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February 1, 2026

Ms. Dori Wollen, Chairman
Inland Wetlands & Watercourse Agency
Town of Easton Conservation Commission
225 Center Road
Easton, Connecticut 06612

RE: Saddle Ridge Cluster Subdivision
Sport Hill Road & Cedar Hill Road
Easton, Connecticut

Dear Chairman. Wollen and Members of the Inland Wetlands & Conservation Commission:

At the request of the Citizens for Easton, Inc., I have performed a civil engineering review of the plans and reports submitted for the Saddle Ridge Cluster Subdivision. The focus of my review is on the stormwater management system and the potential impacts as this site is located within the watershed of the Aspetuck Reservoir system.

I have reviewed the following documents:

- a. 28 sheet plan set by SLR dated: Revised October 15, 2025
- b. Drainage report by SLR dated: October 9, 2025
- c. Conceptual Conventional Layout by SLR, Revised to October 16, 2025

I have the following comments for consideration by the Inland Wetlands & Watercourses Agency, Town of Easton Conservation Commission:

Executive Summary:

- A. The stormwater basins will not adequately address non-point source pollutant loads which will result in the discharge of increased pollutant loads to the wetlands and watercourses on this site and ultimately will drain to the Aspetuck & Easton Reservoirs.
- B. The design of the stormwater management system does not reduce the increased runoff volumes which will be generated by this project.
- C. No feasible and prudent alternatives have been provided for the proposed wetland/stream crossing.
- D. The design of the stormwater management system does not comply with the CT DEEP 2024 Storm Water Quality Manual.

- E. The erosion control plan is not in compliance with the CT DEEP 2024 Guidelines for soil erosion and sediment control.
- F. When all the issues cited in this review are taken together, there will be adverse impacts to wetlands and watercourses.

Conceptual Conventional Layout:

1. The Town of Easton Zoning Regulations (section 5900) discusses the criteria for determining the allowable density for a Conservation Development. One approach is proving septic suitability of each lot. This is the approach taken by the applicant. The second approach uses a “net land area” calculation where the total land area is reduced by eliminating the areas of wetlands & watercourses, 100-year flood plains, and slopes >25%. This was not done by the applicant as it would likely reduce the number of potential lots. The second approach should be done by the applicant so that the commission can consider both approaches. Based upon the regulation, it is the commission’s decision which method to use.
2. Section 5930 of the Zoning Regulations require a “site inventory/analysis map” which shows wetlands, watercourses, vernal pools, slopes 25% or greater, 100-year flood plains. This analysis has not been provided by the applicant.
3. While soil testing has confirmed the suitability of the site to support 26 potential lots, it is my professional opinion that many of the potential lots would NOT be approved by the inland wetlands commission. Each lot will be discussed below.
 - a. Lot #1 shows a proposed house in very close proximity to a delineated inland wetland boundary which could not be built without construction impacting the wetland area.
 - b. Lot #2 is bisected by a large wetland area which limits the practical development area of the lot. There would be substantial grading associated with the construction of the house.
 - c. Lot #3 appears feasible.
 - d. Lot #4 appears feasible.
 - e. Lot #5 appears feasible.
 - f. Lot #6 has a wetland area located off the left front corner of the proposed house and could be impacted by the proposed construction on this lot.
 - g. Lot #7 shows a proposed house in very close proximity to a delineated inland wetland boundary which could not be built without construction impacting the wetland area.
 - h. Lot #8 appears feasible.
 - i. Lot #9 has construction directly above a delineated inland wetland area and does not provide a reasonable area for a yard without being almost adjacent to the wetland area.
 - j. Lot #10 appears feasible.
 - k. Lot #11 has the potential development located on steep slopes above a delineated inland wetland area. The potential lot is also bisected by a large wetland area.
 - l. Lot #12 has all the proposed development located on very steep slopes which will require significant grading above a delineated inland wetland area.
 - m. Lot #13 has all the proposed development located on very steep slopes which will require significant grading above a delineated inland wetland area.

- n. Lot #14 has all the proposed development located on very steep slopes which will require significant grading above a delineated inland wetland area.
- o. Lot #15 has all the proposed development located on very steep slopes which will require significant grading which will destroy the natural land form on this lot.
- p. Lot #16 has all the proposed development located on very steep slopes which will require significant grading which will destroy the natural land form on this lot.
- q. Lot #17 has all the proposed development located on very steep slopes which will require significant grading which will destroy the natural land form on this lot.
- r. Lot #18 shows a proposed house in very close proximity to a delineated inland wetland boundary which could not be built without construction impacting the wetland area.
- s. Lot #19 appears feasible.
- t. Lot #20 appears feasible.
- u. Lot #21 has all the proposed development located on very steep slopes which will require significant grading which will destroy the natural land form on this lot.
- v. Lot #22 appears feasible.
- w. Lot #23 appears feasible.
- x. Lot #24 appears feasible.
- y. Lot #25 appears feasible.
- z. Lot #26 appears feasible.

Site Plans:

Title Sheet:

- 4. The construction sequence is very generic and is not specific to this development plan. It also does not follow the form and content found in the CT DEEP 2024 Guidelines for Soil Erosion and Sediment Control “2024 Guidelines”.

Sheet EX-1 & EX-2:

- 5. The text for the test holes overlap, making the information impossible to read.
- 6. The text for the wetland flags is too small to read. The Connecticut Association of Land Surveyors (CALs) specifies the minimum size of text to be used on mapping.

Sheet IN: No comment on this sheet.

Sheet SM-1 & SM-2:

- 7. Several of the labels for open space parcels are very confusing. This information should be clarified for the benefit of the Agency.

Sheet TR: No comment on this sheet.

Sheet SP-1:

- 8. The inlet pipe into Basin 210 is unlabeled and no invert is provided at the flared end.
- 9. There is no emergency spillway shown for Basin 210.
- 10. The 2024 Manual states that forebays need to be 2’ to 4’ in depth. What is proposed here is only 2’ in depth which is the minimum allowed by the 2024 Manual. Additionally, the forebay does not meet the 1:1 or preferably 2:1 length to width ratio from inlet to outlet as required by the 2024 Manual. A forebay

- which only two (2) feet in depth will not prevent the re-suspension of any sediment which has settled out as new inflows to the forebay will disturb and resuspend the sediments which will then go back into solution and travel into the main body of Basin 210.
11. It is called out on the plan, that the spillway from the forebay to the main body of Basin 210 will be set at 422.2', however a spot elevation of 419.5' is shown at the center of the spillway.
 12. The plan shows the bottom of Basin 210 to be at elevation 217', however it is noted on detail (sheet SD-4) of the outlet structure that the bottom of Basin 210 is 216'. This conflicts with the grading shown on the plan. If the bottom of Basin 210 is to be at 216', the grading must reflect this elevation.
 13. The detail on sheet SD-4 calls out an underdrain. No underdrain is shown on the site plan. No detail has been provided for the underdrain.
 14. The invert of the low flow orifice is called out at 417.4' which is only 0.4' above the bottom of Basin 210 according to this plan.
 15. There is a significant error in the grading shown for Basin 210. There are four contour lines shown between 417' and 422', however this an elevation difference of five (5) feet. All contour lines must be correctly defined and labelled Basin 210.
 16. No deep test holes were done in Basin 210 as required by the CT DEEP 2024 Storm Water Quality Manual "2024 Manual".
 17. The bottom of Basin 210 is located between one (1) foot and fourteen (14) feet below grade. It cannot be confirmed if the required three (3) foot vertical separation to bedrock or seasonal high groundwater table as required by the 2024 Manual will be met. This condition also applies to the forebay with is twelve (12) below grade.
 18. The discharge structure from Basin 210 is unlabeled.
 19. It appears that Basin 210 is a standard Dry Detention Basin which will only provide the following pollutant removal rates:
 - a. Total Suspended Solids (TSS) – Moderate per 2024 Manual
 - b. Total Phosphorous (TP) – Low per 2024 Manual
 - c. Total Nitrogen (TN) – Low per 2024 Manual
 20. The 2024 Manual requires the following removal rates:
 - d. TSS – 90%
 - e. TP – 60%
 - f. TN – 40%
 21. A Dry Detention Basin will never provide these removal rates no matter how much water is held within the basin.
 22. A 4,500 gallon sediment chamber is shown in an online configuration just to the north of MH 28.1. A sediment chamber is basically a modified septic tank. This is confirmed by the detail shown on sheet SD-5. This will provide marginal, if any pollutant load reduction. A sediment Chamber is not equal to an Oil/Grit separator.
 23. The footing drains on lot #3 are shown connecting to a manhole on the road. Based upon the elevations provided, the footing at the house is two (2) feet lower than the invert at the manhole so this will not work.
 24. The footing drains on lot #10 are shown connecting to a catch basin on the road. Based upon the elevations provided, the footing at the house is approximately two (2) feet lower than the invert at the catch basin so this will not work.

25. On several lots where the footing drains are discharged to the ground, no outlet protection has been provided.
26. No footing drains are shown for lot #4.

Sheet SP-2:

27. The whole purpose of a Conservation/Cluster subdivision is to place the development on the land most suitable for development and respect the natural landform by minimizing clearing and grading. There is significant grading proposed on lots #12 & 13 which appears to be excessive and does not follow the concept of working with the natural landform.
28. Both slopes are greater than 15' in height and per the 2024 Guidelines, reverse benches are required, and none are shown. The grading is not in compliance with the 2024 Guidelines.
29. The footing drains on lot #13 are shown connecting to the catch basin on the road. Based upon the elevations provided, the footing at the house is seven (7) feet lower than the invert at the catch basin so this will not work.
30. No footing drains are shown on lot #12. Where will they be located?

Sheet SP-3:

31. The footing drains do not work on lot #8, #14 for the same reason stated in comment #21 above.
32. No outlet protection is shown for the footing drains on lots 9, 15, 16, 17, 18, and #19.
33. Roof drains on lots #15, #16, and #19 are not directed to a stormwater management system which must provide zero increase in the peak rate of runoff.
34. The grading on lots #15, # 17, 18, and #19 is significant and the slopes are greater than thirty feet in height which requires a reverse bench, but none has been provided.
35. The forebay of Basin 140 and 150 appear to be only two (2) feet in depth. As finish contours for the forebay are not labeled so this is difficult to confirm. The 2024 Manual states that forebays need to be 2' to 4' in depth. A forebay which only two (2) feet in depth will not prevent the re-suspension of any sediment which has settled out as new inflows to the forebay will disturb and resuspend the sediments which will then go back into solution and travel into the main body of Basins 140 and 150.
36. A portion of the berm for Basin 140 is greater than four (4) feet in height, thus the berm must be designed as a dam per CT DEEP requirements.
37. A deep test hole (930) is shown in the bottom of Basin 140, but no soil log was found.
38. The bottom of Basin 140 is approximately five (5) feet below grade. It cannot be confirmed if the required three (3) foot vertical separation to bedrock or seasonal high groundwater table as required by the 2024 Manual will be met. This condition also applies to the forebay with is five (5) below grade.
39. A 1,000 gallon sediment chamber is shown in an online configuration just to the east of CCB 6. A sediment chamber is basically a modified septic tank. This is confirmed by the detail shown on sheet SD-5. This will provide marginal, if any pollutant load reduction. A sediment Chamber is not equal to an Oil/Grit separator.
40. The level spreader for Basin 140 is right up to the wetland boundary and cannot be installed without having a direct adverse effect on the wetland area.

41. Basins 140 and 150 also appear to be a Dry Detention Basin, so all the water quality concern stated for Basin 210 are also applicable to Basin 140 and 150.
42. A portion of the berm for Basin 150 is greater than four (4) feet in height, thus the berm must be designed as a dam per CT DEEP requirements.
43. A deep test hole (929) is shown in the bottom of Basin 150, but no soil log was found.
44. The detail on sheet SD-4 calls out an underdrain for Basin 150. No underdrain is shown on the site plan. No detail has been provided for the underdrain.
45. A note states that specialized mowing equipment will be necessary to mow the steep slope behind the houses on lots #16, # 17, 18, and #19. How will a homeowner perform this work? This is not a feasible condition for a residential homeowner.
46. The bottom of Basin 150 is located between six (6) foot and ten (10) feet below grade. It cannot be confirmed if the required three (3) foot vertical separation to bedrock or seasonal high groundwater table as required by the 2024 Manual will be met.
47. A 1,500 gallon sediment chamber is shown in an online configuration just to the south of MH 12. A sediment chamber is basically a modified septic tank. This is confirmed by the detail shown on sheet SD-5. This will provide marginal, if any pollutant load reduction. A sediment Chamber is not equal to an Oil/Grit separator.

Sheet SP-4:

48. A 1,500 gallon sediment chamber is shown in an online configuration just to the south of MH 12. A sediment chamber is basically a modified septic tank. This is confirmed by the detail shown on sheet SD-5. This will provide marginal, if any pollutant load reduction. A sediment Chamber is not equal to an Oil/Grit separator.
49. A deep test hole (929) is shown in the bottom of Basin 150, but no soil log was found.
50. Basin 160 also appears to be a Dry Detention Basin, so all the water quality concern stated for Basin 210 are also applicable to Basin 160.
51. The forebay of Basin 160 appears to be only two (2) feet in depth. As finish contours for the forebay are not labeled so this is difficult to confirm. The 2024 Manual states that forebays need to be 2' to 4' in depth. A forebay which only two (2) feet in depth will not prevent the re-suspension of any sediment which has settled out as new inflows to the forebay will disturb and resuspend the sediments which will then go back into solution and travel into the main body of Basin 160.
52. Roof drains on lots #7, and #24 are not directed to a stormwater management system which must be to provide zero increase in the peak rate of runoff.
53. No outlet protection is shown for the footing drains on lots #20, # 21, 24, 25, and #26.

Sheet WM: No comment on this sheet.

Sheets SE-1, SE-2, SE-3, and SE-4:

54. It is proposed that all the permanent stormwater basins be used as temporary sediment traps during the active construction period. This approach is fraught with issues as it is very difficult to convert a sediment basin to the permanent stormwater basin and get the vegetation to become fully established prior to the introduction of stormwater.

55. No construction entrances are shown for the residential driveways and must be shown.
56. A temporary diversion berm/swale is shown at the lower limit of proposed work. In some locations, this berm/swale goes uphill. It is unclear when there will be a swale or berm.
57. No proposed contours for the temporary sediment traps are shown despite a note stating the plans. They cannot be constructed without contours.
58. No elevation of the spillways from the temporary sediment traps have been provided.
59. In several locations the perimeter erosion control measures do not encompass the limit of grading. In these locations the plans are not in compliance with the 2024 Guidelines.
60. In several locations, erosion control measures are shown perpendicular to contours which will result in concentrated flow along the face of the control measure which is not in compliance with the 2024 Guidelines.
61. In several locations, the erosion control measures cross over proposed grading or components of the stormwater management system.
62. Erosion control blankets are shown on the steep slopes which were discussed above. The use of an erosion control blanket does not eliminate the requirement of a reverse bench per the 2024 guidelines.

Sheets ST-1, ST-2, and ST-3:

63. Results of two infiltration tests are shown on ST-3. Where were the infiltration tests done on the site?

Sheet SP: No comments on this sheet.

Sheet PR-1: No comments on this sheet.

Sheet PR-2:

64. It is stated on the profile that an open bottom culvert will be installed at the wetland crossing. This conflicts with the information shown on Sheet CS.

Sheet CS:

65. This plan calls out a 4' x 6' box culvert to be installed at the wetland/stream crossing of the road. There will be substantial disturbance associated with the installation of the box culvert.
 - g. There is excavation of the wetland/stream channel to install the box culvert and cut off walls.
 - h. There is filling of the wetland area for the road and associated grading on either side of the road.
 - i. The depth of fill over the wetland/stream crossing averages over ten (10) feet in depth which is excessive.
66. As the installation of the box culvert will have a direct adverse impact on the wetlands, feasible and prudent alternatives to this activity must be provided. No alternatives have been provided by the applicant.

Sheet SD-1:

67. No phasing plan has been provided for this project, and one is clearly required due to the extent of site clearing and disturbance which is being proposed.
68. The use of a siltation fence backed up by a staked hay bale is not a redundant erosion barrier. If the siltation fence fails so does the staked hay bales.

Sheet SD-2: No comment on this sheet.

Sheet SD-3:

69. A typical detail of the detention basin is shown. This detail does not reflect the layout of the detention basins shown on the site plan. Site specific details must be provided.
70. There is a detail for a riprap filter berm, but no such berms are found on the site plan.

Sheet SD-4:

71. The details for several of the detention basin outlet structures do not match the information shown on the site plans.

Sheet SD-5:

72. The details shown here are the claimed sediment chambers depicted on the site plan. If the sediment chambers conform to these details, they will not provide any water quality benefit.

Drainage Report:

73. It is stated on page 2 that the Water Quality Measures include the following: Sediment Chamber, sediment forebays, retention storage for WQV and GRV. These systems are not adequate to reduce non-point source pollutant loads as stated below.
 - j. An online sediment chamber will provide minimal retention of sediments as subsequent rainfall events will resuspend any settled sediments which will be discharged from the system.
 - k. A sediment forebay is not a standalone water quality system. It is part of a Dry Detention Basin as proposed here.
 - l. Dry Detention Basins provide minimal treatment of the runoff as stated below.
74. The applicant claims that since they are containing the water quality volume in the stormwater system, the pollutant loads are magically reduced as the following language from the CT DEEP 2024 Storm Water Quality Manual seems to imply: ***“Achieving these minimum required load reductions for sediment and nutrients is assumed to provide adequate reductions of other stormwater pollutants including floatable materials. However, it is important to note that if the full retention goal (i.e., Required Retention Volume) is met, then it is assumed pollutant reduction is also achieved and individual pollutant calculations are not necessary.”***
75. The above statement is not supported by science for the following reasons:
 - m. Treatment Processes: Effective removal relies on specific physical, chemical, and biological processes occurring within the practice, such as sedimentation, filtration, adsorption, and microbial action. Holding the water simply provides the opportunity for these process to work.
 - n. Design and Maintenance: The specific design of the practice (e.g., detention pond, rain garden, permeable pavement) and its ongoing maintenance are vital for ensuring these processes function correctly. Clogged systems or short-circuiting flow paths can drastically reduce efficiency, even if the total volume is captured.

- o. Pollutant Characteristics: Different pollutants behave differently. Suspended solids often settle out well, while dissolved nutrients (like nitrogen and phosphorus) or certain chemicals might require specialized treatment components or longer retention times for effective removal.
 - p. Storm Dynamics: The WQV is typically designed for a specific "design storm" (e.g., the first flush or a 90% storm event) [1]. Larger or more intense storms may overwhelm the system, resulting in bypass or reduced treatment efficiency for the excess volume.
 - q. Many stormwater practices found in the 2024 CT DEEP Storm Water Quality Manual are incapable of providing the high level of reduction required. As an example, a Dry Detention Basin is rated by CT DEEP to have Moderate TSS removal and low TP and TP removal, so it does not matter how much water is held in a Dry Detention Basin, the required pollutant load reductions will never be met as the system cannot provide them.
76. The applicant further claims that the Groundwater Recharge Volume (GRV) has been met as part of the Water Quality Volume (WQV). This is not correct. The GRV must be infiltrated to be met which has not been proven by the applicant.
 77. It is stated on page 7 that there will be no increases in the peak rates of runoff. There will however be significant increases in runoff volume which will be discharged to downgradient inland wetlands and watercourses. It is well documented in professional literature that increased runoff volume will cause adverse physical impacts to receiving by bank erosion and resultant downstream sedimentation.
 78. While each forebay does provide more than 10% of the WQV, the depth of this storage varies from 1.2' to 1.5', which does not meet the minimum depth requirement of 2'. The design of the forebays does not comply with the 2024 Manual.
 79. For Basin 140, the applicant uses an infiltration rate of 2.75"/hr. and according to the infiltration test results, the tests were done 12" below the ground surface. The bottom of Basin 140 is between 1' to 5' below existing grade, so the use of an infiltration rate of 2.75"/hr. is not valid as the tests must be done at or below the bottom of the basin. In this case, the test would have to be done at least 60" below grade.
 80. The stormwater management system will not adequately reduce non-point source pollutant loads which will result in increased pollutant loads being discharged to the downgradient wetland system. Increased pollutant loads including suspended sediments, nitrogen, phosphorous, metals and hydrocarbons will be discharged to the off-site wetland system, where over time, these pollutant loads will adversely affect the water quality in the wetland area which is an adverse physical impact. Because of this impact, the application should be evaluated by the Inland Wetlands Commission.
 81. No pollutant loading analysis was provided by the applicant to evaluate the effectiveness of the stormwater management system to reduce non-point source pollutant loads.
 82. The design of the stormwater management system does not comply with the CT DEEP 2024 Storm Water Quality Manual. As proposed, there will be no reduction in runoff volume as it has not been demonstrated that any infiltration will occur in four Dry Detention Basins.

83. The following analysis is based upon published and verified pollutant removal rates for the systems proposed by the applicant.

- a. Catch Basins with 24" deep sumps:
 - i. Total Suspended Solids = 5%
 - ii. Total Petroleum Hydrocarbons = 7%
 - iii. Metals = 2%
 - iv. Phosphorous = 0%
 - v. Nitrogen = 0%
- b. Online Sedimentation Chamber:
 - i. Total Suspended Solids = 10%
 - ii. Total Petroleum Hydrocarbons = 2%
 - iii. Metals = 2%
 - iv. Phosphorous = 0%
 - v. Nitrogen = 0%
- c. Dry Detention Pond:
 - i. Total Suspended Solids = 30%
 - ii. Total Petroleum Hydrocarbons = 38%
 - iii. Metals = 30%
 - iv. Phosphorous = 10%
 - v. Nitrogen = 2%

84. The following are pollutant loading analyses for each stormwater basin which clearly show the design will not meet the CT DEEP criteria.

85. Basin 140:

PROJECT NAME:	Saddle Ridge					
PROJECT ADDRESS:	Cedar Hill Road					
PLANNING & ZONING NUMBER:	N/A					
DATE	12/27/2025					
SCHUELER'S EQUATION:	$L = (0.226) * (P) * (Pj) * (Rv) * (C) * (A)$				Where:	
	0.226 CONVERSION FACTOR					
P	WATER QUALITY STORM RAINFALL IN INCHES					
Pj	FACTOR THAT CORRECTS FOR STORMS WHICH DO NOT GENERATE RUNOFF = 0.9					
Rv	RUNOFF COEFFICIENT					
Rv	0.05 + 0.009(I)					
I	PERCENT IMPERVIOUS COVERAGE					
C	POLLUTANT CONCENTRATION IN MG/L					
A	SUB-WATERSHED AREA IN ACRES					
L	POLLUTANT LOAD IN POUNDS					
P =	1.3 "/24-HOURS					
Pj =	0.9					
SUB-WATERSHED AREA =	3.34 ACRES				(Taken from site plan by engineer)	
PERCENT IMPERVIOUS AREA =	18				(Taken from site plan by engineer)	
Rv =	0.212					
LAND USE	Low Density Residential (1 or 2 units/acre)				(See Sheet 2 for data)	
POLLUTANT CONCENTRATION IN MG/L FOR LAND USE						
Pollutant	Load in pounds	Concentration (mg/l)				
TSS	1.123383 lbs.	60				
TP	0.005617 lbs.	0.3				
TN	0.028085 lbs.	1.5				
Zn	0.001311 lbs.	0.07				
TPH	0.037446 lbs.	2				
POLLUTANT RENOVATION ANALYSIS						
TREATMENT SYSTEM #1		Standard Catch Basin (24" sump)				
Pollutant	Load	Removal Rate	Load Removed	Load Remaining	Total Removal Percentage	
TSS	1.1233831	0.05	0.056169	1.067214	5%	
TP	0.0056169	0	0	0.005617	0%	
TN	0.0280846	0	0	0.028085	0%	
Zn	0.0013106	0.02	2.62E-05	0.001284	2%	
TPH	0.0374461	0.07	0.002621	0.034825	7%	
TREATMENT SYSTEM #2		On-line Hydrodynamic Separator				
Pollutant	Load	Removal Rate	Adjustment Factor **	Load Removed	Load Remaining	Total Removal Percentage
TSS	1.0672139	0.29	1	0.309492	0.757722	33%
TP	0.0056169	0	1	0	0.005617	0%
TN	0.0280846	0	1	0	0.028085	0%
Zn	0.0012844	0.21	1	0.00027	0.001015	23%
TPH	0.0348249	0.42	1	0.014626	0.020198	46%
TREATMENT SYSTEM #3		Dry Detention Pond				
Pollutant	Load	Removal Rate	Adjustment Factor **	Load Removed	Load Remaining	Total Removal Percentage
TSS	0.7577219	0.3	0.55	0.125024	0.632698	44%
TP	0.0056169	0.1	0.8	0.000449	0.005168	8%
TN	0.0280846	0.02	0.8	0.000449	0.027635	2%
Zn	0.0010147	0.3	0.55	0.000167	0.000847	35%
TPH	0.0201984	0.38	0.55	0.004221	0.015977	57%

86. Basin 150:

PROJECT NAME:	Saddle Ridge						
PROJECT ADDRESS:	Cedar Hill Road						
PLANNING & ZONING NUMBER:	N/A						
DATE:	12/27/2025						
SCHUELER'S EQUATION:	$L = (0.226) * (P) * (Pj) * (Rv) * (C) * (A)$			Where:			
	0.226	CONVERSION FACTOR					
P	WATER QUALITY STORM RAINFALL IN INCHES						
Pj	FACTOR THAT CORRECTS FOR STORMS WHICH DO NOT GENERATE RUNOFF = 0.9						
Rv	RUNOFF COEFFICIENT						
Rv	0.05 + 0.009(I)						
I	PERCENT IMPERVIOUS COVERAGE						
C	POLLUTANT CONCENTRATION IN MG/L						
A	SUB-WATERSHED AREA IN ACRES						
L	POLLUTANT LOAD IN POUNDS						
P=	1.3 "/24-HOURS						
Pj=	0.9						
SUB-WATERSHED AREA=	5.75	ACRES	(Taken from site plan by engineer)				
PERCENT IMPERVIOUS AREA=	15		(Taken from site plan by engineer)				
Rv=	0.185						
LAND USE	Low Density Residential (1 or 2 units/acre)		(See Sheet 2 for data)				
POLLUTANT CONCENTRATION IN MG/L FOR LAND USE							
Pollutant	Load in pounds		Concentration (mg/l)				
TSS	1.687661 lbs.		60				
TP	0.008438 lbs.		0.3				
TN	0.042192 lbs.		1.5				
Zn	0.001969 lbs.		0.07				
TPH	0.056255 lbs.		2				
POLLUTANT RENOVIATION ANALYSIS							
TREATMENT SYSTEM #1	Standard Catch Basin (24" sump)						
Pollutant	Load	Removal Rate	Adjustment Factor **	Load Removed	Load Remaining	Total Removal Percentage	
TSS	1.6876607	0.05	1	0.084383	1.603278	5%	
TP	0.0084383	0	1	0	0.008438	0%	
TN	0.0421915	0	1	0	0.042192	0%	
Zn	0.0019689	0.02	1	3.94E-05	0.00193	2%	
TPH	0.0562554	0.07	1	0.003938	0.052317	7%	
TREATMENT SYSTEM #2	On-line Hydrodynamic Separator						
Pollutant	Load	Removal Rate	Adjustment Factor **	Load Removed	Load Remaining	Total Removal Percentage	
TSS	1.6032776	0.29	1	0.464951	1.138327	33%	
TP	0.0084383	0	1	0	0.008438	0%	
TN	0.0421915	0	1	0	0.042192	0%	
Zn	0.0019296	0.21	1	0.000405	0.001524	23%	
TPH	0.0523175	0.42	1	0.021973	0.030344	46%	
TREATMENT SYSTEM #3	Dry Detention Pond						
Pollutant	Load	Removal Rate	Adjustment Factor **	Load Removed	Load Remaining	Total Removal Percentage	
TSS	1.1383271	0.3	0.55	0.187824	0.950503	44%	
TP	0.0084383	0.1	0.8	0.000675	0.007763	8%	
TN	0.0421915	0.02	0.8	0.000675	0.041516	2%	
Zn	0.0015244	0.3	0.55	0.000252	0.001273	35%	
TPH	0.0303441	0.38	0.55	0.006342	0.024002	57%	

87. Basin 160:

PROJECT NAME:	Saddle Ridge					
PROJECT ADDRESS:	Cedar Hill Road					
PLANNING & ZONING NUMBER:	N/A					
DATE:	12/27/2025					
SCHUELER'S EQUATION:	$L = (0.226) * (P) * (Pj) * (Rv) * (C) * (A)$			Where:		
	0.226	CONVERSION FACTOR				
P	WATER QUALITY STORM RAINFALL IN INCHES					
Pj	FACTOR THAT CORRECTS FOR STORMS WHICH DO NOT GENERATE RUNOFF = 0.9					
Rv	RUNOFF COEFFICIENT					
Rv	0.05 + 0.009(I)					
I	PERCENT IMPERVIOUS COVERAGE					
C	POLLUTANT CONCENTRATION IN MG/L					
A	SUB-WATERSHED AREA IN ACRES					
L	POLLUTANT LOAD IN POUNDS					
P=	1.3 "/24-HOURS					
Pj=	0.9					
SUB-WATERSHED AREA=	4.35	ACRES	(Taken from site plan by engineer)			
PERCENT IMPERVIOUS AREA=	25		(Taken from site plan by engineer)			
Rv=	0.275					
LAND USE	Low Density Residential (1 or 2 units/acre)					(See Sheet 2 for data)
POLLUTANT CONCENTRATION IN MG/L FOR LAND USE						
Pollutant	Load in pounds		Concentration (mg/l)			
TSS	1.897875 lbs.		60			
TP	0.009489 lbs.		0.3			
TN	0.047447 lbs.		1.5			
Zn	0.002214 lbs.		0.07			
TPH	0.063262 lbs.		2			
POLLUTANT RENOVIATION ANALYSIS						
TREATMENT SYSTEM #1	Standard Catch Basin (24" sump)					
Pollutant	Load	Removal Rate		Load Removed	Load Remaining	Total Removal Percentage
TSS	1.8978746	0.05		0.094894	1.802981	5%
TP	0.0094894	0		0	0.009489	0%
TN	0.0474469	0		0	0.047447	0%
Zn	0.0022142	0.02		4.43E-05	0.00217	2%
TPH	0.0632625	0.07		0.004428	0.058834	7%
TREATMENT SYSTEM #2	On-line Hydrodynamic Separator					
Pollutant	Load	Removal Rate	Adjustment Factor **	Load Removed	Load Remaining	Total Removal Percentage
TSS	1.8029808	0.29	1	0.522864	1.280116	33%
TP	0.0094894	0	1	0	0.009489	0%
TN	0.0474469	0	1	0	0.047447	0%
Zn	0.0021699	0.21	1	0.000456	0.001714	23%
TPH	0.0588341	0.42	1	0.02471	0.034124	46%
TREATMENT SYSTEM #3	Dry Detention Pond					
Pollutant	Load	Removal Rate	Adjustment Factor **	Load Removed	Load Remaining	Total Removal Percentage
TSS	1.2801164	0.3	0.55	0.211219	1.068897	44%
TP	0.0094894	0.1	0.8	0.000759	0.00873	8%
TN	0.0474469	0.02	0.8	0.000759	0.046688	2%
Zn	0.0017142	0.3	0.55	0.000283	0.001431	35%
TPH	0.0341238	0.38	0.55	0.007132	0.026992	57%

88. Basin 210:

PROJECT NAME:	Saddle Ridge						
PROJECT ADDRESS:	Cedar Hill Road						
PLANNING & ZONING NUMBER:	N/A						
DATE:	12/27/2025						
SCHUELER'S EQUATION:	$L = (0.226) * (P) * (Pj) * (Rv) * (C) * (A)$	Where:					
	0.226 CONVERSION FACTOR						
P	WATER QUALITY STORM RAINFALL IN INCHES						
Pj	FACTOR THAT CORRECTS FOR STORMS WHICH DO NOT GENERATE RUNOFF = 0.9						
Rv	RUNOFF COEFFICIENT						
Rv	0.05 + 0.009(I)						
I	PERCENT IMPERVIOUS COVERAGE						
C	POLLUTANT CONCENTRATION IN MG/L						
A	SUB-WATERSHED AREA IN ACRES						
L	POLLUTANT LOAD IN POUNDS						
P =	1.3 "/24-HOURS						
Pj =	0.9						
SUB-WATERSHED AREA =	6.79 ACRES	(Taken from site plan by engineer)					
PERCENT IMPERVIOUS AREA =	34	(Taken from site plan by engineer)					
Rv =	0.356						
LAND USE	Low Density Residential (1 or 2 units/acre)	(See Sheet 2 for data)					
POLLUTANT CONCENTRATION IN MG/L FOR LAND USE							
Pollutant	Load in pounds	Concentration (mg/l)					
TSS	3.835 lbs.	60					
TP	0.019175 lbs.	0.3					
TN	0.095875 lbs.	1.5					
Zn	0.004474 lbs.	0.07					
TPH	0.127833 lbs.	2					
POLLUTANT RENOVIATION ANALYSIS							
TREATMENT SYSTEM #1	Standard Catch Basin (24" sump)						
Pollutant	Load	Removal Rate	Adjustment Factor **	Load Removed	Load Remaining	Total Removal Percentage	
TSS	3.8349996	0.05	1	0.19175	3.64325	5%	
TP	0.019175	0	1	0	0.019175	0%	
TN	0.095875	0	1	0	0.095875	0%	
Zn	0.0044742	0.02	1	8.95E-05	0.004385	2%	
TPH	0.1278333	0.07	1	0.008948	0.118885	7%	
TREATMENT SYSTEM #2	On-line Hydrodynamic Separator						
Pollutant	Load	Removal Rate	Adjustment Factor **	Load Removed	Load Remaining	Total Removal Percentage	
TSS	3.6432496	0.29	1	1.056542	2.586707	33%	
TP	0.019175	0	1	0	0.019175	0%	
TN	0.095875	0	1	0	0.095875	0%	
Zn	0.0043847	0.21	1	0.000921	0.003464	23%	
TPH	0.118885	0.42	1	0.049932	0.068953	46%	
TREATMENT SYSTEM #3	Dry Detention Pond						
Pollutant	Load	Removal Rate	Adjustment Factor **	Load Removed	Load Remaining	Total Removal Percentage	
TSS	2.5867072	0.3	0.55	0.426807	2.159901	44%	
TP	0.019175	0.1	0.8	0.001534	0.017641	8%	
TN	0.095875	0.02	0.8	0.001534	0.094341	2%	
Zn	0.0034639	0.3	0.55	0.000572	0.002892	35%	
TPH	0.0689533	0.38	0.55	0.014411	0.054542	57%	

Pollutant Concentration Data

LAND COVER TYPE	TSS	TP	TN	Zn	TPH
Large Lot Residential (1 unit/5-10 acres)	60	0.3	1.5	0.07	2
Low Density Residential (1 or 2 units/acre)	60	0.3	1.5	0.07	2
Medium Density Residential (2-8 units per acre)	60	0.3	1.5	0.07	2
High Density Residential (8+ units/acre)	60	0.3	1.5	0.07	2
Commercial (Retail, Office, Restaurants)	55	0.21	1.2	0.13	2
Industrial	74	0.21	1.2	0.13	2
Institutional (schools, churches)	55	0.27	2	0.07	3
Open Urban Lane	50	0.25	1.3	0	0
Transportation (Highways only)	74	0.21	1.5	0.13	5
Earth Excavation (Mining)	350	0.5	1.5	0	0
Animal Feeding Operations	145	0.38	2.2	0	0
Agriculture (Breeding & Training Facilities)	145	0.38	2.2	0	0
Deciduous Forest	55	0.137	0.6	0	0
Evergreen Forest	55	0.137	0.6	0	0
Mixed Forest	55	0.137	0.6	0	0
Brush	55	0.137	0.6	0	0
Wetlands	0	0.38	1.5	0	0
Row & Garden Crops	357	1	2.92	0	0
Cropland	357	1	2.92	0	0
Orchards/Vineyards/Horticulture	357	1	2.92	0	0
Pasture Lands	145	0.38	2.2	0	0
Beaches	0	0.1	1.5	0	0
Bare Ground	100	0.38	1.5	0	0

Pollutant Removal Rates for Standalone Systems

STANDALONE RATES SYSTEM TYPE	POLLUTANT REMOVAL RATES (PERCENT)				
	TSS	TP	TN	Zn	TPH
Bioretention (No underdrain)	83	34	12	67	65
Bioretention (Internal Water Storage)	83	34	75	67	65
Bioretention (WTR or Iron Filings)	83	80	12	67	65
Tree Filter	91	15	1	75	99
Surface Sand Filter	51	33	5	77	99
Dry Swale w/filter berms	58	50	65	40	82
Infiltration Trenches	75	33	19	86	90
Infiltration Chambers	75	33	19	86	90
Infiltration Basin	80	35	21	88	90
Cultec/Stormtech Isolator Row	80	50	0	55	92
Permeable Asphalt Pavement	99	60	0	75	99
Porous Concrete Pavement	97	0	0	99	99
Permeable Interlocking Pavers	99	99	99	99	99
Extended Detention Shallow Wetlands	69	51	27	62	72
Subsurface Gravel Wetland	99	58	98	99	99
Pond/Wetland System	65	51	27	58	81
Micro-pool Extended Detention Pond	65	51	27	58	81
Wet Pond/Pocket Pond	65	51	27	58	81
Shallow Wetlands	65	28	18	58	81
Wet Extended Detention Pond	65	51	27	58	81
Multiple Pond System	65	51	27	58	81
Wet Swale	75	20	40	38	65
Dry Detention Pond	30	10	2	30	38
Vegetated Filter Strip	52	10	13	67	45
Standard Catch Basin (24" sump)	5	0	0	2	7
Deep Sump Catch Basin (48" w/hooded outlet)	9	0	0	5	14
On-line Hydrodynamic Separator	29	0	0	21	42
Off-line Hydrodynamic Separator	75	0	0	26	64
LISD Urban Planter	63	22	34	65	65
LISD Curb Extension	63	22	34	65	62
ADS Water Quality Unit	68	0	0	64	58
ADS Detention/Infiltration Unit	99	0	0	99	99
Riprap Swale	52	0	0	65	32

Please feel free to contact my office if you have any questions concerning this information. A copy of my CV is attached for submission into the land use record.

Very Truly Yours,
Trinkaus Engineering, LLC



Steven D. Trinkaus, P.E.