

# Traffic Engineering Solutions, P.C.

193 Lexington Road  
Glastonbury, CT 06033

---

## M E M O R A N D U M

---

**DATE:** October 27, 2004  
**TO:** Christine Nelson, AICP  
Town Planner/Director of Land Use  
Town of Old Saybrook  
302 Main Street  
Old Saybrook, CT 06475  
**FROM:** Bruce Hillson - Traffic Engineering Solutions  
**RE:** Review of Conventional and Open Space Subdivisions

Traffic Engineering Solutions has completed its preliminary review of the roadway layout for the Conventional and Open Space Subdivisions proposed for the development know as The Preserve. Below is a summary of our review findings:

### **Conventional Subdivision**

Our review found the following roadway layouts did not conform to the Town's Subdivision Regulations for roadway design.

1. The intersections of Road 4 at Road 1 and Road 6 at Road 7 are not perpendicular for at least one hundred (100) feet per Subdivision Regulation 6.4.3. Additionally, the Intersection Sight Distance (ISD) looking left from Road 6 onto Road 7 is less than the required 275 feet (see Subdivision Regulation 6.4.3). The vertical curve on Road 7 is the cause of the ISD restriction. During discussions with other members of the Town's Review Team, Roads 4, 5, portions of 6 and 7 resulted in environmental concerns. As a result of the roadway design issues and environmental concerns, Lots 130 through 146 should be eliminated.
2. The horizontal alignment of Road 2 at its intersection with Road 9 limits the Intersection Sight Distance looking right for drivers leaving Road 9. A sight line easement across Lot 108 is recommended to make this road viable.
3. The cul d' sac at the end of Road 2 does not have a Right of Way with a 75 foot radius. Additionally, other review members identified the presence of a vernal pool along this section of Road 2. It is recommended that the section of Road 2 beyond its intersection with Road 8 be eliminated and that a smooth curve be inserted to connect

Road 2 to Road 8. This would eliminate Lots 97, 98, 99 and 102 (due to realignment of the road connection).

4. Road 10 is not perpendicular for a distance of 100 feet per Subdivision Regulation 6.4.3. Additionally, there is a 10% grade on Road 10 with no vertical curve at its intersection with Road 1. It is recommended that Road 10 be eliminated along with Lots 212 through 217
5. The intersection of Road 1 at Ingham Hill Road does not meet any design standards for intersections. It is recommended that Road 1 be extended and realigned across Lots 73 and 79 to eliminate the sharp curve on Ingham Hill Road. This would eliminate Lots 73 and 79 as building lots.
6. The intersection Sight Distance from Road 13 to Road 11 does not meet the required 275 feet per Subdivision Regulation 6.4.3. It is recommended that a sight line easement be provided across Lot 196 to make this road viable.
7. The tangent section on Road 11 in the vicinity of Station 33+50 is less than 50 feet as required by Section 6.4.2 (A) of the Subdivision Regulations. It is recommended that the road be shifted to allow a longer tangent section. This would eliminate Lot 279 due to the driveway grade (it is fifteen percent with the proposed design and will become steeper with the realigned road).
8. There is a single connection to the roadway system in Old Saybrook (directly or indirectly to Ingham Hill Road) and a second connection in the Town of Westbrook. It is recommended that a second connection be provided within the Town of Old Saybrook to assure that Town emergency vehicles will have access to the proposed subdivision. The second connection will also provide a second access to the existing residents who are served by Ingham Hill Road. Presently this road is dead end and has a length far greater than 1,000 feet as stipulated in Section 5.3.4 of the Subdivision Regulations.

## **Open Space Subdivision**

The Open Space Plans are all at a scale of 1 inch equals 100 feet. Because of the small scale that was used, it was difficult to get exact measurements of roadway widths; however, a close approximation of the proposed width has been scaled from the plans. Our review found the following roadway layouts did not conform to the Town's Subdivision Regulations for roadway design. We understand that the Applicant proposes Alternative Road Design Standards for the roadways within The Preserve; however, these alternative standards were not included with the information submitted for our review and have not yet been approved by the Board of Selectmen. The Town would need to approve Alternative Road Standards to allow the roads to be constructed as shown on the plans.

1. There are several intersecting roads that are not perpendicular for 100 feet as required by the Subdivision Regulations. We believe this standard was established to assure that drivers would be able to safely negotiate a corner without crossing into the opposing lane of travel and to assure that drivers leaving the side street will be able to observe approaching vehicles without having to turn and look over their shoulder. The

following locations do not meet existing Subdivision Regulation 6.4.3 that requires an intersecting road to be perpendicular for 100 feet.

- The Road K intersection with Road A is not perpendicular for 100 feet. This intersection is close to perpendicular but does not meet the Subdivision Regulation.
  - The Road D intersection with Road A is not perpendicular for 100 feet. This intersection is not near perpendicular.
  - The Road E intersection with Road F and the Road F intersection with Road A are not perpendicular for 100 feet. The intersection of Road E with Road F is close to perpendicular but does not meet the Subdivision Regulation; however, the intersection of Road F at Road A is not close to perpendicular.
  - The Road B intersection with Road A is not perpendicular for 100 feet. This intersection is close to perpendicular but does not meet the Subdivision Regulation.
  - The Road C intersection with Road A is not perpendicular for 100 feet. This intersection is close to perpendicular but does not meet the Subdivision Regulation.
  - The Road E intersection with Road D is not perpendicular for 100 feet.
2. Sheet GN-1 indicates that the minimum pavement width for streets is 18 feet in accordance with Subdivision Regulation 5.3.5.2. Our review found no Section 5.3.5.2; however Section 5.3.5 (B) provides minimum pavement width of 20 feet for Private Residential roads.
  3. Many of the roads within the Central Village are narrower than 20 feet and some of the Rights of way within the Central Village are less than 25 feet as required for Private Residential Streets. These dimensions do not meet the requirements for road and right of way widths for Private Residential Streets.
  4. The Subdivision Regulations in Section 5.3.5 (B) states that Private Residential Streets shall provide access to no more than four abutting Lots. The roadways within the Central Village provide access to more than 4 Building Lots within the PRD Lot. Clarification is needed to determine the appropriateness of using the Private Residential Street design standards.
  5. The plans indicate that Road A is 24 feet wide. The Subdivision Regulations in Section 5.3.5 (A) indicate that Local Residential Streets are to be 26 feet wide within a 50 foot right of way, and in Section 5.3.5 (C) indicate that Feeder Streets are to be 30 feet wide within a 60 foot right of way. It is our opinion that Road A should be treated as a Feeder Street for at least two reasons. First, the Road is proposed to be a through street connecting Bokum Road in Old Saybrook with Route 153 in Westbrook; and second, the apparent purpose of Road A is to serve as a Collector Street for The Preserve since there are very few homes that will have driveways connecting directly to Road A (a Local Residential Street's primary function is to provide access to abutting lots used for residential purposes).

6. Road K is 20 feet wide which does not meet the requirements of Section 5.3.5 (A) of the Subdivision Regulations.
7. The section of Road A just north of Road J has a combination of a sharp curve (250 foot radius) and steep grade (10%). Neither condition meets the Subdivision Regulations for Feeder Streets (maximum grade of 6% and minimum radius of 350 feet). If an alternative standard is requested, it is recommended that this section of road (at a minimum- other locations may also need to be included) comply with the existing road standards for Feeder Streets as presented in the Subdivision Regulations.
8. Road J is 20 feet wide which does not meet the requirements of Section 5.3.5 (A) of the Subdivision Regulations.
9. Roads H and I intersect Road A with a spacing less than 400 feet as required by Section 3.6.1 of the Design and Construction Specifications of the Town of Old Saybrook. Additionally, there is a Private road that intersects Roads H and I 125 feet and 175 feet, respectively from the intersections of these Roads with Road A.
10. Sections of Road I are less than 13 feet wide. This width does not conform to any Town Standards.
11. Road A makes a right angle turn at the intersection with Road H. This curve does not meet any minimum curve requirements (minimum of a 350 foot radius for Feeder Streets).
12. The intersections of Road F at Road A, Road E at Road F, and Road F at Road D have spacing less than 400 feet as required by Section 3.6.1 of the Design and Construction Specifications of the Town of Old Saybrook.
13. Roads D, E and F are all less than 24 feet wide (20 feet at their narrowest point), all less than the Town's standard for Local Residential Streets.
14. Road B is 18 to 19 feet wide, less than the Town's standard for Local Residential Streets.
15. Road C is 22 feet wide, less than the Town's standard for Local Residential Streets.
16. It is uncertain whether Road G is a cul d' sac or a Local Street. In either case, the geometrics do not meet the Town's Standards. If a cul d' sac, it is not a thermometer design; and if a Local Street, the curves are much sharper than allowed (40 foot radius vs. the Town Standard of not less than 100 feet (Section 6.4.2 (A) of the Subdivision Regulations).
17. The vertical curves at Station 79+50, Station 103+00, Station 118+00, and Station 128+50 on Road A have Sight Distances of 200 to 210 feet, equal to or more than the 200 feet required for Local Streets but less than the 275 feet required for Feeder Streets (Section 6.4.2 of the Subdivision Regulations).
18. The vertical curve at Station 23+50 is very abrupt (-8% to 10% grade change over 425 feet).
19. There is a single connection to the roadway system in Old Saybrook (directly to Bokum Road) and a second connection in the Town of Westbrook. It is recommended that a second full-time connection be provided within the Town of Old Saybrook to provide alternatives for residents of The Preserve and to assure that Town emergency vehicles will have access to the proposed subdivision. A connection to Ingham Hill

Road will also provide more direct access to I-95 to and from the east and to Route 9 (from I-95). More than half the proposed residential units lie near the end of Ingham Hill Road within the designated Central Village. These residences would best be served by a connection to Ingham Hill Road.

## Comparison of Trip Generation

New trips associated with The Preserve as a Conventional Subdivision and as an Open Space Subdivision were determined from the Institute of Transportation Engineers (ITE) reference, Trip Generation<sup>1</sup>. The ITE reference has established mathematical relationships based on studies of various land uses to determine their trip generation rates. These trip generation relationships have been standardized and published in the Trip Generation reference.

The ITE reference provides trip generation information for “Single-Family Detached Housing”, “Residential Condominium/Townhouse” and “Golf Course” under Land Use Codes 210 - “Single-Family Detached Housing”, 230 - “Residential Condominium/Townhouse” and 430 – “Golf Course”. The following trip generation relationships were used to determine the number of daily, and morning, afternoon and Saturday peak hour trips that would be generated by the two developments. The results are summarized in Tables 1 and 2.

### Single-Family Detached Housing

Average Weekday Trips	$\text{Ln}(T) = 0.92 \text{Ln}(X) + 2.71$	
Morning Peak Hour	$T = 0.70 (X) + 9.43$	25/75
Afternoon Peak Hour	$\text{Ln}(T) = 0.90 \text{Ln}(X) + 0.53$	63/37
Saturday Daily	$\text{Ln}(T) = 0.94 \text{Ln}(X) + 2.63$	
Saturday Peak Hour	$T = 0.89 (X) + 10.93$	54/46

where T is the number of trips and X the number of detached homes

### Residential Condominium/Townhouse

Average Weekday Trips	$\text{Ln}(T) = 0.85 \text{Ln}(X) + 2.55$	
Morning Peak Hour	$\text{Ln}(T) = 0.80 \text{Ln}(X) + 0.26$	17/83
Afternoon Peak Hour	$\text{Ln}(T) = 0.82 \text{Ln}(X) + 0.32$	67/33
Saturday Daily	$T = 3.62 (X) + 427.93$	
Saturday Peak Hour	$T = 0.29 (X) + 42.63$	54/46

where T is the number of trips and X the number of units

### Golf Course

Average Weekday Trips	35.74 Trips per Hole
Morning Peak Hour	2.22 Trips per Hole 79/21
Afternoon Peak Hour	2.74 Trips per Hole 44/56
Saturday Daily	40.63 Trips per Hole
Saturday Peak Hour	4.59 Trips per Hole 49/51

<sup>1</sup> Trip Generation Seventh Edition published by the Institute of Transportation Engineers, 2003

where T is the number of trips and X the number of units

**Table 1 – Trip Generation for Conventional 292 Home Subdivision**

	Trips Entering	Trips Leaving
Daily	1,393	1,393
Morning Peak Hour	53	160
Afternoon Peak Hour	177	104
Saturday Daily	1,441	1,441
Saturday Midday Peak Hour	146	125

**Table 2 - Trip Generation for Open Space Subdivision with 158 S.F. Homes, 90 Multi-Family Homes and Golf Course**

	Trips Entering				Trips Leaving			
	S.F. Homes	Condos	Golf Course	Total	S.F. Homes	Condos	Golf Course	Total
Daily	792	293	322	1,407	792	293	322	1,407
Morning Peak Hour	30	8	32	70	90	39	8	137
Afternoon Peak Hour	102	37	22	161	60	18	28	106
Saturday Daily	809	377	366	1,552	809	377	366	1,552
Saturday Midday Peak Hour	82	37	40	159	70	32	42	144