STOCK & ASSOCIATES
Consulting Engineers, Inc.

STORMWATER MANAGEMENT REPORT

for

CENTENE DATA CENTER BUILDING ADDITION

Project Location:

6430 Weldon Spring Road
City of O'Fallon
St. Charles County, Missouri

Prepared for:
Centene Corporation
7711 Carondelet Avenue
Clayton, MO 63105

Prepared by:
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Stock Project No. 209-4511.8

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EXECUTIVE SUMMARY

Introduction

This report was prepared by Stock & Associates, for the Centene Data Center Building Addition, a existing commercial development of approximately 8.56 Ac of land off of Weldon Spring Road in the City of O'Fallon in St. Charles County, Missouri. The existing building and parking lot are currently served by an existing forebay and sand filter. The existing service pavement area is currently served by a Hydrodynamic Separator. These existing BMPs will not be affected by the proposed building addition. For the proposed addition one (1) surface sand filter will be utilized for water quality treatment. All drainage calculations were done in accordance with the Georgia "Stormwater Management Manual".

Water Quality Volumes (WQv):

The City of O'Fallon has recently adopted stormwater management requirements, which include stormwater quality. To accomplish the Water Quality volume requirement one (1) surface sand filter will be used. See Sheets C8.0 and C12.0 of the Improvement Plans for Water Quality Volume calculations and details (also located in this report).

The maintenance plans for the stormwater facilities are also included in this report following the water quality calculations.

Summary of Results: Stormwater Calculations (Proposed Conditions):

One (1) Surface Sand Filter has been provided for water quality treatment of the Building Addition. The computed water quality volume is as shown in Table 1, which is computed for the total area that is tributary to the water quality feature. A total of 1 (one) forebay will be used on the site. The computed Water Quality volume (WQv) is approximately 1,433 cu. ft for the onsite area. As shown in Table 1, the provided Water Quality volume (WQv) is approximately 2,241 cu. Ft. Table 1 also shows the required and computed treatment volumes in the forebay.

PROJECT: Centene Data Center - Building Addition **PROJ. NO: 209-4511.8**

Table 1: Roof Expansion Runoff & Greenspace Surface Sand Filter

Step 1: Water Quality Volume:

Drainage/Disturbed Area1:	0.63	Acres
Percent Impervious Cover(I)	55.5	%
Required WQv Area1:	1,433	*Cu. FT [WQv=[1.14*(.05+.009I)*A/12]*43560]*

Step 2: Sediment Basin Surface Area(Asf)

Required WQv:	1433	
Asf:	95	*Ft.^2 (.066 x WQv)**

*Note: This equation is for %Impervious < 75%

Step 3: WQv Pretreatment Forebay

Required WQv:	1,074	*Cu. FT [Vp=0.75xWQv]*
Pretreatment Volume(Vp)	358	*Cu. FT [Vp=0.25xWQv]*

Provided:

Elevation	Area	Volume
546.50	194	0
547.00	357	138
547.50	520	357
548.00	683	658

Step 4: WQv Basin Area

Provided: Area(Af) = 858 Ft.^2

Required WQv:	1,433	*Cu. FT*
Filter Bed Depth(df):	1.50	*Ft.***
Coefficient of Permiability(k):	3.5	*Ft./day****
Avg. height of water above Bed(hf):	0.75	*Ft.*
Design Filter Bed Drain Time(tf):	1.67	*days*****
Surface Area of Filter Bed(Af):	163	*Ft.^2 (WQv x df)/[(k) x (hf + df) x (tf)]*

Provided Volume(V1):(Above Sand Filter)

Elevation	Area	Volume
546.00	492	0
546.50	764	314
547.00	1,050	768
547.50	1,357	1,369
547.75	1,511	1,728
548.00	1,665	2,125

**Filter Bed Depth Typically is 1.5' (18") for sand filter, and has to be 1.0' minimum.
***k=3.5 ft/day for sand
****Note: 1.67 days for Sand Filters

Step 5: Storage Provided(100% WQv)

Required WQv:	1,433	
Pretreatment Volume(Vp)	357	*Cu. Ft.*
Treatment Volume(Vt)	1,884	*Cu. Ft. [V1 + v(df x Af)]*
Provided WQv:	2,241	*Cu. Ft. [Vp + Vt]*

v (Voids) = 0.40

Project name:	*Centene Data Center*	Calculated By:		*J.M.B.*	Revisions:
Project number:	*4511.8*	Checked By:		*G.M.S.*	*12/30/2015*
Project Location:	*O'fallon, Missouri*	Date:		*11/16/2015*	

BMP Summary Table

BMP Area	Tributary Area	% Impervious	Required WQv	Provided WQv	BMP	Tributary/Disturbed Area
	(ac)	(%)	(CF)	(CF)		
A	0.63	55.50	1,433	2,241	Sand Filter	Building Roof / Greenspace
B	0.27	37.50	433	0	Bypass	Greenspace/Mech. Yard
Total:	**0.90**		**1,866.00**	**2,241.00**		

MAINTENANCE PLAN: SURFACE SAND FILTER (BMP F-1).

As set forth by the City of O'Fallon, Missouri, the owner has executed a "Maintenance Agreement" between themselves and the City of O'Fallon, Missouri. This agreement states that the owner agrees to the following requirements in exchange for the issuance of a sewer permit:

1. To build and construct the drainage facilities and sewer lines in accordance with the plans submitted and approved by the City of O'Fallon, Missouri.
2. Maintain all pipes and drains in good working order and maintain all dikes and related improvements for the conveyance of the water in good repair.
3. To maintain and operate the stormwater management in conformity with the approved Stormwater Management Facilities Report.
4. That in the event the owner or its successor in title to said property shall fail to maintain the drainage facilities and sewer lines in accordance with the agreement, The City of O'Fallon, Missouri shall be permitted to enter onto the property and make the repairs and corrections and perform such maintenance as it deems necessary and bill the owners of said property for the services performed. It is further agreed that in the event said bill or charge for the services performed shall not be paid with a period of thirty (30) days said sum shall become a lien on the real property and shall become a lien on the real property and shall accrue at a rate of eight percent(8%) until paid in full.

A. MAINTENANCE

The property owner will maintain all private stormwater and sanitary facilities in good working order. Minimum maintenance of the private facilities shall include the routine removal of sediment, debris, oil and foreign material from the storm sewers so that the operation and capacity of the facilities continues to function properly. The stormwater and sanitary facilities will have an annual inspection, maintenance, and reporting schedule, every 4 months or as actually needed, whichever is most restrictive.

B. INSPECTION OF FACILITIES

In first year of operation, inspection shall take place at least once each quarter during the spring, summer and early fall. Bi-monthly inspections should be conducted from November through March to determine how leaf litter will impact the flow capacity of the structures. After the first year of operation routine inspections shall take place every 4 months.

Routine (every 4 months) inspection of stormwater facilities shall consist of the following:

1. Inspect each sewer structure for any silt or debris build-up.
2. Check to see that all sewer structures grates and lids are seated properly and no damage has occurred.

3. Inspect Surface Sand Filter and Forebay to determine if 25% of the volume has been lost due to sediment build-up. A marker shall be provided to determine when this occurs, see plans for each areas corresponding elevation.

Sediment shall be removed for the Surface Sand Filter bed when it is noticed that the filtering capacity of the filter has diminished substantially (i.e. when water ponds on the surface of the filter bed for more than 48 hours).

In the event that any of the filter media in the Surface Sand Filter need to be replaced the following are the requirements for filter media replacement.

Geotextile Fabric: Geotextile fabric should meet ASTM D-751 (puncture strength – 125 lb), ASTM D-1117 (Mullen burst strength – 400 psi), and ASTM D-1682 (Tensile strength – 300 lb). Fabric should have 0.08" thick Equivalent Opening Size (E.O.S.) of #80 Sieve, and maintain 125 gallons per minute (GPM) per square feet flow rate. Fabric to be placed over the sand filter with an overlap of 12".

Sand Filter: Sand for the sand filter bed is to be a clean, washed course concrete sand meeting ASTM C-33 requirements. Sand to maintain a minimum depth of 12" in the sand filter bed.

Rock Lining/Spillways: Rock Lining/Spillways shall be constructed with clean durable rock. A minimum of 50 percent of the rock shall have a diameter of 6 inches or greater, with a maximum size of 9 inches.

Surface Sand Filter Grasses: See MoDOT's Standard Specifications Section 805 – Seeding.

C. CLEANING OF FACILITIES

The stormwater facilities shall be cleaned after the project is completed, erosion control has been removed, and vegetation established. Generally, a sump-vacuum truck is the best and most convenient method of removing the captured sediment and debris from the stormwater catch basins.

Once silt and debris is removed from the storm structures the sewer line shall be flushed using a fire hose to remove remaining silt. The flushing of the storm sewer line shall begin at the upstream end of the storm sewer and work downstream. Any remaining silt and debris shall be vacuumed out at the downstream structure. All sediment removed from the site shall be disposed of according to current erosion and sediment control regulations.

The owner is responsible for determining whether the filter media and debris are classified as a special waste and for properly handling and disposal of the material. Records of same must be kept and be made available for inspection by appropriate authorities. Use of a qualified, even possibly licensed and bonded, disposal service is highly recommended, and should be contacted for assistance and direction.

In the event the surface sand filter becomes clogged a "stone window" shall be installed and sized so that it covers approximately 10% of the filter area. The "window" shall be filled pea gravel (3/4" stone). This pea gravel "window" is to be added to allow runoff into the filter in the event the surface becomes clogged. If the surface becomes clogged, the owner is to replace the top 3" of topsoil with new permeable soil.

The following general guidance is based on the federal regulations, 40 CFR 262.11-Special Waste Determination. (Note-Regulations are subject to change in the future and this is offered only as general information available at this time.) The generator of the waste should determine if the waste is special waste using the following method:

1. Determine if the waste is excluded from being a special waste per 10 CSR 25-4.261(2)(A) and 40 CFR 261.4; then
2. Determine if the waste is listed as a special waste per 10 CSR 25-4.261(2)(D) and 40 CFR 261 subpart D; then
3. Determine if the waste is a characteristic special waste (i.e. ignitable, corrosive, reactive, or toxic). Consider the materials used or the processed used to generate the waste.

Based on this knowledge, determine the appropriate testing and analysis in accordance with 10 CSR 25-4.261(2)(C) and 40 CFR 261 subpart C.

Testing for special waste characteristics requires sampling at the point of generation. If the analysis detects any property characteristic of special waste, you must manage the waste as a special waste. It is very important to understand that special waste remains special waste when diluted or stabilized, unless it is specifically excluded for the definition of special waster after the process (40 CFR 261.3). You may not dilute special waste solely for the purpose or rendering it non-hazardous, unless dilution is warranted in an emergency response situation or where dilution is part of a special waste treatment process regulated or exempted under 10 CSR 25-7 or 10 CSR 25-9. You may not dispose of regulated special wastes in any sanitary, demolition, utility waste landfill in Missouri. The following table lists typical properties of characteristic special waste. This is not a complete listing, but only a guideline to determine if a waste may be a characteristic hazardous waste.

Ignitability

Catches fire easily through friction, absorption of moisture or spontaneous chemical changes.

Corrosivity

pH < 2.0 or pH>12.5

Reactivity

Wastes that are normally unstable, react violently with water, can explode or release poisonous gases.

Toxicity

TCLP, EPA Method 1311, any contaminants listed in Table 1 of 40 CFR 261.24 equal to or greater that the listed concentration.

Once the waste is determined to be non-hazardous and contain no free liquids, you must request approval from the owner/operator to dispose of the special waste at the landfill by filling out and signing the generator's portion of the Special Waste Disposal Request Form. You must also identify health hazards associated with the material, as well as any special shipping, handling or safety requirements. For example, note whether the material should be transported in covered containers or whether is a respiratory hazard. The Material Safety Data Sheet, if one exists for the material, lists some of this information. The completed Special Waste Disposal Request Form, along with appropriate test results and other pertinent information are then sent to the receiving landfill for the landfill owner or operator's review and signature prior to acceptance and disposal of the waste. Until a landfill accepts the waste for disposal, it is the owners' responsibility to manage the waste in an environmentally sound manner. Free liquids must have pollutant components removed to or below regulatory thresholds before the free liquid may be discarded to the environment, or pretreatment or treatment facility, as and where allowable by the local authority or jurisdiction. Do not discharge the liquids or liquid slurry, captured by the cleaning and maintenance process, into any storm or sanitary structures.

D. RECORD KEEPING AND REPORTING

The property owner shall keep an inspection log on-site detailing dates of inspection, structures inspected, results of inspection, and any maintenance or corrective action required. Each inspection should log information on the depth of silt in the Forebay, and the accumulations of material over the Surface Sand Filter. It is recommended that the property owner assign specific personnel who will be responsible for the inspection, maintenance, and record keeping of the private storm and sanitary sewer facilities. Inspection personnel will fully completely with OSHA safety requirements and all other jurisdictions safety requirements.

Monthly Inspection Checklist

Project/Location: Centene Data Center / Sand Filter basin
6430 Weldon Spring Road, O'Fallon, Missouri
Maintenance Responsibility/ Point of Contact:
Centene
7711 Carondelet Avenue
St. Louis, MO 63105
Phone: (314) 725-4706
Fax: (314) 558-2429
Date/Time: _____
Days Since Previous Rainfall and Rainfall Amount: _____
Inspector: _____

1. Debris Cleanout	Satisfactory	Unsatisfactory
Filtration facility clean of debris		
Inlet and outlets clear of debris		
Actions to be taken/additional comments:		
To be completed by date:		

2. Oil and Grease	Satisfactory	Unsatisfactory
No evidence of filter surface clogging		
Activities in drainage area minimize oil and grease entry		
Actions to be taken/additional comments:		
To be completed by date:		

3. Vegetation	Satisfactory	Unsatisfactory
Contributing drainage area stabilized		
No evidence of erosion		
Area mowed and clipping removed		
Actions to be taken/additional comments:		
To be completed by date:		

4. Water Retention	Satisfactory	Unsatisfactory
Water holding chambers at normal pool		
Sand Filter chamber dewaters between storms		
No evidence of leakage		
Actions to be taken/additional comments:		
To be completed by date:		

5. Sediment Accumulation	Satisfactory	Unsatisfactory
Approximate depth of accumulated sediment.		
Depth of sediment in forebay or sump should not be more than 6". Record Approx. Depth of Sediment in Forebay here:_____ inch		
Sediment accumulation on filter bed does not exceed 1" or drawdown time does not exceed 40 hours. Record Approx. Depth of Sediment on Sand Filter here:_____ inch		
Actions to be taken/additional comments:		
To be completed by date:		

6. Structural Components	Satisfactory	Unsatisfactory
No evidence of structural deterioration.		
Grates are in good condition.		
No evidence of spalling or cracking of structural parts.		
Actions to be taken/additional comments:		
To be completed by date:		

7. Outlet/Overflow Spillway	Satisfactory	Unsatisfactory
Good condition, no need for repairs		
No evidence of erosion (if draining into a natural channel)		
Actions to be taken/additional comments:		
To be completed by date:		

8. Overall Function of Facility	Satisfactory	Unsatisfactory
No evidence of flow bypassing facility		
No noticeable odors outside facility		
Complaints from residents/businesses (odors, insects, other)		
Evidence of Mosquito habitats		
Actions to be taken/additional comments:		
To be completed by date:		