I. EXCAVATION AND SITEWORK

A. General Requirements

Construction of the nitrification system shall be done in accordance with the Engineer's plans, these specifications, and as directed by the Engineer or representatives of the On-Site Wastewater Section. Should conditions be encountered in the work which are not covered by these specifications or where it would not be practical or feasible to proceed with the work in strict accordance with the specifications, then the Contractor shall notify the Engineer and await instructions from him before proceeding with the work.

B. Clearing and Grubbing

1. Clearing. – All trees, logs, brush, boulders, and other objectionable material shall be removed and burned, or otherwise disposed of by the Contractor as the Engineer may direct. Unless directed in writing by the Engineer, trees or brush must not be thrown on the adjacent lands. All merchantable timber shall be cut into logs of standard length, as directed and piled along the edge of the clearing, or otherwise disposed of as stated in the proposal or plans.

2. Grubbing. – All stumps and roots and other objectionable matter shall be grubbed and removed. Such material shall be burned, or otherwise disposed of as the Engineer may direct.

C. Underground Obstructions

The Contractor shall anticipate all underground obstructions such as water lines, gas lines, sewer lines, utility lines, concrete and debris. No extra payment will be allowed for the removal, replacement, repair or possible increased cost caused by underground obstructions. Any such lines or obstructions indicated on the map show only the approximate location and must be verified in the field by the Contractor. The Owner and Engineer will endeavor to familiarize the Contractor with all known underground utilities and obstructions, but this will not relieve the Contractor from full responsibility in anticipating all underground obstructions.

D. Excavation and Backfilling

The Contractor shall make, in open cut, to the lines and grades shown on the plans, trenches for the pipe and tanks. The Contractor shall do all excavation of whatever substances encountered. Excavation shall not be carried below the required level. Excess excavation below the required level shall be backfilled with earth, sand, gravel, or concrete, as directed by the Engineer, and thoroughly tamped. Unstable soil shall be removed and replaced with gravel, crushed stone, or crushed slag, which shall be thoroughly tamped. The Engineer shall determine the depth of the removal of the unstable soil. The Contractor shall exercise care to make neat cuts and fills and finish to the lines and grades as shown on the plans. Trench width shall be not less than pipe outside diameter plus 12 inches. Hydrostatic tests shall be conducted in accordance with the specifications before backfilling. Backfill will be thoroughly tamped, to the satisfaction of the Engineer, under, beside and to a height of 12 inches over the pipe. The remainder of the trench shall be filled in 12 inch layers and rolled with mechanical equipment. Rocks will not be permitted in the backfill. Bell holes shall be dug after the trench bottom has been graded, and shall be of sufficient depth and width to provide ample room for caulking. Bell holes shall be excavated accurately by hand.

E. Shoring

Wherever necessary to prevent caving of the banks or injury to the pipe, work, workmen, or building, the Contractor shall, at his own expense, brace and sheath the trenches or excavation by order of the Engineer, it shall be cut off one foot below grade and shall be paid for by the Owner at the price agreed upon, but otherwise the Contractor shall receive no extra compensation for it.

F. Water in Trenches

Wherever ground water is encountered the Contractor will be required to install such equipment and carry on the construction in such a manner as to provide the best possible laying conditions. He shall remove all water which may be accumulated or be found in the trenches or other excavations made under this contract by pumping or bailing, and no pipe shall be laid until such water has been removed from the trench. Water so removed from the trench must be disposed of in such manner as not to cause injury to the public's health, not to public or private property, nor cause any interference with the use of the streets by the public.

G. Existing Pipes

The Contractor shall use every precaution to preserve intact all pipes and cables under the ground. Where one is damaged he shall repair or replace it immediately at his own expense.

H. Obstructions to Traffic

The excavated material shall be placed on one side of the trench in such manner as not to obstruct any drain or unnecessarily obstruct any passageway. All street hydrants, water valve boxes, fire alarm boxes and letter boxes shall be kept accessible for immediate use. At street crossings, the Contractor must, when necessary, provide a safe bridge with railings, to allow pedestrians to cross the trench. The Contractor shall provide, without additional compensation, suitable temporary channels for the water that may flow along or across the site of the work.

I. Pavement Repair

When it is necessary to remove existing pavement, prepared road surfaces, sidewalks or curbing, these surfaces shall be removed by the Contractor in such a manner as to do as little harm to the surfaces as possible and only to the extent necessary for the installation of the pipe or other structure involved. After the installation of the pipe or structure has been completed and the 12 inches below the surface, the Contractor shall then fill the trench with gravel (to which calcium chloride has been added at the rate of seven pounds per ton of gravel; the calcium chloride shall be hand spread as approved by the Engineer) and shall maintain it in a safe condition for traffic during the construction period or until released, in writing, by the Engineer. This same care and method of backfilling shall apply where macadam or gravel or topsoil roads or alleys are cut. This work shall be included in the price bid for trenching and backfilling. The Contractor at his expense will replace the pavement and restore the surface to a satisfactory condition.

J. Grassing

All disturbed areas will be grassed immediately. Suitable erosion control measures will be taken until grass is established.

K. Siltation and Erosion Control

The Contractor shall institute a program to hold siltation and erosion to a minimum during the construction of the lines.

L. Final Cleaning Up

Upon completion of the work, the Contractor shall remove all materials not required on the job, and shall leave all disturbed areas in as good or better condition than when he began construction. All disturbed areas will be grassed.

M. Maintenance

The Contractor shall refill for settlement all backfilled areas for a period of one year.

II. PIPE

A. Gravity Collection and Leader Pipe

All gravity collection sewer pipe shall be polyvinyl chloride (PVC), drain-waste-vent (DWV) pipe in sizes as shown on the plans. All gravity collection sewer pipe and fittings shall be PVC Schedule 40, furnished in accordance with ASTM 1784 and 1785, and bear the National Sanitation Foundation (NSF) seal. All fittings shall be PVC Schedule 40 glue joint type. Installation and testing shall be in accordance with manufacturer's recommendations, the North Carolina State Building Code Volume II, Plumbing, and ASTM D 2321 latest revision.

No sooner than 10 days following completion of backfill, the Contractor along with the Engineer shall determine the level of the ground water table. If the level of the ground water table is above the top of the pipe, the sewer line shall be tested for infiltration. If there is no ground water above the top of the pipe, the sewer line shall be low pressure air tested. Each test shall be performed as follows:

Infiltration: Weirs shall be furnished and installed by the Contractor. The infiltration shall not exceed 0.01 gallon per day per inch diameter per foot. There shall be no visible points of infiltration.

Low Pressure Air Test: Tests shall be performed in accordance with ASTM C-828 and C-924. Test pressure will be measured by gauges furnished and installed by the Contractor above ground at the end of the line opposite the air supply. The pipeline tested shall hold the test pressure with no pressure loss for a period of 4 hours.

B. Force Main Pipe

All force main pipe shall be polyvinyl chloride (PVC) pipe in sizes as shown on the plans. All force main pipe shall be PVC 1120, furnished in accordance with ASTM D2241, and must be Pressure Class 200 with a Standard Dimension Ratio (SDR) of 21 or less. PVC pressure pipe shall be made from white or blue pigmented virgin materials whose Cell Classifications are either Class 12454A or 12454B, and shall be furnished in lengths of 20 feet. Lesser lengths will be accepted to allow the proper alignment of fittings, valves, etc. All PVC pressure pipe shall be shipped, stored, and strung at the project in such a manner as to be protected from total accumulated exposure to sunlight and possible ultraviolet radiation of no more than four (4) weeks.

Pipe jointing will be elastomeric joints only. Joints shall conform to ASTM D3139. Pipe bells, with gasket seats, shall be formed as the pipe is extruded. Sleeve couplings are not permitted except as necessary for repairs during pressure/leakage testing.

All fittings for PVC pressure pipe shall be threaded malleable iron or push on joint PVC. Malleable iron fittings shall be furnished with threaded PVC adaptors to connect the fittings to the push on joint pipe. Elastomeric joints for PVC adaptors and PVC fittings with push on joints shall conform to ASTM D3139. PVC adaptors and fittings shall have a minimum pressure rating of 200 PSI and shall, except for threaded areas on adaptors, have a SDR of 13.5.

PVC pressure pipe shall be installed substantially in accordance with the Standard Recommended Practices for UNDERGROUND INSTALLATION OF FLEXIBLE THERMOPLASTIC SEWER PIPE, ASTM D2774.

All bends deflecting 11-1/4 degrees or more on PVC pressure pipe shall be provided with thrust blocking, placed as shown on the plans and/or as directed by the Engineer. Bagged mix concrete may be used for blocking. Blocking shall be placed between solid ground and the fitting to be anchored. The area bearing on the pipe and on the ground in each instance shall be that shown or directed by the Engineer. The blocking shall be so placed that the pipe and fittings will be accessible for repair.

On completion of the line or sections of the lines, the line shall be filled with water and hydrostatically tested. All leaks and any defective material shall be repaired or replaced to the satisfaction of the Engineer and the tests repeated until the requirments of this specification are met. Any special equipment, pumps, etc. required to make the test shall be furnished and operated by the Contractor as directed by the Engineer. The Contractor shall use great care to be sure that all air is expelled from each section under test. The test pressure will be 200 PSI at the low point of the section under test. Allowable leakage will be determined by the formula $L=.000106SD$ where S is the length of pipe under test in feet, D is the pipe diameter in inches, and L is the allowable leakage in gallons per hour. The pressure and leakage tests will be run concurrently and for a duration of four hours. The maximum allowable leakage shall be 100 gallons per day per inch of pipe diameter per mile.

C. Manifold Pipe

All manifold pipe shall be polyvinyl chloride (PVC) pipe in sizes as shown on the plans. All manifold pipe shall be PVC Schedule 40, furnished in accordance with ASTM 1784 and 1785, and bear the National Sanitation Foundation (NSF) seal. All fittings shall be PVC Schedule 40 glue joint type. Installation and testing shall be in accordance with manufacturer's recommendations, the North Carolina State Building Code Volume II, Plumbing, and ASTM D 2774 latest revision.

D. Nitrification Drain Pipe

All nitrification drain pipe shall use the Infiltrator System Quick 4 Chambers Low Pressure Design. Pipe and fittings shall be made of virgin PE compounds which conform to the requirements of Type III or IV, Category 3, 4, or 5; Grade P 33, Class C; or Grade P 34, Class C as defined and described in ASTM 1248

III. NITRIFICATION FIELDS

Nitrification fields shall consist of one new field consisting of 4 lines of 146 feet in length (see plan chart) with Infiltrator Systems, Inc. Quick4 standard chamber lines spaced at 9'-0" min. centers. The new field has been designated "Primary". The lines have been numbered P1 thru P4.

A. Trenches

Trenches shall be excavated in accordance with this specification to neat lines and grades. Trenches must be installed level and parallel to the natural ground contours, without the use of stepdowns. Individual trench lengths vary; see plan chart. Trench width shall be 3'-0". Trench depth shall be a minimum of 18" and a maximum of 24" below grade on the downslope side. During the trenching process, attention shall be given to avoid the smearing of side walls in trenches and should any occur, there shall be raking or sloughing off of the smeared area. Open trenches shall not be exposed to rainfall. ABSOLUTELY NO TRENCHING SHALL BE DONE WHEN THE SITE IS WET.

B. Backfill

The trenches shall be filled with native soils. Soils may include group I, II, III, or IV soil. Soil should be mounded over the trench to allow drainage and vegetation establishMENT. Six (6) inches of minimum cover will be required in non-traffic areas and twelve (12) inches required in traffic areas.

C. Finish Grading and Seeding

The Contractor shall carefully plan his site preparations for the installation of the nitrification fields. Special attention shall be directed to surface drainage, layout and minimizing nitrification field disturbance by machinery and labor. Final system cover-up shall be in accordance with the drawings ans specifications. Final surface drainage and landscaping shall be done as specified by the Engineer and/or the owner. Finished slopes shall be protected and established with permanent grass immediately upon completion of cut and fill operations. Surface drainage shall be made to convey surface runoff at nonerosive velocities to stable outlets and to prevent surface runoff from damaging cut faces and fill slopes. All disturbed areas shall be graded to neat and finished appearance. Chisel or rip on the contour and spread available topsoil to a minimum of 3" deep over areas not designated to receive water coverage. Remove all loose rock, roots, etc. from the surface that will interfere with establishment and maintenance vegetation. Uniformly apply finely ground agriculture lime at the rate of 2(two) tons per acre (80#/000sy). Uniformly apply 1210 lbs. per acre (25# per 100sy) 10-20-20 fertilizer and thoroughly mix into soil with disk and or chisel plow to a depth of 4 inches. Continue tillage (on the contour) until a well-pulverized firm seedbed is prepared. Seed shall be placed on a freshly prepared firm seedbed. Equipment used shall apply seed uniformly and seed shall be covered lightly with seeding equipment or cultipacker after seeding. Seed Kentucky 31 Fescue on the area using at least 145 lbs. per acre (3#/00sy). Seed shall have purity of 98% and a minimum germination of 90%. Mulch all areas immediately after seeding using 3000 lbs. per acre (1.65 bales per 100sy). Mulch applied to all slopes shall be tacked with cut back asphalt at the rate of 150 gallons per acre (2.5 gallons per 100sy).

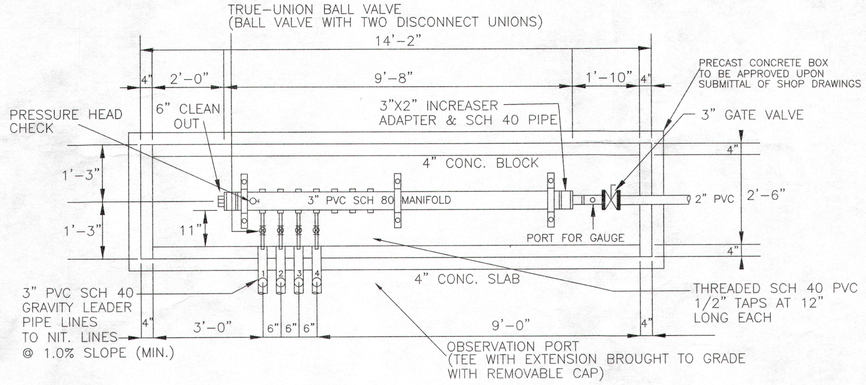
IV. OPERATION AND MAINTENANCE PROCEDURES

A. Responsible Operating Agent

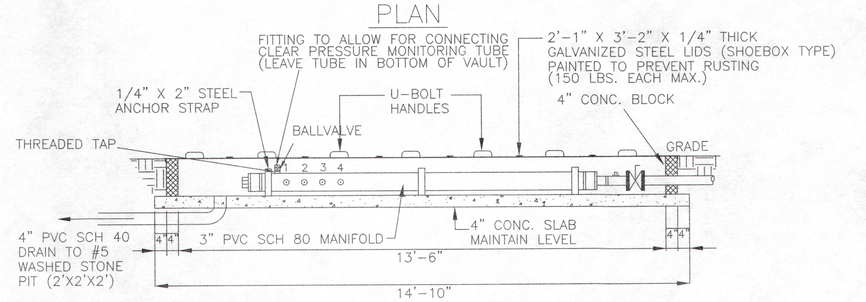
The responsible agent for the proposed facilities is the tenant, McCombs Steel, Inc. 117 Slingshot Road, Statesville, NC, 28677, telephone number 704-873-7563.

B. Routine Maintenance Schedule

1. Collection system	6-12 months	check for blockages and infiltration
2. Settling tank	3 months	check for solids accumulation, blockages, or damage to outlet baffle, excess in/exfiltration, pump septage as solids approach 1/3 the liquid level
3. Pump tank	2-4 weeks	check pumps, controls, and high water alarm
	1 month	collect sample for laboratory analysis to monitor wastewater for COD, TDS, TSS, alkalinity, pH, and temperature.
	3-6 months	check for solids accumulation and pump as required; check for in/exfiltration
4. Supply lines, force mains	6-12 months	check for pipe exposure, leakage
5. Ground absorption	2-4 weeks	maintenance of field vegetative cover
	3-6 months	check for erosion, surfacing of effluent



PLAN

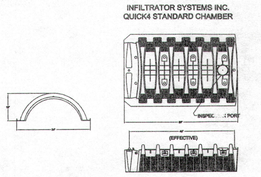


SECTION

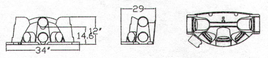
DETAIL OF MANIFOLD

SCALE: 1/2" = 1'-0"

INFILTRATOR SYSTEMS INC.
QUICK4 STANDARD CHAMBER



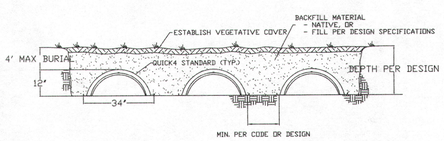
QUICK4 STANDARD MULTIPORT END CAP



DETAIL OF END CAP

SCALE: NO SCALE

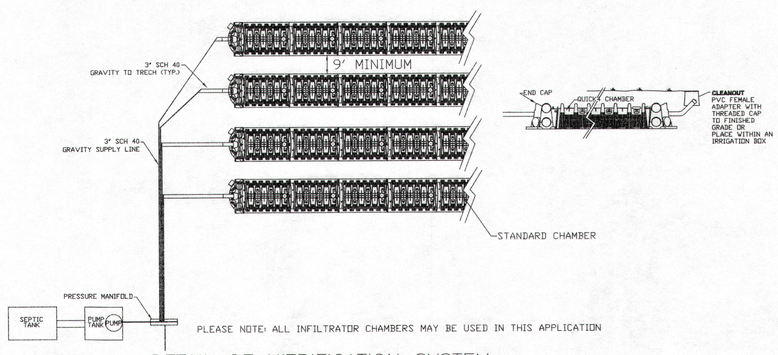
INFILTRATOR SYSTEMS INC.
QUICK4 STANDARD
CHAMBER BED
NOT TO SCALE



DETAIL OF CHAMBER BED

SCALE: NO SCALE

INFILTRATOR SYSTEMS INC.
NOT TO SCALE

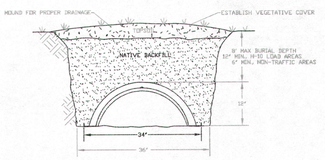


PLEASE NOTE: ALL INFILTRATOR CHAMBERS MAY BE USED IN THIS APPLICATION

DETAIL OF NITRIFICATION SYSTEM

SCALE: NO SCALE

INFILTRATOR SYSTEMS INC.
QUICK4 STANDARD
TRENCH DETAIL
(NOT TO SCALE)



DETAIL OF TRENCH

SCALE: NO SCALE

NORTH CAROLINA PROFESSIONAL SEAL 6786 ENGINEER GERALD V. GRANT
06-20-2016

Engineering Site Planning GVGA Surveying

GV GRANT & ASSOCIATES
P.O. BOX 268
STATESVILLE, NC 28687
PHONE: (704) 872-3136

matt@gvgrant.com

OWNER/DEVELOPER:

M. WILLIAM McCOMBS, III
BUFFALO SHOALS FAMILY LIMITED PARTNERSHIP
117 SLINGSHOT ROAD,
STATESVILLE, NC 28677
704-873-7563

ON-SITE SEWAGE TREATMENT & DISPOSAL DETAILS FOR

BUFFALO SHOALS PROPERTIES FAMILY LIMITED PARTNERSHIP

PIN: ILLUSTRATED NORTH CAROLINA

DEED REF: ILLUSTRATED IREDELL COUNTY

STATESVILLE INSIDE / OUTSIDE TOWNSHIP

REVISIONS:

NO.	DATE	DESCRIPTION	BY
1	6/20/16	ISSUED FOR PERMIT	GVG

DRAWN	SMS
CHECK	GVG
DATE	06-20-2016
SCALE	SHOWN
PROJ. NO.	G15061

SHEET:

C-5