

ENVIRONMENTAL CONCEPT PLAN RAISING CANE'S - COLUMBIA, MD

9071 SNOWDEN RIVER PARKWAY, COLUMBIA, MD 21046
ELECTION DISTRICT NO. 6
TAX MAP 0042, GRID 0006, PARCEL 0513

ENVIRONMENTAL CONCEPT PLAN DESIGN NARRATIVE

NATURAL RESOURCES PROTECTION, ENHANCEMENT, AND PRESERVATION
ALL NATURAL FEATURES HAVE BEEN DEPICTED ON THE EXISTING CONDITIONS PLAN. THE SITE CONTAINS AREAS OF LANDSCAPED VEGETATION. IMPACTS TO THE VEGETATED LANDSCAPED AREAS WILL BE MINIMIZED OR REPLACED DURING REDEVELOPMENT.

MAINTENANCE OF NATURAL FLOW PATTERNS
THE PROPOSED SITE DRAINAGE WILL MAINTAIN THE EXISTING CONDITION OF FLOW PATTERNS WHEREVER FEASIBLE DURING DEVELOPMENT EFFORTS. ALL DRAINAGE FROM THE PROPOSED DEVELOPMENT WILL BE DIRECTED TO THE EXISTING OUTFALL LOCATIONS.

REDUCTION OF IMPERVIOUS AREAS THROUGH BETTER SITE DESIGN, ALTERNATIVE SURFACES, AND NON-STRUCTURAL PRACTICES
THE PROPOSED DEVELOPMENT HAS MINIMIZED IMPERVIOUS SURFACES TO THOSE REQUIRED TO SUPPORT THE INTENDED LAND USES (RESTAURANT, PARKING SPACES, ACCESS RISLES, AND ASSOCIATED TIE-INS TO EXISTING ROADS AND DRIVE THROUGH). THESE AREAS HAVE BEEN MINIMIZED TO PROVIDE MINIMUM ACCESS PATHS FOR VEHICLES AND PARKING AREAS.

INTEGRATION OF EROSION AND SEDIMENT CONTROLS INTO STORMWATER STRATEGY
SOIL EROSION AND SEDIMENT CONTROL PRACTICES HAVE BEEN DEVELOPED IN CONSIDERATION OF THE PROPOSED STORMWATER MANAGEMENT STRATEGIES. THE USE OF A SUPER SILT FENCE AND SILT FENCE ON PAVEMENT WILL PREVENT SEDIMENT LADEN RUNOFF FROM LEAVING THE SITE OR ENTERING THE STORMWATER MANAGEMENT FACILITY PRIOR TO FINAL STABILIZATION. THE INLET PROTECTION ON EXISTING AND PROPOSED INLETS WILL PREVENT SEDIMENT LADEN RUNOFF FROM ENTERING THE EXISTING STORM DRAIN SYSTEM. THE USE OF A STABILIZED CONSTRUCTION ENTRANCE WILL REDUCE SEDIMENT FROM BEING TRACKED OFF-SITE. TEMPORARY STABILIZATION PRACTICES (SEEDING AND STRAW, EROSION CONTROL MATTING, ETC) WILL BE IMPLEMENTED THROUGHOUT CONSTRUCTION AS NEEDED PER SOIL EROSION AND SEDIMENT CONTROL STANDARDS AND SPECIFICATIONS.

IMPLEMENTATION OF ESD PLANNING TECHNIQUES AND PRACTICES TO THE MEP
THE PROPOSED ESD PRACTICE WAS LOCATED AND DESIGNED TO PROVIDE TREATMENT AS CLOSE TO THE SOURCE AS FEASIBLE. TO MINIMIZE REQUIRED TREATMENT ON-SITE, SITE PLANNING TECHNIQUES WERE UTILIZED TO MINIMIZE THE PROPOSED IMPERVIOUS SURFACE COVERAGE.

PERMEABLE PAVEMENT MAY BE IMPLEMENTED WHERE FEASIBLE DURING FINAL SITE DESIGN; HOWEVER, DUE TO THE ANTICIPATED LIMITED INFILTRATION RATES OF THE 'D'-TYPE SOILS, REQUIRED FILL LOCATIONS, CONSTRUCTION DISTURBANCES, AND EXCESSIVE 'RUN-ON' CONDITIONS, THE LOCATIONS WILL BE LIMITED.

NON-STRUCTURAL PRACTICES (DISCONNECTIONS) HAVE BEEN CONSIDERED NOT FEASIBLE WITHIN THE PROPOSED DEVELOPMENT DUE TO THE EXISTING TOPOGRAPHY AND EXCESSIVE DISCONNECTION LENGTHS THAT WOULD BE REQUIRED. ADDITIONAL DISTURBANCE WOULD BE REQUIRED TO ENSURE PROPER DISCONNECTION SLOPES.

MICRO-SCALE PRACTICES HAVE BEEN IMPLEMENTED TO THE MAXIMUM EXTENT PRACTICABLE. DUE TO THE EXISTING ON-SITE SOILS, CONSTRUCTION DISTURBANCES, AND EXCESSIVE DRAINAGE AREAS, RAIN GARDENS AND LANDSCAPE INFILTRATION FACILITIES WERE NOT CONSIDERED FEASIBLE. FOR ALL OF THE MICRO-SCALE PRACTICES, DRAINAGE AREAS HAVE BEEN MINIMIZED TO THE PRACTICES TO ENSURE PROPER FUNCTION, AND FREEBOARD DEPTH HAS BEEN PROVIDED TO PREVENT DAMAGE TO FACILITIES DURING LARGE STORM EVENTS. PER HOWARD COUNTY STORMWATER MANAGEMENT REQUIREMENTS, NO ESDV WILL BE COUNTED IN THE SOIL MEDIA, ONLY IN THE PONDINGS ABOVE THE MEDIA.

AFTER EXHAUSTING THE IMPLEMENTATION OF MICRO-SCALE FACILITIES, ADDITIONAL CHAPTER 3 PRACTICES MAY BE UTILIZED TO MEET THE REMAINING STORMWATER MANAGEMENT REQUIREMENTS FOR THE SITE, INCLUDING QUANTITY CONTROL REQUIREMENTS.

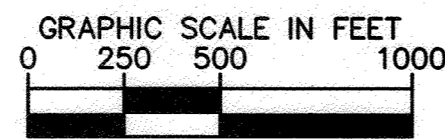
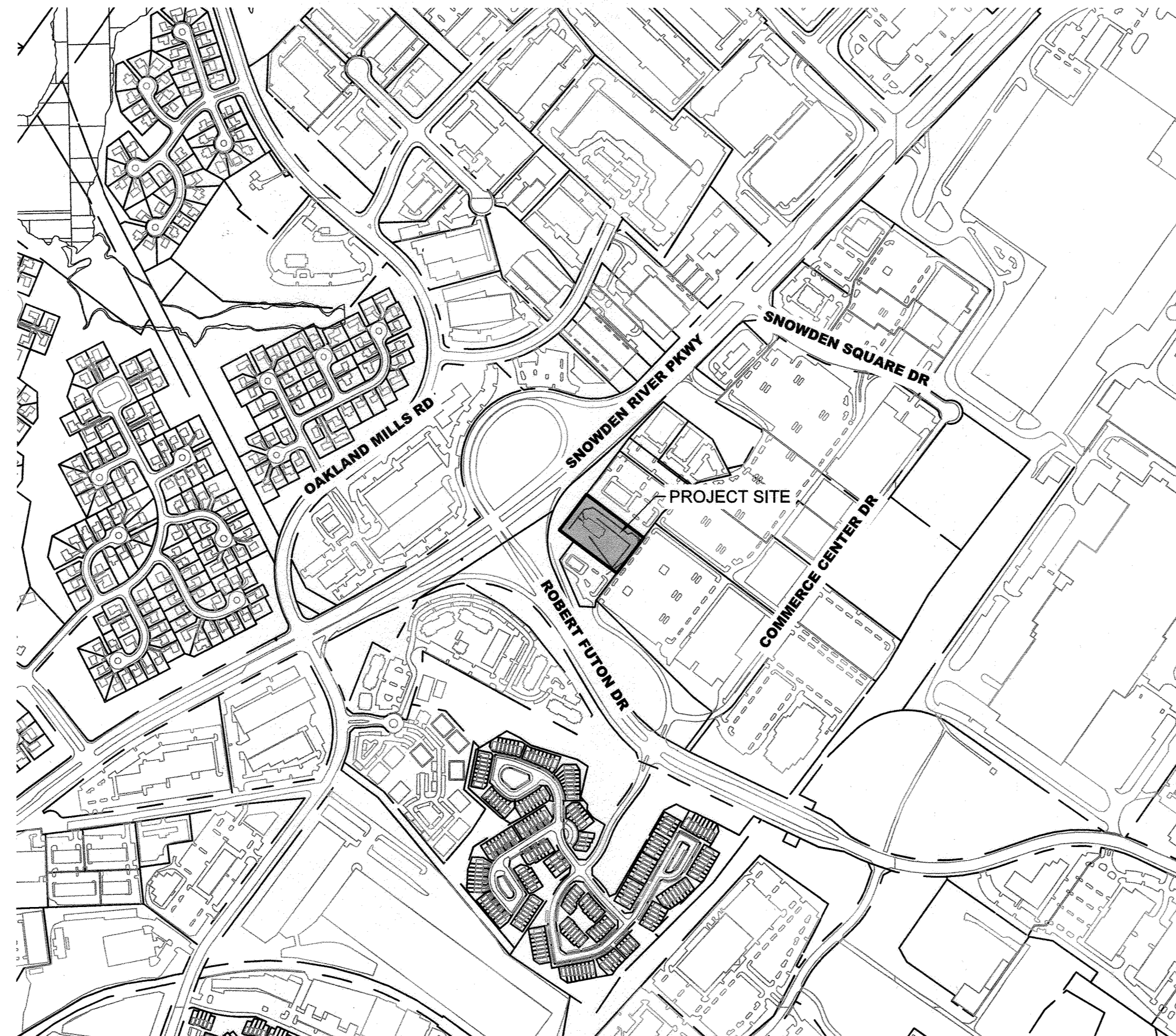
STORMWATER QUALITY TREATMENT - ENVIRONMENT SITE DESIGN
AS ADOPTED BY THE HOWARD COUNTY STORMWATER MANAGEMENT, GRADING, EROSION AND SEDIMENT CONTROL ORDINANCE, THE MARYLAND STORMWATER MANAGEMENT DESIGN MANUAL STATES THAT BECAUSE THE EXISTING ON-SITE IMPERVIOUS AREA IS MORE THAN 40% THIS PROJECT SHALL BE CONSIDERED RE-DEVELOPMENT.

BASED ON THE PROPOSED 0.86 ACRES OF IMPERVIOUS AREAS TO BE DEVELOPED AS PART OF THIS PROJECT, BASED ON THE PROPOSED IMPERVIOUS AREAS AND THE UNDERLYING SOIL CONDITIONS, THE ESDV VOLUME ASSOCIATED WITH THIS AREA IS 1,089 CF. REFER TO APPENDIX C FOR ENVIRONMENTAL SITE DESIGN COMPUTATIONS. WATER QUALITY TREATMENT SHALL BE PROVIDED THROUGH THE IMPLEMENTATION OF ENVIRONMENTAL SITE DESIGN. ENVIRONMENTAL SITE DESIGN NON-STRUCTURAL PRACTICES WILL BE IMPLEMENTED TO THE MAXIMUM EXTENT PRACTICABLE (MEP). HOWEVER, IN AREAS WHERE PROPOSED LAND USE, ENVIRONMENTAL CONSTRAINT, OR ADDITIONAL EASEMENT AND/OR RIGHT-OF-WAY CONSTRAINTS LIMIT ESD IMPLEMENTATION, NON-STRUCTURAL WATER QUALITY BMP'S SHALL BE IMPLEMENTED TO TREAT THE REMAINING IMPERVIOUS AREAS. BASED ON FINAL SITE DESIGN AND GRADING REQUIREMENTS, A STRUCTURAL UNDERGROUND BMP MAY BE PROVIDED IN LIEU OF MICRO-BIORETENTION.

THE STORMWATER FACILITIES WILL BE OWNED AND MAINTAINED BY RAISING CANE'S RESTAURANT, LLC.

STORMWATER QUANTITY CONTROL - CHANNEL PROTECTION VOLUME
AS THE PROPOSED PROJECT IMPLEMENTS ENVIRONMENTAL SITE DESIGN (ESD) TO THE MAXIMUM EXTENT PRACTICABLE, THERE ARE NOT ANY REMAINING CHANNEL PROTECTION REQUIREMENTS.

STORMWATER QUANTITY CONTROL - OVERBANK FLOOD AND EXTREME STORM
THE TOTAL FLOW TO POI-1, LO-1, LO-2, AND LO-3 REMAIN THE SAME OR DECREASE IN THE PROPOSED SITE CONDITION, THEREFORE THERE IS ADEQUATE OUTFALL AND NO SITE ATTENUATION IS REQUIRED.



LOCATION PLAN
SCALE: 1" = 500'
ADC MAP 5053-J2

LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING SEWER
- EXISTING EASEMENT
- EXISTING STORM DRAIN MANHOLE
- EXISTING CLEANOUT
- EXISTING SEWER MANHOLE
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- LIMITS OF DISTURBANCE
- PROPOSED CURB
- PROPOSED BUILDING
- PROPOSED ADA PARKING MARKING
- PROPOSED PARKING COUNT
- PROPOSED PARKING STRIPING
- PROPOSED LANDSCAPING
- PROPOSED CONCRETE SIDEWALK

Sheet List Table

Sheet Number	Sheet Title
1	COVER SHEET
2	EXISTING CONDITIONS AND INITIAL ESC
3	SITE PLAN AND FINAL ESC
4	CONCEPT SWM

NATURAL RESOURCES INVENTORY								
FEDERAL REGULATED			STATE REGULATED			LOCAL REGULATED		
PRESENT?	FEATURE	LEGEND SYMBOL	PRESENT?	FEATURE	LEGEND SYMBOL	PRESENT?	FEATURE	LEGEND SYMBOL
(Y/N)			(Y/N)			(Y/N)		
N	MAJOR WATERWAYS	N/A	N	WETLANDS OF SPECIAL STATE	N/A	N	HIGH ERODIBLE SOILS	N/A
N	FLOODPLAINS	N/A	N	WETLAND BUFFERS	N/A	N	ENHANCE STREAM BUFFERS	N/A
			N	STREAM BUFFERS	N/A	N	TOPOGRAPHIC SLOPES	N/A
			N	PERENNIAL STREAMS	N/A	N	SPRINGS	N/A
			N	FLOODPLAINS	N/A	N	SEEPS	N/A
			N	FORESTS	N/A	N	INTERMITTENT STREAMS	N/A
			N	FOREST BUFFERS	N/A	N	VEGETATIVE COVER	N/A
			N	CRITICAL AREAS	N/A	Y	SOILS	SEE SOILS TABLE
						N	BEDROCK/ GEOLOGY	N/A
						N	EXISTING DRAINAGE AREA	N/A
						N	EXISTING SWM FACILITIES	N/A

SOIL TYPES		
MAP UNIT SYMBOL	SOIL NAME	HYDROLOGIC SOIL GROUP
UD	URBAN LAND - UDORTHERTS COMPLEX, 0 TO 15 PERCENT SLOPES	D

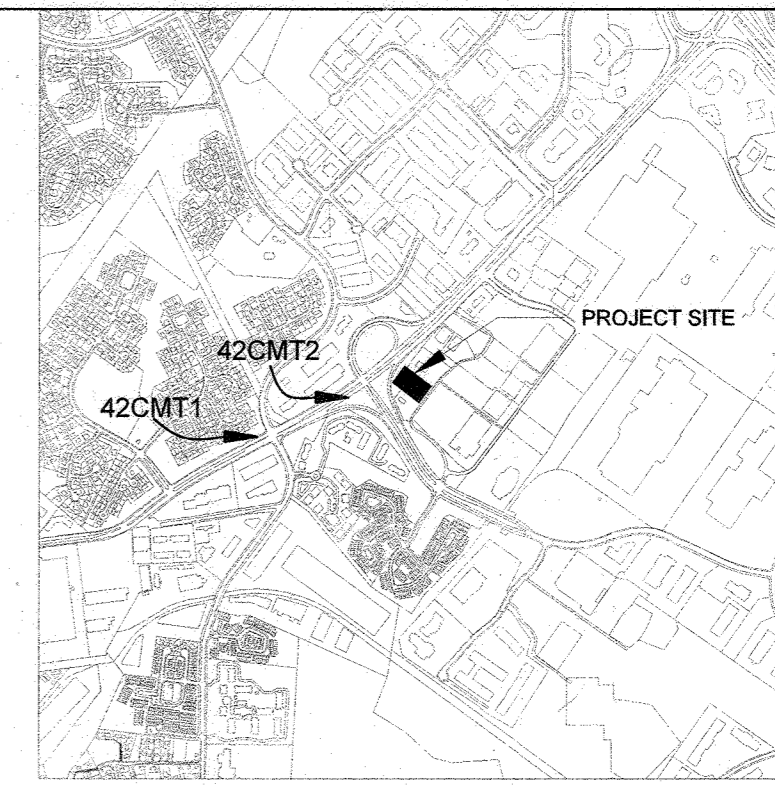
STANDARD STABILIZATION NOTE

FOLLOWING INITIAL SOIL DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION MUST BE COMPLETED WITHIN:

- THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1); AND
- SEVEN (7) CALENDAR DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE NOT UNDER ACTIVE GRADING.

GENERAL NOTES

- ALL EXISTING CONDITIONS ARE PROVIDED BY HOWARD COUNTY GIS DATA, PREVIOUSLY RECORDED PLATS, AND ALTA SURVEY.
- PROPERTY LINE OF SUBJECT PROPERTY IS ACCORDING TO SURVEY PROVIDED BY GRS GROUP, LLC, DATED JULY 12, 2021.
- APPROVAL OF THIS ECP DOES NOT CONSTITUTE AN APPROVAL OF ANY SUBSEQUENT AND ASSOCIATED SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN AND/OR RED-LINE REVISION PLAN. REVIEW OF THIS PROJECT FOR COMPLIANCE WITH THE HOWARD COUNTY SUBDIVISION PLAN AND LAND DEVELOPMENT REGULATIONS SHALL OCCUR AT THE SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN STAGES AND/OR RED-LINE REVISION PROCESS. THE APPLICATION AND CONSULTANT SHOULD EXPECT ADDITIONAL AND MORE DETAILED REVIEW COMMENTS (INCLUDING COMMENTS THAT MAY ALTER THE OVERALL SITE DESIGN) AS THIS PROJECT PROGRESSES THROUGH THE PLAN REVIEW PROCESS.



VICINITY MAP
SCALE: 1" = 2000'

GEODETTIC BENCHMARK

STATION	NORTHING	EASTING	ELEVATION
42CMT1	1360936.6	550818.0	368.994
42CMT2	1361854.1	551216.3	376.529

DEVELOPER

RAISING CANE'S RESTAURANTS, LLC
ATTN: FELICIA BIVENS
6800 BISHOP ROAD
PLANO, TX 75024
TEL: 931-993-5258
EMAIL: FELICIA.BIVENS@GMAIL.COM

OWNER

NATIONAL RETAIL PROPERTIES LP
450 S ORANGE AVE
SUITE 900
ORLANDO FL 32801

CIVIL ENGINEER / LANDSCAPE ARCHITECT

KIMLEY-HORN AND ASSOCIATES, INC.
ATTN: EMILY A. DEAN, PE
W. DAVIS WALKER, PLA
215 WASHINGTON AVE
SUITE 500
TOWSON, MD 21204
TEL: (443) 743-3470
EMAIL: EMILY.DEAN@KIMLEY-HORN.COM
EMAIL: DAVIS.WALKER@KIMLEY-HORN.COM

SURVEY INFORMATION

GRS GROUP, LLC
ATTN: KEVIN STEINHILBER
6703 DELAND COURT
SPRINGFIELD, VA 22152
TEL: (703) 727-5628

SITE ANALYSIS DATA CHART

TOTAL PROJECT AREA	1.793 ACRES (78,100 SF)
ZONING	B-2 (BUSINESS GENERAL)
EXISTING USES	COMMERCIAL
PROPOSED USES	COMMERCIAL
LOD AREA	1.15 ACRES (49,877 SF)
GREEN OPEN AREA	0.419 ACRES (18,255 SF)
PROPOSED IMPERVIOUS AREA	0.86 ACRES (37,462 SF)
WETLAND AREA	0 ACRES
WETLAND BUFFER AREA	0 ACRES
STREAM AREA	0 ACRES
STREAM BUFFER AREA	0 ACRES
FLOODPLAIN AREA	0 ACRES
STEEP SLOPE AREA (>15%)	0 ACRES

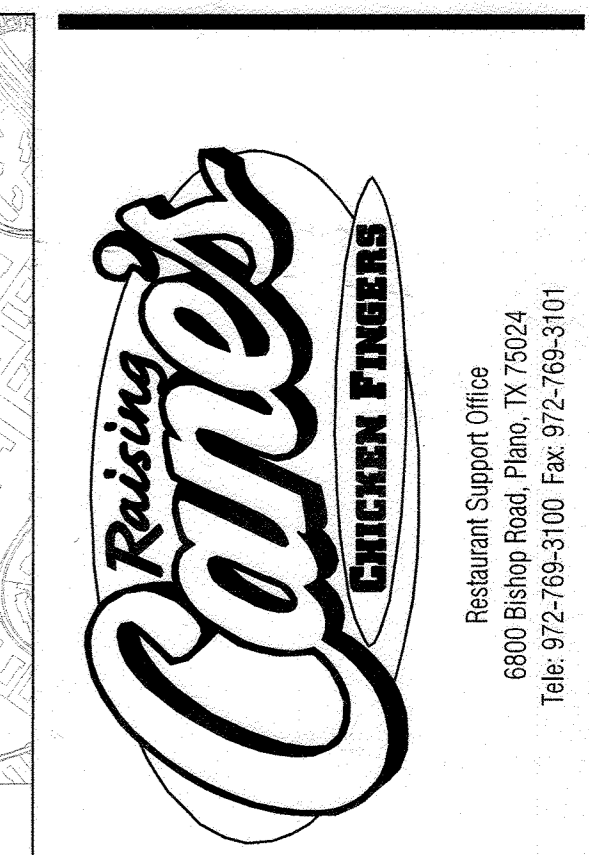
APPROVED: DEPARTMENT OF PLANNING AND ZONING

Chief, Development Engineering Division Date: 3/7/22
Chief, Division of Land Development Date: 3/7/22

ADDRESS CHART	
LOT/PARCEL #	STREET ADDRESS
LOT 4 36; PARCEL 513	9071 SNOWDEN RIVER PKWY

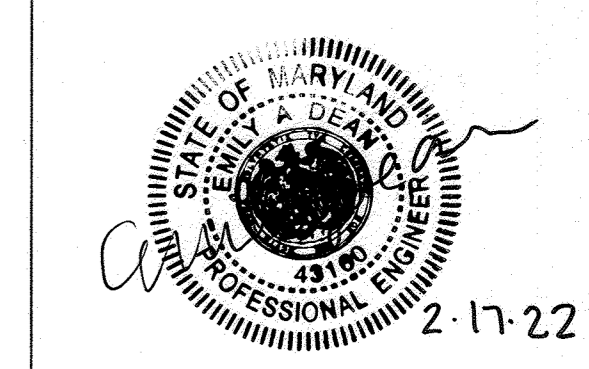
PERMIT INFORMATION CHART					
Subdivision Name	N/A	Section/Area	N/A	Lot/Parcel No.	513
Plat # or Tax Map No.	10805	Grid No.	0006	Tax Map No.	28-09-052
Water Code	E08	Grid No.	0006	Election District	6
				Conservation District	005/07
				Sewer Code	49000000

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Store:
9071 SNOWDEN RIVER PARKWAY
COLUMBIA, MD 21046
RESTAURANT #C0838
P4EV-AV SCHEME A

Professional of Record: EMILY A. DEAN



PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 43180 EXPIRATION DATE 12/31/2022

9071 SNOWDEN RIVER PKWY
COLUMBIA, MARYLAND
TAX MAP: 42 PARCEL: 513
ZONING: B-2
6TH ELECTION DISTRICT

OWNER: NATIONAL RETAIL PROPERTIES LP
450 S ORANGE AVE, SUITE 900
ORLANDO, FL 32801

DEVELOPER: RAISING CANE'S RESTAURANTS, LLC
ATTN: FELICIA BIVENS
6800 BISHOP ROAD, PLANO, TX 75024
931-993-5258

ENGINEER: KIMLEY-HORN AND ASSOCIATES, INC.
ATTN: EMILY DEAN
1801 PORTER STREET, SUITE 401
BALTIMORE, MD 21230
443-884-5085

Prototype: P4EV-AV 2020 - 2.0 RELEASE

Prototype Issue Date: 7.14.2020

Design Bulletin Updates: --

Date Issued: -- Bulletin Number: --

FOR REVIEW

Kimley Horn
11400 COMMERCE PARK DR, SUITE 400, RESTON, VA 20191
PHONE: 703-674-1300 FAX: 703-674-1350
WWW.KIMLEY-HORN.COM

REVISIONS:	
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Sheet Title:

COVER SHEET

Date: 01/07/2022

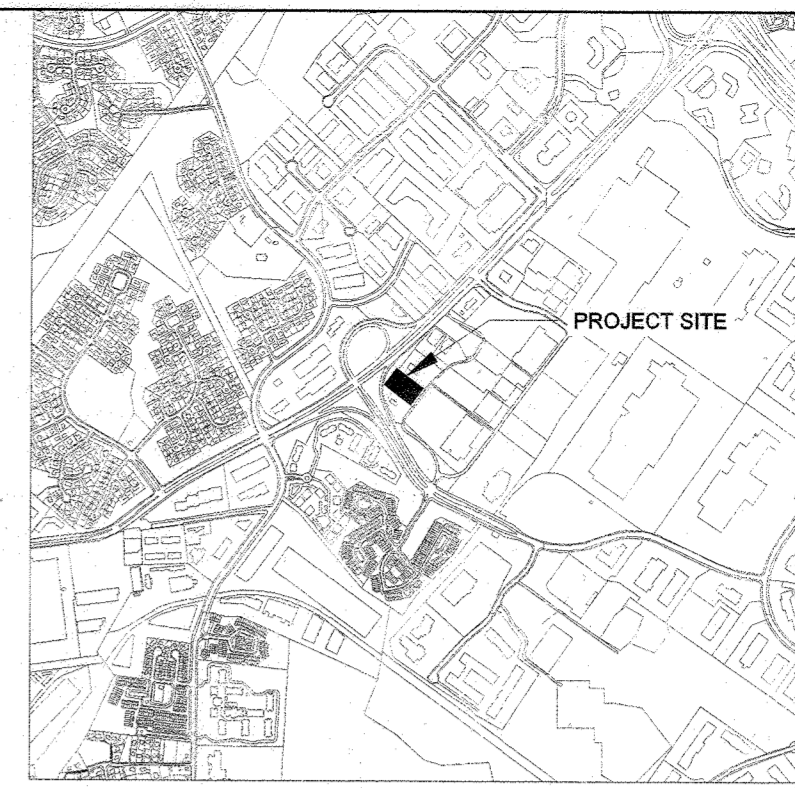
Project Number: 110723018

Drawn By: JAM

Checked By: EAD

Sheet Number:

1 OF 4



VICINITY MAP
SCALE: 1" = 2000'



Restaurant Support Office
6800 Bishop Road, Plano, TX 75024
Tel: 972-769-3100 Fax: 972-769-3101

Store:
9071 SNOWDEN RIVER PARKWAY
COLUMBIA, MD 21046
RESTAURANT #C0838
P4EV-AV SCHEME A

Professional of Record: **EMILY A. DEAN**



PROFESSIONAL CERTIFICATION: HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 21699
EXPIRATION DATE 12/31/2022

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Sheet Title:
EXISTING CONDITIONS AND INITIAL ESC

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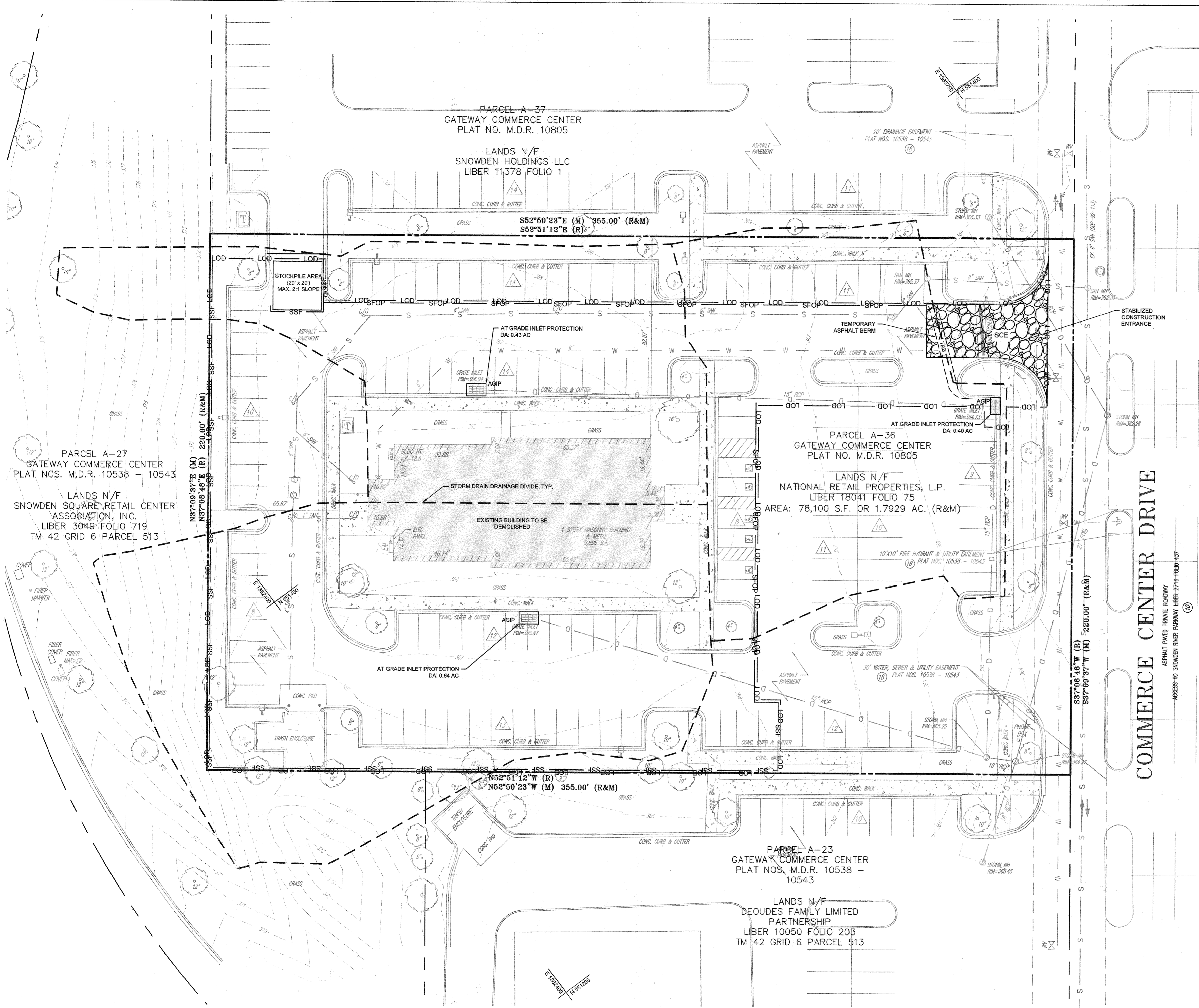
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2 OF 4

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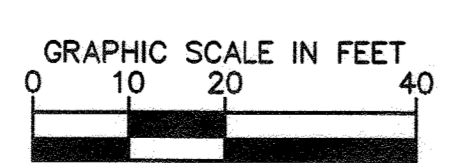


EX CONDITIONS LEGEND

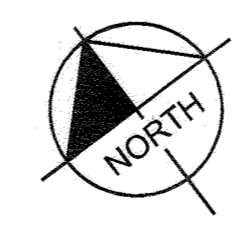
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- EXISTING PARKING COUNT
- EXISTING BUILDING

SEDIMENT CONTROL LEGEND

- LOD --- PROPERTY LINE
- LIMITS OF DISTURBANCE
- DRAINAGE DIVIDE
- SFOP --- PROPOSED SILT FENCE ON PAVEMENT
- SSF --- PROPOSED SUPER SILT FENCE
- AGIP --- AT-GRADE INLET PROTECTION
- TAB --- TEMPORARY ASPHALT BERM
- STABILIZED CONSTRUCTION ENTRANCE



EXISTING CONDITIONS AND INITIAL ESC
SCALE: 1" = 20'



SOIL TYPES

MAP UNIT SYMBOL	SOIL NAME	HYDROLOGIC SOIL GROUP
uid	URBAN LAND - UDORTMENTS COMPLEX, 0 TO 15 PERCENT SLOPES	D

APPROVED: DEPARTMENT OF PLANNING AND ZONING

Chief, Development Engineering Division: *[Signature]* Date: 3/7/22

Chief, Division of Land Development: *[Signature]* Date: 2/24/22

ADDRESS CHART

LOT/PARCEL #	STREET ADDRESS
LOT A 36; PARCEL 513	9071 SNOWDEN RIVER PKWY

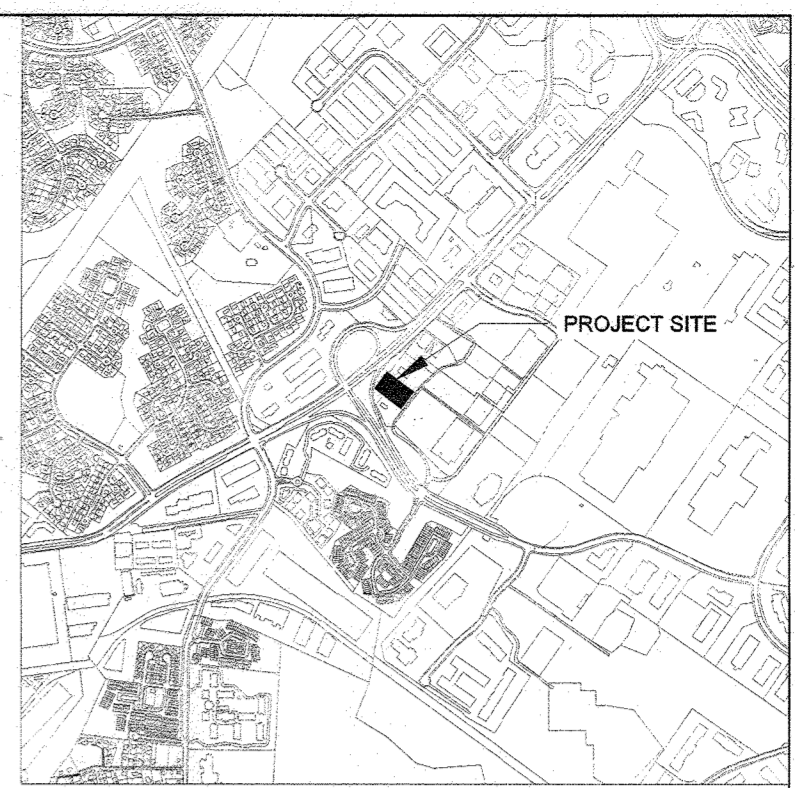
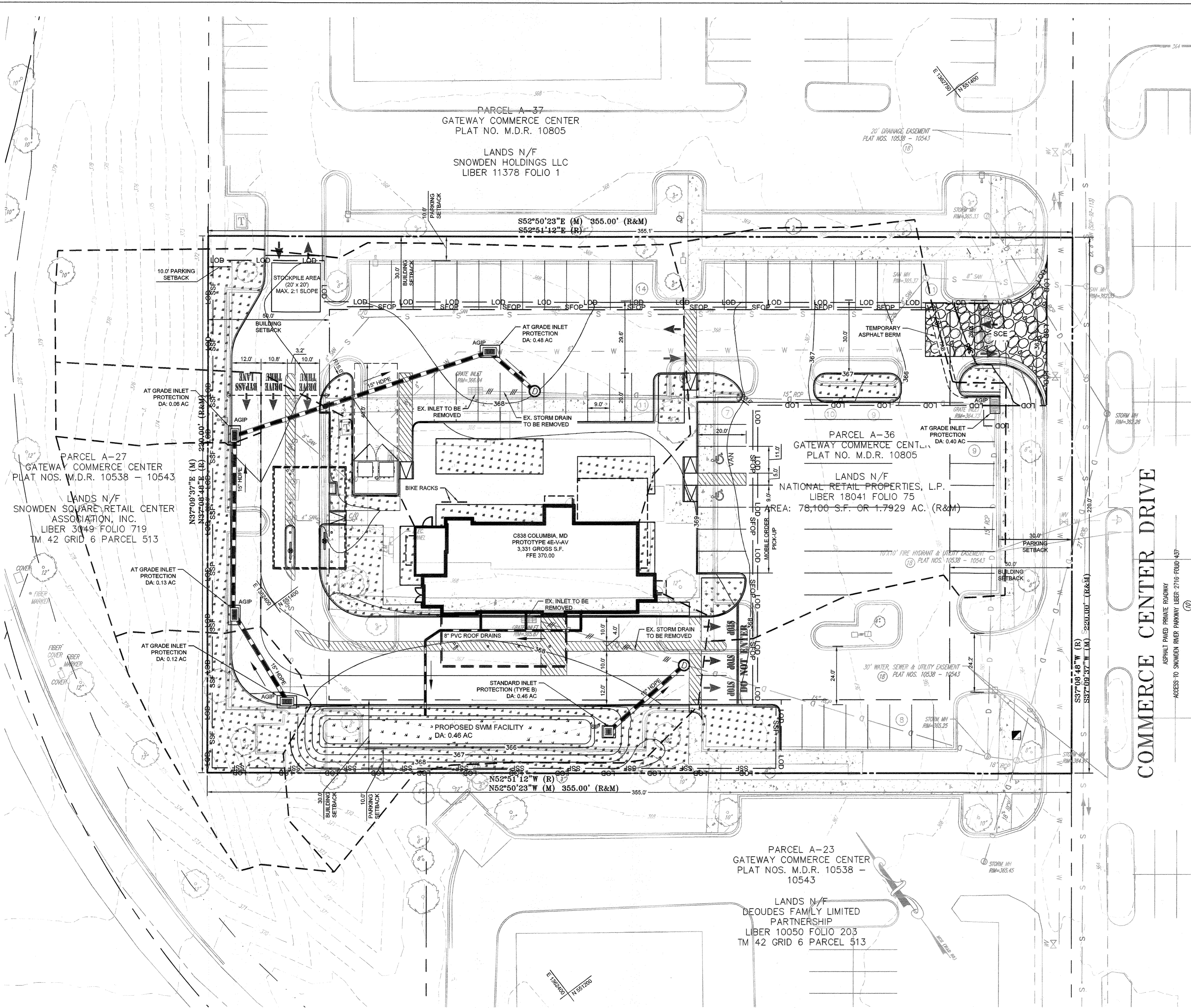
PERMIT INFORMATION CHART

Subdivision Name	N/A	Section/Area	N/A	Lot/Parcel No.	513
Plat # or Ref	10805	Grid No.	0005	Zoning	B-2
Water Code	E06	Tax Map No.	042	Election District	6
		Census Tract		Census Block	608707
		Sewer Code			49000000

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VICINITY MAP
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SITE LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PROPERTY SETBACK
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- LIMITS OF DISTURBANCE
- PROPOSED CURB
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- AGIP
- AT-GRADE INLET PROTECTION
- TAB
- TEMPORARY ASPHALT BERM
- STABILIZED CONSTRUCTION ENTRANCE

SWM LEGEND

- LOD
- LIMITS OF DISTURBANCE
- 110
- 108
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- SWM DRAINAGE AREA
- PROPOSED SWM FACILITY
- PROPOSED STORM DRAIN PIPE
- PROPOSED ROOF DRAIN
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM INLETS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

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		Sewer Code		Change District	606707
			49000000		

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Sheet Title: **SITE PLAN AND FINAL ESC**

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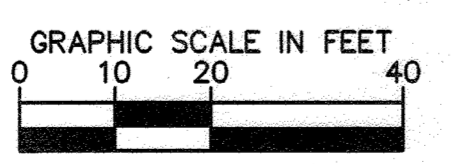
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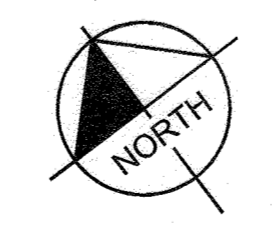
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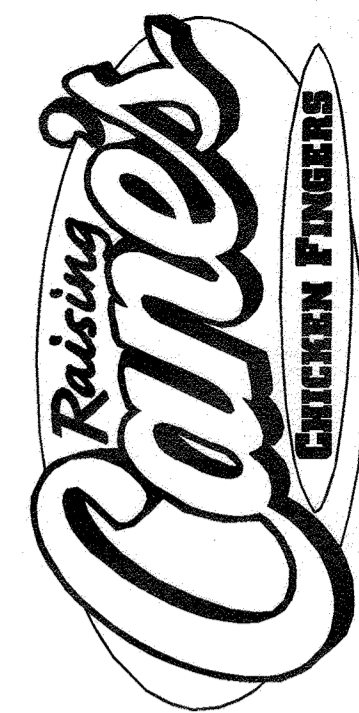
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SITE PLAN AND FINAL ESC
SCALE: 1" = 20'





Restaurant Support Office
6800 Bishop Road, Plano, TX 75024
Tel: 972-769-5100 Fax: 972-769-5101

Store:
9071 SNOWDEN RIVER PARKWAY
COLUMBIA, MD 21046
RESTAURANT #C0838
P4EV-AV SCHEME A

Professional of Record: EMILY A. DEAN



PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 4316
EXPIRATION DATE 12/31/2022

OWNER: NATIONAL RETAIL PROPERTIES LP
450 S ORANGE AVE, SUITE 900
ORLANDO, FL 32801

DEVELOPER: RAISING CANE'S RESTAURANTS, LLC
ATTN: FELICIA BIVENS
6800 BISHOP ROAD, PLANO, TX 75024
951-993-6258

ENGINEER: KIMLEY-HORN AND ASSOCIATES, INC.
ATTN: EMILY A. DEAN
1801 PORTER STREET, SUITE 401
BALTIMORE, MD 21230
443-894-5085

Prototype: P4EV-AV 2020 - 2.0 RELEASE

Prototype Issue Date: 7.14.2020

Design Bulletin Updates: --

Date Issued: Bulletin Number: --

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FOR REVIEW

Kimley»Horn

11400 COMMERCE PARK DR., SUITE 400, RESTON, VA 20191
PHONE: 703-674-1300 FAX: 703-674-1350
WWW.KIMLEY-HORN.COM

REVISIONS:

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Sheet Title:

CONCEPT SWM

Date: 01/07/2022

Project Number: 110723018

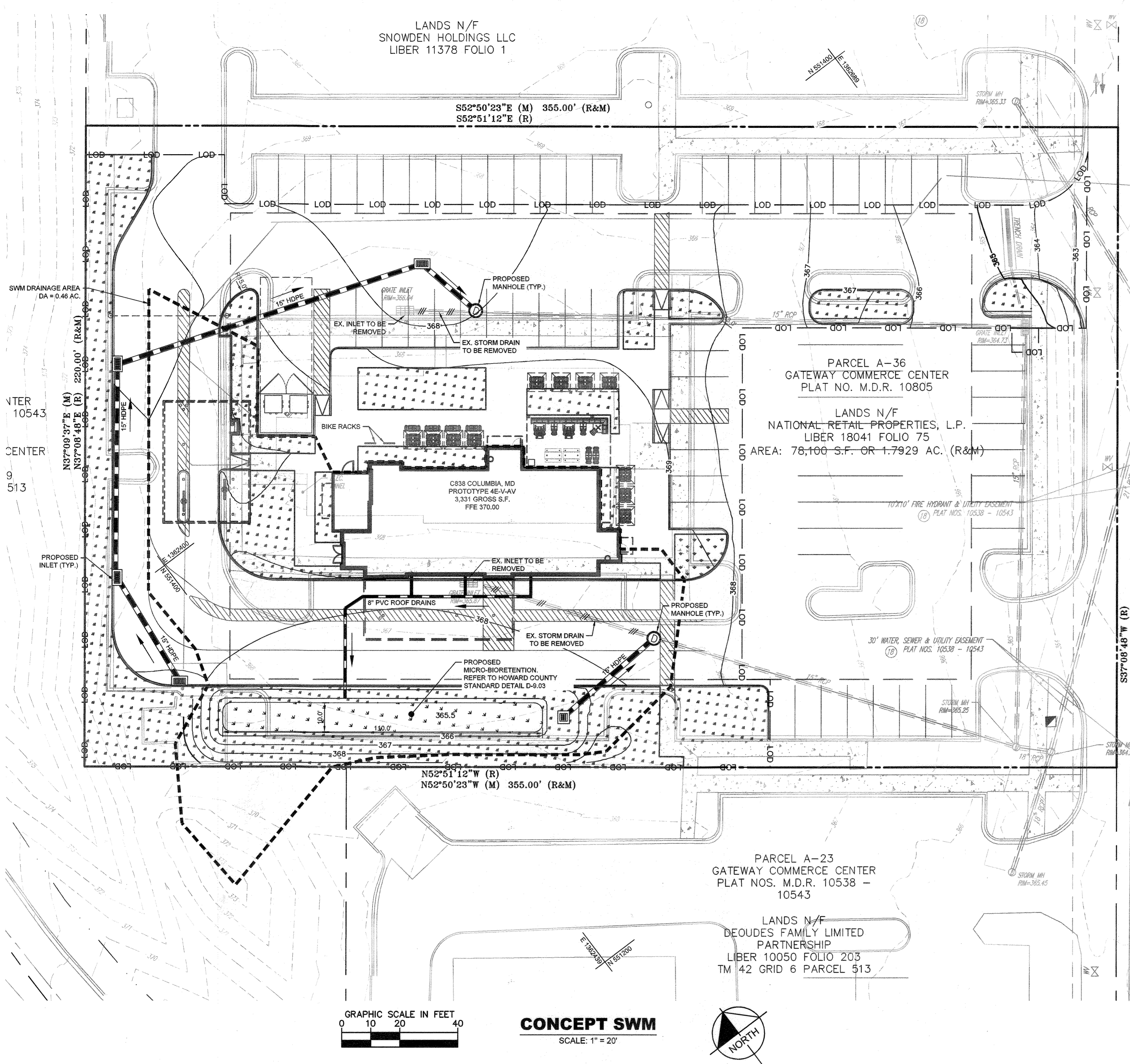
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Checked By: EAD

Sheet Number:

4 OF 4

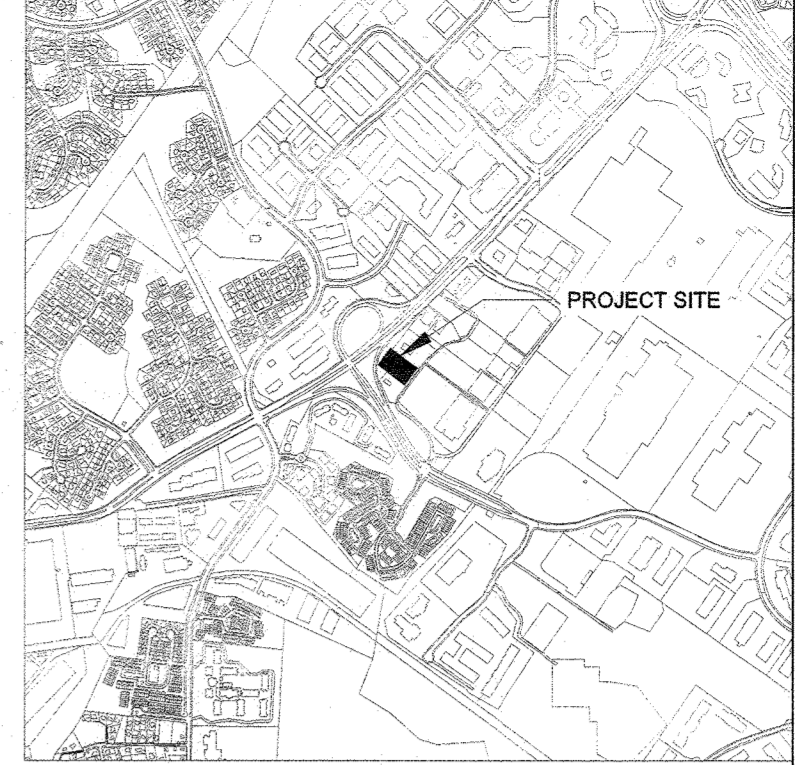
ECP-22-017



SWM LEGEND

- LIMITS OF DISTURBANCE
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- SWM DRAINAGE AREA
- PROPOSED SWM FACILITY
- PROPOSED STORM DRAIN PIPE
- PROPOSED ROOF DRAIN
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM INLETS

VICINITY MAP
SCALE: 1" = 2000'



Stormwater Management - Environmental Site Design

Site Drainage Area Data:

Step 1. Determine Area Requiring Treatment	
Project Site Area:	1.79 acres
Project Limit of Work Area, A:	1.15 acres
Existing Impervious Area:	1.39 acres
Existing % Impervious, I:	78%
Existing Impervious Area within Project Limit of Work:	0.89 acres
Proposed Impervious Area within Project Limit of Work:	0.86 acres
Proposed % Impervious, I:	76%
Imp Area to Treat, A _T :	0.42 acres

> 40%, therefore Redevelopment

Includes entire parcel area
AT=(50%)(Existing Impervious)+(100%)(Proposed Impervious-Existing Impervious)

Step 2. Determine Required Treatment Volume

A. Determine Target P_e & ESD_v Using Table 5.3 (MDE SWM Manual Section 5-page 5.21)

Redevelopment

$$I = 100\%$$

$$R_p = 0.05 + (0.009 * (I))$$

$$R_p = 0.950$$

$$ESD_v = \frac{[(P_e)(R_p)(A_T)]^{1/2}}{P_e}$$

$$P_e = 1.00 \text{ inch} \quad (\text{Determine } P_e \text{ from Table 5.3})$$

Target ESD_v = 0.033 ac-ft = 1431 cf

B. Determine SWM Treatment Provided

ESD Practice	Drainage Area (ac)	Imp. Area Treated (ac)	Volume Treated (cf)
Micro-Bioretentation	0.46	0.33	1467
Total	0.46	0.33	1467
			1431 cf Required

Confirm Stormwater Management Treatment

Target ESD_v = 1431 cf
Provided ESD_v = 1467 cf OK

C. Calculate Recharge (Rev) Requirements

$$Rev = \frac{[(S)(R_p)(A_T)]^{1/2}}{S}$$

S = 0.07 (D-Type Soils)

Target Rev = 0.006 ac-ft
278 cf

Provided Rev = 0.008 ac-ft
330 cf

D. Calculate Channel Protection (C_{pv}) Requirements

n/a

E. Calculate Overbank Flood Protection (Q₁₀) Requirements

n/a

F. Calculate Extreme Flood Protection (Q₁₀₀) Requirements

n/a

ESD Treatment Summary

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)	(U)	(V)			
ESD ID	Type of Swale	Total Drainage Area, DA (sf)	Imp Area (ac)	Imp Area Treated (ac)	%I	Rv	Target Rainfall Depth* (Inches)	Length (ft)	Width (ft)	A _v (Prov'd) (sf)	A _v Req'd (min 2%) (sf)	Ponding Depth (ft)	Check Dam Height (ft)	Surface Storage (cf)	Filter Depth (ft)	Porosity	Filter Bed Storage (cf)	ESD _v Storage Temp (cf)	ESD _v Obtained (cf)	ESD _v (Max) (cf)	ESD _v Prov'd (cf)	Rev Prov'd (cf)	Pe Prov'd (in)	
MBR-1**	Micro-Bio	19957	0.46	14543	0.33	73%	0.71	110	10	1100	400	1	N/A	1100	2	0.4	880	1100	1467	3052	1467	1467	330	1.25
				Prov'd		0.33															1467	330		
				Req'd		0.42															1431	278		

Notes and Equations

- ** If required, to minimize on-site disturbance, structural underground BMP may be provided in lieu of micro-bioretentation during final stormwater management design
- (D) %I = Imp Area / Total DA (M) Surface Storage = A_v (Prov'd) * Ponding Depth (Note: Per MDE Manual 75% Temporary Storage Required for treatment)
- (E) Rv = 0.05 + 0.009(%I) (P) Filter Bed Storage = A_v (Prov'd) * Filter Depth * Porosity
- (F)* Target Rainfall Depth = Overall Site Target Rainfall Depth & Is Not Calculated Individually For Each Facility (Q) ESD_v Storage = Surface Storage
- (I) A_v (Prov'd) = Length * Width (R) ESD_v Obtained = ESD_v Storage / 75%
- (J) A_v (min) = Total Drainage * 2% (per MDE Manual) (S) ESD_v (max) = (2.6 * Rv * DA) / 12
- (L) Height = Ponding Depth * 2 (T) ESD_v Prov'd = Minimum of ESD_v Obtained and ESD (max) (Note: Maximum Storage for 1-yr storm event, P = 2.6")
- (U) Pe Prov'd = (ESD_v Prov'd * 12) / (Rv * DA)
- (V) Rev Prov'd = Porosity * Filter Area * Gravel Depth Below Underdrain (6")

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APPROVED: DEPARTMENT OF PLANNING AND ZONING
Chief, Development Engineering Division: [Signature] Date: 3/7/22
Chief, Division of Land Development: [Signature] Date: 2/24/22

ADDRESS CHART

LOT/PARCEL #	STREET ADDRESS
LOT A 36; PARCEL 513	9071 SNOWDEN RIVER PKWY

PERMIT INFORMATION CHART

Subdivision Name	Section/Area	Lot/Parcel No.
N/A	N/A	513
Plat # or L.P. No. 10805	Lot No. 006	28/29
Water Code E06	Sewer Code 49000000	Change Sheet 006/107