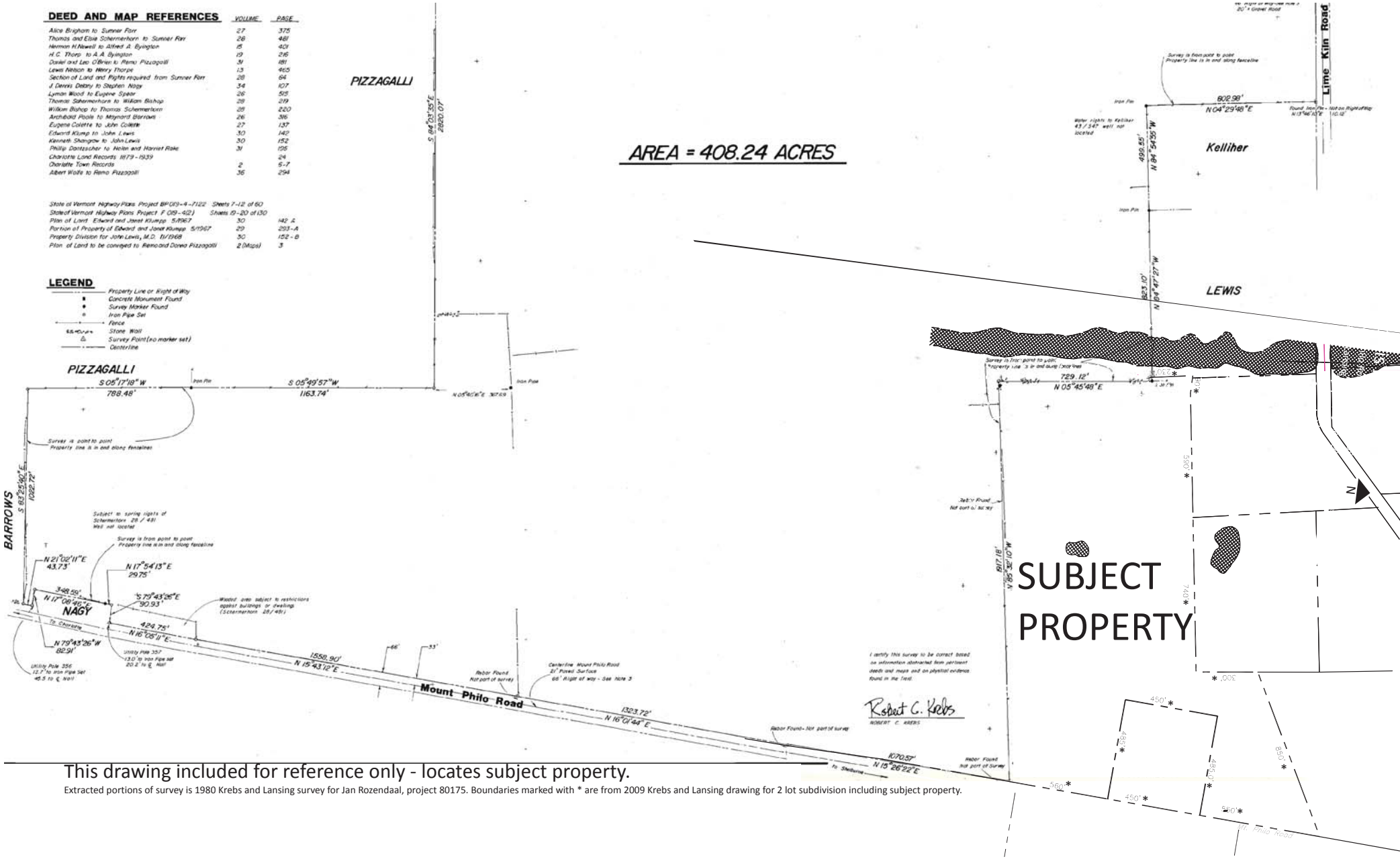
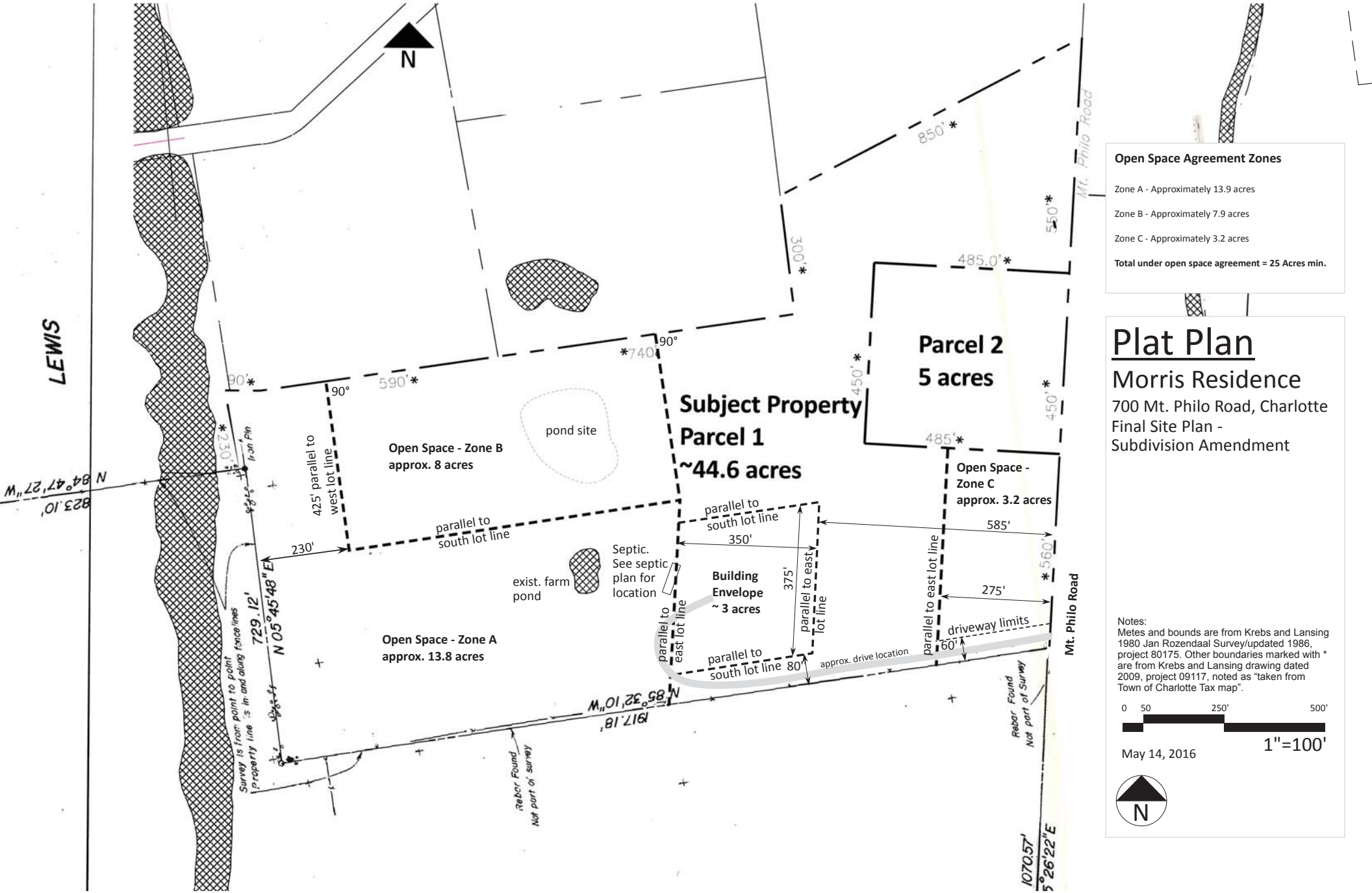


This drawing included for reference only - locates subject property.

Extracted portions of survey is 1980 Krebs and Lansing survey for Jan Rozendaal, project 80175. Boundaries marked with * are from 2009 Krebs and Lansing drawing for 2 lot subdivision including subject property.



Open Space Agreement Zones

Zone A - Approximately 13.9 acres

Zone B - Approximately 7.9 acres

Zone C - Approximately 3.2 acres

Total under open space agreement = 25 Acres min.

Plat Plan

Morris Residence

700 Mt. Philo Road, Charlotte
Final Site Plan -
Subdivision Amendment

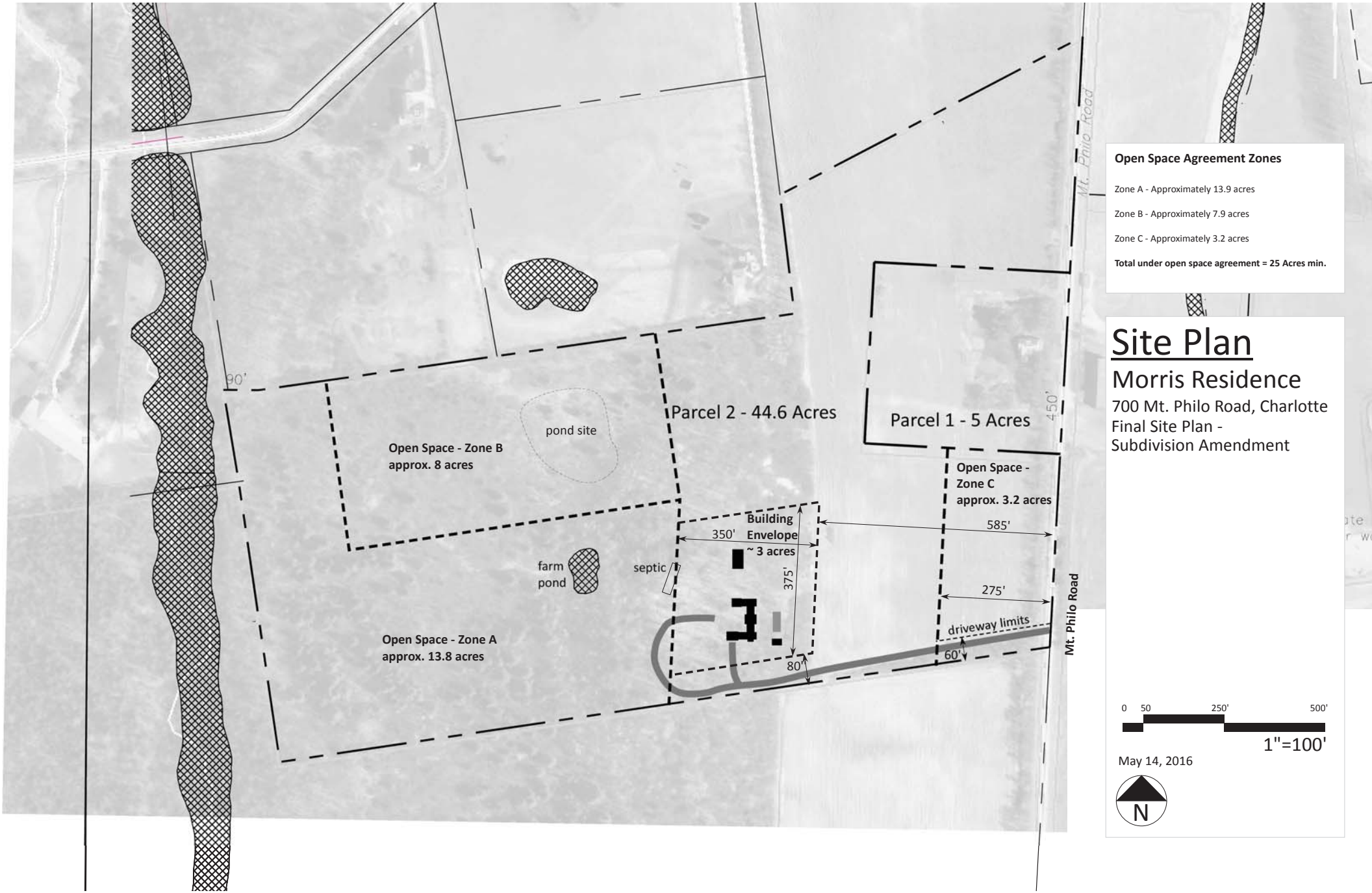
Notes:
Metes and bounds are from Krebs and Lansing 1980 Jan Rozendaal Survey/updated 1986, project 80175. Other boundaries marked with * are from Krebs and Lansing drawing dated 2009, project 09117, noted as "taken from Town of Charlotte Tax map".

0 50 250' 500'

1"=100'

May 14, 2016

N



Open Space Agreement Zones

Zone A - Approximately 13.9 acres

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Site Plan

Morris Residence

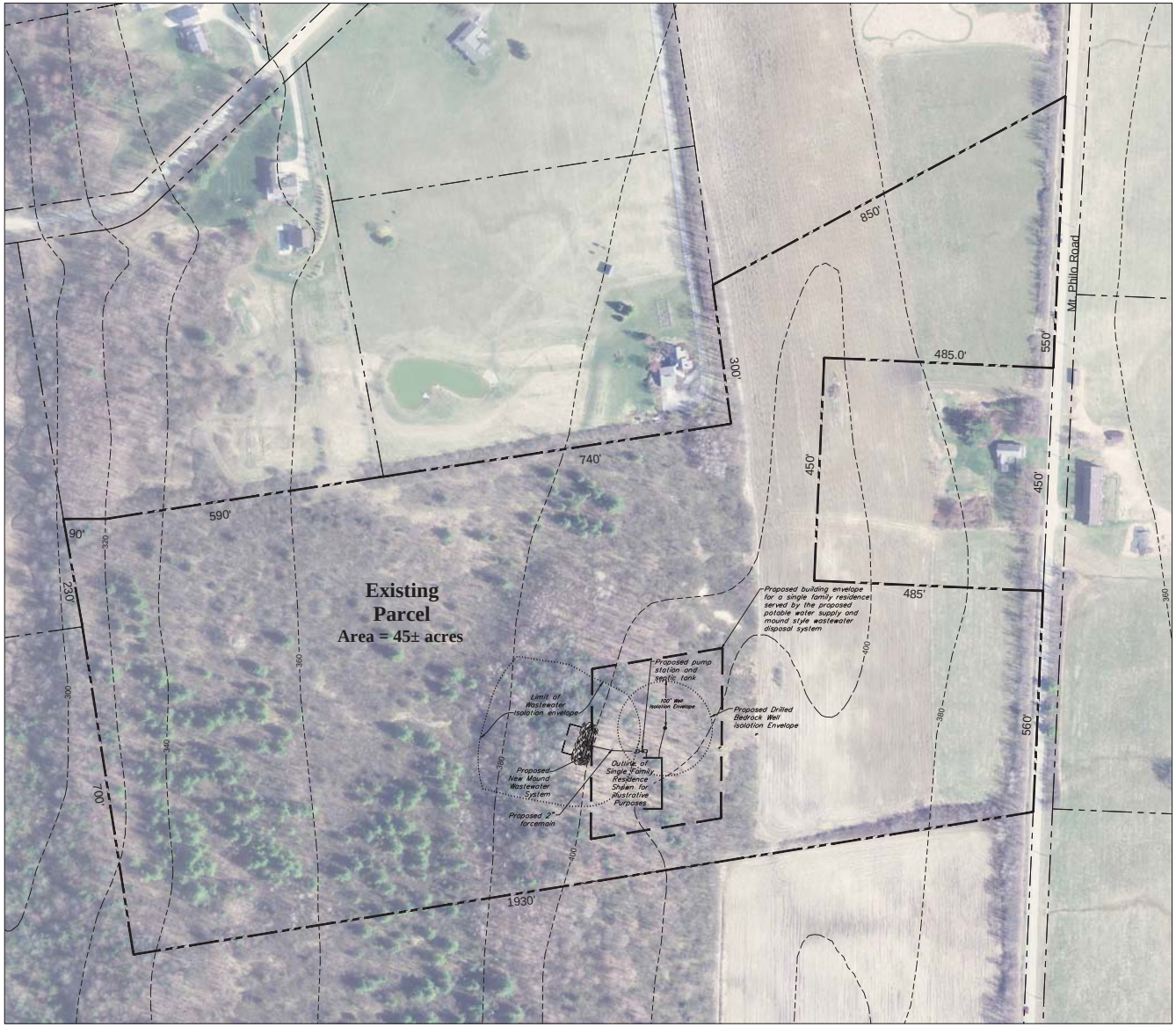
700 Mt. Philo Road, Charlotte
Final Site Plan -
Subdivision Amendment

0 50 250' 500'

1"=100'

May 14, 2016

N



Location Map
N.T.S.

Legend

- Survey control point
- Soil test hole
- percolation test
- TBM #1 — Temporary bench mark
- 140 — Finish Contour
- Building Envelope
- 150 — Existing Contour
- FM — New Sewer Forcemain
- W — New Water Service
- 112 — Survey Control Point
- Approximate Property Line
- Wastewater Disposal Bed

Minimum Isolation Distances

(Contact Engineer for any Clarifications or conflicts)

	Horizontal Distance (ft.) Edge of System	Septic Tank	Sewer
Drilled well serving 1 home – up slope of system	100	50	50
Drilled well serving 1 home – down slope of system	200	50	50
Lake and pond impoundment – standing water	50	25	25
River, streams	50	25	10
Drainage swales, roadway ditches	25	–	–
Main or municipal water lines	50	50	10
Service water lines	25	25	10
Roadways, driveways, parking lots	10 (25 downslope)	5	–
Top of embankment or slope > 30%	25	10	–
Property line	25	10	10
	10	10	10
Other disposal field or replacement area	10	–	–
Foundation, footing drains, curtain drains	35 (75 downslope)	10	–
Suction water line	100	50	50

Note:
These distances may be increased if necessary to provide adequate protection.

Notes:

1. This plan is not a boundary survey. The property lines shown are based on tax maps of Charlotte. Property lines are considered approximate.
2. The underground utilities shown on this plan are based on visible utilities located during a topographic survey performed by Krebs & Lansing in May 3, 2016. Underground utilities are approximate and not warranted to be exact or complete. Dig Safe shall be contacted prior to any excavation.
3. Elevations are based on the NAVD 88 (Geoid 12A) vertical datum.
4. Project Horizontal Coordinates derived from GPS observation using reference frame NAD83 (2011) 2010.00 epoch.
5. The sole intent of this plan is to provide the applicant with the required information in the pursuit of wastewater system and potable water supply permit for a single family residence.

0' 100' 200' 400' 800'

Bar Scale 1" = 100'

For Review Only

Date revised	Description	Checked	Date
Design JAR	Overall Plan		
Drawn JAR			
Checked SWH			
Scale 1"=100'	Morris Residence		
Date May 4, 2016			
Project 1611.3	700 Mount Philo Road	Charlotte, Vermont	

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

C-1

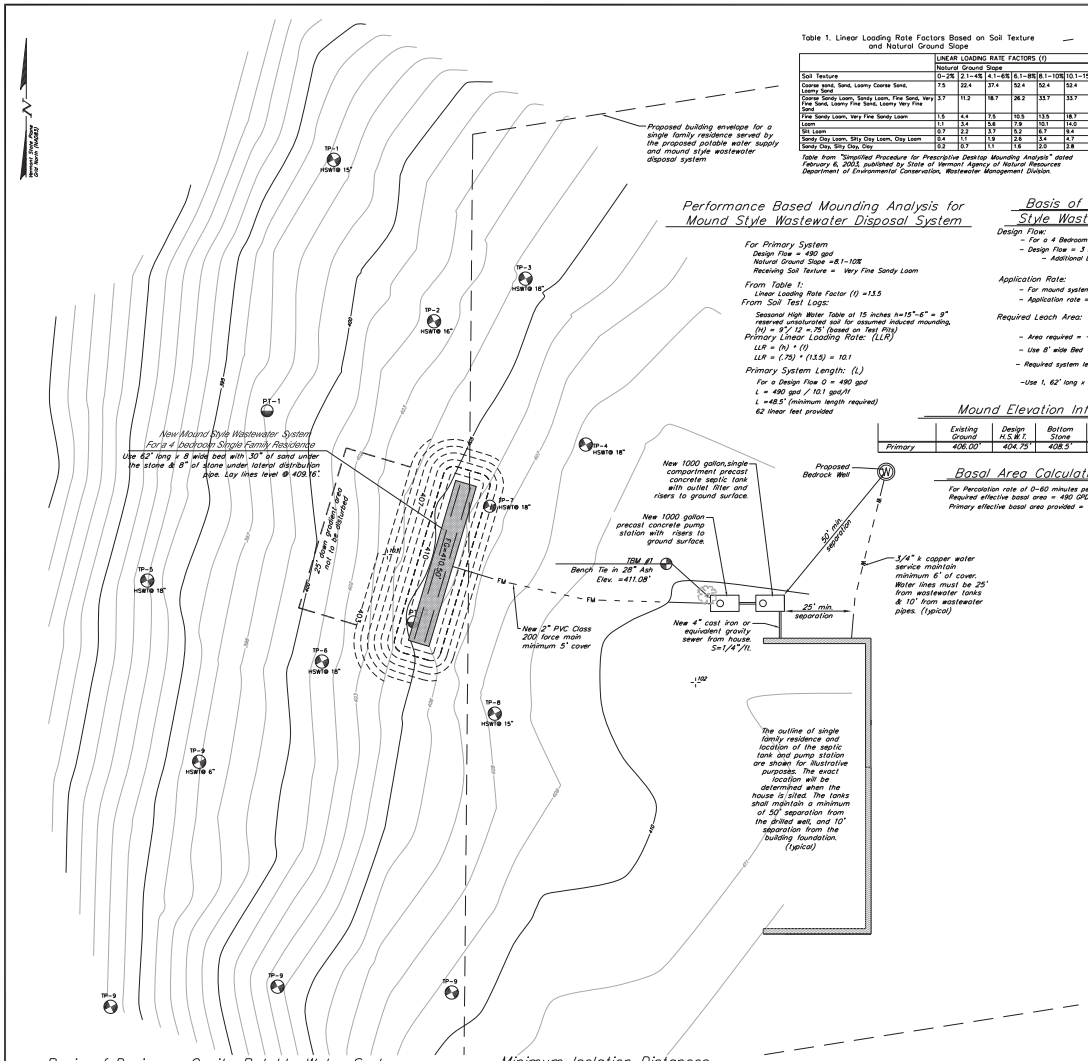


Table 1. Linear Loading Rate Factors Based on Soil Texture and Natural Ground Slope

	LINEAR LOADING RATE FACTORS (f) Natural Ground Slope					
Soil Texture	0–2%	2.1–4%	4.1–6%	6.1–8%	8.1–10%	10.1–15%	15.1–20%
Coarse sand, Sand, Loamy Coarse Sand, Loamy Sand	7.5	22.4	37.4	52.4	52.4	52.4	52.4
Coarse Sandy Loam, Sandy Loam, Fine Sand, Very Fine Sand, Loamy Fine Sand, Loamy Very Fine Sand	3.7	11.2	18.7	26.2	33.7	33.7	33.7
Fine Sandy Loam, Very Fine Sandy Loam	1.5	4.4	7.5	10.5	13.5	18.7	26.2
Loam	1.1	3.4	5.6	7.9	10.1	14.0	19.6
Silt Loam	0.7	2.2	3.7	5.2	6.7	9.4	13.1
Sandy Clay Loam, Silty Clay Loam, Clay Loam	0.4	1.1	1.9	2.6	3.4	4.7	6.5
Sandy Clay, Silty Clay, Clay	0.2	0.7	1.1	1.6	2.0	2.8	3.9

Table from "Simplified Procedure for Prescriptive Desktop Mounding Analysis" dated February 6, 2003, published by State of Vermont Agency of Natural Resources Department of Environmental Conservation, Wastewater Management Division.

Performance Based Mounding Analysis for Mound Style Wastewater Disposal System

For Primary System
Design Flow = 490 gpd
Natural Ground Slope =8.1–10%
Receiving Soil Texture = Very Fine Sandy Loam

From Table 1:
Linear Loading Rate Factor (f) =13.5

From Soil Test Logs:
Seasonal High Water Table at 15 inches h=15"–6" = 9" reserved unsaturated soil for assumed induced mounding, (hi) = 9".2 12 = .75" (based on Test Pits)

Primary Linear Loading Rate: (LLR)
LLR = (hi) * (f)
LLR = (.75) * (13.5) = 10.1

Primary System Length: (L)
For a Design Flow Q = 490 gpd
L = 490 gpd / 10.1 gpd/ft
L =48.5' (minimum length required)
62 linear feet provided

Basis of Design for Mound Style Wastewater Disposal System

Design Flow:
– For a 4 Bedroom Single Family
– Design Flow = 3 bedrooms * 140gpd gal/day/bedroom = 420 gals/day
– Additional bedroom based on 1 person per/bedroom = 70 gpd
Total Design Flow = 490 gpd

Application Rate:
– For mound system
– Application rate = Q = 1.0 gals/s.f./day

Required Leach Area:
– Area required = 490 / 1.0 = 490 s.f.
– Use 8' wide Bed
– Required system length = 490 s.f. / 8 ft. = 61.25 ft.
–Use 1, 62' long x 8' wide bed style mound

Mound Elevation Information

	Existing Ground	Design H.S.W.T.	Bottom Stone	Pipe Inverts	Top Stone	Finish Grade
Primary	406.00'	404.75'	408.5'	409.16'	409.50'	410.50'

Basal Area Calculations

For Percolation rate of 0–60 minutes per inch,
Required effective basal area = 490 GPD/0.74 GPD/SF = 662 SF
Primary effective basal area provided = 1569 SF

Percolation Tests

Test #	Percolation Rate
A	33 min./inch
B	31 min./inch

Soil Logs

Engineer/Designer: Jay Renshaw
Excavation Date: April 6, 2016
Others Present: Brian Tremback (Town of Charlotte)
Others Present: Dan Morris (Applicant/Owner)

NLWTD = No ledge or water to depth
NWTD = No water to depth
HSWT = High seasonal water table
REDOX = Redoximorphic Features

TP #1
0"–8" Dark brown, loam/very fine sandy loam, crumb structure, soft, damp, loose, many roots,
8"–13" Dull yellow brown, very fine sandy loam, sub angular blocky, semi loose, damp, roots
13–19" Light dull brown, very fine sandy loam, weak platy structure, faint redox features @ 15"
19–29" Brown silt loam, platty structure, damp, few roots, distict redox features
29–36" Seep (filled with ground water)
HSWT @ 15" NLTD

TP #2
0"–6" Dark brown, loam/very fine sandy loam, fine granular structure, loose, many roots,
6"–16" Light brown, very fine sandy loam, weak subangular blocky, semi loose, damp, roots faint redox @ 16"
16–36" Dull brown, very fine sandy loam/silt loam, weak platy structure, damp to wet, common redox features
HSWT @ 16" NLTD Seep @ 36"

TP #3
0"–6" Dark brown, loam/very fine sandy loam, crumb structure, soft, damp, loose, many roots,
6"–12" Yellow brown, very fine sandy loam, sub angular blocky, semi loose, damp, roots
12–18" Light dull brown, very fine sandy loam, weak subangular blocky, faint redox features @ 18"
18–36" Brown silt loam, platty structure, damp, few roots, distict redox features
36–43" Seep (filled with ground water)
HSWT @ 18" NLTD

TP #4
0"–6" Dark brown, loam/very fine sandy loam, crumb structure, soft, damp, loose, many roots,
6"–18" Yellow brown, very fine sandy loam, subangular blocky, very loose, slight dampness, roots
18–29" Light dull brown, very fine sandy loam, weak subangular blocky, faint redox features @ 18"
29–36" Brown silt loam, platty structure, damp, few roots, distict redox features
HSWT @ 18" NLWTD

TP #5
0"–8" Dark brown, fine sandy loam, fine granular structure, loose, many roots,
8"–18" Yellow brown, very fine sandy loam, subangular blocky, very loose, slight dampness, roots
18–36" Light dull brown, very fine sandy loam/weak subangular blocky, faint redox features @ 18"
36–40" Grey silt loam, saturated, slight seep @ 38"
HSWT @ 18" NLTD

TP #6
0"–8" Dark brown, fine sandy loam, fine granular structure, damp, loose, many roots,
8"–18" Yellow brown, very fine sandy loam, subangular blocky, very loose, roots, faint redox features @ 18"
18–30" Light dull brown, very fine sandy loam, subangular blocky, common redox features
30–36" Seep (filled with ground water)
HSWT @ 18" NLWTD

TP #7
0"–6" Dark brown, fine sandy loam, fine granular structure, damp, loose, many roots,
6"–18" Yellow brown, very fine sandy loam, subangular blocky, very loose, roots, faint redox features @ 18"
18"–29" Light dull brown, very fine sandy loam/silt loam, weak subangular blocky, common redox features
29"–36" Seep (filled with ground water)
HSWT @ 18" NLTD

TP #8
0"–10" Dark brown, fine sandy loam, fine granular structure, damp, loose, many roots,
10"–15" Yellow brown, very fine sandy loam, subangular blocky, loose, roots faint redox features @ 15"
15"–36" Light dull brown, very fine sandy loam/silt loam, weak subangular blocky, common redox features
HSWT @ 18" NLWTD

TP #9
0"–10" Dark brown, fine sandy loam, fine granular structure, damp, loose, many roots,
10"–15" Yellow brown, very fine sandy loam, subangular blocky, loose, slight dampness, roots
15"–36" Light dull brown, very fine sandy loam/silt loam, weak subangular blocky, faint redox features @ 18"
HSWT @ 18" NLTD Seep @ 36"

TP #9
0"–6" Dark brown, very fine sandy loam, saturated, many roots, possible redox @ 6"
6"–36" Seep (filled with ground water)
HSWT @ surface" NLTD Seep @ 6"

TP #10
0"–10" Dark brown, fine sandy loam, fine granular structure, damp, loose, excessive roots,
10"–20" Dull brown/grey, very fine sandy loam, moderate platty structure, loose, roots possible redox features @ 10"
20"–36" Grey silt loam/ very fine sandy loam, moderate cemented structure, common redox feature
HSWT @ 10" NLWTD

TP #11
0"–10" Dark brown, fine sandy loam, fine granular structure, damp, loose, excessive roots,
10"–33" Dull brown/grey, very fine sandy loam, moderate platty structure, loose, roots, redox features @ 10'
20"–36" Grey silt loam/ very fine sandy loam, moderate cemented structure, common redox feature
HSWT @ 10" NLWTD

Legend

Survey control point
Soil test hole
percolation test
TBM #1 Temporary bench mark
Finish Contour
Building Envelope
Existing Contour
New Sewer Forcemain
New Water Service
Survey Control Point
Approximate Property Line
Wastewater disposal bed

Notes:

1. This plan is not a boundary survey. The property lines shown are based on tax maps of Charlotte. Property lines are considered approximate.
2. The underground utilities shown on this plan are based on visible utilities located during a topographic survey performed by Krebs & Lansing in May 3, 2016. Underground utilities are approximate and not warranted to be exact or complete. Dig Safe shall be contacted prior to any excavation.
3. Elevations are based on the NAVD 88 (Geoid 12A) vertical datum.
4. Project Horizontal Coordinates derived from GPS observation using reference frame NAD83 (2011) 2010.00 epoch.
5. The sole intent of this plan is to provide the applicant with the required information in the pursuit of wastewater system and potable water supply permit to construct a single family residence..

0' 20' 40' 80' 120'
Bar Scale 1" = 20'

Basis of Design – Onsite Potable Water System

Average Day Demand = 4 bedrooms (3 * 140 GPD x 3 bedrooms = 420 GPD) + 70 G.P.D. per additional bedroom
Total Average Day Demand = 490 Gallons Per Day

Maximum Day Demand 490 G.P.D. / 720 min./perday = .68 G.P.M.

Instantaneous Peak Demand = 5 GPM/Unit = 5 G.P.M.
Source capacity = Not required for projects with maximum day demand of 5 GPM or less
Storage capacity = Not required for projects with maximum day demand of 5 GPM or less
Minimum pump Capacity = 5 G.P.M.
Operating pressure range 40 psi to 60 psi
The well is not located in a flood plain

Minimum Isolation Distances

(Contact Engineer for any Clarifications or conflicts)	Horizontal Distance (ft.) Edge of System	Septic Tank	Sewer
Drilled well serving 1 home – up slope of system	100	50	50
Drilled well serving 1 home – down slope of system	200	50	50
Lake and pond impoundment – standing water	50	25	25
River, streams	50	25	10
Drainage swales, roadway ditches	25	–	–
Main or municipal water lines	50	50	10
Service water lines	25	25	10
Roadways, driveways, parking lots	10 (25 downslope)	5	–
Top of embankment or slope > 30%	25	10	–
Property line	25	10	10
	10	10	10
Other disposal field or replacement area	10	–	–
Foundation, footing drains, curtain drains	35 (75 downslope)	10	–
Suction water line	100	50	50

Note:
These distances may be increased if necessary to provide adequate protection.

For Review Only

Date revised	Description	Checked	Date
Design JAR	Wastewater Design Plan		
Drawn JAR			
Checked SWH			
Scale 1"=20'	Morris Residence		
Date Dec. 3, 2015			
Project 16113	700 Mount Philo Road Charlotte, Vermont		

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

C-2

Construction Procedure

1. The Contractor shall arrange a meeting at the site with the Engineer and a representative of the Town of Charlotte. This meeting shall occur before any construction can begin. The purpose of this meeting is to review the layout, construction methods, scheduling of construction and testing of the proposed septic system.
2. The site shall be cleared. All stumps shall be cut flush with the ground surface.
3. Install the force main and riser that will be in and under the above ground mound.
4. Plow the area to a depth of 7" to 8", parallel to the land contours with the plow throwing the soil uphill.
5. The approved mound sand (sieve analysis; 85% passing the No. 10 sieve, 30% to 50% passing the No. 40 sieve, and 5% to 10% passing the No. 200 sieve) shall be placed in the mound area. Work from the outside of the plowed area and drive equipment over the mound as little as possible. It is very important to avoid compacting the plowed native soil any more than is absolutely necessary. Bring fill to the elevation of the top of the trenches. Shape sideslopes as shown on the approved plans. Dig out the trenches (or bed). Pay close attention to keeping the trenches (or bed) level. Shape by hand if necessary.
6. Fill trenches (or bed) with approved stone. Bring stone to the elevation of the bottom of the distribution lines. Carefully level the stone.
7. Dry fit distribution lines. Drill holes and turn holes up for testing. The discharge from the holes in the distribution lines must be checked before the mound construction can proceed. Both the Engineer and a representative of the Town must be present for this test. The system must be pressurized with water. The discharge rate from each hole will be measured to ensure an even distribution of the effluent.
8. After the discharge test is complete and approved by both the Town and the Engineer add the remaining stone. The stone shall be a minimum of 2" over the top of the distribution lines.
9. Mirafi filter fabric shall be placed over the stone in the trenches.
10. Cover the mound (18" above the trenches in the center and 12" at the sides) with material that is less permeable than the mound sand. The top 4" of this material shall be topsoil.
11. The soil uphill of the mound shall be shaped to divert surface runoff away from the mound.
12. The entire mound construction area shall be seeded and mulched.

Basis of Design

Design Flow:
- 1 single family, 4 bedrooms = (3 bedrooms * 140 G.P.D.) + (1 bedrooms * 70 G.P.D.) = 490 G.P.D.

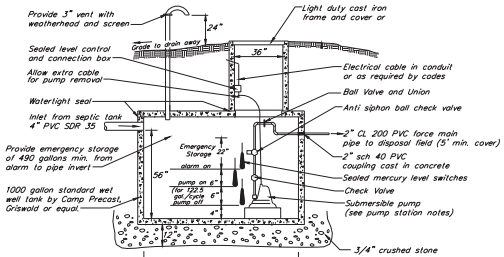
Simplex Pump Station Design:
Volume of wetwell = 1264 gals
Volume of wetwell per foot = 1264 gals/4.67 feet = 271 gals/feet
4 pump cycles per day
Volume of pump cycles = 490 gals/4 cycles = 122.5 gals/cycle
Height of pump cycle = (122.5 gals)/(271 gals/foot) = 0.45 feet
Minimum volume of emergency storage = 490 gal (volume for 1 day)
Emergency storage will be in wetwell
Height of emergency storage = 490 gals/271 gals/foot) = 1.8 feet
Elevation floor and rim to be determined before construction
Elevation of invert in = 4.67' above floor
Elevation of Alarm = 1.33' (16.0") above floor
Elevation of Pump off = 0.33' (4") above floor
Elevation of Pump on = .83' (10") above floor
Volume of emergency storage provided = (4.67'-1.8') * 271 gals/foot = 778 gallons > 490 gallons, therefore OK

Volume of Dose verses 5 times volume of Distribution Network

Total Length Distribution Network = 124 of 1 1/2" PVC
Volume = (.75/12)^2 x 3.1415 x 7.48 = .0917 gal/ft
Volume of Distribution System = .0917 gal/ft x 124 = 11.4 gallons

Design flow =490 GPD

Dose Volume = 490 GPD /4 doses per day = 122.5 gals per dose
Per dose volume 122.5 gals is > 56.8 gal (5 x distrubution network)

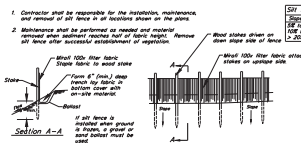


490 GPD Simplex Pump Station

N.T.S.

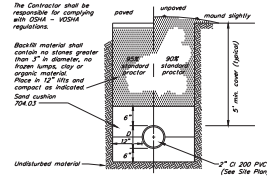
Pump Station Notes

1. The Contractor shall test tank for water tightness prior to backfill and shall anchor tank as required due to high seasonal groundwater table.
2. All penetrations and joints on tank shall have watertight seals.
3. The Contractor shall provide all necessary unions, fittings, etc. for easy pump removal.
4. The pump station shall include all the necessary controls, switches, fittings and appurtenances to make the station complete.
5. The Contractor shall provide an audible and flashing alarm and fused disconnect switch to be installed inside house or building. All necessary cable and wiring shall be supplied by the Contractor.
6. Provide a 4" solid concrete block under pump.
7. The Contractor shall use Schedule 80 PVC with solvent weld joints for all piping inside pump station.
8. All electrical equipment shall comply with the National Electric Code and other applicable codes.
9. Any modifications to pump station design or location must be approved by the Engineer.



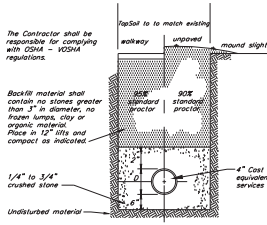
Typical Temporary Silt Fence

N.T.S.



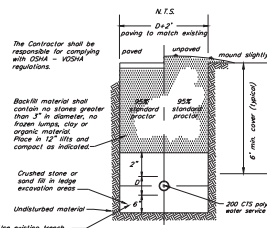
Force Main Trench Detail

N.T.S.



Typical Sanitary Trench Detail

N.T.S.



Typical Water Trench Details

N.T.S.

Force Main Pressure/Leakage Test

Upon completion of construction of a force main, the line shall be pressure and leakage tested in accordance with the following procedure.

Pressure Test

After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 1.5 x the highest working pressure in the section.

Test Pressure Restrictions. Test pressures shall:
1. Not to be less than 50 psi at the highest point along the test section.
2. Not exceed pipe or thrust restraint design pressures.
3. Be of at least 2 hour duration.
4. Not vary by more than 5 psi.
5. Not exceed twice the rated pressure of the valves when the pressure boundary of the test section includes closed gate valves.

Pressurization. Each valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe.

Air Removal. Before applying the specified test pressure, air shall be expelled completely from the pipe and valves.

Examination. All exposed pipe, fittings, valves, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, or valves, that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated.

Leakage Test

A leakage test shall be conducted concurrently with the pressure test.

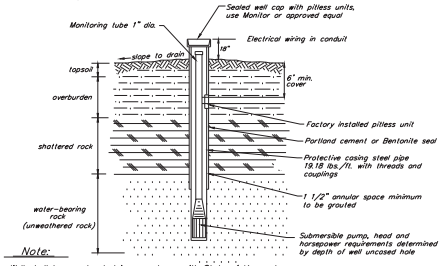
Leakage Defined. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

Allowable Leakage. No pipe installation will be accepted if leakage is greater than that determined by the following formula:

$$L = \frac{N\sqrt{P}}{7400}$$

L is the allowable leakage, in gallons per hour; N is the number of joints in the length of pipeline tested; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gage.

Sections which fail the pressure/leakage test shall be repaired and retested by the contractor at no additional expense to the owner.

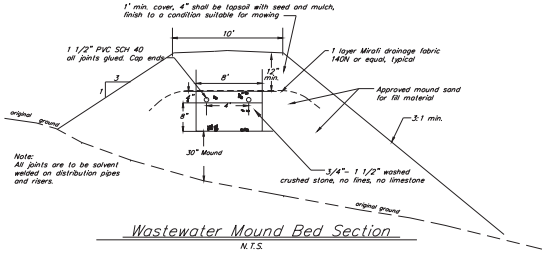


Note:

Well shall be constructed in accordance with State of Vermont, Agency of Natural Resources Department of Environmental Conservation, Environmental Protection Rules, Chapter 21 Water Supply Rule, Appendix A. Part 12. Original Effective Date September 24, 1992, Revision Date December 1, 2011

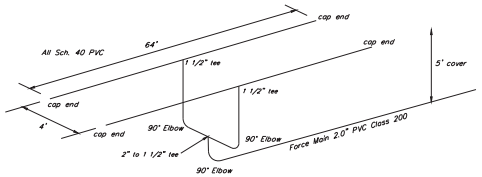
Typical Drilled Well Section

N.T.S.



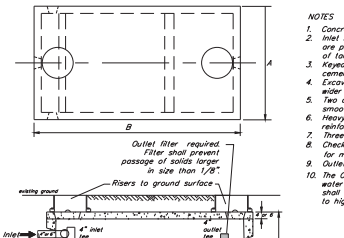
Wastewater Mound Bed Section

N.T.S.



Pipe Layout Wastewater System

N.T.S.

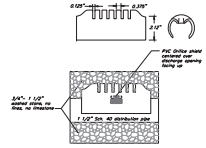


Verify tank dimensions with manufacturer prior to installation.

Tank size	A	B	C	D
1000 gal	63"	96"	53"	56"

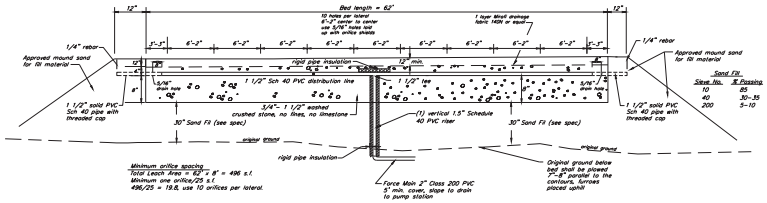
Single Compartment Septic Tank

N.T.S.



Typical Orifice Shield

N.T.S.



Mound System Distribution Lateral For Mound Style Wastewater System

N.T.S.

For Review Only

Date revised	Description	Checked	Date
Design JAR			
Drawn JAR			
Checked SWH			
Scale N.T.S.			
Date May 6, 2016			
Project 16113	700 Mount Philo Road	Charlotte, Vermont	

Wastewater Design Details

Morris Residence

KREBS & LANSING Consulting Engineers, Inc.
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