

**INLAND WETLANDS COMMISSION  
REGULAR MEETING  
MINUTES**

April 12, 2023 @ 7:30 p.m.  
Council Chambers, Newtown Municipal Center  
3 Primrose Street, Newtown CT

These Minutes are subject to approval by the Inland Wetland Commission

**Present:** Sharon Salling, Scott Jackson, Suzanne Guidera, Craig Ferris, Kendall Horch, Stephanie Kurose

**Staff Present:** Steve Maguire, Senior Land Use Enforcement Officer, Kiana Maisonet, Land Use Enforcement Officer, Dawn Fried, Clerk

Ms. Salling opened the meeting at 7:30 p.m.

**PUBLIC HEARING**

**Application IW #23-04 by Teton Capital Company, LLC**, property located at 6 & 8 Commerce Road, for construction of a 171-unit multifamily housing development.

Ms. Salling read the legal notice into the record. Ms. Salling reviewed the public hearing process, which included a ten minute maximum time for public persons to speak. The public hearing will conclude at 9:30 pm and if needed will be continued to the next IWC meeting.

Ms. Salling stated the Public Hearing will begin with public participation.

**PUBLIC PARTICIPATION**

Steve Trinkaus, PE, Trinkaus Engineering, LLC, 114 Hunters Ridge Road, Southbury, CT, spoke on behalf of the Candlewood Valley Chapter of Trout Unlimited. Mr. Trinkaus gave an overview of the stormwater management plan and a summary of the wetland impacts. (See attached report and qualifications.)

Don Leonard, 38 Joal Court, commended the Commission on their hard work. Mr. Leonard asked the Commission how they assess the information they receive and how do they determine whether a third party review is needed. Mr. Maguire stated the application process is extensive and is reviewed by Land Use, the Town Engineer and the Inland Wetlands Commission. The Commission will consider a third party review if deemed necessary.

Neil Baldino, 18 Gelding Hill Road, Sandy Hill, Vice President of Trout Unlimited Candlewood Valley gave a PowerPoint presentation titled "Deep Brook Watercourse – A High-Quality Aquifer Temperature Profile – Stress Zone & Lethal Zone", dated April 12, 2023. Mr. Baldino voiced his concerns regarding the rising water temperatures in Deep Brook, which is due to water runoff.

Mr. Baldino stressed higher water temperatures and thermal spikes are creating chronic stress, loss of energy and a decrease in the wild trout population. (See attached PowerPoint presentation.)

Joe Hovious, 3 Leopard Drive, Sandy Hook, presented a slide presentation titled “Comments submitted to Newtown Inland Wetlands and Watercourses Commission regarding the proposed development at 6 & 8 Commerce Drive, titled ‘Church Hill Farm at Deep Brook’ dated April 12, 2023.” (See attached.) Mr. Hovious is concerned with the impacts from the increasing water flows and is questioning whether the water courses and stormwater plan can handle it. Mr. Hovious has worked with Trout Unlimited and Deep Brook for 25+ years.

Peter Paulos, P H Architects, LLC, 38 Taunton Hill Road has worked with the Hubbard’s for over nine years. He stated they have done tremendous work on the Catherine Violet Hubbard Animal Sanctuary (CVHAS). Mr. Paulos doesn’t want to lose everything they have worked for. Mr. Paulos stated the Catherine Violet Hubbard property is a designated International Firefly Sanctuary as well as an International Monarch Butterfly Sanctuary. Many colleges such as UCONN, WesCon, Yale and Cornell are working with the CVHAS on biodiversity studies and internships. The CVHAS has also planted over 12,000 pollinator plants for the apiary/beehive programs. Mr. Paulos has concerns with negative impacts on the watercourses and woodland areas as well as the use of pesticides, fertilizers and snowmelt on the proposed adjacent development. Mr. Paulos asked the Commission to review the percentages for impervious surfaces and noted that the conservation easement should not be included in those calculations. Mr. Paulos applauds the Commissioners for taking on this difficult decision.

Dan Ackert, 6 Cider Mill Road, spoke about the positive human impacts Deep Brook has had on his family throughout the years. Mr. Ackert described fishing on the brook with his children and how important the brook was to shaping their lives. Mr. Ackert stated he is concerned with the rising water temperatures and the effect it will have on the brook and future generations. Mr. Ackert is concerned that development and increased impervious surfaces will make it worse. Mr. Ackert thanked the Commission and all those who have protected our waterways.

Dan Holmes, Obtuse Street, stated you don’t have to be a professional engineer to understand the impacts of development and increased population. Water quality and temperature have been impacted over the years. Trout are indicator species of water quality and what happens to the trout happens to us. Mr. Holmes spoke about the “sole source” aquifer and stated what we do above ground directly effects the aquifer. He also stated it takes a community to protect this land and this aquifer.

Mark D’Amico, 7 Tory Lane, thanked the Commission for their difficult job. Mr. D’Amico stated the information given by the experts is bias due to the fact they were hired by the applicants. Mr. D’Amico implored the Commission to consider third party experts such as a soil scientist, stormwater engineer and animal biologist to give their professional opinions. This is warranted due to the size and scope of the development and the sensitivity of property. Mr. D’Amico is concerned that once the development is done, it can’t be undone. Mr. D’Amico suggested saving the meadow by moving the development closer to Commerce Road.

Ms. Kurose asked whether the applicant looked at the CT Natural Diversity Data Base (NDDDB). Ms. Kurose noted there is a protected species in the project area. Ms. Kurose asked whether a survey will be conducted or a wildlife biologist will be consulted. Atty. Olsen stated they are working on a set of revised plans and will be able to answer more questions at that time. Atty. Olsen introduced Steven Danzer, Wetland Scientist, PhD & Associates LLC, Stamford, CT. Mr. Danzer stated one species came up between 2010 and 2011, which was the Wood turtle. The NDDDB is a mandatory site used when obtaining a stormwater permit. Mr. Danzer stated there is a plan in place which was carried over from the 2010 plan.

Mr. Ferris stated he received reports from the applicant describing different underground stormwater systems. Mr. Ferris asked Mr. Trinkaus whether he was familiar with these systems and whether these systems would work for this property. Mr. Trinkaus stated he was familiar with the underground systems and stated soil tests would have to be done. Mr. Trinkaus stated the open-water surface pond, which is currently proposed, will be a real problem for thermal impact because new water comes in and pushes the warm water out. Mr. Ferris asked whether the underground systems are capable of handling a certain amount of capacity. Mr. Trinkaus stated yes as long as there is adequate room on the site.

Ms. Horch discussed obtaining a peer review, which was brought up several times at the meeting. Ms. Horch would like to wait until the revised plans are submitted before hiring a third party. The Commissioners concurred that a peer review will be discussed at a later time.

Mr. Ferris asked Mr. Maguire to explain the Commission's role pertaining to wildlife and the Commission's decision. Mr. Maguire stated the Commission determines whether the wetland characteristic would be altered by the absence or lack of that species. The species tend to more related to wetlands and require a wetland resource. Mr. Danzer confirmed.

Atty. Olsen stated the applicant may need more time to revise the plans. Atty. Olsen will reach out to Mr. Maguire if they need an extension.

The Public Hearing for IW #23-04 by Teton Capital Company, LLC will remain open and be CONTINUED to the next IWC meeting on Wednesday, April 26, 2023 at 7:30 pm in the Council Chambers, Municipal Center, 3 Primrose Street, Newtown.

## **PENDING APPLICATIONS**

**IW Application #23-05 by David & Molly Basak-Smith**, property located at 71 Lakeview Terrace, to construct a sloped accessway from the property to the waterfront by decreasing the grade.

IW Application #23-05 is TABLED for this meeting.

## **ACCEPTANCE OF APPLICATION**

IW Application #23-07 by Kevin Grover, property located at 10 Ox Hill Road for pond dredging.

## **APPROVAL OF MINUTES**

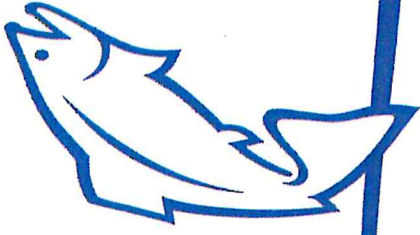
### Regular Meeting of March 22, 2023

Change “Mr. Guidera” to “Ms. Guidera”. Mr. Ferris moved to accept the amended minutes from March 22, 2023. Ms. Horch seconded. The minutes from March 22, 2023 were approved.

## **ADJOURNMENT**

With no additional business, Mr. Jackson moved to adjourn. Ms. Horch seconded. All in favor. The Regular IWC Meeting of April 12, 2023 was adjourned at 8:55 pm.

*Respectfully Submitted,  
Dawn Fried*



# **TROUT UNLIMITED**

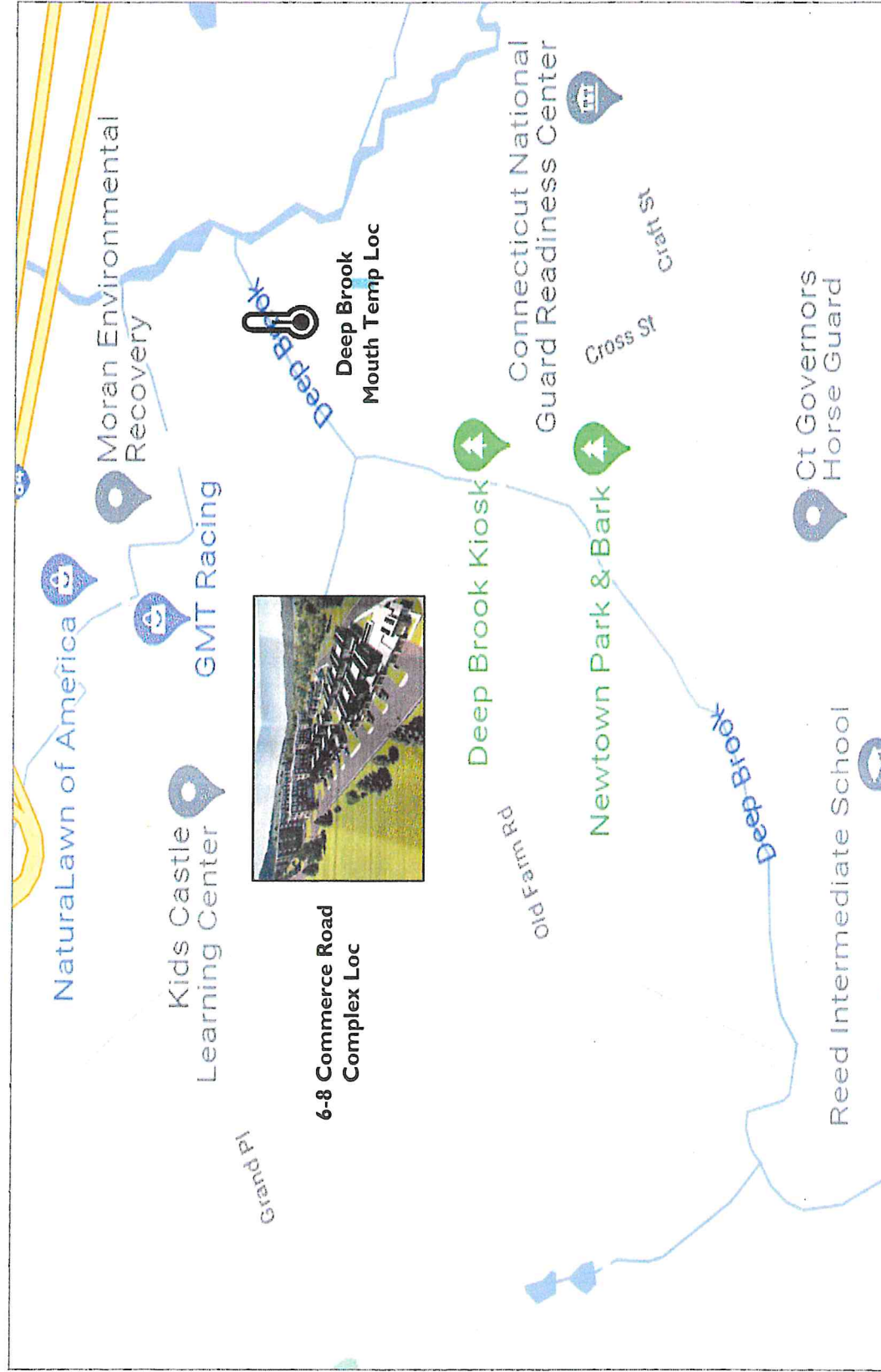
## **CANDLEWOOD VALLEY**

### **Deep Brook Watercourse – A High-Quality Aquifer** **“Temperature Profile – Stress Zone & Lethal Zone”**

Newtown Inland Wetlands Commission Public Hearing  
Regarding IW Application #23-04 – Teton Capital Company, LLC  
Wednesday, April 12, 2023

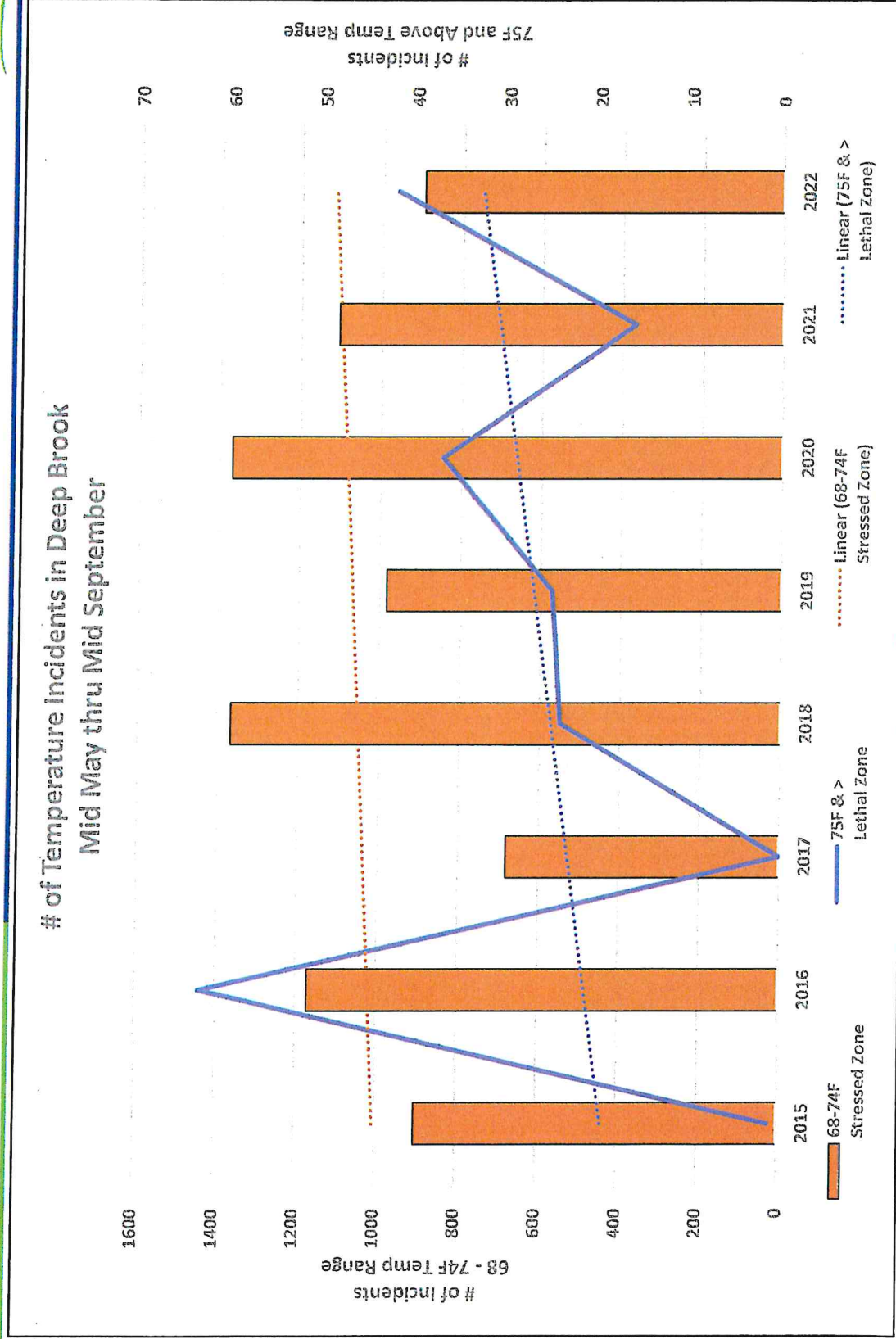
IWC mtg. 4-12-22 8:17.

Fig. #1:Temp Data Logger Location Relative to 6-8 Commerce Rd Project  
 Deep Brook Mouth Thermometer Logger



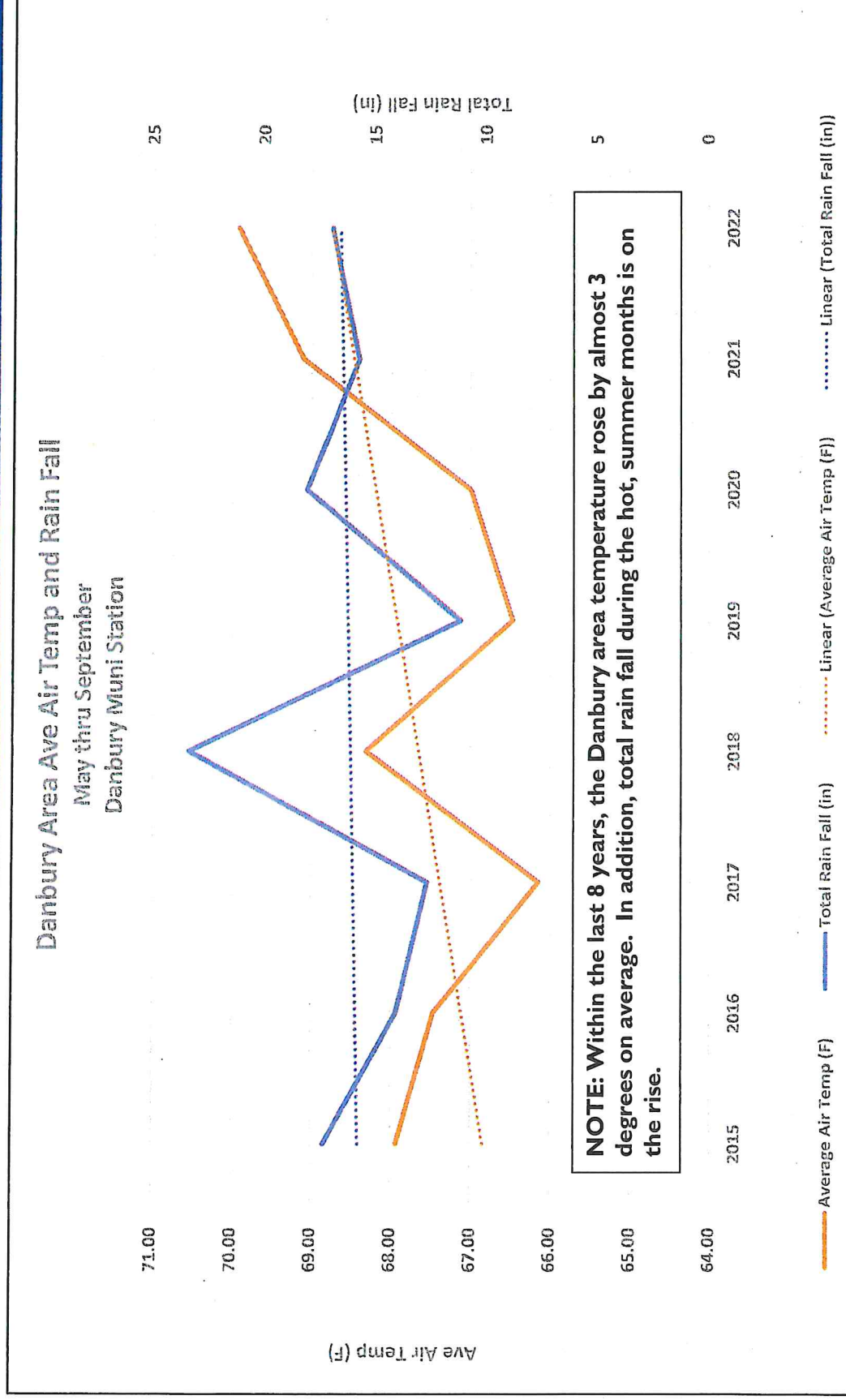
# Deep Brook Temperature Profile

## Figure #2: Temperature Incidents



# Danbury Area - Air Temperature and Rain Fall Profile

## Figure #3: Data Summary (May thru September)



# Deep Brook Temperature Profile Summary/Conclusion



- It can be observed in Figure #2 that from 2015 through 2022 the number of temperature incidents in Deep Brook that fall in the “Stress Zone” (68-74F) for wild trout has been increasing.
- The percent time that the wild trout are living in the “Stress Zone”, equates to an average of 35%. Meaning, from mid May through mid September, 35% of the time Deep Brook water temperature falls between 68-74F. This can have a harmful effect on “Young of the Year” survival rate and wild trout health.
- It can be observed in Figure #2 that from 2015 through 2022 the number of temperature incidents in Deep Brook that fall in the “Lethal Zone” (75F and above) for wild trout has been increasing. The “trend” (Rate of Increase) for this data is greater than that for the “Stress Zone”.
- **NOTE:** Short-term “Lethal Zone” kills faster, i.e. half of trout die after an hour of exposure. Long-term “Lethal Zone” temps kill after a longer exposure due more to chronic stress and a losing energy budget. This distinction allows for trout population to continue to survive despite regular exposure to the long-term “Lethal Zone” range without killing everything.

# Deep Brook Temperature Profile Overview for Analyzed Data

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- Temperature data was analyzed to look at the number of incident events that occur within the following two ranges;
  - 1) 68 to 74F - This is considered to be a “High Stressed Zone” for wild trout
  - 2) 75F and above – This is considered to be a “Lethal Zone” for wild trout
- The time range for the data analysis was mid May through mid September from 2015 to 2022
- Each incident equates to one hour of time spent at that temperature range. (NOTE: The thermograph’s take a temperature reading every hour.)
- Figure #1 shows the location where the temperature data was collected (Deep Brook Mouth) in proximity to the proposed project.

**Comments submitted to Newtown Inland Wetlands and Watercourses  
Commission regarding the proposed development at 6 and 8 Commerce Drive,  
titled "Church Hill Farm at Deep Brook"**

Submitted at public hearing, April 12, 2023 by Joseph Hovious on behalf of Candlewood Valley Trout Unlimited

**Observations on the Stormwater Plan regarding changes in site drainage.**

- Existing overland runoff from the southern portion of the site flows along Old Farm Road. The proposed project will direct it to a different watercourse.
- The Project will introduce significant new flows into the receiving watercourse which is limited
- The receiving watercourse need to be studied to determine if it can accept the new flows

The stormwater plan analysis assumes that all existing runoff goes into the same watercourse that will receive the outflow from the new stormwater pond. (See drawing 2.0) On site inspections reveal that this is a small watercourse which flows underground or through a clogged culvert shortly downstream of the proposed discharge. It then emerges and flows above ground for a short distance before entering 2 drainage pipes to flow under the farm road leading to the parcel noted as "To Remain Open Space" on drawing 1.1. After emerging from the 2 drainage pipes, it flows above ground for a short distance and then under Old Farm Road and discharges to Deep Brook. This is limited flow path.

Inspection of the topographic contours on Drawing 4.1 show the higher elevation "hump" which currently directs surface water from the southern section of the property to the southeast and along the Old Farm Road before discharging to Deep Brook. (See Drawing 1.2 notes) This is different than the flow which will occur with the new project which directs all stormwater through the retention pond and into the small watercourse as shown in 2.0.

This observation of existing flows is verified by photos collected after the rainfall from Hurricane Ida. These photos show the major damage caused by overland flow onto Old Farm Road. (See attached pictures taken 9/2/2021). NOAA records for the Danbury Airport reported rainfall of 2.14" on 9/1 and 2.51" on 9/2 for 4.65" total for the 2 days. The Point Precipitation Frequency Estimates chart on pg. 8 of the Stormwater Management Plan it indicates that this was a 2 to 5 year storm over the 2 day period.

In summary, pre project, much of the runoff from the southern half of the fields where construction will occur runs across the fields and downhill to Old Farm Road. This was obvious during Ida when the increased flows eroded the Old Farm Road. The existing drainage pattern does not send all that runoff into the small stream where the new construction will discharge, so a major change in flow patterns will result from this project.

An analysis as to whether the watercourse can handle the increased flow and any impacts of this increased flow has not been included in the project stormwater plan. Since this watercourse flows underground and through 2 culvert sections and under 2 roads, an analysis should be completed and a determination as to whether modifications are required to the watercourse.

IWC mtg.  
4/12/23  
DJ



J. EDWARDS &  
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WWW.JEDWARDS.COM



CHURCH HILL FARM  
AT DEEP BROOK  
628 COMMERCE ROAD  
NEWTOWN, CONNECTICUT

REVISION	DATE	DESCRIPTION
1	01/15/10	PRELIMINARY
2	02/10/10	REVISED PER COMMENTS
3	03/10/10	REVISED PER COMMENTS
4	04/10/10	REVISED PER COMMENTS
5	05/10/10	REVISED PER COMMENTS
6	06/10/10	REVISED PER COMMENTS
7	07/10/10	REVISED PER COMMENTS
8	08/10/10	REVISED PER COMMENTS
9	09/10/10	REVISED PER COMMENTS
10	10/10/10	REVISED PER COMMENTS
11	11/10/10	REVISED PER COMMENTS
12	12/10/10	REVISED PER COMMENTS

DATE	01/15/10
PROJECT	CHURCH HILL FARM
DESIGNER	J. EDWARDS & ASSOCIATES LLC
SCALE	1"=100'
TITLE	ZONING COMPLIANCE PLAN

ZONING  
COMPLIANCE  
PLAN  
SHEET NUMBER

2.0

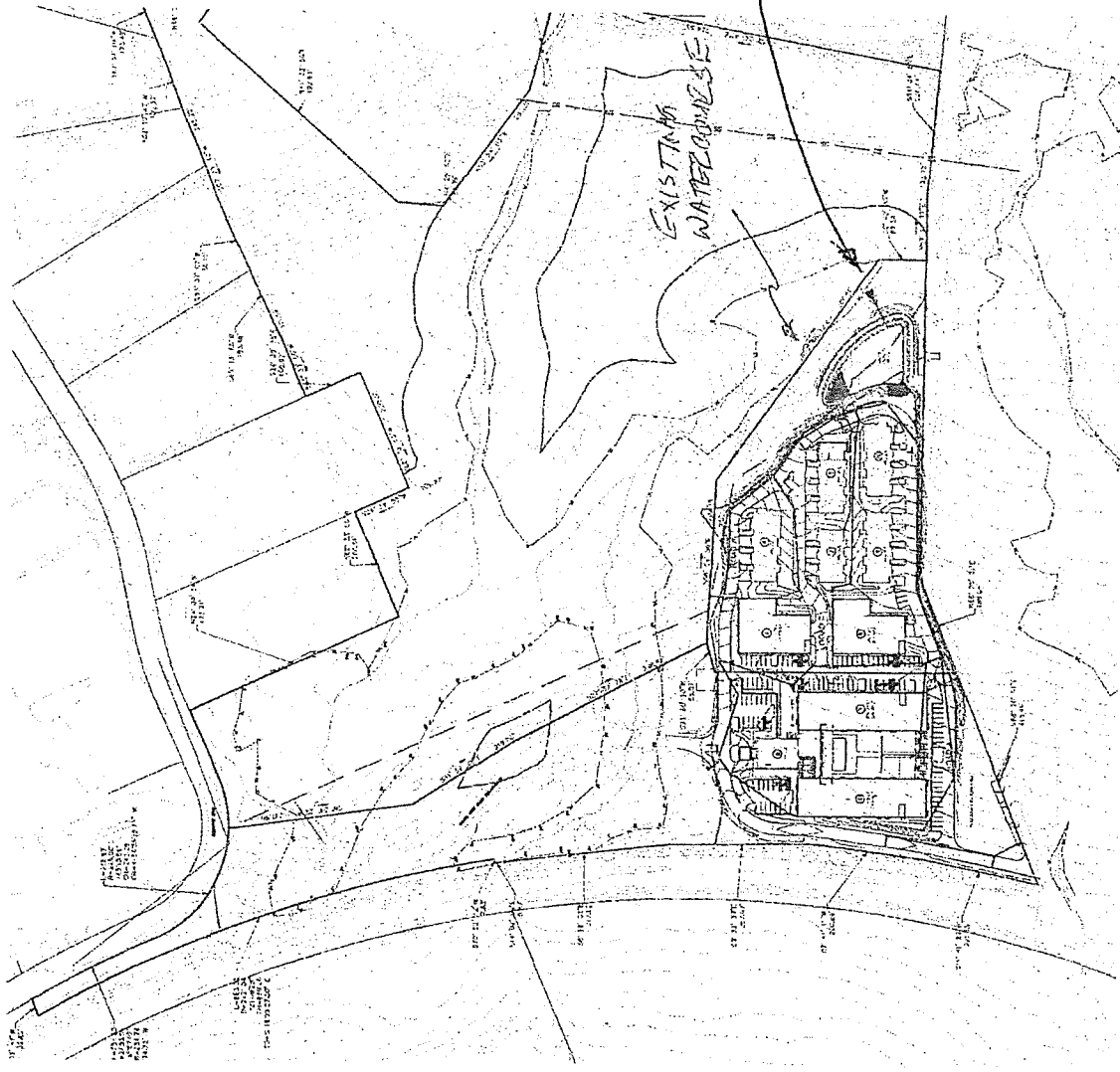
PERMIT SET - NOT FOR CONSTRUCTION

ZONING DATA TABLE

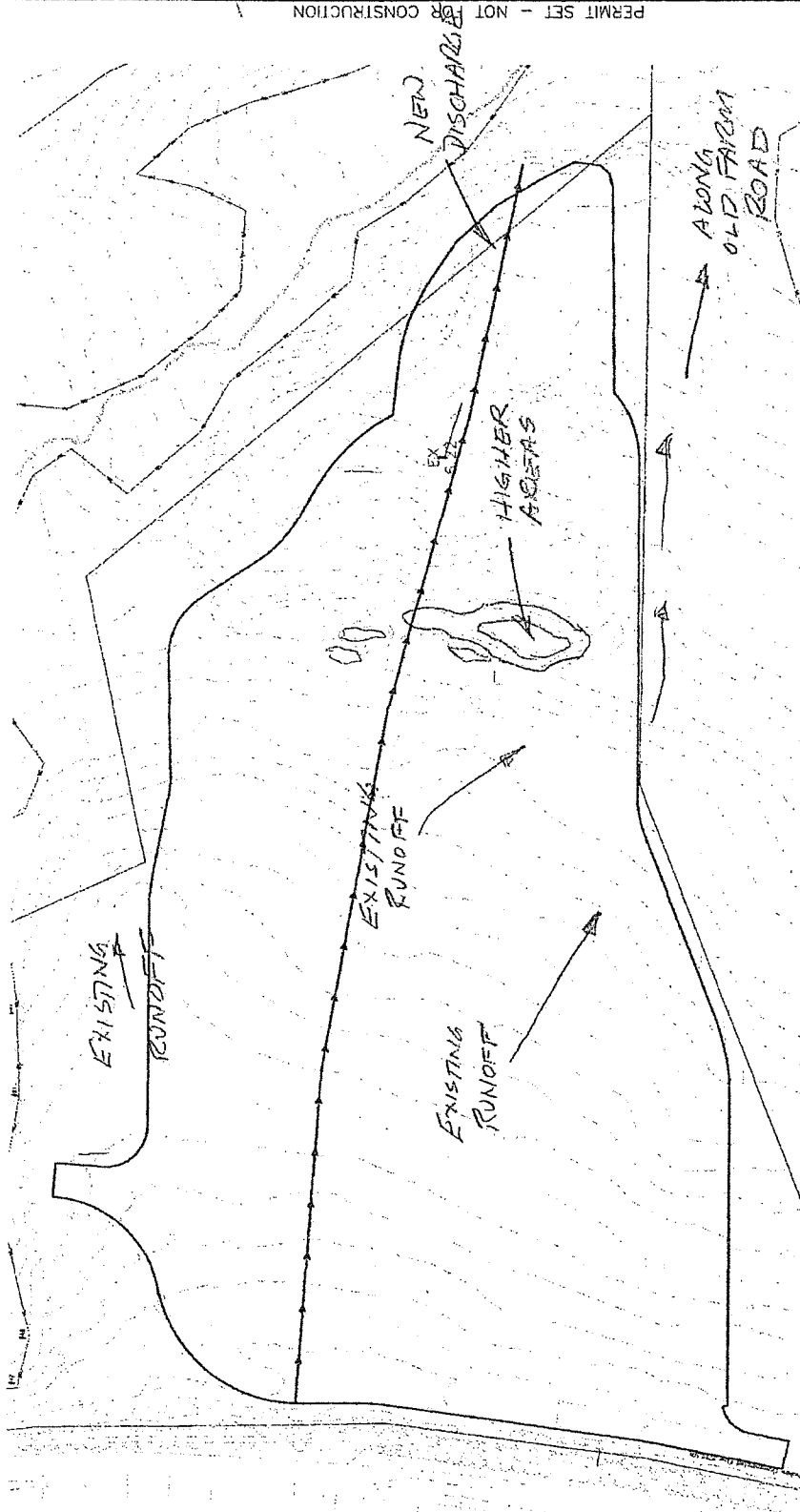
ZONING REQUIREMENT	ZONING STANDARD	LOT 1A PROPOSED	LOT 1B PROPOSED
MIN. LOT AREA (SQUARE FEET)	4,000 (MIN. 100' x 100')	4,000 (MIN. 100' x 100')	4,000 (MIN. 100' x 100')
MIN. LOT FRONT SETBACK (FEET)	5	5	5
MIN. LOT SIDE SETBACK (FEET)	5	5	5
MIN. LOT REAR SETBACK (FEET)	5	5	5
MIN. LOT WIDTH (FEET)	20	20	20
MIN. LOT DEPTH (FEET)	20	20	20
MIN. LOT AREA (SQUARE FEET)	4,000 (MIN. 100' x 100')	4,000 (MIN. 100' x 100')	4,000 (MIN. 100' x 100')
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MIN. LOT AREA (SQUARE FEET)	4,000 (MIN. 100' x 100')	4,000 (MIN. 100' x 100')	4,000 (MIN. 100' x 100')

1. AREA EXCLUDED LOT 1A & LOT 1B & LOT 2 & LOT 3 & LOT 4  
2. PERMIT TO SUEVE PART OF THE ARE EXCLUDED. REMAINS FOR PERMIT DEVELOPMENT

DISCHARGE POINT  
AFTER COMPLETION  
FOR ALL RUNOFF



PERMIT SET - NOT FOR CONSTRUCTION



ALONG  
OLD FARM  
ROAD

NEW

541-1511  
REGISTER

~~EX-151X7~~

ADJONNÉ  
EXISTENT

EX-157N23



**DRAINAGE AREA  
MAP  
(EXISTING)**

**SECRET**



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ASSOCIATES LLC  
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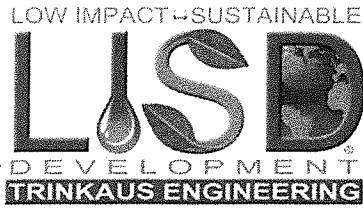
CHURCH HILL FARM  
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NEAR DEEP  
BROOK

NEAR  
TREE  
LINE

Photos taken Sept. 2, 2021



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April 10, 2023

Ms. Sharon Salling, Chairman  
Inland Wetlands Commission  
3 Primrose Street  
Newtown, Connecticut 06470

Re: Church Hill Road at Deep Brook  
6 Commerce Road  
Newtown, Connecticut

Dear Ms. Salling and Members of the Inland Wetlands Commission,

At the request of the Candlewood Valley Chapter of Trout Unlimited, I have reviewed the following documents for the above referenced project. I also attended the public hearing on 3/22/23 and will respond to numerous comments made by the applicant.

**Documents Reviewed:**

1. Stormwater Management Plan for Church Hill Farm at Deep Brook, 6 Commerce Road, Newtown, Connecticut; dated: February 14, 2023 by J. Edwards & Associates.
2. Church Hill Farm at Deep Brook – An Active Adult Conservation Community in Newtown, Connecticut, consisting of 17 sheets; dated: 2/14/23 by J. Edwards & Associates.
3. Wetland Application prepared by Peter Olsen, Esq. of February 16, 2023.
4. Environmental Report, 6 & 8 Commerce Road, Newtown, CT, Church Hill Farm at Deep Brook; dated: February 23, 2023 by Steven Danzer, PhD & Associates
5. Landscape Plan by Environmental Land Solutions.
6. Addendum 2 – Stormwater Management Plan by J. Edwards & Associates of March 20, 2023.

**Wetland Impact Summary:**

- A. While the majority of proposed construction is located outside the defined 100' upland review area, all of the construction activity is located directly upgradient of delineated inland wetlands and watercourses. As noted in the following comments, the erosion control plan is not adequate to protect these aquatic resources from the discharge of sediment laden runoff during the construction period. The site plans do not call out the presence of Deep Brook which is located approximately 300' downgradient of the proposed site. Deep Brook is a native cold water fisheries stream and needs to be

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protected to the maximum extent. It is not being protected from adverse impacts which will result from this project.

- B. Both increased runoff volumes and non-point source pollutant loads will be discharged to Deep Brook. Potential impacts include the following:
- a. Increased runoff volumes and increased duration of flow from this project to Deep Brook will cause the channel banks of Deep Brook to erode as the stream get back to a hydrologic equilibrium. Eroded material will move downstream and be deposited on the gravel substrate of the bottom of Deep Brook, thus smothering benthic organisms which live in the gravel substrate and trout eggs.
  - b. Increased pollutant loads of metal and hydrocarbons in the runoff are toxic to many aquatic organisms at very low concentrations. The biological activity, particularly benthic organisms and trout can be reduced by the discharge of metals and hydrocarbons.
  - c. As currently proposed, the ponded water in the bottom of the basin will be exposed to full sunlight which will have the effect of heating up the stored water in the basin. When new runoff is directed to the basin, the stored warmer water is discharged to Deep Brook. Deep Brook, according to temperature monitoring by Trout Unlimited is already stressed from a temperature perspective. This project will increase the thermal loads to Deep Brook which will further stress the trout in Deep Brook.
  - d. The CT DEEP Natural Diversity Database (NDDB) shows a location which encompasses the Pootatuck River as well as the portion of Deep Brook up to a point approximately opposite the southern end of the Newtown wastewater treatment facility. As a portion of Deep Brook is called out on the NDDB mapping, it is reasonable to believe that upper portions of Deep Brook may also contain threatened or endangered species. Did the applicant query the Natural Diversity Database? Did the applicant conduct any field inspections of Deep Brook for threatened or endangered species?

#### **Executive Summary:**

- A. The stormwater management system does not comply with the requirements of the Town of Newtown.
- B. The design of the proposed stormwater management practices does not conform to the requirements found in the CT DEP 2004 Storm Water Quality Manual "2004 Manual" for a particular practice and will not reduce non-point source pollutant loads or runoff volumes. Higher pollutant loads, particularly metals and hydrocarbons will cause adverse impacts to aquatic organisms in Deep Brook as noted above.
- C. The erosion control plan is not in compliance with the CT DEP 2002 Guidelines for Soil Erosion and Sediment Control "2002 Guidelines" and pose a significant risk to Deep Brook during the anticipated construction period.

## **Stormwater Management Plan:**

1. It is stated that the stormwater management system will consist of catch basins with 2' minimum sumps with the last catch basin being equipped with a hooded trap, an off-line hydrodynamic separator and then a water quality retention basin.
2. Catch basins with 2' sumps and hooded outlets as well as the hydrodynamic separator are consisted secondary water quality practices by the 2004 Manual.
3. There is no such practice called a "water quality retention basin" in the 2004 Manual.
4. It is stated that the drainage analysis was performed for the 2, 10, 25, and 100 year rainfall events. The applicant did not consider the Water Quality Storm (1"/24-hours). This is a critical event to design for as these and smaller storms constitute 85% to 90% of all annual rainfall events based upon rainfall records.
5. The Water Quality Volume (WQV) has been calculated to be 18,400 cubic feet. The applicant claims that the water quality retention basin will provide 18,754 cubic feet of storage, thus meeting the WQV. This is not correct. Per the 2004 Manual, the WQV must be "captured and treated" which means the WQV must be fully contained below the lowest outlet invert of a stormwater practice. As designed, the basin only stores 7,883.4 cubic feet below the invert of the 24" pipe.
6. The applicant calculated the Water Quality Flow (WQF) for sizing of the hydrodynamic separator. The calculation does not follow the process outlined in the TR-55 Urban Hydrology Manual so it cannot be confirmed that the value calculated by the applicant is correct.
7. The Groundwater Recharge Volume (GRV) has been calculated as 1,934 cubic feet using a soil class of D. This is not correct as it is noted on the first page of this report that the soils on this site consist of Paxton/Montauk fine sandy loams. According to the Natural Resource Conservation Service (NRCS) websoil survey, the Paxton/Montauk is a Class C soil, not a Class D soil. A Class C soil will infiltrate more than a Class D soils, so the GRV will be larger than the applicant calculated.
8. As with the WQV, simply claiming that you are providing a volume which is equal to or larger than the GRV does not meet this requirement. The purpose of the GRV is to maintain pre-development infiltration rates for post-development conditions. It must be demonstrated that the GRV will be infiltrated back into the soil.
9. The applicant states that the Channel Protection Volume is being met which requires that the post-development peak rate for the 2-year event be reduced to 50% of the pre-development peak rate. The table shows a pre-development peak rate of 7.19 cfs and a post-development peak rate of 2.14 cfs. However, when you look at the routing analysis of the water quality retention basin, the peak rate released from the basin for the 2-year event is 6.01 cfs which is just a slight reduction from the pre-development peak rate of 7.19 cfs. Based upon the routing analysis, the applicant has not met the Channel Protection Volume.
10. It is stated that outlet protection has been sized by the CT DOT drainage manual. The controlling document for the sizing of outlet protection is the CT DEP 2002 Guidelines for Soil Erosion and Sediment Control and not the CT DOT Drainage Manual.
11. According to this report, it is implied that there will not be impacts downstream of the site simply because peak rates will not exceed pre-development levels. This statement ignores the fact that there will be significant increases of runoff volumes because of the

increase of impervious area and the fact that no infiltration is provided to reduce the runoff volumes. Additionally, there will be increased pollutant loads which will be discharged to Deep Brook which is a native cold water trout stream. The combination of increased runoff volumes and increased pollutant loads will cause adverse impacts to DEEP Brook.

12. The following table shows the increases of runoff volume which will generated for post-development conditions for the analyzed storm events. As Table 1 shows will be significant increases in runoff volume for all stormwater events. Increased runoff volumes when discharged to native streams, such as the 300' small tributary conveying the runoff and Deep Brook will cause erosion of the channel banks and the eroded material is then deposited further downstream which will smother the gravel substrate of Deep Brook.

Table 1 – Summary of Runoff Volumes taken from Stormwater Report

Rainfall Event	Pre-Dev. Volume	Post-Dev. Volume	Net Change	Percent Change
2-year	0.692 ac-ft	1.464 ac-ft	0.772 ac-ft	+ 111.5%
10-year	1.554 ac-ft	2.542 ac-ft	0.988 ac-ft	+ 63.5%
25-year	2.155 ac-ft	3.220 ac-ft	1.065 ac-ft	+ 49.4%
100-year	3.125 ac-ft	4.252 ac-ft	1.127 ac-ft	+ 36.0%

13. The applicant is claiming an infiltration rate of 3" per hour for the proposed water quality retention basin, but there is no evidence to support this value. According to the site plans, there are four test pits in the vicinity of the proposed water quality retention basin which were excavated on 4/15/10, which is almost twelve years ago. No infiltration results were found on the plan. The lack of data makes the claimed reductions of post-development invalid.
14. Many of the test pits call out "fill" from the ground surface to the bottom of the test pit, but there is no description of the material which makes up the fill. Does the fill layer extend deeper than the depth called out in the plan? How far downgradient does the area of "fill" extend?
15. The top of the berm and (storage area) is called out as 320.0'. According to the routing analyses, the water surface elevation for the 10-year, 25-year, and 100-year are all higher than 319.0', thus there is no 12" of freeboard provided to the top of the berm as required by standard civil engineering design.
16. I took the applicant's data for post-development conditions and the water quality retention basin and created the same hydrologic model in HydroCAD without infiltration. When the infiltration rate is removed from the routing analysis, the post-development peak rates of runoff discharged from the basin increase. The 2-year storm goes to 8.96 cfs which is higher than the pre-development rate of 7.19 cfs. 10-year storm goes to 20.71 cfs which is higher than pre-development rate of 15.55 cfs. 25-year storm goes to 27.71 cfs which is higher than the pre-development rate of 21.02 cfs, and the 100-year storm will overtop the basin, thus potentially causing a failure of the basin berm. Thus, reductions in the post-development peak rates will not be met and are not in compliance with the Newtown regulations.

17. In the above analysis performed by my office, the water surface for the 2-year, 10-year, 25-year are all higher than 319.0' and thus do not meet standard civil engineering practice.
18. In the post-development analysis, the applicant uses an average grade of 6.0% for 900' of pipe. This is not correct. A review of the profiles shows highly variable pipe slopes and sizes. A valid hydrologic model uses all the proposed pipe sizes and slopes in series and not a one size fits all approach. This is another reason why the hydrologic analysis is not valid.
19. The invert of the 24" outlet pipe is set at 317.7' which is 0.7' above the bottom of the basin. The storage volume below 317.7' is 7,883.4 cubic feet based upon the applicant's numbers and is only 42.8% of the required WQV. The basin is not fully treating the WQV and thus is not in compliance with the requirements of the 2004 Manual and will result in higher pollutant loads being released from the basin into Deep Brook.
20. No assessment of what the non-point source pollutant loads (TSS, TP, TN, Metals and Hydrocarbons) for post-development conditions has been done.
21. There is also no analysis which shows how the proposed stormwater management system will reduce all the non-point source pollutant loads prior to the discharge to Deep Brook.
22. Will deicing agents be used on the site driveways and parking areas? No stormwater management system will reduce or remove the chlorides in the deicing agents and thus they will be discharged to Deep Brook.

#### **Addendum 2 – Stormwater Management Report:**

23. The analysis on page 2 and 3 of this document are for the temporary sediment basins or sediment traps to be used during construction and NOT the post-development water quality retention basin. The use of Stokes' Law does not apply to the functionality of post-development basins.
24. This analysis does not demonstrate that post-development TSS loads will be reduced by 80%.
25. Page 4 discusses how thermal impacts will be reduced by the water quality retention basin. This analysis does not provide any technical analysis which shows how the thermal load in post-development runoff from the site will be reduced in this basin. Several statements made in this section contradict other information provided by the applicant:
  - a. It states that the volume of the basin is 43,089 cubic feet. According to the routing analysis for the basin in the stormwater report, the maximum volume of the basin is 38,934 cubic feet, which is a difference of 4,155 cubic feet.
  - b. It is stated that the 1" rainfall event will produce 0.195 acre-feet (8,494 cubic feet) of runoff directed to the basin. This contradicts the calculation of the Water Quality Volume which shows this volume to be 18,400 cubic feet.
  - c. The claim that runoff will infiltrate through the bottom of the basin has not been proven by analysis. On this point it was stated by the applicant that additional soil testing, including percolation tests and infiltration tests were done in the area of the proposed basin. No results of this soil testing have been submitted by the applicant to the Inland Wetlands Commission. I inspected the site from Old Farm Road on April 5, 2023 in the vicinity of two parked trailers and only observed four old white

- PVC pipes in this area. There two small areas of the ground surface which were recently disturbed possibly for a percolation test.
- d. It is now claimed that what was called a Water Quality Retention Basin is actually an infiltration basin. It has not been designed as an infiltration basin as found in the 2004 Manual. It has not been designed as an off-line practice which is highly recommended by the 2004 Manual to prevent clogging of the infiltrative surface of the basin. There is no forebay conforming to the requirements found in the 2004 Manual which contains a minimum of 25% of the required Water Quality Volume.
  - e. The trees proposed along the southern slope of the basin will take years to be large enough to provide any meaningful shading of the basin bottom (this comment is made based upon my Bachelor of Science in Forest Management from the University of New Hampshire).
26. The section on Hydrology does not discuss the adverse impacts associated with the development program on the hydrologic conditions in downgradient wetlands or Deep Brook.
27. This document is not signed by the licensed professional engineer who prepared it.

#### **Site Plans:**

##### **Sheet 2.1**

28. It is stated that there will be under building parking for Buildings #2, #3, #4, and #5. There are no provisions for handling the runoff from the under building parking to access rainfall and snowmelt from cars in the under building parking.
29. According to CT DEEP, drainage from under building parking areas must be directed through a hydrodynamic separator and then to the sanitary sewer system and NOT a stormwater management system. Will the Newtown WPCA approve this discharge?
30. The proposed water quality basin most closely approximates a Dry Detention basin. Dry Detention basins are considered a Secondary Practice by the 2004 Manual as they do not reduce non-point source pollutant loads.
31. The water quality retention basin does not have forebay as required by the 2004 Manual for any type of stormwater pond or wetland. It is not in compliance with the requirements of the 2004 Manual. A Forebay per the CT DEP 2004 Storm Water Quality Manual is defined as follows:
- a. A depressed area which is 4' to 6' in depth below the nominal bottom of the stormwater practice.
  - b. The depressed area is located at the outlet of a stormwater pipe which is entering the practice.
  - c. A minimum length to width ratio of 2:1, with a preferred ratio of 3:1.
  - d. The forebay must contain a minimum of 10% of the Water Quality Volume (WQV) directed to the practice.
  - e. The invert of the outlet from the forebay to the remaining portion of the stormwater practice must be elevated so that the 10% WQV is stored the invert.
32. There is no emergency spillway for the basin. All stormwater ponds or wetlands must have an emergency spillway as it is a safety valve in the event of clogging of the primary outlet system.
33. A small storage area is shown just off the driveway at the southwest corner of the basin. This area appears to be too small to stockpile snow from a normal New England winter.

It also appears that snowmelt can also drain to the south away from the basin, thus no treatment of the snowmelt will be provided. It is widely acknowledged in professional literature that snowmelt has some of the highest pollutant loads so the snowmelt must be fully treated to minimize environmental impacts. A second snow storage area is shown north of Road A between buildings #1 and #4. This does not drain to the stormwater management but will drain directly to the northeast and into the delineated inland wetland system with an intermediate watercourse. This will increase the pollutant loads in this wetland corridor.

### **Sheet 2.3**

34. The placement of siltation fence or other similar perimeter barrier which is perpendicular to the original slope is incorrect and not in compliance with the 2002 Guidelines.
35. Erosion control barriers placed perpendicular to the original slope will cause runoff to become channelized along the face of the barrier with higher flow velocities and will cause erosion which will overwhelm other downgradient barriers.
36. Several Temporary Sediment Traps are called out on this sheet. No grading has been provided for them so it would be impossible for a contractor to build one.
37. Where will the discharge from the temporary sediment basins be directed? Nothing is shown on the plans.
38. No sizing computations have been provided per the 2002 Guidelines.
39. The plan only shows a perimeter erosion control barrier of siltation fence for the disturbance of over 7 acres. Based upon the length of the uphill slope, this barrier will be highly prone to failure and result in the discharge of turbid runoff to Deep Brook during the construction period.

### **Sheet 4.2**

33. No catchment areas are called out for the buildings #2, #3, #4, and #5.
34. There is no breakdown of impervious versus pervious area in each catchment.

### **Sheet 5.1**

35. It is noted that the area of disturbance will be 7.7 acres and thus this project must obtain a General Permit (GP) from CT DEP for the discharge of Construction Stormwater and Dewatering Activities. The GP limits site disturbance to no more than five (5) acres at one time, so a phasing plan is required for this project, and none has been provided. It is not in compliance with 2002 Guidelines.
36. The construction narrative is not in compliance with the form and content found in the 2002 Guidelines.

### **Sheet 5.5**

37. The Detention Basin Section shows an underdrain going under the bottom of the basin. No inverts, pipe sizes and materials are provided. The underdrain is not shown on the site plans of the basin. Is there an underdrain or not.
38. No sizing computations of the outlet protection pads have been provided as required by the 2002 Guidelines.
39. No sizing computations for the Grass Swale have been provided as required by the 2004 Manual.

### **Landscape Plans:**

40. The seed mixture specified for the water quality retention basin is called out as “New England Erosion Control/Restoration Mix for Detention Basins and Moist Sites”. According to information found on the New England Wetland Plant website, “this mix is particularly appropriate for detention basins that do not hold standing water. Many of the plants in this mix can tolerate infrequent inundation, but not constant flooding.” As this basin will have a permanent pool which is 0.7’ in depth, this seed mixture is inappropriate.

### **Comments made at the public hearing on March 22, 2023:**

41. I agree with commissioner Horch that the post-development Time of Concentration (Tc) will be much shorter than the pre-development Tc as the flow path is located along either pavement or within a smooth drainage pipe. The Tc affects the height (peak rate) of the hydrograph as well as how soon after runoff begins, the peak rate is reached.
42. It was noted by Steven Danzer, PhD that the meadow which is located north of the site is a critical environmental resource to be preserved. As the majority of the proposed development site consists of the same type of meadow, would the same argument apply to this meadow?
43. Jason Edwards identified himself as representing J. Edwards & Associates. According to the State of Connecticut Department of Consumer Protection Professional Licensing Division, Mr. Edwards is only a licensed land surveyor (LSX #70308) and not a licensed professional engineer. According to Section 20-299 (2020) - Definitions of the CT General Statutes, Land Surveyor is defined as follows:  
“Land surveyor” means a person who is qualified by knowledge of mathematics, physical and applied sciences and the principles of land surveying, and who is licensed under this chapter to practice or offer to practice the profession of land surveying, including, but not limited to: (A) Measuring, evaluating or mapping elevations, topography, planimetric features or land areas of any portion of the earth's surface; (B) determining positions of points with respect to appropriate horizontal or vertical datums in order to establish control networks for topographic, planimetric or cadastral mapping; (C) measuring, evaluating, mapping, monumenting or otherwise marking on the ground, property boundary lines, interior lot lines of subdivisions, easements, rights-of-way or street lines; (D) measuring, evaluating, mapping or marking on the ground, the horizontal location of existing or proposed buildings, structures or other improvements with respect to property boundary lines, building, setback, zoning or restriction lines, existing or proposed interior lot lines, easements, rights-of-way or street lines; (E) measuring, evaluating, mapping or reporting the vertical location of existing or proposed buildings, structures or other improvements with respect to vertical reference surfaces, including base flood elevations; (F) measuring, evaluating, mapping or reporting the location of existing or proposed buildings, structures or other improvements or their surrounding topography with respect to flood insurance rate mapping or federal emergency management agency mapping; (G) measuring or mapping inland wetland boundaries delineated by a soil scientist; (H) creating or mapping surveys required for condominiums or planned communities meeting the requirements of section 47-228; (I) monumenting or otherwise marking on the ground, property subject to development rights, vertical unit boundaries,

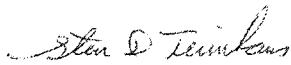
horizontal unit boundaries, leasehold real property or limited common elements described in section 47-228; (J) evaluating or designing the horizontal or vertical alignment of roads in conjunction with the layout and mapping of a subdivision; (K) measuring, evaluating or mapping areas under the earth's surface and the beds of bodies of water."

44. A Professional Engineer is defined as follows: "Professional engineer" means a person who is qualified by reason of his knowledge of mathematics, the physical sciences and the principles of engineering, acquired by professional education and practical experience, to engage in engineering practice, including rendering or offering to render to clients any professional service such as consultation, investigation, evaluation, planning, design or responsible supervision of construction, in connection with any public or privately-owned structures, buildings, machines, equipment, processes, works or projects in which the public welfare or the safeguarding of life, public health or property is concerned or involved". As Jason Edwards is not a professional engineer, his testimony on stormwater and site design cannot be considered expert testimony in my professional opinion. A partial copy of the State of Connecticut Department of Consumer Protection Professional license roster for Professional Engineers and Land Surveyors shows that Jason Edwards is only a licensed land surveyor.

JOHN	EDWARDS	2100 COOK RD	BALLSTON LAKE	NY	12019 PEN.0020097	PROFESSIONAL ENGINEER
JASON	EDWARDS	227 STEPNEY RD	EASTON	CT	06612-121LSX.0070308	LAND SURVEYOR
LARRY	EDWARDS	279 RICHARDS RD	NEW HARTFORD	CT	6057 PEL.0010937	PROFESSIONAL ENGINEER & LAND SURVEYOR
ROBERT	EDWARDS	1022 KEYSTONE DRIVE	SELLERSVILLE	PA	18960 PEN.0019134	PROFESSIONAL ENGINEER
STEVEN	EDWARDS	1260 OLD CHARLOTTE PIKE	PEGRAM	TN	37143-60C PEN.0036139	PROFESSIONAL ENGINEER
ROCKWOOD	EDWARDS	8 4TH AVE	BELLINGHAM	MA	02019-141PEN.0027387	PROFESSIONAL ENGINEER

A copy of my professional qualifications is attached for the record.

Respectfully Submitted,  
Trinkaus Engineering, LLC

  
Steven D. Trinkaus, PE

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<b>Qualifications</b>	B.S. / Forest Management/1980 University of New Hampshire
<b>Licenses/Certifications</b>	Licensed Professional Engineer- Connecticut (1988)
<b>Professional Societies</b>	American Society of Civil Engineers Connecticut Society of Professional Engineers International Erosion Control Association
<b>Professional Awards</b>	Steve was named an Industry Icon by Storm Water Solutions in July 2015 <a href="http://editiondigital.net/publication/?i=263831&amp;p=16">http://editiondigital.net/publication/?i=263831&amp;p=16</a> for his work in the Low Impact Development field.

**International Experience**

**South Korea – July 2017, June 2016, April 2015, October 2014, April 2014, October 2013 and June 2013**

- Steve was invited by Dr. Leeyoung Kim of Kongju University to make a presentation at the Seoul International Symposium for water cycle held on July 27, 2017 at Seoul City Hall. Steve's presentation was entitled "Sustainable Urban Water Cycle Management, Low Impact Development Strategies for Urban Retrofits". Steve also made a presentation to Master and PhD Engineering students at Kongju University on designing LID treatment systems. He also visited the research office of Land & Housing Institute in Daejeon to inspect recent LID retrofits consisting of Bioretention systems, Bioswales and Permeable Paver systems.
- Steve was invited by Dr. Shin to visit the Korean GI/LID research center in July of 2017. The purpose of the visit was to inspect the LID research systems which had been in place for a year to observe how well they were functioning and also to observe the current research on infiltration of LID systems and evapotranspiration of green roof systems.
- Steve was an invited attendee to the official opening of the Korean GI & LID Research Center recently constructed at the Yangsam Campus of Pusan National University. Steve was a consultant on the design of the research center for Dr. Hyunsuk Shin of Pusan National University.
- Steve was an invited presenter at the World Water Forum by Dr. Hyunsuk Shin of Pusan National University. He presented case studies of GI/LID applications in the United States.
- Steve was invited by Dr. Yong Deok Cho of Kwater to participate in the Water Business Forum at the World Water Forum. Steve presented an overview of his business and expertise in Low Impact Development.

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- Steve was invited by Dr. Hong-Ro Lee of Kunsan National University and made a presentation entitled “Understanding Low Impact Development in the Urban-Rural Interface” for the **Ariul Brainstorming Working Group** on April 16, 2015 in Gunsan, South Korea. He also toured portions of the proposed land reclamation area to assess how Low Impact Development strategies could be incorporated to address water quality issues from the proposed agricultural, residential, commercial and industrial land uses for this area.
- Steve was a Contributing Author as well as an Advisory Reviewer for a report prepared by Land & Housing Institute (LHI) entitled “Pyeongtaek Godeok New City Low Impact Development techniques (LID), A study on the introduction of measures (I) “ dated: January 2015. This report by LHI also cited the Town of Tolland LID Design Manual as a foreign LID Manual to be used as a reference document.
- Steve was an invited presenter at the International Water Forum 2014 held in conjunction with the Nakong River International Water Week in Gyeongju, South Korea sponsored by DaeGyeong Water Foundation & the International Hydrologic Environmental Society. His presentation focused on urban stormwater and the benefits of LID in these areas.
- Steve was an invited presenter at the IWA Water Reuse & Energy Conference 2014 held in Daegu, South Korea. His presentation was on the regulatory barriers to implementation of LID and how to overcome these barriers. He also participated in a panel discussion with other presenters.
- He also made a presentation at The 1<sup>st</sup> GI & LID Technical Education Workshop held at Pusan National University on October 22<sup>nd</sup> on an overview of LID and the application of LID concepts. He was invited by Dr. Kyung Hak Hyun of Land & Housing Institute (LHI) to make two presentations of LID case studies at Sangyung University and at a seminar hosted at LHI along with Kwater.
- Steve met with Jong-Pyo Park, Director and Kyoung-Do Lee, CEO of HECOREA, a water resource consulting firm to discuss LID in dense urban areas. Steve signed a MOU with HECOREA to provide consulting services on LID monitoring approaches and maintenance protocols for the Go-Deok International Planning District near Pyeongtaek, South Korea.
- Steve was invited by Dr. Kyung Hak Hyun of Land & Housing Institute to present at the 2<sup>nd</sup> Low Impact Development Forum in Daejeon, South Korea on October 31, 2013. He also inspected the site of Asan-tangeong which is an expansion of residential housing for the city of Asan. This expansion will incorporate LID stormwater strategies.
- Steve was invited to make a presentation of the implementation of LID on commercial sites by Dr. Reeho Kim of the Korea Institute of Construction Technology in Seoul.
- Steve met with Dr. Sangjin Lee of Korean Water and Dr. Woo Young Heo, CEO of LID Solution Co, Ltd to review the initial concept plans for the Eco-Delta City project. Eco-Delta City is a new city located near the Gimhae International Airport of 13 square kilometers and will incorporate LID concepts throughout the new city.
- Steve signed a MOU with Dr. Shin of Pusan National University to provide consulting services for the Smart GI/LID Research Facility at Pusan National University. Steve was asked by Dr. Shin to review the design plans for the GI/LID research facility to be constructed at Pusan National University with a focus on the exterior LID research facilities. He provided a written comprehensive review for consideration by PNU.
- Steve was invited by Dr. Hyunsuk Shin of Pusan National University in South Korea to present a workshop on Low Impact Development on June 24, 2013. The presentation was made to research professors, graduate engineering students and practicing engineers at K-water headquarters in Daejeon, South Korea. He also met with representatives of other agencies tasked with the development of a new city, called Eco-Delta City which will implement LID practices from the ground up and comprises approximately 3,500 acres.

### **Nanjing, China, September 2018**

Steve was invited by the organizing committee for the third China Sponge City International Exchange Conference to make three presentations on LID. The presentations were entitled: “LID: The Good, the Bad and the Ugly”, “Permeable Pavement Case Studies” and “The regulatory framework to adopt LID”. The conference was held September 27<sup>th</sup> and 28<sup>th</sup> in Nanjing, China.

### **Beijing/Zhenjiang, China – August 2017**

Steve was invited to make a presentation entitled “Urban LID in China and South Korea” at the 2017 Second China Sponge City International Exchange Conference held in Beijing on August 16-17, 2017. He also made a presentation for Dr. Nian She, Director of Smart Sponge City Planning and Construction Research Institute in Zhenjiang, China on modeling approaches for LID treatment systems as well as inspecting some recent LID retrofits currently under construction in Zhenjiang. Steve also made a presentation at Reschand entitled “LID Case Studies from US” at the request of Yuming Su of Reschand.

### **Nanjing, China – September 2016**

Steve was invited to present at the 2016 First China Sponge City International Exchange Conference held in Nanjing, China. The presentation focused on several case studies of LID systems in the US.

### **Zhenjiang, China – June 2015**

Was retained by Dr. Nian She to design Urban LID retrofits for a 2.5 hectare (6.5 acres) dense residential area in the city of Zhenjiang. The LID retrofits had to fully treat runoff from the existing impervious areas (building roofs, driveways and parking areas) for 65 mm (2.6”) of rainfall in 24 hours. The LID systems also had to attenuate the peak rate of runoff for a rainfall event of 150 mm (5.9”) rainfall event. A combination of Bioretention systems, and permeable pavers with a filter course and reservoir layer were used to meet these stormwater requirements.

### **Zhenjiang, China – May 2015**

Steve was invited by Professor Nian She of Shenzhen University to make a presentation entitled “Using LID to Attenuate Large Rainfall Events and Reduce Flood Potential” at the 2015 First Sino US Sponge City LID Technology Practice Conference held on May 4-5, 2015 in Zhenjiang, China organized by Zhenjiang Water Supply and Drainage Management Office. ([http://www.c-water.com.cn/2015lid/en/index\\_e.html](http://www.c-water.com.cn/2015lid/en/index_e.html)). In addition to the presentation, field inspections were made of several new LID installations in the city consisting of Bioswales, permeable pavement systems and rainwater harvesting.

### **Guangzhou, China – December 2012**

- Steve was an invited attendee at the 15<sup>th</sup> Annual Guangzhou Convention of Chinese Scholars in Science and Technology in Guangzhou, China on December 17 – 21, 2012 to present a project narrative on how Low Impact Development and sustainable development can be applied to address water quality issues in urban and rural areas of China to implement sustainability concepts and conservation of resources. He attended with Dr. Jim Su, PE of Golder Associates of Mt. Laurel, New Jersey. While at the convention he met with representatives from Sichuan University, Chang’an University, Guangdong University of Technology, Shenzhen University and the South China Institute of Environmental Sciences, MEP to discuss LID being incorporated into their engineering programs.
- Steve also met Dr. Hongbin Cheng of New China Times Technology which is located in Stellenbosch, South Africa. Steve has signed a three year partnership agreement with New China Times Technology to introduce LID concepts to the west cape area of South Africa.

## **Taiwan – December 2011**

- Steve was invited by Hung Kwai Chen, Director of the Water Resources Planning Institute, Water Resource Agency, Ministry of Economic Affairs of Taiwan and Dr. Yong Lai of the US Bureau of Reclamation to present a 12-hour presentation on Low Impact Development on December 8<sup>th</sup> and 9<sup>th</sup>, 2011 in Taichung, Taiwan. The presentation focused on applying LID strategies in both urban and rural environments to address runoff volumes and water quality issues.
- Steve is an invited consultant to a project team headed up by Xiaoyan Zhou, PhD of the Institute for Taiwan Water Environment Research (TIWE) along with The National Taiwan Ocean University, Hohai Engineering Professor Liao Chaoxuan, Ting Engineering Consultants Co., Ltd and University of Colorado professor Guo Chunyuan to develop a LID demonstration project in New Taipei City along with LID policy strategies to further the use of LID in New Taipei City, Taiwan.

## **Low Impact Development**

- Review of existing municipal land use regulations to identify barriers to the implementation of Low Impact Development
- Preparation of regulatory language changes to facilitate the adoption of Low Impact Development
- Preparation of design manuals for the implementation of Low Impact Development strategies and processes with an approach that simplifies the design process
- Application of environmental site design strategies to focus development concepts on land most suitable for development while enhancing the protection of environmentally sensitive areas
- Design of Low Impact Development treatment systems, such as Bioretention areas, wet/dry swales, vegetated level spreaders, vegetated filter strips, subsurface gravel wetlands, constructed wetlands and/or pond systems, infiltration basins & trenches
- Hydrologic analyses of current and post-development conditions to assess impacts of proposed development on storm water flows
- Design of storm water control systems including detention and water quality basins and appropriate planting plans
- Perform hydrologic modeling of stormwater management systems to demonstrate compliance with regulatory benchmarks
- Prepare Pollutant loadings analyses to evaluate the effectiveness of stormwater treatment designs in reducing pollutant loads

## **Wastewater Management:**

- Soil testing to determine suitability of land to support on-site sewage disposal systems for residential and commercial projects and assistance with identifying optimal location for both small and large scale systems.

- Perform necessary calculations to model and design large scale subsurface sewage disposal systems under CT DEEP criteria and State Department of Public Health
- Design of on-site sewage disposal systems in accordance with state and local health codes
- Perform construction oversight of both small and large scale subsurface sewage disposal systems and provide certifications of compliance.

### **Site Engineering:**

- Development feasibility studies
- Layout concepts to maximize development, while preserving environmentally sensitive areas
- Design of horizontal and vertical road geometry
- Preparation of grading, drainage and erosion and sedimentation control plans
- Use AutoCAD Land Development, Civil3D, HydroCAD and Pondpack software packages
- Layout and design of sanitary sewers
- Bid estimates
- Construction oversight
- Third party technical reviews
- Expert testimony

### **Professional Committees**

- Chairman and primary author of EWRI/ASCE LID Model Ordinance Task Committee (goal is to create a National LID Guidance document to further the adoption of LID)
- Chairman of EWRI/ASCE LID Task Committee on Filter Strips and Bioswales (goal is to review & evaluate literature and design specifications for filter strips and Bioswales and create uniform design standards for different geographical regions)
- Member of EWRI/ASCE LID National Guidelines Task Committee

### **Published Articles**

- **“Easier Said Than Done – Overcoming common errors when installing bioretention systems”** – October 2018 edition of Storm Water Solutions by Scranton Gillette Communications.
- **“Large-scale LID Design for urban expansion in South Korea”** with co-author, Dr. Kyung Hak Hyun of South Korean Land and Housing Institute – Volume 3/Issue 4, August/September 2015 – Worldwater Stormwater Management by the Water Environmental Federation.
- **“Research team leads LID deployment in South Korea”** – Volume 2/Issue 1, Spring 2014 – Worldwater Stormwater Management by the Water Environmental Federation.

- “**Low Impact Development, Sustainable Stormwater Management**” – English article converted to Chinese and published in the Chinese Edition of Global Water Magazine, July 2013.
- “**A Case Study: Southbury Medical Facility and Low Impact Development**” - January/February 2014 issue of Land and Water.
- “**A True Pioneer of Low Impact Development – Member Spotlight**” – January/February 2014 Issue of Erosion Control – Official Journal of the International Erosion Control Association.
- “**Low Impact Development: Changing the Paradigm**” published in the March 2012 edition of PE, The Magazine for Professional Engineers by the National Society of Professional Engineers. Article was also republished in the Spring 2012 addition of EWRI Currents (with permission of NSPE).
- “**Stormwater Retrofit of Existing Detention Basins**” published in the March/April 2012 Land and Water, The Magazine of Natural Resource Management and Restoration with co-author Sean Hayden of the Northwest Conservation District.
- “**Out in the Open; Creating a Stormwater Park in the Heart of a Community**” published in the April 2013 issue of WaterWorld by Pennwell Corporation.
- “**Creating a Stormwater Park in the City Meadow of Norfolk, Connecticut**” published in the July/August 2013 edition of Land and Water

### **Volunteer Organizations**

- President (elected 11/2013) and Connecticut Representative to the Board of Directors for the Northeast Chapter of IECA,
- Alternate member of Inland Wetlands Commission Town of Southbury (served three years),
- Northwest Conservation District Board of Directors (served 18 months)

### **Software Development**

Developed a proprietary software application called Assessment of Pollutant Loads and Evaluation of Treatment Systems (**A.P.L.E.T.S.**). This application calculates the pollutant loads for current and future land use conditions for the seven most common pollutants in non-point source runoff (TSS, TP, TN, Zn, Cu, TPH, & DIN) for a total of twenty-two different types of land uses. The application then allows the evaluation of the effectiveness of thirty-four Conventional and Low Impact Development treatment systems in removing these pollutants. Up to four treatment systems can be used in a row as a treatment train to achieve water quality goals.

### **Future Presentations**

- Steve will be making two presentations entitled “Stormwater Management for Ground Mounted Solar Arrays in New England” and “LID in Connecticut – Are Designs Improving” at the **2023 World Environmental & Water Resources Congress** to be held in Henderson, Nevada on May 21 – 24, 2013. <https://www.ewricongress.org/>
- Steve will be presenting a 6.5-hour webinar over two days entitled “Low Impact Development” on June 6<sup>th</sup> and 7<sup>th</sup>, 2023 for design professionals sponsored by Halfmoon Seminars.
- Steve will be making two presentations entitled “Designing LID Systems: What do you need to know and why?” and LID in Connecticut – Are Designing Improving?” at the 2023

International LID conference to be held in Oklahoma City, Oklahoma on August 6 – 9, 2023.  
<https://www.lidconference.org/>

### **Invited Speaker Presentations:**

- Steve made a presentation entitled “Making Rainfall Disappear using Bioretention and Permeable Pavement” for a webinar entitled “ Groundwater: Making the Invisible Visible” sponsored by the **Philippine-American Academy of Science and Engineering (PAASE)** on March 11, 2002 at 8 am (Philippine Time) <https://paase.org/?fbclid=IwAR1KNhxJ69qpolCOxxCT4omfeFLysKCfLDN9cw-Ygizs2DtLiJMfO-Nk8Pg>
- Steve made a two-hour presentation via zoom on November 22, 2021, for the Green Infrastructure & Low Impact Development Specialized Graduate School at **Pusan National University** at the request of Dr. Hyun Suk Shin. The topics presented were “Why we need LID” and “Bioretention systems and the design”.
- Steve made two presentations at the **IWA Dipcon 2019**; The 19<sup>th</sup> IWA International Conference on Diffuse Pollution and Eutrophication being held in Jeju, South Korea in October 2019. The presentations were entitled “How Low Impact Development strategies can mitigate high intensity rainfall events” and “If LID is so easy to implement, how come we keep getting it wrong”. (<http://iwadipcon2019.org/dipcon/about.asp> )
- Steve made the following presentations at **St. Andrews University in Scotland** on October 19<sup>th</sup> , 2017 for the Sustainable Development program. The first presentation is entitled "Improving the environment with Low Impact Sustainable Development Strategies". The second presentation is entitled "Addressing Water Quality and Runoff Issues in a changing weather world".
- Steve was invited by Dr. Jae Ryu of the University of Idaho Water Center to make a presentation entitled “Designing Low Impact Development treatment systems for **Urban & Agricultural Environments**” at the **Annual US-Korea Conference on Science, Technology, and Entrepreneurship** being held in Atlanta, Georgia on July 29 to August 1, 2015. ( <http://www.ukc.ksea.org/UKC2015/> )
- Steve was invited by the Lake George Waterkeeper to make a presentation entitled “Applying LID Concepts in the Real World” at the 5<sup>th</sup> Annual Low Impact Development Conference being held in Lake George, NY on May 7, 2015. ( <http://fundforlakegeorge.org/2015LID> )
- Steve was invited by Dr. Hyunsuk Shin and made a presentation entitled “Real Adaptation and Implementation of GI and LID Technology in USA” at the **World Water Forum** (<http://eng.worldwaterforum7.org/main/>) being held in Daegu, South Korea on April 14, 2015.
- Steve prepared a presentation for a workshop to civil and environmental engineering students at **Pusan National University** ([http://www.pusan.ac.kr/uPNU\\_homepage/kr/default.asp](http://www.pusan.ac.kr/uPNU_homepage/kr/default.asp)) in Busan, South Korea on April 17, 2015, entitled “Designing LID System - What do you need to know and why”.
- Steve was invited by Dr. Hong-Ro Lee of Kunsan National University and made a presentation entitled “Understanding Low Impact Development in the Urban-Rural Interface” for the **Ariul Brainstorming Working Group** on April 16, 2015, in Gunsan, South Korea. It will focus on how

Low Impact Development concepts can be applied to made land areas filled in off the west coast of South Korea to address water quality issues.

- Steve was an invited speaker at the **2014 Low Impact Development Conference** sponsored by the Lake George Waterkeeper and the Fund for Lake George in Lake George, NY on May 1, 2014, for land use professionals and regulatory agencies. He will be presenting case studies focusing on the application of LID concepts for commercial and residential projects.
- Steve was invited by Justin Kenney, Green Infrastructure Coordinator of the Vermont Department of Environmental Conservation Watershed Management Division to present an eight-hour workshop entitled “From Bioretention to Permeable Pavement: An In-depth Introduction to Low Impact Development and Green Stormwater Infrastructure” in Montpelier, Vermont on December 5, 2013. The presentation was hosted by the **Vermont Green Infrastructure Initiative** with support from the following Vermont Agencies and Divisions, **Building and General Services, Ecosystem Restoration Program and Agency of Transportation**.
- Steve was invited to attend and present on the Application of LID Concepts for the Urban Environment and LID Case Studies at the 2<sup>nd</sup> Low Impact Development, Stormwater Management Forum hosted by the **Land & Housing Institute, Korean Land & Housing Corporation** to be held in South Korea in on October 31, 2013. He also made presentations at the **Korean Institute of Construction Technology** and **Pusan National University** on various aspects of LID during this time.
- Steve was an invited speaker at the **2013 Low Impact Development Conference** sponsored by the Lake George Waterkeeper and the The Fund for Lake George in Lake George, NY on May 2, 2013 for land use professionals and regulatory agencies. Over 80 design professionals and regulatory people were in attendance. He made a presentation entitled “Barriers to the implementation of LID”.
- Steve was an invited presenter at a closed-meeting of the **National Association of Home Builders (NAHB) and the Water Environment Federation (WEF)** on October 10, 2012 focusing on progressive stormwater management. The presentation focused on the application of LID strategies on actual development projects and discussed the hydrologic performance and cost effectiveness of LID design.
- Steve was the invited presenter for a 1-hour long webinar presented by **Stormwater Solutions and Stormwater USA** on Low Impact Development and the Basics of Bioretention held on September 18, 2012. Over 760 individuals watched the webinar.
- Steve was an invited speaker at and **EPA/WEF Stormwater Technical Meeting** on July 18, 2012 in Baltimore, MD to discuss the application of Low Impact Development strategies for actual projects with a focus on cost effectiveness when compared to conventional stormwater management as well as field performance of the LID designs. The purpose of this meeting was to assist EPA in the development of a National Stormwater Rule.
- Site Design using Low Impact Development Strategies and What are the impacts of Impervious Cover on Water Quality and Quantity were presented at a workshop entitled “Challenges and Solutions using Low Impact Development”, sponsored by the **Lake George Waterkeeper** in Lake George, NY on May 5, 2011, for land use professionals and regulatory agencies. 90 design professionals and regulators in attendance.

- Steve was an invited speaker at the **2012 Low Impact Development Seminar** sponsored by the Lake George Waterkeeper in Lake George, NY on April 25, 2012, for land use professionals and regulatory agencies. 100 design professionals and regulatory people were in attendance. He made a presentation entitled “The Hydrologic Benefits of Vegetation in Site Design”.

### **Conference Presentations:**

- Steve made a presentation entitled “Stormwater Management for Ground Mounted Solar Arrays in the Real World”. The presentation was made on Tuesday, February 7, 2023, at 10:30 to 11:00 am CST in Room 2203 at the **2023 IECA Annual Conference**. <https://www.eventscribe.net/2023/IECA/>
- Steve made two presentations at the International Erosion Control Association (IECA) Annual Conference being held at the Minneapolis Convention Center in Minneapolis, MN from February 15<sup>th</sup> to February 18<sup>th</sup>, 2022. (<http://www.eventscribe.net/2022/IECA2022>). The first presentation is entitled “Low Impact Sustainable Development Design Manual for Morris, Connecticut”. The second presentation is entitled “LID in Connecticut – Are Designs Improving?”.
- Steve made two presentations at the UKC 2021 which is sponsored by the Korean-American Scientists and Engineers Association being held at the Hyatt Regency Orange County, CA from December 15<sup>th</sup> to December 18<sup>th</sup>, 2021. ([https://ukc.ksea.org/ukc2021/wp-content/uploads/2021/12/UKC-2021\\_PB\\_v1.pdf](https://ukc.ksea.org/ukc2021/wp-content/uploads/2021/12/UKC-2021_PB_v1.pdf)). The first presentation is entitled “Implementing LID Retrofits to address Nutrient Loads in Lake Pocotopaug in East Hampton, CT”. The second presentation is entitled “How to Design Stormwater Management for Ground Mounted Solar Arrays”.
- Steve made the following presentations: “Implementing LID Retrofits to Address Nutrient Loads in Lake Pocotopaug in East Hampton, Connecticut” and “How to Design Stormwater Management for Ground Mounted Solar Array” at the Virtual IECA Annual Conference and Expo on February 22 – 25, 2021 [https://ieca.org/IECA/2021%20Annual%20Conference%20Home/IECA/IECA\\_Events/2021\\_Events/2021\\_Virtual\\_Annual\\_Conference.aspx?hkey=2dc821ad-cb72-4b2e-80ed-69ad51367611](https://ieca.org/IECA/2021%20Annual%20Conference%20Home/IECA/IECA_Events/2021_Events/2021_Virtual_Annual_Conference.aspx?hkey=2dc821ad-cb72-4b2e-80ed-69ad51367611).
- Steve made one presentation at UKC 2019 by The Korean-American Scientists and Engineers Association in Chicago, IL in August 2019. The presentation is entitled “Designing Low Impact Development Treatment Systems for Agricultural Environments”. (<https://ukc.ksea.org/ukc2019/about/about-ukc-2019/>)
- Steve made two presentations at the 2019 Annual Conference of IECA being held in Denver, CO in February 2019. The presentations were entitled “A Study on Introduction Plan of Low Impact Development Techniques for Widespread Application in South Korea” and “If LID is so easy to implement, how come we keep getting it wrong”.
- Steve made a presentation entitled “LID in China and South Korea” at the 2018 Annual Conference of the Northeast Chapter of IECA in Concord, NH on October 1, 2018.
- Steve made a presentation entitled “If LID is so easy to implement, how come we keep getting in wrong” at the **2018 International Low Impact Development** conference being held in Nashville, TN on August 12 – 15, 2018. The conference is sponsored by ASCE and EWRI. (<https://www.lidconference.org/>)

- Steve made two presentations at the **2018 TRIECA Conference** being held on March 21 & 22, 2018 at the Pearson Convention Center in Brampton, Ontario. The presentations are entitled “Addressing Stormwater in China with Low Impact Development” and “Implement Low Impact Development in South Korea.” This conference is sponsored by the Toronto and Region Conservation Authority and the Canadian Chapter of the International Erosion Control Association.
- Steve made the following presentations at the **2018 IECA Annual Conference** being held in Long Beach, CA in February of 2018. The presentations are entitled “How Low Impact Development strategies can mitigate high intensity rainfall events” and “Designing Low Impact Sustainable Development treatment systems for Agricultural Environments”.
- Steve was invited by the Dylan Drudul, President of the Mid-Atlantic Chapter of IECA to present the keynote address at a one-day event called “Sediment Control Innovations Roadshow on July 14th in Columbia, Maryland. The keynote is entitled **“A Worldwide Perspective on Municipal Stormwater Issues”**.
- Steve made a presentation entitled **“Designing LID Systems: What do you need to know and why”** at the 27<sup>th</sup> Annual Nonpoint Source Pollution Conference being held in Hartford, CT on April 20-21, 2016, as sponsored by the New England Interstate Water Pollution Control Commission.
- Steve will be presenting four one-hour long webinars through Halfmoon Seminars on Low Impact Development. The first entitled **“Introduction to Low Impact Development”** will be on May 10, 2016 at 12 pm. The second entitled **“Bioretention System Design”** will be offered on May 10, 2016 at 1:30 pm. The third entitled **“Applying LID Concepts to Residential Development”** will be offered on May 12, 2016 at 12 pm. The fourth entitled **“LID Case Studies”** will be offered on May 12, 2016 at 1:30 pm.
- Steve will be making a presentation entitled **“Designing LID Systems: What do you need to know and why”** at the UKC2016 conference, sponsored by KSEA (Korean-American Scientists and Engineers Association) at the Hyatt Regency DFW in Dallas, Texas, August 10 – 13, 2016.
- Steve made five presentations at the **2016 Environmental Connection** conference by IECA ([www.ieca.org](http://www.ieca.org)) being held in San Antonio, Texas on February 16 – 19, 2016. The presentations were entitled “Designing LID Systems: What do you need to know and why”, “Construction Site Stormwater: The Ignored Problem”, “Solving Construction Stormwater Problems in the Field”, “Developing Effective LID Municipal Regulations”, and “LID Demonstration Projects in Connecticut, a study of Contrasts”.
- Steve made two presentations at the **EPA Region Stormwater Conference 2015** (<http://epa.gov/region6/water/npdes/sw/ms4/2015conference/index.html>) being held in Hot Springs, AR on October 18-23, 2015. The presentations are entitled “Designing LID systems: What do you need to know and why” and “Designing LID treatment systems for Urban and Agricultural Environments.”
- Steve made a presentation entitled “Applying LID strategies to residential and commercial developments to address water quality and runoff volumes” at the KSEA Northwest Regional Conference 2015 held at the Idaho Water Center in Boise, Idaho on October 11, 2015.
- Steve made a presentation entitled “Solving Construction Stormwater Problems in the Field” at **WEFTEC 2015** (<http://www.weftec.org>) in Chicago, IL on September 29, 2015.

- Steve made three presentations entitled: “Korean GI/LID Research Facility”, Applying LID concepts to High Density Residential Developments, and Municipal LID Regulations” at the 2015 Environmental Connection IECA Annual Conference being held in Portland, Oregon on February 16 – 18, 2015. He also presented a half day workshop entitled: “Designing LID Projects”. He moderated an Expert Panel on Low Impact Development with Seth Brown, (Water Environment Federation), Bob Adair (Construction Ecoservices, Inc.) and Roger Sutherland (AMEC)
- Steve made two presentations at International Low Impact Development Conference 2015 in Houston, Texas which is sponsored by ASCE-EWRI. The presentations are entitled “Korean GI/LID Research Facility”, and “LID Demonstration Projects in Connecticut: The Good and the Bad”.
- Steve made presentations entitled “Overview of Low Impact Development” and “The Application of Low Impact Development Strategies for Land Development Projects” along with Dr. Jae Ryu of the University of Idaho and Dr. Hyun-Suk Shin of Pusan National University at the annual meeting of the **American Water Works Association** in Tyson Corners, VA on November 6, 2014.
- Steve made two presentations entitled “Construction Site Stormwater: The Ignored Problem” and “Applying LID Concepts to High Density Residential Development” at the **2014 Annual Conference and Trade Show of the Northeast Chapter of IECA** held at Lake Morey, Vermont on November 4 – 5, 2014.
- Steve made the following presentations entitled: “A Case Study – Southbury Medical Facility and Applying LID concepts on undeveloped land and in the urban environment” at Municipal Wet Weather Stormwater Conference, hosted by the **Southeast Chapter of IECA** in Charlotte, NC on August 18<sup>th</sup> and 19<sup>th</sup>, 2014.
- Steve made the following presentations: “The Incorporation of LID on Affordable Housing Projects, A Case Study – Southbury Medical Facility and LID’ and Municipal LID Regulations” at the **16<sup>th</sup> Annual EPA Region 6 Stormwater Conference** sponsored by the South Central Chapter of IECA in Fort Worth, TX on July 27<sup>th</sup> through August 1<sup>st</sup>, 2014.
- Steve made oral presentations at the **2014 Environmental Connection** sponsored by the International Erosion Control Association in Nashville, Tennessee on February 25 – 18, 2014. The presentations were entitled “A Case Study – Southbury Medical Facility and LID”, “The Implementation of the Highland Estates Detention Basin Retrofit water quality impairment in Northfield Lake”, and “Creating Effective Municipal LID Regulations”.
- Steve co-presented an all day workshop on Low Impact Development with Jamie Houle of the University of New Hampshire Stormwater Center at the **2013 International Erosion Control Association Northeast Chapter Conference and Trade Exposition** on November 19 – 21, 2013 in Warwick, RI.
- Steve made three oral presentations at the **2013 International Low Impact Development Symposium** held at the Saint Paul RiverCentre in Saint Paul, Minnesota on August 18 – 21, 2013. The presentations were entitled “A Case Study – Southbury Medical Facility and LID”, “LID regulations in Connecticut: The Long and Tortured Road”, and “Creating a Stormwater Park in the City Meadow of Norfolk, Connecticut.”
- Steve presented two papers at the **2013 EWRI World Environmental and Water Resources Congress** held in Cincinnati, Ohio on May 19- 23, 2013. The papers are entitled: “Municipal LID

Regulations - What is important to include to be successful?" and "Creating a Stormwater Park in the City Meadow of Norfolk, Connecticut". <http://content.asce.org/conferences/ewri2013/index.html>

- Steve made a presentation at the **Soil and Water Conservation Society Winter Conference** held in Berlin, Connecticut on February 15, 2013. The presentation focused on erosion and sedimentation control issues with Low Impact Development treatment systems.
- Steve presented two papers at the **2013 Environmental Connection** held in San Diego, CA on February 10 – 13, 2013. The papers are entitled "LID Demonstration Project for Seaside Village in Bridgeport, Connecticut" and "Creating a Stormwater Park in the City Meadow of Norfolk, Connecticut". He also presented a full day LID workshop entitled "Next Generation Low Impact Development and Meet Today's Needs" and a half day workshop on Low Impact Development covering Environmental Site Design, Water Quality Issues, Pollutant Loading Analyses, Designing different types of LID treatment systems and actual case studies.
- Steve made three presentations at the **2012 Annual Conference of the Northeast Chapter of IECA** in Fishkill, NY on November 7, 8, & 9, 2012. The presentations are entitled: "LID Demonstration Projects in Connecticut, A Study of Contrasts, Environmental Site Design and LID Hydrologic Issues, and Siting and Designing LID Treatment Systems with Case Studies"
- Steve made two oral presentations entitled "Applying Environmental Site Design Strategies to Design a Residential Subdivision" and "The incorporation of LID on Affordable Housing Projects" at the **2012 Ohio Stormwater Conference** in Toledo, Ohio sponsored by the Ohio Stormwater Association on June 7<sup>th</sup> and 8<sup>th</sup>, 2012.
- Presented two papers at the **ASABE Watershed Technology Conference** in Bari, Italy, May 28 – 30, 2012. The papers were entitled "LID Demonstration Project for Seaside Village in Bridgeport, Connecticut" and "The creation of a Stormwater Park in the City Meadow of Norfolk, Connecticut".
- Steve made one oral presentation entitled "LID Demonstration Project for Seaside Village in Bridgeport, Connecticut" and presented one poster entitled "The Incorporation of LID on Affordable Housing Projects" at the **2012 World Environmental & Water Resources Congress** in Albuquerque, New Mexico sponsored by EWRI/ASCE on May 20 - 24, 2012.
- "Stormwater Retrofit of Highwood Estates Detention basins to address Water Quality Issues and How the application of Environmental Site Design Strategies can provide a resource for carbon sequestering" were presented at the **2011 International Erosion Control Associated Northeast Chapter Annual Conference** on December 1 – 3, 2011 at the Crowne Plaza Hotel in Natick, Massachusetts.
- Stormwater Retrofit of Highwood Estates Detention Basins to enhance Water Quality Benefits; A Low Impact Development (LID) Model Ordinance and Guidance Document and The Farmington River Enhancement Grants: A tale of three towns and the path to Low Impact Development were presented at the **Philadelphia Low Impact Development Symposium "Greening the Urban Environment"** in Philadelphia, PA (September 2011) sponsored by EWRI, Villanova University, North Carolina University and the University of Maryland.
- Stormwater Retrofit of Highwood Estates Detention Basins to enhance Water Quality Benefits; The Farmington River Enhancement Grants: A tale of two towns and the path to Low Impact Development and A Low Impact Development (LID) Model Ordinance and Guidance Document was

presented at the **EWRI/ASCE 2011 World Environmental & Water Resources Congress** in Palm Springs, CA (May 2011).

- Stormwater Retrofit of Highwood Estates Detention Basins to enhance Water Quality Benefits was presented at the “Annual Nonpoint Source Pollution Conference”, sponsored by the **New England Interstate Pollution Control Commission** in Saratoga Springs, NY, on May 17-18, 2011.
- Stormwater Pollutant Load Modeling presented at the **Northeast Chapter of IECA Annual Conference** at the University of New Hampshire Stormwater Center in Durham, NH (December 2010).
- How the application of Environmental Site Design Strategies and Low Impact Development Storm Water Treatment Systems can mimic the Natural Hydrologic Conditions in a watershed and provide a resource for carbon sequestering and The Importance of Assessing Pollutant Loads from Land Development Project and the Design of Effective Storm Water Treatment Systems at the **EWRI/ASCE Watershed Management Conference** in Madison, WI (August 2010).
- The Tolland Low Impact Development Design Manual: The Changing Paradigm for Land Development, The application of Environmental Site Design Processes to design a residential subdivision and A Low Impact Development (LID) Model Ordinance and Guidance Document at the **EWRI/ASCE 2010 World Environmental and Water Resources Congress** in Providence, RI (May 2010).
- The application of Form-Based Zoning and Low Impact Development for the Revitalization of the Town Center of Simsbury, Connecticut and The Integration of Low Impact Development to enhance the application of Smart Code Zoning to create a Gateway District to the Historic Town Center of Tolland, Connecticut at the **EWRI/ASCE 2010 International Low Impact Development Conference** in San Francisco, CA (April 2010).
- The application of Environmental Site Design Processes to design a residential subdivision and Assessing Pollutant Loads and Evaluation of Treatment Systems to achieve Water Quality Goals for Land Development Projects at the **EWRI/ASCE 2009 World Environmental & Water Resources Congress** in Kansas City, Missouri (May 2009).
- Ahead of the Curve – Tolland, CT adopts Low Impact Development Regulations and Preparing a Pollutant Loading Analysis for Land Development Projects at the **Urban Water Management Conference** in Overland Park, KS sponsored by National Association of Clean Water Agencies (NACWA) and the City of Independence Water Pollution Control Department (March 2009).
- Ahead of the Curve – Tolland, Connecticut adopts Low Impact Development Regulations and Trade Winds Farm – Winchester, Connecticut – How to create a LID subdivision along with the preparation of a poster on Preparing a Pollutant Loading Analysis for Land Development Projects at **EWRI/ASCE 2008 International Low Impact Development Conference** in Seattle, WA (November, 2008).
- Trade Winds Farm – Winchester, Connecticut – How to create a LID subdivision and Preparing a Pollutant Loading Analysis for Land Development Projects at the **IECA Northeast Chapter’s Annual Conference & Trade Exposition** in Portland, ME (October, 2008).

- The Preparation of a Valid Pollutant Loading Analysis at the **National StormCon 2008 Conference** in Orlando, FL (August, 2008).
- Panelist with Linda Farmer, AICP for Profiles of Partnerships for Addressing NPS Pollution at **NEIWPCC Annual Non-point Source Pollution Conference** in Groton, CT (May, 2008).

### **Workshop Presentations:**

- Steve presented a two-hour webinar entitled “Bioretention System Design” on Wednesday, November 2, 2022 at 1:00 pm CST, sponsored by Halfmoon Seminars. Link: <https://halfmoonseminars.org/product/webinars/biorentention-system-design-2/?variation=142422>
- Steve presented a 6.5-hour webinar entitled “Low Impact Development” on Wednesday, April 20, 2022 from 10:00 am to 2:00 pm and then on Thursday, April 21, 2022 from 10:00 am to 12:45 pm sponsored by Halfmoon Seminars.
- Steve presented a two-hour webinar entitled “Bioretention System Design” on March 28, 2022. ( <https://halfmoonseminars.org/product/webinars/biorentention-system-design/> ).
- Steve made a two-hour webinar entitled “How to Design for Stormwater Management for Ground Mounted Solar Arrays” on Wednesday, December 29, 2021 sponsored by Halfmoon Seminars ( <https://halfmoonseminars.org/product/webinars/how-to-design-for-stormwater-management-for-ground-mounted-solar-arrays-3/> )
- Steve made a 6.5-hour presentation on Erosion and Sediment Control on Tuesday, January 25, 2022 for Halfmoon Seminars.
- Steve made an all-day (6.5 hour) webinar entitled “New York Erosion and Sediment Control” on February 3, 2022. ( <https://halfmoonseminars.org/product/webinars/new-york-erosion-and-sediment-control/> ).
- Steve presented a 2-hour webinar entitled “How to Design Stormwater Management for Ground Mounted Solar Arrays” on July 14, 2020. This webinar is hosted by Halfmoon Seminars.
- Steve presented a two-day webinar encompassing 6.5 hours entitled “Low Impact Development” on July 15, 2020 and July 16, 2020. The webinars are hosted by Halfmoon Seminars.
- Steve presented an all-day workshop on Low Impact Development for continuing education for design professionals in Little Rock, Arkansas on February 28, 2020 which is sponsored by Halfmoon Seminars.
- Steve presented an all-day workshop on Low Impact Development for continuing education for design professionals in Nanuet, NY on December 19, 2019 which is sponsored by Halfmoon Seminars.
- Steve presented a webinar entitled “Construction Stormwater Regulation Strategies: Best Practices to Assure NPDES Compliance” on Thursday, November 12, 2015 at 2:00 pm to 3:00 pm eastern time. The webinar is sponsored by Business and Legal Resources.

- Steven presented a full day workshop entitled “Stormwater Management 2015” in Columbia, Maryland on August 13, 2015 which focused on applying the State of Maryland Stormwater Manual. The workshop was sponsored by Halfmoon Seminars, LLC and 113 people attended the workshop.
- Steve presented a full day workshop on “Stormwater Regulations in Connecticut”, sponsored by Halfmoon Seminars, LLC in North Haven, Connecticut on June 25, 2014. More than 30 engineers and landscape architects attended the workshop.
- Steve was the facilitator in a live chat as part of the Stormwater Solutions Virtual Trade Show on April 2, 2014. The topic of the live chat will be LID with a focusing on Bioretention systems.
- Steve made a presentation entitled “What is Low Impact Development and how do you apply it to residential projects” for the Connecticut Chapter of the American Institute of Architects in New Haven, Connecticut on April 22, 2014.
- Steve made a presentation entitled “Wastewater to Stormwater; Designing a subsurface flow gravel wetlands” at the annual meeting of the Connecticut Association of Wetland Scientists on March 20, 2014 in Southbury, Connecticut.
- Steve made a presentation entitled “Low Impact Development and the Connecticut General Stormwater Permit” at the annual meeting of the Southern New England Chapter of the Soil and Water Conservation Society on March 14, 2014 at Eastern Connecticut State University.
- He co-taught an ASCE Short Course entitled, “Introduction to Low Impact Development” with Mike Clar at the 2013 Low Impact Development Symposium held in St. Paul, Minnesota on August 18, 2013.
- Steve presented a workshop on Low Impact Development to the Town of Naugatuck Inland Wetlands Commission on June 5, 2013 to demonstrate how the implementation of LID can reduce stormwater impacts in the urban area of the community.
- Steve presented a webinar entitled “The Basics of Low Impact Development on Wednesday, April 17, 2013.”
- Steve presented a webinar entitled “Changing the Regulatory Framework to Adopt LID Strategies” on Thursday, March 7, 2013 and on Thursday, August 8, 2013 from 11:30 am to 1:00 pm through **ASCE and EWRI**. Link for more information.
- Steve presented a three-hour workshop on Low Impact Development on June 5, 2012 at the Oxford town hall for municipal land use staff and officials at the request of the **Oxford Inland Wetlands and Watercourses Commission**. Approximately 20 individuals attended the workshop.
- Steve presented an eight-hour short courses on Low Impact Development at the **EWRI/ASCE 2011 World Environmental & Water Resources Congress** in Palm Springs, CA (May 2011). The following topics will be covered: Understanding and Implementing Principles of Low Impact Development, Applying LID Strategies to a Site, Low Impact Development Hydrologic Considerations, The Regulatory Framework and LID, LID Integrated Management Practices, Erosion and Sedimentation Controls for the Implementation of LID Practices and Case Studies (Applying LID and Regulations). 12 attendees took the course, including professors from Mississippi State

University, Oklahoma State University, Adelaide University (Australia) and Pusan National University (South Korea).

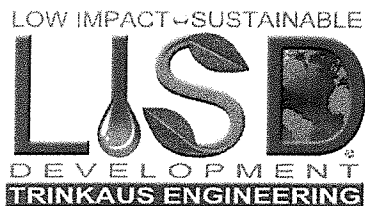
- Understanding and Implementing Principles of Low Impact Development, Applying Low Impact Development to a Site, Low Impact Development Hydrologic Considerations, Low Impact Development Integrated Management Practices, Erosion and Sediment Control for the Implementation of Low Impact Development Practices, and Case Studies of LID (Residential and Commercial) at workshops on Low Impact Development sponsored by **HalfMoon, LLC** (<https://www.halfmoonseminars.com>) in Albany, NY, Ronkonkoma, NY, North Haven, CT, Manchester, NH, Nanuet, NY, Cleveland, OH, Natick, MA, Portland, ME Fort Washington, PA, Springfield, MA, Wilmington, DE, White River Junction, VT, Somerset, NJ, and White Plains, NY for continuing education credit for design professionals. A total of 322 land use professionals have attended these workshops.
- Pollutant Loads and the Design of Effective Stormwater Treatment Systems was presented at the Virtual H2O conference on February 22, 2011 as presented by **PennWell Publishing**. 25 professionals in attendance.
- LID Stormwater Treatment Systems: Siting, Design and Installation for Maximum Environmental Benefit. What are the aesthetic, financial and maintenance implications? presented at a seminar for the **AIA Connecticut, Committee on the Environment** in New Haven, CT (December 2010). 70 architects in attendance.
- Low Impact Development and the Environmental Site Design process to create sustainable sites at a seminar for the **AIA Connecticut, Committee on the Environment** in New Haven, CT (September 2010). 40 architects in attendance.
- Workshop entitled Using Environmental Site Design Strategies and LID stormwater systems for commercial development at the **Connecticut Conference on Natural Resources** at the University of Connecticut (March 2010). 10 design professionals and regulatory staff in attendance.
- Implementing Low Impact Development in Your Community for the **Connecticut Technology Transfer Center** in Glastonbury, CT (November, 2009). 40+ professionals in attendance.
- What towns can do to encourage LID at the “Low Impact Development Forum” presented by the **Housatonic Valley Association** in Shelton, CT. (October 2009). 12 professionals in attendance.
- Town of Tolland, CT; Low Impact Development Regulations and Design Manual at the **Community Builders Institute** for the workshop entitled: “Swift, Certain & Smart: Best Practices in Land Use” (May 2009). 30+ professionals in attendance.
- Low Impact Development, Environmental Site Design and Water Quality issues and strategies to local municipalities (Greenwich, and Old Lyme) to provide an educational opportunity about the many benefits of Low Impact Development in 2009. 30+ design professionals, regulatory commissioners and staff in attendance for each presentation.
- Low Impact Development, Environmental Site Design and Water Quality issues and strategies to local municipalities (Bolton, Farmington, and Guilford to date) on a pro bono basis to provide an educational opportunity about the many benefits of Low Impact Development in 2009. 25+ design professionals, regulatory staff and commission members in attendance for each presentation.

- Workshop entitled Using Environmental Site Design Strategies to create a residential subdivision at the **Connecticut Conference on Natural Resources** at the University of Connecticut (March 2009). 20 design professionals and regulatory staff in attendance.
- The Need for Pollutant Loading Analyses for Land Development Projects to storm water engineers at **CT DEP** (March 2009). 6 DEP staff in attendance.
- A review of existing land use regulations and storm water management issues for the Middle Quarter Districts in Woodbury, CT and how the implementation of Environmental Site Design and Low Impact Development strategies can improve water quality of storm water runoff for the Woodbury land use agencies (August 2008). 15 regulatory commission members in attendance.
- Low Impact Development at meeting of the **Connecticut Association of Zoning Enforcement Officers** (October 2007). 30+ professionals in attendance.
- Low Impact Development and adoption of LID regulations by municipalities at workshops of the **Land Use Leadership Alliance (LULA)** (2007, 2010 and 2011). 20+ professionals in attendance at each presentation.
- Stormwater management and Low Impact Development at workshop sponsored by the **Northwest Conservation District** held for land use officials (March 2006). 20+ professionals in attendance.

### **Conferences Attended**

- Bioretention Summit: Ask the Researcher – Annapolis, MD by the University of Maryland (Dr. Alan Davis), North Carolina State University (Dr. Bill Hunt) and Villanova University Stormwater Partnership (Dr. Rob Traver) – (July 2010).
- Workshop at the University of New Hampshire Stormwater Center on permeable pavements. This full-day training included field visits to a variety of on-the ground porous pavement installations throughout the region. Participants learned key design principles necessary to successfully design, evaluate, specify, and install porous pavement for stormwater management. (December 2009).
- Two workshops at the University of New Hampshire Stormwater Center in Durham, NH to observe conventional and Low Impact Development storm water treatment systems in operation. The Stormwater Center is independently verifying the effectiveness of the various treatment systems to remove pollutants from runoff and reduce impacts associated with storm flows. (March 2006 and May 2007).
- 2<sup>ND</sup> National Low Impact Development Conference – North Carolina State University held in Wilmington, NC, (March 2007).
- Designing Bio/Infiltration Best Management Practices for Stormwater Quality Improvement – University of Wisconsin (Madison, WI) (November 2005).
- Stormwater Design Institute – Center for Watershed Protection (White Plains, NY), (December 2004).

- Engineering and Planning Approaches/Tools for Conservation Design – University of Wisconsin (Madison, WI) (December 2003).
- Law for Design Professionals in Connecticut – Lorman Education Services in Trumbull, CT (September 2002).
- On-site Wastewater Facility Design – University of Massachusetts in Amherst, MA (May 2002).
- The Northeast Onsite Wastewater Short Course & Equipment Exhibition – New England Interstate Water Pollution Control Commission in Newport, RI (March 2002).
- Designing On-site Wetland Treatment Systems, University of Wisconsin, (Madison, WI) (October 1999).
- Cost Effective Drainage System Design – University of Wisconsin (Atlanta, GA) (November 1997).
- Treatment Wetlands, University of Wisconsin, (Madison, WI). “Creating and Using Wetlands for Wastewater Disposal and Water Quality Improvement” (April 1996).
- Alternative On-site Wastewater Treatment Systems, New England Intrastate Pollution Control Commission’s On-Site Wastewater Task Force in Westford, MA (November 1994).
- Stormwater Quality, University of Wisconsin, (Portland, ME). “Designing Stormwater Quality Management Practices” (June 1994).



## LOW IMPACT SUSTAINABLE DEVELOPMENT PROJECTS

### LID and LISD Regulations and Design Manuals

- **Town of Tolland, CT** – Prepared amendments to Town of Tolland Zoning, Subdivision, Inland Wetland regulations and Road Design Manual to incorporate Low Impact Development standards. Wrote “Design Manual – Low Impact Development – Storm Water Treatment Systems – Performance Requirements – Road Design & Storm Water Management” prepared for the Town of Tolland; October 2007. The Town of Tolland was awarded the Implementation Award by the CT-APA for the LID regulations and design manual in December 2008.
- **Town of Plainville, CT** – Planimetrics was the lead consultant on this project. This office performed the technical regulatory audit to identify barriers to the implementation of LID. These barriers were removed from the regulations to provide for the implementation of LID. A LID design manual was written by Steve Trinka to address specific development/stormwater issues for the Town of

Plainville. The regulatory changes and LID manual were adopted by the Planning and Zoning Commission in September 2010. This work was funded by the Farmington River Enhancement Grants from CT DEP.

- **Town of Harwinton, CT** – In conjunction with Planimetrics of Avon, CT, the existing land use regulations were evaluated for barriers to the implementation of Low Impact Development (LID). The project team suggested changes to the land use regulations to encourage the application of LID in the community. Steve Trinkaus defined design processes and strategies to encourage the implementation of LID in the town. This work was funded by the Farmington River Enhancement Grants from CT DEP.
- **Town of East Granby, CT** – Planimetrics was the lead consultant on this project. This office performed the technical regulatory audit to identify barriers to the implementation of LID. These barriers were removed from the regulations to provide for the implementation of LID. Steve Trinkaus prepared a LID Design Manual and LID Educational document for the town working with Gary Haynes, the town planner. This work was funded by the Farmington River Enhancement Grants from CT DEP.
- **Town of Morris, CT** - This office performed the technical regulatory audit to identify barriers to the implementation of LISD. These barriers were removed from the regulations to provide for the implementation of LISD. A LISD design manual was written by Steve Trinkaus to address specific development/stormwater issues for the Town of Morris. The regulatory changes and LISD manual were adopted by the Planning and Zoning Commission in January 2020.

### **LID Projects**

- **Town of Stonington** – Stonington, Connecticut – Perform site investigation consisting of deep test holes and then double ring infiltration tests to determine feasibility of LISD stormwater retrofits to reduce directly connected impervious cover under Town MS4 permit. Design LISD retrofits consisting of Bioretention systems at four locations. Retrofits will result in the disconnection of approximately five acres of impervious area.
- **Victorian Heron, LLC** – Bethel, Connecticut (Affordable Housing) – An existing Victorian house with 6 apartments will be expanded by the addition of a new building containing five more apartment developed under 8-30g. Access and parking areas improved for fire access to site. Stormwater will be handled by the creation of a Bioretention system to address water quality, groundwater recharge volume and peak rate attenuation.
- **Garden Homes Management** – Westport, Connecticut (Affordable Housing) – 19-unit residential apartment building being developed under 8-30g (affordable housing) on 1 acre site directly tributary to West Branch of the Saugatuck River. All construction activities are located outside regulatory setbacks to tidal wetland and 100-year flood boundary. Stormwater management system was designed to fully infiltrate the runoff for all storm events up to and including the 100-year event and reduce pollutant loads to existing levels as wooded parcel.
- **Jelliff Mill, LLC** – New Canaan, Connecticut: Redesigned the site layout to create ten single family residential units on a site overlooking the restored historic Jelliff Mill dam on the Noroton River. The site design uses two sections of permeable pavement and a Bioretention system to infiltrate the runoff from the proposed impervious areas on the site. Due to the presence of sand and gravel soils, all

runoff from the impervious areas will be infiltrated up to and including the 25-yr storm event (5.7" of rain/24 hrs). Fully constructed and occupied.

- **SRG Family, LLC** – Southbury, Connecticut: Design final site grading for 38,000+ sq.ft. Medical services building and approximately 225 parking spaces in order to maintain overland flow patterns. Designed multiple LID treatment systems consisting of bioswales with weirs, Bioretention systems and Permeable Pavement (asphalt) to handle runoff from all impervious area on the project site. The LID treatment systems are capable of fully infiltrating the runoff from a 50-yr storm event will virtually eliminating the discharge of any pollutants to the adjacent wetland area. Currently pending before Inland Wetlands Commission for modification of original approval.
- **Farmington River Watershed Association** – Winchester, Connecticut: Designed stormwater retrofit for existing 1-acre paved parking area at the science building of the Northwest Community College to treat runoff prior to discharge into the Still River. Retrofit consists of forebay and Bioswale to treat runoff from parking area and building roof. Currently at Bid stage.
- **Garden Homes Management** – Southport, Connecticut (Affordable Housing) - Designed site to support 96-unit apartment building and 115 parking spaces. Site contains both freshwater and tidal wetlands. Stormwater management design required to provide Groundwater Recharge Volume & Water Quality Volume in addition to reducing the post-development peak rate of runoff from the 10-yr rainfall event to the pre-development peak rate of runoff from the 2-yr rainfall event. The stormwater management design includes grassed swales, Bioretention systems and underground concrete galleries to meet all of these stormwater requirements. Due to favorable soils on the site, the site will likely be a zero discharge site. Court Approved.
- **Garden Homes Management** – Milford, Connecticut (Affordable Housing) - Designed site to support 257-unit apartment building with 295 parking spaces. Stormwater management design required to provide Groundwater Recharge Volume & Water Quality Volume in addition to reducing the post-development peak rate of runoff from the 25-yr rainfall event to the pre-development peak rate of runoff from the 25-yr rainfall event. The design utilizes a Bioretention system, two underground galleries systems as well as a small detention basin to meet all of the stormwater requirements. Court Approved.
- **Garden Homes Management** – Milford, Connecticut (Affordable Housing) - Designed site to support 21,888 sq.ft. building (three stories) containing 36 studio apartments and 45 parking spaces. Permeable pavement and Bioretention will be used on the site to treat runoff for water quality improvements along with reducing runoff volume from the 1-yr to 100-yr storm event. Construction complete and project occupied.
- **Quickcomm, Inc.** – Newtown, CT: Design a parking facility for approximately 140 vehicles to serve an existing corporate use. Runoff from the entire parking facility will be directed to one of seven Bioretention systems. Water quality of the runoff will be improved by the filtration through a specialized soil media and will then infiltrate into the underlying soils. Due the presence of sand and gravel soils, the Bioretention systems will fully infiltrate all runoff up to and including a fifty-year design storm (6.5" of rain/24 hours). Land use approvals obtained in the fall of 2012 and work completed in the fall of 2013.
- **Garden Homes Management** – Fairfield, Connecticut (Affordable Housing) - Designed site to support 32,592 sq.ft. building (three stories) containing 54 studio apartments and 68 parking spaces. Permeable pavement will be used for majority of parking facility. Roof drains will also be directed

to permeable pavement system for water quality improvement. Reservoir layer was sized to fully contain 1.7" of runoff from contributing impervious area. By using a raised underdrain an anaerobic condition will be maintained in the bottom of the reservoir, thus providing denitrification of Total Nitrogen prior to discharge to tidal section of Rooster River. Construction complete and occupied.

- **Garden Homes Management** – Oxford, Connecticut (Affordable Housing) - Design site plan for 126 units of manufactured housing on 41+ acres. Stormwater management is achieved by the use of linear Bioretention systems (Bioswales) along both sides of all interior roads. After treatment in Bioswales, all runoff is directed to standard detention basins to provide peak rate attenuation from the 2-year to 100-year rainfall event. Approved by Inland Wetlands Agency, Denied by Planning and Zoning Commission. Court Approved and under construction.
- **Compton Family Trust** – New Hartford, Connecticut: Design two wet swales systems to convey and filter runoff from road which is currently discharged into West Hill Lake via a paved swale. West Hill Lake has very good water quality and the owner desires this work on this property to become a template for other homeowners on West Hill Lake to prevent adverse impacts of stormwater on the water quality of the lake. Received all necessary land use approvals. Construction to commence in the summer of 2012.
- **Highwood Estates** – Thomaston, Connecticut: Design retrofits for two existing failing detention basins serving existing 50 lot residential subdivision. Retrofits were designed using LID techniques to improve water quality reaching Northfield Brook, an impaired waterway. The larger basin was converted to an Extended Detention Shallow Wetlands to significantly reduce pollutant loads. Due to a limited area, only a forebay and deep pool could be designed for the smaller basin, thus providing measurable improvements in water quality.
- **Farmington River Watershed Association** – Winchester, Connecticut: Design stormwater retrofits consisting of a Bioretention system at the Town of Winchester Wastewater Treatment Plant and a Bioswale at the Town of Winchester Public Drinking Supply facility. These projects are being funded as LID demonstration projects to increase public awareness of LID. The systems were installed in June 2012 and were featured in articles in the Republican American and Register Citizen newspapers.
- **Harwinton Sports Complex** – Harwinton, Connecticut: Redesign stormwater management system for indoor sports facility to use vegetated swales and Bioretention systems. Redesign site grading to eliminate all structural drainage in parking facility. Client saved over \$ 40,000 on infrastructure costs by the use of LID treatment systems.
- **Holland Joint Venture, LLC** – Bridgewater, Connecticut: Prepared site plan for 28,000 sq.ft. industrial/light assembly use and 140 parking spaces on 10.94 acres. Utilize Environmental Site Design strategies to preserve large portions of site in natural condition, minimize impacts due to site disturbance, and minimize impacts to wetland/watercourse system by access driveway. Designed five Bioretention systems for storm water management and pollutant removal from all impervious areas.
- **Goodhouse Flooring, LLC** – Newtown, Connecticut: Design site to accommodate 8,800 commercial building and associated driveway and parking areas on 1-acre site. Designed eight Bioretention systems to handle runoff from all impervious surfaces. Analyze and demonstrate that State of Connecticut water quality goals will be achieved for the site design.

- **Trade Winds Farm** – Winchester, Connecticut: 24 lot Open space subdivision on 104+ acres of land. Performed all civil engineering design work for project. Notable feature of project is the preservation of 64+ acres of the site as dedicated Open Space. Many LID strategies such as Environmental Site Design, site fingerprinting, volumetric reduction and water quality improvements were incorporated into site design. Storm water treatment systems utilized vegetated basins, vegetated swales with gravel filter berms, emergent marsh, Bioretention systems, linear vegetated level spreader, and meadow filter strips.
- **Northern View Estates** – Sherman, Connecticut: Five lot subdivision with private road. Design has no direct wetland impacts and only minor intrusions into defined 100' upland review area. Low Impact Development systems, such as vegetated swales and Bioretention were used to treat post-development runoff while maintaining existing drainage patterns to the maximum extent possible.
- **Mill River** – New Milford, Connecticut: Designed 14 lot open space subdivision on 68-acre site. Performed all civil engineering services for project. LID treatment systems such as a permanent pond/emergent marsh system, linear biofiltration swale, and rain gardens were designed for the site.
- **Byron Avenue Cluster Development** – Ridgefield, Connecticut: Seven lot cluster subdivision on 4 acres. The Stormwater management system consisted of a road with no curbs, grassed swales, and constructed wetland with detention to reduce pollutant loads and increases in the peak rate of runoff.
- **The Estates on the Ridge** – Ridgefield, Connecticut: 32 lot open space subdivision on 152+ acres. Over 80 acres of the site will be preserved as Open Space as part of this project. Stormwater will be treated by the use of rain gardens for roof drains, infiltration trenches for footing drains, emergent marsh systems and vegetated swales for conveyance and treatment of road runoff. Designed over 1 mile of proposed road for project. Designed bottomless culverts over several wetlands crossing to minimize direct impact on wetland areas.
- **G & F Rentals, LLC** – Oxford, Connecticut: By utilizing LID stormwater concepts such as grass filter strips, Bioretention in parking islands, Bioretention for roof drains, and infiltration trenches, a total of 54,000 sq.ft. of commercial office space along with 140+ parking spaces was placed on 10-acre site. The project also restored previously degraded inland wetlands on the site.
- **Dauti Construction – Edona Commons** – Newtown, Connecticut: Designed 23-unit affordable housing plan to minimize impacts on delineated wetland areas. Designed three construction wetland systems for the treatment of storm water runoff for water quality renovation.
- **American Dimensions, LLC** – New Milford, Connecticut: Redesigned the storm water treatment systems for a 7-lot residential subdivision. Rain gardens were designed to handle the runoff from all roof areas and proposed driveways. Each rain garden provided the required Water Quality Volume and Groundwater Recharge Volume as specified in the 2004 Storm Water Quality Manual. A Subsurface Gravel Wetland was designed to treat the full Water Quality Volume for runoff from adjacent roads network which drained through the subject property.
- **Molitero Residence** – New Fairfield, CT: Designed five Bioretention systems to mitigate both volumetric increases of runoff and address water quality issues for large building addition to single family residence on Candlewood Lake. Also designed landscape filter strip above lake edge to filter runoff from up gradient lawn area. Bioretention systems fully infiltrated 5" of rain in 24 hours from Hurricane Irene in August of 2011. Project was featured in newsletter of Candlewood Lake Authority to demonstrate the effectiveness of LID treatment systems in a lake environment.

- **Multiple single-family residences** – Design Bioretention systems to mitigate volumetric increases of runoff due to increases of impervious cover on the lot for large building additions and new construction including the reduction of volumetric increases up to the 25-yr event (5.7” of rain in 24 hours).

### **Residential Subdivisions**

- **Stone Ridge Estates**, 59 lot residential open space subdivision, Ridgefield, Connecticut (Town of Ridgefield)
- **Oak Knoll**, 14 lot open space subdivision, Ridgefield, Connecticut (Mike Forbes)
- **Ward Acres Farm**, 12 lot open space subdivision, Ridgefield, Connecticut (Sturges Brothers, Inc.)
- **Horblitz Subdivision**, 13 lot open space subdivision, Ridgefield, Connecticut (John Sturges)
- **McKeon Subdivision**, 14 lot conventional subdivision, Ridgefield, Connecticut (McKeon Family Trust)
- **High Ridge Estates**, 5 lot subdivision in historic district, Ridgefield, Connecticut (Scandia Construction)
- **Millstone Court**, 7 lot conventional subdivision, Ridgefield, Connecticut (Sturges Brothers, Inc.)
- **Cricklewood Subdivision** – 12 lot conventional subdivision, Redding, Connecticut (Jay Aaron)
- **Spruce Meadows Subdivision** – 12 lot conventional subdivision, Wilton, Connecticut (Piburo Builders)
- **Noroneke Estates** – 12 lot open space subdivision, Ridgefield, Connecticut (John Sturges)
- **Lynch Brook Lane** – 7 lot open space subdivision, Ridgefield, Connecticut (Sturges Brothers, Inc.)
- **Ledgebrook Subdivision** – 27 lot conventional subdivision, Southbury, Connecticut (Conte Family Trust, LLC)
- **Seven Oaks** – 19 lot open space subdivision, Ridgefield, Connecticut (Basha Szymanska)
- **Applewoods** – 29 lot conventional subdivision, Bethel, Connecticut (Gene & Joe Nazzaro)

### **Third Party Engineering Reviews**

- **Groton Open Space Association** – Wal-Mart Super center, Mystic Woods Age Restricted Development, and changes to stormwater standards in the Town of Groton regulations – Groton, Connecticut. Focus of review was on stormwater management plans to address water quality and runoff volumes per the CT DEP 2004 Storm Water Quality Manual as well as the adequacy of the erosion and sedimentation control plan for the proposed development. Project approved with modifications to stormwater management system to address water quality.
- **Town of Tolland Planning & Zoning Commission** – Star Hill Athletic Complex with focus on water quality impacts on existing impaired waterway. Focus was on suggesting changes to stormwater management system to comply with recently adopted Low Impact Development requirements in the Town of Tolland. Project approved and built with modifications to stormwater management system to address water quality of post-development runoff.
- **Town of Newtown Inland Wetlands Commission** – Sherman Woods – 38 lot residential Subdivision with focus on stormwater management and water quality. Review stormwater management plan for compliance with CT DEP 2004 Storm Water Quality Manual to address water quality issues being directed to high quality wetland systems. Also review erosion & sedimentation control plan for adequacy and compliance with CT DEP 2002 Guidelines for Soil Erosion & Sediment Control. Project withdrawn and not resubmitted.
- **Town of Winchester Inland Wetlands Commission** – 30,000 sq.ft. Commercial building with grading and stormwater management within 100-yr flood plain. Plan reviewed focused on impacts to

floodway and 100-year flood plain as a result of the placement of significant fill within the flood plain. Project approved with modifications to stormwater management system.

- **Town of Southbury Inland Wetlands Commission** – 35,000 sq.ft. Medical office building proposed in close proximity to inland wetlands & watercourses. Review focus on the adequacy of the stormwater management plan to address water quality and runoff volumes prior to discharge into on-site wetland areas.
- **Friends of Litchfield** – Stop & Shop proposal on existing retail site proposing an increase of impervious area of 1 acre directly draining into an aquifer protection area. Focus of review was on adequacy of stormwater management system to address water quality of runoff and prevent further off-site adverse impacts. Project approved with minor modifications to stormwater management system.
- **The Regency at Ridgefield** – Proposal for contractor's yard on steep slope immediately uphill of existing pond and wetlands. Project proposed removal of over 45,000 cubic yards of earth and rock to facilitate construction of building. Focus of review was on adequacy of erosion control and stormwater management plan to prevent discharges of pollutants to receiving pond. Project denied citing impacts of stormwater on existing pond.
- **Friends of Oswegatchie Hills Nature Preserve, Inc. and Save the River, Save the Hills, Inc.** – Review of preliminary site plan for 840 unit of affordable housing on a 230+ acre site directly adjacent to the Niantic River submitted for a zone change to the Planning and Zoning Commission. Focus of review was on stormwater management and impacts to down gradient wetlands, including the Niantic River. Preliminary site plan approval granted with conditions of approval requiring final plans to address stormwater issues raised by Trinkaus Engineering, LLC.
- **Save the River, Save the Hills, Inc.** – Review of the erosion control plans and stormwater management plans for 90-acre solar array proposed on core forest in Waterford, Connecticut which drained directly to first order cold water fishery streams. Provide written comments to Connecticut Siting Council on behalf of Save the River, Save the Hills (Intervenor). Siting Council denied project citing erosion and stormwater management issues with the plan.
- **Town of Brookfield Inland Wetlands Commission** – The Enclave at Brookfield, an affordable housing project with 187 units on 9.8 acres proposing filling of wetland, locating stormwater basin within inland wetland area and a significant increase of impervious. Review focused on adequacy of stormwater management system to address water quality, runoff volume and peak rate changes due to development in accordance with CT DEP 2004 Storm Water Quality Manual and local land use requirements, review of erosion & sedimentation control plan for compliance with CT DEP 2002 Guidelines for Soil Erosion & Sediment Control and local land use requirements. Offer modifications to plans to address water quality and runoff volume which applicant accepted resulting in approval of project.
- **Town of Brookfield Inland Wetlands Commission and Zoning Commission** – The Renaissance, an affordable housing project with 156 units of 5+ acres adjacent to the Still River replacing existing development on the site. Review focused on adequacy of stormwater management system to address water quality, runoff volume and peak rate changes due to development in accordance with CT DEP 2004 Storm Water Quality Manual and local land use requirements, review of erosion & sedimentation control plan for compliance with CT DEP 2002 Guidelines for Soil Erosion & Sediment Control and local land use requirements. Additionally, reviewed issues of development in the floodway and 100-year flood plain of the Still River. Provided modifications to plans to address water quality and runoff volume which applicant accepted resulting in approval of project.
- **Town of Brookfield Inland Wetlands Commission** – Brookfield Village – Phase II – 12/23 Station Road proposing commercial space and residential apartments in the “Four Corners of Brookfield”; 70 Stony Hill Road proposing 26 units of affordable housing served by private water and on-site sewage disposal systems; 468 Federal Road – 280-unit affordable housing project. In all applications, the review focused on the probable adverse impacts to inland wetlands and watercourse as well as the

adequacy of the erosion control plan and stormwater management plan to treat non-point source pollutants and runoff volumes to minimize adverse impacts to the receiving inland wetlands and watercourses. Original application withdrawn after initial review. Provide sketch of modifications to improve water quality of post-development runoff and minimize direct impacts on inland wetlands. Application not resubmitted at this time.

- **Town of Salisbury Inland Wetlands Commission** – Review of multiple applications for residential development and/or improvements on existing lakes. Issues reviewed were stormwater management to ensure that water quality of post-development runoff was improved prior to entering lake and that erosion control plans were appropriate and adequate to prevent eroded material from reaching the lake or shoreline wetlands.
- **Branford Citizens for Responsible Development** – Review of development plans for Costco Store and other commercial development on 45 acres in Branford, CT. Review focuses on stormwater management issues particularly increased runoff volumes and pollutant loads to be generated by development and whether the proposed stormwater management proposal would adequately address the impacts of these two issues. Both the 2004 CT DEP Storm Water Quality Manual and the Branford Inland Wetland Regulations were used to determine if the plans were compliant with the applicable standards. The erosion control plan was evaluated for compliance with the CT DEP 2002 Guidelines for Soil Erosion & Sediment Control. Project withdrawn and not resubmitted.
- **Save our Shelton** – Review of development plans for large-scale mixed-use development on 120+ acre site on Bridgeport Avenue. Site contained core forest and high-quality wetland/watercourse systems. Review focused on stormwater management issues, particularly increased runoff volumes and pollutant loads to be generated by development and whether the proposed stormwater management proposal would adequately address the impacts of these two issues. Both the 2004 CT DEP Storm Water Quality Manual and the Shelton Inland Wetland and Stormwater Regulations were used to determine if the plans were compliant with the applicable standards. The erosion control plan was evaluated for compliance with the CT DEP 2002 Guidelines for Soil Erosion & Sediment Control. Project still in land use process.
- **Concerned Citizen Group - Roxbury, CT** – Review of proposed residential 12-lot subdivision on steeply sloping site with high quality wetlands and watercourses. Review of all aspects of civil engineering (site layout, grading, erosion/sediment control, stormwater management, stream crossing methodology) using the CT DEP 2004 Storm Water Quality Manual and CT DEP 2002 Guidelines for Soil Erosion and Sediment Control as well as the Town of Roxbury land use regulations and ordinances and evaluate impacts to wetlands and watercourses. Stormwater management system and erosion control plans were found to be inadequate to protect the high-quality wetlands and watercourses from adverse impacts by the Inland Wetlands Commission. Project denied by Inland Wetlands Commission citing findings from the Trinkaus Engineering, LLC review and other consultants.
- **Par Arbors, LLC – Bloomfield, CT** – Review of truck storage and dispatch center on agricultural land with numerous delineated inland wetland/watercourses on the site. Focus of review was on stormwater management and the adverse effects of increased pollutant loads and runoff volumes on wetland. Also review adequacy of erosion control plans. Provided testimony at two public hearings in front of Inland Wetlands Commission. Application to conduct regulated activities was denied by the commission in July 2019.
- **Town of Brooklyn** – Perform review of stormwater management design with regard to addressing water quality, runoff volume and downstream impacts of a 51-unit condominium project. Provide suggestions to design engineer to implement comments in review letter.
- **Friends of the Lake – Enfield, CT** – Perform third-party civil engineering review of proposed 819,000 square truck warehouse/distribution center with a focus on impacts of increased runoff volumes and water quality from a high-pollutant load site. Prepare written report and provide testimony in front of Planning and Zoning Commission.

- **Newtown Neighbors – Newtown, CT** - Perform third-party civil engineering review of proposed 340,000 square truck warehouse/distribution center with a focus on impacts of increased runoff volumes and water quality from a high-pollutant load site. Prepare written report and provide testimony in front of Planning and Zoning Commission.
- **Town of Mansfield – Mansfield, CT** - Perform third-party civil engineering review of alterations to existing car dealership to allow for the construction three new restaurants and retail space. Review encompassed all civil engineering aspects of plan. Prepare written report for submission to Inland Wetlands Agency.

### **Ground Mounted Solar Arrays**

- **Lodestar Energy – Winchester, CT:** Performed all civil engineering for an eight-acre solar array on 100-acre parcel. This work included the access driveway, two wetland crossings and the design of a stormwater management system for the project. Notable aspects include: All solar panels are considered impervious area, Soil Class for hydrologic model was dropped down by 1 to account for compaction by the movement of vehicles, grass swales with check dams were proposed on the two sides of the array to collect runoff and convey to a constructed wetland basin which met the requirements of the channel protection volume (DEP Manual). All designed comprehensive erosion and sedimentation control plan with multiple phases. The design of the erosion control plans and stormwater management plans exceed the requirements found in the CT DEP 2004 Storm Water Quality Manual and the CT DEP 2002 Guidelines for Soil Erosion and Sediment Control.
- **GRE – Waterford, CT:** Retained by Save-the-River, Save-the-Hills to review the erosion control plan and stormwater management plan on an environmentally sensitive site with runoff being directed to cold-water fishery streams which support native trout populations and drain to Niantic River. Provide civil engineering technical review in pre-filed testimony to Connecticut Siting Council and testify at Siting Council public hearing on application.
- **GRE – East Lyme, CT:** Retained by adjacent property owner to evaluate stormwater impacts from 30 acres ground mounted solar array in legal case for adverse impacts to wetlands and watercourses. Finding showed that runoff from the site was significantly under-estimated by the design professional as the panels were not considered impervious and the changes to soil conditions due to regrading were not considered in the design which resulted in the failure of the stormwater basins during construction as well as after the construction was complete.
- **Other Ground Mounted Solar Projects:** I have also reviewed the erosion and stormwater management plans for ground mounted arrays in Old Lyme, Brooklyn/Canterbury, New Milford, North Stonington, and East Hampton for compliance with the standards found in the CT DEP 2004 Storm Water Quality Manual. In all cases, the stormwater management designs were not in compliance with the DEP Manual.

### **Commercial Site Plans**

- **Cannondale Corporation Headquarters** - Bethel, Connecticut
- **Village Bank Headquarters** – Danbury, Connecticut
- **Newtown Hardware** - Newtown, Connecticut
- **Amicus Healthcare Living Centers** – Rocky Hill, Connecticut
- **Nathan Hale Office Building** – Fairfield, Connecticut
- **Ridgefield Recreation Center** – Ridgefield, Connecticut
- **Silver Spring Country Clubhouse & Pool house renovations** - Ridgefield, Connecticut

### **Multi-family Projects**

- **64 Wooster Street** – 12-unit affordable housing project - Bethel, Connecticut
- **91 Wooster Street** – 13-unit affordable housing project – Bethel, Connecticut
- **49 Taylor Avenue** – 18-unit affordable housing project – Bethel, Connecticut
- **47 Shelly Road** – 9-unit affordable housing project served by private company and on-site sewage disposal systems – Bethel, Connecticut
- **1315 Washington Boulevard** – 180-unit affordable housing project – Stamford, Connecticut

### **On-site sewage disposal systems**

- **Candle Hill Mobile Home Park** – Design Subsurface Sewage Disposal Systems for individual mobile home units. New Milford, Connecticut.
- **Hemlock Hills Camp Resort** – Expansion of campground, design of gravity sanitary sewer and design of subsurface sewage disposal system to handle 4,800 gpd. Litchfield, Connecticut.
- **Old Field Condominiums** – long term inspection & reporting on the condition of multiple subsurface sewage disposal systems serving 40 unit condominium complex with design flows in excess of 15,000 gpd. Southbury, Connecticut.
- **Thorncrest Farm** – Design of on-site sewage disposal system to handle wastewater from milking operation. Goshen, Connecticut.
- **Silver Spring Country Club** – Design of multiple subsurface sewage disposal systems for private country club with average daily flow of 7,000 gpd during peak usage season.
- **Richter Park Golf Course** – Design subsurface sewage disposal system to replace existing failed system for golf club house and year round restaurant with average daily flow of just under 5,000 gpd.
- **Redding Country Club** - Performed soil testing to design a repair to an existing wastewater management system that was experiencing periodic effluent discharges during high use on very marginal soil conditions. Utilized oversized grease tanks for kitchen waste and septic tanks to increase the clarity of the effluent which was discharged by force main to the subsurface sewage disposal system increase the long term functionality of the system. Discharge rate 4,900 gpd.

### **General Civil Engineering Projects**

- **Montgomery Residence**, 10,000 sq.ft. residence with 2.5 acre pond, Redding, Connecticut.
- **Neils Different**, Design 1 acre pond, Ridgefield, Connecticut.
- **Anthony DeLuca**, Design 2 acre pond, Redding, Connecticut.
- **Barrett Cram**, Design 0.5 acre pond, Redding, Connecticut.
- **Jay & Eileen Walker Residence**, 27,000 sq.ft. residence, Ridgefield, Connecticut.

### **Athletic Facilities**

- **Kingdome – East Fishkill, NY**, Prepare comprehensive site plan for the construction of an air-supported structure covering 7.96 acres of land area. Project also includes the design of 303 parking spaces, two full size artificial turf baseball fields and three 54-80 artificial turf baseball fields. Designed all site grading and stormwater management facilities to address water quality volume, channel protection volume as well as peak rate attenuation for the 1-yr, 2-yr, 10-yr, 25-yr, 50-yr and 100-yr rainfall events.
- **Tiger Hollow – Ridgefield High School – Phase I**, Design and site artificial turf competition field and track complex. Design access road to provide access to new building containing locker rooms,

concessions, media room, and equipment storage areas. Design all utility connections and obtain local permits.

- **Tiger Hollow – Ridgefield High School – Phase II**, Prepare Conceptual Development plan for reconfiguration of existing athletic fields adjacent to the Tiger Hollow stadium.
- **Joel Barlow High School – Redding, CT**, Provide preliminary Master Plan on pro bono basis for reconfiguration and improvement of existing athletic fields at Joel Barlow in response to Falcon Pride stadium proposal. Plan was provided to Region 9 Board of Education for general discussion purposes.