



**Vantage at Corpus Christi Apartments
UP River Road
Corpus Christi, Texas**

Traffic Assesment
GKW Engineering
May 8, 2015



A handwritten signature in black ink, appearing to read 'Angel'.

Sealed by Angel F. Gonzalez on May 8, 2015



Table of Contents

<u>DESCRIPTION</u>	<u>PAGE</u>
Table of Contents	2
Table of Exhibits	3
Executive Summary:	5
Description of Proposed Development:.....	5
Field observation and Data Collection at the intersection of Up River Road and Deer Run:	6
Analysis and Results	8
Impact from Proposed Development:	9
Results and Conclusions:	9



Table of Exhibits

Exhibit 1 – Aerial Layout

Exhibit 2 – Project Site Plan.....

Exhibit 3 – Existing School Site.....

Exhibit 4- Suggested School Site and Roadway configuration



Chris Weigand
5710 W. Hausman Road, Suite 115
San Antonio, TX 78249
Office: 210.860.9224
chris.weigand@bigreddog.com

May 8, 2015

Re: Traffic Engineering Report
Vantage Apartments on Up River Road, Corpus Christi TX

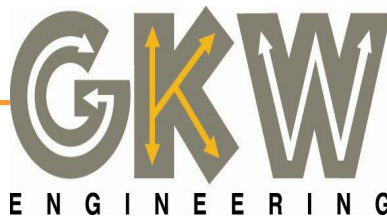
Dear Mr. Weigand:

As requested, GKW has prepared a traffic study, letter report of the proposed development located along Up River Road, between Deer Run and Carbon Plant Rd. This report is prepared in accordance Texas Department of Transportation guidelines. The scope of the report is based on the field investigation of the existing traffic patterns within the site and to examine the impact of the development to the current condition for the intersection of Up River Road at Deer Run (School Entrance).

For the evaluation process, GKW performed traffic data collection within the area. 24 Hr counts, Tourning movement counts, pictures and video were taken during the peak hour of the morning and the peak hour of the school. PM peak hour was not taken since the volume significantly dropped after school pickup time.

Below is the list of data collection:

1. Tourning movement count at Up River Road and Deer Run (unsignalized)
2. 24 hr bi directional count at Up River Road North and South of the intersection.
3. 24 hr approach count from Deer Run to Up River Road.
4. 24 Hr. Bi directional count at Carbon Road between Up River Road and IH 37 Frontage



Executive Summary:

The development will generate a total 86 vehicles per hour in the weekday a.m. peak hour and 112 vehicles per hour in the weekday p.m. peak hour. Traffic from the development will be typical of residents that will be living in it, employees, and people interested in apartment living. The distribution and study area will run along Up River Road. Access points will be located onto Up River Road and Harington Drive.

Based on analysis and conclusions in this report, our recommendations are as follows.

- Proposed development: based on the projected traffic volumes, the proposed development will have no significance impact to the existing intersection of Up River Road at Deer Run.
- Up River Rd at Deer Run: Based on the LOS analysis, it was concluded that existing lane configuration is capable of handling the traffic volume during a normal traffic condition. That said, due to the school drop off and release time, significant queue was observed on Up River Road approaches and on Deer Run. As part of the report, we are providing suggestion on how to manage the current issue. (See Exhibit 3)
- General Recommendation: Locate development signs and landscaping to avoid obstructing motorist view and reducing sight distance at the development driveway.

Description of Proposed Development:

The proposed development for the 20-acre unimproved tract will be located approximately 1000 ft. South of Up River Road and Deer Run. (See Exhibit 1 – Aerial Vicinity Map).

Proposed use is most similar to Mid-rise Apartments (ITE Land Use Code 223). This land use yields trips as shown in Table 1 – Trip Generation. The size of development provided on the Master Land Plan, up to 288 dwelling units, represents full build out, in Year 2017. This report is based on a single build phase to be completed within 2 years. Both a.m. and p.m. peak hours are analyzed. The development will have two access point. (See Exhibit 2)



Field observation and Data Collection at the intersection of Up River Road and Deer Run

Morning Peak (7:00 a.m. to 9:00 a.m.): it was noted that the intersection of Up River Road at Deer Run has traffic congestion between the hours of 7:15am to 7:45am. During the 30 Minute event, an officer assist on directing traffic and managing the queue caused by student drop off.

Time	Northbound			Southbound			Eastbound			Westbound			Sum
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
Movement	C	C	C	C	C	C	C	C	C	C	C	C	
Veh. Type	C	C	C	C	C	C	C	C	C	C	C	C	
7:00-7:15	34	3	0	0	9	43	3	0	14	0	0	0	106
7:15-7:30	73	0	0	0	3	80	7	0	65	0	0	0	228
7:30-7:45	66	5	0	0	7	69	13	0	59	0	0	0	219
7:45-8:00	27	1	0	0	19	20	18	0	52	0	0	0	137
Totals:	200	9	0	0	38	212	41	0	190	0	0	0	690
Peak Hr. Auto Totals:	200	9	0	0	38	212	41	0	190	0	0	0	690
Turning % by Approach:	96%	4%	0%	0%	15%	85%	18%	0%	82%	0%	0%	0%	
Approach Vol. & % Trucks:	209			250			231			0			

Table 1. Turning Movement Count during Morning school Peak Time

School Release (2:00 p.m. to 4:00 p.m): During school release, it was noted that traffic queing occurred between 2:30 p.m. to 3:10 p.m. During the 40 Minute event, an officer assist on directing traffic and managing the queue caused by student Pick up. The queue length during the school release was similar in length as of the morning. Although the traffic volume during the school events were noted to be 50% less as the morning.

Time	Northbound			Southbound			Eastbound			Westbound			Sum
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
Movement	C	C	C	C	C	C	C	C	C	C	C	C	
Veh. Type	C	C	C	C	C	C	C	C	C	C	C	C	
2:15-2:30	15	6	0	0	11	19	3	0	2	0	0	0	56
2:30-2:45	17	7	0	0	4	25	5	0	2	0	0	0	60
2:45-3:00	10	2	0	0	9	20	0	0	3	0	0	0	44
3:00-3:15	16	1	0	0	10	20	8	0	11	0	0	0	66
3:15-3:30	36	9	0	0	10	28	26	0	46	0	0	0	155
Totals:	94	25	0	0	44	112	42	0	64	0	0	0	381
Peak Hr. Auto Totals:	79	19	0	0	33	93	39	0	62	0	0	0	325
Turning % by Approach:	81%	19%	0%	0%	26%	74%	39%	0%	61%	0%	0%	0%	
Approach Vol. & % Trucks:	98			126			101			0			

Table 2. Turning Movement Count during school Release Time



PM Peak time (4:00 p.m. to 6:00 p.m.): During PM peak time, the intersection operated as expected. There were no queues noticed at the intersection. No significance delay were noted for vehicles waiting time to clear the intersection. The critical movement, considered to the Deer Run Eastbond approach, vehicles were able to negotiate their maneuvering without having to wait for a gap in able to continuing traveling onto Up River Rd.

Time	Northbound			Southbound			Eastbound			Westbound			Sum
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
Movement	C	C	C	C	C	C	C	C	C	C	C	C	
Veh. Type	C	C	C	C	C	C	C	C	C	C	C	C	
4:00-4:15	8	16	0	0	17	7	12	0	17	0	0	0	77
4:15-4:30	5	13	0	0	13	6	3	0	8	0	0	0	48
4:30-4:45	14	8	0	0	8	7	3	0	12	0	0	0	52
4:45-5:00	13	13	0	0	11	7	6	0	15	0	0	0	65
5:00-5:15	24	9	0	0	21	10	9	0	12	0	0	0	85
5:15-5:30	22	17	0	0	16	17	5	0	9	0	0	0	86
5:30-5:45	15	16	0	0	11	5	9	0	8	0	0	0	64
Totals:	101	92	0	0	97	59	47	0	81	0	0	0	477
Peak Hr. Auto Totals:	74	55	0	0	59	39	29	0	44	0	0	0	300
Turning % by Approach:	57%	43%	0%	0%	60%	40%	40%	0%	60%	0%	0%	0%	
Approach Vol. & % Trucks:	129			98			73			0			

Table 3. Turning Movement Count during PM Peak Time

Analysis and Results

Based on normal traffic conditions, the traffic volumes are acceptable to the lane configuration of the intersection. Traffic congestion was observed due to the school drop off and pickup time. Using Synchro Software, the intersection of Up River Rd at Deer Run was analyzed for level of service (LOS) capacity and it shows that, based on a typical traffic condition, the intersection would be at a LOS “B” for the Morning and school release time. During the regular PM Peak time the LOS is “A”. That said, *the existing lane configuration of the intersection is capable of handling the traffic current volumes.*

The current issue of extensive queuing is caused by the logistic and coordination of student drop off where vehicles are forced to queue onto the public street in able to wait to go into school property to drop off the students.



Figure 1. Up River Road NB approach



Figure 2. Deer Run approach



Figure 3. Up River Road SB approach



Figure 4. Deer Run at school entrances



Impact from Proposed Development

The proposed development traffic projections will only generate 86 vehicles per hour during the morning peak, which will coincide with the school peak. That said, out of the 86 VPH, it is only expected that no more than 13 VPH (15%) will travel north towards the intersection of Up River Rd. at Deer Run. The majority of the projected traffic is expected to travel south on Up River Road and turning left to Carbon Plant in able to have access to IH 37 NORTH and SOUTH. *Based on the Morning projection, it is our opinion that the additional traffic will have no significance impact to the current condition during the AM peak time.*

During the PM peak the proposed development will generate 112 VPH on which approximately 95 VPH (85%) will approach the proposed development from the South and only 17 VPH (15%) from the North. . *Based on the PM projection, it is our opinion that the additional traffic will have no significance impact to the current condition during the AM peak time.*

Results and Conclusions:

The development will generate a total 86 vehicles per hour in the weekday a.m. peak hour and 112 vehicles per hour in the weekday p.m. peak hour. Traffic from the development will be typical of most multi-family apartment developments. Based on analysis and conclusions in this report, our recommendations are as follows.

1. *Up River Road at Deer Run:* Based on the Synchro analysis the intersection is currently operating at a LOS B/B (AM/School Release) and LOS A (PM Peak). For the future future with development, the LOS remain unchanged. That said, the current intersection geometry needs no recommendations based on a regular traffic condition. Due to the school pickup and drop off, GKW had prepared and Exhibit which provides suggestion on how to help manage the traffic flow during the school events. See Exhibit 3
2. *School site:* Based on a study conducted by Texas Department of Transportation (TxDOT), Texas has a tendency to a bigger proportion of children being transported to and from schools in private vehicles. This elementary school in Corpus Christi present this situation and the issues related with traffic around schools. In the report no. FHWA/TX-04/4286-2 is performing by Texas Transportation Institute; researchers suggest recommendation in order to improve safety and reduce local congestion. This guideline has a particular focus on the parent drop-off/pick-up zones.

During our study, the team perceived that this schools did not offer acceptable on-site stacking length space to accommodate the queue. This insufficient on-site space to accommodate the queue led to spill out on neighboring roadways. Figure 5 shows the lanes of the northbound direction of the roadways adjacent to the school were obstructed up by parent how want to drop-off student to the schools.

For this type of situation, the study suggests the Guideline 9: Provide an adequate driveway for stacking cars on site.



Figure 5. Up River Road Northbound approach to Deer Run

During the field study we examine the geometric design. Exhibit 3 show the actual geometric design. This actual schools design have separate entrance and exit points, which decrease the available stacking space and produced needless on-site congestion. We suggest a singlet two-way driveway where driveway serves as the entrance and exit for the parent drop-off/pick-up with the objective to increase the stacking length. To determine the loop drive staking length for Tuloso-Midway Pri School who use the Table 2 . This information was obtained base in this study, who suggest a 750-1500 loop drive staking length for student population 500.



School Type /Student Population	Loop Drive Stacking Length (linear feet) (m)
Elementary / Less than 500	400 – 750 (122 – 229)
500 or more	750 – 1500 (229 – 458)
Middle/ Less than 600	500 – 800 (153 – 244)
600 or more	800 – 1600 (244 – 488)
High (31) /400 – 800	800 – 1200 (244 – 366)
800 – 2500	1200 – 1500 (366 – 458)

Table 4- School Type Student Population Loop Drive Stacking Length (linear feet) (m)

Exhibit 4 shows the suggested schematic design to take into consideration. The change involved modifying the actual loop driveway to a single two-way driveway. In the design, we increase the actual drive stacking length from 726 linear feet to 1308 linear feet. An increase of 582 LF (80%) which is equivalent of approximately 29 additional vehicles. In addition, the proposed roadway stripping will provided additional stacking in case that the queuing extend to the public street without affecting thru movements, thus providing a safer alternative and efficient.

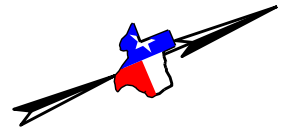
As shown on Exhibit 4, the proposed suggestion will only require to restripe existing pavement foot print for Up River Rd. for Up River Road NB Approach, the thru lane is proposed to be a 13 foot Shared lane (bike/auto) and a 10' left turn lane. For the SB Approach, maintain the right turn lane and provide 13 ft shared lane with a 10' median. For Deer Run adding a Right turn Lane onto the proposed School main entrance and restriping the existing pavement to provide a middle left turn lane. This proposed layout will provide ample queuing area on which the thru traffic will not be affected by on which is the existing case scenario.

This schematic is a draft and was not intended to be final. This schematic need to be reviewed by the school district representatives and the appropriate roadway agencies.

If you have questions or need additional information, please feel free to contact us.

Yours truly,

Angel Felipe Gonzalez, P.E.
President GKW Engineering



PROPOSED DEVELOPMENT LOCATION
(APPROX. 20 ACRES)

TULOSO MIDWAY
PRIMARY SCHOOL

IH 37

UP RIVER RD

STONE MILL DR

DEER RUN RD

SITE

N HARRING DR

IRMA DR

E HARRING DR

CARBON PLANT RD

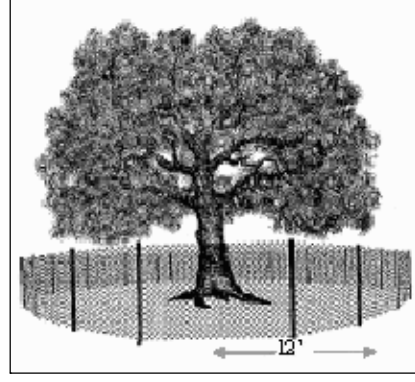
REV NO	DATE	DESCRIPTION	BY
GKW GONZALEZ, KYPUROS AND WHITE <small>3463 MAGIC DR, SUITE 250 SAN ANTONIO, TEXAS 78229 210-582-5870 FAX 210-582-5872 WWW.GKW-INC.COM FIRM No. TX - 4532</small>			
VANTAGE AT CORPUS CHRISTI APARTMENTS EXHIBIT 1 AERIAL LAYOUT			
DRWN. BY:	DSGN. BY:	CHKD. BY:	DATE:

\$DATES \$TIMES
\$FILEL \$

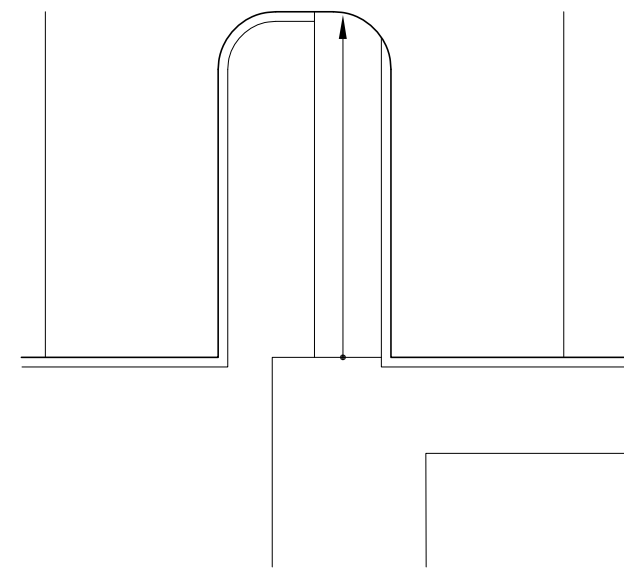
\$FILEL \$

Sidewalk Note:
All sidewalk that go over a root protection zone of a Heritage tree must go on top of existing grade no excavation in the root protection zone of a Heritage tree.

Root Protection Zone (RPZ)
Tree protection fencing must include the RPZ. The required RPZ is 1' for every 1" DBH for commercial projects. Although there is no RPZ for residential projects, it is recommended that trees be protected to insure long term health of the trees. A six-inch (6") layer of coarse mulch on the RPZ may be required based on a site inspection.



A 12" DBH tree would have a RPZ with a radius of 12' from the trunk for a commercial site.



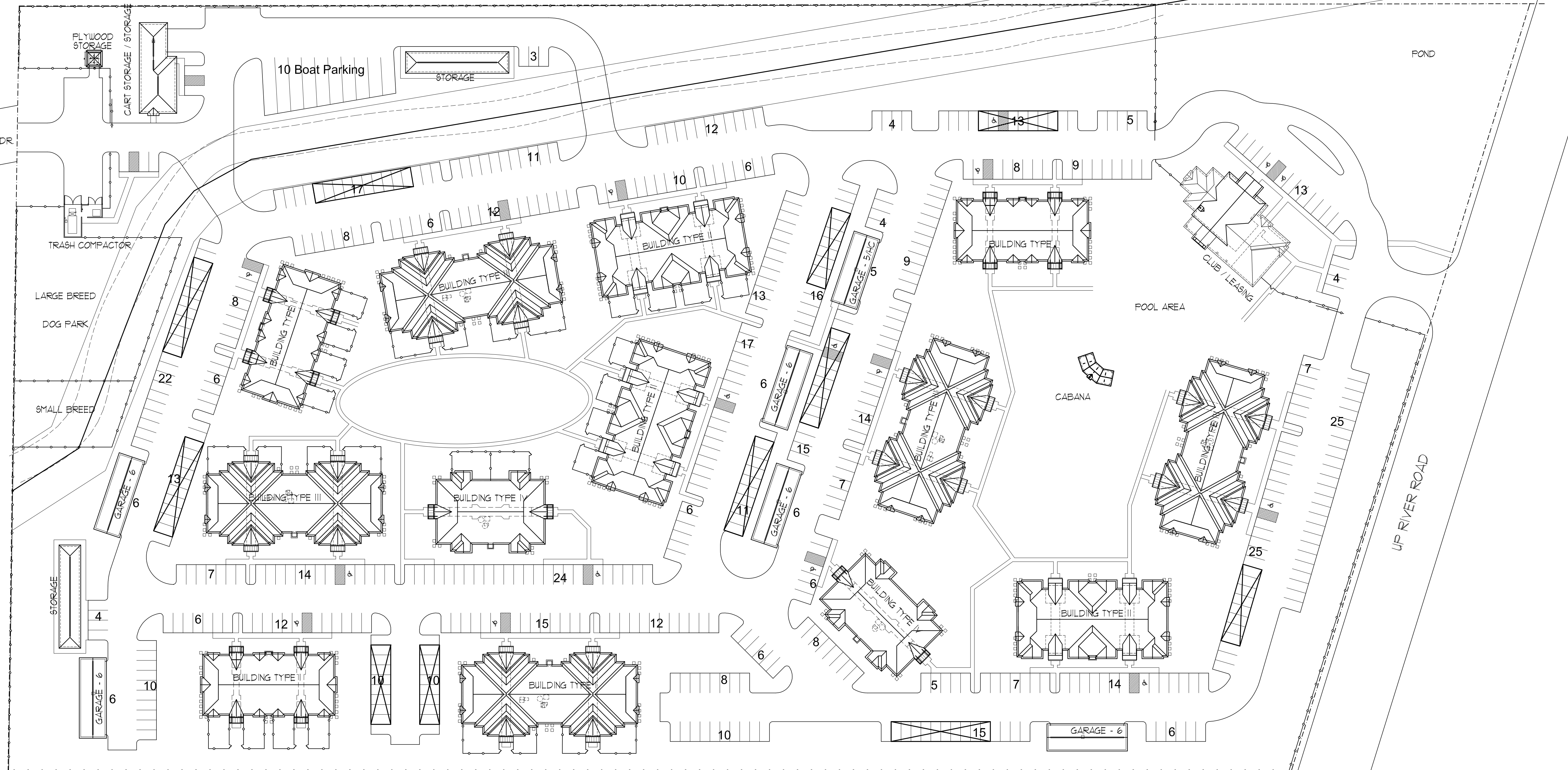
Typical: all walks in island to slope less than 5% to road surface.

Ø2 SLOPED SIDEWALK
SLOPE SIDEWALK TO ROAD SURFACE LESS THAN 5%.
sc. 1"=1'-0"

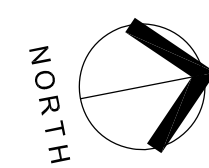
BIKE RACK REFER CIVIL SITE PLAN FOR LOCATIONS.

BBQ PIT WITH PICNIC TABLE CONFIRM LOCATION AT SITE WITH ARCHITECT.

Dog Run Protective Area Fence:
Fence to be 4'-0" high chain link with green coating.



Ø1 SITE PLAN
sc. 1"=50'-0"



222 Ridgcrest
San Antonio, Texas 78209
ph. 210.829.1898 fax. 210.829-1899
architects@b-a-architects.com
www.b-a-architects.com

Architect
ERIC A. BRENDLER JR.
DATE 02/15
NOT FOR REGULATORY
APPROVAL, PERMITTING
OR CONSTRUCTION

Issuance

Revisions:

**Vantage at Corpus Christi
Apartments**
Address
Corpus Christi, Texas

Page Description
SITE PLAN
ADDRESS PLAN
UNIT MIX

These drawings and accompanying specifications are to be an instrument of service and shall remain the property of the Architect. They are not to be used on other projects or extensions of this project except by agreement in writing and with appropriate compensation to the Architect.

Drawn By: **SDM**

Checked By:

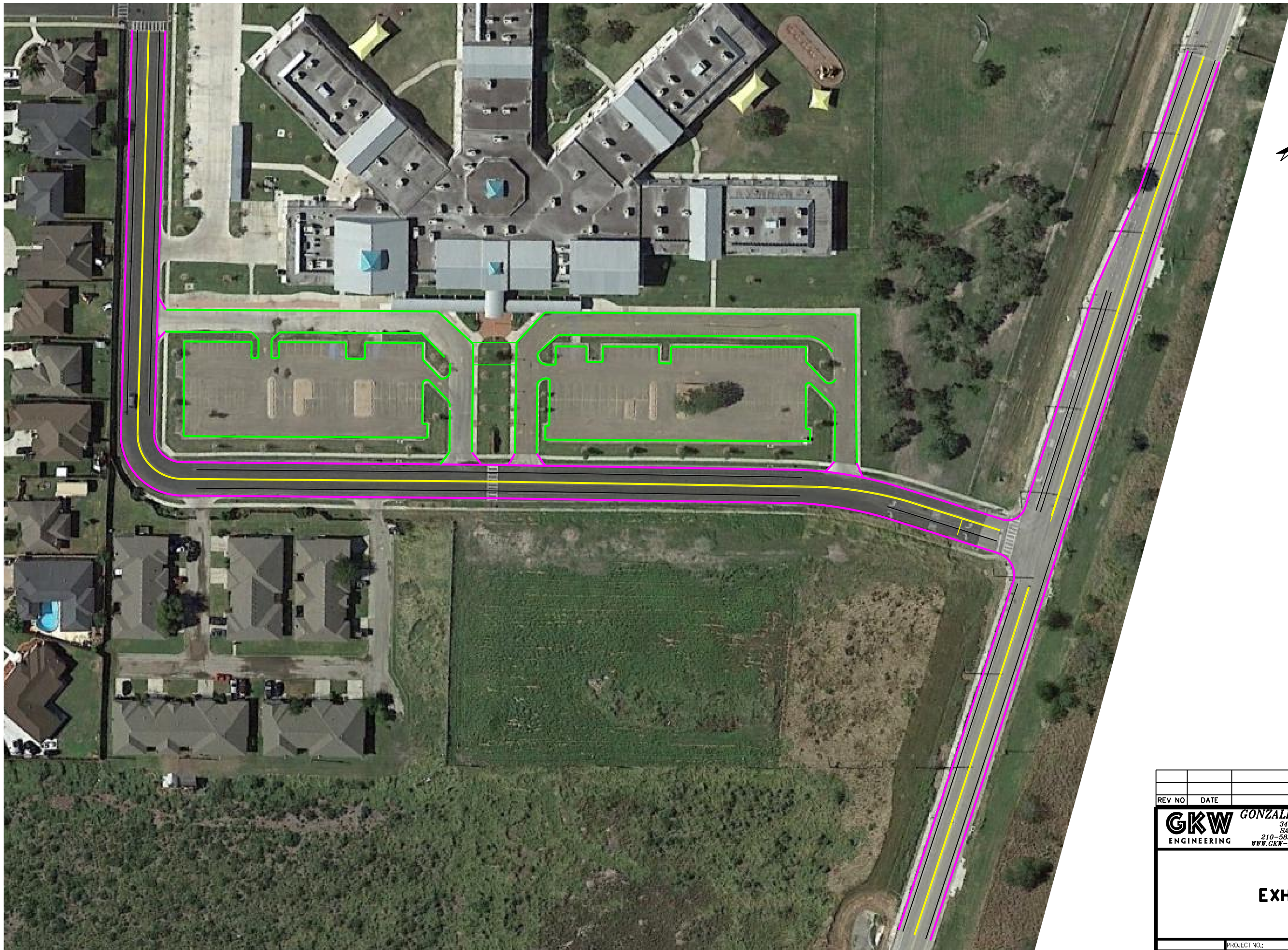
Project No. 15004

Date: 03.04.2015

Page

A1.1

5/8/2015 1:42:54 PM
K:\ProjDir\15_Job\15-24_BRD_Vantage at Corpus Christi\CADD\DWG\Vantage CC*Layout*EX03.dwg



SCALE: 1" = 100'

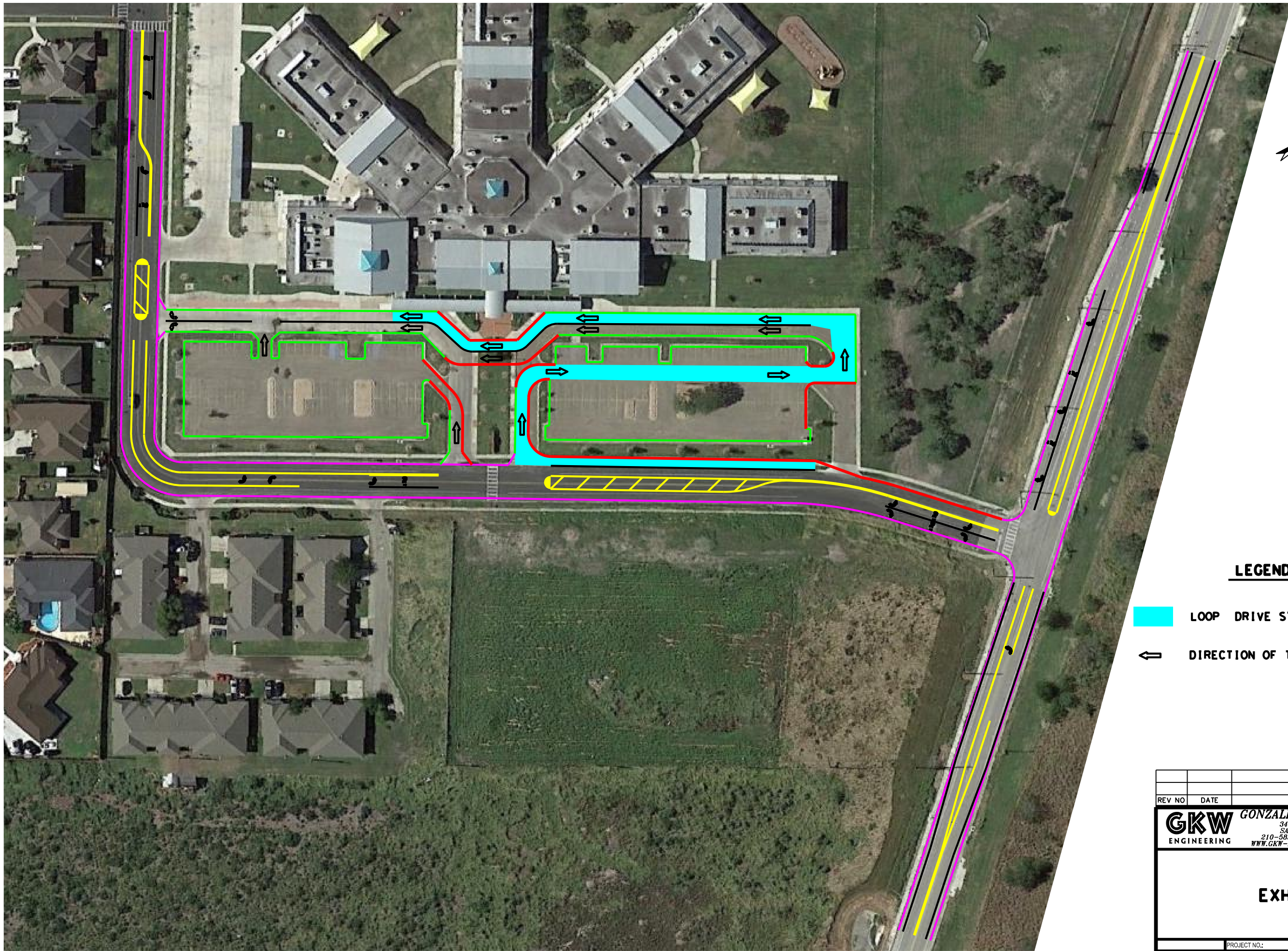
REV NO	DATE	DESCRIPTION	BY

GKW **GONZALEZ, KYPUROS AND WHITE**
ENGINEERING
3463 MAGIC DR., SUITE 250
SAN ANTONIO, TEXAS 78229
210-582-5870 FAX 210-582-5872
WWW.GKW-INC.COM FIRM No. TX - 4532

EXHIBIT 3



PROJECT NO.:	DATE:			
DRWN. BY:	DSGN. BY:	CHKD. BY:	SHEET NO.:	OF

5/8/2015 2:37:21 PM
K:\ProjDir\15_Job\15-24_BRD_Vantage at Corpus Christi\CADD\DWG\Vantage_C01\Layout*EX04.dwg



SCALE: 1" = 100'

LEGEND

-  LOOP DRIVE STACKING LENGTH 1308 LF
-  DIRECTION OF TRAFFIC FLOW

REV NO	DATE	DESCRIPTION	BY

GKW **GONZALEZ, KYPUROS AND WHITE**
ENGINEERING
3463 MAGIC DR., SUITE 250
SAN ANTONIO, TEXAS 78229
210-582-5870 FAX 210-582-5872
WWW.GKW-INC.COM FIRM No. TX - 4532

EXHIBIT 4

PROJECT NO.:	DATE:			
DRWN. BY:	DSGN. BY:	CHKD. BY:	SHEET NO.:	OF