PRELIMINARY STORMWATER REPORT

FOR

HCA LSMC ASC

1950 SE Shenandoah Drive
Lee's Summit, MO 64063

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October 21, 2022

CIVIL ENGINEERING / SURVEYING / UTILITIES

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1.0 GENERAL INFORMATION

This preliminary stormwater report is in support of a new approximately 20,000 square foot ambulatory surgery center on the HCA Lee's Summit Medical Center campus. The entire campus is approximately 28.5-acres located between SE Shenandoah Drive and SE Blue Parkway to the west of SE Cumberland Drive in Lee's Summit, Missouri. This proposed project will be on an approximately 4-acre piece of the southwest corner of the overall campus property. The site is currently vacant and used for agricultural purposes and is separated on the east by a wooded stream from the main hospital campus. The site lies within the northwest quarter of Section 10, Township 47, Range 31, in Jackson County. The site lies entirely within the South Prairie Lee watershed.

The site is generally rectangular. The site is bounded on the south by SE Blue Parkway and US 50 Highway, to the west by SE Cumberland Drive and vacant land, to the north by undeveloped land, and to the east by the existing Lee's Summit Medical Center campus. Refer to the aerial photograph in Appendix A for existing cover conditions and surrounding land use.

The proposed project consists of a one-story, approximately 20,000 square foot surgery center. The project will include the construction of parking lot and drive aisles, sidewalks, storm drainage improvements, and utility relocations.

The site generally consists of one watershed that slopes gently from the west to east. It eventually works to a wooded stream that runs along the east edge of the property to be developed. The property does not have any special flood hazard areas on it. Thus, there will be no floodplain issues with the project and no permitting will be needed with FEMA. All existing drainage patterns will be generally maintained.

Along the east side of the site is an existing wooded stream area. This stream has an upstream tributary greater than 40 acres but less than 160 acres. This requires a stream buffer of 60 feet on either side of the ordinary high-water mark for the stream. This stream buffer will not be encroached upon with the project.

The soil types that have been identified on the site for the areas to be disturbed are Arisbug-Urban land complex (1-5% slopes) and Udarents-Urban land-Sampsel complex (2-5% slopes). The soil type falls within Hydraulic Soil Group (HSG) C for the site. For additional information pertaining to the soils, refer to the NRCS soils report included in Appendix A.

The purpose of this plan is to identify existing and potential drainage issues, delineate required stormwater facilities and document that stormwater runoff from the development will not have an adverse impact on existing properties adjacent to or downstream of the project.

2.0 METHODOLOGY

To calculate stormwater runoff rates, the software Bentley PondPack V8i was used to model the drainage basins and ponds. The unit hydrograph method is used to determine runoff levels, based on the SCS, Type II 24-hour rainfall. The hydrograph routing through the ponds uses the modified-Puls level pool routing method. Storm events for the 50%, 10%, and 1% chance events were evaluated based on the comprehensive control requirements. As well, the 90% mean annual event was modeled to be released over a 40-hour period. The rainfall depths used are from "Precipitation Frequency Estimates for the Kansas City Metropolitan Area" (McEnroe, 2002) as shown below in Table 1.

Table 1 – Rainfall Depth (in.)

Storm Event	90%	50%	10%	1%
Depth	1.37	3.55	5.25	7.94

Analysis of the storm drainage systems followed all adopted City of Lee's Summit codes, ordinances, and design criteria. The stormwater facility design was analyzed using the current Section 5600 of KCAPWA and APWA/MARC BMP Manual design criteria.

3.0 EXISTING CONDITIONS ANALYSIS

3.1 WATERSHED

The site consists of one watershed that currently sheet drains to the east to the existing wooded area and stream. The entire site is within the South Prairie Lee Watershed. Refer to the Existing Drainage Area Map in Appendix B. Table 2 below summarizes the existing runoff conditions on the property.

Table 2 – Existing Runoff Conditions

Drainage Sub-Basin	Area (acres)	Runoff Coeff. (CN)	Time of Conc. (min.)	50% Runoff Rate (cfs)	10% Runoff Rate (cfs)	1% Runoff Rate (cfs)
Existing	3.94	85	10	11.03	18.88	31.35

3.2 CALCULATIONS

The site will need to follow the comprehensive control requirements outlined in section 5608.4 of the APWA design criteria. This allows 0.5 cfs per acre for the 50% event, 2.0 cfs per acre for the 10% event, and 3.0 cfs per acre for the 1% event. Refer to Table 3 below for the allowable release rates the site for each respective storm event

Table 3 – Allowable Release Rates (cfs)

Drainage Sub-Basin	50%	10%	1%
Existing	1.97	7.88	11.82

4.0 PROPOSED CONDITIONS ANALYSIS

4.1 WATERSHED

The site will generally maintain the same drainage patterns as currently exist. The site will be split into three watersheds in the proposed condition. The south part of the site and the building will be conveyed to a detention pond on the southwest corner. The north part of the site will be conveyed to a detention pond on the northeast corner. A small portion of the north end of the site will surface drain off the site undetained. Everything will continue to generally drain and discharge to the wooded area and stream along the east boundary of the site. Refer to the Proposed Drainage Map in Appendix B for more detailed information.

4.2 CALCULATIONS

To analyze the proposed conditions, the software Bentley PondPack V8i was used to model the drainage basins and ponds. The unit hydrograph method was used to determine runoff levels for the proposed conditions, based on the SCS, Type II 24-hour rainfall. The hydrograph routing through the ponds used the modified-Puls level pool routing method. The ponds and their outlets were designed so that the peak flows for the 50%, 10%, and 1% storm events at the proposed condition would not exceed the allowable release rates. The primary outlet control for the ponds will consist of an outlet control structure containing multiple orifices. This will then have a discharge pipe. The ponds are also designed to release the water quality event over a 40-hour period. See Table 4 below for a summary of the peak flows and water surface elevations for the detention and refer to the runoff calculations in Appendix C for detailed calculations. Table 5 shows a comparison between the allowable and proposed peak runoff rates. The proposed condition produces lower peak runoff rates than the allowable runoff rates.

Table 4 – Proposed Watershed Conditions

Drainage Sub-Basin	Runoff Coeff. (CN)	Time of Conc. (min)	Area (AC)	Proposed 50% Peak Flow (cfs)	50% Max. W.S.E.	Proposed 10% Peak Flow (cfs)	10% Max. W.S.E.	Proposed 1% Peak Flow (cfs)	1% Max. W.S.E.
North	91	5	1.12	4.32	-	6.90	-	10.92	-
N Detention	-	-	-	0.39	982.90	1.17	983.70	1.88	984.76
South	90	5	2.36	8.86	-	14.31	-	22.82	-
S Detention	-	-	-	0.50	986.17	2.17	986.98	8.03	987.96
Undetained	82	5	0.46	1.26	-	2.29	-	3.97	-

Table 5 –Allowable vs. Proposed Release Rates (cfs)

Condition	50%	10%	1%
Allowable	1.97	7.88	11.82
Proposed	1.83	4.33	11.76

5.0 CONCLUSIONS AND RECOMMENDATIONS

This preliminary stormwater report is in support of a new approximately 20,000 square foot ambulatory surgery center on the HCA Lee's Summit Medical Center campus. The entire campus is approximately 28.5-acres located between SE Shenandoah Drive and SE Blue Parkway to the west of SE Cumberland Drive in Lee's Summit, Missouri. This proposed project will be on an approximately 4-acre piece of the southwest corner of the overall campus property. The site is currently vacant and used for agricultural purposes and is separated on the east by a wooded stream from the main hospital campus.

The proposed project consists of a one-story, approximately 20,000 square foot surgery center. The project will include the construction of parking lot and drive aisles, sidewalks, storm drainage improvements, and utility relocations.

The site consists of one watershed currently that slopes gently from the west to east. It eventually works to a wooded stream that runs along the east edge of the property to be developed. All existing drainage patterns will be generally maintained. The existing wooded stream area along the east edge of the site will require a stream buffer of 60 feet on either side of the ordinary high-water mark for the stream. This

stream buffer will not be encroached upon with the project. The general drainage patterns will be maintained by the proposed site. The site will have two detention ponds, one that handles the north parking area and one that handles the south parking area and building. A small portion of the north end of the site will sheet drain undetained off the site.

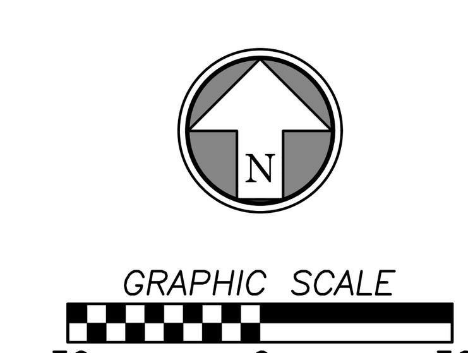
Based on the codes of the City of Lee's Summit, detention is being provided to limit the proposed peak runoff rates to the allowable rates for the 50%, 10%, and 1% storm events.

An extended dry detention basin is proposed to release the water quality event over a 40-hour period utilizing a small orifice and trash rack in the outlet structure.

The project will not produce any impacts to the downstream system as the rates of runoff will be limited to below the allowed rate, which are also below existing conditions. The project will not impact any FEMA floodplains and will respect the existing stream buffer.

DRAINAGE LEGEND

— — —	DRAINAGE AREA BOUNDARY
→	DRAINAGE DIRECTION
Field	AREA/DIRECTION OF DRAINAGE BOUNDARY
980	EXISTING GRADE MAJOR CONTOUR
982	EXISTING GRADE MINOR CONTOUR
PL	PROPERTY LINE
R/W	RIGHT-OF-WAY LINE



Rev.	Date	Description	By	App.

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EXISTING DRAINAGE MAP

Design:	TMS	Drawn:	TMS
Checked:			ERB
Issue Date:			10/21/22
Project Number:			034660

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Oct 20, 2022 – 3:00pm Plotted By: Eric.Byrd

DRAINAGE LEGEND

— — —	DRAINAGE AREA BOUNDARY
→	DRAINAGE DIRECTION
Field	AREA/DIRECTION OF DRAINAGE BOUNDARY
980	PROPOSED FINISH GRADE MAJOR CONTOUR
982	PROPOSED FINISH GRADE MINOR CONTOUR
980	EXISTING GRADE MAJOR CONTOUR
982	EXISTING GRADE MINOR CONTOUR
℞	PROPERTY LINE
R/W	RIGHT-OF-WAY LINE

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GRAPHIC SCALE

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PROPOSED DRAINAGE MAP

Design: TMS	Drawn: TMS
Checked:	ERB
Issue Date:	10/21/22
Project Number:	034660

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Oct 20, 2022 – 2:59pm Plotted By: Eric.Byrd V:\034660-HCA LSMC ASC\04-DWG\Eng\Sheet\PDP\034660-SHTS-DMAP.dwg Layout: Proposed Drain Map