GEOTECHNICAL ENGINEERING STUDY

CROSSINGS AT SOUTHPARK
10511 WEST MANSLICK ROAD
FAIRDALE, KENTUCKY

ASHER PROJECT NO. 21-108

Prepared For:

WBCS Architecture+Design
jonathan@wbcsarch.com

Prepared By:

Asher Engineering, Inc.
1021 South Floyd Street
Louisville, Kentucky 40203

October 12, 2021

Asher Engineering, Inc.
Environmental & Engineering Consulting

October 12, 2021

WBCS Architecture+Design
jonathan@wbcsarch.com

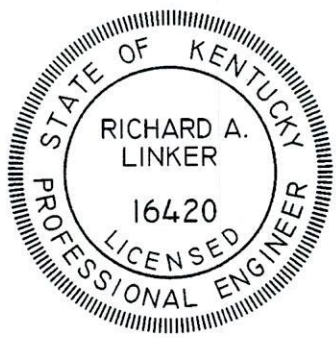
Re: Geotechnical Engineering Study
Crossings at SouthPark
10511 West Manslick Road
Louisville, Kentucky

Asher Engineering has completed a Geotechnical Engineering Study for the referenced project. This report contains the findings of our subsurface exploration, geotechnical recommendations to aid design of foundations and floor slabs, and construction recommendations with regard to site work, fill placement, and foundation installation and inspection.

We appreciate the opportunity to be of service to you on this project. If we can be of further assistance, or if you have any questions regarding this report, please contact our office.

Sincerely,

Richard A. Linker, P. E.



1021 S. Floyd Street • Louisville, Kentucky 40203 • Office: (502) 589-0073 asherinc@aol.com

TABLE OF CONTENTS

1.0 PROJECT INFORMATION

The site is located at 10511 W. Manslick Rd., about 1 mile south of I-265 (Gene Snyder), in Fairdale, Kentucky. The site is a flat to gently sloping, heavily wooded tract of about 15.7 acres. A review of historical aerial photographs revealed that the site has not been developed in the past, and has been heavily wooded dating back to the 1990s. Prior to 1990, the site was farmland planted in crops.

Proposed for construction are eight 3-Story, shallow foundation, slab on grade apartment buildings with 24 units each. A 1-story slab on grade Club House, and a 1-Story slab on grade commercial bldg would also be construction near the front (west) end of the site. A detention pond would also be provided near the front of the property. Asphalt paved parking and access drives will be provided throughout the site.

2.0 SUBSURFACE EXPLORATION

The subsurface conditions were explored by conducting 11 test pits across the site (one test pit at each building location, and one test pit in the retention pond area). The test pits were very consistent across the property. About 12 in. of topsoil underlain by another 6 in. of very silty clay soil was encountered at the ground surface. The thick topsoil / very silty soil layer is underlain by medium stiff to stiff, natural Silty Clay (CL) soil extending to at least 8 ft. depth. Bedrock was not encountered in any of the test pits; however, indications of weathered shale bedrock were noted at the 6 to 8 ft. depth in Test Pits 2, 3, 4, 7, and 8. Water was not encountered in any of the test pits.

3.0 DESIGN AND CONSTRUCTION RECOMMENDATIONS

The following design and construction recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions. Please notify our office if the project description included herein is incorrect, or if the location of the proposed structure has changed.

3.1 Site Development

The subsurface conditions are favorable for the proposed development, and the support of the new structures on shallow foundations and slab on grade construction.

We recommend a 12 in stripping depth be used for sitework and site balance considerations. Some isolated areas of thicker topsoil may be encountered. The relatively thick topsoil layer is due to the site being wooded for the last 30 years, preceded by the property being planted in crops.

The on-site soil (including the soil in the retention pond area) is also suitable for use as structural fill. However, the soil is very silty and will be very sensitive to moisture, and construction traffic and vibrations. The sitework would benefit greatly if conducted during the dry, hot time of the year. Still, some areas may require undercutting and stabilization with crushed stone, or lime stabilization to achieve a firm soil subgrade for support of the new bldgs and pavement areas.

3.2 Shallow Foundations and Floor Slabs

Footings bearing on firm natural soil, or engineered fill placed over firm soil may be proportioned using a net allowable bearing capacity of 2600 psf. Footings can bear on firm natural soil or bedrock. A Site Classification C should be used for seismic design. Wall footings should 16 in. wide and column footings should be at least 24 in. wide in order to provide an adequate factor of safety for bearing capacity. All exterior footings and footings in unheated areas must bear at least 24 in. below final exterior grade for frost protection. Interior footings can bear at nominal depths below the floor.

The building subgrades should be inspected and approved by the geotechnical engineer prior to the placement of grade raise fill or the stone subbase. The slab should be supported on a 4-in. layer of KY Dense Graded Aggregate (DGA) compacted to 98 percent of the standard Proctor (ASTM D-698).

3.4 Below Grade Walls

Below grade walls should be designed to provide drainage to relieve hydrostatic pressure. A clean, free draining granular fill (KY No. 57 stone) should be used to backfill against below grade walls. The backfill zone should be drained using a perforated pipe at the base of the wall. An Equivalent Hydrostatic Pressure (EHP) of 50 pcf may be used to design below grade walls. A unit weight of 130 pcf should be used for the granular backfill.

3.5 Pavements

New pavement areas should be inspected by the geotechnical engineer to determine the suitability of the subgrade and to provide recommendations for stabilization if necessary. Assuming proper subgrade preparation, a California Bearing Ratio (CBR) value of 5 is recommended. This value applies for both undisturbed soil and the stone subbase that is stable under a proofroll, and for soil that is recompacted to at least 95 percent of the standard Proctor maximum dry density.

The following asphalt pavement section is recommended for areas that will be limited to automobiles and light trucks:

Automobile and Light Truck Areas	1.0 in. asphalt concrete surface 2.0 in. asphalt concrete base 4.0 in. KY DGA limestone 4.0 in. 4-Minus or Surge limestone

Areas that may experience heavier loading conditions should be provided with the following pavement section.

Heavy Truck Areas	1.0 in. asphalt concrete surface 3.0 in. asphalt concrete base 4.0 in. KY DGA 6.0 in 4-Minus or Surge limestone

4.0 CONSTRUCTION RECOMMENDATIONS

Variations in subsurface conditions should be expected during construction. It is therefore recommended that the geotechnical engineer be retained by the Owner to review the soils-related phases of the project and to correlate the test data with the soil conditions that are encountered during construction.

4.1 Subgrade Preparation

Prior to construction or the placement of new engineered fill or stone subbase, the exposed subgrade should be evaluated by the project geotechnical engineer. The existing subgrade should be carefully inspected by proofrolling with a loaded dump truck prior to the placement of fill to identify soft areas. Any soft areas identified by the proofroll would be undercut and stabilized with crushed stone. The contractor should exercise discretion when selecting equipment sizes and also control surface water while the subgrade soils are exposed. The severity of this potential problem depends to a great extent on the weather conditions during construction.

4.2 Engineered Fill

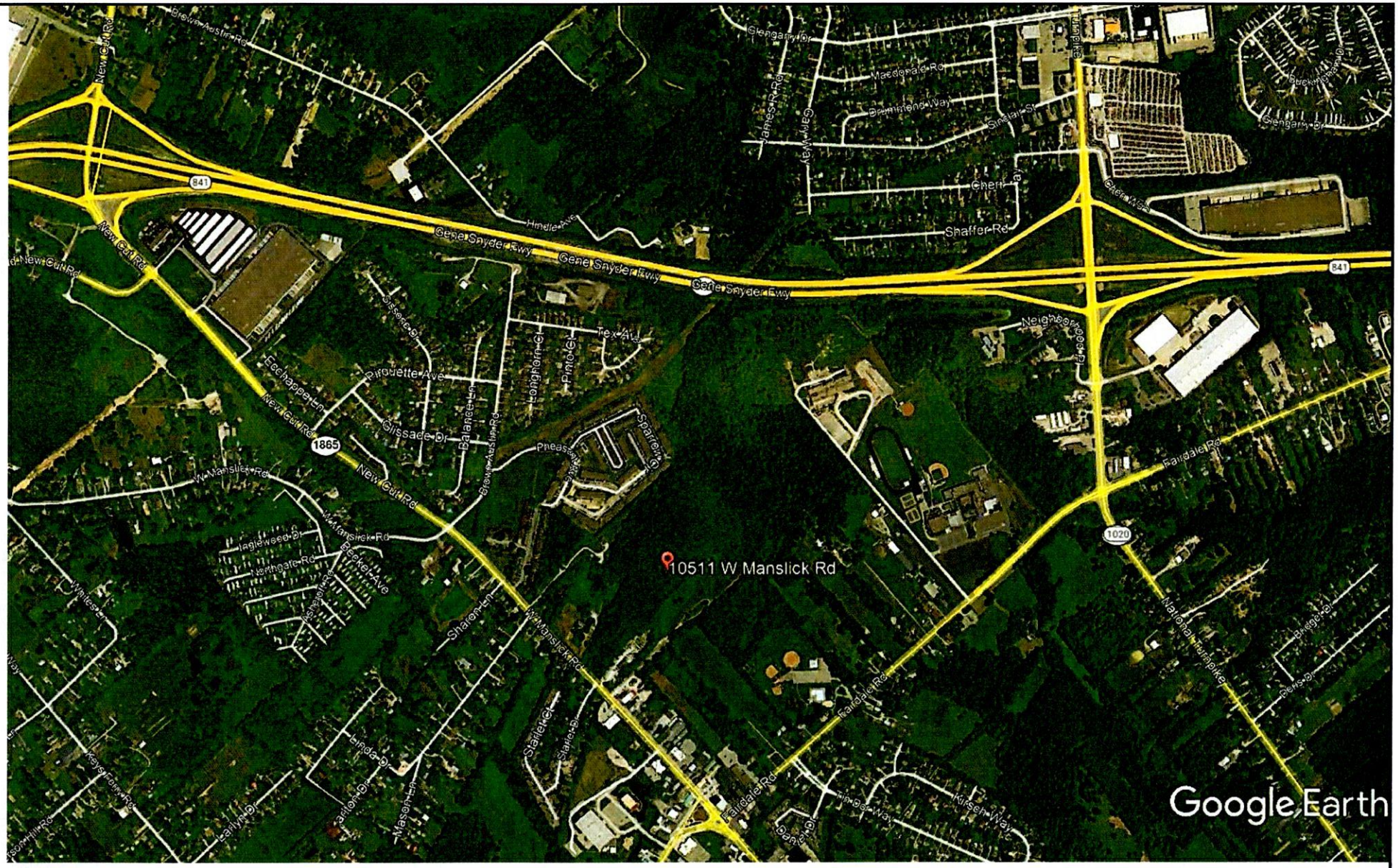
Engineered fill should be placed on a prepared subgrade that has been inspected and approved by the project geotechnical engineer. The inspection would include proofrolling of the exposed subgrade with a loaded pan or other suitable rubber tired piece of equipment. If unsuitable material is disclosed, an appropriate remedial measure would be recommended by the geotechnical engineer at that time. Engineered fill placement and compaction operations should be monitored by the geotechnical engineer or his representative. Field density tests should be performed on each lift as necessary to insure that the specified compaction is being achieved. Soil fill placed in the proposed building area should be compacted to at least 98 percent of the standard Proctor maximum dry density (ASTM D-698). Fill placed in the paved areas should be compacted to 95 percent, and fill placed in green areas to 90 percent.

4.3 Foundation Excavations

All foundation excavations should be evaluated by the geotechnical engineer or his representative to insure adequate foundation support. All concrete for foundations should be poured the same day the excavation is made.

APPENDIX

Site Location Photograph
Historical Aerial Photographs
Location of Test Pits



WBCS Architecture+Design	**Site Location** **10511 W. Manslick Road** **Fairdale, Kentucky**	**Asher Engineering, Inc.** **Project No.: 21-108** **Photo Date June 2020**

WBCS Architecture+Design	**10511 W. Manslick Road** **Fairdale, Kentucky**	**Asher Engineering, Inc.** **Project No.: 21-108** **Photo Date June 2020**

WBCS Architecture+Design	**10511 W. Manslick Road** **Fairdale, Kentucky**	**Asher Engineering, Inc.** **Project No.: 21-108** **Photo Date June 2017**

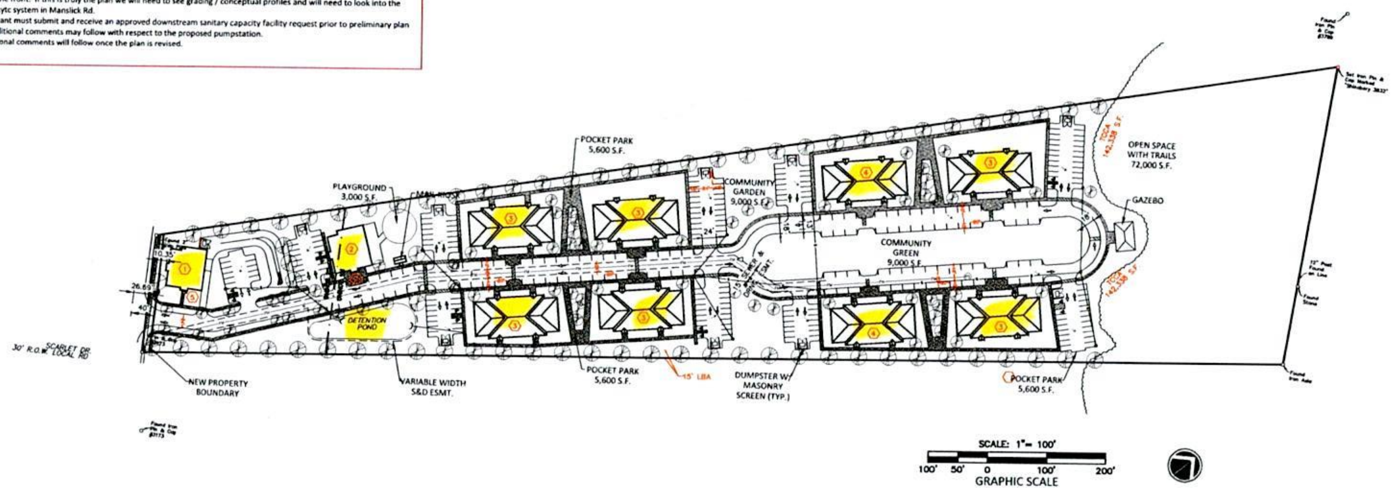
WBCS Architecture+Design	**10511 W. Manslick Road** **Fairdale, Kentucky**	**Asher Engineering, Inc.** **Project No.: 21-108** **Photo Date June 2010**

WBCS Architecture+Design	**10511 W. Manslick Road** **Fairdale, Kentucky**	**Asher Engineering, Inc.** **Project No.: 21-108** **Photo Date December 2001**

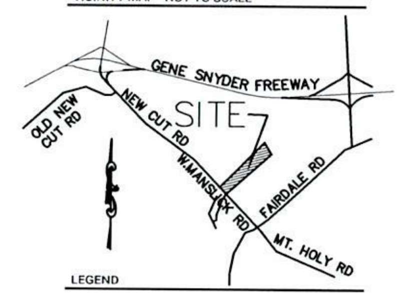
WBCS Architecture+Design	**10511 W. Manslick Road** **Fairdale, Kentucky**	**Asher Engineering, Inc.** **Project No.: 21-108** **Photo Date Feb. 1997**

WBCS Architecture+Design	**10511 W. Manslick Road** **Fairdale, Kentucky**	**Asher Engineering, Inc.** **Project No.: 21-108** **Photo Date March 1993**

9-28-21
1. Conceptual storm water plan rejected refer to the preliminary plan checklist for required content found on MSD's website http://www.msdlouky.org/insidemsd/formsstormwater.htm Resubmit with all applicable information. Comments may follow once additional information is provided on the plan. Detention basin does not have an outlet shown but 80% of this site appears to drain to the rear in the predeveloped condition. In the post developed condition it appears your bucking grade to bring it all to the front. If this is truly the plan we will need to see grading / conceptual profiles and will need to look into the downstream kytc system in Manslick Rd.
2. Applicant must submit and receive an approved downstream sanitary capacity facility request prior to preliminary plan approval. Additional comments may follow with respect to the proposed pumpstation.
3. Additional comments will follow once the plan is revised.



VICINITY MAP - NOT TO SCALE



LEGEND

	SITE BOUNDARY LINE
	ADJACENT BOUNDARY LINE
100	EXISTING CONTOUR
	EXISTING TREE LINE
#	KEYED NOTES
	DRAINAGE FLOW ARROW
	TRAFFIC DIRECTION ARROW
	NEW CONCRETE WALK
	HYDRIC SOILS
	ISOLATED WETLAND
	UNSTABLE SOILS
LBA	LANDSCAPE BUFFER AREA
S	STORM SEWER
SS	SANITARY
	STORM STRUCTURE

KEYED NOTES

1. COMMERCIAL SHELL SPACE – 1 STORY
2. CLUB HOUSE – 1 STORY
3. BUILDING TYPE A– 24 PLEX – 3 STORIES
4. BUILDING TYPE B – 24 PLEX – 3 STORIES
5. BICYCLE PARKING

PARKING SUMMARY

DWELLING UNITS:
MIN. REQUIRED @ 1 SPACE / UNIT= 192 PARKING SPACES
MAX. REQUIRED @ 2 SPACES / UNIT= 384 PARKING SPACES

TOTAL PROVIDED= 262 PARKING SPACES
(PARKING COURTS + ON STREET)

COMMERCIAL SPACE (RESTAURANT):
4,200 S.F. + 4,000 S.F. OUTDOOR SPACE
MIN. REQUIRED @ 1 SPACE / 1,000 S.F. = 7.5 PARKING SPACES
MAX. REQUIRED @ 1 SPACE / 500 S.F. = 15 PARKING SPACES
TOTAL PROVIDED= 15 PARKING SPACES

FOUR (4) BICYCLE PARKING PROVIDED

CLUBHOUSE:
REQUIRED @ 1 SPACE / 1,000 S.F. = 4 PARKING SPACES
MAX. REQUIRED @ 1 SPACE / 500 S.F. = 8 PARKING SPACES
TOTAL PROVIDED= 15 PARKING SPACES

TOTAL PARKING PROVIDED= 292 PARKING SPACES

FOUR (4) BICYCLE PARKING PROVIDED

TREE CANOPY

TREE CANOPY REQUIRED	239,059 S.F. (35%)
EXISTING TREE CANOPY	683,025 S.F. (100%)
EXISTING TREE CANOPY TO REMAIN	142,338 S.F. (21%)
NEW TREE CANOPY	95,623 S.F. (14%) 80 TYPE A TREES

A DETAILED LANDSCAPING PLAN WILL BE PROVIDED AT CONSTRUCTION DOCUMENT PHASE.

UTILITY NOTE

ALL UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE. PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL CONTACT THE UTILITY PROTECTION CENTER FOR THE ACCURATE LOCATION OF THE UNDERGROUND UTILITIES. THE CONTRACTOR IS REQUIRED TO GIVE AT LEAST 48 HOURS PRIOR NOTICE OF EXCAVATION WORK. THE UNDERGROUND PROTECTION CENTER CAN BE REACHED BY CALLING 1-800-752-6007 OR 811.

The New Look For Digging Safely in Kentucky
Kentucky 811
Call 811 Before You Dig

EXCEPTIONS TO DRAWING

THIS DRAWING IS SUBJECT TO ALL RIGHTS OF WAY, EASEMENTS, CONVEYANCES AND RESTRICTIONS THAT A TITLE EXAMINATION WOULD REVEAL. NO TITLE REPORT WAS PROVIDED BY OWNER.

GENERAL NOTES

MSD NOTES:
1. KDOT APPROVAL REQUIRED PRIOR TO CONSTRUCTION PLAN APPROVAL.
2. ONSITE DETENTION WILL BE PROVIDED. POST DEVELOPED PEAK FLOWS WILL BE LIMITED TO PRE-DEVELOPED PEAK FLOWS FOR THE 2,10,25, AND 100-YEAR STORMS OR TO THE CAPACITY OF THE DOWNSTREAM SYSTEM, WHICHEVER IS MORE RESTRICTIVE.
3. NEW SANITARY SEWER SERVICE BY LATERAL EXTENSION, SUBJECT TO FEES AND CHARGES. SEWAGE TO WILL BE TREATED AT THE DEREK GUTHRIE PLANT.
4. PORTION OF THE SITE IS LOCATED ON THE FEMA FLOODPLAIN REVIEW ZONE, FEMA FIRM PANEL 21111C0108F.
5. ALL ROOF DRAINS TO BE DIRECTED TO THE PROPOSED STORM SYSTEM.
6. CONSTRUCTION PLANS AND DOCUMENTS SHALL COMPLY WITH LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT'S DESIGN MANUAL AND STANDARD SPECIFICATIONS AND OTHER LOCAL, STATE AND FEDERAL ORDINANCES.
7. THE FINAL DESIGN OF THIS PROJECT MUST MEET ALL MS4 WATER QUALITY REGULATIONS ESTABLISHED BY MSD. SITE LAYOUT MAY CHANGE AT THE DESIGN PHASE DUE TO PROPER SIZING OF GREEN BEST MGMT. PRACTICES.
8. INCREASED RUN OFF SHALL BE PROVIDED ON SITE AT 1.5 TO 1 BELOW THE FLOODPLAIN. VOLUME SHALL BE CALCULATED USING THE REGIONAL FACILITY FEES.

EPSC NOTES
1. AN APPROVED EROSION PREVENTION AND SEDIMENT CONTROL (EPSC) PLAN SHALL BE IMPLEMENTED PRIOR TO ANY LAND-DISTURBING ACTIVITY ON THE CONSTRUCTION SITE. ANY MODIFICATIONS TO THE APPROVED EPSC PLAN MUST BE REVIEWED AND APPROVED BY THE METROPOLITAN SEWER DISTRICT (MSD) REVIEW OFFICE. EPSC BMP'S SHALL BE INSTALLED PER THE PLAN AND BEST PRACTICE STANDARDS.
2. DETENTION BASINS, IF APPLICABLE, SHALL BE CONSTRUCTED FIRST AND SHALL PERFORM AS SEDIMENT BASINS DURING CONSTRUCTION UNTIL THE CONTRIBUTING DRAINAGE AREAS ARE SEEDED AND STABILIZED. ACTIONS MUST BE TAKEN TO MINIMIZE THE TRACKING OF MUD AND SOIL FROM CONSTRUCTION AREAS ONTO PUBLIC ROADWAYS. SOILS TRACKED ONTO THE ROADWAY SHALL BE REMOVED DAILY.
3. SOIL STOCKPILES SHALL BE LOCATED AWAY FROM STREAMS, PONDS, SWALES, AND CATCH BASINS. STOCKPILES SHALL BE SEEDED, MULCHED, AND ADEQUATELY CONTAINED THROUGH THE USE OF SILT FENCING. ALL STREAM CROSSINGS MUST UTILIZE LOW-WATER CROSSING STRUCTURES.
4. WHERE CONSTRUCTION OR LAND DISTURBANCE ACTIVITY WILL OR HAS TEMPORARILY CEASED ON ANY PORTION OF A SITE, TEMPORARY SITE STABILIZATION MEASURES SHALL BE REQUIRED AS SOON AS PRACTICABLE, BUT NO LATER THAN 14 CALENDAR DAYS AFTER THE ACTIVITY HAS CEASED.
5. SEDIMENT-LADEN GROUNDWATER ENCOUNTERED DURING TRENCHING, BORING OR OTHER EXCAVATION ACTIVITIES SHALL BE PUMPED TO A SEDIMENT TRAPPING DEVICE PRIOR TO BEING DISCHARGE INTO A STREAM, POND, SWALE OR CATCH BASIN.
6. ACTIONS MUST BE TAKEN TO MINIMIZE THE TRACKING OF MUD AND SOIL FROM CONSTRUCTION AREAS ONTO PUBLIC ROADWAYS. SOIL TRACKED ONTO THE ROADWAY SHALL BE REMOVED DAILY.

APCD, PDS
1. SITE LIGHTING SHALL NOT SHINE IN THE EYES OF DRIVERS AND SHALL BE DIRECTED DOWN AND AWAY FROM ANY RESIDENTIAL PROPERTIES. SITE LIGHTING SHALL NOT EXCEED 0.2 FOOTCANDLES AT THE PROPERTY LINE ADJACENT TO RESIDENTIAL AND SHALL NOT CAUSE GLARE ONTO ADJOINING PROPERTIES.
2. ALL SIGNAGE SHALL COMPLY WITH LOUISVILLE LAND DEVELOPMENT CODE REGULATIONS. THERE SHOULD BE NO COMMERCIAL SIGNS ON THE RIGHT-OF-WAY(KYTC).
3. MITIGATION MEASURES FOR DUST CONTROL SHALL BE IN PLACE DURING CONSTRUCTION TO PREVENT FUGITIVE PARTICULATE EMISSIONS FROM REACHING EXISTING ROADS AND NEIGHBORING PROPERTIES.
4. THERE SHOULD BE NO LANDSCAPING IN THE RIGHT-OF-WAY WITHOUT AN ENCROACHMENT PERMIT. LANDSCAPING SHOULD NOT OBSTRUCT SIGHT DISTANCE REQUIREMENT AREAS.
5. ALL SERVICE STRUCTURES, INCLUDING DUMPSTER SHALL BE SCREENED.
6. ALL HANDICAP SITE FEATURES SHALL BE CONSTRUCTED IN ACCORDANCE WITH FEDERAL REGULATIONS 28 CFR PART 36: ADA STANDARDS FOR ACCESSIBLE DESIGN.
7. COMPATIBLE UTILITIES SHALL BE PLACE IN A COMMON TRENCH UNLESS APPLICABLE AGENCIES REQUIRE OTHERWISE.
8. CONCRETE WHEEL STOPS OR CURBING AT LEAST SIX (6) INCHES HIGH AND SIX (6) INCHES WIDE SHALL BE PROVIDED TO PREVENT VEHICLES FROM OVERHANGING ABUTTING SIDEWALKS, PROPERTIES OR PUBLIC RIGHTS-OF-WAY, TO PROTECT LANDSCAPED AREAS AND TO PROTECT ADJACENT PROPERTIES. SUCH WHEEL STOPS OR CURBING SHALL BE LOCATED AT LEAST THREE (3) FEET FROM ANY ADJACENT WALL, FENCE, PROPERTY LINE, WOODY VEGETATION, WALKWAY OR STRUCTURE

SITE INFORMATION

FORM DISTRICT:	VILLAGE CENTER
EXISTING ZONING:	R-4 & C2
PROPOSED ZONING:	R-6 & C2
EXISTING USE:	VACANT
PROPOSED USE:	COMMERCIAL – MULTIFAMILY RESIDENTIAL
TOTAL #OF DWELLING UNITS:	192
DWELLING UNITS BUILDINGS:	249,240 S.F. (8 BUILDINGS)
FOOTPRINT (8 BUILDINGS)	83,080 S.F.
CLUBHOUSE S.F.:	4,200 S.F.
COMMERCIAL S.F:	4,200 S.F.
TOTAL RESIDENTIAL FOOTPRINT:	87,280 S.F.
TOTAL COMMERCIAL FOOTPRINT:	4,200 S.F.
GROSS SITE ACREAGE:	15.68 AC./ 683,025 S.F.
C2 ACREAGE:	1.61 AC./ 70,151 S.F.
R6 ACREAGE:	14.07 AC./ 612,874 S.F.
RES. FLOOR AREA RATIO (FAR):	0.06
COM. FLOOR AREA RATIO (FAR):	0.41
NET DENSITY R AREA:	13.65 DWELLINGS PER ACRE
ALLOWABLE DENSITY:	17.42 DWELLINGS PER ACRE
VEHICULAR USE AREA (VUA)	119,306 S.F.
ILA REQUIRED– 7.5%	8,948 S.F.
ILA PROVIDED	10,000 S.F.
MAX. BUILDING HEIGHT:	35'
PROPOSED BUILDING HEIGHT:	45'
REQD TOTAL OPEN SPACE 15%:	102,454 S.F.
REQD. REC. OPEN SPACE 50%:	51,227 S.F.
PROVIDED REC. OPEN SPACE:	95,200 S.F.
PROVIDED OTHER OPEN SPACE:	8,000 S.F.
TOTAL OPEN SPACE PROVIDED:	103,200 S.F.

21-ZONEPA-0074, WM#12313

Engineering
Planning
1046 E. Chestnut Street, Louisville, Kentucky 40204
Phone: 502-585-2222 Internet: www.qk4.com
Kentucky - Indiana - Georgia - Tennessee

WBCS ARCHITECTURE

MARIAN DEVELOPMENT

Seals

Crossings at South Park
Rezoning Pre-Application
10511 W Manslick Road
Louisville, Kentucky 40118
Owner
Estate of Chester Cummings
7411 Woolmore Avenue
Louisville, Kentucky 40214

REV #	DATE	DESCRIPTION

Rezoning Plan

Job No:	21331.000
Date:	August 27, 2021
Scale:	1"=100'
Drawn By:	AWB
Checked By:	AWB

Drawing Title:
Crossings at South Park
Rezoning Plan

Drawing No:
1 of 1

Users: abarrfley Plot Date: August 27, 2021 11:53 AM
File Name: L:\21331.000 - Crossings at South Park\Civil Site\Drawings\Development Plans\21331_Rezone Plan (2021-08-27).dwg

Recieved October 14, 2021 Planning & Design
21-ZONE-0119

LOCATION OF TEST PITS