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& ASSOCIATES
A Division of Pennoni

401 Providence Road
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www.pennoni.com

Narrative Describing Proposed Chapel Hill Cooperative Preschool

The Chapel Hill Cooperative Preschool was originally organized in 1960 by the Community Church in Chapel Hill as a parent cooperative and the first integrated preschool in the area. The Preschool is a non-profit childcare center governed by a board of directors, including parents and community representative(s). The preschool first extended its enrollment to the full year in 1972. The two (2) year old and Infant/Toddler programs were started in 1980 and 1997 respectively.

Currently there are two (2) school locations. Both Sites are state licensed through the Division of Child Development and accredited by the National Association for the Education of Young Children. The Preschool site is located at the Community Church (106 Purefoy Road, Chapel Hill) and the Infant/Toddler site is located at the Church of Reconciliation (110 N. Elliott Road, Chapel Hill). These two facilities contain a maximum of eighty (80) children and twenty (20) teachers (including the Executive Director). These existing facilities will be combined at the proposed Mt. Carmel Church Road site.

The Chapel Hill Cooperative Preschool is proposing to construct an 8,929-sf one-story building with an adjacent playground, a 23-space off-street parking area and associated site improvements.

The hours of operation for the school is 7:30-5:30. Families begin dropping off students between 7:30am and 9:00am and pick up times is between 12:00-5:30. There are several enrollment options for families to choose; consequently, it is not unusual to have fewer than 80 students and 20 staff on-site. Enrollment options (i.e.: duration of day) for the children are: half day (7:30-12:00), ¾ day (7:30-3:00), and full day (7:30-5:30). Additionally, students can be enrolled on a full-time (5 days a week) or on a part-time basis (2 to 3 days per week). Staff have staggered work schedules; there are morning and afternoon shift teachers. The staggering of staff and children will minimize the traffic impact to the surrounding area. This as well as site access will be discussed in more detail in the Traffic section of this narrative.

CHCP offer a breakfast snack, lunch and afternoon snack to the children. Food preparation on-site is limited; most food is brought to the site prepared and only requires warming and portioning for the students.

The Chapel Hill Cooperative Preschool and the design team have thoroughly reviewed the site and the present/future needs for the school. The application being presented has been designed to utilize the character of this site while minimize the impact (to the site) and the surrounding area. A few examples of this are as follows:

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- Existing on-site structures such as the "Sugar Shack" and the dwelling are being re-used. The "Sugar Shack" will be utilized by the staff/children for activities and learning opportunities within the woods.
- The existing dwelling will be used during construction as a construction office for the contractor(s). This has been reviewed with the Chapel Hill Inspections Department and found to be acceptable as a temporary use. Once the proposed preschool building has sufficiently progressed, the construction office will be relocated into the new building and the dwelling will be vacated. The dwelling will then be demolished to the existing foundation prior to obtaining a certificate of occupancy for the new preschool building.
- An effort was made to maintain as may existing trees as possible and to integrate them into the design of the site. Specifically, the 20" double Hemlock tree at the center of the site was the major factor for the placement of the proposed building and parking area. This CHCP wants to utilize this tree and the immediate area around it as another learning opportunity which is unique to this site.
- Land disturbance was minimized and kept below 40,000 sf.

Traffic

During the TRT meeting (including the comments issued by the TRT) the following topics were identified as concerns:

- Trip generation,
- The arrive/departure times of staff/students, and
- The concern of cars potentially queuing onto Mt. Carmel Church road if students are dropped off at a car loading zone within the driveway circle on-site

Based upon the comments received and discussions held during the TRT meeting, traffic counts were performed at both CHCP sites on Monday October 3, 2016, Tuesday October 4, 2016 & Wednesday October 5, 2016. The results of these counts have been attached to this narrative. These results indicate the following:

- On average, the majority of students arrive on-site between 8:00 and 9:10 with the peak occurring between 8:40 am to 9:00 am.
- Staff starts arriving on site around 7:00 am and is staggered throughout the morning.
- Approximately 40% of the students and approximately half of the staff (8-10) leave the site for the day by 4 pm.
- Based upon these counts, traffic generation is distributed throughout the day; this will minimize traffic impacts to the surrounding area/neighborhoods.
- To eliminate the concern of cars potentially queuing onto Mt. Carmel Church Road, the CHCP will have all parents park their cars on-site and walk the children into the building. To accommodate this volume of cars, the parking lot has been expanded to 23 spaces (including four (4) compact spaces). Operationally, the CHCP staff will occupy the westerly most spaces, this will also include temporary stacking of staff vehicles within the westerly end drive aisle during the peak morning time. The operational moving of staff vehicles is similar to how the current sites operate. This approach is being used to minimize the impervious area on-site.

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- Proposed access to the site will be restricted to right turns into the site and right turns out of the site. This will be accomplished using a raised brick median within Mt. Carmel Church Road. CHCP staff and families will be instructed to access the site via Bennett Road and not utilize the surrounding residential street such as Old Bridge Lane for any of their traffic movements (i.e.: U-turns). CHCP will work with families/neighborhood to enforce this policy.

Deliveries to the site are infrequent. Refuse collection will be coordinated with the private collection company (or town) to minimize traffic impacts to the surrounding area.

In conjunction with the development of this site, the CHCP is committed to working with the NCDOT and Town during the Mobility Plan update. This will include the institution of a Transportation Management Plan; said plan will encourage the staff/parents to carpool, possible use of an off-site parking areas for staff with shuttle service to/from the site and to use the walking/biking infrastructure in the area (once constructed) to the maximum extent practicable. As previously indicated, the parents will be instructed to utilize the Bennett Road roundabout (once constructed) to not impact the adjacent residential neighborhoods.

Solid Waste

Due to the uniqueness of the site and how the CHCP is attempting to minimizing the impact of the development on the site; consequently, alternative methods of recycling/trash pick-up are being proposed. CHCP will be requesting a waiver from Orange County picking up the site recyclables; this will be accomplished by use of a private company or families taking the recyclables off-site to an Orange County facility. Regarding trash pickup, the CHCP is proposing to compost on-site to reduce the volume generated by the school; a preliminary composting plan has been prepared by the CHCP and has been attached to this narrative. The remaining trash from the site will need to be picked up. The CHCP would request to discuss the possibility with the Town of an alternative trash collection vehicle serving this site; if this is not possible then the CHCP will contract this service with a private collector.

Amended November 18, 2016

SITE PLAN REVIEW APPLICATION

TOWN OF CHAPEL HILL
Planning Department
405 Martin Luther King Jr. Blvd
phone (919) 968-2728 *fax* (919) 969-2014
www.townofchapelhill.org

Parcel Identifier Number (PIN): 9787-29-6199; 9787-29-7266;9787-29-9047; 9787-39-0045 Date: Amended November 18, 2016

Section A: Project Information

Project Name: Chapel Hill Cooperative Preschool

Property Address: 108 Mt. Carmel Church Road Zip Code: 27516

Use Groups (A, B, and/or C): B Existing Zoning District: R-1

Project Description: Construction of proposed 8,929 sf preschool and associated site improvements, including the preservation of the existing Sugar Shack structure.

Section B: Applicant, Owner and/or Contract Purchaser Information

Applicant Information (to whom correspondence will be mailed)

Name: Philip Post & Associates, a Division of Pennoni (Peter Bellantoni)

Address: 401 Providence Road, Suite 200

City: Chapel Hill State: NC Zip Code: 27514

Phone: 919-929-1173 Email: pbellantoni@pennoni.com

The undersigned applicant hereby certifies that, to the best of his knowledge and belief, all information supplied with this application is true and accurate.

Signature: Peter Bellantoni Date: 11/18/16

Owner/Contract Purchaser Information:

☐ **Owner** ■ **Contract Purchaser**

Name: Chapel Hill Cooperative Preschool

Address: 106 Purefoy Road

City: Chapel Hill State: NC Zip Code: 27514

Phone: 919-942-3955 Email: chapelhillcooperativepreschool@gmail.com

The undersigned applicant hereby certifies that, to the best of his knowledge and belief, all information supplied with this application is true and accurate.

Signature: Maria L Dawson Date: 11/10/16

PROJECT FACT SHEET

TOWN OF CHAPEL HILL
Planning Department

Section A: Project Information

Application type: Site Plan Review Date: Amended November 18, 2016

Project Name: Chapel Hill Cooperative Preschool

Use Type: *(check/list all that apply)*

☐ Office/Institutional ☐ Residential ☐ Mixed-Use ■ Other: Preschool

Overlay District: (check all those that apply)

☐ Historic District ☐ Neighborhood Conservation District ☐ Airport Hazard Zone

Section B: Land Area

Net Land Area (NLA): Area within zoning lot boundaries		NLA=	172,960	sq. ft.
Choose one, or both, of the following (a or b,) not to exceed 10% of NLA	a) Credited Street Area (total adjacent frontage) x ½ width of public right-of-way	CSA=	10% NLA	sq. ft.
	b) Credited Permanent Open Space (total adjacent frontage) x ½ public or dedicated open space	COS=	10% NLA	sq. ft.
TOTAL: NLA + CSA and/or COS = Gross Land Area (not to exceed NLA + 10%)		GLA=	190,256	sq. ft.

Section C: Special Protection Areas, Land Disturbance, and Impervious Area

Special Protection Areas: *(check all those that apply)*

■ Jordan Buffer ■ Resource Conservation District ■ 100 Year Floodplain ■ Watershed Protection District

Land Disturbance	**Total (sq ft)**
Area of Land Disturbance (Includes: Footprint of proposed activity plus work area envelope, staging area for materials, access/equipment paths, all grading, including off-site clearing)	39,942 SF (Zoning)
Area of Land Disturbance within RCD	349 SF
Area of Land Disturbance within Jordan Buffer	- 0 -

Impervious Areas	**Existing (sq ft)**	**Demolition (sq ft)**	**Proposed (sq ft)**	**Total (sq ft)**
Impervious Surface Area (ISA)	7,896	-	18,788	26,684
Impervious Surface Ratio: Percent Impervious Surface Area of Gross Land Area (ISA/GLA) %	4.41%	-	9.88%	14.03%
If located in Watershed Protection District, % of impervious surface on 7/1/1993	4.41%	-	N/A	N/A

Revised 02.04.14

Parcel Identifier Number (PIN): 0787-20-6190; 0787-20-7266,0787-29-9047; 0787-30-0045

Section D: Dimensions

Dimensional Unit (sq ft)	Existing (sq ft)	Demolition (sq ft)	Proposed (sq ft)	Total (sq ft)
Number of Buildings	4 (3,053 SF)	3 (2,787 SF)	1 New (8,929)	9,195
Number of Floors	1 Each	3	1 Each	2 (1 Each)
Recreational Space	N/A	N/A	N/A	N/A

Residential Space				
Dimensional Unit (sq ft)	**Existing (sq ft)**	**Demolition (sq ft)**	**Proposed (sq ft)**	**Total (sq ft)**
Floor Area (all floors – heated and unheated)	3,053	2,787	0	266
Total Square Footage of All Units	3,053	2,787	0	266
Total Square Footage of Affordable Units	N/A	N/A	N/A	N/A
Total Residential Density	1	1	0	0
Number of Dwelling Units	1	1	0	0
Number of Affordable Dwelling Units	N/A	N/A	N/A	N/A
Number of Single Bedroom Units	N/A	N/A	N/A	N/A
Number of Two Bedroom Units	N/A	N/A	N/A	N/A
Number of Three Bedroom Units	N/A	N/A	N/A	N/A

Non-Residential Space *(Gross Floor Area in Square Feet)*					
Use Type	**Existing**	**Proposed**	**Uses**	**Existing**	**Proposed**
Commercial	N/A	N/A			
Restaurant	N/A	N/A	**# of Seats**	N/A	N/A
Government	N/A	N/A			
Institutional	N/A	8,929			
Medical	N/A	N/A			
Office	N/A	N/A			
Hotel	N/A	N/A	**# of Rooms**	N/A	N/A
Industrial	N/A	N/A			
Place of Worship	N/A	N/A	**# of Seats**	N/A	N/A
Other	N/A	N/A			

Dimensional Requirements		Required by Ordinance	Existing	New Building Proposed
Setbacks (minimum)	Street	28'	47'	104' +/-
	Interior (neighboring property lines)	14'	18'	43' +/-
	Solar (northern property line)	17'	120'	144' +/-
Height (maximum)	Primary	29'		<29'
	Secondary	40'		<40'
Streets	Frontages	64'	>64'	>64'
	Widths	80'	>80'	>80'

Revised 02.04.14

Parcel Identifier Number (PIN): 9787-29-6199, 9787-29-7266, 9787-29-9047; 9787-39-0045

Section F: Adjoining or Connecting Streets and Sidewalks

(Note: For approval of proposed street names, contact the Engineering Department)

Street Name	Right-of-way Width	Pavement Width	Number of Lanes	Existing Sidewalk*	Existing curb/gutter
Mt. Carmel Church Road	Varies	Varies	Varies 2 to 4	☐ Yes	☐ Yes
				☐ Yes	☐ Yes

List Proposed Points of Access (Ex: Number, Street Name): 108 Mt. Carmel Church Road

*If existing sidewalks do not exist and the applicant is adding sidewalks, please provide the following information: N/A

Sidewalk Information			
Street Names	**Dimensions**	**Surface**	**Handicapped Ramps**
			☐ Yes ☐ No ☐ N/A
			☐ Yes ☐ No ☐ N/A

Section G: Parking Information

Parking Spaces *	Minimum	Maximum	Proposed
Regular Spaces	19	23	23 (18 std+5 compact)
Handicap Spaces	1	2	1
Total Spaces	20	25	24
Loading Spaces	N/A	N/A	N/A
Bicycle Spaces	8	N/A	4
Surface Type	Asphalt		

* Based on Elementary/Middle School

Section H: Landscape Buffers

Location (North, South, Street, Etc.)	Minimum Width	Proposed Width	Alternate Buffer	Modify Buffer
North	20'	20'	☐ Yes	☐ Yes
South (Street)	20'	20'	☐ Yes	☐ Yes
East	20'	20'/Varies	■ Yes	☐ Yes
West (Street)	30'	30'	☐ Yes	☐ Yes

Parcel Identifier Number (PIN): 9787-29-8109; 9787-29-7206; 9787-29-9047; 9787-39-0045

Section I: Land Use Intensity

Existing Zoning District: R-1
Proposed Zoning Change *(if any)*: N/A

Note: Refer to Table 3.8-1 (Dimensional Matrix) in the Land Use Management Ordinance for help completing this table.

Zoning – Area – Ratio			Impervious Surface Thresholds			Minimum and Maximum Limitations	
Zoning District(s)	**Floor Area Ratio (FAR)**	**Recreation Space Ratio (RSR)**	**Low Density Residential (0.24)**	**High Density Residential (0.50)**	**Non-Residential (0.70)**	**Maximum Floor Area (MFA) = FAR x GLA**	**Minimum Recreation Space (MSR) = RSR x GLA**
R-1	0.076 Max	N/A	0.1222				
TOTAL				N/A	N/A	11,308 SF	
RCD Streamside	0.01	0.01					
RCD Managed	0.019	0.019					
RCD Upland	0.076						

Section J: Utility Service

Check all that apply				
Water	■ OWASA	☐ Individual Well	☐ Community Well	☐ Other
Sewer	■ OWASA	☐ Individual Septic Tank	☐ Community Package Plant	☐ Other
Electrical	■ Underground	☐ Above Ground		
Telephone	■ Underground	☐ Above Ground		
Solid Waste	■ Town	☐ Private		

9787-29-6199; 9787-29-7286,9787-29-9047, 9787-39-0045
Parcel Identifier Number (PIN):_____

SITE PLAN REVIEW APPLICATION
SUBMITTAL REQUIREMENTS
TOWN OF CHAPEL HILL
Planning Department

The following must accompany your application. Failure to do so will result in your application being considered incomplete. For assistance with this application, please contact the Chapel Hill Planning Department (Planning) at (919)968-2728 or at planning@townofchapelhill.org. For detailed information, please refer to the Description of Detailed Information handout.

✓	**Application fee** (including Engineering Review fee) (refer to fee schedule) Amount Paid $ 5,673.70
Done	**Pre-application meeting** – with appropriate staff
✓	**Digital Files** - provide digital files of all plans and documents
✓	**Recorded Plat or Deed of Property**
✓	**Project Fact Sheet**
Exempt	**Traffic Impact Statement** – completed by Town's consultant (or exemption)
✓	**Mailing list of owners of property within 1,000 feet perimeter of subject property** (see GIS notification tool)
✓	**Mailing fee for above mailing list (mailing fee is double due to 2 mailing)** Amount Paid $ 179.20
✓	**Written Narrative describing the proposal**
✓	**Resource Conservation District, Floodplain, & Jordan Buffers Determination** - necessary for all submittals
N/A	**Jurisdictional Wetland Determination – if applicable**
N/A	**Resource Conservation District Encroachment Exemption or Variance (determined by Planning)**
N/A	**Jordan Buffer Authorization Certificate or Mitigation Plan Approval (determined by Planning)**
✓	**Reduced Site Plan Set (reduced to 8.5"x11")**

Stormwater Impact Statement (1 copy to be submitted)

a) Written narrative describing existing & proposed conditions, anticipated stormwater impacts and management structures and strategies to mitigate impacts
b) Description of land uses and area (in square footage)
c) Existing and proposed Impervious surface area in square feet for all subareas and project area
d) Ground cover and uses information
e) Soil information (classification, infiltration rates, depth to groundwater and bedrock)
f) Time of concentration calculations and assumptions
g) Topography (2-foot contours)
h) Pertinent on-site and off-site drainage conditions
i) Upstream and/or downstream volumes
j) Discharges and velocities
k) Backwater elevations and effects on existing drainage conveyance facilities
l) Location of jurisdictional wetlands and regulatory FEMA Special Flood Hazard Areas
m) Water quality volume calculations
n) Drainage areas and sub-areas delineated
o) Peak discharge calculations and rates (1, 2, and 25-year storms)
p) Hydrographs for pre- & post-development without mitigation, post-development with mitigation
q) Volume calculations and documentation of retention for 2-year storm
r) 85% TSS removal for post-development stormwater run-off

Revised 02.04.14

Parcel Identifier Number (PIN): 9787-29-6186; 9787-29-7296;9787-29-9047; 9787-39-0046

s) Nutrient loading calculations
t) BMP sizing calculations
u) Pipe sizing calculations and schedule (include HGL & EGL calculations and profiles)

Plan Sets (10 copies to be submitted no larger than 24"x36")

Plans should be legible and clearly drawn. All plan sets sheets should include the following:

- Project Name
- Legend
- Labels
- North Arrow (North oriented toward top of page)
- Property Boundaries with bearing and distances
- Scale (Engineering), denoted graphically and numerically
- Setbacks
- Streams, RCD Boundary, Jordan Riparian Buffer Boundary, Floodplain, and Wetlands Boundary, where applicable
- Revision dates and professional seals and signatures, as applicable

Area Map

a) Project name, applicant, contact information, location, PIN, & legend
b) Dedicated open space, parks, greenways
c) Overlay Districts, if applicable
d) Property lines, zoning district boundaries, land uses, project names of site and surrounding properties, significant buildings, corporate limit lines
e) Existing roads (public & private), rights-of-way, sidewalks, driveways, vehicular parking areas, bicycle parking, handicapped parking, street names.
f) 1,000' notification boundary

Existing Conditions Plan

a) Slopes, soils, environmental constraints, existing vegetation, and any existing land features
b) Location of all existing structures and uses
c) Existing property line and right-of-way lines
d) Existing utilities & easements including location & sizes of water, sewer, electrical, & drainage lines
e) Nearest fire hydrants
f) Nearest bus shelters and transit facilities
g) Existing topography at minimum 2-foot intervals and finished grade
h) Natural drainage features & water bodies, floodways, floodplain, RCD, Jordan Buffers, & Watershed boundaries

9787-29-6199; 9787-29-7256 9787-29-9047; 9787-39-0045
Parcel Identifier Number (PIN):_____

Detailed Site Plan

a) Existing and proposed building locations
b) Description & analysis of adjacent land uses, roads, topography, soils, drainage patterns, environmental constraints, features, existing vegetation, vistas (on & off-site)
c) Location, arrangement, & dimension of vehicular parking, width of aisles and bays, angle of parking, number of spaces, handicapped parking, bicycle parking . Typical pavement sections & surface type
d) Location of existing and proposed fire hydrants
e) Location and dimension of all vehicle entrances, exits, and drives
f) Dimensioned street cross-sections and rights-of-way widths
g) Pavement and curb & gutter construction details
h) Dimensioned sidewalk and tree lawn cross-sections
i) Proposed transit improvements including bus pull-off and/or bus shelter
j) Required landscape buffers (or proposed alternate/modified buffers)
k) Required recreation area/space (including written statement of recreation plans)
l) Refuse collection facilities (existing and proposed) or shared dumpster agreement
m) Construction parking, staging, storage area, and construction trailer location
n) Sight distance triangles at intersections
o) Proposed location of street lights and underground utility lines and/or conduit lines to be installed
p) Easements
q) Clearing and construction limits
r) Traffic Calming Plan – detailed construction designs of devices proposed & associated sign & marking plan

Stormwater Management Plan

a) Topography (2-foot contours)
b) Existing drainage conditions
c) RCD and Jordan Riparian Buffer delineation and boundary (perennial & intermittent streams, note ephemeral streams on site)
d) Proposed drainage and stormwater conditions
e) Drainage conveyance system (piping)
f) Roof drains
g) Easements
h) BMP plans, dimensions, details, and cross-sections
i) Planting and stabilization plans and specifications

Landscape Protection Plan

a) Rare, specimen, and significant tree survey within 50 feet of construction area
b) Rare and specimen tree critical root zones
c) Rare and specimen trees proposed to be removed
d) Certified arborist tree evaluation, if applicable

9787-20-6199; 9787-29-7768,9787-29-9047; 9787-39-0045
Parcel Identifier Number (PIN):_____

e) Significant tree stand survey
f) Clearing limit line
g) Proposed tree protection /silt fence location
h) Pre-construction/demolition conference note
j) Landscape protection supervisor note
k) Existing and proposed tree canopy calculations, if applicable

Planting Plan

a) Dimensioned and labeled perimeter landscape bufferyard
b) Off-site buffer
c) Landscape buffer and parking lot planting plan (including planting strip between parking and building, entryway planting, and 35% shading requirement

Steep Slope Plan

a) Classify and quantify slopes 0-10%, 10-15%, 15-25% and 25% and greater
b) Show and quantify areas of disturbance in each slope category
c) Provide/show specialized site design and construction techniques

Grading and Erosion Control Plan

a) Topography (2-foot contours)
b) Limits of Disturbance
c) Pertinent off-site drainage features
d) Existing and proposed impervious surface tallies

Streetscape Plan, if applicable

a) Public right-of-way existing conditions plan
b) Streetscape demolition plan
c) Streetscape proposed improvement plan
d) Streetscape proposed utility plan and details
e) Streetscape proposed pavement/sidewalk details
f) Streetscape proposed furnishing details
g) Streetscape proposed lighting details

9787-29-6199; 9787-29-7266;9787-29-9047; 9787-39-0045
Parcel Identifier Number (PIN):_____

Solid Waste Plan

a) Preliminary Solid Waste Management Plan
b) Existing and proposed dumpster pads
c) Proposed dumpster pad layout design
d) Proposed heavy duty pavement locations and pavement construction detail
e) Preliminary Shared dumpster agreement, if applicable

Construction Management Plan

a) Construction trailer location
b) Location of construction personnel parking and construction equipment parking
c) Location and size of staging and materials storage area
d) Description of emergency vehicle access to and around project site during construction
e) Delivery truck routes shown or noted on plan sheets

Energy Management Plan

a) Description of how project will be 20% more energy efficient than ASHRAE Standards
b) Description of utilization of sustainable forms of energy (Solar, Wind, Hydroelectric, and Biofuels)
c) Participation in NC GreenPower program
d) Description of how project will ensure indoor air quality, adequate access to natural lighting, and allow for proposed utilization of sustainable energy
e) Description of how project will maintain commitment to energy efficiency and reduced carbon footprint over time
f) Description of how the project's Transportation Management Plan will support efforts to reduce energy consumption as it affects the community

Exterior Elevations

a) An outline of each elevation of the building, including the finished grade line along the foundation (height of building measured from mean natural grade).

9787-29-6199; 9787-29-7286,9787-29-9047; 9787-38-0045
Parcel Identifier Number (PIN):_____

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November 21, 2016
Via Hand Delivery

Town of Chapel Hill Planning
405 Martin Luther King Jr. Blvd.
Chapel Hill, NC 27514

Attention: Jay Heikes

RE: Proposed Site Plan for
Chapel Hill Cooperative Preschool
108 Mt. Carmel Church Road
Chapel Hill, NC 27514

Dear Jay,

Philip Post & Associates, a Division of Pennoni; on behalf of the Chapel Hill Cooperative Preschool hereby resubmits the following documentation for the Site Plan Approval review for Parcels 9787-29-6199, 9787-29-7266, 9787-29-9047 and 9787-39-0045:

- Ten (10) copies of amended Site Plans, dated 08/24/16, revision 1 dated 11/18/16, containing seventeen (17) sheets,
- One (1) copy of the Town of Chapel Hill Site Plan Review Application, revised November 18, 2016,
- One (1) copy of the Orange County Solid Waste Management Plan Application,
- One (1) copy of the amended Stormwater Report last revised November 10, 2016 (not included in this submittal; previously submitted on 11/16/16);
- One (1) copy of an amended Project Narrative revised November 18, 2016;
- One (1) copy of the TIA Exemption submission revised April 27, 2016;
- One (1) copy an OWASA Fire Flow Test Report dated November 15, 2016;

The above-mentioned documents have been revised in accordance with comments received from the Town of Chapel Hill Planning Department dated October 3, 2016 and comments received regarding the calculation of disturbed area. Please note that additional sheets have been added to the plan set for clarity. We offer the following responses to each comment:

ACCESS AND CIRCULATION:

Comment 1- The ITE Trip Generator indicates that the 8,900-square foot Day Care facility may generate 700 trips daily with 60 trips entering at the morning peak and 60 trips exiting during evening peak. During the meeting, it was said that the preschool would only generate about 200 trips daily which is a significant decrease than anticipated. Please provide data supporting the difference in trips generated by this development. (*NC DOT Orange County*)

Response: *On Monday, October 3, 2016, Tuesday, October 4, 2016 and Wednesday, October 5, 2016, traffic counts were performed at each of the Preschool's current facilities. The results of these counts which included all student and staff trips indicate that* ***the average daily number of trips generated by the entire Preschool is 173****. The trip counts have been included in this submittal.*

FIRE:

Comment 2- FIRE WATCH; During construction and demolition where hot work, materials subject to spontaneous combustion, or other hazardous construction or demolition is occurring, the owner or their designee shall be responsible for maintaining a fire watch. The fire watch shall consist of at least one person with a means of communicating an alarm to 911, shall a written address posted in a conspicuous location and shall maintain constant patrols. NC FPC 2012 Section 1404 (*Fire*)

Response: *General Note 5 has been added to Sheet CS0002.*

Comment 3- CONSTRUCTION/DEMOLITION; All Construction and demolition conducted shall be in compliance of the current edition of Chapter 14 of the NC FPC. (*Fire*)

Response: *General Note 6 has been added to Sheet CS0002.*

RECREATION:

Comment 4- Provide an easement along their frontage with Mt. Carmel Church Road to accommodate a possible future greenway link to the Morgan Creek Trail. (*Parks and Recreation*)

Response: *A Note has been added to the Site Plan (Sheet CS1001).*

STORMWATER MANAGEMENT:

Comment 5- The slope analysis on plan sheet CS0202 is not legible. Provide also on the slope table sheet, the amount of land disturbance in square feet for each category of slope. (*Stormwater*)

Response: *The Slope Analysis Plan (CS0202) has been amended for clarity. The Slope Table previously provided has been enlarged.*

Comment 6- Provide on plan sheet CS6001, a detail of the proposed pavement on top of the infiltration system. Please label the cross-section on the plan view of the Infiltration bed to correspond to the profile view. (*Stormwater*)

Response: *The pavement section is currently being designed by the project Geotechnical Engineer. This information will be provided in conjunction with the ZCP Application.*

Comment 7- There is 30 feet OWASA easement on the location of the proposed Infiltration system. I need a documentation from OWASA agreeing to allow the installation in the easement. (*Stormwater*)

Response: *Based upon correspondence received by this office (see Comment 24 below), OWASA has no objection to abandoning this portion of their easement. This will be finalized during the ZCP Application process.*

Comment 8- Please provide a copy of the erosion control permit. (*Stormwater*)

Response: *This permit will be applied for during the ZCP Application process. A copy of the permit will be forwarded to your office upon receipt.*

Comment 9- Provide pre and post-development drainage delineation map. The map should show the travel path used in computing the time of concentration to the point of analysis and areas bypassing stormwater treatment. (*Stormwater*)

Response: *This information has been provided in the amended stormwater report (attached).*

Comment 10- Provide in the calculation document, the curve number with corresponding land use and the composite curve number for the pre and post-development. (*Stormwater*)

Response: *This information has been provided in the amended stormwater report (attached).*

Comment 11- The post-development and pre-development curve number cannot be the same. Address. (*Stormwater*)

Response: *This information has been clarified in the amended stormwater report (attached).*

Comment 12- Provide in the calculation document, the first inch water quality volume computation and how it was used in sizing the infiltration system. Show how the volume will drawdown within 5 days. (*Stormwater*)

Response: *This information has been provided in the amended stormwater report (attached).*

Comment 13- Provide the 2-year volume computation difference between the post and pre-development and show the volume will draw down 2-5 days. (*Stormwater*)

Response: *This information has been provided in the amended stormwater report (attached).*

Comment 14- Provide 10 and 25 year hydraulic grade line calculation for the proposed storm sewer pipe. (*Stormwater*)

Response: *Conveyance pipe design information will be provided in conjunction with the ZCP Application process.*

Comment 15- A minimum of one observation well should be provided for the Infiltration system. Show on the plan view the location of the observation well. (*Stormwater*)

Response: *Four (4) observation wells will be provided as shown on the Infiltration System Detail on the Site Details Sheet (CS6001).*

Comment 16- Add to the detail sheet CS6001, Town of Chapel Hill Engineering Standard detail number SD-5A and SD-5C. (*Stormwater*)

Response: *The requested details have been added to Site Details Sheet (CS6001).*

Comment 17- How does stormwater runoff on the site drain into the infiltration system? (*Stormwater*)

Response: *Runoff will be directed into the infiltration by piping from structures as shown on the Site Grading & Drainage Plan (CS1501).*

Comment 18- Provide on plan sheet CS1501, riprap at the outlet of the pipe discharging to the ditch along Mt. Carmel Church Road. The rim elevation of the junction box in the ditch at the entrance should be provided. (*Stormwater*)

Response: *On Sheet CS1501, rip-rap has been shown as requested; please note that the final design will be submitted in conjunction with the ZCP application. The junction box rim elevation has also been added.*

Comment 19- The existing building foot print should be included in the land disturbance computation. (*Stormwater*)

Response: *Land disturbance notes on have been added to the General Notes and Legends Sheet (CS0002). Please note that due to a change (by the town) in the interpretation of land disturbance, this area remains outside of the area of disturbance and has been excluded from the land disturbance computation.*

Comment 20- Encroachment within the RCD requires RCD encroachment permit application approval. (*Stormwater*)

Response: *The RCD Encroachment Permit Application will be filed in accordance with the ZCP Application process.*

TRANSPORTATION PLANNING:

Comment 21- Show 5' sidewalks along frontage (*Long Range/Transportation*)

Response: *See Comment 75.*

Comment 22- Provide width for 5' bike lane along frontage (*Long Range/Transportation*)

Response: *See Comment 75.*

Comment 23- Provide Bike parking on site per LUMO Appendix A section 5.9; 4.11 Town of Chapel Hill Design Manual (*Long Range/Transportation*)

Response: *Four (4) bike parking spaces have been shown on the Site Plan (CS1001). Please note that the LUMO Appendix A Section 5.9 requires a minimum of eight (8) spaces for the school uses identified; the applicant would request to discuss this minimum requirement.*

OWASA:

Comment 24- We have no objection to the Site Plan which includes combining 4 parcels into 1 and abandoning sanitary sewer through the site. (*OWASA*)

Response: *No comment necessary.*

Comment 25- Sheet List Table does not match numbers on sheets. (*OWASA*)

Response: *The Sheet List Table has been amended.*

Comment 26- Call out abandonment of existing water service at the main per OWASA Standards and Specifications, if it will not be used. (*OWASA*)

Response: *A note has been added to the Demolition Plan Sheet CS0501. Detail will be provided during the ZCP Application process.*

Comment 27- An 8-inch water main extension is required for a fire hydrant and new service. Include 12 x 8-inch tapping sleeve, 8-inch gate valve, and 8-inch DIP main. (*OWASA*)

Response: *The requested revisions have been indicated on the Site Utility Plan (Sheet CS1701). Additionally, General Utility Note 17 has been added which indicates that work shall be performed in accordance with OWASA Standards and Specifications.*

Comment 28- Include an 8 x 6-inch tee, not a Y for branch to fire hydrant. (*OWASA*)

Response: *The requested change is shown on the Site Utility Plan (CS1701).*

Comment 29- Label size of domestic water service and meter. Our GIS shows existing service line as Â¾-inch with a standard, 5/8-inch meter. (*OWASA*)

Response: *The sizes of the existing domestic service line and meter have been added to the Existing Conditions Plan (CS0201) and the Demolition Plan (CS0501).*

Comment 30- Provide expanded view of domestic service and fire line branches from main. There will need to be adequate separation. Eliminate valve to fire line Light pole foundation appears too close to water meter. (*OWASA*)

Response: *On the Site Utility Plan (CS1701), the location of the proposed 8" main has been relocated to avoid conflict with the proposed light pole. An enlarged detail of this area will be provided in conjunction with the ZCP Application process.*

Comment 31- Label type of backflow prevention assemblies. "RP" and "RPDA"are required for domestic and fire line services. (*OWASA*)

Response: *The types of backflow prevention assemblies have been identified on the Site Utility Plan (CS1701),*

Comment 32- Include 30-ft wide easement for public water main. Extend it to include 5 ft beyond meter and fire hydrant. (*OWASA*)

Response: *The location of the proposed water main has been relocated to accommodate the required 30-ft wide easement. This has been shown on the Site Utility Plan (CS1701).*

Comment 33- Replace "plug" with permanent blow-off assembly at end of water main. (*OWASA*)

Response: *A permanent blow-off assembly has been shown on the Site Utility Plan (CS1701).*

Comment 34- Include note for easement to remain 15-ft from manhole where new 6-inch service connects. (*OWASA*)

Response: *The requested note has been added to the Site Utility Plan (CS1701).*

Comment 35- Include a grease interceptor for sewer service. (*OWASA*)

Response: *Per correspondence on 10/27/16, this detail will be address during the ZCP Application process.*

Comment 36- Include a clean-out for private force main. Service cannot be pumped directly into manhole. Service must enter the bottom of manhole by gravity flow. (*OWASA*)

Response: *The requested clean-out has been added to the Site Utility Plan (CS1701). Also, a private septic (settling) tank has been added to this plan to allow gravity flow (using the existing main) into the existing OWASA Sanitary Sewer Manhole; additional details of this connection will be provided during the ZCP Application process.*

ORANGE COUNTY SOLID WASTE:

Comment 37- Solid Waste Management Plan â€" This document must be filled out and returned to me for review and approval. A copy of the document will be attached to the e-mail transmitting these review comments to you. (*OC Solid Waste*)

Response: *The completed document has been attached.*

Comment 38- Plan Sheet CS0501 (Demolition Plan) â€" Add the following standard notes: Construction Waste:1. All existing structures 500 square feet and larger shall be assessed prior to the issuance of a demolition permit to ensure compliance with the County's Regulated Recyclable Materials Ordinance (RRMO) and to assess the potential for deconstruction and/or the reuse of salvageable materials.2. Pursuant to the County's RRMO, clean wood

waste, scrap metal, and corrugated cardboard present in construction or demolition waste must be recycled.3. Pursuant to the Countyâ€™s RRMO, all haulers of mixed construction and demolition waste which includes any regulated recyclable materials shall be licensed by Orange County.4. Prior to any demolition or construction activity on the site, the applicant shall hold a pre-demolition/pre-construction conference with Solid Waste staff. This may be the same pre-construction meeting held with other development/enforcement officials.5. The presence if any asbestos containing materials (ACM) and/or other hazardous materials shall be handled in accordance with any and all local, state, and federal regulations and guidelines. (*OC Solid Waste*)

Response: *The requested notes have been added under the heading Orange County Solid Waste Notes on the General Notes and Legends Sheet (CS0002).*

Comment 39- Plan Sheet CS1001 (Site Plan) â€“1. The proposed â€˜Trash Container Areaâ€™ depicted on the plan is not appropriate for a building of this size (and number of occupants; 80 students, 20 teachers). A standard refuse/recycling station consisting of 1 eight (8) CY garbage dumpster, 1 eight (8) CY cardboard dumpster, and 8 mixed recycling carts will be required and placed in location that is accessible to service trucks. A copy of the OCSW standard refuse/recycling station will be attached to e-mail transmitting these comments to you and a copy of the detail must be placed on the plan as well.2. The proposed radius of the traffic circle (to face of curb) is 36â€™ and needs to be 43â€™ 6â€ to accommodate OCSW recycling trucks.3. The travel way to and from the refuse/recycling station must be heavy-duty paving or a damage waiver note must be placed on the plans. (*OC Solid Waste*)

Response: *Due to the constraints of this site, the applicant is not able to provide the requested Trash Container Area. Recycling will either be handled by a private service or by the staff/students bringing the materials home (as they presently do; a waiver will be requested for this from Orange County. Trash collection will either be handled by a private service or by the Town if they are willing to provide alternative collection vehicles for this site. Additionally, the school is proposing to implement a composing plan as part of their operating procedures to provide additional learning experiences for the children and to expand their mission.*

Comment 40- If the applicant elects not to have OCSW collect the mixed recyclables (which does not include cardboard collection) then the following waiver notes must be placed on the plans: Public Recycling Waiver:1. Applicant elects to provide recycling services to residents/tenants of this property in lieu of building a recycling station constructed to Orange County specifications. The site will not receive public recycling collection now or in the future unless such a recycling station is constructed or contingency for such a station is included on the development plans.2. Applicant must require at the least the same level of service (current or future) to its residents as that provided by Orange County.3. County fees for recycling and waste management associated with this project/property will not be waived.4. Applicant agrees to enter into a service agreement with a private solid waste/recycling collection contractor that is acceptable to Orange County. Further, the agreement shall provide for the collection and recycling of corrugated cardboard in addition to the other co-mingled recyclables and an executed copy of the agreement shall be

provided to and approved by Orange County prior to approval of final construction plans for the property/project. (*OC Solid Waste*)

Response: *The requested notes have been added under the heading Orange County Solid Waste Notes on the General Notes and Legends Sheet (CS0002).*

PUBLIC WORKS:

Comment 41- If proposing to keep the double hemlock between the parking lot and building, provide arborists report of the potential impacts to the tree. Absent a third-party opinion we recommend removing it. (*Urban Forestry*)

Response: *As discussed during the TRC meeting on October 4, 2016, the double hemlock tree was inadvertently referenced. The comment was intended to identify an existing 40" oak (which is leaning) located along easterly side of the property. The applicant will cut this tree down to prevent any possible future damage to the adjoining property. This tree is shown to be removed on the Demolition Plan (Sheet CS0501) with a note indicating that the stump shall remain since this tree is located outside of the limit of disturbance.*

Comment 42- Prior to issuance of zoning compliance permit a detailed landscaping plan shall be reviewed and approved. This plan should include information on the location, size, and species of existing trees and shrubs that are proposed to be a part of the required landscape buffers along Mt. Carmel Church Rd and along the east lot line. (*Urban Forestry*)

Response: *This information will be provided during the ZCP Application process.*

Comment 43- Additional new buffer plantings will likely be required along Mt. Carmel Church rd where land disturbance is occurring as well as possibly against the retaining wall along the east lot line. (*Urban Forestry*)

Response: *This information will be provided during the ZCP Application process.*

Comment 44- Provide a commercial refuse collection area for waste dumpster, cardboard dumpster, and mixed recycling carts per LUMO 5.13 and in accordance with design standards in Town Design Manual (*Urban Forestry*)

Response: *See response to Comment 39.*

Comment 45- Prior to issuance of a Certificate of Occupancy applicant shall replace any trees shown as preserved-protected on the landscape protection plan that have died or are in poor health as a result of land disturbing activities. (*Urban Forestry*)

Response: *General Note 7 has been added to Sheet CS0002.*

PLANNING:

Comment 46- It will be necessary to provide two separate tallies of land disturbance: 1. A total figure - total land disturbance- that encompasses all land disturbance related to the construction of this project including offsite disturbance. This figure will be used for stormwater and erosion control purposes - LUMO 3.6.3, 3.6.4, 5.3, 5.4, and Town Code 5-97. 2. A discounted figure -zoning land disturbance- that deducts credits for previous disturbance on the site as well as off-site disturbance in the public right of way. This figure will be used to determine compliance with the 20/40 rule in LUMO 3.7.1 (*Current Development*)

Response: *General Note 9 (Site Land Disturbance Calculations) has been added to the General Notes and Legends Sheet (CS0002); this note indicated that proposed on-site land disturbance will be less than 40,000 sf. Please note that based on an amended interpretation of the calculation of land disturbance, this comment is no longer applicable.*

Comment 47- Application Page 1: Clarify the description line to include preservation of existing structure. Be advised that using this structure for purposes other than a Single Family Dwelling requires a zoning Change of Use, which can be processed, reviewed, and acted upon at the same time as the Site Plan Review for the daycare facility. Also, be advised that a change of use may be required by Inspection with respect to Fire and Building Code. (*Current Development*)

Response: *The application has been clarified as requested. The temporary use of the existing single family structure has been reviewed with Inspections; based upon this meeting, it was indicated that this temporary use (as a construction trailer) would be acceptable. At some point during the construction of this project, this structure will be demolished to the foundation.*

Comment 48- The Address for the Daycare Facility has been established as 108 Mt Carmel Church Rd by Orange County E-911. Please change all application materials to reflect this address. (*Current Development*)

Response: *The plans and application materials have been amended accordingly.*

Comment 49- Prior to Issuance of a Zoning Compliance Permit applicant shall record a recombination plat for the four properties with the Orange County Registry. An Exempt Plat Application to be reviewed and approved by the Town is required for this action. (*Current Development*)

Response: *General Note 8 has been added to Sheet CS0002.*

Comment 50- Cover sheet and Sheet CS 1001 include site data block to include the following information: 1. zoning district information, i.e. district, setbacks, etc..., 2. Existing and proposed impervious surfaces 3. Existing and proposed floor area 4. Zoning land disturbance for the purposes of LUMO 3.7.1 and total land disturbance which does not include any deductions or credits 5. Vehicular and bicycle parking requirements and proposed parking (*Current Development*)

Response: *The requested information has been added to the Cover Sheet (CS0001) and the Site Plan (CS1001).*

Comment 51- Sheet CS 1501 include data block with the following information to demonstrate compliance with LUMO 3.6.3 F, 3.6.4, and 5.3.2: 1. Call out total proposed impervious surface and delimit proposed impervious surface by non-RCD, RCD zone 1, RCD zone 2, and RCD zone 3. 2. Call out total land disturbance and delimit total land disturbance by non-RCD, RCD zone 1, RCD zone 2, and RCD zone 3. 3. delimit square feet and percent of site Net Land Area in each slope category per 5.3-1. For each slope category include square feet of land disturbance and percent of each slope category disturbed. (*Current Development*)

Response: *This information has been provided on the Cover Sheet (CS0001) and the Site Plan (Sheet CS1501).*

Comment 52- PLEASE ENSURE THAT YOU ARE USING THE MOST UP TO DATE COPY OF LUMO. MUNICODE NOW CONTAINS ORDINANCES ENACTED 11-23-15 thru 4-18-16. Notable changes include steep slopes, watershed protection district and residential impervious allowances, measurement of height limits, parking lot landscaping, Accessory Dwellings, Neighborhood Conservation Districts, Duplexes, and modifications to the Ephesus Fordham Form Code. ALSO BE ADVISED that Ordinances enacted in May in June are in effect but have not yet been codified on Municode those include Signs and additional Ephesus Fordham Form Code changes. These individual ordinances are available on the Municode home page for Chapel Hill (*Current Development*)

Response: *Noted*

Comment 53- Application page 3: Include new floor area in the Institutional row (*Current Development*)

Response: *Information has been added.*

Comment 54- Confirm height measurements. Setback height aka primary height is the height closest to the setback on each lot line. Really for this project the only setback height that is important is the height adjacent to the East lot line. Core height aka secondary height is going to be the height of the structure at its tallest point. PLEASE BE ADVISED THAT HEIGHT IS NOW MEASURED FROM MEAN FINISHED GRADE not Mean Natural Grade as of 3-21-16. Also to determine mean finished grade for the structure, take the highest and lowest elevations along the street-facing -Mt Carmel Ch- facade of the structure. that mean will then give you the basis for measuring setback and core heights. Very unlikely that height is an issue on this project, we just need it called out and recorded properly. (*Current Development*)

Response: *The architectural elevation along the Mt. Carmel Church Road frontage has not been completed at this time; this information will be submitted in conjunction with the Zoning Compliance Permit application. Please note that the applicant will comply with this requirement.*

Comment 55- Provide data block on sheet CS 1001 to include the following detailed floor area calculations: 1. square feet and percent of the site within the following zones Non-RCD AND Zone 3, Zone 2, and Zone 1. 2. Multiply these square footages as follows Non-RCD AND Zone 3 X .076, Zone 2 X .019, and Zone 1 X.01. 3. Sum these products and that will give you an effective Floor Area Ratio FAR for the site. 4. Finally, multiply the effective FAR by the Gross Land Area for the site and the produce will be the allowable Floor Area Maximum on this site. 5. provide the proposed Floor Area in this data block AND include this Floor Area Maximum on the site data block on the Coversheet and CS 10001 (*Current Development*)

Response: *This data block has been added to the Cover Sheet (CS0001) and Site Plan (Sheet CS 1001).*

Comment 56- Sheet CS 0201: Clarify existing and proposed tree line symbology. Include line type legend (*Current Development*)

Response: *Amended/expanded legends have been added to Sheet CS0002.*

Comment 57- Sheet CS 0202: Duplicate the portion of the data block including land disturbance and slope information demonstrating compliance with LUMO 5.3.1 (*Current Development*)

Response: *The Slope Analysis Plan (CS0202) has been amended.*

Comment 58- Sheet CS 2001: Overlay Limits of Disturbance and existing tree line (*Current Development*)

Response: *Requested information has been added to the Landscape & Lighting Plan (Sheet CS2001).*

Comment 59- Sheet CS 1701: Clarify that proposed Electric is underground. provide line symbology (*Current Development*)

Response: *The legends have been amended on Sheet CS0002; additionally, this line has been identified on the Site Utility Plan (SheetCS1701) as underground.*

Comment 60- Provide sidewalk from turn around to Mt Carmel Church along or adjacent to the site driveway. provide sidewalk to existing house. (*Current Development*)

Response: *Once the improvement plan for Mt. Carmel Church Road has been furthered, a sidewalk will be added to provide access to the school. Since the existing house will be demolished in the future, no sidewalk will be provided to this structure.*

Comment 61- Parking Lot Landscaping. Demonstrate compliance with LUMO 5.9.6 (*Current Development*)

Response: *Based upon the amended parking lot design, landscaping has been revised on Sheet CS2001.*

Comment 62- Clarify narrative to include the maximum number of teachers, staff, and volunteers onsite at one time (*Current Development*)

Response: *An amended narrative has been included with this submittal.*

Comment 63- Show 40% Tree canopy calculation on Sheet CS 1001 and landscape sheet (*Current Development*)

Response: *Tree canopy calculations have been added to the Site Plan (Sheet CS1001) and the Landscape & Lighting Plan (Sheet CS2001).*

Comment 64- Provide up-to-date stream determination and redraw RCD buffers based on current bank of stream. Please be advised that the location of the stream and therefore the RCD buffer location is not a vested right regardless if it is shown on a plat or not. typically, they are shown on plats for illustrative purposes only and to aid future homebuyers in understanding the approximate location of the RCD. The only component of the RCD that may be vested is the width of the corridor based on the date the lot was platted or development began. In this case since a new development and Site Plan Review is proposed the applicable RCD buffer is 150 feet based on stream bank as field surveyed on an up-to-date survey. (*Current Development*)

Response: *The existing southerly Morgan Creek top of bank was surveyed in the field on October 12, 2016 by this office. The stream side, managed use and 150' RCD buffer have been updated on the plans based upon the current top of bank location.*

Comment 65- Temporary chain link fencing may be required where the work area - the distance between where work is occurring and the limits of disturbance - is less than 10 feet. (*Current Development*)

Response: *A note has been added to the Erosion Control Plan (Sheet CS8001) to address this comment. Actual location of fencing (if required) will be shown on the plans submitted in conjunction with the ZCP Application.*

Comment 66- Temporary chain link fencing will be required where the limits of disturbance is within 10 feet of the RCD or within the RCD. (*Current Development*)

Response: *See response to Comment 65.*

Comment 67- Label the buffer to the east side of the property as an Alternative Buffer as you are not meeting the requirements of the required Type C 20-foot buffer (*Current Development*)

Response: *The buffer designation has been changed on the Site Plan (CS1001).*

Comment 68- show relocated sewer line as new land disturbance. (*Current Development*)

Response: *The limit of disturbance line has been updated/amended based upon the updated design.*

Comment 69- has OWASA approved the proposed grinder pump or at least given it tentative approval? (*Current Development*)

Response: *As was indicated in the OWASA comment section, they (OWASA) have no objection to the proposed site plan. Final design details will be coordinated with OWASA during the ZCP process.*

Comment 70- What is the intended use of the cleared area at the end of the parking lot? (*Current Development*)

Response: *Based upon the traffic/parking demand study performed, additional parking spaces have been provided in this area.*

Comment 71- include information in the updated-new transportation narrative on how the applicant proposes to avoid conflict between deliveries and drop-offs (*Current Development*)

Response: *The narrative has been amended to provide a separate traffic narrative section to address this comment.*

Comment 72- Provide legible copy of TIA Exemption submission (*Current Development*)

Response: *A copy of the TIA Exemption submission has been attached.*

Comment 73- Provide separate transportation narrative to address comments from Engineering, NCDOT, and planning staff related to pick-up-drop-off queues, trip generation, upstream impacts resulting from median installation -- i.e. U-turns at or on Old Bridge Ln, conflicts with deliveries and refuse collection, etc. As a part of your narrative and justification we suggest that you consider committing to a Transportation Management Plan, to be reviewed and approved prior to issuance of a Zoning Compliance Permit for both staff and parents the encourages carpool, use of the future roundabout rather than adjacent neighborhood streets, and use of walking and biking once infrastructure is constructed in this area. Contact Len Cone at 919-969-5065 or lcone@townofchapelhill.org to discuss a transportation management plan for this site (*Current Development*)

Response: *A separate traffic section has been added to the amended narrative to address this comment.*

Comment 74- PLEASE BE ADVISED: The Town is undergoing an update to our Mobility Plan which will combine elements of the Bike Plan, Greenways Plan, and Sidewalk Priority list. This site currently includes elements of two of those. We think it is likely that the outcome for this property will be a side path along Mt Carmel Church Rd extending from the proposed roundabout down to 15-501 with a potential greenway connection under the James Taylor Bridge which carries 15-501 over Morgan Creek. Staff will be discussing this particular side path as it relates to this site and will forward updated comments ASAP. The likely outcome will be the requirement for dedication of an easement and-or right of way for the side path as well as evaluation of the current payment in Lieu- see comment below. (*Current Development*)

Response: *The applicant awaits these comments.*

Comment 75- PAYMENT IN LIEU (Revised 10/7/16) Staff is evaluating the current payment in lieu compared to requirements from current approved plans. The current requirement is for a sidewalk and bike lane on one side of Mt Carmel Church Rd. Preliminary analysis by NCDOT has indicated that a sidewalk is not feasible on the north side of Mt Carmel Church Rd. Therefore, the requirement would be for a sidewalk on the south side of Mt Carmel Church Rd and a bike lane on one side of the road, likely the uphill / south side of the road. Once a cost estimate is determined, we will deduct the existing payment in lieu from this cost to determine the amount due. As a note, we are considering amending our administrative policy to require 150% of the cost of actual improvements to encourage actual completion.

Response: *The applicant will provide a cost estimate for the construction of a bike lane to address this comment.*

INSPECTIONS:

Comment 76- A zone for fire department ladders and firefighting operations must be provided. This will require all electrical service lines to be buried ot or around the structure. Article 225.19 E 2014 edition of North Carolina Electric Code (*Inspections*)

Response: *This has been shown on the Site Utility Plan (Sheet CS2001). Additionally, General Utility Note 18 (on Sheet CS0002) has been added to address this comment as well.*

Comment 77- Accessibility Requirements: That prior to issuance of a Certificate of Occupancy, the applicant shall provide the minimum required handicapped parking spaces and design all handicapped parking spaces, ramps, and crosswalks, and associated infrastructure according to Americans with Disabilities Act standards, North Carolina Building Code, American National Standards Institute ANSI Code, and Town standard.1. Parking - number of spaces to comply with NCBC 2012 section 1106.1, 1 per 6 compliant spaces or portion thereof must be van accessible, No slope to exceed 2 percent in any direction. Signage per NC requirements, MUT-CD and ICC A 117.1.2. Curb cuts and accessible routes Per ICC A117.1 2009 Ed. Cross slope limited to 2 percent, call for inspection before placement of concrete.â€¢ Slope greater than 5 percent requires construction as a ramp. (*Inspections*)

Response: *To address this comment, ADA Instructions to Contractor Notes have been added to Sheet CS0002, specifically Note 9.*

Comment 78- A single electrical service shall be provided to serve the structure with the exception if a fire pump was required. Article 230.2 A 2014 edition of North Carolina Electric Code. (*Inspections*)

Response: *To address this comment, Inspection Notes have been added to Sheet CS0002, specifically Note 1.*

Comment 79- Address numbers must be a minimum of 4 inches high and of contrasting color to their background. Reflective numbers are preferred. When the distance from the street or fire

department access lane to the front or address side of the building exceeds 25 feet, larger numbers are required. 26 feet to 50 feet shall have 8 inch numbers, 51-75 feet shall have 12 inch numbers and over 75 feet shall have 18 inch numbers. Where access is by private means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. (*Inspections*)

Response: *To address this comment, Inspection Notes have been added to Sheet CS0002, specifically Note 2.*

Comment 80- Key boxes shall be required on any building that has a fire alarm system, a fire sprinkler system, an elevator, or special locking arrangements. The key box shall be of an approved type as required from the Chapel Hill Fire Department. The size of the key box will be determined by the number of keys necessary to mitigate any emergency situation based on the building and its occupancy. An approved lock shall be installed on gates or similar barriers when required by the fire code official. Keys shall be changed out immediately if the locks are changed or rekeyed. (*Inspections*)

Response: *To address this comment, Inspection Notes have been added to Sheet CS0002, specifically Note 3.*

Comment 81- Page CS1701 shows a siamese out the rear of the building. A standpipe connection was discussed but it should be inside the building gallery 102 area near rear door. The heated wall space between 2 year room 115 and gallery 102. (*Inspections*)

Response: *This comment will be review and discussed prior to the submission of the ZCP Application.*

Comment 82- All fence gates in playground area shall open in the direction of egress tracel with panic hardware. (*Inspections*)

Response: *To address this comment, Inspection Notes have been added to Sheet CS0002, specifically Note 4.*

Comment 83- OWASA requires a lead-free RPZ with Bypass for the backflow protection. Ensure at least 18 inches of working clearance is provided around or more if manufacturer's instructions require more. (*Inspections*)

Response: *To address this comment, Inspection Notes have been added to Sheet CS0002, specifically Note 5.*

Comment 84- Demolition of the existing structures will require an asbestos test prior to demolition and a second asbestos test of the soil after they have been removed. (*Inspections*)

Response: *To address this comment, Inspection Notes have been added to Sheet CS0002, specifically Note 6. Additionally, this comment will be addressed when a demolition permit application is submitted.*

Comment 85- Local ordinance requires all commercial buildings over 6,000 sf to be protected by a NFPA 13 sprinkler system. (*Inspections*)

Response: *To address this comment, Inspection Notes have been added to Sheet CS0002, specifically Note 7.*

ENGINEERING:

Comment 86- 1. Prior to a subdivision the owner of this property provided an earlier payment in lieu for sidewalk along the site frontage therefore we are recommending the installation of a sidewalk paid by the developer. (*Engineering*)

Response: *See Comment 75 and response to same.*

Comment 87- 2. Mount Carmel Church Road is classified as a Collector. The standard Collector street has sidewalk and bicycle lanes. Because of the steep grade the staff should consider the installation of a 5 feet wide bicycle lane as part of this development on the south side (opposite of the development) of Mount Carmel Church Road from US 15-501 to a location opposite of the intersection of Mount Carmel Church Road and Old Bridge Lane. (*Engineering*)

Response: *See Planning Comment 75.*

Comment 88- 3. Prior to a Certificate of Occupancy construct a median on Mount Carmel Church Road to prevent the left turns into and out of the proposed driveway and dedicate any public right-of-way necessary for the construction of the improvements. (*Engineering*)

Response: *A median has been identified on the Site Plan (Sheet CS1001) and a Brick Paver Median Detail has been provided on the Site Details (Sheet CS6001).*

Comment 89- 4. Prior to a Zoning Compliance Permit submit detailed construction plans for the proposed improvements on Mount Carmel Church Road. The design is subject to the approval of the North Carolina Department of Transportation and the Town. (*Engineering*)

Response: *The applicant will comply.*

Comment 90- 5. Prior to a Certificate of Occupancy construct the parking lot and drive aisle to Town standard for dimensions and pavement design. (*Engineering*)

Response: *The applicant will comply.*

Comment 91- 6. Prior to a Zoning Compliance Permit submit a Construction Management Plan for approval by the Town. The plan must show proposed construction employee parking, material staging areas, construction trailer (if applicable) and provide the hours of proposed work. (*Engineering*)

Response: *The applicant will comply.*

Comment 92- 7. Prior to a Zoning Compliance Permit submit a Street Light Plan for street light installations for approval by the Town. The street lights shall be installed prior to a Certificate of Occupancy. (*Engineering*)

Response: *The applicant will comply.*

Comment 93- 8. It will be necessary to provide a narrative or exhibit to address how arrivals and departures will be handled to prevent vehicles from stacking into the public right-of-way. (*Engineering*)

Response: *A separate traffic section has been added to the amended narrative to address this comment.*

Comment 94- 9. Prior to a Zoning Compliance Permit submit a Fire Flow Report sealed by a professional engineer licensed in North Carolina. The report must demonstrate that the available fire flow will meet Town Standard and the North Carolina Fire Code. (*Engineering*)

Response: *The applicant will comply. Please note that a Fire Flow test was completed by OWASA on November 15, 2016 (copy attached).*

FIRE DEPARTMENT ACCESS:

Comment 95- FIRE APPARATUS ACCESS ROADS; Any fire apparatus access roads, any public/private street, parking lot access, fire lanes and access roadways, used for fire department access shall be all weather and designed to carry the imposed load of fire apparatus weighing at least 80,000 lbs. Fire apparatus access roads shall have a minimum width of 20' exclusive of shoulders with an overhead clearance of at least 13'-6" for structures not exceeding 30' in height and shall provide access to within 150' of all exterior portions of the building. Structures exceeding 30' in height shall be provided with an aerial apparatus access road 26' in width in the immediate vicinity of the building or portion thereof and shall provide at least one of the required access roads to be located not less than 15' and not more than 30' from the structure parallel to one entire side of the structure. NC FPC 2012 502.1,503.1.1, 503.2.1, D102.1 (*Fire*)

Response: *To address this comment, Fire Department Notes have been added to Sheet CS0002, specifically Note 1.*

Comment 96- Turning radius for vehicles must meet Town standards (*Fire*)

Response: *The Town fire truck turning template was used to design the entry circle.*

FIRE SERVICE FEATURES:

Comment 97- GRADE AND APPROACH; Fire apparatus access roads shall not exceed 10% in grade unless approved by the fire chief and all approach and departure angles shall be within the limits established based on the Department's apparatus. NC FPC 2012, 503.2.7, 503.2.8 and D103.2 (*Fire*)

Response: *To address this comment, Fire Department Notes have been added to Sheet CS0002, specifically Note 2.*

Comment 98- GATES AND BARRICADES; Where required or authorized by the fire code official and permanent or temporary construction, any gates across fire apparatus access roads shall be a minimum width of 20 feet, be of swinging or sliding type, have an emergency means of operation, shall be openable by either forcible entry or keyed, capable of being operated by one person, and shall be installed and maintained according to UL 325 and ASTM F 2200. NC FPC 2012, 503.5, 503.6, D103.5 (*Fire*)

Response: *To address this comment, Fire Department Notes have been added to Sheet CS0002, specifically Note 3.*

Comment 99- FIRE LANES; Where required, approved marking signs including the words, NO PARKING-FIRE LANE signs shall be provided for fire apparatus access roads to identify such roads. NC FPC 2012, 503.3, D103.6, D103.6.1, D103.6.2 (*Fire*)

Response: *To address this comment, Fire Department Notes have been added to Sheet CS0002, specifically Note 4.*

Comment 100- PREMISE IDENTIFICATION; Approved building address numbers, placed in acceptable position to the fire code official, shall be required on all new buildings. NC FPC 2012, 505.1 (*Fire*)

Response: *To address this comment, Fire Department Notes have been added to Sheet CS0002, specifically Note 5.*

Comment 101- KEY BOXES; Where required by the fire code official, a secure key box, mounted on the address side of the building, near the main entrance, shall be provided to ensure adequate access to the building based on life safety and/or fire protection needs. NC FPC 2012, 506 (*Fire*)

Response: *To address this comment, Fire Department Notes have been added to Sheet CS0002, specifically Note 6.*

FIRE PROTECTION:

Comment 102- FIRE HYDRANTS; The addition of any required hydrants to serve the submitted building must flow a minimum of 2500 gpm per Town Engineering Standards unless approved by the fire code official. The farthest hydrant serving a proposed structure must be no more

than 500 feet distant. A maximum distance of 500 feet spacing between hydrants must be maintained unless otherwise approved by the fire code official. Lesser spacing distances may be required. A minimum working space of 3 feet must be maintained around all hydrants. Where hydrants are subject to physical impact, physical protection may be required, NC FPC 2012, 507.5.6. The minimum number of required hydrants and their spacing must meet NC FPC 2012, Appendix C, table C 105.1 (*Fire*)

Response: *To address this comment, Fire Department Notes have been added to Sheet CS0002, specifically Note 7.*

Comment 103- FIRE HYDRANT LOCATIONS; Indicate the locations of existing and proposed fire hydrants. (*Fire*)

Response: *The locations of the proposed and the closest existing hydrants are shown on the Site Utility Plan (Sheet CS1701). Please note that the closest existing hydrant was found on Old Bridge Lane.*

Comment 104- FIRE PROTECTION AND UTILITY PLAN; shall include the fire flow report: for a hydrant within 500 feet of each building, provide the calculated gallons per minute of with a residual pressure of 20 pounds per square inch. The calculations should be sealed by a professional engineer licensed in the State of NC and accompanied by a water supply flow test conducted within one year of the submittal. Reference Town Design Manual for required gallons per minute. (*Fire*)

Response: *This will be addressed during the ZCP Application process. Please note that a fire flow test has been requested to be performed by OWASA.*

Comment 105- FIRE DEPARTMENT CONNECTIONS, LOCATIONS; Any required FDCs for any buildings shall meet the design and installation requirements for the current, approved edition of NFPA 13, 13D, 13R, or 14 of the NC FPC 2012 and Town Ordinances; 7-38 for location. FDCs shall be installed on the street/ address side of the building and within 100' of a hydrant or unless otherwise approved by the fire code official and shall not be obstructed or hindered by parking or landscaping. FDC's shall be equipped with NST. (*Fire*)

Response: *To address this comment, Fire Department Notes have been added to Sheet CS0002, specifically Note 8.*

Comment 106- FIRE DEPARTMENT CONNECTIONS, INSTALLATION; A working space of not less than 36 inches in width and depth and a working space of 78 inches in height shall be provided on all sides with the exception of wall mounted FDC's unless otherwise approved by the fire code official. The FDC's where required must be physically protected by an approved barrier from impacts. NC FPC 2012, 912.1, 912.2 912.2.1, 912.3.2, 312 (*Fire*)

Response: *To address this comment, Fire Department Notes have been added to Sheet CS0002, specifically Note 9.*

[NO CATEGORY]:

Comment 107- Provide soils report from a geotechnical engineer or soil scientist showing the seasonal high water table information and in-situ soil permeability at the proposed location of the Infiltration basin. Note seasonal highwater table should be a minimum of 2 feet below the bottom of the basin. (*Stormwater*)

Response: *A geotechnical investigation of this site will be performed shortly. Once completed, the information will utilized to finalize the stormwater design.*

Comment 108- Per page 16-5 of the NCDENR Bmp design manual, a minimum of 4â€ of clean sand shall be provided underneath the stone in the Infiltration basin. Label the stone in the Infiltration basin as â€œWashed Stoneâ€ . (*Stormwater*)

Response:

Comment 109- 2. It seems that the arrival time for all students is at 7:30 am according to the narrative provided. How will student arrival operate? Will parents park and walk students inside or will there be a designated car loading zone? What is the arrival time for teachers and staff? If student arrival will operate by drop off/pick up please provide location of car loading zone. (*NC DOT Orange County*)

Response: *A separate traffic section has been added to the amended narrative to address this comment.*

Comment 110- 3. The driveway stem is approximately 85â€™ long. This will allow a queue of 3 to 4 vehicles. If students will be dropped at a car loading zone, please address potential of cars queuing onto Mt. Carmel Church Road. (*NC DOT Orange County*)

Response: *A separate traffic section has been added to the amended narrative to address this comment.*

During your review of the above, should you have further questions or comments, please do not hesitate to contact me at the office.

Sincerely,

Peter C. Bellantoni, P.E.

CC:

TRAFFIC

TOTAL TRIP GENERATION

TIME	Monday - 10/3/16	Tuesday - 10/4/16	Wednesday - 10/5/16	AVERAGE TRIPS
7:00-7:09	1	0	0	0.33
7:10-7:19	2	4	3	3.00
7:20-7:29	4	5	3	4.00
7:30-7:39	5	2	4	3.67
7:40-7:49	2	5	5	4.00
7:50-7:59	4	3	6	4.33
8:00-8:09	7	5	8	6.67
8:10-8:19	11	9	8	9.33
8:20-8:29	5	6	3	4.67
8:30-8:39	9	6	6	7.00
8:40-8:49	8	11	12	10.33
8:50-8:59	10	7	16	11.00
9:00-9:09	10	13	5	9.33
9:10-9:19	5	5	2	4.00
9:20-9:29	1	0	0	0.33
9:30-9:39	1	1	0	0.67
9:40-9:49	0	0	1	0.33
9:50-9:59	1	0	0	0.33
10:00-10:09	0	0	0	0.00
10:10-10:19	0	1	0	0.33
10:20-10:29	0	0	0	0.00
10:30-10:39	0	0	0	0.00
10:40-10:49	1	0	0	0.33
10:50-10:59	1	0	0	0.33
11:00-11:09	0	0	0	0.00
11:10-11:19	0	0	0	0.00
11:20-11:29	0	0	0	0.00
11:30-11:39	0	0	0	0.00
11:40-11:49	0	0	1	0.33
11:50-11:59	1	2	1	1.33
12:00-12:09	3	2	0	1.67
12:10-12:19	0	0	0	0.00
12:20-12:29	0	0	0	0.00
12:30-12:39	1	1	2	1.33
12:40-12:49	0	0	0	0.00
12:50-12:59	0	1	0	0.33
1:00-1:09	5	1	3	3.00
1:10-1:19	1	1	0	0.67
1:20-1:29	0	0	0	0.00
1:30-1:39	0	0	1	0.33
1:40-1:49	1	0	0	0.33
1:50-1:59	0	0	0	0.00
2:00-2:09	1	2	2	1.67
2:10-2:19	1	2	2	1.67
2:20-2:29	1	0	0	0.33
2:30-2:39	4	1	2	2.33
2:40-2:49	4	3	3	3.33
2:50-2:59	11	8	10	9.67
3:00-3:09	8	9	9	8.67
3:10-3:19	3	0	3	2.00
3:20-3:29	1	1	2	1.33
3:30-3:39	0	1	0	0.33
3:40-3:49	1	3	1	1.67
3:50-3:59	1	1	0	0.67
4:00-4:09	0	0	3	1.00
4:10-4:19	0	0	0	0.00
4:20-4:29	2	2	0	1.33
4:30-4:39	2	2	3	2.33
4:40-4:49	1	4	4	3.00
4:50-4:59	3	4	4	3.67
5:00-5:09	9	4	3	5.33
5:10-5:19	12	13	10	11.67
5:20-5:29	8	8	11	9.00
5:30-5:39	5	9	4	6.00
5:40-5:49	3	0	2	1.67
5:50-5:59	0	0	0	0.00

STAFF TRIP GENERATION

TIME	Monday - 10/3/16	Tuesday - 10/4/16	Wednesday - 10/5/16	AVERAGE TRIPS
7:00-7:09	1	0	0	0.33
7:10-7:19	2	4	3	3.00
7:20-7:29	3	2	3	2.67
7:30-7:39	1	0	1	0.67
7:40-7:49	0	0	0	0.00
7:50-7:59	0	0	0	0.00
8:00-8:09	3	2	0	1.67
8:10-8:19	2	0	2	1.33
8:20-8:29	0	1	0	0.33
8:30-8:39	1	0	0	0.33
8:40-8:49	1	3	0	1.33
8:50-8:59	2	1	2	1.67
9:00-9:09	3	3	2	2.67
9:10-9:19	1	0	1	0.67
9:20-9:29	0	0	0	0.00
9:30-9:39	0	0	0	0.00
9:40-9:49	0	0	0	0.00
9:50-9:59	0	0	0	0.00
10:00-10:09	0	0	0	0.00
10:10-10:19	0	0	0	0.00
10:20-10:29	0	0	0	0.00
10:30-10:39	0	0	0	0.00
10:40-10:49	0	0	0	0.00
10:50-10:59	0	0	0	0.00
11:00-11:09	0	0	0	0.00
11:10-11:19	0	0	0	0.00
11:20-11:29	0	0	0	0.00
11:30-11:39	0	0	0	0.00
11:40-11:49	0	0	0	0.00
11:50-11:59	0	0	0	0.00
12:00-12:09	0	0	0	0.00
12:10-12:19	0	0	0	0.00
12:20-12:29	0	0	0	0.00
12:30-12:39	0	0	0	0.00
12:40-12:49	0	0	0	0.00
12:50-12:59	0	0	0	0.00
1:00-1:09	0	0	0	0.00
1:10-1:19	0	0	0	0.00
1:20-1:29	0	0	0	0.00
1:30-1:39	0	0	0	0.00
1:40-1:49	0	0	0	0.00
1:50-1:59	0	0	0	0.00
2:00-2:09	0	1	1	0.67
2:10-2:19	1	0	0	0.33
2:20-2:29	0	0	0	0.00
2:30-2:39	1	1	1	1.00
2:40-2:49	1	0	0	0.33
2:50-2:59	0	0	0	0.00
3:00-3:09	2	2	3	2.33
3:10-3:19	2	0	2	1.33
3:20-3:29	1	1	2	1.33
3:30-3:39	0	1	0	0.33
3:40-3:49	1	0	1	0.67
3:50-3:59	0	0	0	0.00
4:00-4:09	0	0	0	0.00
4:10-4:19	0	0	0	0.00
4:20-4:29	0	0	0	0.00
4:30-4:39	0	0	0	0.00
4:40-4:49	0	0	1	0.33
4:50-4:59	1	1	0	0.67
5:00-5:09	3	1	1	1.67
5:10-5:19	0	0	0	0.00
5:20-5:29	1	0	2	1.00
5:30-5:39	3	7	2	4.00
5:40-5:49	2	0	2	1.33
5:50-5:59	0	0	0	0.00

STUDENT TRIP GENERATION

TIME	Monday - 10/3/16	Tuesday - 10/4/16	Wednesday - 10/5/16	AVERAGE TRIPS
7:00-7:09	0	0	0	0.00
7:10-7:19	0	0	0	0.00
7:20-7:29	1	3	0	1.33
7:30-7:39	4	2	3	3.00
7:40-7:49	2	5	5	4.00
7:50-7:59	4	3	6	4.33
8:00-8:09	4	3	8	5.00
8:10-8:19	9	9	6	8.00
8:20-8:29	5	5	3	4.33
8:30-8:39	8	6	6	6.67
8:40-8:49	7	8	12	9.00
8:50-8:59	8	6	14	9.33
9:00-9:09	7	10	3	6.67
9:10-9:19	4	5	1	3.33
9:20-9:29	1	0	0	0.33
9:30-9:39	1	1	0	0.67
9:40-9:49	0	0	1	0.33
9:50-9:59	1	0	0	0.33
10:00-10:09	0	0	0	0.00
10:10-10:19	0	1	0	0.33
10:20-10:29	0	0	0	0.00
10:30-10:39	0	0	0	0.00
10:40-10:49	1	0	0	0.33
10:50-10:59	1	0	0	0.33
11:00-11:09	0	0	0	0.00
11:10-11:19	0	0	0	0.00
11:20-11:29	0	0	0	0.00
11:30-11:39	0	0	0	0.00
11:40-11:49	0	0	1	0.33
11:50-11:59	1	2	1	1.33
12:00-12:09	3	2	0	1.67
12:10-12:19	0	0	0	0.00
12:20-12:29	0	0	0	0.00
12:30-12:39	1	1	2	1.33
12:40-12:49	0	0	0	0.00
12:50-12:59	0	1	0	0.33
1:00-1:09	5	1	3	3.00
1:10-1:19	1	1	0	0.67
1:20-1:29	0	0	0	0.00
1:30-1:39	0	0	1	0.33
1:40-1:49	1	0	0	0.33
1:50-1:59	0	0	0	0.00
2:00-2:09	1	1	1	1.00
2:10-2:19	0	2	2	1.33
2:20-2:29	1	0	0	0.33
2:30-2:39	3	0	1	1.33
2:40-2:49	3	3	3	3.00
2:50-2:59	11	8	10	9.67
3:00-3:09	6	7	6	6.33
3:10-3:19	1	0	1	0.67
3:20-3:29	0	0	0	0.00
3:30-3:39	0	0	0	0.00
3:40-3:49	0	3	0	1.00
3:50-3:59	1	1	0	0.67
4:00-4:09	0	0	3	1.00
4:10-4:19	0	0	0	0.00
4:20-4:29	2	2	0	1.33
4:30-4:39	2	2	3	2.33
4:40-4:49	1	4	3	2.67
4:50-4:59	2	3	4	3.00
5:00-5:09	6	3	2	3.67
5:10-5:19	12	13	10	11.67
5:20-5:29	7	8	9	8.00
5:30-5:39	2	2	2	2.00
5:40-5:49	1	0	0	0.33
5:50-5:59	0	0	0	0.00

STAFF PARKING DEMAND

TIME	Monday - 10/3/16	Tuesday - 10/4/16	Wednesday - 10/5/16	AVERAGE TRIPS
7:00-7:09	1	0	0	
7:10-7:19	3	4	3	
7:20-7:29	6	6	6	
7:30-7:39	7	6	7	
7:40-7:49	7	6	7	
7:50-7:59	7	6	7	
8:00-8:09	10	8	7	
8:10-8:19	12	8	9	
8:20-8:29	12	9	9	
8:30-8:39	13	9	9	
8:40-8:49	14	12	9	
8:50-8:59	16	13	11	
9:00-9:09	19	16	13	
9:10-9:19	20	16	14	
9:20-9:29	20	16	14	
9:30-9:39	20	16	14	
9:40-9:49	20	16	14	
9:50-9:59				
10:00-10:09				
10:10-10:19				
10:20-10:29				
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STUDENT PARKING DEMAND

TIME	Monday - 10/3/16	Tuesday - 10/4/16	Wednesday - 10/5/16	AVERAGE TRIPS
7:00-7:09	0	0	0	
7:10-7:19	0	0	0	
7:20-7:29	1	3	0	
7:30-7:39	4.5	3.5	3	
7:40-7:49	4	6	6.5	
7:50-7:59	5	5.5	8.5	
8:00-8:09	6	4.5	11	
8:10-8:19	11	10.5	10	
8:20-8:29	9.5	9.5	6	
8:30-8:39	10.5	8.5	7.5	
8:40-8:49	11	11	15	
8:50-8:59	11.5	10	20	
9:00-9:09	11	13	10	
9:10-9:19	7.5	10	2.5	
9:20-9:29	3	2.5	0.5	
9:30-9:39	1.5	1	0	
9:40-9:49	0.5	0.5	1	
9:50-9:59				
10:00-10:09				
10:10-10:19				
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5:50-5:59				

TOTAL PARKING DEMAND

TIME	Monday - 10/3/16	Tuesday - 10/4/16	Wednesday - 10/5/16	AVERAGE TRIPS
7:00-7:09	1	0	0	
7:10-7:19	3	4	3	
7:20-7:29	7	9	6	
7:30-7:39	11.5	9.5	10	
7:40-7:49	11	12	13.5	
7:50-7:59	12	11.5	15.5	
8:00-8:09	16	12.5	18	
8:10-8:19	23	18.5	19	
8:20-8:29	21.5	18.5	15	
8:30-8:39	23.5	17.5	16.5	
8:40-8:49	25	23	24	
8:50-8:59	27.5	23	31	
9:00-9:09	30	29	23	
9:10-9:19	27.5	26	16.5	
9:20-9:29	23	18.5	14.5	
9:30-9:39	21.5	17	14	
9:40-9:49	20.5	16.5	15	
9:50-9:59	0	0	0	
10:00-10:09				
10:10-10:19				
10:20-10:29				
10:30-10:39				
10:40-10:49				
10:50-10:59				
11:00-11:09				
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5:10-5:19				
5:20-5:29				
5:30-5:39				
5:40-5:49				
5:50-5:59				

SOLID WASTE

Compost Proposal Plan for the Chapel Hill Cooperative Preschool

The Preschool is a cooperative preschool that requires families to volunteer 6 hours to the program completing daily, weekly, and monthly pragmatic duties. The Composting job would be a parent Job that would fulfill the monthly participation requirement.

CHCP is looking at the benefits composting has:
-The amount of trash our school produces are reduced.
-Nutrients are recycled back into the soil.
-Soil erosion is prevented when you add compost.
-Awareness is created around recycling and waste reduction efforts with the kids, staff and families.

Some of the steps we would go through to begin the process of starting a composting plan at CHCP:

1. We would share our ideas and seek out others who may be supportive. We would include food service staff, teachers, parents, a knowledgeable compost staff through Orange County. We would start by having a forum to discuss how composting can be done at our school.

2. Recruit parents/teachers to develop the idea to form a Composting Committee. Members can come from, administration, kitchen staff, teachers, parents. The committee would be responsible for developing a clear plan of action, promoting the program, coordinating the actual work, and evaluating what's working and what's not.

3. Research what is involved in a school-wide composting operation. This is to determine the system that will work best for our school. Some things to think about is if the school will compost on or off site.

4. Define the scope of the project, plan the scope of the composting program our school is envisioning. Some ideas are to maybe start with a small pilot program or develop the program in phases.

5. Planning the details for the plan on composting in our program. For example, placing a table next to where kids compost, recycle and throw things away. Having signage to help kids visually see what waste items they are separating.
Another method would be cutting a table to fit three buckets for these three options.

Orange County
Solid Waste Management Plan

All development applications must provide a detailed solid waste management plan, including a recycling plan and a plan for management of construction debris. The following form must be completed to fulfill this requirement. This form must be completed and approved to satisfy the requirement of a plan for management of construction debris. Please complete all information in its entirety. Assistance in completing this form is available from the Orange County Solid Waste Staff at (919) 968-2788 x107 or x109.

COMPLETE ALL INFORMATION BELOW

(Incomplete contact information will delay plan review and approval.)

Project Name: Chapel Hill Cooperative Preschool

Property ID #: 9787-29-6199, 9787-29-7266, 9787-29-9047 and 9787-39-0045: Permit: _____

Project Location: 108 Mt. Carmel Church Road, Chapel Hill, NC 27514

Project Owner: Chapel Hill Cooperative Preschool (Contract Purchaser)

Contact Person: Maria Dickinson

Address: 106 Purefoy Road, Chapel Hill, NC 27514

Telephone: (919) 942-3955

Fax/Mobile: (_____) _____-_____ / (_____) _____-_____

Design Firm: Philip Post & Associates, a Division of Pennoni

Contact Person: Peter Bellantoni

Address: 401 Providence Road, Suite 200, Chapel Hill, NC 27514

Telephone: (919) 230-9214

Fax/Mobile: (919) 493-6548 / (919) 609-6111

Date: November 11, 2016

Provide a brief description of the work to be performed under this application:

(For example: construct a new commercial building [include use/sq. ft.], apartment complex [# units], place of worship, horizontal improvements for subdivision, etc.)

New construction of a 8,929 sf Preschool, off-street parking area and associated site improvements.

1. Site Preparation Wastes (landclearing, demolition, deconstruction)

During site preparation for a project the amount of waste destined for a construction waste landfill or an inert debris landfill should be minimized or diverted for reuse or recycling. Many materials can be reused, recycled, or salvaged, provided that materials are kept separate. This approach may also reduce overall project waste disposal costs. **Regulated Recyclable Materials (clean wood waste, scrap metal and corrugated cardboard) generated in Orange County must be recycled**. During demolition activities, metal and wood are often not "reasonably possible to separate" or doing so may present health and safety concerns (asbestos, lead paint, etc.). In these cases only, are regulated materials not required to be separated for recycling. Consider whether the following materials will be generated on this project, *in any quantity*, and indicate the management method(s).

☒	**1. Trees and Plant Materials:**
	No tree/plant wastes will be produced (proceed to # 2)
	Tree waste will be salvaged as timber, mulch, or boiler fuel
	Valuable plants will be removed for replanting
x	Landclearing and inert debris landfill (LCID)
	Construction and demolition debris landfill (C&D)
	Other (specify):

☒	**2. Dirt, Rock, Clean Fill, Inert materials to be removed from site:**
x	No inert materials will be removed from the site (proceed to # 3)
	Site Needs Fill
	Will be hauled to site needing fill
	Construction and demolition debris landfill (C&D)
	Landclearing and inert debris landfill (LCID)
	Other (specify):

☒	**3. Asphalt Paving:**
x	No asphalt wastes will be produced (proceed to # 4)

	Recycled at asphalt-paving producer
	Used on or off site. Describe use:
	Disposed in an approved landfill
	Other (specify):

☒	**4. Concrete, Brick, Block, other Aggregate materials:**
	No aggregate materials will be removed from the site (proceed to # 5)

	Recycled as scrap at an aggregate producer
	Used on or off site: Describe use:
x	Construction and demolition debris landfill (C&D)
	Landclearing and inert debris landfill (LCID)
	Other (specify):

☒	**5. Metal Scrap** (metal wastes are required by ordinance to be recycled)
	No metal waste will be produced (proceed to # 6)
	Segregated for on-site recycling collection
	Recycle at Orange County Landfill (**no tip fee charged if kept separate**)
x	Segregated for hauling to scrap dealer by general contractor
	Segregated for hauling to scrap dealer by sub-contractor
	Certified Commingled Recycling Facility
	Other (specify):

☒	**6. Clean Wood Wastes** (clean wood wastes are required to be recycled)
x	No clean wood wastes will be produced (proceed to # 7)
	Segregated for on-site recycling collection
	Recycle at Orange County Landfill (**reduced tip fee charged if kept separate**)
	Saved and used on future jobs
	Separated for private salvage or charity
	Certified Commingled Recycling Facility
	Other (specify):

☒	**7. Demolition/Salvage of Buildings or Structures on the Site:**
	No structure(s) will be removed (proceed to Construction Waste section)
x	Structure(s) must be removed. Please describe (include square footage for each structure): Existing 540 sf (+/-) garage and 640 sf (+/-) studio to be removed.

If any structure described above is greater than 500 ft^2, it must be assessed for deconstruction possibilities. Please call Solid Waste Staff at (919) 968-2788 x107 or x109 to arrange an assessment.

Could the structure(s) be moved from the site? YES NO Don't Know

Has the sale or donation of the structures been considered?
Please explain: YES NO

How will the structure be removed otherwise?

What is the timetable on removal of the structure(s)?
Spring 2017

Are there salvageable materials (hardwood floors, fixtures, molding, that can be removed for reuse prior to demolition?
If Yes, Please list (use a separate sheet if necessary): YES NO Don't Know

Have, or will, these materials been offered for sale or donation? YES NO

2. Construction Wastes

During the construction phase there are multiple options for recycling building materials. **Regulated Recyclable Materials (clean wood waste, scrap metal and corrugated cardboard) generated in Orange County must be recycled.** Although other materials are not required to be recycled, you are highly encouraged to do so. One of the best methods of recycling is to separate the materials on the jobsite. You may also combine materials for delivery to a certified recycling facility. Specifying waste reduction/recycling practices on a project will assure better performance.

☒	**1. Clean Wood Wastes** (clean wood wastes are required by ordinance to be recycled)
	No clean wood wastes will be produced (proceed to # 2)
	Segregated for on-site recycling collection
x	Recycle at Orange County Landfill (**reduced tip fee charged if kept separate**)
	Saved and used on future jobs
	Separated for private salvage or charity
	Certified Commingled Recycling Facility
	Other (specify):

☒	**2. Metal Scrap** (metal wastes are required by ordinance to be recycled)
	No metal waste will be produced (proceed to # 3)
	Segregated for on-site recycling collection
x	Recycle at Orange County Landfill (**no tip fee charged if kept separate**)
	Segregated for hauling to scrap dealer by general contractor
	Segregated for hauling to scrap dealer by sub-contractor
	Certified Commingled Recycling Facility
	Other (specify):

☒	**3. Concrete, Brick, Block, other Aggregate materials:**
	No aggregate materials will be removed from the site (proceed to # 4)

	Recycled as scrap at an aggregate producer
	Used on or off site: Describe use:
x	Construction and demolition debris landfill (C&D)
	Landclearing and inert debris landfill (LCID)
	Other (specify):

☒	**4. Corrugated Cardboard** (cardboard wastes are required to be recycled)
	No cardboard waste will be produced (proceed to # 5)
	Segregated for on-site recycling collection
x	Recycle at Orange County Landfill (**no tip fee charged if kept separate**)
	Segregated for hauling to paper dealer by general contractor
	Segregated for hauling to paper dealer by sub-contractor
	Certified Commingled Recycling Facility
	Other (specify):

☒	**5. Drywall**
	No drywall waste will be produced (proceed to # 6)

	Segregated for on-site recycling collection
	Used on site as agricultural supplement
x	Disposed in an approved landfill
	Certified Commingled Recycling Facility
	Other (specify):

☒	**6. Other Materials**
	No other wastes will be produced (proceed to # 7)

Please specify other wastes that will be produced and how they will be managed:

Plastics (including vinyl and shrink-wrap):
Carpet and padding:
Shingles:
Fixtures (sinks, tubs, lighting, etc):
Other (specify):
Other (specify):
Other (specify):

7. Bulk Containers (Dumpsters)

County ordinance requires that any bulk waste container be labeled to define what materials are intended or prohibited from being deposited in them and be serially numbered. Hauling Licenses are required for vehicles greater than 9000 GVW in Orange County. Ensure that your waste haulers is licensed. You may contact Orange County Solid Waste for a list of licensees at (919) 968-2788 x107 or x109.

x	There will be one or more bulk containers at the site for construction wastes.
	Contractors will be required to remove own wastes without the use of bulk containers.
	Corral or similar system will be used.

WAIVER BEING REQUESTED FROM FROM ORANGE COUNTY COLLECTION

3. Recycling After Occupancy

Depending on the eventual use of the structure, different waste materials will be produced and available for recycling. Recyclable materials must be separated into categories based on collection methods.

PLANNING REQUIREMENTS:

- **Indicate location of all bulk waste containers for refuse and recycling. Plan must show location of all containers, even if using existing refuse/recycling enclosures. Standard details/notes for any of the following are available from Orange County Solid Waste Management (919-968-2788 x107 or x109).**
- **All refuse/recycling containers are required to be on concrete pads.**
- **Provide a detailed and scaled plan of all bulk waste containers areas that show: each container labeled, required screening, lighting, overhead clearances, bollards, and concrete pad.**
- **Indicate whether refuse/recycling area will be gated. If so doors/gates will need retainers to be latched open for refuse/recycling collection.**
- **Ensure adequate collection vehicle access routes to all containers for deposit and collection. Turning radius templates are available from Orange County Solid Waste Management.**
- **Sharing of exterior recycling locations is acceptable if a joint access/shared-use agreement is filed and the deeds of all properties amended.**

☒	**Check materials that will be generated once the structure is ready for occupancy:**
x	Standard: glass bottles, metal cans, newspaper, glossy magazines, #1 plastics, #2 plastics
x	Corrugated Cardboard (not including waxed or single layer cardboard)
x	Mixed Paper: junk mail, cereal boxes
x	Office Paper: white or colored copy paper, confidential papers
	Restaurant: food wastes, cooking oil, disposable dining ware
x	Other Plastics: #5, #7
	Business specific wastes (please describe):

Cardboard Recycling Requirement

Orange County Ordinance requires recyclable corrugated cardboard to be kept separate from all other refuse. All developments must provide for cardboard recycling. If the facility's garbage will be collected from a bulk container (dumpster), a second waste container is likely to be required for cardboard. Public recycling drop-off sites can accommodate a very limited amount of commercial use (no > 50 boxes per week).

	Site Plan includes space for cardboard recycling container on Sheet # _____
x	Corrugated Cardboard will be handled in an alternate manner. Description Required: Cardboard recycling will be taken from the site by the school families and brought to a recycling center.

☒ **Collection Type: This project will be served by the following collection methods. Check all that apply.**

	Exterior individual or cooperative-use bulk waste container site. May be suitable for apartment complexes, restaurants, places of worship, educational facility, office building, retail/office/restaurant combinations
	Garbage dumpster
	Garbage compactor
	Cardboard dumpster
	Cardboard compactor
	Recycling carts for glass, cans, plastic bottles, newspaper, magazines, office paper (co-mingled)
	Cooking grease rendering container (required for any commercial kitchen facility)
	Food waste collection container (If qualify based on volume; contact OCSW staff for details of program)

	Standard "curbside" recycling collection. May be suitable for single-family developments and subdivisions, including some duplex, triples, and townhome developments.

PHILIP POST
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Chapel Hill Cooperative Preschool Development

Town of Chapel Hill

Orange County, North Carolina

GENERAL PROJECT DESCRIPTION AND SUPPLEMENTAL STORMWATER MANAGEMENT CALCULATIONS

Prepared By:

Philip Post & Associates

A Division of Pennoni

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(919) 929-1173

Firm License: F-1267

Project #CHCP1601

August 24, 2016

Revised: November 10, 2016

Professional Engineer: Peter Bellantoni

NC License #033040

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General Project Description/Stormwater Management

GENERAL PROJECT DESCRIPTION

The Chapel Hill Cooperative Preschool (CHCP) proposes to develop an residential property (Parcel Identification Numbers: 9787-39-0049, 9787-29-9047, 9787-29-7266 & 9787-29-6199) located along the north side of Mt. Carmel Church Road at the northeasterly side of the intersection with 15-501 in Orange County, North Carolina. The existing site consists of a wooded lot with one (1) existing residence and three (3) accessory structures. The proposed CHCP project area is approximately 3.97 acres and will include the construction of an approximate 8,929 SF one-story pre-school building and 24 parking spaces. The development will also include the construction of playground, landscaping, lighting, stormwater management system, and the utilities necessary to support the development. Access to the site will be provided by one (1) full access driveway onto Mt. Carmel Church Road. Pertinent data characterizing the existing and proposed site conditions are shown on the accompanying Site Plans.

STORMWATER MANAGEMENT

The pre-development condition of the site consists of one (1) point of interest. POI#1 is at the northeast property line at Morgan Creek. A portion of the stormwater runoff from the subject site will ultimately drain to this low lying area. The point of interest and drainage areas have been depicted on the Pre-development Drainage Area Plan with associated drainage paths and times of concentration for the watershed. Hydrographs have been generated for the 1-, 2-, and 25-year storm events.

The post development condition maintains the same point of interest. A subsurface infiltration system has been designed to intercept flow from the impervious surfaces created by the CHCP development. The subsurface infiltration system will discharge to the existing ditch along the north side of Mt. Carmel Chapel Road and ultimately reach POI#1.

The subsurface infiltration system has been designed in accordance with the Town of Chapel Hill's Design Manual and NCDENR Stormwater BMP Manual requirements. The subsurface infiltration system has been designed to provide 85% TSS removal as well as provide stormwater runoff rate control to reduce the post- development peak flows rates for the 1-, 2-, and 25-year storm events to at or below the corresponding pre-development peak flow rates. Additionally, an emergency spillway has been incorporated as part of the outlet structure

The USDA NRCS Hydrologic Urban Hydrology for Small Watersheds was utilized for calculating the peak runoff rates and generating hydrographs for the pre-development and post-development as defined in the computer watershed software "Hydraflow Hydrographs

Extension for AutoCAD Civil 3D 2015". The hydrographs were generated based upon the precipitation amounts provided by NOAA Atlas 14, Volume 2, Version 3 for each storm event.

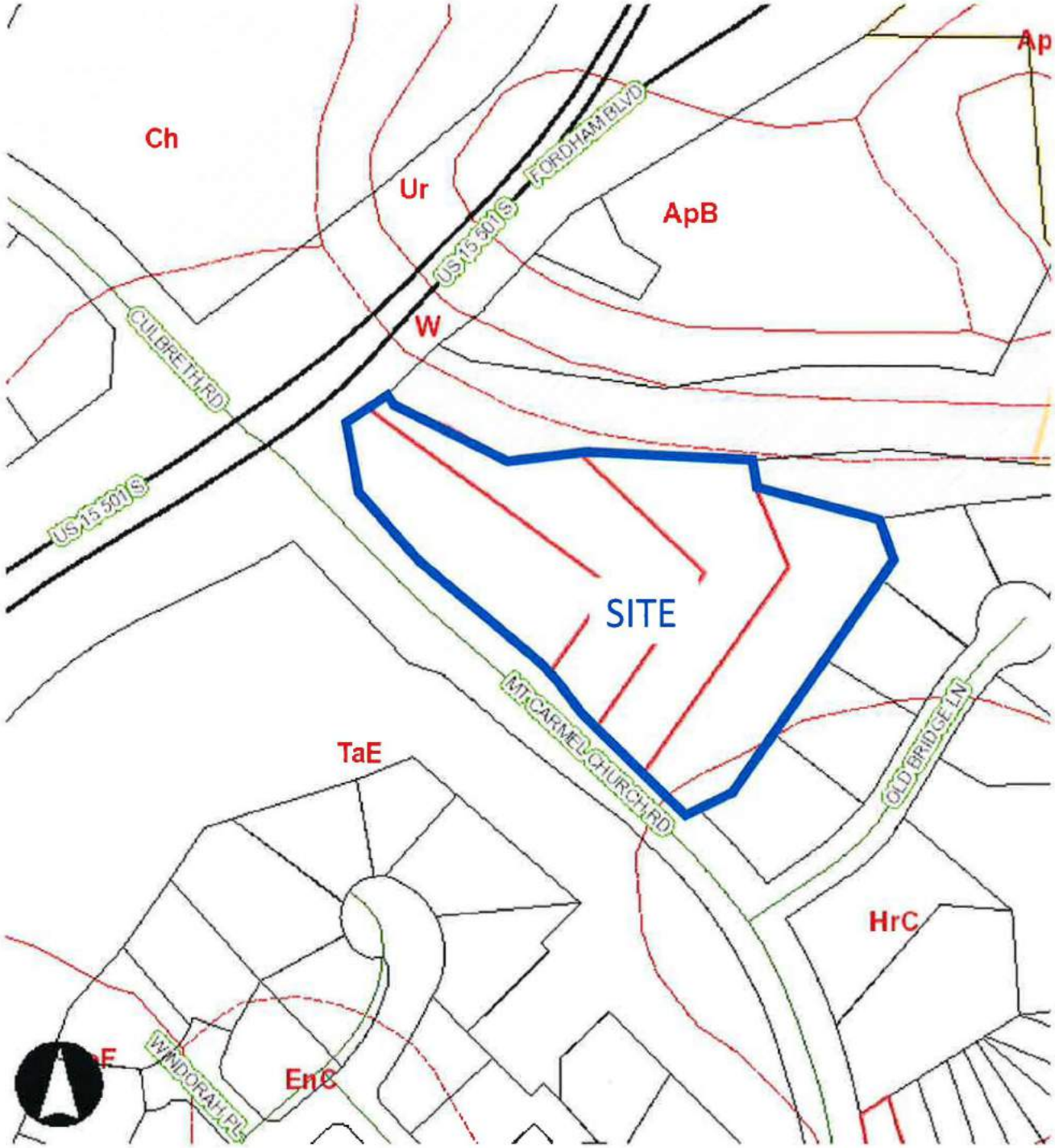
STORMWATER CONVEYANCE

The storm drainage system was designed to intercept runoff at topographic low points and areas of significant runoff quantities and convey the stormwater runoff to the bioretention areas. Autodesk Storm and Sanitary Analysis 2015 has been utilized for designing the stormwater conveyance system, which takes into account the flow from the outlet structure discharge point of the underground infiltration basin. Conveyance design precipitation amounts are based upon NOAA Atlas 14, Volume 2, Version 3 for the 10- and 25-year storm events.

STORMWATER MANAGEMENT BMPs

Subsurface Infiltration Bed – Subsurface infiltration beds provide temporary storage and infiltration of stormwater runoff by placing storage media of varying types beneath the proposed surface grades. Stormwater runoff from nearby impervious areas can be conveyed to the subsurface storage media, where it is then distributed via a network of perforated piping. Subsurface infiltration is generally less maintenance intensive than other practices of its type. Maintenance activities required for the subsurface bed are similar to thos of any infiltration system and focus predominantly on regular sediment and debris removal. All upstream catch basins and inlets should be inspected and cleaned on a regular basis.

SOILS MAP


Ch
Ur
ApB
W
Ap
FORDHAM BLVD
US 15 501 S
CULBRETH RD
US 15 501 S
SITE
MT CARMEL CHURCH RD
OLD BRIDGE LN
TaE
HrC
EnC
WINDORAH PL
E

USGS MAP


NC 54
54
Channing Ln
Culbreth Rd
15
US 15-501 S
SITE
Mt Carmel Church Rd
Old Bridge Ln
300
350
400

NOAA Atlas 14, Volume 2, Version 3
Location name: Chapel Hill, North Carolina, USA*
Latitude: 35.8908°, Longitude: -79.0582°
Elevation: 354.67 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.411 (0.377-0.450)	0.484 (0.444-0.530)	0.557 (0.511-0.609)	0.616 (0.563-0.672)	0.676 (0.615-0.737)	0.719 (0.652-0.783)	0.757 (0.683-0.825)	0.790 (0.708-0.862)	0.824 (0.733-0.901)	0.852 (0.750-0.932)
10-min	0.657 (0.602-0.718)	0.775 (0.710-0.847)	0.893 (0.818-0.975)	0.985 (0.900-1.07)	1.08 (0.981-1.18)	1.15 (1.04-1.25)	1.20 (1.08-1.31)	1.25 (1.12-1.37)	1.30 (1.16-1.43)	1.34 (1.18-1.47)
15-min	0.821 (0.752-0.898)	0.974 (0.893-1.06)	1.13 (1.03-1.23)	1.25 (1.14-1.36)	1.37 (1.24-1.49)	1.45 (1.31-1.58)	1.52 (1.37-1.66)	1.58 (1.42-1.72)	1.64 (1.46-1.79)	1.68 (1.48-1.84)
30-min	1.13 (1.03-1.23)	1.34 (1.23-1.47)	1.60 (1.47-1.75)	1.80 (1.65-1.97)	2.02 (1.84-2.21)	2.18 (1.98-2.38)	2.33 (2.10-2.54)	2.46 (2.20-2.68)	2.61 (2.32-2.85)	2.73 (2.40-2.98)
60-min	1.40 (1.29-1.53)	1.69 (1.55-1.85)	2.06 (1.89-2.25)	2.35 (2.15-2.56)	2.69 (2.45-2.94)	2.96 (2.68-3.22)	3.21 (2.89-3.50)	3.45 (3.09-3.76)	3.75 (3.33-4.09)	3.98 (3.51-4.36)
2-hr	1.68 (1.53-1.84)	2.02 (1.85-2.22)	2.49 (2.27-2.73)	2.86 (2.60-3.14)	3.33 (3.01-3.64)	3.70 (3.33-4.05)	4.05 (3.62-4.44)	4.41 (3.92-4.83)	4.87 (4.28-5.33)	5.25 (4.57-5.76)
3-hr	1.78 (1.63-1.96)	2.15 (1.98-2.37)	2.66 (2.43-2.92)	3.08 (2.81-3.37)	3.61 (3.27-3.94)	4.04 (3.64-4.41)	4.46 (3.99-4.88)	4.90 (4.35-5.35)	5.48 (4.80-5.99)	5.96 (5.17-6.54)
6-hr	2.14 (1.97-2.35)	2.58 (2.38-2.83)	3.19 (2.93-3.49)	3.71 (3.39-4.04)	4.37 (3.97-4.75)	4.92 (4.44-5.35)	5.47 (4.89-5.95)	6.04 (5.35-6.57)	6.81 (5.94-7.41)	7.47 (6.43-8.14)
12-hr	2.54 (2.34-2.77)	3.06 (2.82-3.33)	3.79 (3.49-4.13)	4.43 (4.05-4.82)	5.27 (4.79-5.72)	5.98 (5.39-6.47)	6.71 (5.98-7.24)	7.47 (6.59-8.06)	8.53 (7.39-9.21)	9.45 (8.05-10.2)
24-hr	2.96 (2.77-3.16)	3.57 (3.35-3.82)	4.46 (4.18-4.76)	5.16 (4.83-5.51)	6.11 (5.69-6.53)	6.86 (6.38-7.33)	7.62 (7.07-8.16)	8.41 (7.77-9.02)	9.50 (8.73-10.2)	10.4 (9.47-11.2)
2-day	3.46 (3.24-3.69)	4.16 (3.90-4.45)	5.16 (4.84-5.52)	5.94 (5.55-6.35)	6.98 (6.50-7.46)	7.80 (7.25-8.35)	8.64 (8.00-9.26)	9.49 (8.75-10.2)	10.7 (9.79-11.5)	11.6 (10.6-12.5)
3-day	3.66 (3.43-3.91)	4.40 (4.12-4.70)	5.43 (5.09-5.80)	6.24 (5.83-6.67)	7.33 (6.82-7.83)	8.18 (7.60-8.76)	9.06 (8.38-9.72)	9.96 (9.18-10.7)	11.2 (10.3-12.1)	12.2 (11.1-13.1)
4-day	3.86 (3.62-4.13)	4.63 (4.34-4.95)	5.70 (5.34-6.08)	6.53 (6.11-6.98)	7.67 (7.14-8.21)	8.57 (7.95-9.18)	9.48 (8.77-10.2)	10.4 (9.61-11.2)	11.7 (10.7-12.6)	12.8 (11.6-13.8)
7-day	4.44 (4.18-4.72)	5.29 (4.99-5.64)	6.43 (6.06-6.85)	7.33 (6.90-7.81)	8.56 (8.03-9.13)	9.53 (8.91-10.2)	10.5 (9.80-11.3)	11.6 (10.7-12.4)	13.0 (11.9-13.9)	14.1 (12.9-15.1)
10-day	5.04 (4.77-5.36)	5.99 (5.66-6.37)	7.20 (6.79-7.65)	8.14 (7.66-8.65)	9.41 (8.84-10.0)	10.4 (9.74-11.1)	11.4 (10.7-12.2)	12.5 (11.6-13.3)	13.9 (12.8-14.8)	14.9 (13.8-16.0)
20-day	6.75 (6.38-7.14)	7.96 (7.53-8.42)	9.40 (8.88-9.94)	10.5 (9.95-11.2)	12.1 (11.4-12.8)	13.3 (12.5-14.1)	14.5 (13.6-15.5)	15.8 (14.7-16.8)	17.5 (16.2-18.7)	18.8 (17.4-20.1)
30-day	8.38 (7.94-8.86)	9.86 (9.34-10.4)	11.5 (10.8-12.1)	12.7 (12.0-13.4)	14.3 (13.5-15.1)	15.6 (14.7-16.5)	16.8 (15.8-17.8)	18.1 (16.9-19.2)	19.8 (18.4-21.0)	21.0 (19.5-22.4)
45-day	10.7 (10.2-11.2)	12.5 (11.9-13.1)	14.3 (13.6-15.0)	15.7 (14.9-16.5)	17.5 (16.6-18.4)	18.9 (17.9-19.9)	20.3 (19.1-21.3)	21.6 (20.4-22.8)	23.4 (21.9-24.7)	24.8 (23.1-26.2)
60-day	12.8 (12.3-13.4)	14.9 (14.3-15.6)	16.9 (16.1-17.7)	18.3 (17.5-19.2)	20.2 (19.3-21.2)	21.7 (20.6-22.8)	23.1 (21.9-24.2)	24.4 (23.1-25.7)	26.2 (24.7-27.6)	27.5 (25.9-29.0)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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NOAA Atlas 14, Volume 2, Version 3
Location name: Chapel Hill, North Carolina, USA*
Latitude: 35.8908°, Longitude: -79.0582°
Elevation: 354.67 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.93 (4.52-5.40)	5.81 (5.33-6.36)	6.68 (6.13-7.31)	7.39 (6.76-8.06)	8.11 (7.38-8.84)	8.63 (7.82-9.40)	9.08 (8.20-9.90)	9.48 (8.50-10.3)	9.89 (8.80-10.8)	10.2 (9.00-11.2)
10-min	3.94 (3.61-4.31)	4.65 (4.26-5.08)	5.36 (4.91-5.85)	5.91 (5.40-6.44)	6.47 (5.89-7.05)	6.87 (6.23-7.49)	7.22 (6.51-7.87)	7.51 (6.73-8.20)	7.82 (6.95-8.55)	8.05 (7.09-8.81)
15-min	3.28 (3.01-3.59)	3.90 (3.57-4.26)	4.52 (4.14-4.94)	4.98 (4.56-5.44)	5.46 (4.97-5.96)	5.80 (5.26-6.32)	6.08 (5.49-6.63)	6.32 (5.66-6.90)	6.56 (5.84-7.17)	6.74 (5.93-7.37)
30-min	2.25 (2.06-2.46)	2.69 (2.47-2.94)	3.21 (2.94-3.51)	3.61 (3.30-3.94)	4.05 (3.68-4.41)	4.37 (3.96-4.76)	4.66 (4.20-5.08)	4.92 (4.41-5.37)	5.22 (4.64-5.71)	5.46 (4.80-5.97)
60-min	1.40 (1.29-1.53)	1.69 (1.55-1.85)	2.06 (1.89-2.25)	2.35 (2.15-2.56)	2.69 (2.45-2.94)	2.96 (2.68-3.22)	3.21 (2.89-3.50)	3.45 (3.09-3.76)	3.75 (3.33-4.09)	3.98 (3.51-4.36)
2-hr	0.838 (0.764-0.922)	1.01 (0.924-1.11)	1.24 (1.14-1.37)	1.43 (1.30-1.57)	1.66 (1.50-1.82)	1.85 (1.66-2.02)	2.03 (1.81-2.22)	2.21 (1.96-2.41)	2.44 (2.14-2.67)	2.62 (2.29-2.88)
3-hr	0.594 (0.544-0.652)	0.717 (0.658-0.788)	0.885 (0.810-0.971)	1.03 (0.935-1.12)	1.20 (1.09-1.31)	1.34 (1.21-1.47)	1.49 (1.33-1.63)	1.63 (1.45-1.78)	1.82 (1.60-1.99)	1.99 (1.72-2.18)
6-hr	0.358 (0.329-0.392)	0.432 (0.397-0.472)	0.533 (0.489-0.583)	0.619 (0.566-0.676)	0.730 (0.663-0.794)	0.821 (0.741-0.894)	0.914 (0.817-0.993)	1.01 (0.893-1.10)	1.14 (0.993-1.24)	1.25 (1.07-1.36)
12-hr	0.211 (0.194-0.230)	0.254 (0.234-0.277)	0.315 (0.289-0.343)	0.368 (0.337-0.400)	0.438 (0.397-0.475)	0.497 (0.447-0.537)	0.557 (0.497-0.601)	0.620 (0.547-0.669)	0.708 (0.613-0.764)	0.784 (0.668-0.847)
24-hr	0.123 (0.116-0.132)	0.149 (0.140-0.159)	0.186 (0.174-0.199)	0.215 (0.201-0.230)	0.255 (0.237-0.272)	0.286 (0.266-0.306)	0.318 (0.294-0.340)	0.351 (0.324-0.376)	0.396 (0.364-0.425)	0.431 (0.395-0.465)
2-day	0.072 (0.067-0.077)	0.087 (0.081-0.093)	0.108 (0.101-0.115)	0.124 (0.116-0.132)	0.145 (0.135-0.155)	0.163 (0.151-0.174)	0.180 (0.167-0.193)	0.198 (0.182-0.212)	0.222 (0.204-0.239)	0.241 (0.221-0.260)
3-day	0.051 (0.048-0.054)	0.061 (0.057-0.065)	0.075 (0.071-0.081)	0.087 (0.081-0.093)	0.102 (0.095-0.109)	0.114 (0.106-0.122)	0.126 (0.116-0.135)	0.138 (0.127-0.149)	0.155 (0.143-0.167)	0.169 (0.154-0.182)
4-day	0.040 (0.038-0.043)	0.048 (0.045-0.052)	0.059 (0.056-0.063)	0.068 (0.064-0.073)	0.080 (0.074-0.086)	0.089 (0.083-0.096)	0.099 (0.091-0.106)	0.109 (0.100-0.117)	0.122 (0.112-0.132)	0.133 (0.121-0.144)
7-day	0.026 (0.025-0.028)	0.031 (0.030-0.034)	0.038 (0.036-0.041)	0.044 (0.041-0.046)	0.051 (0.048-0.054)	0.057 (0.053-0.061)	0.063 (0.058-0.067)	0.069 (0.064-0.074)	0.077 (0.071-0.083)	0.084 (0.077-0.090)
10-day	0.021 (0.020-0.022)	0.025 (0.024-0.027)	0.030 (0.028-0.032)	0.034 (0.032-0.036)	0.039 (0.037-0.042)	0.043 (0.041-0.046)	0.048 (0.044-0.051)	0.052 (0.048-0.055)	0.058 (0.053-0.062)	0.062 (0.057-0.067)
20-day	0.014 (0.013-0.015)	0.017 (0.016-0.018)	0.020 (0.019-0.021)	0.022 (0.021-0.023)	0.025 (0.024-0.027)	0.028 (0.026-0.029)	0.030 (0.028-0.032)	0.033 (0.031-0.035)	0.036 (0.034-0.039)	0.039 (0.036-0.042)
30-day	0.012 (0.011-0.012)	0.014 (0.013-0.014)	0.016 (0.015-0.017)	0.018 (0.017-0.019)	0.020 (0.019-0.021)	0.022 (0.020-0.023)	0.023 (0.022-0.025)	0.025 (0.023-0.027)	0.027 (0.026-0.029)	0.029 (0.027-0.031)
45-day	0.010 (0.009-0.010)	0.012 (0.011-0.012)	0.013 (0.013-0.014)	0.015 (0.014-0.015)	0.016 (0.015-0.017)	0.018 (0.017-0.018)	0.019 (0.018-0.020)	0.020 (0.019-0.021)	0.022 (0.020-0.023)	0.023 (0.021-0.024)
60-day	0.009 (0.009-0.009)	0.010 (0.010-0.011)	0.012 (0.011-0.012)	0.013 (0.012-0.013)	0.014 (0.013-0.015)	0.015 (0.014-0.016)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.018 (0.017-0.019)	0.019 (0.018-0.020)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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POINT OF INTEREST #1

TR 55 Worksheet: Time of Concentration (Tc) **PROJECT: Chapel Hill Co-Op** **PN: CHCP (PRE-DEVELOPMENT: POI#1)**

	1	2	3	4	5	6	6	
Sheet Flow								
Surface description (Table 3-1)	WOODS (LIGHT)							
Manning's roughness coeff., n (Table 3-1)	0.40							
Flow length, L (total L < 100 ft) ..... ft	100.00							
Two-year 24-hour rainfall, P2..... in	3.57							
Land slope, S ..... ft/ft	0.1200							
$T_t = (0.007\ (nL)^{0.8})/(P_2^{0.5}\ s^{0.4})$ ..... hr	0.17	0.00	0.00	0.00	0.00	0.00	0.00	
Shallow Concetrated Flow								
Surface description (paved=1 or unpaved=0)	0	0	0	0	0	0	0	
Flow length, L ..... ft	30.0	420.0	0.0	0.0	0.0	0.0	0.0	
Watercourse slope, S ..... ft/ft	0.1650	0.1700	0.0100	0.0100	0.0100	0.0100	0.0100	
Average velocity, V ..... ft/s	-	-	-	-	-	-	-	
Unpaved $V = 16.1345\ (s)^{0.5}$	6.55	6.65	1.61	1.61	1.61	1.61	1.61	
Paved $V = 20.3282\ (s)^{0.5}$								
$T_t = L/3600V$ ..... hr	0.00	0.02	0.00	0.00	0.00	0.00	0.00	
Channel Flow	**CHANNEL**							
Cross sectional flow area, A ..... ft^2	60.00							
Wetted perimeter, Pw..... ft	26.00							
Hydraulic radius, r = A/Pw.....ft	2.31	0.00	0.00	0.00	0.00	0.00	0.00	
Channel slope, s..... ft/ft	0.008							
Manning's roughness coefficient, n.....	0.030	0.035	0.069	0.013	0.013	0.013	0.013	
Velocity, $V=(1.49/n)R^{2/3}s^{1/2}$ ..... ft	7.74	0.00	0.00	0.00	0.00	0.00	0.00	
Flow length, L ..... ft	485.0							
$T_t = L/3600V$ ..... hr	**0.017**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	
Sub Basin Tc = $T_{sheetflow}+T_{shallow\ concentrated}+T_{channel}$ =	0.18 hr	0.02 hr	0.00 hr	0.00 hr	0.00 hr	0.00 hr	0.00 hr	
Sub Basin Tc = $T_{sheetflow}+T_{shallow\ concentrated}+T_{channel}$ =	11.05 min	1.05 min	0.00 min	0.00 min	0.00 min	0.00 min	0.00 min	**12.10 min**

COMPUTATION SHEET : RUNOFF CURVE NUMBER (CN)

PROJECT:	Chapel Hill Co-op	DATE:	11/10/2016
	Mt. Carmel Church Rd.	BY:	JJB
		CHECKED BY:	PCB
		SHEET NO:	1
LOCATION	Pre-Development POI#1	REVISION:	

SOIL GROUP	LAND USE DESCRIPTION	CN (A)	% OF AREA (ACRE) (B)	PRODUCT (A*B) (C)
B	IMPERVIOUS	98	0.07	6.86
	Gravel	85	0.105	8.93
	PERVIOUS			
B	*Open space (fair condition)*	69	0.689	47.54
	Woods (good condition)	55	3.106	170.83

TOTAL: 3.97 234.156

CN (weighted)	Total (C) / Total (B)	234.156 / 3.97	58.9814	Use CN =	**59**

Notes:

Time of Concentration = 12.10 minutes (see calculations)

Hydrograph Report

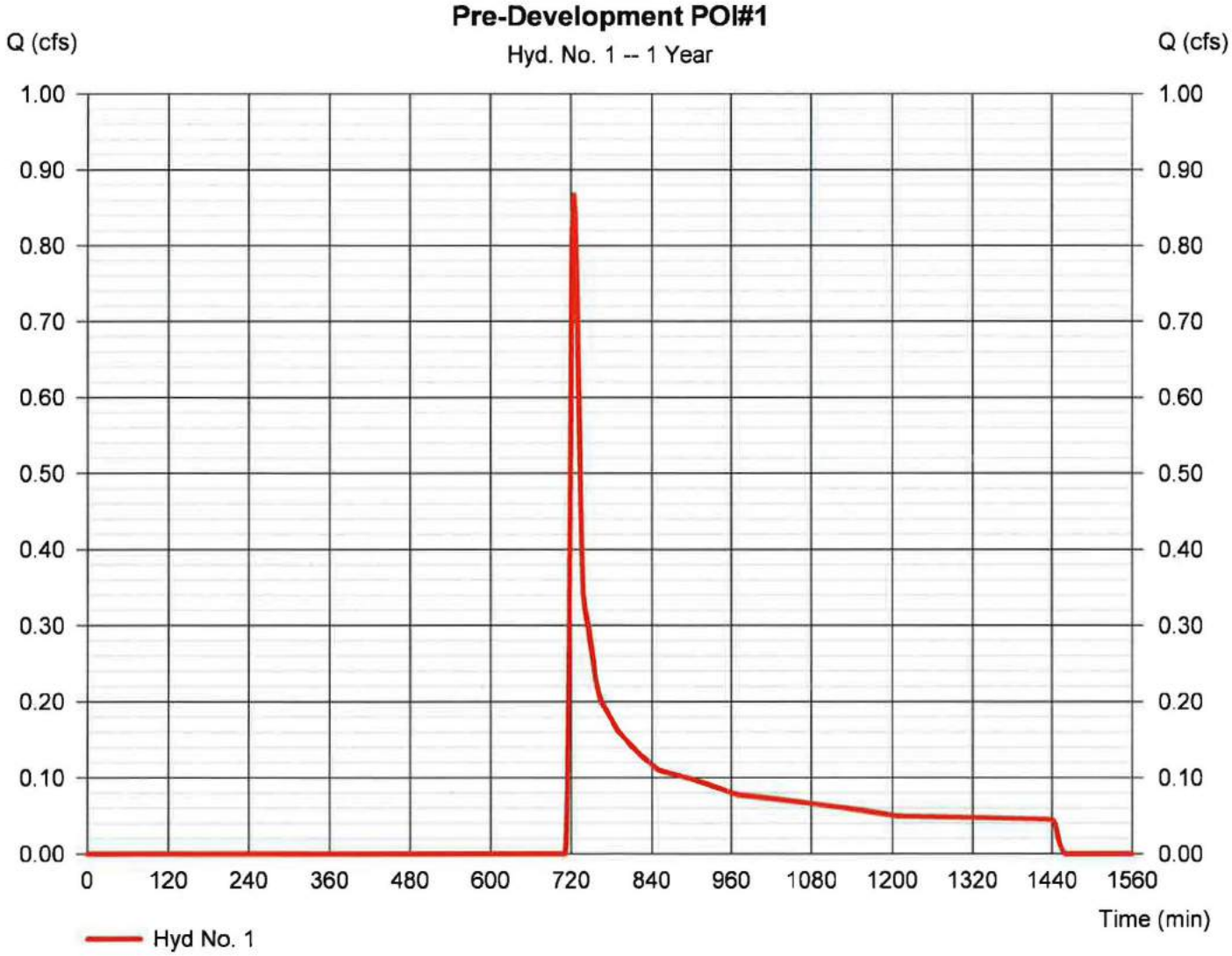
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 1

Pre-Development POI#1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.867 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 4,301 cuft
Drainage area	= 3.970 ac	Curve number	= 59*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.10 min
Total precip.	= 2.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.105 x 85) + (0.070 x 98) + (0.689 x 69) + (3.106 x 55)] / 3.970



Hydrograph Report

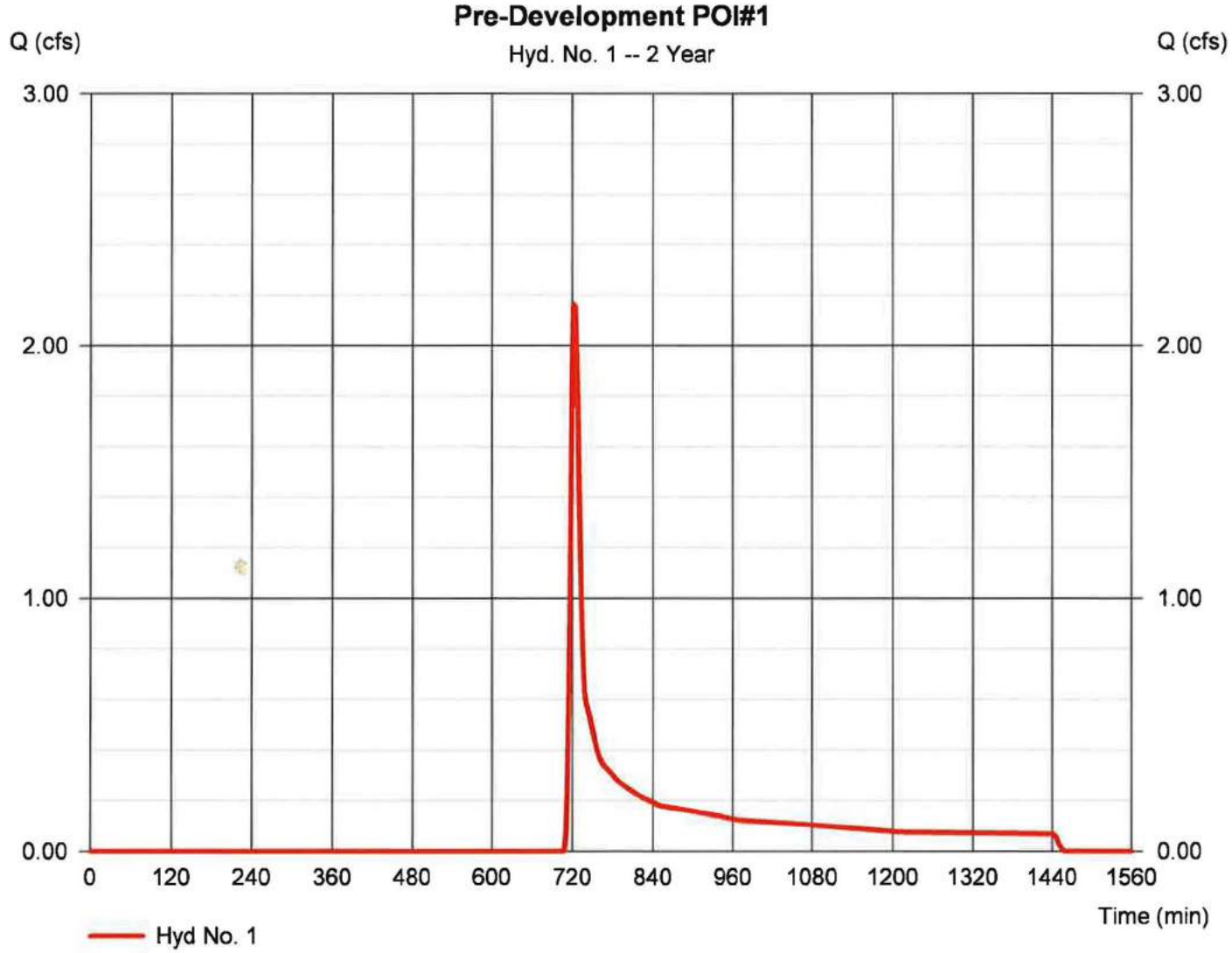
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 1

Pre-Development POI#1

Hydrograph type	= SCS Runoff	Peak discharge	= 2.165 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 7,735 cuft
Drainage area	= 3.970 ac	Curve number	= 59*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.10 min
Total precip.	= 3.57 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.105 x 85) + (0.070 x 98) + (0.689 x 69) + (3.106 x 55)] / 3.970



Hydrograph Report

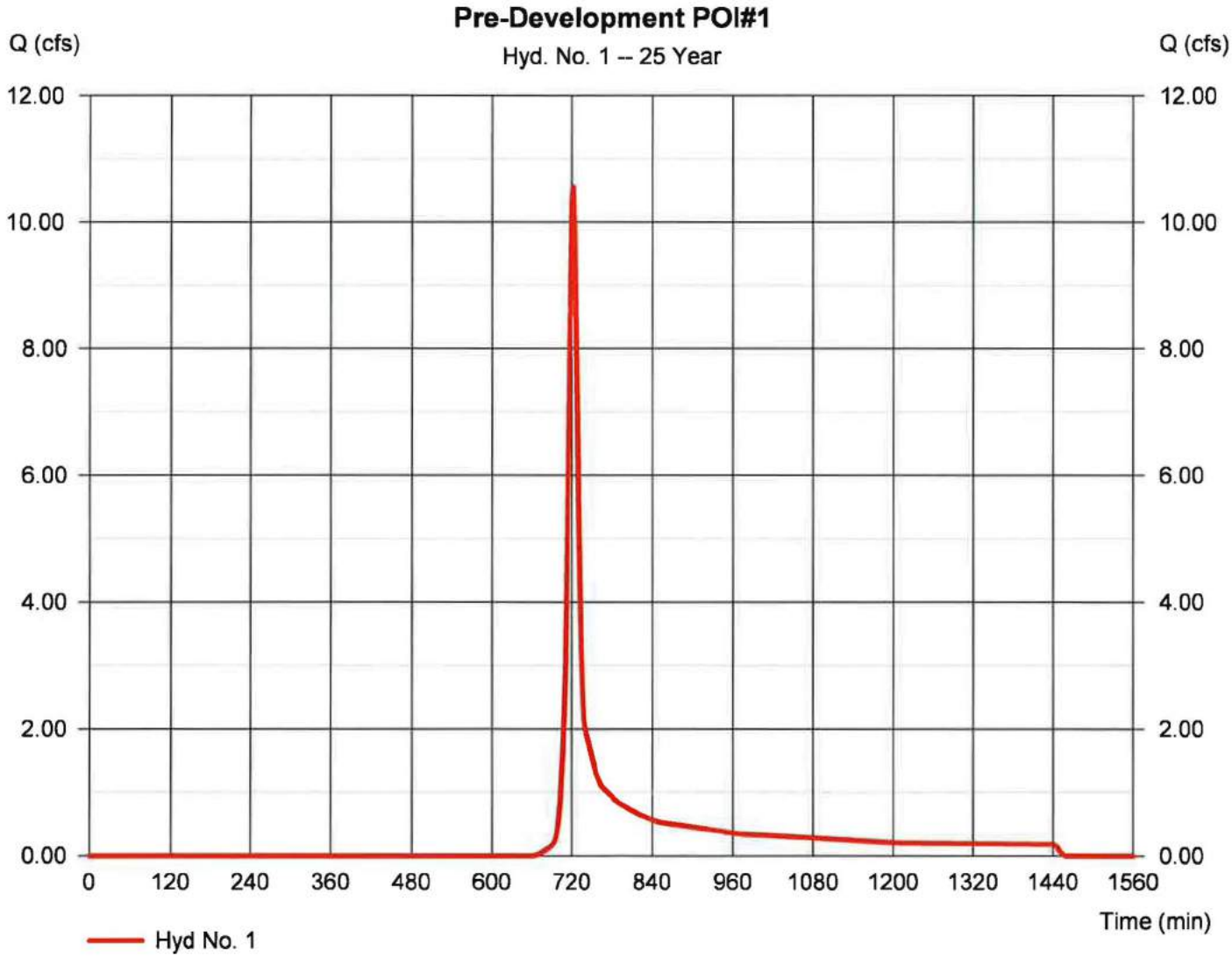
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 1

Pre-Development POI#1

Hydrograph type	= SCS Runoff	Peak discharge	= 10.56 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 28,375 cuft
Drainage area	= 3.970 ac	Curve number	= 59*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.10 min
Total precip.	= 6.11 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.105 x 85) + (0.070 x 98) + (0.689 x 69) + (3.106 x 55)] / 3.970



TR 55 Worksheet: Time of Concentration (Tc) **PROJECT: Chapel Hill Co-Op** **PN: CHCP (POST-DEV. BYPASS POI#1)**

	1	2	3	4	5	6	6	
Sheet Flow								
Surface description (Table 3-1)	WOODS (LIGHT)							
Manning's roughness coeff., n (Table 3-1)	0.40							
Flow length, L (total L < 100 ft) ..... ft	100.00							
Two-year 24-hour rainfall, P2..... in	3.57							
Land slope, S ..... ft/ft	0.1100							
$T_t = (0.007\ (nL)^{0.8})/(P_2^{0.5}\ s^{0.4})$ ..... hr	0.17	0.00	0.00	0.00	0.00	0.00	0.00	
Shallow Concetrated Flow								
Surface description (paved=1 or unpaved=0)	0	0	0	0	0	0	0	
Flow length, L ..... ft	145.0	0.0	0.0	0.0	0.0	0.0	0.0	
Watercourse slope, S ..... ft/ft	0.5500	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	
Average velocity, V ..... ft/s	-	-	-	-	-	-	-	
Unpaved $V = 16.1345\ (s)^{0.5}$	11.97	1.61	1.61	1.61	1.61	1.61	1.61	
Paved $V = 20.3282\ (s)^{0.5}$								
$T_t = L/3600V$ ..... hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Channel Flow	**CHANNEL**							
Cross sectional flow area, A ..... ft^2	60.00							
Wetted perimeter, Pw..... ft	26.00							
Hydraulic radius, r = A/Pw.....ft	2.31	0.00	0.00	0.00	0.00	0.00	0.00	
Channel slope, s..... ft/ft	0.008							
Manning's roughness coefficient, n.....	0.030	0.035	0.069	0.013	0.013	0.013	0.013	
Velocity, $V=(1.49/n)R^{2/3}s^{1/2}$ ..... ft	7.74	0.00	0.00	0.00	0.00	0.00	0.00	
Flow length, L ..... ft	290.0							
$T_t = L/3600V$ ..... hr	**0.010**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	
Sub Basin Tc = $T_{sheetflow}+T_{shallow\ concentrated}+T_{channel}$ =	0.19 hr	0.00 hr	0.00 hr	0.00 hr	0.00 hr	0.00 hr	0.00 hr	
Sub Basin Tc = $T_{sheetflow}+T_{shallow\ concentrated}+T_{channel}$ =	11.11 min	0.00 min	0.00 min	0.00 min	0.00 min	0.00 min	0.00 min	**11.11 min**

COMPUTATION SHEET : RUNOFF CURVE NUMBER (CN)

PROJECT:	Chapel Hill Co-op	DATE:	11/10/2016
	Mt. Carmel Church Rd.	BY:	JJB
		CHECKED BY:	PCB
		SHEET NO:	1
LOCATION	Post Dev. By-Pass	REVISION:	

SOIL GROUP	LAND USE DESCRIPTION	CN (A)	% OF AREA (ACRE) (B)	PRODUCT (A*B) (C)
B	IMPERVIOUS	98	0.218	21.36
	Gravel	85	0.105	8.93
	PERVIOUS			
B	*Open space (good condition)*	61	0.146	8.91
B	*Woods (good condition)*	55	2.995	164.73

TOTAL: 3.464 203.92

CN (weighted)	Total (C)	203.92	58.8684	Use CN =	**59**
	Total (B)	3.464			

Notes:

Time of Concentration = 11.11 minutes (see calculations)

Hydrograph Report

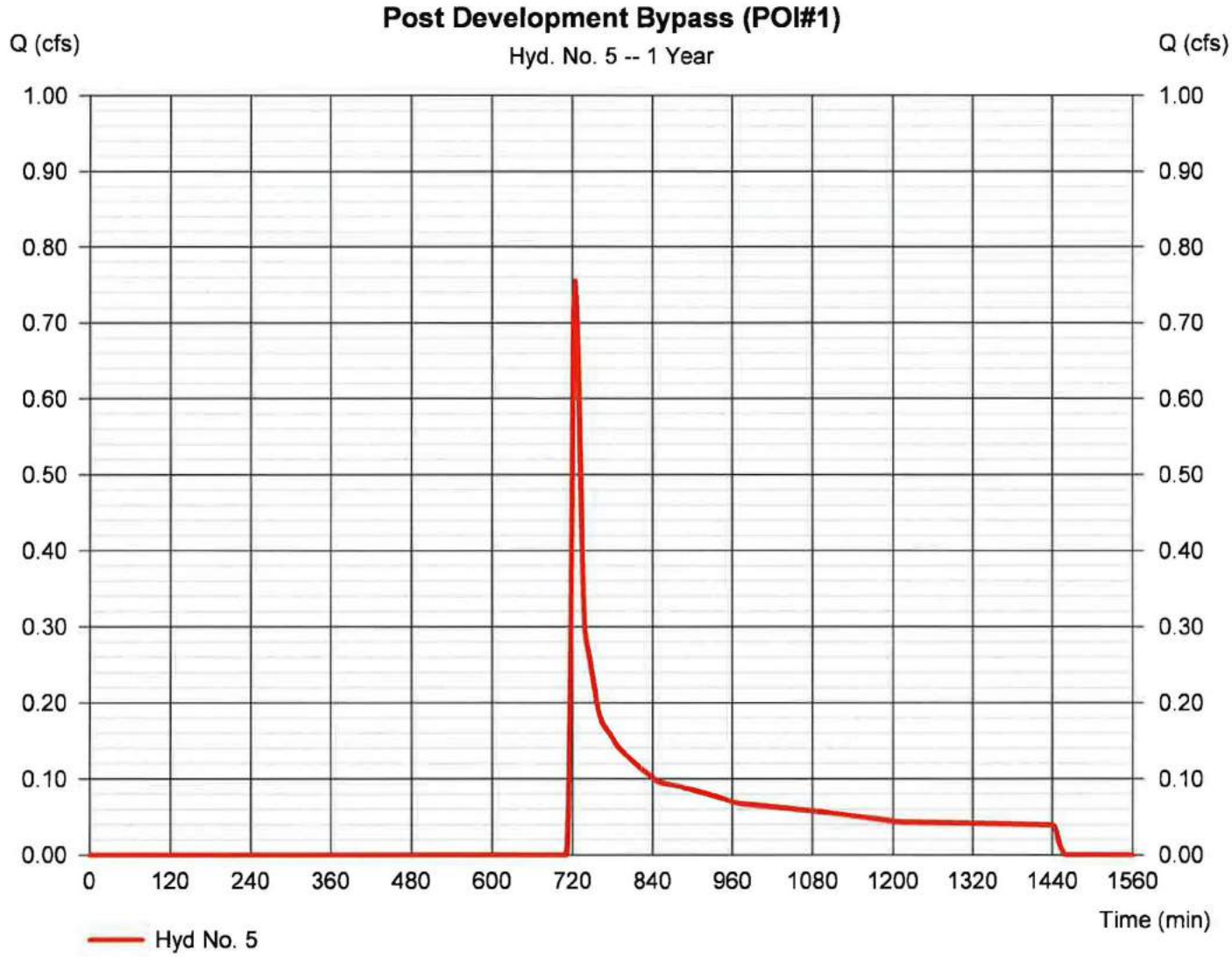
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 5

Post Development Bypass (POI#1)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.755 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 3,748 cuft
Drainage area	= 3.460 ac	Curve number	= 59*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.11 min
Total precip.	= 2.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.220 x 61) + (0.140 x 98) + (0.010 x 85) + (3.090 x 55)] / 3.460



Hydrograph Report

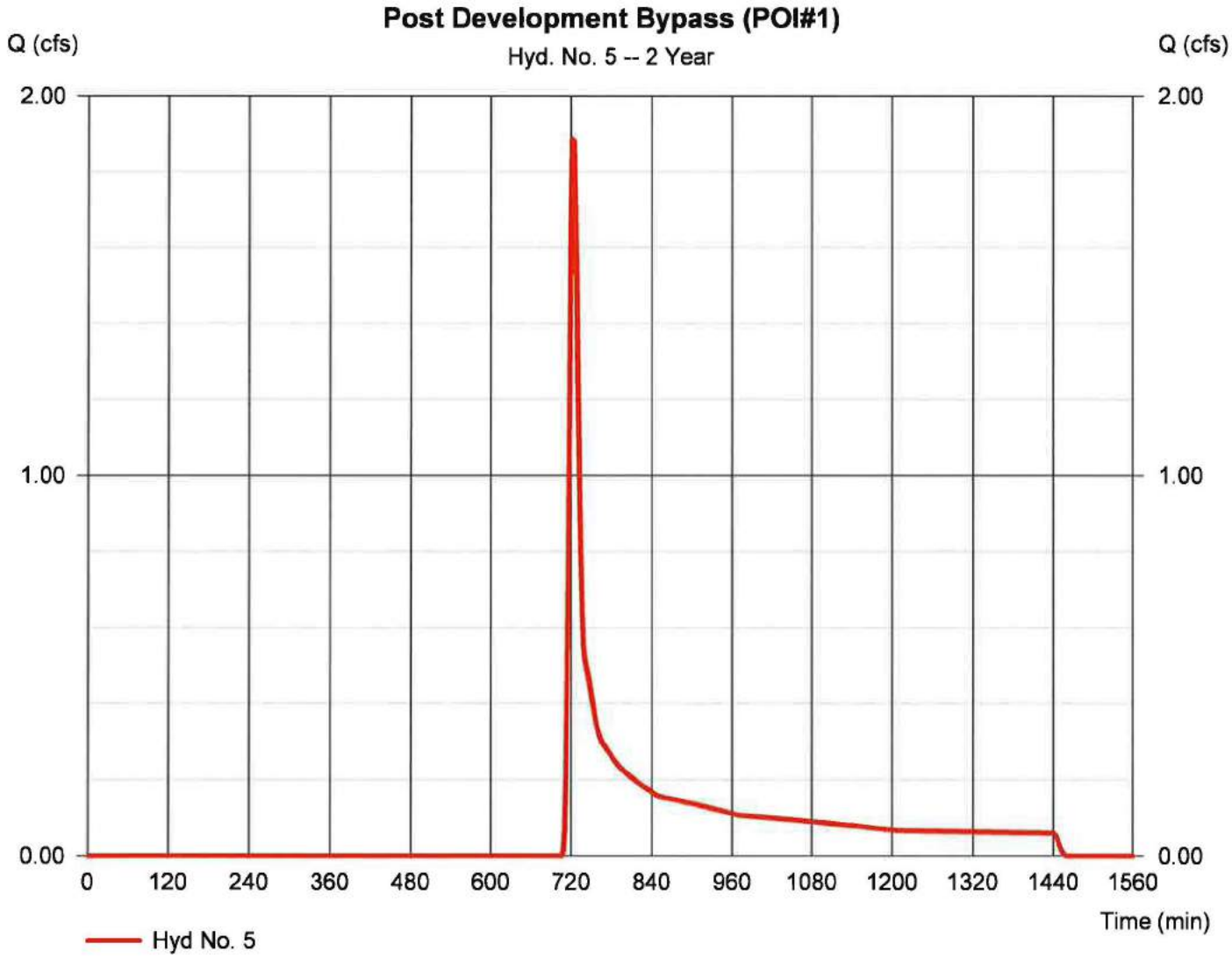
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 5

Post Development Bypass (POI#1)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.887 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 6,741 cuft
Drainage area	= 3.460 ac	Curve number	= 59*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.11 min
Total precip.	= 3.57 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.220 x 61) + (0.140 x 98) + (0.010 x 85) + (3.090 x 55)] / 3.460



Hydrograph Report

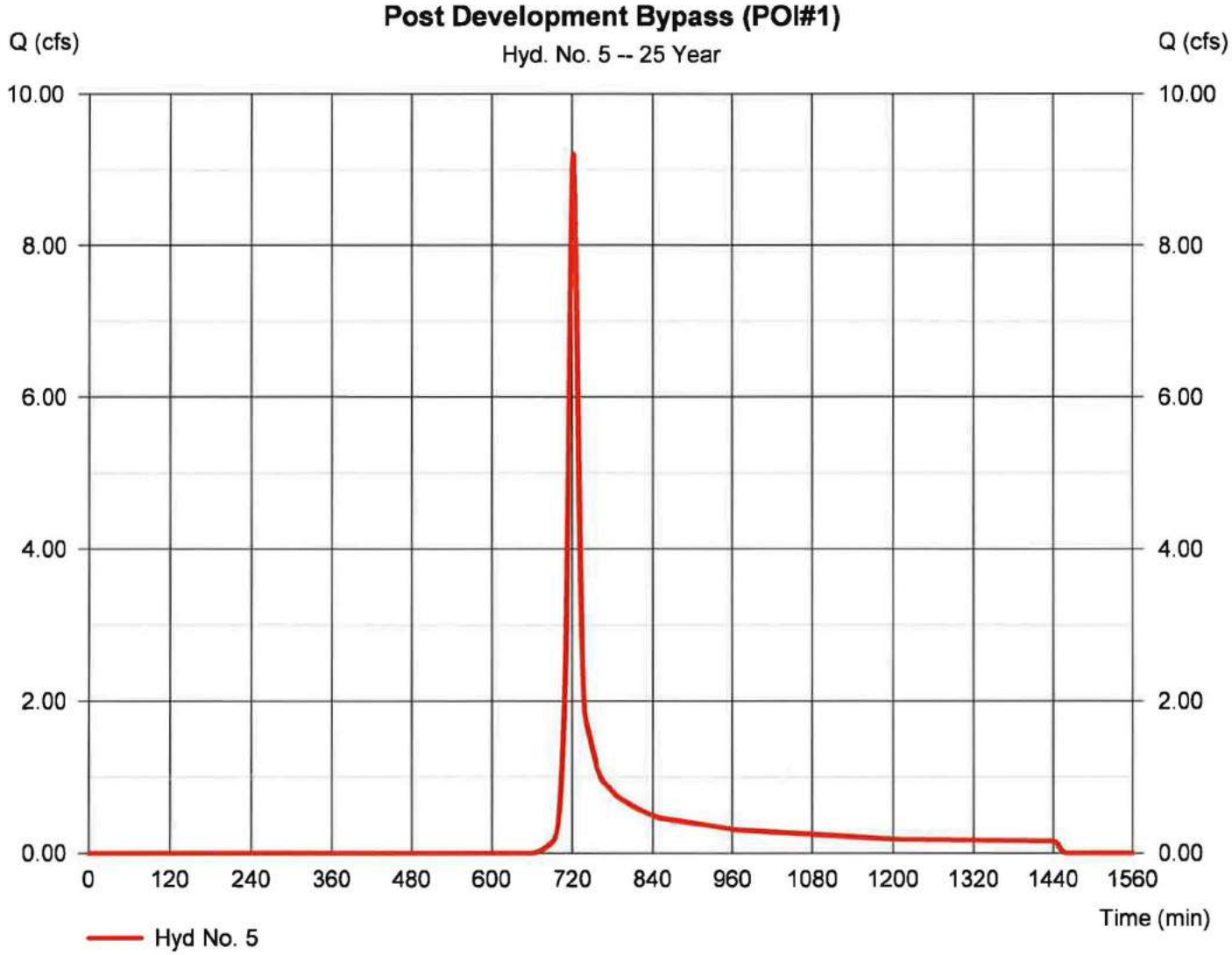
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 5

Post Development Bypass (POI#1)

Hydrograph type	= SCS Runoff	Peak discharge	= 9.207 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 24,730 cuft
Drainage area	= 3.460 ac	Curve number	= 59*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.11 min
Total precip.	= 6.11 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.220 x 61) + (0.140 x 98) + (0.010 x 85) + (3.090 x 55)] / 3.460



COMPUTATION SHEET : RUNOFF CURVE NUMBER (CN)

PROJECT:	Chapel Hill Co-op	DATE:	11/10/2016
	Mt. Carmel Church Rd.	BY:	JJB
		CHECKED BY:	PCB
		SHEET NO:	1
LOCATION	Post Dev. Basin Inflow	REVISION:	

SOIL GROUP	LAND USE DESCRIPTION	CN (A)	% OF AREA (ACRE) (B)	PRODUCT (A*B) (C)
B	IMPERVIOUS	98	0.391	38.32
	PERVIOUS			
B	*Open space (good condition)*	69	0.046	3.17
B	*Woods (good condition)*	55	0.069	3.80

TOTAL: 0.506 45.287

CN (weighted)	Total (C)	45.287	89.5000	Use CN =	**90**
	Total (B)	0.506			

Notes:

Time of Concentration = 5.00 minutes (Assumed, actual is less)

Hydrograph Report

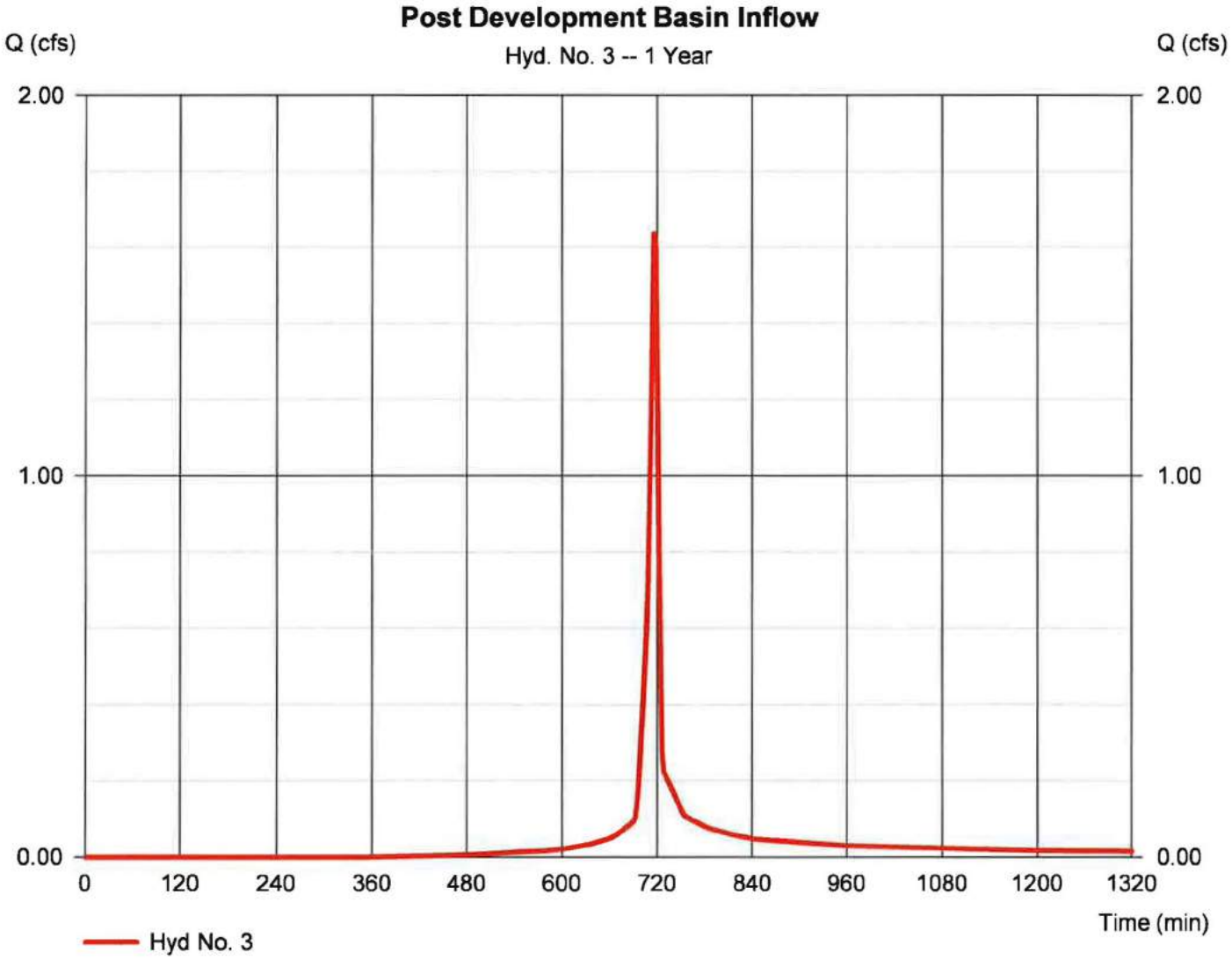
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 3

Post Development Basin Inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 1.637 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 3,380 cuft
Drainage area	= 0.510 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.123 x 61) + (0.387 x 98)] / 0.510



Hydrograph Report

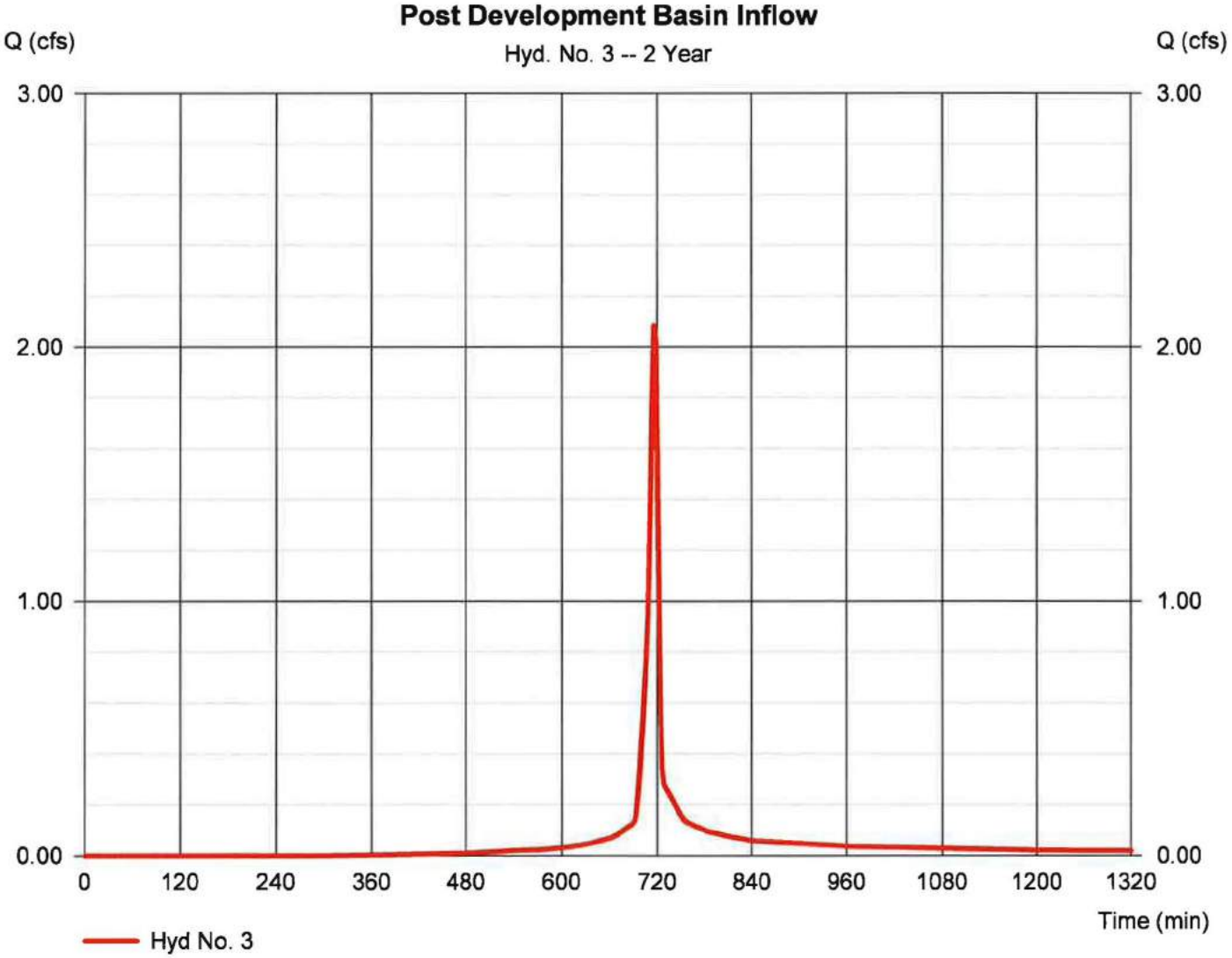
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 3

Post Development Basin Inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 2.086 cfs
Storm frequency	= 2 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 4,362 cuft
Drainage area	= 0.510 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.57 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.123 x 61) + (0.387 x 98)] / 0.510



Hydrograph Report

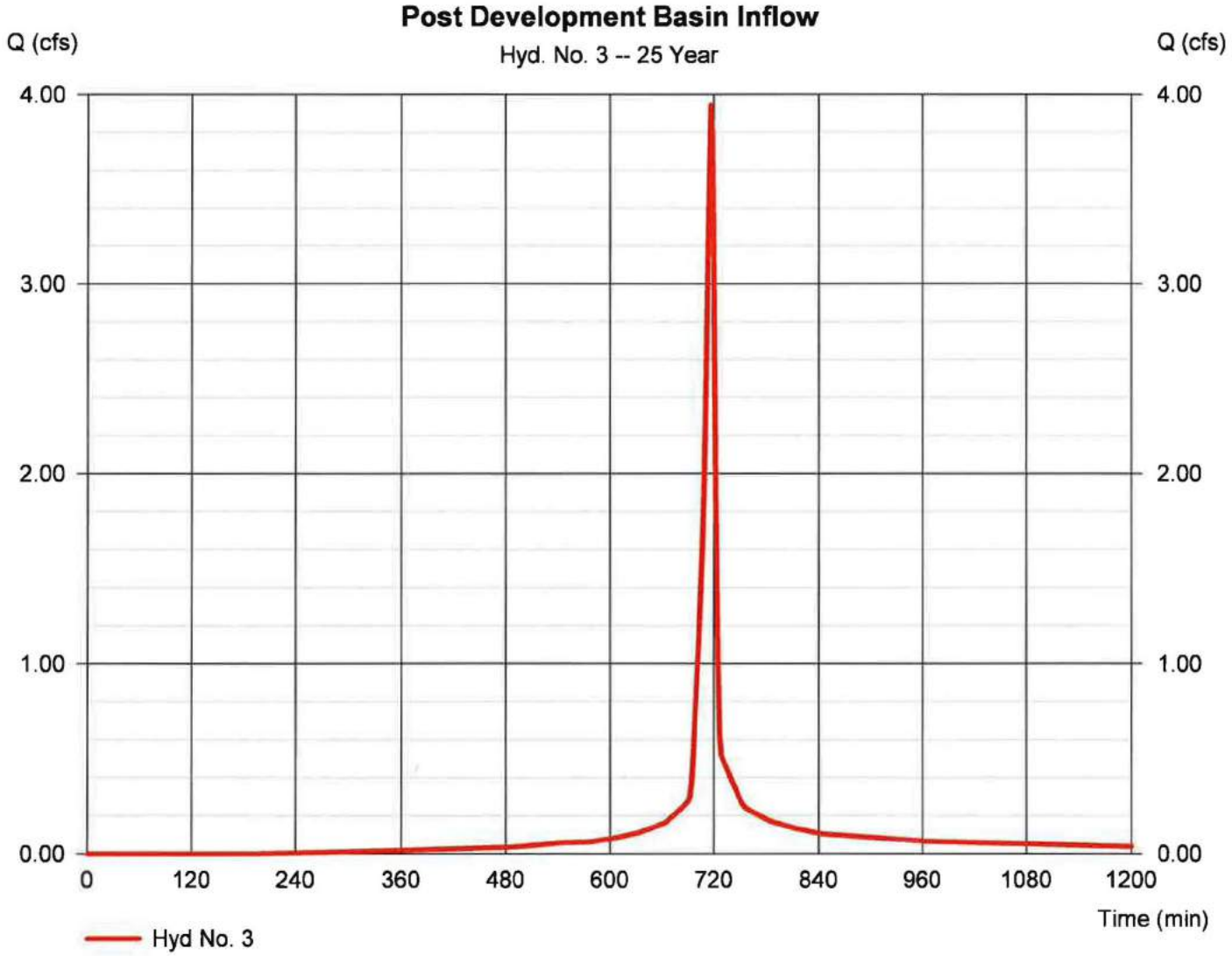
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 3

Post Development Basin Inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 3.944 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 8,597 cuft
Drainage area	= 0.510 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.11 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.123 x 61) + (0.387 x 98)] / 0.510



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Pond No. 1 - UG Basin

Pond Data

UG Chambers -Invert elev. = 368.00 ft, Rise x Span = 2.00 x 2.00 ft, Barrel Len = 100.00 ft, No. Barrels = 5, Slope = 0.50%, Headers = Yes
Encasement -Invert elev. = 367.50 ft, Width = 3.50 ft, Height = 3.50 ft, Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	367.50	n/a	0	0
0.40	367.90	n/a	126	126
0.80	368.30	n/a	308	434
1.20	368.70	n/a	453	887
1.60	369.10	n/a	534	1,421
2.00	369.50	n/a	551	1,972
2.40	369.90	n/a	522	2,494
2.80	370.30	n/a	415	2,909
3.20	370.70	n/a	310	3,219
3.60	371.10	n/a	300	3,518
4.00	371.50	n/a	300	3,818

Culvert / Orifice Structures

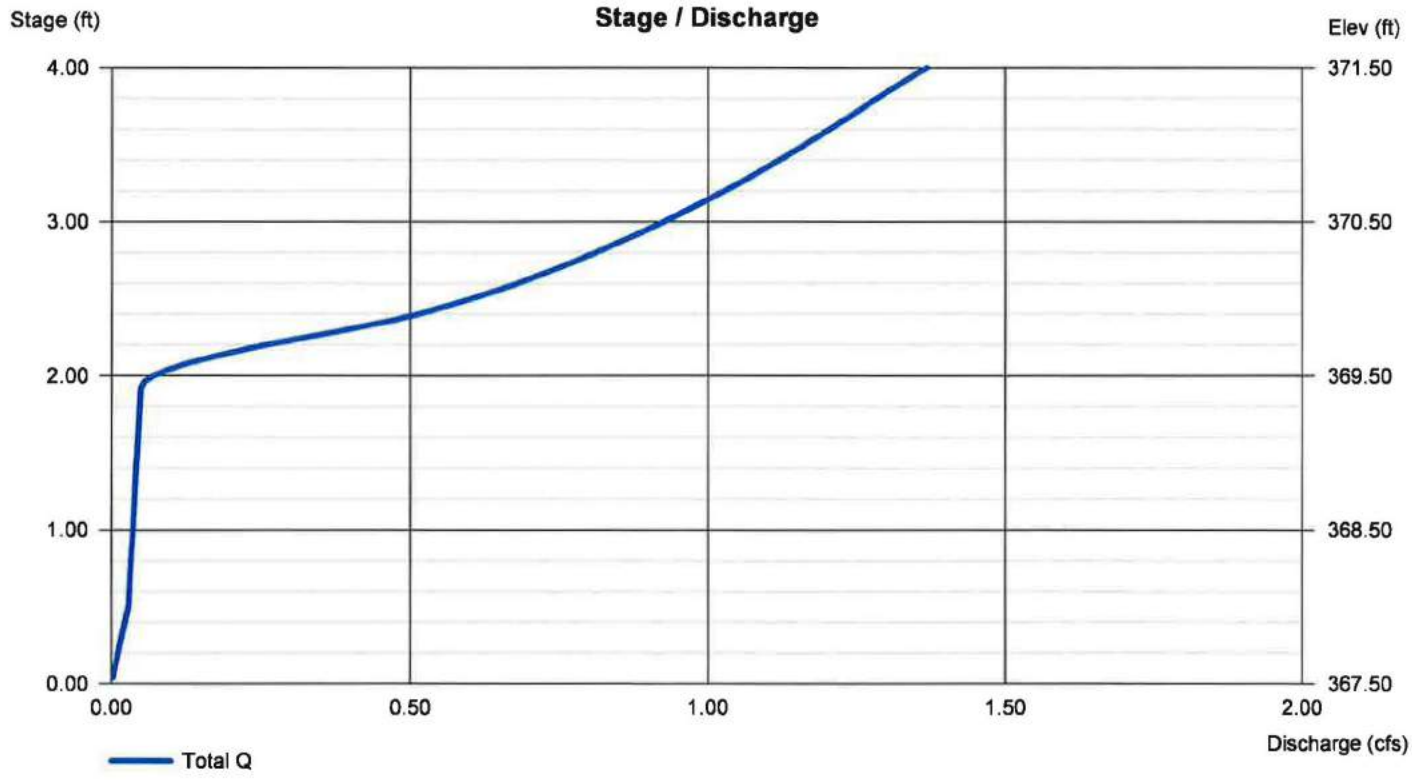
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	6.00	Inactive	0.00
Span (in)	= 15.00	6.00	6.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 367.90	369.42	371.00	0.00
Length (ft)	= 32.00	0.50	0.50	0.00
Slope (%)	= 2.80	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 16.00	0.00	0.00	0.00
Crest El. (ft)	= 373.00	371.25	0.00	0.00
Weir Coeff.	= 3.33	0.33	3.33	3.33
Weir Type	= 1	15 degV	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.600 (by Wet area)
TW Elev. (ft) = 0.00

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



Hydrograph Report

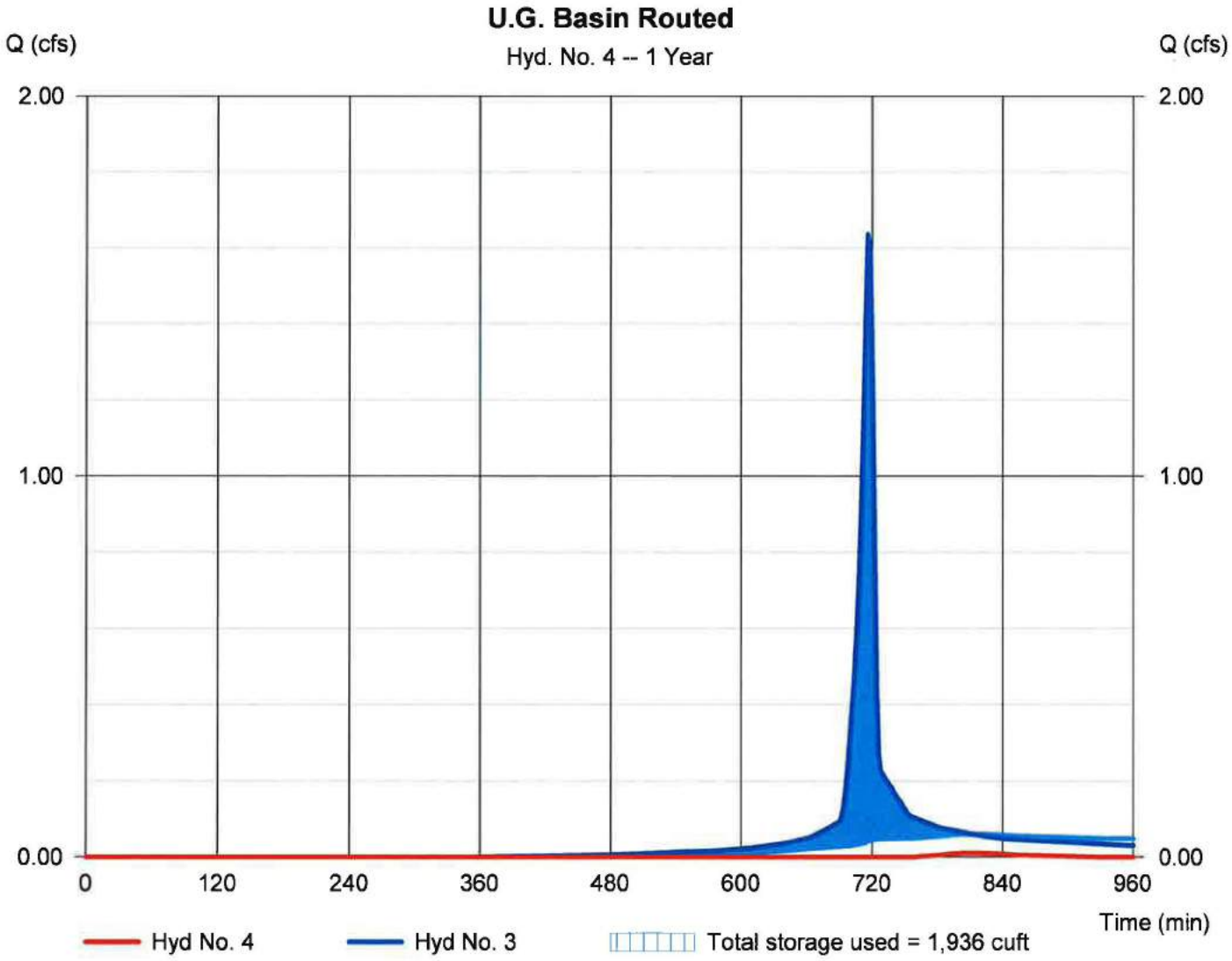
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 4

U.G. Basin Routed

Hydrograph type	= Reservoir	Peak discharge	= 0.010 cfs
Storm frequency	= 1 yrs	Time to peak	= 812 min
Time interval	= 2 min	Hyd. volume	= 55 cuft
Inflow hyd. No.	= 3 - Post Development Basin Flow	Max. Elevation	= 369.47 ft
Reservoir name	= UG Basin	Max. Storage	= 1,936 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

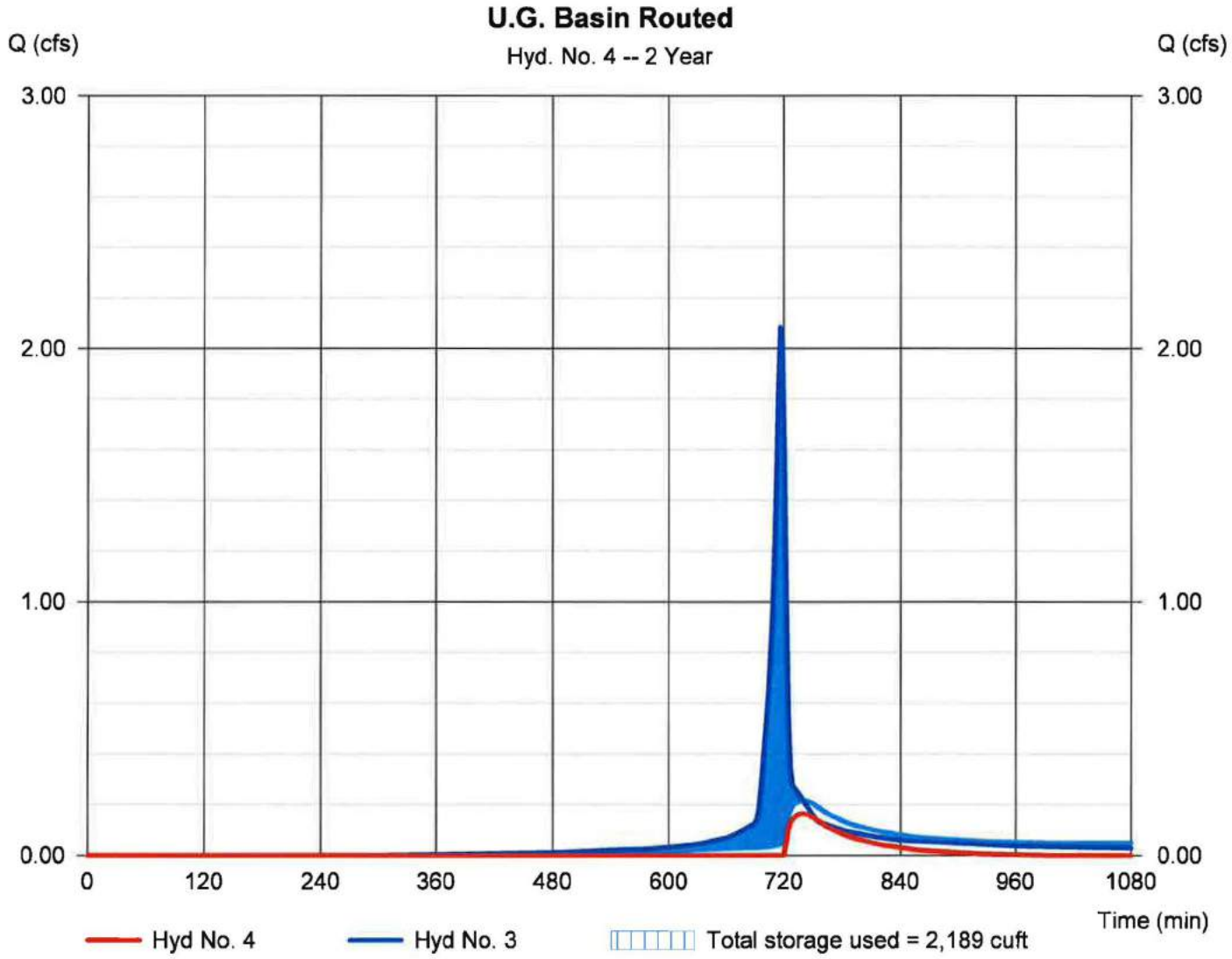
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 4

U.G. Basin Routed

Hydrograph type	= Reservoir	Peak discharge	= 0.165 cfs
Storm frequency	= 2 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 742 cuft
Inflow hyd. No.	= 3 - Post Development Basin Flow	Max. Elevation	= 369.67 ft
Reservoir name	= UG Basin	Max. Storage	= 2,189 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

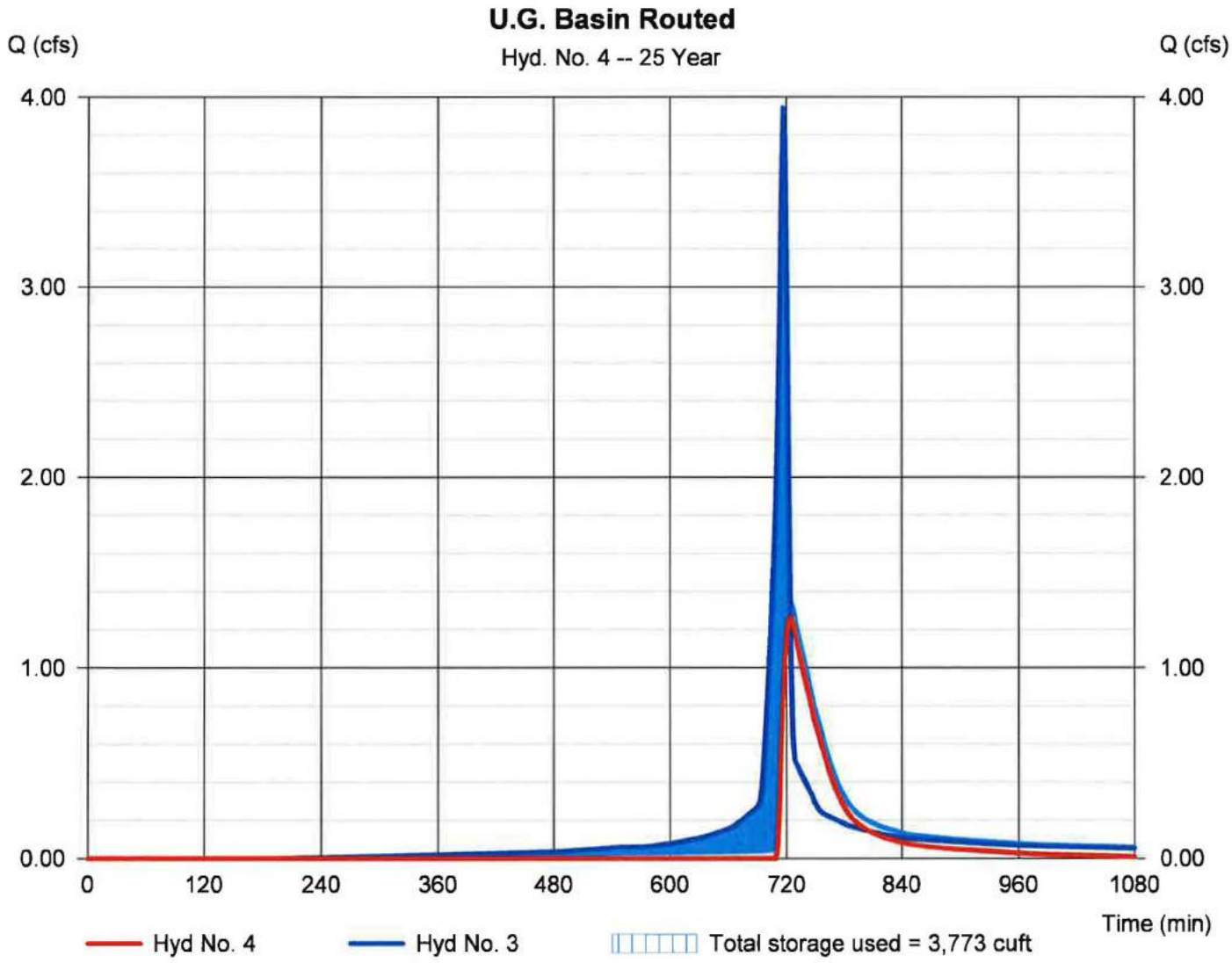
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 Friday, 11 / 11 / 2016

Hyd. No. 4

U.G. Basin Routed

Hydrograph type	= Reservoir	Peak discharge	= 1.263 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 4,108 cuft
Inflow hyd. No.	= 3 - Post Development Basin Flow	Max. Elevation	= 371.47 ft
Reservoir name	= UG Basin	Max. Storage	= 3,773 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



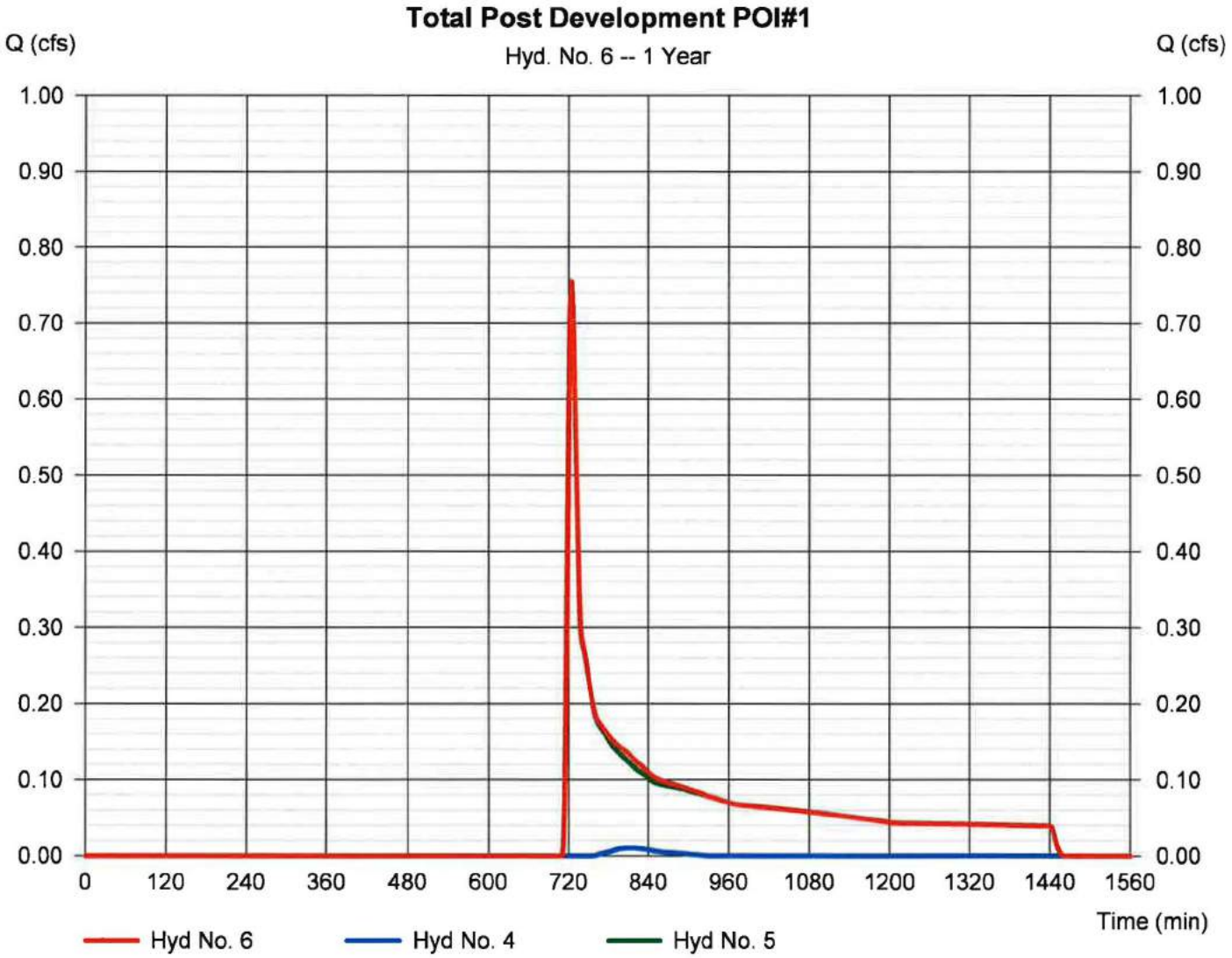
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 6

Total Post Development POI#1

Hydrograph type	= Combine	Peak discharge	= 0.755 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 3,804 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 3.460 ac



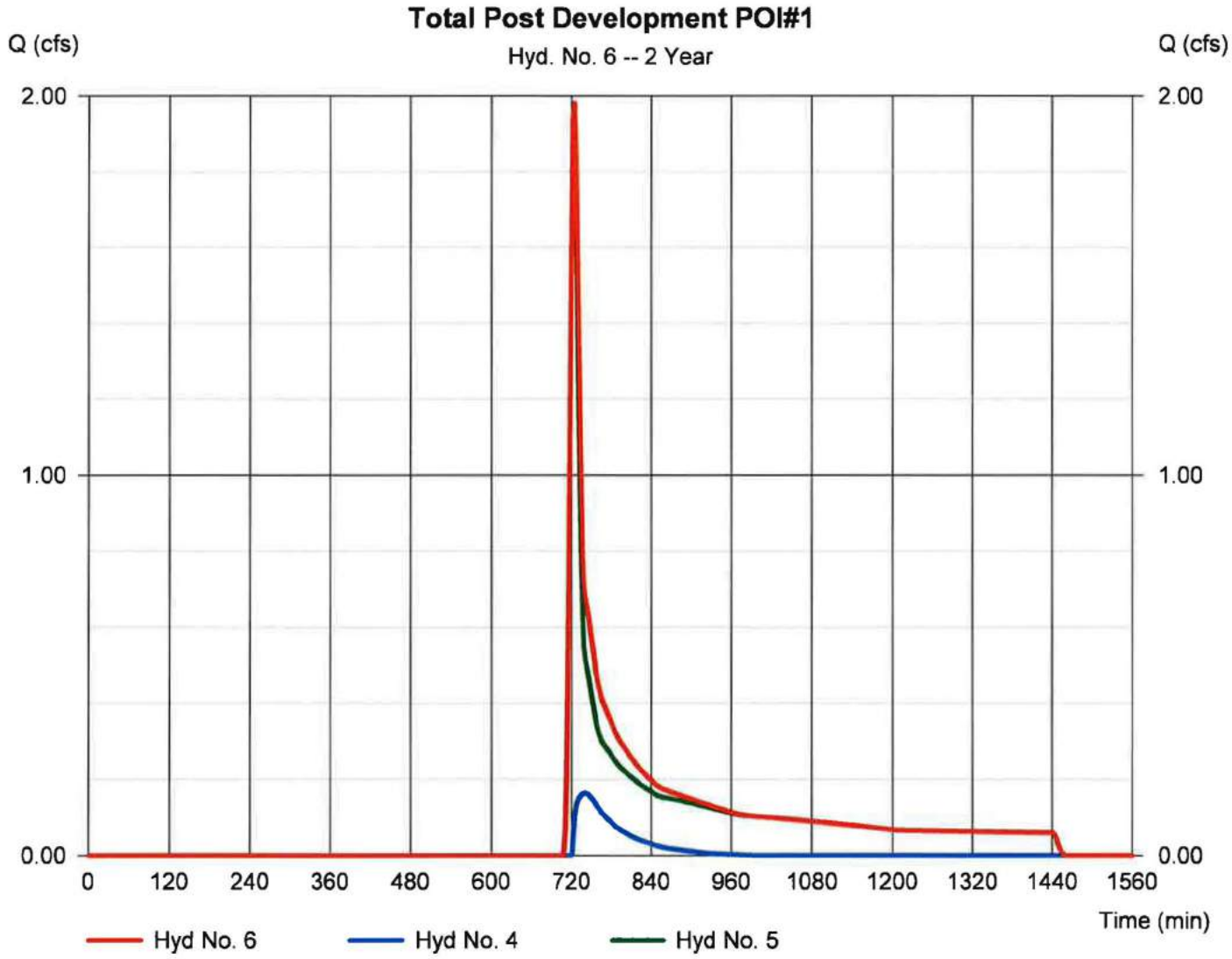
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 6

Total Post Development POI#1

Hydrograph type	= Combine	Peak discharge	= 1.981 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 7,483 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 3.460 ac



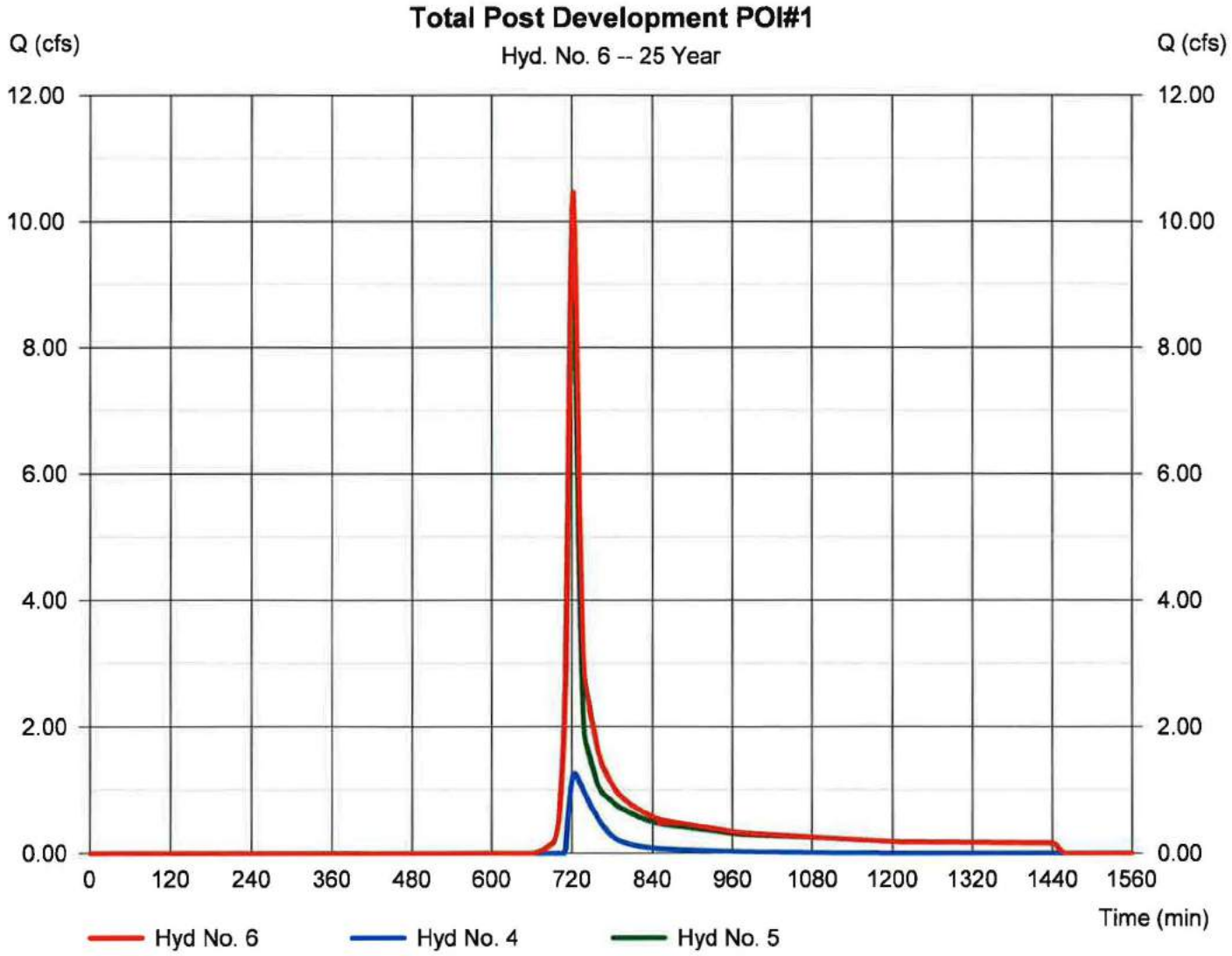
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Hyd. No. 6

Total Post Development POI#1

Hydrograph type	= Combine	Peak discharge	= 10.46 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 28,838 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 3.460 ac



STORMWATER MANAGEMENT SUMMARY

Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4 — Friday, 11 / 11 / 2016

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	69.8703	13.1000	0.8658	--------
3	0.0000	0.0000	0.0000	--------
5	79.2597	14.6000	0.8369	--------
10	88.2351	15.5000	0.8279	--------
25	102.6072	16.5000	0.8217	--------
50	114.8193	17.2000	0.8199	--------
100	127.1596	17.8000	0.8186	--------

File name: SampleFHA.idf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

Tc = time in minutes. Values may exceed 60.

Precip. file name: Sample.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.96	3.57	0.00	4.46	5.16	6.11	6.86	7.62
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	0.867	2.165	-------	-------	-------	10.56	-------	-------	Pre-Development POI#1
3	SCS Runoff	------	1.637	2.086	-------	-------	-------	3.944	-------	-------	Post Development Basin Inflow
4	Reservoir	3	0.010	0.165	-------	-------	-------	1.263	-------	-------	U.G. Basin Routed
5	SCS Runoff	------	0.755	1.887	-------	-------	-------	9.207	-------	-------	Post Development Bypass (POI#1)
6	Combine	4, 5	0.755	1.981	-------	-------	-------	10.46	-------	-------	Total Post Development POI#1

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.867	2	724	4,301	------	------	------	Pre-Development POI#1
3	SCS Runoff	1.637	2	716	3,380	------	------	------	Post Development Basin Inflow
4	Reservoir	0.010	2	812	55	3	369.47	1,936	U.G. Basin Routed
5	SCS Runoff	0.755	2	724	3,748	------	------	------	Post Development Bypass (POI#1)
6	Combine	0.755	2	724	3,804	4, 5	------	------	Total Post Development POI#1

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.165	2	722	7,735	------	------	------	Pre-Development POI#1
3	SCS Runoff	2.086	2	716	4,362	------	------	------	Post Development Basin Inflow
4	Reservoir	0.165	2	740	742	3	369.67	2,189	U.G. Basin Routed
5	SCS Runoff	1.887	2	722	6,741	------	------	------	Post Development Bypass (POI#1)
6	Combine	1.981	2	724	7,483	4, 5	------	------	Total Post Development POI#1

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	10.56	2	722	28,375	------	------	------	Pre-Development POI#1
3	SCS Runoff	3.944	2	716	8,597	------	------	------	Post Development Basin Inflow
4	Reservoir	1.263	2	724	4,108	3	371.47	3,773	U.G. Basin Routed
5	SCS Runoff	9.207	2	722	24,730	------	------	------	Post Development Bypass (POI#1)
6	Combine	10.46	2	722	28,838	4, 5	------	------	Total Post Development POI#1

SUBSURFACE INFILTRATION SYSTEM DESIGN / CALCULATIONS

PHILIP POST & ASSOCIATES
A Division of Pennoni

PROJECT: Chapel Hill Co-op
Mt. Carmel Church Rd.
LOCATION: Infiltration Basin

DATE: 11/11/2016
BY: JJB
CHECKED BY: PCB
SHEET NO: 1
REVISION: 0

Required Storage Volume (1.0 inch rainfall) - Using Simple Method

Sub Area Location:	Infiltration Basin		
Drainage Area (DA) =	22,041	cf	
Impervious Area (IA) =	17,031	cf	
Percent Impervious (I) =	77.3	%	
Design Storm =	1.0	inch	
Determine Rv Value =	0.05 + 0.009 (I) =	0.75	in/in
Storage Volume Required =	1,369	cf	

Drawdown Time (1.0 inch rainfall event)

Infiltration Rate	0.6000	in/hr
Infiltration Basin Floor Area	1926	sf
Drawdown Time =	0.6	days

less than 5 days (yes/no) ? Yes

Drawdown Time (2-year rainfall event)

Sub Area Location:	Infiltration Basin		
Basin Inflow Volume:	4,362	cf	(from Hydraflow Hydrograph)
Storage Volume Required =	4,362	cf	
Infiltration Rate	0.6000	in/hr	
Infiltration Basin Floor Area	1926	sf	
Drawdown Time =	2.0	days	

less than 5 days (yes/no) ? Yes
greater than 2 days (yes/no) ? Yes

PHILIP POST
& ASSOCIATES
A Division of Pennoni

PROJECT: Chapel Hill Co-op
Mt. Carmel Church Rd.

LOCATION: Pre-School Development

DATE: 11/11/2016
BY: JJB
CHECKED BY: PCB
SHEET NO: 1
REVISION: 0

Volume Reduction Analysis (2-year / 24-hour storm event)

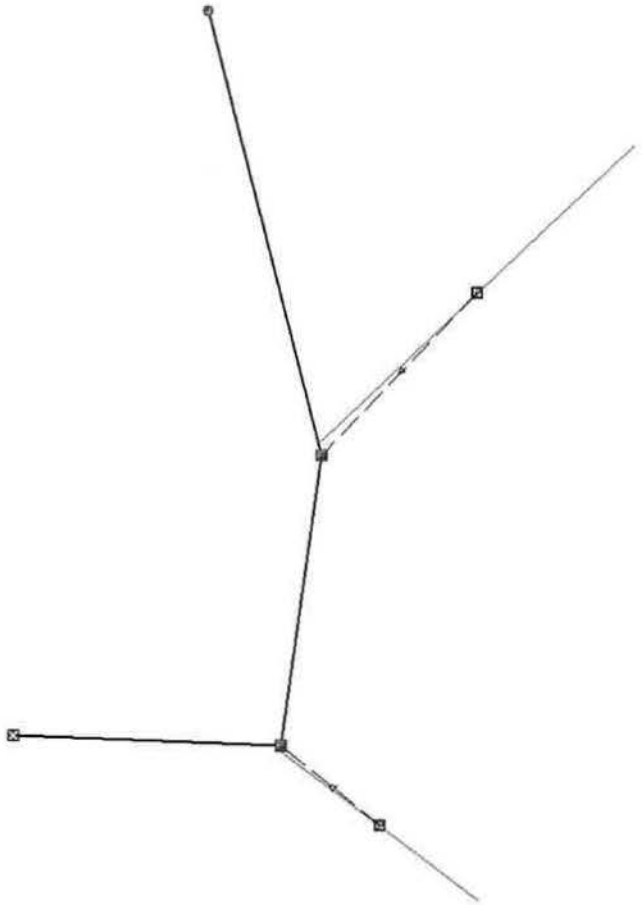
Pre-Development Volume Runoff	7,735	cf	(from Hydraflow Hydrograph)
Total Post Development Runoff	7,483	cf	(from Hydraflow Hydrograph)
Volume Reduction	252	cf	

Volume Reduction Achieved? Yes

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.165	2	722	7,735	------	------	------	Pre-Development POI#1
3	SCS Runoff	2.086	2	716	4,362	------	------	------	Post Development Basin Inflow
4	Reservoir	0.165	2	740	742	3	369.67	2,189	U.G. Basin Routed
5	SCS Runoff	1.887	2	722	6,741	------	------	------	Post Development Bypass (POI#1)
6	Combine	1.981	2	724	7,483	4, 5	------	------	Total Post Development POI#1



STORMWATER CONVEYANCE SUMMARY

Project Description

File Name	CHCP - SSA File.SPF
Description	Chapel Hill Co-Op Pre School

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Nov 11, 2016	00:00:00
End Analysis On	Nov 11, 2016	06:00:00
Start Reporting On	Nov 11, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	2
Nodes	4
Junctions	1
Outfalls	1
Flow Diversions	0
Inlets	2
Storage Nodes	0
Links	3
Channels	0
Pipes	3
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	10 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	CB-1DA	0.05	0.8200	0.62	0.51	0.02	0.27	0 00:05:00
2	CB-2DA	0.13	0.7300	0.62	0.45	0.06	0.70	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	OS-1	Junction	367.90	373.00	0.00	0.00	0.00	0.00	367.90	0.00	5.10	0 00:00	0.00	0.00
2	Exist.EW	Outfall	358.71					0.95	358.92					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Link-01	Pipe	OS-1	CB-1	32.00	367.90	367.00	2.8100	15.000	0.0150	0.74	9.39	0.08	12.50	0.12	0.10	0.00	Calculated
2	Link-02	Pipe	CB-1	CB-2	20.00	364.00	363.00	5.0000	18.000	0.0130	0.41	23.49	0.02	10.46	0.16	0.11	0.00	Calculated
3	Link-03	Pipe	CB-2	Exist.EW	51.00	361.93	358.71	6.3100	18.000	0.0150	0.95	22.88	0.04	8.47	0.21	0.14	0.00	Calculated

Inlet Summary

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	CB-1	FHWA HEC-22 GENERIC	N/A	On Sag	1	364.00	370.52	0.00	10.00	0.27	N/A	N/A	N/A	7.00	0.64	370.60
2	CB-2	FHWA HEC-22 GENERIC	N/A	On Sag	1	361.93	366.00	0.00	0.00	0.70	N/A	N/A	N/A	7.00	1.87	366.57

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	OS-1	367.90	373.00	5.10	0.00	-367.90	0.00	-373.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	OS-1	0.00	0.00	367.90	0.00	0.00	5.10	367.90	0.00	0 00:00	0 00:00	0.00	0.00

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	Link-01	32.00	367.90	0.00	367.00	3.00	0.90	2.8100	CIRCULAR	15.000	15.000	0.0150	0.5000	0.5000	0.0000	1.26	No	1
2	Link-02	20.00	364.00	0.00	363.00	1.07	1.00	5.0000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
3	Link-03	51.00	361.93	0.00	358.71	0.00	3.22	6.3100	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-01	0.74	0 00:00	9.39	0.08	12.50	0.04	0.12	0.10	0.00		Calculated
2	Link-02	0.41	0 00:00	23.49	0.02	10.46	0.03	0.16	0.11	0.00		Calculated
3	Link-03	0.95	0 00:05	22.88	0.04	8.47	0.10	0.21	0.14	0.00		Calculated

Inlet Input

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	CB-1	FHWA HEC-22 GENERIC	N/A	On Sag	1	364.00	370.52	6.52	0.00	0.00	10.00	0.00
2	CB-2	FHWA HEC-22 GENERIC	N/A	On Sag	1	361.93	366.00	4.07	0.00	0.00	0.00	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	CB-1	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
2	CB-2	N/A	0.2500	0.0400	0.2500	5.00	0.0656	7.00

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	CB-1	0.27	0.27	N/A	N/A	N/A	0.64	370.60	0.08	0 00:00	0.00	0.00
2	CB-2	0.70	0.70	N/A	N/A	N/A	1.87	366.57	0.57	0 00:00	0.00	0.00

Project Description

File Name	CHCP - SSA File.SPF
Description	Chapel Hill Co-Op Pre School

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Nov 11, 2016	00:00:00
End Analysis On	Nov 11, 2016	06:00:00
Start Reporting On	Nov 11, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	2
Nodes	4
Junctions	1
Outfalls	1
Flow Diversions	0
Inlets	2
Storage Nodes	0
Links	3
Channels	0
Pipes	3
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	25 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	CB-1DA	0.05	0.8200	0.68	0.55	0.02	0.30	0 00:05:00
2	CB-2DA	0.13	0.7300	0.68	0.49	0.06	0.76	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	OS-1	Junction	367.90	373.00	0.00	0.00	0.00	0.00	367.90	0.00	5.10	0 00:00	0.00	0.00
2	Exist.EW	Outfall	358.71					1.05	358.93					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Link-01	Pipe	OS-1	CB-1	32.00	367.90	367.00	2.8100	15.000	0.0150	0.74	9.39	0.08	12.50	0.12	0.10	0.00	Calculated
2	Link-02	Pipe	CB-1	CB-2	20.00	364.00	363.00	5.0000	18.000	0.0130	0.41	23.49	0.02	10.39	0.16	0.11	0.00	Calculated
3	Link-03	Pipe	CB-2	Exist.EW	51.00	361.93	358.71	6.3100	18.000	0.0150	1.05	22.68	0.05	8.36	0.22	0.15	0.00	Calculated

Inlet Summary

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	CB-1	FHWA HEC-22 GENERIC	N/A	On Sag	1	364.00	370.52	0.00	10.00	0.30	N/A	N/A	N/A	7.00	0.71	370.61
2	CB-2	FHWA HEC-22 GENERIC	N/A	On Sag	1	361.93	366.00	0.00	0.00	0.76	N/A	N/A	N/A	7.00	2.06	366.63

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
1	OS-1	367.90	373.00	5.10	0.00	-367.90	0.00	-373.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	OS-1	0.00	0.00	367.90	0.00	0.00	5.10	367.90	0.00	0 00:00	0 00:00	0.00	0.00

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	Link-01	32.00	367.90	0.00	367.00	3.00	0.90	2.8100	CIRCULAR	15.000	15.000	0.0150	0.5000	0.5000	0.0000	1.26	No	1
2	Link-02	20.00	364.00	0.00	363.00	1.07	1.00	5.0000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
3	Link-03	51.00	361.93	0.00	358.71	0.00	3.22	6.3100	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-01	0.74	0 00:00	9.39	0.08	12.50	0.04	0.12	0.10	0.00		Calculated
2	Link-02	0.41	0 00:00	23.49	0.02	10.39	0.03	0.16	0.11	0.00		Calculated
3	Link-03	1.05	0 00:05	22.88	0.05	8.36	0.10	0.22	0.15	0.00		Calculated

Inlet Input

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	CB-1	FHWA HEC-22 GENERIC	N/A	On Sag	1	364.00	370.52	6.52	0.00	0.00	10.00	0.00
2	CB-2	FHWA HEC-22 GENERIC	N/A	On Sag	1	361.93	366.00	4.07	0.00	0.00	0.00	0.00

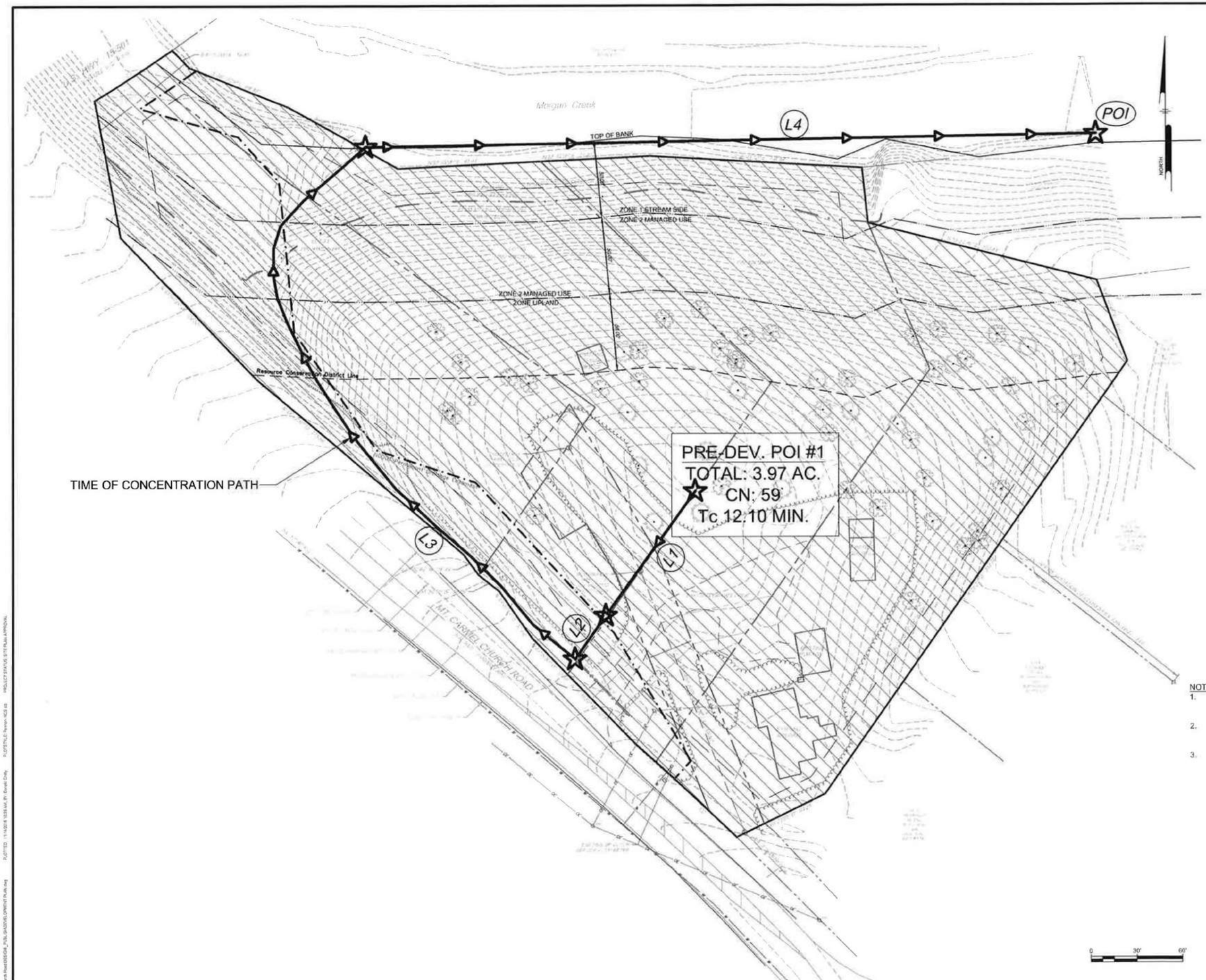
Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	CB-1	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
2	CB-2	N/A	0.2500	0.0400	0.2500	5.00	0.0656	7.00

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	CB-1	0.30	0.30	N/A	N/A	N/A	0.71	370.61	0.09	0 00:00	0.00	0.00
2	CB-2	0.76	0.76	N/A	N/A	N/A	2.06	366.63	0.63	0 00:00	0.00	0.00

DRAINAGE AREA PLANS



NOTES:

1. TOPOGRAPHIC INFORMATION SHOWN HEREON OBTAINED FROM ORANGE COUNTY GIS
2. SUBJECT LOTS ARE LOCATED WITHIN THE WATERSHED PROTECTION DISTRICT.
3. SOUTHERN TOP OF MORGAN CREEK BANK OBTAINED IN THE FIELD BY PHILIP POST & ASSOC, ON 10/12/2016.

NOT FOR CONSTRUCTION

PHILIP POST & ASSOCIATES
A Division of Pennoni Firm License F-1387
PENNONI ASSOCIATES INC.
401 Providence Road #200
Chapel Hill, NC 27514
T 919.929.1173 F 919.493.6548

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK

CHAPEL HILL COOPERATIVE PRESCHOOL
108 MT. CARMEL CHURCH ROAD
CHAPEL HILL, NC 27514

PRE-DEVELOPMENT DRAINAGE AREA PLAN

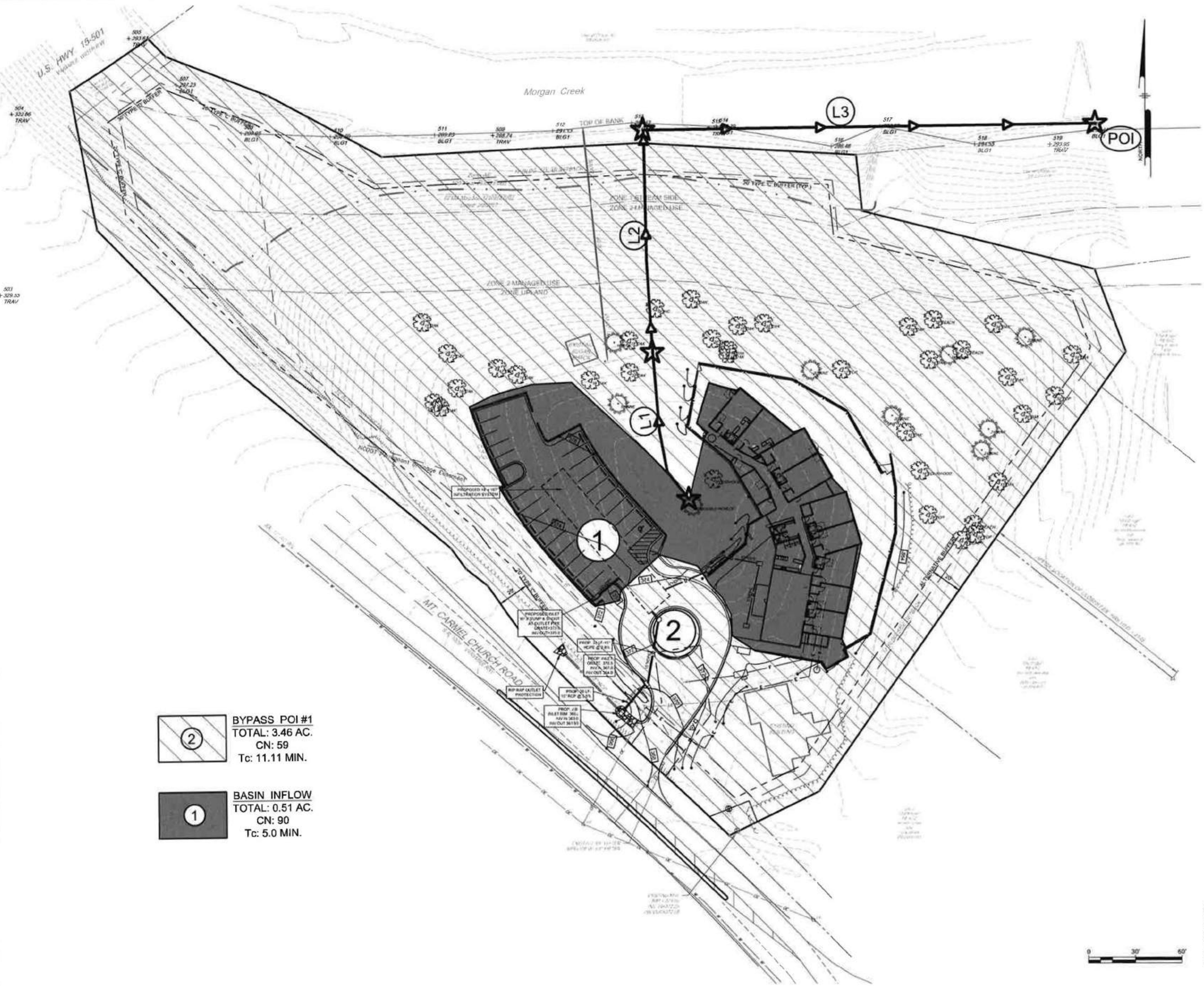
CHAPEL HILL COOPERATIVE PRESCHOOL
106 PUREFOY ROAD
CHAPEL HILL, NC 27514

NO.	DATE	REVISIONS	BY
-	-	-	-

PROJECT	CHCP1601
DATE	2016-11-11
DRAWING SCALE	1"= 30'
DRAWN BY	DMC
APPROVED BY	PCB

PRE-DEVELOPMENT DRAINAGE AREA PLAN

SHEET 1 OF 2



(2)	BYPASS POI #1 TOTAL: 3.46 AC. CN: 59 Tc: 11.11 MIN.
(1)	BASIN INFLOW TOTAL: 0.51 AC. CN: 90 Tc: 5.0 MIN.

0 30' 60'

NOTE:
TOPOGRAPHIC INFORMATION OBTAINED FROM A FIELD SURVEY PROVIDED BY:
PHILIP POST & ASSC.
401 PROVIDENCE ROAD, STE 200
CHAPEL HILL, NC 27514
TEL. 919.929.1173

NOT FOR CONSTRUCTION

PHILIP POST & ASSOCIATES
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CHAPEL HILL COOPERATIVE PRESCHOOL
108 MT. CARMEL CHURCH ROAD
CHAPEL HILL, NC 27514

POST DEVELOPMENT DRAINAGE AREA PLAN

CHAPEL HILL COOPERATIVE PRESCHOOL
106 PUREFOY ROAD
CHAPEL HILL, NC 27514

DATE	NO	REVISIONS	BY
2016-11-09	1	REVISED PER 10/31/16 C.H. MEMO	PCB

PROJECT	CHCP1601
DATE	2016-11-11
DRAWING SCALE	1"= 30'
DRAWN BY	DMC
APPROVED BY	PCB

POST DEVELOPMENT DRAINAGE AREA PLAN

SHEET 2 OF 2

Orange Water And Sewer Authority

Fire Flow Test Report

Location Mt Carmel Church Road

Test Made By: Crew 4 **Time:** 07:50 AM **Date:** 11/15/16

Requested By: Peter Bellantoni **Phone:** (919) 929-1173

Date Requested: 11/9/2016 **FAX:**

Flow Hydrant No. 1393 **Gauge Hydrant No.** 1405

Hydrant Make Flow: American Darling **Nozzle Size:** 2½"

Hydrant Make Gauge: Mueller **Nozzle Size:** 2½"

Expected Static Pressure (PSI): **(Approx.)**

Static Pressure (PSI): 122 **Pitot Reading:** 100 / 80

Residual Pressure (PSI) 102 **Flow (GPM):** 1680 / 1500

Sketch: