

# ***DRAINAGE STATEMENT***

*For*

**NAKT Real Estate Holdings, LLC**

**Proposed Medical Building**

Block 473, Lot 1  
49 South Avenue West (CR-610) &  
Lincoln Avenue West  
Township of Cranford, Union County, New Jersey

Prepared by:



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A handwritten signature in black ink, appearing to read 'J. Henry', is written over a horizontal line.

**James E. Henry, PE, PP**  
**NJ Professional Engineer License #49266**

February 2022  
Last Revised September 2022  
DEC # 4087-99-001

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## **I. Drainage Summary**

This Drainage Statement has been prepared to define and analyze the stormwater drainage conditions that would occur as a result of the redevelopment of Block 473, Lot 1 as shown on the Township of Cranford Tax Map Sheet No. 103, located in the Township of Cranford, Union County, New Jersey. The subject site consists of 0.41 acres (17,692 SF) and is located on South Avenue West (CR-610) and Lincoln Avenue West.

Under existing conditions, the site is an abandoned fueling station. The proposed project consists of the construction of a +/- 5,802 SF Medical Building. The first floor is to be +/- 2,836 SF and the second floor +/- 2,966 SF. Additional site improvements will include proposed parking, lighting, landscaping stormwater collection system, grading, driveways, and other associated site amenities. The new development proposes to reduce the impervious coverage on site by approximately 14.3% (2,522SF) and proposes a limit of disturbance of 21,044 SF (0.483 acres).

The project consists of less than one (1) acre of disturbance and will not increase the impervious coverage on-site by ¼ acre or more. Therefore, the proposed project does not meet the definition of a ‘major development’ and is not subject to the NJDEP Stormwater Management Rules (NJAC 7:8). Furthermore, as the proposed development does not increase the existing impervious surfaces on site it is not subject to the New Jersey Standards for Soil Erosion and Sediment Control runoff rate reduction requirements.

The stormwater drainage for the proposed site has been designed to maintain existing runoff patterns. The stormwater runoff from the proposed development is tributary to the existing stormwater collection system located along South Avenue West (CR-610) and Lincoln Avenue West. The proposed roof leader system of the building routes stormwater runoff to the proposed conveyance system located on the southwestern portion of the subject property, which ultimately discharges into the stormwater conveyance system located on Lincoln Avenue West.

## **II. Runoff Rate Reduction Performance**

As noted above, a majority of the stormwater runoff from the proposed development discharges into the existing stormwater conveyance system located within Lincoln Avenue West. Due to the reduction in impervious coverage associated with the proposed development, the total runoff discharging to this existing stormwater conveyance system decreases for the two (2), ten (10) and one-hundred (100) year design storms modeled as 24-hour SCS Type III design storms as compared to existing conditions. Please refer to the appendix of this report for the hydrography summary reports indicating the same.

*Pre-Development and Post Development Peak Runoff Results Summary  
for South Avenue West and Lincoln Ave West*

<b>Design Storm</b>	<b>Pre-Development Conditions</b>		<b>Post-Development Conditions</b>		<b>Reduction in Flow</b>	
2 Year	0.886	CFS	0.814	CFS	0.072	CFS
10 Year	1.397	CFS	1.314	CFS	0.083	CFS
100 Year	2.415	CFS	2.314	CFS	0.101	CFS

**III. Conclusion**

The proposed project has been designed to ensure safe and efficient control of the stormwater runoff in a manner that will not adversely impact the existing drainage patterns and systems, adjacent roadways, or adjacent parcels. Furthermore, the project decreases the impervious coverage on-site and thereby does not increase the peak stormwater runoff rates from the parcel. We anticipate that the proposed development will not significantly impact the existing drainage infrastructure located within South Avenue West (CR-610), Lincoln Avenue West, or the surrounding properties.

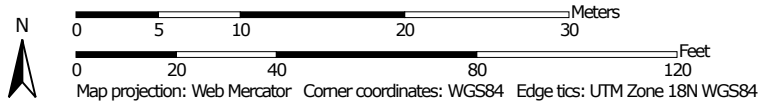
## **APPENDIX**

# **NRCS WEB SOIL SURVEY**

Hydrologic Soil Group—Union County, New Jersey




Map Scale: 1:460 if printed on A portrait (8.5" x 11") sheet.



## 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 1:24,000.

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: <http://websoilsurvey.nrcs.usda.gov>  
 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: Union County, New Jersey  
 Survey Area Data: Version 8, Sep 24, 2014

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

Date(s) aerial images were photographed: Mar 19, 2011—Apr 16, 2012

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

Hydrologic Soil Group— Summary by Map Unit — Union County, New Jersey (NJ039)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
HatB	Haledon-Urban land-Hasbrouck complex, 0 to 8 percent slopes	C	0.1	22.5%
UR	Urban land		0.4	77.5%
<b>Totals for Area of Interest</b>			<b>0.5</b>	<b>100.0%</b>

### 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*

**RUNOFF CURVE NUMBER (CN)  
CALCULATIONS – EXISTING**



## EXISTING DRAINAGE AREA SUMMARY AND AVERAGE CURVE NUMBER(CN) CALCULATIONS

Project: Proposed Cannabis Dispensary      Computed By: PR  
 Job #: 4087-99-001                              Checked By: MD/RTO  
 Location: Township of Cranford, NJ        Date: 9/16/2022

Drainage Area	Impervious Area (acre)	Impervious Area (sf)	Curve Number (CN) Used	HSG C - Open Space Area (acre)	HSG C - Open Space Area (sf)	Curve Number (CN) Used	HSG C - Wooded Area (acre)	HSG C - Wooded Area (sf)	Curve Number (CN) Used	HSG D - Open Space Area (acre)	HSG D - Open Space Area (sf)	Curve Number (CN) Used	HSG D - Wooded Area (acre)	HSG D - Wooded Area (sf)	Curve Number (CN) Used	Avg. Perv. Curve Number	Total Pervious Area (acres)	Total Area (acres)	TC (Min.)
EX. DA LINCOLN AVE WEST	0.35	15,247	98	0.03	1,173	74	0.00	-	70	0.03	1,420	80	0.00	-	77	77	0.06	0.41	10
<b>Total</b>	<b>0.35</b>	<b>15247.00</b>		<b>0.03</b>	<b>1173.00</b>		<b>0.00</b>	<b>0.00</b>		<b>0.03</b>	<b>1420.00</b>		<b>0.00</b>	<b>0.00</b>			<b>0.06</b>	<b>0.41</b>	

Per County Soil Survey -	Ha1B	HSG	C	Soil	Haledon-Urban land-Hasbrouck complex
Per County Soil Survey -	UR	HSG	D	Soil	Urban land

Description	Runoff Curve Number (CN) (HSG C)	Runoff Curve Number (CN) (HSG D)
Impervious Surface	98	98
Open Space (lawn) (good)	74	80
Woods (good)	70	77

**RUNOFF CURVE NUMBER (CN)  
CALCULATIONS – PROPOSED**



## PROPOSED DRAINAGE AREA SUMMARY AND AVERAGE CURVE NUMBER(CN) CALCULATIONS

Project: Proposed Cannabis Dispensary  
 Job #: 4087-99-001  
 Location: Township of Cranford, NJ

Computed By: PR  
 Checked By: MD/RTO  
 Date: 9/16/2022

Drainage Area	Impervious Area (acre)	Impervious Area (sf)	Curve Number (CN) Used	HSG C - Open Space Area (acre)	HSG C - Open Space Area (sf)	Curve Number (CN) Used	HSG C - Wooded Area (acre)	HSG C - Wooded Area (sf)	Curve Number (CN) Used	HSG D - Open Space Area (acre)	HSG D - Open Space Area (sf)	Curve Number (CN) Used	HSG D - Wooded Area (acre)	HSG D - Wooded Area (sf)	Curve Number (CN) Used	Avg. Perv. Curve Number	Total Pervious Area (acres)	Total Area (acres)	TC (Min.)
PROP. DA LINCOLN AVE WEST	0.29	12,795	98	0.03	1,196	74	0.00	-	70	0.09	3,722	80	0.00	-	77	79	0.11	0.41	10
<b>Total</b>	<b>0.29</b>	<b>12795.00</b>		<b>0.03</b>	<b>1196.00</b>		<b>0.00</b>	<b>0.00</b>		<b>0.09</b>	<b>3722.00</b>		<b>0.00</b>	<b>0.00</b>			<b>0.11</b>	<b>0.41</b>	

Per County Soil Survey -	HaB	HSG	C	Soil	Haledon-Urban land-Hasbrouck complex
Per County Soil Survey -	UR	HSG	D	Soil	Urban land

Description	Runoff Curve Number (CN) (HSG C)	Runoff Curve Number (CN) (HSG D)
Impervious Surface	98	98
Open Space (lawn) (good)	74	80
Woods (good)	70	77

**HYDROGRAPH SUMMARY REPORTS – EXISTING  
AND PROPOSED CONDITIONS 2 YR. & 10 YR.**

**Watershed Model Schematic ..... 1**

**2 - Year**

**Summary Report ..... 2**  
**Hydrograph Reports ..... 3**  
    Hydrograph No. 1, SCS Runoff, Ex. DA Lincoln Ave West (Per.) ..... 3  
    Hydrograph No. 2, SCS Runoff, Ex. DA Lincoln Ave West (Imp.) ..... 4  
    Hydrograph No. 3, Combine, Ex. DA Lincoln Ave West (Total) ..... 5  
    Hydrograph No. 5, SCS Runoff, Prop. DA Lincoln Ave West (Per.) ..... 6  
    Hydrograph No. 6, SCS Runoff, Prop. DA Lincoln Ave West (Imp.) ..... 7  
    Hydrograph No. 7, Combine, Prop. DA Lincoln Ave West (Total) ..... 8

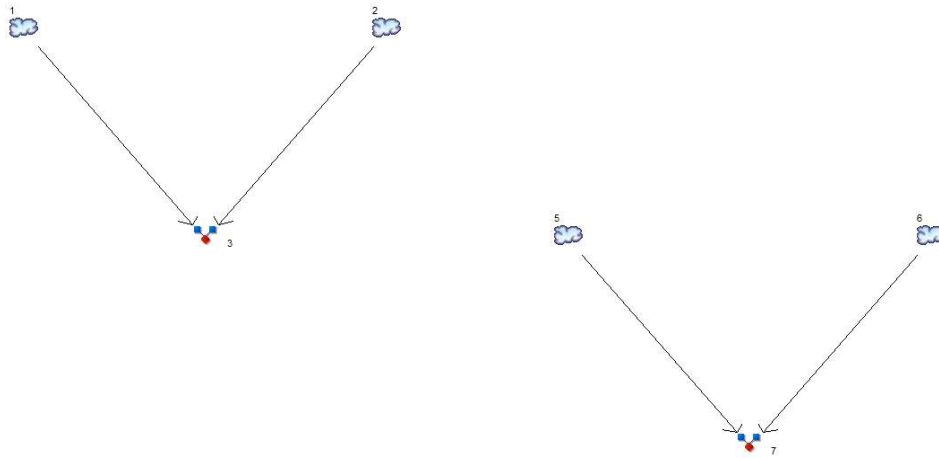
**10 - Year**

**Summary Report ..... 9**  
**Hydrograph Reports ..... 10**  
    Hydrograph No. 1, SCS Runoff, Ex. DA Lincoln Ave West (Per.) ..... 10  
    Hydrograph No. 2, SCS Runoff, Ex. DA Lincoln Ave West (Imp.) ..... 11  
    Hydrograph No. 3, Combine, Ex. DA Lincoln Ave West (Total) ..... 12  
    Hydrograph No. 5, SCS Runoff, Prop. DA Lincoln Ave West (Per.) ..... 13  
    Hydrograph No. 6, SCS Runoff, Prop. DA Lincoln Ave West (Imp.) ..... 14  
    Hydrograph No. 7, Combine, Prop. DA Lincoln Ave West (Total) ..... 15



# Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.1



## Legend

<u>Hyd. Origin</u>	<u>Description</u>
1	SCS Runoff Ex. DA Lincoln Ave West (Per.)
2	SCS Runoff Ex. DA Lincoln Ave West (Imp.)
3	Combine Ex. DA Lincoln Ave West (Total)
5	SCS Runoff Prop. DA Lincoln Ave West (Per.)
6	SCS Runoff Prop. DA Lincoln Ave West (Imp.)
7	Combine Prop. DA Lincoln Ave West (Total)

### Hydrograph Summary Report

Hydroflow Hydrographs by Intelsolve v9.1

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 storage used (cuft)	Hydrograph description
1	SCS Runoff	0.067	5	730	276	---	---	---	Ex. DA Lincoln Ave West (Per.)
2	SCS Runoff	0.819	5	730	3,760	---	---	---	Ex. DA Lincoln Ave West (Imp.)
3	Combine	0.886	5	730	4,036	1, 2	---	---	Ex. DA Lincoln Ave West (Total)
5	SCS Runoff	0.135	5	730	554	---	---	---	Prop. DA Lincoln Ave West (Per.)
6	SCS Runoff	0.679	5	730	3,115	---	---	---	Prop. DA Lincoln Ave West (Imp.)
7	Combine	0.814	5	730	3,670	5, 6	---	---	Prop. DA Lincoln Ave West (Total)

2, 10, 100 yr Hydrograph.gpw      Return Period: 2 Year      Thursday, Sep 15, 2022

### Hydrograph Report

Hydroflow Hydrographs by Intelsolve v9.1

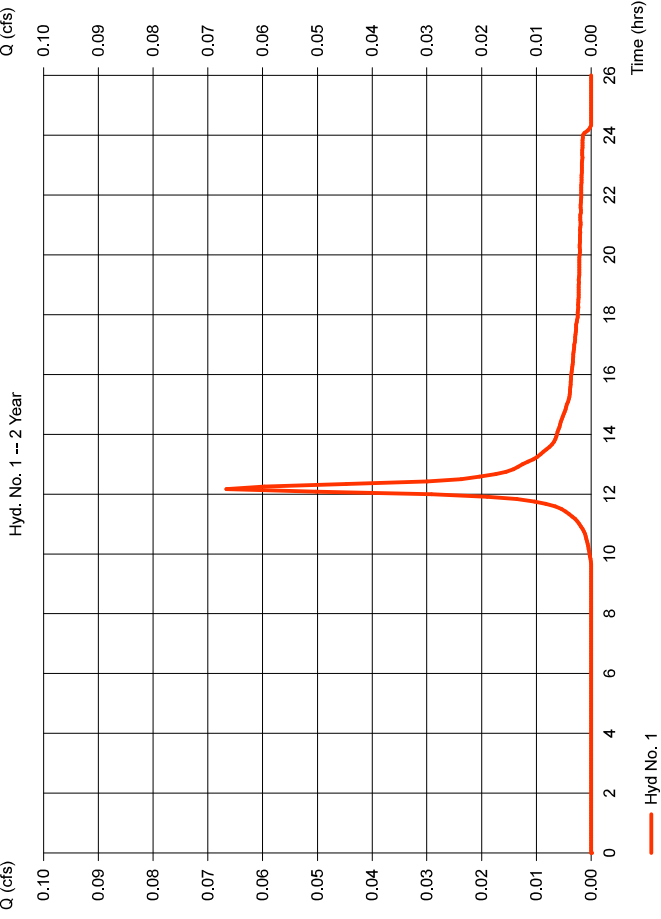
Thursday, Sep 15, 2022

#### Hyd. No. 1

Ex. DA Lincoln Ave West (Per.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.067 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 276 cuft
Drainage area	= 0.060 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.39 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-D.cds	Shape factor	= 484

#### Ex. DA Lincoln Ave West (Per.)



Hyd No. 1

# Hydrograph Report

Hydraflow Hydrographs by Intellsolve v9.1

Thursday, Sep 15, 2022

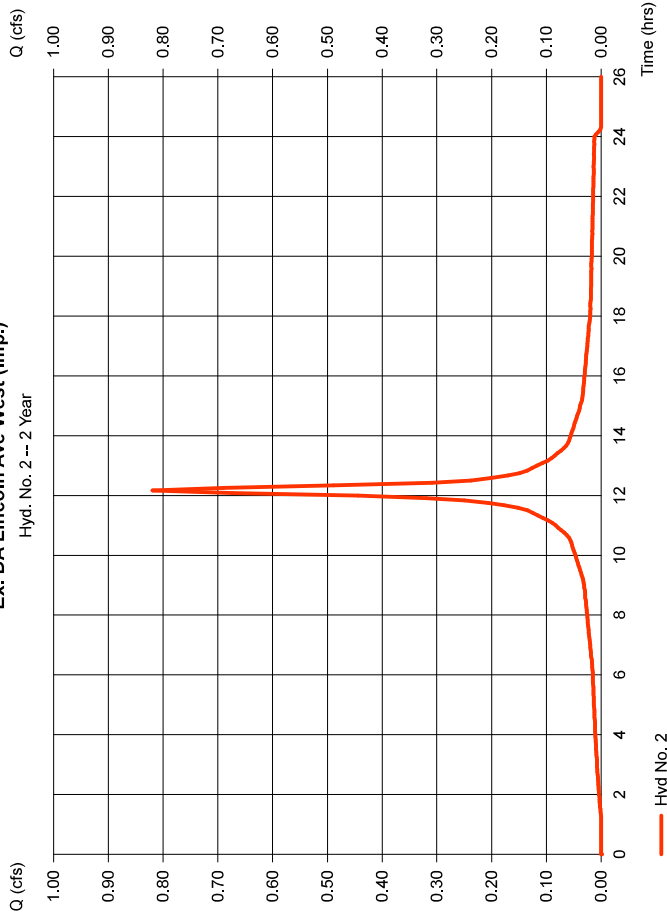
## Hyd. No. 2

Ex. DA Lincoln Ave West (Imp.)

Hydrograph type = SCS Runoff  
 Storm frequency = 2 yrs  
 Time interval = 5 min  
 Drainage area = 0.350 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 3.39 in  
 Storm duration = NOAA Atlas 14 Type-D.cds

Peak discharge = 0.819 cfs  
 Time to peak = 12.17 hrs  
 Hyd. volume = 3,760 cuft  
 Curve number = 98  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 10.00 min  
 Distribution = Custom  
 Shape factor = 484

Ex. DA Lincoln Ave West (Imp.)



# Hydrograph Report

Hydraflow Hydrographs by Intellsolve v9.1

Thursday, Sep 15, 2022

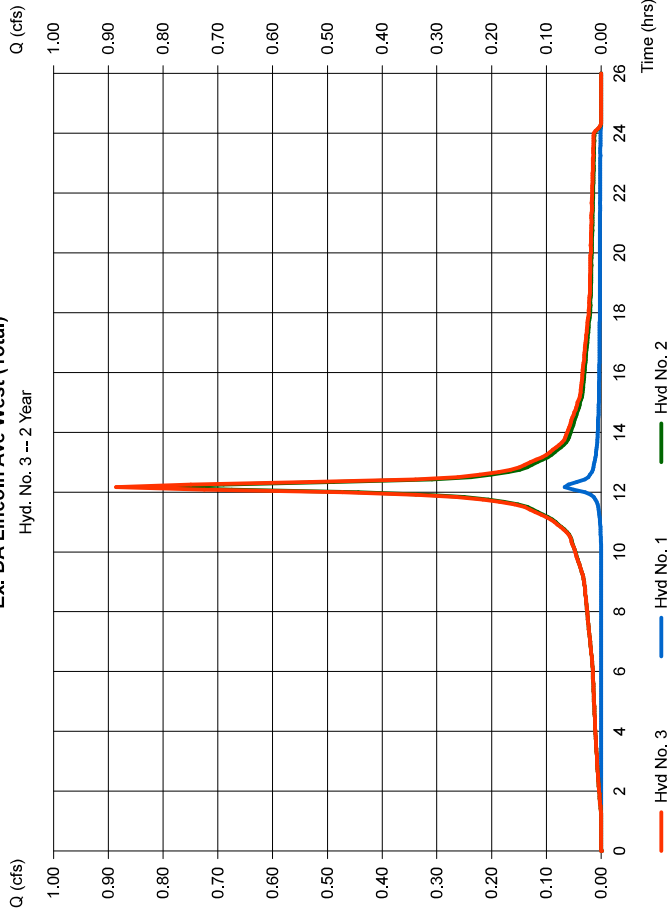
## Hyd. No. 3

Ex. DA Lincoln Ave West (Total)

Hydrograph type = Combine  
 Storm frequency = 2 yrs  
 Time interval = 5 min  
 Inflow hyds. = 1, 2

Peak discharge = 0.886 cfs  
 Time to peak = 12.17 hrs  
 Hyd. volume = 4,036 cuft  
 Contrib. drain. area = 0.410 ac

Ex. DA Lincoln Ave West (Total)



# Hydrograph Report

Hydratflow Hydrographs by Intellsolve v9.1

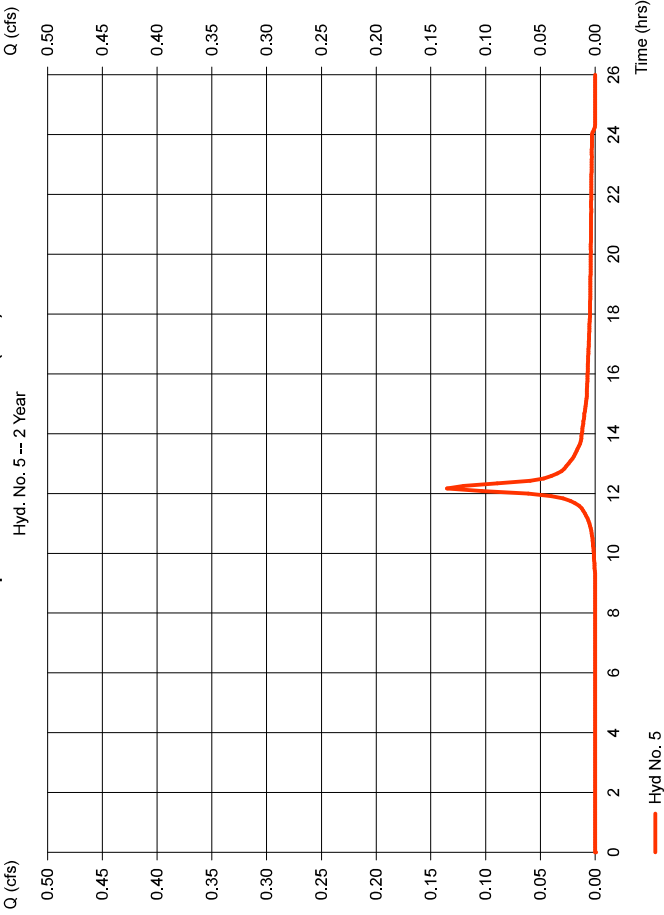
Thursday, Sep 15, 2022

## Hyd. No. 5

Prop. DA Lincoln Ave West (Per.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.135 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 554 cuft
Drainage area	= 0.110 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.39 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-D.cds	Shape factor	= 484

Prop. DA Lincoln Ave West (Per.)



# Hydrograph Report

Hydratflow Hydrographs by Intellsolve v9.1

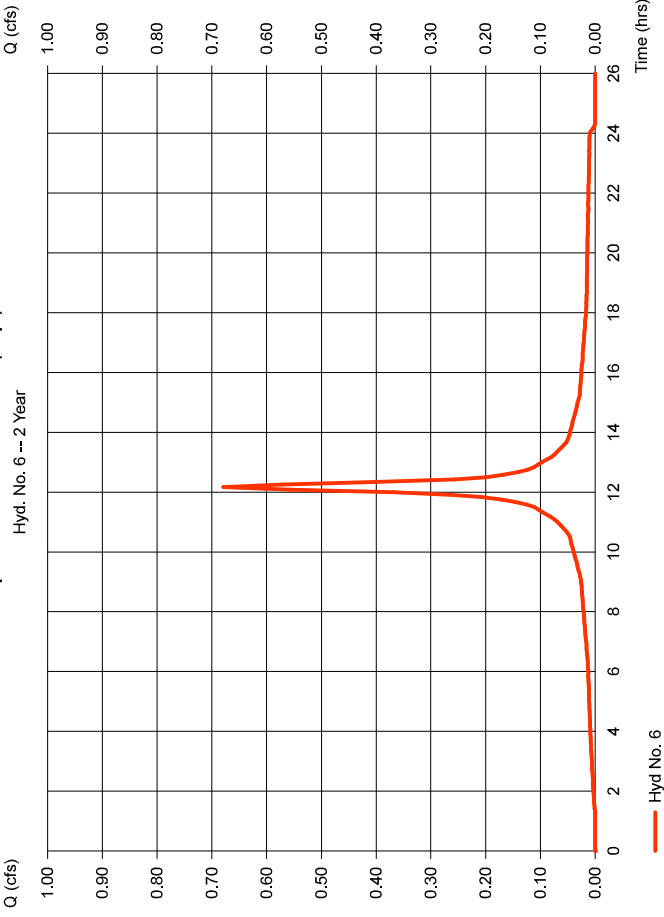
Thursday, Sep 15, 2022

## Hyd. No. 6

Prop. DA Lincoln Ave West (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.679 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 3,115 cuft
Drainage area	= 0.290 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.39 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-D.cds	Shape factor	= 484

Prop. DA Lincoln Ave West (Imp.)



# Hydrograph Report

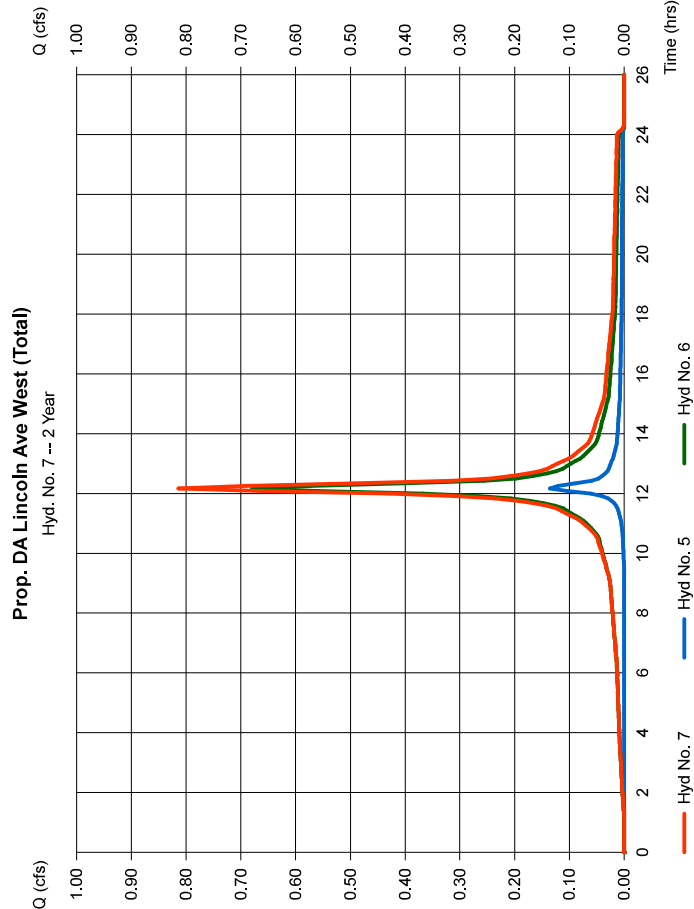
Hydraflow Hydrographs by Intelsolve v9.1 Thursday, Sep 15, 2022

## Hyd. No. 7

Prop. DA Lincoln Ave West (Total)

Hydrograph type = Combine  
 Storm frequency = 2 yrs  
 Time interval = 5 min  
 Inflow hyds. = 5, 6

Peak discharge = 0.814 cfs  
 Time to peak = 12.17 hrs  
 Hyd. volume = 3,670 cuft  
 Contrib. drain. area = 0.400 ac



# Hydrograph Summary Report

Hydraflow Hydrographs by Intelsolve v9.1

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	0.139	5	730	565	---	---	---	Ex. DA Lincoln Ave West (Per.)
2	SCS Runoff	1.258	5	730	5,876	---	---	---	Ex. DA Lincoln Ave West (Imp.)
3	Combine	1.397	5	730	6,440	1, 2	---	---	Ex. DA Lincoln Ave West (Total)
5	SCS Runoff	0.272	5	730	1,104	---	---	---	Prop. DA Lincoln Ave West (Per.)
6	SCS Runoff	1.042	5	730	4,868	---	---	---	Prop. DA Lincoln Ave West (Imp.)
7	Combine	1.314	5	730	5,972	5, 6	---	---	Prop. DA Lincoln Ave West (Total)

2, 10, 100 yr Hydrograph.gpw Return Period: 10 Year Thursday, Sep 15, 2022

# Hydrograph Report

Hydratlow Hydrographs by Intellsolve v9.1

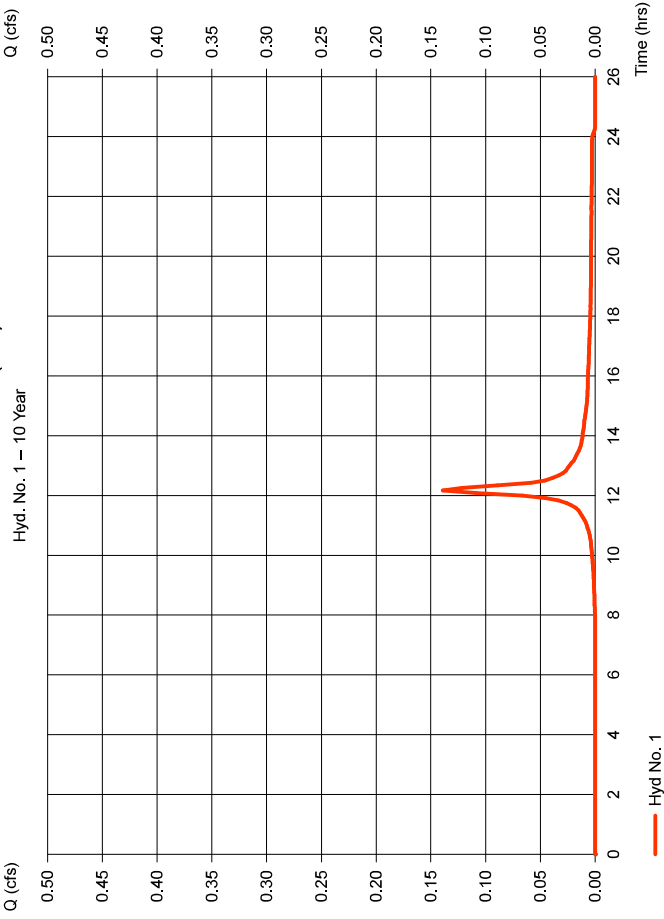
Thursday, Sep 15, 2022

## Hyd. No. 1

Ex. DA Lincoln Ave West (Per.)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.139 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.17 hrs
Time interval	=	5 min	Hyd. volume	=	565 cuft
Drainage area	=	0.060 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.17 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-D.cds	Shape factor	=	484

Ex. DA Lincoln Ave West (Per.)



# Hydrograph Report

Hydratlow Hydrographs by Intellsolve v9.1

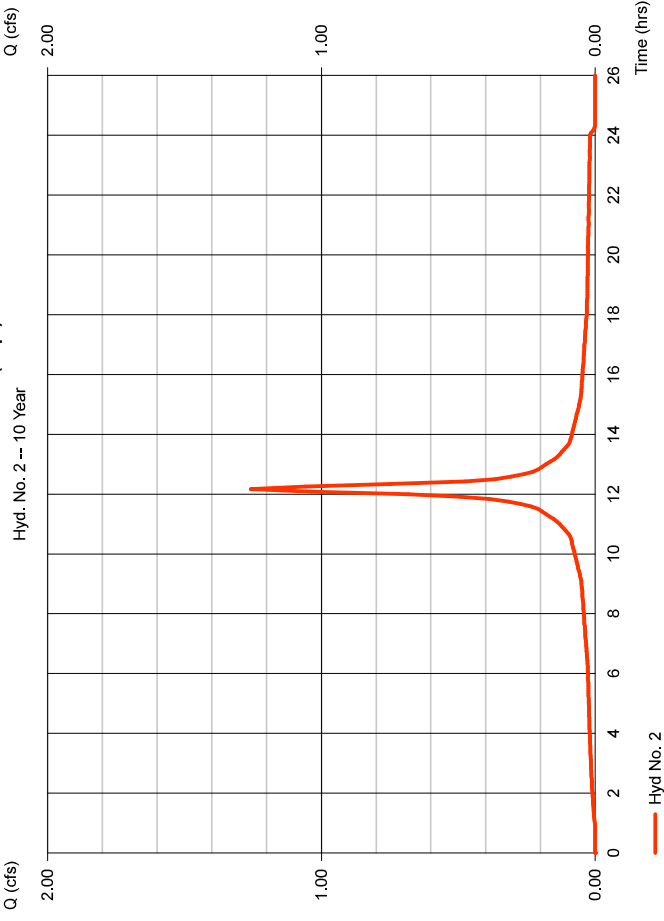
Thursday, Sep 15, 2022

## Hyd. No. 2

Ex. DA Lincoln Ave West (Imp.)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.258 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.17 hrs
Time interval	=	5 min	Hyd. volume	=	5,876 cuft
Drainage area	=	0.350 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.17 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-D.cds	Shape factor	=	484

Ex. DA Lincoln Ave West (Imp.)



# Hydrograph Report

Hydratlow Hydrographs by Intellsolve v9.1

Thursday, Sep 15, 2022

## Hyd. No. 3

Ex. DA Lincoln Ave West (Total)

Hydrograph type = Combine  
 Storm frequency = 10 yrs  
 Time interval = 5 min  
 Inflow hyds. = 1, 2

Peak discharge = 1,397 cfs  
 Time to peak = 12.17 hrs  
 Hyd. volume = 6,440 cuft  
 Contrib. drain. area = 0.410 ac

# Hydrograph Report

Hydratlow Hydrographs by Intellsolve v9.1

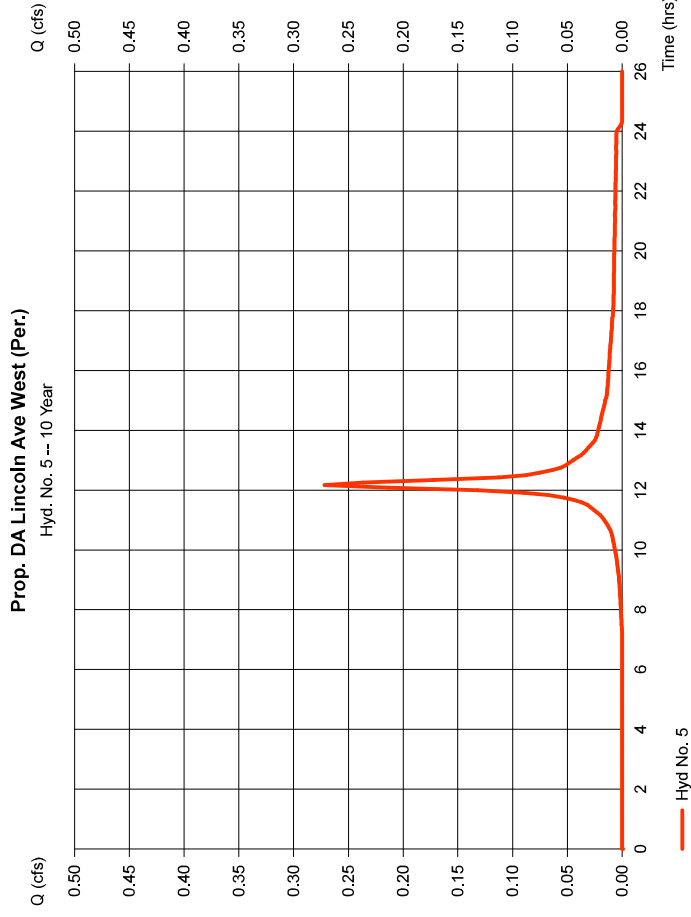
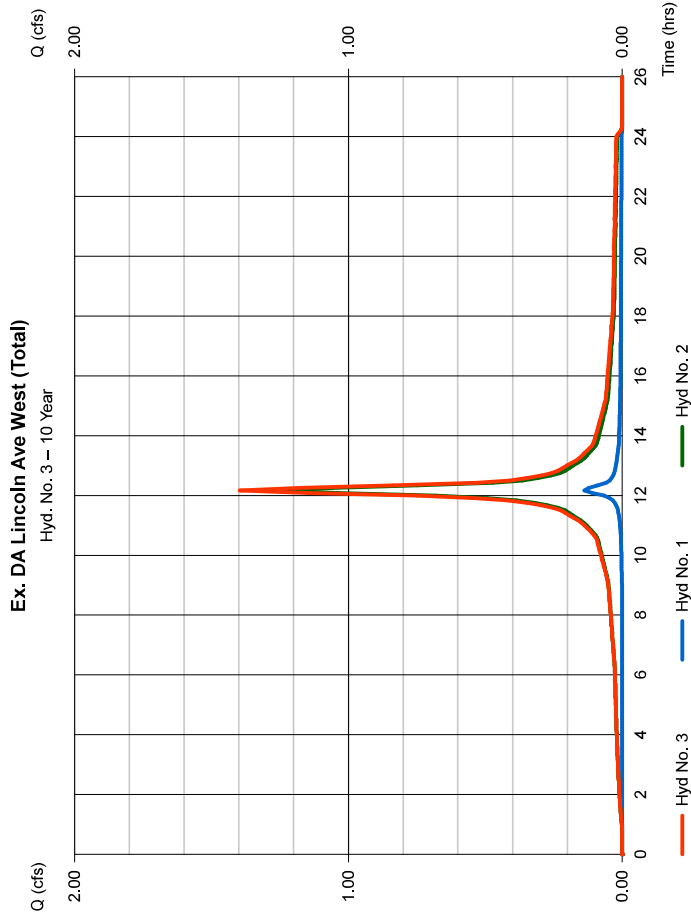
Thursday, Sep 15, 2022

## Hyd. No. 5

Prop. DA Lincoln Ave West (Per.)

Hydrograph type = SCS Runoff  
 Storm frequency = 10 yrs  
 Time interval = 5 min  
 Drainage area = 0.110 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 5.17 in  
 Storm duration = NOAA Atlas 14 Type-D.cds

Peak discharge = 0.272 cfs  
 Time to peak = 12.17 hrs  
 Hyd. volume = 1,104 cuft  
 Curve number = 79  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 10.00 min  
 Distribution = Custom  
 Shape factor = 484



# Hydrograph Report

Hydratlow Hydrographs by Intellsolve v9.1

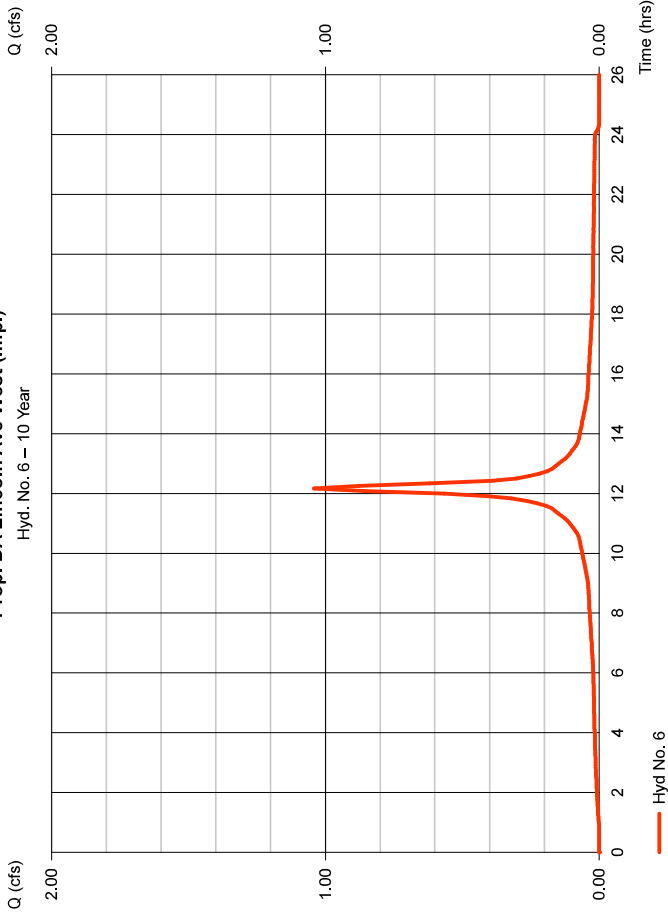
Thursday, Sep 15, 2022

## Hyd. No. 6

Prop. DA Lincoln Ave West (Imp.)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1,042 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.17 hrs
Time interval	=	5 min	Hyd. volume	=	4,868 cuft
Drainage area	=	0.290 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.17 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-D.cds	Shape factor	=	484

Prop. DA Lincoln Ave West (Imp.)



# Hydrograph Report

Hydratlow Hydrographs by Intellsolve v9.1

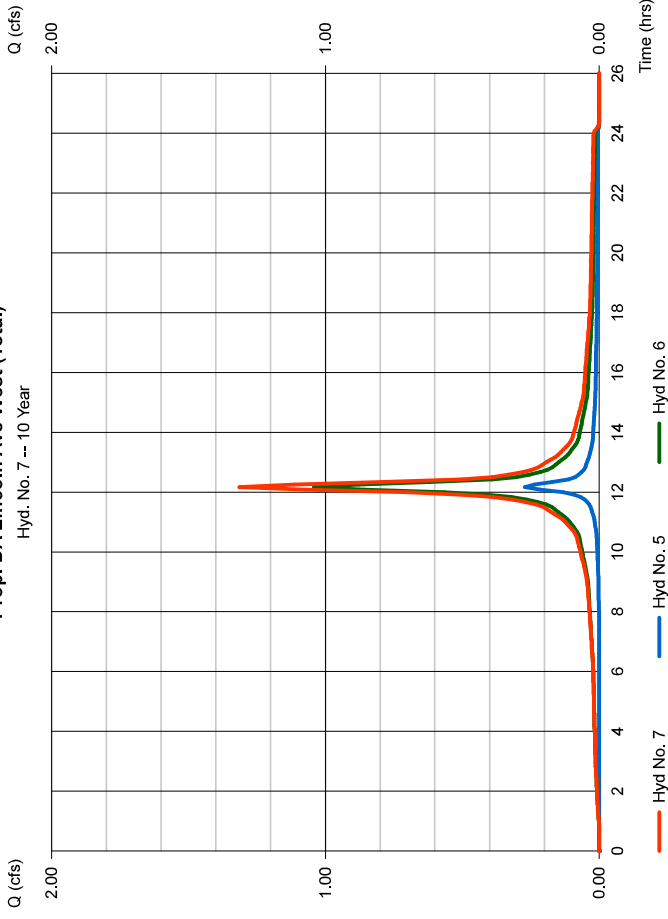
Thursday, Sep 15, 2022

## Hyd. No. 7

Prop. DA Lincoln Ave West (Total)

Hydrograph type	=	Combine	Peak discharge	=	1,314 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.17 hrs
Time interval	=	5 min	Hyd. volume	=	5,972 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	0.400 ac

Prop. DA Lincoln Ave West (Total)



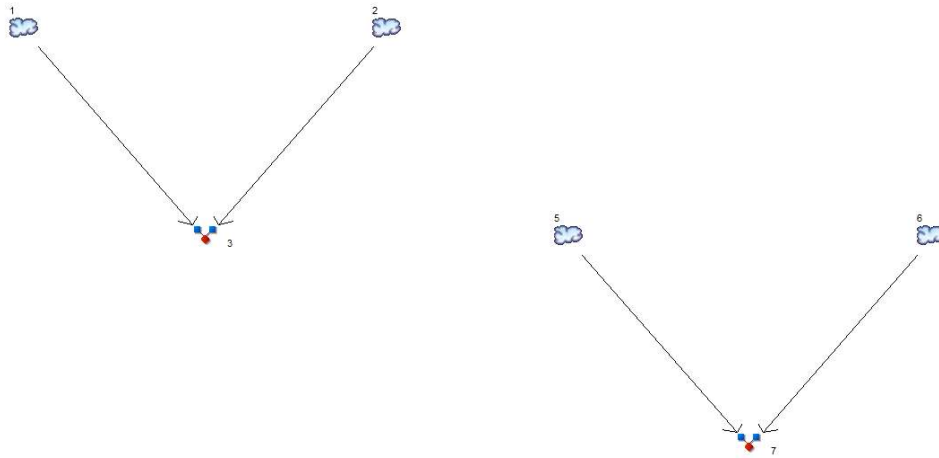


**HYDROGRAPH SUMMARY REPORTS – EXISTING  
AND PROPOSED CONDITIONS 100 YR.**

<b>Watershed Model Schematic .....</b>	<b>1</b>
<b>100 - Year</b>	
<b>Summary Report .....</b>	<b>2</b>
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# Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.1



## Legend

<u>Hyd. Origin</u>	<u>Description</u>
1	SCS Runoff Ex. DA Lincoln Ave West (Per.)
2	SCS Runoff Ex. DA Lincoln Ave West (Imp.)
3	Combine Ex. DA Lincoln Ave West (Total)
5	SCS Runoff Prop. DA Lincoln Ave West (Per.)
6	SCS Runoff Prop. DA Lincoln Ave West (Imp.)
7	Combine Prop. DA Lincoln Ave West (Total)

### Hydrograph Summary Report

Hydroflow Hydrographs by Intelsolve v9.1

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 storage used (cuft)	Hydrograph description
1	SCS Runoff	0.293	5	730	1,207	---	---	---	Ex. DA Lincoln Ave West (Per.)
2	SCS Runoff	2.122	5	730	10,065	---	---	---	Ex. DA Lincoln Ave West (Imp.)
3	Combine	2.415	5	730	11,271	1, 2	---	---	Ex. DA Lincoln Ave West (Total)
5	SCS Runoff	0.556	5	730	2,303	---	---	---	Prop. DA Lincoln Ave West (Per.)
6	SCS Runoff	1.758	5	730	8,339	---	---	---	Prop. DA Lincoln Ave West (Imp.)
7	Combine	2.314	5	730	10,643	5, 6	---	---	Prop. DA Lincoln Ave West (Total)

2, 10, 100 yr Hydrograph.gpw      Return Period: 100 Year      Thursday, Sep 15, 2022

### Hydrograph Report

Hydroflow Hydrographs by Intelsolve v9.1

Thursday, Sep 15, 2022

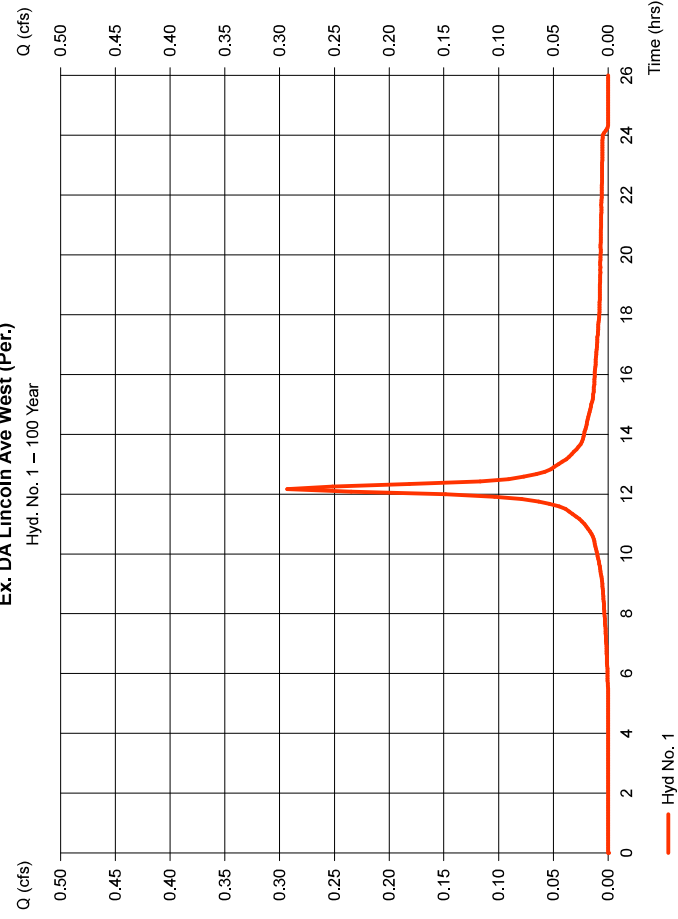
#### Hyd. No. 1

Ex. DA Lincoln Ave West (Per.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.293 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 1,207 cuft
Drainage area	= 0.060 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.69 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-D.cds	Shape factor	= 484

#### Ex. DA Lincoln Ave West (Per.)

Hyd. No. 1 – 100 Year



Hyd No. 1

# Hydrograph Report

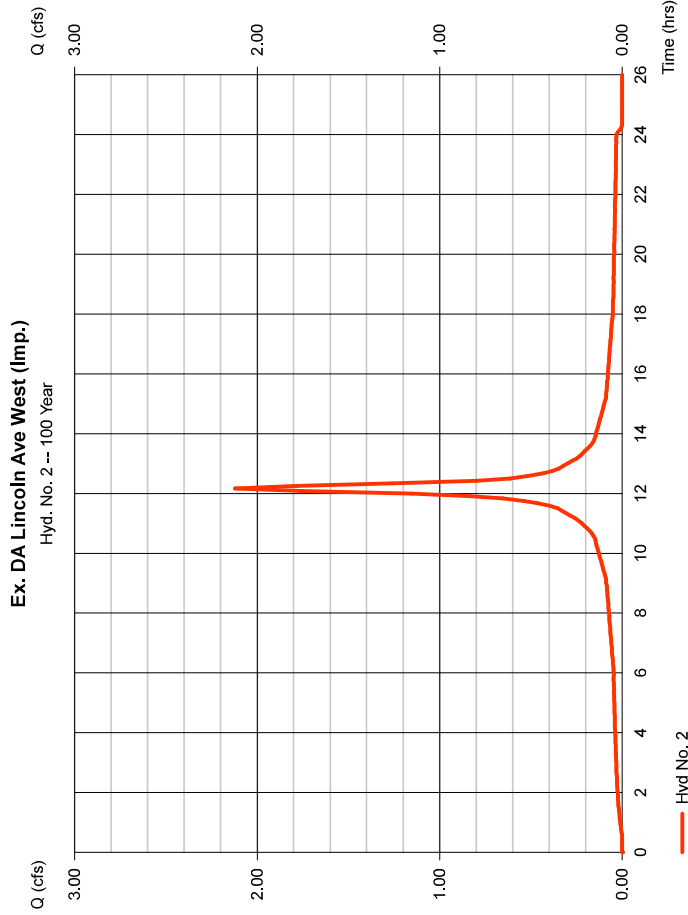
Hydraflow Hydrographs by Intellsolve v9.1

Thursday, Sep 15, 2022

## Hyd. No. 2

Ex. DA Lincoln Ave West (Imp.)  
 Hydrograph type = SCS Runoff  
 Storm frequency = 100 yrs  
 Time interval = 5 min  
 Drainage area = 0.350 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 8.69 in  
 Storm duration = NOAA Atlas 14 Type-D.cds

Peak discharge = 2.122 cfs  
 Time to peak = 12.17 hrs  
 Hyd. volume = 10.065 cuft  
 Curve number = 98  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 10.00 min  
 Distribution = Custom  
 Shape factor = 484



# Hydrograph Report

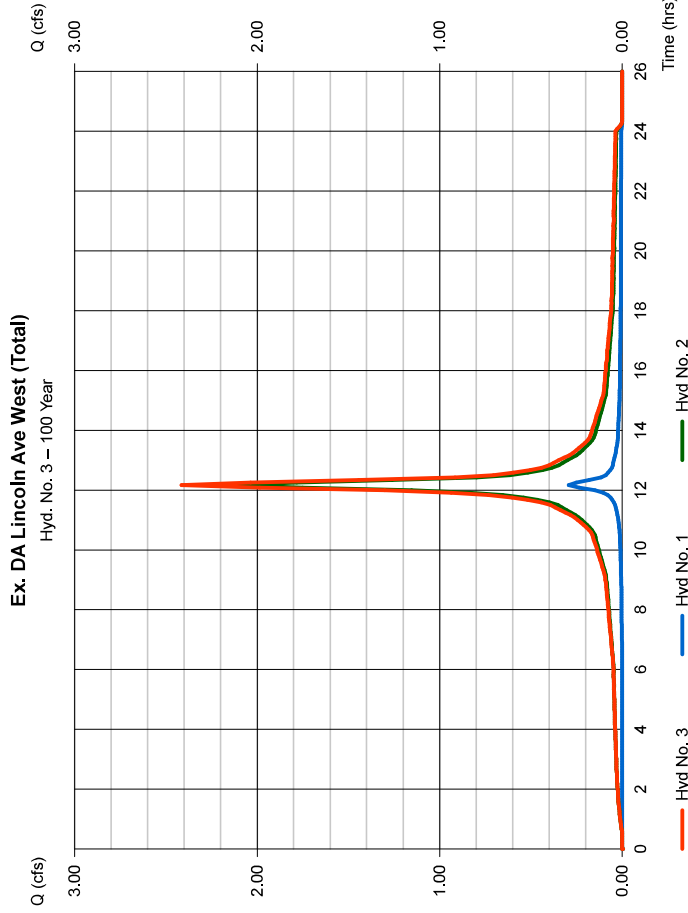
Hydraflow Hydrographs by Intellsolve v9.1

Thursday, Sep 15, 2022

## Hyd. No. 3

Ex. DA Lincoln Ave West (Total)  
 Hydrograph type = Combine  
 Storm frequency = 100 yrs  
 Time interval = 5 min  
 Inflow hyds. = 1, 2

Peak discharge = 2.415 cfs  
 Time to peak = 12.17 hrs  
 Hyd. volume = 11,271 cuft  
 Contrib. drain. area = 0.410 ac



# Hydrograph Report

Hydratlow Hydrographs by Intellsolve v9.1

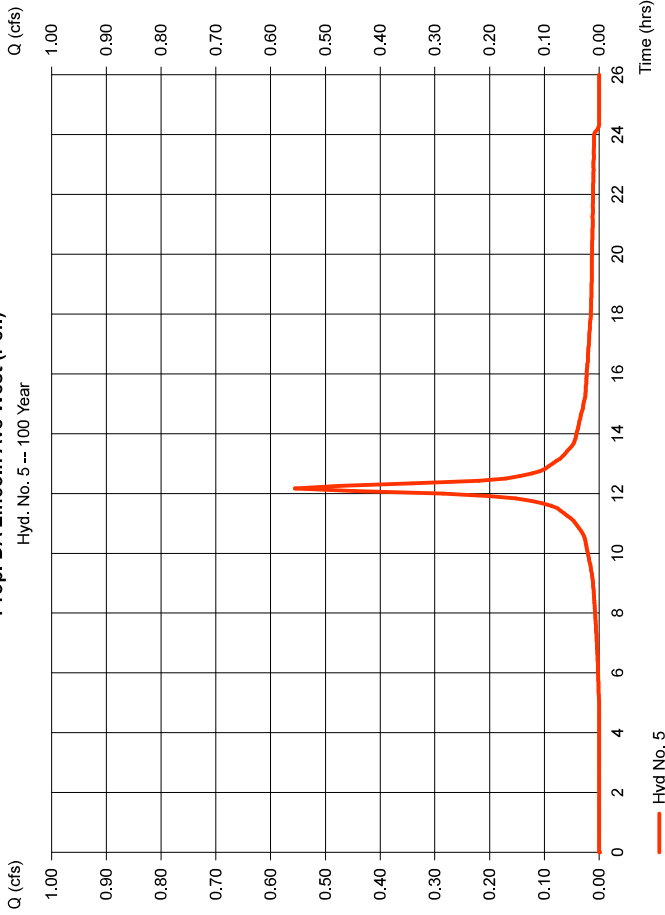
Thursday, Sep 15, 2022

## Hyd. No. 5

Prop. DA Lincoln Ave West (Per.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.556 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 2,303 cuft
Drainage area	= 0.110 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.69 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-D.cds	Shape factor	= 484

Prop. DA Lincoln Ave West (Per.)



# Hydrograph Report

Hydratlow Hydrographs by Intellsolve v9.1

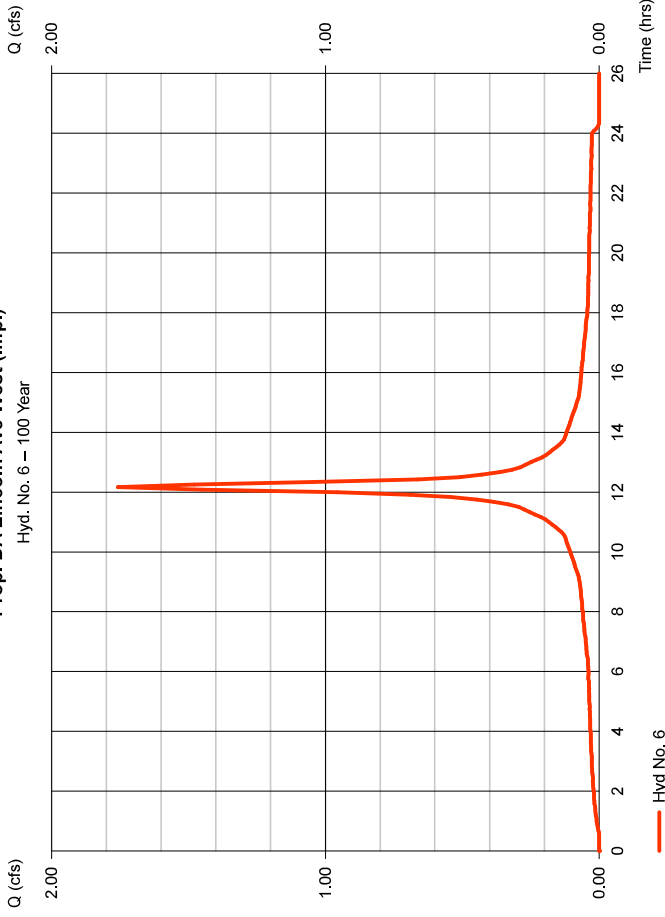
Thursday, Sep 15, 2022

## Hyd. No. 6

Prop. DA Lincoln Ave West (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 1,758 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 8,339 cuft
Drainage area	= 0.290 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.69 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-D.cds	Shape factor	= 484

Prop. DA Lincoln Ave West (Imp.)



# Hydrograph Report

Thursday, Sep 15, 2022

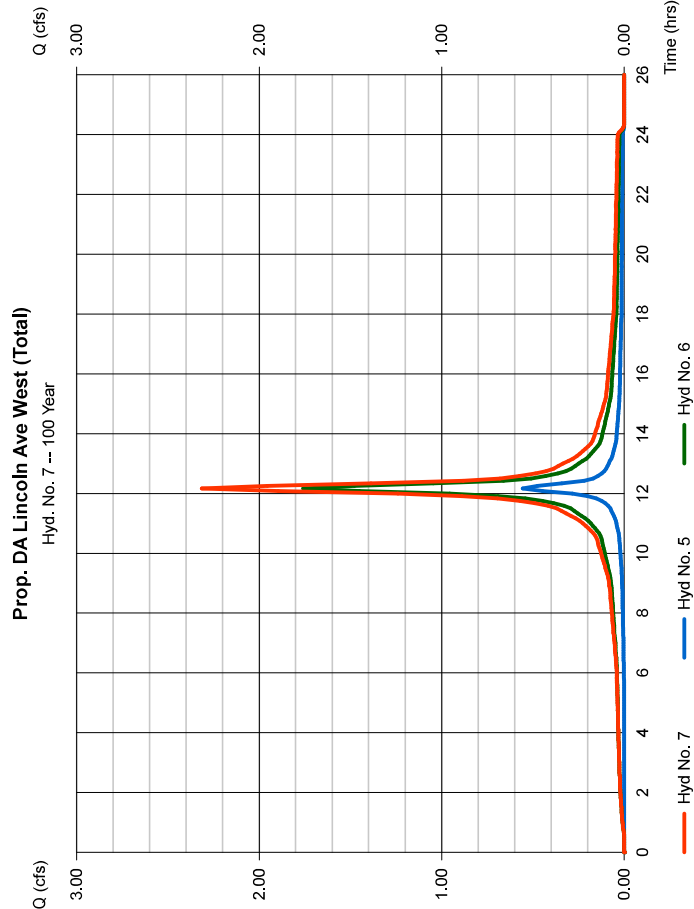
Hydroflow Hydrographs by Intelsolve v9.1

## Hyd. No. 7

Prop. DA Lincoln Ave West (Total)

Hydrograph type = Combine  
Storm frequency = 100 yrs  
Time interval = 5 min  
Inflow hyds. = 5, 6

Peak discharge = 2,314 cfs  
Time to peak = 12.17 hrs  
Hyd. volume = 10,643 cuft  
Contrib. drain. area = 0.400 ac



**STORMWATER COLLECTION SYSTEM  
CALCULATIONS**





# DYNAMIC ENGINEERING

## Stormwater Collection System Calculations

Project: Proposed Medical Building

Job #: 4087-99-001

Location: Township of Cranford, Union County, NJ

Design Storm: 25 Year

Computed By: MD

Checked By: RTO

Date: 2/25/2022

NOTES:

- 1) Design method used is Rational Method, unless otherwise noted.
- 2) Refer to Weighted Runoff Coefficient table for calculation of incremental areas and C values

PIPE SECTION		SUBCATCHMENT AREA	INCREMENTAL		CUMULATIVE	TIME OF CONCENTRATION			I	PEAK RUNOFF		PIPING INPUT			PIPING DATA		
FROM	TO	Area (Acres)	"C"	A x C Ac	A x C (acres)	Tc to Inlet (min)	Tc in Pipe (min.)	Final Tc (min)	(In/Hr)	Q to Inlet (CFS)	Q cum. for Pipe (CFS)	Dia. (In)	Length (Ft)	Man. "n"	Slope (ft/ft)	Pipe Capacity (cfs)	Pipe Velocity (fps)
Inlet Area Roof	Inlet Area 1	0.07	0.95	0.07	0.07	10.00	0.52	10.00	6.80	0.48	0.48	6	115.0	0.010	0.0100	0.73	3.72
Inlet Area 1	Inlet Area 2	0.11	0.83	0.09	0.16	10.00	0.53	10.52	6.68	0.60	1.07	15	119.0	0.013	0.0050	4.57	3.73
Inlet Area 2	Existing Inlet	0.07	0.95	0.07	0.23	10.00	0.08	11.05	6.56	0.46	1.51	15	17.0	0.013	0.0050	4.57	3.73

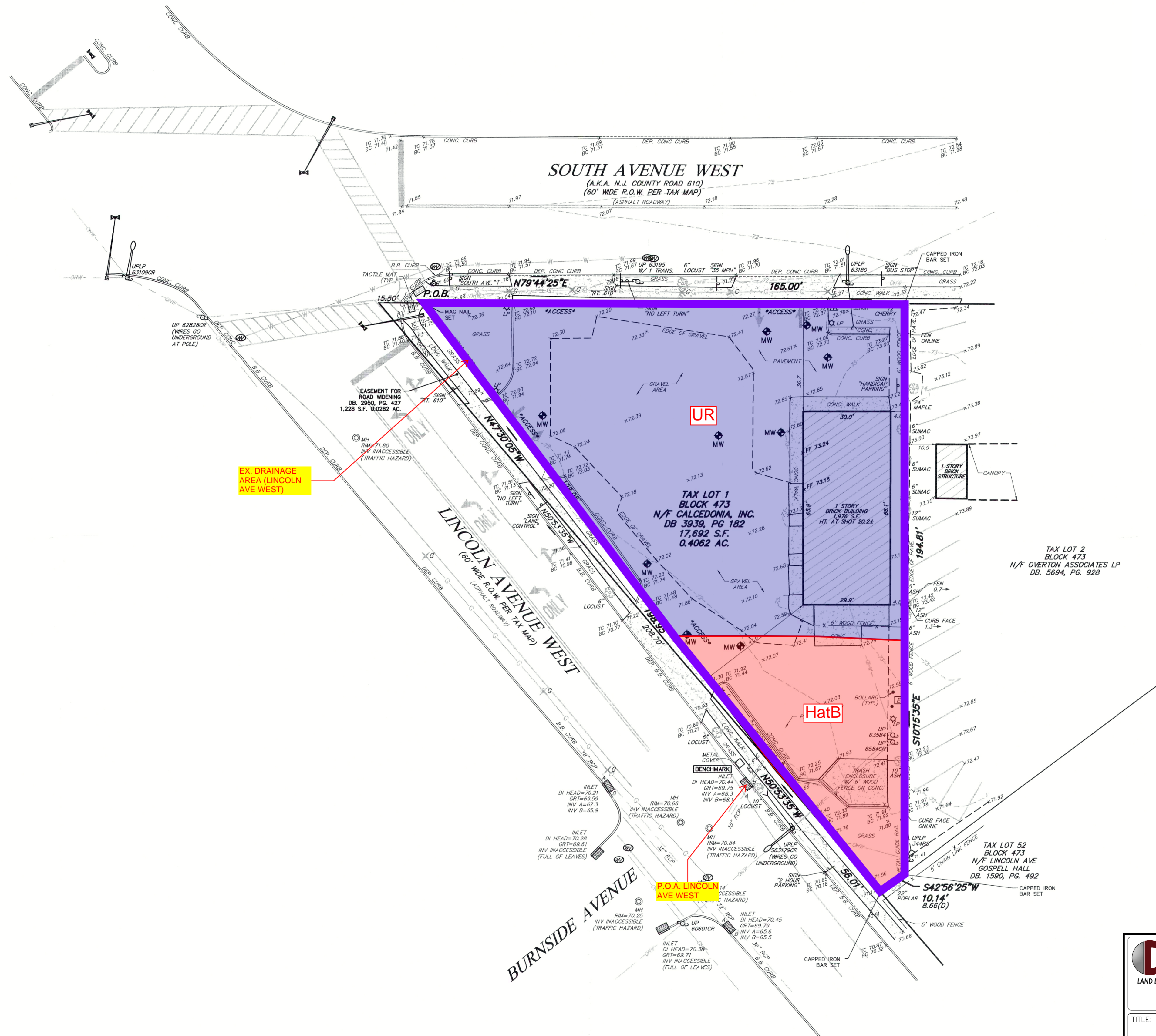
## **DRAINAGE AREA MAPS**



SYMBOL LEGEND			
	CONC. MONUMENT FND		MAIL BOX
	I.P. / I.B. FND		CABLE TV BOX
	TACK / STAKE FND		TELEPHONE BOX
	SPOT ELEVATIONS		A/C UNIT
	TRAFFIC SIGNAL POLE		TRANSFORMER
	UTILITY POLE		ELECTRIC METER
	GUY WIRE		GAS METER
	UTILITY POLE W/LIGHT		WATER METER
	LIGHT POLE		WATER VALVE
	SIGN		GAS VALVE
	FIRE HYDRANT		CLEAN OUT
	D.W.P.		GAS
	D.C.		WATER
	L.S.A.		ELECTRIC
	WELL		TELEPHONE
	MANHOLE		CABLE TV
	"A"-INLET		TREE
	"B"-INLET		SHRUB
	"E"-INLET		BOLLARD
	YARD INLET		MONITORING WELL
	FLARED END SECTION		WETLAND FLAG

**GENERAL NOTES:**

1. THIS SURVEY IS PREPARED IN ACCORDANCE WITH DOCUMENTS SUPPLIED BY THE CLIENT AND THOSE OBTAINED THROUGH SUPPLEMENTAL RESEARCH BY DPK. THE DOCUMENTS UTILIZED MAY OR MAY NOT REPRESENT ALL THE TITLE DOCUMENTS RELEVANT TO THE SUBJECT PROPERTY. IT IS STRONGLY SUGGESTED THAT A COMPLETE TITLE SEARCH BE SUPPLIED TO THE SURVEYOR FOR REVIEW PRIOR TO THE PLACEMENT OF OR ALTERATION TO IMPROVEMENTS ON THE PROPERTY.
2. THIS SURVEY IS SUBJECT TO ANY EASEMENTS OF RECORD AND ANY OTHER PERTINENT FACTS THAT A COMPLETE TITLE SEARCH MIGHT DISCLOSE.
3. THIS SURVEY REPRESENTS FIELD CONDITIONS AS OF NOVEMBER 17, 2021.
4. THE UTILITIES SHOWN HAVE BEEN LOCATED FROM EVIDENCE OBSERVED ON THE SURFACE ONLY OR HAVE BEEN SHOWN GRAPHICALLY PER SUPPLIED MATERIALS. DPK CONSULTING MAKES NO GUARANTEES THAT THE UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN-SERVICE OR ABANDONED. DPK CONSULTING FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. DPK CONSULTING HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.
5. PREMISES ARE COMMONLY KNOWN AS 49 SOUTH AVENUE WEST, CRANFORD, NEW JERSEY.
6. ALSO KNOWN AS LOT 1 IN BLOCK 473 AS SHOWN ON THE OFFICIAL TAX MAPS OF THE TOWNSHIP OF CRANFORD, UNION COUNTY, NEW JERSEY.
7. CORNER MARKERS AS SHOWN HAVE BEEN LOCATED, VERIFIED AND/OR SET.
8. THE PROJECT VERTICAL DATUM IS BASED UPON NAVD 88 DERIVED USING LEICA GX1230 GPS RECEIVERS AND NEW JERSEY SMARTNET NETWORK.
9. IF THIS DOCUMENT DOES NOT CONTAIN A RAISED SEAL OF THE UNDERSIGNED PROFESSIONAL, IT IS NOT AN AUTHORIZED ORIGINAL DOCUMENT.



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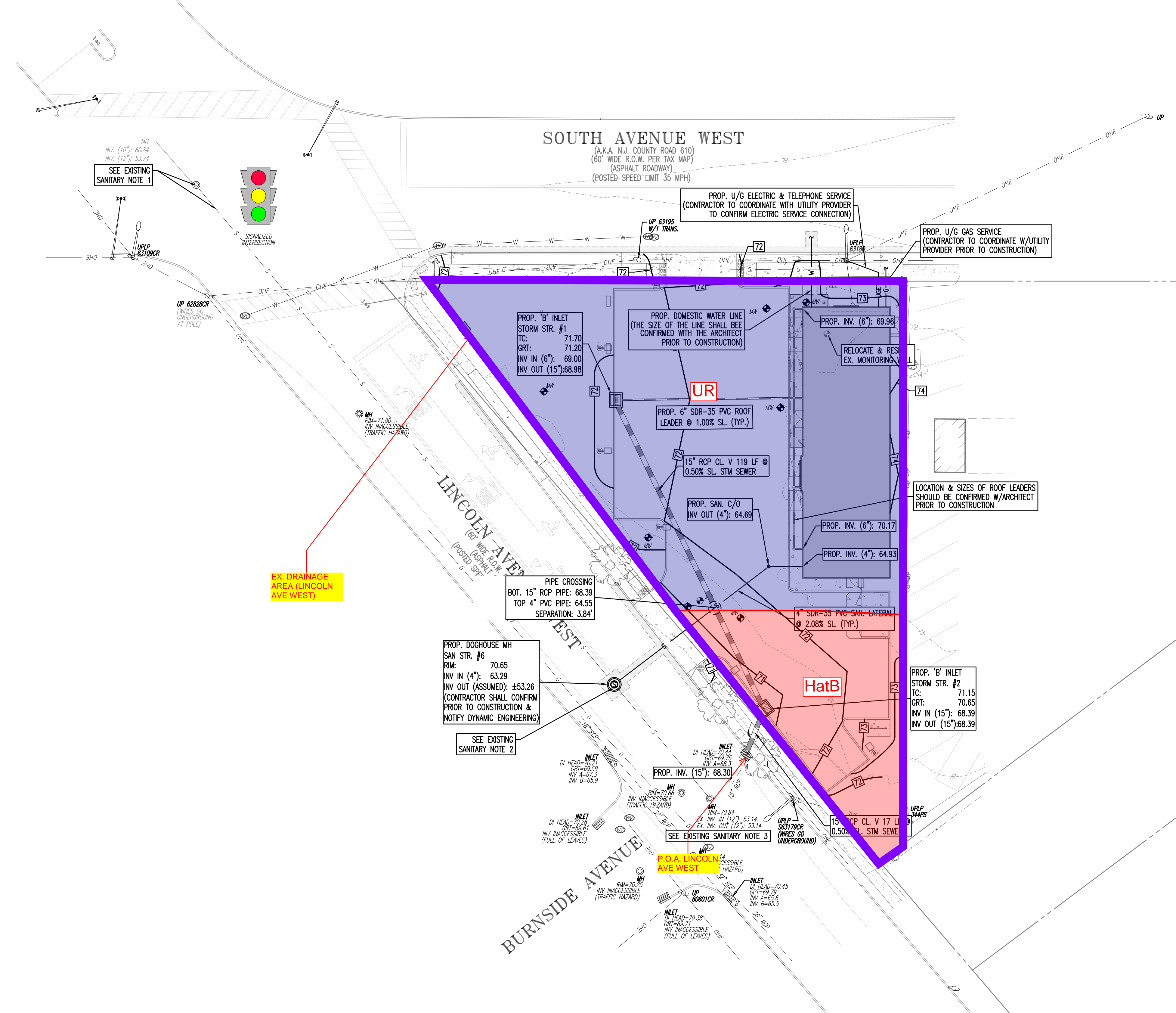
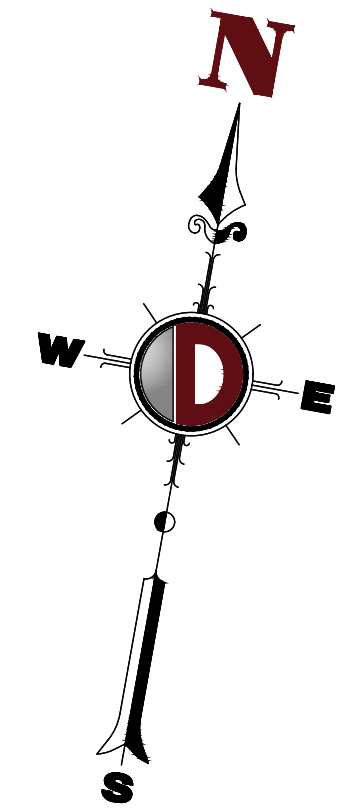
TITLE: **EXISTING DRAINAGE AREA MAP EXHIBIT**

PROJECT: <b>NAKT REAL ESTATE HOLDINGS, LLC PROPOSED MEDICAL BUILDING</b>	JOB No: 4087-99-001	DATE: 09/16/2022	
BLOCK 473, LOT 1 49 SOUTH AVENUE WEST (CR 610) & LINCOLN AVENUE WEST TOWNSHIP OF CRANFORD, UNION COUNTY, NEW JERSEY	DRAWN BY: DJB	SCALE: (H) 1"=20' (V)	
DESIGNED BY: MPD	CHECKED BY: JEH	SHEET No:	
CHECKED BY: JEH	CHECKED BY: -	<b>1</b> OF 1	
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;"> <b>JAMES E. HENRY</b>                      PROFESSIONAL ENGINEER                      NEW JERSEY LICENSE No. 49266                 </td> <td style="width: 50%; text-align: center;"> <b>JOHN A. PALUS</b>                      PROFESSIONAL ENGINEER                      NEW JERSEY LICENSE No. 41975                 </td> </tr> </table>			<b>JAMES E. HENRY</b> PROFESSIONAL ENGINEER NEW JERSEY LICENSE No. 49266
<b>JAMES E. HENRY</b> PROFESSIONAL ENGINEER NEW JERSEY LICENSE No. 49266	<b>JOHN A. PALUS</b> PROFESSIONAL ENGINEER NEW JERSEY LICENSE No. 41975		

Rev. # 0



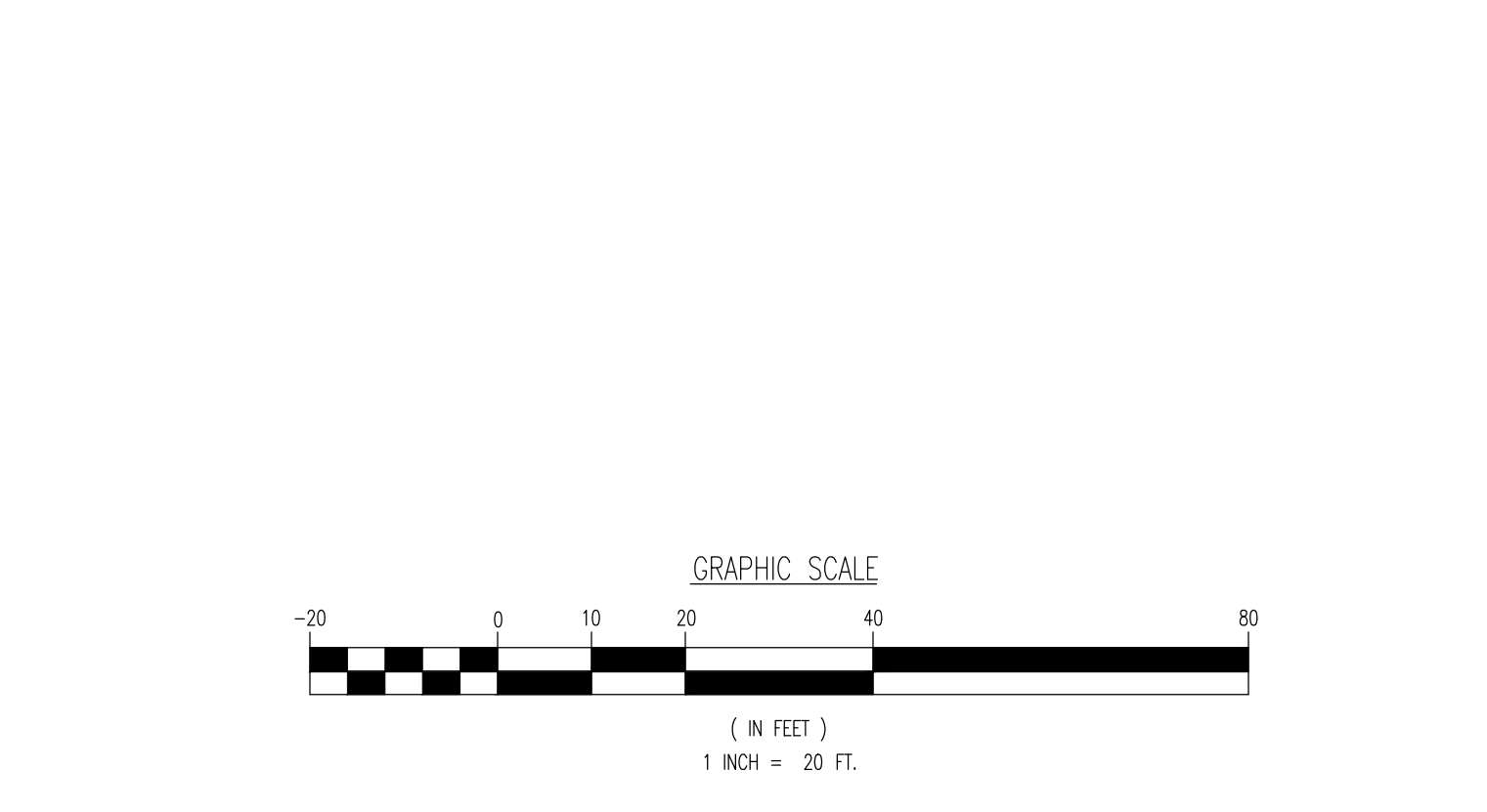
Product Ver: 24.1s (LMS Tech) - Product: 09/16/22 - 3:50 PM, By: aboyd, File: \\spsc.local\c\folders\Data\espc\_projects\4087\_nakt\_real\_estate\_holdings\lic\_99-001\_cranford\DWG\Site\Plans\06\_DRAINAGE & UTILITY PLAN



- UTILITY NOTES**
- LOCATION OF ALL EXISTING AND PROPOSED SERVICES ARE APPROXIMATE AND MUST BE CONFIRMED INDEPENDENTLY WITH LOCAL UTILITY COMPANIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION OR EXCAVATION. SANITARY SEWER AND ALL OTHER UTILITY SERVICE CONNECTION POINTS SHALL BE CONFIRMED INDEPENDENTLY BY THE CONTRACTOR IN FIELD PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ALL DISCREPANCIES SHALL BE REPORTED IMMEDIATELY IN WRITING TO THE ENGINEER. CONSTRUCTION SHALL COMMENCE BEGINNING AT THE LOWEST INVERT (POINT OF CONNECTION) AND PROGRESS UP GRADE/INVERT. INTERFACE POINTS (CROSSINGS) WITH EXISTING UNDERGROUND UTILITIES SHALL BE FIELD VERIFIED BY TEST PIT PRIOR TO COMMENCEMENT OF CONSTRUCTION.
  - IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY UTILITY "ONE-CALL" NUMBER 72 HOURS PRIOR TO ANY EXCAVATION ON THIS SITE. CONTRACTOR SHALL ALSO NOTIFY LOCAL WATER & SEWER DEPARTMENTS TO MARK-OUT THEIR UTILITIES.
  - REFER TO ARCHITECTURAL DRAWINGS FOR EXACT BUILDING UTILITY CONNECTION LOCATIONS, WHERE CONFLICTS EXIST WITH THESE SITE PLANS, ENGINEER IS TO BE NOTIFIED PRIOR TO CONSTRUCTION TO RESOLVE SAME. SERVICE SIZES TO BE DETERMINED BY ARCHITECT.
  - WATER SERVICE MATERIALS SHALL BE SPECIFIED BY THE LOCAL UTILITY COMPANY. CONTRACTORS PRICE FOR WATER SERVICE SHALL INCLUDE ALL FEES AND APPURTENANCES REQUIRED BY THE UTILITY TO PROVIDE A COMPLETE WORKING SERVICE.
  - ALL WATER MAIN SHALL BE CEMENT-LINED, CLASS 52 DUCTILE IRON PIPE, UNLESS OTHERWISE DESIGNATED.
  - THE MINIMUM DIAMETER FOR DOMESTIC WATER SERVICES SHALL BE 1 INCH.
  - SEWER MAINS SHALL BE SEPARATED FROM WATER MAINS BY A DISTANCE OF AT LEAST 10 FEET HORIZONTALLY. WHERE THIS IS NOT POSSIBLE, THE PIPES SHALL BE IN SEPARATE TRENCHES WITH THE SEWER MAIN AT LEAST 18 INCHES BELOW THE WATER MAIN. ALL SEWER MAINS SHALL BE SDR-35 PVC PIPE UNLESS OTHERWISE DESIGNATED.
  - ALL SEWER PIPE INSTALLED WITH LESS THAN 3 FEET OF COVER, GREATER THAN 20 FEET OF COVER OR WITHIN 18 INCHES OF A WATER MAIN SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE. ALL DUCTILE IRON SEWER PIPE SHALL BE CEMENT-LINED, CLASS 52 PIPE, FURNISHED WITH SEWER COAT, OR APPROVED EQUAL.
  - WHERE SANITARY SEWER LATERALS ARE GREATER THAN 10' DEEP AT CONNECTION TO THE SEWER MAIN, CONCRETE DEEP LATERAL CONNECTIONS ARE TO BE UTILIZED. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILIZATION OF THE EXISTING SEWER MAIN, STRUCTURES AND APPURTENANCES DURING CONNECTION.
  - LOCATION & LAYOUT OF GAS, ELECTRIC & TELECOMMUNICATION UTILITY LINES AND SERVICES SHOWN ON THESE PLANS ARE SCHEMATIC IN NATURE. ACTUAL LOCATION & LAYOUT OF THESE UTILITIES & SERVICES ARE TO BE PER THE APPROPRIATE UTILITY PROVIDER.
  - ROOF LEADER COLLECTION PIPING ARE CONCEPTUAL IN NATURE AND ARE NOT FOR CONSTRUCTION. ACTUAL ROOF LEADER COLLECTION PIPING IS TO BE COORDINATED W/ ARCHITECTURAL PLANS FOR EACH INDIVIDUAL BUILDING. ALL ROOF LEADER COLLECTION PIPING SHALL BE SCHEDULE 40 PVC UNLESS OTHERWISE DESIGNATED.
  - ALL SEWER AND WATER FACILITIES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REGULATORY AUTHORITY'S RULES AND REGULATIONS.
  - ALL PROPOSED UTILITIES TO BE INSTALLED UNDERGROUND UNLESS OTHERWISE NOTED.
  - MANUFACTURED REINFORCED CONCRETE STORM PIPE TO CONFORM TO ASTM C-76, CLASS III, UNLESS OTHERWISE DESIGNATED. MANUFACTURED REINFORCED CONCRETE ELLIPTICAL STORM PIPE TO CONFORM TO ASTM C-507, CLASS HE-III, UNLESS OTHERWISE DESIGNATED. REINFORCED CONCRETE STORMWATER PIPE TO BE INSTALLED IN ACCORDANCE WITH AMERICAN CONCRETE PIPE ASSOCIATION INSTALLATION GUIDELINES AND MORTAR OR PREFORMED FLEXIBLE JOINT SEAMANTS IN ACCORDANCE WITH ASTM C 990 TO BE UTILIZED TO PROVIDE A SLIT-TIGHT JOINT. WHERE SPECIFICALLY INDICATED, REINFORCED CONCRETE STORM PIPE JOINTS SHALL BE WATER-TIGHT AND CONFORM TO ASTM C-443.
  - HDPE DRAINAGE PIPE SHALL HAVE A SMOOTH WALL INTERIOR WITH ANNUAL EXTERIOR CORRUGATIONS AND CONFORM TO ASTM F2306. SOLID PIPE SHALL HAVE GASKETED WATER-TIGHT JOINTS MEETING THE REQUIREMENTS OF ASTM D3212. PERFORATED PIPE SHALL HAVE GASKETED SLIT-TIGHT JOINTS MEETING THE REQUIREMENTS OF ASTM F2306 AND ASTM F477. HDPE PIPE SHALL BE FROM A MANUFACTURER WHO IS AN EASTERN STATES CONSORTIUM (ESC) QUALIFIED MANUFACTURER OF HDPE PIPE AND INSTALLED IN ACCORDANCE WITH PIPE MANUFACTURER RECOMMENDATIONS.
  - HP DRAINAGE PIPE SHALL HAVE A SMOOTH WALL INTERIOR WITH ANNUAL EXTERIOR CORRUGATIONS AND CONFORM TO ASTM F2336 (12"-30" PIPE) AND ASTM F2881 (36"-60" PIPE). PIPE SHALL HAVE GASKETED WATER-TIGHT JOINTS MEETING THE REQUIREMENTS OF ASTM D3212 AND ASTM F477. FIELD WATER-TIGHTNESS PERFORMANCE VERIFICATION MAY BE ACCOMPLISHED IN ACCORDANCE WITH ASTM F2487. HP PIPE SHALL BE FROM A MANUFACTURER WHO IS AN EASTERN STATES CONSORTIUM (ESC) QUALIFIED MANUFACTURER OF HP STORM PIPE AND INSTALLED IN ACCORDANCE WITH PIPE MANUFACTURER RECOMMENDATIONS.
  - PIPE LENGTHS ON THIS PLAN HAVE BEEN MEASURED AS THE DISTANCE BETWEEN THE CENTER POINT OF THE 2 CONNECTED STRUCTURES. ACTUAL PHYSICAL PIPE LENGTH FOR INSTALLATION IS EXPECTED TO BE LESS AND SHOULD BE ACCOUNTED FOR BY THE CONTRACTOR ACCORDINGLY.

- EXISTING SANITARY NOTES**
- APPROXIMATE LOCATION OF 12" SANITARY SEWER MAIN AND DROP MANHOLE AS PER THE TOWNSHIP OF CRANFORD EXISTING SANITARY SEWERS MAPPING, DATED JANUARY 1977. INVERTS SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
  - THE INVERT OF THE SANITARY SEWER MAIN WAS INTERPOLATED PER THE INFORMATION ON THE TOWNSHIP OF CRANFORD EXISTING SANITARY SEWERS MAPPING, DATED JANUARY 1977. CONTRACTOR TO CONFIRM DEPTH OF SANITARY SEWER MAIN INVERT PRIOR TO CONSTRUCTION. IF THE ELEVATION ON SITE VARIES FROM WHAT IS SHOWN ON THIS PLAN, DYNAMIC ENGINEERING MUST BE CONTACTED IMMEDIATELY.
  - THE INVERT WAS DETERMINED THROUGH DIFFERENTIAL CALCULATIONS OF THE INFORMATION FROM THE TOWNSHIP OF CRANFORD EXISTING SANITARY SEWERS MAPPING, DATED JANUARY 1977. INVERTS SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

- NOTES**
- INSTALLATION OF SANITARY MANHOLE IN LINCOLN AVE TO BE COORDINATED WITH CRANFORD DPW AND POLICE PRIOR TO BEGINNING WORK IN R.O.W.
  - PRIOR TO COMMENCEMENT OF CONSTRUCTION, CONTRACTOR AND ARCHITECT SHALL CONFIRM THE SIZE, CAPACITY AND CONDITION OF THE EXISTING UTILITIES IN ORDER TO CONFIRM IF THE EXISTING UTILITIES CAN BE UTILIZED FOR THIS DEVELOPMENT.
  - A ROAD OPENING PERMIT IS REQUIRED PRIOR TO CONSTRUCTION WITHIN THE R.O.W. INCLUDING INSTALLATION OF THE DRIVEWAY APRON, R.O.W. CURBING, R.O.W. SIDEWALK AND SANITARY SEWER CONNECTION.



**GRADING/UTILITY GRAPHIC LEGEND**

	PROPERTY LINE (PARCEL IN QUESTION)		PROP. WATER VALVE		EXIST. SANITARY SEWER LINE		EXIST. SPOT ELEVATIONS
	OFF-SITE PROPERTY LINES		PROP. GAS VALVE		EXIST. STORM DRAIN LINE		EXIST. TOP OF CURB ELEV.
	EXIST. GUY WIRE		PROP. STORM CLEANOUT		EXIST. ELECTRIC LINE		EXIST. FINISH FLOOR ELEV.
	EXIST. BUILDING LIGHT		PROP. AREA LIGHT		EXIST. FIBER OPTIC LINE		EXIST. GARAGE FLOOR ELEV.
	EXIST. SHOE BOX LIGHT		PROP. OUTLET CONTROL STRUCTURE		EXIST. GAS LINE		PROP. GRADE SPOT ELEV.
	EXIST. TRAFFIC SIGNAL POLE		PROP. DRAINAGE MANHOLE		EXIST. GAS LINE		PROP. TOP OF CURB & FINISHED GRADE ELEV.
	EXIST. MANHOLE		PROP. SANITARY SEWER MANHOLE		EXIST. OVERHEAD WIRES		PROP. FINISHED FLOOR ELEV.
	EXIST. "A" INLET		PROP. CLEAN OUT		EXIST. TELEPHONE LINE		PROP. TOP OF WALL & FINISHED GRADE @ LOW SIDE OF WALL (ACTUAL BOTTOM OF WALL FOOTING TO BE ESTABLISHED BY WALL DESIGNER)
	EXIST. "B" INLET		EXIST. WELL		EXIST. WATER LINE		PROP. TOP OF EXTENDED CURB, (GH) FINISHED GRADE @ HIGH SIDE OF EXTENDED CURB & (LS) FINISHED GRADE @ LOW SIDE OF EXTENDED CURB
	EXIST. "C" INLET		EXIST. WATER SHUT OFF VALVE		PROP. DIRECTION OF DRAINAGE FLOW ARROW		
	EXIST. YARD INLET		EXIST. TELEPHONE BOX				
	EXIST. HEADWALL SECTION		EXIST. CABLE TV BOX				
	EXIST. HEADWALL		EXIST. UTILITY POLE				
			EXIST. MONITORING WELL				
			APPROX. TEST PIT LOCATION				

**DYNAMIC ENGINEERING**  
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1904 Main Street  
 Lake Como, NJ 07719  
 T: 908.991.0188  
 F: 908.991.5521  
 www.dynamiceng.com

Project: **PROPOSED MEDICAL BUILDING**

Client: **NAKT REAL ESTATE HOLDINGS, LLC**

Address: 49 SOUTH AVENUE WEST (CR 610) & LINCOLN AVENUE WEST, TOWNSHIP OF CRANFORD, UNION COUNTY, NEW JERSEY

Job No: 4087-99-001  
 Date: 09/16/2022  
 Drawn By: DJB  
 Designed By: MPD  
 Checked By: JEH

**JAMES E. HENRY** PROFESSIONAL ENGINEER  
 NEW JERSEY LICENSE No. 49266

**JOHN A. PALUS** PROFESSIONAL ENGINEER  
 NEW JERSEY LICENSE No. 41975

Scale: (H) 1"=20'  
 (V)

Sheet No: 1

Protect Yourself  
 ALL STATES REQUIRE VERIFICATION OF LICENSE STATUS OF ANY DESIGNER PREPARING TO SEAL THE PROJECT'S SERVICE AGREEMENT AND/OR SPECIFICATIONS.  
 FOR STATE-SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

Rev: 0

## **INLET AREA MAP**



### GRADING NOTES

- SITE GRADING SHALL BE PERFORMED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND THE RECOMMENDATIONS SET FORTH IN THE SOILS REPORT REFERENCED IN THIS PLAN SET. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND REPLACING ALL SOFT, YIELDING OR UNSUITABLE MATERIALS AND REPLACING WITH SUITABLE MATERIALS AS SPECIFIED IN THE SOILS REPORT. ALL EXCAVATED OR FILLED AREAS SHALL BE COMPACTED TO 95% OF MODIFIED PROCTOR MAXIMUM DENSITY PER AASHTO T-99. MIXTURE CONTROLS SHALL NOT EXCEED 2% ABOVE NOR 3% BELOW OPTIMUM. CONTRACTOR SHALL SUBMIT A COMPARISON REPORT PREPARED BY A QUALIFIED SOILS ENGINEER, REGISTERED WITHIN THE STATE, WHERE THE WORK IS PERFORMED, VERIFYING THAT ALL FILLED AREAS AND SUBGRADE AREAS WITHIN THE BUILDING AREA AND AREAS TO BE PAVED HAVE BEEN COMPACTED IN ACCORDANCE WITH THESE PLANS AND SPECS AND THE RECOMMENDATIONS SET FORTH IN THE SOILS REPORT.
- CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF EXISTING TOPOGRAPHIC INFORMATION AND UTILITY INVERT ELEVATIONS PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION. CONTRACTOR TO ENSURE 0.75% MIN. SLOPE AGAINST ALL ISLAND, GUTTERS, CURBS AND 1.0% ON ALL CONCRETE SURFACES, AND 1-1/2% MIN. ON ASPHALT TO PREVENT FLOODING. ANY DISCREPANCIES THAT MAY AFFECT THE PUBLIC SAFETY OR PROJECT COST, MUST BE IDENTIFIED TO THE ENGINEER IN WRITING IMMEDIATELY. PROCEEDING WITH CONSTRUCTION WITH DESIGN DISCREPANCIES IS DONE SO AT THE CONTRACTOR'S OWN RISK.
- PROPOSED TOP OF CURB ELEVATIONS ARE GENERALLY 6" ABOVE EXISTING LOCAL ASPHALT GRADE UNLESS OTHERWISE NOTED. FIELD ADJUST TO CREATE A MIN. OF 0.75% GUTTER GRADE ALONG CURB FACE. ENGINEER TO APPROVE FINAL CURBING CUT SHEETS PRIOR TO INSTALLATION.
- SUBBASE MATERIAL FOR SIDEWALKS, CURB, OR ASPHALT SHALL BE FREE OF ORGANICS AND OTHER UNSUITABLE MATERIALS. SHOULD SUBBASE BE DEEMED UNSUITABLE, SUBBASE IS TO BE REMOVED AND FILLED WITH APPROVED FILL MATERIAL COMPACTED TO 95% OPTIMUM DENSITY (AS DETERMINED BY MODIFIED PROCTOR METHOD).
- REFER TO SITE PLAN FOR ADDITIONAL NOTES.
- IN CASE OF DISCREPANCIES BETWEEN PLANS, THE SITE PLAN WILL SUPERCEDE IN ALL CASES. CONTRACTOR MUST NOTIFY ENGINEER OF RECORD OF ANY CONFLICT IMMEDIATELY.
- MAXIMUM CROSS SLOPE OF 2% ON ALL SIDEWALKS.
- CONTRACTOR TO ENSURE A MAXIMUM OF 2% SLOPE IN ALL DIRECTIONS IN ADA PARKING SPACES AND ADA ACCESSIBLE AREAS. CONTRACTOR TO ENSURE A MAXIMUM OF 5% RUNNING SLOPE AND 2% CROSS SLOPE ALONG ALL OTHER PORTIONS OF ACCESSIBLE ROUTE, WITH THE EXCEPTION OF RAMPS AND CURB RAMPS. CONTRACTOR SHALL CLARIFY ANY QUESTIONS CONCERNING CONSTRUCTION IN ADA AREAS WITH THE ENGINEER PRIOR TO THE START OF CONSTRUCTION.
- THE OWNER SHALL RETAIN DYNAMIC ENGINEERING, LLC (908-879-7095) OR ALTERNATE QUALIFIED GEOTECHNICAL ENGINEER TO TEST SOIL PERMEABILITY AND PROVIDE CONSTRUCTION PHASE INSPECTIONS OF THE BASIN BOTTOM SOILS AND ANY FILL MATERIALS WITHIN ANY PROPOSED INFILTRATION OR RETENTION BASIN TO COMPARE RESULTS TO DESIGN CRITERIA.
- CONTRACTOR IS TO REMOVE EXISTING UNSUITABLE OR OVERLY COMPACT SOIL OR ROCK AS NEEDED TO ACHIEVE REQUIRED PERMEABILITY AS DIRECTED BY THE OWNERS GEOTECHNICAL ENGINEER, AND NEW FILL, IF NEEDED, SHALL HAVE AN IN PLACE PERMEABILITY GREATER THAN OR EQUAL TO THE DESIGN CRITERIA.
- CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE OWNER'S GEOTECHNICAL ENGINEER PRIOR TO ONSET OF CONSTRUCTION TO SUBMIT AND CONFIRM THE CONTRACTOR'S PROPOSED MEANS AND MATERIALS AND TO SCHEDULE INSPECTIONS FOR BOTTOM OF BASIN, REMOVAL OF UNSUITABLE SOIL, FILL PLACEMENT, AND FINAL BASIN PERMEABILITY TESTING.
- THE CONTRACTOR IS RESPONSIBLE FOR AS-BUILT PLANS AND GRADE CONTROL UNLESS DEFINED OTHERWISE ELSEWHERE IN THE CONTRACT DOCUMENTS.

### ADA NOTES

ALL SLOPES INDICATED ARE ACTUAL. CONTRACTOR TO REFER TO LATEST ADA GUIDELINES AND NJ BARRIER FREE SUBCODE (NJAC 5:23-7) FOR SLOPE LIMITS. AT THE TIME OF PLAN DESIGN, THE SLOPE LIMITS ARE AS FOLLOWS:

#### SIDEWALKS / ACCESSIBLE ROUTES

- RUNNING SLOPE: 1:20 (5%) MAX. (4.5% MAX. FOR NEW CONSTRUCTION)
- CROSS SLOPE: 1:48 (2.08%) MAX. (1.5% MAX. FOR NEW CONSTRUCTION)
- INTERSECTION SLOPE: 1:48 (2.08%) MAX. IN ALL DIRECTIONS (1.5% MAX. FOR NEW CONSTRUCTION)
- CHANGE IN LEVELS: 1/4" MAX. HEIGHT OR 1/2" MAX. HEIGHT WITH BEVELLED EDGE BEVELLED EDGE SLOPE OF 1:2 (50%) MAX.
- GAPS: 1/2" MAX. WIDTH ELONGATED OPENINGS SHALL BE PLACED SO LONG DIMENSION IS PERPENDICULAR TO PATH OF TRAVEL.

#### CURB RAMP

- SLOPE: 1:12 (8.33%) MAX. (7.4% MAX. FOR NEW CONSTRUCTION)
- SIDE FLARE SLOPE: 1:10 (10%) MAX. (WHERE PEDES CROSS RAMP)
- BOTTOM LANDING: 48" MIN. LENGTH; WIDTH TO MATCH CURB RAMP; 1:48 MAX. (2.08%) IN ALL DIRECTIONS (1.5% MAX. FOR NEW CONSTRUCTION)
- TOP LANDING: 36" MIN. LENGTH; WIDTH TO MATCH CURB RAMP; 1:48 MAX. (2.08%) CROSS SLOPE (1.5% MAX. FOR NEW CONSTRUCTION) AND 1:20 (5%) RUNNING SLOPE (4.5% MAX. FOR NEW CONSTRUCTION)

#### ACCESSIBILITY PARKING STALLS

- SPACE AND ACCESS AISLE SLOPE: 1:48 MAX. (2.08%) IN ALL DIRECTIONS (1.5% MAX. FOR NEW CONSTRUCTION)

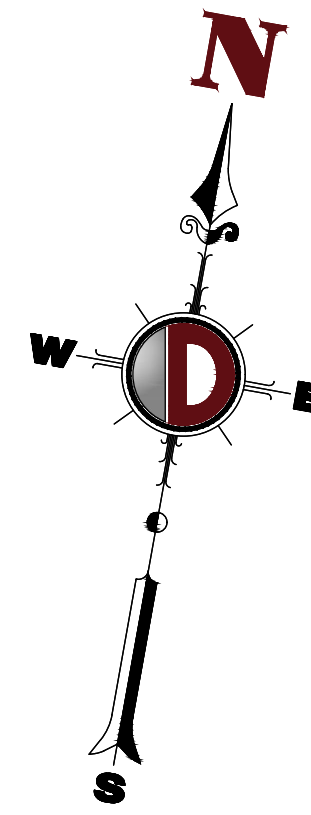
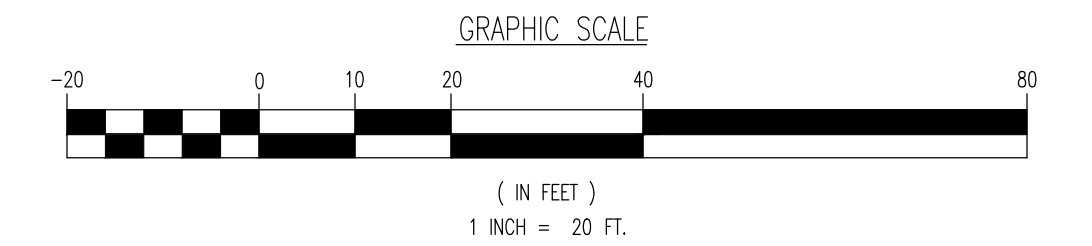
#### CROSSWALKS

- RUNNING SLOPE: 1:20 (5%) MAX. (4.5% MAX. FOR NEW CONSTRUCTION)
- CROSS SLOPE: 1:48 (2.08%) MAX. (1.5% MAX. FOR NEW CONSTRUCTION)
- CHANGE IN LEVELS: 1/4" MAX. HEIGHT OR 1/2" MAX. HEIGHT WITH BEVELLED EDGE BEVELLED EDGE SLOPE OF 1:2 (50%) MAX.
- GAPS: 1/2" MAX. WIDTH ELONGATED OPENINGS SHALL BE PLACED SO LONG DIMENSION IS PERPENDICULAR TO PATH OF TRAVEL.

#### RAMPS

- SLOPE: 1:12 (8.33%) MAX. (7.4% MAX. FOR NEW CONSTRUCTION)
- EXISTING RAMPS: SLOPE: 1:10 (10%) MAX. FOR RISE OF 6"; 1:8 (12.5%) MAX. FOR MAX. RISE OF 3"
- MAX. RISE: 36"
- MIN. CLEAR WIDTH: 36"
- MIN. LANDING CLEAR LENGTH: 60"
- MAX. CROSS SLOPE: 1:48 (2.08%) (1.5% MAX. FOR NEW CONSTRUCTION)

**ALL EXCAVATED MATERIAL TO BE REMOVED FROM SITE. NO MATERIAL IS TO BE STORED ON TOWNSHIP PROPERTY. ALL SOIL DISTURBANCE SHALL BE DONE AS SET FORTH BY SUBSECTION 351.**



**SOUTH AVENUE WEST**  
(A.K.A. N.J. COUNTY ROAD 610)  
(60' WIDE R.O.W. PER TAX MAP)  
(ASPHALT ROADWAY)  
(POSTED SPEED LIMIT 35 MPH)

**INLET AREA 1**

**INLET AREA ROOF**

**INLET AREA 2**

### GRADING/UTILITY GRAPHIC LEGEND

	PROPERTY LINE (PARCEL IN QUESTION)		UTILITY		SPOT ELEVATIONS
	OFF-SITE PROPERTY LINE		UGET		EXIST. GUTTER ELEV.
	EXIST. GUY WIRE		EXIST. CABLE LINE		EXIST. TOP OF CURB ELEV.
	EXIST. LIGHT POLE		PROP. CABLE LINE		EXIST. FINISH FLOOR ELEV.
	EXIST. BUILDING LIGHT		PROP. ELECTRIC LINE		EXIST. GARAGE FLOOR ELEV.
	EXIST. COBBLE LIGHT POLE		EXIST. FIBER OPTIC LINE		PROP. GRADE SPOT ELEV.
	EXIST. TRAFFIC SIGNAL POLE		PROP. FIBER OPTIC LINE		PROP. TOP OF CURB & FINISHED GRADE ELEV.
	EXIST. MANHOLE		EXIST. GAS LINE		PROP. FINISHED FLOOR ELEV.
	EXIST. 'A' INLET		EXIST. OVERHEAD WIRES		PROP. TOP OF WALL & FINISHED GRADE @ LOW SIDE OF WALL (ACTUAL BOTTOM OF WALL FOOTING TO BE ESTABLISHED BY WALL DESIGNER)
	EXIST. 'B' INLET		EXIST. TELEPHONE LINE		PROP. TOP OF EXTENDED CURB @ HIGH SIDE OF EXTENDED CURB & (G) FINISHED GRADE @ HIGH SIDE OF EXTENDED CURB
	EXIST. 'C' INLET		EXIST. WATER LINE		PROP. TOP OF EXTENDED CURB @ LOW SIDE OF EXTENDED CURB
	EXIST. YARD INLET		PROP. WATER VALVE		
	EXIST. FLARED END SECTION		PROP. GAS VALVE		
	EXIST. HEADWALL		PROP. STORM CLEANOUT		
	EXIST. UTILITY POLE		PROP. SANITARY CLEANOUT		
	EXIST. MONITORING WELL		PROP. AREA LIGHT		
	EXIST. APPROX. TEST PIT LOCATION		PROP. OUTLET CONTROL STRUCTURE		
	EXIST. FIRE HYDRANT		PROP. DRAINAGE MANHOLE		
	EXIST. WATER VALVE		PROP. SANITARY SEWER MANHOLE		
	EXIST. GAS VALVE		PROP. SANITARY SEWER INLET		
	EXIST. GAS METER		PROP. WELL		
	EXIST. ELECTRIC METER		PROP. WATER SHUT OFF VALVE		
	EXIST. CLEAN OUT		EXIST. TELEPHONE BOX		
	EXIST. WELL		EXIST. CABLE TV BOX		
	EXIST. WATER SHUT OFF VALVE		EXIST. HEADWALL		
	EXIST. TELEPHONE BOX		EXIST. FLARED END SECTION		
	EXIST. CABLE TV BOX		EXIST. UTILITY POLE		
	EXIST. HEADWALL				
	EXIST. UTILITY POLE				

## DYNAMIC ENGINEERING

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TITLE: **INLET AREA MAP EXHIBIT**

PROJECT: **NAKT REAL ESTATE HOLDINGS, LLC  
PROPOSED MEDICAL BUILDING**

DATE: **09/16/2022**

JOB No: 4087-99-001

SCALE: (H) 1"=20'  
(V)

DRAWN BY: DJB

DESIGNED BY: MPD

CHECKED BY: JEH

CHECKED BY: -

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**JAMES E. HENRY**      **JOHN A. PALUS**

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