Plans and Specifications

I. Grease Trap (4)

a. A grease trap with a minimum liquid capacity of 2,942 gallons will be required for this system. Dellinger Precast 3,000 gallon grease trap (HS 20-44) or equal is specified. (4)

II. Septic Tank

(4) a. The septic tank shall be State approved (Section .1953 of 15A NCAC 18A), watertight, structurally sound. Dellinger Precast 4,000 gallon septic tank (ST-4,000-HS20) or equal is specified.
b. The septic tank shall be demonstrated to be watertight by a 24-hour leak test or by pressure test.
c. The septic tank will be fitted with an approved commercial effluent filter that is appropriately sized and riser for easy access and periodic maintenance (Polylok PL-525 or equivalent - commercial grade).
d. It is the responsibility of the septic contractor to thoroughly inspect the septic tank prior to accepting delivery to assure that the tank has had time to properly cure and is free of cracks or other structural deficiencies.

III. Dosing Tank

(4) a. The dosing/equalization tank shall be State approved, watertight, structurally sound. Dellinger (4,500) gallon pump tank ((PT-4,500)) or equal is specified. Again, it is the responsibility of the septic tank contractor to thoroughly inspect each pump tank prior to accepting delivery.
b. The dosing/equalization tank shall be demonstrated to be watertight by a 24-hour leak test or by pressure test.
c. The dosing/equalization tank shall have access risers that extend, at a minimum, 6 inches above finished grade.
d. Pump submergence is required. Effluent volume shall cover the pump and motor housing at all times and, in no case, shall be less than 16 inches of effluent remaining in the tank at all times.
(3) e. Discharge pump: Goulds WE07H (cut sheet available in Appendix) or equivalent.
f. Discharge pump will be tethered with a nylon rope for removal purposes.
- HOA switch
- Control circuit fuse
- Alarm circuit fuse
- Float switch terminal block
- Circuit breaker for the pump
- Circuit breaker for the alarm control circuit
- NEMA 4X alarm strobe beacon
- NEMA 4X Alarm Horn (83 decibels at 3 feet minimum) with auto reset
- NEMA 4X Exterior Horn Test/Normal Silence Switch
- Ground lug
- 2 Lockable Hasps or one lockable hasp and 2 captive screws opposite the hinges of the NEMA 4X enclosure

g. The pump and alarm control panel shall be mounted within 10 feet of the pump tank and at a height to allow the Operator in Responsible Charge (ORC) to easily adjust and observe the timer control device and other appurtenances of the control panel (e.g.: center of box to be 3 to 5 feet above finished grade).
h. It is paramount that the conduit is properly sealed to prevent the escape of flammable gases from the pump tank.
i. The alarm circuit shall be supplied separate from any pump overload and short circuit devices. The alarm shall be both audible and visible by the system users.
j. Controls shall require the pump enable float switch to be activated (minimum dose volume present) before the start of any pump cycle. Cycles shall be shut off by the run timer or the low-water cut-off float (not by deactivation of the enable float).
k. Float switch tie downs must be made of a corrosion resistant material (do not use electrical tape or metal hose clamps to secure these switches). Floats should be mounted on a separate "float tree" rather than the pump supply line (see pump tank detail).
l. The following floats shall be provided and shall meet the requirements of Rule .1952 (c)(5):
- A low-level/redundant-off switch shall prevent the pump from running in the event the level in the tank is below the pump intake.
- A high-level alarm shall activate after the equalization volume is exceeded. If there is a controlled delay before the alarm activation, the delay shall be no more than 5 minutes. After being silenced, the alarm horn shall automatically reset and shall be audible with each high level event. The alarm event counter shall record each activation of the alarm.

IV. Hydrostatic Tank Check (optional Pressure Test)

a. All tanks shall undergo a 24 hour hydrostatic check after installation and backfill. A water level change of 1/2 inch or more, within a 24" riser, over 24 hours, or visual observation of leakage shall be cause for failure of the water tightness test. Initial water level shall be to 2" above the riser/adapter seam.
b. Tanks may also be pressure tested in lieu of the hydrostatic test.

V. Pipe and Fittings

a. All discharge piping, supply lines, valves and disconnects should be made of PVC and pressure rated.
b. All joints must be properly "welded" utilizing the appropriate PVC cement for each application.
c. The supply line from the pump tank to the pressure manifold shall be 2 inch Schedule 40 PVC (approximate length of supply line is 85 feet).
d. Supply line shall be sleeved with ductile iron or its equivalent at any point it passes underneath an area subjected to vehicular traffic (parking lots, driveways, etc.).

VI. Pressure Manifold

a. A 6 inch SCH 80 PVC pressure manifold shall be used for pressure distribution to the drainlines.
(2) b. The pressure manifold shall have a total of seven (7) 3/4 inch and one (1) 1/4" Schedule 80 taps with a true union ball valve on each, direct threaded or saddle tapped into the Schedule 80 PVC manifold body.
c. A gate valve will need to be added at the Pressure Manifold box to allow for final pressure adjustment (2 foot of head pressure as per design - can be installed inside of the manifold vault or immediately prior to the vault if installed in a protective gate valve box).
d. A 1/2 inch tap with plug will need to be added to the top of the manifold at the distal end to allow for the addition of a 2 foot tall standpipe when pressure to the manifold is regulated.

VII. Drain Field Installation

a. The proposed drainfield is marked on the ground with color coded pin flags.
b. Once this area has been approved by the Iredell County Environmental Health (ICEH), the property owner/builder should mark this area and isolate it from construction traffic (barrier fencing is highly recommended). Prior to the system installation, the septic contractor shall contact the ICEH for a pre-construction conference at which time the drainfield area will be re-verified.
c. Under no circumstances shall any construction take place within the drainfield area while the soil is in a wet condition. If the installer has doubts as to whether or not the drain field area is dry enough to begin construction, the ICEH should be contacted for permission to proceed with the installation.
d. The specified drainfield addition is specified as the **Infiltrator Chamber System**
(2) e. This proposal will require that seven (7) 200 foot long drainlines and (1) 110' foot long drainline (25% reduction product, due to low flow plumbing fixtures) installed.
f. The drainlines are to be center-fed utilizing flow-dividers to split the flow to each 100 foot long section of drainline.
g. The maximum trench depth for the drainlines shall be **15 inches** (1)
h. The trenches are to be installed on contour with the land, keeping the individual trench bottoms level from beginning to end.
i. Trench walls must be scoured before installing chambers or other innovative drainfield material.
j. The trenches should be left open for the final inspection by the ICEH.

VIII. Proper Operation Check

a. After all components of the waste water disposal system have been installed and connected, the system shall be checked for proper operation.
b. A pump delivery rate shall be measured and the timer control device adjusted according to the measured delivery rate to achieve the equalized daily flow. The time dosing control panel manufacturer's recommendations shall be followed for system start-up.
c. The timer control panel device shall be setup per the system design specifications in accordance with the measured pump delivery rate by the ORC.
d. All floats, counters, meters, timers, and alarms shall be tested for functionality.

IX. Pressure Head Adjustment

a. A 2-foot section of pipe (standpipe) shall be threaded into the "pressure head check tap" and the pump activated once again. The gate valve should be adjusted so that the water exiting this 2-foot section of pipe is barely trickling out of it. Once the 2-feet of head pressure has been properly set, the pump can be turned off and the standpipe removed. A male threaded plug should be used to replace the standpipe.
b. Turn the pump on again and allow it to run through the remainder of the cycle. The pump float switch will automatically turn the pump off if it is operating properly. Make sure that the effluent pump is completely submerged in the remaining water, making adjustments to the float switch(es) as needed. This completes the checks for proper operation of the pump, alarm and float switches.

X. Final Landscaping

a. The drainfield shall be shaped to shed rainwater and be free from low spots.
b. Final soil cover over the drainlines shall be a minimum of six inches.
c. The entire area of the drainfield should be planted with grass as soon as possible to prevent erosion. The soil should be properly tilled, limed (if necessary) and fertilized prior to planting. After applying grass seed, the area should be heavily mulched with straw or other suitable material.
d. Stormwater runoff from the adjacent parking lot must be diverted away from the drainfield area.

XI. Utility Conflicts

a. The builder and church must take special care in planning for water, power, gas, telephone and cable line upgrades. These utilities shall be kept clear of all parts of the septic system and its proposed repair area. Improper planning for underground utilities can negatively impact the installation and, in some cases, cause irreparable damage.

Maintenance

XII. Operation and Maintenance

The designed system is classified as a Type III wastewater treatment and disposal system and requires periodic maintenance. (3)

(3) a. The minimum inspection/maintenance and reporting frequency for a Type III system is once every 5 years by the local health dept. Operator. The local health department is required to inspect the system once (1) a year.
(2) b. At each inspection, the Operator-in-Responsible Charge (ORC) shall, at a minimum, observe, monitor, and record:
c. The ORC shall also conduct other additional observations, measurements, monitoring, and maintenance activities as specified in the Operation Permit.
(3) d. It should be noted that the septic and dosing tanks may need to be pumped when the solids within the septic tank reach an elevation that is equivalent to 1/3 of the volume of the tank.
e. All piping and valves should be inspected semi-annually for damage and corrections/repairs made immediately.
f. The drain field area should be maintained to prevent over growth of vegetation. Any damp areas, leakages or malfunctions should be addressed immediately.

Design Specifics

Unreduced design flow:	746 People (Occupancy of Both Buildings) x 5 GPD = 3,730 GPD (4)
Adjusted Daily Design Flow (based on comps.)	1125 GPD (3)
Grease Trap Size:	3,000 gallons (2/3 volume of the septic tank, use 3,000 gallons) (4)
Septic Tank Size:	4,000 gallons (0.75 x 3,730 GPD = 1,125 GPD = 3,922.5 GPD, use 4,000 Gallon Tank) (4)
Dosing Tank Size:	4,500 gallons (4)
Dosing:	Goulds WE07H (or equiv.) (3)
Supply Line to Pressure Manifold:	+/- 85 feet (2 in. SCH 40)
Pressure Manifold:	6 inch SCH 80 PVC
Number and Size of Taps:	(8) Varying Sizes (3) 1 - ½ SCH 80 PVC 7 - ¾ SCH 80 PVC
Effluent Loading Rate:	Design = 0.25 GPD per sq. ft.
Drainlines:	(7) 3' Wide x 200' Long Center-Fed w/Flow Dividers (3) (1) 3' Wide x 110' Long End Fed
Drainfield Type:	Infiltrator Chamber (or equiv.)
Maximum Trench Depth:	15 inches (1)
Dosing Volume:	652.61 gallons per dose (4)
Flow Rate:	76.18 gallons per minute (3)
Elevation Head/Friction Loss:	13 feet
Pressure Head:	2 feet
Drainfield Pump Requirements:	76.18 GPM at 15 TDH (3)
Depth of Water Pumped:	18.66 inches (Assumes 39.47 gal. per inch) (4)
Pump Run:	14.77 minutes (4)
Check Valve:	Yes
Anti-Siphon Hole:	Yes

PER SOIL AND SITE EVALUATION (AUGUST 26, 2014)
PREPARED BY: LARRY B. THOMPSON, LICENSED SOIL SCIENTIST

Adjusted Design Daily Sewage Flow
Calculation Sheet

(5) Please note that all readings as listed and tabulated below are taken from the attached " 30-Day Water Meter Log" taken at Williamson's Chappell United Methodist Church (WCUMC) and the attached 12 consecutive months of water bills from WCUMC. Also, attached is a description of use from WCUMC.

30-Day Water Meter Log Summary		12 Months Billings	
Date	**Flow in Gallons**	**Date**	**Flow in Gallons**
10/4/14	100	1/2014	8,500
10/5/14	600	2/2014	9,200
10/6/14	300	3/2014	10,900
10/7/14	400	4/2014	13,500
10/8/14	400	5/2014	9,800
10/9/14	500	6/2014	8,100
10/10/14	90	7/2014	4,200
10/11/14	220	8/2014	500
10/12/14	455	**9/2014**	**14,800**
10/13/14	365	10/2014	10,190
10/14/14	425	11/2014	13,500
10/15/14	183	12/2014	9,600
10/16/14	317		
10/17/14	35	12 month total = 112,790	
10/18/14	186		
10/19/14	**870**	Average of 3 Greatest 10% Daily Flow	
10/20/14	310	(870+736+704)/3 = **770 gallons**	
10/21/14	90		
10/22/14	**736**	Peaking Factor Calculation	
10/23/14	289	14,800/10,255= **1.4432**	
10/24/14	89		
10/25/14	326	**Adjusted Daily Flow Calculation**	
10/26/14	**704**	770x1.4432= **1,111.26 gallons per day**	
10/27/14	273		
10/28/14	463		
10/29/14	526		
10/30/14	303		
10/31/14	80		
11/1/14	140		
11/2/14	480		
30 day total = 10,255			

Note: All calculations are made in accordance with rule 15A NCAC 18A.1949.

PROPOSED ACTIVITY BUILDING AND FELLOWSHIP HALL FOR:
Triplett United Methodist Church
838 MAZEPPA ROAD
BARRINGER TOWNSHIP, IREDELL COUNTY, NORTH CAROLINA 28115

CHRISTOPHER L. HOPE, JR. NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 5044
1-10-15

	(4) 7/9/15
	(3) 6/1/15
	(2) 10/17/14
Rev.	(1) 9/26/14
Scale	AS NOTED
Drawn By	NAE
Checked By	CLH
Date	9/9/2014
Job No	12714

U-3
OF 3

CHRIS HOPE/PROFESSIONAL ENGINEER/2617 ROLLING HILLS DRIVE/MONROE, NC 28110/(704) 882-1500