CITY OF HUXLEY

TUESDAY ** APRIL 16, 2019 ** CITY COUNCIL ** 6:30 P.M.

A SESSION OF THE CITY OF HUXLEY'S
PLANNING AND ZONING COMMISSION

PUBLIC NOTICE IS HEREBY GIVEN THAT THE PLANNING AND ZONING COMMISSION OF THE CITY OF HUXLEY, IOWA, WILL MEET IN THE HUXLEY CITY COUNCIL CHAMBERS 515 NORTH MAIN AVE., HUXLEY, IOWA AT *6:30 P.M. ON TUESDAY THE 16TH DAY OF APRIL 2019* TO CONSIDER THE MATTERS ENUMERATED IN THE AGENDA BELOW:

1.0) ROLL CALL

COMMISSION AGENDA ITEMS:

2.0) MOTION TO APPROVE THE MINUTES FROM THE FOLLOWING MEETINGS:
2.1) April 8, 2019 – Meeting

2.0) PUBLIC HEARING: NONE

4.0) DISCUSSION AND RECOMMENATION ITEMS:

4.01) DISCUSSION AND POSSIBLE ACTION REGARDING MINI STORAGE SITE PLAN AT 508 EAST FIRST STREET.

4.02) DISCUSSION OF THE KUM AND GO TRAFFIC STUDY AND STORM WATER MANAGEMENT PLAN.

4.03) DISCUSSION AND POSSIBLE ACTION REGARDING THE KUM AND GO SITE PLAN.

5.0) MISCELLANEOUS

6.0) COMMENTS

7.0) ADJOURNMENT

THIS NOTICE IS HEREBY GIVEN AT LEAST 24 HOURS PRIOR TO THE COMMENCEMENT OF THE MEETING SPECIFIED ABOVE. THIS WAS DONE BY ADVISING THE NEWS MEDIA WHO HAVE FILED A REQUEST FOR NOTICE AND BY POSTING THE NOTICE ON THE FRONT WINDOW IN THE LOBBY AREA IN CITY HALL THAT IS ACCESSIBLE TO THE PUBLIC. THIS WAS ALL PURSUANT TO CHAPTER 21 OF THE CODE OF IOWA.

John Haldeman

John Haldeman, City Administrator/Zoning Administrator

Planning and Zoning Commission Minutes
Monday, April 8, 2019
Huxley Safe Room, 6:30pm

1.0) Call to Order and Roll Call:

P & Z members present: Larry Wilson, Cheryl Patterson, Joe Scott, Mike Schonhorst
Staff present: John Haldeman – City Administrator, Jolene Lettow – City Clerk
Consultants present: Mike Heilman – city attorney
Guests present: Keith Weggen, Britni Andreassen – Kum 'N Go representatives, Roger Wheeler, Henry Haupert, Matthew Hawes, Alissa Hawes, Wes James, Jill Riedemann, Jeff Barnwell, Shawna Murphy, Jesse Sommerfeld, Randy Schmerbach, T.J. Trav, Kelsey Trav, Dennis Hokel, Adam Walters, Amanda DeMaris, Lisa Ditenford, Jamie Dailey, Molly Mollman, Todd Nelson, Clifford DeMaris

Mike Schonhorst, Acting Chairman, called the meeting to order at 6:38pm.

Commission Agenda Items:

2.0) Motion – Scott, Second – Wilson to Approve Minutes from the Following Meeting: March 25, 2019. 4 ayes. Motion carried.

3.0) Public Hearing: None

4.01) Motion – Patterson, Second – Wilson to Recommend Approval to Council the Annexation Request from Leonard and Jaqueline Larson for Property at SE Corner of I-35 and Highway 210. Kum 'N Go representatives explained that a 5,975 square foot facility would be built on the five acre lot. Roll Call: Wilson, Patterson, Scott, Schonhorst voted yes. Motion carried.

4.02) Motion – Patterson, Second – Scott to Recommend Approval to Council the Rezoning Request from Leonard and Jaqueline Larson for Property at SE Corner of I-35 and Highway 210. The zoning will be changed from Agricultural to R-2. Roll Call: Patterson, Scott, Schonhorst, Wilson voted yes. Motion carried.

4.03) Motion – Scott, Second – Wilson to Recommend to Council the Rezoning of the Westview Development Owned by Dickson and Luann Jensen. Development is 40 acres northwest of town. There will be three different zones within development: R-1/80 foot wide lots and ½ acre estate lots, R-1A/74 foot wide lots, and R-2/twin homes. Residents from Centennial West subdivision had following comments/concerns:

- Traffic flow – large number of new homes will be adding traffic to area. Could there be another entrance added to development?
- Water flow – currently there are drainage issues in development – will this be resolved?
- Construction path – could there be one set specifically to avoid heavy construction vehicles on existing roads?
- Will a park be added to development/area?
- Is city keeping up with the growth?
- Advantage Homes builds the same looking houses – need diversity, more custom built homes.

Roll Call: Scott, Schonhorst, Wilson, Patterson voted yes. Motion carried.

4.04) Motion – Patterson, Second - Scott to Recommend to Council the Approval of the Annexation Request for the Westview Development from Dickson and LuAnn Jensen. There was discussion regarding preliminary plat process and steps to continue to voice concerns/comments from public. Roll Call: Scott, Schonhorst, Wilson, Patterson voted yes. Motion carried.

5.01) Next meeting scheduled for May 13th.

7.0) Motion – Scott, Second – Wilson to adjourn at 7:33pm. 4 ayes.

Submitted by: Jolene R. Lettow, City Clerk

VEENSTRA & KIMM, INC.

3000 Westown Parkway • West Des Moines, Iowa 50266-1320

515-225-8000 • 515-225-7848 (FAX) • 800-241-8000 (WATS)

April 12, 2019

MEMORANDUM

To: Huxley Planning & Zoning

Fr: Forrest Aldrich, Veenstra & Kimm, Inc.

Re: 508 East First Street

Chris Gardner, the owner of the property at 508 East First Street, will be at the Planning & Zoning meeting on April 16, 2019 to make a presentation.

The property is currently used as a mini-storage facility with three buildings. Chris is proposing to construct a fourth building at the north end of the property. The use of the property is not proposed to be changed. The property is zoned M-1.

Attached is the approved site plan for the site from December 1999. Chris is essentially wanting to complete Phase 3 of the site plan. The proposed building would have a similar footprint to the north building shown on the site plan.

The paving of the drives around the mini-storage buildings as described in Phase 2 was never completed. Currently there is gravel around the buildings.

Phase 3 describes the construction of a second driveway entrance, parking spaces at the north end of the site, and the installation of a sanitary lift station and water service. The sewer and water services are not needed as the building is proposed to be used for storage with internal access and not to be used for an office/warehouse.

Chris will present additional information on the proposed building and site layout.

The discussion with Planning & Zoning will focus on providing some direction for the site plan. Is the site plan still valid? Do all of the phasing requirements of the site plan need to be followed, or just some of the phasing requirements? Which ones? Assuming the existing site plan is still valid, at what point are there enough changes that a new site plan needs to be submitted?

If a new site plan were submitted, what is the thought of obtaining a waiver for not paving and leaving the site gravel? What would be the stormwater management requirements?

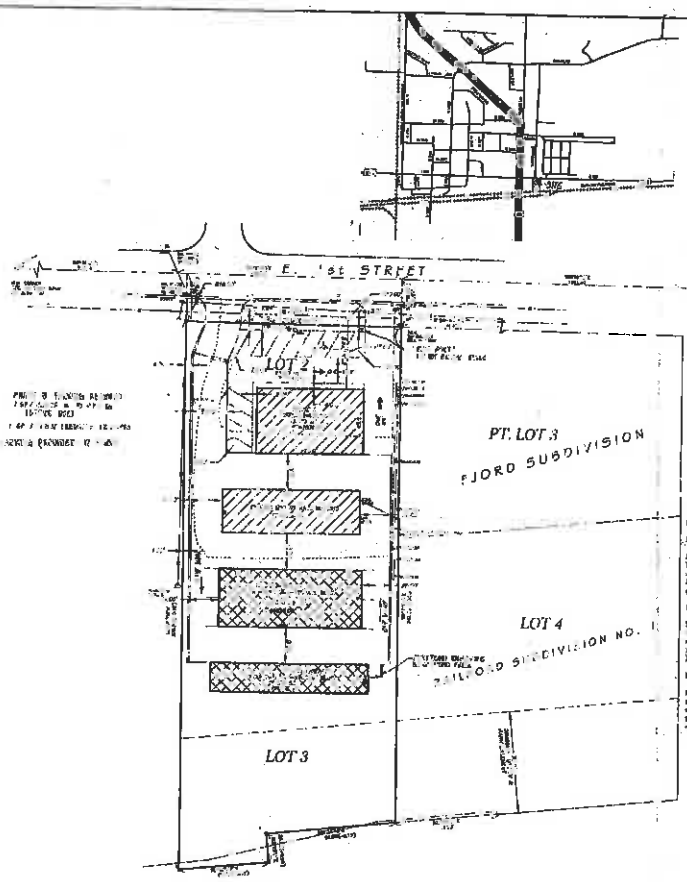
There is an existing sidewalk to the west but no sidewalk to the east. Will a sidewalk be required?

Both Chris Gardner and the writer will be at the meeting to answer questions.

END

45229-039
Attachment

SITE PLAN
FOR
HUXLEY MINI-STORAGE
508 E. FIRST STREET
HUXLEY, IOWA



PROPERTY DESCRIPTION

LOT 2, FJORD SUBDIVISION, AN OFFICIAL PLAT, HUXLEY, STORY COUNTY, IOWA, AND LOT 3, RAILROAD SUBDIVISION NO 1, AN OFFICIAL PLAT, HUXLEY, STORY COUNTY, IOWA.

SAID TRACT OF LAND CONTAINS 1.283 ACRES MORE OR LESS

GENERAL NOTES

CONSTRUCTION PHASING:

NORTH

GRAPHIC SCALE

Bishop Engineering Company
3501 104th Street
Des Moines, Iowa 50322

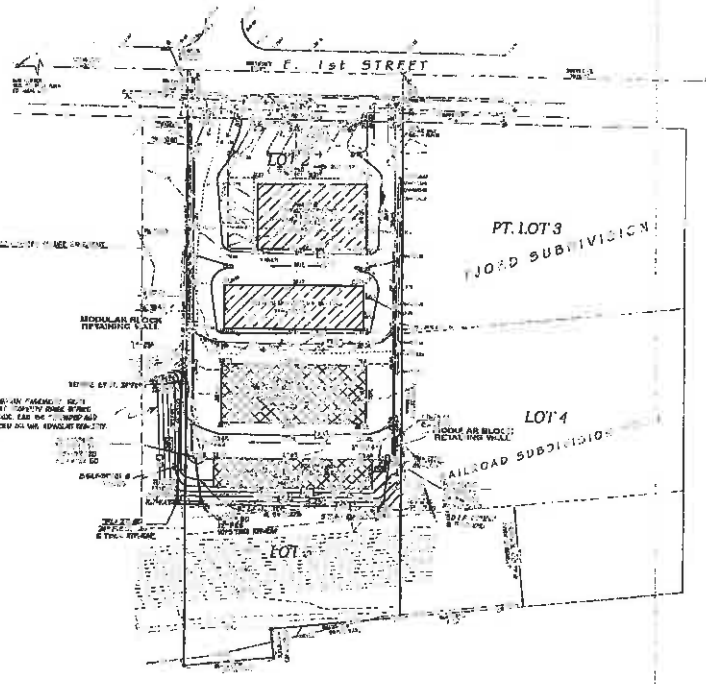
UTILITY SYMBOLS

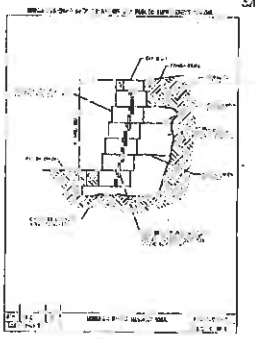
WATER MAINS
SANITARY SEWER
STORM SEW. LINE
TELEPHONE CABLES
ELECTRICAL CABLES
FENCE LINES

SITE PLAN
HUXLEY MINI-STORAGE
508 E. FIRST AVENUE

'99-193-S

SITE PLAN
FOR
HUXLEY MINI-STORAGE
508 E. FIRST STREET
HUXLEY, IOWA





NORTH

GRAPHIC SCALE

PROPERTY DESCRIPTION

LOT 2, FJORD SUBDIVISION, AN OFFICIAL PLAT, HUXLEY, STORY COUNTY, IOWA, AND LOT 3, RAILROAD SUBDIVISION NO. 1, AN OFFICIAL PLAT, HUXLEY, STORY COUNTY, IOWA.

SAID TRACT OF LAND CONTAINS 1.2362 ACRES MORE OR LESS.

GENERAL NOTES

UTILITY SYMBOLS

SITE PLAN
HUXLEY MINI-STORAGE
508 E. FIRST AVENUE

'92-
193-S

Traffic Impact Letter

Draft Letter

Kum & Go Site #0131

Huxley, Iowa

Prepared for:

Iowa Department of Transportation

Submitted to:

Iowa Department of Transportation

January 29, 2019

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Date:

KIMBERLEY L. ROUSE, P.E.

License No. 14865

My renewal date is **December 31, 2020**

Pages or sheets covered by this seal:

Analysis of Existing Conditions

The site of the proposed new Kum & Go 0131 is near the interchange of Hwy. 210 and Interstate 35 in rural Huxley. The site is located on the south side of the Hwy. to the east of the northbound off ramp. The site is surrounded by agricultural land uses. Monsanto Company is located approximately 2400' to the west of the site. Hwy. 210 is a rural highway with a speed limit of 55 mph near the site.

Figure 1 – Site Location

Proposed Development

The proposed development is a 5,975 square foot Kum & Go convenience store. It is proposed to have 12 gas pumps for passenger cars and 6 pumps for trucks. There is one access proposed on the east side of the development off of Hwy 210. The proposed entrance is approximately 610' from the northbound I-35 off ramp.

Existing Traffic Counts

November 2018 traffic counts were provided by Civil Design Advantage for Hwy. 210 near the proposed site. Traffic counts from the Iowa Department of Transportation were also reviewed. It was determined that the growth rate for the area is approximately 3% per year.

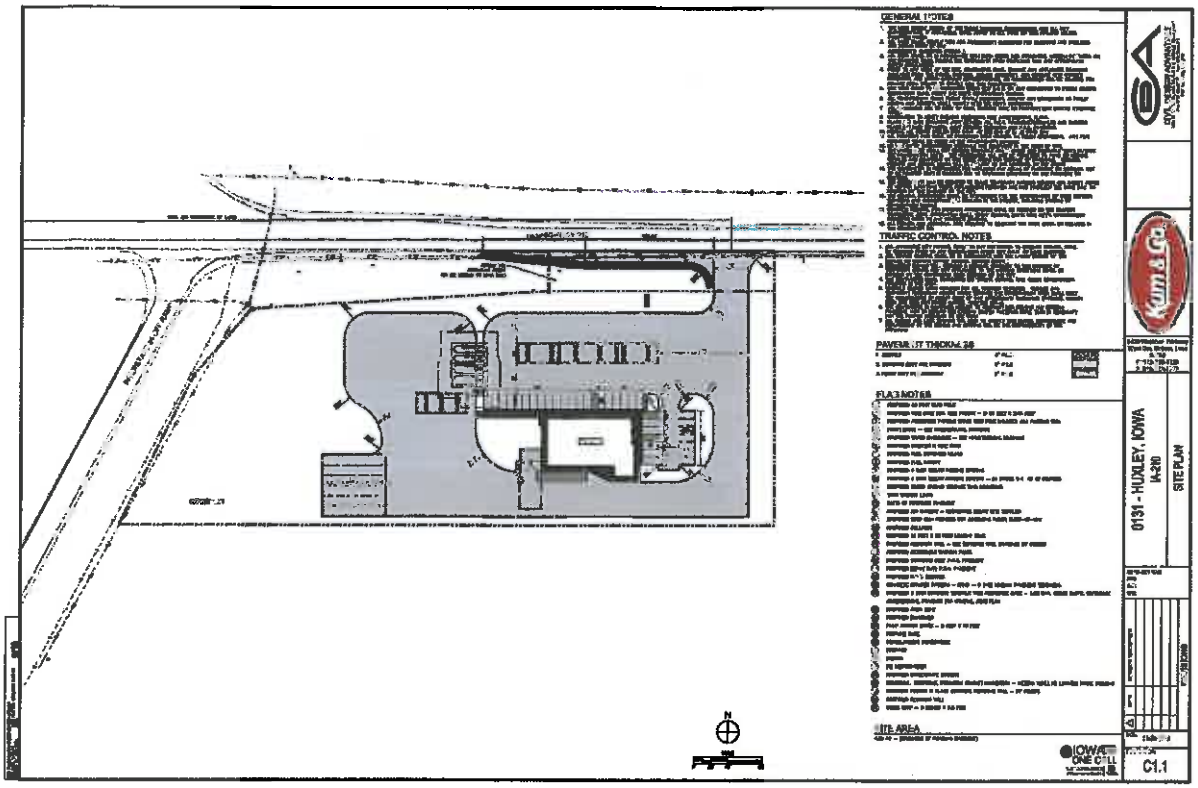


Figure 2 – Site Plan

Trip Generation

Trip generation rates recommended in the *Institute of Transportation Engineers' (ITE) Trip Generation, 9th Edition*, were used to develop estimates of trips to and from the site based on the proposed land use. **Table 1** shows the daily, AM peak hour, and PM peak hour trip generation for the proposed land use. According to the trip generation manual, 66% pass-by trips were calculated for the convenience store with gas pumps land use. Pass-by trips are made by traffic already using the adjacent roadway and enter the site as an intermediate stop on the way to another destination. The trip may not necessarily be "generated" by the land use under study and thus, is not a new trip added to the transportation system. **Table 1** shows the trip generation for the site at full build-out.

Table 1 – Trip Generation

Trip Generaion									
Land Use Code		Use	Total SF/Units/ Fuel Pos.	Factor	Percent	Entering	Percent	Exit	Pass By
				Daily					
853		Convenience store with gas pumps	18.00	542.6	50%	4883	50%	4883	0
						4883		4883	
				AM					
853		Convenience store with gas pumps	18.00	16.57	50%	51	50%	51	197
						51		51	
				PM					
853		Convenience store with gas pumps	18.00	19.02	50%	58	50%	58	226
						58		58	

Trip Distribution and Assignments

Based on the trip generation of the proposed land use, the trip ends were assigned to the site entrance. Assignments were based on assumed travel behaviors, location of trip destinations, and accessibility from/to various routes considering normal overall travel patterns.

Using the existing split of traffic calculated from the 2018 traffic counts on Hwy. 210, the trips and pass-by trips were distributed at the intersection. It was assumed that during the AM peak 75% of the traffic travels to/from the east and 25% to/from the west. During the PM peak the assumption is 30% to/from the east and 70% to/from the west. **Figures 3 and 4** show the AM and PM peaks at the new proposed entrance into the proposed Kum & Go 0131 site. **Figures 5 and 6** show the AM and PM peaks at year 2029.

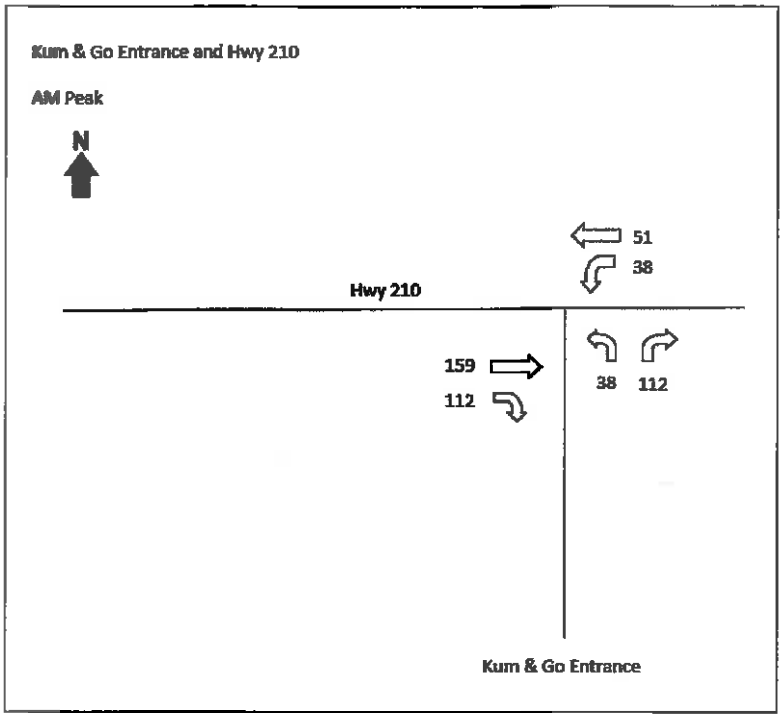


Figure 3 – AM Peak

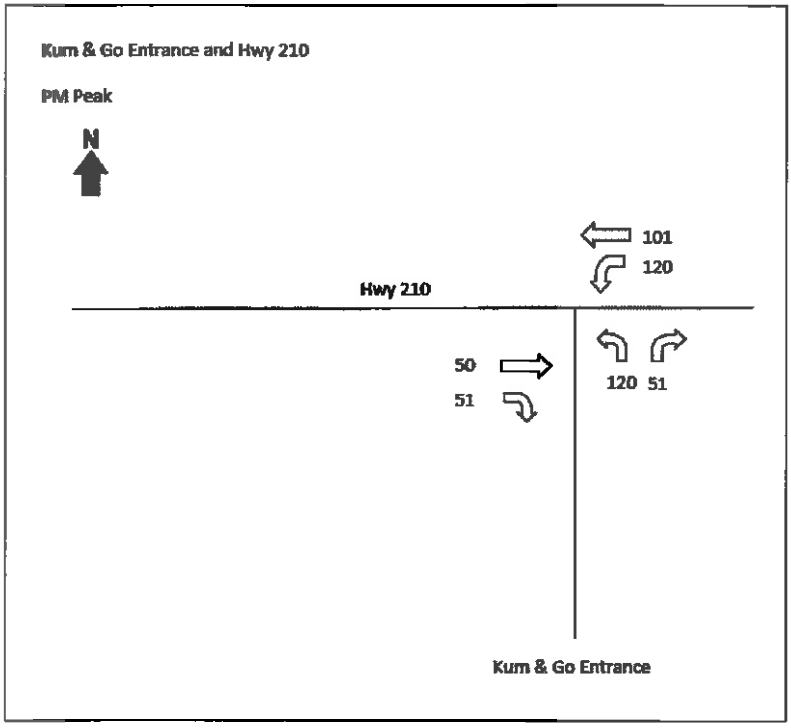


Figure 4 – PM Peak

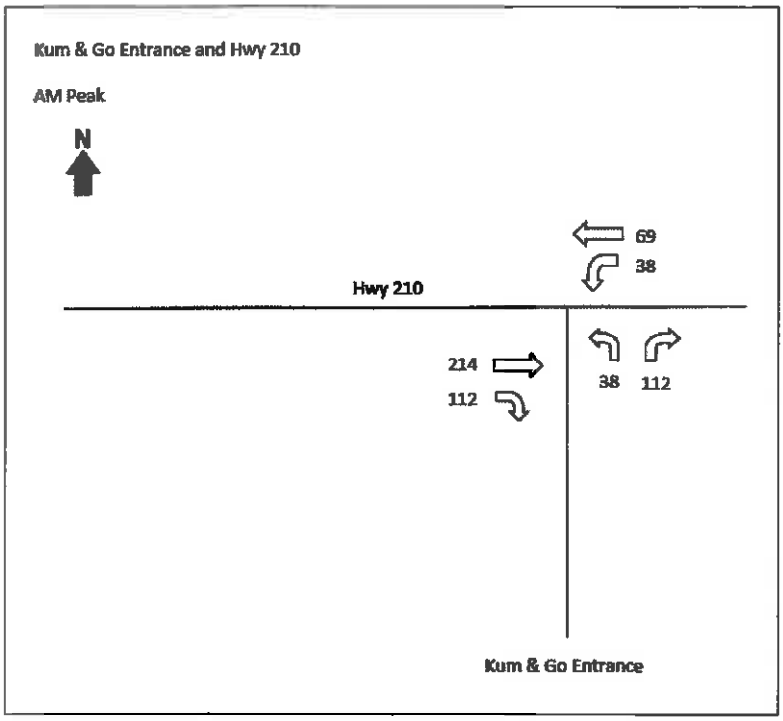


Figure 5 – AM Peak – 2029

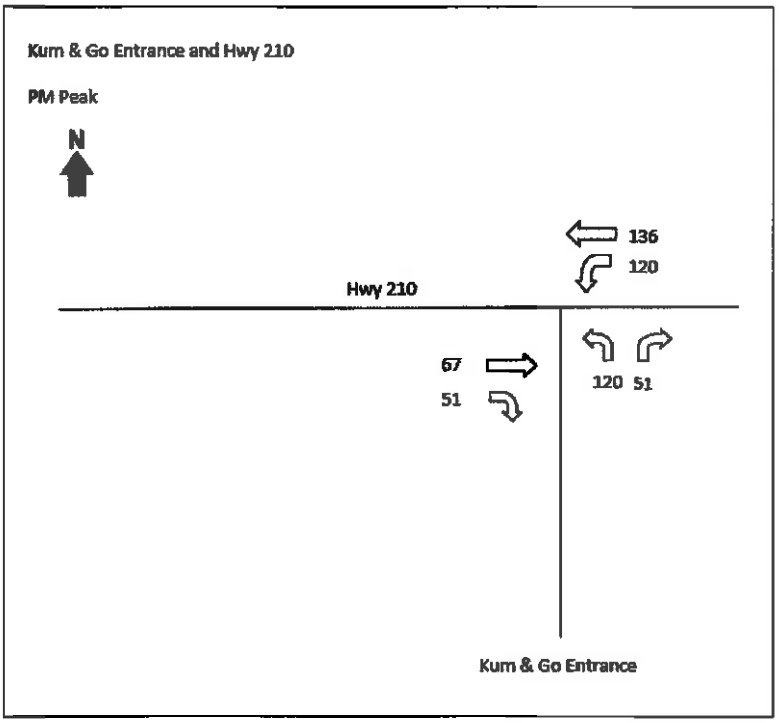


Figure 6 – PM Peak – 2029

Turn Lane Warrants

"NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide" was used to evaluate the need for right and left turning bays at the proposed site entrance. **Figure 7** shows that during the PM peak a right-turn lane would be warranted into the proposed Kum & Go site. **Figure 8** shows that a left-turn lane is not warranted at this time. **Figure 9** shows that by 2029 a left-turn lane would likely be warranted at the Kum & Go site entrance assuming the 3% annual growth rate.

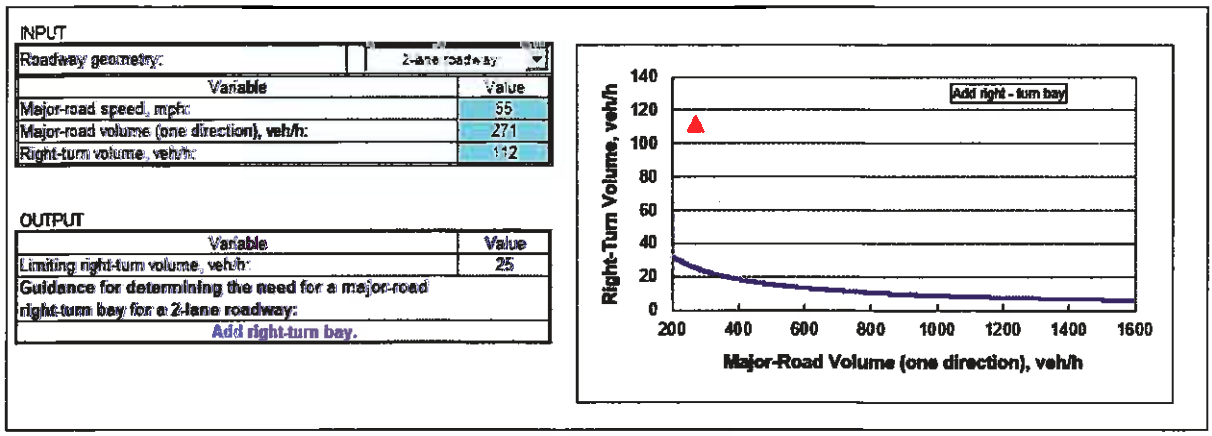


Figure 7 – Guideline for Determining the Need for a Major Road Right Turn Bay

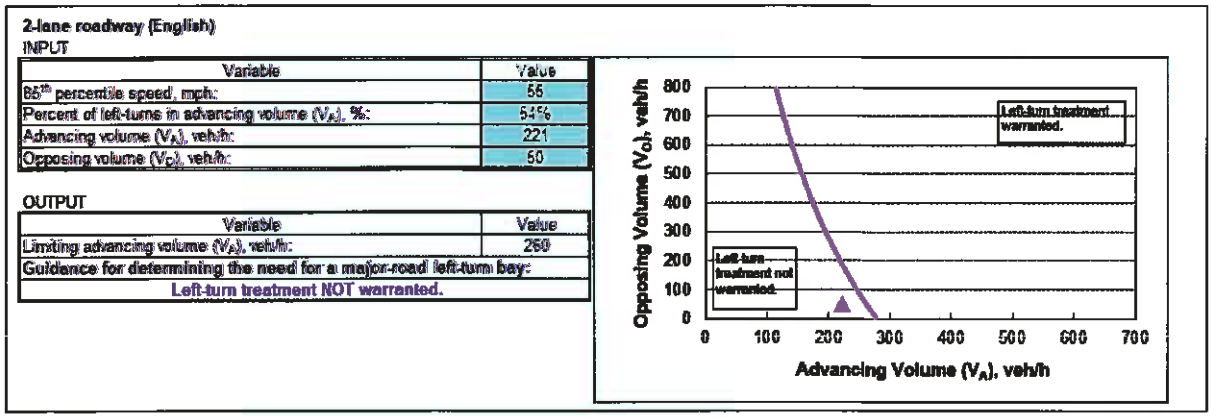


Figure 8 – Guideline for Determining the Need for a Major Road Left Turn Bay

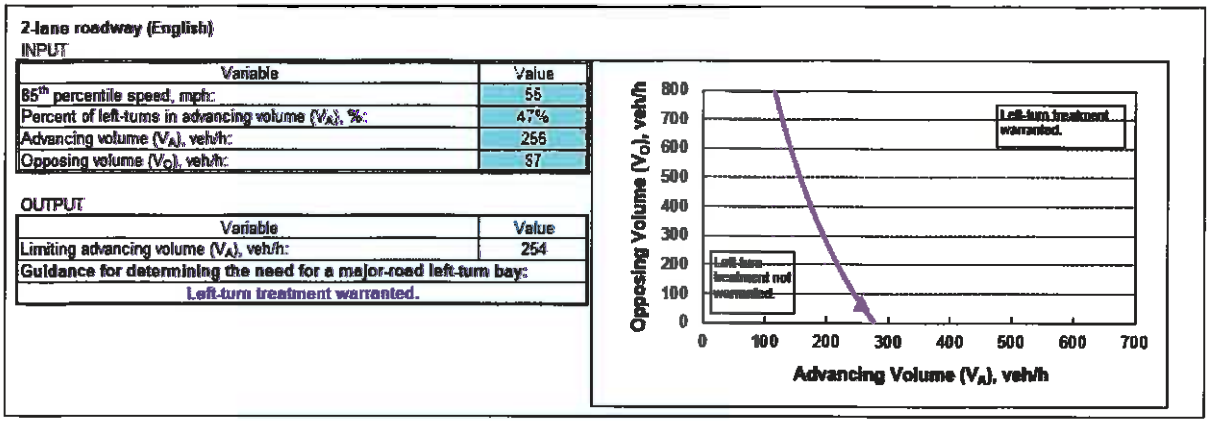


Figure 9 – Guideline for Determining the Need for a Major Road Left Turn Bay

Conclusion and Recommendation

Based on the assumptions stated in the report and resulting analysis, it is recommended that an eastbound right-turn lane on Hwy 210 should be installed when Kum & Go 0131 is developed. A left-turn lane is not warranted at this time. It is estimated that a left-turn lane may be warranted by 2029. It may be necessary to install a left-turn lane earlier if traffic volumes near the site increase at a faster rate that assumed in the analysis, or if traffic slowing down to enter the site starts to cause safety issues for westbound Hwy. 210.

KUM & GO #0131

STORM WATER MANAGEMENT PLAN

HUXLEY, IOWA

CDA PROJECT NO. 1811.616

PRELIMINARY
NOT FOR CONSTRUCTION
FEBRUARY, 2019

CIVIL DESIGN ADVANTAGE
3405 SE Crossroads Drive, Suite G
GRIMES, IOWA 50111
(515) 369-4400

PREPARED BY: CIVIL DESIGN ADVANTAGE, LLC
PREPARED ON: MARCH 19, 2019
REVISED ON: APRIL 5, 2019

KUM & GO #0131

CIVIL DESIGN ADVANTAGE

3405 SE Crossroads Dr., SUITE G GRIMES, IA 50111

PROJECT: Kum & Go 0131 JOB NO. 1811.616 Page ____ of ____ Pages

SUBJECT: Stormwater Calculations DATE: 04/05/19 COMP. BY: DSH OK'D BY: RAH

Project Description:

Existing Site Conditions

The Kum & Go site is located east of the I-35 ramp intercepting IA-210 in Huxley, Iowa. The existing site constist of 4.30 acres of land utilized for agricultural purposes (row crops) and is slated for a commercial use as a Kum & Go. Refer to the existing drainage map and Hydraflow Hydrographs for detailed analysis of the existing site conditions.

Proposed Site Conditions

The site will be developed as a new 5,975 sf Kum & Go convenience store with a detached gas canopy and associated access drives, parking and utilities. Proposed storm water detention will be provided in a dry bottom detention basin west of the proposed building. (Refer to the Post-Developed Drainage Map and hydraflow hydrographs).

Storm Water Analysis:

Storm Sewer Analysis

Storm sewer pipes were designed to convey the 100-year post-developed storm event at all critical locations and overflow paths have been provided. The Rational Method was used to determine the flow rate for each drainage area and the Manning's equation was used to size the pipes.

Detention Analysis

Detention for the Kum & Go site will be provided in one dry bottom detention basin located on the west side of the property. The pond was designed with Hydraflow Hydrogrpahs which utilizes the SCS Unit Hydrograph Method for computation of hydrographs. The drainage basin was analyzed for the 2, 5 and 100-year rainfall events. Runoff curve numbers used to determine peak flow rates are listed in the assumptions. The detention basin was designed to limit the 2 and 5-year post-developed runoff to the 2 and 5-year existing peak runoff rate and to limit the 100-year post-developed release rate to the 5-year existing release rate.

CIVIL DESIGN ADVANTAGE
3405 SE Crossroads Dr., SUITE G GRIMES, IA 50111

PROJECT: Kum & Go 0131 JOB NO. 1811.616 Page ____ of ____ Pages
SUBJECT: Stormwater Calculations DATE: 04/05/19 COMP. BY: DSH OK'D BY: RAH

Assumptions:

* A time of concentration of 15 minutes was assumed for post developed detention calculations.
* A USDA Hydrologic Soil Map was prepared for the site. Hydrologic Soil Group B was assumed for storm water runoff calculations. Refer to the attached Hydrologic Soil Map report for soils information.
* The runoff coefficients used to determine flow rates for the site were taken from SUDAS Section 2B-4.03 are listed in the following table.

Land Use or Surface Characteristics	B Soils	
	5-year	100-year
Impervious Area, (Drives, Walks, and Roofs)	0.95	0.98
Open Space -Grass, >75% (Good Condition)	0.15	0.35

* The curve numbers used to determine flow rates for the site were taken from SUDAS Section 2B-4.04 and are listed in the following table.

Land Use or Surface Characteristics	Curve Number
Impervious Area, (Drives, Walks, and Roofs)	98
Open Space -Grass, >75% (Good Condition)	61
Row Crops (Contoured)	75

Storm Water Runoff Summary:

Drainage Basin 1 (DB 1)

Storm Event	Post-Developed Pond Release, cfs	Detention Elevation	Detention Provided, ft^3	Detention Overflow Elevation	Top of Pond Elevation	Freeboard, ft
2-Year	3.99	999.30	3,319	1001.00	1002.00	2.70
5-Year	4.30	999.75	6,553	1001.00	1002.00	2.25
100-Year	4.92	1000.72	25,499	1001.00	1002.00	1.28

Detention will be provided in a dry-bottom pond (Pond 1). The outlet pipe will consist of a 15" RCP culvert with a 9.60" orifice plate installed in the outlet north side of structure 4 (SW-501) at an elevation of 996.19 .

Rainfall Return Frequency (Yrs)	Existing Runoff, cfs	Allowable Release, cfs	Post-Developed Runoff Release, cfs
2-Year	4.00	4.00	3.99
5-Year	6.22	6.22	4.30
100-Year	17.82	6.22	4.92

CIVIL DESIGN ADVANTAGE

3405 SE Crossroads Dr., SUITE G GRIMES, IA 50111

PROJECT: Kum & Go 0131 JOB NO. 1811.616 Page ____ of ____ Pages

SUBJECT: Stormwater Calculations DATE: 03/18/19 COMP. BY: DSH OK'D BY: RAH

Storm Sewer
Post-Developed Composite C-factor Calculations
100-year

Drainage Area ID	Lawn B	Lawn Area, SF	Imperv. B	Imperv. Area, SF	Total Area SF	Total Area Acres	Composite C
DA 4	0.35	3,118	0.98	21,764	24,882	0.57	0.90
DA 5	0.35	0	0.98	14,810	14,810	0.34	0.98
DA 6	0.35	0	0.98	20,475	20,475	0.47	0.98
DA 9	0.35	0	0.98	10,064	10,064	0.23	0.98

Detention
Post-Developed Composite CN Calculations

Drainage Area ID	Lawn B	Lawn Area, SF	Imperv. B	Imperv. Area, SF	Total Area SF	Total Area Acres	Composite CN
DB 1 POST	61	78,851	98	108,457	187,308	4.30	82

CIVIL DESIGN ADVANTAGE

3405 SE Crossroads Dr., SUITE G GRIMES, IA 50111

PROJECT: Kum & Go 0131 JOB NO. 1811.616 Page ____ of ____ Pages

SUBJECT: Storm Water Calculations DATE: 02/20/19 COMP. BY: DSH OK'D BY: RAH

Pre-Developed Time of Concentration:

Drainage Area: DB 1 EXISTING

Sheet Flow:

Flow length, L_1 =	100	feet
Land slope, s_1 =	0.52	%
Manning's n=	0.17	
2-Year 24-hr p_2=	3.08	
Travel time, t_1 =	18.9	minutes

Design Equation:

$$t_1 = \frac{0.007[(n)(L_1)]^{0.8}}{\sqrt{p_2}(s)^{0.4}}$$

Shallow Concentrated Flow:

Flow length, L_2 =	342	feet
Land slope, s_2 =	1.48	%
Ground Cover No. =	4	Table 1
Flow velocity, v_2 =	1.06	ft/sec
Travel time, t_2 =	5.4	minutes

Table 1:

Ground Cover:	No.	Equation	
Forest w/ heavy ground litter & meadow	1	$v_2 = s_2^{1/2}$ x	2.516
Minimum tillage cultivation and woodlands	2	$v_2 = s_2^{1/2}$ x	5.032
Short grass pasture & lawns	3	$v_2 = s_2^{1/2}$ x	6.962
Cultivated straight row crops	4	$v_2 = s_2^{1/2}$ x	8.726
Nearly bare ground	5	$v_2 = s_2^{1/2}$ x	9.965
Grassed waterway	6	$v_2 = s_2^{1/2}$ x	16.135
Paved area & shallow gutter flow	7	$v_2 = s_2^{1/2}$ x	20.238

Channel Flow:

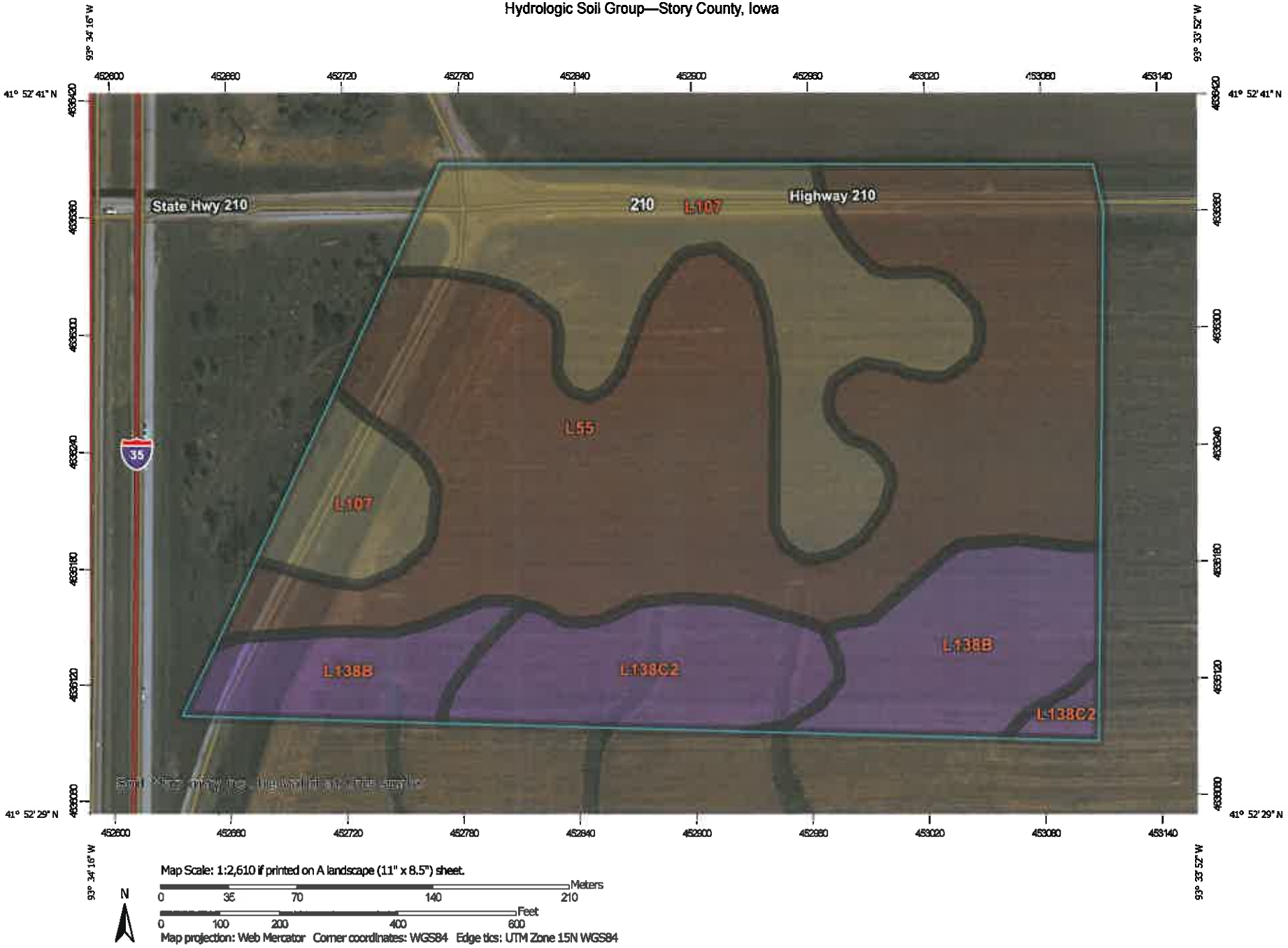
Flow length, L_3 =	0	feet
Land slope, s_3 =	1.2	%
Manning's n =	0.025	
Left Slope =	4	:1
Bottom Width =	5	feet
Right Slope =	4	:1
Flow depth =	1	feet
Flow area, a =	9	ft^2
Wetted perim., P_w =	13.25	ft
Flow velocity, v_3 =	5.03	ft/sec
Travel time, t_3 =	0.0	minutes

Design Equation:

$$v_3 = \frac{1.486(a/P_w)^{2/3}s_3^{1/2}}{n}$$

q= 45.2911

Time of Concentration, t_c = 24.3 minutes $t_c = t_1 + t_2 + t_3$


93° 34' 16" W
93° 33' 52" W
41° 52' 41" N
41° 52' 29" N
452600
452660
452720
452780
452840
452900
452960
453020
453080
453140
4639420
4639360
4639300
4639240
4639180
4639120
4639060
State Hwy 210
210
Highway 210
L107
L55
L107
L138B
L138C2
L138B
L138C2
35
Map Scale: 1:2,610 if printed on A landscape (11" x 8.5") sheet.
Meters
0
35
70
140
210
Feet
0
100
200
400
600
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Story County, Iowa
Survey Area Data: Version 29, Sep 7, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 26, 2012—Sep 28, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
L55	Nicollet loam, 1 to 3 percent slopes	B/D	14.5	49.4%
L107	Webster clay loam, Bemis moraine, 0 to 2 percent slopes	C/D	7.4	25.2%
L138B	Clarion loam, Bemis moraine, 2 to 6 percent slopes	B	4.5	15.2%
L138C2	Clarion loam, Bemis moraine, 6 to 10 percent slopes, moderately eroded	B	3.0	10.3%
Totals for Area of Interest			**29.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

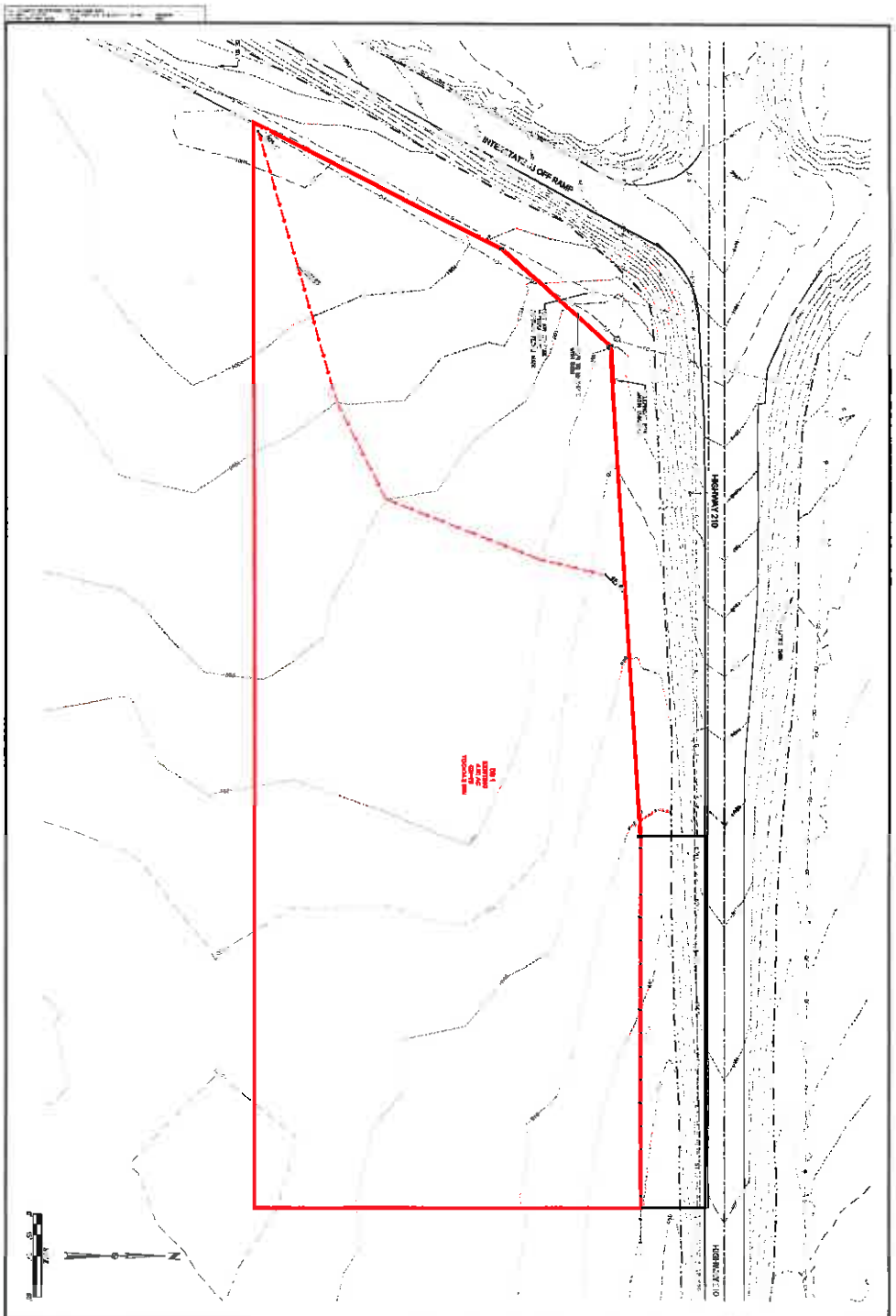
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



1 OF 1 SHEETS	**KUM & GO #0131** **EXISTING MAP**	CIVIL DESIGN ADVANTAGE	3405 S.E. CROSSROADS DRIVE, SUITE 3 GRIMES, IOWA 50111 PHONE: (515) 369-4400 FAX: (515) 369-4410 ENGINEER:RAH TECH: DSH

Hydraflow Table of Contents

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Legend

Hyd.	Origin	Description
1	SCS Runoff	DB 1 EXISTING

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	------	4.003	-------	6.215	------	-------	-------	17.82	DB 1 EXISTING

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

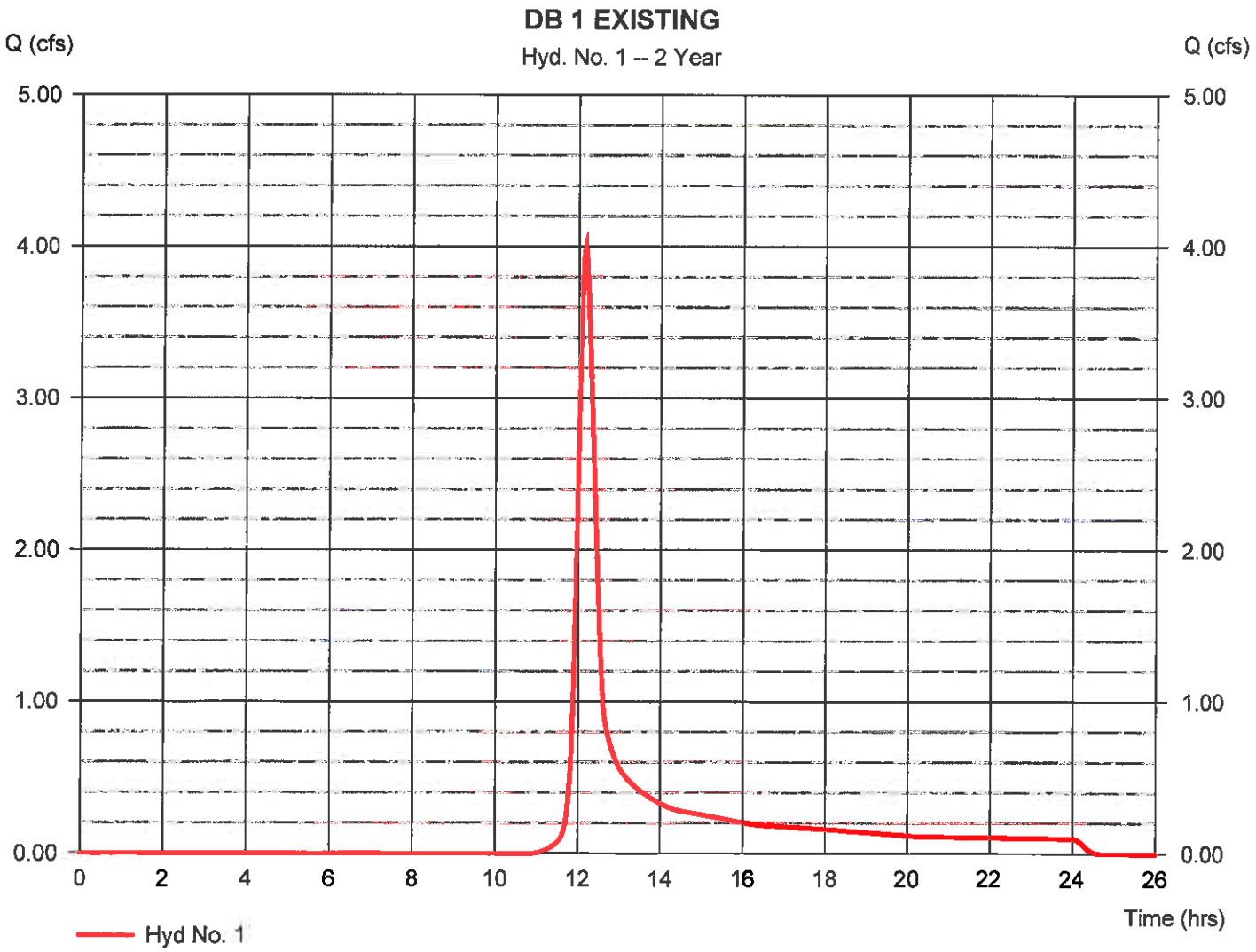
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	4.003	2	730	15,572	------	------	------	DB 1 EXISTING

Hydrograph Report

Hyd. No. 1

DB 1 EXISTING

Hydrograph type	= SCS Runoff	Peak discharge	= 4.003 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 15,572 cuft
Drainage area	= 4.300 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 24.30 min
Total precip.	= 3.08 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

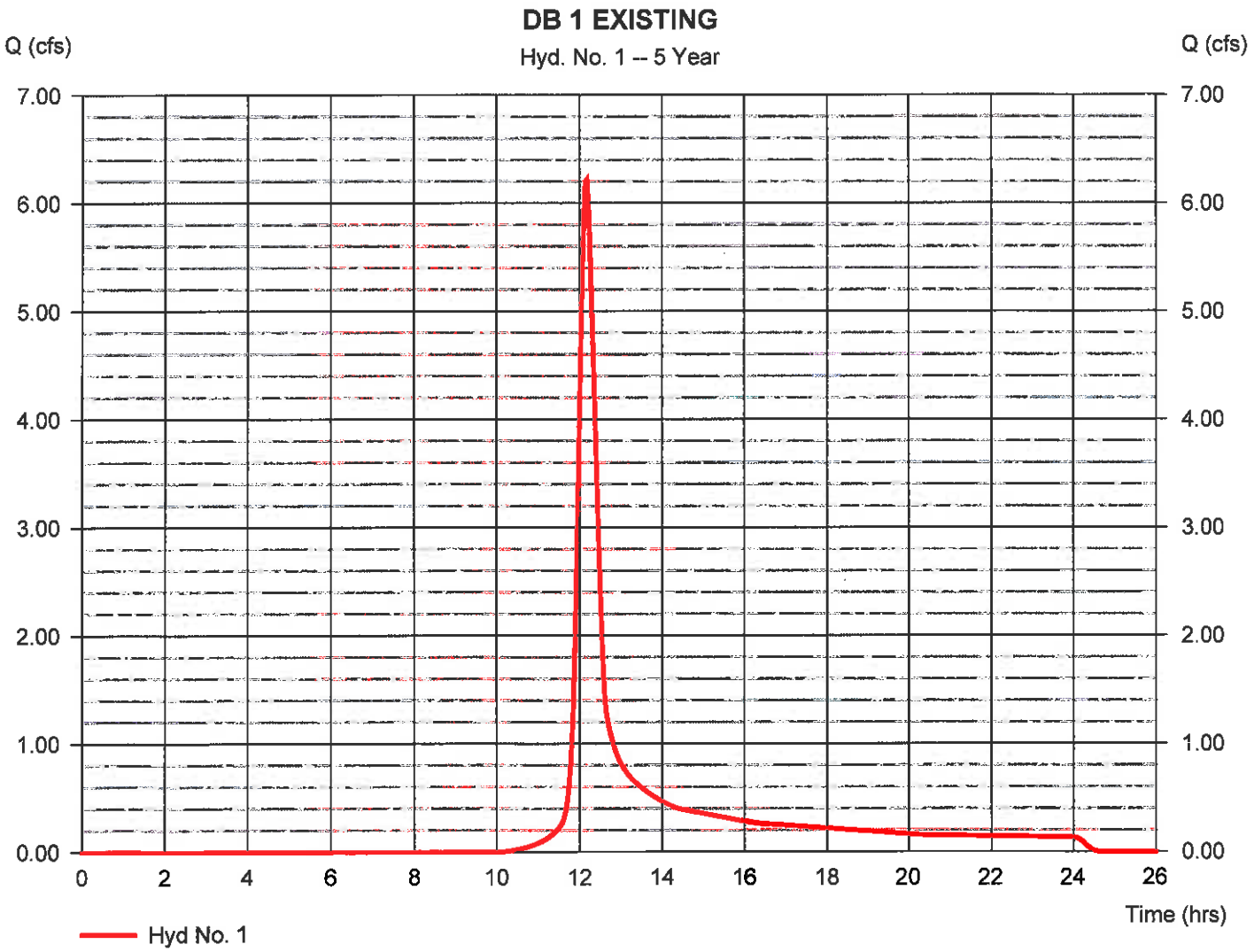
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time Interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	6.215	2	730	23,440	-----	-----	-----	DB 1 EXISTING

Hydrograph Report

Hyd. No. 1

DB 1 EXISTING

Hydrograph type	= SCS Runoff	Peak discharge	= 6.215 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 23,440 cuft
Drainage area	= 4.300 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 24.30 min
Total precip.	= 3.81 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

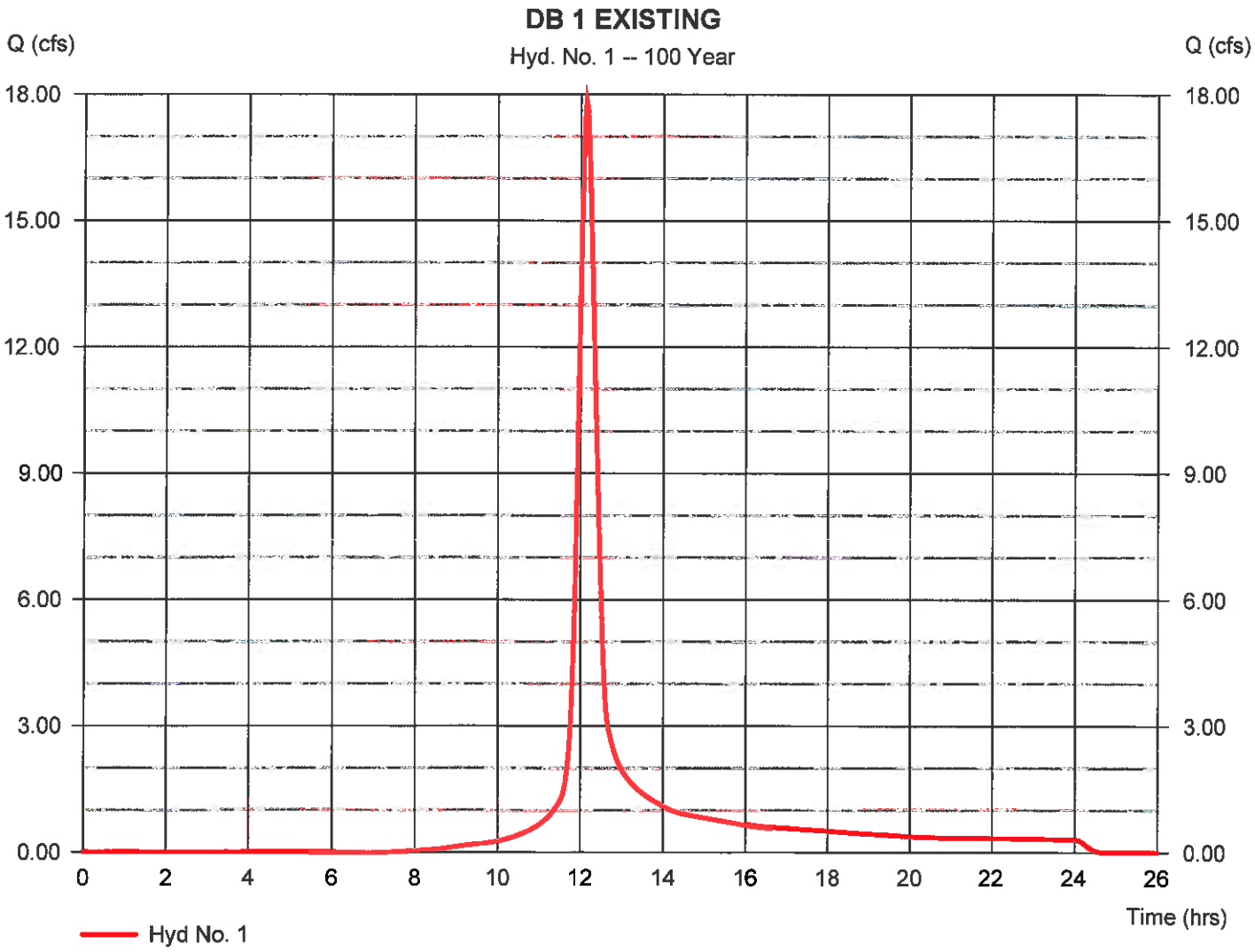
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	17.82	2	728	65,384	------	------	------	DB 1 EXISTING

Hydrograph Report

Hyd. No. 1

DB 1 EXISTING

Hydrograph type	= SCS Runoff	Peak discharge	= 17.82 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 65,384 cuft
Drainage area	= 4.300 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 24.30 min
Total precip.	= 7.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	66.7390	18.4000	0.9371	-------
2	101.8674	20.8000	0.9811	-------
3	0.0000	0.0000	0.0000	-------
5	124.8469	20.4000	0.9780	-------
10	145.4638	20.8000	0.9749	-------
25	181.9707	20.8000	0.9836	-------
50	201.7299	20.9000	0.9769	-------
100	239.1196	21.3001	0.9873	-------

File name: Central Iowa.IDF

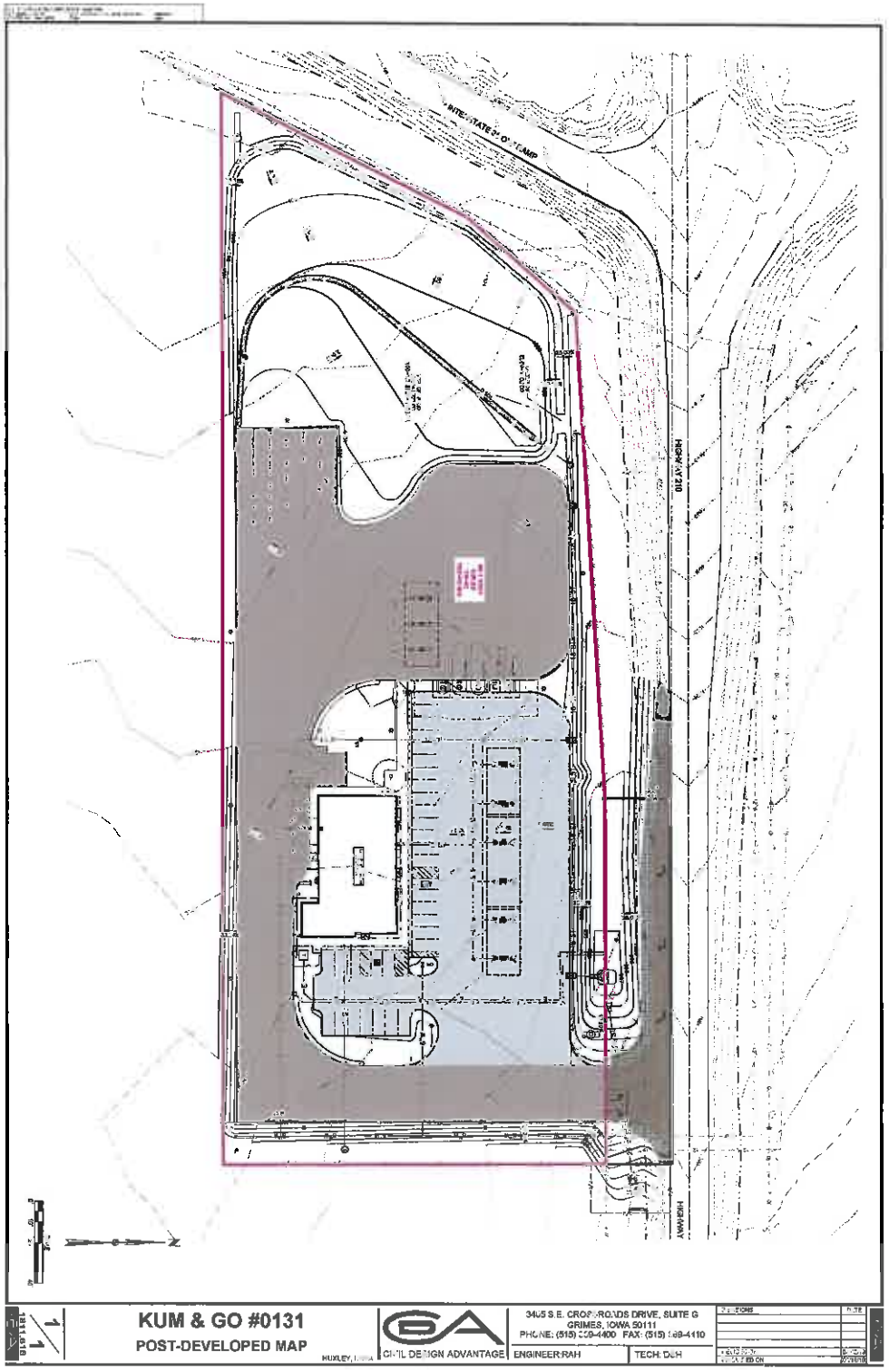
Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	3.48	2.90	2.49	2.19	1.95	1.76	1.61	1.48	1.37	1.27	1.19	1.12
2	4.20	3.53	3.04	2.68	2.39	2.16	1.97	1.81	1.68	1.56	1.46	1.37
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	5.28	4.43	3.81	3.35	2.99	2.70	2.46	2.26	2.09	1.95	1.82	1.71
10	6.12	5.15	4.44	3.91	3.50	3.16	2.88	2.65	2.46	2.29	2.14	2.01
25	7.44	6.25	5.39	4.74	4.23	3.82	3.48	3.20	2.96	2.76	2.58	2.42
50	8.40	7.07	6.10	5.37	4.80	4.34	3.96	3.64	3.37	3.14	2.94	2.76
100	9.48	7.98	6.89	6.07	5.42	4.90	4.47	4.11	3.80	3.54	3.31	3.11

Tc = time in minutes. Values may exceed 60.

Precip. file name: C:\Users\ccalhoun\Desktop\Rainfall Intensities.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.67	3.08	0.00	3.81	4.46	5.44	6.26	7.12
SCS 6-Hr	2.05	2.40	0.00	3.03	3.61	4.47	5.20	5.98
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



KUM & GO #0131

POST-DEVELOPED MAP

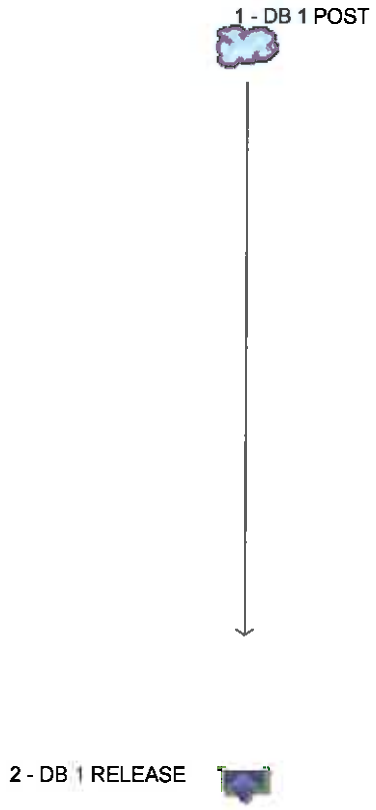
3405 S.E. CROSSROADS DRIVE, SUITE G
GRIMES, IOWA 50111
PHONE: (515) 369-4400 FAX: (515) 369-4410

HUXLEY, IOWA | CIVIL DESIGN ADVANTAGE | ENGINEER: RAH | TECH: DJH

Hydraflow Table of Contents

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	DB 1 POST
2	Reservoir	DB 1 RELEASE

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	-------	7.798	-------	11.08	------	-------	-------	26.78	DB 1 POST
2	Reservoir	1	-------	3.986	-------	4.298	-------	------	------	4.917	DB 1 RELEASE

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

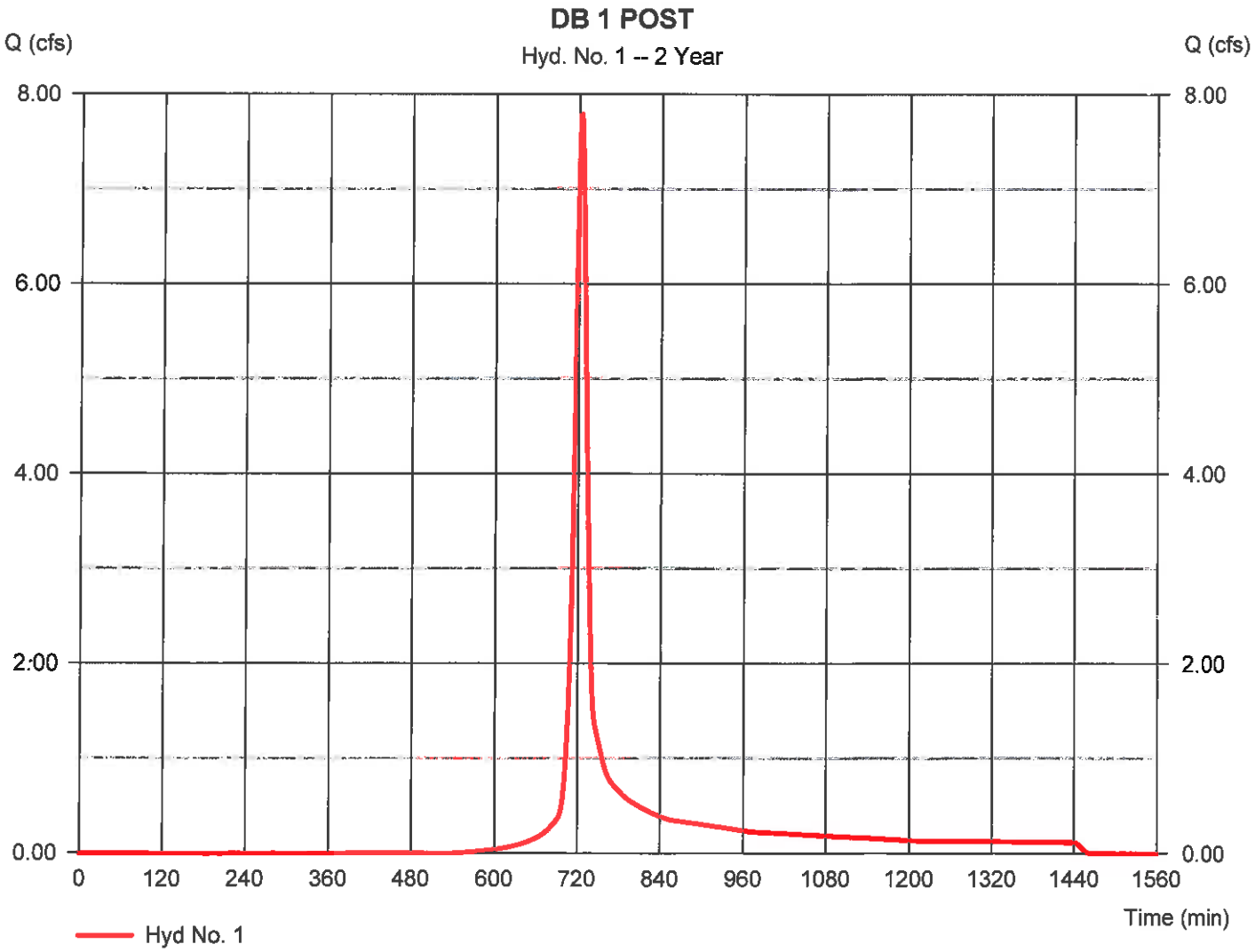
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	7.798	2	722	21,949	-----	-----	-----	DB 1 POST
2	Reservoir	3.986	2	732	21,949	1	999.31	3,361	DB 1 RELEASE

Hydrograph Report

Hyd. No. 1

DB 1 POST

Hydrograph type	= SCS Runoff	Peak discharge	= 7.798 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 21,949 cuft
Drainage area	= 4.300 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 3.08 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



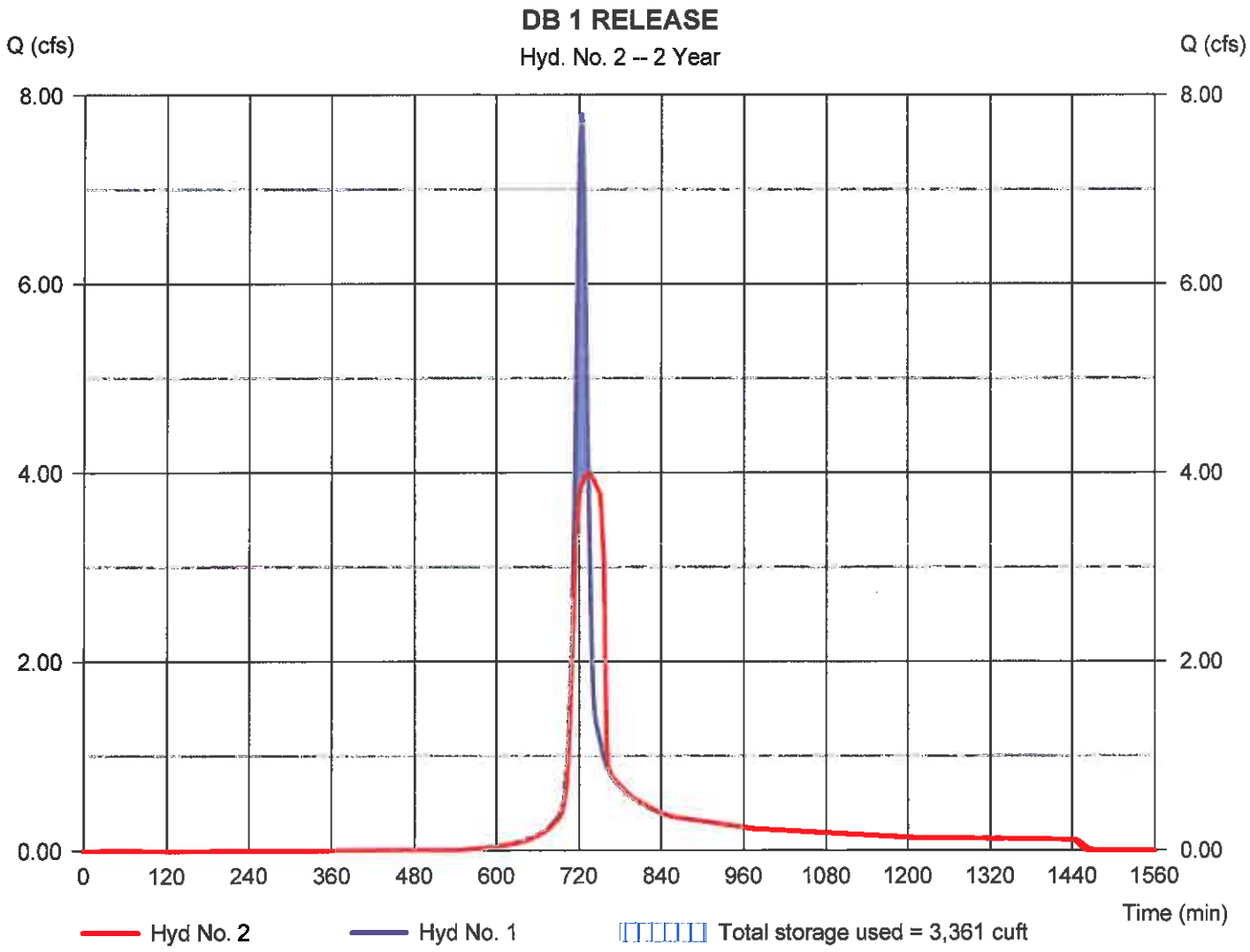
Hydrograph Report

Hyd. No. 2

DB 1 RELEASE

Hydrograph type	= Reservoir	Peak discharge	= 3.986 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 21,949 cuft
Inflow hyd. No.	= 1 - DB 1 POST	Max. Elevation	= 999.31 ft
Reservoir name	= POND 1	Max. Storage	= 3,361 cuft

Storage Indication method used.



Pond No. 1 - POND 1

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 996.19 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	996.19	00	0	0
1.81	998.00	425	385	385
1.96	998.15	425	64	448
2.81	999.00	1,288	728	1,176
3.81	1000.00	13,139	7,214	8,390
4.81	1001.00	34,433	23,786	32,176
5.81	1002.00	46,836	40,634	72,810

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 9.60	0.00	0.00	0.00
Span (in)	= 9.60	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 996.19	0.00	0.00	0.00
Length (ft)	= 17.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 1001.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	996.19	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.18	38	996.37	0.11 oc	---	---	---	0.00	---	---	---	---	---	0.114
0.36	77	996.55	0.34 oc	---	---	---	0.00	---	---	---	---	---	0.343
0.54	115	996.73	0.59 oc	---	---	---	0.00	---	---	---	---	---	0.590
0.72	154	996.91	0.78 oc	---	---	---	0.00	---	---	---	---	---	0.780
0.90	192	997.10	1.18 oc	---	---	---	0.00	---	---	---	---	---	1.184
1.09	231	997.28	1.65 oc	---	---	---	0.00	---	---	---	---	---	1.653
1.27	269	997.46	2.02 oc	---	---	---	0.00	---	---	---	---	---	2.017
1.45	308	997.64	2.32 oc	---	---	---	0.00	---	---	---	---	---	2.324
1.63	346	997.82	2.60 oc	---	---	---	0.00	---	---	---	---	---	2.595
1.81	385	998.00	2.84 oc	---	---	---	0.00	---	---	---	---	---	2.840
1.83	391	998.02	2.86 oc	---	---	---	0.00	---	---	---	---	---	2.859
1.84	397	998.03	2.88 oc	---	---	---	0.00	---	---	---	---	---	2.879
1.86	404	998.05	2.90 oc	---	---	---	0.00	---	---	---	---	---	2.898
1.87	410	998.06	2.92 oc	---	---	---	0.00	---	---	---	---	---	2.917
1.89	417	998.08	2.94 oc	---	---	---	0.00	---	---	---	---	---	2.936
1.90	423	998.09	2.95 oc	---	---	---	0.00	---	---	---	---	---	2.954
1.92	429	998.11	2.97 oc	---	---	---	0.00	---	---	---	---	---	2.973
1.93	436	998.12	2.99 oc	---	---	---	0.00	---	---	---	---	---	2.992
1.95	442	998.14	3.01 ic	---	---	---	0.00	---	---	---	---	---	3.008
1.96	448	998.15	3.02 ic	---	---	---	0.00	---	---	---	---	---	3.023
2.05	521	998.24	3.10 ic	---	---	---	0.00	---	---	---	---	---	3.104
2.13	594	998.32	3.18 ic	---	---	---	0.00	---	---	---	---	---	3.183
2.22	667	998.41	3.26 ic	---	---	---	0.00	---	---	---	---	---	3.260
2.30	740	998.49	3.34 ic	---	---	---	0.00	---	---	---	---	---	3.336
2.39	812	998.58	3.41 ic	---	---	---	0.00	---	---	---	---	---	3.410
2.47	885	998.66	3.48 ic	---	---	---	0.00	---	---	---	---	---	3.482
2.56	958	998.75	3.55 ic	---	---	---	0.00	---	---	---	---	---	3.553
2.64	1,031	998.83	3.62 ic	---	---	---	0.00	---	---	---	---	---	3.622
2.73	1,104	998.92	3.69 ic	---	---	---	0.00	---	---	---	---	---	3.690
2.81	1,176	999.00	3.76 ic	---	---	---	0.00	---	---	---	---	---	3.757
2.91	1,898	999.10	3.83 ic	---	---	---	0.00	---	---	---	---	---	3.834
3.01	2,619	999.20	3.91 ic	---	---	---	0.00	---	---	---	---	---	3.910
3.11	3,340	999.30	3.98 ic	---	---	---	0.00	---	---	---	---	---	3.984
3.21	4,062	999.40	4.06 ic	---	---	---	0.00	---	---	---	---	---	4.057
3.31	4,783	999.50	4.13 ic	---	---	---	0.00	---	---	---	---	---	4.128

Continues on next page...

POND 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.41	5,504	999.60	4.20 ic	---	---	---	0.00	---	---	---	---	---	4.198
3.51	6,226	999.70	4.27 ic	---	---	---	0.00	---	---	---	---	---	4.268
3.61	6,947	999.80	4.34 ic	---	---	---	0.00	---	---	---	---	---	4.336
3.71	7,669	999.90	4.40 ic	---	---	---	0.00	---	---	---	---	---	4.403
3.81	8,390	1000.00	4.47 ic	---	---	---	0.00	---	---	---	---	---	4.469
3.91	10,768	1000.10	4.53 ic	---	---	---	0.00	---	---	---	---	---	4.534
4.01	13,147	1000.20	4.60 ic	---	---	---	0.00	---	---	---	---	---	4.598
4.11	15,526	1000.30	4.66 ic	---	---	---	0.00	---	---	---	---	---	4.661
4.21	17,904	1000.40	4.72 ic	---	---	---	0.00	---	---	---	---	---	4.724
4.31	20,283	1000.50	4.79 ic	---	---	---	0.00	---	---	---	---	---	4.785
4.41	22,661	1000.60	4.85 ic	---	---	---	0.00	---	---	---	---	---	4.846
4.51	25,040	1000.70	4.91 ic	---	---	---	0.00	---	---	---	---	---	4.906
4.61	27,419	1000.80	4.97 ic	---	---	---	0.00	---	---	---	---	---	4.965
4.71	29,797	1000.90	5.02 ic	---	---	---	0.00	---	---	---	---	---	5.024
4.81	32,176	1001.00	5.08 ic	---	---	---	0.00	---	---	---	---	---	5.082
4.91	36,239	1001.10	5.14 ic	---	---	---	0.82	---	---	---	---	---	5.961
5.01	40,303	1001.20	5.20 ic	---	---	---	2.32	---	---	---	---	---	7.521
5.11	44,366	1001.30	5.25 ic	---	---	---	4.27	---	---	---	---	---	9.523
5.21	48,430	1001.40	5.31 ic	---	---	---	6.58	---	---	---	---	---	11.88
5.31	52,493	1001.50	5.36 ic	---	---	---	9.19	---	---	---	---	---	14.55
5.41	56,557	1001.60	5.42 ic	---	---	---	12.08	---	---	---	---	---	17.50
5.51	60,620	1001.70	5.47 ic	---	---	---	15.22	---	---	---	---	---	20.69
5.61	64,683	1001.80	5.52 ic	---	---	---	18.60	---	---	---	---	---	24.12
5.71	68,747	1001.90	5.58 ic	---	---	---	22.19	---	---	---	---	---	27.77
5.81	72,810	1002.00	5.63 ic	---	---	---	26.00	---	---	---	---	---	31.63

...End

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

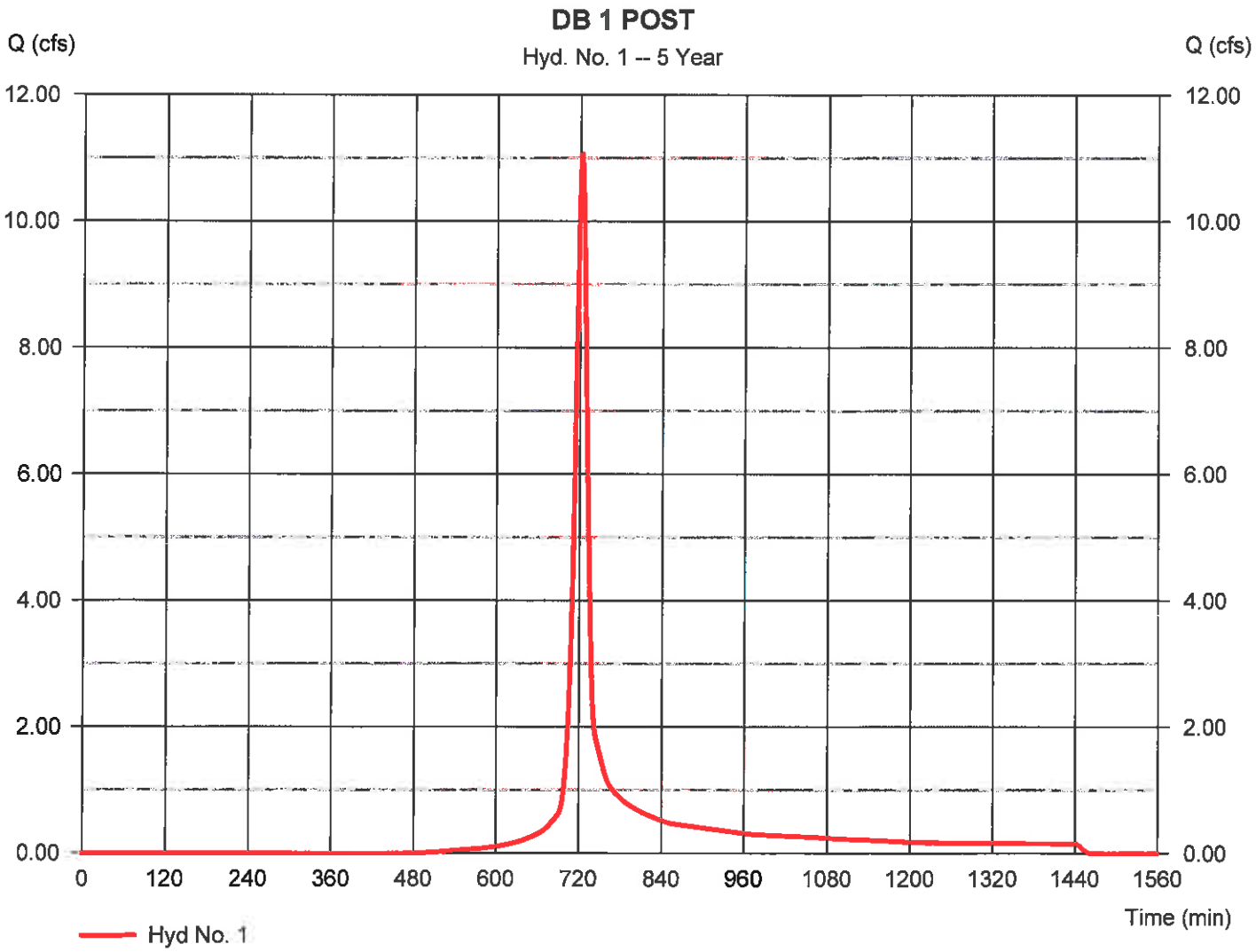
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	11.08	2	722	31,070	------	-----	-----	DB 1 POST
2	Reservoir	4.298	2	734	31,070	1	999.75	6,553	DB 1 RELEASE

Hydrograph Report

Hyd. No. 1

DB 1 POST

Hydrograph type	= SCS Runoff	Peak discharge	= 11.08 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 31,070 cuft
Drainage area	= 4.300 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 3.81 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



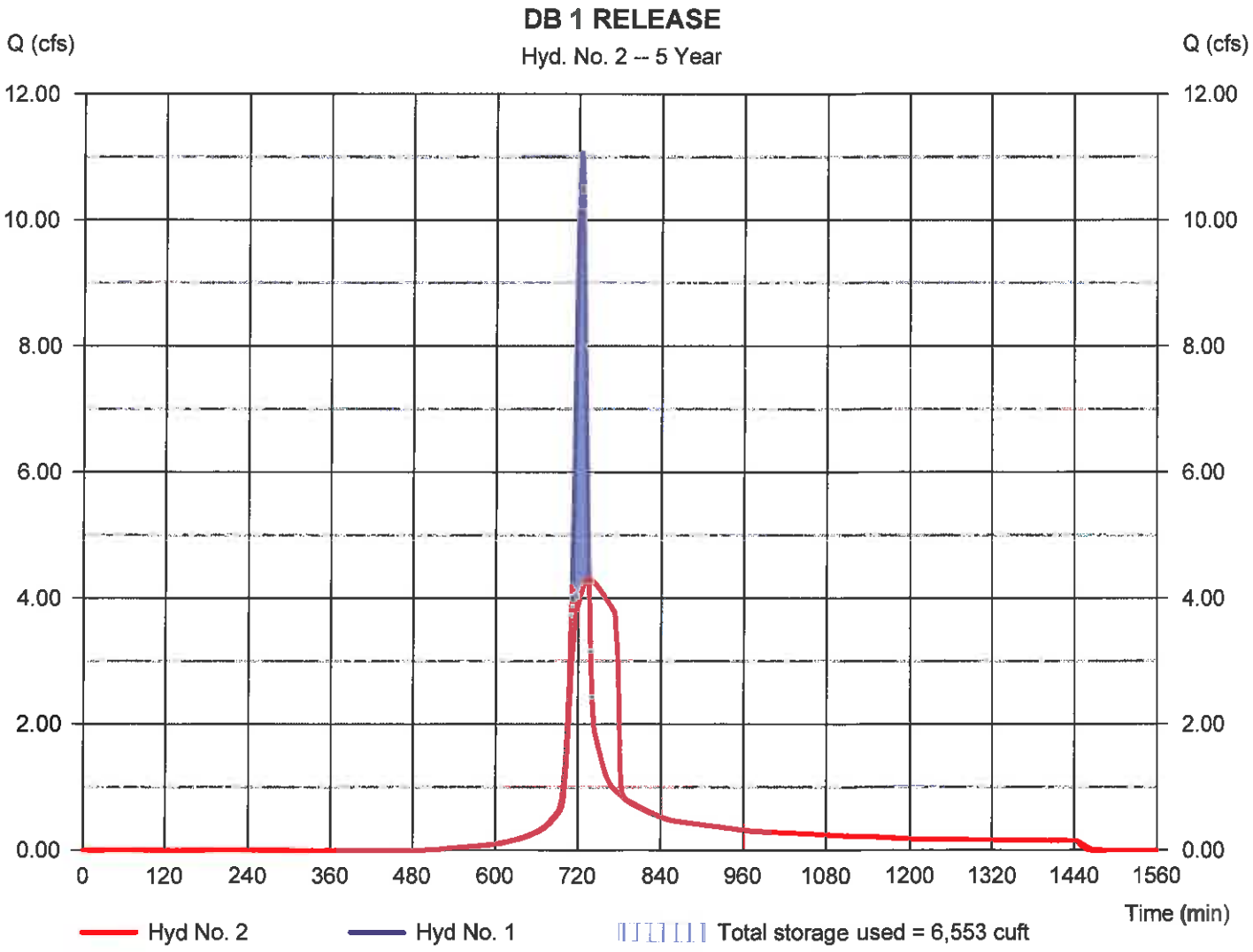
Hydrograph Report

Hyd. No. 2

DB 1 RELEASE

Hydrograph type	= Reservoir	Peak discharge	= 4.298 cfs
Storm frequency	= 5 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 31,070 cuft
Inflow hyd. No.	= 1 - DB 1 POST	Max. Elevation	= 999.75 ft
Reservoir name	= POND 1	Max. Storage	= 6,553 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

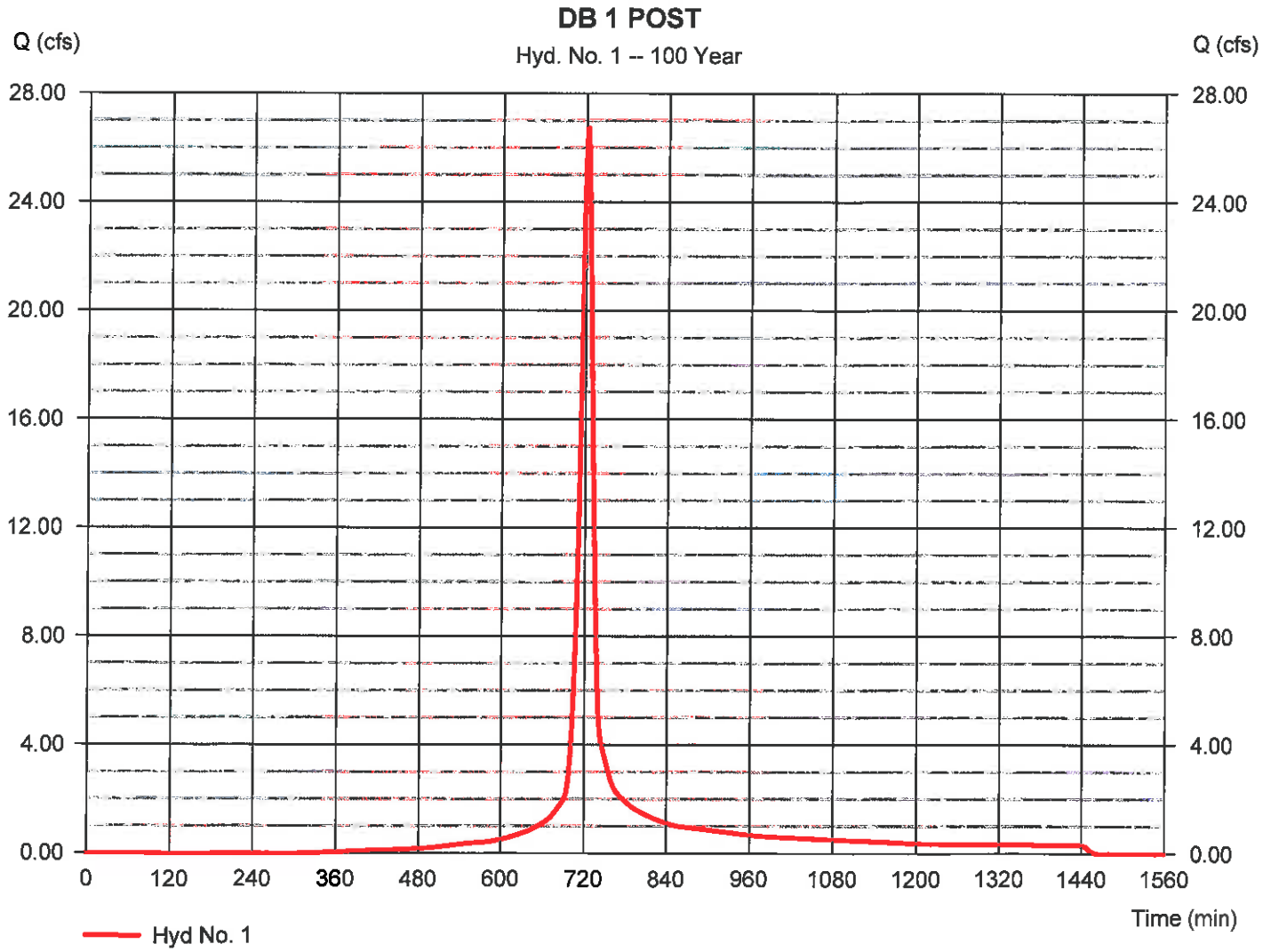
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	26.78	2	722	76,531	-----	-----	-----	DB 1 POST
2	Reservoir	4.917	2	740	76,531	1	1000.72	25,483	DB 1 RELEASE

Hydrograph Report

Hyd. No. 1

DB 1 POST

Hydrograph type	= SCS Runoff	Peak discharge	= 26.78 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 76,531 cuft
Drainage area	= 4.300 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 7.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



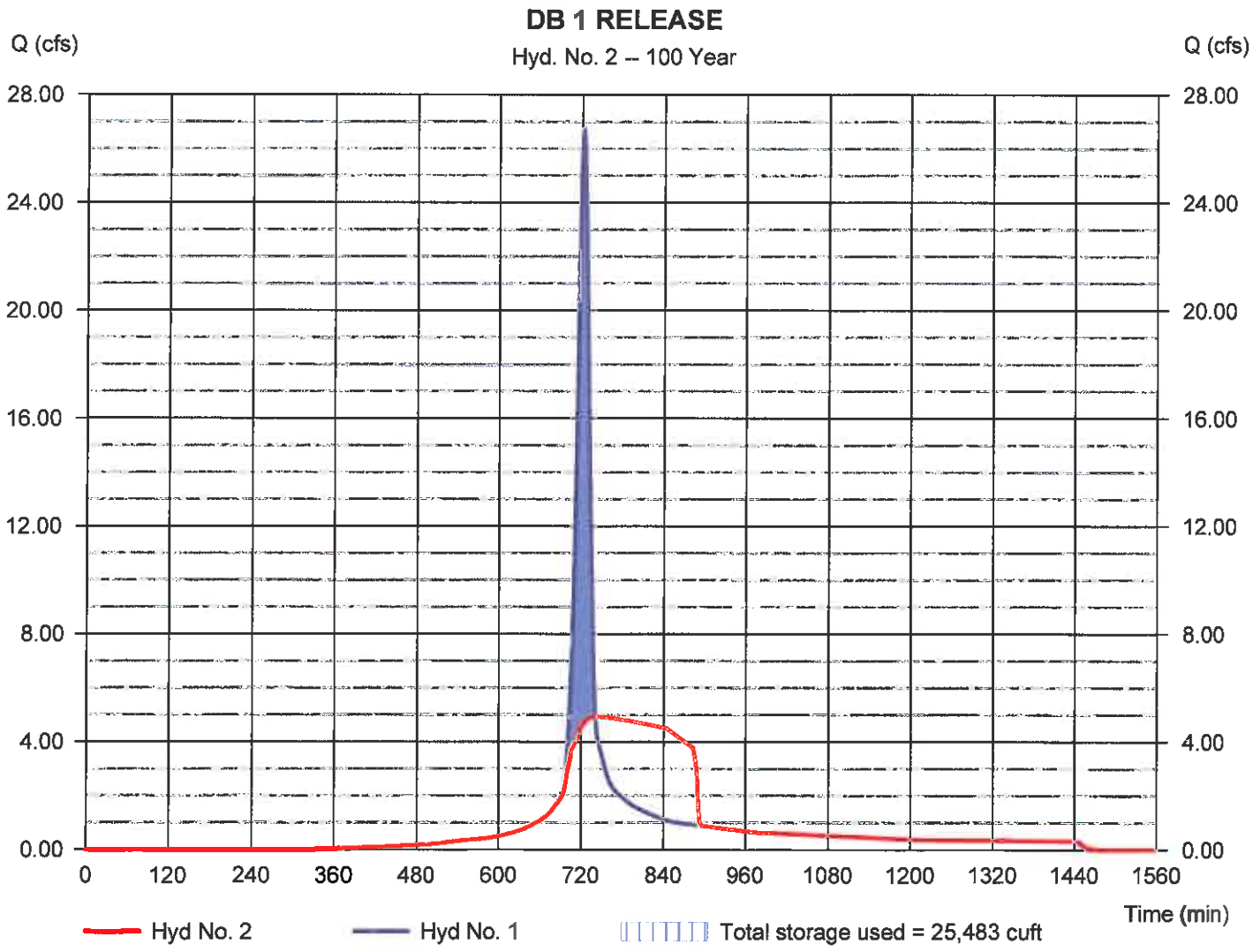
Hydrograph Report

Hyd. No. 2

DB 1 RELEASE

Hydrograph type	= Reservoir	Peak discharge	= 4.917 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 76,531 cuft
Inflow hyd. No.	= 1 - DB 1 POST	Max. Elevation	= 1000.72 ft
Reservoir name	= POND 1	Max. Storage	= 25,483 cuft

Storage Indication method used.



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	66.7390	18.4000	0.9371	-------
2	101.8674	20.8000	0.9811	-------
3	0.0000	0.0000	0.0000	-------
5	124.8469	20.4000	0.9780	-------
10	145.4638	20.8000	0.9749	-------
25	181.9707	20.8000	0.9836	-------
50	201.7299	20.9000	0.9769	-------
100	239.1196	21.3001	0.9873	-------

File name: Central Iowa.IDF

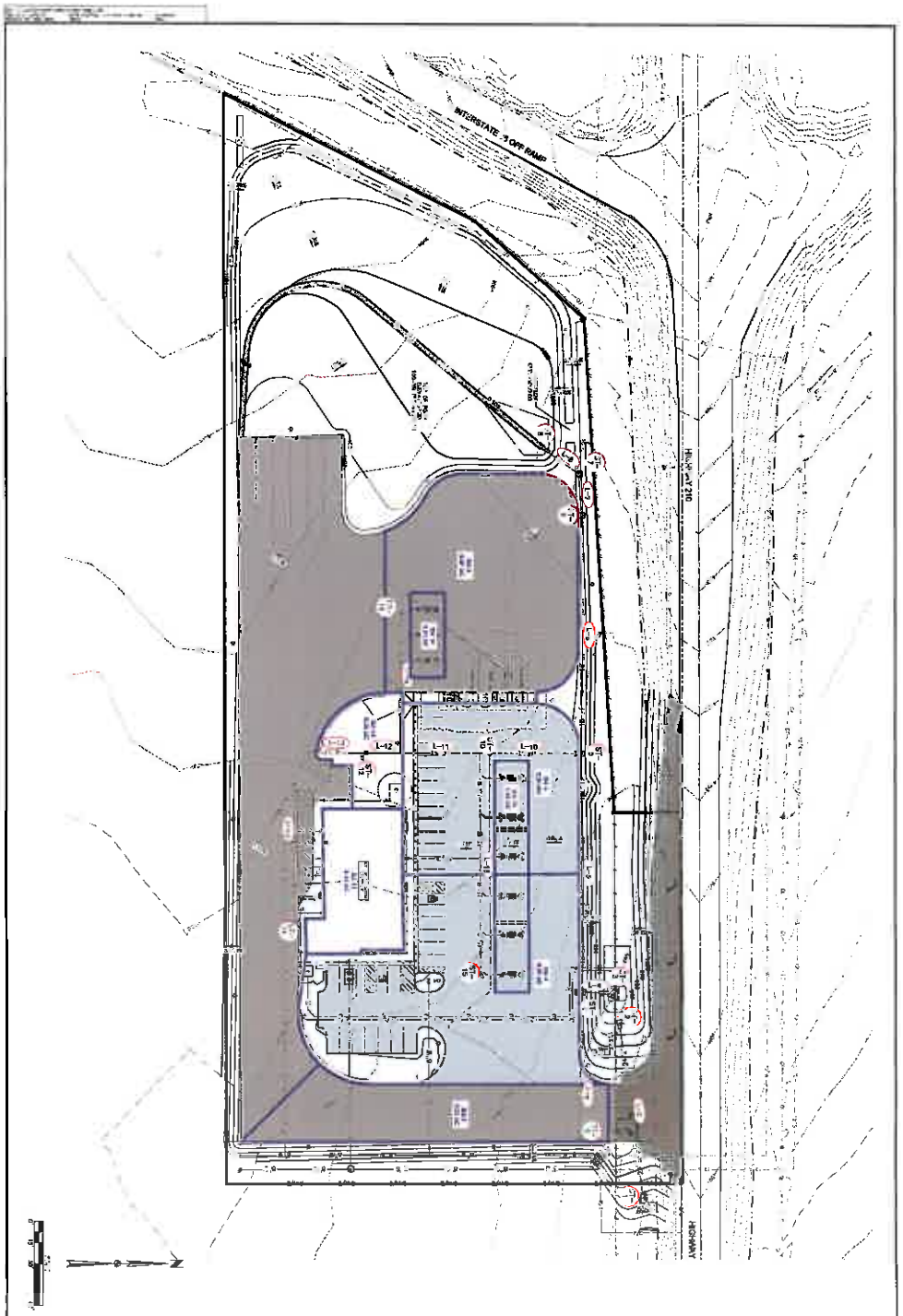
Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	3.48	2.90	2.49	2.19	1.95	1.76	1.61	1.48	1.37	1.27	1.19	1.12
2	4.20	3.53	3.04	2.68	2.39	2.16	1.97	1.81	1.68	1.56	1.46	1.37
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	5.28	4.43	3.81	3.35	2.99	2.70	2.46	2.26	2.09	1.95	1.82	1.71
10	6.12	5.15	4.44	3.91	3.50	3.16	2.88	2.65	2.46	2.29	2.14	2.01
25	7.44	6.25	5.39	4.74	4.23	3.82	3.48	3.20	2.96	2.76	2.58	2.42
50	8.40	7.07	6.10	5.37	4.80	4.34	3.96	3.64	3.37	3.14	2.94	2.76
100	9.48	7.98	6.89	6.07	5.42	4.90	4.47	4.11	3.80	3.54	3.31	3.11

Tc = time in minutes. Values may exceed 60.

Precip. file name: C:\Users\ccalhoun\Desktop\Rainfall Intensities.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.67	3.08	0.00	3.81	4.46	5.44	6.26	7.12
SCS 6-Hr	2.05	2.40	0.00	3.03	3.61	4.47	5.20	5.98
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



KUM & GO #0131

STORM SEWER MAP

3405 S.E. CROSSROADS DRIVE, SUITE G
GRIMES, IOWA 50111
PHONE: (515) 369-4400 FAX: (515) 369-4410
CIVIL DESIGN ADVANTAGE | ENGINEER:RAH | TECH: DTH

Project: Kum & Go #[illegible]
Proj. No: 1811[illegible]
Designed: DSH
Date: [illegible]

List of Intakes and Utility Accesses

Structure Number ST-#	Location	Type or Standard Road Plan	FL / TC / RIM Elevation	Note
ST-1		[illegible] RCP [illegible]	FL= [illegible]	
ST-2		[illegible] RCP APRON	FL= 993.00	
ST-[illegible]		[illegible] APRON	FL= 998.[illegible]	
ST-4		[illegible] 503 INTAKE	TC= 10[illegible]	
ST-5		[illegible] INTAKE	TC= 10[illegible]	
ST-6		[illegible] 508 INTAKE	TC= [illegible]	
ST-7		[illegible] 01 [illegible] IN. DIA	RIM= 10[illegible] 51	
ST-8		18" RCP APRON	FL= [illegible]	
ST-[illegible]		[illegible] INTAKE	TC= 100[illegible]	
ST-10		10" x [illegible] TEE	FL= [illegible]	
ST-11		1[illegible] x [illegible] TEE	FL= [illegible]	
ST-12		HDPE INLINE DRAIN	FL= [illegible]	
ST-13		[illegible] DEGREE BEND	FL= [illegible]	
ST-14		CLEANOUT	FL= 100[illegible]66	
ST-15		CLEANOUT	FL= [illegible]	
ST-1[illegible]		CLEANOUT	FL= [illegible]	

Notes:

List of Storm Sewer Pipe

Pipe Number L-#	Structure To ST-#	Structure From ST-#	Storm Sewer Material	Diameter inches	Length (ft)	Slope %	FL (out)	FL (in)	Note
[illegible]	ST-1	ST-[illegible]	[illegible]	[illegible]	101	[illegible]	[illegible]	[illegible]3.00	1
L-[illegible]	ST-3	ST-[illegible]	[illegible]	1[illegible]	17	[illegible]	[illegible]10	[illegible]	1
L-[illegible]	ST-4	ST-[illegible]	RCP	[illegible]	1[illegible]6	[illegible]	[illegible]	[illegible]	
L-[illegible]	ST-5	ST-[illegible]	RCP	18	10[illegible]	[illegible]	[illegible]7.09	[illegible]	
L-[illegible]	ST-6	ST-[illegible]	RCP	18	[illegible]	0.40	997.[illegible]	[illegible]	
L-[illegible]	ST-7	ST-[illegible]	RCP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]16	1
L-[illegible]	ST-4	ST-[illegible]	RCP	15	10[illegible]	[illegible]	[illegible]	[illegible]	
L-[illegible]	ST-5	ST-[illegible]	HDPE	10	[illegible]	[illegible]	[illegible]70	[illegible]	
L-[illegible]	ST-10	ST-11	HDPE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
L-1[illegible]	ST-11	ST-[illegible]	[illegible]	10	[illegible]	[illegible]	[illegible]	[illegible]18	
L-1[illegible]	ST-12	ST-[illegible]	HDPE	8	[illegible]	[illegible]	[illegible]	[illegible]	
L-1[illegible]	ST-1[illegible]	ST-[illegible]	HDPE	8	11[illegible]	[illegible]	[illegible]71	[illegible]	
L-1[illegible]	ST-1[illegible]	ST-1[illegible]	HDPE	8	[illegible]	[illegible]	[illegible]	999.[illegible]	
L-1[illegible]	ST-11	ST-[illegible]	HDPE	8	[illegible]	[illegible]	[illegible]	[illegible]	

Notes:
1. INCLUDES APRON LENGTH

Storm Sewer Pipe Design Information

Manning's n: RCP = [illegible] PVC = [illegible] Design Storm = [illegible] year

Drainage Area Acres	C	[illegible]	Accumulated Equiv. Area	Time of Conc. min	Rainfall Intensity	Storm Runoff cfs	Sump Limit	Sump Flow	Pipe Capacity Design cfs	Pipe Capacity Full Flow cfs	Flow Velocity Design	Flow Velocity Full Flow	Travel Time min	Note
														1
0.[illegible]	0.[illegible]	0.[illegible]13	1.[illegible]	17.0	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2
0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
0.47	0.98	[illegible]	0.[illegible]61	15.0	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
0.00	0.[illegible]	[illegible]	0.000	[illegible]	[illegible]	0.7[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
0.00	[illegible]	[illegible]	[illegible]000	[illegible]	[illegible]	0.[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
0.23	0.[illegible]	[illegible]	[illegible]225	15.[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	0.8[illegible]	[illegible]	0.2[illegible]	15.[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	0.2[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	0.[illegible]	[illegible]	0.107	16.1	[illegible]	1.01			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]14	0.98	[illegible]	0.1[illegible]	15.0	[illegible]	1.[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	0.[illegible]	[illegible]	0.0[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	0.[illegible]	[illegible]	0.[illegible]	[illegible]	[illegible]	0.[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Notes:
1. PIPE WAS ANALYZED AS A CULVERT WITH HY-[illegible]
2. REFER TO DETENTION CALCULATION RELEASE Q_{100} [illegible]

CIVIL DESIGN ADVANTAGE
3405 SE CROSSROADS DR., SUITE G GRIMES, IA 50111

PROJECT: Kum & Go 0131 JOB NO. 1811.616 Page ____ of ____ Pages
SUBJECT: Storm Water Calculations DATE: 04/04/19 DESIGNED: DSH CHECKED: ____

INTAKE ST-4 CAPACITY CALCUALTIONS

EQUATIONS

1. ORIFICE: $Q = 0.6\ A\ (2gh)^{1/2}$

WHERE - Q = flow, cfs
A = area of opening, ft^2
g = gravity (32.2 ft/s^2)
h = headwater from center of opening, ft

2. WEIR: $Q = 3.3*P*h^{1.5}$

WHERE - Q = flow, cfs
P= Perimeter of grate in feet
h = headwater from center of opening, ft

$Q_{100} = C_{100} I_{100} A$
Assume a Time of Concentration = 15 min.

C_{100} = 0.98
I_{100} = 7.44 in/hr
A = 0.57 acres
$Q_{100} = 0.70 * 7.44 * 0.47$
Q_{100} = 4.16 cfs

CALCULATIONS

1. Solve for required head given flow and open area for casting using Orifice Equation:

LOCATION: **ST-4**

INPUT: Q_{100} = 4.16 cfs (From Rational Equation)
A = 1.95 sq. ft. (Open Area of Casting) Type 3B, 24" Beehive grate

Required Head at Grate: h = 0.196 ft.

2. Solve for required head given flow and open perimeter of casting using Weir Equation:

LOCATION: **ST-4**

INPUT: Q_{100} = 4.16 cfs (From Rational Equation)
P = 5.86 ft. (Open Perimeter of Casting) Type R, grate

Required Head at Grate: h = 0.359 ft.

GOVERNING EQUATION: **Weir Equation**
Required Head = 0.359 ft = 4.3 inches

The 100-year elevation is 1002.13 + 0.359 = 1002.49
The 100-year elevation is less than the overflow elevation of 1002.50; therefore, ponding depth is ok.

CIVIL DESIGN ADVANTAGE
3405 SE CROSSROADS DR., SUITE G GRIMES, IA 50111

PROJECT: Kum & Go 0131 JOB NO. 1811.616 Page ____ of ____ Pages
SUBJECT: Storm Water Calculations DATE: 04/04/19 DESIGNED: DSH CHECKED: ____

INTAKE ST-5 CAPACITY CALCUALTIONS

EQUATIONS

1. ORIFICE: $Q = 0.6\ A\ (2gh)^{1/2}$

WHERE - Q = flow, cfs
A = area of opening, ft^2
g = gravity (32.2 ft/s^2)
h = headwater from center of opening, ft

2. WEIR: $Q = 3.3*P*h^{1.5}$

WHERE - Q = flow, **cfs**
P= Perimeter of grate in feet
h = headwater from center of opening, ft

$Q_{100} = C_{100} I_{100} A$
Assume a Time of Concentration = 15 min.

C_{100} = 0.98
I_{100} = 7.44 in/hr
A = 0.34 acres
$Q_{100} = 0.70 * 7.44 * 0.47$
Q_{100} = 2.48 cfs

CALCULATIONS

1. Solve for required head given flow and open area for casting using Orifice Equation:

LOCATION: **ST-5**

INPUT: Q_{100} = 2.48 cfs (From Rational Equation)
A = 1.95 sq. ft. (Open Area of Casting) Type 3B, 24" Beehive grate

Required Head at Grate: h = 0.070 ft.

2. Solve for required head given flow and open perimeter of casting using Weir Equation:

LOCATION: **ST-5**

INPUT: Q_{100} = 2.48 cfs (From Rational Equation)
P = 5.86 ft. (Open Perimeter of Casting) Type R, grate

Required Head at Grate: h = 0.254 ft.

GOVERNING EQUATION: **Weir Equation**
Required Head = 0.254 ft = 3.1 inches

The 100-year elevation is 1002.13 + 0.254 = 1002.38
The 100-year elevation is less than the overflow elevation of 1002.50; therefore, ponding depth is ok.

CIVIL DESIGN ADVANTAGE
3405 SE CROSSROADS DR., SUITE G GRIMES, IA 50111

PROJECT: Kum & Go 0131 JOB NO. 1811.616 Page ____ of ____ Pages
SUBJECT: Storm Water Calculations DATE: 04/04/19 DESIGNED: DSH CHECKED: ____

INTAKE ST-6 CAPACITY CALCUALTIONS

EQUATIONS

1. ORIFICE: $Q = 0.6\ A\ (2gh)^{1/2}$

WHERE - Q = flow, cfs
A = area of opening, ft^2
g = gravity (32.2 ft/s^2)
h = headwater from center of opening, ft

2. WEIR: $Q = 3.3*P*h^{1.5}$

WHERE - Q = flow, **cfs**
P= Perimeter of grate in feet
h = headwater from center of opening, ft

$Q_{100} = C_{100} I_{100} A$
Assume a Time of Concentration = 15 min.

C_{100} = 0.98
I_{100} = 7.44 in/hr
A = 0.47 acres
$Q_{100} = 0.70 * 7.44 * 0.47$
Q_{100} = 3.43 cfs

CALCULATIONS

1. Solve for required head given flow and open area for casting using Orifice Equation:

LOCATION: **ST-6**

INPUT: Q_{100} = 3.43 cfs (From Rational Equation)
A = 1.95 sq. ft. (Open Area of Casting) Type 3B, 24" Beehive grate

Required Head at Grate: h = 0.133 ft.

2. Solve for required head given flow and open perimeter of casting using Weir Equation:

LOCATION: **ST-6**

INPUT: Q_{100} = 3.43 cfs (From Rational Equation)
P = 5.86 ft. (Open Perimeter of Casting) Type R, grate

Required Head at Grate: h = 0.315 ft.

GOVERNING EQUATION: **Weir Equation**
Required Head = 0.315 ft = 3.8 inches

The 100-year elevation is 1001.50 + 0.315 = 1001.82
The 100-year elevation is less than the overflow elevation of 1002.00; therefore, ponding depth is ok.

CIVIL DESIGN ADVANTAGE
3405 SE CROSSROADS DR., SUITE G GRIMES, IA 50111

PROJECT: Kum & Go 0131 JOB NO. 1811.616 Page ____ of ____ Pages
SUBJECT: Storm Water Calculations DATE: 04/04/19 DESIGNED: DSH CHECKED: ____

INTAKE ST-9 CAPACITY CALCUALTIONS

EQUATIONS

1. ORIFICE: $Q = 0.6\ A\ (2gh)^{1/2}$

WHERE - Q = flow, cfs
A = area of opening, ft^2
g = gravity (32.2 ft/s^2)
h = headwater from center of opening, ft

2. WEIR: $Q = 3.3*P*h^{1.5}$

WHERE - Q = flow, cfs
P= Perimeter of grate in feet
h = headwater from center of opening, ft

$Q_{100} = C_{100} I_{100} A$
Assume a Time of Concentration = 15 min.

C_{100} = 0.98
I_{100} = 7.44 in/hr
A = 0.23 acres
Q_{100} = 0.70 * 7.44 * 0.47
Q_{100} = 1.68 cfs

CALCULATIONS

1. Solve for required head given flow and open area for casting using Orifice Equation:

LOCATION: **ST-9**

INPUT: Q_{100} = 1.68 cfs (From Rational Equation)
A = 1.95 sq. ft. (Open Area of Casting) Type R, grate

Required Head at Grate: h = 0.032 ft.

2. Solve for required head given flow and open perimeter of casting using Weir Equation:

LOCATION: **ST-9**

INPUT: Q_{100} = 1.68 cfs (From Rational Equation)
P = 5.86 ft. (Open Perimeter of Casting) Type 3B, 24" Beehive grate

Required Head at Grate: h = 0.196 ft.

GOVERNING EQUATION: **Weir Equation**
Required Head = 0.196 ft = 2.4 inches

The 100-year elevation is 1002.38 + 0.196 = 1002.58
The 100-year elevation is less than the overflow elevation of 1002.58; therefore, ponding depth is ok.

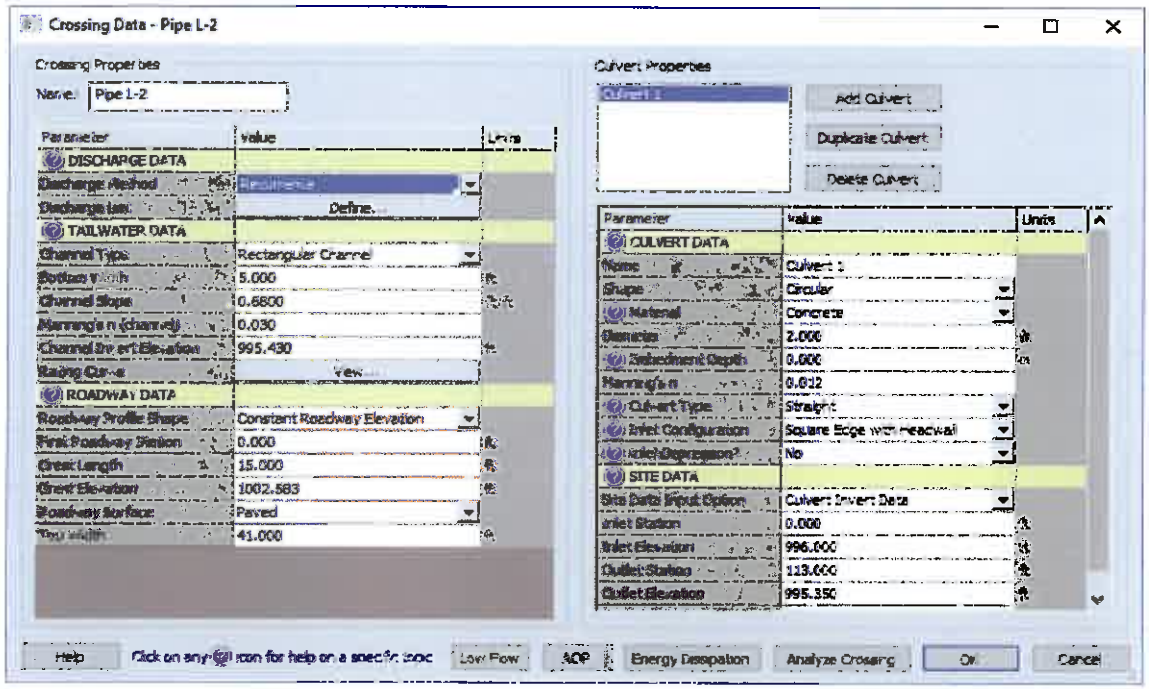
CIVIL DESIGN ADVANTAGE

3405 SE Crossroads Dr., SUITE G GRIMES, IA 50111

PROJECT: Kum & Go 0131 JOB NO. 1811.616 Page ____ of ____ Pages

SUBJECT: Stormwater Calculations DATE: 04/03/19 COMP. BY: DSH OK'D BY: RAH

Culvert Design



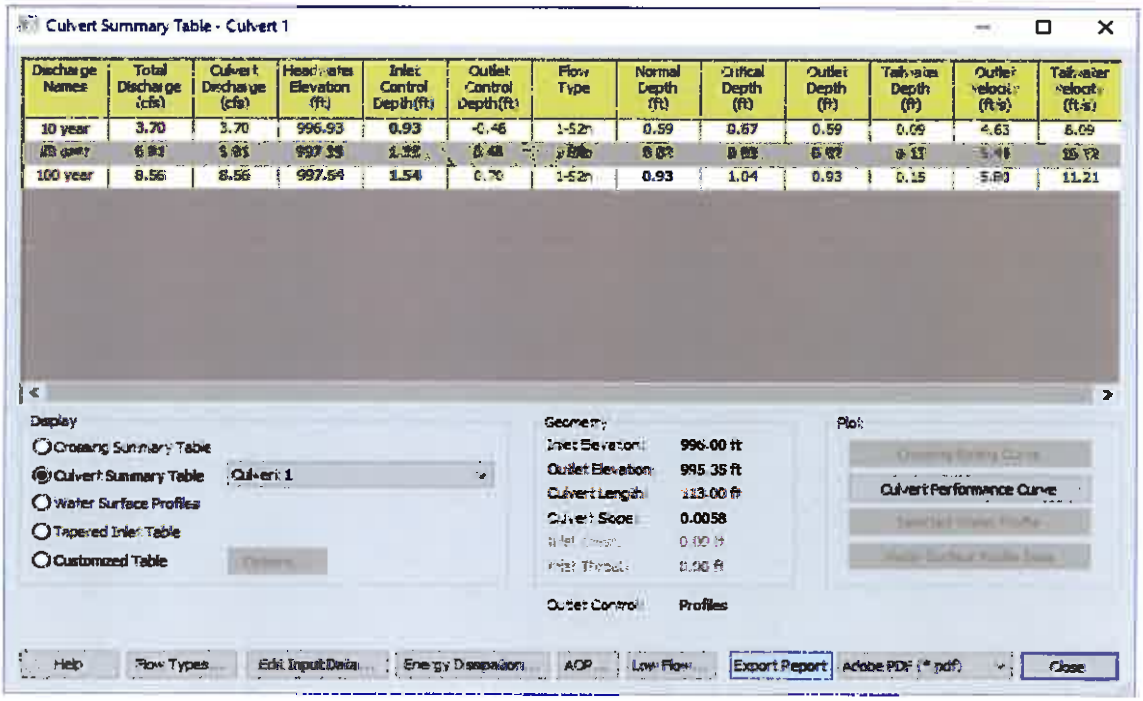


Table 2B-4.01: Runoff Coefficients for the Rational Method

Cover Type and Hydrologic Condition		Runoff Coefficients for Hydrologic Soil Group											
		A			*B*			*C*			*D*		
Recurrence Interval		*5*	*10*	*100*	*5*	*10*	*100*	*5*	*10*	*100*	*5*	*10*	*100*
Open Space (lawns, parks, golf courses, cemeteries, etc.)													
Poor condition (grass cover < 50%)		.25	.30	.50	.45	.55	.65	.65	.70	.80	.70	.75	.85
Fair condition (grass cover 50% to 75%)		.10	.10	.15	.25	.30	.50	.45	.55	.65	.60	.65	.75
Good condition (grass cover >75%)		.05	.05	.10	.15	.20	.35	.35	.40	.55	.50	.55	.65
Impervious Areas													
Parking lots, roofs, driveways, etc. (excluding ROW)		.95	.95	.98	.95	.95	.98	.95	.95	.98	.95	.95	.98
Streets and roads:													
Paved; curbs & storm sewers (excluding ROW)		.95	.95	.98	.95	.95	.98	.95	.95	.98	.95	.95	.98
Paved; open ditches (including ROW)		---	---	---	.70	.75	.85	.80	.85	.90	.80	.85	.90
Gravel (including ROW)		---	---	---	.60	.65	.75	.70	.75	.85	.75	.80	.85
Dirt (including ROW)		---	---	---	.55	.60	.70	.65	.70	.80	.70	.75	.85
Urban Districts (excluding ROW)													
Commercial and business (85% impervious)		---	---	---	---	---	---	.85	.85	.90	.90	.90	.95
Industrial (72% impervious)		---	---	---	---	---	---	.80	.80	.85	.80	.85	.90
Residential Districts by Average Lot Size (excluding ROW)[1]													
1/8 acre (36% impervious)		---	---	---	---	---	---	.55	.60	.70	.65	.70	.75
1/4 acre (36% impervious)		---	---	---	---	---	---	.55	.60	.70	.65	.70	.75
1/3 acre (33% impervious)		---	---	---	---	---	---	.55	.60	.70	.65	.70	.75
1/2 acre (20% impervious)		---	---	---	---	---	---	.45	.50	.65	.60	.65	.70
1 acre (11% impervious)		---	---	---	---	---	---	.40	.45	.60	.55	.60	.65
2 acres (11% impervious)		---	---	---	---	---	---	.40	.45	.60	.55	.60	.65
Newly Graded Areas (pervious areas only, no vegetation)													
Agricultural and Undeveloped													
Meadow - protected from grazing (pre-settlement)		.10	.10	.25	.10	.15	.30	.30	.35	.55	.45	.50	.65
Straight Row Crops													
Straight Row (SR)	*Poor Condition*	33	39	55	52	58	71	70	74	84	78	81	89
	Good Condition	24	30	46	45	51	66	62	67	78	73	76	86
SR + Crop Residue (CR)	*Poor Condition*	.31	.37	.54	.50	.56	.70	.67	.72	.82	.75	.79	.87
	Good Condition	.19	.25	.41	.38	.45	.61	.55	.60	.73	.62	.67	.78
Contoured (C)	*Poor Condition*	29	35	52	47	53	70	60	65	77	70	74	84
	Good Condition	21	26	43	38	45	61	55	60	73	65	69	80
C+CR	*Poor Condition*	.27	.33	.50	.45	.51	.66	.57	.63	.75	.67	.72	.82
	Good Condition	.19	.25	.41	.36	.43	.59	.52	.58	.71	.62	.67	.78
Contoured & Terraced (C&T)	*Poor Condition*	22	28	45	36	43	59	50	56	70	55	60	73
	Good Condition	16	22	38	31	37	54	45	51	66	52	58	71
C&T + CR	*Poor Condition*	.13	.19	.35	.31	.37	.54	.45	.51	.66	.52	.58	.71
	Good Condition	.10	.16	.32	.27	.33	.50	.43	.49	.65	.50	.56	.70

[1] The average percent impervious area shown was used to develop composite coefficients.

Note: Rational coefficients were derived from SCS CN method

b. Composite Runoff Analysis: Care should be taken not to average runoff coefficients for large segments that have multiple land uses of a wide variety (i.e., business to agriculture). However, within similar land uses, it is often desirable to develop a composite runoff coefficient based on the percentage of different types of surface in the drainage area. The composite procedure can be applied to an entire drainage area, or to typical sample blocks as a guide to selection of reasonable values of the coefficient for an entire area.

Table 2B-4.03: Runoff Curve Numbers for Urban Areas[1]

Cover Type and Hydrologic Condition	Average Percent Impervious Area[2]	CN's for Hydrologic Soil Group			
		A	*B*	*C*	*D*
Fully Developed Urban Areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.):[3]					
Poor condition (grass cover < 50%)	----------	68	79	86	89
Fair condition (grass cover 50% to 75%)	----------	49	69	79	84
Good condition (grass cover > 75%)	----------	39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	----------	98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)	----------	98	98	98	98
Paved; open ditches (including right-of-way)	----------	83	89	92	93
Gravel (including right-of-way)	----------	76	85	89	91
Dirt (including right-of-way)	----------	72	82	87	89
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town homes)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing Urban Areas					
Newly graded areas (pervious areas only, no vegetation)[4]	----------	77	86	91	94
Idle lands (CN's are determined using cover types similar to those in Table 2B-4.01)					

[1] Average runoff condition and I_a=0.2S

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figures 2B-4.01 or 2B-4.02.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figures 2B-4.01 or 2B-4.02 based upon the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Source: NRCS National Engineering Handbook, Part 630, Chapter 9

Table 2B-4.04: Runoff Curve Numbers for Cultivated Agricultural Lands[1]

Cover Description			CN's for Hydrologic Soil Group			
Cover Type	*Treatment*[2]	*Hydrologic Condition*[3]	*A*	*B*	*C*	*D*
Fallow	Bare Soil	---	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row Crops	Straight Row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T + CR	Poor	65	73	79	81
		Good	61	70	77	80
Small Grain	Straight Row (SR)	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	Contoured (C)	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	Contoured & terraced (C&T)	Poor	61	72	79	82
		Good	59	70	78	81
	C&T + CR	Poor	60	71	78	81
		Good	58	69	77	80
Close Seeded or Broadcast Legumes or Rotation Meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Source: NRCS National Engineering Handbook, Part 630, Chapter 9

VEENSTRA & KIMM, INC.
3000 Westown Parkway • West Des Moines, Iowa 50266-1320
515-225-8000 • 515-225-7848 (FAX) • 800-241-8000 (WATS)

April 12, 2019

John Haldeman
City Administrator
City of Huxley
515 N. Main Avenue
Huxley, Iowa 50124

HUXLEY, IOWA
KUM & GO
SITE PLAN REVIEW

We have reviewed the site plan for Kum & Go located at Highway 210 and Interstate 35 and find it acceptable provided the following items are completed:

1. The detention basin berm needs to have a side slope of 4:1 or flatter in accordance with SUDAS Design Manual Section 2G-1.F.1.a. The slopes on Sheet Nos. C2.1 and C2.3 are labeled as being 3:1 (33.33%).

2. The overflow spillway on the north side of the detention basin needs to be dimensioned and spot elevations provided on Sheet No. C2.1.

If you have any questions or comments, please contact us at 515-225-8000.

VEENSTRA & KIMM, INC.

Forrest S. Aldrich

FSA:dml
45229-037
cc: Jeff Peterson, City of Huxley (e-mail)
Britni Andreassen, Kum & Go (e-mail)
Keith Weggen, Civil Design Advantage (e-mail)

SITE PLAN DRAWINGS
STORE #0131
I-35 & IA-210
HUXLEY, IA 50124

Kum & Go

WHERE & MEANS MORE

PROJECT TEAM:

OWNER/DEVELOPER/APPLICANT:
KUM & GO L C
1459 GRAND AVENUE
DES MOINES, IA [illegible]
ATTN. [illegible] ANDREA[illegible]
PH (515) 457 [illegible]

ENGINEER:
CIVIL DESIGN ADVANTAGE, LLC
3405 SE CROSSROADS DRIVE, SUITE G
GRIMES, IOWA 50111
CONTACT: KEITH WEGGEN
PH. (515) [illegible]

LANDSCAPE ARCHITECT:
CIVIL DESIGN ADVANTAGE, LLC
3405 SE CROSSROADS DRIVE, SUITE G
GRIMES, IOWA 50111
CONTACT: KEITH WEGGEN
PH. [illegible]

SURVEYOR:
CIVIL DESIGN ADVANTAGE, LLC
3405 SE CROSSROADS DRIVE, SUITE G
GRIMES, IOWA 50111
CONTACT: KEITH WEGGEN
PH (515) 369-4400

TELEPHONE/CABLE:
HUXLEY COMMUNICATIONS
102 N MAIN AVE
HUXLEY, IA 50124
CONTACT: GRANT STRUMPFER
PH (515) 203 6716

GEOTECHNICAL ENGINEER:
TERRACON CONSULTANTS, INC
600 SW 7TH STREET, SUITE [illegible]
[illegible]
[illegible]
PH [illegible]

WATER:
CITY OF HUXLEY
515 N MAIN AVENUE
HUXLEY, IOWA 50124
CONTACT: KEITH [illegible]THUM
PH (515) 290 7512

SANITARY SEWER:
CITY OF HUXLEY
515 N MAIN AVENUE
HUXLEY, IOWA 50124
CONTACT: KEITH [illegible]THUM
PH [illegible]

ELECTRIC:
INTERSTATE POWER AND LIGHT COMPANY
XE PLACE
AMES, IA [illegible]
CONTACT [illegible] CLARK
PH (800) 255-4268

STORM SEWER:
CITY OF HUXLEY
515 N. MAIN AVENUE
HUXLEY, IOWA 50124
CONTACT: KEITH [illegible]THUM
PH (515) 290 7512

BUILDING DEPARTMENT:
STORY COUNTY
900 6TH ST
NEVADA, IA 50201
CONTACT: EMILY ZANDT
PH (515) [illegible]

BENCH MARKS

[illegible]

ELEV=1007[illegible]

PROPERTY DESCRIPTION

A PART OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 31, TOWNSHIP 82 NORTH, RANGE 24 WEST OF THE 5TH P.M., STORY COUNTY, IOWA AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTH QUARTER CORNER OF SAID SECTION 31; THENCE [illegible]

UTILITY WARNING

THE UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY AND RECORDS OBTAINED BY THIS SURVEYOR. THE SURVEYOR MAKES NO GUARANTEE THAT THE UTILITIES SHOWN COMPRISE ALL THE UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UTILITIES SHOWN ARE IN THE EXACT LOCATION SHOWN. A REQUEST WAS MADE TO IOWA ONE CALL FOR THE UTILITY PROVIDERS TO LOCATE THEIR UTILITIES IN THE FIELD.

CONSTRUCTION SCHEDULE

ANTICIPATED START DATE = AUGUST, 2018
ANTICIPATED FINISH DATE = DECEMBER, 2018

SUBMITTAL DATES

SUBMITTAL #1 [illegible]
SUBMITTAL #2 [illegible]

ALL CONSTRUCTION MATERIALS, DUMPSTERS, DETACHED TRAILERS OR SIMILAR ITEMS ARE PROHIBITED ON PUBLIC STREETS OR WITHIN THE PUBLIC R.O.W.

THE MOST RECENT EDITIONS OF THE SUDAS STANDARD SPECIFICATIONS, AND ALL CITY SUPPLEMENTALS, IF APPLICABLE, SHALL APPLY TO ALL WORK ON THIS PROJECT UNLESS OTHERWISE NOTED.

THE PROJECT REQUIRES AN IOWA NPDES PERMIT #2. CIVIL DESIGN ADVANTAGE WILL PROVIDE THE PERMIT AND THE INITIAL STORM WATER POLLUTION PREVENTION PLAN (SWPPP) FOR THE CONTRACTOR'S USE DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR UPDATING THE SWPPP THROUGHOUT CONSTRUCTION AND MEETING LOCAL, STATE AND FEDERAL REQUIREMENTS.

I HEREBY CERTIFY THAT THE PORTION OF THIS TECHNICAL SUBMISSION DESCRIBED BELOW WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND RESPONSIBLE CHARGE. I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

KEITH D. WEGGEN — PRELIMINARY — XX-XX-2018 DATE

MY LICENSE RENEWAL DATE IS DECEMBER 31, 20[illegible]
PAGES OR SHEETS COVERED BY THIS SEAL:
ALL SHEETS

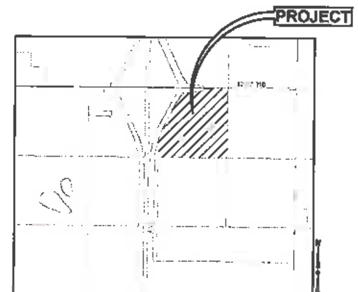
GENERAL LEGEND

PROPOSED
LOT LINE
CENTER LINE
RIGHT OF WAY
PERMANENT EASEMENT
TEMPORARY EASEMENT
TYPE SW-501 STORM INTAKE
TYPE SW-505 STORM INTAKE
TYPE SW-401 STORM MANHOLE
TYPE SW-301 SANITARY MANHOLE
STORM/SANITARY CLEANOUT
WATER VALVE
FIRE HYDRANT ASSEMBLY
SIGN
DETECTABLE WARNING PANEL
SANITARY SEWER WITH SIZE
STORM SERVICE
WATERMAIN WITH SIZE
SILT CUT (FULL DEPTH)
SILT FENCE

EXISTING
SANITARY MANHOLE
WATER VALVE BOX
FIRE HYDRANT
WATER CURB STOP
STORM SEWER MANHOLE
STORM SEWER SINGLE INTAKE
STORM SEWER DOUBLE INTAKE
FLARED END SECTION
DECIDUOUS TREE
CONIFEROUS TREE
DECIDUOUS SHRUB
CONIFEROUS SHRUB
ELECTRIC POWER POLE
GUY ANCHOR
STREET LIGHT
POWER POLE W/ TRANSFORMER
UTILITY POLE W/ LIGHT
ELECTRIC BOX
ELECTRIC TRANSFORMER
ELECTRIC MANHOLE OR VAULT
TRAFFIC SIGN
TELEPHONE JUNCTION BOX
TELEPHONE MANHOLE/VAULT
TELEPHONE POLE
GAS VALVE BOX
CABLE TV JUNCTION BOX
CABLE TV MANHOLE/VAULT
BENCH MARK
SOIL BORING
UNDERGROUND TV CABLE
GAS MAIN
FIBER OPTIC
UNDERGROUND TELEPHONE
OVERHEAD ELECTRIC
UNDERGROUND ELECTRIC
SANITARY SEWER W/ SIZE
STORM SEWER W/ SIZE
WATER MAIN W/ SIZE

VICINITY MAP

NOT TO SCALE



SHEET INDEX

1	COVER SHEET	C0.0
2-3	SITE PLAN	C1.1-C1.2
4	TOPOGRAPHIC SURVEY / DEMOLITION PLAN	C1.[illegible]
5-6	GRADING PLAN	C2.1-C2.2
7	EROSION & SEDIMENT CONTROL	[illegible]
[illegible]	UTILITY PLAN	C3.1-C3.2
10-11	PAVING GEOMETRICS & SPOT ELEVATION PLAN	C4.1-C4.2
12	LANDSCAPE PLAN	L1.1

SITE DATA

STORE TYPE		INTERSTATE
CANOPY / DISPENSER ARRANGEMENT		6 DISPENSERS (SINGLE), 3 HI-FLOW DISPENSERS
TYPE OF USE		CONVENIENCE STORE WITH FUEL
HEIGHT	BUILDING	21'-0"
	TOP OF PARAPET WALL	22' 7"
	CANOPY	21' 10"
	DIESEL CANOPY	[illegible]
GROUND FLOOR AREA		[illegible] SF
GROSS CANOPY AREA		[illegible]
GROSS LOT AREA		±[illegible] S.F. ±[illegible] ACRES
FAR (EXCLUDING CANOPY)		0.08
KUM & GO BUILDING COVERAGE		[illegible]
LANDSCAPE COVERAGE		80 [illegible] (42.[illegible])
PARKING/CANOPY/AREA COVERAGE		101 [illegible]
BICYCLE PARKING		1
REQUIRED PARKING	STANDARD	[illegible]
	ADA	1
	TOTAL	[illegible]
	PARKING RATIO = 1 SPACE/[illegible]00 SF	
PROVIDED PARKING	STANDARD	30
	ADA	2
	TRUCKS	6
	TOTAL	[illegible]
	PARKING RATIO = [illegible]	

ZONING INFORMATION

ZONE: C-[illegible] GENERAL COMMERCIAL DISTRICT	
MINIMUM LOT AREA (SQUARE FEET)	[illegible]
MINIMUM LOT WIDTH (FEET)	[illegible]
LOT AREA PER UNIT (SQUARE FEET)	N/A
FRONT YARD DEPTH (FEET)	[illegible]
FRONT YARD LANDSCAPE SETBACK (FEET)	[illegible]
SIDE YARD SETBACK (FEET)	0
REAR YARD SETBACK (FEET)	[illegible]
MAXIMUM HEIGHT (FEET)	[illegible]
MAXIMUM BUILDING COVERAGE	[illegible]
MAXIMUM IMPERVIOUS COVERAGE	80%
MAXIMUM FLOOR AREA	N/A

CONFIDENTIAL DOCUMENT: INFORMATION CONTAINED IN THIS DOCUMENT IS PROPRIETARY TO KUM & GO, L.C. AND SHALL NOT BE DISTRIBUTED.

IOWA ONE CALL 1-800-292-8989

CIVIL DESIGN ADVANTAGE

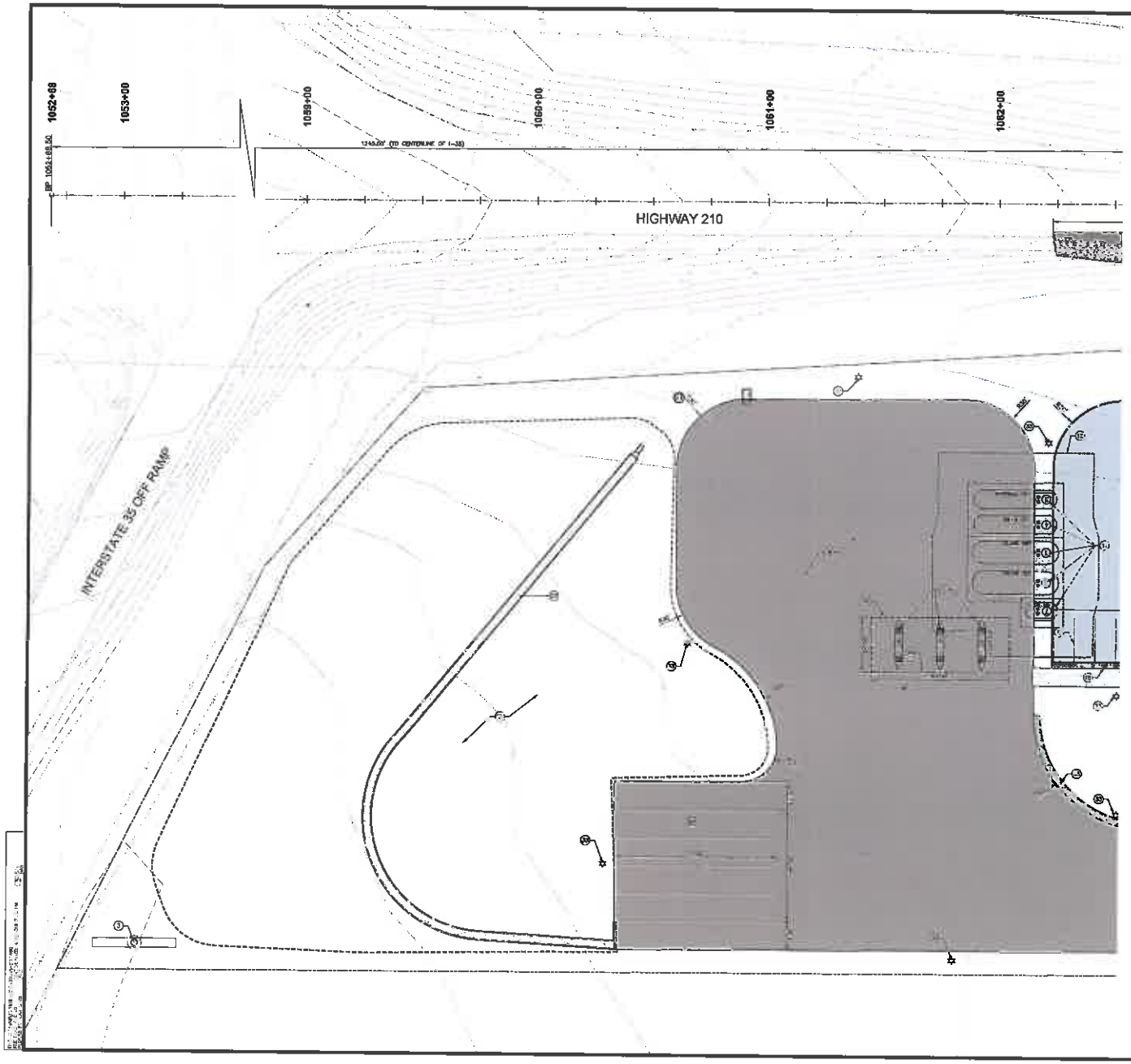
6400 Westown Parkway
West Des Moines, Iowa 50266
P: 515-226-0128
F: 515-223-8273

0131 - HUXLEY, IOWA
I-35 & IA-210
COVER SHEET

REVISIONS

DATE: 04-09-2018

SHEET NUMBER: C0.0



GENERAL NOTES

1. THE MOST RECENT EDITION OF THE SUDAS STANDARD SPECIFICATIONS AND ALL CITY SUPPLEMENTALS, IF APPLICABLE, SHALL APPLY TO ALL WORK ON THIS PROJECT UNLESS OTHERWISE NOTED.
2. ALL WORK SHALL COMPLY WITH ADA ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES AND PUBLIC RIGHT OF WAY ACCESSIBILITY GUIDELINES (PROWAG).
3. ALL WORK SHALL BE IN ACCORDANCE WITH OSHA CODES AND STANDARDS. NOTHING INDICATED ON THE DRAWINGS SHALL RELIEVE THE CONTRACTOR FROM COMPLYING WITH ANY APPROPRIATE SAFETY REGULATIONS.
4. PRIOR TO ANY WORK AT THE SITE, CONTRACTOR SHALL EXAMINE ANY APPLICABLE DRAWINGS AVAILABLE FROM THE OWNER, ENGINEER, AND/OR ARCHITECT, AND CONSULT WITH OWNER'S PERSONNEL AND UTILITY COMPANY REPRESENTATIVES. NO COMPENSATION WILL BE ALLOWED FOR DAMAGE FROM FAILURE TO COMPLY WITH THIS REQUIREMENT.
5. ONE WEEK PRIOR TO CONSTRUCTION WITHIN CITY ROW, OR ANY CONNECTION TO PUBLIC SEWERS, CONTRACTOR SHALL NOTIFY THE CITY'S CONSTRUCTION DIVISION.
6. ALL CONSTRUCTION WITHIN PUBLIC R.O.W./ EASEMENTS, AND/OR ANY CONNECTION TO PUBLIC SEWERS AND STREETS, SHALL COMPLY WITH THE CITY'S STANDARDS.
7. ALL DIMENSIONS ARE TO BACK OF CURB, BUILDING FACE OR PROPERTY LINE UNLESS OTHERWISE NOTED.
8. CONTRACTOR TO VERIFY BUILDING DIMENSIONS WITH ARCHITECTURAL PLANS.
9. PLACE 3/4 INCH EXPANSION JOINT BETWEEN ALL P.C.C. PAVEMENT/SIDEWALKS AND BUILDING. PLACE 1/2 INCH EXPANSION JOINT BETWEEN SIDEWALKS AND P.C.C. PAVEMENT.
10. REMOVE ALL DEBRIS PULLED INTO R.O.W. AT THE END OF EACH WORK DAY.
11. ALL PROPERTY PINS SHALL BE PROTECTED FROM GRADING OR OTHER OPERATIONS. ANY PINS DISTURBED SHALL BE RESET AT THE CONTRACTOR'S EXPENSE.
12. DO NOT STORE CONSTRUCTION MATERIALS AND EQUIPMENT IN THE RIGHT OF WAY.
13. THE CONTRACTOR SHALL NOT DISTURB DESIRABLE GRASS AREAS AND DESIRABLE TREES OUTSIDE THE CONSTRUCTION LIMITS. THE CONTRACTOR WILL NOT BE PERMITTED TO PARK OR SERVICE VEHICLES, AND EQUIPMENT OR USE THESE AREAS FOR STORAGE OF MATERIALS. STORAGE, PARKING AND SERVICE AREAS WILL BE SUBJECT TO THE APPROVAL OF THE OWNER.
14. THE CONTRACTOR IS RESPONSIBLE FOR REPLACING ANY AREAS OF PAVEMENT OR SIDEWALK NOT TO BE REMOVED THAT IS DAMAGED DUE TO OPERATION EQUIPMENT ON THE PAVEMENT OR SIDEWALK.
15. THE CONTRACTOR MAY BE REQUIRED TO PLACE TEMPORARY WARNING DEVICES AND SAFETY FENCE AT CERTAIN LOCATIONS WHERE REPLACEMENT FEATURES ARE NOT INSTALLED THE SAME DAY, AS DIRECTED BY THE ENGINEER OR THE CITY.
16. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF WORK BETWEEN SUPPLIERS AND SUBCONTRACTORS INVOLVED IN THE PROJECT, INCLUDING STAGING OF CONSTRUCTION DETAILS.
17. CONCRETE REMOVAL FOR DRIVEWAY APPROACHES SHALL BE REMOVED TO THE NEAREST TRANSVERSE JOINT. CONTRACTOR SHALL VERIFY REMOVAL LIMITS WITH CITY'S CONSTRUCTION INSPECTOR PRIOR TO ANY CONCRETE REMOVAL.
18. ALL PERMITS AND ADDITIONAL FEES REQUIRED TO COMPLETE THE WORK SHALL BE INCLUDED IN THE CONTRACTOR BID.

TRAFFIC CONTROL NOTES

1. ALL APPLICABLE CITY PERMITS, INCLUDING BUT NOT LIMITED TO CLOSURE PERMITS, SHALL BE OBTAINED PRIOR TO ANY CONSTRUCTION WITHIN CITY R.O.W. OR LANE CLOSURES.
2. ALL TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
3. PERMANENT SIGNING THAT CONFLICTS A MESSAGE CONTRARY TO THE MESSAGE OF TEMPORARY SIGNING AND NOT APPLICABLE TO THE WORKING CONDITIONS SHALL BE COVERED BY THE CONTRACTOR WHEN DIRECTED BY THE CITY.
4. THE CONTRACTOR SHALL COORDINATE HIS TRAFFIC CONTROL WITH OTHER CONSTRUCTION PROJECTS IN THE AREA.
5. SIDEWALK CLOSED SIGNS REQUIRED FOR ALL SIDEWALK CLOSURES. STORAGE AND TEMPORARY PEDESTRIAN ACCESS ROUTE THROUGH THE CONSTRUCTION AREA SHALL MEET THE REQUIREMENTS OF PUBLIC RIGHT OF WAY ACCESSIBILITY GUIDELINES (PROWAG), SECTION R302 AND IOWA DOT DESIGN MANUAL, CHAPTER 12H-8.
6. THE CONTRACTOR IS CAUTIONED NEITHER TO OBSTRUCT NOR REMOVE ANY EXISTING PAVEMENT, NOR TO DISTURB THE EXISTING TRAFFIC PATTERNS MORE THAN IS NECESSARY FOR THE PROPER EXECUTION OF THE WORK.
7. ALL SIGNING AND LANE STRIPING WILL NEED TO COMPLY WITH MUTCD. MAINTENANCE AND REPLACEMENT OF THE SIGNING AND STRIPING WILL BE THE RESPONSIBILITY OF THE APPLICANT.

PAVEMENT THICKNESS

1. SIDEWALK	4" P.C.C.	
2. STANDARD DUTY PCC PAVEMENT	6" P.C.C.	
3. HEAVY DUTY PCC PAVEMENT	8" P.C.C.	
4. R.O.W. PCC PAVEMENT	8" P.C.C. WITH 12" MODIFIED SUBBASE	
5. STAMPED CONCRETE	6" P.C.C.	

FLAG NOTES

1. PROPOSED 60 FOOT FLAG POLE, MAINTAIN 24 FEET CLEAR SPACE
2. 35 FOOT POLE SIGN WITH COMMODITY
3. 100 FOOT POLE SIGN WITH COMMODITY
4. PROPOSED ACCESSIBLE PARKING SPACE WITH POLE MOUNTED ADA PARKING SIGN
5. FRONT ENTRY – SEE ARCHITECTURAL DRAWINGS
6. PROPOSED TRASH ENCLOSURE – SEE ARCHITECTURAL DRAWINGS
7. PROPOSED FUEL DISPENSER ISLAND
8. PROPOSED FUEL CANOPY
9. PROPOSED 4 INCH YELLOW PARKING STRIPING
10. PROPOSED 4 INCH YELLOW PARKING STRIPING – 24 INCHES O.C. AT 45 DEGREES
11. PROPOSED UNDER GROUND STORAGE TANK LOCATIONS
12. TANK OVERDIG LIMITS
13. LIMITS OF PROPOSED PAVEMENT
14. PROPOSED AIR MACHINE – COORDINATE MOUNT WITH SUPPLIER
15. PROPOSED BOLLARDS
16. PROPOSED 12 FEET X 60 FEET LOADING ZONE
17. PROPOSED STANDARD DUTY P.C.C. PAVEMENT
18. PROPOSED HEAVY DUTY P.C.C. PAVEMENT
19. R.O.W. PCC PAVEMENT
20. CONCRETE STAMPED PATTERN – BRICK – 6 INCH MINIMUM PAVEMENT THICKNESS
21. PROPOSED 4 INCH CONCRETE SIDEWALK WITH AGGREGATE BASE – 1.5% MAX CROSS SLOPE. REFERENCE ARCHITECTURAL DRAWINGS FOR CONTROL JOINT PLAN.
22. PROPANE CAGE
23. MISCELLANEOUS MERCHANDISE
24. FIREWOOD
25. REDBOX
26. ICE MERCHANDISER
27. CONCRETE FLUME – 4 FEET WIDE WITH 8 INCH CURB AND 4 INCHES P.C.C.
28. DETENTION BASIN
29. PROPOSED GRATE.
30. PROPOSED STOP SIGN FOR ACCESSING PUBLIC-RIGHT-OF-WAY
31. TEMPORARY GRADING EASEMENT
32. PROPOSED SANITARY/WATER EASEMENT
33. PROPOSED AREA LIGHT
34. PROPOSED TRUCK DIRECTIONAL SIGNAGE
35. FLOOR CURB
36. PROPOSED BOLLARD BIKE RACK

SITE AREA

4.30 AC – (EXCLUSIVE OF ROADWAY EASEMENT)

N

SCALE
0 10 20 40

IOWA ONE CALL
1-800-292-8989

CIVIL DESIGN ADVANTAGE
3601 104th Street, Urbandale, IA 50322
PH: (515) 369-4400 FAX: (515) 369-4444
PROJECT NO: 0131.019

Kum & Go
6400 Westown Parkway
West Des Moines, Iowa
50266
P: 515-226-0128
F: 515-223-1973

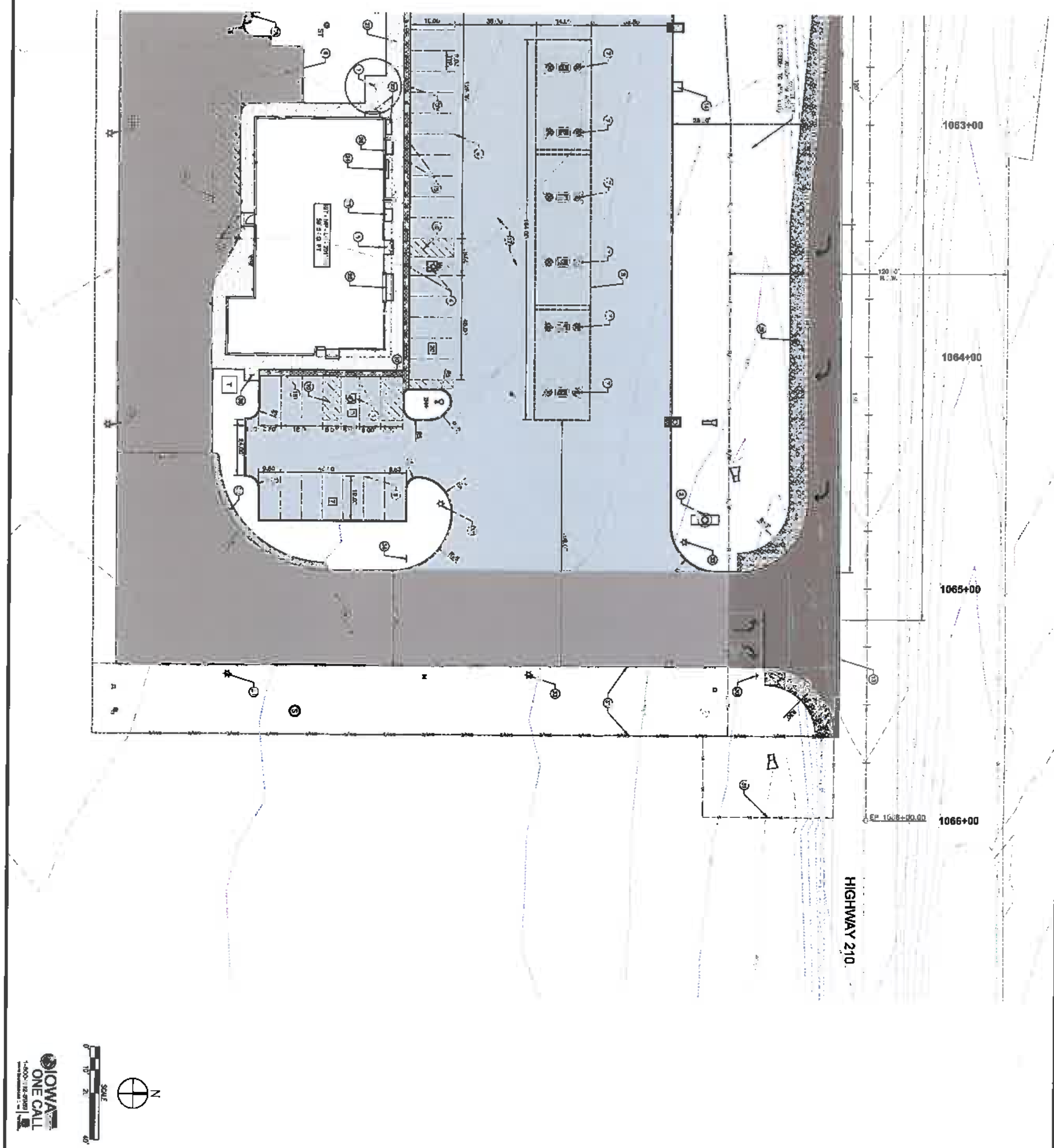
0131 - HUXLEY, IOWA
I-35 & IA-210
SITE PLAN

KH PROJECT TEAM:
RDM:
RDM:
QPM:

NO.	DESCRIPTION	DATE
	REVISIONS	

DATE: 04-09-2019

SHEET NUMBER:
C1.1



Civil Design Advantage	CIVIL DESIGN ADVANTAGE
Kum & Go	6400 Westown Parkway West Des Moines, Iowa 50266 P: 515-226-0128 F: 515-223-0973
Project	0131 - HUXLEY, IOWA I-35 & IA-210 SITE PLAN
Date	04-09-2019
Sheet Number	C1.2
	REVISIONS

DEMOLITION NOTES

1. PRIOR TO ANY WORK AT THE SITE, CONTRACTOR SHALL EXAMINE ANY AFFORDABLE DRAWINGS AVAILABLE FROM THE OWNER OR ENGINEER AND CONSULT WITH OWNER'S PERSONNEL AND UTILITY COMPANY REPRESENTATIVES. NO COMPENSATION WILL BE ALLOWED FOR DAMAGE FROM FAILURE TO COMPLY WITH THIS REQUIREMENT.
2. PRIOR TO DEMOLITION, CONTRACTOR SHALL NOTIFY IN WRITING (48 HR. NOTICE) THE FOLLOWING:
   A. CITY
   B. APPROPRIATE UTILITY COMPANIES
   C. OWNER
   D. CIVIL DESIGN ADVANTAGE
   E. ARCHITECT
3. DO NOT DISTURB EXISTING UTILITIES UNLESS OTHERWISE NOTED. COORDINATE REMOVAL OR RE-ADJUSTMENT OF ALL UTILITIES WITH THE APPROPRIATE UTILITY SUPPLIER AND REGULATORY AGENCIES.
4. PROTECT EXISTING UTILITIES THAT ARE TO REMAIN. THE LOCATIONS OF ALL UTILITIES INDICATED ON THE PLAN ARE TAKEN FROM EXISTING RECORDS. THE EXACT LOCATION AND ELEVATION OF ALL UTILITIES MUST BE DETERMINED BY THE CONTRACTOR. IT SHALL BE THE DUTY OF THE CONTRACTOR TO ASCERTAIN WHETHER ANY ADDITIONAL FACILITIES OTHER THAN THOSE SHOWN ON THE PLAN MAY BE PRESENT.
5. BACKFILL ALL EXCAVATIONS WITH COHESIVE MATERIAL COMPACTED TO 95% MAXIMUM STANDARD PROCTOR DRY DENSITY AND MOISTURE RANGE OF OPTIMUM MOISTURE TO 4% ABOVE OPTIMUM MOISTURE. TESTING OF BACKFILL TO BE BY A GEOTECHNICAL ENGINEER EMPLOYED BY THE OWNER. IN THE EVENT OF A TEST FAILURE, ANY RETESTING SHALL BE PAID FOR BY THE CONTRACTOR.
6. FIELD VERIFY EXISTING GRADES AND LOCATION OF EXISTING UTILITY, CONDUIT, UNDG, POLES, TREES, PAVING, BUILDINGS AND OTHER SITE FEATURES PRIOR TO DEMOLITION AND IMMEDIATELY INFORM THE ENGINEER AND/OR OWNER OF ANY DISCREPANCIES.
7. DEMOLITION NOTES AS SHOWN ON THIS PLAN ARE NOT ALL INCLUSIVE. CONTRACTOR TO ABANDON IN PLACE OR REMOVE AND DISPOSE OF ALL EXISTING SITE IMPROVEMENTS ABOVE AND BELOW GROUND TO COMPLY WITH THE GENERAL INTENT OF THIS DOCUMENT.
8. ALL CONSTRUCTION/DEMOLITION DEBRIS SHALL BE DISPOSED OF OFFSITE IN FULL COMPLIANCE WITH CURRENT ENVIRONMENTAL REGULATIONS.
9. CONSTRUCTION LIMITS SHALL BE CONFINED TO THE SITE BOUNDARY AS NOTED. ANY DAMAGE TO PROPERTIES OUTSIDE THE SITE BOUNDARY SHALL BE AT THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
10. ALL WORK SHALL BE IN ACCORDANCE WITH OSHA STANDARDS. NOTHING INDICATED ON THE DRAWINGS SHALL RELIEVE THE CONTRACTOR FROM COMPLYING WITH ANY APPROPRIATE SAFETY REGULATIONS.

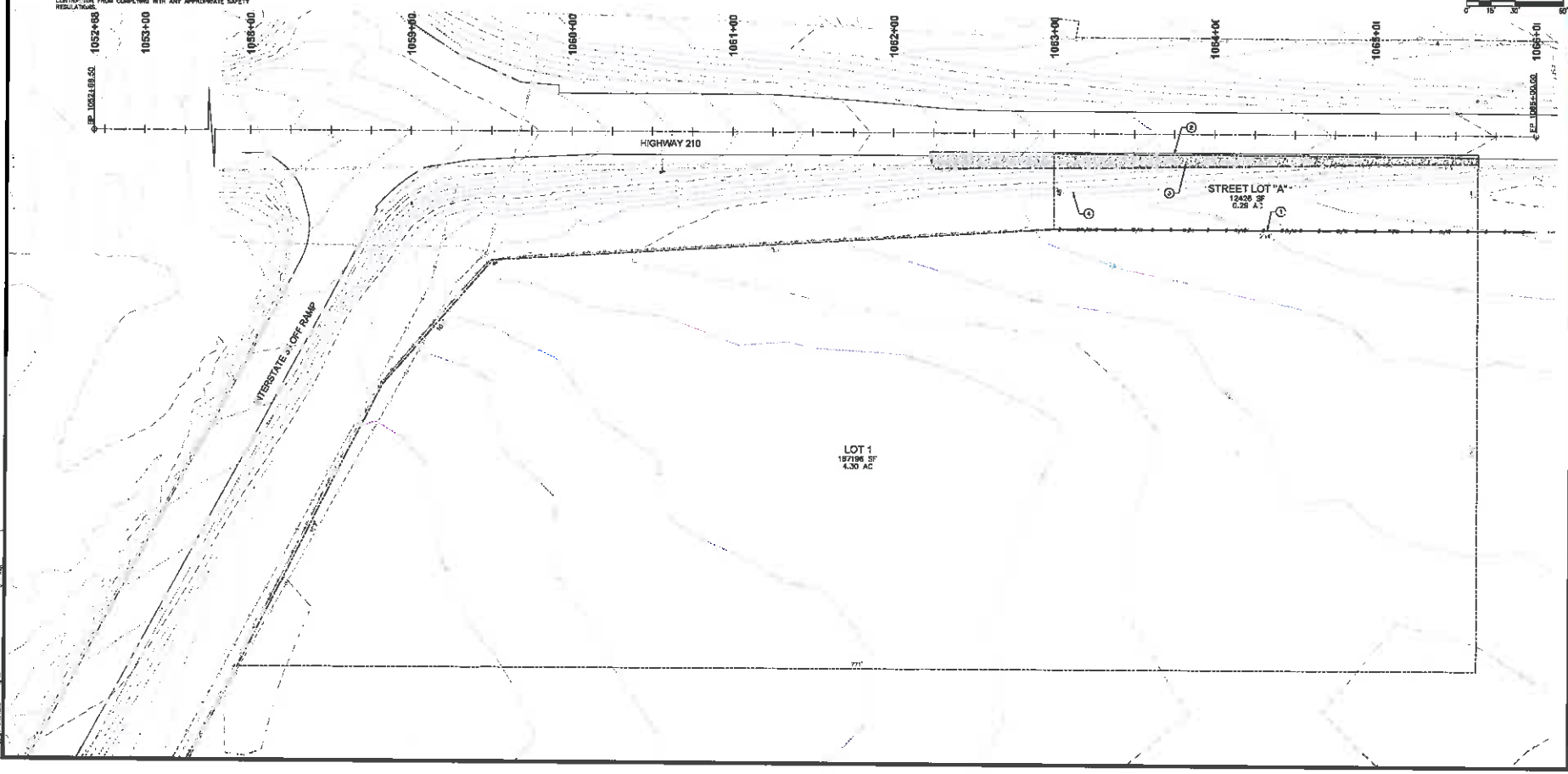
FLAG NOTES

1. REMOVE AND DISPOSE EXISTING FENCE.
2. REMOVE AND DISPOSE OF EXISTING HMA PAVEMENT SHOULDER – FULL DEPTH SAWCUT.
3. REMOVE AND DISPOSE OF EXISTING GRAVEL SHOULDER.
4. REMOVE AND DISPOSE OF EXISTING SIGN.

IOWA ONE CALL
1-800-292-8989
www.iowaonecall.com

N

SCALE
0' 15' 30' 60'



CIVIL DESIGN ADVANTAGE
6400 Westown Parkway
West Des Moines, Iowa
50266
P: 515-226-0123
F: 515-221-9673

Kum & Go

0131 - HUXLEY, IOWA
I-35 & IA-210

TOPOGRAPHIC SURVEY & DEMOLITION PLAN

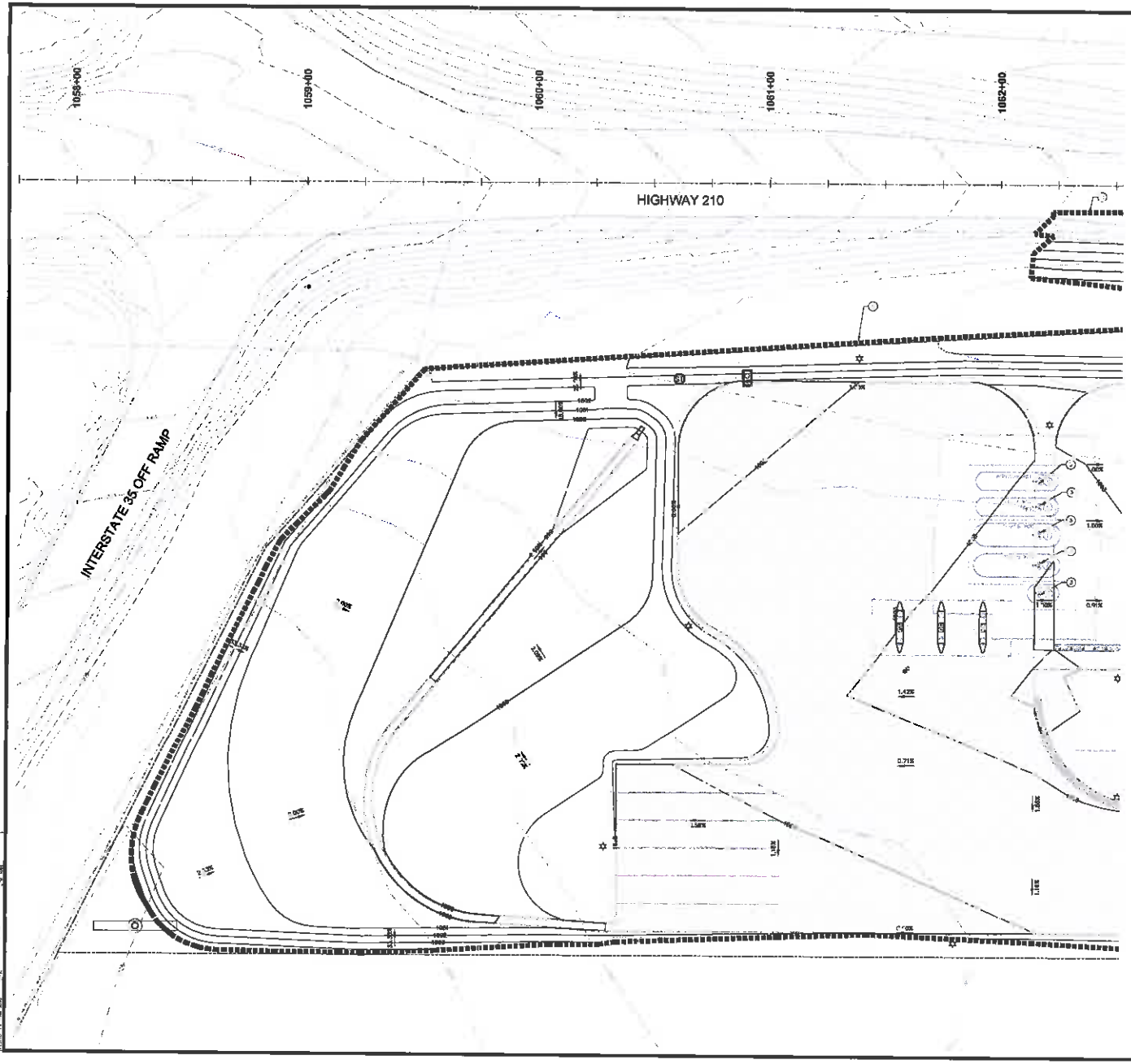
CIVIL PROJECT TEAM:
RCR:
BDM:
CPM:

REVISIONS

	DATE	REVISION DESCRIPTION

DATE: 04-09-2019

SHEET NUMBER:
C1.3



GRADING NOTES

1. PRIOR TO ANY GRADING, A COPY OF THE NPDES PERMIT SHALL BE PROVIDED TO THE CITY BUILDING DEPARTMENT.
2. CONTRACTOR SHALL STRIP ALL DELETERIOUS MATERIAL. THE TOP 6" OF TOPSOIL IS TO BE STOCKPILED AND RESPREAD AFTER GRADING IS COMPLETE. CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING A SUITABLE TOPSOIL STOCKPILE SITE.
3. EXCAVATION SHALL BE IN ACCORDANCE WITH THE MOST RECENT EDITION OF THE SUDAS STANDARD SPECIFICATIONS, AND ALL CITY SUPPLEMENTALS, IF APPLICABLE.
4. MATCH EXISTING GRADES AT PROPERTY LINES AND/OR CONSTRUCTION LIMITS.
5. ALL SPOT ELEVATIONS ARE FINISH GRADE (FG) OR TOP OF FINISHED SURFACES UNLESS OTHERWISE NOTED.
6. SITE SHALL BE GRADED TO PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDINGS.
7. SLOPES IN PAVEMENT SHALL BE UNIFORM TO A GIVEN GRADE.
8. THE CONTRACTOR SHALL CONFINE HIS GRADING OPERATIONS TO WITHIN THE CONSTRUCTION LIMITS AND EASEMENTS SHOWN ON THE PLANS. ANY DAMAGE TO PROPERTIES OUTSIDE THE SITE BOUNDARY SHALL BE AT THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL APPLY NECESSARY MOISTURE CONTROL TO THE CONSTRUCTION AREA AND HAUL ROADS TO PREVENT THE SPREAD OF DUST.
10. REFER TO SEPARATE STORM WATER POLLUTION PREVENTION PLAN FOR DETAILS ON EROSION CONTROL.
11. FINAL FINISH GRADING TO BE APPROVED BY THE ARCHITECT AND CIVIL ENGINEER. MATCH EXISTING GRADES AT THE INTERFACE OF NEW AND EXISTING GRADES OF PAVING.
12. SIDEWALK:
    MAINTAIN 1% MINIMUM AND 5% MAXIMUM LONGITUDINAL SLOPES ON ALL PAVED SIDEWALKS. ALL WALKS TO HAVE 2.0% MAXIMUM TRANSVERSE SLOPE IN THE DIRECTION OF NATURAL DRAINAGE. SAW CUT JOINTS AS SOON AS CONCRETE HAS SET. SAW CUTS TO BE 1/8" TO 1/4" WIDE, DEPTH:
    LONGITUDINAL 1/4", TRANSVERSE 1/4".
13. THE GRADING OF THE DETENTION FACILITY AND INSTALLATION OF THE STORM SEWER SYSTEM SHALL BE COMPLETED AND FUNCTIONAL PRIOR TO ANY INCREASE IN IMPERVIOUS SURFACES WITHIN THE SITE OR THE PREVIOUSLY MENTIONED ITEMS SHALL BE GRADED/INSTALLED AS SOON AS PRACTICAL.

FLAG NOTES

1. ADA ACCEPTABLE STALL, NOT TO EXCEED 2.0% GRADE IN ANY DIRECTION
2. MATCH EXISTING GRADE
3. ALL FILL LIDS FOR UNDERGROUND TANKS TO BE 1 INCH ABOVE FINISHED GRADE
4. GRADING LIMIT.

OVER-EXCAVATION NOTES

1. OVER-EXCAVATE TO A MINIMUM OF 2 FEET BELOW THE PROPOSED BOTTOM OF SUBGRADE ELEVATION. REPLACE OVER-EXCAVATED SOIL WITH ENGINEERED FILL PER GEOTECH REPORT.
2. OVER-EXCAVATE A MINIMUM OF 2 FEET BELOW THE BUILDING FOUNDATION BEARING ELEVATION. REPLACE OVER-EXCAVATED SOIL WITH ENGINEERED FILL PER GEOTECH REPORT.
3. PROOF-ROLLED, AIR OR CHEMICAL DRIED AND COMPACT BEFORE FILL. CONTRACTOR SHALL USE OVER-EXCAVATED SOIL AS FILL IN ALL AREAS WHERE FILL EXCEEDS 3 FEET OR MORE.

N

SCALE
0' 10' 20' 40'

CIVIL DESIGN ADVANTAGE
3800 86th Street, Urbandale, IA 50322
PH: (515) 369-4400 FAX: (515) 369-4410

Kum & Go

6400 Westown Parkway
West Des Moines, Iowa
50266
P: 515-226-0128
F: 515-223-9873

0131 - HUXLEY, IOWA
I-35 & IA-210

GRADING PLAN

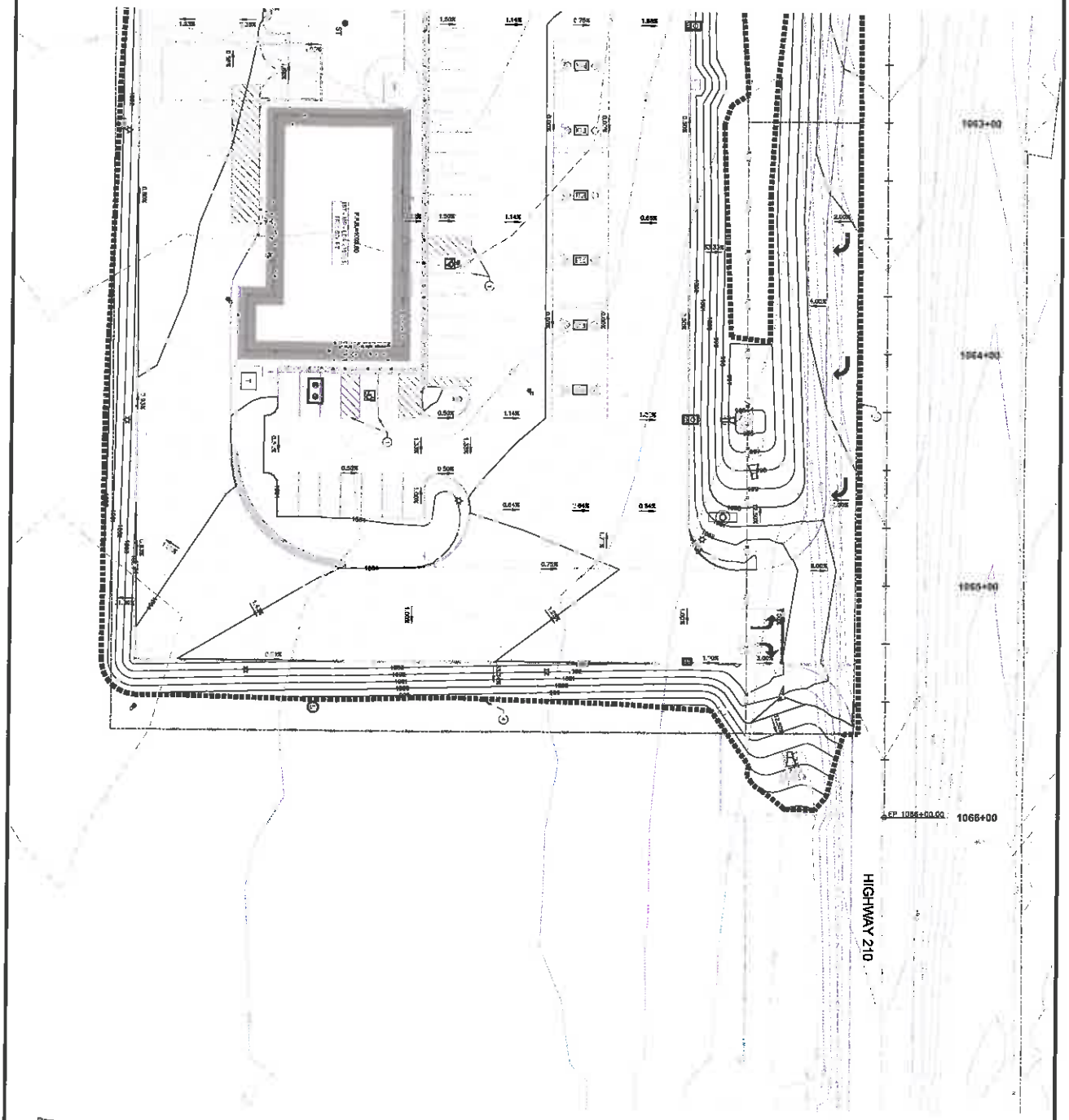
KG PROJECT TEAM:
ROM:
BDM:
CPM:

△	DATE	REVISION DESCRIPTION

REVISIONS

DATE: 04-09-2019

SHEET NUMBER
C2.1



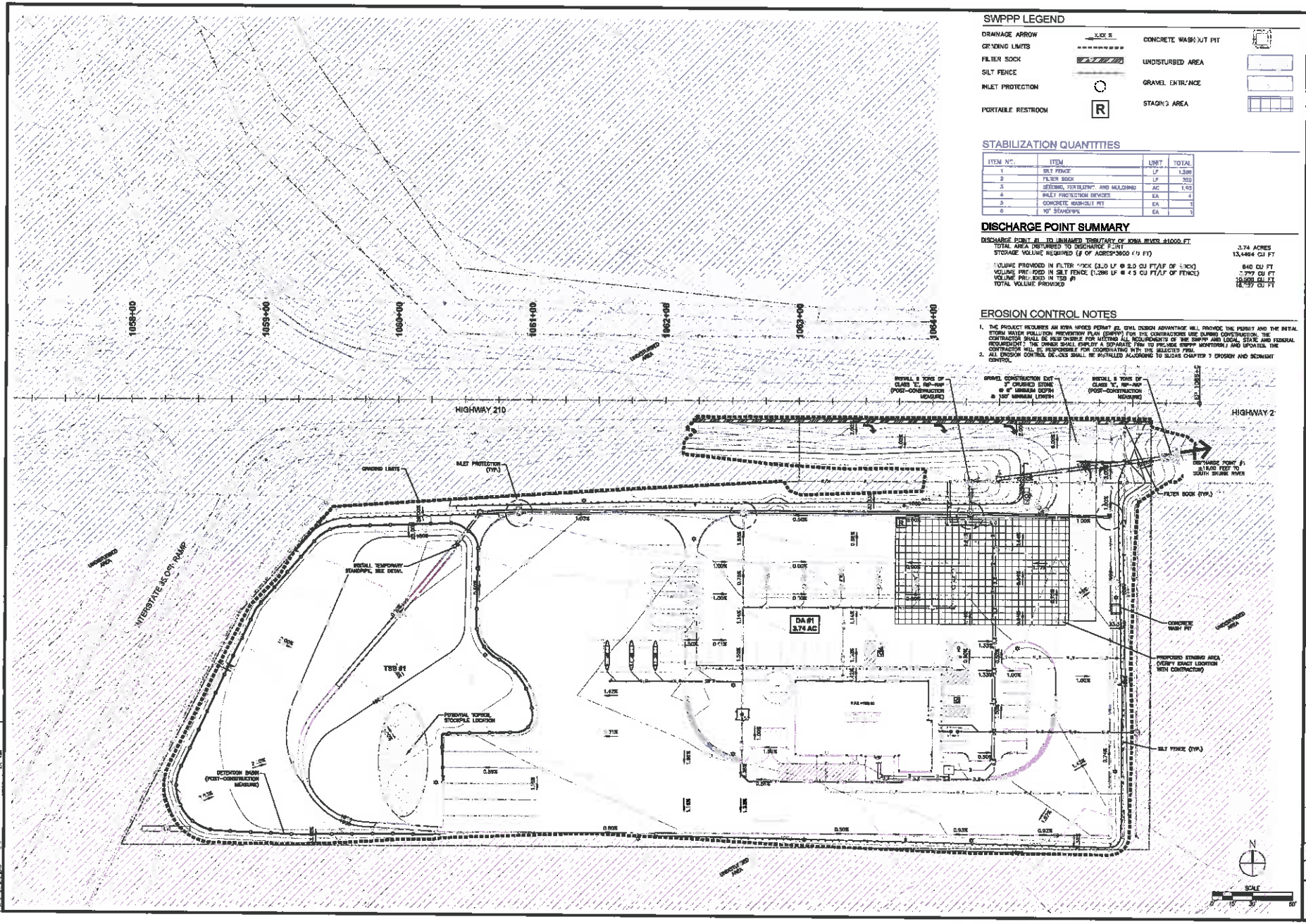
SHEET NUMBER	DATE	△	DATE	REVISION DESCRIPTION	BY
C2.2	04-09-2019				
				REVISIONS	

0131 - HUXLEY, IOWA
I-35 & IA-210
GRADING PLAN

6400 Westown Parkway
West Des Moines, Iowa
50266
P: 515-226-0128
F: 515-222-6873

Kum & Go

CIVIL DESIGN ADVANTAGE



SWPPP LEGEND

DRAINAGE ARROW	XXX ft	CONCRETE WASHOUT PIT	
GRADING LIMITS		UNDISTURBED AREA	
FILTER SOCK		GRAVEL ENTRANCE	
SILT FENCE		STAGING AREA	
INLET PROTECTION			
PORTABLE RESTROOM	R		

STABILIZATION QUANTITIES

ITEM NO.	ITEM	UNIT	TOTAL
1	SILT FENCE	LF	1,286
2	FILTER SOCK	LF	300
3	SEEDING, FERTILIZER, AND MULCHING	AC	1.43
4	INLET PROTECTION DEVICES	EA	4
5	CONCRETE WASHOUT PIT	EA	1
6	10" STANDPIPE	EA	1

DISCHARGE POINT SUMMARY

DISCHARGE POINT #1 TO UNNAMED TRIBUTARY OF IOWA RIVER ±1000 FT

TOTAL AREA DISTURBED TO DISCHARGE POINT	3.74 ACRES
STORAGE VOLUME REQUIRED (1" OF ACRES*3600 CU FT)	13,4484 CU FT
VOLUME PROVIDED IN FILTER SOCK (3.0 LF @ 2.0 CU FT/LF OF SOCK)	840 CU FT
VOLUME PROVIDED IN SILT FENCE (1,286 LF @ 4.5 CU FT/LF OF FENCE)	5,787 CU FT
VOLUME PROVIDED IN TSB #1	10,000 CU FT
TOTAL VOLUME PROVIDED	16,627 CU FT

EROSION CONTROL NOTES

1. THE PROJECT REQUIRES AN IOWA NPDES PERMIT #2. CIVIL DESIGN ADVANTAGE WILL PROVIDE THE PERMIT AND THE INITIAL STORM WATER POLLUTION PREVENTION PLAN (SWPPP) FOR THE CONTRACTORS USE DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL REQUIREMENTS OF THE SWPPP AND LOCAL, STATE AND FEDERAL REQUIREMENT. THE OWNER SHALL EMPLOY A SEPARATE FIRM TO PROVIDE SWPPP MONITORING AND UPDATES. THE CONTRACTOR WILL BE RESPONSIBLE FOR COORDINATING WITH THE SELECTED FIRM.
2. ALL EROSION CONTROL DEVICES SHALL BE INSTALLED ACCORDING TO SUDAS CHAPTER 7 EROSION AND SEDIMENT CONTROL.

CIVIL DESIGN ADVANTAGE
3601 104th Street, Urbandale, IA 50322
PH: (515)369-4400
FAX: (515)369-4410

6400 Westown Parkway
West Des Moines, Iowa
50266
P: 515-226-0128
F: 515-223-9673

0131 - HUXLEY, IOWA
I-35 & IA-210

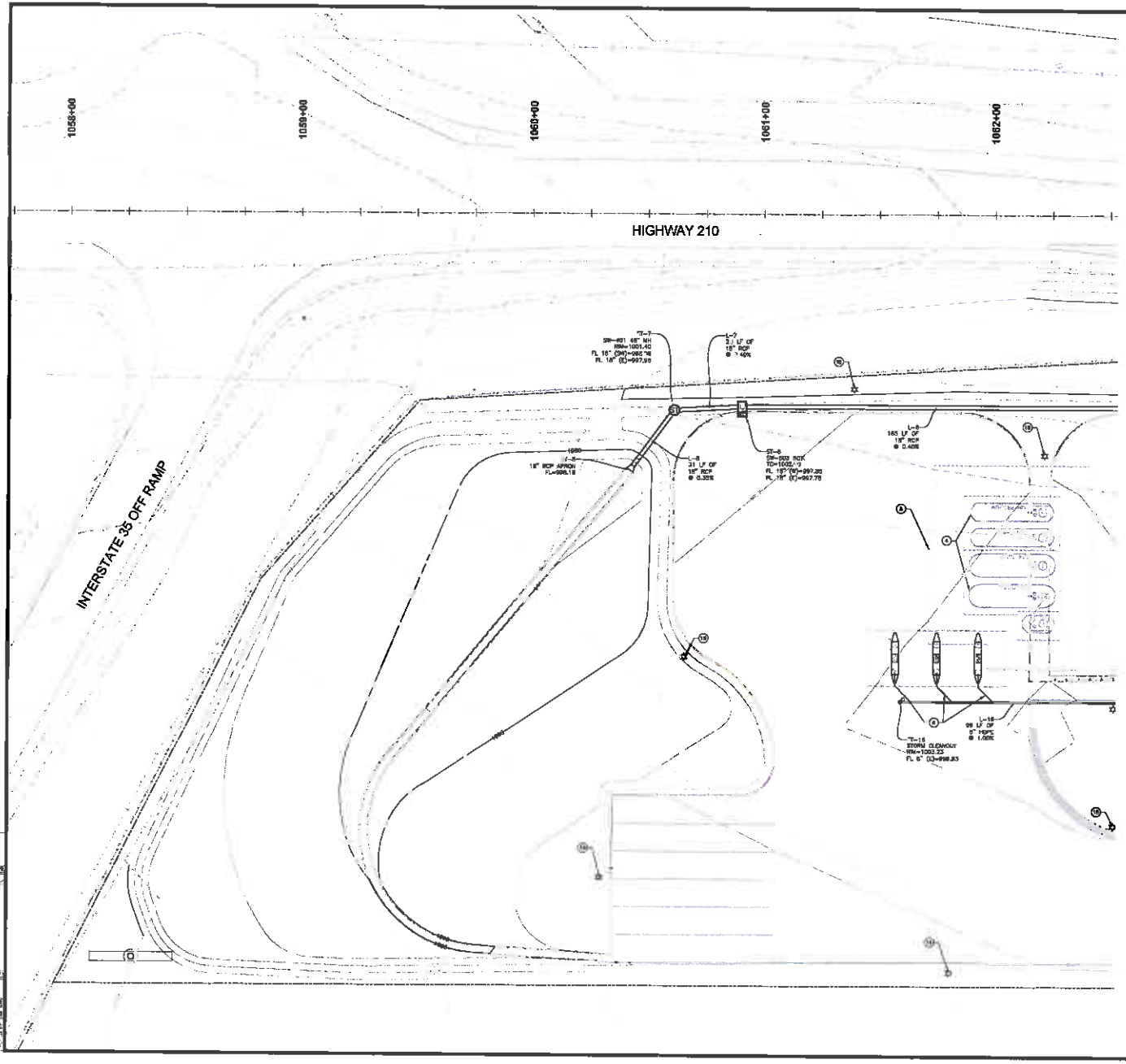
EROSION & SEDIMENT CONTROL PLAN

NO PROJECT TEAM:
ROW:
SDW:
CPM:

NO.	DATE	DESCRIPTION
1		REVISIONS

DATE: 04-09-2019

SHEET NUMBER: C2.3



UTILITY NOTES

1. REFER TO MECHANICAL, ELECTRICAL AND PLUMBING PLANS FOR UTILITY SERVICE SIZES AND EXACT LOCATIONS. REFER TO ELECTRICAL PLANS FOR ELECTRIC AND TELEPHONE SERVICE CONSTRUCTION DETAILS. REFER TO MECHANICAL PLANS FOR G.S. SERVICE CONSTRUCTION DETAILS.
2. FIELD VERIFY ELEVATIONS AND LOCATIONS OF ALL CONNECTIONS TO EXISTING UTILITIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.
3. PROVIDE TEMPORARY SUPPORT FOR EXISTING UTILITY LINES THAT ARE ENCOUNTERED DURING CONSTRUCTION UNTIL BACKFILLING IS COMPLETE.
4. BACKFILL ALL UTILITY TRENCHES ACCORDING TO THE MOST RECENT EDITION OF THE SUDAS STANDARD SPECIFICATIONS AND ALL CITY OF HUXLEY SUPPLEMENTALS. MAINTAIN A MINIMUM OF 2'-0" COVER OVER ALL WATERMAINS.
5. ALL UTILITIES SHALL BE SHIELDED TO 5 FEET FROM BUILDINGS. REFER TO MEP PLANS FOR DESIGN FROM 5' TO 10' OF BUILDING FACE.
6. ADJUST ALL MANHOLES AND INTAKES TO FINISHED GRADES.
7. ALL SANITARY SEWER AND WATER SERVICES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF HUXLEY'S PLUMBING CODE.
8. 18" MINIMUM VERTICAL CLEARANCE BETWEEN STORM SEWER AND SANITARY SEWER PIPES. 18" MINIMUM VERTICAL CLEARANCE BETWEEN SANITARY SEWER AND WATER MAIN.
9. MAINTAIN A MINIMUM OF 10' HORIZONTAL SEPARATION BETWEEN SANITARY SEWER LINES AND WATER MAINS.
10. WHERE PUBLIC UTILITY FIXTURES ARE SHOWN AS EXISTING ON THE PLANS OR ENCOUNTERED WITHIN THE CONSTRUCTION AREA, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE OWNERS OF THOSE UTILITIES PRIOR TO THE BEGINNING OF ANY CONSTRUCTION. THE CONTRACTOR SHALL AFFORD ACCESS TO THOSE FACILITIES FOR NECESSARY MODIFICATION OF SERVICE. UNDERGROUND FACILITIES, STRUCTURES AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORDS, AND THEREFORE, THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. IT IS POSSIBLE THERE MAY BE OTHERS. THE EXISTENCE OF WHICH IS PRESENTLY NOT KNOWN OR SHOWN. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THEIR EXISTENCE AND EXACT LOCATIONS AND TO AVOID DAMAGE THERETO. NO CLAIMS FOR ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR FOR ANY INTERFERENCE OR DELAY CAUSED BY SUCH WORK. THE CONTRACTOR IS REQUIRED TO UTILIZE THE UTILITY ONE-CALL SERVICE AT 811 OR 1-800-292-8989 AT LEAST 48 HOURS PRIOR TO EXCAVATING ANYWHERE ON THE PROJECT.
11. ALL WATERMAIN WORK, PUBLIC OR PRIVATE, SHALL BE DONE IN ACCORDANCE WITH THE CITY OF HUXLEY'S STANDARD CONSTRUCTION SPECIFICATIONS FOR PUBLIC IMPROVEMENTS.
12. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF WORK OF ALL SUBCONTRACTORS(S) INVOLVED IN THE PROJECT.
13. PRIVATE UTILITIES TO BE INSTALLED PER THE CITY OF HUXLEY'S STANDARD CONSTRUCTION SPECIFICATIONS FOR PUBLIC IMPROVEMENTS AND THE 2009 UNIFORM PLUMBING CODE. CONTACT BUILDING INSPECTOR A MINIMUM OF 24 HOURS IN ADVANCE FOR UTILITY INSTALLATION INSPECTIONS.
14. OWNER IS RESPONSIBLE FOR MAINTENANCE OF PRIVATE RETENTION FACILITIES AND PRIVATE UTILITIES. PERIODIC MAINTENANCE AND CLEANING OF STORM AND SANITARY SEWER MAY BE NECESSARY.
15. CONTRACTOR SHALL PREVENT ENTRY OF MUD, DIRT, DEBRIS AND OTHER MATERIAL INTO NEW AND EXISTING SEWER SYSTEMS. SHOULD ANY CONTAMINATION OCCUR DURING CONSTRUCTION, THE CONTRACTOR SHALL CLEAN IT AT NO COST TO THE OWNER. INSTALL SILT FENCE AT ALL PERIMETER STORM SEWER INLET.
16. ALL STORM SEWER, SANITARY SEWER, AND WATER UTILITIES WITHIN THE SITE SHALL BE PRIVATE EXCEPT 8" SANITARY SEWER AND 12" WATER MAIN LOCATED RUNNING NORTH AND SOUTH ON THE EAST END OF THE SITE, THE 8" SANITARY SEWER AND 12" WATER MAIN ARE PUBLIC.
17. SANITARY SEWER SERVICE SHALL BE 6 IN. DIA. SCH 23.5 PVC.
18. USE DR-125 FLX PROFD TO 24 IN DIA. CULVERT PIPE UNDER THE ENTRANCE.
19. DEVELOPER SHALL INSTALL WATTS RPZ BACKFLOW ASSEMBLY FOR WATER SERVICE INTO THE BUILDING.
20. PROVIDE TRACER WIRE ON THE PUBLIC WATER MAIN AND SANITARY SEWER. INSTALL TRACER WIRE TERMINATION BOXES TO HYDRANTS, VALVES AND MANHOLES. BOX MANUFACTURER: DRAINAGE & WATER SOLUTIONS PE-WIS NO. TMAB.

FLAG NOTES

1. 1,000 GALLON GREASE INTERCEPTOR WITH SAMPLE PORT. INSTALL PER LOCAL STANDARDS AND SPECIFICATIONS
2. INSTALL TRANSFORMER PAD, COORDINATE WITH LOCAL UTILITY PROVIDER
3. CONNECT TO BUILDING SERVICE, SEE ARCHITECTURAL DRAWINGS FOR ROOF DRAIN LOCATIONS. FL=1000.14
4. PROPOSED UNDERGROUND STORAGE TANK LOCATIONS
5. UNDERGROUND STORAGE TANK OVERFLOW LANTS
6. 6 INCH HDPE DOWNSPOUT LATERALS TO CONNECT TO STORM DRAIN. MIN. SLOPE 2 PERCENT.
7. WATER METER LOCATION — INSTALL SEPARATE METERS AND BACKFLOW PROTECTION FOR DOMESTIC & IRRIGATION
8. PROPOSED 1 INCH IRRIGATION SERVICE OUT TO SYSTEM, SPLITS FROM 2 INCH DOMESTIC SERVICE INSIDE BUILDING
9. PROPOSED 2 INCH TYPE K COPPER DOMESTIC WATER SERVICE
10. PROPOSED 6 INCH DIP FIRE WATER SERVICE
11. 2 INCH CURB STOP
12. 45 DEGREE BEND
13. UTILITY CROSSING, CONTRACTOR TO MAINTAIN A MINIMUM OF 18 INCH VERTICAL CLEARANCE
14. PROPOSED 6 INCH GATE VALVE
15. PROPOSED UNDERGROUND ELECTRICAL POWER SERVICE LINE, COORDINATE WITH LOCAL UTILITY PROVIDER
16. PROPOSED 2 INCH CONDUIT
17. PROPOSED FIRE HYDRANT
18. PROPOSED AREA LIGHT

N

SCALE
0' 10' 20' 40'

CIVIL DESIGN ADVANTAGE
3405 SE CROSSROADS DRIVE, SUITE G
GRIMES, IOWA 50111
PH: (515) 369-4400
FAX: (515) 369-4410
PROJECT #: 19-294

Kum & Go
6400 Westown Parkway
West Des Moines, Iowa
50266
P: 515-226-0126
F: 515-223-9873

0131 - HUXLEY, IOWA
I-35 & IA-210

UTILITY PLAN

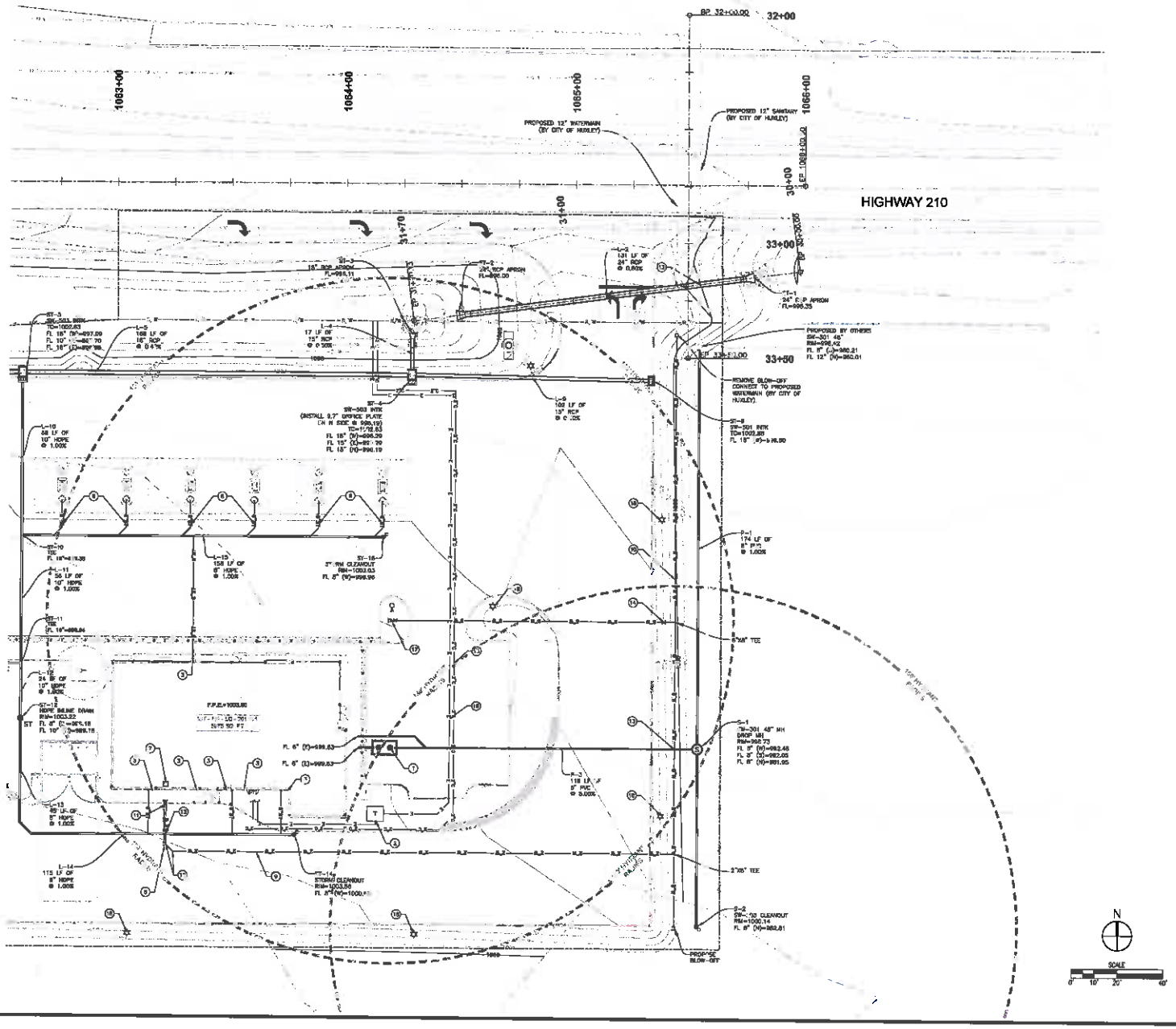
KD PROJECT TEAM:
RDN:
SDS:
CPR:

REVISIONS

△	DATE	REVISION DESCRIPTION

DATE: 04-09-2019

SHEET NUMBER
C3.1



CIVIL DESIGN ADVANTAGE

Kum & Go

6400 Westown Parkway
West Des Moines, Iowa
50266
P: 515-225-0128
F: 515-222-2573

0131 - HUXLEY, IOWA
I-35 & IA-210

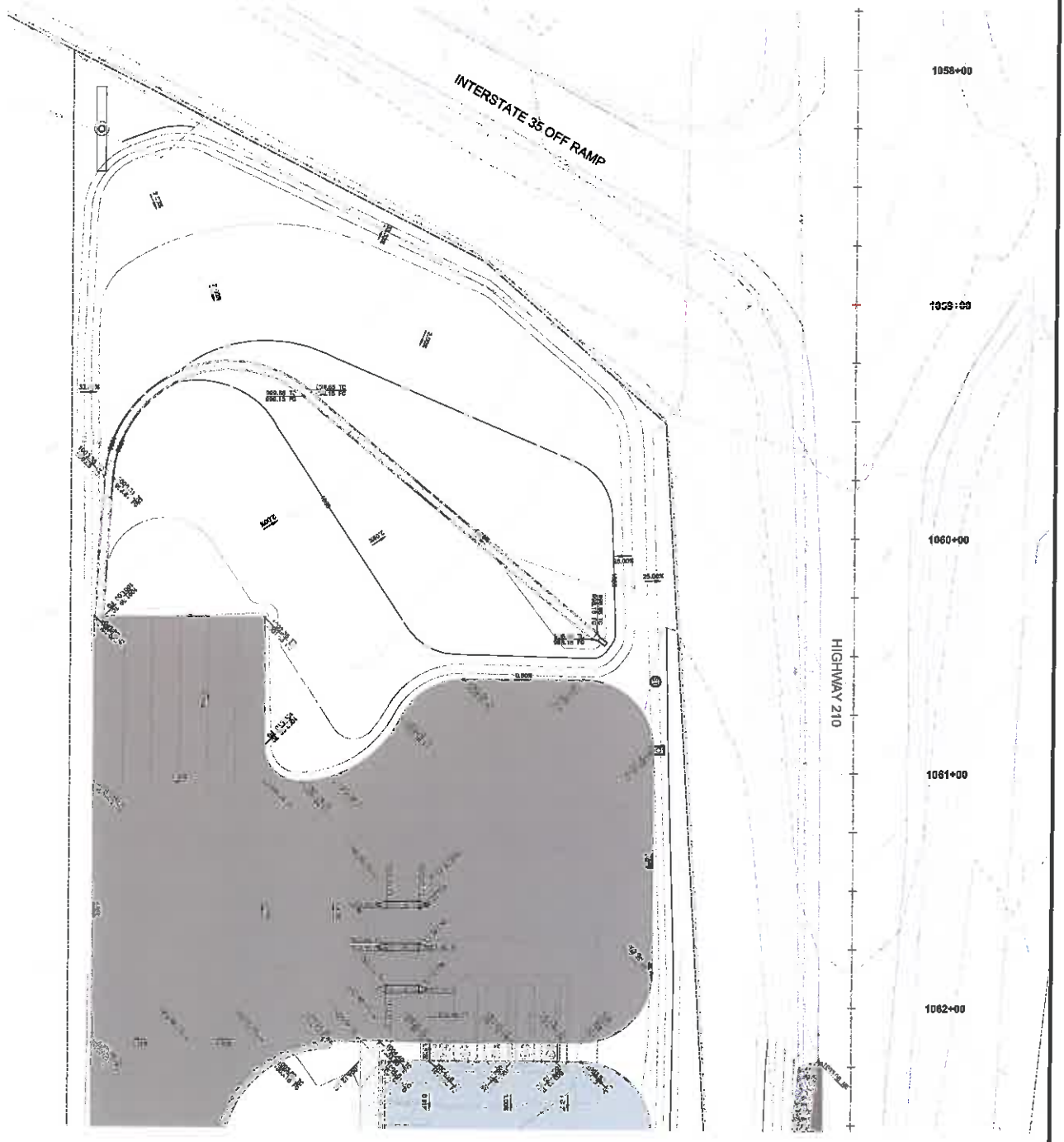
UTILITY PLAN

XGI PROJECT TEAM:
RDR:
SDM:
DPM:

NO.	DATE	REVISIONS
1		

DATE: 04-09-2019

SHEET NUMBER:
C3.2



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IOWA ONE CALL

SHEET NUMBER	DATE	REVISION DESCRIPTION	REVISIONS
C4.1	04-09-2019		

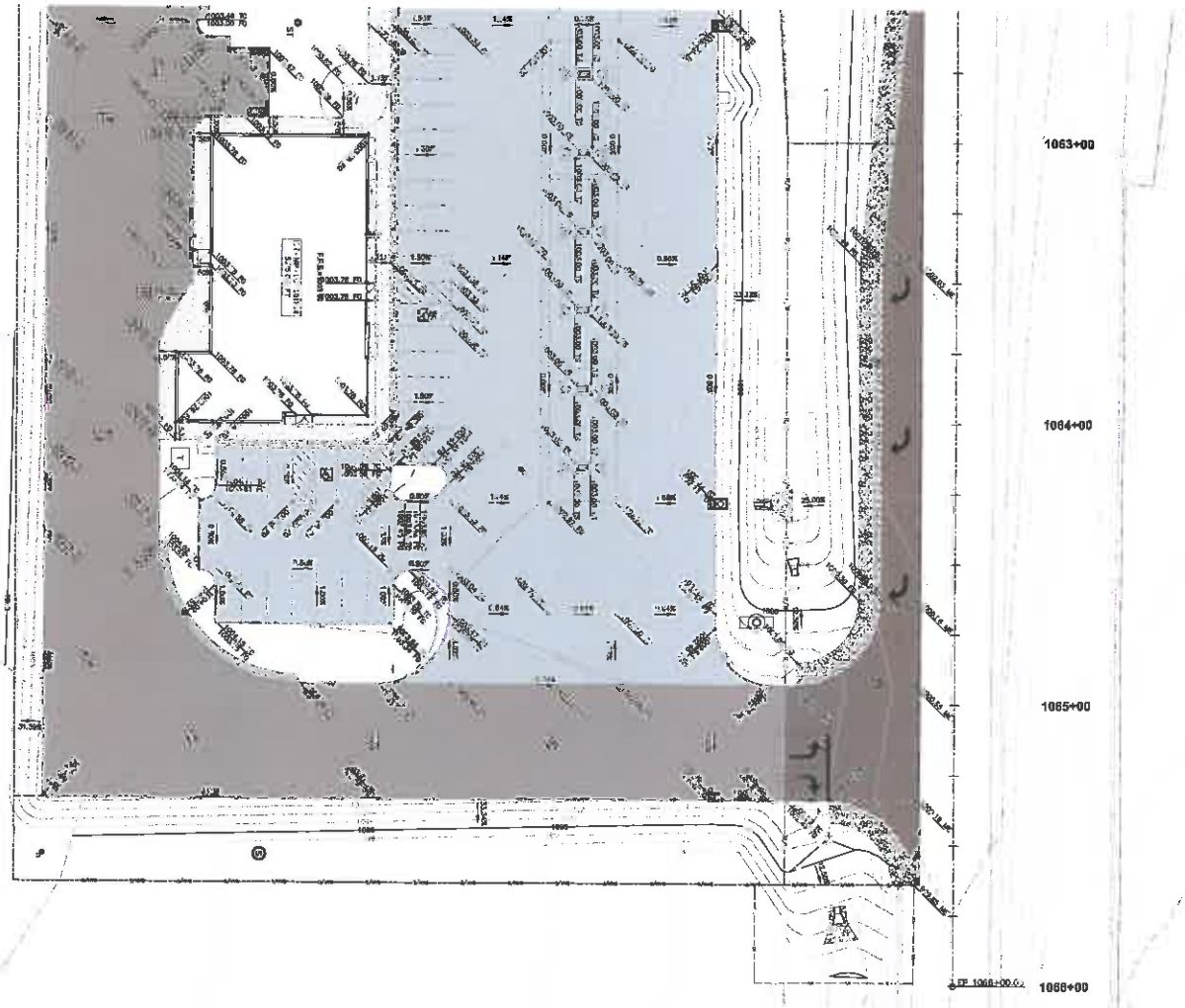
0131 - HUXLEY, IOWA
I-35 & IA-210

PAVING GEOMETRICS & SPOT ELEVATION PLAN

8-100 Westown Parkway
West Des Moines, Iowa
P: 515-226-0128
F: 515-223-9873

Kum & Go

CIVIL DESIGN ADVANTAGE



SCALE: 1" = 20'

N

IOWA ONE CALL

SHEET NUMBER	DATE	△	DATE	REVISIONS DESCRIPTION	BY
C4.2	04-09-2019				

0131 - HUXLEY, IOWA
I-35 & IA-210
PAVING GEOMETRICS & SPOT ELEVATION PLAN

8400 Westown Parkway
West Des Moines, Iowa 50266
P: 515-226-0128
F: 515-223-5873

Kum & Go

CIVIL DESIGN ADVANTAGE

LANDSCAPE NOTES

1. LOCATE ALL UTILITIES BEFORE ANY PLANTING WORKS.
2. THE MOST RECENT EDITION OF THE "SUDAS STANDARD" SPECIFICATIONS AND ALL CITY SUPPLEMENTALS, IF APPLICABLE, SHALL APPLY TO ALL WORK ON THIS PROJECT UNLESS OTHERWISE NOTED.
3. TYPE, SIZE, AND QUALITY OF PLANT MATERIAL SHALL CONFORM TO THE MOST CURRENT EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1)
4. ALL PLANT MATERIAL SHALL BE HEALTHY SPECIMENS WITHOUT DEFORMITIES, VOIDS AND OPEN SPACES, WITH WELL DEVELOPED BRANCH AND ROOT SYSTEMS, TRUE TO HEIGHT, SHAPE, AND CHARACTER OF GROWTH OF THE SPECIES OR VARIETY.
5. SEED OR SOD ALL DISTURBED AREAS AS DIRECTED BY OWNER.
6. BACKFILL TO TOP OF CURB. (MINUS 1 1/2" FOR SOD, IF REQ.) MINERAL MULCH (~3in WIDE) BARRIER SHALL BE PLACED AROUND ALL TREES, SHRUBS AND IN ALL PLANTING BEDS.
7. ALL EDGING SHALL BE STEEL.
8. PLANT QUANTITIES ARE SHOWN FOR INFORMATION ONLY, THE DRAWING SHALL PREVAIL IF ANY CONFLICTS ARISE.
9. ALL DEBRIS SPILLED IN THE PUBLIC R.O.W. SHALL BE PICKED UP BY THE CONTRACTOR AT THE END OF EACH WORK DAY.
10. CONTRACTOR SHALL WARRANTY ALL PLANT MATERIALS FOR A PERIOD OF ONE YEAR FROM DATE OF INSTALLATION.
11. CONTRACTOR SHALL PROVIDE IRRIGATION DESIGN TO OWNER, IF REQUESTED, FOR APPROVAL.

OPEN SPACE

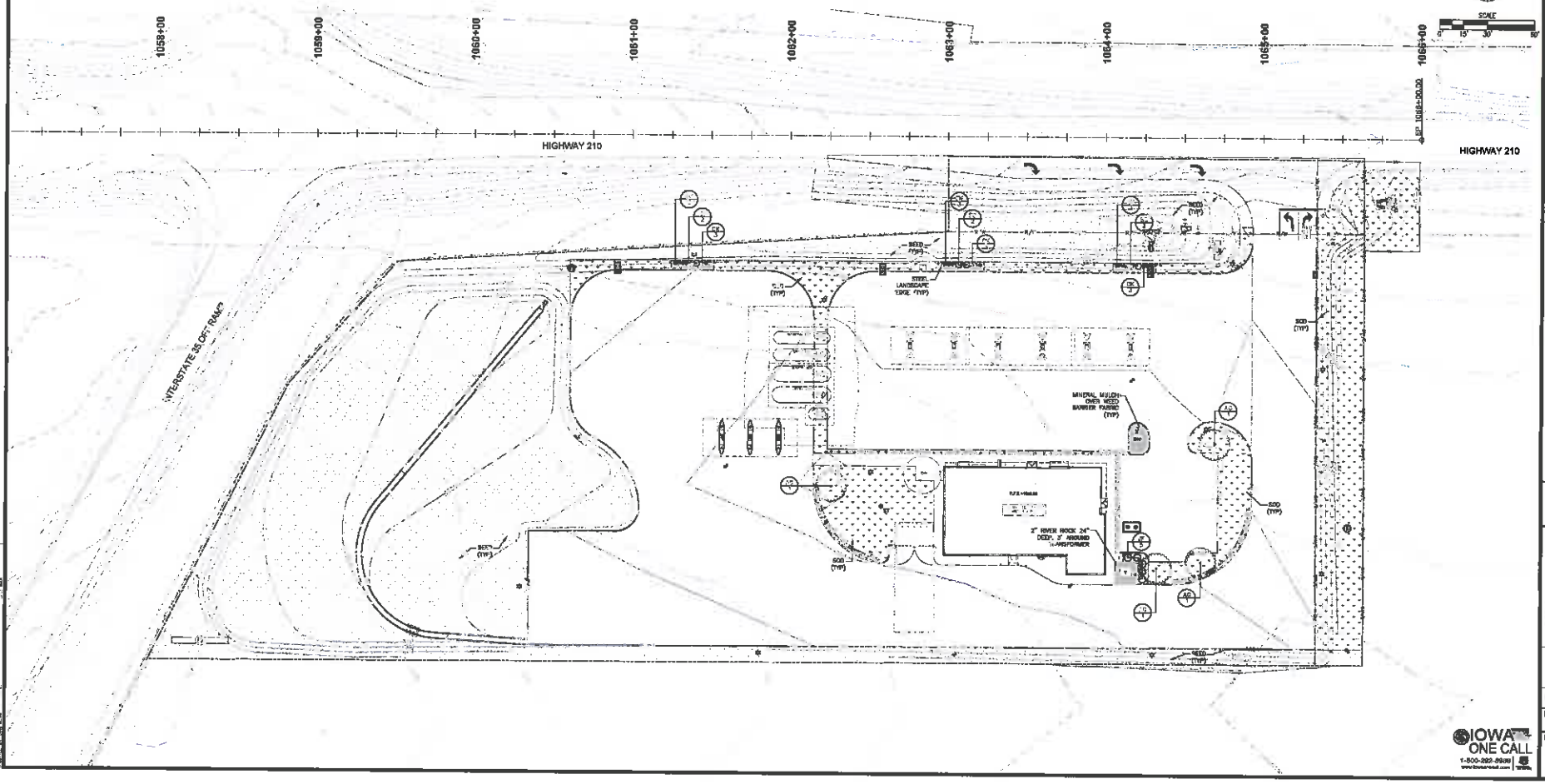
SITE AREA:	187,186 SF (4.30 ACRES)
OPEN SPACE REQUIRED:	37,438 SF (20%)
PROVIDED:	79,779 SF (43%)

PLANT SCHEDULE

DECIDUOUS TREES	QTY	COMMON NAME	BOTANICAL NAME	COMT
AG	6	GREEN COLUMN MAPLE	ACER FREEMANII 'GREENCOLUMN'	B&B, 2" CALIPER

SHRUBS	QTY	COMMON NAME	BOTANICAL NAME	SIZE
JF	5	"SEA GREEN" JUNIPER	JUNIPERUS CHINENSIS 'SEA GREEN'	3 GAL
SJ	8	GOLDFLAME SPIREA	SPIRAEA X BUMALDA 'GOLDFLAME'	3 GAL

GRASSES	QTY	COMMON NAME	BOTANICAL NAME	SIZE
CK	15	FEATHER REED GRASS	CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'	1 GAL



IOWA ONE CALL 1-800-292-8989

CIVIL DESIGN ADVANTAGE
3421 100th Street, Urbandale, IA 50322
Phone: 515.369.4300 Fax: 515.369.4400

Kum & Go

6400 Westown Parkway
West Des Moines, Iowa 50266
P: 515-223-0128
F: 515-223-9673

0131 - HUXLEY, IOWA
I-35 & IA-210

LANDSCAPE PLAN

REVISIONS

NO	DATE	REVISION DESCRIPTION

DATE: 04-08-2019

SHEET NUMBER: L1.1