



An aerial photograph of the Chapel Hill High School campus and surrounding area. The map shows the school building, a large green field, a baseball field, and a tennis court. Roads labeled include High School Rd, Seawell School Rd, Homehead Rd, and E Winmore Ave. Other landmarks include Winmore Townhomes, Carrboro Fire Rescue, Hanes Theatre, and the Carolina Center for Educational Excellence. A blue location pin is placed on the school building.

## Town Council Presentation

**CHAPEL HILL HIGH  
SCHOOL**  
April 18, 2018

# AGENDA

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- ✓ **Project Overview**
- ✓ **Advisory Board Approvals – conditions and solutions**
  - ✓ Stormwater Management Utility Advisory Board
  - ✓ Transportation and Connectivity Advisory Board
  - ✓ Community Design Commission
  - ✓ Environmental Stewardship Advisory Board
  - ✓ Planning Commission
- ✓ **Traffic Analysis Report**
- ✓ **Request Modifications**

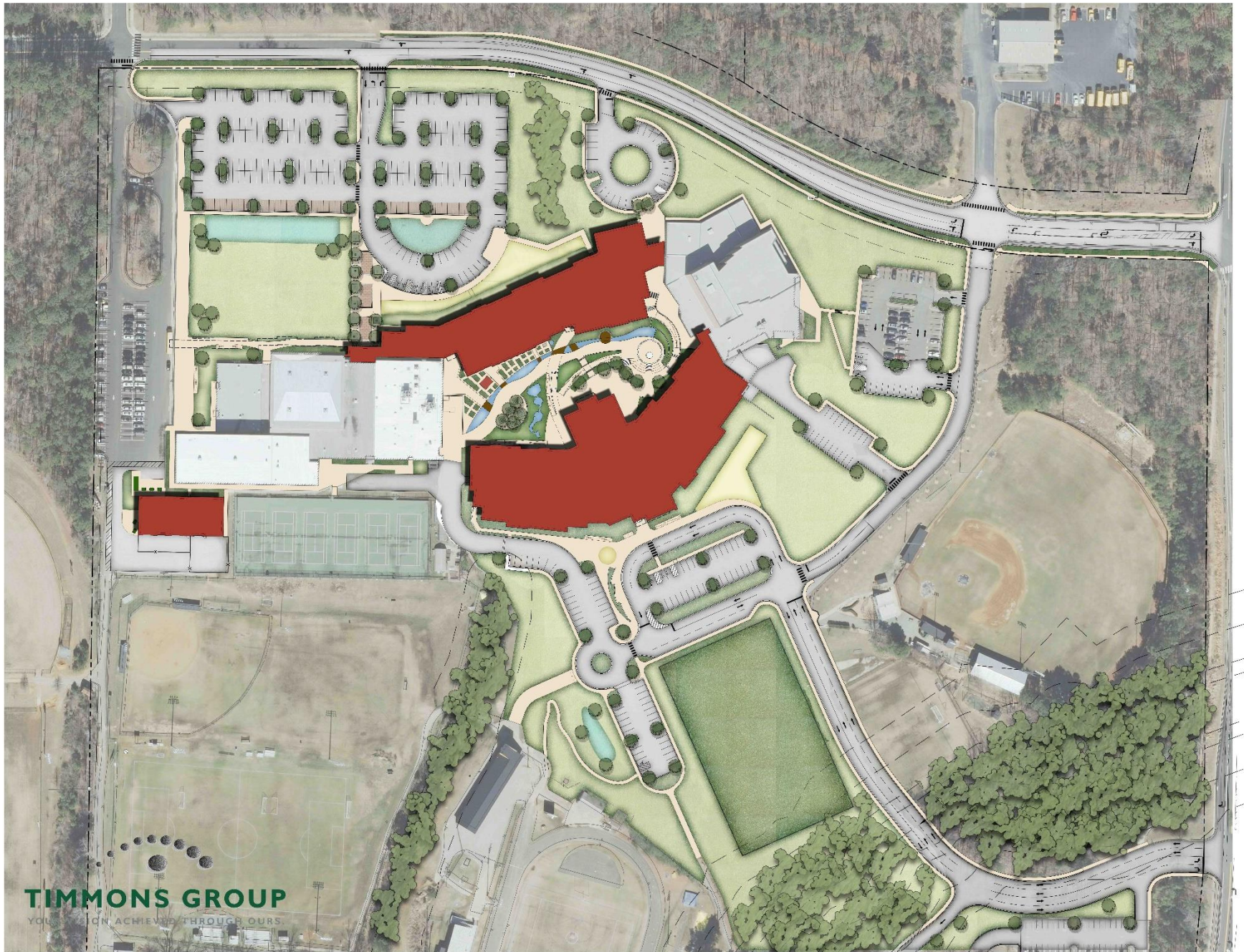












**TIMMONS GROUP**

YOUR VISION ACHIEVED THROUGH OURS



# Rendering

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Overall View of School –  
North-West Facing View



# Rendering

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Front of School/Student Dropoff  
– North Facing View



# Rendering

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Courtyard  
– West Facing View



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# Stormwater Management Utility Advisory Board

## Approval

### MEMORANDUM

TO: Todd LoFrese and the Chapel Hill Carrboro City Schools School Board

FROM: Stefan Klakovich, Chair, Stormwater Management Utility Advisory Board

CC: Chapel Hill Town Council

SUBJECT: Stormwater Recommendations for new CHHS construction project

DATE: February 27, 2018

The Stormwater Management Utility Advisory Board appreciates the opportunity to collaborate with Chapel Hill Carrboro City Schools on the design of the construction of new buildings at CHHS. After reviewing the latest site design, the Stormwater Board makes the following recommendations:

We highly recommend storm water measures that improve storm water quality and address nutrient reduction which assists in meeting Chapel Hill residents to meet the Jordan Lake Rules.

We also highly recommend stormwater measures that provide educational opportunities. Schools are incredibly efficient places to educate the public. Money spent on education here goes much further than spending on education elsewhere and thus should be considered when weighing the costs.

Given the significant issues with past flooding and the addition of impervious area, a well thought out Stormwater Management Plan is crucial for this site and will help refine the design and selection process for the final stormwater features.

We are pleased to endorse the inclusion of stormwater features currently in the site design. When the plan is brought to the Chapel Hill Town Council for consideration, which elements are required to meet stormwater management regulations, and the school board is committed to constructing.

**Bio-retention ponds that drain parking lot water.** This is a very cost effective feature that reduces stormwater flow, improves water quality, and due to its visibility and accessibility provides educational opportunities.

**Harvest rainwater from the roof of the new building in above ground cisterns.** If this collected water is used to irrigate raised beds and other plantings in the courtyard, it will also improve water quality. This reuse of stormwater has high educational value as well as it can be directly used by students. This water should also be allowed to be slowly released to the intermittent stream to maintain base flow and maintain a minimum stormwater capacity for the cistern.

**Employ careful re-sloping of the old athletic field east of the new road to slow stormwater flow and reduce erosion in to Jolly Branch.** We request the adding native plantings and trees on the slope as a cost effective way of slowing run-off, reducing erosion and increasing wildlife habitat.

**Include one-half acre of pervious pavement in the parking lot.** This will reduce stormwater and any increased infiltration will enhance water quality. These pervious pavers also showcase a viable alternative to asphalt and its high visibility, a feature with high education value.

### **Use Native plantings and trees wherever possible.**

This is not an expensive addition and adds wildlife value to the site as well as educational opportunities. Once established, native landscapes require less maintenance and save money.

The feature of greatest concern to our board was the new entrance on Seawell School Road that traverses a healthy creek with a new road with three lanes and sidewalks. The Board discussion lamented that the DOT rules for on-site queuing of cars would appear to trump the consequential environmental damage. If the final design includes this feature, the Chapel Hill Stormwater Advisory Board highly recommends the following items that are not included in the current plan when we reviewed it:

**1 - Widening of the entrance road off of Seawell Drive should be done on the opposite side from Jolly Branch so construction can stay out of the managed watershed area.** Presently, the plan calls for expanding the width of the Seawell School Road entrance to accommodate on site queuing of cars. We recommend that the extra width of this road be added to the south side of the present road so as to avoid encroaching on the steep slopes of the creek. We were told by the architect that this should not add cost to the project nor would it change traffic flow or necessitate extra work on Seawell School Road. The creeks on this property have already been severely impacted by the existing school. All reasonable measures should be made to reduce any additional impacts from road construction.

**2 - The new road crossing Jolly Branch should have a box culvert.** Box culverts allow for a more natural flow of water enhancing the riparian habitat of the creek. All reasonable measures should be made to reduce additional negative impacts on the creeks. The additional cost of a box culvert is not unreasonable.

**We also highly recommend that the school district maintain contractual services with a sweeping service to maintain the pervious pavement.** This is extremely important to maintain this expensive investment and to assure that it operates effectively.

**In addition to the above recommendations, the Stormwater board also recommends that the school administration apply for a 319 grant to help finance enhanced educational stormwater features that will be installed in the enclosed courtyard.** Highly visible projects that are educational are often given priority so we strongly recommend the district pursue this grant funding.

The board would also recommend the administration consider applying for an **Environmental Education (EE) grant through the U.S. EPA** to create a Stormwater Outdoor Classroom. Proposals are due March 15, 2018. <https://www.epa.gov/education/environmental-education-ee-grants>



# Stormwater Management Utility Advisory Board

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## Approval

### Special Considerations:

- Bio Retention ponds that drain parking lot water
- Harvest Rainwater from roof of new building in above ground cisterns
- Employ careful re-sloping of the old athletic field East of the new road to slow stormwater flow and reduce erosion in to Jolly Branch
- Include one half acre of pervious pavement in the parking lot
- Use Native plantings and trees wherever possible
- Widening of the entrance road off of Seawell School Rd. should be done on the opposite side from Jolly Branch so construction can stay out of the managed watershed area
- The new road crossing Jolly Branch should have a box culvert
- Highly recommend the school district maintain contractual services with a sweeping service to maintain the pervious pavement
- Stormwater board recommends that the school administration apply for a 319 grant to help finance enhanced educational stormwater features that will be installed in the enclosed courtyard
- Stormwater board also recommends the administration consider applying for an Environmental Education (EE) grant through the U.S. EPA to create a stormwater Outdoor Classroom



# Stormwater Management Utility Advisory Board

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- **Stormwater board also recommends the administration consider applying for an Environmental Education (EE) grant through the U.S. EPA to create a stormwater Outdoor Classroom**



# Stormwater Management Utility Advisory Board

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## Approval

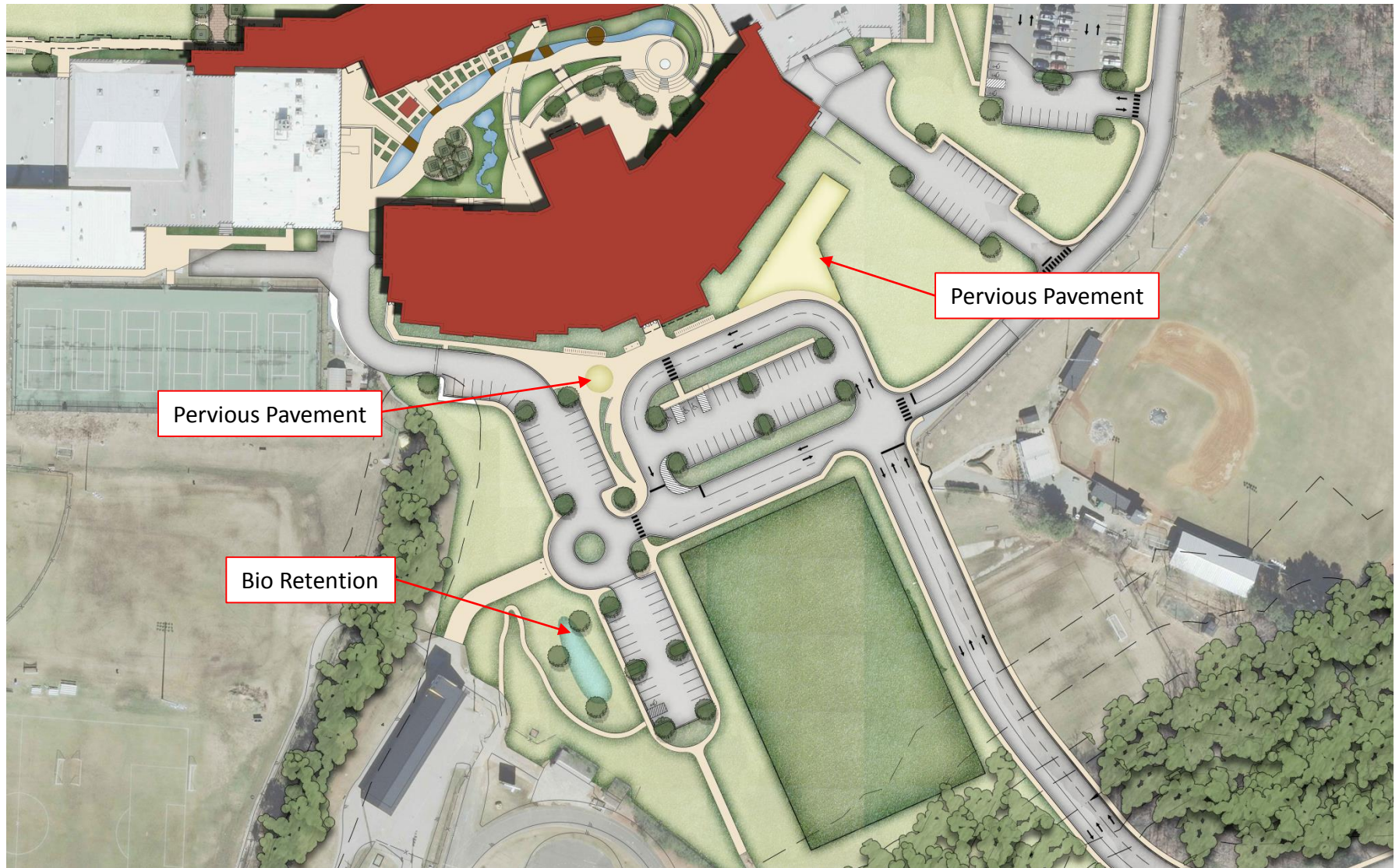
### Solutions incorporated into the design

- Reduction in impervious surface - approximately 1.5 acre
- Bioretention – Student Parking (approximately 2.5 acre)
- Pervious Pavement / Infiltration – Parking & Fire Lanes (approximately 1/2 acre)
- Educational Courtyard
  - Cistern
  - Rain Garden
  - Stormwater Detention



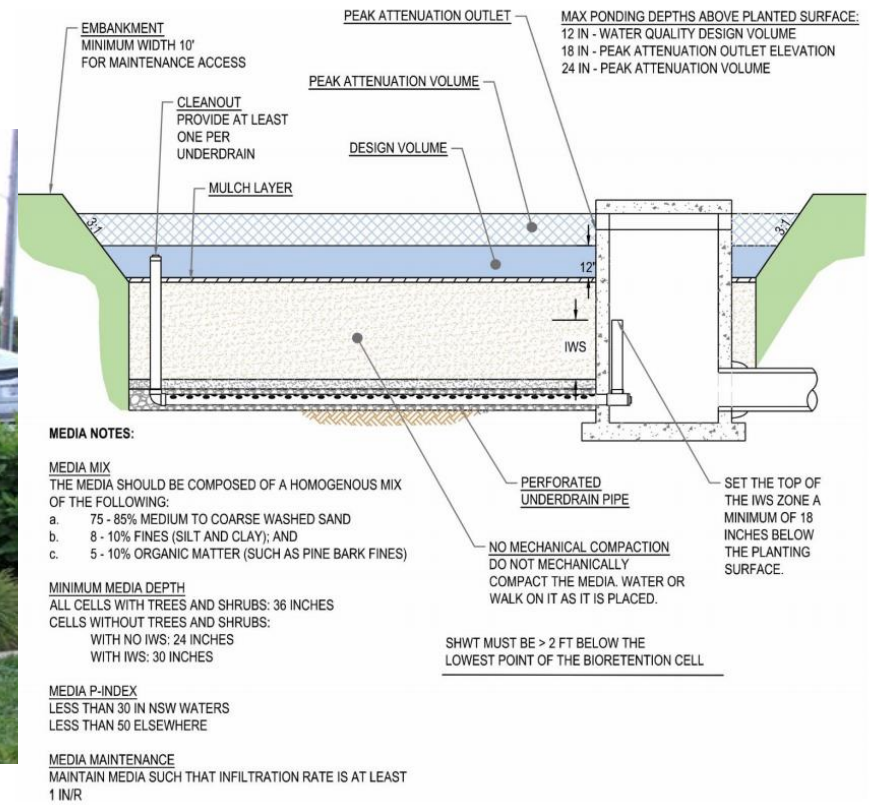






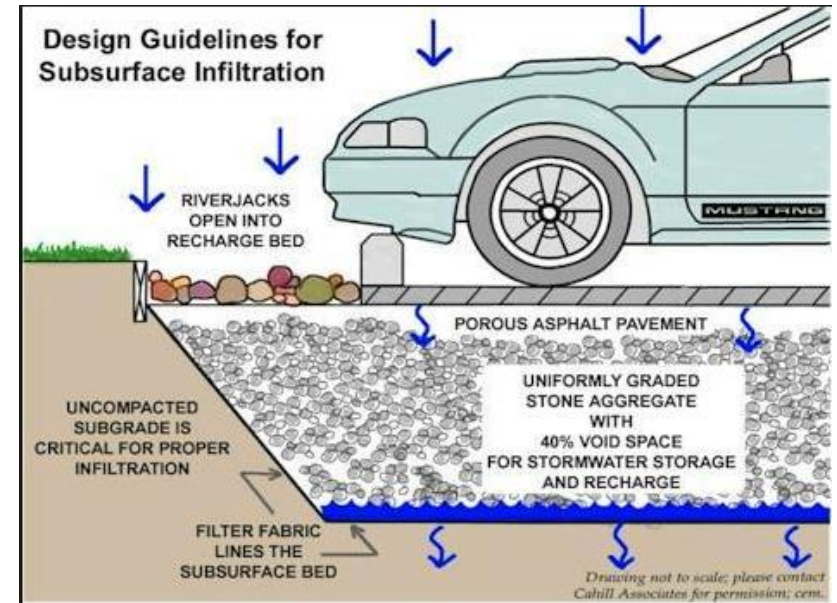
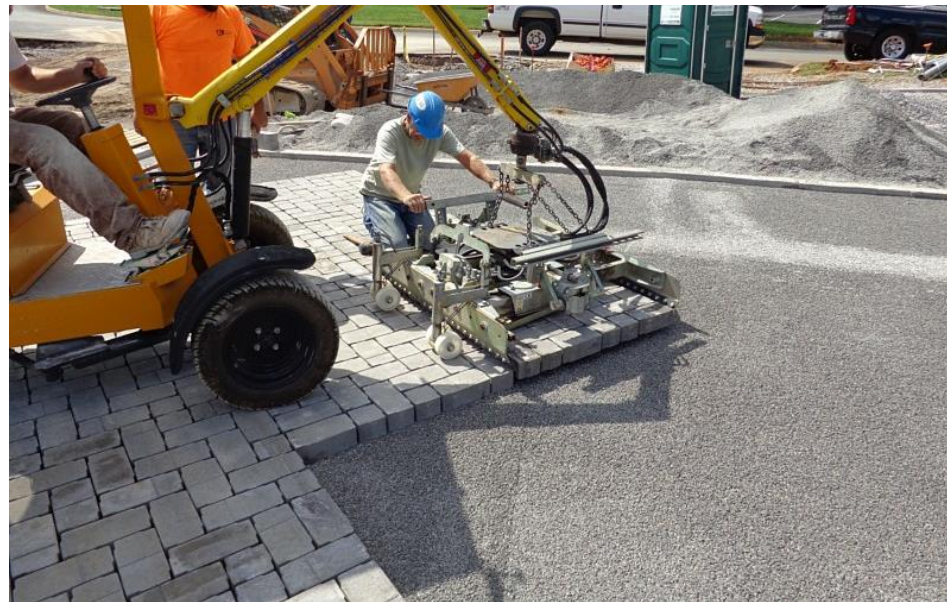
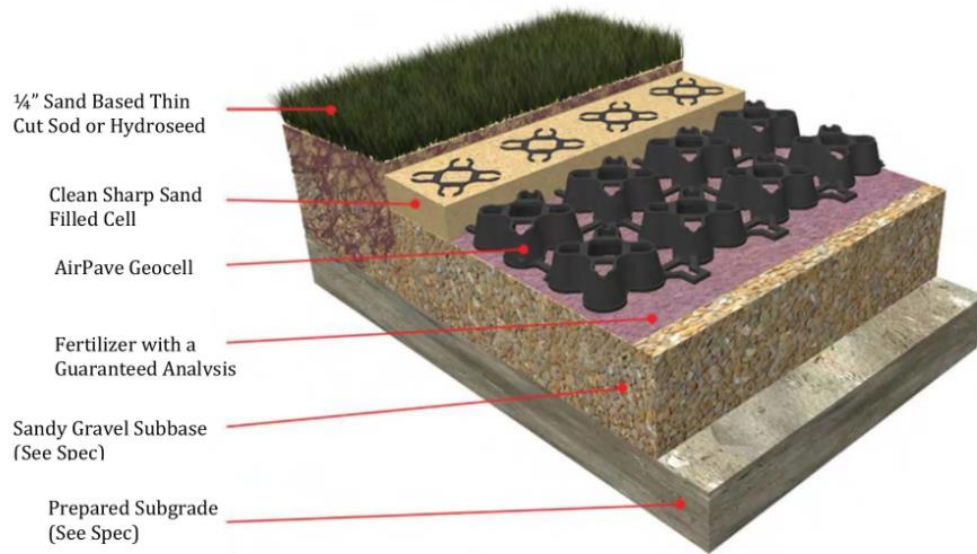


# Bioretention





# Pervious Pavement







# Stormwater Management Utility Advisory Board

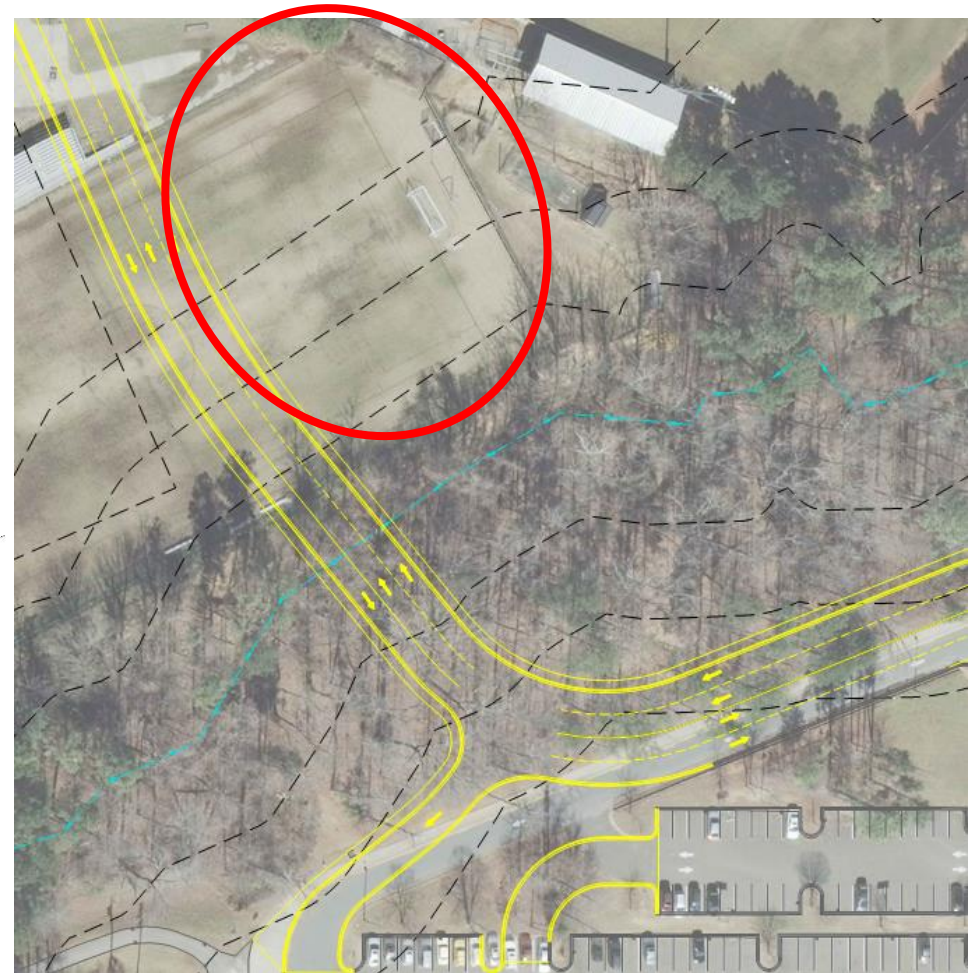
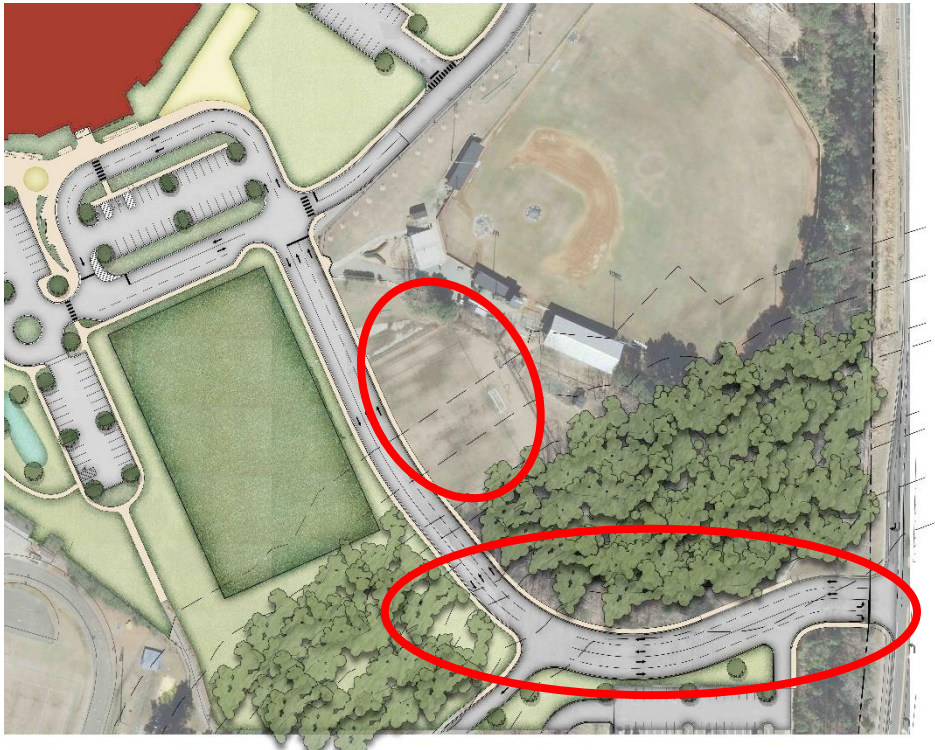
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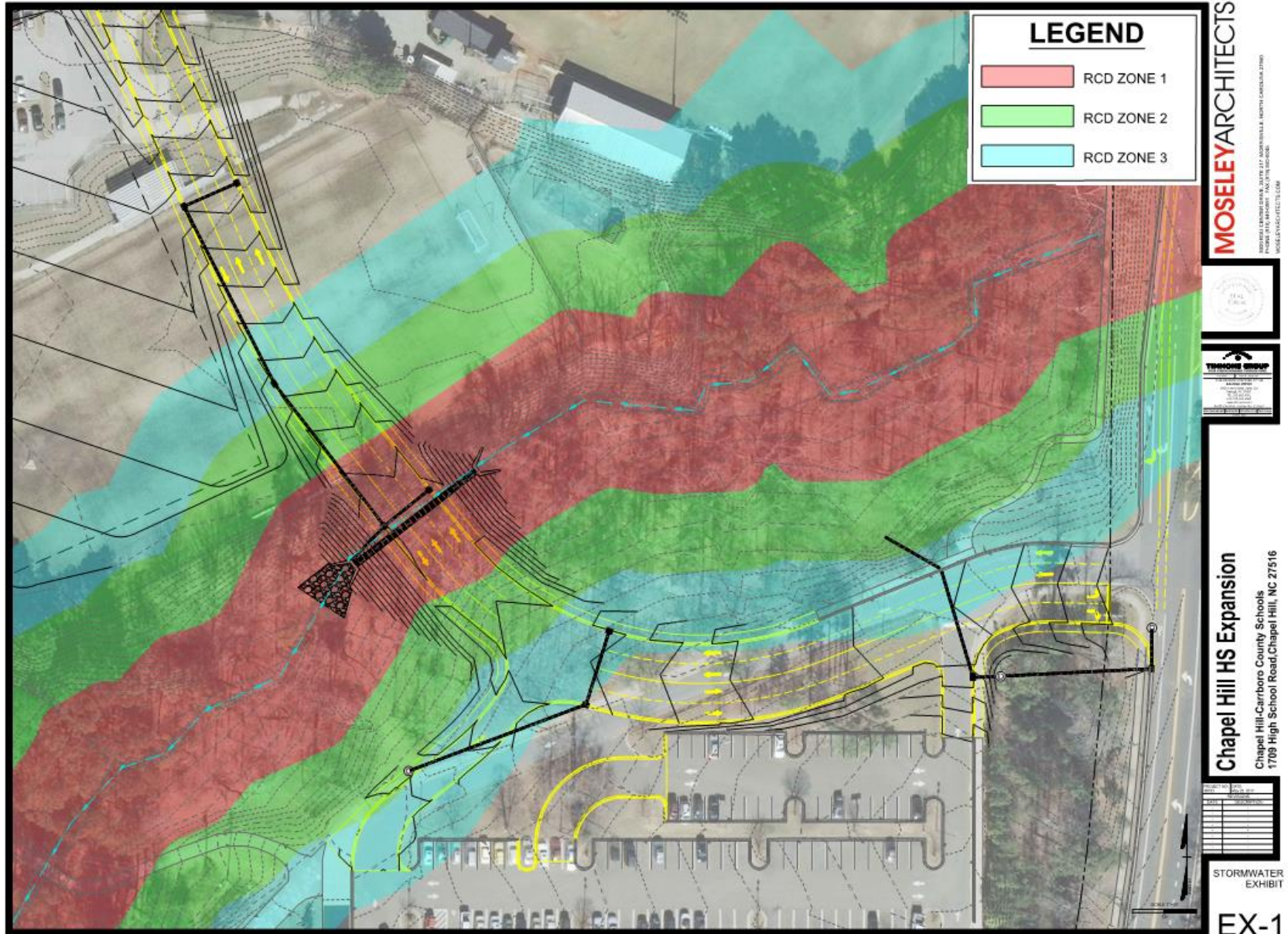


# Stormwater Management Advisory Board





# Stormwater Management Advisory Board





# Stormwater Management Utility Advisory Board

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# Transportation and Connectivity Advisory Board

## Approval w/Conditions

### TRANSPORTATION AND CONNECTIVITY ADVISORY BOARD

*To assist the Chapel Hill Town Council in creating an inclusive connected community by recommending, advocating and planning for comprehensive, safe, effective and sustainable multi-modal transportation and connectivity*

### RECOMMENDATION

Chapel Hill High School Special Use Permit Modification  
1709 High School Rd.  
(PROJECT #17-059)  
February 27, 2017

Recommendation: Approved ☐ Approval with Conditions ☒ Denied ☐

**Motion:** Josh Kastrinsky moved and Susanne Kjemtrup-Lovelace seconded to approve the Chapel Hill High School Special Use Permit Modification with the following conditions:

- a) That the applicant run conduit to all the new parking lots so that at least 20% of the parking spaces could be electrified in the future.
- b) That the applicant may provide the minimum bike parking space requirement (163) as long as they provide covered bike parking to at least 25% of Class II bike parking spaces. In exchange, the applicant need not provide as many bike storage lockers.

**Vote:** 6-0

**Ayes:** Jason Merrill (Vice Chair), Eric Allman, Heather Brutz, Josh Kastrinsky, Susanne Kjemtrup-Lovelace, and Ignacio Tzoumas

**Nays:** none

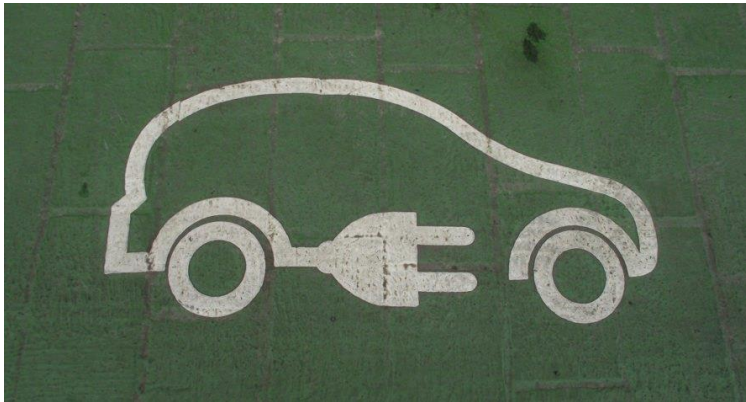
Prepared by: Jason Merrill, Vice Chair, Transportation and Connectivity Advisory Board  
Kayla Seibel, Planner II



# Transportation and Connectivity Advisory Board

## Approval w/Conditions

- That the applicant run conduit to all the new parking lots so that at least 20% of the parking spaces could be electrified in the future.
- That the applicant may provide the minimum bike parking space requirement (163) as long as they provide covered bike parking to at least 25% of Class II bike parking spaces. In exchange, the applicant need not provide as many bike storage lockers.



Conduit provided to 104 parking spaces for future electric car charging



42 covered Class II bike parking spaces provided

# Community Design Commission

## Approval w/Conditions

### COMMUNITY DESIGN COMMISSION

*To assist the Council in guiding the Town's vision on aesthetics, character, and function to focus community growth through advice, advocacy and implementation of the Council's policies and review of proposed development in key areas of the community.*

### RECOMMENDATION CHAPEL HILL HIGH SCHOOL REDEVELOPMENT SPECIAL USE PERMIT MODIFICATION (PROJECT #17-059) March 15, 2018

**Recommendation:**   **Approved** ☐   **Approval with Conditions** ☒   **Denied** ☐

**Motion:**   Chris Berndt moved and Ted Hoskins seconded to approve Chapel Hill High School Redevelopment with the following additional two stipulations to Resolution A:

1. Provide additional plantings along the western property line to protect the adjacent residential area.
2. Identify existing trees to be saved and protected on the tree survey, saving as many mature trees whenever possible.

**Vote:**   5 - 0

**Ayes:**   Chris Berndt, Susana Dancy, Ted Hoskins, Dixon Pitt, and Polly van de Velde

**Nays:**   None

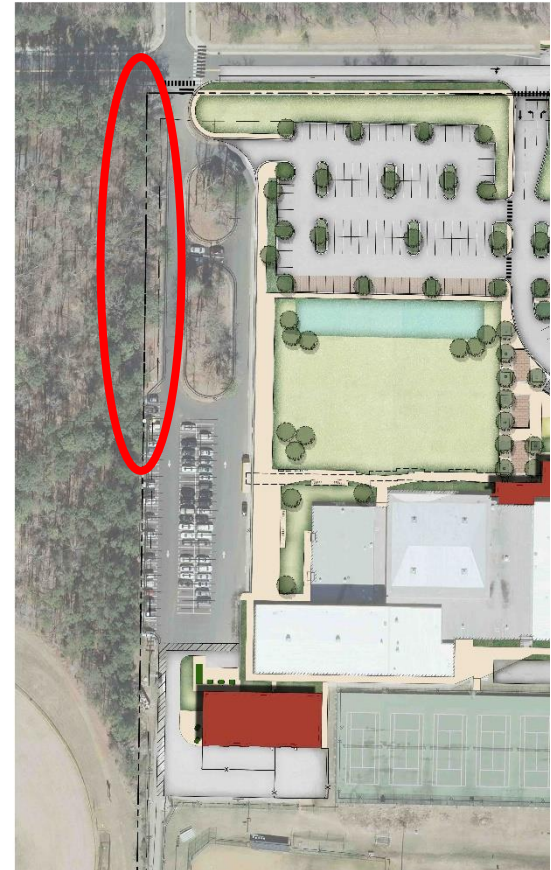
Prepared by: Dixon Pitt, Chair, Community Design Commission  
Kay Pearlstein, Staff



# Community Design Commission

## Approval w/Conditions

- Provide Additional Plantings along the Western property line to protect the adjacent residential area.
- Identify existing trees to be saved and protected on a tree survey, saving as many mature trees whenever possible.



# Environmental Stewardship Advisory Board

## Approval

### ENVIRONMENTAL STEWARDSHIP ADVISORY BOARD

*The charge of the environmental stewardship advisory board will be to assist the Chapel Hill Town Council in strengthening environmentally responsible practices that protect, promote and nurture our community and the natural world through advice and program support.*

### RECOMMENDATION CHAPEL HILL HIGH SCHOOL (PROJECT #17-059) SPECIAL USE PERMIT MODIFICATION

March 19, 2018

**Recommendation:** Approval ☒ Approval with Conditions ☐ Denial ☐

**Motion:** Bruce Sinclair moved and Mary Metcalf seconded a motion to recommend approval of the Special Use Permit modification with the special considerations listed below.

**Vote:** 7-0

**Ayes:** John Wallace (Chair), Gregory Ames, Heidi Kim, Mary Metcalf, Bruce Sinclair, Brian Vaughn

**Nays:**

#### **Conditions:**

- None.

#### **Special Considerations:**

- Explore an environmental impact analysis for the proposed stream crossing for concerns related to flora and fauna
- Consider a staggered student release or other approach to mitigate traffic congestion and reduce emissions from vehicle idling
- Explore Safe Routes to School as a way to increase multi-modal access to the school, specifically NACTO intersection safety guidelines
- Follow Best Management Practices for designing rainwater harvesting systems for pre-filtering and overflow sizing to prevent system failure
- Incorporate environmental education into the sustainable design features and fixtures associated with the project

**Prepared by:** John Wallace, Chair, Environmental Stewardship Advisory Board  
John Richardson, Community Resilience Officer, Staff Liaison to ESAB



# Environmental Stewardship Advisory Board

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## Approval

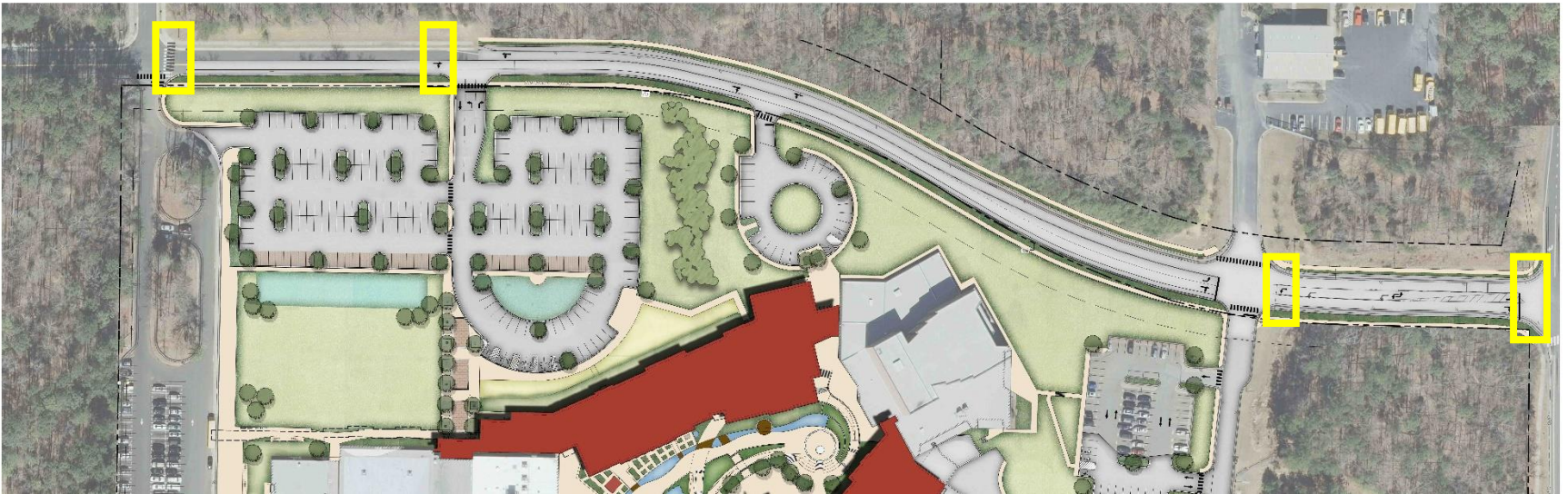
### Special Consideration:

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- Follow Best Management Practices for designing rainwater harvesting systems for pre-filtering and overflow sizing to prevent system failure
- Incorporate environmental education into the sustainable design features and fixtures associated with the project

# Planning Commission

## Approval

- Consideration – Create a plan for safe crossings for students especially across High School Road, and explore a lighted signal, crossing signal, or pedestrian refuge.



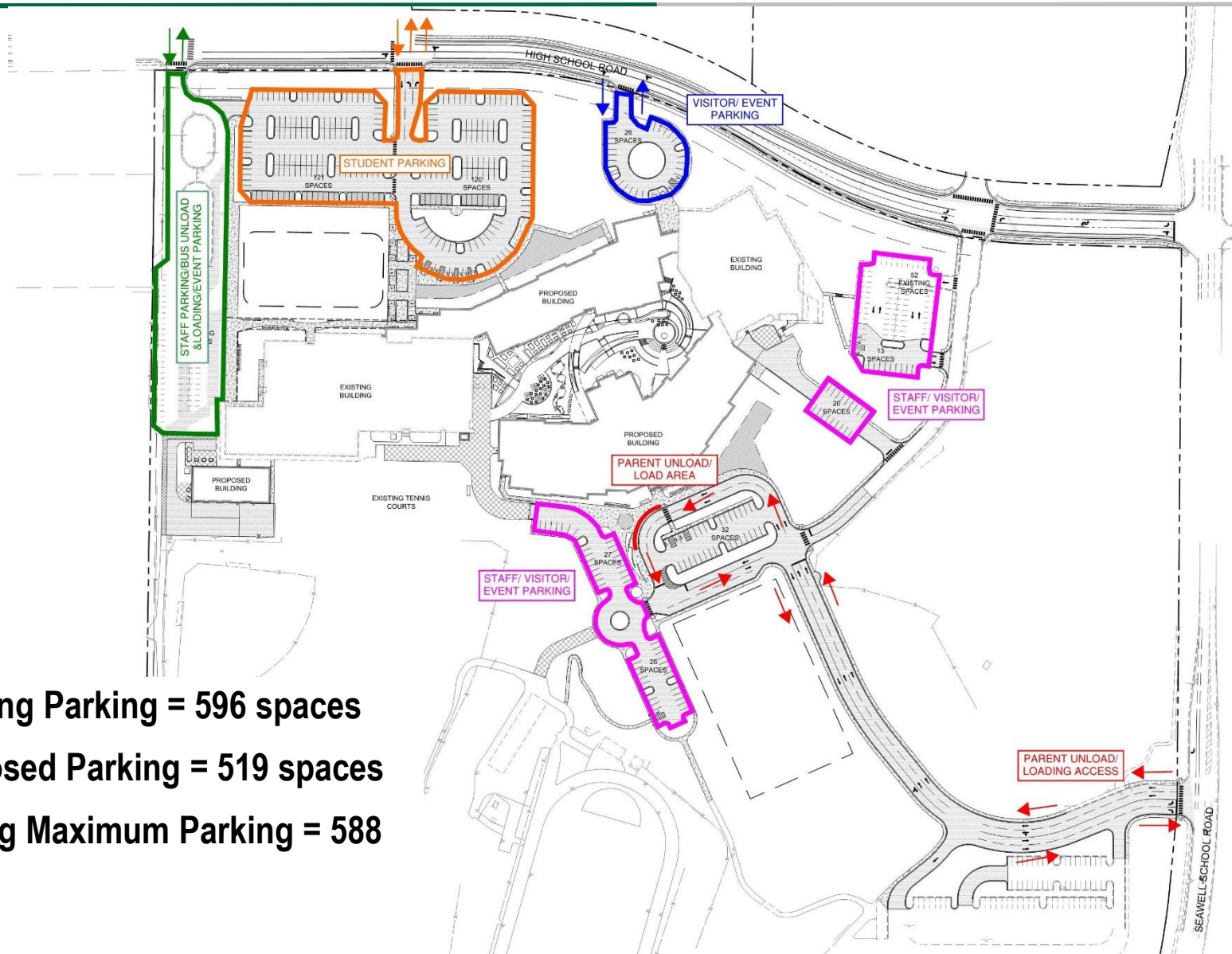


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# Reduced Parking / Less Impervious



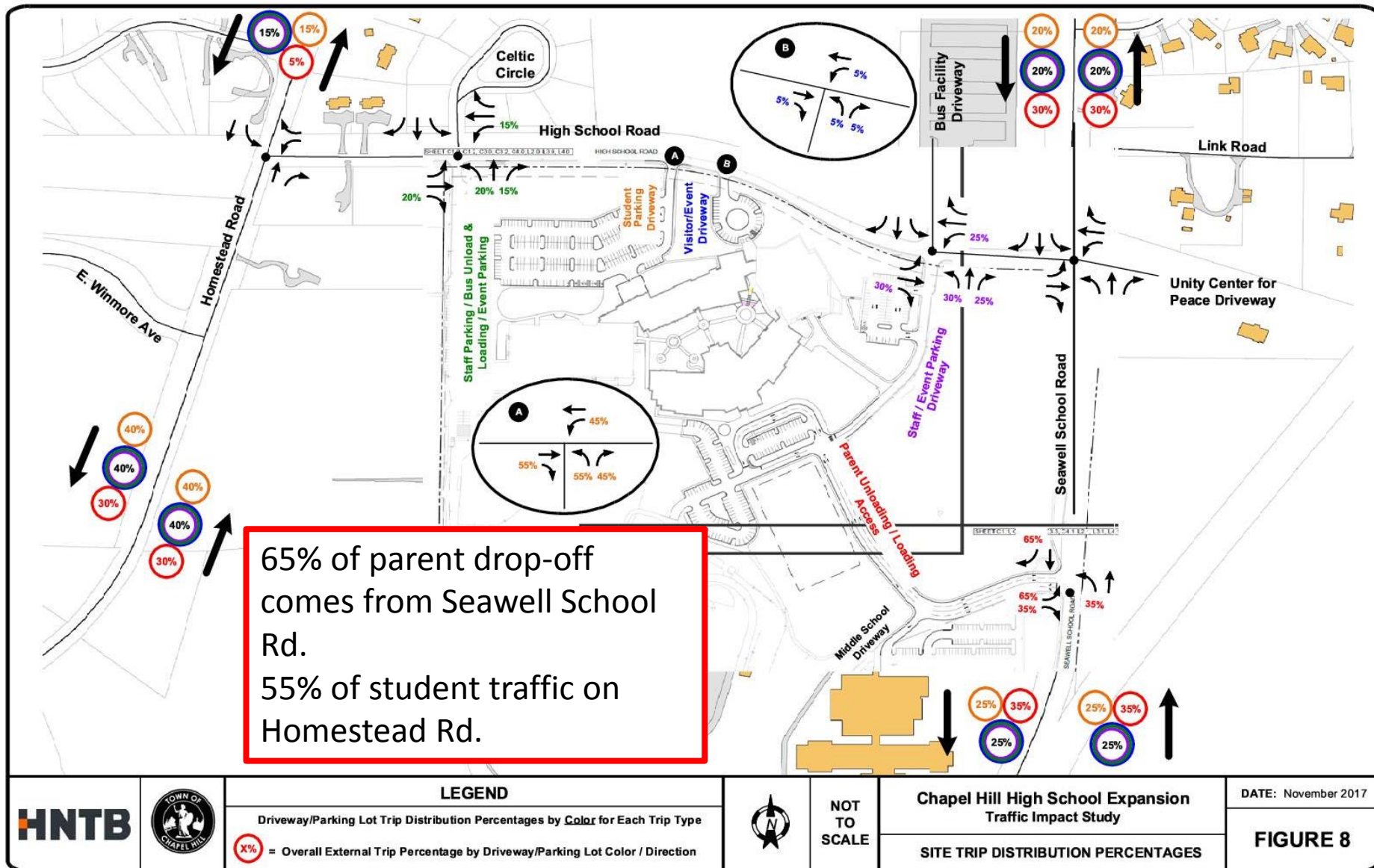
**Existing Parking = 596 spaces**

**Proposed Parking = 519 spaces**

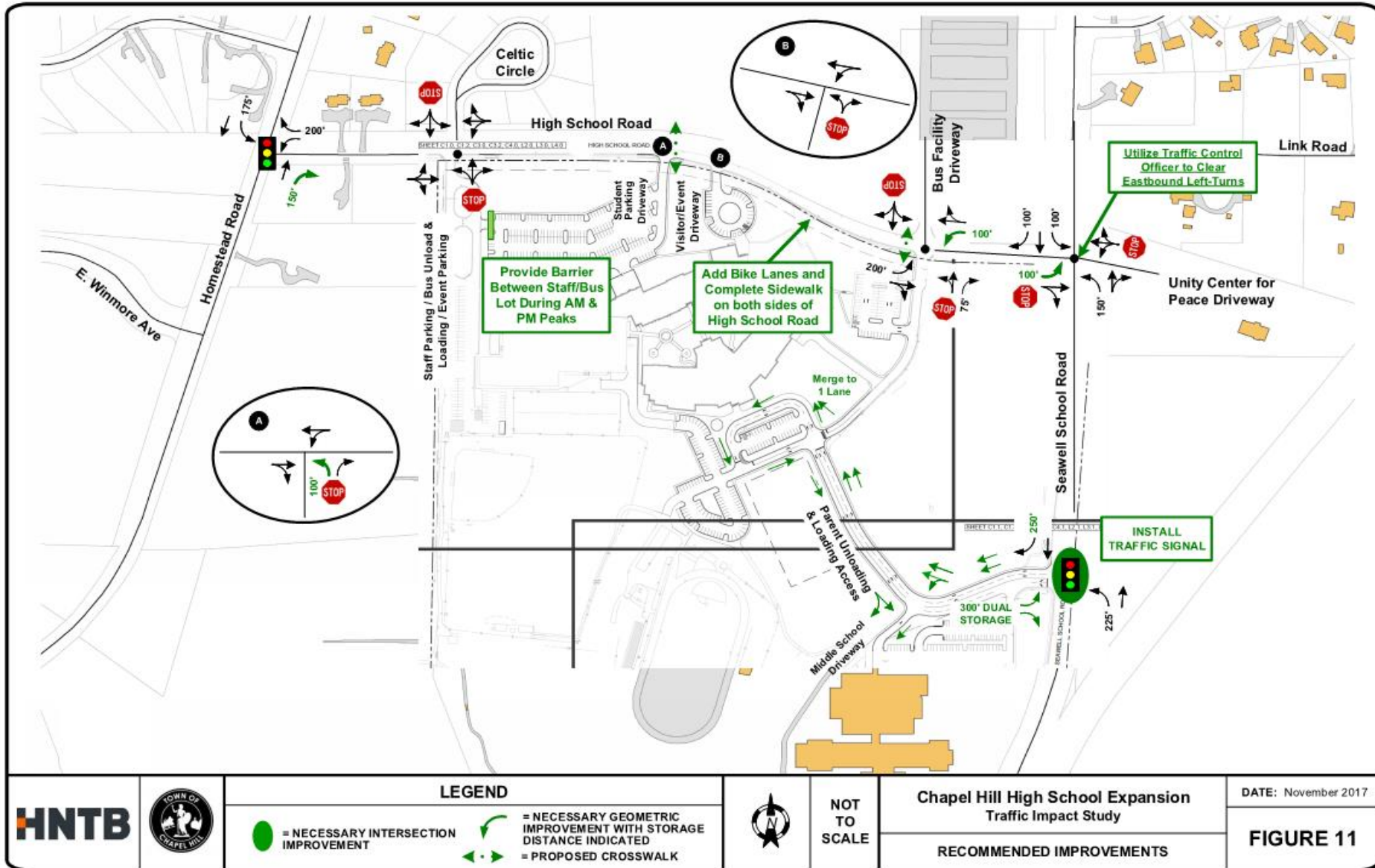
**Zoning Maximum Parking = 588**



# Traffic Percentages



# Access and MSTA (Municipal School Traffic Assistant)



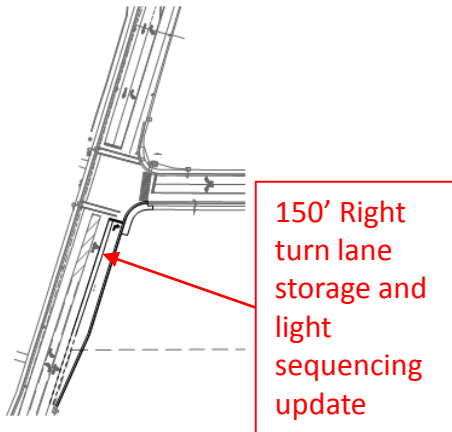


# Access and MSTA (Municipal School Traffic Assistant) Homestead Rd. & High School Rd. Intersection

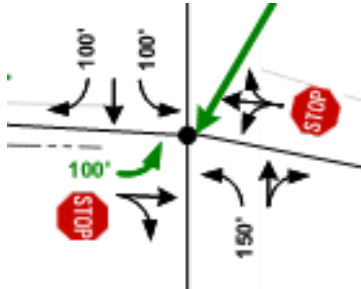


- Existing intersection grade = F
- Grade with mitigation = B

Re-signaling & providing a right hand turn lane to provide 150' of storage on Homestead Road



# Access and MSTA (Municipal School Traffic Assistant) High School Rd. & Seawell Rd. Intersection



- Existing Intersection Grade = F
- Grade with mitigation = C\*

Re-striping to provide 100 feet for left hand turn on High School.  
Traffic control officer during peak times

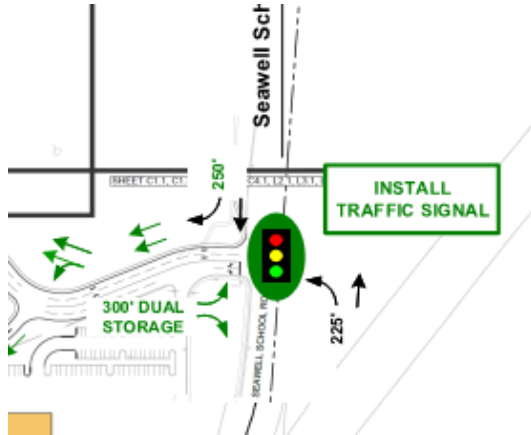
100 + ft of left  
turn storage

Traffic Control  
Officer will be  
utilized





# Access and MSTA (Municipal School Traffic Assistant) Middle School Entrance & Seawell Rd. Intersection



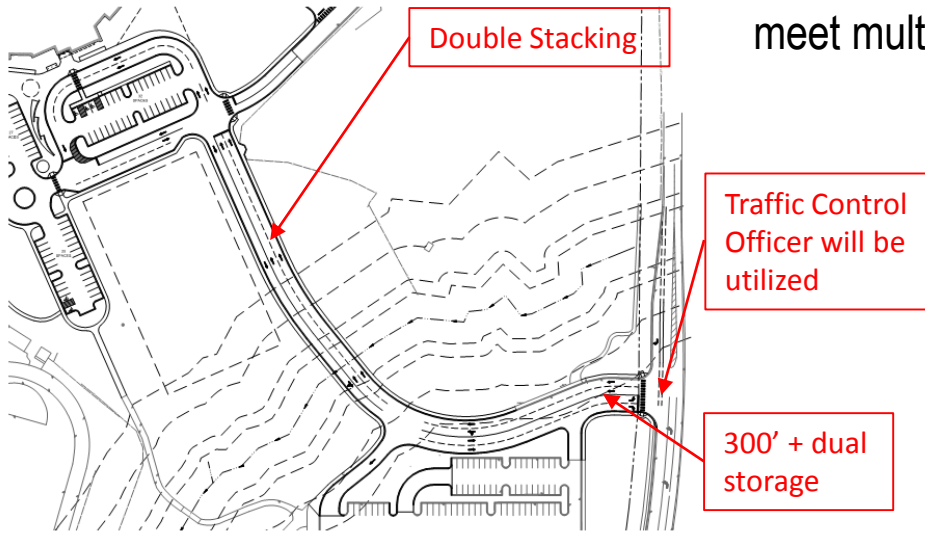
- Existing Intersection Grade = C
- Grade with mitigation = C\*

Provide two lanes in and two lanes out

Provide 300 feet of dual storage

Traffic Control Officer at peak times

DOT will not allow Traffic Signal because it does not meet multiple warrants.



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# Modification Requests

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## **Secondary Building Height increase to 50'**

- Building is set back more than 150' from High School Road

## **Buffer Modification (Western Property Boundary) Variable 3-20'**

- The existing parking lot will remain as located.
- Applicant will comply with condition to plant along residential property line.

## **Tree Canopy Modification – 35% (previous request to 30%)**

- Existing Canopy does not meet requirements
- Removing less than 1% of the existing canopy
- Will be installing new landscaping to increase canopy

## **Parking**

- Per recommendation of Transportation board, 25% Covered bike parking in lieu of 10% Class I bike parking for schools as required in the Design Standards Manual. Total bike parking 163 spaces of which a minimum of 41 spaces will be covered.



Town Council  
Presentation

CHAPEL HILL HIGH  
SCHOOL  
April 18, 2018



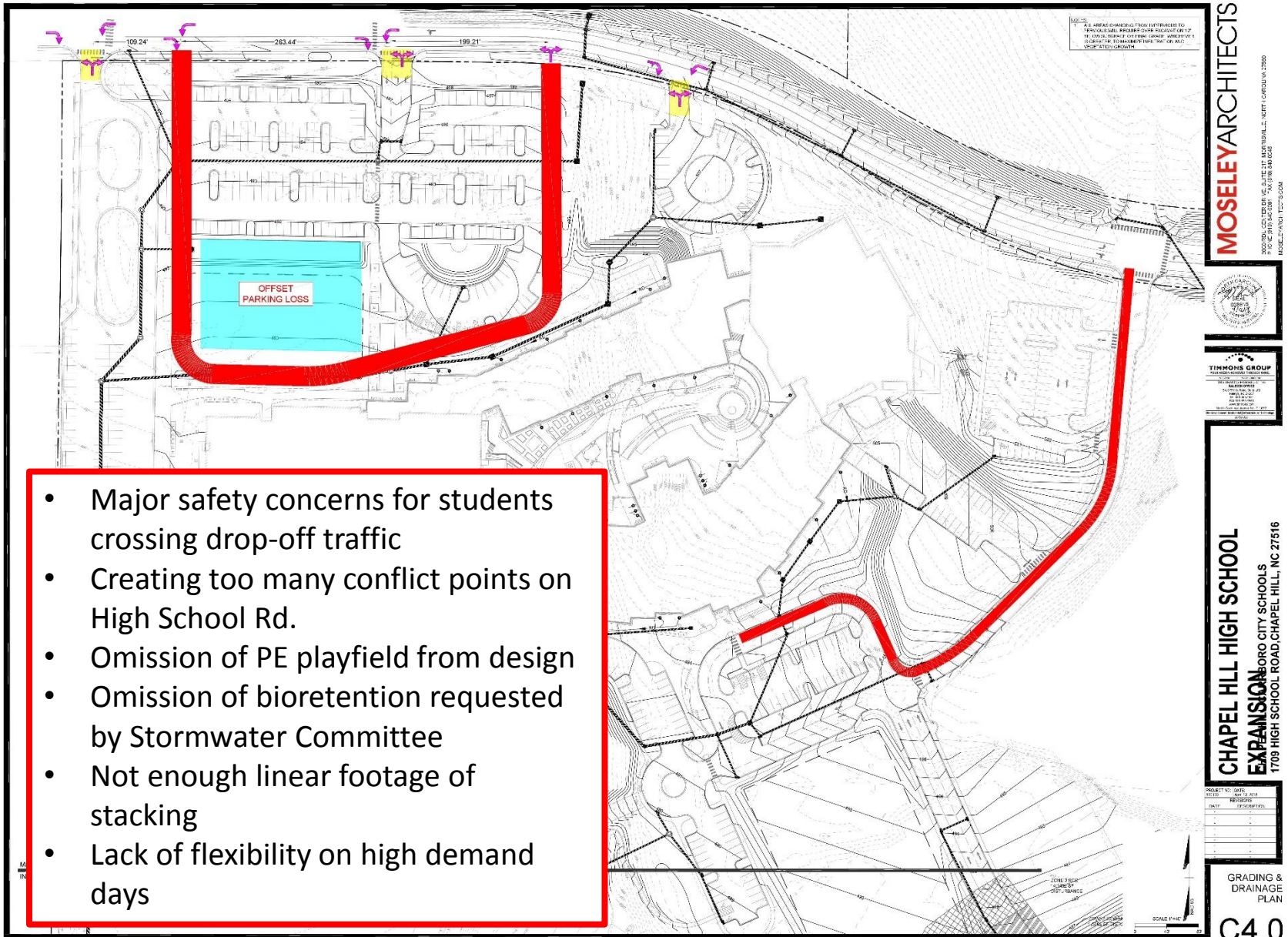
**MOSELEY**ARCHITECTS



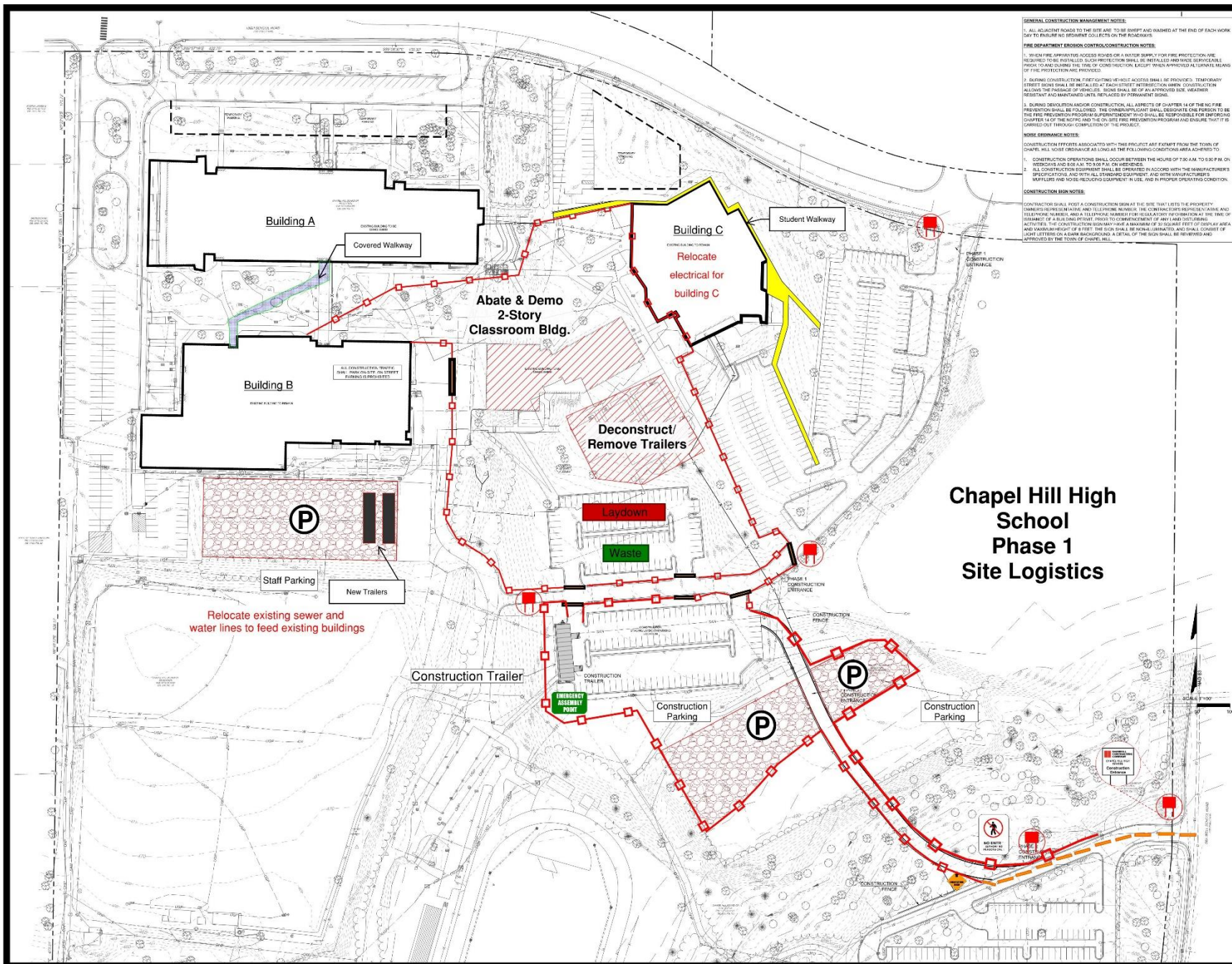




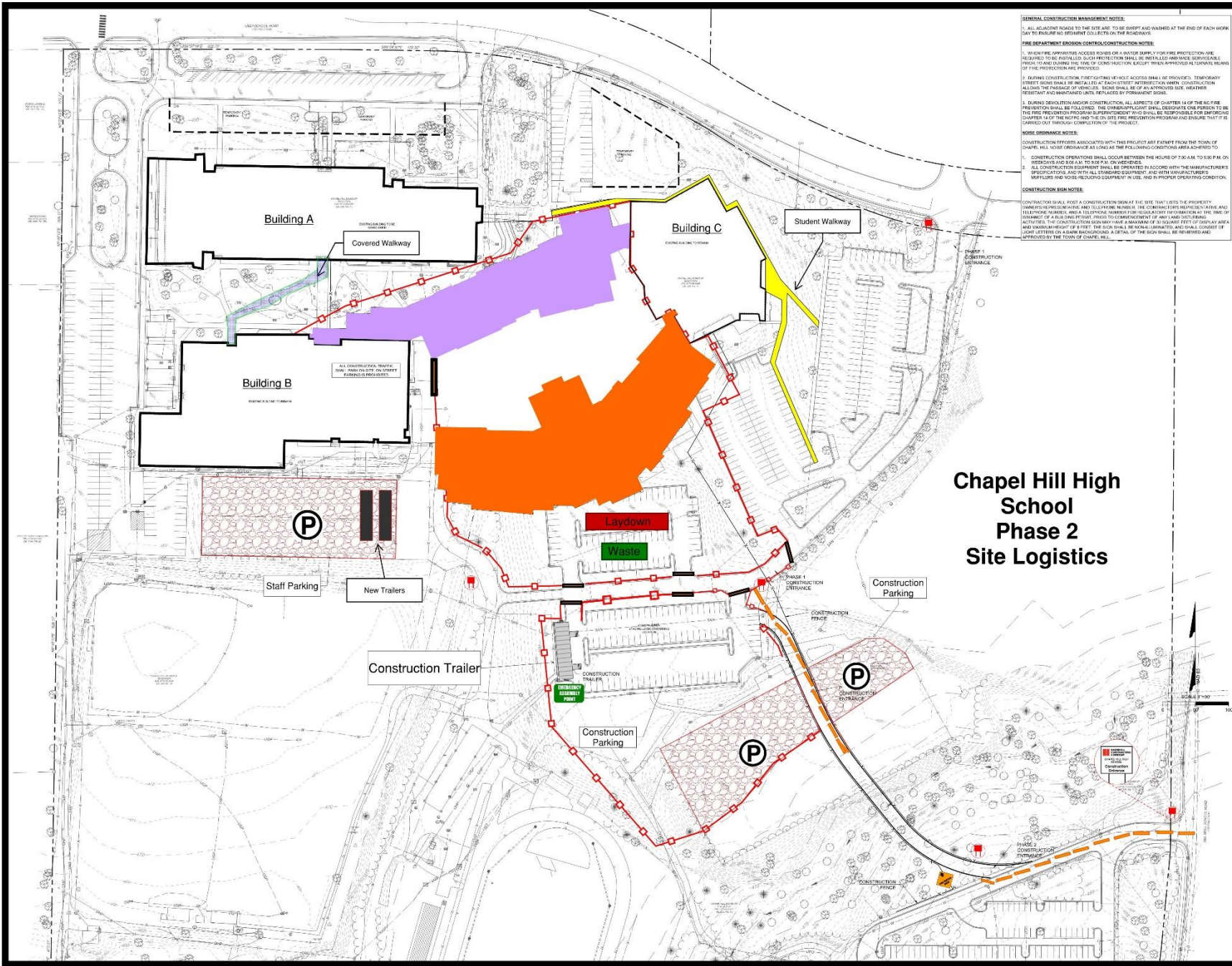
# Consideration of Alternative Circulation Plans











# Chapel Hill High School Phase 2 Site Logistics

- GENERAL CONSTRUCTION MANAGEMENT NOTES:**
1. ALL ADJACENT ROADS TO THE SITE ARE TO BE SWEEPED AND WASHED AT THE END OF EACH WORK DAY TO PREVENT ANY DEBRIS FROM COLLECTING ON THE ROADWAYS.
  2. WHEN FIRE APPARATUS ACCESS ROADS OR A WATER SUPPLY FOR FIRE PROTECTION ARE REQUIRED, THE INSTALLED SUECH PROTECTION SHALL BE REMOVED AND REINSTALLED PRIOR TO AND DURING THE TIME OF CONSTRUCTION, EXCEPT WHEN APPROVED ALTERNATE MEANS OF FIRE PROTECTION ARE PROVIDED.
  3. DURING CONSTRUCTION, FIRE FIGHTING VEHICLE ACCESS SHALL BE PROVIDED. TEMPORARY STREET CLOSURE SHALL BE INSTALLED AT EACH STREET INTERSECTION WHERE CONSTRUCTION ALIGNS THE PASSAGE OF VEHICLES. SIGNS SHALL BE OF AN APPROVED SIZE, WEATHER RESISTANT AND MAINTAINED UNTIL RELEASED BY PERMANENT SIGNS.
  4. DURING DEVIATION AND/OR CONSTRUCTION, ALL ASPECTS OF CHAPTER 14 OF THE NC FIRE PREVENTION SHALL BE FOLLOWED. THE CONSTRUCTION SHALL DESIGNATE ONE PERSON TO BE THE FIRE PREVENTION PROGRAM SUPERVISOR WHO SHALL BE RESPONSIBLE FOR ENFORCING CHAPTER 14 OF THE NC FIRE PREVENTION PROGRAM AND ENSURE THAT IT IS CARRIED OUT THROUGHOUT THE PROJECT.
- NOISE PERFORMANCE NOTES:**
- CONSTRUCTION NOISE ASSOCIATED WITH THIS PROJECT MAY EXCEED THE TOWN OF CHAPEL HILL NOISE ORDINANCE AS LONG AS THE FOLLOWING CONDITIONS ARE ADHERED TO:
1. CONSTRUCTION OPERATIONS SHALL OCCUR BETWEEN THE HOURS OF 7:30 A.M. TO 5:00 P.M. ON WEEKDAYS AND 8:00 A.M. TO 5:00 P.M. ON WEEKENDS.
  2. ALL CONSTRUCTION EQUIPMENT SHALL BE OPERATED IN ACCORD WITH THE MANUFACTURER'S SPECIFICATIONS AND WITH STANDARD EQUIPMENT AND WITH SOUND-REDUCING MEASURES.
  3. ALL CONSTRUCTION EQUIPMENT SHALL BE MAINTAINED AND SHALL CONSIST OF LOW VIBRATION AND SOUND-REDUCING EQUIPMENT IN USE, AND IN PROPER OPERATING CONDITION.
- CONSTRUCTION SIGN NOTES:**
- CONTRACTOR SHALL POST A CONSTRUCTION SIGN AT THE SITE THAT LISTS THE PROPERTY, OWNER, ADDRESS, PHONE NUMBER, AND A TELEPHONE NUMBER FOR EMERGENCY INFORMATION AT THE TIME OF OCCURRENCE OF A HAZARDOUS EVENT PRIOR TO CONSTRUCTION OF ANY LAND-USE-RELATED ACTIVITIES. THE CONSTRUCTION SIGN SHALL HAVE A MINIMUM OF 24 INCHES OF CLEARANCE AND A MINIMUM HEIGHT OF 8 FEET. THE SIGN SHALL BE MAINTAINED AND SHALL CONSIST OF LOW VIBRATION AND SOUND-REDUCING EQUIPMENT IN USE, AND IN PROPER OPERATING CONDITION. APPROVED BY THE TOWN OF CHAPEL HILL.

**MOSELEYARCHITECTS**

3000 MILL CENTER DRIVE, SUITE 217, APOURVILLE, NORTH CAROLINA 27608  
 PHONE (919) 840-0001 FAX (919) 840-0046  
 MOSELEYARCHITECTS.COM

**TIMMONS GROUP**  
 A DIVISION OF THE  
 TIMMONS GROUP, INC.  
 10000 WILSON ROAD, SUITE 100  
 WILSON, NC 27604  
 PHONE (919) 840-0001 FAX (919) 840-0046  
 WWW.TIMMONSGROUP.COM

**Chapel Hill HS Expansion**

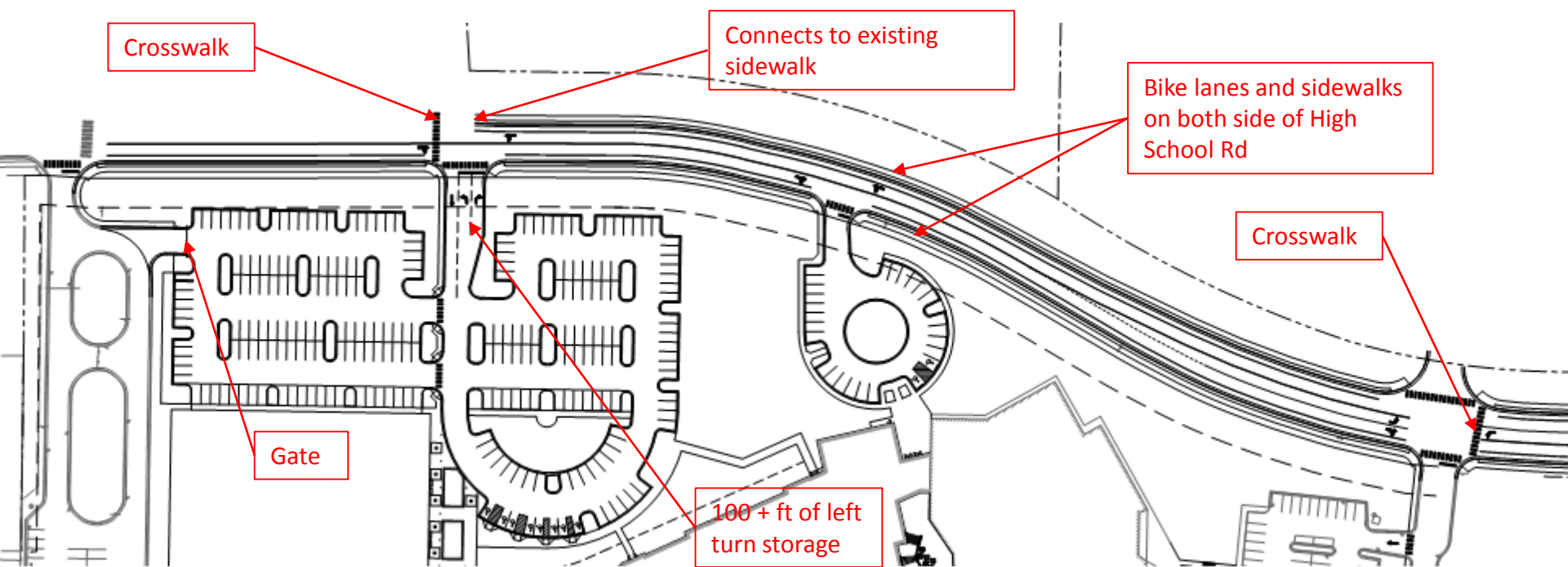
Chapel Hill-Carrboro County Schools  
 1709 High School Road Chapel Hill, NC 27516

PROJECTED DATE	REVISIONS
08/01/2018	1
08/01/2018	2
08/01/2018	3
08/01/2018	4
08/01/2018	5
08/01/2018	6
08/01/2018	7
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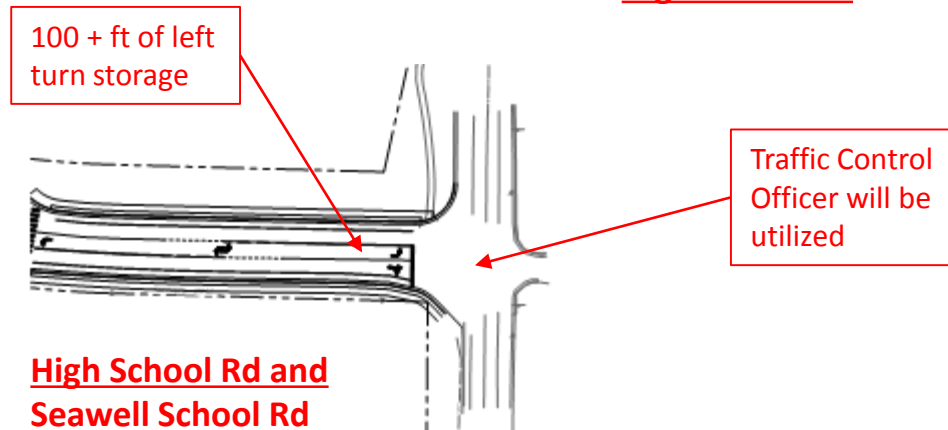
**CONSTRUCTION MANAGEMENT PLAN**

**C5.1**





### High School Rd



# Stream Impact Permits – USACE NWP39 & DWR 401 Water Quality Certification

## U.S. ARMY CORPS OF ENGINEERS WILMINGTON DISTRICT

Action Id. SAW-2016-01904 County: Orange U.S.G.S. Quad: NC-Chapel Hill

### GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Applicant: Chapel Hill Board of Education  
Mr. William J. Mullin  
Address: 750 S. Merritt Mill Road  
Chapel Hill, North Carolina 27514

Authorized Agent: Timmons Group  
Mr. George Buchholz  
Address: 5410 Trinity Road, Suite 102  
Raleigh, North Carolina 27607

Size (acres) 111.9 Nearest Town Chapel Hill  
Nearest Waterway Bolin Creek River Basin Cape Fear River  
USGS HUC 03030002 Coordinates Latitude: 35.944687  
Longitude: -79.078391

Description of the project location: The project area is identified as an approximate 111.9 acre tract of land, located on Orange County, North Carolina Parcel 9779686385. This parcel is located at 1709 High School Road, Chapel Hill, Orange County, North Carolina. Work in waters of the United States would occur in Jolly Branch, an indirect tributary to the Cape Fear River (03030002).

Description of projects area and activity: The applicant, Chapel Hill Board of Education, has requested a Department of the Army authorization to discharge fill material into waters of the United States in conjunction with the construction of the Chapel Hill Middle/High School Expansion. Project activity will involve constructing new facilities on campus, and constructing an access road between the northern (high school) and southern (middle school) section of the campus; which will also provide a second ingress/egress access point for emergency vehicles. Implementation of the proposed project will result in the discharge of fill material into 154 linear feet of stream channel (106 permanent; 48 temporary) in order to facilitate the installation of the above referenced access road. All other impacts associated with the Chapel Hill Middle/High School Expansion will be constructed in uplands, outside of waters of the United States. Compensatory mitigation is NOT required in conjunction with the aforementioned activities.

Applicable Law: ☒ Section 404 (Clean Water Act, 33 USC 1344)  
☐ Section 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: Regional General Permit Number or Nationwide Permit Number: NWP 39- Commercial and Institutional Developments

**SEE ATTACHED RGP or NWP GENERAL, REGIONAL AND SPECIAL CONDITIONS**

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions and your submitted application and attached information dated November 27, 2016. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Quality (telephone 919-807-6300) to determine Section 401 requirements.



December 28, 2017.

Chapel Hill Board of Education  
Attn: William J. Mullin  
750 S. Merritt Mill Road  
Chapel Hill, NC 27514

Subject: **APPROVAL OF 401 WATER QUALITY CERTIFICATION WITH ADDITIONAL CONDITIONS**  
1709 High School Road

Dear Mr. Mullin:

You have our approval for the impacts listed below for the purpose described in your application dated November 27, 2017 and received by the Division of Water Resources (Division) on November 28, 2017. These impacts are covered by the attached Water Quality General Certification Number 4139 and the conditions listed below. This certification is associated with the use of Nationwide Permit Number 39 once it is issued to you by the U.S. Army Corps of Engineers. Please note that you should get any other federal, state or local permits before proceeding with your project, including those required by (but not limited to) Sediment and Erosion Control, Non-Discharge, and Water Supply Watershed regulations.

This approval requires you to follow the conditions listed in the enclosed certification and the following additional conditions:

1. The following impacts are hereby approved provided that all of the other specific and general conditions of the Certification are met. No other impacts are approved, including incidental impacts. [15A NCAC 02B .0506(b)(c)]

Type of Impact	Amount Approved (units) Permanent	Amount Approved (units) Temporary
Stream		
S1: Coffor Dam and Diversion Channel	0 (linear feet)	17 (linear feet)
S2: Fill/Culvert	106 (linear feet)	0 (linear feet)
S3: Fill/Dissipator Pad	31 (linear feet)	0 (linear feet)

Division of Water Resources, Raleigh Regional Office, Water Quality Operations Section  
1628 Mail Service Center, Raleigh, NC 27699-1628  
Location: 3800 Barrett Drive, Raleigh, NC 27609

http://portal.ncdenr.org/web/wq/aps  
Phone: (919) 791-4200  
Fax: (919) 788-7159

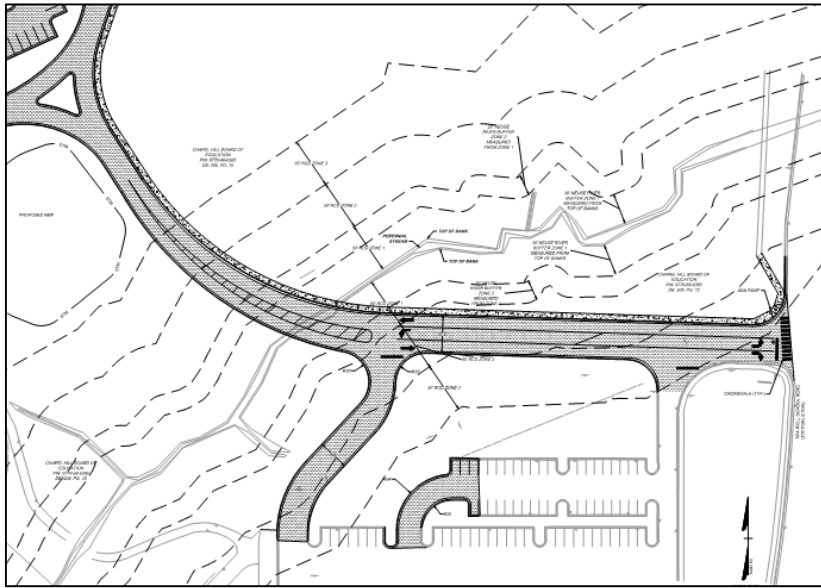
ROY COOPER  
Governor

MICHAEL S. REGAN  
Secretary

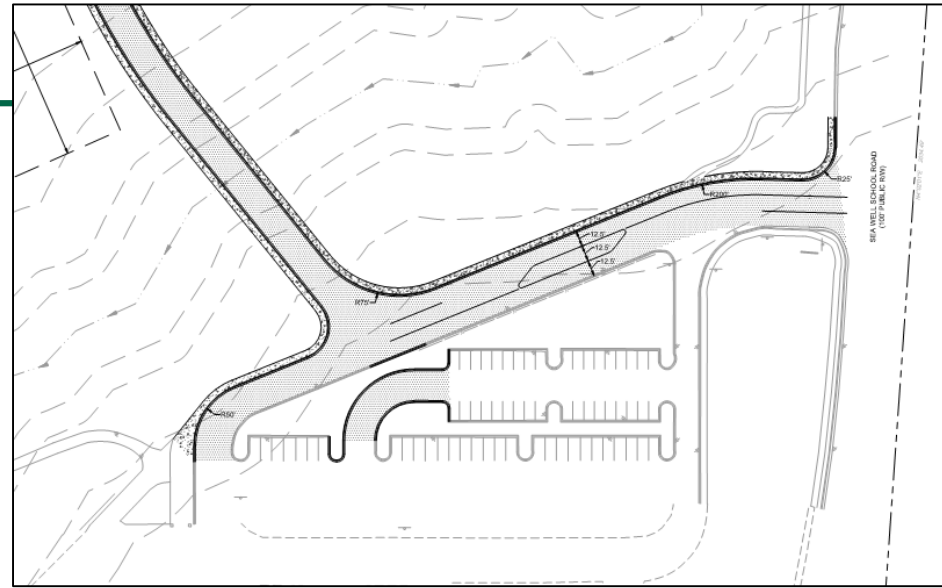
LINDA CULPEPPER  
Interim Director

DWR #17-1528  
Orange County

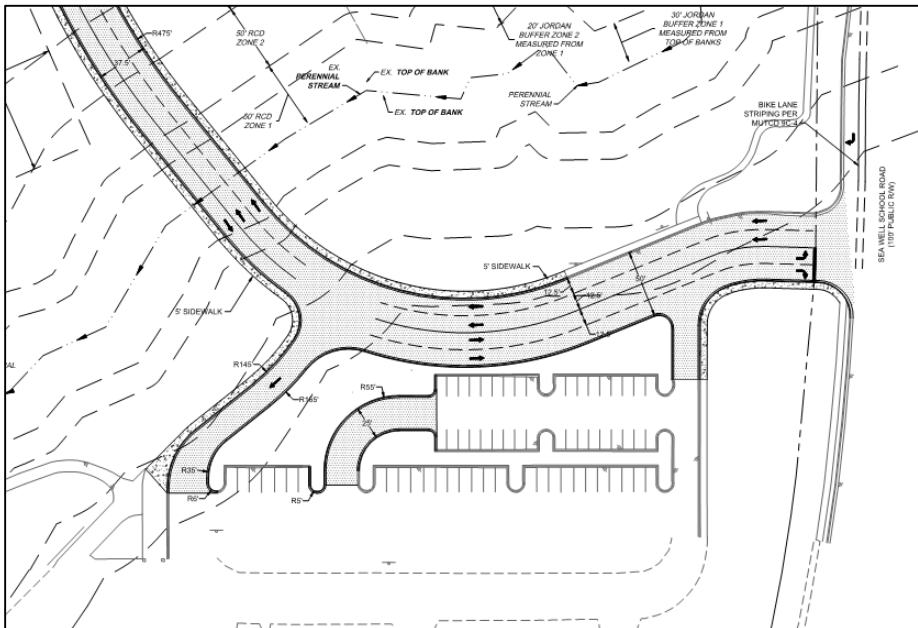




Concept #1



Concept #2



Current  
Concept



# Stream Recharge – Surface Flow vs Groundwater

