

SITE ENGINEER:

CIVIL ENGINEERING ASSOCIATES, INC.
 10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
 802-654-2323 FAX: 802-654-2271 web: www.ceai.com

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DRAWN: MAB
 CHECKED: DSM
 APPROVED: DSM

OWNER:
2877 SPEAR STREET ASSOCIATES

PROJECT:
PROPOSED SUBDIVISION PLAN
 SPEAR STREET EXTENSION CHARLOTTE VERMONT

LOCATION MAP
 1" = 200'

DATE	CHECKED	REVISION
9.23.13	DSM/ACL	REVISED PROPERTY LINES, ACRES AND ABUTTERS

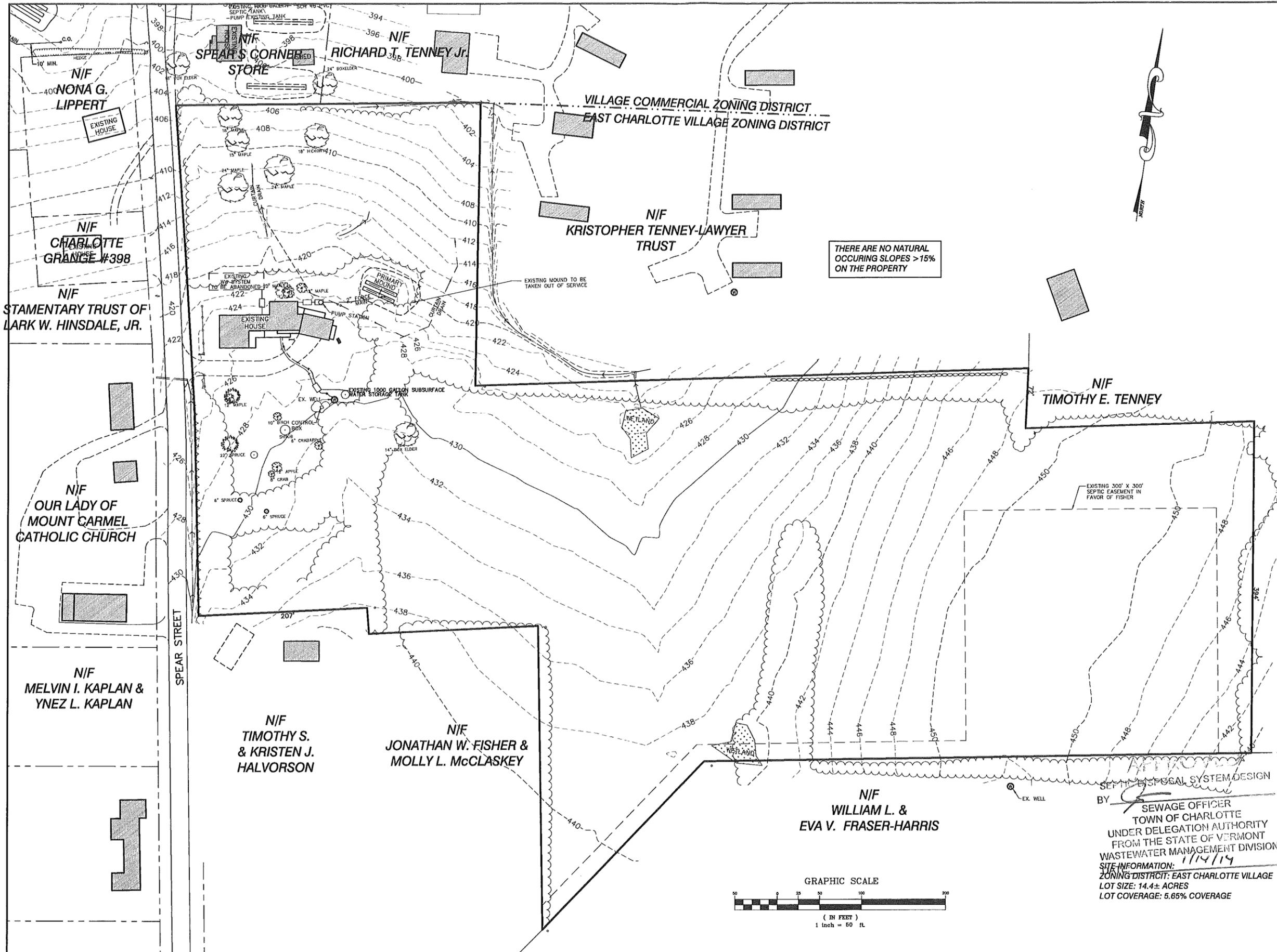
PROPOSED SITE PLAN

DATE: MAY, 2013
 SCALE: 1" = 50'
 PROJ. NO.: 11268

DRAWING NUMBER
C1.0

APPROVED
 SEPTIC DISPOSAL SYSTEM DESIGN
 BY: [Signature]
 SEWAGE OFFICER
 TOWN OF CHARLOTTE
 UNDER DELEGATION AUTHORITY
 FROM THE STATE OF VERMONT
 WASTEWATER MANAGEMENT DIVISION
 DATE: 11/14/13

GRAPHIC SCALE
 (IN FEET)
 1 inch = 50 ft.



SITE ENGINEER:

CIVIL ENGINEERING ASSOCIATES, INC.
 10 HANFELD NEWLANE, SOUTH BURLINGTON, VT 05403
 802-664-2223 FAX: 802-664-2271 web: www.csa-4.com

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PROJECT:

PROPOSED SUBDIVISION PLAN

SPEAR STREET EXTENTION CHARLOTTE VERMONT

LOCATION MAP
 1" = 2000'

DATE	CHECKED	REVISION

EXISTING CONDITIONS

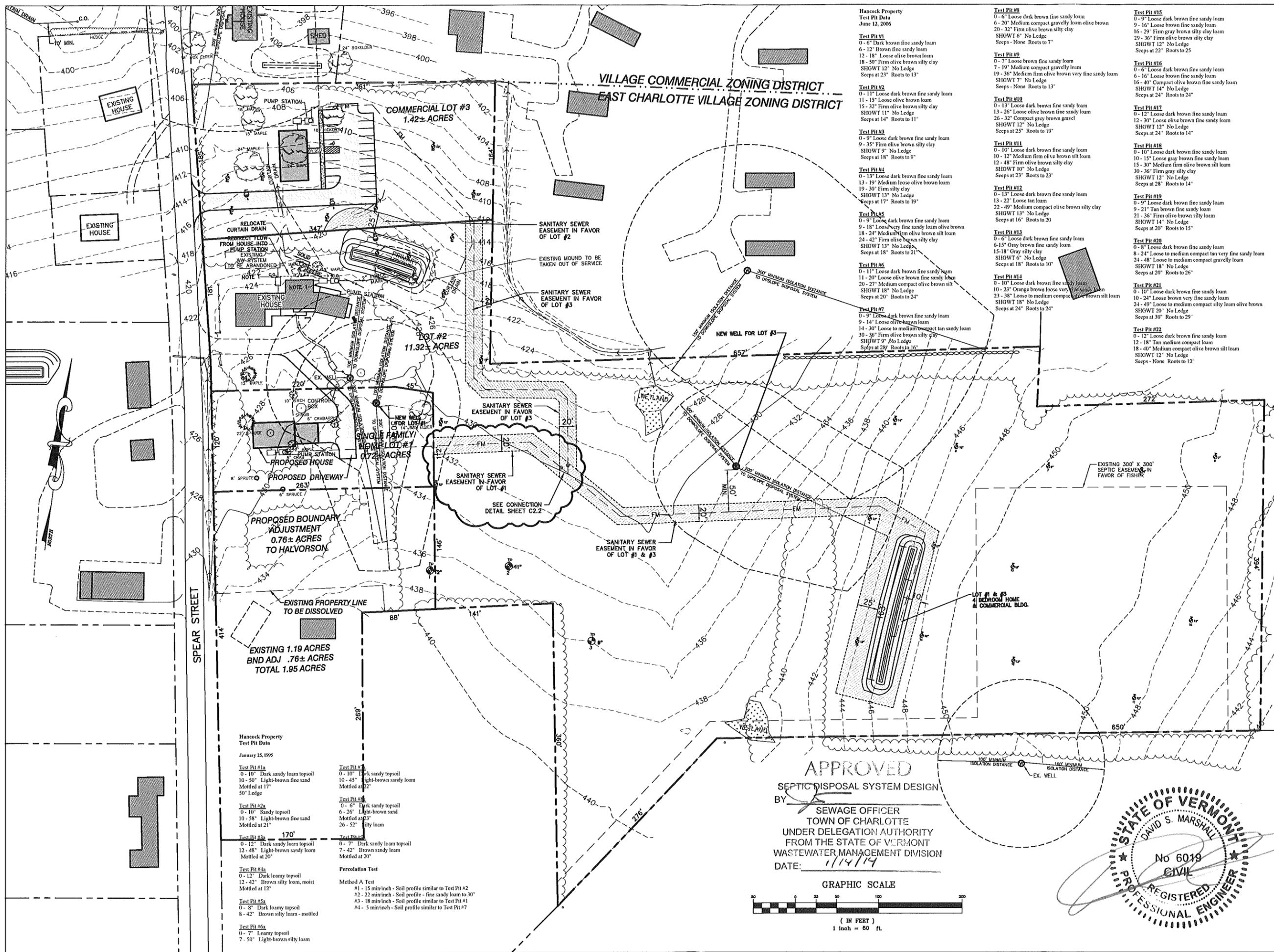
DATE: MAY, 2013
 SCALE: 1" = 50'
 PROJ. NO.: 11268

DRAWING NUMBER: C1.1

SEWER DISPOSAL SYSTEM DESIGN BY [Signature]
 SEWAGE OFFICER TOWN OF CHARLOTTE UNDER DELEGATION AUTHORITY FROM THE STATE OF VERMONT WASTEWATER MANAGEMENT DIVISION 1/14/14
 SITE INFORMATION:
 ZONING DISTRICT: EAST CHARLOTTE VILLAGE
 LOT SIZE: 14.4± ACRES
 LOT COVERAGE: 5.65% COVERAGE

P:\AutoCAD Projects\2011\11268\1-CADD Files\11268\1-CADD Files\11268.dwg, C1.1, 9/23/2013 2:50:53 PM, aliscalle

P:\AutoCADD Projects\2011\11268\1-CADD Files\11268\DWG\11268B.dwg, 12/11/2013 8:41:30 AM, jlarose



Hancock Property
Test Pit Data
January 25, 1995

Test Pit #1a
0 - 10" Dark sandy loam topsoil
10 - 50" Light-brown fine sand
Mottled at 17"
50" Ledge

Test Pit #2a
0 - 10" Sandy topsoil
10 - 58" Light-brown fine sand
Mottled at 21"

Test Pit #3a
0 - 12" Dark sandy loam topsoil
12 - 48" Light-brown sandy loam
Mottled at 20"

Test Pit #4a
0 - 12" Dark loamy topsoil
12 - 42" Brown silty loam, moist
Mottled at 12"

Test Pit #5a
0 - 8" Dark loamy topsoil
8 - 42" Brown silty loam - mottled

Test Pit #6a
0 - 7" Loamy topsoil
7 - 50" Light-brown silty loam

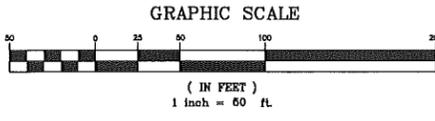
Test Pit #1b
0 - 10" Dark sandy topsoil
10 - 45" Light-brown sandy loam
Mottled at 22"

Test Pit #2b
0 - 6" Dark sandy topsoil
6 - 26" Light-brown sand
Mottled at 23"
26 - 52" Silty loam

Test Pit #3b
0 - 7" Dark sandy loam topsoil
7 - 42" Brown sandy loam
Mottled at 20"

Percolation Test
Method A Test
#1 - 15 min/inch - Soil profile similar to Test Pit #2
#2 - 22 min/inch - Soil profile - fine sandy loam to 30"
#3 - 18 min/inch - Soil profile similar to Test Pit #1
#4 - 5 min/inch - Soil profile similar to Test Pit #7

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BY _____
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UNDER DELEGATION AUTHORITY
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WASTEWATER MANAGEMENT DIVISION
DATE: 11/14/14



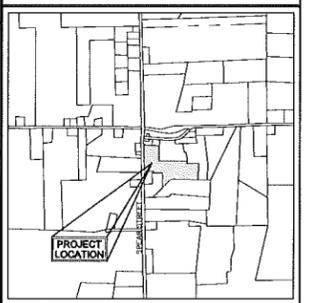
- Hancock Property
Test Pit Data
June 12, 2006
- Test Pit #1
0 - 6" Dark brown fine sandy loam
6 - 12" Brown fine sandy loam
12 - 18" Loose olive brown loam
18 - 50" Firm olive brown silty clay
SHGWT 12" No Ledge
Seeps at 23" Roots to 13"
- Test Pit #2
0 - 11" Loose dark brown fine sandy loam
11 - 15" Loose olive brown loam
15 - 32" Firm olive brown silty clay
SHGWT 11" No Ledge
Seeps at 14" Roots to 11"
- Test Pit #3
0 - 9" Loose dark brown fine sandy loam
9 - 35" Firm olive brown silty clay
SHGWT 9" No Ledge
Seeps at 18" Roots to 9"
- Test Pit #4
0 - 13" Loose dark brown fine sandy loam
13 - 19" Medium loose olive brown loam
19 - 20" Firm silty clay
SHGWT 13" No Ledge
Seeps at 17" Roots to 19"
- Test Pit #5
0 - 9" Loose dark brown fine sandy loam
9 - 18" Loose very fine sandy loam olive brown
18 - 24" Medium firm olive brown silt loam
24 - 42" Firm olive brown silty clay
SHGWT 13" No Ledge
Seeps at 18" Roots to 21"
- Test Pit #6
0 - 11" Loose dark brown fine sandy loam
11 - 20" Loose olive brown fine sandy loam
20 - 27" Medium compact olive brown silt
SHGWT 18" No Ledge
Seeps at 20" Roots to 24"
- Test Pit #7
0 - 9" Loose dark brown fine sandy loam
9 - 14" Loose olive brown loam
14 - 30" Loose to medium compact tan sandy loam
30 - 36" Firm olive brown silty clay
SHGWT 9" No Ledge
Seeps at 20" Roots to 16"
- Test Pit #8
0 - 6" Loose dark brown fine sandy loam
6 - 20" Medium compact gravelly loam olive brown
20 - 32" Firm olive brown silty clay
SHGWT 6" No Ledge
Seeps - None Roots to 7"
- Test Pit #9
0 - 7" Loose brown fine sandy loam
7 - 19" Medium compact gravelly loam
19 - 36" Medium firm olive brown very fine sandy loam
SHGWT 7" No Ledge
Seeps at 23" Roots to 13"
- Test Pit #10
0 - 13" Loose dark brown fine sandy loam
13 - 26" Loose olive brown fine sandy loam
26 - 32" Compact gray brown gravel
SHGWT 12" No Ledge
Seeps at 25" Roots to 19"
- Test Pit #11
0 - 10" Loose dark brown fine sandy loam
10 - 12" Medium firm olive brown silt loam
12 - 48" Firm olive brown silty clay
SHGWT 10" No Ledge
Seeps at 23" Roots to 23"
- Test Pit #12
0 - 13" Loose dark brown fine sandy loam
13 - 22" Loose tan loam
22 - 49" Medium compact olive brown silty clay
SHGWT 13" No Ledge
Seeps at 16" Roots to 20"
- Test Pit #13
0 - 6" Loose dark brown fine sandy loam
6 - 15" Gray brown fine sandy loam
15 - 18" Gray silty clay
SHGWT 6" No Ledge
Seeps at 18" Roots to 10"
- Test Pit #14
0 - 10" Loose dark brown fine sandy loam
10 - 23" Orange brown loose very fine sandy loam
23 - 38" Loose to medium compact tan brown silt loam
SHGWT 18" No Ledge
Seeps at 24" Roots to 24"
- Test Pit #15
0 - 9" Loose dark brown fine sandy loam
9 - 16" Loose brown fine sandy loam
16 - 29" Firm gray brown silty clay loam
29 - 36" Firm olive brown silty clay
SHGWT 12" No Ledge
Seeps at 22" Roots to 25"
- Test Pit #16
0 - 6" Loose dark brown fine sandy loam
6 - 16" Loose brown fine sandy loam
16 - 40" Compact olive brown fine sandy loam
SHGWT 14" No Ledge
Seeps at 24" Roots to 24"
- Test Pit #17
0 - 12" Loose dark brown fine sandy loam
12 - 30" Loose olive brown fine sandy loam
SHGWT 12" No Ledge
Seeps at 24" Roots to 14"
- Test Pit #18
0 - 10" Loose dark brown fine sandy loam
10 - 15" Loose gray brown fine sandy loam
15 - 30" Medium firm olive brown silt loam
30 - 36" Firm gray silty clay
SHGWT 12" No Ledge
Seeps at 28" Roots to 14"
- Test Pit #19
0 - 9" Loose dark brown fine sandy loam
9 - 21" Tan brown fine sandy loam
21 - 36" Firm olive brown silty loam
SHGWT 14" No Ledge
Seeps at 20" Roots to 15"
- Test Pit #20
0 - 8" Loose dark brown fine sandy loam
8 - 24" Loose to medium compact tan very fine sandy loam
24 - 48" Loose to medium compact gravelly loam
SHGWT 18" No Ledge
Seeps at 20" Roots to 26"
- Test Pit #21
0 - 10" Loose dark brown fine sandy loam
10 - 24" Loose brown very fine sandy loam
24 - 49" Loose to medium compact silty loam olive brown
SHGWT 20" No Ledge
Seeps at 30" Roots to 29"
- Test Pit #22
0 - 12" Loose dark brown fine sandy loam
12 - 18" Tan medium compact loam
18 - 40" Medium compact olive brown silt loam
SHGWT 12" No Ledge
Seeps - None Roots to 12"

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SPEAR STREET EXTENSION
CHARLOTTE VERMONT

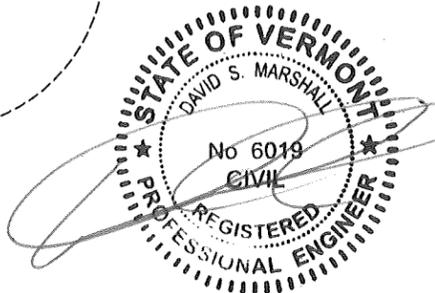


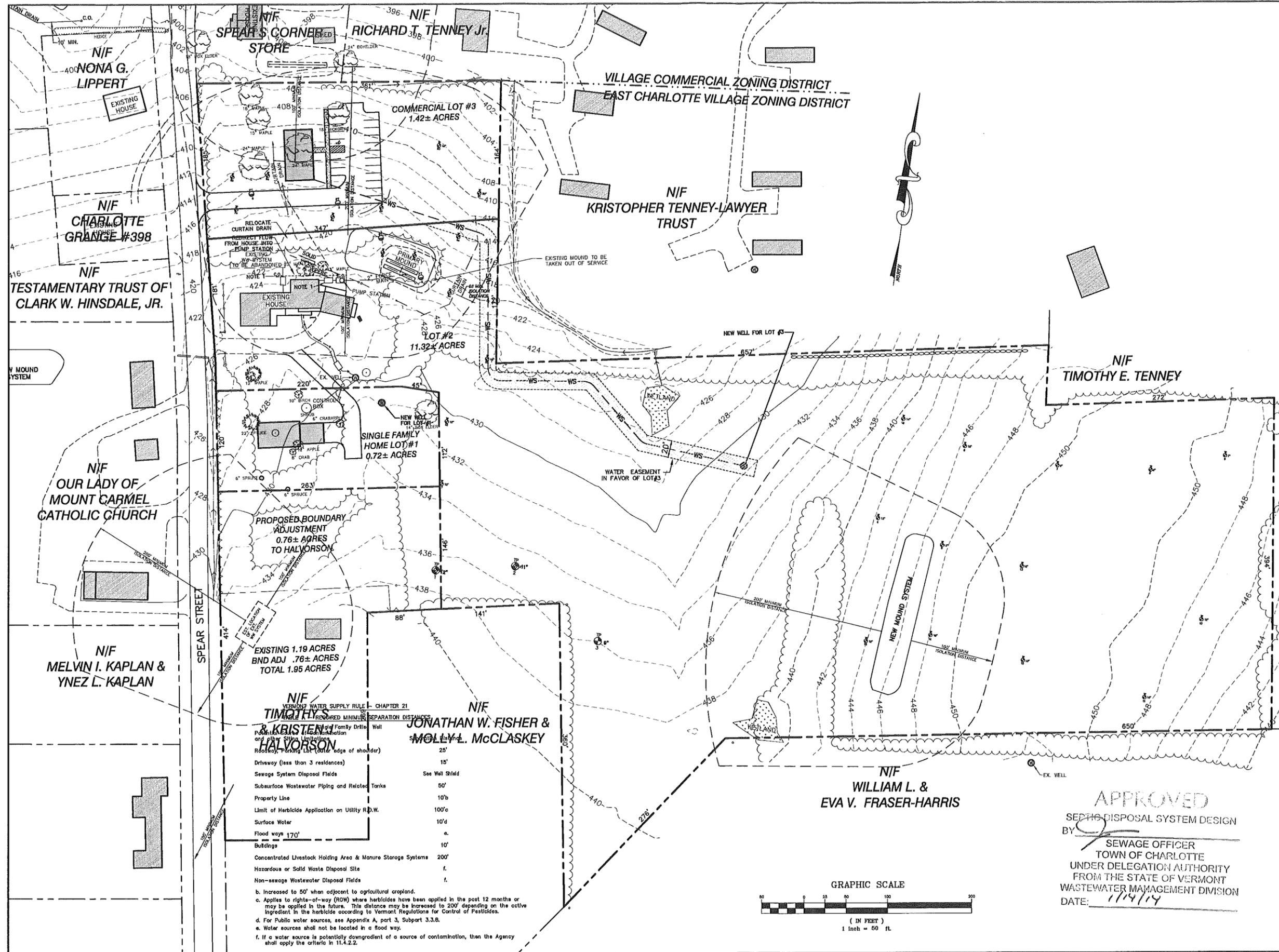
LOCATION MAP
1" = 200'

DATE	CHECKED	REVISION
9.23.13	DSM/ACL	REVISED PROPERTY LINES, ACRES AND ADJUSTERS
11.27.13	DSM/ACL	ADDED SANITARY SEWER EASEMENT IN FAVOR OF LOT 1 - REV.
12.11.13	DSM/IDL	WELLSHIELD REVISION

OVERALL WASTEWATER PLAN

DATE: MAY, 2013
SCALE: 1" = 50'
PROJ. NO: 11268
DRAWING NUMBER: **C2.0**





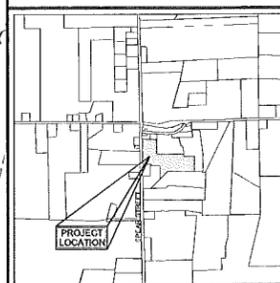
SITE ENGINEER:

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DSM

OWNER:
 2877 SPEAR STREET ASSOCIATES

PROJECT:
 PROPOSED SUBDIVISION PLAN
 SPEAR STREET EXTENSION CHARLOTTE VERMONT



LOCATION MAP
 1" = 2000'

DATE	CHECKED	REVISION
9.23.13	DSM/ACL	REVISED PROPERTY LINES, ACREAGES AND ABUTTERS

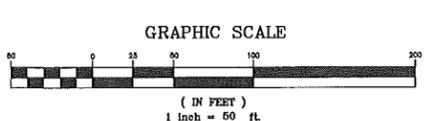
OVERALL WATER SUPPLY PLAN

DATE
MAY, 2013
 SCALE
1" = 50'
 PROJ. NO.
11268
 DRAWING NUMBER
C2.1

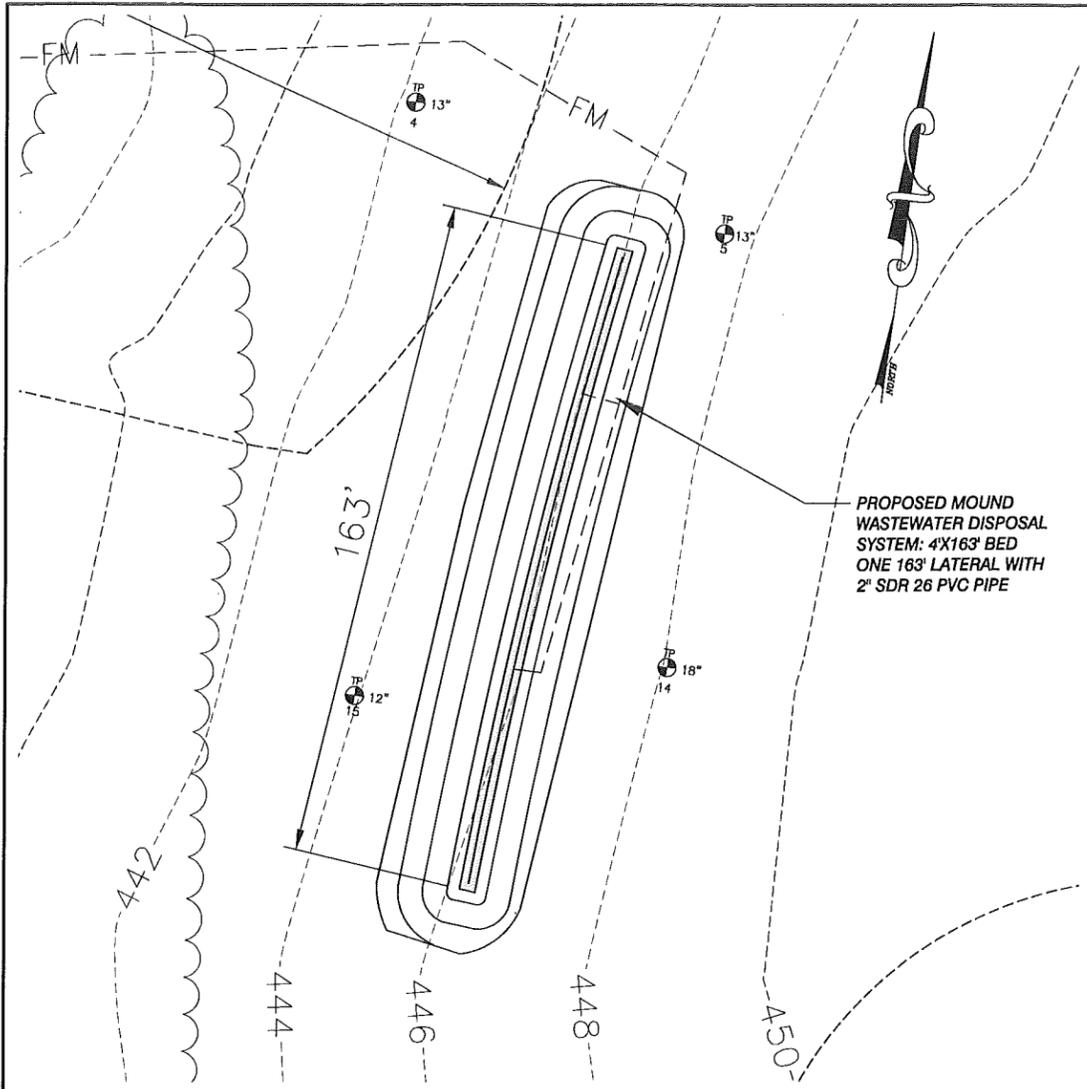
VERMONT WATER SUPPLY RULE - CHAPTER 21
 REQUIRED MINIMUM SEPARATION DISTANCES

Activity	Separation Distance
Single Family Drills Well	25'
Public Water Supply System	See Note
Roadway, Parking Lot (outer edge of shoulder)	25'
Driveway (less than 3 residences)	15'
Sewage System Disposal Fields	See Well Shield
Subsurface Wastewater Piping and Related Tanks	50'
Property Line	10'b
Limit of Herbicide Application on Utility R.O.W.	100'c
Surface Water	10'd
Flood ways	e.
Buildings	10'
Concentrated Livestock Holding Area & Manure Storage Systems	200'
Hazardous or Solid Waste Disposal Site	f.
Non-sewage Wastewater Disposal Fields	f.

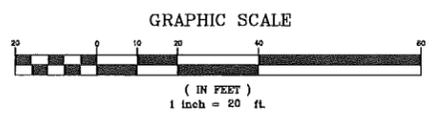
b. Increased to 50' when adjacent to agricultural cropland.
 c. Applies to rights-of-way (ROW) where herbicides have been applied in the past 12 months or may be applied in the future. This distance may be increased to 200' depending on the active ingredient in the herbicide according to Vermont Regulations for Control of Pesticides.
 d. For Public water sources, see Appendix A, part 3, Subpart 3.3.B.
 e. Water sources shall not be located in a flood way.
 f. If a water source is potentially downgradient of a source of contamination, then the Agency shall apply the criteria in 11.4.2.2.



APPROVED
 SEPTIC DISPOSAL SYSTEM DESIGN
 BY
 SEWAGE OFFICER
 TOWN OF CHARLOTTE
 UNDER DELEGATION AUTHORITY
 FROM THE STATE OF VERMONT
 WASTEWATER MANAGEMENT DIVISION
 DATE: 1/19/14



PROPOSED MOUND WASTEWATER DISPOSAL SYSTEM: 4'X163' BED ONE 163' LATERAL WITH 2" SDR 26 PVC PIPE



Basis of Design

Design Flow
 LOT #1 - 4-BR Home 490 GPD
 LOT #3 - COMM. LOT (10 EMPLOYEES) 120 GPD
 Total Flow 610 GPD

Performance Based Design Approach
 Limiting Soil Condition - Fine Sandy Loam
 Limiting Slope Condition - 5.4%
 Linear Loading Rate - 7.5 GPD/LF/VLF

Design Trench - 4-foot Seepage Bed
 Standard Effluent Application Rate = 1 GPD/SF
 Design Linear Loading Rate - 3.75 GPD/LF

Resulting Groundwater Mounding
 (3.75 GPD/LF)/(7.5 GPD/LF) = 0.5 ft = 6"

Limiting Depth to SHGWT under Bed/Trench = 12'
 Resulting Unsaturated Depth = 12' - 6" = 6"

Required Separation to Mounded SHGWT = 36"
 Min. Required Depth of Sand under Trench 36" - 6" = 30"

Limiting Depth to SHGWT at Toe of Mound = 12'
 Resulting Unsaturated Depth = 12' - 6" = 6"

Limiting Depth to SHGWT at 25' below Toe of Mound = 12'
 Resulting Unsaturated Depth = 12' - 6" = 6"

Disposal Field
 Min Required Length of Bed 625 GPD / (3.75 GPD/LF) = 167 feet
 Limiting Percolation Rate = 25 inches/Hour
 Required Effective Basal Area = 625 GPD/(0.74 GPD/SF) = 845 SF
 Basal Area Provided = 3,143 SF
 Separation Distance to Property Line
 10 FT to Top, 10 FT provided
 25 FT to bed, 25 FT provided
 Required Separation to Bedrock = 4 FT, 6 FT min. provided

Minimum Required Number of Orifices
 167 LF Bed x 4 FT width / (25 GPD/SF) = 27 Use 28.
 Provide One 2" Distribution Pipes, 163 FT long
 See Detail for Orifice Sizing and Layout
 Fill Volume of Distribution Piping = 26 Gal
 Minimum Required Dose Volume = 26 Gal x 5 = 130 Gal
 Minimum Number of Doses per Day = 4
 Maximum Dose Size = 625 GPD/4 = 156 Gal

LOT #1 - Pump Sizing
 449 = Invert of Distribution Piping in Mound (or High Pt of FM)
 424 = Low Elevation in Pump Station (FT)
 25 = Elevation Head (FT)

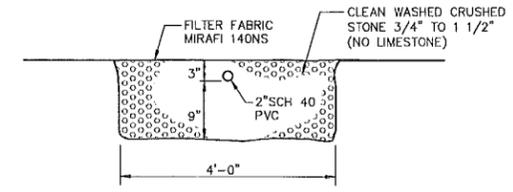
Length of SDR 26 PVC Force Main = 910 FT
 Diameter of Force Main = 2"
 Design Flow Rate = 30 GPM
 Friction Loss per 100 LF = 1.83 FT
 16.7 = Resulting Friction Head (FT)
 25.0 = Elevation Head (FT)
 3.0 = Minor Losses (FT)
 3.0 = Design Residual Pressure (FT)
 47.7 = Design TDH
 Use Hydromatic SHEF50, 1 Ph, 60 Hz, 230 V, 0.5 HP or approved equal

LOT #3 - Pump Sizing
 449.0 = Invert of Distribution Piping in Mound (or High Pt of FM)
 403.0 = Low Elevation in Pump Station (FT)
 46.0 = Elevation Head (FT)

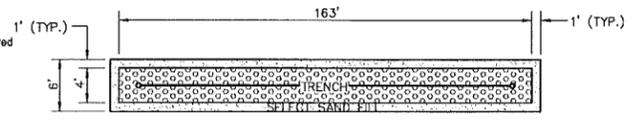
Length of SDR 26 PVC Force Main = 1,210 FT
 Diameter of Force Main = 2"
 Design Flow Rate = 30 GPM
 Friction Loss per 100 LF = 1.83 FT
 22.1 = Resulting Friction Head (FT)
 48.0 = Elevation Head (FT)
 3.0 = Minor Losses (FT)
 3.0 = Design Residual Pressure (FT)
 74.1 = Design TDH
 Use Hydromatic SHEF50, 1 Ph, 60 Hz, 230 V, 0.5 HP or approved equal

Pump Station Emergency Storage
 Required=630 GAL, 500 GAL Provided at each pump station

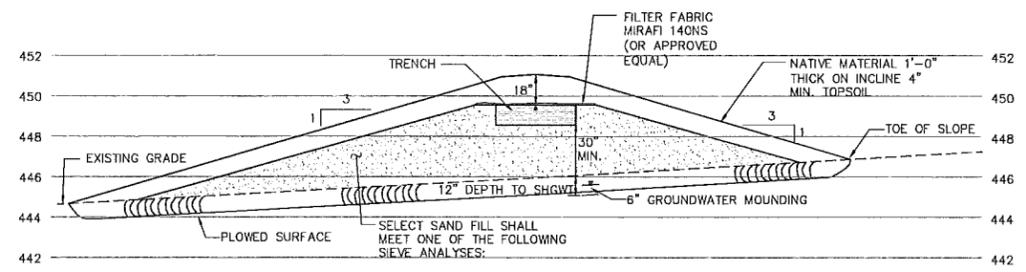
Septic Tank
 Minimum Size Required = 1,000 Gal for Design Flows <667 GPD
 Effluent Filter Required



TYPICAL BED SECTION
N.T.S.



LOT 1 TYPICAL TRENCH PLAN
N.T.S.



SEIVE #	% PASSING	SEIVE #	% PASSING	SEIVE #	% PASSING
3/8	85-100	4	95-100	3/8	85-100
40	25-75	8	80-100	40	30-50
60	0-30	16	50-85	200	0-10
100	0-10	30	25-60		
200	0-5	50	10-30		
		100	2-10		

SECTION A-A
1/4" = 1'-0"

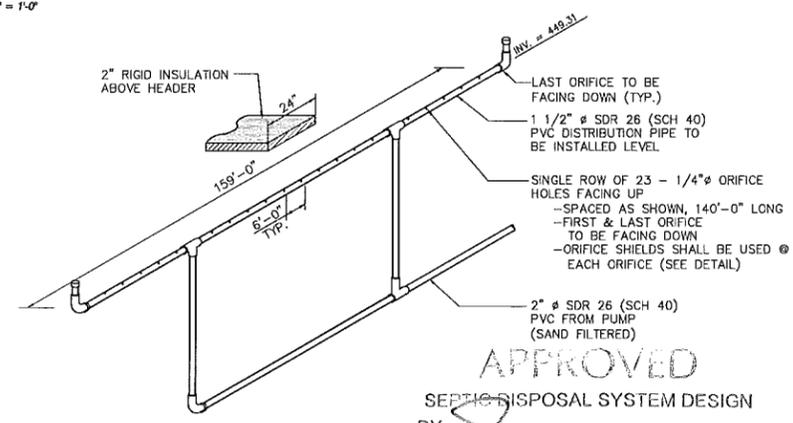
MINIMUM ISOLATION DISTANCES
 (Contact Engineer for any Clarifications or Conflicts)

	Horizontal Distance (Feet)		
	Leachfield	Septic Tank	Sewer
Drilled Well Serving 1 Home - Up Slope of Disposal Field	100 (Min.)	50	50
Drilled Well Serving 1 Home - Down Slope of Disposal Field	200 (Min.)	50	50
Shallow Well or Spring, Up Slope of Disposal Field	150 (Min.)	75	75
Shallow Well or Spring, Down Slope of Disposal Field	500 (Min.)	75	75
Lakes, Ponds and Impoundment	50	25	25
Rivers, Streams	50	25	10
Drainage Swales, Roadway Ditches	25	50	10
Municipal Water Main	25	25	10
Service Water Lines	10	5	5
Roadways, Driveways, Buildings	25	10	10
Top of embankment or slope > 30%	10 (25 Downslope)	10	10
Property Line	10	10	10
Trees	10	10	10
Replacement Area	35 (75 Downslope)	10	-
Foundation, Footing Drains			

LEGEND

- 336--- EXISTING CONTOUR
- 536--- PROPOSED CONTOUR
- --- APPROXIMATE PROPERTY LINE
- --- APPROXIMATE SETBACK LINE
- ● IRON ROD/PIPE FOUND/SET
- CONCRETE MONUMENT
- SS--- GRAVITY SEWER LINE
- FM--- FORCE MAIN
- DECIDUOUS TREE
- CONIFEROUS TREE
- EDGE OF BRUSH/WOODS
- TEST PIT
- PERCOLATION TEST
- WELL

- Isolation distances to well locations may vary due to site conditions - contact Engineer for verification with the Vermont Water Supply Rule Regulations.
- For mound disposal systems, the limit of mound fill must be 25 feet from any downhill property line and 10 feet from side or uphill property lines.
- If a curtain or foundation drain is downslope of the leachfield, the leachfield cannot be closer than 75 feet to the drain. If the drain is upslope of the leachfield, it shall be 35' if possible and 20' minimum.
- Sewers under roads, driveways or parking lots may require protective conduits or sleeves.



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 BY: [Signature]
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 DATE: 1/14/14

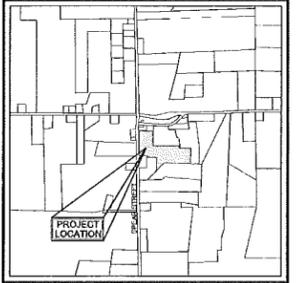
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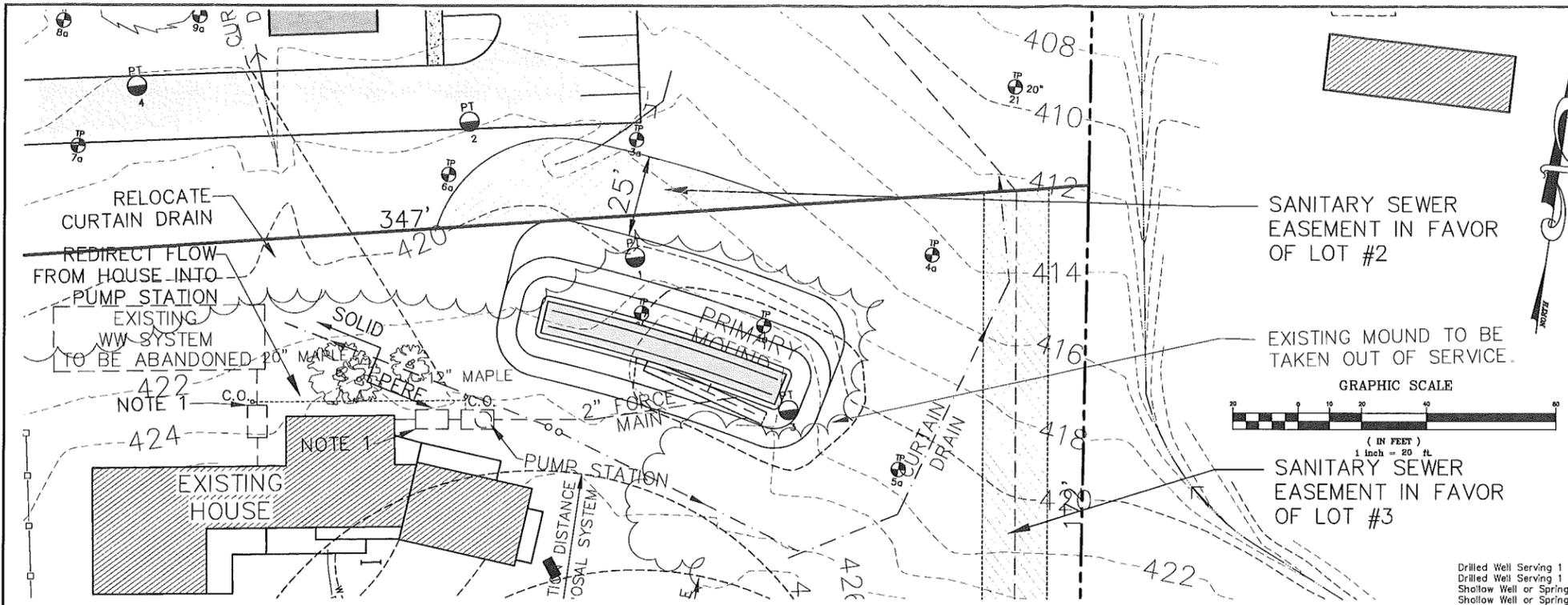


LOCATION MAP
1" = 200'

DATE	CHECKED	REVISION
9.23.13	DSM/ACL	REVISED DATA

LOT#1 WASTEWATER PLAN

DATE: MAY, 2013
 SCALE: 1" = 20'
 PROJ. NO. 11268
 DRAWING NUMBER: **C2.2**



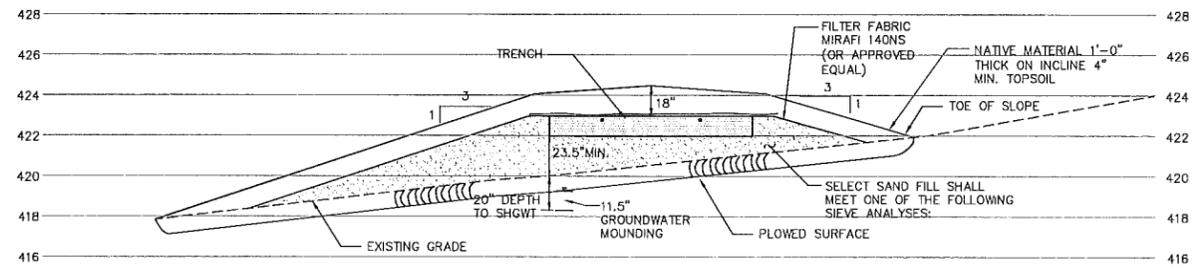
LEGEND

- 336 --- EXISTING CONTOUR
- 338 --- PROPOSED CONTOUR
- --- APPROXIMATE PROPERTY LINE
- --- APPROXIMATE SETBACK LINE
- ● IRON ROD/PIPE FOUND/SET
- CONCRETE MONUMENT
- SS --- GRAVITY SEWER LINE
- FM --- FORCE MAIN
- DECIDUOUS TREE
- CONIFEROUS TREE
- EDGE OF BRUSH/WOODS
- TEST PIT
- PERCOLATION TEST
- WELL

MINIMUM ISOLATION DISTANCES
(Contact Engineer for any Clarifications or Conflicts)

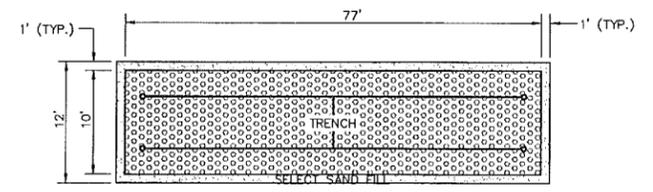
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	Leachfield	Septic Tank	Sewer
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Drilled Well Serving 1 Home - Down Slope of Disposal Field	200 (Min.)	50	50
Shallow Well or Spring, Up Slope of Disposal Field	150 (Min.)	75	75
Shallow Well or Spring, Down Slope of Disposal Field	500 (Min.)	75	75
Lakes, Ponds and Impoundment	50	25	25
Rivers, Streams	50	25	10
Drainage Swales, Roadway Ditches	25	-	-
Municipal Water Main	50	50	10
Service Water Lines	25	25	10
Roadways, Driveways, Buildings	10	5	5
Top of embankment or slope > 30%	25	10	10
Property Line	10 (25 Downslope)	10	10
Trees	10	10	10
Replacement Area	10	-	-
Foundation, Footing Drains	35 (75 Downslope)	10	-

- NOTES**
- EXISTING SEPTIC TANKS SHALL BE MODIFIED TO INCLUDE AN EFFLUENT FILTER AND AN AT-GRADE ACCESS RISER TO ONE OF THE ACCESS PORTS SHALL BE INSTALLED.
 - Isolation distances to well locations may vary due to site conditions - contact Engineer for verification with the Vermont Water Supply Rule Regulations.
 - For mound disposal systems, the limit of mound fill must be 25 feet from any downhill property line and 10 feet from side or uphill property lines.
 - If a curtain or foundation drain is downslope of the leachfield, the leachfield cannot be closer than 75 feet to the drain, if the drain is upslope of the leachfield, it shall be 35' if possible and 20' minimum.
 - Sewers under roads, driveways or parking lots may require protective conduits or sleeves.

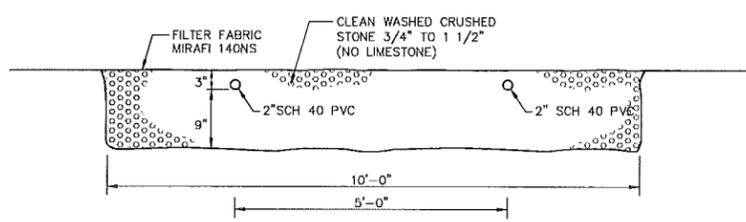


SEIVE #	% PASSING	SEIVE #	% PASSING	SEIVE #	% PASSING
3/8	85-100	4	85-100	3/8	85-100
40	25-75	8	80-100	40	30-50
60	0-30	16	50-85	200	0-10
100	0-10	30	25-60		
200	0-5	50	10-30		
		100	2-10		

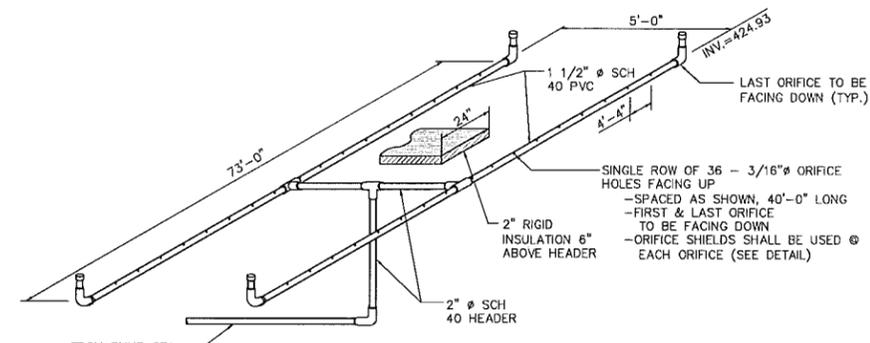
SECTION A-A
1/4" = 1'-0"



TYPICAL TRENCH PLAN
N.T.S.



TYPICAL BED SECTION
N.T.S.



MOUND PIPING DETAIL
N.T.S.

Basis of Design

Design Flow
4-BR Home 490 GPD
2-BR Apartment 280 GPD
Total Flow 770 GPD

Performance Based Design Approach
Limiting Soil Condition - Very Fine Sandy Loam
Limiting Slope Condition - 6.7%
Linear Loading Rate - 10.5 GPD/LF/LF

Design Trench - 10-foot Seepage Bed
Standard Effluent Application Rate = 1 GPD/SF
Design Linear Loading Rate - 10 GPD/LF

Resulting Groundwater Mounding
(10 GPD/LF)/(10.5 GPD/LF) = 0.95 ft = 11.5"

Limiting Depth to SHGWT under Bed/Trench = 20"
Resulting Unsaturated Depth = 24" - 11.5" = 12.5"

Required Separation to Mounded SHGWT = 35"
Min. Required Depth of Sand under Bed 36" - 12.5" = 23.5"

Limiting Depth to SHGWT at Toe of Mound = 20"
Resulting Unsaturated Depth = 20" - 11.5" = 8.5"

Limiting Depth to SHGWT at 25' below Toe of Mound = 20"
Resulting Unsaturated Depth = 20" - 11.5" = 8.5"

Disposal Field
Min Required Length of Bed 770 GPD / (10 GPD/LF) = 77 feet
Limiting Percolation Rate = 22 inches/hour
Required Effective Basal Area = 820 GPD/(0.74 GPD/SF) = 1041 SF
Basal Area Provided = 1,056 SF

Separation Distance to Property Line (Side Setback)
10 FT to Toe, 125 FT provided
25 FT to bed, 154 FT provided
Downhill Setback 28 FT to Toe, 25 FT provided
Required Separation to Bedrock = 4 FT, 6 FT min. provided

Pressure Distribution System

Minimum Required Number of Orifices
77 LF Bed x 10 FT width / (25 GPD/SF) = 30.8 Use 31.
Provide Two 1.5" Distribution Pipes, 73 FT long
See Detail for Orifice Sizing and Layout
Fill Volume of Distribution Piping = 14 Gal
Minimum Required Dose Volume = 10.8 Gal x 5 = 72 Gal
Minimum Number of Doses per Day = 4
Maximum Dose Size = 770 GPD/4 = 192.5 Gal

Pump Sizing

423.5 = Invert of Distribution Piping in Mound (or High Pt of FM)
418.00 = Low Elevation in Pump Station (FT)
5.5 = Elevation Head (FT)

Length of SDR 28 PVC Force Main = 50 FT
Diameter of Force Main = 2"
Design Flow Rate = 28 GPM
Friction Loss per 100 LF = 5.7 FT
2.9 = Resulting Friction Head (FT)
5.5 = Elevation Head (FT)
3.0 = Minor Losses (FT)
3.0 = Design Residual Pressure (FT)
14.4 = Design TDH

Use Hydromatic SHEF30, 1 Ph, 60 Hz, 230 V, 0.4 HP or approved equal

Pump Station Emergency Storage
Required=770 GAL, 770 GAL Provided Through Float Adjustment

Septic Tank
Minimum Size Required = 1,000 Gal for Design Flow < 667 GPD
Effluent Filter Required

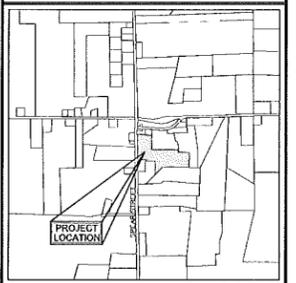
SEPTIC DISPOSAL SYSTEM
DESIGNED BY
SEWAGE OFFICER
TOWN OF CHARLOTTE
UNDER DELEGATION AUTHORITY
FROM THE STATE OF VERMONT
WASTEWATER MANAGEMENT DIVISION
DATE: 11/4/14

SITE ENGINEER:
CIVIL ENGINEERING ASSOCIATES, INC.
10 MAYSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
802-664-2223 FAX: 802-664-2271 web: www.coea-vt.com
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DRAWN: MAB
CHECKED: DSM
APPROVED: DSM

OWNER:
2877 SPEAR STREET ASSOCIATES

PROJECT:
PROPOSED SUBDIVISION PLAN
SPEAR STREET EXTENSION
CHARLOTTE VERMONT

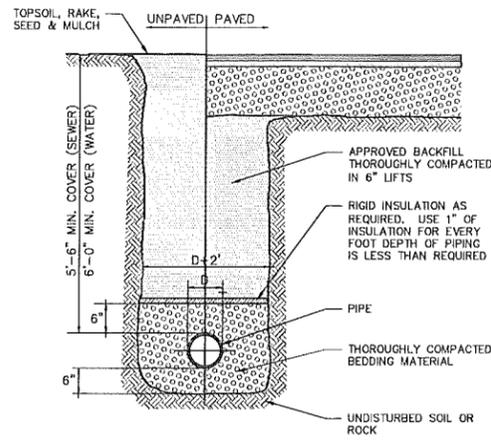


LOCATION MAP
1" = 2000'

DATE	CHECKED	REVISION
0.23.13	DSM/ACL	ADDED NOTES

LOT#2 WASTEWATER PLAN

DESIGN DATE: MAY, 2013
SCALE: 1" = 20'
DRAWING NUMBER: C2.3

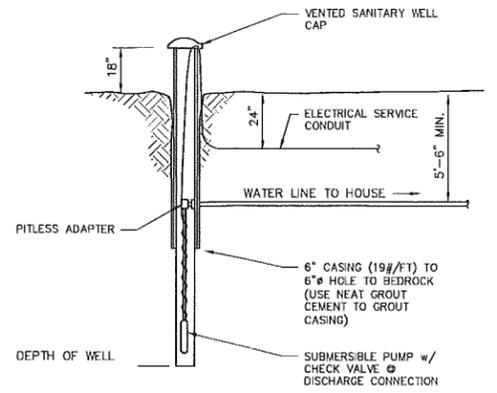


GENERAL TRENCH DETAIL

N.T.S.

NOTES:

1. Typical trench for water, sewer, and drainage pipe.
2. Compaction of backfill and bedding shall be a minimum of 90% (95% under roadway surfaces) of maximum dry density determined in the standard proctor test (ASTM D698).
3. Bedding material shall not be placed on frozen subgrade.
4. Approved backfill shall not contain any stones more than 6" in largest dimension, 2" maximum diameter within 2' of the outside of the pipe, or any frozen, wet, or organic material.
5. Trenches shall be completely dewatered prior to placing of pipe bedding material and kept dewatered during installation of pipe and backfill.
6. The sides of trenches 4' or more in depth entered by personnel shall be sheeted or sloped to the angle of repose as defined by O.S.H.A. standards.
7. Bedding material for wastewater lines shall consist of crushed stone or gravel with maximum size of 3/4". For water lines bedding material shall be sand. Submit a sample to the Engineer for approval.
8. In trenches with unstable materials, trench bottom shall first be stabilized by placement of stabilization fabric then crushed stone (3/4" maximum).



DRILLED WELL DETAIL

N.T.S.

DESIGN BASIS:
 AVERAGE DAILY DEMAND = 600 GALLONS (4 BEDROOMS @ 150 GPD)
 MAXIMUM DAY DEMAND 600 GPD/720 MIN. = 0.8 GPM INSTANTANEOUS
 PEAK DEMAND = 5 GPM (RESIDENTIAL UNIT)

NOTE:
 THE WELL SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE VERMONT WATER SUPPLY RULE - CHAPTER 21 (PART II SMALL SCALE WATER SUPPLY SYSTEMS)

MOUND DISPOSAL FIELDS & FORCE MAINS

PART 1 - GENERAL

- 1.01 Summary
- A. Section Includes:
 1. Wastewater Disposal Field
 2. Force Main Materials
- 1.02 References
- A. All work shall be done in accordance with the State of Vermont Environmental Protection Rules effective September 29, 2007.

PART 2 - PRODUCTS

- 2.01 General
- A. Disposal Fields: Schedule 40 PVC pipe meeting the requirements of the latest revision of ASTM Specification D-1785. Fittings used in the disposal fields shall be compatible with distribution lines material.
 - B. Force Mains: PVC pipe shall conform in all respects to the latest revisions of ASTM Specifications D-2241. All pipe fittings shall be SDR 26 (or SCH 40) clearly marked as follows:
 - Manufacturer's Name and Trademark
 - Nominal Pipe Size (as shown on plans)
 - Material Designation
 Joints shall be push-on type using elastomeric gaskets factory installed conforming to ASTM Specification D-3212.
 - C. Crushed stone shall be clean, durable and no smaller than 3/4" or larger than 1 1/2 inches in diameter.

PART 3 - EXECUTION

- 3.01 Mound Construction
- A. The mound system shall be inspected during critical stages of construction by a qualified consultant from Civil Engineering Associates. This shall include the staking of the mound, the ploved surface prior to sand placement, installation and pressure test of the distribution piping, and a final inspection of the entire system. The Contractor will be responsible for contacting the Engineer to set up the inspection schedule.
 - B. Aboveground vegetation shall be closely cut and removed from the ground surface throughout the area to be utilized for the placement of the fill material. Prior to plowing, the dosing pump discharge line from the pump chamber or dosing chamber to the point of connection with the distribution piping header shall be installed. The area shall then be plowed to a depth of seven to eight inches, parallel to the land contour with the plow throwing the soil upward to provide a proper interface between the fill and natural soil. Tree stumps should be cut flush with the surface of the ground and roots should not be pulled. Once plowing of the mound area is completed, the area shall be fenced to prevent vehicles and equipment from entering the ploved area.
 - C. To prevent compaction, construction equipment shall not be moved across the ploved surface or the effluent disposal area. However, after placement of a minimum of six inches of sand fill over the ploved area, construction equipment may be driven over the protected surface to expedite construction. Construction equipment shall be kept off the area down gradient of the disposal field. Construction and/or plowing shall not be initiated when the soil moisture content is high.
 - D. Construction should be initiated immediately after preparation of the soil interface by placing all of the sand fill needed for the mound to a minimum depth of 27 inches. This depth will permit excavation of trenches to accommodate the crushed stone (12 inches) necessary for the distribution piping.
 - E. The pressure distribution pipe should be laid level on top of the stone and flushing valves installed at the ends of the pipe. Upon completion of the distribution piping, the qualified consultant shall test the system with clean water. The test shall show that a minimum pressure of three feet of head is present at the ends of the pipe and that the difference in discharge rate between the two orifices with the greatest difference in discharge rates is not greater than 15 percent. After meeting the distribution pipe to the force main, the distribution pipe shall be covered with at least two inches of clean stone aggregate. The stone aggregate shall be covered completely with filter fabric.
 - F. After installation of the distribution system, crown the entire mound with cover of soil less permeable than the mound fill, covering with 12 inches on the side slopes and a minimum of 18 inches over the center of the mound. Native soil from the site is normally suitable for cover material, though the top two to four inches of this cover should be topsoil. The entire mound shall be seeded, sodded or otherwise provided with vegetative cover to assure stability of the installation.
 - G. The area surrounding the disposal field shall be graded to provide diversion of surface runoff waters if required.
- 3.02 Testing Notes
- A. The wastewater system shall be inspected during critical stages of construction by a qualified consultant. This shall include at a minimum the staking of the disposal field, the trenches after the initial 9 inches of stone and distribution piping is placed, the installation and pressure test of distribution piping, and a final inspection of the entire system. The Contractor will be responsible for contacting the Engineer to set up the inspection schedule.
 - B. Testing of pressure distribution shall be done in the Engineer's presence. Pressure shall be measured to insure a minimum of 1 psi. (See section E above).
 - C. The distribution line shall then be carefully placed on the bedding with no slope, orifice shields snapped into place, and covered with at least 2' of crushed stone.
 - D. All work shall be done in accordance with the State of Vermont Environmental Protection Rules and the Towns Sewage Ordinance Standards.
 - E. Prior to use of the system, the qualified consultant shall submit a written report to the State of Vermont stating that the system has been installed according to the approved plans and permit. The report shall specifically address the inspection of the site preparations and include numerical results of the orifice discharge rate comparison.
- 3.03 Pressure Pipe Leakage Testing
- A. General: All force mains shall pass the hydrostatic pressure test and leakage test described here prior to testing of air release valves and braces shall be installed. All concrete thrust blocks and restraints shall be in place and cured at least seven days. All buried pipe shall be backfilled. Suitable test plugs shall be installed and air release valves shall be installed at the high points.
 - B. Hydrostatic Test: The following procedure shall be used:
 1. All air release valves shall be opened and the pipe shall be filled with water at a rate not to exceed the venting capacity of the air release valves.
 2. The water pressure shall be raised to 150 percent of the designed operating pressure or 60 psi minimum at the highest point.
 3. Failure to hold the designated pressure within 5 psi of the specified test pressure for the two hour period constitutes a failure of the section tested.
 - C. Leakage Test: The following procedure shall be used:
 1. Leakage shall be defined as the quantity of water that must be supplied into the pipe being tested to maintain pressure within 5 psi of the specified test pressure.
 2. No pipe installation shall be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{ND(P)0.5}{7,400}$$
 Wherever is less

$$L = \frac{SD(P)0.5}{148,000}$$
 S = Length of Pipe Testing (ft)
 L = Allowable Leakage in Gal/Hr
 D = Nominal Diameter of Pipe (in)
 P = Average Test Pressure (psi)
 N = Number of Joints in the Pipeline Tested
- All testing shall be conducted in accordance with AWWA C600-07 test revision.

SITE ENGINEER:

CIVIL ENGINEERING ASSOCIATES, INC.
 10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
 802-864-2323 FAX: 802-864-2271 web: www.ceai.com

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 CHECKED: DSM
 APPROVED: DSM

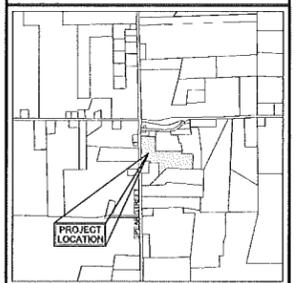
OWNER:

2877 SPEAR STREET ASSOCIATES

PROJECT:

PROPOSED SUBDIVISION PLAN

SPEAR STREET EXTENSION CHARLOTTE VERMONT



LOCATION MAP

1" = 200'

DATE	CHECKED	REVISION
9.23.13	DSM/ACL	ADDED PS NOTE

WASTEWATER DETAILS

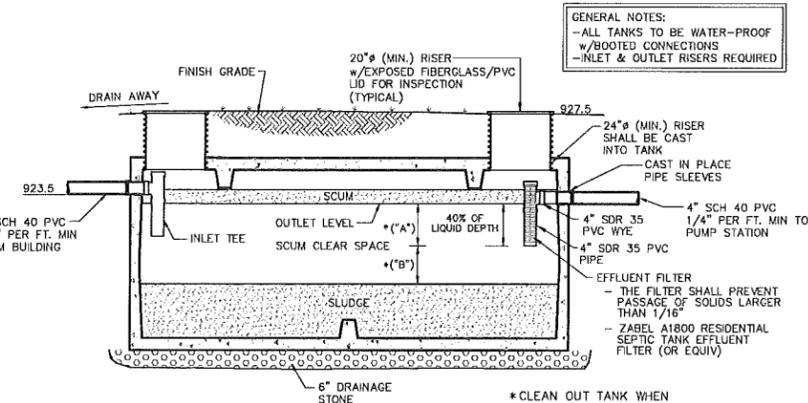
APPROVED

SEWER DISPOSAL SYSTEM DESIGN

BY: [Signature]

SEWAGE OFFICER
 TOWN OF CHARLOTTE
 UNDER DEPARTMENT AUTHORITY
 FROM THE STATE OF VERMONT
 WASTEWATER AS SHOWN ON 11/14/14

11268



1000 GALLON SEPTIC TANK

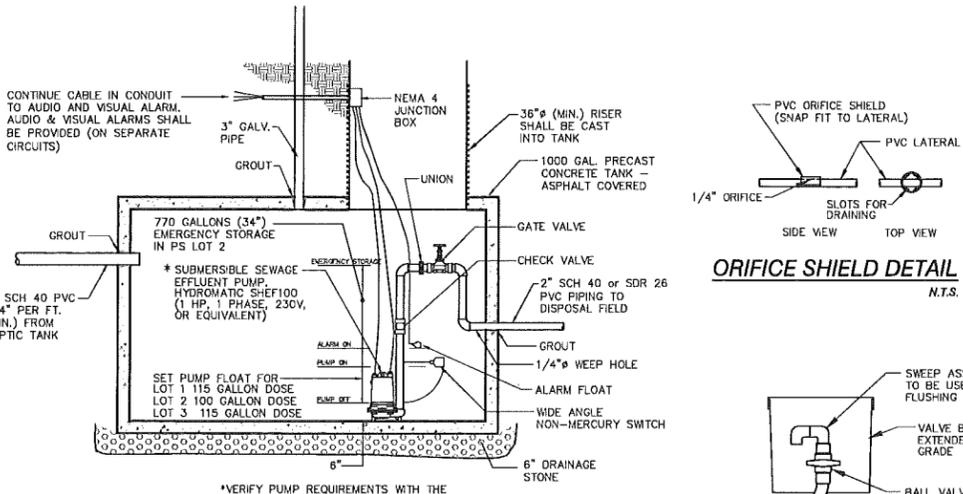
N.T.S.

GENERAL NOTES:
 - ALL TANKS TO BE WATER-PROOF w/ BOOTED CONNECTIONS
 - INLET & OUTLET RISERS REQUIRED

* CLEAN OUT TANK WHEN "A" IS 3" OR LESS OR "B" IS 12" OR LESS

Septic Tank Notes

1. Septic tank shall be a precast concrete tank, unless otherwise approved.
2. Maintenance
 - At least once a year, the depth of sludge and scum in the septic tank should be measured. The tank should be pumped if:
 - The sludge is closer than twelve inches to the outlet baffle or;
 - The scum layer is closer than three inches to the outlet baffle.
 - Under no circumstances should anyone enter a septic tank.
3. Recommendations
 - The use of garbage grinders is discouraged as sludge accumulation in the septic tank can be increased by up to 40%. If used, the septic tank will require more frequent pumping.
 - The septic system is designed to handle human waste and toilet paper, plus water from plumbing fixtures such as toilets, baths and sinks. Moderate use of household cleaners, detergents and bleach should not damage your system; however, indiscriminate use may cause problems. Non-degradable paper products and any other non-biodegradable substances should not be put in your wastewater system.
 - Minimize the amount of water used in the household. Excessive water could flush solids from the septic tank to the disposal field which leads to clogging or plugging of the piping. When dishwashers and washers are used, make sure loads are full and stagger their use to reduce peak flows, i.e. stagger loads of laundry over several days instead of one day.
4. Walkways, patios or decks or other permanent structures should not be constructed over the septic tank.
5. There should be no need to use commercial "starter", "bacterial feeds", or "cleaners", etc. Bacteria in a septic tank system occurs naturally.



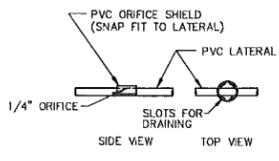
1000 GALLON PUMP STATION DETAIL

N.T.S.

PUMP STATION / SEPTIC TANK TESTING

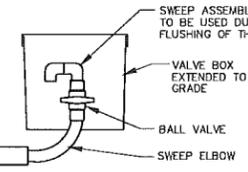
The tanks shall be tested by the following procedure and in conformance with the State of Vermont - Environmental Protection Rules:

1. Infiltration Leakage Test: All pipes and other openings into the tank shall be suitably plugged and the plugs braced to prevent blowout. The tank shall then be filled with water to the top of the riser section. A period of time may be permitted, if the Contractor so wishes, to allow for absorption. At the end of this period, the tank shall be refilled to the top of the riser, if necessary, and the measuring time of at least four hours begun. At the end of the test period, the tank shall be refilled to the top of the riser, measuring the volume of water added. This amount shall be converted to gallons per vertical foot depth for 24 hours. The leakage for each tank shall not exceed four gallon/vertical foot/day. If leakage exceeds the allowable rate, repairs shall be made as approved by the Engineer and the tank retested. If the Contractor elects to backfill prior to testing, the testing shall be at his own risk, and it shall be incumbent upon the Contractor to determine the reason for any failure of the test. No adjustment in the leakage allowance will be made for unknown causes such as leaking plugs, absorption, etc. It will be assumed that all loss of water during the test is a result of leaks through the joints or through the concrete. Furthermore, the Contractor shall take any steps necessary to assure the Engineer that the water table is below the bottom of the tank throughout the test.
- OR
2. Vacuum test in accordance with ASTM C1227-03, Standard Specification for Precast Concrete Septic Tanks, except as noted below:
 - seal the empty tank and apply a vacuum to 5 inches (100mm) of mercury. The tank is approved if 90% of vacuum is held for 5 minutes.



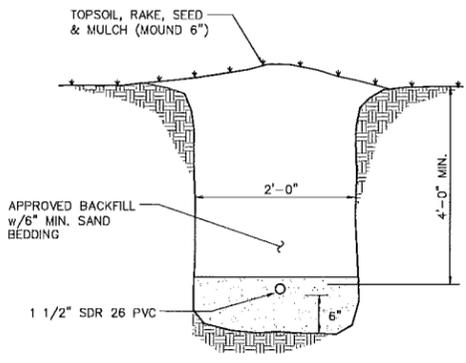
ORIFICE SHIELD DETAIL

N.T.S.



FLUSHING VALVE DETAIL

N.T.S.



FM TRENCH SECTION

N.T.S.