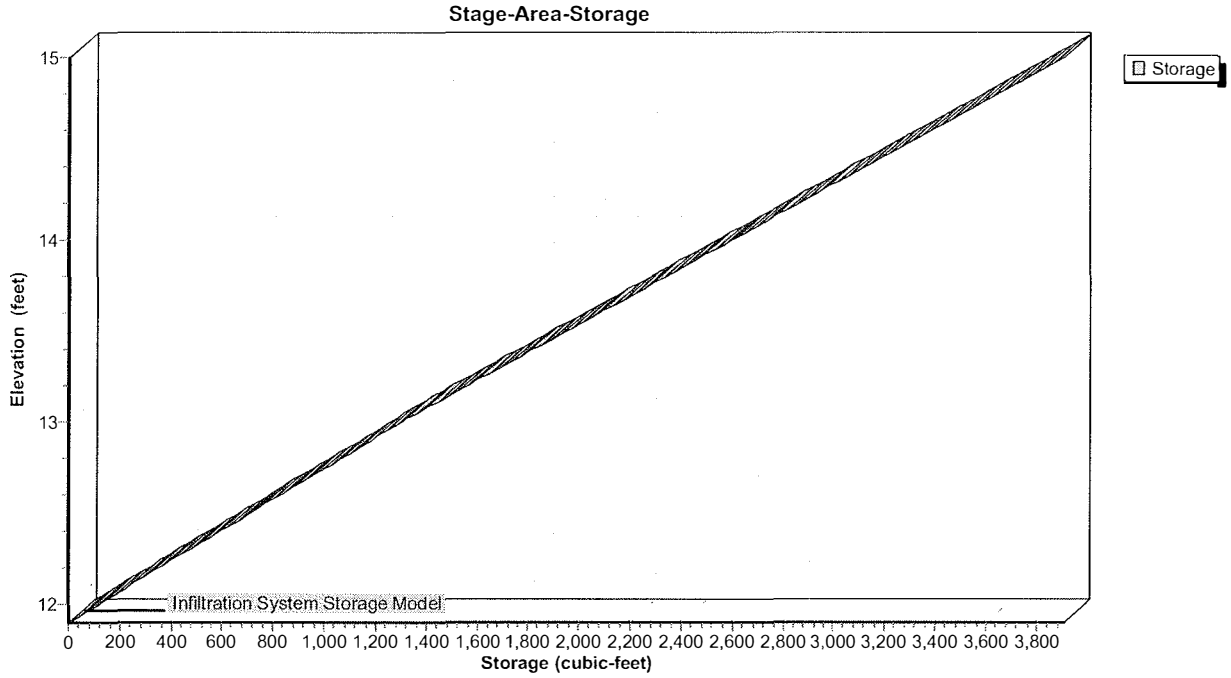
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

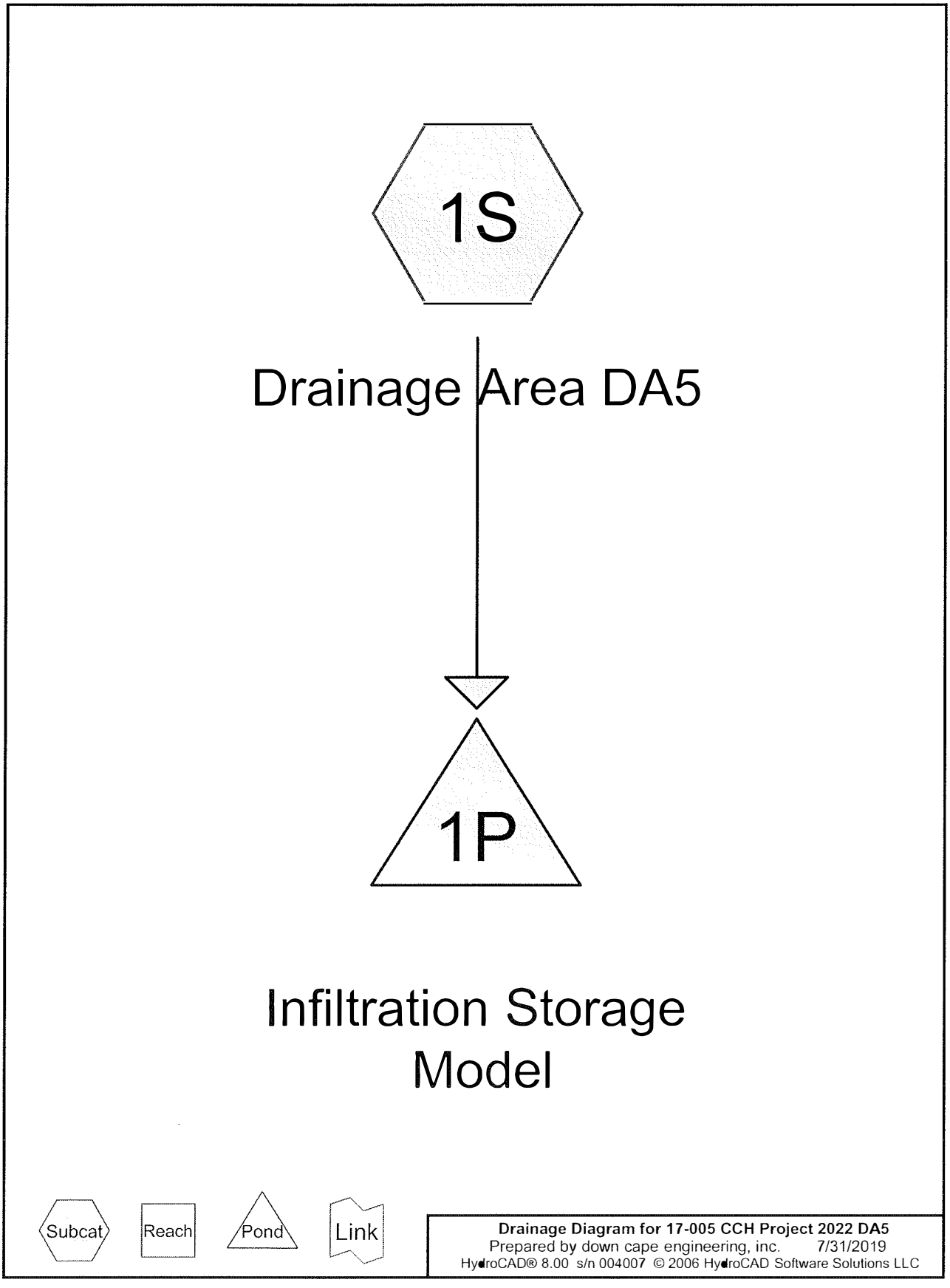
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.01	0	11.90	0.00
1.20	0.01	0	11.90	0.01
1.40	0.02	0	11.90	0.02
1.60	0.02	0	11.90	0.02
1.80	0.03	0	11.90	0.03
2.00	0.03	1	11.90	0.03
2.20	0.03	1	11.90	0.03
2.40	0.04	1	11.90	0.04
2.60	0.04	1	11.90	0.04
2.80	0.04	1	11.90	0.04
3.00	0.05	1	11.90	0.05
3.20	0.05	1	11.90	0.05
3.40	0.05	1	11.90	0.05
3.60	0.06	1	11.90	0.06
3.80	0.06	1	11.90	0.06
4.00	0.06	1	11.90	0.06
4.20	0.07	1	11.90	0.07
4.40	0.07	1	11.90	0.07
4.60	0.07	1	11.90	0.07
4.80	0.08	1	11.90	0.08
5.00	0.08	1	11.90	0.08
5.20	0.08	1	11.90	0.08
5.40	0.08	2	11.90	0.08
5.60	0.09	2	11.90	0.09
5.80	0.09	2	11.90	0.09
6.00	0.09	2	11.90	0.09
6.20	0.10	2	11.90	0.10
6.40	0.10	2	11.90	0.10
6.60	0.11	2	11.90	0.11
6.80	0.12	2	11.90	0.12
7.00	0.12	2	11.90	0.12
7.20	0.13	2	11.90	0.13
7.40	0.14	2	11.90	0.14
7.60	0.14	3	11.90	0.14
7.80	0.15	3	11.90	0.15
8.00	0.16	3	11.90	0.16
8.20	0.17	3	11.90	0.17
8.40	0.19	3	11.90	0.19
8.60	0.20	4	11.90	0.20
8.80	0.22	4	11.90	0.22
9.00	0.23	4	11.90	0.23
9.20	0.25	4	11.90	0.25
9.40	0.26	5	11.90	0.26
9.60	0.28	5	11.90	0.28
9.80	0.29	5	11.90	0.29
10.00	0.31	6	11.90	0.31
10.20	0.34	6	11.91	0.33
10.40	0.37	7	11.91	0.37
10.60	0.40	7	11.91	0.40
10.80	0.43	8	11.91	0.43
11.00	0.46	8	11.91	0.46
11.20	0.55	10	11.91	0.55
11.40	0.67	12	11.91	0.67
11.60	0.95	17	11.91	0.93
11.80	2.07	37	11.93	2.04
12.00	**4.52**	**78**	**11.97**	**4.34**
12.20	**3.26**	**60**	**11.95**	**3.35**
12.40	1.82	33	11.93	1.85
12.60	0.81	15	11.91	0.82
12.80	0.65	12	11.91	0.65
13.00	0.53	10	11.91	0.53
13.20	0.46	8	11.91	0.46
13.40	0.43	8	11.91	0.43
13.60	0.40	7	11.91	0.40
13.80	0.37	7	11.91	0.37
14.00	0.34	6	11.91	0.34
14.20	0.32	6	11.90	0.32
14.40	0.30	5	11.90	0.30
14.60	0.28	5	11.90	0.28
14.80	0.27	5	11.90	0.27
15.00	0.25	5	11.90	0.25
15.20	0.24	4	11.90	0.24
15.40	0.22	4	11.90	0.22
15.60	0.21	4	11.90	0.21
15.80	0.19	3	11.90	0.19
16.00	0.18	3	11.90	0.18
16.20	0.17	3	11.90	0.17
16.40	0.16	3	11.90	0.16
16.60	0.15	3	11.90	0.16
16.80	0.15	3	11.90	0.15
17.00	0.14	3	11.90	0.14
17.20	0.13	2	11.90	0.14
17.40	0.13	2	11.90	0.13
17.60	0.12	2	11.90	0.12
17.80	0.12	2	11.90	0.12
18.00	0.11	2	11.90	0.11
18.20	0.10	2	11.90	0.10
18.40	0.10	2	11.90	0.10
18.60	0.10	2	11.90	0.10
18.80	0.10	2	11.90	0.10
19.00	0.10	2	11.90	0.10
19.20	0.09	2	11.90	0.09
19.40	0.09	2	11.90	0.09
19.60	0.09	2	11.90	0.09
19.80	0.09	2	11.90	0.09
20.00	0.09	2	11.90	0.09

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
11.90	0.00	12.98	6.92	14.06	7.33
11.92	1.31	13.00	6.93	14.08	7.34
11.94	2.62	13.02	6.94	14.10	7.35
11.96	3.94	13.04	6.95	14.12	7.35
11.98	5.25	13.06	6.95	14.14	7.36
12.00	6.56	13.08	6.96	14.16	7.37
12.02	6.57	13.10	6.97	14.18	7.38
12.04	6.57	13.12	6.98	14.20	7.38
12.06	6.58	13.14	6.98	14.22	7.39
12.08	6.59	13.16	6.99	14.24	7.40
12.10	6.60	13.18	7.00	14.26	7.41
12.12	6.60	13.20	7.01	14.28	7.41
12.14	6.61	13.22	7.01	14.30	7.42
12.16	6.62	13.24	7.02	14.32	7.43
12.18	6.63	13.26	7.03	14.34	7.44
12.20	6.63	13.28	7.04	14.36	7.44
12.22	6.64	13.30	7.04	14.38	7.45
12.24	6.65	13.32	7.05	14.40	7.46
12.26	6.66	13.34	7.06	14.42	7.47
12.28	6.66	13.36	7.07	14.44	7.47
12.30	6.67	13.38	7.07	14.46	7.48
12.32	6.68	13.40	7.08	14.48	7.49
12.34	6.69	13.42	7.09	14.50	7.50
12.36	6.69	13.44	7.10	14.52	7.50
12.38	6.70	13.46	7.10	14.54	7.51
12.40	6.71	13.48	7.11	14.56	7.52
12.42	6.72	13.50	7.12	14.58	7.52
12.44	6.72	13.52	7.13	14.60	7.53
12.46	6.73	13.54	7.14	14.62	7.54
12.48	6.74	13.56	7.14	14.64	7.55
12.50	6.75	13.58	7.15	14.66	7.55
12.52	6.75	13.60	7.16	14.68	7.56
12.54	6.76	13.62	7.17	14.70	7.57
12.56	6.77	13.64	7.17	14.72	7.58
12.58	6.77	13.66	7.18	14.74	7.58
12.60	6.78	13.68	7.19	14.76	7.59
12.62	6.79	13.70	7.20	14.78	7.60
12.64	6.80	13.72	7.20	14.80	7.61
12.66	6.80	13.74	7.21	14.82	7.61
12.68	6.81	13.76	7.22	14.84	7.62
12.70	6.82	13.78	7.23	14.86	7.63
12.72	6.83	13.80	7.23	14.88	7.64
12.74	6.83	13.82	7.24	14.90	7.64
12.76	6.84	13.84	7.25	14.92	7.65
12.78	6.85	13.86	7.26	14.94	7.66
12.80	6.86	13.88	7.26	14.96	7.67
12.82	6.86	13.90	7.27	14.98	7.67
12.84	6.87	13.92	7.28	15.00	**7.68**
12.86	6.88	13.94	7.29		
12.88	6.89	13.96	7.29		
12.90	6.89	13.98	7.30		
12.92	6.90	14.00	7.31		
12.94	6.91	14.02	7.32		
12.96	6.92	14.04	7.32		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
11.90	0	12.98	1,278	14.06	2,682
11.92	24	13.00	1,302	14.08	2,708
11.94	47	13.02	1,328	14.10	2,734
11.96	71	13.04	1,354	14.12	2,760
11.98	95	13.06	1,380	14.14	2,786
12.00	118	13.08	1,406	14.16	2,812
12.02	142	13.10	1,432	14.18	2,838
12.04	166	13.12	1,458	14.20	2,864
12.06	189	13.14	1,484	14.22	2,890
12.08	213	13.16	1,510	14.24	2,916
12.10	237	13.18	1,536	14.26	2,943
12.12	260	13.20	1,562	14.28	2,969
12.14	284	13.22	1,588	14.30	2,995
12.16	308	13.24	1,614	14.32	3,021
12.18	331	13.26	1,641	14.34	3,047
12.20	355	13.28	1,667	14.36	3,073
12.22	379	13.30	1,693	14.38	3,099
12.24	402	13.32	1,719	14.40	3,125
12.26	426	13.34	1,745	14.42	3,151
12.28	450	13.36	1,771	14.44	3,177
12.30	473	13.38	1,797	14.46	3,203
12.32	497	13.40	1,823	14.48	3,229
12.34	521	13.42	1,849	14.50	3,255
12.36	544	13.44	1,875	14.52	3,281
12.38	568	13.46	1,901	14.54	3,307
12.40	592	13.48	1,927	14.56	3,333
12.42	615	13.50	1,953	14.58	3,359
12.44	639	13.52	1,979	14.60	3,385
12.46	663	13.54	2,005	14.62	3,411
12.48	687	13.56	2,031	14.64	3,437
12.50	710	13.58	2,057	14.66	3,463
12.52	734	13.60	2,083	14.68	3,489
12.54	758	13.62	2,109	14.70	3,515
12.56	781	13.64	2,135	14.72	3,541
12.58	805	13.66	2,161	14.74	3,567
12.60	829	13.68	2,187	14.76	3,594
12.62	852	13.70	2,213	14.78	3,620
12.64	876	13.72	2,239	14.80	3,646
12.66	900	13.74	2,265	14.82	3,672
12.68	923	13.76	2,292	14.84	3,698
12.70	947	13.78	2,318	14.86	3,724
12.72	971	13.80	2,344	14.88	3,750
12.74	994	13.82	2,370	14.90	3,776
12.76	1,018	13.84	2,396	14.92	3,802
12.78	1,042	13.86	2,422	14.94	3,828
12.80	1,065	13.88	2,448	14.96	3,854
12.82	1,089	13.90	2,474	14.98	3,880
12.84	1,113	13.92	2,500	15.00	**3,906**
12.86	1,136	13.94	2,526		
12.88	1,160	13.96	2,552		
12.90	1,184	13.98	2,578		
12.92	1,207	14.00	2,604		
12.94	1,231	14.02	2,630		
12.96	1,255	14.04	2,656		


1S
Drainage Area DA5
1P
Infiltration Storage
Model
Subcat
Reach
Pond
Link
Drainage Diagram for 17-005 CCH Project 2022 DA5
Prepared by down cape engineering, inc. 7/31/2019
HydroCAD® 8.00 s/n 004007 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.102	32	Woods/grass comb., Good, HSG A (1S)
0.306	98	Paved parking (1S)
0.408		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA5 Runoff Area=17,766 sf Runoff Depth>5.35"
Tc=5.0 min CN=82 Runoff=2.74 cfs 0.182 af

Pond 1P: Infiltration Storage Model Peak Elev=11.69' Storage=257 cf Inflow=2.74 cfs 0.182 af
Outflow=1.98 cfs 0.181 af

Total Runoff Area = 0.408 ac Runoff Volume = 0.182 af Average Runoff Depth = 5.35"
24.91% Pervious Area = 0.102 ac 75.09% Impervious Area = 0.306 ac

Subcatchment 1S: Drainage Area DA5

Time of Concentration

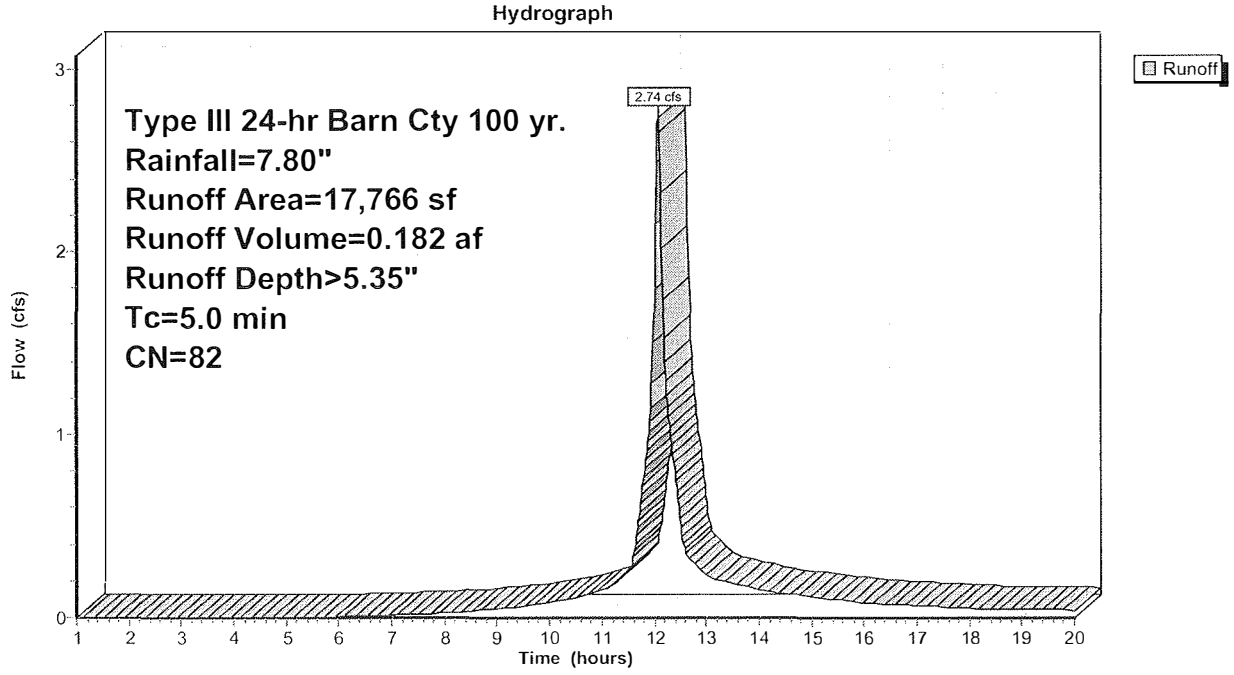
Runoff = 2.74 cfs @ 12.07 hrs, Volume= 0.182 af, Depth> 5.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 100 yr. Rainfall=7.80"

Area (sf)	CN	Description
13,341	98	Paved parking
4,425	32	Woods/grass comb., Good, HSG A
17,766	82	Weighted Average
4,425		Pervious Area
13,341		Impervious Area

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

Subcatchment 1S: Drainage Area DA5



Hydrograph for Subcatchment 1S: Drainage Area DA5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	11.80	2.91	1.31	0.77
1.20	0.09	0.00	0.00	12.00	3.90	2.12	**1.80**
1.40	0.11	0.00	0.00	12.20	4.89	2.98	**1.39**
1.60	0.12	0.00	0.00	12.40	5.35	3.39	0.79
1.80	0.14	0.00	0.00	12.60	5.56	3.59	0.36
2.00	0.16	0.00	0.00	12.80	5.72	3.73	0.29
2.20	0.17	0.00	0.00	13.00	5.85	3.85	0.24
2.40	0.19	0.00	0.00	13.20	5.96	3.95	0.21
2.60	0.20	0.00	0.00	13.40	6.06	4.04	0.19
2.80	0.22	0.00	0.00	13.60	6.16	4.13	0.18
3.00	0.24	0.00	0.00	13.80	6.25	4.21	0.16
3.20	0.26	0.00	0.00	14.00	6.33	4.29	0.15
3.40	0.28	0.00	0.00	14.20	6.40	4.36	0.14
3.60	0.30	0.00	0.00	14.40	6.47	4.42	0.13
3.80	0.32	0.00	0.00	14.60	6.54	4.49	0.13
4.00	0.34	0.00	0.00	14.80	6.60	4.55	0.12
4.20	0.36	0.00	0.00	15.00	6.66	4.60	0.11
4.40	0.38	0.00	0.00	15.20	6.72	4.65	0.11
4.60	0.40	0.00	0.00	15.40	6.77	4.70	0.10
4.80	0.42	0.00	0.00	15.60	6.82	4.75	0.09
5.00	0.44	0.00	0.00	15.80	6.87	4.79	0.09
5.20	0.47	0.00	0.00	16.00	6.91	4.83	0.08
5.40	0.49	0.00	0.00	16.20	6.95	4.87	0.08
5.60	0.51	0.00	0.00	16.40	6.99	4.91	0.07
5.80	0.54	0.00	0.00	16.60	7.03	4.94	0.07
6.00	0.56	0.01	0.00	16.80	7.06	4.97	0.07
6.20	0.59	0.01	0.01	17.00	7.09	5.00	0.06
6.40	0.61	0.01	0.01	17.20	7.13	5.03	0.06
6.60	0.64	0.02	0.01	17.40	7.16	5.06	0.06
6.80	0.67	0.02	0.01	17.60	7.19	5.09	0.06
7.00	0.71	0.03	0.01	17.80	7.21	5.12	0.05
7.20	0.74	0.04	0.02	18.00	7.24	5.14	0.05
7.40	0.77	0.04	0.02	18.20	7.26	5.16	0.05
7.60	0.81	0.05	0.02	18.40	7.29	5.19	0.05
7.80	0.85	0.06	0.02	18.60	7.31	5.21	0.05
8.00	0.89	0.08	0.02	18.80	7.33	5.23	0.05
8.20	0.93	0.09	0.03	19.00	7.36	5.25	0.04
8.40	0.98	0.11	0.03	19.20	7.38	5.27	0.04
8.60	1.03	0.12	0.04	19.40	7.40	5.29	0.04
8.80	1 08	0.14	0.04	19.60	7.42	5.31	0.04
9.00	1.14	0.17	0.05	19.80	7.44	5.33	0.04
9.20	1.20	0.19	0.05	20.00	**7.46**	**5.35**	0.04
9.40	1.26	0.22	0.06				
9.60	1.33	0.26	0.07				
9.80	1.40	0.29	0.07				
10.00	1.47	0.33	0.08				
10.20	1.55	0.38	0.09				
10.40	1.64	0.43	0.10				
10.60	1.74	0.48	0.12				
10.80	1.84	0.55	0.13				
11.00	1.95	0.62	0.15				
11.20	2.08	0.70	0.18				
11.40	2.24	0.81	0.23				
11.60	2.45	0.96	0.33				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 0.408 ac, Inflow Depth > 5.35" for Barn Cty 100 yr. event
Inflow = 2.74 cfs @ 12.07 hrs, Volume= 0.182 af
Outflow = 1.98 cfs @ 12.14 hrs, Volume= 0.181 af, Atten= 28%, Lag= 4.2 min
Primary = 1.98 cfs @ 12.14 hrs, Volume= 0.181 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 11.69' @ 12.14 hrs Surf.Area= 0 sf Storage= 257 cf

Plug-Flow detention time=1.3 min calculated for 0.181 af (100% of inflow)
Center-of-Mass det. time=0.4 min (767.3 - 766.9)

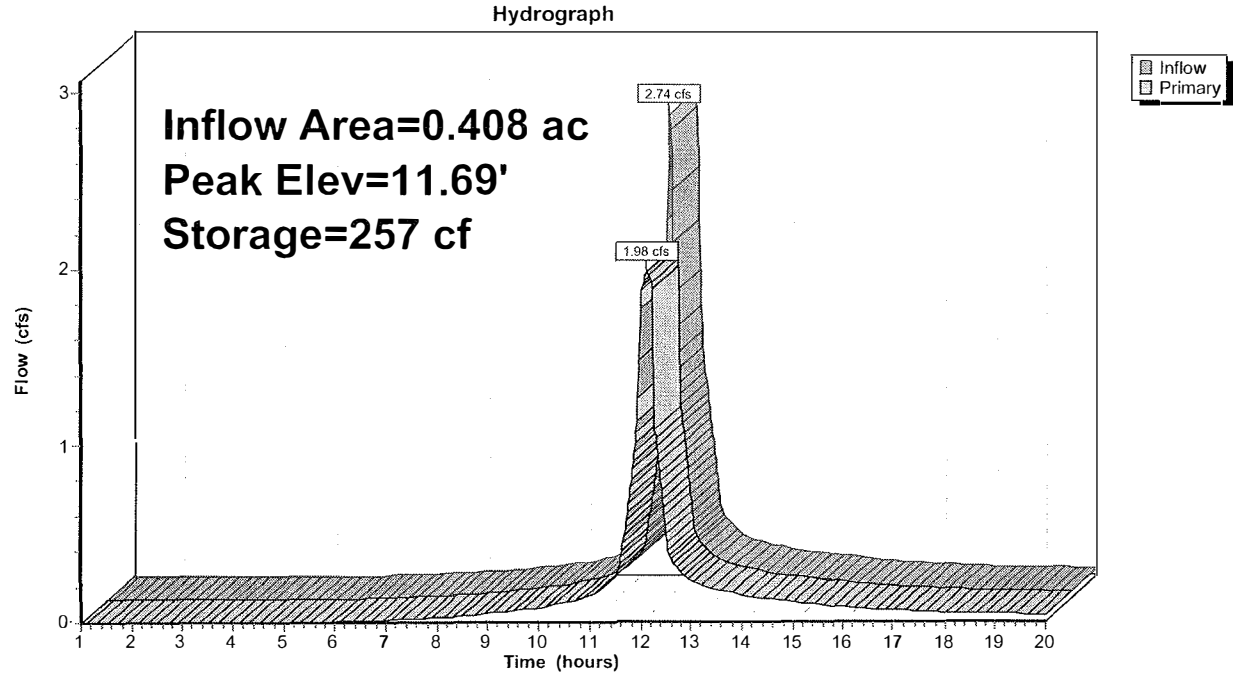
Volume	Invert	Avail.Storage	Storage Description
#1	11.00'	1,116 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
11.00	0
12.00	372
13.00	744
14.00	1,116

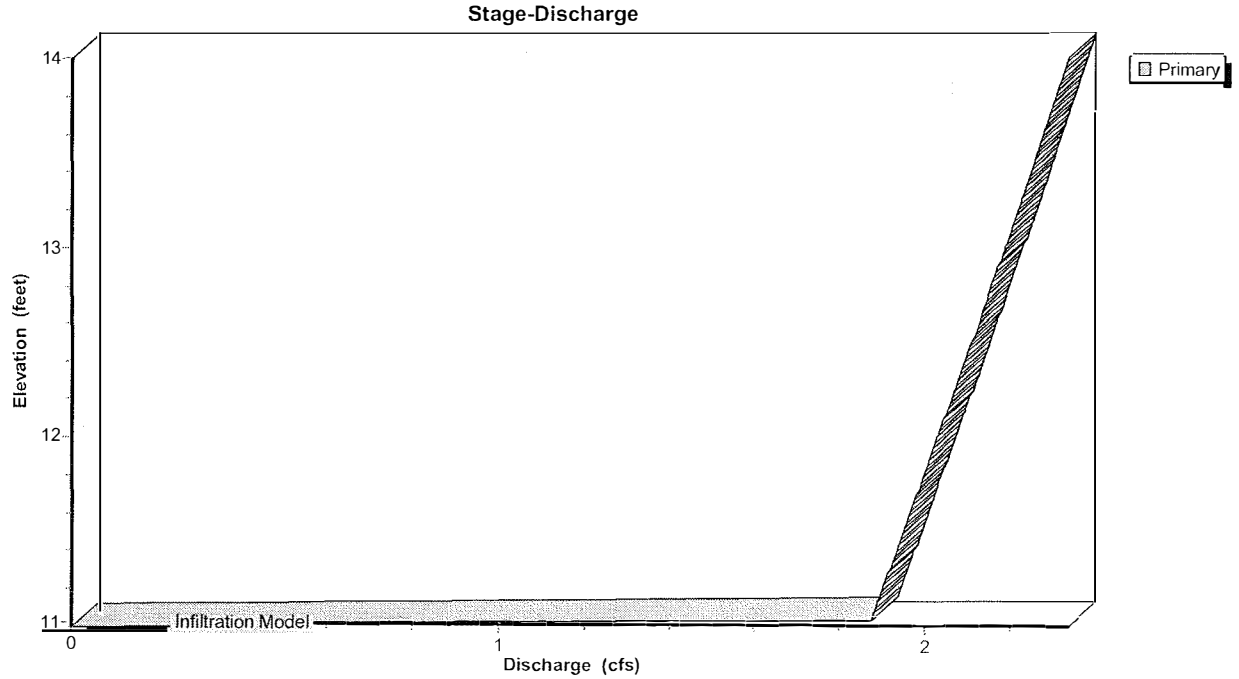
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model**
			Elev. (feet) 10.90 11.00 12.00 13.00 14.00
			Disch. (cfs) 0.000 1.870 2.030 2.190 2.340

Primary OutFlow Max=1.98 cfs @ 12.14 hrs HW=11.69' (Free Discharge)
↳**1=Infiltration Model** (Custom Controls 1.98 cfs)

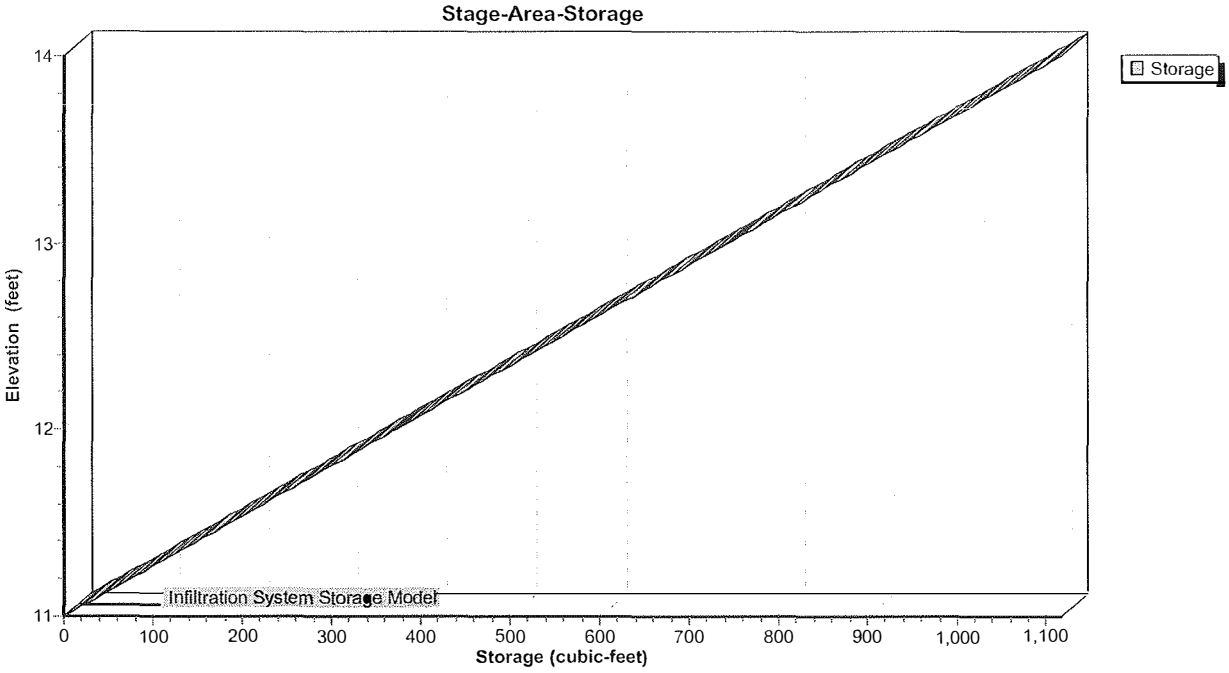
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	11.00	0.00
1.20	0.00	0	11.00	0.00
1.40	0.00	0	11.00	0.00
1.60	0.00	0	11.00	0.00
1.80	0.00	0	11.00	0.00
2.00	0.00	0	11.00	0.00
2.20	0.00	0	11.00	0.00
2.40	0.00	0	11.00	0.00
2.60	0.00	0	11.00	0.00
2.80	0.00	0	11.00	0.00
3.00	0.00	0	11.00	0.00
3.20	0.00	0	11.00	0.00
3.40	0.00	0	11.00	0.00
3.60	0.00	0	11.00	0.00
3.80	0.00	0	11.00	0.00
4.00	0.00	0	11.00	0.00
4.20	0.00	0	11.00	0.00
4.40	0.00	0	11.00	0.00
4.60	0.00	0	11.00	0.00
4.80	0.00	0	11.00	0.00
5.00	0.00	0	11.00	0.00
5.20	0.00	0	11.00	0.00
5.40	0.00	0	11.00	0.00
5.60	0.00	0	11.00	0.00
5.80	0.00	0	11.00	0.00
6.00	0.00	0	11.00	0.00
6.20	0.01	0	11.00	0.01
6.40	0.01	0	11.00	0.01
6.60	0.01	0	11.00	0.01
6.80	0.01	0	11.00	0.01
7.00	0.01	0	11.00	0.01
7.20	0.02	0	11.00	0.02
7.40	0.02	0	11.00	0.02
7.60	0.02	0	11.00	0.02
7.80	0.02	0	11.00	0.02
8.00	0.02	0	11.00	0.02
8.20	0.03	0	11.00	0.03
8.40	0.03	0	11.00	0.03
8.60	0.04	0	11.00	0.04
8.80	0.04	0	11.00	0.04
9.00	0.05	0	11.00	0.05
9.20	0.05	0	11.00	0.05
9.40	0.06	0	11.00	0.06
9.60	0.07	0	11.00	0.07
9.80	0.07	0	11.00	0.07
10.00	0.08	0	11.00	0.08
10.20	0.09	1	11.00	0.09
10.40	0.10	1	11.00	0.10
10.60	0.12	1	11.00	0.12
10.80	0.13	1	11.00	0.13
11.00	0.15	1	11.00	0.15
11.20	0.18	1	11.00	0.18
11.40	0.23	1	11.00	0.23
11.60	0.33	2	11.01	0.33
11.80	0.77	5	11.01	0.76
12.00	**1.80**	**11**	**11.03**	**1.78**
12.20	**1.39**	**189**	**11.51**	**1.95**
12.40	0.79	5	11.01	0.80
12.60	0.36	2	11.01	0.36
12.80	0.29	2	11.00	0.29
13.00	0.24	1	11.00	0.24
13.20	0.21	1	11.00	0.21
13.40	0.19	1	11.00	0.19
13.60	0.18	1	11.00	0.18
13.80	0.16	1	11.00	0.17
14.00	0.15	1	11.00	0.15
14.20	0.14	1	11.00	0.14
14.40	0.13	1	11.00	0.13
14.60	0.13	1	11.00	0.13
14.80	0.12	1	11.00	0.12
15.00	0.11	1	11.00	0.11
15.20	0.11	1	11.00	0.11
15.40	0.10	1	11.00	0.10
15.60	0.09	1	11.00	0.09
15.80	0.09	1	11.00	0.09
16.00	0.08	0	11.00	0.08
16.20	0.08	0	11.00	0.08
16.40	0.07	0	11.00	0.07
16.60	0.07	0	11.00	0.07
16.80	0.07	0	11.00	0.07
17.00	0.06	0	11.00	0.06
17.20	0.06	0	11.00	0.06
17.40	0.06	0	11.00	0.06
17.60	0.06	0	11.00	0.06
17.80	0.05	0	11.00	0.05
18.00	0.05	0	11.00	0.05
18.20	0.05	0	11.00	0.05
18.40	0.05	0	11.00	0.05
18.60	0.05	0	11.00	0.05
18.80	0.05	0	11.00	0.05
19.00	0.04	0	11.00	0.04
19.20	0.04	0	11.00	0.04
19.40	0.04	0	11.00	0.04
19.60	0.04	0	11.00	0.04
19.80	0.04	0	11.00	0.04
20.00	0.04	0	11.00	0.04

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
11.00	0.00	12.08	2.04	13.16	2.21
11.02	1.87	12.10	2.05	13.18	2.22
11.04	1.88	12.12	2.05	13.20	2.22
11.06	1.88	12.14	2.05	13.22	2.22
11.08	1.88	12.16	2.06	13.24	2.23
11.10	1.89	12.18	2.06	13.26	2.23
11.12	1.89	12.20	2.06	13.28	2.23
11.14	1.89	12.22	2.07	13.30	2.23
11.16	1.90	12.24	2.07	13.32	2.24
11.18	1.90	12.26	2.07	13.34	2.24
11.20	1.90	12.28	2.07	13.36	2.24
11.22	1.91	12.30	2.08	13.38	2.25
11.24	1.91	12.32	2.08	13.40	2.25
11.26	1.91	12.34	2.08	13.42	2.25
11.28	1.91	12.36	2.09	13.44	2.26
11.30	1.92	12.38	2.09	13.46	2.26
11.32	1.92	12.40	2.09	13.48	2.26
11.34	1.92	12.42	2.10	13.50	2.26
11.36	1.93	12.44	2.10	13.52	2.27
11.38	1.93	12.46	2.10	13.54	2.27
11.40	1.93	12.48	2.11	13.56	2.27
11.42	1.94	12.50	2.11	13.58	2.28
11.44	1.94	12.52	2.11	13.60	2.28
11.46	1.94	12.54	2.12	13.62	2.28
11.48	1.95	12.56	2.12	13.64	2.29
11.50	1.95	12.58	2.12	13.66	2.29
11.52	1.95	12.60	2.13	13.68	2.29
11.54	1.96	12.62	2.13	13.70	2.29
11.56	1.96	12.64	2.13	13.72	2.30
11.58	1.96	12.66	2.14	13.74	2.30
11.60	1.97	12.68	2.14	13.76	2.30
11.62	1.97	12.70	2.14	13.78	2.31
11.64	1.97	12.72	2.15	13.80	2.31
11.66	1.98	12.74	2.15	13.82	2.31
11.68	1.98	12.76	2.15	13.84	2.32
11.70	1.98	12.78	2.15	13.86	2.32
11.72	1.99	12.80	2.16	13.88	2.32
11.74	1.99	12.82	2.16	13.90	2.32
11.76	1.99	12.84	2.16	13.92	2.33
11.78	1.99	12.86	2.17	13.94	2.33
11.80	2.00	12.88	2.17	13.96	2.33
11.82	2.00	12.90	2.17	13.98	2.34
11.84	2.00	12.92	2.18	14.00	**2.34**
11.86	2.01	12.94	2.18		
11.88	2.01	12.96	2.18		
11.90	2.01	12.98	2.19		
11.92	2.02	13.00	2.19		
11.94	2.02	13.02	2.19		
11.96	2.02	13.04	2.20		
11.98	2.03	13.06	2.20		
12.00	2.03	13.08	2.20		
12.02	2.03	13.10	2.21		
12.04	2.04	13.12	2.21		
12.06	2.04	13.14	2.21		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
11.00	0	12.08	402	13.16	804
11.02	7	12.10	409	13.18	811
11.04	15	12.12	417	13.20	818
11.06	22	12.14	424	13.22	826
11.08	30	12.16	432	13.24	833
11.10	37	12.18	439	13.26	841
11.12	45	12.20	446	13.28	848
11.14	52	12.22	454	13.30	856
11.16	60	12.24	461	13.32	863
11.18	67	12.26	469	13.34	870
11.20	74	12.28	476	13.36	878
11.22	82	12.30	484	13.38	885
11.24	89	12.32	491	13.40	893
11.26	97	12.34	498	13.42	900
11.28	104	12.36	506	13.44	908
11.30	112	12.38	513	13.46	915
11.32	119	12.40	521	13.48	923
11.34	126	12.42	528	13.50	930
11.36	134	12.44	536	13.52	937
11.38	141	12.46	543	13.54	945
11.40	149	12.48	551	13.56	952
11.42	156	12.50	558	13.58	960
11.44	164	12.52	565	13.60	967
11.46	171	12.54	573	13.62	975
11.48	179	12.56	580	13.64	982
11.50	186	12.58	588	13.66	990
11.52	193	12.60	595	13.68	997
11.54	201	12.62	603	13.70	1,004
11.56	208	12.64	610	13.72	1,012
11.58	216	12.66	618	13.74	1,019
11.60	223	12.68	625	13.76	1,027
11.62	231	12.70	632	13.78	1,034
11.64	238	12.72	640	13.80	1,042
11.66	246	12.74	647	13.82	1,049
11.68	253	12.76	655	13.84	1,056
11.70	260	12.78	662	13.86	1,064
11.72	268	12.80	670	13.88	1,071
11.74	275	12.82	677	13.90	1,079
11.76	283	12.84	684	13.92	1,086
11.78	290	12.86	692	13.94	1,094
11.80	298	12.88	699	13.96	1,101
11.82	305	12.90	707	13.98	1,109
11.84	312	12.92	714	14.00	**1,116**
11.86	320	12.94	722		
11.88	327	12.96	729		
11.90	335	12.98	737		
11.92	342	13.00	744		
11.94	350	13.02	751		
11.96	357	13.04	759		
11.98	365	13.06	766		
12.00	372	13.08	774		
12.02	379	13.10	781		
12.04	387	13.12	789		
12.06	394	13.14	796		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA5 Runoff Area=17,766 sf Runoff Depth>3.48"
Tc=5.0 min CN=82 Runoff=1.82 cfs 0.118 af

Pond 1P: Infiltration Storage Model Peak Elev=11.03' Storage=11 cf Inflow=1.82 cfs 0.118 af
Outflow=1.81 cfs 0.118 af

Total Runoff Area = 0.408 ac Runoff Volume = 0.118 af Average Runoff Depth = 3.48"
24.91% Pervious Area = 0.102 ac 75.09% Impervious Area = 0.306 ac

Subcatchment 1S: Drainage Area DA5

Time of Concentration

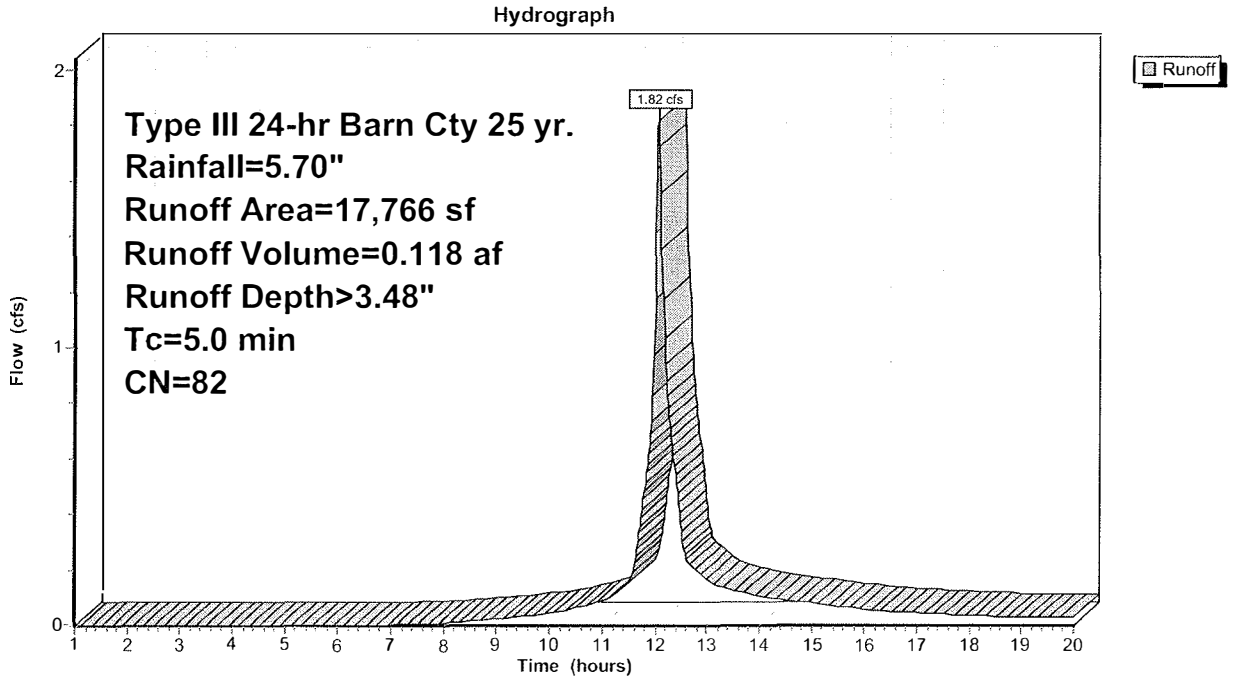
Runoff = 1.82 cfs @ 12.07 hrs, Volume= 0.118 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 25 yr. Rainfall=5.70"

Area (sf)	CN	Description
13,341	98	Paved parking
4,425	32	Woods/grass comb., Good, HSG A
17,766	82	Weighted Average
4,425		Pervious Area
13,341		Impervious Area

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

Subcatchment 1S: Drainage Area DA5



Hydrograph for Subcatchment 1S: Drainage Area DA5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.06	0.00	0.00	11.80	2.13	0.73	0.48
1.20	0.07	0.00	0.00	12.00	2.85	1.26	**1.18**
1.40	0.08	0.00	0.00	12.20	3.57	1.84	**0.94**
1.60	0.09	0.00	0.00	12.40	3.91	2.12	0.54
1.80	0.10	0.00	0.00	12.60	4.07	2.26	0.25
2.00	0.11	0.00	0.00	12.80	4.18	2.36	0.20
2.20	0.13	0.00	0.00	13.00	4.27	2.44	0.16
2.40	0.14	0.00	0.00	13.20	4.36	2.51	0.14
2.60	0.15	0.00	0.00	13.40	4.43	2.58	0.13
2.80	0.16	0.00	0.00	13.60	4.50	2.64	0.12
3.00	0.18	0.00	0.00	13.80	4.56	2.69	0.11
3.20	0.19	0.00	0.00	14.00	4.62	2.74	0.11
3.40	0.20	0.00	0.00	14.20	4.68	2.79	0.10
3.60	0.22	0.00	0.00	14.40	4.73	2.84	0.09
3.80	0.23	0.00	0.00	14.60	4.78	2.88	0.09
4.00	0.25	0.00	0.00	14.80	4.83	2.92	0.08
4.20	0.26	0.00	0.00	15.00	4.87	2.96	0.08
4.40	0.28	0.00	0.00	15.20	4.91	3.00	0.08
4.60	0.29	0.00	0.00	15.40	4.95	3.03	0.07
4.80	0.31	0.00	0.00	15.60	4.99	3.07	0.07
5.00	0.32	0.00	0.00	15.80	5.02	3.10	0.06
5.20	0.34	0.00	0.00	16.00	5.05	3.12	0.06
5.40	0.36	0.00	0.00	16.20	5.08	3.15	0.05
5.60	0.37	0.00	0.00	16.40	5.11	3.18	0.05
5.80	0.39	0.00	0.00	16.60	5.13	3.20	0.05
6.00	0.41	0.00	0.00	16.80	5.16	3.22	0.05
6.20	0.43	0.00	0.00	17.00	5.18	3.24	0.05
6.40	0.45	0.00	0.00	17.20	5.21	3.27	0.04
6.60	0.47	0.00	0.00	17.40	5.23	3.29	0.04
6.80	0.49	0.00	0.00	17.60	5.25	3.30	0.04
7.00	0.52	0.00	0.00	17.80	5.27	3.32	0.04
7.20	0.54	0.00	0.00	18.00	5.29	3.34	0.03
7.40	0.57	0.01	0.01	18.20	5.31	3.36	0.03
7.60	0.59	0.01	0.01	18.40	5.33	3.37	0.03
7.80	0.62	0.01	0.01	18.60	5.34	3.39	0.03
8.00	0.65	0.02	0.01	18.80	5.36	3.40	0.03
8.20	0.68	0.02	0.01	19.00	5.38	3.42	0.03
8.40	0.71	0.03	0.01	19.20	5.39	3.43	0.03
8.60	0.75	0.04	0.02	19.40	5.41	3.45	0.03
8.80	0.79	0.05	0.02	19.60	5.42	3.46	0.03
9.00	0.83	0.06	0.02	19.80	5.44	3.48	0.03
9.20	0.87	0.07	0.03	20.00	**5.45**	**3.49**	0.03
9.40	0.92	0.09	0.03				
9.60	0.97	0.10	0.03				
9.80	1.02	0.12	0.04				
10.00	1.08	0.14	0.04				
10.20	1.14	0.17	0.05				
10.40	1.20	0.20	0.06				
10.60	1.27	0.23	0.07				
10.80	1.34	0.26	0.08				
11.00	1.42	0.31	0.09				
11.20	1.52	0.36	0.11				
11.40	1.63	0.42	0.14				
11.60	1.79	0.52	0.20				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 0.408 ac, Inflow Depth > 3.48" for Barn Cty 25 yr. event
Inflow = 1.82 cfs @ 12.07 hrs, Volume= 0.118 af
Outflow = 1.81 cfs @ 12.08 hrs, Volume= 0.118 af, Atten= 0%, Lag= 0.1 min
Primary = 1.81 cfs @ 12.08 hrs, Volume= 0.118 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 11.03' @ 12.08 hrs Surf.Area= 0 sf Storage= 11 cf

Plug-Flow detention time=0.1 min calculated for 0.118 af (100% of inflow)
Center-of-Mass det. time=0.1 min (777.2 - 777.1)

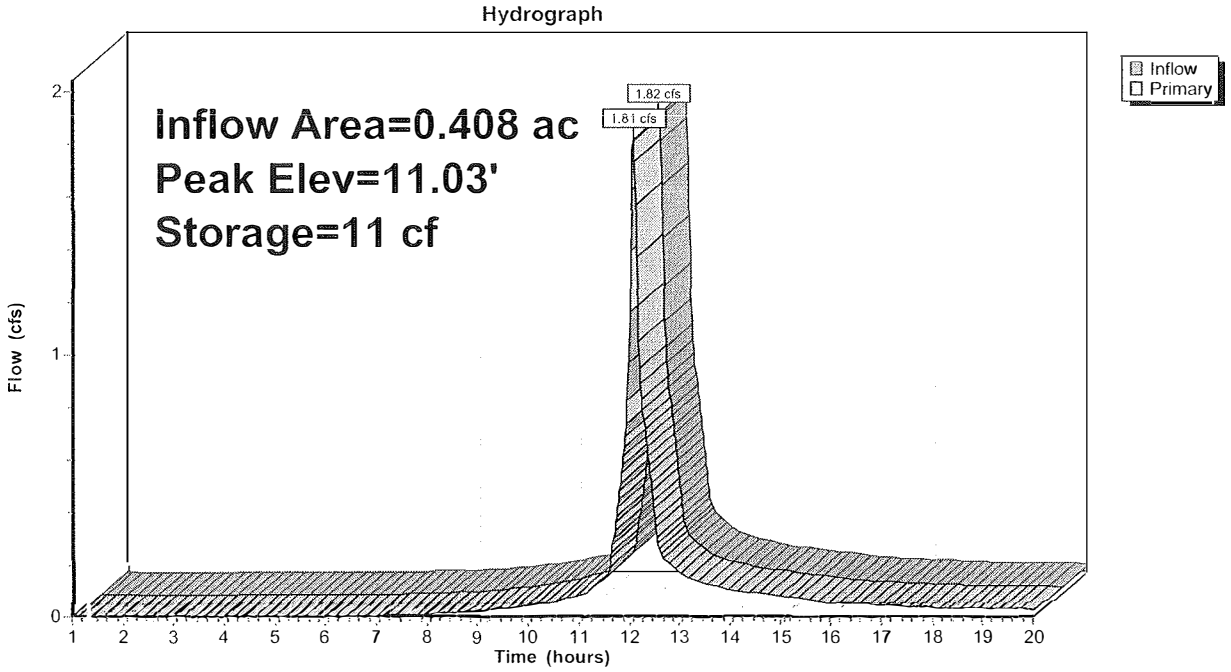
Volume	Invert	Avail.Storage	Storage Description
#1	11.00'	1,116 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
11.00	0
12.00	372
13.00	744
14.00	1,116

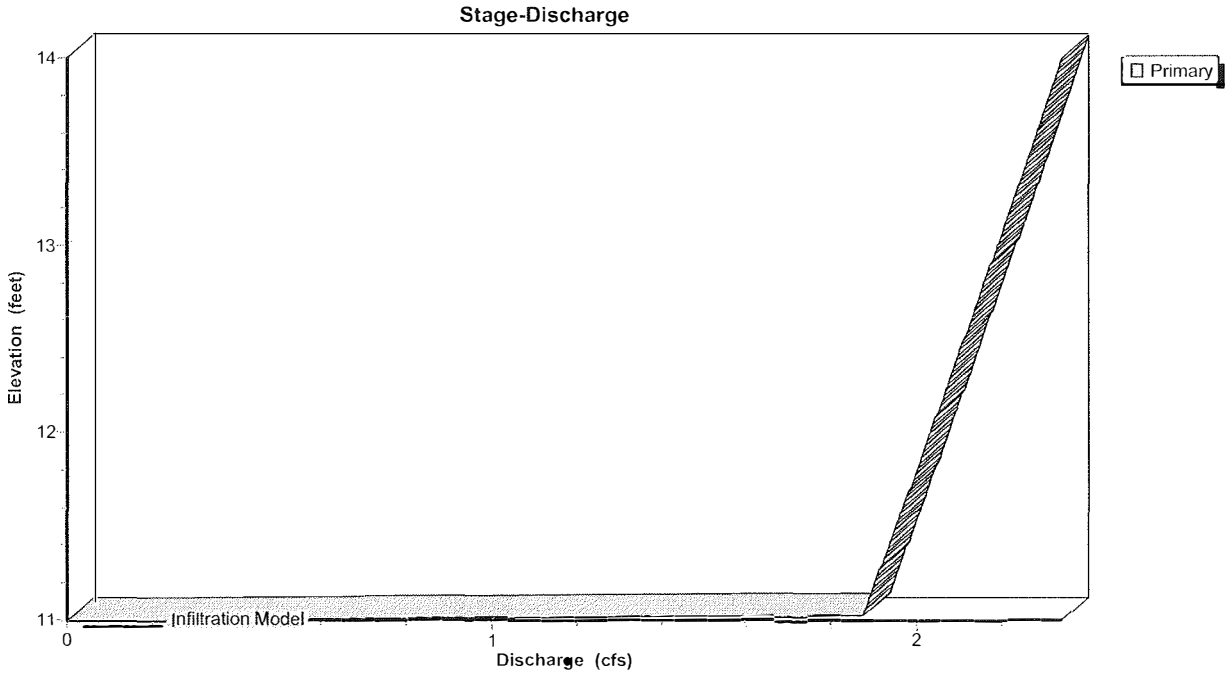
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model** Elev. (feet) 10.90 11.00 12.00 13.00 14.00 Disch. (cfs) 0.000 1.870 2.030 2.190 2.340

Primary OutFlow Max=1.87 cfs @ 12.08 hrs HW=11.03' (Free Discharge)
↑**1=Infiltration Model** (Custom Controls 1.87 cfs)

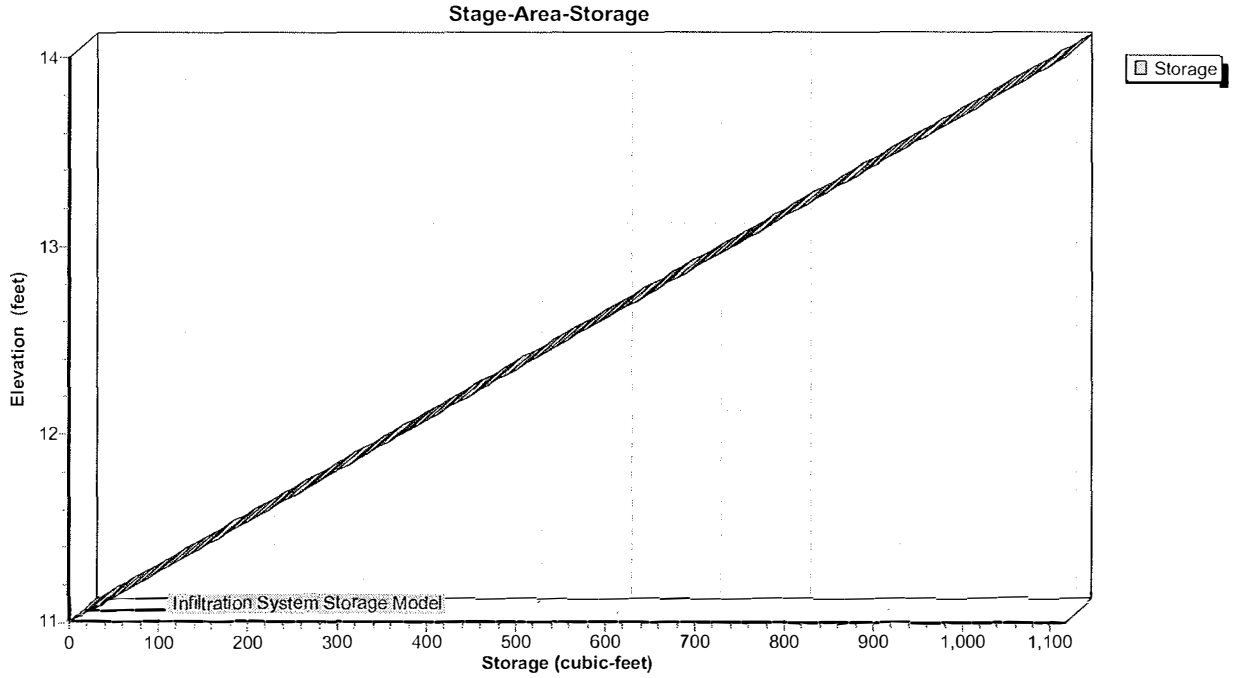
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

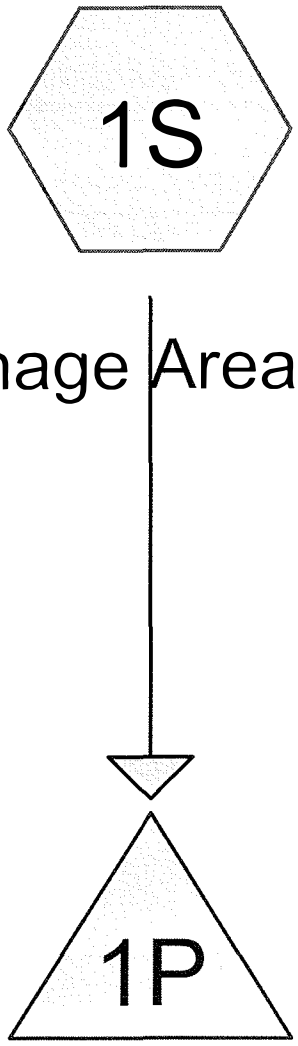
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	11.00	0.00
1.20	0.00	0	11.00	0.00
1.40	0.00	0	11.00	0.00
1.60	0.00	0	11.00	0.00
1.80	0.00	0	11.00	0.00
2.00	0.00	0	11.00	0.00
2.20	0.00	0	11.00	0.00
2.40	0.00	0	11.00	0.00
2.60	0.00	0	11.00	0.00
2.80	0.00	0	11.00	0.00
3.00	0.00	0	11.00	0.00
3.20	0.00	0	11.00	0.00
3.40	0.00	0	11.00	0.00
3.60	0.00	0	11.00	0.00
3.80	0.00	0	11.00	0.00
4.00	0.00	0	11.00	0.00
4.20	0.00	0	11.00	0.00
4.40	0.00	0	11.00	0.00
4.60	0.00	0	11.00	0.00
4.80	0.00	0	11.00	0.00
5.00	0.00	0	11.00	0.00
5.20	0.00	0	11.00	0.00
5.40	0.00	0	11.00	0.00
5.60	0.00	0	11.00	0.00
5.80	0.00	0	11.00	0.00
6.00	0.00	0	11.00	0.00
6.20	0.00	0	11.00	0.00
6.40	0.00	0	11.00	0.00
6.60	0.00	0	11.00	0.00
6.80	0.00	0	11.00	0.00
7.00	0.00	0	11.00	0.00
7.20	0.00	0	11.00	0.00
7.40	0.01	0	11.00	0.01
7.60	0.01	0	11.00	0.01
7.80	0.01	0	11.00	0.01
8.00	0.01	0	11.00	0.01
8.20	0.01	0	11.00	0.01
8.40	0.01	0	11.00	0.01
8.60	0.02	0	11.00	0.02
8.80	0.02	0	11.00	0.02
9.00	0.02	0	11.00	0.02
9.20	0.03	0	11.00	0.03
9.40	0.03	0	11.00	0.03
9.60	0.03	0	11.00	0.03
9.80	0.04	0	11.00	0.04
10.00	0.04	0	11.00	0.04
10.20	0.05	0	11.00	0.05
10.40	0.06	0	11.00	0.06
10.60	0.07	0	11.00	0.07
10.80	0.08	0	11.00	0.08
11.00	0.09	1	11.00	0.09
11.20	0.11	1	11.00	0.11
11.40	0.14	1	11.00	0.14
11.60	0.20	1	11.00	0.20
11.80	0.48	3	11.01	0.48
12.00	**1.18**	**7**	**11.02**	**1.16**
12.20	**0.94**	**6**	**11.02**	**0.95**
12.40	0.54	3	11.01	0.55
12.60	0.25	1	11.00	0.25
12.80	0.20	1	11.00	0.20
13.00	0.16	1	11.00	0.16
13.20	0.14	1	11.00	0.14
13.40	0.13	1	11.00	0.13
13.60	0.12	1	11.00	0.12
13.80	0.11	1	11.00	0.11
14.00	0.11	1	11.00	0.11
14.20	0.10	1	11.00	0.10
14.40	0.09	1	11.00	0.09
14.60	0.09	1	11.00	0.09
14.80	0.08	1	11.00	0.08
15.00	0.08	0	11.00	0.08
15.20	0.08	0	11.00	0.08
15.40	0.07	0	11.00	0.07
15.60	0.07	0	11.00	0.07
15.80	0.06	0	11.00	0.06
16.00	0.06	0	11.00	0.06
16.20	0.05	0	11.00	0.05
16.40	0.05	0	11.00	0.05
16.60	0.05	0	11.00	0.05
16.80	0.05	0	11.00	0.05
17.00	0.05	0	11.00	0.05
17.20	0.04	0	11.00	0.04
17.40	0.04	0	11.00	0.04
17.60	0.04	0	11.00	0.04
17.80	0.04	0	11.00	0.04
18.00	0.03	0	11.00	0.03
18.20	0.03	0	11.00	0.03
18.40	0.03	0	11.00	0.03
18.60	0.03	0	11.00	0.03
18.80	0.03	0	11.00	0.03
19.00	0.03	0	11.00	0.03
19.20	0.03	0	11.00	0.03
19.40	0.03	0	11.00	0.03
19.60	0.03	0	11.00	0.03
19.80	0.03	0	11.00	0.03
20.00	0.03	0	11.00	0.03

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
11.00	0.00	12.08	2.04	13.16	2.21
11.02	1.87	12.10	2.05	13.18	2.22
11.04	1.88	12.12	2.05	13.20	2.22
11.06	1.88	12.14	2.05	13.22	2.22
11.08	1.88	12.16	2.06	13.24	2.23
11.10	1.89	12.18	2.06	13.26	2.23
11.12	1.89	12.20	2.06	13.28	2.23
11.14	1.89	12.22	2.07	13.30	2.23
11.16	1.90	12.24	2.07	13.32	2.24
11.18	1.90	12.26	2.07	13.34	2.24
11.20	1.90	12.28	2.07	13.36	2.24
11.22	1.91	12.30	2.08	13.38	2.25
11.24	1.91	12.32	2.08	13.40	2.25
11.26	1.91	12.34	2.08	13.42	2.25
11.28	1.91	12.36	2.09	13.44	2.26
11.30	1.92	12.38	2.09	13.46	2.26
11.32	1.92	12.40	2.09	13.48	2.26
11.34	1.92	12.42	2.10	13.50	2.26
11.36	1.93	12.44	2.10	13.52	2.27
11.38	1.93	12.46	2.10	13.54	2.27
11.40	1.93	12.48	2.11	13.56	2.27
11.42	1.94	12.50	2.11	13.58	2.28
11.44	1.94	12.52	2.11	13.60	2.28
11.46	1.94	12.54	2.12	13.62	2.28
11.48	1.95	12.56	2.12	13.64	2.29
11.50	1.95	12.58	2.12	13.66	2.29
11.52	1.95	12.60	2.13	13.68	2.29
11.54	1.96	12.62	2.13	13.70	2.29
11.56	1.96	12.64	2.13	13.72	2.30
11.58	1.96	12.66	2.14	13.74	2.30
11.60	1.97	12.68	2.14	13.76	2.30
11.62	1.97	12.70	2.14	13.78	2.31
11.64	1.97	12.72	2.15	13.80	2.31
11.66	1.98	12.74	2.15	13.82	2.31
11.68	1.98	12.76	2.15	13.84	2.32
11.70	1.98	12.78	2.15	13.86	2.32
11.72	1.99	12.80	2.16	13.88	2.32
11.74	1.99	12.82	2.16	13.90	2.32
11.76	1.99	12.84	2.16	13.92	2.33
11.78	1.99	12.86	2.17	13.94	2.33
11.80	2.00	12.88	2.17	13.96	2.33
11.82	2.00	12.90	2.17	13.98	2.34
11.84	2.00	12.92	2.18	14.00	**2.34**
11.86	2.01	12.94	2.18		
11.88	2.01	12.96	2.18		
11.90	2.01	12.98	2.19		
11.92	2.02	13.00	2.19		
11.94	2.02	13.02	2.19		
11.96	2.02	13.04	2.20		
11.98	2.03	13.06	2.20		
12.00	2.03	13.08	2.20		
12.02	2.03	13.10	2.21		
12.04	2.04	13.12	2.21		
12.06	2.04	13.14	2.21		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
11.00	0	12.08	402	13.16	804
11.02	7	12.10	409	13.18	811
11.04	15	12.12	417	13.20	818
11.06	22	12.14	424	13.22	826
11.08	30	12.16	432	13.24	833
11.10	37	12.18	439	13.26	841
11.12	45	12.20	446	13.28	848
11.14	52	12.22	454	13.30	856
11.16	60	12.24	461	13.32	863
11.18	67	12.26	469	13.34	870
11.20	74	12.28	476	13.36	878
11.22	82	12.30	484	13.38	885
11.24	89	12.32	491	13.40	893
11.26	97	12.34	498	13.42	900
11.28	104	12.36	506	13.44	908
11.30	112	12.38	513	13.46	915
11.32	119	12.40	521	13.48	923
11.34	126	12.42	528	13.50	930
11.36	134	12.44	536	13.52	937
11.38	141	12.46	543	13.54	945
11.40	149	12.48	551	13.56	952
11.42	156	12.50	558	13.58	960
11.44	164	12.52	565	13.60	967
11.46	171	12.54	573	13.62	975
11.48	179	12.56	580	13.64	982
11.50	186	12.58	588	13.66	990
11.52	193	12.60	595	13.68	997
11.54	201	12.62	603	13.70	1,004
11.56	208	12.64	610	13.72	1,012
11.58	216	12.66	618	13.74	1,019
11.60	223	12.68	625	13.76	1,027
11.62	231	12.70	632	13.78	1,034
11.64	238	12.72	640	13.80	1,042
11.66	246	12.74	647	13.82	1,049
11.68	253	12.76	655	13.84	1,056
11.70	260	12.78	662	13.86	1,064
11.72	268	12.80	670	13.88	1,071
11.74	275	12.82	677	13.90	1,079
11.76	283	12.84	684	13.92	1,086
11.78	290	12.86	692	13.94	1,094
11.80	298	12.88	699	13.96	1,101
11.82	305	12.90	707	13.98	1,109
11.84	312	12.92	714	14.00	1,116
11.86	320	12.94	722		
11.88	327	12.96	729		
11.90	335	12.98	737		
11.92	342	13.00	744		
11.94	350	13.02	751		
11.96	357	13.04	759		
11.98	365	13.06	766		
12.00	372	13.08	774		
12.02	379	13.10	781		
12.04	387	13.12	789		
12.06	394	13.14	796		



Drainage Area DA6

Infiltration Storage Model

Subcat Reach Pond Link

Drainage Diagram for 17-005 CCH Project 2022 DA6
Prepared by down cape engineering, inc. 7/31/2019
HydroCAD® 8.00 s/n 004007 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.026	32	Woods/grass comb., Good, HSG A (1S)
0.250	98	Paved parking (1S)
0.277		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA6 Runoff Area=12,049 sf Runoff Depth>4.53"
Tc=5.0 min CN=92 Runoff=1.50 cfs 0.104 af

Pond 1P: Infiltration Storage Model Peak Elev=12.70' Storage=381 cf Inflow=1.50 cfs 0.104 af
Outflow=0.90 cfs 0.105 af

Total Runoff Area = 0.277 ac Runoff Volume = 0.104 af Average Runoff Depth = 4.53"
9.49% Pervious Area = 0.026 ac 90.51% Impervious Area = 0.250 ac

Subcatchment 1S: Drainage Area DA6

Time of Concentration

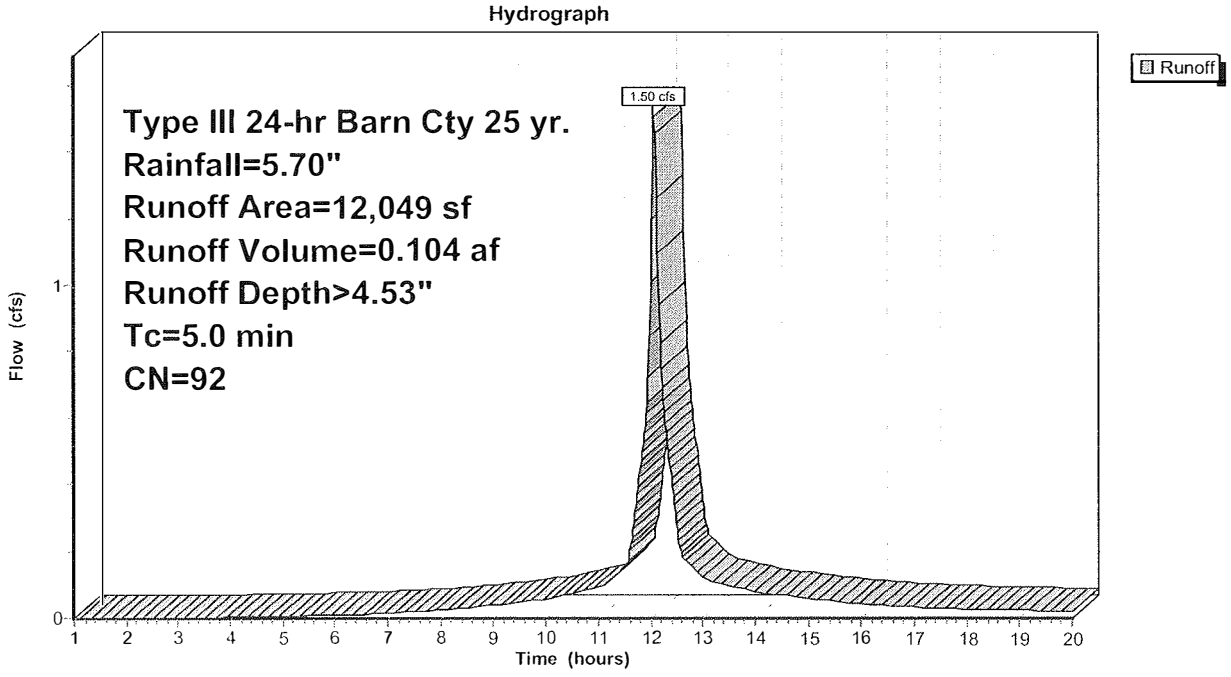
Runoff = 1.50 cfs @ 12.07 hrs, Volume= 0.104 af, Depth> 4.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 25 yr. Rainfall=5.70"

Area (sf)	CN	Description
10,905	98	Paved parking
1,144	32	Woods/grass comb., Good, HSG A
12,049	92	Weighted Average
1,144		Pervious Area
10,905		Impervious Area

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

Subcatchment 1S: Drainage Area DA6



Hydrograph for Subcatchment 1S: Drainage Area DA6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.06	0.00	0.00	11.80	2.13	1.35	0.45
1.20	0.07	0.00	0.00	12.00	2.85	2.02	**1.01**
1.40	0.08	0.00	0.00	12.20	3.57	2.71	**0.75**
1.60	0.09	0.00	0.00	12.40	3.91	3.03	0.42
1.80	0.10	0.00	0.00	12.60	4.07	3.18	0.19
2.00	0.11	0.00	0.00	12.80	4.18	3.29	0.15
2.20	0.13	0.00	0.00	13.00	4.27	3.38	0.12
2.40	0.14	0.00	0.00	13.20	4.36	3.46	0.11
2.60	0.15	0.00	0.00	13.40	4.43	3.53	0.10
2.80	0.16	0.00	0.00	13.60	4.50	3.60	0.09
3.00	0.18	0.00	0.00	13.80	4.56	3.66	0.09
3.20	0.19	0.00	0.00	14.00	4.62	3.72	0.08
3.40	0.20	0.00	0.00	14.20	4.68	3.77	0.07
3.60	0.22	0.00	0.00	14.40	4.73	3.83	0.07
3.80	0.23	0.00	0.00	14.60	4.78	3.87	0.07
4.00	0.25	0.01	0.00	14.80	4.83	3.92	0.06
4.20	0.26	0.01	0.00	15.00	4.87	3.96	0.06
4.40	0.28	0.01	0.00	15.20	4.91	4.00	0.06
4.60	0.29	0.01	0.00	15.40	4.95	4.04	0.05
4.80	0.31	0.02	0.01	15.60	4.99	4.08	0.05
5.00	0.32	0.02	0.01	15.80	5.02	4.11	0.05
5.20	0.34	0.03	0.01	16.00	5.05	4.14	0.04
5.40	0.36	0.03	0.01	16.20	5.08	4.17	0.04
5.60	0.37	0.04	0.01	16.40	5.11	4.19	0.04
5.80	0.39	0.04	0.01	16.60	5.13	4.22	0.04
6.00	0.41	0.05	0.01	16.80	5.16	4.25	0.03
6.20	0.43	0.06	0.01	17.00	5.18	4.27	0.03
6.40	0.45	0.07	0.01	17.20	5.21	4.29	0.03
6.60	0.47	0.08	0.01	17.40	5.23	4.31	0.03
6.80	0.49	0.09	0.01	17.60	5.25	4.33	0.03
7.00	0.52	0.10	0.02	17.80	5.27	4.35	0.03
7.20	0.54	0.11	0.02	18.00	5.29	4.37	0.03
7.40	0.57	0.12	0.02	18.20	5.31	4.39	0.02
7.60	0.59	0.14	0.02	18.40	5.33	4.41	0.02
7.80	0.62	0.15	0.02	18.60	5.34	4.42	0.02
8.00	0.65	0.17	0.02	18.80	5.36	4.44	0.02
8.20	0.68	0.19	0.03	19.00	5.38	4.46	0.02
8.40	0.71	0.21	0.03	19.20	5.39	4.47	0.02
8.60	0.75	0.23	0.03	19.40	5.41	4.49	0.02
8.80	0.79	0.26	0.04	19.60	5.42	4.50	0.02
9.00	0.83	0.28	0.04	19.80	5.44	4.52	0.02
9.20	0.87	0.31	0.04	20.00	**5.45**	**4.53**	0.02
9.40	0.92	0.35	0.05				
9.60	0.97	0.38	0.05				
9.80	1.02	0.42	0.05				
10.00	1.08	0.46	0.06				
10.20	1.14	0.51	0.06				
10.40	1.20	0.56	0.07				
10.60	1.27	0.61	0.08				
10.80	1.34	0.67	0.09				
11.00	1.42	0.74	0.09				
11.20	1.52	0.82	0.11				
11.40	1.63	0.91	0.14				
11.60	1.79	1.05	0.20				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 0.277 ac, Inflow Depth > 4.53" for Barn Cty 25 yr. event
Inflow = 1.50 cfs @ 12.07 hrs, Volume= 0.104 af
Outflow = 0.90 cfs @ 12.14 hrs, Volume= 0.105 af, Atten= 40%, Lag= 4.1 min
Primary = 0.90 cfs @ 12.14 hrs, Volume= 0.105 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 12.70' @ 12.17 hrs Surf.Area= 0 sf Storage= 381 cf

Plug-Flow detention time=(not calculated: outflow precedes inflow)
Center-of-Mass det. time=1.9 min (750.6 - 748.7)

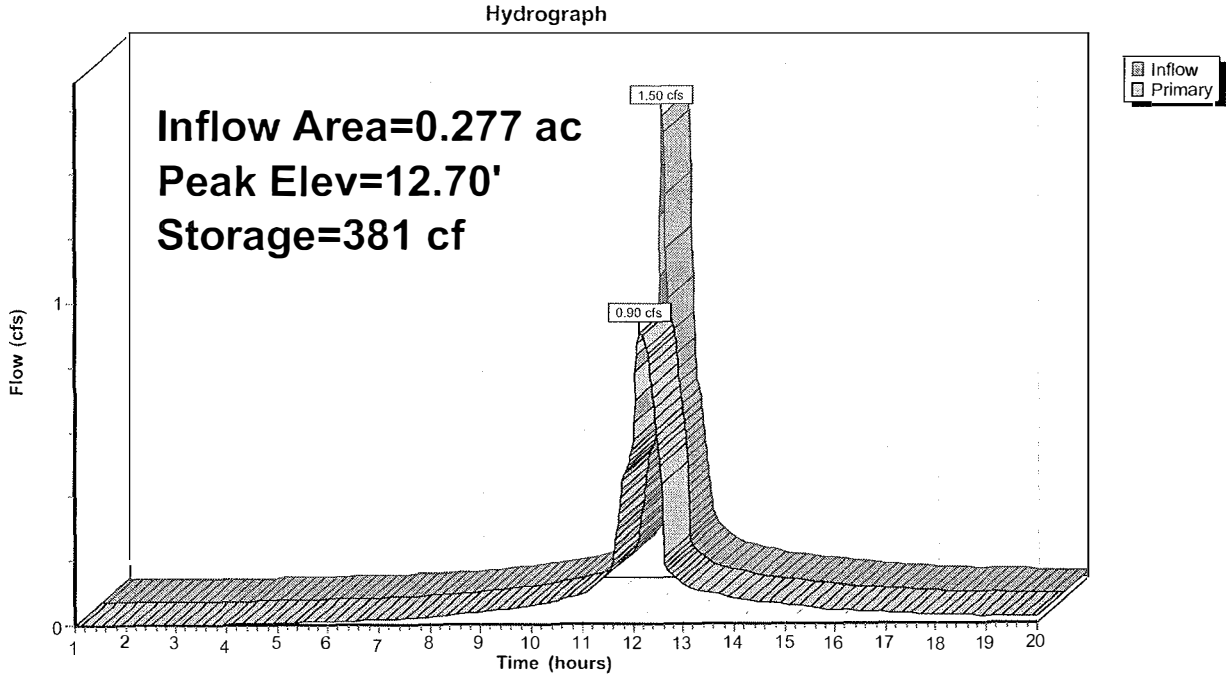
Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	476 cf	**Infiltration System Storage Model**Listed below

Elevation (feet)	Cum.Store (cubic-feet)
9.50	0
10.50	119
12.50	357
13.50	476

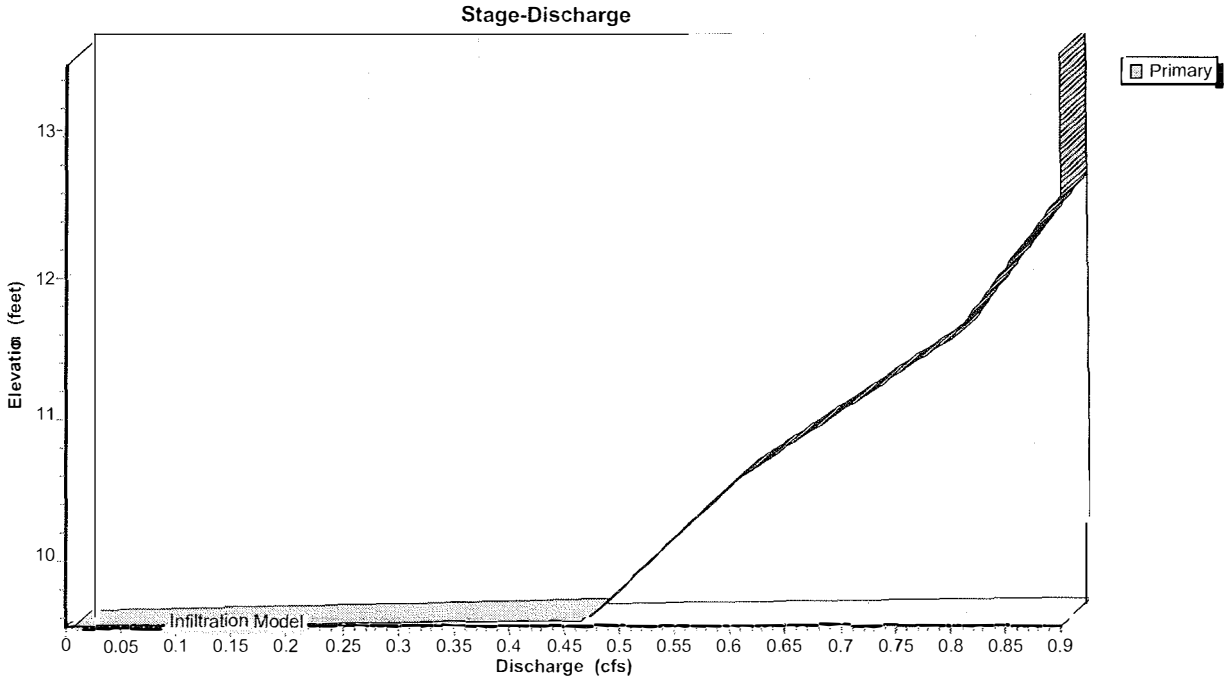
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model** Elev. (feet) 9.40 9.50 10.50 11.50 12.50 Disch. (cfs) 0.000 0.460 0.600 0.800 0.900

Primary OutFlow Max=0.90 cfs @ 12.14 hrs HW=12.63' (Free Discharge)
↑**1=Infiltration Model** (Custom Controls 0.90 cfs)

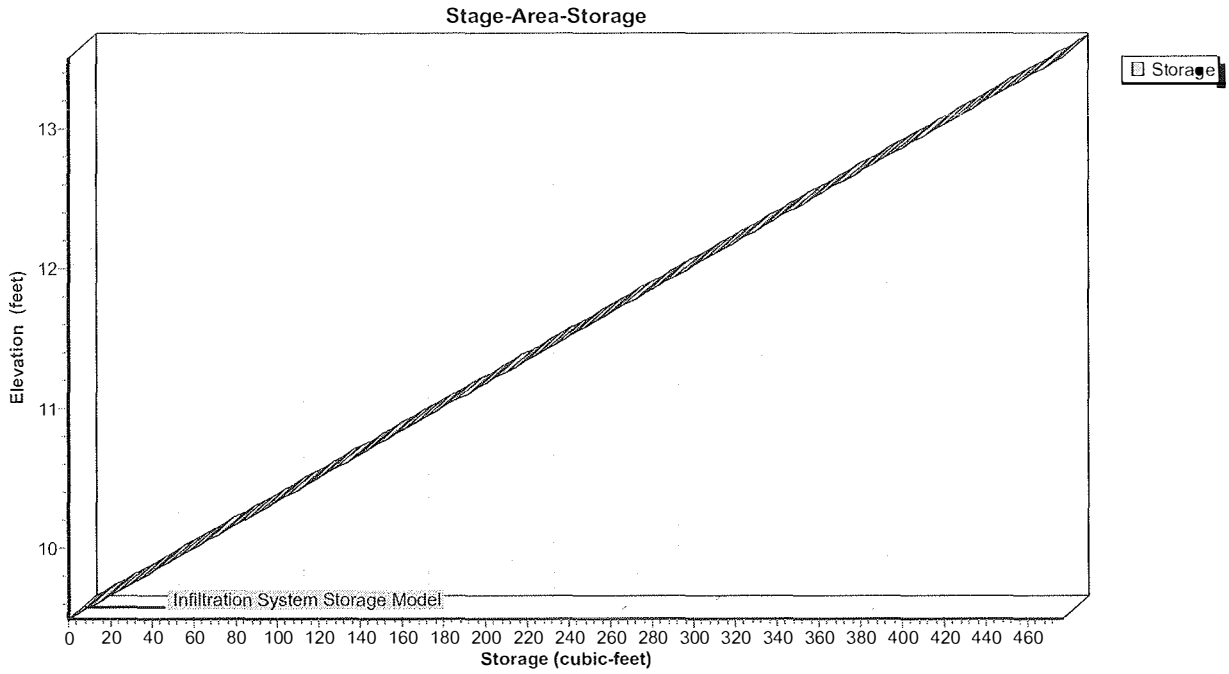
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

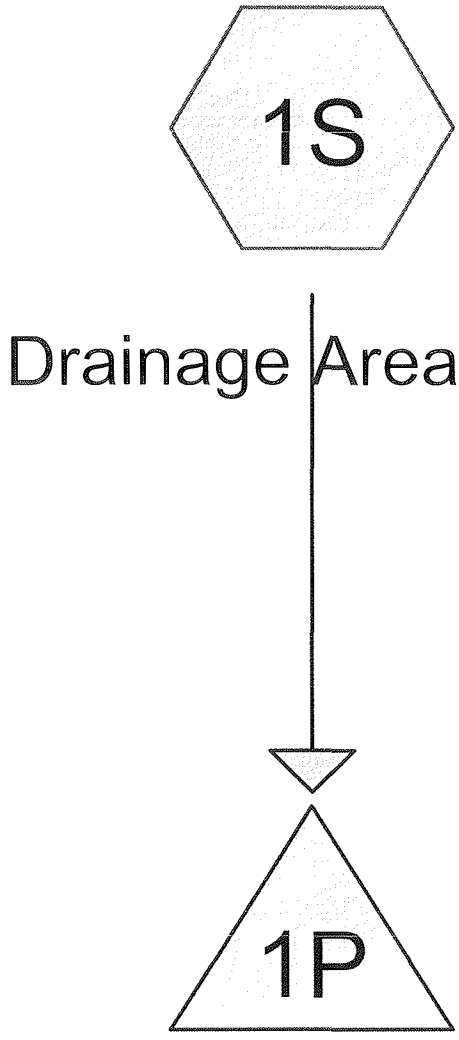
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	9.50	0.00
1.20	0.00	0	9.50	0.00
1.40	0.00	0	9.50	0.00
1.60	0.00	0	9.50	0.00
1.80	0.00	0	9.50	0.00
2.00	0.00	0	9.50	0.00
2.20	0.00	0	9.50	0.00
2.40	0.00	0	9.50	0.00
2.60	0.00	0	9.50	0.00
2.80	0.00	0	9.50	0.00
3.00	0.00	0	9.50	0.00
3.20	0.00	0	9.50	0.00
3.40	0.00	0	9.50	0.00
3.60	0.00	0	9.50	0.00
3.80	0.00	0	9.50	0.00
4.00	0.00	0	9.50	0.00
4.20	0.00	0	9.50	0.00
4.40	0.00	0	9.50	0.00
4.60	0.00	0	9.50	0.00
4.80	0.01	0	9.50	0.01
5.00	0.01	0	9.50	0.01
5.20	0.01	0	9.50	0.01
5.40	0.01	0	9.50	0.01
5.60	0.01	0	9.50	0.01
5.80	0.01	0	9.50	0.01
6.00	0.01	0	9.50	0.01
6.20	0.01	0	9.50	0.01
6.40	0.01	0	9.50	0.01
6.60	0.01	0	9.50	0.01
6.80	0.01	0	9.50	0.01
7.00	0.02	0	9.50	0.02
7.20	0.02	0	9.50	0.02
7.40	0.02	0	9.50	0.02
7.60	0.02	0	9.50	0.02
7.80	0.02	0	9.50	0.02
8.00	0.02	0	9.50	0.02
8.20	0.03	0	9.50	0.03
8.40	0.03	0	9.50	0.03
8.60	0.03	0	9.50	0.03
8.80	0.04	0	9.50	0.04
9.00	0.04	0	9.50	0.04
9.20	0.04	0	9.50	0.04
9.40	0.05	0	9.50	0.05
9.60	0.05	1	9.50	0.05
9.80	0.05	1	9.50	0.05
10.00	0.06	1	9.50	0.06
10.20	0.06	1	9.51	0.06
10.40	0.07	1	9.51	0.07
10.60	0.08	1	9.51	0.08
10.80	0.09	1	9.51	0.09
11.00	0.09	1	9.51	0.09
11.20	0.11	1	9.51	0.11
11.40	0.14	1	9.51	0.14
11.60	0.20	2	9.52	0.20
11.80	0.45	5	9.54	0.44
12.00	**1.01**	**95**	**10.30**	**0.57**
12.20	**0.75**	**371**	**12.62**	**0.90**
12.40	0.42	180	11.01	0.70
12.60	0.19	2	9.52	0.21
12.80	0.15	2	9.51	0.15
13.00	0.12	1	9.51	0.12
13.20	0.11	1	9.51	0.11
13.40	0.10	1	9.51	0.10
13.60	0.09	1	9.51	0.09
13.80	0.09	1	9.51	0.09
14.00	0.08	1	9.51	0.08
14.20	0.07	1	9.51	0.07
14.40	0.07	1	9.51	0.07
14.60	0.07	1	9.51	0.07
14.80	0.06	1	9.51	0.06
15.00	0.06	1	9.51	0.06
15.20	0.06	1	9.50	0.06
15.40	0.05	1	9.50	0.05
15.60	0.05	1	9.50	0.05
15.80	0.05	0	9.50	0.05
16.00	0.04	0	9.50	0.04
16.20	0.04	0	9.50	0.04
16.40	0.04	0	9.50	0.04
16.60	0.04	0	9.50	0.04
16.80	0.03	0	9.50	0.03
17.00	0.03	0	9.50	0.03
17.20	0.03	0	9.50	0.03
17.40	0.03	0	9.50	0.03
17.60	0.03	0	9.50	0.03
17.80	0.03	0	9.50	0.03
18.00	0.03	0	9.50	0.03
18.20	0.02	0	9.50	0.02
18.40	0.02	0	9.50	0.02
18.60	0.02	0	9.50	0.02
18.80	0.02	0	9.50	0.02
19.00	0.02	0	9.50	0.02
19.20	0.02	0	9.50	0.02
19.40	0.02	0	9.50	0.02
19.60	0.02	0	9.50	0.02
19.80	0.02	0	9.50	0.02
20.00	0.02	0	9.50	0.02

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
9.50	0.00	10.58	0.62	11.66	0.82	12.74	0.90
9.52	0.46	10.60	0.62	11.68	0.82	12.76	0.90
9.54	0.47	10.62	0.62	11.70	0.82	12.78	0.90
9.56	0.47	10.64	0.63	11.72	0.82	12.80	0.90
9.58	0.47	10.66	0.63	11.74	0.82	12.82	0.90
9.60	0.47	10.68	0.64	11.76	0.83	12.84	0.90
9.62	0.48	10.70	0.64	11.78	0.83	12.86	0.90
9.64	0.48	10.72	0.64	11.80	0.83	12.88	0.90
9.66	0.48	10.74	0.65	11.82	0.83	12.90	0.90
9.68	0.49	10.76	0.65	11.84	0.83	12.92	0.90
9.70	0.49	10.78	0.66	11.86	0.84	12.94	0.90
9.72	0.49	10.80	0.66	11.88	0.84	12.96	0.90
9.74	0.49	10.82	0.66	11.90	0.84	12.98	0.90
9.76	0.50	10.84	0.67	11.92	0.84	13.00	0.90
9.78	0.50	10.86	0.67	11.94	0.84	13.02	0.90
9.80	0.50	10.88	0.68	11.96	0.85	13.04	0.90
9.82	0.50	10.90	0.68	11.98	0.85	13.06	0.90
9.84	0.51	10.92	0.68	12.00	0.85	13.08	0.90
9.86	0.51	10.94	0.69	12.02	0.85	13.10	0.90
9.88	0.51	10.96	0.69	12.04	0.85	13.12	0.90
9.90	0.52	10.98	0.70	12.06	0.86	13.14	0.90
9.92	0.52	11.00	0.70	12.08	0.86	13.16	0.90
9.94	0.52	11.02	0.70	12.10	0.86	13.18	0.90
9.96	0.52	11.04	0.71	12.12	0.86	13.20	0.90
9.98	0.53	11.06	0.71	12.14	0.86	13.22	0.90
10.00	0.53	11.08	0.72	12.16	0.87	13.24	0.90
10.02	0.53	11.10	0.72	12.18	0.87	13.26	0.90
10.04	0.54	11.12	0.72	12.20	0.87	13.28	0.90
10.06	0.54	11.14	0.73	12.22	0.87	13.30	0.90
10.08	0.54	11.16	0.73	12.24	0.87	13.32	0.90
10.10	0.54	11.18	0.74	12.26	0.88	13.34	0.90
10.12	0.55	11.20	0.74	12.28	0.88	13.36	0.90
10.14	0.55	11.22	0.74	12.30	0.88	13.38	0.90
10.16	0.55	11.24	0.75	12.32	0.88	13.40	0.90
10.18	0.56	11.26	0.75	12.34	0.88	13.42	0.90
10.20	0.56	11.28	0.76	12.36	0.89	13.44	0.90
10.22	0.56	11.30	0.76	12.38	0.89	13.46	0.90
10.24	0.56	11.32	0.76	12.40	0.89	13.48	0.90
10.26	0.57	11.34	0.77	12.42	0.89	13.50	0.90
10.28	0.57	11.36	0.77	12.44	0.89		
10.30	0.57	11.38	0.78	12.46	0.90		
10.32	0.57	11.40	0.78	12.48	0.90		
10.34	0.58	11.42	0.78	12.50	**0.90**		
10.36	0.58	11.44	0.79	12.52	0.90		
10.38	0.58	11.46	0.79	12.54	0.90		
10.40	0.59	11.48	0.80	12.56	0.90		
10.42	0.59	11.50	0.80	12.58	0.90		
10.44	0.59	11.52	0.80	12.60	0.90		
10.46	0.59	11.54	0.80	12.62	0.90		
10.48	0.60	11.56	0.81	12.64	0.90		
10.50	0.60	11.58	0.81	12.66	0.90		
10.52	0.60	11.60	0.81	12.68	0.90		
10.54	0.61	11.62	0.81	12.70	0.90		
10.56	0.61	11.64	0.81	12.72	0.90		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
9.50	0	10.58	129	11.66	257	12.74	386
9.52	2	10.60	131	11.68	259	12.76	388
9.54	5	10.62	133	11.70	262	12.78	390
9.56	7	10.64	136	11.72	264	12.80	393
9.58	10	10.66	138	11.74	267	12.82	395
9.60	12	10.68	140	11.76	269	12.84	397
9.62	14	10.70	143	11.78	271	12.86	400
9.64	17	10.72	145	11.80	274	12.88	402
9.66	19	10.74	148	11.82	276	12.90	405
9.68	21	10.76	150	11.84	278	12.92	407
9.70	24	10.78	152	11.86	281	12.94	409
9.72	26	10.80	155	11.88	283	12.96	412
9.74	29	10.82	157	11.90	286	12.98	414
9.76	31	10.84	159	11.92	288	13.00	417
9.78	33	10.86	162	11.94	290	13.02	419
9.80	36	10.88	164	11.96	293	13.04	421
9.82	38	10.90	167	11.98	295	13.06	424
9.84	40	10.92	169	12.00	298	13.08	426
9.86	43	10.94	171	12.02	300	13.10	428
9.88	45	10.96	174	12.04	302	13.12	431
9.90	48	10.98	176	12.06	305	13.14	433
9.92	50	11.00	179	12.08	307	13.16	436
9.94	52	11.02	181	12.10	309	13.18	438
9.96	55	11.04	183	12.12	312	13.20	440
9.98	57	11.06	186	12.14	314	13.22	443
10.00	60	11.08	188	12.16	317	13.24	445
10.02	62	11.10	190	12.18	319	13.26	447
10.04	64	11.12	193	12.20	321	13.28	450
10.06	67	11.14	195	12.22	324	13.30	452
10.08	69	11.16	198	12.24	326	13.32	455
10.10	71	11.18	200	12.26	328	13.34	457
10.12	74	11.20	202	12.28	331	13.36	459
10.14	76	11.22	205	12.30	333	13.38	462
10.16	79	11.24	207	12.32	336	13.40	464
10.18	81	11.26	209	12.34	338	13.42	466
10.20	83	11.28	212	12.36	340	13.44	469
10.22	86	11.30	214	12.38	343	13.46	471
10.24	88	11.32	217	12.40	345	13.48	474
10.26	90	11.34	219	12.42	347	13.50	**476**
10.28	93	11.36	221	12.44	350		
10.30	95	11.38	224	12.46	352		
10.32	98	11.40	226	12.48	355		
10.34	100	11.42	228	12.50	357		
10.36	102	11.44	231	12.52	359		
10.38	105	11.46	233	12.54	362		
10.40	107	11.48	236	12.56	364		
10.42	109	11.50	238	12.58	367		
10.44	112	11.52	240	12.60	369		
10.46	114	11.54	243	12.62	371		
10.48	117	11.56	245	12.64	374		
10.50	119	11.58	248	12.66	376		
10.52	121	11.60	250	12.68	378		
10.54	124	11.62	252	12.70	381		
10.56	126	11.64	255	12.72	383		



Infiltration Storage Model

Subcat Reach Pond Link

Drainage Diagram for 17-005 CCH Project 2022 DA7
Prepared by down cape engineering, inc. 7/31/2019
HydroCAD® 8.00 s/n 004007 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.025	32	Woods/grass comb., Good, HSG A (1S)
0.514	98	Paved parking (1S)
0.539		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA7 Runoff Area=23,472 sf Runoff Depth>6.86"
Tc=5.0 min CN=95 Runoff=4.21 cfs 0.308 af

Pond 1P: Infiltration Storage Model Peak Elev=11.19' Storage=1,009 cf Inflow=4.21 cfs 0.308 af
Outflow=2.44 cfs 0.308 af

Total Runoff Area = 0.539 ac Runoff Volume = 0.308 af Average Runoff Depth = 6.86"
4.69% Pervious Area = 0.025 ac 95.31% Impervious Area = 0.514 ac

Subcatchment 1S: Drainage Area DA7

Time of Concentration

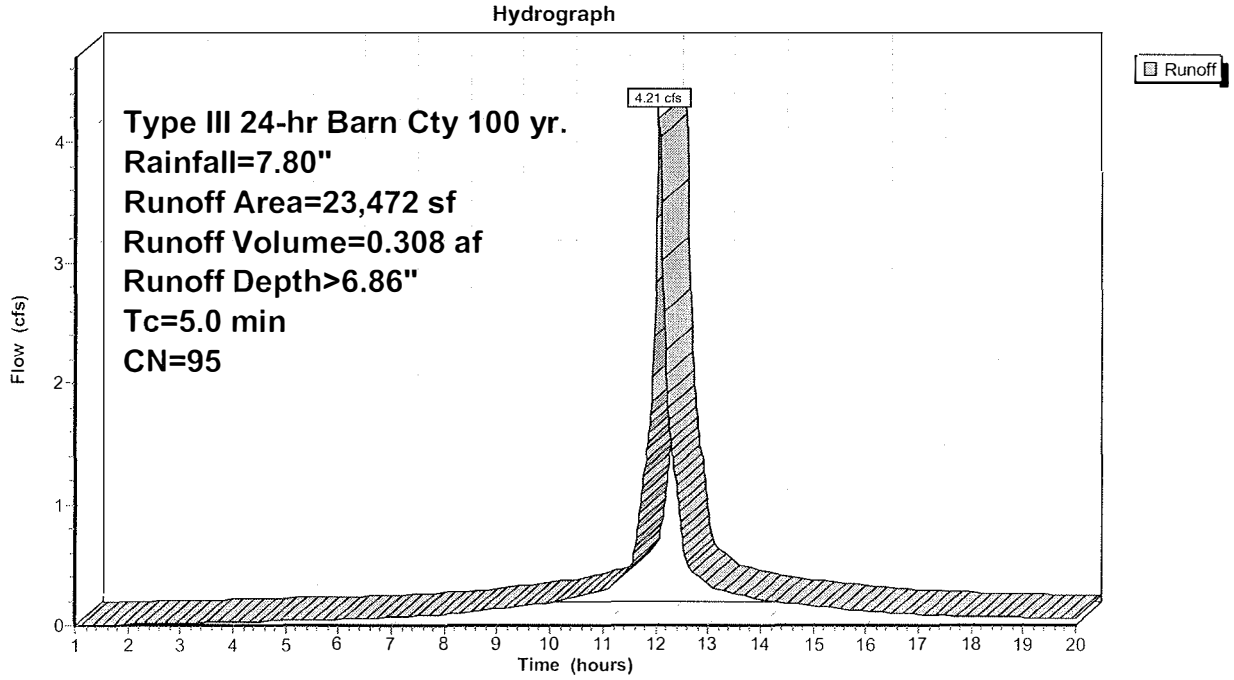
Runoff = 4.21 cfs @ 12.07 hrs, Volume= 0.308 af, Depth> 6.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 100 yr. Rainfall=7.80"

Area (sf)	CN	Description
22,372	98	Paved parking
1,100	32	Woods/grass comb., Good, HSG A
23,472	95	Weighted Average
1,100		Pervious Area
22,372		Impervious Area

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

Subcatchment 1S: Drainage Area DA7



Hydrograph for Subcatchment 1S: Drainage Area DA7

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	11.80	2.91	2.36	1.30
1.20	0.09	0.00	0.00	12.00	3.90	3.33	**2.85**
1.40	0.11	0.00	0.00	12.20	4.89	4.31	**2.07**
1.60	0.12	0.00	0.00	12.40	5.35	4.76	1.16
1.80	0.14	0.00	0.00	12.60	5.56	4.98	0.52
2.00	0.16	0.00	0.01	12.80	5.72	5.14	0.41
2.20	0.17	0.01	0.01	13.00	5.85	5.26	0.34
2.40	0.19	0.01	0.01	13.20	5.96	5.37	0.29
2.60	0.20	0.02	0.01	13.40	6.06	5.47	0.27
2.80	0.22	0.02	0.01	13.60	6.16	5.57	0.25
3.00	0.24	0.03	0.02	13.80	6.25	5.66	0.23
3.20	0.26	0.03	0.02	14.00	6.33	5.74	0.21
3.40	0.28	0.04	0.02	14.20	6.40	5.81	0.20
3.60	0.30	0.05	0.02	14.40	6.47	5.88	0.19
3.80	0.32	0.06	0.03	14.60	6.54	5.95	0.18
4.00	0.34	0.07	0.03	14.80	6.60	6.01	0.17
4.20	0.36	0.08	0.03	15.00	6.66	6.07	0.16
4.40	0.38	0.09	0.03	15.20	6.72	6.13	0.15
4.60	0.40	0.10	0.03	15.40	6.77	6.18	0.14
4.80	0.42	0.12	0.04	15.60	6.82	6.23	0.13
5.00	0.44	0.13	0.04	15.80	6.87	6.27	0.12
5.20	0.47	0.15	0.04	16.00	6.91	6.32	0.11
5.40	0.49	0.16	0.04	16.20	6.95	6.36	0.11
5.60	0.51	0.18	0.04	16.40	6.99	6.39	0.10
5.80	0.54	0.19	0.05	16.60	7.03	6.43	0.10
6.00	0.56	0.21	0.05	16.80	7.06	6.47	0.09
6.20	0.59	0.23	0.05	17.00	7.09	6.50	0.09
6.40	0.61	0.25	0.05	17.20	7.13	6.53	0.09
6.60	0.64	0.27	0.06	17.40	7.16	6.56	0.08
6.80	0.67	0.30	0.06	17.60	7.19	6.59	0.08
7.00	0.71	0.32	0.07	17.80	7.21	6.62	0.07
7.20	0.74	0.35	0.07	18.00	7.24	6.64	0.07
7.40	0.77	0.37	0.08	18.20	7.26	6.67	0.07
7.60	0.81	0.40	0.08	18.40	7.29	6.69	0.07
7.80	0.85	0.44	0.09	18.60	7.31	6.72	0.06
8.00	0.89	0.47	0.09	18.80	7.33	6.74	0.06
8.20	0.93	0.50	0.10	19.00	7.36	6.76	0.06
8.40	0.98	0.54	0.11	19.20	7.38	6.78	0.06
8.60	1.03	0.59	0.12	19.40	7.40	6.81	0.06
8.80	1.08	0.63	0.13	19.60	7.42	6.83	0.06
9.00	1.14	0.68	0.14	19.80	7.44	6.85	0.06
9.20	1.20	0.74	0.15	20.00	**7.46**	**6.87**	0.06
9.40	1.26	0.79	0.16				
9.60	1.33	0.86	0.17				
9.80	1.40	0.92	0.18				
10.00	1.47	0.99	0.19				
10.20	1.55	1.06	0.20				
10.40	1.64	1.14	0.22				
10.60	1.74	1.23	0.24				
10.80	1.84	1.33	0.27				
11.00	1.95	1.44	0.29				
11.20	2 08	1.56	0.34				
11.40	2.24	1.71	0.42				
11.60	2.45	1.92	0.59				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 0.539 ac, Inflow Depth > 6.86" for Barn Cty 100 yr. event
Inflow = 4.21 cfs @ 12.07 hrs, Volume= 0.308 af
Outflow = 2.44 cfs @ 12.17 hrs, Volume= 0.308 af, Atten= 42%, Lag= 6.0 min
Primary = 2.44 cfs @ 12.17 hrs, Volume= 0.308 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 11.19' @ 12.17 hrs Surf.Area= 0 sf Storage= 1,009 cf

Plug-Flow detention time=(not calculated: outflow precedes inflow)
Center-of-Mass det. time=1.6 min (730.6 - 729.0)

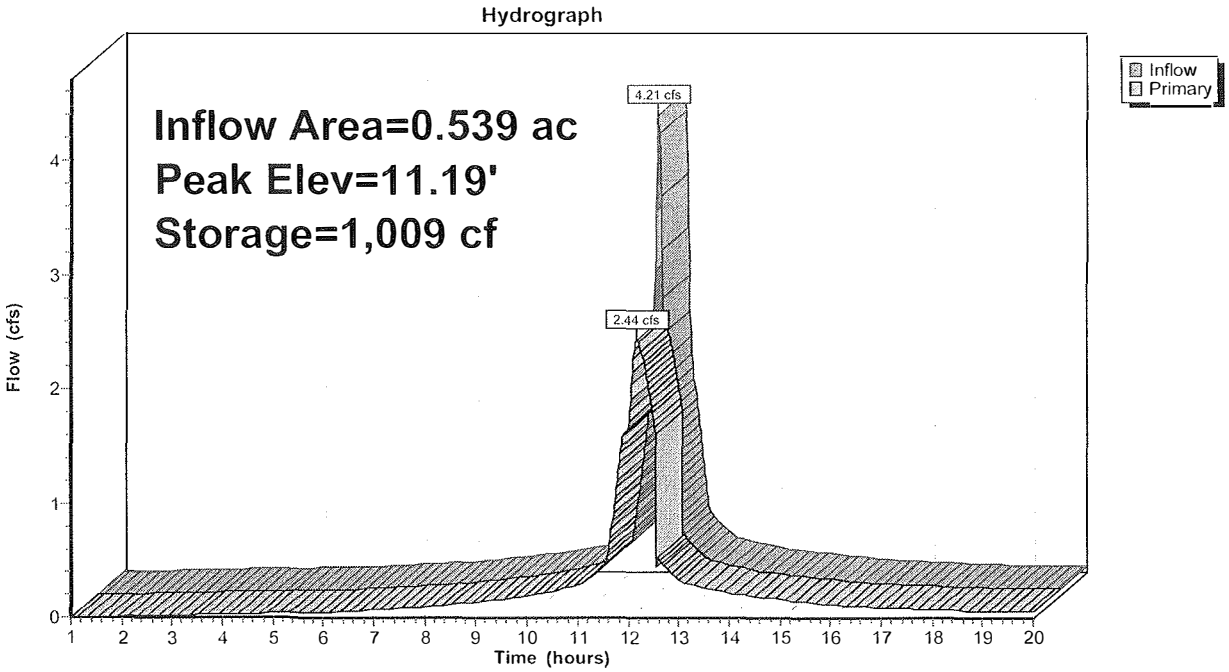
Volume	Invert	Avail.Storage	Storage Description
#1	8.00'	1,264 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
8.00	0
9.00	316
10.00	632
11.00	948
12.00	1,264

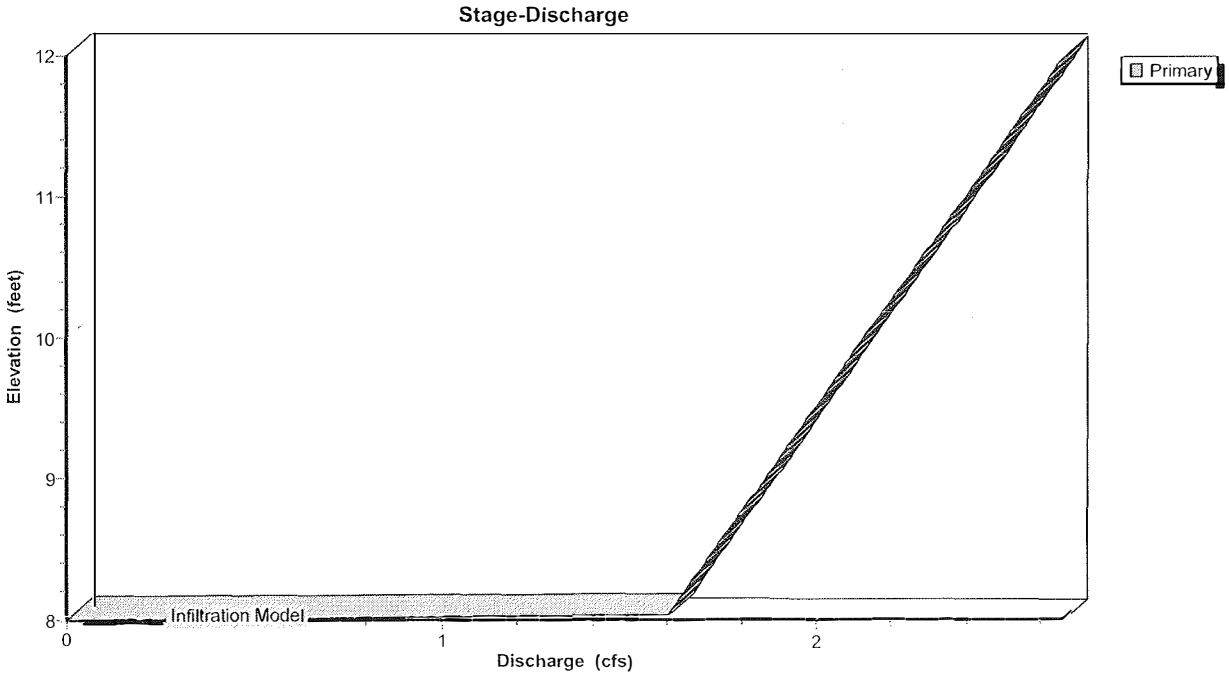
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model** Elev. (feet) 7.90 8.00 9.00 10.00 11.00 12.00 Disch. (cfs) 0.000 1.590 1.860 2.120 2.390 2.650

Primary OutFlow Max=2.44 cfs @ 12.17 hrs HW=11.19' (Free Discharge)
↑—**1=Infiltration Model** (Custom Controls 2.44 cfs)

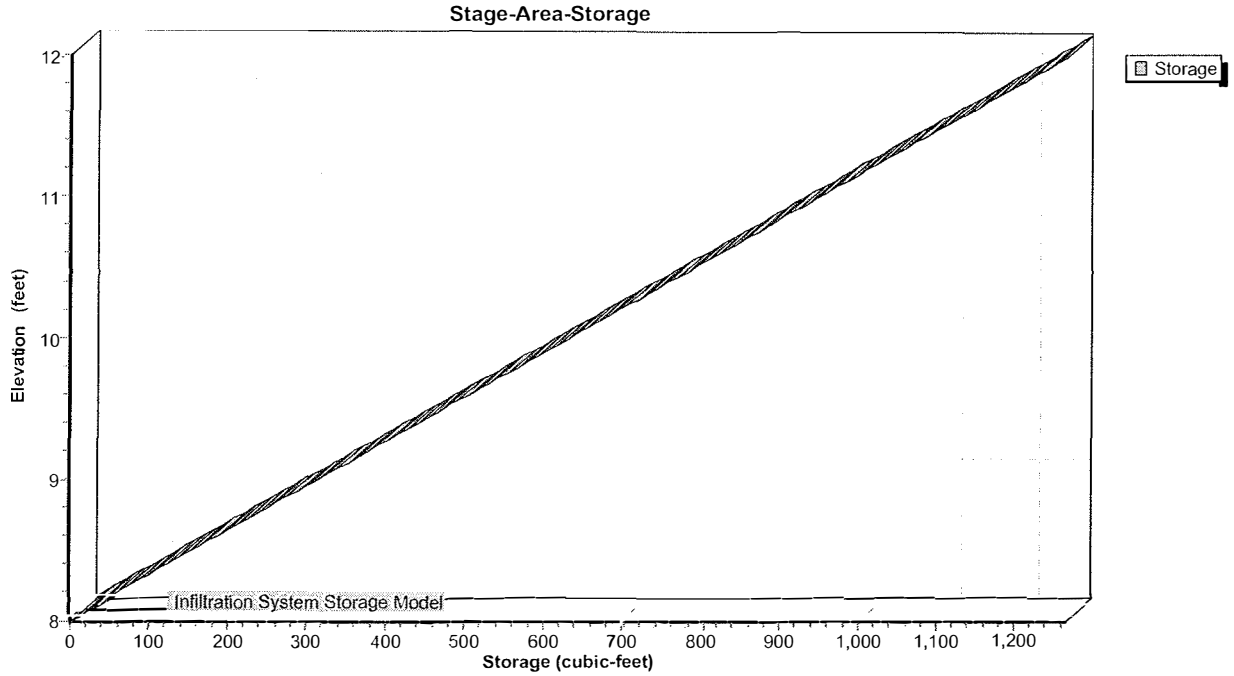
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	8.00	0.00	11.80	1.30	10	8.03	1.29
1.20	0.00	0	8.00	0.00	12.00	**2.85**	**165**	**8.52**	**1.73**
1.40	0.00	0	8.00	0.00	12.20	**2.07**	**989**	**11.13**	**2.42**
1.60	0.00	0	8.00	0.00	12.40	1.16	496	9.57	2.01
1.80	0.00	0	8.00	0.00	12.60	0.52	4	8.01	0.52
2.00	0.01	0	8.00	0.01	12.80	0.41	3	8.01	0.42
2.20	0.01	0	8.00	0.01	13.00	0.34	3	8 01	0.34
2.40	0.01	0	8.00	0.01	13.20	0.29	2	8.01	0.30
2.60	0.01	0	8.00	0.01	13.40	0.27	2	8.01	0.27
2.80	0.01	0	8.00	0.01	13.60	0.25	2	8.01	0.25
3.00	0.02	0	8.00	0.02	13.80	0.23	2	8.01	0.23
3.20	0.02	0	8.00	0.02	14.00	0.21	2	8.01	0.21
3.40	0.02	0	8.00	0.02	14.20	0.20	2	8.01	0.20
3.60	0.02	0	8.00	0.02	14.40	0.19	2	8.00	0.19
3.80	0.03	0	8.00	0.03	14.60	0.18	1	8.00	0.18
4.00	0.03	0	8.00	0.03	14.80	0.17	1	8.00	0.17
4.20	0.03	0	8.00	0.03	15.00	0.16	1	8.00	0.16
4.40	0.03	0	8.00	0.03	15.20	0.15	1	8.00	0.15
4.60	0.03	0	8.00	0.03	15.40	0.14	1	8.00	0.14
4.80	0.04	0	8.00	0.04	15.60	0.13	1	8.00	0.13
5.00	0.04	0	8.00	0.04	15.80	0.12	1	8.00	0.12
5.20	0.04	0	8.00	0.04	16.00	0.11	1	8.00	0.11
5.40	0.04	0	8.00	0.04	16.20	0.11	1	8.00	0.11
5.60	0.04	0	8.00	0.04	16.40	0.10	1	8.00	0.10
5.80	0.05	0	8.00	0.05	16.60	0.10	1	8.00	0.10
6.00	0.05	0	8.00	0.05	16.80	0.09	1	8.00	0.09
6.20	0.05	0	8.00	0.05	17.00	0.09	1	8.00	0.09
6.40	0.05	0	8.00	0.05	17.20	0.09	1	8.00	0.09
6.60	0.06	0	8.00	0.06	17.40	0.08	1	8.00	0.08
6.80	0.06	1	8.00	0.06	17.60	0.08	1	8.00	0.08
7.00	0.07	1	8.00	0.07	17.80	0.07	1	8.00	0.07
7.20	0.07	1	8.00	0.07	18.00	0.07	1	8.00	0.07
7.40	0.08	1	8.00	0.08	18.20	0.07	1	8.00	0.07
7.60	0.08	1	8.00	0.08	18.40	0.07	1	8.00	0.07
7.80	0.09	1	8.00	0.09	18.60	0.06	1	8.00	0.06
8.00	0.09	1	8.00	0.09	18.80	0.06	0	8.00	0.06
8.20	0.10	1	8.00	0.10	19.00	0.06	0	8.00	0.06
8.40	0.11	1	8.00	0.11	19.20	0.06	0	8.00	0.06
8.60	0.12	1	8.00	0.12	19.40	0.06	0	8.00	0.06
8.80	0.13	1	8.00	0.13	19.60	0.06	0	8.00	0.06
9.00	0.14	1	8.00	0.14	19.80	0.06	0	8.00	0.06
9.20	0.15	1	8.00	0.15	20.00	0.06	0	8.00	0.06
9.40	0.16	1	8.00	0.16					
9.60	0.17	1	8.00	0.17					
9.80	0.18	1	8.00	0.18					
10.00	0.19	1	8.00	0.19					
10.20	0.20	2	8.01	0.20					
10.40	0.22	2	8.01	0.22					
10.60	0.24	2	8.01	0.24					
10.80	0.27	2	8.01	0.27					
11.00	0.29	2	8.01	0.29					
11.20	0.34	3	8 01	0.34					
11.40	0.42	3	8 01	0.42					
11.60	0.59	5	8 01	0.59					

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
8.00	0.00	9.08	1.88	10.16	2.16	11.24	2.45
8.02	1.60	9.10	1.89	10.18	2.17	11.26	2.46
8.04	1.60	9.12	1.89	10.20	2.17	11.28	2.46
8.06	1.61	9.14	1.90	10.22	2.18	11.30	2.47
8.08	1.61	9.16	1.90	10.24	2.18	11.32	2.47
8.10	1.62	9.18	1.91	10.26	2.19	11.34	2.48
8.12	1.62	9.20	1.91	10.28	2.20	11.36	2.48
8.14	1.63	9.22	1.92	10.30	2.20	11.38	2.49
8.16	1.63	9.24	1.92	10.32	2.21	11.40	2.49
8.18	1.64	9.26	1.93	10.34	2.21	11.42	2.50
8.20	1.64	9.28	1.93	10.36	2.22	11.44	2.50
8.22	1.65	9.30	1.94	10.38	2.22	11.46	2.51
8.24	1.65	9.32	1.94	10.40	2.23	11.48	2.51
8.26	1.66	9.34	1.95	10.42	2.23	11.50	2.52
8.28	1.67	9.36	1.95	10.44	2.24	11.52	2.53
8.30	1.67	9.38	1.96	10.46	2.24	11.54	2.53
8.32	1.68	9.40	1.96	10.48	2.25	11.56	2.54
8.34	1.68	9.42	1.97	10.50	2.25	11.58	2.54
8.36	1.69	9.44	1.97	10.52	2.26	11.60	2.55
8.38	1.69	9.46	1.98	10.54	2.27	11.62	2.55
8.40	1.70	9.48	1.98	10.56	2.27	11.64	2.56
8.42	1.70	9.50	1.99	10.58	2.28	11.66	2.56
8.44	1.71	9.52	2.00	10.60	2.28	11.68	2.57
8.46	1.71	9.54	2.00	10.62	2.29	11.70	2.57
8.48	1.72	9.56	2.01	10.64	2.29	11.72	2.58
8.50	1.73	9.58	2.01	10.66	2.30	11.74	2.58
8.52	1.73	9.60	2.02	10.68	2.30	11.76	2.59
8.54	1.74	9.62	2.02	10.70	2.31	11.78	2.59
8.56	1.74	9.64	2.03	10.72	2.31	11.80	2.60
8.58	1.75	9.66	2.03	10.74	2.32	11.82	2.60
8.60	1.75	9.68	2.04	10.76	2.33	11.84	2.61
8.62	1.76	9.70	2.04	10.78	2.33	11.86	2.61
8.64	1.76	9.72	2.05	10.80	2.34	11.88	2.62
8.66	1.77	9.74	2.05	10.82	2.34	11.90	2.62
8.68	1.77	9.76	2.06	10.84	2.35	11.92	2.63
8.70	1.78	9.78	2.06	10.86	2.35	11.94	2.63
8.72	1.78	9.80	2.07	10.88	2.36	11.96	2.64
8.74	1.79	9.82	2.07	10.90	2.36	11.98	2.64
8.76	1.80	9.84	2.08	10.92	2.37	12.00	**2.65**
8.78	1.80	9.86	2.08	10.94	2.37		
8.80	1.81	9.88	2.09	10.96	2.38		
8.82	1.81	9.90	2.09	10.98	2.38		
8.84	1.82	9.92	2.10	11.00	2.39		
8.86	1.82	9.94	2.10	11.02	2.40		
8.88	1.83	9.96	2.11	11.04	2.40		
8.90	1.83	9.98	2.11	11.06	2.41		
8.92	1.84	10.00	2.12	11.08	2.41		
8.94	1.84	10.02	2.13	11.10	2.42		
8.96	1.85	10.04	2.13	11.12	2.42		
8.98	1.85	10.06	2.14	11.14	2.43		
9.00	1.86	10.08	2.14	11.16	2.43		
9.02	1.87	10.10	2.15	11.18	2.44		
9.04	1.87	10.12	2.15	11.20	2.44		
9.06	1.88	10.14	2.16	11.22	2.45		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
8.00	0	9.08	341	10.16	683	11.24	1,024
8.02	6	9.10	348	10.18	689	11.26	1,030
8.04	13	9.12	354	10.20	695	11.28	1,036
8.06	19	9.14	360	10.22	702	11.30	1,043
8.08	25	9.16	367	10.24	708	11.32	1,049
8.10	32	9.18	373	10.26	714	11.34	1,055
8.12	38	9.20	379	10.28	720	11.36	1,062
8.14	44	9.22	386	10.30	727	11.38	1,068
8.16	51	9.24	392	10.32	733	11.40	1,074
8.18	57	9.26	398	10.34	739	11.42	1,081
8.20	63	9.28	404	10.36	746	11.44	1,087
8.22	70	9.30	411	10.38	752	11.46	1,093
8.24	76	9.32	417	10.40	758	11.48	1,100
8.26	82	9.34	423	10.42	765	11.50	1,106
8.28	88	9.36	430	10.44	771	11.52	1,112
8.30	95	9.38	436	10.46	777	11.54	1,119
8.32	101	9.40	442	10.48	784	11.56	1,125
8.34	107	9.42	449	10.50	790	11.58	1,131
8.36	114	9.44	455	10.52	796	11.60	1,138
8.38	120	9.46	461	10.54	803	11.62	1,144
8.40	126	9.48	468	10.56	809	11.64	1,150
8.42	133	9.50	474	10.58	815	11.66	1,157
8.44	139	9.52	480	10.60	822	11.68	1,163
8.46	145	9.54	487	10.62	828	11.70	1,169
8.48	152	9.56	493	10.64	834	11.72	1,176
8.50	158	9.58	499	10.66	841	11.74	1,182
8.52	164	9.60	506	10.68	847	11.76	1,188
8.54	171	9.62	512	10.70	853	11.78	1,194
8.56	177	9.64	518	10.72	860	11.80	1,201
8.58	183	9.66	525	10.74	866	11.82	1,207
8.60	190	9.68	531	10.76	872	11.84	1,213
8.62	196	9.70	537	10.78	878	11.86	1,220
8.64	202	9.72	544	10.80	885	11.88	1,226
8.66	209	9.74	550	10.82	891	11.90	1,232
8.68	215	9.76	556	10.84	897	11.92	1,239
8.70	221	9.78	562	10.86	904	11.94	1,245
8.72	228	9.80	569	10.88	910	11.96	1,251
8.74	234	9.82	575	10.90	916	11.98	1,258
8.76	240	9.84	581	10.92	923	12.00	**1,264**
8.78	246	9.86	588	10.94	929		
8.80	253	9.88	594	10.96	935		
8.82	259	9.90	600	10.98	942		
8.84	265	9.92	607	11.00	948		
8.86	272	9.94	613	11.02	954		
8.88	278	9.96	619	11.04	961		
8.90	284	9.98	626	11.06	967		
8.92	291	10.00	632	11.08	973		
8.94	297	10.02	638	11.10	980		
8.96	303	10.04	645	11.12	986		
8.98	310	10.06	651	11.14	992		
9.00	316	10.08	657	11.16	999		
9.02	322	10.10	664	11.18	1,005		
9.04	329	10.12	670	11.20	1,011		
9.06	335	10.14	676	11.22	1,018		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA7 Runoff Area=23,472 sf Runoff Depth>4.87"
Tc=5.0 min CN=95 Runoff=3.04 cfs 0.218 af

Pond 1P: Infiltration Storage Model Peak Elev=9.50' Storage=474 cf Inflow=3.04 cfs 0.218 af
Outflow=1.99 cfs 0.219 af

Total Runoff Area = 0.539 ac Runoff Volume = 0.218 af Average Runoff Depth = 4.87"
4.69% Pervious Area = 0.025 ac 95.31% Impervious Area = 0.514 ac

Subcatchment 1S: Drainage Area DA7

Time of Concentration

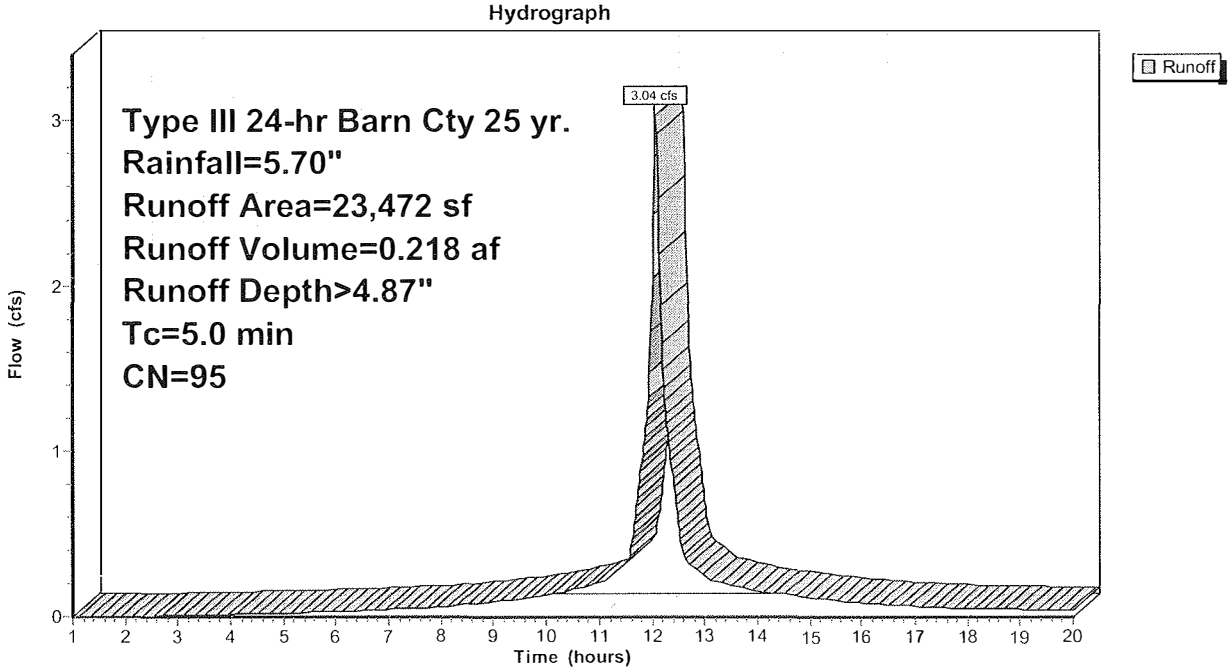
Runoff = 3.04 cfs @ 12.07 hrs, Volume= 0 218 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 25 yr. Rainfall=5.70"

Area (sf)	CN	Description
22,372	98	Paved parking
1,100	32	Woods/grass comb., Good, HSG A
23,472	95	Weighted Average
1,100		Pervious Area
22,372		Impervious Area

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

Subcatchment 1S: Drainage Area DA7



Hydrograph for Subcatchment 1S: Drainage Area DA7

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.06	0.00	0.00
1.20	0.07	0.00	0.00
1.40	0.08	0.00	0.00
1.60	0.09	0.00	0.00
1.80	0.10	0.00	0.00
2.00	0.11	0.00	0.00
2.20	0.13	0.00	0.00
2.40	0.14	0.00	0.00
2.60	0.15	0.00	0.00
2.80	0.16	0.01	0.01
3.00	0.18	0.01	0.01
3.20	0.19	0.01	0.01
3.40	0.20	0.02	0.01
3.60	0.22	0.02	0.01
3.80	0.23	0.02	0.01
4.00	0.25	0.03	0.01
4.20	0.26	0.04	0.02
4.40	0.28	0.04	0.02
4.60	0.29	0.05	0.02
4.80	0.31	0.06	0.02
5.00	0.32	0.06	0.02
5.20	0.34	0.07	0.02
5.40	0.36	0.08	0.02
5.60	0.37	0.09	0.03
5.80	0.39	0.10	0.03
6.00	0.41	0.11	0.03
6.20	0.43	0.12	0.03
6.40	0.45	0.14	0.03
6.60	0.47	0.15	0.04
6.80	0.49	0.16	0.04
7.00	0.52	0.18	0.04
7.20	0.54	0.20	0.05
7.40	0.57	0.22	0.05
7.60	0.59	0.23	0.05
7.80	0.62	0.26	0.06
8.00	0.65	0.28	0.06
8.20	0.68	0.30	0.07
8.40	0.71	0.33	0.07
8.60	0.75	0.36	0.08
8.80	0.79	0.39	0.09
9.00	0.83	0.42	0.09
9.20	0.87	0.46	0.10
9.40	0.92	0.50	0.11
9.60	0.97	0.54	0.11
9.80	1.02	0.58	0.12
10.00	1.08	0.63	0.13
10.20	1.14	0.68	0.14
10.40	1.20	0.74	0.16
10.60	1.27	0.80	0.17
10.80	1.34	0.87	0.19
11.00	1.42	0.94	0.20
11.20	1.52	1.03	0.24
11.40	1.63	1.14	0.30
11.60	1.79	1.29	0.42
11.80	2.13	1.60	0.93
12.00	2.85	2.30	**2.05**
12.20	3.57	3.01	**1.50**
12.40	3.91	3.34	0.84
12.60	4.07	3.50	0.37
12.80	4.18	3.61	0.30
13.00	4.27	3.70	0.24
13.20	4.36	3.78	0.21
13.40	4.43	3.86	0.20
13.60	4.50	3.92	0.19
13.80	4.56	3.99	0.17
14.00	4.62	4.05	0.16
14.20	4.68	4.10	0.15
14.40	4.73	4.15	0.14
14.60	4.78	4.20	0.13
14.80	4.83	4.25	0.12
15.00	4.87	4.29	0.12
15.20	4.91	4.33	0.11
15.40	4.95	4.37	0.10
15.60	4.99	4.41	0.10
15.80	5.02	4.44	0.09
16.00	5.05	4.47	0.08
16.20	5.08	4.50	0.08
16.40	5.11	4.53	0.07
16.60	5.13	4.55	0.07
16.80	5.16	4.58	0.07
17.00	5.18	4.60	0.07
17.20	5.21	4.63	0.06
17.40	5.23	4.65	0.06
17.60	5.25	4.67	0.06
17.80	5.27	4.69	0.05
18.00	5.29	4.71	0.05
18.20	5.31	4.72	0.05
18.40	5.33	4.74	0.05
18.60	5.34	4.76	0.05
18.80	5.36	4.78	0.05
19.00	5.38	4.79	0.04
19.20	5.39	4.81	0.04
19.40	5.41	4.82	0.04
19.60	5.42	4.84	0.04
19.80	5.44	4.86	0.04
20.00	**5.45**	**4.87**	0.04

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 0 539 ac, Inflow Depth > 4.87" for Barn Cty 25 yr. event
Inflow = 3.04 cfs @ 12.07 hrs, Volume= 0.218 af
Outflow = 1.99 cfs @ 12.15 hrs, Volume= 0.219 af, Atten= 34%, Lag= 5.0 min
Primary = 1.99 cfs @ 12.15 hrs, Volume= 0.219 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 9.50' @ 12.15 hrs Surf.Area= 0 sf Storage= 474 cf

Plug-Flow detention time=(not calculated: outflow precedes inflow)
Center-of-Mass det. time=0.8 min (736.7 - 735.9)

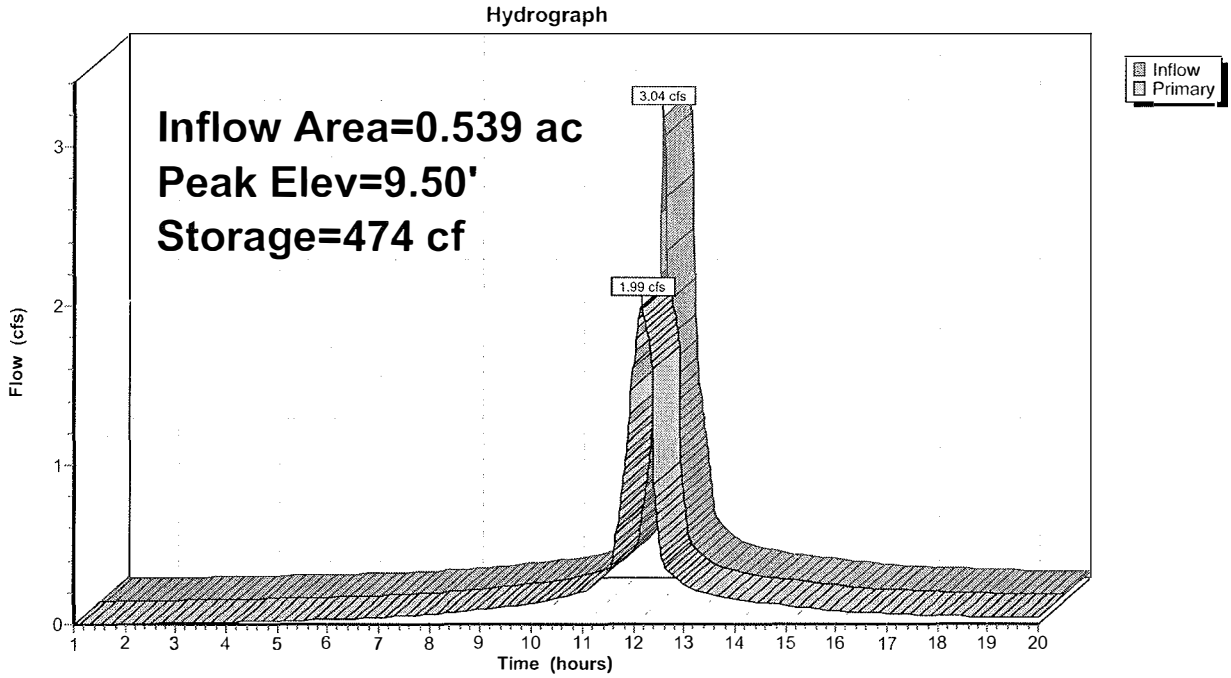
Volume	Invert	Avail.Storage	Storage Description
#1	8.00'	1,264 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
8.00	0
9.00	316
10.00	632
11.00	948
12.00	1,264

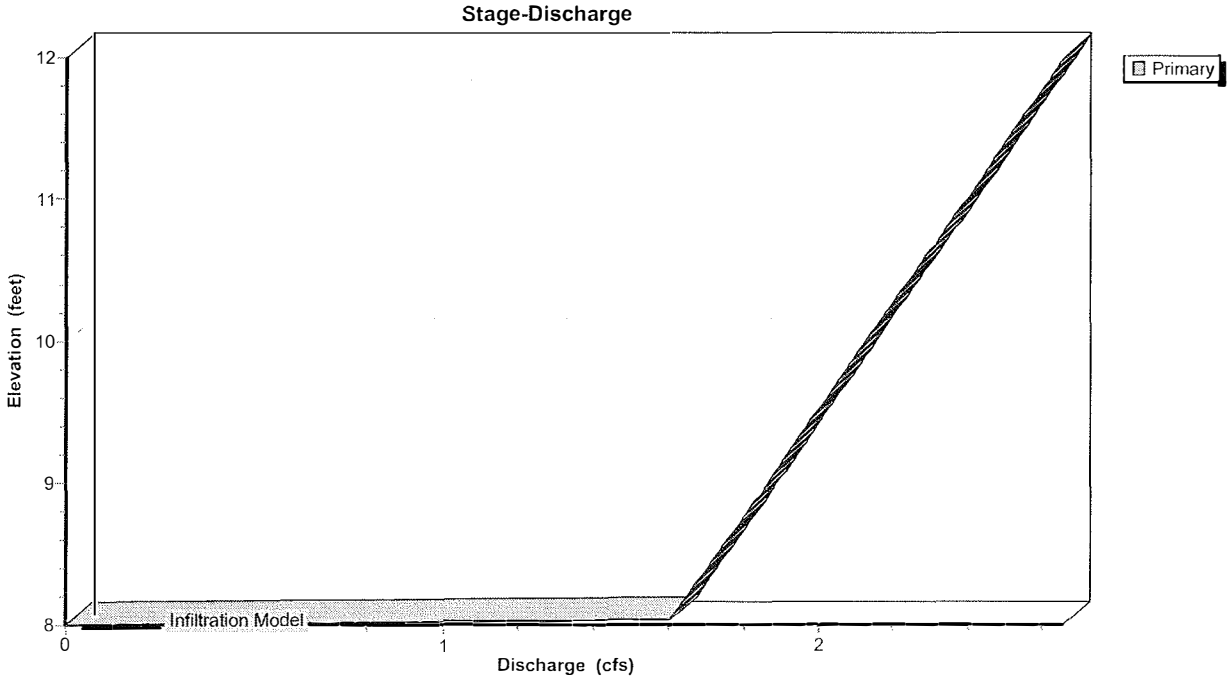
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model** Elev. (feet) 7.90 8.00 9.00 10.00 11.00 12.00 Disch. (cfs) 0.000 1.590 1.860 2.120 2.390 2.650

Primary OutFlow Max=1.99 cfs @ 12.15 hrs HW=9.49' (Free Discharge)
↑**1=Infiltration Model** (Custom Controls 1.99 cfs)

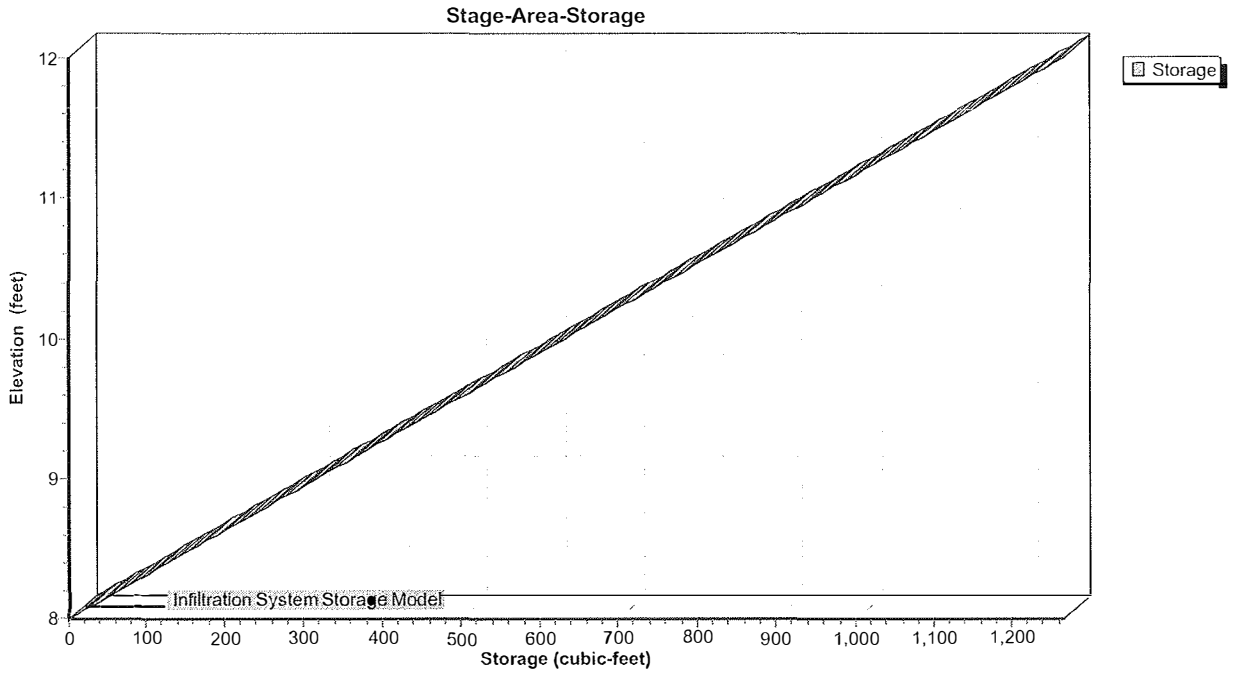
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

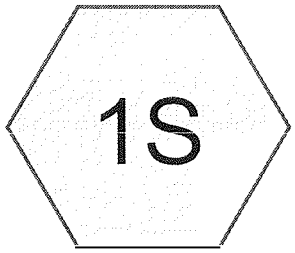
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	8.00	0.00
1.20	0.00	0	8.00	0.00
1.40	0.00	0	8.00	0.00
1.60	0.00	0	8.00	0.00
1.80	0.00	0	8.00	0.00
2.00	0.00	0	8.00	0.00
2.20	0.00	0	8.00	0.00
2.40	0.00	0	8.00	0.00
2.60	0.00	0	8.00	0.00
2.80	0.01	0	8.00	0.01
3.00	0.01	0	8.00	0.01
3.20	0.01	0	8.00	0.01
3.40	0.01	0	8.00	0.01
3.60	0.01	0	8.00	0.01
3.80	0.01	0	8.00	0.01
4.00	0.01	0	8.00	0.01
4.20	0.02	0	8.00	0.02
4.40	0.02	0	8.00	0.02
4.60	0.02	0	8.00	0.02
4.80	0.02	0	8.00	0.02
5.00	0.02	0	8.00	0.02
5.20	0.02	0	8.00	0.02
5.40	0.02	0	8.00	0.02
5.60	0.03	0	8.00	0.03
5.80	0.03	0	8.00	0.03
6.00	0.03	0	8.00	0.03
6.20	0.03	0	8.00	0.03
6.40	0.03	0	8.00	0.03
6.60	0.04	0	8.00	0.04
6.80	0.04	0	8.00	0.04
7.00	0.04	0	8.00	0.04
7.20	0.05	0	8.00	0.05
7.40	0.05	0	8.00	0.05
7.60	0.05	0	8.00	0.05
7.80	0.06	0	8.00	0.06
8.00	0.06	0	8.00	0.06
8.20	0.07	1	8.00	0.07
8.40	0.07	1	8.00	0.07
8.60	0.08	1	8.00	0.08
8.80	0.09	1	8.00	0.09
9.00	0.09	1	8.00	0.09
9.20	0.10	1	8.00	0.10
9.40	0.11	1	8.00	0.11
9.60	0.11	1	8.00	0.11
9.80	0.12	1	8.00	0.12
10.00	0.13	1	8.00	0.13
10.20	0.14	1	8.00	0.14
10.40	0.16	1	8.00	0.16
10.60	0.17	1	8.00	0.17
10.80	0.19	1	8.00	0.19
11.00	0.20	2	8.01	0.20
11.20	0.24	2	8.01	0.24
11.40	0.30	2	8.01	0.30
11.60	0.42	3	8 01	0.42
11.80	0.93	7	8.02	0.92
12.00	**2.05**	**35**	**8.11**	**1.62**
12.20	**1.50**	**430**	**9.36**	**1.95**
12.40	0.84	7	8.02	0.87
12.60	0.37	3	8.01	0.38
12.80	0.30	2	8.01	0.30
13.00	0.24	2	8.01	0.25
13.20	0.21	2	8.01	0.21
13.40	0.20	2	8.00	0.20
13.60	0.19	1	8.00	0.19
13.80	0.17	1	8.00	0.17
14.00	0.16	1	8.00	0.16
14.20	0.15	1	8.00	0.15
14.40	0.14	1	8.00	0.14
14.60	0.13	1	8.00	0.13
14.80	0.12	1	8.00	0.12
15.00	0.12	1	8.00	0.12
15.20	0.11	1	8.00	0.11
15.40	0.10	1	8.00	0.10
15.60	0.10	1	8.00	0.10
15.80	0.09	1	8.00	0.09
16.00	0.08	1	8.00	0.08
16.20	0.08	1	8.00	0.08
16.40	0.07	1	8.00	0.07
16.60	0.07	1	8.00	0.07
16.80	0.07	1	8.00	0.07
17.00	0.07	1	8.00	0.07
17.20	0.06	0	8.00	0.06
17.40	0.06	0	8.00	0.06
17.60	0.06	0	8.00	0.06
17.80	0.05	0	8.00	0.05
18.00	0.05	0	8.00	0.05
18.20	0.05	0	8.00	0.05
18.40	0.05	0	8.00	0.05
18.60	0.05	0	8.00	0.05
18.80	0.05	0	8.00	0.05
19.00	0.04	0	8.00	0.04
19.20	0.04	0	8.00	0.04
19.40	0.04	0	8.00	0.04
19.60	0.04	0	8.00	0.04
19.80	0.04	0	8.00	0.04
20.00	0.04	0	8.00	0.04

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
8.00	0.00	9.08	1.88	10.16	2.16	11.24	2.45
8.02	1.60	9.10	1.89	10.18	2.17	11.26	2.46
8.04	1.60	9.12	1.89	10.20	2.17	11.28	2.46
8.06	1.61	9.14	1.90	10.22	2.18	11.30	2.47
8.08	1.61	9.16	1.90	10.24	2.18	11.32	2.47
8.10	1.62	9.18	1.91	10.26	2.19	11.34	2.48
8.12	1.62	9.20	1.91	10.28	2.20	11.36	2.48
8.14	1.63	9.22	1.92	10.30	2.20	11.38	2.49
8.16	1.63	9.24	1.92	10.32	2.21	11.40	2.49
8.18	1.64	9.26	1.93	10.34	2.21	11.42	2.50
8.20	1.64	9.28	1.93	10.36	2.22	11.44	2.50
8.22	1.65	9.30	1.94	10.38	2.22	11.46	2.51
8.24	1.65	9.32	1.94	10.40	2.23	11.48	2.51
8.26	1.66	9.34	1.95	10.42	2.23	11.50	2.52
8.28	1.67	9.36	1.95	10.44	2.24	11.52	2.53
8.30	1.67	9.38	1.96	10.46	2.24	11.54	2.53
8.32	1.68	9.40	1.96	10.48	2.25	11.56	2.54
8.34	1.68	9.42	1.97	10.50	2.25	11.58	2.54
8.36	1.69	9.44	1.97	10.52	2.26	11.60	2.55
8.38	1.69	9.46	1.98	10.54	2.27	11.62	2.55
8.40	1.70	9.48	1.98	10.56	2.27	11.64	2.56
8.42	1.70	9.50	1.99	10.58	2.28	11.66	2.56
8.44	1.71	9.52	2.00	10.60	2.28	11.68	2.57
8.46	1.71	9.54	2.00	10.62	2.29	11.70	2.57
8.48	1.72	9.56	2.01	10.64	2.29	11.72	2.58
8.50	1.73	9.58	2.01	10.66	2.30	11.74	2.58
8.52	1.73	9.60	2.02	10.68	2.30	11.76	2.59
8.54	1.74	9.62	2.02	10.70	2.31	11.78	2.59
8.56	1.74	9.64	2.03	10.72	2.31	11.80	2.60
8.58	1.75	9.66	2.03	10.74	2.32	11.82	2.60
8.60	1.75	9.68	2.04	10.76	2.33	11.84	2.61
8.62	1.76	9.70	2.04	10.78	2.33	11.86	2.61
8.64	1.76	9.72	2.05	10.80	2.34	11.88	2.62
8.66	1.77	9.74	2.05	10.82	2.34	11.90	2.62
8.68	1.77	9.76	2.06	10.84	2.35	11.92	2.63
8.70	1.78	9.78	2.06	10.86	2.35	11.94	2.63
8.72	1.78	9.80	2.07	10.88	2.36	11.96	2.64
8.74	1.79	9.82	2.07	10.90	2.36	11.98	2.64
8.76	1.80	9.84	2.08	10.92	2.37	12.00	**2.65**
8.78	1.80	9.86	2.08	10.94	2.37		
8.80	1.81	9.88	2.09	10.96	2.38		
8.82	1.81	9.90	2 09	10.98	2.38		
8.84	1.82	9.92	2.10	11.00	2.39		
8.86	1.82	9.94	2.10	11.02	2.40		
8.88	1.83	9.96	2.11	11.04	2.40		
8.90	1.83	9.98	2.11	11.06	2.41		
8.92	1.84	10.00	2.12	11.08	2.41		
8.94	1.84	10.02	2.13	11.10	2.42		
8.96	1.85	10.04	2.13	11.12	2.42		
8.98	1.85	10.06	2.14	11.14	2.43		
9.00	1.86	10.08	2.14	11.16	2.43		
9.02	1.87	10.10	2.15	11.18	2.44		
9.04	1.87	10.12	2.15	11.20	2.44		
9.06	1.88	10.14	2.16	11.22	2.45		

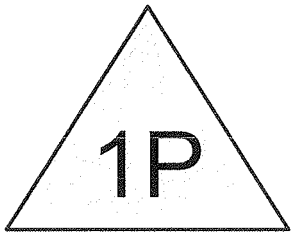
Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
8.00	0	9.08	341	10.16	683	11.24	1,024
8.02	6	9.10	348	10.18	689	11.26	1,030
8.04	13	9.12	354	10.20	695	11.28	1,036
8.06	19	9.14	360	10.22	702	11.30	1,043
8.08	25	9.16	367	10.24	708	11.32	1,049
8.10	32	9.18	373	10.26	714	11.34	1,055
8.12	38	9.20	379	10.28	720	11.36	1,062
8.14	44	9.22	386	10.30	727	11.38	1,068
8.16	51	9.24	392	10.32	733	11.40	1,074
8.18	57	9.26	398	10.34	739	11.42	1,081
8.20	63	9.28	404	10.36	746	11.44	1,087
8.22	70	9.30	411	10.38	752	11.46	1,093
8.24	76	9.32	417	10.40	758	11.48	1,100
8.26	82	9.34	423	10.42	765	11.50	1,106
8.28	88	9.36	430	10.44	771	11.52	1,112
8.30	95	9.38	436	10.46	777	11.54	1,119
8.32	101	9.40	442	10.48	784	11.56	1,125
8.34	107	9.42	449	10.50	790	11.58	1,131
8.36	114	9.44	455	10.52	796	11.60	1,138
8.38	120	9.46	461	10.54	803	11.62	1,144
8.40	126	9.48	468	10.56	809	11.64	1,150
8.42	133	9.50	474	10.58	815	11.66	1,157
8.44	139	9.52	480	10.60	822	11.68	1,163
8.46	145	9.54	487	10.62	828	11.70	1,169
8.48	152	9.56	493	10.64	834	11.72	1,176
8.50	158	9.58	499	10.66	841	11.74	1,182
8.52	164	9.60	506	10.68	847	11.76	1,188
8.54	171	9.62	512	10.70	853	11.78	1,194
8.56	177	9.64	518	10.72	860	11.80	1,201
8.58	183	9.66	525	10.74	866	11.82	1,207
8.60	190	9.68	531	10.76	872	11.84	1,213
8.62	196	9.70	537	10.78	878	11.86	1,220
8.64	202	9.72	544	10.80	885	11.88	1,226
8.66	209	9.74	550	10.82	891	11.90	1,232
8.68	215	9.76	556	10.84	897	11.92	1,239
8.70	221	9.78	562	10.86	904	11.94	1,245
8.72	228	9.80	569	10.88	910	11.96	1,251
8.74	234	9.82	575	10.90	916	11.98	1,258
8.76	240	9.84	581	10.92	923	12.00	**1,264**
8.78	246	9.86	588	10.94	929		
8.80	253	9.88	594	10.96	935		
8.82	259	9.90	600	10.98	942		
8.84	265	9.92	607	11.00	948		
8.86	272	9.94	613	11.02	954		
8.88	278	9.96	619	11.04	961		
8.90	284	9.98	626	11.06	967		
8.92	291	10.00	632	11.08	973		
8.94	297	10.02	638	11.10	980		
8.96	303	10.04	645	11.12	986		
8.98	310	10.06	651	11.14	992		
9.00	316	10.08	657	11.16	999		
9.02	322	10.10	664	11.18	1,005		
9 04	329	10.12	670	11.20	1,011		
9 06	335	10.14	676	11.22	1,018		



Drainage Area DA8

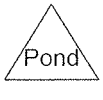




Infiltration Storage Model









Drainage Diagram for 17-005 CCH Project 2022 DA8
Prepared by down cape engineering, inc. 7/31/2019
HydroCAD® 8.00 s/n 004007 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.120	32	Woods/grass comb., Good, HSG A (1S)
0.464	98	Paved parking (1S)
0.584		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA8 Runoff Area=25,458 sf Runoff Depth>5.58"
Tc=5.0 min CN=84 Runoff=4.05 cfs 0.272 af

Pond 1P: Infiltration Storage Model Peak Elev=11.08' Storage=698 cf Inflow=4.05 cfs 0.272 af
Outflow=2.48 cfs 0.271 af

Total Runoff Area = 0.584 ac Runoff Volume = 0.272 af Average Runoff Depth = 5.58"
20.56% Pervious Area = 0.120 ac 79.44% Impervious Area = 0.464 ac

Subcatchment 1S: Drainage Area DA8

Time of Concentration

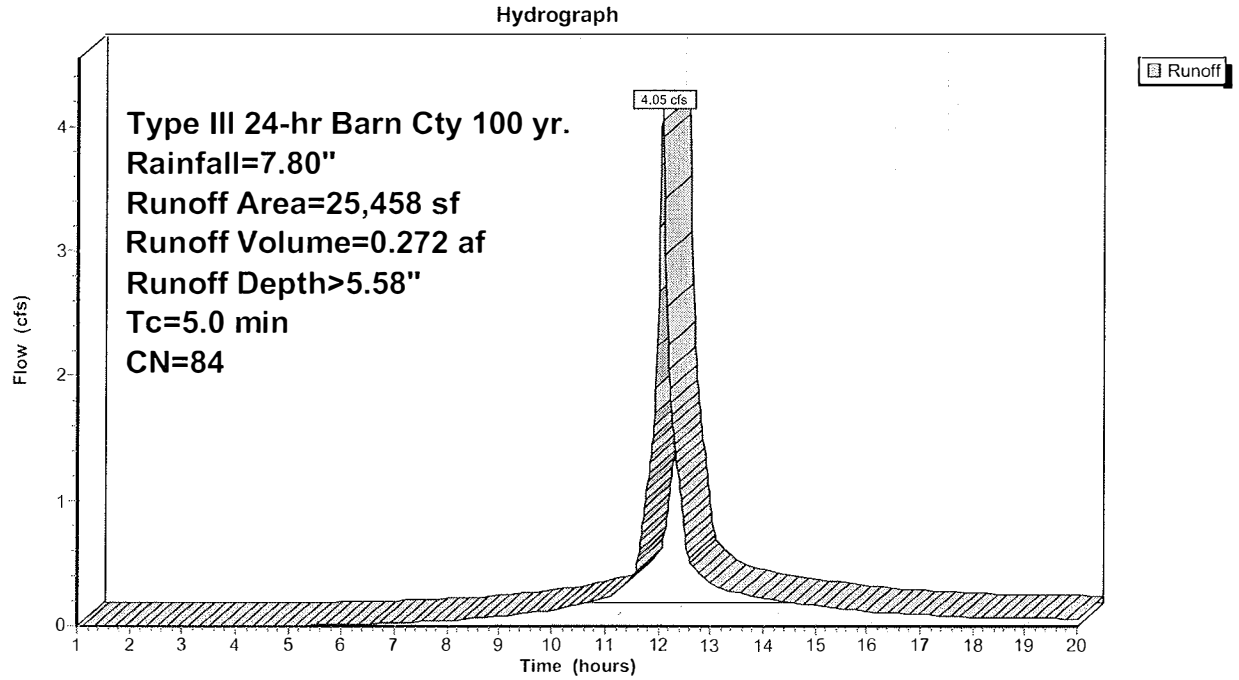
Runoff = 4.05 cfs @ 12.07 hrs, Volume= 0.272 af, Depth> 5.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 100 yr. Rainfall=7.80"

Area (sf)	CN	Description
20,224	98	Paved parking
5,234	32	Woods/grass comb., Good, HSG A
25,458	84	Weighted Average
5,234		Pervious Area
20,224		Impervious Area

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

Subcatchment 1S: Drainage Area DA8



Hydrograph for Subcatchment 1S: Drainage Area DA8

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	11.80	2.91	1.44	1.16
1.20	0.09	0.00	0.00	12.00	3.90	2.28	**2.68**
1.40	0.11	0.00	0.00	12.20	4.89	3.17	**2.05**
1.60	0.12	0.00	0.00	12.40	5.35	3.59	1.16
1.80	0.14	0.00	0.00	12.60	5.56	3.79	0.52
2.00	0.16	0.00	0.00	12.80	5.72	3.94	0.42
2.20	0.17	0.00	0.00	13.00	5.85	4.06	0.34
2.40	0.19	0.00	0.00	13.20	5.96	4.16	0.30
2.60	0.20	0.00	0.00	13.40	6.06	4.26	0.28
2.80	0.22	0.00	0.00	13.60	6.16	4.34	0.26
3.00	0.24	0.00	0.00	13.80	6.25	4.43	0.24
3.20	0.26	0.00	0.00	14.00	6.33	4.50	0.22
3.40	0.28	0.00	0.00	14.20	6.40	4.57	0.21
3.60	0.30	0.00	0.00	14.40	6.47	4.64	0.20
3.80	0.32	0.00	0.00	14.60	6.54	4.70	0.19
4.00	0.34	0.00	0.00	14.80	6.60	4.76	0.18
4.20	0.36	0.00	0.00	15.00	6.66	4.82	0.17
4.40	0.38	0.00	0.00	15.20	6.72	4.87	0.16
4.60	0.40	0.00	0.00	15.40	6.77	4.92	0.15
4.80	0.42	0.00	0.00	15.60	6.82	4.97	0.14
5.00	0.44	0.00	0.00	15.80	6.87	5.02	0.13
5.20	0.47	0.00	0.01	16.00	6.91	5.06	0.12
5.40	0.49	0.01	0.01	16.20	6.95	5.09	0.11
5.60	0.51	0.01	0.01	16.40	6.99	5.13	0.11
5.80	0.54	0.01	0.01	16.60	7.03	5.16	0.10
6.00	0.56	0.02	0.01	16.80	7.06	5.20	0.10
6.20	0.59	0.02	0.01	17.00	7.09	5.23	0.09
6.40	0.61	0.03	0.02	17.20	7.13	5.26	0.09
6.60	0.64	0.03	0.02	17.40	7.16	5.29	0.08
6.80	0.67	0.04	0.02	17.60	7.19	5.32	0.08
7.00	0.71	0.05	0.02	17.80	7.21	5.34	0.08
7.20	0.74	0.06	0.03	18.00	7.24	5.37	0.07
7.40	0.77	0.07	0.03	18.20	7.26	5.39	0.07
7.60	0.81	0.08	0.04	18.40	7.29	5.41	0.07
7.80	0.85	0.09	0.04	18.60	7.31	5.44	0.07
8.00	0.89	0.11	0.04	18.80	7.33	5.46	0.07
8.20	0.93	0.12	0.05	19.00	7.36	5.48	0.06
8.40	0.98	0.14	0.06	19.20	7.38	5.50	0.06
8.60	1.03	0.16	0.06	19.40	7.40	5.52	0.06
8.80	1.08	0.19	0.07	19.60	7.42	5.54	0.06
9.00	1.14	0.21	0.08	19.80	7.44	5.56	0.06
9.20	1.20	0.24	0.09	20.00	**7.46**	**5.58**	0.06
9.40	1.26	0.28	0.10				
9.60	1.33	0.31	0.11				
9.80	1.40	0.35	0.12				
10.00	1.47	0.40	0.13				
10.20	1.55	0.45	0.15				
10.40	1.64	0.50	0.16				
10.60	1.74	0.56	0.18				
10.80	1.84	0.63	0.20				
11.00	1.95	0.71	0.23				
11.20	2.08	0.80	0.28				
11.40	2.24	0.91	0.35				
11.60	2.45	1.08	0.50				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 0.584 ac, Inflow Depth > 5.58" for Barn Cty 100 yr. event
Inflow = 4.05 cfs @ 12.07 hrs, Volume= 0.272 af
Outflow = 2.48 cfs @ 12.17 hrs, Volume= 0.271 af, Atten= 39%, Lag= 5.6 min
Primary = 2.48 cfs @ 12.17 hrs, Volume= 0.271 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 11.08' @ 12.17 hrs Surf.Area= 0 sf Storage= 698 cf

Plug-Flow detention time=(not calculated: outflow precedes inflow)
Center-of-Mass det. time=1.0 min (763.4 - 762.4)

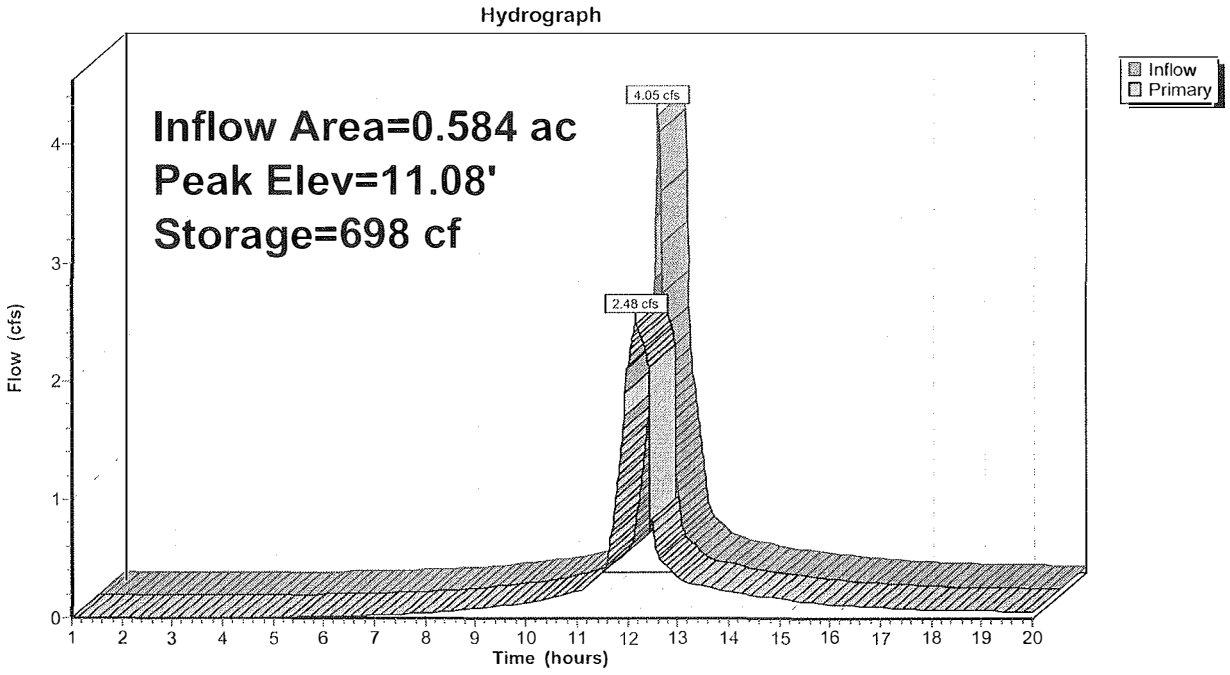
Volume	Invert	Avail.Storage	Storage Description
#1	8.80'	1,200 cf	**Infiltration System Storage Model**Listed below

Elevation (feet)	Cum.Store (cubic-feet)
8.80	0
9.80	220
10.80	600
11.80	950
12.80	1,200

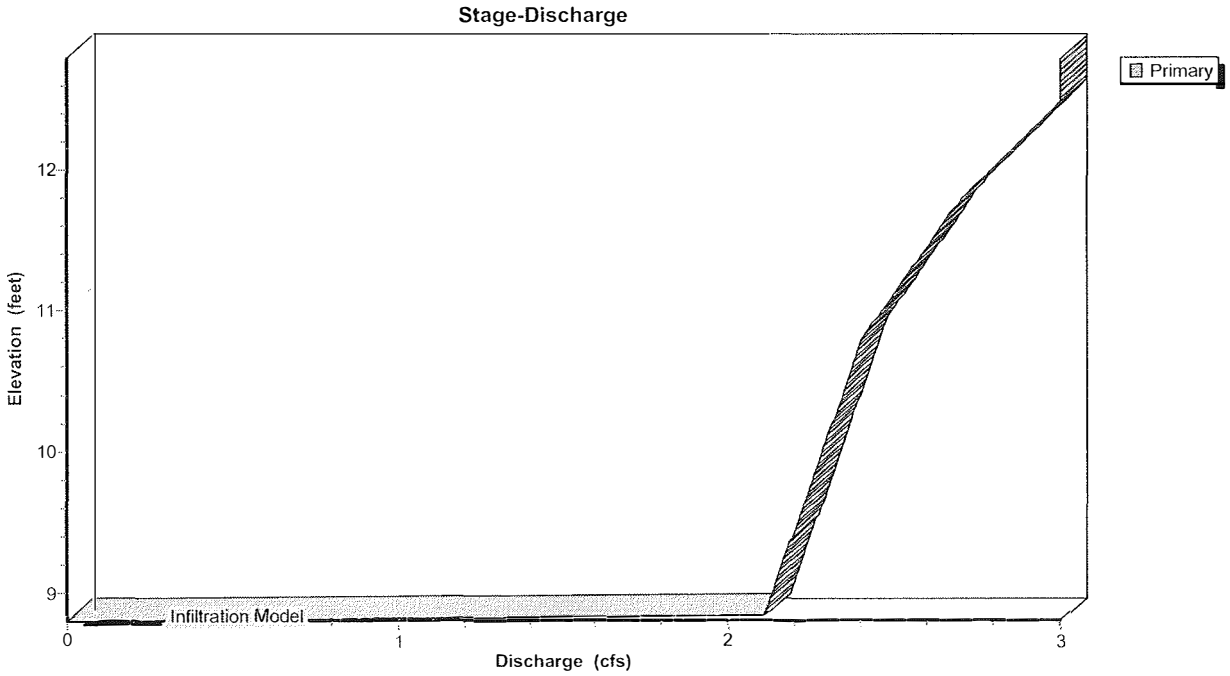
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model** Elev. (feet) 8.70 8.80 10.80 11.80 12.50 Disch. (cfs) 0.000 2.100 2.400 2.700 3.000

Primary OutFlow Max=2.48 cfs @ 12.17 hrs HW=11.07' (Free Discharge)
↳**1=Infiltration Model** (Custom Controls 2.48 cfs)

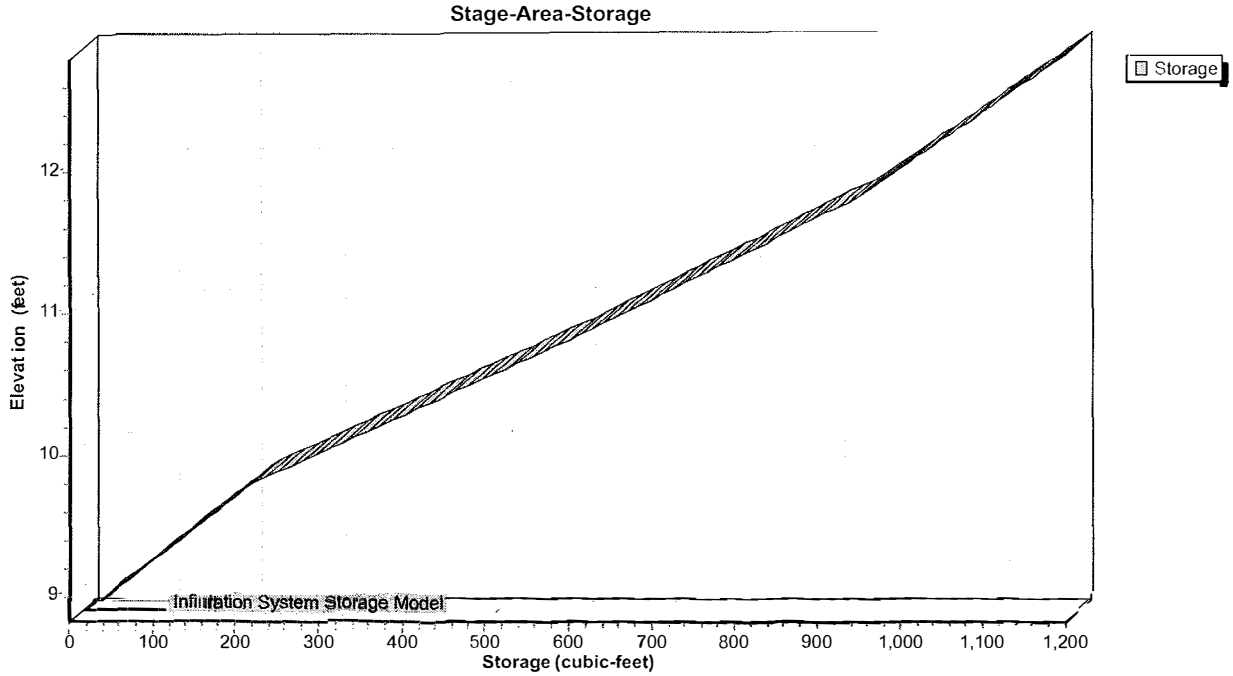
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	8.80	0.00	11.80	1.16	5	8.82	1.15
1.20	0.00	0	8.80	0.00	12.00	**2.68**	**36**	**8.96**	**2.12**
1.40	0.00	0	8.80	0.00	12.20	**2.05**	**668**	**11.00**	**2.46**
1.60	0.00	0	8.80	0.00	12.40	1.16	107	9.29	2.17
1.80	0.00	0	8.80	0.00	12.60	0.52	2	8.81	0.52
2.00	0.00	0	8.80	0.00	12.80	0.42	2	8.81	0.42
2.20	0.00	0	8.80	0.00	13.00	0.34	1	8.81	0.34
2.40	0.00	0	8.80	0.00	13.20	0.30	1	8.81	0.30
2.60	0.00	0	8.80	0.00	13.40	0.28	1	8.81	0.28
2.80	0.00	0	8.80	0.00	13.60	0.26	1	8.80	0.26
3.00	0.00	0	8.80	0.00	13.80	0.24	1	8.80	0.24
3.20	0.00	0	8.80	0.00	14.00	0.22	1	8.80	0.22
3.40	0.00	0	8.80	0.00	14.20	0.21	1	8.80	0.21
3.60	0.00	0	8.80	0.00	14.40	0.20	1	8.80	0.20
3.80	0.00	0	8.80	0.00	14.60	0.19	1	8.80	0.19
4.00	0.00	0	8.80	0.00	14.80	0.18	1	8.80	0.18
4.20	0.00	0	8.80	0.00	15.00	0.17	1	8.80	0.17
4.40	0.00	0	8.80	0.00	15.20	0.16	1	8.80	0.16
4.60	0.00	0	8.80	0.00	15.40	0.15	1	8.80	0.15
4.80	0.00	0	8.80	0.00	15.60	0.14	1	8.80	0.14
5.00	0.00	0	8.80	0.00	15.80	0.13	1	8.80	0.13
5.20	0.01	0	8.80	0.01	16.00	0.12	0	8.80	0.12
5.40	0.01	0	8.80	0.01	16.20	0.11	0	8.80	0.11
5.60	0.01	0	8.80	0.01	16.40	0.11	0	8.80	0.11
5.80	0.01	0	8.80	0.01	16.60	0.10	0	8.80	0.10
6.00	0.01	0	8.80	0.01	16.80	0.10	0	8.80	0.10
6.20	0.01	0	8.80	0.01	17.00	0.09	0	8.80	0.09
6.40	0.02	0	8.80	0.02	17.20	0.09	0	8.80	0.09
6.60	0.02	0	8.80	0.02	17.40	0.08	0	8.80	0.08
6.80	0.02	0	8.80	0.02	17.60	0.08	0	8.80	0.08
7.00	0.02	0	8.80	0.02	17.80	0.08	0	8.80	0.08
7.20	0.03	0	8.80	0.03	18.00	0.07	0	8.80	0.07
7.40	0.03	0	8.80	0.03	18.20	0.07	0	8.80	0.07
7.60	0.04	0	8.80	0.04	18.40	0.07	0	8.80	0.07
7.80	0.04	0	8.80	0.04	18.60	0.07	0	8.80	0.07
8.00	0.04	0	8.80	0.04	18.80	0.07	0	8.80	0.07
8.20	0.05	0	8.80	0.05	19.00	0.06	0	8.80	0.06
8.40	0.06	0	8.80	0.06	19.20	0.06	0	8.80	0.06
8.60	0.06	0	8.80	0.06	19.40	0.06	0	8.80	0.06
8.80	0.07	0	8.80	0.07	19.60	0.06	0	8.80	0.06
9.00	0.08	0	8.80	0.08	19.80	0.06	0	8.80	0.06
9.20	0.09	0	8.80	0.09	20.00	0.06	0	8.80	0.06
9.40	0.10	0	8.80	0.10					
9.60	0.11	0	8.80	0.11					
9.80	0.12	0	8.80	0.12					
10.00	0.13	1	8.80	0.13					
10.20	0.15	1	8.80	0.15					
10.40	0.16	1	8.80	0.16					
10.60	0.18	1	8.80	0.18					
10.80	0.20	1	8.80	0.20					
11.00	0.23	1	8.80	0.23					
11.20	0.28	1	8.81	0.28					
11.40	0.35	1	8.81	0.35					
11.60	0.50	2	8.81	0.50					

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
8.80	0.00	9.88	2.26	10.96	2.45	12.04	2.80
8.82	2.10	9.90	2.27	10.98	2.45	12.06	2.81
8.84	2.11	9.92	2.27	11.00	2.46	12.08	2.82
8.86	2.11	9.94	2.27	11.02	2.47	12.10	2.83
8.88	2.11	9.96	2.27	11.04	2.47	12.12	2.84
8.90	2.12	9.98	2.28	11.06	2.48	12.14	2.85
8.92	2.12	10.00	2.28	11.08	2.48	12.16	2.85
8.94	2.12	10.02	2.28	11.10	2.49	12.18	2.86
8.96	2.12	10.04	2.29	11.12	2.50	12.20	2.87
8.98	2.13	10.06	2.29	11.14	2.50	12.22	2.88
9.00	2.13	10.08	2.29	11.16	2.51	12.24	2.89
9.02	2.13	10.10	2.29	11.18	2.51	12.26	2.90
9.04	2.14	10.12	2.30	11.20	2.52	12.28	2.91
9.06	2.14	10.14	2.30	11.22	2.53	12.30	2.91
9.08	2.14	10.16	2.30	11.24	2.53	12.32	2.92
9.10	2.15	10.18	2.31	11.26	2.54	12.34	2.93
9.12	2.15	10.20	2.31	11.28	2.54	12.36	2.94
9.14	2.15	10.22	2.31	11.30	2.55	12.38	2.95
9.16	2.15	10.24	2.32	11.32	2.56	12.40	2.96
9.18	2.16	10.26	2.32	11.34	2.56	12.42	2.97
9.20	2.16	10.28	2.32	11.36	2.57	12.44	2.97
9.22	2.16	10.30	2.33	11.38	2.57	12.46	2.98
9.24	2.17	10.32	2.33	11.40	2.58	12.48	2.99
9.26	2.17	10.34	2.33	11.42	2.59	12.50	**3.00**
9.28	2.17	10.36	2.33	11.44	2.59	12.52	3.00
9.30	2.17	10.38	2.34	11.46	2.60	12.54	3.00
9.32	2.18	10.40	2.34	11.48	2.60	12.56	3.00
9.34	2.18	10.42	2.34	11.50	2.61	12.58	3.00
9.36	2.18	10.44	2.35	11.52	2.62	12.60	3.00
9.38	2.19	10.46	2.35	11.54	2.62	12.62	3.00
9.40	2.19	10.48	2.35	11.56	2.63	12.64	3.00
9.42	2.19	10.50	2.35	11.58	2.63	12.66	3.00
9.44	2.20	10.52	2.36	11.60	2.64	12.68	3.00
9.46	2.20	10.54	2.36	11.62	2.65	12.70	3.00
9.48	2.20	10.56	2.36	11.64	2.65	12.72	3.00
9.50	2.21	10.58	2.37	11.66	2.66	12.74	3.00
9.52	2.21	10.60	2.37	11.68	2.66	12.76	3.00
9.54	2.21	10.62	2.37	11.70	2.67	12.78	3.00
9.56	2.21	10.64	2.38	11.72	2.68	12.80	3.00
9.58	2.22	10.66	2.38	11.74	2.68		
9.60	2.22	10.68	2.38	11.76	2.69		
9.62	2.22	10.70	2.38	11.78	2.69		
9.64	2.23	10.72	2.39	11.80	2.70		
9.66	2.23	10.74	2.39	11.82	2.71		
9.68	2.23	10.76	2.39	11.84	2.72		
9.70	2.23	10.78	2.40	11.86	2.73		
9.72	2.24	10.80	2.40	11.88	2.73		
9.74	2.24	10.82	2.41	11.90	2.74		
9.76	2.24	10.84	2.41	11.92	2.75		
9.78	2.25	10.86	2.42	11.94	2.76		
9.80	2.25	10.88	2.42	11.96	2.77		
9.82	2.25	10.90	2.43	11.98	2.78		
9.84	2.26	10.92	2.44	12.00	2.79		
9.86	2.26	10.94	2.44	12.02	2.79		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
8.80	0	9.88	250	10.96	656	12.04	1,010
8.82	4	9.90	258	10.98	663	12.06	1,015
8.84	9	9.92	266	11.00	670	12.08	1,020
8.86	13	9.94	273	11.02	677	12.10	1,025
8.88	18	9.96	281	11.04	684	12.12	1,030
8.90	22	9.98	288	11.06	691	12.14	1,035
8.92	26	10.00	296	11.08	698	12.16	1,040
8.94	31	10.02	304	11.10	705	12.18	1,045
8.96	35	10.04	311	11.12	712	12.20	1,050
8.98	40	10.06	319	11.14	719	12.22	1,055
9.00	44	10.08	326	11.16	726	12.24	1,060
9.02	48	10.10	334	11.18	733	12.26	1,065
9.04	53	10.12	342	11.20	740	12.28	1,070
9.06	57	10.14	349	11.22	747	12.30	1,075
9.08	62	10.16	357	11.24	754	12.32	1,080
9.10	66	10.18	364	11.26	761	12.34	1,085
9.12	70	10.20	372	11.28	768	12.36	1,090
9.14	75	10.22	380	11.30	775	12.38	1,095
9.16	79	10.24	387	11.32	782	12.40	1,100
9.18	84	10.26	395	11.34	789	12.42	1,105
9.20	88	10.28	402	11.36	796	12.44	1,110
9.22	92	10.30	410	11.38	803	12.46	1,115
9.24	97	10.32	418	11.40	810	12.48	1,120
9.26	101	10.34	425	11.42	817	12.50	1,125
9.28	106	10.36	433	11.44	824	12.52	1,130
9.30	110	10.38	440	11.46	831	12.54	1,135
9.32	114	10.40	448	11.48	838	12.56	1,140
9.34	119	10.42	456	11.50	845	12.58	1,145
9.36	123	10.44	463	11.52	852	12.60	1,150
9.38	128	10.46	471	11.54	859	12.62	1,155
9.40	132	10.48	478	11.56	866	12.64	1,160
9.42	136	10.50	486	11.58	873	12.66	1,165
9.44	141	10.52	494	11.60	880	12.68	1,170
9.46	145	10.54	501	11.62	887	12.70	1,175
9.48	150	10.56	509	11.64	894	12.72	1,180
9.50	154	10.58	516	11.66	901	12.74	1,185
9.52	158	10.60	524	11.68	908	12.76	1,190
9.54	163	10.62	532	11.70	915	12.78	1,195
9.56	167	10.64	539	11.72	922	12.80	**1,200**
9.58	172	10.66	547	11.74	929		
9.60	176	10.68	554	11.76	936		
9.62	180	10.70	562	11.78	943		
9.64	185	10.72	570	11.80	950		
9.66	189	10.74	577	11.82	955		
9.68	194	10.76	585	11.84	960		
9.70	198	10.78	592	11.86	965		
9.72	202	10.80	600	11.88	970		
9.74	207	10.82	607	11.90	975		
9.76	211	10.84	614	11.92	980		
9.78	216	10.86	621	11.94	985		
9.80	220	10.88	628	11.96	990		
9.82	228	10.90	635	11.98	995		
9.84	235	10.92	642	12.00	1,000		
9.86	243	10.94	649	12.02	1,005		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA8 Runoff Area=25,458 sf Runoff Depth>3.68"
Tc=5.0 min CN=84 Runoff=2.74 cfs 0.179 af

Pond 1P: Infiltration Storage Model Peak Elev=9.49' Storage=151 cf Inflow=2.74 cfs 0.179 af
Outflow=2.20 cfs 0.178 af

Total Runoff Area = 0.584 ac Runoff Volume = 0.179 af Average Runoff Depth = 3.68"
20.56% Pervious Area = 0.120 ac 79.44% Impervious Area = 0.464 ac

Subcatchment 1S: Drainage Area DA8

Time of Concentration

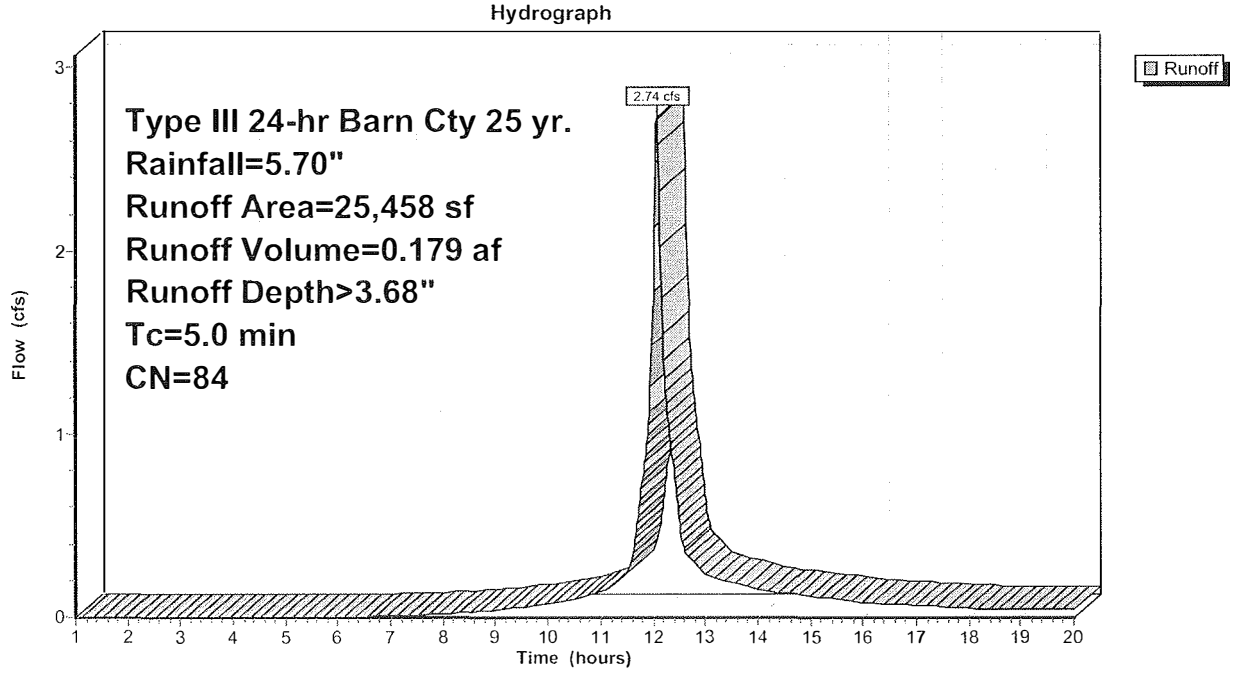
Runoff = 2.74 cfs @ 12.07 hrs, Volume= 0.179 af, Depth> 3.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 25 yr. Rainfall=5.70"

Area (sf)	CN	Description
20,224	98	Paved parking
5,234	32	Woods/grass comb., Good, HSG A
25,458	84	Weighted Average
5,234		Pervious Area
20,224		Impervious Area

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

Subcatchment 1S: Drainage Area DA8



Hydrograph for Subcatchment 1S: Drainage Area DA8

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.06	0.00	0.00	11.80	2.13	0.84	0.75
1.20	0.07	0.00	0.00	12.00	2.85	1.39	**1.78**
1.40	0.08	0.00	0.00	12.20	3.57	2.00	**1.40**
1.60	0.09	0.00	0.00	12.40	3.91	2.29	0.81
1.80	0.10	0.00	0.00	12.60	4.07	2.43	0.36
2.00	0.11	0.00	0.00	12.80	4.18	2.53	0.29
2.20	0.13	0.00	0.00	13.00	4.27	2.61	0.24
2.40	0.14	0.00	0.00	13.20	4.36	2.69	0.21
2.60	0.15	0.00	0.00	13.40	4.43	2.75	0.20
2.80	0.16	0.00	0.00	13.60	4.50	2.82	0.18
3.00	0.18	0.00	0.00	13.80	4.56	2.87	0.17
3.20	0.19	0.00	0.00	14.00	4.62	2.93	0.15
3.40	0.20	0.00	0.00	14.20	4.68	2.98	0.14
3.60	0.22	0.00	0.00	14.40	4.73	3.02	0.14
3.80	0.23	0.00	0.00	14.60	4.78	3.07	0.13
4.00	0.25	0.00	0.00	14.80	4.83	3.11	0.12
4.20	0.26	0.00	0.00	15.00	4.87	3.15	0.12
4.40	0.28	0.00	0.00	15.20	4.91	3.19	0.11
4.60	0.29	0.00	0.00	15.40	4.95	3.22	0.10
4.80	0.31	0.00	0.00	15.60	4.99	3.26	0.10
5.00	0.32	0.00	0.00	15.80	5.02	3.29	0.09
5.20	0.34	0.00	0.00	16.00	5.05	3.32	0.08
5.40	0.36	0.00	0.00	16.20	5.08	3.34	0.08
5.60	0.37	0.00	0.00	16.40	5.11	3.37	0.08
5.80	0.39	0.00	0.00	16.60	5.13	3.39	0.07
6.00	0.41	0.00	0.00	16.80	5.16	3.42	0.07
6.20	0.43	0.00	0.00	17.00	5.18	3.44	0.07
6.40	0.45	0.00	0.00	17.20	5.21	3.46	0.06
6.60	0.47	0.00	0.01	17.40	5.23	3.48	0.06
6.80	0.49	0.01	0.01	17.60	5.25	3.50	0.06
7.00	0.52	0.01	0.01	17.80	5.27	3.52	0.05
7.20	0.54	0.01	0.01	18.00	5.29	3.54	0.05
7.40	0.57	0.02	0.01	18.20	5.31	3.55	0.05
7.60	0.59	0.02	0.01	18.40	5.33	3.57	0.05
7.80	0.62	0.03	0.02	18.60	5.34	3.59	0.05
8.00	0.65	0.03	0.02	18.80	5.36	3.60	0.05
8.20	0.68	0.04	0.02	19.00	5.38	3.62	0.05
8.40	0.71	0.05	0.03	19.20	5.39	3.63	0.04
8.60	0.75	0.06	0.03	19.40	5.41	3.65	0.04
8.80	0.79	0.07	0.04	19.60	5.42	3.66	0.04
9.00	0.83	0.09	0.04	19.80	5.44	3.68	0.04
9.20	0.87	0.10	0.05	20.00	**5.45**	**3.69**	0.04
9.40	0.92	0.12	0.05				
9.60	0.97	0.14	0.06				
9.80	1.02	0.16	0.07				
10.00	1.08	0.19	0.07				
10.20	1.14	0.21	0.08				
10.40	1.20	0.25	0.10				
10.60	1.27	0.28	0.11				
10.80	1.34	0.32	0.12				
11.00	1.42	0.37	0.14				
11.20	1.52	0.43	0.17				
11.40	1.63	0.50	0.22				
11.60	1.79	0.60	0.32				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 0.584 ac, Inflow Depth > 3.68" for Barn Cty 25 yr. event
Inflow = 2.74 cfs @ 12.07 hrs, Volume= 0.179 af
Outflow = 2.20 cfs @ 12.13 hrs, Volume= 0.178 af, Atten= 20%, Lag= 3.3 min
Primary = 2.20 cfs @ 12.13 hrs, Volume= 0.178 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 9.49' @ 12.13 hrs Surf.Area= 0 sf Storage= 151 cf

Plug-Flow detention time=2.6 min calculated for 0.178 af (99% of inflow)
Center-of-Mass det. time=0.4 min (772.8 - 772.4)

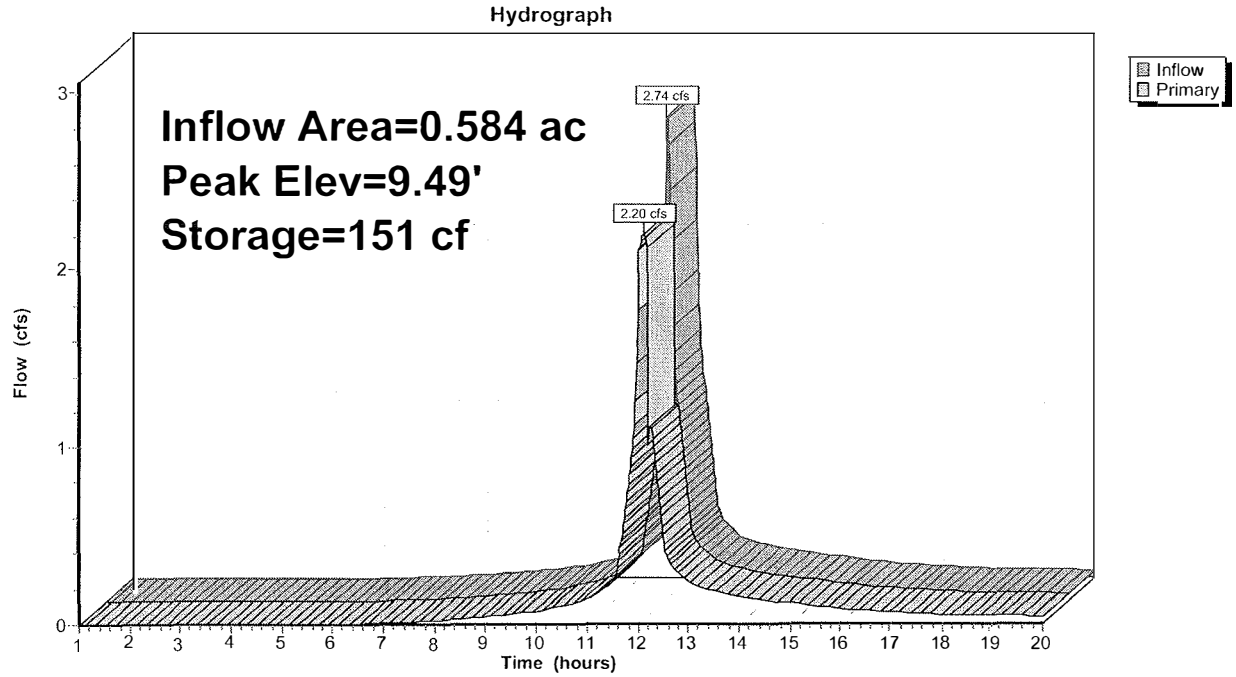
Volume	Invert	Avail.Storage	Storage Description
#1	8.80'	1,200 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
8.80	0
9.80	220
10.80	600
11.80	950
12.80	1,200

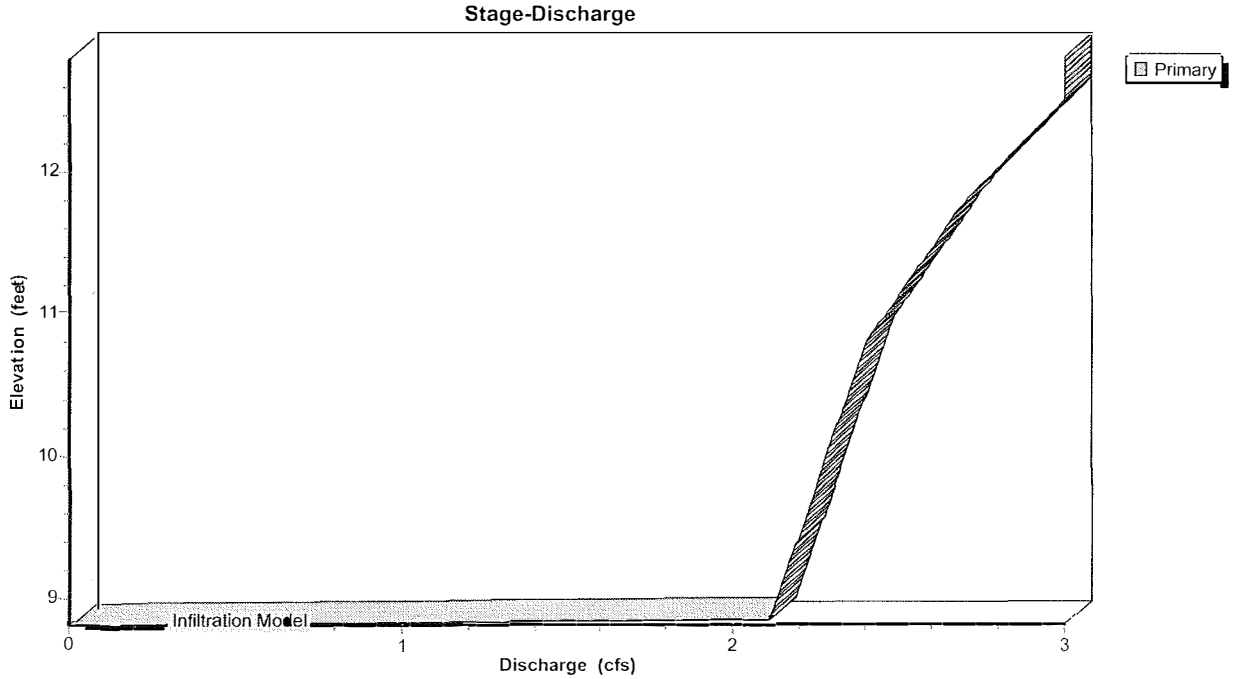
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model** Elev. (feet) 8.70 8.80 10.80 11.80 12.50 Disch. (cfs) 0.000 2.100 2.400 2.700 3.000

Primary OutFlow Max=2.20 cfs @ 12.13 hrs HW=9.48' (Free Discharge)
↑—1=**Infiltration Model** (Custom Controls 2.20 cfs)

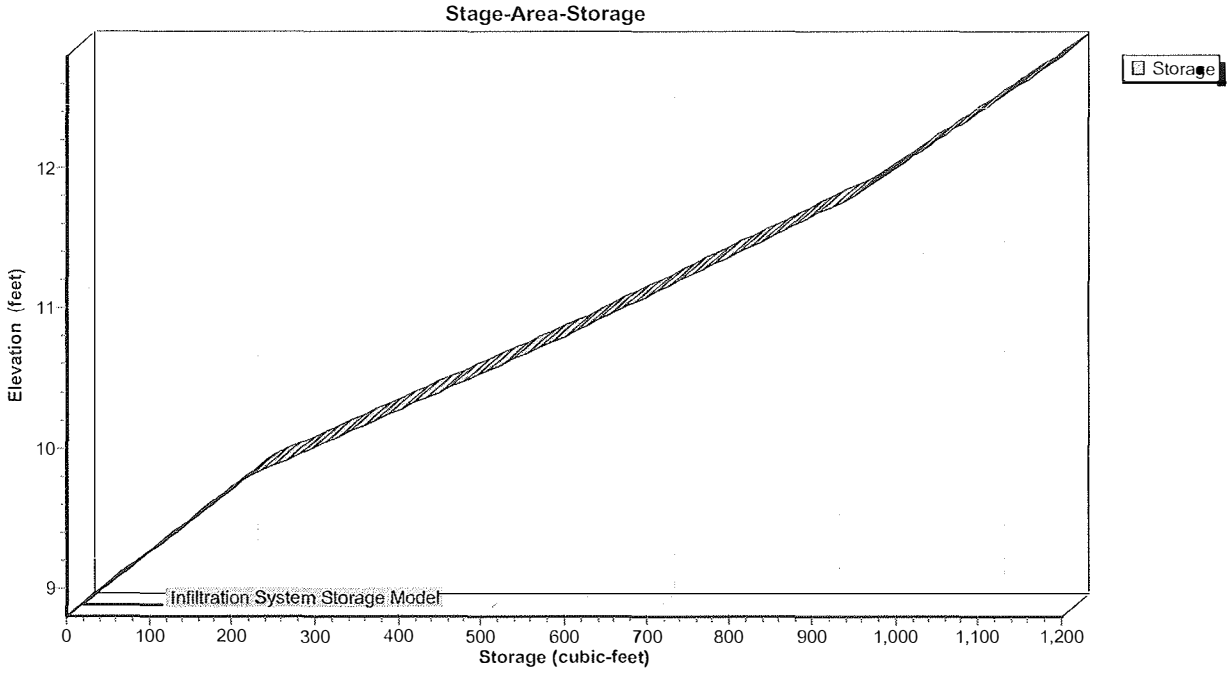
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

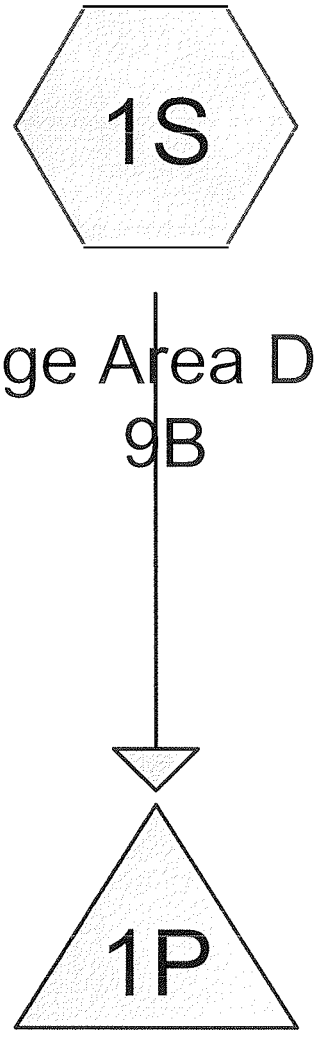
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	8.80	0.00
1.20	0.00	0	8.80	0.00
1.40	0.00	0	8.80	0.00
1.60	0.00	0	8.80	0.00
1.80	0.00	0	8.80	0.00
2.00	0.00	0	8.80	0.00
2.20	0.00	0	8.80	0.00
2.40	0.00	0	8.80	0.00
2.60	0.00	0	8.80	0.00
2.80	0.00	0	8.80	0.00
3.00	0.00	0	8.80	0.00
3.20	0.00	0	8.80	0.00
3.40	0.00	0	8.80	0.00
3.60	0.00	0	8.80	0.00
3.80	0.00	0	8.80	0.00
4.00	0.00	0	8.80	0.00
4.20	0.00	0	8.80	0.00
4.40	0.00	0	8.80	0.00
4.60	0.00	0	8.80	0.00
4.80	0.00	0	8.80	0.00
5.00	0.00	0	8.80	0.00
5.20	0.00	0	8.80	0.00
5.40	0.00	0	8.80	0.00
5.60	0.00	0	8.80	0.00
5.80	0.00	0	8.80	0.00
6.00	0.00	0	8.80	0.00
6.20	0.00	0	8.80	0.00
6.40	0.00	0	8.80	0.00
6.60	0.01	0	8.80	0.00
6.80	0.01	0	8.80	0.01
7.00	0.01	0	8.80	0.01
7.20	0.01	0	8.80	0.01
7.40	0.01	0	8.80	0.01
7.60	0.01	0	8.80	0.01
7.80	0.02	0	8.80	0.02
8.00	0.02	0	8.80	0.02
8.20	0.02	0	8.80	0.02
8.40	0.03	0	8.80	0.03
8.60	0.03	0	8.80	0.03
8.80	0.04	0	8.80	0.04
9.00	0.04	0	8.80	0.04
9.20	0.05	0	8.80	0.05
9.40	0.05	0	8.80	0.05
9.60	0.06	0	8.80	0.06
9.80	0.07	0	8.80	0.07
10.00	0.07	0	8.80	0.07
10.20	0.08	0	8.80	0.08
10.40	0.10	0	8.80	0.10
10.60	0.11	0	8.80	0.11
10.80	0.12	1	8.80	0.12
11.00	0.14	1	8.80	0.14
11.20	0.17	1	8.80	0.17
11.40	0.22	1	8.80	0.22
11.60	0.32	1	8.81	0.32
11.80	0.75	3	8.81	0.74
12.00	**1.78**	**7**	**8.83**	**1.77**
12.20	**1.40**	**39**	**8.98**	**2.13**
12.40	0.81	3	8.82	0.81
12.60	0.36	2	8.81	0.36
12.80	0.29	1	8.81	0.29
13.00	0.24	1	8.80	0.24
13.20	0.21	1	8.80	0.21
13.40	0.20	1	8.80	0.20
13.60	0.18	1	8.80	0.18
13.80	0.17	1	8.80	0.17
14.00	0.15	1	8.80	0.15
14.20	0.14	1	8.80	0.14
14.40	0.14	1	8.80	0.14
14.60	0.13	1	8.80	0.13
14.80	0.12	1	8.80	0.12
15.00	0.12	0	8.80	0.12
15.20	0.11	0	8.80	0.11
15.40	0.10	0	8.80	0.10
15.60	0.10	0	8.80	0.10
15.80	0.09	0	8.80	0.09
16.00	0.08	0	8.80	0.08
16.20	0.08	0	8.80	0.08
16.40	0.08	0	8.80	0.08
16.60	0.07	0	8.80	0.07
16.80	0.07	0	8.80	0.07
17.00	0.07	0	8.80	0.07
17.20	0.06	0	8.80	0.06
17.40	0.06	0	8.80	0.06
17.60	0.06	0	8.80	0.06
17.80	0.05	0	8.80	0.05
18.00	0.05	0	8.80	0.05
18.20	0.05	0	8.80	0.05
18.40	0.05	0	8.80	0.05
18.60	0.05	0	8.80	0.05
18.80	0.05	0	8.80	0.05
19.00	0.05	0	8.80	0.05
19.20	0.04	0	8.80	0.04
19.40	0.04	0	8.80	0.04
19.60	0.04	0	8.80	0.04
19.80	0.04	0	8.80	0.04
20.00	0.04	0	8.80	0.04

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
8.80	0.00	9.88	2.26	10.96	2.45	12.04	2.80
8.82	2.10	9.90	2.27	10.98	2.45	12.06	2.81
8.84	2.11	9.92	2.27	11.00	2.46	12.08	2.82
8.86	2.11	9.94	2.27	11.02	2.47	12.10	2.83
8.88	2.11	9.96	2.27	11.04	2.47	12.12	2.84
8.90	2.12	9.98	2.28	11.06	2.48	12.14	2.85
8.92	2.12	10.00	2.28	11.08	2.48	12.16	2.85
8.94	2.12	10.02	2.28	11.10	2.49	12.18	2.86
8.96	2.12	10.04	2.29	11.12	2.50	12.20	2.87
8.98	2.13	10.06	2.29	11.14	2.50	12.22	2.88
9.00	2.13	10.08	2.29	11.16	2.51	12.24	2.89
9.02	2.13	10.10	2.29	11.18	2.51	12.26	2.90
9.04	2.14	10.12	2.30	11.20	2.52	12.28	2.91
9.06	2.14	10.14	2.30	11.22	2.53	12.30	2.91
9.08	2.14	10.16	2.30	11.24	2.53	12.32	2.92
9.10	2.15	10.18	2.31	11.26	2.54	12.34	2.93
9.12	2.15	10.20	2.31	11.28	2.54	12.36	2.94
9.14	2.15	10.22	2.31	11.30	2.55	12.38	2.95
9.16	2.15	10.24	2.32	11.32	2.56	12.40	2.96
9.18	2.16	10.26	2.32	11.34	2.56	12.42	2.97
9.20	2.16	10.28	2.32	11.36	2.57	12.44	2.97
9.22	2.16	10.30	2.33	11.38	2.57	12.46	2.98
9.24	2.17	10.32	2.33	11.40	2.58	12.48	2.99
9.26	2.17	10.34	2.33	11.42	2.59	12.50	**3.00**
9.28	2.17	10.36	2.33	11.44	2.59	12.52	3.00
9.30	2.17	10.38	2.34	11.46	2.60	12.54	3.00
9.32	2.18	10.40	2.34	11.48	2.60	12.56	3.00
9.34	2.18	10.42	2.34	11.50	2.61	12.58	3.00
9.36	2.18	10.44	2.35	11.52	2.62	12.60	3.00
9.38	2.19	10.46	2.35	11.54	2.62	12.62	3.00
9.40	2.19	10.48	2.35	11.56	2.63	12.64	3.00
9.42	2.19	10.50	2.35	11.58	2.63	12.66	3.00
9.44	2.20	10.52	2.36	11.60	2.64	12.68	3.00
9.46	2.20	10.54	2.36	11.62	2.65	12.70	3.00
9.48	2.20	10.56	2.36	11.64	2.65	12.72	3.00
9.50	2.21	10.58	2.37	11.66	2.66	12.74	3.00
9.52	2.21	10.60	2.37	11.68	2.66	12.76	3.00
9.54	2.21	10.62	2.37	11.70	2.67	12.78	3.00
9.56	2.21	10.64	2.38	11.72	2.68	12.80	3.00
9.58	2.22	10.66	2.38	11.74	2.68		
9.60	2.22	10.68	2.38	11.76	2.69		
9.62	2.22	10.70	2.38	11.78	2.69		
9.64	2.23	10.72	2.39	11.80	2.70		
9.66	2.23	10.74	2.39	11.82	2.71		
9.68	2.23	10.76	2.39	11.84	2.72		
9.70	2.23	10.78	2.40	11.86	2.73		
9.72	2.24	10.80	2.40	11.88	2.73		
9.74	2.24	10.82	2.41	11.90	2.74		
9.76	2.24	10.84	2.41	11.92	2.75		
9.78	2.25	10.86	2.42	11.94	2.76		
9.80	2.25	10.88	2.42	11.96	2.77		
9.82	2.25	10.90	2.43	11.98	2.78		
9.84	2.26	10.92	2.44	12.00	2.79		
9.86	2.26	10.94	2.44	12.02	2.79		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
8.80	0	9.88	250	10.96	656	12.04	1,010
8.82	4	9.90	258	10.98	663	12.06	1,015
8.84	9	9.92	266	11.00	670	12.08	1,020
8.86	13	9.94	273	11.02	677	12.10	1,025
8.88	18	9.96	281	11.04	684	12.12	1,030
8.90	22	9.98	288	11.06	691	12.14	1,035
8.92	26	10.00	296	11.08	698	12.16	1,040
8.94	31	10.02	304	11.10	705	12.18	1,045
8.96	35	10.04	311	11.12	712	12.20	1,050
8.98	40	10.06	319	11.14	719	12.22	1,055
9.00	44	10.08	326	11.16	726	12.24	1,060
9.02	48	10.10	334	11.18	733	12.26	1,065
9.04	53	10.12	342	11.20	740	12.28	1,070
9.06	57	10.14	349	11.22	747	12.30	1,075
9.08	62	10.16	357	11.24	754	12.32	1,080
9.10	66	10.18	364	11.26	761	12.34	1,085
9.12	70	10.20	372	11.28	768	12.36	1,090
9.14	75	10.22	380	11.30	775	12.38	1,095
9.16	79	10.24	387	11.32	782	12.40	1,100
9.18	84	10.26	395	11.34	789	12.42	1,105
9.20	88	10.28	402	11.36	796	12.44	1,110
9.22	92	10.30	410	11.38	803	12.46	1,115
9.24	97	10.32	418	11.40	810	12.48	1,120
9.26	101	10.34	425	11.42	817	12.50	1,125
9.28	106	10.36	433	11.44	824	12.52	1,130
9.30	110	10.38	440	11.46	831	12.54	1,135
9.32	114	10.40	448	11.48	838	12.56	1,140
9.34	119	10.42	456	11.50	845	12.58	1,145
9.36	123	10.44	463	11.52	852	12.60	1,150
9.38	128	10.46	471	11.54	859	12.62	1,155
9.40	132	10.48	478	11.56	866	12.64	1,160
9.42	136	10.50	486	11.58	873	12.66	1,165
9.44	141	10.52	494	11.60	880	12.68	1,170
9.46	145	10.54	501	11.62	887	12.70	1,175
9.48	150	10.56	509	11.64	894	12.72	1,180
9.50	154	10.58	516	11.66	901	12.74	1,185
9.52	158	10.60	524	11.68	908	12.76	1,190
9.54	163	10.62	532	11.70	915	12.78	1,195
9.56	167	10.64	539	11.72	922	12.80	**1,200**
9.58	172	10.66	547	11.74	929		
9.60	176	10.68	554	11.76	936		
9.62	180	10.70	562	11.78	943		
9.64	185	10.72	570	11.80	950		
9.66	189	10.74	577	11.82	955		
9.68	194	10.76	585	11.84	960		
9.70	198	10.78	592	11.86	965		
9.72	202	10.80	600	11.88	970		
9.74	207	10.82	607	11.90	975		
9.76	211	10.84	614	11.92	980		
9.78	216	10.86	621	11.94	985		
9.80	220	10.88	628	11.96	990		
9.82	228	10.90	635	11.98	995		
9.84	235	10.92	642	12.00	1,000		
9.86	243	10.94	649	12.02	1,005		



Infiltration Storage Model

Subcat Reach Pond Link

Drainage Diagram for 17-005 CCH Project 2022 DA9
Prepared by down cape engineering, inc. 7/31/2019
HydroCAD® 8.00 s/n 004007 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.185	32	Woods/grass comb., Good, HSG A (1S)
1.662	98	Paved parking (1S)
1.847		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA9A & 9B Runoff Area=80,447 sf Runoff Depth>6.39"
Tc=5.0 min CN=91 Runoff=13.97 cfs 0.983 af

Pond 1P: Infiltration Storage Model Peak Elev=11.00' Storage=780 cf Inflow=13.97 cfs 0.983 af
Outflow=13.20 cfs 0.983 af

Total Runoff Area = 1.847 ac Runoff Volume = 0.983 af Average Runoff Depth = 6.39"
10.00% Pervious Area = 0.185 ac 90.00% Impervious Area = 1.662 ac

Subcatchment 1S: Drainage Area DA9A & 9B

Time of Concentration

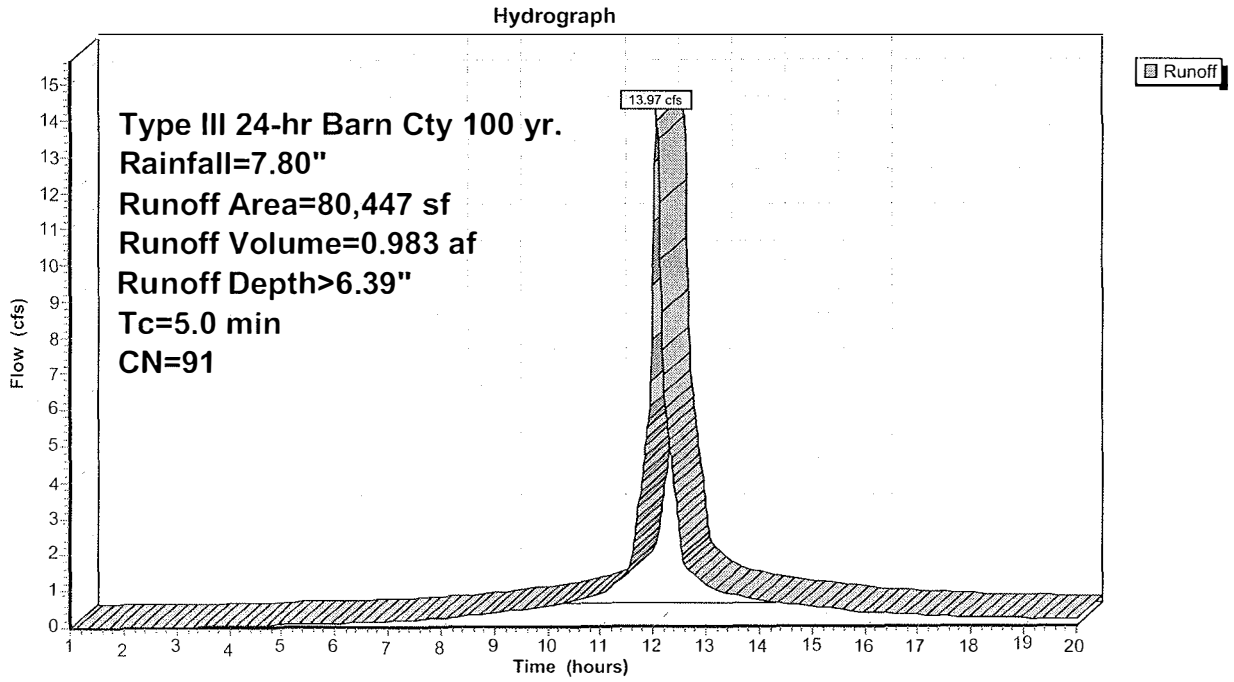
Runoff = 13.97 cfs @ 12.07 hrs, Volume= 0.983 af, Depth> 6.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 100 yr. Rainfall=7.80"

Area (sf)	CN	Description
72,403	98	Paved parking
8,044	32	Woods/grass comb., Good, HSG A
80,447	91	Weighted Average
8,044		Pervious Area
72,403		Impervious Area

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

Subcatchment 1S: Drainage Area DA9A & 9B



Hydrograph for Subcatchment 1S: Drainage Area DA9A & 9B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	11.80	2.91	1.99	4.21
1.20	0.09	0.00	0.00	12.00	3.90	2.92	**9.40**
1.40	0.11	0.00	0.00	12.20	4.89	3.87	**6.93**
1.60	0.12	0.00	0.00	12.40	5.35	4.32	3.89
1.80	0.14	0.00	0.00	12.60	5.56	4.53	1.74
2.00	0.16	0.00	0.00	12.80	5.72	4.69	1.40
2.20	0.17	0.00	0.00	13.00	5.85	4.81	1.14
2.40	0.19	0.00	0.00	13.20	5.96	4.92	1.00
2.60	0.20	0.00	0.00	13.40	6.06	5.02	0.93
2.80	0.22	0.00	0.01	13.60	6.16	5.11	0.86
3.00	0.24	0.00	0.01	13.80	6.25	5.20	0.79
3.20	0.26	0.00	0.02	14.00	6.33	5.28	0.72
3.40	0.28	0.01	0.02	14.20	6.40	5.35	0.68
3.60	0.30	0.01	0.03	14.40	6.47	5.42	0.65
3.80	0.32	0.01	0.03	14.60	6.54	5.49	0.61
4.00	0.34	0.02	0.04	14.80	6.60	5.55	0.58
4.20	0.36	0.02	0.05	15.00	6.66	5.61	0.55
4.40	0.38	0.03	0.05	15.20	6.72	5.66	0.52
4.60	0.40	0.03	0.06	15.40	6.77	5.72	0.48
4.80	0.42	0.04	0.07	15.60	6.82	5.76	0.45
5.00	0.44	0.05	0.07	15.80	6.87	5.81	0.42
5.20	0.47	0.06	0.08	16.00	6.91	5.85	0.38
5.40	0.49	0.07	0.09	16.20	6.95	5.89	0.36
5.60	0.51	0.08	0.09	16.40	6.99	5.93	0.35
5.80	0.54	0.09	0.10	16.60	7 03	5.96	0.33
6.00	0.56	0.10	0.11	16.80	7.06	6.00	0.32
6.20	0.59	0.11	0.12	17.00	7.09	6.03	0.31
6.40	0.61	0.12	0.13	17.20	7.13	6.06	0.29
6.60	0.64	0.14	0.14	17.40	7.16	6.09	0.28
6.80	0.67	0.15	0.15	17.60	7.19	6.12	0.26
7.00	0.71	0.17	0.17	17.80	7.21	6.15	0.25
7.20	0.74	0.19	0.18	18.00	7.24	6.17	0.23
7.40	0.77	0.21	0.20	18.20	7.26	6.20	0.23
7.60	0.81	0.23	0.21	18.40	7.29	6.22	0.22
7.80	0.85	0.26	0.23	18.60	7.31	6.25	0.22
8.00	0.89	0.28	0.24	18.80	7.33	6.27	0.21
8.20	0.93	0.31	0.26	19.00	7.36	6.29	0.21
8.40	0.98	0.34	0.29	19.20	7.38	6.31	0.20
8.60	1.03	0.38	0.32	19.40	7.40	6.33	0.20
8.80	1.08	0.42	0.36	19.60	7.42	6.36	0.20
9.00	1.14	0.46	0.39	19.80	7.44	6.38	0.19
9.20	1.20	0.50	0.42	20.00	**7.46**	**6.40**	0.19
9.40	1.26	0.55	0.46				
9.60	1.33	0.60	0.49				
9.80	1.40	0.66	0.53				
10.00	1.47	0.72	0.56				
10.20	1.55	0.78	0.62				
10.40	1.64	0.86	0.68				
10.60	1.74	0.94	0.75				
10.80	1.84	1.02	0.82				
11.00	1.95	1.12	0.89				
11.20	2.08	1.23	1.07				
11.40	2.24	1.37	1.33				
11.60	2.45	1.57	1.89				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 1.847 ac, Inflow Depth > 6.39" for Barn Cty 100 yr. event
Inflow = 13.97 cfs @ 12.07 hrs, Volume= 0.983 af
Outflow = 13.20 cfs @ 12.10 hrs, Volume= 0.983 af, Atten= 6%, Lag= 1.5 min
Primary = 13.20 cfs @ 12.10 hrs, Volume= 0.983 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 11.00' @ 12.10 hrs Surf.Area= 0 sf Storage= 780 cf

Plug-Flow detention time=(not calculated: outflow precedes inflow)
Center-of-Mass det. time=0.4 min (744.2 - 743.8)

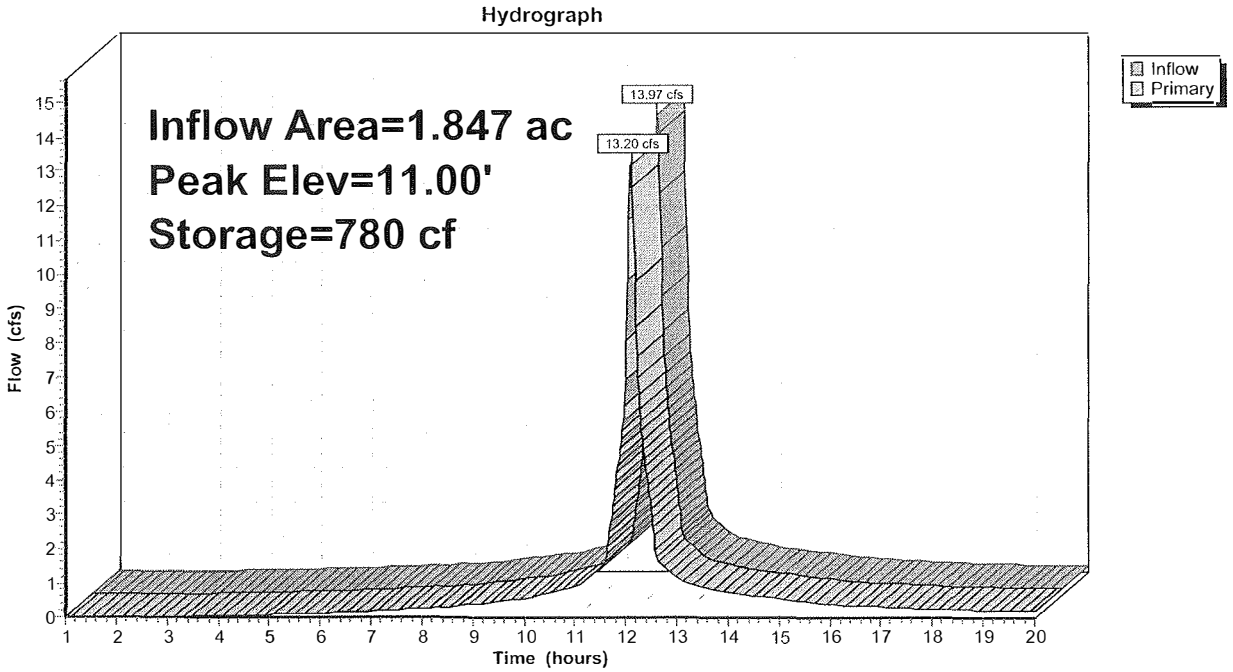
Volume	Invert	Avail.Storage	Storage Description
#1	8.80'	1,400 cf	**Infiltration System Storage Model**Listed below

Elevation (feet)	Cum.Store (cubic-feet)
8.80	0
9.80	440
10.80	700
11.80	1,100
12.80	1,400

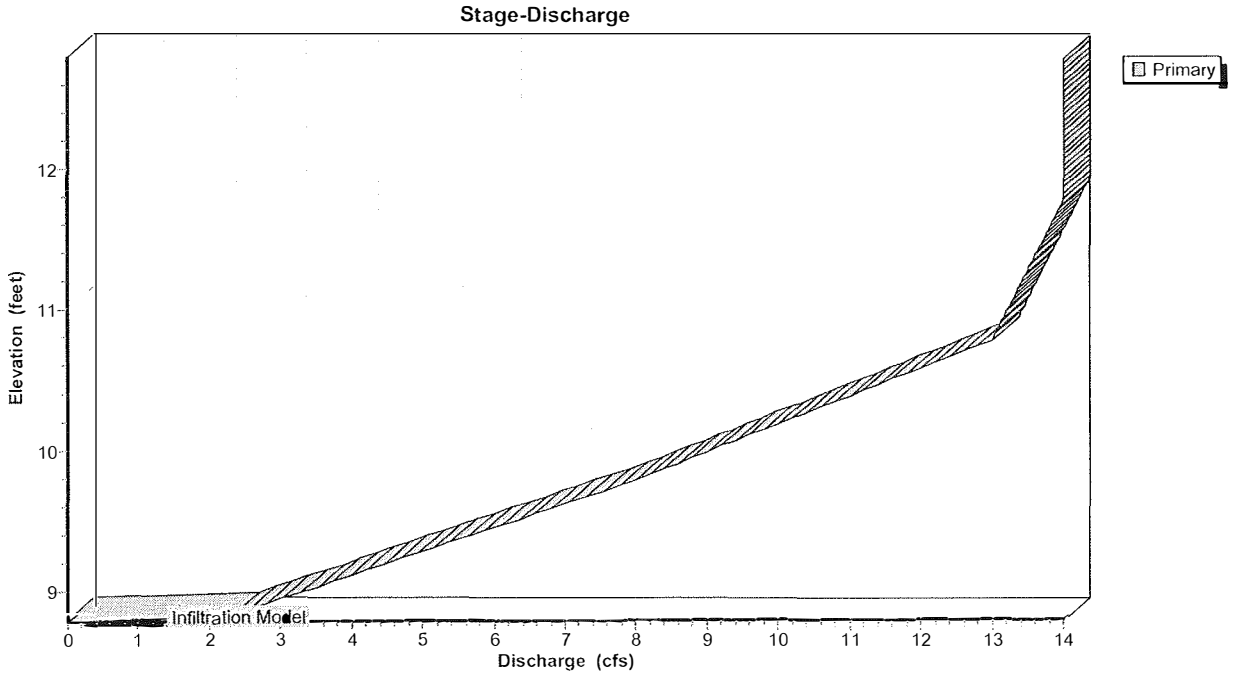
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model** Elev. (feet) 8.70 8.80 9.80 10.80 11.80 Disch. (cfs) 0.000 2.100 8.000 13.000 14.000

Primary OutFlow Max=13.18 cfs @ 12.10 hrs HW=10.98' (Free Discharge)
↑**1=Infiltration Model** (Custom Controls 13.18 cfs)

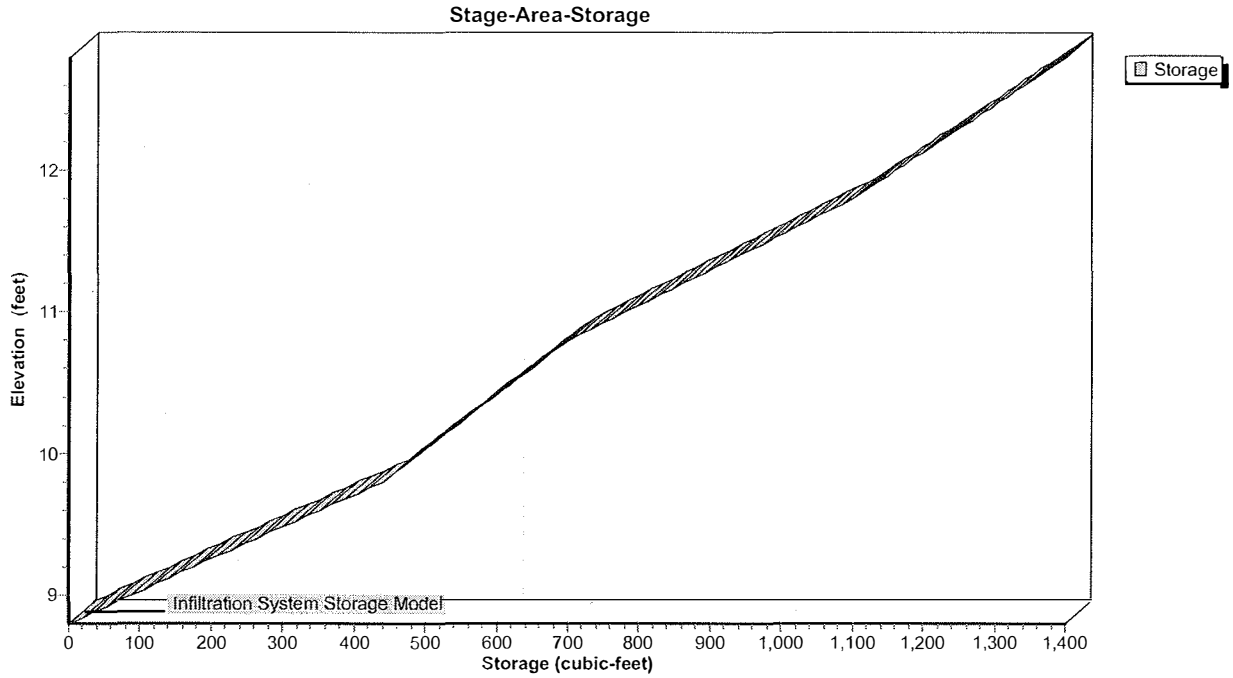
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	8.80	0.00
1.20	0.00	0	8.80	0.00
1.40	0.00	0	8.80	0.00
1.60	0.00	0	8.80	0.00
1.80	0.00	0	8.80	0.00
2.00	0.00	0	8.80	0.00
2.20	0.00	0	8.80	0.00
2.40	0.00	0	8.80	0.00
2.60	0.00	0	8.80	0.00
2.80	0.01	0	8.80	0.01
3.00	0.01	0	8.80	0.01
3.20	0.02	0	8.80	0.02
3.40	0.02	0	8.80	0.02
3.60	0.03	0	8.80	0.03
3.80	0.03	0	8.80	0.03
4.00	0.04	0	8.80	0.04
4.20	0.05	0	8.80	0.05
4.40	0.05	0	8.80	0.05
4.60	0.06	0	8.80	0.06
4.80	0.07	0	8.80	0.07
5.00	0.07	1	8.80	0.07
5.20	0.08	1	8.80	0.08
5.40	0.09	1	8.80	0.09
5.60	0.09	1	8.80	0.09
5.80	0.10	1	8.80	0.10
6.00	0.11	1	8.80	0.11
6.20	0.12	1	8.80	0.12
6.40	0.13	1	8.80	0.13
6.60	0.14	1	8.80	0.14
6.80	0.15	1	8.80	0.15
7.00	0.17	1	8.80	0.17
7.20	0.18	1	8.80	0.18
7.40	0.20	1	8.80	0.19
7.60	0.21	2	8.80	0.21
7.80	0.23	2	8.80	0.23
8.00	0.24	2	8.80	0.24
8.20	0.26	2	8.80	0.26
8.40	0.29	2	8.81	0.29
8.60	0.32	2	8.81	0.32
8.80	0.36	3	8.81	0.36
9.00	0.39	3	8.81	0.39
9.20	0.42	3	8.81	0.42
9.40	0.46	3	8.81	0.46
9.60	0.49	4	8.81	0.49
9.80	0.53	4	8.81	0.53
10.00	0.56	4	8.81	0.56
10.20	0.62	5	8.81	0.62
10.40	0.68	5	8.81	0.68
10.60	0.75	6	8.81	0.75
10.80	0.82	6	8.81	0.82
11.00	0.89	7	8.82	0.89
11.20	1.07	8	8.82	1.07
11.40	1.33	10	8.82	1.32
11.60	1.89	14	8.83	1.88
11.80	4.21	139	9.11	3.96
12.00	**9.40**	**444**	**9.82**	**8.08**
12.20	**6.93**	**413**	**9.74**	**7.63**
12.40	3.89	152	9.15	4.14
12.60	1.74	13	8.83	1.75
12.80	1.40	11	8.82	1.40
13.00	1.14	9	8.82	1.14
13.20	1.00	8	8.82	1.00
13.40	0.93	7	8.82	0.93
13.60	0.86	6	8.81	0.86
13.80	0.79	6	8.81	0.79
14.00	0.72	5	8.81	0.73
14.20	0.68	5	8.81	0.68
14.40	0.65	5	8.81	0.65
14.60	0.61	5	8.81	0.61
14.80	0.58	4	8.81	0.58
15.00	0.55	4	8.81	0.55
15.20	0.52	4	8.81	0.52
15.40	0.48	4	8.81	0.48
15.60	0.45	3	8.81	0.45
15.80	0.42	3	8.81	0.42
16.00	0.38	3	8.81	0.38
16.20	0.36	3	8.81	0.36
16.40	0.35	3	8.81	0.35
16.60	0.33	3	8.81	0.33
16.80	0.32	2	8.81	0.32
17.00	0.31	2	8.81	0.31
17.20	0.29	2	8.80	0.29
17.40	0.28	2	8.80	0.28
17.60	0.26	2	8.80	0.26
17.80	0.25	2	8.80	0.25
18.00	0.23	2	8.80	0.23
18.20	0.23	2	8.80	0.23
18.40	0.22	2	8.80	0.22
18.60	0.22	2	8.80	0.22
18.80	0.21	2	8.80	0.21
19.00	0.21	2	8.80	0.21
19.20	0.20	2	8.80	0.20
19.40	0.20	2	8.80	0.20
19.60	0.20	1	8.80	0.20
19.80	0.19	1	8.80	0.19
20.00	0.19	1	8.80	0.19

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
8.80	0.00	9.88	8.40	10.96	13.16	12.04	14.00
8.82	2.22	9.90	8.50	10.98	13.18	12.06	14.00
8.84	2.34	9.92	8.60	11.00	13.20	12.08	14.00
8.86	2.45	9.94	8.70	11.02	13.22	12.10	14.00
8.88	2.57	9.96	8.80	11.04	13.24	12.12	14.00
8.90	2.69	9.98	8.90	11.06	13.26	12.14	14.00
8.92	2.81	10.00	9.00	11.08	13.28	12.16	14.00
8.94	2.93	10.02	9.10	11.10	13.30	12.18	14.00
8.96	3.04	10.04	9.20	11.12	13.32	12.20	14.00
8.98	3.16	10.06	9.30	11.14	13.34	12.22	14.00
9.00	3.28	10.08	9.40	11.16	13.36	12.24	14.00
9.02	3.40	10.10	9.50	11.18	13.38	12.26	14.00
9.04	3.52	10.12	9.60	11.20	13.40	12.28	14.00
9.06	3.63	10.14	9.70	11.22	13.42	12.30	14.00
9.08	3.75	10.16	9.80	11.24	13.44	12.32	14.00
9.10	3.87	10.18	9.90	11.26	13.46	12.34	14.00
9.12	3.99	10.20	10.00	11.28	13.48	12.36	14.00
9.14	4.11	10.22	10.10	11.30	13.50	12.38	14.00
9.16	4.22	10.24	10.20	11.32	13.52	12.40	14.00
9.18	4.34	10.26	10.30	11.34	13.54	12.42	14.00
9.20	4.46	10.28	10.40	11.36	13.56	12.44	14.00
9.22	4.58	10.30	10.50	11.38	13.58	12.46	14.00
9.24	4.70	10.32	10.60	11.40	13.60	12.48	14.00
9.26	4.81	10.34	10.70	11.42	13.62	12.50	14.00
9.28	4.93	10.36	10.80	11.44	13.64	12.52	14.00
9.30	5.05	10.38	10.90	11.46	13.66	12.54	14.00
9.32	5.17	10.40	11.00	11.48	13.68	12.56	14.00
9.34	5.29	10.42	11.10	11.50	13.70	12.58	14.00
9.36	5.40	10.44	11.20	11.52	13.72	12.60	14.00
9.38	5.52	10.46	11.30	11.54	13.74	12.62	14.00
9.40	5.64	10.48	11.40	11.56	13.76	12.64	14.00
9.42	5.76	10.50	11.50	11.58	13.78	12.66	14.00
9.44	5.88	10.52	11.60	11.60	13.80	12.68	14.00
9.46	5.99	10.54	11.70	11.62	13.82	12.70	14.00
9.48	6.11	10.56	11.80	11.64	13.84	12.72	14.00
9.50	6.23	10.58	11.90	11.66	13.86	12.74	14.00
9.52	6.35	10.60	12.00	11.68	13.88	12.76	14.00
9.54	6.47	10.62	12.10	11.70	13.90	12.78	14.00
9.56	6.58	10.64	12.20	11.72	13.92	12.80	14.00
9.58	6.70	10.66	12.30	11.74	13.94		
9.60	6.82	10.68	12.40	11.76	13.96		
9.62	6.94	10.70	12.50	11.78	13.98		
9.64	7.06	10.72	12.60	11.80	**14.00**		
9.66	7.17	10.74	12.70	11.82	14.00		
9.68	7.29	10.76	12.80	11.84	14.00		
9.70	7.41	10.78	12.90	11.86	14.00		
9.72	7.53	10.80	13.00	11.88	14.00		
9.74	7.65	10.82	13.02	11.90	14.00		
9.76	7.76	10.84	13.04	11.92	14.00		
9.78	7.88	10.86	13.06	11.94	14.00		
9.80	8.00	10.88	13.08	11.96	14.00		
9.82	8.10	10.90	13.10	11.98	14.00		
9.84	8.20	10.92	13.12	12.00	14.00		
9.86	8.30	10.94	13.14	12.02	14.00		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
8.80	0	9.88	461	10.96	764	12.04	1,172
8.82	9	9.90	466	10.98	772	12.06	1,178
8.84	18	9.92	471	11.00	780	12.08	1,184
8.86	26	9.94	476	11.02	788	12.10	1,190
8.88	35	9.96	482	11.04	796	12.12	1,196
8.90	44	9.98	487	11.06	804	12.14	1,202
8.92	53	10.00	492	11.08	812	12.16	1,208
8.94	62	10.02	497	11.10	820	12.18	1,214
8.96	70	10.04	502	11.12	828	12.20	1,220
8.98	79	10.06	508	11.14	836	12.22	1,226
9.00	88	10.08	513	11.16	844	12.24	1,232
9.02	97	10.10	518	11.18	852	12.26	1,238
9.04	106	10.12	523	11.20	860	12.28	1,244
9.06	114	10.14	528	11.22	868	12.30	1,250
9.08	123	10.16	534	11.24	876	12.32	1,256
9.10	132	10.18	539	11.26	884	12.34	1,262
9.12	141	10.20	544	11.28	892	12.36	1,268
9.14	150	10.22	549	11.30	900	12.38	1,274
9.16	158	10.24	554	11.32	908	12.40	1,280
9.18	167	10.26	560	11.34	916	12.42	1,286
9.20	176	10.28	565	11.36	924	12.44	1,292
9.22	185	10.30	570	11.38	932	12.46	1,298
9.24	194	10.32	575	11.40	940	12.48	1,304
9.26	202	10.34	580	11.42	948	12.50	1,310
9.28	211	10.36	586	11.44	956	12.52	1,316
9.30	220	10.38	591	11.46	964	12.54	1,322
9.32	229	10.40	596	11.48	972	12.56	1,328
9.34	238	10.42	601	11.50	980	12.58	1,334
9.36	246	10.44	606	11.52	988	12.60	1,340
9.38	255	10.46	612	11.54	996	12.62	1,346
9.40	264	10.48	617	11.56	1,004	12.64	1,352
9.42	273	10.50	622	11.58	1,012	12.66	1,358
9.44	282	10.52	627	11.60	1,020	12.68	1,364
9.46	290	10.54	632	11.62	1,028	12.70	1,370
9.48	299	10.56	638	11.64	1,036	12.72	1,376
9.50	308	10.58	643	11.66	1,044	12.74	1,382
9.52	317	10.60	648	11.68	1,052	12.76	1,388
9.54	326	10.62	653	11.70	1,060	12.78	1,394
9.56	334	10.64	658	11.72	1,068	12.80	**1,400**
9.58	343	10.66	664	11.74	1,076		
9.60	352	10.68	669	11.76	1,084		
9.62	361	10.70	674	11.78	1,092		
9.64	370	10.72	679	11.80	1,100		
9.66	378	10.74	684	11.82	1,106		
9.68	387	10.76	690	11.84	1,112		
9.70	396	10.78	695	11.86	1,118		
9.72	405	10.80	700	11.88	1,124		
9.74	414	10.82	708	11.90	1,130		
9.76	422	10.84	716	11.92	1,136		
9.78	431	10.86	724	11.94	1,142		
9.80	440	10.88	732	11.96	1,148		
9.82	445	10.90	740	11.98	1,154		
9.84	450	10.92	748	12.00	1,160		
9.86	456	10.94	756	12.02	1,166		

Time span=1.00-20.00 hrs, dt=0.02 hrs, 951 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area DA9A & 9B Runoff Area=80,447 sf Runoff Depth>4.42"
Tc=5.0 min CN=91 Runoff=9.90 cfs 0.680 af

Pond 1P: Infiltration Storage Model Peak Elev=10.14' Storage=528 cf Inflow=9.90 cfs 0.680 af
Outflow=9.68 cfs 0.680 af

Total Runoff Area = 1.847 ac Runoff Volume = 0.680 af Average Runoff Depth = 4.42"
10.00% Pervious Area = 0.185 ac 90.00% Impervious Area = 1.662 ac

Subcatchment 1S: Drainage Area DA9A & 9B

Time of Concentration

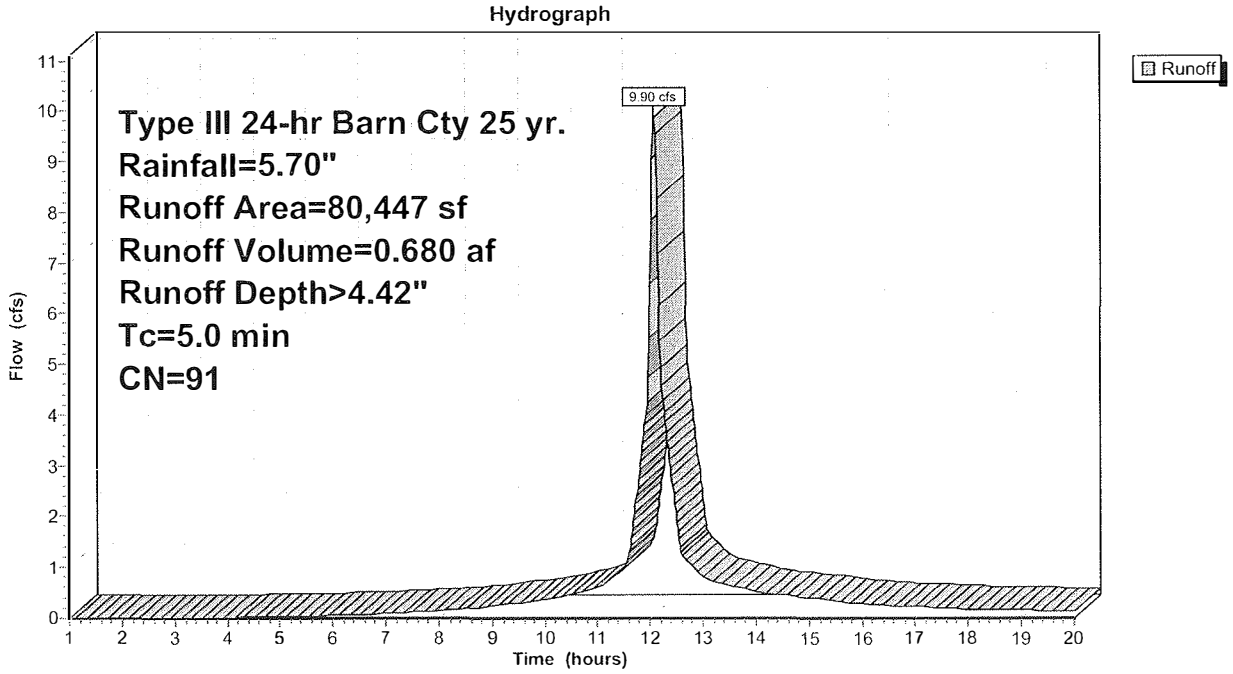
Runoff = 9.90 cfs @ 12.07 hrs, Volume= 0.680 af, Depth> 4.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr Barn Cty 25 yr. Rainfall=5.70"

Area (sf)	CN	Description
72,403	98	Paved parking
8,044	32	Woods/grass comb., Good, HSG A
80,447	91	Weighted Average
8,044		Pervious Area
72,403		Impervious Area

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

Subcatchment 1S: Drainage Area DA9A & 9B



Hydrograph for Subcatchment 1S: Drainage Area DA9A & 9B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.06	0.00	0.00	11.80	2.13	1.28	2.92
1.20	0.07	0.00	0.00	12.00	2.85	1.93	**6.61**
1.40	0.08	0.00	0.00	12.20	3.57	2.61	**4.94**
1.60	0.09	0.00	0.00	12.40	3.91	2.93	2.78
1.80	0.10	0.00	0.00	12.60	4.07	3.08	1.25
2.00	0.11	0.00	0.00	12.80	4.18	3.19	1.00
2.20	0.13	0.00	0.00	13.00	4.27	3.28	0.82
2.40	0.14	0.00	0.00	13.20	4.36	3.36	0.72
2.60	0.15	0.00	0.00	13.40	4.43	3.43	0.67
2.80	0.16	0.00	0.00	13.60	4.50	3.50	0.62
3.00	0.18	0.00	0.00	13.80	4.56	3.56	0.57
3.20	0.19	0.00	0.00	14.00	4.62	3.62	0.52
3.40	0.20	0.00	0.00	14.20	4.68	3.67	0.49
3.60	0.22	0.00	0.00	14.40	4.73	3.72	0.47
3.80	0.23	0.00	0.01	14.60	4.78	3.77	0.44
4.00	0.25	0.00	0.01	14.80	4.83	3.81	0.42
4.20	0.26	0.00	0.01	15.00	4.87	3.86	0.39
4.40	0.28	0.01	0.02	15.20	4.91	3.90	0.37
4.60	0.29	0.01	0.02	15.40	4.95	3.93	0.35
4.80	0.31	0.01	0.03	15.60	4.99	3.97	0.32
5.00	0.32	0.01	0.03	15.80	5.02	4.00	0.30
5.20	0.34	0.02	0.04	16.00	5.05	4.03	0.28
5.40	0.36	0.02	0.04	16.20	5.08	4.06	0.26
5.60	0.37	0.03	0.04	16.40	5.11	4.09	0.25
5.80	0.39	0.03	0.05	16.60	5.13	4.11	0.24
6.00	0.41	0.04	0.05	16.80	5.16	4.14	0.23
6.20	0.43	0.04	0.06	17.00	5.18	4.16	0.22
6.40	0.45	0.05	0.07	17.20	5.21	4.18	0.21
6.60	0.47	0.06	0.07	17.40	5.23	4.21	0.20
6.80	0.49	0.07	0.08	17.60	5.25	4.23	0.19
7.00	0.52	0.08	0.09	17.80	5.27	4.25	0.18
7.20	0.54	0.09	0.10	18.00	5.29	4.26	0.17
7.40	0.57	0.10	0.11	18.20	5.31	4.28	0.16
7.60	0.59	0.11	0.12	18.40	5.33	4.30	0.16
7.80	0.62	0.13	0.13	18.60	5.34	4.32	0.16
8.00	0.65	0.14	0.14	18.80	5.36	4.33	0.15
8.20	0.68	0.16	0.16	19.00	5.38	4.35	0.15
8.40	0.71	0.18	0.18	19.20	5.39	4.36	0.15
8.60	0.75	0.20	0.20	19.40	5.41	4.38	0.14
8.80	0.79	0.22	0.22	19.60	5.42	4.40	0.14
9.00	0.83	0.25	0.24	19.80	5.44	4.41	0.14
9.20	0.87	0.28	0.26	20.00	**5.45**	**4.42**	0.14
9.40	0.92	0.31	0.29				
9.60	0.97	0.34	0.31				
9.80	1.02	0.38	0.34				
10.00	1.08	0.41	0.36				
10.20	1.14	0.46	0.40				
10.40	1.20	0.50	0.45				
10.60	1.27	0.56	0.50				
10.80	1.34	0.62	0.55				
11.00	1.42	0.68	0.60				
11.20	1.52	0.76	0.73				
11.40	1.63	0.85	0.90				
11.60	1.79	0.98	1.30				

Pond 1P: Infiltration Storage Model

44% TSS removal prior to infiltration provided

Inflow Area = 1.847 ac, Inflow Depth > 4.42" for Barn Cty 25 yr. event
Inflow = 9.90 cfs @ 12.07 hrs, Volume= 0.680 af
Outflow = 9.68 cfs @ 12.09 hrs, Volume= 0.680 af, Atten= 2%, Lag= 0.9 min
Primary = 9.68 cfs @ 12.09 hrs, Volume= 0.680 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 10.14' @ 12.09 hrs Surf.Area= 0 sf Storage= 528 cf

Plug-Flow detention time=0.5 min calculated for 0.679 af (100% of inflow)
Center-of-Mass det. time=0.3 min (752.7 - 752.3)

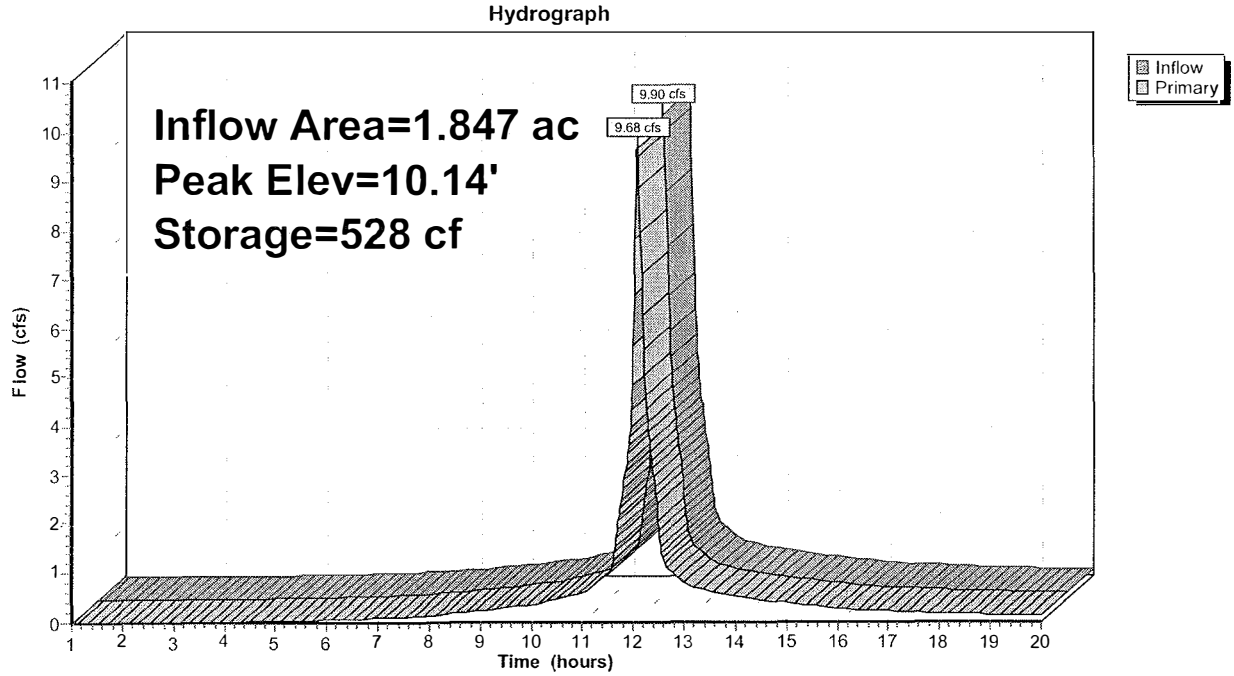
Volume	Invert	Avail.Storage	Storage Description
#1	8.80'	1,400 cf	**Infiltration System Storage Model** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
8.80	0
9.80	440
10.80	700
11.80	1,100
12.80	1,400

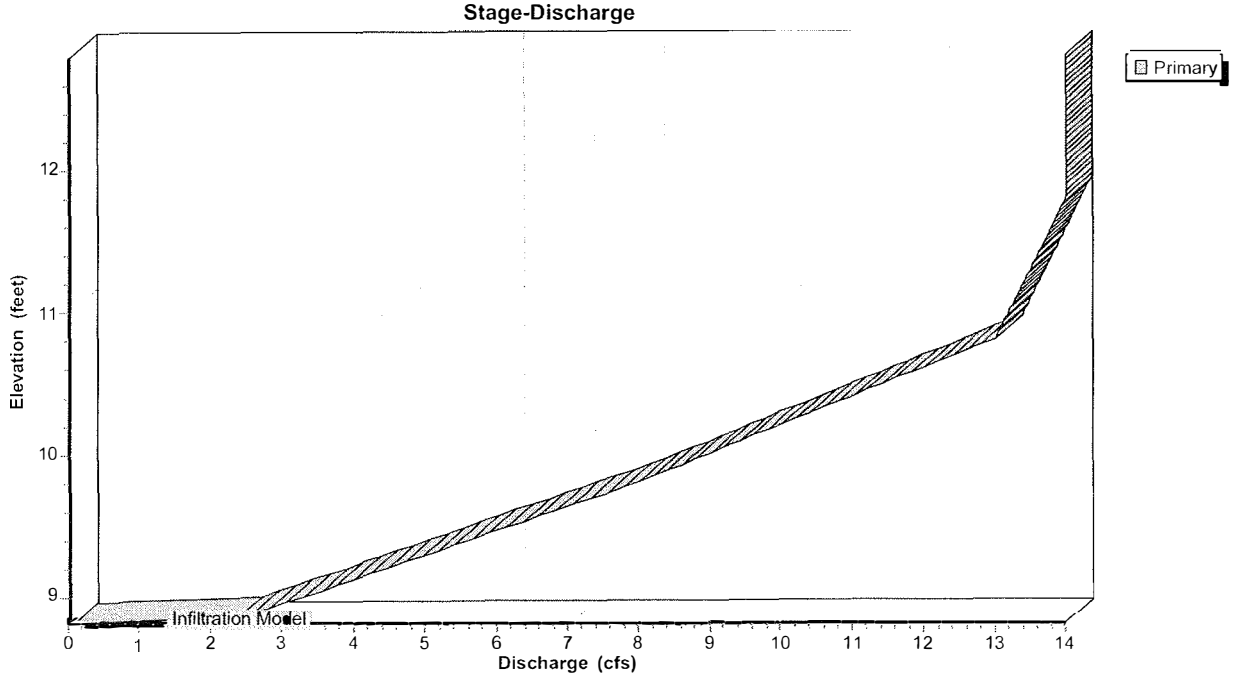
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**Infiltration Model** Elev. (feet) 8.70 8.80 9.80 10.80 11.80 Disch. (cfs) 0.000 2.100 8.000 13.000 14.000

Primary OutFlow Max=9.61 cfs @ 12.09 hrs HW=10.12' (Free Discharge)
↑—**1=Infiltration Model** (Custom Controls 9.61 cfs)

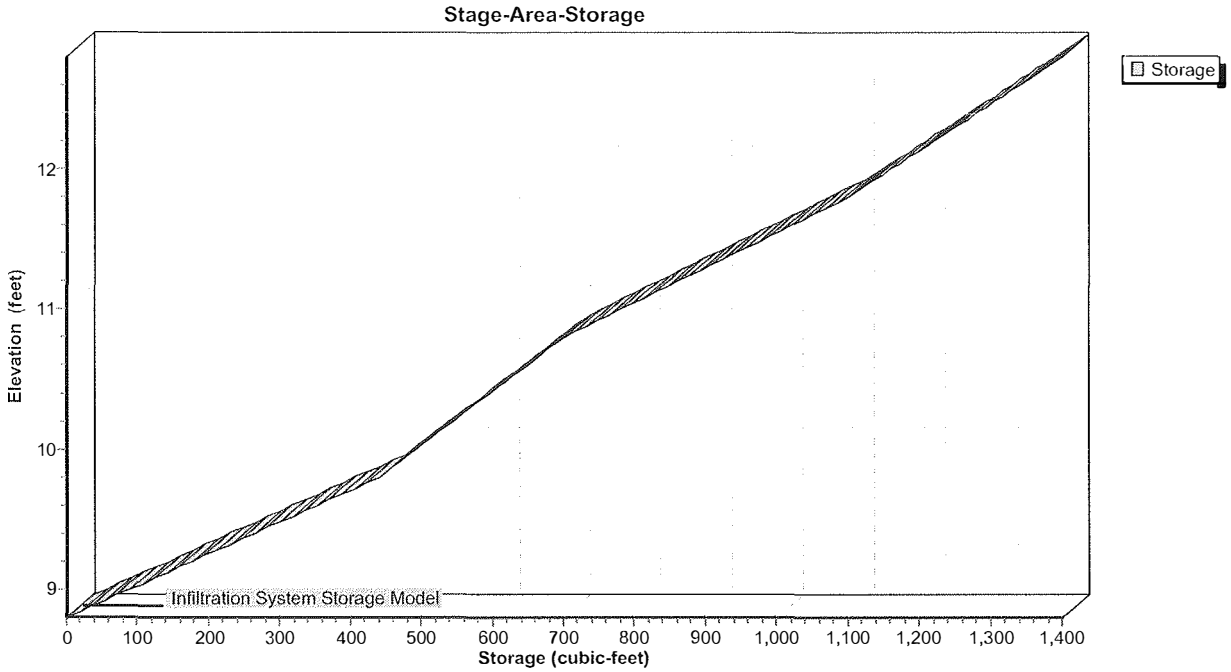
Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Pond 1P: Infiltration Storage Model



Hydrograph for Pond 1P: Infiltration Storage Model

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	8.80	0.00
1.20	0.00	0	8.80	0.00
1.40	0.00	0	8.80	0.00
1.60	0.00	0	8.80	0.00
1.80	0.00	0	8.80	0.00
2.00	0.00	0	8.80	0.00
2.20	0.00	0	8.80	0.00
2.40	0.00	0	8.80	0.00
2.60	0.00	0	8.80	0.00
2.80	0.00	0	8.80	0.00
3.00	0.00	0	8.80	0.00
3.20	0.00	0	8.80	0.00
3.40	0.00	0	8.80	0.00
3.60	0.00	0	8.80	0.00
3.80	0.01	0	8.80	0.01
4.00	0.01	0	8.80	0.01
4.20	0.01	0	8.80	0.01
4.40	0.02	0	8.80	0.02
4.60	0.02	0	8.80	0.02
4.80	0.03	0	8.80	0.03
5.00	0.03	0	8.80	0.03
5.20	0.04	0	8.80	0.04
5.40	0.04	0	8.80	0.04
5.60	0.04	0	8.80	0.04
5.80	0.05	0	8.80	0.05
6.00	0.05	0	8.80	0.05
6.20	0.06	0	8.80	0.06
6.40	0.07	1	8.80	0.07
6.60	0.07	1	8.80	0.07
6.80	0.08	1	8.80	0.08
7.00	0.09	1	8.80	0.09
7.20	0.10	1	8.80	0.10
7.40	0.11	1	8.80	0.11
7.60	0.12	1	8.80	0.12
7.80	0.13	1	8.80	0.13
8.00	0.14	1	8.80	0.14
8.20	0.16	1	8.80	0.16
8.40	0.18	1	8.80	0.18
8.60	0.20	1	8.80	0.20
8.80	0.22	2	8.80	0.22
9.00	0.24	2	8.80	0.24
9.20	0.26	2	8.80	0.26
9.40	0.29	2	8.80	0.29
9.60	0.31	2	8.81	0.31
9.80	0.34	3	8.81	0.34
10.00	0.36	3	8.81	0.36
10.20	0.40	3	8.81	0.40
10.40	0.45	3	8.81	0.45
10.60	0.50	4	8.81	0.50
10.80	0.55	4	8.81	0.55
11.00	0.60	5	8.81	0.60
11.20	0.73	5	8.81	0.72
11.40	0.90	7	8.82	0.90
11.60	1.30	10	8.82	1.29
11.80	2.92	48	8.91	2.75
12.00	**6.61**	**266**	**9.40**	**5.66**
12.20	**4.94**	**259**	**9.39**	**5.58**
12.40	2.78	65	8.95	2.97
12.60	1.25	9	8.82	1.25
12.80	1.00	8	8.82	1.01
13.00	0.82	6	8.81	0.82
13.20	0.72	5	8.81	0.72
13.40	0.67	5	8.81	0.67
13.60	0.62	5	8.81	0.62
13.80	0.57	4	8.81	0.57
14.00	0.52	4	8.81	0.52
14.20	0.49	4	8.81	0.49
14.40	0.47	4	8.81	0.47
14.60	0.44	3	8.81	0.44
14.80	0.42	3	8.81	0.42
15.00	0.39	3	8.81	0.40
15.20	0.37	3	8.81	0.37
15.40	0.35	3	8.81	0.35
15.60	0.32	2	8.81	0.32
15.80	0.30	2	8.81	0.30
16.00	0.28	2	8.80	0.28
16.20	0.26	2	8.80	0.26
16.40	0.25	2	8.80	0.25
16.60	0.24	2	8.80	0.24
16.80	0.23	2	8.80	0.23
17.00	0.22	2	8.80	0.22
17.20	0.21	2	8.80	0.21
17.40	0.20	2	8.80	0.20
17.60	0.19	1	8.80	0.19
17.80	0.18	1	8.80	0.18
18.00	0.17	1	8.80	0.17
18.20	0.16	1	8.80	0.16
18.40	0.16	1	8.80	0.16
18.60	0.16	1	8.80	0.16
18.80	0.15	1	8.80	0.15
19.00	0.15	1	8.80	0.15
19.20	0.15	1	8.80	0.15
19.40	0.14	1	8.80	0.15
19.60	0.14	1	8.80	0.14
19.80	0.14	1	8.80	0.14
20.00	0.14	1	8.80	0.14

Stage-Discharge for Pond 1P: Infiltration Storage Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
8.80	0.00	9.88	8.40	10.96	13.16	12.04	14.00
8.82	2.22	9.90	8.50	10.98	13.18	12.06	14.00
8.84	2.34	9.92	8.60	11.00	13.20	12.08	14.00
8.86	2.45	9.94	8.70	11.02	13.22	12.10	14.00
8.88	2.57	9.96	8.80	11.04	13.24	12.12	14.00
8.90	2.69	9.98	8.90	11.06	13.26	12.14	14.00
8.92	2.81	10.00	9.00	11.08	13.28	12.16	14.00
8.94	2.93	10.02	9.10	11.10	13.30	12.18	14.00
8.96	3.04	10.04	9.20	11.12	13.32	12.20	14.00
8.98	3.16	10.06	9.30	11.14	13.34	12.22	14.00
9.00	3.28	10.08	9.40	11.16	13.36	12.24	14.00
9.02	3.40	10.10	9.50	11.18	13.38	12.26	14.00
9.04	3.52	10.12	9.60	11.20	13.40	12.28	14.00
9.06	3.63	10.14	9.70	11.22	13.42	12.30	14.00
9.08	3.75	10.16	9.80	11.24	13.44	12.32	14.00
9.10	3.87	10.18	9.90	11.26	13.46	12.34	14.00
9.12	3.99	10.20	10.00	11.28	13.48	12.36	14.00
9.14	4.11	10.22	10.10	11.30	13.50	12.38	14.00
9.16	4.22	10.24	10.20	11.32	13.52	12.40	14.00
9.18	4.34	10.26	10.30	11.34	13.54	12.42	14.00
9.20	4.46	10.28	10.40	11.36	13.56	12.44	14.00
9.22	4.58	10.30	10.50	11.38	13.58	12.46	14.00
9.24	4.70	10.32	10.60	11.40	13.60	12.48	14.00
9.26	4.81	10.34	10.70	11.42	13.62	12.50	14.00
9.28	4.93	10.36	10.80	11.44	13.64	12.52	14.00
9.30	5.05	10.38	10.90	11.46	13.66	12.54	14.00
9.32	5.17	10.40	11.00	11.48	13.68	12.56	14.00
9.34	5.29	10.42	11.10	11.50	13.70	12.58	14.00
9.36	5.40	10.44	11.20	11.52	13.72	12.60	14.00
9.38	5.52	10.46	11.30	11.54	13.74	12.62	14.00
9.40	5.64	10.48	11.40	11.56	13.76	12.64	14.00
9.42	5.76	10.50	11.50	11.58	13.78	12.66	14.00
9.44	5.88	10.52	11.60	11.60	13.80	12.68	14.00
9.46	5.99	10.54	11.70	11.62	13.82	12.70	14.00
9.48	6.11	10.56	11.80	11.64	13.84	12.72	14.00
9.50	6.23	10.58	11.90	11.66	13.86	12.74	14.00
9.52	6.35	10.60	12.00	11.68	13.88	12.76	14.00
9.54	6.47	10.62	12.10	11.70	13.90	12.78	14.00
9.56	6.58	10.64	12.20	11.72	13.92	12.80	14.00
9.58	6.70	10.66	12.30	11.74	13.94		
9.60	6.82	10.68	12.40	11.76	13.96		
9.62	6.94	10.70	12.50	11.78	13.98		
9.64	7.06	10.72	12.60	11.80	**14.00**		
9.66	7.17	10.74	12.70	11.82	14.00		
9.68	7.29	10.76	12.80	11.84	14.00		
9.70	7.41	10.78	12.90	11.86	14.00		
9.72	7.53	10.80	13.00	11.88	14.00		
9.74	7.65	10.82	13.02	11.90	14.00		
9.76	7.76	10.84	13.04	11.92	14.00		
9.78	7.88	10.86	13.06	11.94	14.00		
9.80	8.00	10.88	13.08	11.96	14.00		
9.82	8.10	10.90	13.10	11.98	14.00		
9.84	8.20	10.92	13.12	12.00	14.00		
9.86	8.30	10.94	13.14	12.02	14.00		

Stage-Area-Storage for Pond 1P: Infiltration Storage Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
8.80	0	9.88	461	10.96	764	12.04	1,172
8.82	9	9.90	466	10.98	772	12.06	1,178
8.84	18	9.92	471	11.00	780	12.08	1,184
8.86	26	9.94	476	11.02	788	12.10	1,190
8.88	35	9.96	482	11.04	796	12.12	1,196
8.90	44	9.98	487	11.06	804	12.14	1,202
8.92	53	10.00	492	11.08	812	12.16	1,208
8.94	62	10.02	497	11.10	820	12.18	1,214
8.96	70	10.04	502	11.12	828	12.20	1,220
8.98	79	10.06	508	11.14	836	12.22	1,226
9.00	88	10.08	513	11.16	844	12.24	1,232
9.02	97	10.10	518	11.18	852	12.26	1,238
9.04	106	10.12	523	11.20	860	12.28	1,244
9.06	114	10.14	528	11.22	868	12.30	1,250
9.08	123	10.16	534	11.24	876	12.32	1,256
9.10	132	10.18	539	11.26	884	12.34	1,262
9.12	141	10.20	544	11.28	892	12.36	1,268
9.14	150	10.22	549	11.30	900	12.38	1,274
9.16	158	10.24	554	11.32	908	12.40	1,280
9.18	167	10.26	560	11.34	916	12.42	1,286
9.20	176	10.28	565	11.36	924	12.44	1,292
9.22	185	10.30	570	11.38	932	12.46	1,298
9.24	194	10.32	575	11.40	940	12.48	1,304
9.26	202	10.34	580	11.42	948	12.50	1,310
9.28	211	10.36	586	11.44	956	12.52	1,316
9.30	220	10.38	591	11.46	964	12.54	1,322
9.32	229	10.40	596	11.48	972	12.56	1,328
9.34	238	10.42	601	11.50	980	12.58	1,334
9.36	246	10.44	606	11.52	988	12.60	1,340
9.38	255	10.46	612	11.54	996	12.62	1,346
9.40	264	10.48	617	11.56	1,004	12.64	1,352
9.42	273	10.50	622	11.58	1,012	12.66	1,358
9.44	282	10.52	627	11.60	1,020	12.68	1,364
9.46	290	10.54	632	11.62	1,028	12.70	1,370
9.48	299	10.56	638	11.64	1,036	12.72	1,376
9.50	308	10.58	643	11.66	1,044	12.74	1,382
9.52	317	10.60	648	11.68	1,052	12.76	1,388
9.54	326	10.62	653	11.70	1,060	12.78	1,394
9.56	334	10.64	658	11.72	1,068	12.80	**1,400**
9.58	343	10.66	664	11.74	1,076		
9.60	352	10.68	669	11.76	1,084		
9.62	361	10.70	674	11.78	1,092		
9.64	370	10.72	679	11.80	1,100		
9.66	378	10.74	684	11.82	1,106		
9.68	387	10.76	690	11.84	1,112		
9.70	396	10.78	695	11.86	1,118		
9.72	405	10.80	700	11.88	1,124		
9.74	414	10.82	708	11.90	1,130		
9.76	422	10.84	716	11.92	1,136		
9.78	431	10.86	724	11.94	1,142		
9.80	440	10.88	732	11.96	1,148		
9.82	445	10.90	740	11.98	1,154		
9.84	450	10.92	748	12.00	1,160		
9.86	456	10.94	756	12.02	1,166		

Stormwater Pollution Prevention Plan

For:

Cape Cod Hospital
27 Park Street
Hyannis, MA

Operator(s):

Name
Company
Address
Phone
Email:

Stormwater Manager and SWPPP Contact(s):

Name
Company
Address
Phone
Email:

SWPPP Preparation Date:

6-28-2019

Estimated Project Dates:

Start of Construction: 8-5-2019
Completion of Construction: 9-30-2020

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SECTION 1: SITE EVALUATION, ASSESSMENT, AND PLANNING

1.1 Project/Site Information

Project Information:

Project/Site Name: Project 2022 Addition to Cape Cod Hospital

Project Street/Location: 27 Park Street Hyannis, MA

City: Hyannis State: MA Zip Code: 02601

County or Similar Subdivision: Barnstable County

Latitude/Longitude (Use **one** of three possible formats, and specify method)

Latitude:	Longitude:
1. 41°39'8.10"N (degrees, minutes, seconds)	1. 70°16'26.43"W (degrees, minutes, seconds)
2. _ _ ° _ _ . _ _ ' N (degrees, minutes, decimal)	2. _ _ ° _ _ . _ _ ' W (degrees, minutes, decimal)
3. _ _ . _ _ _ _ ° N (decimal)	3. _ _ . _ _ _ _ ° W (decimal)

Method for determining latitude/longitude:

☐ USGS topographic map (specify scale: __1 ☐ EPA Web site ☒ GPS

☒ Other (please specify):___Google Earth/Mass GIS data_____

Is the project located in Indian country? ☐ Yes ☒ No

If yes, name of Reservation, or if not part of a Reservation, indicate "not applicable."

Is this project considered a federal facility? ☐ Yes ☒ No

NPDES project or permit tracking number:_____tbd_____

(This is the unique identifying number assigned to your project by your permitting authority after you have applied for coverage under the appropriate NPDES construction general permit.)

1.2 Contact Information/Responsable Parties

Instructions:

- List the operator(s), project managers, stormwater manager, and person or organization that prepared the SWPPP. Indicate respective responsibilities, where appropriate.
- Also, list subcontractors expected to work on-site. Notify subcontractors of stormwater requirements applicable to their work.
- See SWPPP Guide, Chapter 2.B. and your construction general permit for the definition of *operator*.

Project Information:

Operator(s):

Name
Company
Address
Phone
Email:

Project Manager(s) or Site Supervisor(s):

Name
Company
Address
Phone
Email:

Stormwater Manager and SWPPP Contact(s):

Name
Company
Address
Phone
Email:

This SWPPP Was Prepared By:

Daniel A. Ojala PE, PLS
down cape engineering, Inc.
939 Main St. (Rt. 6a)
Yarmouthport, MA 02675
1-508-362-4541 fax 508-362-4541
email: downcape@downcape.com copies available by PDF upon request to this email address.

Subcontractor(s):

Name
Company
Address
Phone
Email:

Emergency 24 hour contact:

Name
Company
Address
Phone
Email:

1.3 Nature and Sequence of Construction Activity

Instructions:

- Briefly describe the nature of the construction activity and approximate timeframes (one or more paragraphs, depending on the nature and complexity of the project).

Project Information:

- Describe the general scope of the work for the project, major phases of construction, etc:

Demolition of existing Whitcomb Medical building and surrounding site features. Construction of new utility lines. Construction of building addition and paved parking areas. Demolition of CCMedical Building and paved parking east side.

What is the function of the construction activity?

☐ Residential ☒ Commercial ☐ Industrial ☐ Road Construction

☐ Linear Utility

☐ Other (please specify):_____

Estimated Project Start Date: 11/5/2019

Estimated Project Completion Date: 9/30/2022

1.4 Soils, Slopes, Vegetation, and Current Drainage Patterns

Project Information:

Soil type(s):

- **Glacial Outwash Plain- Carver Coarse Sand, excessively drained. See attached soil maps.**

Slopes (describe current slopes and note any changes due to grading or fill activities):

- **0-10%, fairly level site, slopes to south.**

Drainage Patterns (describe current drainage patterns and note any changes dues to grading or fill activities):

- **Site is currently heavily developed with medical buildings and parking.**
- **Subsurface drainage is to be provided to infiltrate all runoff.**
- **Vegetation: Landscaped around buildings and parking.**

Other:

- **Site has very well drained soils due to sandy glacial outwash and level grades, see erosion and sedimentation control plan for temporary construction period BMPs.**

1.5 Construction Site Estimates

Project Information:

The following are estimates of the construction site:

Construction Site Area to be disturbed	4.7 acres
Total Project Area	4.7 acres
Percentage impervious area before construction	85 %
Runoff coefficient before construction	93
Percentage impervious area after construction	85 %
Runoff coefficient after construction	93

1.6 Receiving Waters

Project Information:

Description of receiving waters: Hyannis Harbor

Description of storm sewer systems: Roof runoff directs to storm drains, all drainage others infiltrated on-site

Description of impaired waters or waters subject to TMDLs: n/a

1.7 Site Features and Sensitive Areas to be Protected

Project Information:

Description of unique features and measures to protect them:

- Site is relatively level, subsurface stormwater infiltration trenches will be used per local stormwater requirements for recharging 25 year storm onsite. Groundwater will be recharged from onsite precipitation. Silt fence and construction aprons to protect buffers to wetland areas (coastal bank, land subject to coastal storm flowage, land under ocean).

1.8 Potential Sources of Pollution

Project Information:

Potentials sources of sediment to stormwater runoff:

- Silt from disturbed topsoil and subsoil, site construction.

- Stockpiled soils, especially topsoil or subsoil, underlying material sand and not subject to forming silt.

1.9 Endangered Species Certification

Project Information:

Are endangered or threatened species and critical habitats on or near the project area?

☐ Yes ☒ No

Describe how this determination was made: Review of Mass GIS Mapping of Estimated and Priority Habitat for Rare Species under Mass Environmental Protection Act (MEPA/NHESP)

If yes, describe the species and/or critical habitat: n/a

If yes, describe or refer to documentation which determines the likelihood of an impact on identified species and/or habitat and the steps taken to address that impact. (Note, if species are present on or near your project site, EPA strongly recommends that the site operator work closely with the appropriate field office of the U.S. Fish and Wildlife Service or National Marine Fisheries Service. Please contact a state or tribal official for concerns related to state or tribal listing of species.)

1.10 Historic Preservation

Project Information:

Are there any historic sites on or near the construction site?

☐ Yes ☒ No

- Describe how this determination was made: Previously developed site
- If yes, describe or refer to documentation which determines the likelihood of an impact on this historic site and the steps taken to address that impact.

1.11 Maps

Instructions:

- Attach at least two site maps. The first should show the undeveloped site and its current features. An additional map or maps should be created to show the developed site or the major phases of development, for more complicated sites.

These maps should include:

- ☐ Direction(s) of stormwater flow and approximate slopes before and after major grading activities
- ☐ Areas and timing of soil disturbance and areas that will not be disturbed
- ☐ Natural features to be preserved
- ☐ Locations of major structural and non-structural BMPs identified in the SWPPP
- ☐ Locations and timing of stabilization measures
- ☐ Locations of off-site material, waste, borrow, or equipment storage areas
- ☐ Locations of all waters of the U.S., including wetlands
- ☐ Locations where stormwater discharges to a surface water
- ☐ Locations of storm drain inlets
- ☐ Areas where final stabilization has been accomplished
- ☐ For more information, see SWPPP Guide, Chapter 3.C.

Project Information:

- Include the site maps with the SWPPP. SEE ATTACHED MAPS/PLANS

SECTION 2: EROSION AND SEDIMENT CONTROL BMPS

Project Information:

1. Minimize Disturbed Area and Protect Natural Features and Soil:

Describe the areas that will be disturbed with each phase of construction and the methods (signs, fences, etc.) that you will use to protect those areas that should not be disturbed. Describe natural features identified earlier and how each will be protected during construction activity. Also describe how topsoil will be preserved. Include these areas and associated BMPs on your site map(s) also. (See SWPPP Guide, Chapter 4, ESC Principle 1 for more information.)

- Silt fence shall be installed per plan prior to other work on the site. Temporary retention areas are to be constructed. Site demolition of existing structures and pavement. Site utilities including drainage, lighting, water, gas and electric planned. Site will be stabilized with loam and seed, and vegetation established prior to silt fence removal and project Notice Of Termination filed.
- Phase Construction Activity:

Describe the intended construction sequencing and timing of major activities, including grading activities, road and utility installation, and building phases

- Phase I
  - ☐ Silt fence installation, temporary erosion control basins.
  - ☐ Signage per DEP/RDA/NOI
  - ☐ Site Demolition

- Phase II
  - ☐ Installation of drainage and utilities
  - ☐ Installation of washed stone construction aprons prior to work.

- Phase III
  - ☐ Construction of buildings, utilities, grading, parking, sitework. Work, site will be loamed and seeded, with grass stable, plantings in prior to filing Notice of Termination of coverage.

2. Control Stormwater Flowing Onto and Through the Project:

Describe structural practices (i.e., diversions, berms, ditches, storage basins) including design specifications and details used to divert flows from exposed soils, retain or detain flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. (See SWPPP Guide, Chapter 4, ESC Principle 3 for more information.)

- Silt fence in select locations, temporary stormwater retention basins, sandy soils allow high infiltration rates on site.

4. Stabilize Soils:

Describe controls (i.e., temporary seeding with native vegetation, hydroseeding, etc.) to stabilize exposed soils where construction activities have temporarily or permanently ceased. Also describe measures to control dust generation. Use of impervious surfaces for stabilization should be avoided whenever possible. (See SWPPP Guide, Chapter 4, ESC Principle 4 for more information.)

- BMP Description: Loam and Seed, Erosion control netting
  ☒ Permanent ☐ Temporary
- Installation Schedule: Prior to project completion
- Maintenance and Inspection: Ensure grass germination and growth.
- Responsible Staff: Site Operator/Contractor

- BMP Description: Stockpile Silt Fence
  ☐ Permanent ☒ Temporary
- Installation Schedule: Silt fence around all materials upon creation of pile
- Maintenance and Inspection: Operator to inspect with regular inspections (see inspections)
- Responsible Staff: Site Operator/Contractor

5. Protect Slopes:

Describe controls (i.e., erosion control blankets, tackifiers, etc.) including design specifications and details that will be implemented to protect all slopes. (See SWPPP Guide, Chapter 4, ESC Principle 5 for more information.)

- BMP Description: Silt Fence, Erosion Control netting on all exposed slopes.
- Installation Schedule: After site clearing complete, after loaming for netting.
- Maintenance and Inspection: After any rain event 0.5" or greater.
- Responsible Staff: Site Operator/Contractor

6. Protect Storm Drain Inlets:

Describe controls (i.e., inserts, rock-filled bags, or block and gravel, etc.) including design specifications and details that will be implemented to protect all inlets receiving stormwater from the project during the entire duration of the project. (See SWPPP Guide, Chapter 4, ESC Principle 6 for more information.)

- BMP Description: Filter fabric between frame and grate, haybales around
- Installation Schedule: After new drainage installed, no offsite storm water discharge anticipated
- Maintenance and Inspection: After any rain event 0.5" or greater
- Responsible Staff: Site Operator/Contractor

7. Establish perimeter controls and sediment barriers:

Describe structural practices (i.e., silt fences or fiber rolls) including design specifications and details to filter and trap sediment before it leaves the construction site. (See SWPPP Guide, Chapter 4, ESC Principle 7 for more information.)

- BMP Description: Silt Fence Installation per plan
- Installation Schedule: As soon as practical after sitework begins.
- Maintenance and Inspection: Inspect after each rain event in excess of 0.5".
- Responsible Staff: Site Operator/Contractor

- BMP Description: Temporary infiltration basins
- Installation Schedule: As soon as practical after sitework begins
- Maintenance and Inspection: Inspect after each rain event in excess of 0.5", remove construction silt as required to maintain infiltration capacity.
- Responsible Staff: Site Operator/Contractor

8. Retain Sediment On-Site and Control Dewatering Practices:

Describe sediment control practices (i.e., sediment trap or sediment basin), including design specifications and details (volume, dimensions, outlet structure) that will be implemented at the construction site to retain sediments on-site. Describe dewatering practices that will be implemented if water must be removed from an area so that construction activity can continue. (See SWPPP Guide, Chapter 4, ESC Principle 8 for more information.)

- BMP Description: Sediment Trap/Retention Basin per plan specs.
- Installation Schedule: Prior to demolition work
- Maintenance and Inspection: Inspect after each rain event in excess of 0.5", Remove sediment to prevent standing water, and maintain infiltration capacity.
- Responsible Staff: Site Operator/Contractor

9. Establish Stabilized Construction Exits:

Describe location(s) of vehicle entrance(s) and exit(s), procedures to remove accumulated sediment off-site (i.e., vehicle tracking), and stabilization practices (i.e., stone pads and/or wash racks) to minimize off-site vehicle tracking of sediments and discharges to stormwater. (See SWPPP Guide, Chapter 4, ESC Principle 9 for more information.)

- BMP Description: Washed Stone Construction Apron.
- Installation Schedule: Prior to other construction activity on site.
- Maintenance and Inspection: Inspect after every rain event 0.5" or greater, replenish or replace if aprons clog with silt, sweep apron as required. see plan.
- Responsible Staff: Site Operator/Contractor
-

10. Additional BMPs:

Describe additional BMPs that may not fit into the above categories.

- n/a

SECTION 3: GOOD HOUSEKEEPING BMPS

3.1 Good Housekeeping BMP

Project Information:

1. Material Handling and Waste Management:

Describe measures (i.e., trash disposal, sanitary wastes, recycling, and proper material handling) to prevent the discharge of solid materials to waters of the U.S., except as authorized by a permit issued under section 404 of the CWA. (See SWPPP Guide, Chapter 5, P2 Principle 1)

- BMP Description: Temporary Sanitary Facilities
- Installation Schedule: Prior to regular construction on site
- Maintenance and Inspection: Per contract with provider
- Responsible Staff: Operator/Contractor

- BMP Description: Street Sweeping
- Installation Schedule: As required by site conditions.
- Maintenance and Inspection: visual inspection of tracking
- Responsible Staff: Operator/contractor

2. Establish Proper Building Material Staging Areas:

Describe construction materials expected to be stored on-site and procedures for storage of materials to minimize exposure of the materials to stormwater. (See SWPPP Guide, Chapter 5, P2 Principle 2 for more information.)

- BMP Description: Store any paint etc. under cover of tarps or roof.
- Installation Schedule: as required, constructing one water tower
- Maintenance and Inspection: as required by construction
- Responsible Staff: Operator/Contracor

3. Designate Washout Areas:

Describe location(s) and controls to minimize the potential for stormwater pollution from washout areas for concrete mixers, paint, stucco, etc. (See SWPPP Guide, Chapter 5, P2 Principle 3 for more information.)

- BMP Description: Concrete washout Area- utilize premanufactured unit or construct with 10 mil plastic- onsite constructed requires frequent inspection.
- Installation Schedule: Prior to concrete being poured onsite
- Maintenance and Inspection: -As required by industry standard
- Responsible Staff: Operator/Contractor

- BMP Description: Paint Washout- utilize premanufactured unit
- Installation Schedule: Prior to painting onsite
- Maintenance and Inspection: As required by industry standard
- Responsible Staff: Operator/Contractor

4. Establish proper equipment/vehicle fueling and maintenance practices:

Describe equipment/vehicle fueling and maintenance practices that will be implemented to control pollutants to stormwater (e.g., secondary containment, drip pans, spill kits, etc.) (See SWPPP Guide, Chapter 5, P2 Principle 4 for more information.)

- BMP Description: Fuel over bare ground in designated area, have drip pan available. Spill Kit shall be available.
- Installation Schedule: drip pan and spill kit onsite prior to refueling
- Maintenance and Inspection: inspect refueling area for signs of staining after every rainstorm of 0.5" or greater.
- Responsible Staff: Owner/Contractor

5. Allowable non-stormwater discharges and control equipment/vehicle washing:

For the allowable non-stormwater discharge(s) associated with construction industrial activity identified, describe controls and measures that will be implemented at those sites to minimize pollutant discharges. (See SWPPP Guide, Chapter 5, P2 Principle 5 for more information.)

- BMP Description: Vehicle Washing Area- designate on plan
- Installation Schedule: Wash only if required, avoid detergents.
- Maintenance and Inspection: Inspect area after every rain event of 0.5" or greater
- Responsible Staff: Owner/Contractor (vehicle washing discouraged onsite)

6. Spill Prevention and Control Plan:

Describe the spill prevention and control plan to include ways to reduce the chance of spills, stop the source of spills, contain and clean up spills, dispose of materials contaminated by spills, and train personnel responsible for spill prevention and control. (See SWPPP Guide, Chapter 5, P2 Principle 6 for more information.)

- REFERENCE ATTACHMENT I, SPILL KIT REQ'D.

7. Any Additional BMPs: N/A

3.2 Allowable Non-Stormwater Discharge Management

Instructions:

- Identify all allowable sources of non-stormwater discharges (except flows from firefighting activities) that are not identified above.
- Identify measures used to eliminate or reduce these discharges and the BMPs used to prevent them from becoming contaminated.
- For more information, see SWPPP Guide, Chapter 3.A. Also, review your permit for exact details.

Project Information:

List allowable non-stormwater discharges and the measures used to eliminate or reduce them and to prevent them from becoming contaminated:

- N/A

SECTION 4: SELECTING POST-CONSTRUCTION BMPs

Instructions:

- Describe all post-construction stormwater management measures that will be installed during the construction process to control pollutants in stormwater discharges after construction operations have been completed. Examples of post-construction BMPs include:

  - ☒ Biofilters
  - ☐ Detention/retention devices
  - ☐ Earth dikes, drainage swales, and lined ditches
  - ☒ Infiltration Basins
  - ☐ Porous Pavement
  - ☒ Other proprietary permanent structural BMPs
  - ☐ Outlet protection/velocity dissipation devices
  - ☒ Slope protection
  - ☒ Vegetated strips and/or swales

- Identify any applicable federal, state, local, or tribal requirements for design or installation.
- Describe how low impact designs or smart growth considerations have been incorporated into the design.
- Any structural BMPs should have design specifications and details referred to and attached as appendices to the SWPPP.
- For more information on this topic, please refer to your state's stormwater manual.
- You may also want to consult one of the references listed in Appendix D of the SWPPP Guide.
- Visit the post-construction section of EPA's Menu of BMPs at: www.epa.gov/npes/menuofbmps

Project Information:

- BMP Description: Rain gardens, deep sump hooded catch basins and secondary deep sump hooded manholes prior to subsurface infiltration of all stormwater required per local requirements.
- Installation Schedule: subsurface drainage to be installed prior to t-base and pavement on the site.
- Maintenance and Inspection: Per Stormwater Operations and Maintenance Plan for site.
- Responsible Staff: Owner

SECTION 5: INSPECTIONS and MAINTENANCE

5.1 Inspections

Project Information:

1. Inspection Personnel:

Identify the person(s) who will be responsible for conducting inspections and describe their qualifications.

- Site Operator/Contractor, (experienced site contractor) is the responsible person to review all SWPPP documentation. Will conduct review with owner's engineer.

2. Inspection Schedule and Procedures:

i. Describe the inspection schedules and procedures you have developed for your site (include frequency of inspections for each BMP or group of BMPs, indicate when you will inspect, e.g. before/during/and after rain events, spot inspections, etc.).

- Inspect all BMP's after every rain event in excess of 0.5" during construction period, or every two weeks, whichever occurs sooner. See inspection logs for required information.

ii. Describe the general procedures for correcting problems when they are identified. Include responsible staff and timeframes for making corrections.

- All BMP's will be repaired as required, deficiencies discovered during inspections shall be remedied as soon as possible after discovery.

iii. Attach a copy of the inspection report you will use for your site.

- REFERENCE ATTACHMENT E

5.2 Maintenance of Controls

Project Information:

- Maintenance Procedures: Site Operator/Contractor will replenish/replace stone aprons and repair silt fence, remove silt from basins and accumulated silt at fence per plan, properly operate washout stations, and repair any deficiencies to original specifications. Operator shall ensure spill kit and drip pan onsite at all times. Document all repairs in corrective actions log see Section 5.3 and document maintenance per inspection reports in 6.1 below.

5.3 Corrective Action Log

Instructions:

Project Information:

Corrective Action Log: *REFERENCE ATTACHMENT*

SECTION 6: Recordkeeping and Training

6.1 Recordkeeping

Instructions:

The following is a list of records you should keep at your project site available for inspectors to review:

- Dates of grading, construction activity, (and stabilization which is covered in Section 7).
- A copy of the construction general permit (attach).
- The signed and certified NOI form or permit application form (attach).
- A copy of the letter from the EPA/State notifying you of their receipt of your complete NOI/application (attach).
- Inspection reports (attach).
- Records relating to endangered species and historic preservation (attach).
- Check your permit for additional details.
- For more on this subject, see SWPPP Guide, Chapter 6.C.

Project Information:

Dates when major grading activities occur:

- To be noted-

Dates when construction activities temporarily or permanently cease on a portion of the site

- To be noted

6.2 Log of Changes to the SWPPP

Instructions:

Create a log here, or as an attachment, of changes and updates to the SWPPP. You should include additions of new BMPs, replacement of failed BMPs, significant changes in the activities or their timing on the project, changes in personnel, changes in inspection and maintenance procedures, and updates to site maps, etc.

Project Information:

Log of changes and updates to the SWPPP

- OPERATOR TO UTILIZE ATTACHMENT APP.G

6.3 Training

Instructions:

- Training your staff and subcontractors is an effective BMP. As with the other steps you take to prevent stormwater problems at your site, you should document the training that you conduct for your staff, for those with specific stormwater responsibilities (e.g. installing, inspecting, and maintaining BMPs), and for subcontractors.
- Include dates, number of attendees, subjects covered, and length of training.
- For more on this subject, see SWPPP Guide, Chapter 8.

Project Information:

Describe Training Conducted:

- General stormwater and BMP awareness training for staff and subcontractorss Reading and familiarization of SWPPP and plans and view of BMP's at site.
- Detailed training for staff and subcontractors with specific stormwater responsibilities Operator/Contractor to be familiar with SWPPP and capable of performing maintenance described in 5.2

Individual(s) Responsible for Training:

- Operator/Contractor-....Owners engineer also available 1-508-362-4541 x108 downcape@downcape.com Daniel A. Ojala PE, PLS

SECTION 7: FINAL STABILIZATION

Instructions:

- Describe procedures for final stabilization. If you complete major construction activities on part of your site, you can document your final stabilization efforts for that portion of the site. Many permits will allow you to then discontinue inspection activities in these areas (be sure to check your permit for exact requirements.) You can amend or add to this section as areas of your project are finally stabilized.
- Update your site plans to indicate areas that have achieved final stabilization.
- For more on this topic, see SWPPP Guide, Chapter 9.

Project Information:

- All areas not covered by the building or paving will be loamed and seeded, and the site vegetation established prior to Notice of Termination and silt fence removal. Level site, sandy soils. See plans.

SECTION 8: CERTIFICATION AND NOTIFICATION

Instructions:

- The SWPPP should be signed and certified by the construction operator(s). Attach a copy of the NOI and permit authorization letter received from EPA or the State in Appendix D.

Project Information: Cape Cod Hospital #27 Park Street, Hyannis, MA 02601

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

Name: _____ Title: _____

Signature: _____ Date: _____

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

Name: _____ Title: _____

Signature: _____ Date: _____

SWPPP APPENDICES

Attach the following documentation to the SWPPP:

App A –Soil Maps, Area Maps

App B – Site Plan, Construction Period Erosion Control Plan

App C - Copy of Construction General Permit

App D - Copy of RDA and acknowledgement letter from EPA

App E - Inspection Reports

App F - Corrective Action Log

App G - Log of Changes and Updates to SWPPP

App H - Subcontractor Certifications/Agreements

App I- Spill Contingency Plan

TSOI KOBUS DESIGN

CAPE COD HEALTHCARE

CAPE COD HOSPITAL
27 Park Street
Hyannis, MA 02601

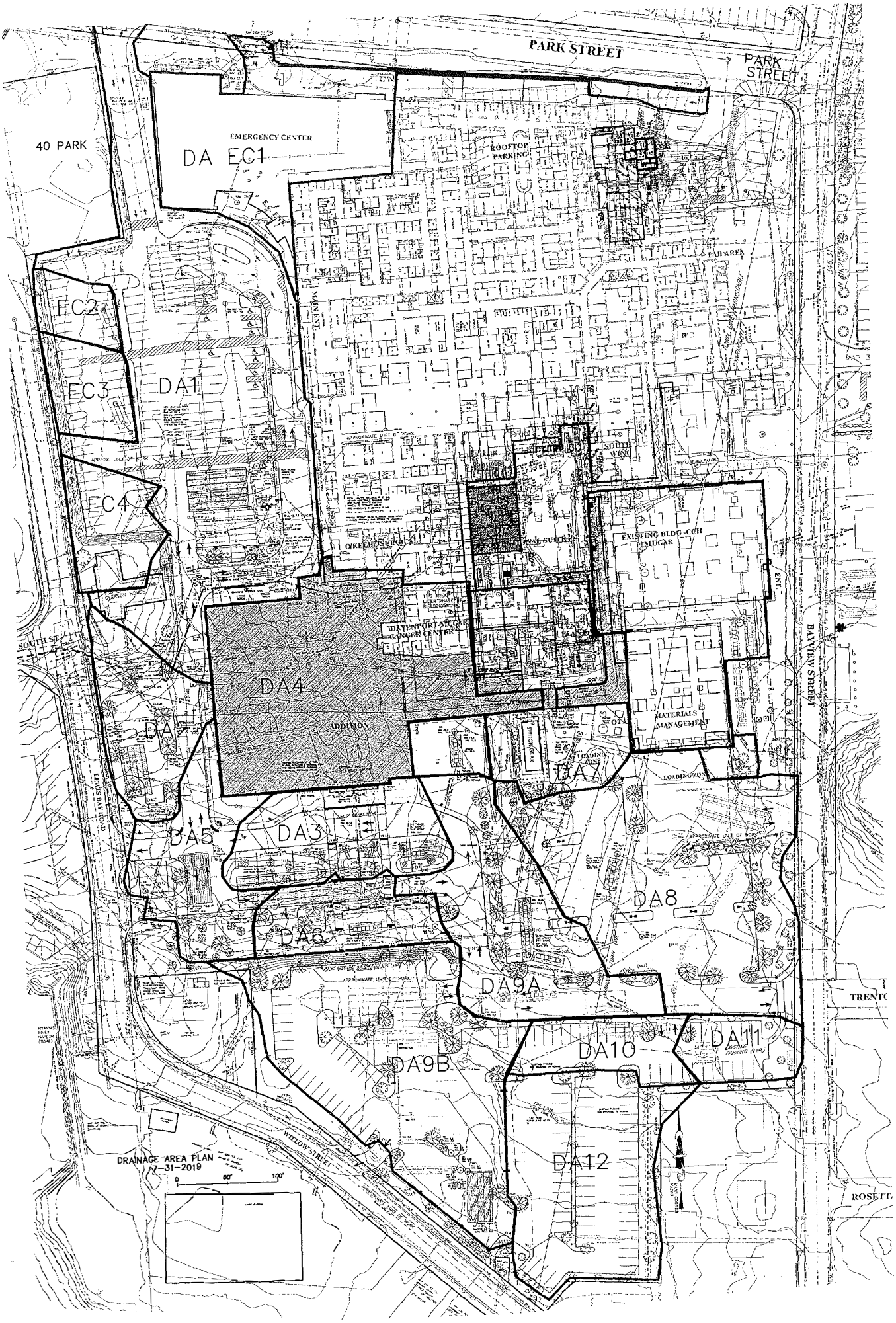
SITE ENABLING SUBMISSION

No.	Description	Date
Revisions		

down cape engineering, inc.
civil engineers
land surveyors

STORMWATER POLLUTION PREVENTION PLAN

C 300


PARK STREET
PARK STREET
40 PARK
EMERGENCY CENTER
DA EC1
ROOFTOP PARKING
EC2
EC3
DA1
EC4
EXISTING BLDG-CCH
DAVENPORT ARCUR CANCER CENTER
DA4
ADDITION
DA7
MATERIALS MANAGEMENT
DA5
DA3
DA6
DA8
DA9A
DA9B
DA10
DA11
DA12
DRAINAGE AREA PLAN
7-31-2019
0
60'
100'

27 Park Street - Cape Cod Hospital - Project 2022

Water Resources Nitrogen Loading and Mitigation Worksheet

See Technical Bulletin 91-001 for further details: http://www.capecodcommission.org/regulatory/NitrogenLoadTechBulletin.pdf

Project Nitrogen Load — ***Wastewater*** — ***Proposed development***

1.

Project Title-5 wastewater flows: 58800.0 gpd (a)
Actual wastewater flows: 58800.0* (b)
Average wastewater flows: 58800.0 gpd (a)+(b) ÷2= (A)
* Title-5 flows prescribed by TB91-001 for commercial uses

Place √ in applicable box:

Yes	No	
X		Will the project be connected to sewer ?
X		Is project Title-5 wastewater flow 10,000 gpd or greater ?

(If 'Yes', then the project must be reviewed for consistency with Additional Methods under Objective WR1)

Place √ in applicable box and multiply unsewered wastewater flow by applicable conversion factor:

☐	Standard Title-5 System (35-ppm-N)	x 0.048359	
☐	DEP-approved I/A System (25-ppm-N)	x 0.034542	
☐	DEP-approved I/A System (19-ppm-N)	x 0.026252	} Type of system: _____
☐	Groundwater Discharge (10-ppm-N)	x 0.013817	

Wastewater nitrogen load (**Title-5 flows**) = 0.00 kg-N/yr (B)

Wastewater nitrogen load (**Actual flows**) = 0.00 kg-N/yr (C)

Stormwater Runoff

Town: Barnstable — Recharge rate for town (inches; for natural areas from Technical Bulletin 91-001): 18 (RECH)

Project site area:	17.424 acres		(D)
Project site wetland area:	0.000 acres		(E)
Project site upland area:	17.424 acres		(F)
Pervious unpaved upland:	2.784 acres		(G)
0 % using LID — Paved area:	333,870 s.f.		(H)
Factor may be adjusted for employment of LID →	x 1.4158E-04		
	= 47.270601 kg-N/yr		(I)
Roof area:	303,850 s.f.		(J)
	x 7.0792E-05		
	= 21.5101 kg-N/yr		(K)

Fertilizer

Managed turf: 121,200 s.f.
x 3.4019E-04
= 41.232 kg-N/yr (L)

Total Nitrogen Load

Total project nitrogen load (**Title-5 flows**): 110.01 kg-N/yr (M)= (B)+(I)+(K)+(L)

Total project nitrogen load (**Actual flows**): 110.01 kg-N/yr (N)= (C)+(I)+(K)+(L)

Nitrogen load (**Average**): 110.01 kg-N/yr (O)= (M)+(N) ÷2

Nitrogen Loading Concentration

Project nitrogen loading concentration (**Title-5 flows**): 0.75 ppm-N (P)= $\frac{(M)}{(a)\div 723.76 + (G)\times(RECH)\div 9.7286 + (H)\div 10{,}594 + (K)\div 0.75}$

Project nitrogen loading concentration (**Actual flows**): 0.75 ppm-N (Q)= $\frac{(N)}{(b)\div 723.76 + (G)\times(RECH)\div 9.7286 + (H)\div 10{,}594 + (K)\div 0.75}$

Project nitrogen loading concentration (**Average**): 0.75 ppm-N (R)= (P)+(Q) ÷2

next page -->

Existing (if redevelopment)

Calculate (A') through (P') as w/ (A) through (P):

Title-5 wastewater flows: 58800.0 gpd
Actual wastewater flows: 58800.0*
Ave. wastewater flows: 58800.0 gpd (A')

Place √ in applicable box:

Yes	No	
X		Is existing development on sewer ? (If 'Yes', then go to line 2.)

☐	Standard Title-5 System	
☐	DEP-approved I/A System (commercial)	
☐	DEP-approved I/A System (residential)	
☐	Wastewater Treatment Facility (GWDP)	

0 — 0.00 kg-N/yr (B')

0 — 0.00 kg-N/yr (C') wastewater offsets

Project site area:	17.424 acres	(D)
Project site wetland area:	0.000 acres	(E)
Project site upland area:	17.424 acres	(F)
Pervious unpaved upland:	3.003 acres	(G')
Paved area:	350,655 s.f.	(H')
Paving runoff offset:	49.6471 kg-N/yr	(I')
Roof area:	277,535 s.f.	(J')
Roof runoff offset:	19.6473 kg-N/yr	(K')
Managed turf:	130,800 s.f.	
Fertilizer offset:	44.497 kg-N/yr	(L')

Existing nitrogen load (Title-5 flows): 113.79 kg-N/yr (M')

Existing nitrogen load (Actual flows): 113.79 kg-N/yr (N')

Nitrogen offset: 113.79 kg-N/yr (O')
85.34382783

Existing nitrogen loading concentrations:

Title-5 flows: 0.78 ppm-N (P')

Actual flows: 0.78 ppm-N (Q')

Average: 0.78 ppm-N (R')

Resource/ Impact Based Criteria

Marine Water Recharge Areas

Yes No

2. [X] [ ] Is the project in Marine Water Recharge Area (MWRA) with a nitrogen-loading limit OR in a MWRA that discharges to coastal waters with documented impaired water quality** ?
(If 'No', then go to line 3.)

Name of Marine Water Recharge Area sub-embayment (*from RPP Data Viewer*):
Hyannis Inner Harbor

Nitrogen-loading limit** : 0.00 kg-N/yr (S)

[ ] [X] Does project's nitrogen load (O) exceed the existing load (O') AND the critical nitrogen load (S) ?
(If 'No', then go to line 3.)

Project nitrogen load to be mitigated: 0.0 kg-N/yr (T)= LESSER OF (O)-(S) x(F) AND (O)-(O') x(F)
x $8,290 /kg/yr
= $ 0 (U)

[ ] Place √ in box if applicant intends to make this payment (S)
(If not checked, then the project must provide an alternative strategy for meeting its nitrogen load requirement pursuant to Objective WR3)

** *When a nitrogen-loading limit has been determined through either a Total Maximum Daily Load (TMDL), a Massachusetts Estuaries Project-accepted technical report, or specified by a Commission-approved comprehensive wastewater management plan pursuant to Objective WR3, or if impaired water quality has been documented for the receiving coastal waters, the nitrogen loading limit shall be 0 kg-N/yr per acre pursuant to Objective WR3.*

Groundwater Quality

Yes No

3. [ ] [X] Does the project's nitrogen loading concentration in groundwater (R) exceed the greater of 5 ppm *or* the existing concentration (R') ?
(If 'Yes' and the project is not located in an Impaired Area, the project will need to provide an alternative strategy for meeting Objective WR1)

Potential Public Water Supply Areas

Yes No

4. [ ] [X] Is project in a Potential Public Water Supply Area (PPWSA) ?
(If 'No', then go to line 5.)

[ ] [ ] Does the project's nitrogen loading concentration (R) exceed the greater of 1 ppm *or* the existing concentration (R') ?
(If 'Yes', the project must provide an alternative strategy for meeting Objective WR1)

[ ] [ ] Does the project use, treat, generate, store or dispose of hazardous materials in excess of the greater of a) household quantities or b) existing quantities ?
(If 'Yes', the project must provide an alternative strategy for meeting Objective WR1)

Wellhead ProtectionAreas

Yes No

5. [ ] [X] Is project in a Wellhead Protection Area (WHPA) ?
(If 'No', then go to line 6.)

[ ] [ ] Does the project's nitrogen loading concentration (R) exceed the greater of 5 ppm *or* the existing concentration (R') ?
(If 'Yes' and the project is not located in an Impaired Area, the project must provide an alternative strategy for meeting Objective WR1)

[ ] [ ] Does the project use, treat, generate, store or dispose of hazardous materials in excess of the greater of a) household quantities or b) existing quantities ?
(If 'Yes', the project must provide an alternative strategy for meeting Objective WR1)

Fresh Water Recharge Areas

Yes No

6. [ ] [X] Is project wastewater disposed of within 300 feet of a stream or fresh surface water body?
(If 'No', then go to line 7.)

[ ] [ ] Is the project located in a freshwater recharge area (FWRA) hydraulically upgradient of a stream or fresh surface water body?
(If 'Yes', the project must provide an alternative strategy for meeting Objective WR2)

Other Potential Impacts

Yes No

7. [ ] [X] Will the project withdraw more than 20,000 gallons of water per day ?
(If 'Yes', then the project must provide documentation demonstrating that there will not be significant impacts to water levels, surface waters and wetlands)

8. ***The project must demonstrate compliance with Objective WR4, including use of Low Impact Development to mitigate impacts of stormwater runoff and O & M plans for maintaining stormwater infrastructure and landscaping.***

Code Compliance and Standards

- Mechanical and Electrical Systems shall be designed per the current 9th edition of the Massachusetts State Building Code based on IBC 2015, IMC 2015, and ASHRAE 90.1- 2013 including related Massachusetts State Amendments
- Massachusetts State Stretch Energy Code
- Requirements of the Massachusetts DPH to comply with DON criteria (i.e. LEED certifiable)
- Massachusetts State Plumbing Codes
- Massachusetts State Electrical Codes
- Massachusetts State Fire Prevention Code (based on NFPA 1)
- Massachusetts Elevator Regulations
- Massachusetts DEP Requirements
- Massachusetts Environmental Air Quality Protection Agency
- Cape Cod Commission regulations that are applicable
- Local Ordinances, Regulations of the Local Building Department and Fire Department
- Massachusetts Board of Pharmacy Recommendations
- USP 797 – Pharmaceutical Compounding – Sterile Preparations
- USP 800 – Hazardous Drugs - Handling in Healthcare Settings
- NFPA 13 – Standard for the Installation of Sprinkler Systems
- NFPA 37 – Standard for the Installation and Use of Stationary Combustion Engines & Gas Turbines
- NFPA 70 - National Electric Code
- NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems
- NFPA 90B – Standard for the Installation of Warm Air Heating and Air-Conditioning Systems
- NFPA 99 - Health Care Facilities Code
- NFPA 101 - Life Safety Code
- NFPA 110 – Standard for Emergency and Standby Power Systems
- Other Relevant NFPA Standards
- AIA Healthcare Facilities Design Guidelines, 2018 edition and referenced ASHRAE Standard 170, Ventilation for Healthcare Facilities
- IES Lighting Handbook 10th Edition
- ANSI/IES RP-29-06 - Lighting for Hospitals and Healthcare Facilities
- ANSI/ASHRAE 62 - Ventilation for Acceptable Indoor Air Quality
- ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration
- ANSI/ASHRAE 55 - Thermal Environmental Conditions for Human Occupancy

ASHRAE 90.1-2013

- This Project shall comply per the current 9th edition Massachusetts State Building Code based on ASHRAE 90.1-2013 with any relevant Massachusetts State Amendments
  - The Mechanical HVAC design shall comply with ASHRAE 90.1-2013, Section 6.4, which relates to the minimum code required energy efficient design for new mechanical equipment. The new mechanical equipment referenced in this section shall meet or exceed the minimum energy efficiency requirements referenced in this section.
  - The Mechanical Plumbing design shall comply with ASHRAE 90.1-2013, Section 7.4, which relates to the mandatory provisions for service water heating, (i.e. piping insulation, controls, outlet temperature controls, circulating pumps).
  - The Lighting and Lighting Controls design shall comply with ASHRAE 90.1-2013, Section 9.4 which relates to lighting and controls incorporated in an appropriate approach for a healthcare inpatient facility. The Lighting and Lighting Controls design shall also comply with the AIA Healthcare Facilities Guideline 2018 edition.

Intent of Cape Cod Regional Policy Plan and Cape Cod Commission Energy 2019 Bulletin:

- To minimize energy consumption through planning and design by incorporating energy efficiency and conservation measures
- To promote resiliency of energy generation and delivery
- To promote sustainable energy efficient design to minimize impact of greenhouse gas emissions through design and construction practices that promote energy efficiency
- The overall intent of this project is to have a high quality of construction consistent with low energy consumption and low long-term life cycle costs. Mechanical equipment shall be of the highest quality requiring a minimum of maintenance. All Mechanical, Electrical, Plumbing (MEP) equipment functions shall be monitored by a central energy management system (EMS), which shall be accessible via the internet.
- There is an intent to have an energy-use reduction goal, which shall be achieved through the use of energy efficient building envelope that utilizes superior building insulation and glazing, energy efficient equipment that either meets or exceeds current energy code requirements, reduced lighting power consumption, and using less energy to minimize the impact of the Cape Cod Healthcare's facility's greenhouse emissions from the construction of this new Tower Building.
- The following energy efficiency strategies shall be employed to reduce energy consumption:
  - Reduced Lighting Density
  - Lighting Daylight Sensors
  - Lighting Occupancy Sensors
  - Enhanced Building Glazing
  - Efficient HVAC and Plumbing Equipment
  - Optimized HVAC Controls
- To ensure efficient operations, commissioning of the HVAC systems, domestic water heating systems and lighting control systems shall be included as part of this new Tower Project.

Mechanical HVAC Energy Efficiency

- New water-cooled and air-cooled chillers shall be installed under this new Tower Building Project to create a stand alone remote chiller plant in the penthouse mechanical room of the new Tower Building. The new chiller plant systemsshall exceed current Massachusetts State Energy Code requirements. All new chillers shall also comply with the LEED refrigerant pre-requisite requirements. The new chillers shall be selected to be considered for an electric utility incentive for energy efficient operation.
- The new cooling towers shall comply with the ANSI/ASHRAE 90.1-2013 energy efficiency requirements. The cooling tower fans shall be inverter duty ready and shall be controlled with variable speed drives to modulate tower fan operation to efficiently control the condenser water supply temperature. The new cooling tower make-up water service shall be metered to monitor tower water make-up usage per LEED requirements. A new sidestream sand filter shall be integrated into the design to ensure optimized cooling tower operation by regularly removing particulates. A diligent chemical treatment program shall be incorporated into the cooling tower operation to optimize tower heat rejection capability and maintain cooling tower water quality for optimal pump and chiller operation.
- All new chiller plant condenser water and chilled water pumps shall have premium efficient motors rated for inverter duty operation. All condenser water and chilled water pumps shall be controlled by variable frequency drives to allow the pumps to operate at actual system load requirements and deliver the required flow and system head in lieu of operating at constant volume design duty during non-design load conditions.
- Existing Chiller Plant
  - There shall be cross connect piping to enable the existing central chiller plant to provide back-up cooling to the new Tower Building chiller plant and vice versa. The new Tower Building chiller plant shall also be designed to provide 'back-up' cooling capacity to the existing chiller plant as a resiliency feature.
- New Hot Water Boiler Plant
  - A new high efficiency (gas-fired) hot water condensing boiler plant shall be installed to provide dedicated heating hot water to the new Tower Building
  - New hot water pumps shall be specified with premium efficient motors rated for inverter duty operation. All hot water pumps shall be controlled by variable frequency drives to allow the pumps to operate at actual system load requirements in lieu of operating at constant volume design duty during non-design load conditions.
- Existing Boiler Plant
  - The existing CCH steam boiler plant shall serve a back-up source of heating to the new Tower Building heating plant. New steam to hot water shell/tube heat exchangers shall convert steam from the existing boiler plant to hot water for use in the new Tower Building heating systems.
  - Design provisions have also been made for the installation of a Combined Heating and Power (CHP) Plant in the future. Steam shall be derived from the CHP plant to provide an energy efficient first stage of heating for the new Tower Building heating plant. Incorporating a heating system design via the future CHP pant shall also provide increased resiliency for the new Tower Building heating systems.
  - The existing CCH boiler plant currently includes one (1) boiler that is equipped with a dual fuel burner (gas and No. 2 fuel oil) for resiliency.

- Custom Air Handling Units
  - Conditioned air to serve the occupied spaces of the new Tower Building shall be derived from new custom air handling units (AHUs). The new AHUs shall be specified with aluminum insulated double wall construction. Wall construction shall be fabricated with thermal insulation that ensures energy efficient operation of the air handling units and tight air leakage requirements.
  - The new custom AHUs shall be designed and fabricated for low velocity through components (i.e. pre-filters, final filters and coils) to minimize and achieve energy efficient operation.
  - All filters in the new custom AHUs shall comply with the current AIA Healthcare Facilities Guidelines
  - All new custom AHUs shall be designed for variable airflow operation to provide the required amount of conditioned air based on the actual load of the spaces served for energy efficient operation (in lieu of operating at design airflow continuously).
- Fans
  - All new exhaust fans shall be specified with premium efficiency inverter duty motors. All new exhaust fans shall be controlled by variable frequency drives to efficiently to deliver the required airflow based on actual conditions.
- Ductwork
  - All new ductwork shall be designed to comply with SMACNA duct standards and sized for energy efficient operation.
- Terminal Air Distribution
  - All new supply air systems shall include variable air volume terminal boxes, which shall modulate to satisfy space load by varying airflow from a maximum design airflow to a minimum design airflow.
- Fan Coil Units
  - All fan coils units shall be specified with EC motors for true variable airflow operation.
- Piping
  - All new chilled water and hot water piping systems shall be sized per ANSI/ASHRAE 90.1-2013 recommended piping requirements.
- Insulation for Ductwork and Piping
  - Insulation for new ductwork and piping systems shall comply with ANSI/ASHRAE 90.1-2013 requirements for required R-values.

ATC/EMS Energy Efficiency

- Energy efficient HVAC sequences of operation shall be implemented for control of the major HVAC equipment of the new Tower Building including:
  - Optimized chiller plant control strategies shall include:
    - CHW temperature reset

        - CW temperature reset
        - Automatic mechanical to free cool switchover operation
        - Variable flow pumping
        - Cooling tower fan modulation
    - Optimized custom AHU control strategies shall include:
        - Air economizer operation
        - VAV operation of the major Air Handling Units
        - Static pressure reset and fan tracking strategy
        - Discharge temperature reset strategy based on outside air temperature
    - Optimized heating hot water system control strategies shall include:
        - Variable HW pumping
        - HW reset temperature based on outside air temperature for the HW reheat system
    - VAV terminal boxes:
        - Efficient EMS sequencing of VAV terminal boxes serving patient floors (exterior exposures shall also be served with HW perimeter baseboard)
    - Fan coil units:
        - Variable fan speed control of the fan coil units which shall have true proportional EC motors
    - Unoccupied Setback for appropriate spaces
    - Demand Control Ventilation for appropriate spaces
    - Occupancy sensors where appropriate
- Additionally, the EMS shall monitor and alarm the following systems:
    - Critical rooms such as isolation rooms, compounding rooms, etc.
    - Space temperatures in mechanical and electrical rooms
    - Domestic hot water equipment for alarm monitoring
    - Monitoring of normal electrical power service
- Meters to monitor energy usage for
    - Gas
    - Electricity (with sub-meters for all major distribution systems)
    - Chilled Water usage
    - Boiler steam usage
- Meters to monitor usage for water:
    - Main building usage
    - Usage for cooling tower make up

Normal Power

- Single 25kv Feeder suppling each unit substation air-cooled transformer for normal power (two total).
- Two new Air-Cooled transformers, each transformer capable of sustaining the full load of the building (N+1 system configuration).
- Each transformer serves one end of a new Main-Tie-Main automated switchgear via fully redundant, for normal service.
- Power shall be distributed throughout the facility at 277/480V with localized transformers to provide power at 120/208V to receptacle loads.
- All new transformers shall comply with DOE 2016 efficiency requirements.
- Mechanical systems shall primary be powered from the 480V power distribution system. Large equipment (chillers, pumps, AHU, fans, etc.) shall be served via VFDs to fluctuate operation based on space demand.

Emergency Power

- New emergency generator shall be a diesel fired (selected for No. 2 low sulfur fuel oil) rated for 1 MW at 480/277V. The new emergency generator shall the primary source as back-up the emergency system for the new Tower Building.
- Redundant emergency power shall be provided by the existing N+1 generator plant via an 'electric cross-connect'.
- The Life Safety/Critical Branch and Equipment Branch automated switchgear shall supply backup power to the automatic transfer switches for life safety, critical branch, elevators and mechanical equipment to support the facility under loss of normal power.
- Automated emergency distribution equipment shall switch loads to the redundant generator in the event of failure of the new Tower Building emergency generator.
- Life Safety and Critical Branch loads shall be prioritized through automated general distribution.
- Resiliency shall be achieved by suppling the following equipment served by the new 1 MW Emergency Generator and generator plant:
  - 50% AHU capacity for the new custom AHUs installed
  - New Hot Water Boiler Plant
  - New imaging equipment
  - Out-patient services
  - DHW booster pumps
- Existing Generators
  - The existing emergency generators shall be 'cross connected' electrically to provide back-up resiliency to the new Tower Building 1 MW emergency generator

- The existing CCH Chiller Plant (CH-2 and CH-4) are currently served by the existing emergency generators. Cross-connected CHW piping shall be installed to provide back-up chilled water capacity to the new Tower Building chiller plant.
- The existing CCH Boiler Plant is currently served by the existing emergency generators
- The existing ejector pumps are served by the existing emergency generators. The new Tower Building sanitary and storm water systems shall be designed for gravity drain and will not require ejector pumps.

Fire Alarm:

- New Fire Alarm Command Center shall be installed to service the entire campus
- Upgrade and expand existing Fire Fighter Communication system.

Lighting Intent:

- Energy Efficient systems
- Low maintenance
- Use of LED fixtures
- Use of latest technology to control lighting

Exterior Lighting:

- Exterior site lighting on roadways shall be an LED source with photocells for on/off operation.
- Exterior lighting fixtures shall be specified to comply with Dark Sky requirements.
- Exterior building lighting shall be controlled via lighting control contactor panel with photocell control.

Interior Lighting:

- Interior lighting shall be primarily LED fixtures. Fixtures shall be provided with sensors for occupant and daylight control. Fixtures' output shall be reduced when unoccupied.
- Exit signs shall use LED illumination.

Lighting Controls:

- Exterior building lighting shall be controlled via lighting control contactor panel with photocell control.
- Local lighting controls (manual and/or occupancy switching) shall be provided for interior spaces based on occupant space, task needs and preferences.

- Fixture light levels and control functions can be individually programmed based on occupancy, daylight and space types.
- In public spaces, individual fixture's illumination levels shall be reduced during unoccupied times and ambient day light levels.
- In specific room types, lighting shall be controlled with manual on/automatic off controls.

Water Plumbing Systems

- As a resiliency feature, the new Tower shall have dual city water feed to the new Tower, one shall be from Barnstable and the 2nd city water feed shall be from Yarmouth.
- As a protective device, each new dedicated service shall have a backflow preventer
- There shall also be localized backflow prevention shall be provided at any equipment requiring Non-potable water to protect the domestic water service
- Domestic hot water shall be generated using a set of fully redundant semi-instantaneous steam water heaters. Domestic hot water shall be generated at 140'F and reduced down to 120'F for distribution. The hot water system shall be fully recirculated.
- Potable water shall maintain a minimum of 30 psi at the most remote flushing fixture.
- Low flow water conserving fixtures for all water closets, lavatories, and showers shall be part of the Project Design; these fixtures shall have consumption rates below the plumbing code required minimums.

Medical Systems Plumbing Systems

- The medical air vacuum service for the new Tower is served by an existing triplex pump/compressor assembly with the triplex pump arrangement offering redundancy and resiliency.
- The medical vacuum and medical air systems have built in redundancy per NFPA 99. The oxygen has an emergency oxygen connection that provides redundancy.

Natural Gas Plumbing Service

- As a resiliency feature, there are two (2) natural gas service feeds:
  - Natural gas service for the chiller and boiler plant, which is the primary gas service
  - Natural gas service for the Lab to serve the Hospital's main kitchens

Fire Protection

- As a resiliency feature, fire protection service includes three (3) feeds:
  - One service from the ED
  - One service from Mugar via the Chiller Plant
  - Once service from the Lab

- A new 100-HP fire pump shall be installed in a code compliant 2-hour rated mechanical room within the New Tower Building. The new fire pump shall be powered via emergency feeder with MI feeder and an automatic transfer switch (ATS).
- The new fire pump shall have a code required dual check backflow preventer.

Combined Heat and Power (CHP)

- The new Tower Building Project shall include provisions to install a future 800-kw cogeneration package that will include an internal combustion natural gas engine from Caterpillar. The rich burn engine shall be capable of running with high temperature jacket water for generation of steam in a new 2,800 lb/hr heat recovery boiler.
- The packaged cogeneration unit shall be contained within a new aluminum weatherproof sound attenuated enclosure. Auxiliary equipment shall include lube oil and aftercooler heat exchangers with pumps that HW shall be extracted for use via the HW reheat loop. Other auxiliary equipment shall be urea storage and SCR emissions control to comply with current Massachusetts State DEP requirements.
- The cogeneration unit shall operate continuously year-round and be base loaded to achieve electrical output of 820 kW to offset electric utility usage and a waste heat recovery steam rate of 2,800 Lbs/hour to offset the operation of the CCH steam boiler plant.

CAPE COD HOSPITAL – PROJECT 2022

Coastal Resiliency Measures

Cape Cod Hospital's Project 2022 incorporates site and design changes and features which further the Cape Cod Commission's Coastal Resiliency Goal and the Technical Bulletin's three Objectives. This is accomplished by minimizing and removing existing development within the most sensitive flood zones, elevating the addition, and improving Hospital infrastructure. These measures, organized by the Technical Bulletin Objectives, are referenced below:

1. Objective CR1: *Minimize development in the floodplain.*

    - No development is proposed within a V zone.

    - The Project includes the demolition and removal of the Whitcomb Pavilion building which is located within flood zone X. The basement of the Whitcomb Pavilion currently houses telephone infrastructure which would be vulnerable to the largest storms. The basement of the Cape Cod Medical Center is likewise low and vulnerable. Both these buildings and their lower levels are being demolished and the space relocated to the first floor of the main hospital, which is 20.67' above mean sea level. (NAVD88 datum). Only parking of vehicles will remain within the 100 year flood plain.

2. Objective CR2: *Plan for sea level rise, erosion and floods.*

    - The first floor of the new addition is elevated to 20.67' NAVD88.

    - All new mechanical systems except for the water-resistant fire sprinkler room are located near or above the first floor.

    - Building entrance grading is elevated for accessibility, substantial fill is being introduced around the addition to raise the grades well above the 100 year base flood elevation.

    - The Project includes upgrading the Hospital's back-up emergency generator to meet current code requirements as well as new underground fuel storage tanks. Fill is being introduced in the fuel tank storage area to bring the ground over the tanks to elevation 20.0 NAVD88.

    - The two closest buildings to the coast line, the Whitcomb Pavilion building and the Cape Cod Medical Center building, are to be demolished and their uses relocated to the main hospital building. The basement levels are currently vulnerable to flooding from the largest modeled storms.

    - All proposed building locations will be outside of the affected SLOSH areas for everything smaller than a category 4 hurricane. The first floor at 20.67 is above

reach of the graphically mapped elevation of the Category 4 flood level which is elevation 20.

3. Objective CR3: *Reduce vulnerability of built environment to coastal hazards.*

    - The Project removes existing development within coastal resource areas.
    - The addition is designed to withstand high pressure wind and debris impact.
    - The project includes new stormwater drainage systems and incorporates stormwater best management practices.

STIMSON

Cape Cod Commission
Landscape Maintenance Narrative
Revised October 9, 2019

Landscape Maintenance
Planting is being designed to increase biodiversity, reduce potable water use for irrigation, increase drought tolerance, and minimize maintenance requirements. Native plants tolerant of the region and site will be utilized to achieve these goals. Plants will only require irrigation during the establishment period. All planting areas will have an integrated pest management program to assess health of the landscape. Fertilization of the landscape will be based on annual soil sample tests and recommendations. All required IPM treatments will be performed by certified applicators.

Turfgrass lawn areas will be established with turf type tall Fescue species which are adapted from native species and more adapted to the Cape environment. These areas will be mown regularly throughout the growing season and irrigated as needed as determined by smart irrigation controls. The turfgrass lawns should be mown at 2.5-3" height and never exceed 5". Turfgrass areas shall be fertilized by a certified applicator with organic fertilizers, like Nature Safe, never in excess of 1lb of Nitrogen per 1,000 sq feet per application with 20% minimum slow release Nitrogen.

Planting areas will be a mix of native and adapted herbaceous perennials and woody shrubs and trees. These will include native grasses like Little Bluestem and Switchgrass, native shrubs like Bayberry and Viburnum, and native trees like Eastern Red Cedar and Oak. These areas will have a fully planted ground plane to minimize weeding and annual mulching. The planting areas will be irrigated during establishment (first 2-3 years) and then only as necessary as determined by smart irrigation controls.

Bioretention areas will capture site and building stormwater runoff. The plantings and in these areas will capture, detain and cleanse the water, and allow for infiltration. These areas will be planted with native perennial grasses and forbs, shrubs and trees that are tolerant of saturated and dry conditions. These will include native grass like Switchgrass, and native trees like Eastern Red Cedar. These areas will be irrigated during establishment (first 2-3 years) only.

Planters within the parking areas will have native and adapted shrubs and trees tolerant to these conditions. These will include shrubs like Bayberry, Beach Plum and Rose and trees like Maple, Planetree and Oak. These plants will be irrigated during establishment (first 2-3 years) and then as necessary as determined by smart irrigation controls.

The green roof planting will include extensive (less than 6" of soil depth) and intensive (greater than 6" of soil depth) plantings. The extensive areas will be a mix of herbaceous perennial grasses and forbs. The intensive plantings will be a mix of native shrubs and trees. These areas will be irrigated during establishment and then as necessary as determined by smart irrigation controls.

STEPHEN STIMSON ASSOCIATES LANDSCAPE ARCHITECTS, INC.

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Construction Waste Management Plan for

Cape Cod Hospital - Project 2022

Project Site Location:
Cape Cod Hospital
27 Park St
Hyannis, MA 02601

Prepared On :
August 7, 2019

Introduction:

Suffolk Construction Company has been awarded the construction management for the Cape Cod Hospital Project 2022 located in Hyannis, MA. This project has set a goal to recycle or salvage for reuse a minimum of 75% of the construction waste that will be generated onsite.

Objective:

- This project is targeting the goal to meet or exceed a 75% recycling rate
- The project Diversion Calculations will be attained by weight.

Statement of Qualifications:

Suffolk's intent will be to hire a locally qualified waste management contractor who will manage and own the responsibilities of our project's recycling goals and tracking to ensure we divert as much waste as possible from our landfills. The company selected to manage this process will be determined just prior to mobilization. Qualified companies to be considered are Waste Management, Cavossa, New England Recycling or Robert Childs.

Process:

Hauler will divert 100% of non-hazardous mixed construction waste from the project site to a certified transfer station utilizing standard construction dumpsters. The material from this transfer station is then loaded and hauled in 100 yard trailer loads to a processing facility. This process will allow this facility to redirect recyclable recovered resources back to the manufacturing process and reuse the remaining mixed construction waste in accordance with the Beneficial Use Determinations.

At the processing facility, the equipment utilized involves a CBI Annihilator, Screeners, Taper-slots, CBI Grindall 5060 and a BB1 picking line. 100% of all construction and demolition material (C/D) is processed. They reclaim and recycle 80% of that material.

The process starts at the scale; each load is weighed on a state certified scale. The scale attendant directs the load to the tipping area. A tipping floor attendant will then direct the load to a safe area to tip the load. Once the load is off-loaded, there equipment operators will start the process of separating the materials.

The facility has a number of loaders and conveyor belts to transport the materials to their processing area.

Once the materials enter the recovery area, the materials pass over metal magnets, water tanks, and sorting/picking lines. After all the metals, ABC's, Gypsum, Cardboard, Plastics are separated; the remaining materials are process through there grinder. The grinded material are then stockpiled awaiting transport to end markets.

If possible, we will have containers for materials to be separated onsite. These containers can/will complement the mixed construction waste containers in an effort to further increase the recycling rate on the project and reduce the cost of construction and demolition materials disposal. If desired, one or more site separated material containers could be onsite throughout the project, and the material to be site separated will be dependent on the phase of the job. EX: Densglass/Gypsum Only Container can be delivered out during the exterior sheeting or wallboard phase of the project.

Materials that can be source separated on site could include:

- Scraps from Densglass/Gypsum Wallboard
- Metals
- Clean Dimensional Lumber
- Asphalt, Brick and Concrete
- Cardboard

Further Information regarding the disposal or recycling of materials

- Contaminated and/or wet gypsum and bulky waste is disposed of at licensed land fills in Massachusetts.
- Tonnage derived from materials such as hazardous waste, soil and or/or land clearing will be tracked separately.

Waste Reduction Progress Reports & Planned Monthly Visits:

In accordance of plan specifications, the waste management company will track the recycling efforts of the project and deliver analysis at each monthly site meeting. Each time a container is delivered, emptied, or is removed from the site a ticket is generated with the time, date, disposal site, and weight of the load. These finalized tickets will be submitted to Suffolk for review and approval.

Many companies today have online tracking system for the recycling efforts on the site. The online calculator will link every load's data and is able to give the current recycling percentage throughout the project, giving Suffolk and the project team 24 hour access to see the progress throughout the project. At our monthly meetings, Suffolk will be working with the waste management company to determine the need for different source separated containers based on the upcoming construction phase and construction waste stream. For example, prior to the drywall phase, Suffolk will make it known that a sufficient amount of excess gypsum wallboard will facilitate the need for a separate container for that material.

Suffolk Contact Information:

Overall responsibility and project oversight:

Joel Perry
Telephone: 617-963-9992
Email: jperry@suffolkconstruction.com

Exhibit A

Example of reporting

(Provided by Waste Management Co, final Waste Company to be determined)



Construction Waste Management
Monthly Project Recycling Report

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Construction Waste Management
Monthly Project Recycling Report

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Project:	Easthampton High School	Target Diversion:	90.0%
Est. End Date:	12/31/2013	Actual Diversion	95.4%

Tic ket Month	Tic ket Date	Tic ket	Destinatio n Fac ility	Hauler	Material	UOM	Total *Qty*	Diverted *Qty*	Act *%*	Residual *Qty*
FEBRUARY 2012	Total:						12.00	9.93	82.8%	2.07
MARCH 2012	3/28/201 2	398925	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	3.38	2.83	83.7%	0.55
MARCH 2012	3/19/2012	393636	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	3.68	3.08	83.7%	0.6
MARCH 2012	3/30/2012	400218	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	1.6	1.34	83.8%	0.26
MARCH 2012	Total:						8.66	7.25	83.7%	1.41
APRIL 201 2	4/9/2012	405175	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	2.61	2.16	82.8%	0.45
APRIL 2012	4/4/2012	402361	Associated Building Beckers	WM Default Hauling Company	Concrete	Tons	13.5	13.5	100.0%	0
APRIL 2012	4/9/2012	404772	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	3.5	2.89	62.6%	0.61
APRIL 2012	4/ 24/201 2	412734	Associated Building Wreckers	WM Default Hauling Company	Concrete	Tons	14.99	14.99	100.0%	0
APRIL 2012	4/19/201 2	410471	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	2.4	1.96	62.5%	0.42
APRIL 2012	4/19/201 2	410474	Associated Building Wreckers	WM Default Hauling Company	Concrete	Tons	15.12	15.12	100.0%	0
APRIL 2012	4/19/2012	410472	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	1.65	1.36	82.4%	0.29
APRIL 2012	4/9/2012	404771	WM - Western Processing Facility	WM Default Ha uting Company	Co-Mingled	Tons	0.68	0.73	63.0%	0.15
APRIL 2012	Total:						54.65	52.73	96.5%	1.92
MAY 2012	5/23/201 2	429583	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	7.61	6.29	82.7%	1.32
MAY 2012	5/23/201 2	429564	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	2.66	2.38	62.6%	0.5
MAY 201 2	5/2/2012	417787	Associated Building Wreckers	WM Default Hauling Company	Concrete	Tons	14.95	14.95	100.0%	0
MAY 2012	5/15/2012	425216	Associated Building Beckers	WM Default Hauling Company	Concrete	Tons	14.9	14.9	100.0%	0
MAY 2012	5/2/2012	417786	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	2.74	2.27	62.6%	0.47
MAY 2012	5/23/2012	430186	Associated Building Wreckers	WM Default Hauling Company	Concrete	Tons	11.66	11.66	100.0%	0
MAY 201 2	Total:						54.74	52.45	95.8%	2.29
JUNE 201 2	6/13/201 2	440476	WM - Western Processing Facility	WM Default Hauling Company	Wood	Tons	2.13	2.13	100.0%	0
JUNE 2012	6/12/201 2	440474	Associated Building Wreckers	WM Default Hauling Company	Concrete	Tons	10.74	10.74	100.0%	0
JUNE 201 2	6/5/2012	436608	Associated Building Wreckers	WM Default Hauling Company	Concrete	Tons	15.66	15.66	100.0%	0
JUNE 2012	6/21/201 2	446079	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	4.14	3.44	83.1%	0.7
JUNE 2012	6/21/201 2	446060	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	1.84	1.53	83.2%	0.31
JUNE 2012	6/13/201 2	440478	Joseph Freedman Company	WM Default Hauling Company	Metal	Tons	4.99	4.99	100.0%	0
JUNE 2012	6/12/2012	440473	Associated Building Wreckers	WM Default Hauling Company	Concrete	Tons	10.14	10.14	100.0%	0
JUNE 201 2	6/25/201 2	447525	Associated Building Wreckers	WM Default Hauling Company	Concrete	Tons	16.44	16.44	100.0%	0
JUNE 2012	6/4/201 2	436251	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	2.76	2.29	83.0%	0.47
JUNE 2012	6/4/2012	436250	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	5.2	4.32	83.1%	0.88
JUNE 2012	6/4/2012	436252	Associated Building Beckers	WM Default Hauling Company	Concrete	Tons	8.56	8.56	100.0%	0
JUNE 2012	6/25/201 2	447524	Associated Building Wreckers	WM Default Hauling Company	Concrete	Tons	15.52	15.52	100.0%	0
JUNE 201 2	6/12/2012	440475	WM - Western Processing Facility	WM Default Hauling Company	Co-Mingled	Tons	2.51	2.09	83.3%	0.42
JUNE 2012	Total:						100.63	97.85	97.2%	2.78
JULY 201 2	7/6/201 2	454283	Associated Building Wreckers	WM Default Hauling Company	Concrete	Tons	14.91	14.91	100.0%	0
JULY 201 2	7/6/2012	454284	Associated Building Wreckers	WM Default Hauling Company	Concrete	Tons	17.11	17.11	100.0%	0
JULY 2012	Total:						32.02	32.02	100.0%	0

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Construction Waste Management
Monthly Project Recycling Report

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Project	Easthampton High School	Target Diversion:	90.0%
Est. End Date:	12/31/2013	Actual Diversion:	95.4%

Ticket Month	Ticket Date	Ticket	Destination Facility	Hauler	Material	UOM	Total Qty	Diverted Qty	Act %	Residual Qty
Total:							275.47	262.80	95.4%	12.67

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CAPE COD HOSPITAL
An Affiliate of Cape Cod Healthcare

APPS No. EC3.107
Dated: 10/31/17
Supersedes: EC3.107

ADMINISTRATIVE POLICY AND PROCEDURE STATEMENT

SUBJECT: RECYCLING OF WASTE MATERIALS

PURPOSE:
To recycle waste materials for the purpose of lowering the environmental impact and reducing financial burdens.

POLICY STATEMENT:
To preserve our environment and use our resources to the fullest, recycling will be part of our daily processing.

PROCEDURE:
1. Recycling of appropriate paper is done on a hospital-wide basis.

    a. Gray bins will be placed in all departments. Bins will be emptied on a routine basis by a contracted service.
    b. It will be each department's responsibility to notify Environmental Services if extra bins are needed for purging of files and/or records.

2. Fluorescent Lighting - all spent bulbs will be returned to their original packaging or placed in a holding container designed for the transporting of recyclable bulbs. Holding containers and spent bulbs returned to their original packaging will be kept in the Universal Waste Accumulation area for Recycling.

3. Future recycling items will be added to this policy.

APPROVALS:

Michael K. Lauf
President & Chief Executive Officer
Cape Cod Hospital

Michael Bundy
Chief Operating Officer
Cape Cod Hospital

Donald A. Guadagnoli, MD
Chief Medical Officer
Cape Cod Hospital

Judith C. Quinn, MSN, RN-BC
Vice President of Patient Care
Cape Cod Hospital

Initiated: 11/18/95
Revised: 11/18/95, 1/31/98
Renumbered: 06/08/04 – Previously #APPS R-8
Reviewed and revised: 07/30/06; 10/01/08; 10/01/11; 03/23/15; 10/31/17

Cape Cod Hospital Tower Development

Project Construction Sequence Narrative

Phase I – Underground utility work and demolition

Underground utility work will begin in September of 2019 followed by the demolition of the Whitcomb pavilion (behavioral health unit) completing approximately in July of 2020. This work consists of water and sewer relocation and additions, gas service relocation, storm water detention expansion, internet and communication cabling move and underground power relocation. Demolition of the Whitcomb pavilion will begin in October 2019 and continue through spring of 2020.

Phase 2 – Foundations and Core, Shell and Interior building development Main Tower

Foundations and Core and Shell building construction will begin approximately in the summer of 2020 and continue through Fall of 2022. This work consists placing of the foundations, structural steel, building envelope (glazing, roofs, etc.), main electrical and HVAC systems, IT and communications, interior finishes, vertical transportation, flooring, etc. Floors 1 and 2 consisting of medical oncology and radiation therapy will open first in the early part of 2022 followed by floors 3 and 4 consisting of a 28 ICU/CVICU bed unit and a 36 bed med surg unit (general patient care floor). The fifth floor will be shelled out for future hospital needs.

Phase 3 and the Connector to the Mugar Building

Construction of 2 new Operating rooms, future space for operating room growth and the physical ground floor connector between the new tower and the existing Mugar tower and other hospital services will be undertaken and completed mid-2023.

Phase 2 Demolition of the Medical Office building

Upon completion of Phases 1, 2 and 3 the hospital will develop interior hospital space for the movement of the OBGYN practice currently located in the on-site medical office building (40 Quinlan) into the recently abandoned medical oncology space. Once this project is completed and licensed the practice can be moved over and the medical center torn down more than likely in 2024-2025. Afterward the additional work to the parking areas on the south side of the campus can be undertaken.

down cape engineering, inc.
CIVIL ENGINEERS & LAND SURVEYORS
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COMMONWEALTH OF MASSACHUSETTS
DANIEL A. OJALA
CIVIL
No. 46502
REGISTERED PROFESSIONAL ENGINEER

Date: 8-20-19

TO: Cape Cod Commission

FROM: Daniel A. Ojala, PE, PLS down cape engineering, inc.

RE: Cape Cod Hospital #27 Park Street, Hyannis, MA
UTILITY CAPACITY
DCE Job # 17-005

This memo is to inform the Commission that my firm has been working with various utility vendors to coordinate upgraded connections for the proposed expansion at the Cape Cod Hospital's main campus.
National Grid has reviewed our existing and proposed gas demand and generated a work order to supply natural gas for the facility.
Hyannis Water Systems has reviewed proposed modifications to the site and has worked with us on the water system design presented. Improvement to the water main in Lewis Bay Road and replacement of older hospital water lines is proposed, and adequate capacity exists in their water system for the expansion.
We have also received permission from the Yarmouth Water Superintendent to connect to the 12" main in Bay View Street for an upgraded fire service line, this will provide important redundancy in the fire protection for the facility.
The Town Engineer of Barnstable has received the revised sewer connection plans and is working with his consultant on reviewing the proposed modifications, and has stated he feels confident in the capacity of the WWTP and collection system to receive the existing and proposed wastewater flows. The wastewater flow is estimated to increase 7,000 gpd from 52,800 gpd to 59,800 gpd design flow (299 beds x 200 gpd/bed total).
We have also worked with Verizon to coordinate a new telephone trunk line, the existing service ran through a panel in the basement of the Whitcomb Pavilion, which is vulnerable to flooding during a greater than 100 year interval storm event. The new panel will be elevated above the first floor which is 21.7' above mean sea level.
In summary, all utilities serving the facility have been examined and designed to assure adequate capacity for the proposed expanded Hospital use.

RECEIVED
SEP 23 2019
CAPE COD COMMISSION

The Commonwealth of Massachusetts

William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

September 19, 2019

Eliza Cox
Nutter, McClennen & Fish, LLP
1471 Iyannough Road
Hyannis, MA 02601

RE: Cape Cod Hospital New Tower Addition-Project 2022, Cape Cod Hospital, 27 Park Street, Hyannis, MA. MHC #RC.66899.

Dear Ms. Cox:

Staff of the Massachusetts Historical Commission (MHC) have reviewed the Project Notification Form (PNF) submitted for the proposed project referenced above. The project includes the construction of a six-story addition to the southwest corner of Cape Cod Hospital.

Review of the Inventory of Historic and Archaeological Assets of the Commonwealth indicates that the project impact area is adjacent to the Edward Francis Gleason House (MHC #BRN.1457), listed in the State and National Registers of Historic Places. The Cape Cod Hospital is also in proximity to the Pleasant-School Street Historic District (BRN.G), listed in the State and National Registers of Historic Places. and a local historic district, and the Hyannis Main Street Waterfront Historic District (BRN.AU), listed in the State Register of Historic Places and a local historic district.

The MHC is interested in the views of regional and local historic preservation groups, including the Cape Cod Commission (CCC), Hyannis Waterfront Historic District Commission (HWHDC), Barnstable Historic District Commission (BHDC) and Barnstable Historical Commission (BHC), regarding the project.

The MHC notes that the project is currently being reviewed by the Cape Cod Commission. Please submit project information to the three Barnstable groups referenced above for their review and comment. Copies of any written comments from the CCC, HWHDC, BHDC, and BHC should be submitted to the MHC.

The MHC looks forward to reviewing the information requested above, and to consultation to avoid, minimize or mitigate adverse effects to significant historic resources.

These comments are offered to assist in compliance with Massachusetts General Law, Chapter 9, Sections 26-27C (950 CMR 71). If you have any questions, please contact Jonathan K. Patton at this office.

Sincerely,

Brona Simon
Executive Director
State Historic Preservation Officer
Massachusetts Historical Commission

xc: Sara Korjeff, Cape Cod Commission
Hyannis Waterfront Historic District Commission
Barnstable Historic District Commission
Barnstable Historical Commission

220 Morrissey Boulevard, Boston, Massachusetts 02125
(617) 727-8470 • Fax: (617) 727-5128
www.sec.state.ma.us/mhc

APPENDIX A
MASSACHUSETTS HISTORICAL COMMISSION
220 MORRISSEY BOULEVARD
BOSTON, MA 02125
617-727-8470, FAX: 617-727-5128

PROJECT NOTIFICATION FORM

Project Name: Cape Cod Hospital – Project 2022

Location/Address: Cape Cod Hospital, 27 Park Street

City/Town: Hyannis, MA

Project Proponent

Name: Cape Cod Hospital

Address: c/o Eliza Cox, Esq., Nutter McClennen & Fish, LLP, 1471 Iyannough Road

City/Town/Zip/Telephone: Hyannis, MA 02601

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name	Type of License or Funding (specify)
FAA	Determination of No Hazard to Navigation (Form 7460)
MA Dept of Environmental Protection (DEP)	Approval of Underground Fuel Tanks, 310 CMR 80
MA Dept. of Public Health (DPH)	Determination of Need
US EPA	NPDES General Construction Stormwater Permit/NOI

Project Description (narrative):
Cape Cod Hospital proposes a six-story addition to the southwest corner of the existing hospital which includes a new cancer care center (2-stories), three stories of inpatient beds, and an education/collaboration center. The redevelopment project also includes numerous site improvements including new and improved infrastructure to serve the Hospital, parking, new access/egress, stormwater management and landscaping.

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.

Yes, the Whitcomb Pavilion and Cape Cod Medical Center buildings on the Hospital campus will be demolished as well as a portion of the main Hospital building where the addition is proposed.

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation.

No.

APPENDIX A (continued)

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

Yes, the project consists of a new six-story addition to the Hospital. Plans are included in the application materials.

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify.

Project is located outside of the Hyannis Main Street Waterfront Historic District. The Project does not propose any changes to Gleason House, also located on the Hospital campus.

What is the total acreage of the project area?

Woodland	acres	Productive Resources:	
Wetland	acres	Agriculture	acres
Floodplain	acres	Forestry	acres
Open space	acres	Mining/Extraction	acres
Developed	~17ac acres	Total Project Acreage	~17 acres

What is the acreage of the proposed new construction? Approx. 6.7 acres
The Hospital campus consists of approximately 17 acres of land. The proposed area of work consists of approximately 6.7 acres.

What is the present land use of the project area?

Hospital

Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.

Please see attached plans/materials.

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

Signature of Person submitting this form: _____ Date: 8/19/19

Name: Eliza Cox, Esq.

Address: Nutter, McClennen & Fish, LLP, 1471 Iyannough Road

City/Town/Zip: Hyannis, MA 02601

Telephone: 508-790-5431

REGULATORY AUTHORITY

930 CMR 71.00:M.G.L. c. 9, ss. 26-27C as amended by St. 1988. c. 254

4574537.1

LINK: Exhibit 23-Project Plans