STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

GENERAL PERMIT for SEWER EXTENSION CONSTRUCTION

The Missouri Department of Natural Resources hereby issues a permit to:

Construction Permit ID:	MOGC00325
Title of Project:	Excelsior Springs WWTP
Owner:	City of Excelsior Springs
Address:	103 East Water Street Excelsior Springs, MO 64024

The project will also include general site work appropriate to the scope and purpose of the project and will include all the necessary appurtenances to make a complete and usable collection system. The construction of this project will be in the vicinity of the county below and discharge to Receiving Permit ID below:

County: Clay Receiving Permit ID: MO0028843

for the construction of (described construction project):

Golf Hill Estates Subdivision
Project consists of installation and construction of approximately 2,950 lineal feet (LF) of 8-inch PVC SDR 35 with 23 manholes and all other items per Plans and Specifications dated January 17, 2018 for a complete gravity sanitary sewer system. This wastewater collection system is designed to serve 14 lots, an estimated population equivalent of 49, and an estimated design average flow of 4,900 gallons per day. The project will include general site work appropriate to scope and purpose of project. The project is located at the intersection of E. Golf Hill Drive and Old Time Drive in Excelsior Springs, Ray County and discharges to the City of Excelsior Springs in Clay County, MO-0028843. The owner is the continuing authority.

Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo, and regulation promulgated thereunder, or this permit may be revoked by the Department of Natural Resources (Department). As the Department does not examine structural features of design or the efficiency of mechanical equipment, the issuance of this permit does not include approval of these features.
This permit applies only to the construction of water pollution control components; it does not apply to other environmentally regulated areas.

February 07, 2018
Issue Date

Edward B. Galbraith, Director
Division of Environmental Quality

February 06, 2020
Expiration Date

Chris Wieberg, Director
Water Protection Program

APPLICABILITY

1. This permit authorizes the construction of gravity sewer extensions, force mains, and lift stations. Storage basins, considered part of the collection system, are also included. Earthen basins are not included under this General Sewer Extension Construction permit.

2. A Sewer Extension Construction Permit may be required by the department due to compliance and enforcement actions.

3. This permit does not apply to:
   A. Earthen storage basins;
   B. Projects located within an Approved Sewer Program. These include the City of Blue Springs, City of Columbia, City of Kansas City, City of Jefferson City, City of Joplin, City of Lebanon, City of Springfield, City of St. Peters, Duckett Creek Sewer District, and Metropolitan St. Louis Sewer District;
   C. Projects funded by the Department of Natural Resources;
   D. Projects that substantially deviate from the Design Guides in 10 CSR 20-8; and
   E. Exempt projects unless requested by the applicant or required by enforcement.

PREREQUISITES:

1. The General Sewer Extension Construction Permit application, appropriate fee, and a schedule for construction with the date on which construction will begin and anticipated completion date.

2. The engineering report, as required, plans and specifications each signed and sealed by a professional engineer registered in the State of Missouri. A Summary of Design is an acceptable substitute for the engineering report required by this permit prerequisite.

3. The Design Certification form signed and sealed by a professional engineer registered in the State of Missouri certifying the design of the system was done in accordance with 10 CSR 20-6 and 10 CSR 20-8.

4. A statement from the continuing authority was received accepting the wastewater for treatment.

5. A statement from the continuing authority was received accepting the responsibility for operation, maintenance, and modernization of these facilities

PERMIT CONDITIONS:

1. Contact the department's appropriate regional office 48 hours prior to starting construction. Contact information can be found at http://dnr.mo.gov/regions/regions.htm.

2. This permit authorizes the activities and scope of work detailed in the plans and specifications submitted with the request.

3. The construction must be in accordance with the design certification stating the plans and specifications comply with 10 CSR 20-6 and 10 CSR 20-8.

PERMIT CONDITIONS: (continued)

4. State and Federal Law does not permit bypassing of raw wastewater, therefore steps must be taken to ensure that raw wastewater does not discharge during construction. If a sanitary sewer overflow or bypass occurs, report the appropriate information to the department's regional office per 10 CSR 20-7.015(9)(E)2.

5. Protection of drinking water supplies shall be in accordance with 10 CSR 20-8.120(10). "There shall be no physical connections between a public or private potable water supply system and a sewer, or appurtenance thereto which would permit the passage of any wastewater or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer manhole."

   A. Sewers in relation to water works structures shall meet the requirements of 10 CSR 23-3.010 with respect to minimum distances from public water supply wells or other water supply sources and structures.

   B. Sewer mains shall be laid at least ten feet (10') horizontally from any existing or proposed water main. The distances shall be measured edge-to-edge. In cases where it is not practical to maintain a ten foot (10') separation, the department may allow a deviation on a case-by-case basis, if supported by data from the design engineer. Such a deviation may allow installation of the sewer closer to a water main, provided that the water main is in a separate trench or on an undisturbed earth shelf located on either side of the sewer and at an elevation so the bottom of the water main is at least 18 inches above the top of the sewer. If it is impossible to obtain proper horizontal and vertical separation as described above for sewers, the sewer must be constructed of slip-on or mechanical joint pipe or continuously encased and be pressure tested to 150 pounds per square inch to assure water tightness.

   C. Manholes shall be located with the top access at or above grade level.

   D. Manholes should be located at least ten feet (10') horizontally from any existing or proposed water main.

   E. Sewers crossing water mains shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to maintain line and grade. When it is impossible to obtain proper vertical separation as stipulated above, one of the following methods must be specified:

      1) The sewer shall be designed and constructed equal to the water pipe and shall be pressure tested to assure water tightness prior to backfilling; or
      2) Either the water main or sewer line may be continuously encased or enclosed in a watertight carrier pipe which extends ten feet (10') on both sides of the crossing, measured perpendicular to the water main. The carrier pipe shall be of materials approved by the department for use in water main construction.

PERMIT CONDITIONS: (continued)

6. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of one acre or more to obtain a Missouri State Operating Permit to discharge stormwater. The permit requires Best Management Practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the department's ePermitting system available online at www.dnr.mo.gov/env/wpp/epermit/help.htm.

   See www.dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm for more information.

7. A United States (U.S.) Army Corps of Engineers (COE) permit (404) and a Water Quality Certification (401) issued by the department or permit waiver may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied. If construction activity will disturb any land below the ordinary high water mark of Jurisdictional Waters of the U.S. then a 404/401 will be required. Since the COE makes determinations on what is jurisdictional, you must contact the COE to determine permitting requirements. You may call the department's Water Protection Program at (573) 751-1300 for more information.

   See www.dnr.mo.gov/env/wpp/401/ for more information.

8. If this project eliminates a wastewater treatment facility, then a full closure plan shall be submitted to the department's appropriate regional office for review and approval of any permitted wastewater treatment system being replaced. In accordance with 10 CSR 20-6.010(12), the closure plan must meet the requirements outlined in Standard Conditions Part III, Section I, of the Missouri State Operating Permit. Closure shall not commence until the submitted closure plan is approved by the department. Form J – Request for Termination of a State Operating Permit, shall be submitted to the department's appropriate Regional Office for termination of any existing Missouri State Operating Permit, once closure is completed in accordance with the approved closure plan.

9. Submit a Statement of Work Completed Form to the department following completion of construction. Submit an electronic copy of the as built plans if the project was not constructed in accordance with previously submitted plans and specifications.

MOGL00325
AP29160

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

APPLICATION FOR CONSTRUCTION PERMIT – SEWER EXTENSION

RECEIVED
JAN 17 2018
Water Protection Program

FOR DEPARTMENT USE ONLY	
APP NO.	CP NO.
FEE RECEIVED $300.00	CHECK NO. 120388
DATE RECEIVED 1-17-18	

NOTE ▶ PLEASE READ THE ACCOMPANYING INSTRUCTIONS BEFORE COMPLETING THIS FORM

1.0 APPLICATION INFORMATION (Note – If any of the questions in this section are answered NO, this application may be considered incomplete and returned.)

1.1 Is this a Federal/State funded project? ☐ YES ☑ N/A Funding Agency: _____ Project #: _____

1.2 Has the Department of Natural Resources approved the proposed project's engineering report* or a Sewer Extension Design Checklist* included?
☑ Sewer Extension Design Checklist. (N/A to department funded projects.) ☐ Engineering Report Date of Approval: _____

1.3 Is a copy of the appropriate plans* and specifications* included with this application?
☑ YES Denote which form is submitted: ☑ Hard copy (1 minimum) and ☐ Electronic copy (See instructions.) ☐ NO

1.4 Is a summary of design* included with this application? ☑ YES ☐ NO

1.5 Is the appropriate fee ($300) included with this application? ☑ YES ☐ NO

* Must be affixed with a Missouri registered professional engineer's seal, signature and date.

2.0 PROJECT INFORMATION

2.1 NAME OF PROJECT
Golf Hill Estates Subdivision Sewer Extension

PHYSICAL ADDRESS	CITY	STATE	ZIP CODE	COUNTY
E. Golf Hill Drive and Old Time Drive	Excelsior Springs	MO	64024	Ray

2.2 Legal Description: ¼, ¼, NW ¼, Sec. 7 , T 52N , R 29W

2.3 UTM Coordinates Easting (X): 39600 Northing (Y): 4354600
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

2.4 Project Components (check all that apply):
☑ Gravity sewers ☐ Pumping stations ☐ Force mains ☐ Alternative sewer system ☐ Other (Describe below.)

2.5 PROJECT DESCRIPTION
1. 23 Manholes 2. 2,950 LF 8" PVC Sewer 3. No lift stations 4. No force mains 5. No alternate sewer systems

2.6 DESIGN INFORMATION
A. Population or number of lots to be served by this extension: See attached design calculations
B. Estimated flow to be contributed by this extension: Design Average Flow: attach gpd Design Peak Hourly Flow: attach gph
C. Industrial Wastes: Type: none Flow: n/a gpd
D. Receiving Sewer: Size: 8" inches Capacity: 344 gpm

3.0 PROJECT OWNER

NAME	TELEPHONE NUMBER WITH AREA CODE	EMAIL ADDRESS	
City of Excelsior Springs, Missouri	(816) 630-0755	cbirdsong@ci.excelsior-springs.mo.us	
ADDRESS	**CITY**	**STATE**	**ZIP CODE**
201 East Broadway	Excelsior Springs	MO	64024

4.0 CONTINUING AUTHORITY: Permanent organization that will serve as the continuing authority for the operation, maintenance and modernization of the wastewater collection system.

NAME	TELEPHONE NUMBER WITH AREA CODE	EMAIL ADDRESS	
City of Excelsior Springs, Missouri	(816) 630-0755	cbirdsong@ci.excelsior-springs.mo.us	
ADDRESS	**CITY**	**STATE**	**ZIP CODE**
201 East Broadway	Excelsior Springs	MO	64024

4.1 A letter from the continuing authority or the Continuing Authority and Receiving Wastewater Treatment Facility Acceptance form, if different than the owner, is included with this application. ☐ YES ☐ NO ☑ N/A

5.0 ENGINEER

ENGINEER NAME / COMPANY NAME	TELEPHONE NUMBER WITH AREA CODE	EMAIL ADDRESS	
Daniel G. Miller / Larkin Lamp Rynearson	(816) 361-0440	dan.miller@lra-inc.com	
ADDRESS	**CITY**	**STATE**	**ZIP CODE**
9001 State Line Road, Suite 200	Kansas City	MO	64114

6.0 RECEIVING WASTEWATER TREATMENT FACILITY		
NAME City of Excelsior Springs, Missouri	TELEPHONE NUMBER WITH AREA CODE (816) 630-0755	EMAIL ADDRESS cbirdsong@ci.excelsior-springs.mo.us
MISSOURI STATE OPERATING PERMIT # MO-0028843	DESIGN AVERAGE FLOW (GPD) 3.5 MGD	REMAINING CAPACITY (GPD) 0.9 MGD

6.1 Has the receiving treatment facility agreed to accept the additional wastewater flow? ☑ YES ☐ NO

6.2 A letter from the receiving wastewater treatment facility or the Continuing Authority and Receiving Wastewater Treatment Facility Acceptance form, if different than the continuing authority, is included with this application. ☐ YES ☐ NO ☑ N/A

7.0 PROJECT OWNER: I hereby certify that I am familiar with the information contained in this application and to the best of my knowledge and belief such information is true, complete, and accurate, and if granted this permit, I agree to abide by the Missouri Clean Water Law and all rules, regulations, orders, and decisions, subject to any legitimate appeal available to applicant under Missouri Clean Water Law.

PROJECT OWNER SIGNATURE		
PRINTED NAME Chad Birdsong		DATE 12/29/2017
TITLE OR COPORATE POSITION Director of Public Works	TELEPHONE NUMBER WITH AREA CODE (816) 630-0755	EMAIL ADDRESS cbirdsong@ci.excelsior-springs.mo.us

Mail completed copy to:

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
P.O. BOX 176
JEFFERSON CITY, MO 65102-0176

SEWER EXTENSION DESIGN CERTIFICATION

Answer all questions yes, no, or N/A. Answer N/A only if the question is clearly not applicable to the design of the proposed sewer extension **OR** if a deviation was previously allowed by the department in the approval of Standard Specifications or Standard Detail Sheets.

7.0 SEWER EXTENSION CHECKLIST – Part 1					
	REGULATION		YES	NO	N/A
1.	8.110(6)(C) 8.020(4)	Is there a detailed plan showing tributary area, boundaries, pertinent elevations, topography, existing and proposed facilities?	✔		
2.	8.120(3)	Does the sewer receive only sewage and not combined sewage?	✔		
3.	8.120(4)(B) 8.020(9)(B)	Is the design flow based on 100 gpcd with a peaking factor of 4? Is the design flow based on the design peak hourly flow in accordance with 8.110(4)(C)4?	✔		
4.	8.120(5)(G) 8.020(9)(A)	Does the sewer pipe comply with ASTM standards for sewer pipe?	✔		
5.	8.120(5)(I)4 8.020(9)(A)	Are the joints sealed to prevent infiltration > 100 gal/inch of pipe dia/mile/day for receiving WWTF with a design flow > 22,500 gpd, and >200 gal/inch of pipe dia/mile/day for receiving WWTF with a design flow ≤ 22,500 gpd?	✔		
6.	8.120(5)(D)4 8.120(6)(A) 8.020(9)(C)	Are manholes located at all changes in grade, size or alignment, at all intersections, and at distances of not greater than 400 feet for sewers 15 inches and less, or 500 feet for sewers 18 – 30 inches?	✔		
7.	8.120(5)(A) 8.020(9)(B)	Is the gravity sewer no less than 8" in diameter?	✔		
8.	8.020(9)(B)	Are sewers for **schools, resorts and similar establishments, and subdivisions located in rural areas**, is the sewer pipe at least 6 inches in diameter, laid at a slope of 0.60 feet/100 feet with appropriate bedding specifications and at least 30" of cover?			✔
9.	8.120(5) 8.020(9)(B)2	Is all sewer pipe constructed with a slope to obtain mean velocities of not less than 2 feet per second?	✔		
10.	8.120(5)(B) 8.020(9)(B)1	Is the pipe covered with at least 36" of soil if receiving WWTF has a design flow of >22,500 gpd or 30" for a design flow of ≤ 22,500 gpd?	✔		
11.	8.120(5)(D)6	If the sewer is on a 20% or greater slope, is it anchored securely and in accordance with requirements?			✔
12.	8.120(5)(G)3 8.020(9)(A)2	Is the pipe material adapted to local conditions, and designed to prevent damage from superimposed loads?	✔		
13.	8.120(5)(H)	Is the pipe installation, embedment, and backfill designed to prevent damage to the pipe and its joints?	✔		
14.	8.120(5)(H)5	Is flexible pipe designed to pass a deflection test run 30 days after backfill using a minimum mandrel or ball size of 95% of pipe ID?	✔		
15.	8.120(5)(H)	Are methods employed to provide adequate control of siltation and erosion during construction?	✔		
16.	8.120(6)(C) 8.020(9)(C)	Are manholes at least 48 inches in diameter with a clear opening of 22 inches?	✔		
17.	8.120(6)(A)4 8.020(9)(C)	Where cleanouts are used at the end of a lateral instead of a manhole, they are a minimum diameter of 8 inches, and the lateral length is not greater than 150 feet?			✔
18.	8.120(6)(D) 8.020(9)(C)	Are the manholes designed and/or specified to have flow channels in the bottom that conforms in shape and slope of the sewer?	✔		
19.	8.120(6)(F) 8.020(9)(C)	Are the manholes precast or poured in place concrete with watertight connections and conform to the "Frame and Cover" requirements?	✔		
20.	8.120(6)(G)	Do the specifications include a requirement for inspection and testing for manholes?	✔		
21.	8.120(6)(E)1	Are sewers 24 inches or less laid straight between manholes?	✔		
22.	8.120(6)(F)1	When a smaller sewer joins a larger one, is the 0.8 depth point of both sewers at the same elevation in the manhole?	✔		
23.	8.120(7)	Do the inverted siphons have two barrels with at least a pipe size of 6 inches?			✔
24.	8.120(8) 8.020(9)(A)5	Is the top of all sewers entering or crossing streams at least 3 feet below the natural stream bottom, perpendicular to the stream, and constructed of cast- or ductile-iron pipe?			✔
25.	8.120 (9) 8.020(9)(A)5	Are all aerial crossings ductile iron pipe with mechanical joints, supported at all pipe joints and designed to withstand freezing and a 50-year flood?			✔
26.	8.120(10)(C) 8.020(9)(A)	Are sewers and manholes located at least 10 feet horizontally and 18 inches vertically from any existing or proposed water line?	✔		

27.	8.120(10) 8.020(9)(A)4	Is the sewer free from physical connections to a potable water supply system and no water pipes come in contact with a sewer manhole?	✓		
28.	8.020(9)(B)	If your system is for a subdivision in a metropolitan area, or in a rural area adjacent to a regional system where incorporation into a region is feasible, is the sewer pipe at least 8 inches in diameter, laid at a slope of 0.40 feet/100 feet with appropriate bedding specifications and at least 30" of cover?	✓		
Part 1		**I answered YES to questions 1 – 28.** ☑ **YES**			

8.0 PUMP STATION CHECKLIST – Part 2

	REGULATION		YES	NO	N/A
29.	8.130(3)(A) 8.020(10)(A)	Is the pump station designed to withstand the 100-year flood, and to remain fully operational and accessible during the 25-year flood?			
30.	8.130(3)(B) 8.020(10)(A)	Is the dry well completely separate from the wet well and is a suitable and safe means of access provided to each?			
31.	8.130(4)(C) 8.020(10)(A)	If the design flow is 1 mgd or less, are there at least 2 pumps or pneumatic ejectors of the same capacity, each capable of handling flows in excess of the expected maximum flow?			
32.	8.130(4)(C)	If the design flow is greater than 1 mgd, are there at least 3 pumps capable of handling maximum sewage flow when 1 unit is out-of-service?			
33.	8.130(4)(C) 8.020(10)(B)	Are the pumps capable of passing spheres of at least 3 inches in diameter, and connected with at least 4 inch piping?			
34.	8.130(4)(C)	Are the pumps able to operate at varying delivery rates to permit discharging sewage at its rate of delivery?			
35.	8.130(4)(E) 8.020(10)(B)	Are there suitable shutoff and check valves on the discharge line of each pump and shutoff valves on suction line of each wet/dry well pump?			
36.	8.130(4)(E) 8.020(10)(B)	Are check valves between the pump and the shutoff valve, on horizontal portion of the discharge pipe, and outside wet well?			
37.	8.130(4)(F) 8.020(10)(B)	Is the wet well floor sloped a minimum of 1:1 to the bottom?			
38.	8.130(4)(G) 8.020(10)(B)	Is there separate mechanical ventilation for wet and dry well pump pits below the ground surface?			
39.	8.130(4)(H)	Flow Measurement? **If yes**, how and where is it measured.			
40.	8.130(4)(I)	Does all potable water at station comply with 8.140 (8) B?			
41.	8.130(7) 8.020(10)(B)	Is there an alarm for power failure, pump failure, lag pump, high level, and unauthorized entry?			
42.	8.130(8) 8.020(10)	Overflow prevented or minimized? **If yes**, indicate method used.			
43.	8.020(10)(B)	Is there 24 hour retention of peak flows?			
44.	8.130(11)(A) 8.020(9)(D)	Is the force main velocity of ≥ 2 ft/s maintained?			
45.	8.130(11)(B) 8.020(9)(D)	Are air relief valves located at high points in the force main to prevent air locking?			
46.	8.130(11)(C) 8.020(9)(D)	Is the force main connection to the manhole less than 2 feet above invert?			
47.	8.130(11)(D) 8.020(9)(D)	Are the force main and fittings designed to withstand normal pressure and surges?			
48.	8.130(11)(E)	Are all aerial crossings supported at all pipe joints and designed to withstand freezing and a 50-year flood?			
49.	8.130(11)(E)	Are all force mains entering or crossing streams constructed of cast- or ductile-iron pipe, cross perpendicular and ≥ 3 feet below the natural stream bottom?			
50.	8.130(11)(F)	Is friction loss calculated in the force main design based on the Hazen and Williams formula?			
51.	8.130(11)(G)	Is the force main located at least 10 feet horizontally and 18 inches vertically from any existing or proposed water line?			
52.	8.130(11)(H)	Is the force main properly identified to avoid confusion with water mains?			
53.	8.130	Instructions and Equipment. Sewage pumping stations and their operators should have a complete set of operational instructions, including emergency procedures, maintenance schedules, special tools and spare parts as may be necessary.			
Part 2		**I answered yes to questions 29 – 53. (N/A if no Pump Stations)** ☐ **YES** ☑ **N/A**			

9.0 SUCTION LIFT PUMP CHECKLIST – Part 3					
	REGULATION		YES	NO	N/A
54.	8.130(5)	Are the suction lift pumps of the self priming or vacuum priming type?			
55.	8.130(5)(A)	Are the self-priming pumps capable of rapid priming and re-priming at the "lead pump on" elevation automatically under design operating conditions? The combined total of dynamic suction lift at the "pump off" elevation and required net positive suction head at design operating conditions shall not exceed twenty-two feet (22') (6.7m).			
56.	8.130(6)(C)	Is the control panel located outside the wet well, protected by a conduit seal, and have a junction box between the controls and the wet well that allows disconnection?			
57.	8.130(6)(D)	Are the valves located in a separate pit that can be drained?			
Part 3		**I answered yes to questions 54 – 57. (N/A if no Suction Lift Pumps)** ☐ **YES** ☑ **N/A**			

9.0 GRINDER PUMP CHECKLIST – Part 4					
	REGULATION		YES	NO	N/A
58.	8.130(9)(A) 8.020(9)(B)	Are the grinder units capable of reducing any material to a size that the materials will pass through the pump unit and force main without plugging or clogging?			
59.	8.130(9)(B) 8.020(9)(B)	Is there at least 50 gallons of storage in the grinder pump unit or enough storage to accommodate normal peak flows for periods of eight to twelve (8–12) hours?			
60.	8.130(9)(C) 8.020(10)(B)	Are there audiovisual alarms capable of alerting the resident and operating personnel in the area for units serving a single home? This may be used in lieu of the alarm system specified in 8.130 (7).			
61.	8.130(9)(D) 8.020(10)(B)	Are gate valves provided on the service line near the common forcemain?			
62.	8.130(9)(E) 8.020(10)(C)	Is the force main cleansing velocity of at least 2 feet per second maintained at the design average flow?			
63.	8.130(9)(F)	Is there a suitable method of cleaning the force main whenever the velocity in the force main may be less than two feet (2') per second (0.61m/s) before ultimate development is reached?			
64.	8.130(9)(G)	Are units serviceable and replaceable under wet conditions without electrical hazard to repair personnel and electrical equipment suitable for hazardous locations (National Electrical Code, Class I, Group D, Division 1 location).			
65.	8.130(9)(H) 8.020(9)(D)	Is there 1 standby unit for each 50 units or fraction thereof for WWTF >22,500 gpd provided? For WWTF ≤ 22,500 gpd, is there a 24 hour repair time either by replacement or repair with spare pump units stocked as follows: Installations — Spare Units 1 - 10 — 1 10 - 20 — 2 20 - 40 — 3 40 - 60 — 4 60 - 100 — 5 100 - 200 — 6 over 200 — 3% of installations?			
66.	8.130(9)(I) 8.020(9)(D)	Are provisions in place to avoid interruption of service due to mechanical or power failure by providing standby power, storage capacity or interconnection with another disposal system?			
Part 4		**I answered yes to questions 58 – 66. (N/A if no Grinder Pumps)** ☐ **YES** ☑ **N/A**			

Fast Track Certification Statement

"☑ I have answered **YES** to Checklist items Part 1, and **N/A** to Part 2, Part 3 and Part 4 above, or
☐ I have answered **YES** to Checklist items Part 1, Part 2, and **YES** or **N/A** to Part 3 and Part 4 above, and hereby certify that the design plans and specifications for this project, to the best of my knowledge, conform to the requirements listed above. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

I hereby certify that this plan, specification, and/or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Missouri."

Missouri Professional Engineer's Seal:

STATE OF MISSOURI
DANIEL G. MILLER
NUMBER E-024308
REGISTERED PROFESSIONAL ENGINEER

12-29-2017

Name: Daniel G. Miller, P.E.
Street Address: 9001 State Line Road, Suite 200
City: Kansas City State: Missouri Zip Code: 64114

Phone Number: 816 823-7228 Email: dan.miller@lra-inc.com

Question Answered N/A	Explanation (i.e. no pump station, no manholes, etc.) or previous approval Title and Date
33	*The pumps are grinder pumps.*

Larkin Lamp Rynearson
Golf Hill Estates
Sanitary Sewer Extension Flow Calculations

1/3/2018

North Line @ Existing MH 5401										
Area	Zoning	Acres	Lots	People per lot	Qavg per person	cfs/Ac	cfs	Qavg (gpd)	Qavg (gpm)	Qpeak (gpm)
1	Golf Hill Estates		14	3.5	100			4900	3	14
2	Golf Course Clubhouse	From Engineer						3046	2	8
3	Golf Hill Estates Future Phase		73	3.5	100			25550	18	71
4	Commercial (Airport)	20				0.0077	0.154		17	69
								Total	41	162

West Line Upstream of Existing MH 2067										
Area	Zoning	Acres	Lots	People per lot	Qavg per person	cfs/Ac	cfs	Qavg (gpd)	Qavg (gpm)	Qpeak (gpm)
1	Golf Hill Estates		8	3.5	100			2800	2	8
2	Existing Residential		1	3.5	100			350	0	1
								Subtotal	2	9

West Line Upstream of Existing MH 2222										
Area	Zoning	Acres	Lots	People per lot	Qavg per person	cfs/Ac	cfs	Qavg (gpd)	Qavg (gpm)	Qpeak (gpm)
1	Golf Hill Estates		6	3.5	100			2100	1	6
2	Existing Residential		0	3.5	100			0	0	0
								Subtotal	1	6
								Total	**4**	**15**

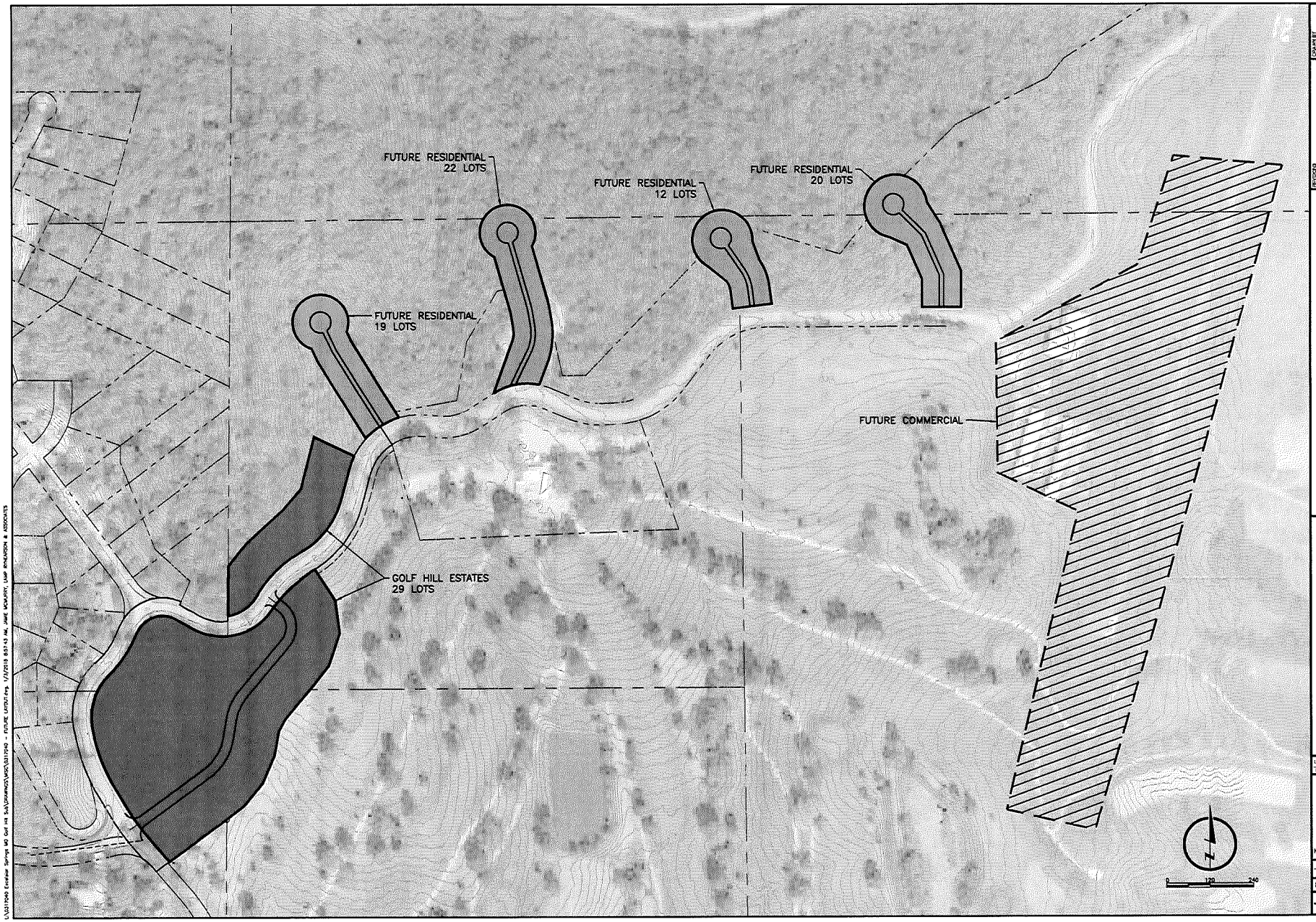
North Line @ MH 5401		
Size	Min. Slope	Min. Capacity
8	0.004	344

West Line Upstream of MH 2067		
Size	Min. Slope	Min. Capacity
10	0.0028	522

West Line Upstream of MH 2222		
Size	Min. Slope	Min. Capacity
10	0.0028	522

Actual Slopes @ Connection Pt.			
Length	US FL	DS FL	Slope
240.51	952.55	949.96	1.08%
312.26	952.61	949.56	0.98%
324.8	956.94	955.26	0.52%

Manning's n = 0.013
Pipe Flowing Full
GPM



DRAWN
CHECKED
DATE
JOB NUMBER
APPROVED
SCALE AS SHOWN

REVISIONS

LARKIN LAMP RYNEARSON
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Kansas City, Missouri 64114 816.361.0045 F
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GOLF HILL SUBDIVISION
EXCELSIOR SPRINGS, MISSOURI

FUTURE SANITARY SEWER
LOTS TO BE SERVICED

LARKIN LAMP RYNEARSON - DIGNIFIED

PRELIMINARY

NOT RELEASED FOR CONSTRUCTION

DATE: 01/08/19
T.R.D.N.N.

SHEET

OF