



PALMER TOWNSHIP FLOOD MITIGATION STUDY

PALMER TOWNSHIP, NORTHAMPTON COUNTY, PA

CLAIRMONT AVE
STUDY AREA



MAP LEGEND:

- FEMA FLOOD HAZARD "ZONE A"

Mapping derived from data provided by PASDA, LVPC GIS, and Palmer Twp GIS.
 1' Contours based upon 2019 PAMAP LiDar Topography.

2/24/2023 PM:GW GIS:GW QA:RC R0048.0426

HRG 369 East Park Drive
 Harrisburg, PA 17111
 717.564.1121 [phone]
 717.564.1158 [fax]
 www.hrg-inc.com

C:\GIS PROJECTS - GAWPALMER\000 - Meadow Ave PowerPoint Maps.mxd

PALMER TOWNSHIP FLOOD MITIGATION STUDY



MITIGATION GOALS:

- Reduce Frequency and Severity of Flooding
- Protect Public Safety
- Reduce Property Damage

CAN WE ELIMINATE FLOODING?

- No... but we can better manage the flood waters to minimize damage
- Reduce Peak Flow of Stormwater
- Increase Capacity of Storm Sewers
- Direct Flood Water Away from Sensitive Areas

PALMER TOWNSHIP FLOOD MITIGATION STUDY



WHAT FLOODING IS BEING ADDRESSED?

- Municipal Drainage System from west of Meadow Ave to the Route 248 Culvert

WILL THIS SOLVE LOCALIZED FLOODING AND WET BASEMENTS?

- NO
- This work will not remediate localized ponding of water on private property
- This work will not have any significant impact on ground water levels

PALMER TOWNSHIP FLOOD MITIGATION STUDY



PROJECT STATUS:

- \$325,000 FEMA / PEMA Grant for a Flood Mitigation Study.
- Palmer Township hired HRG in November 2022 to complete the Study.
- A Public Meeting was held on February 28, 2023 to discuss the Study.
- Flow monitors were installed in the Storm Sewers to monitor flow from 3/1/23 thru 9/31/23
- Computer modeling of the Storm Sewer has been completed
- Draft Report was issued in December 2023.





DRAINAGE AREA

1,580 ACRES



MAP LEGEND:

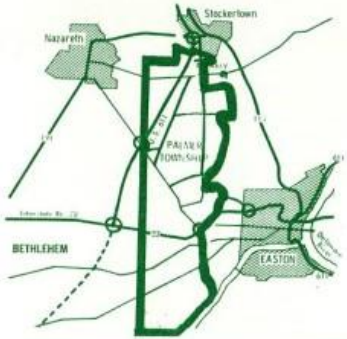
-  - FEMA FLOOD HAZARD "ZONE A"
-  - DRAINAGE AREA (1,580 acres)



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Newsletter



TOWNSHIP OF PALMER
MUNICIPAL BUILDING, 3245 FREEMANSBURG AVE., EASTON, PA. 18042

SUPERVISORS
H. ROBERT DAWS, Chairman
EDWARD C. VIVIAN, Vice-Chairman
HARRISON T. SALES
PAUL C. KOCHER
B. JACK ANDERSON, Secretary

Vol. 1, No. 1 SPRING - 1974 Editor-in-Chief - Milt Diaz

What's It For? What's It About? Why Is It?

Hello fellow Palmer residents. This is the first of a series of newsletters your Board of Supervisors hopes to bring to you during 1974. We hope they will be informative and interesting to you. Many times we wonder, what is in the wind in Palmer. You may ask what is a newsletter for? Well it is just what the name implies - news of what your government is doing in Palmer for Palmer.

One of the problems facing Township government is a lack of communication between the governing body and the Township residents. The purpose of this newsletter is to help fill this communications gap. You will be better informed if you will read it and it will be helpful if you let us know what you think is right or wrong with Township government.

What is it about? Well we hope it will be about long enough to give you the scoop on what is going on, where your money is being spent, and what it is accomplishing. It will give you an insight into the working of Township employees as well as the great efforts of our many volunteer groups. We hope we can keep it short enough so that it will be interesting and readable.

Why is it being done? Because we have tried to put out a township report every second year and our last book was two years ago. We hope to get across with several newsletters this year. All the information we hope you want without the expense of printing a large book as well as the time involved in composing one.

We hope you will enjoy reading the articles and we solicit your comments on them. Drop us a line anytime at the Municipal Building. Just address it to:

PALMER NEWSLETTER
MUNICIPAL BUILDING
3245 FREEMANSBURG AVE.
PALMER TOWNSHIP
P.O. EASTON, PA. 18042

STORM WATER

Two significant steps were taken last summer to correct serious storm water problems in the Township. The total cost of these projects will exceed a quarter of a million dollars, but the problems they alleviate have been a constant source of concern to your Board of Supervisors.

The Hell Avenue (Mine Lane) storm sewer project consisted of a complete underdrain system from Freemansburg Avenue north to Nicholas Street and included opening another street across the tracks of the Central Railroad at Division Street. This provides another access road between Freemansburg Avenue and W. Penn Highway between Greenwood and Stones Crossing.

Mine Lane and the area of Fairview Park have been a flood area and in times of heavy rain have been impassable due to water run-off. We are happy to report these are now "all weather" streets. We note also that the block between Freemansburg Avenue and Virginia Street was another side benefit of this project.

The other project is the recent completion of the Seip Avenue, Shrine Avenue, and Clayton Street storm sewer, and the placement of a new drain under Maplecroft Avenue. As you know, Seip Avenue has always had a water problem in periods of heavy rain, but the recent completion of Rt. 33 and the Rt. 22-Rt. 33 interchange, the increase in surface water has reached the point of becoming a threat to life and property.

The Township is in the process of filing suit against the Commonwealth of Pennsylvania for their action in creating a dangerous situation in Palmer. The situation, however, was so dangerous that your Board of Supervisors decided to proceed to correct the problem immediately. They have borrowed \$250,000 at a low interest rate in order to finance immediate remedies.

The residents of Seip Avenue, Shrine Avenue, and Clayton Street had a long dusty and disruptive summer. They are to be commended for their patience and perseverance throughout the whole project. We know they have a much better neighborhood now that the project is completed. We thank them for their fine cooperation.

this project

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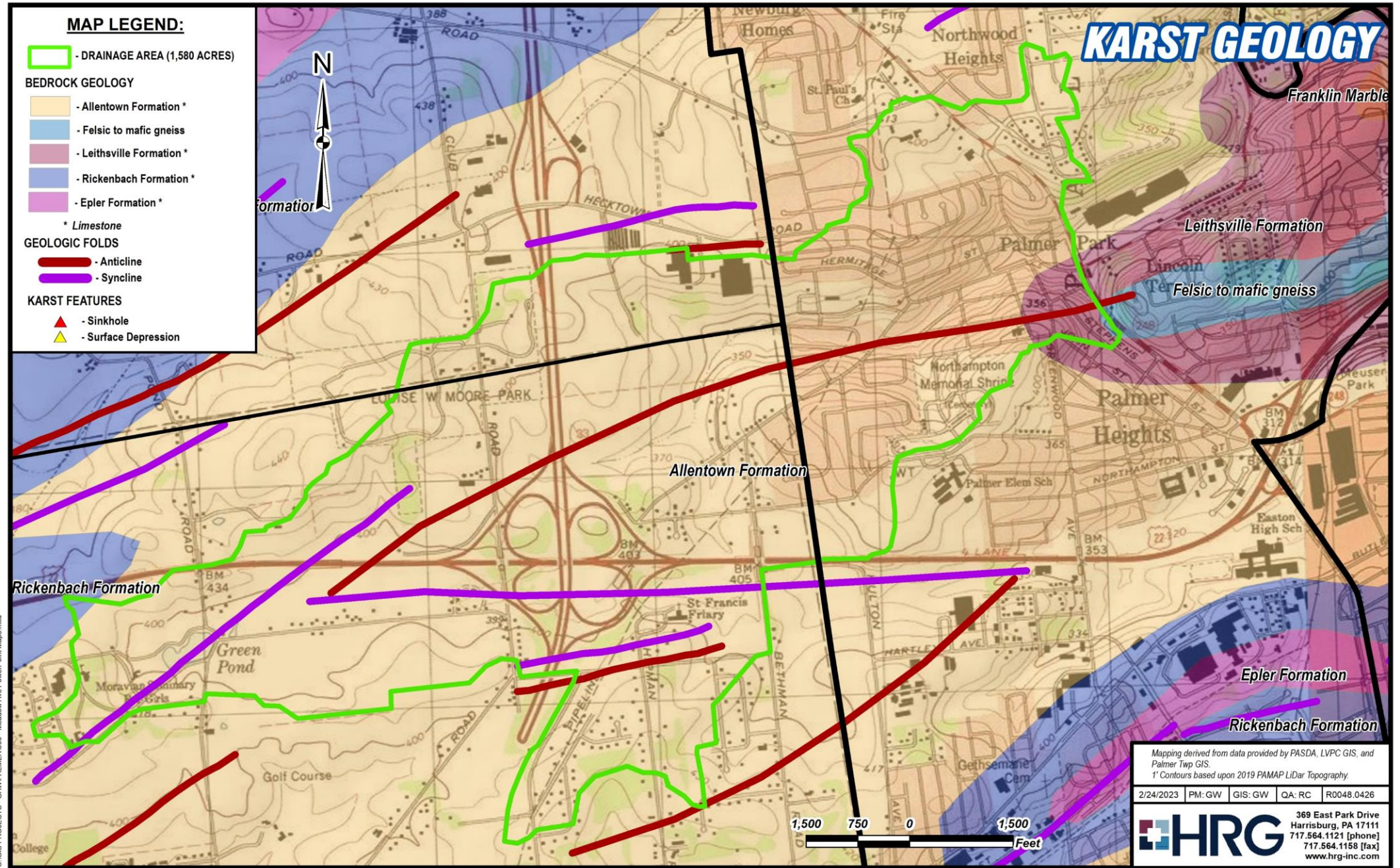
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KARST GEOLOGY

MAP LEGEND:

- DRAINAGE AREA (1,580 ACRES)
- BEDROCK GEOLOGY**
- Allentown Formation *
- Felsic to mafic gneiss
- Leithsville Formation *
- Rickenbach Formation *
- Epler Formation *
- * Limestone
- GEOLOGIC FOLDS**
- Anticline
- Syncline
- KARST FEATURES**
- Sinkhole
- Surface Depression



Mapping derived from data provided by PASDA, LVPC GIS, and Palmer Twp GIS.
 1' Contours based upon 2019 PAMAP LiDar Topography.

2/24/2023	PM:GW	GIS:GW	QA:RC	R0048.0426
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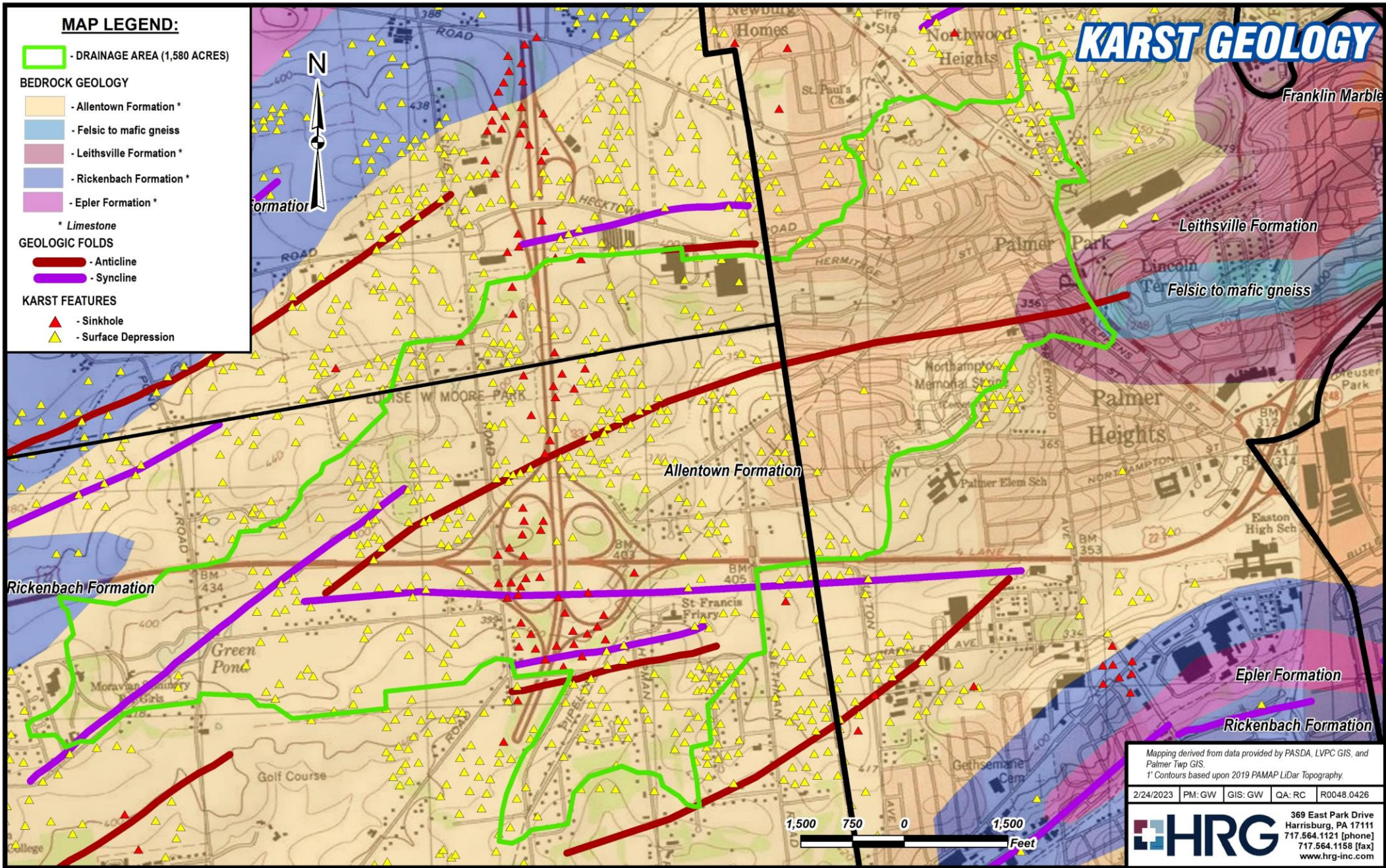
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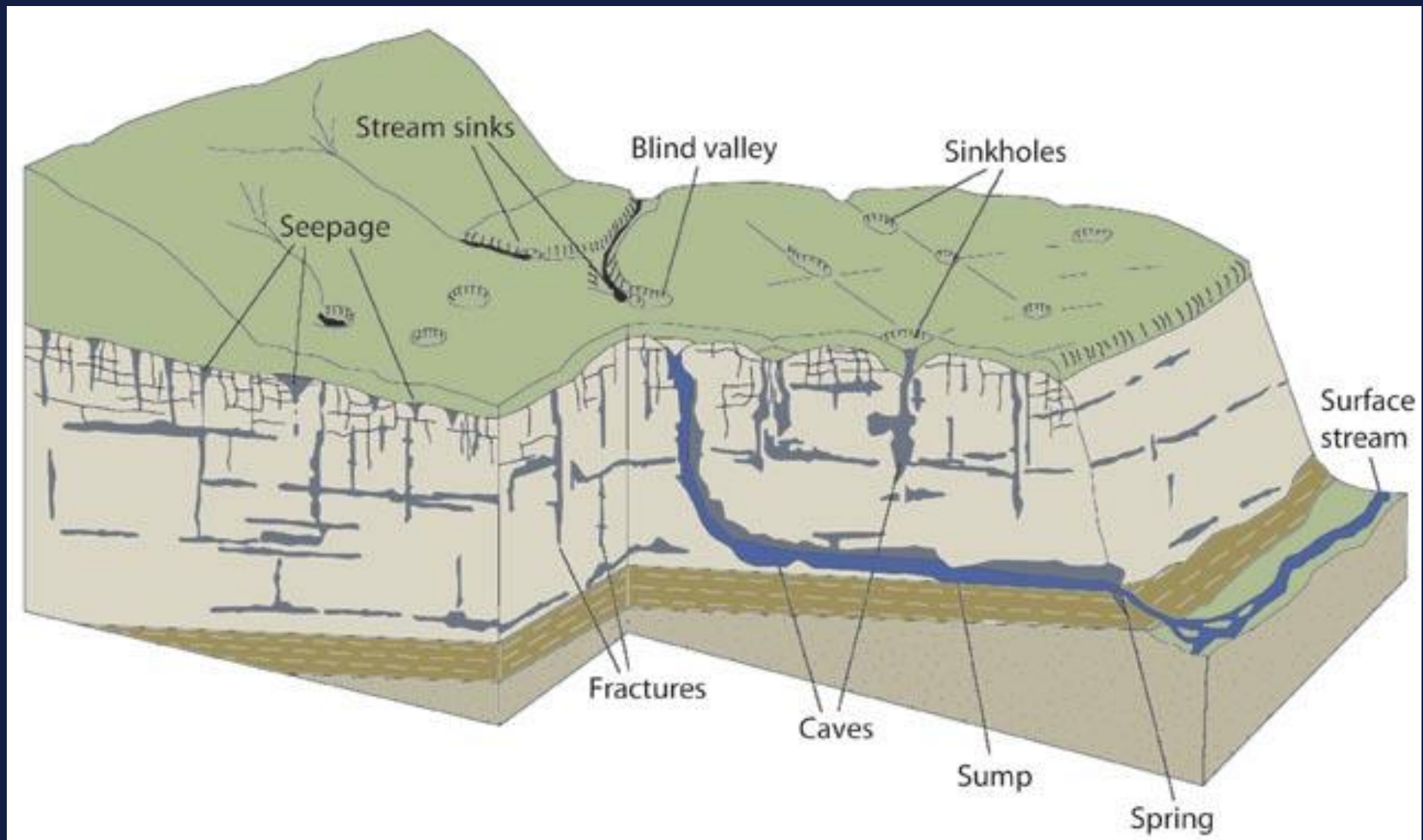


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STORMWATER INFILTRATION IN KARST GEOLOGY

Large volumes of runoff are absorbed by the voids within the bedrock

TOPOGRAPHY



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STORM SEWER SYSTEM



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2/27/2023	PM:GW	GIS:GW	QA:RC	R0048.0426
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STORM SEWER CAPACITY



195 CUBIC FEET PER SECOND

15 CUBIC FEET PER SECOND

159 CUBIC FEET PER SECOND

109 CUBIC FEET PER SECOND

MAP LEGEND:

PIPE CAPACITY (cfs)

- 0 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- 200 - 250
- 250 - 300
- > 300



- Mapping derived from data provided by PASDA, LVPC GIS, and Field Reconnaissance
 - 2021 PEMA Aerial Image

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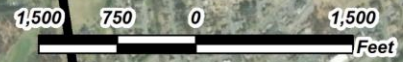
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DRAINAGE SUB-BASINS

1,180 ACRES



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NOAA Atlas 14, Volume 2, Version 3
 Location name: Lower Nazareth Twp,
 Pennsylvania, USA*
 Latitude: 40.692°, Longitude: -75.278°
 Elevation: 337 ft**

* source: ESRI Maps
 ** source: USGS



2020-08-04 FLOODING
8 HR - 8" (500)

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

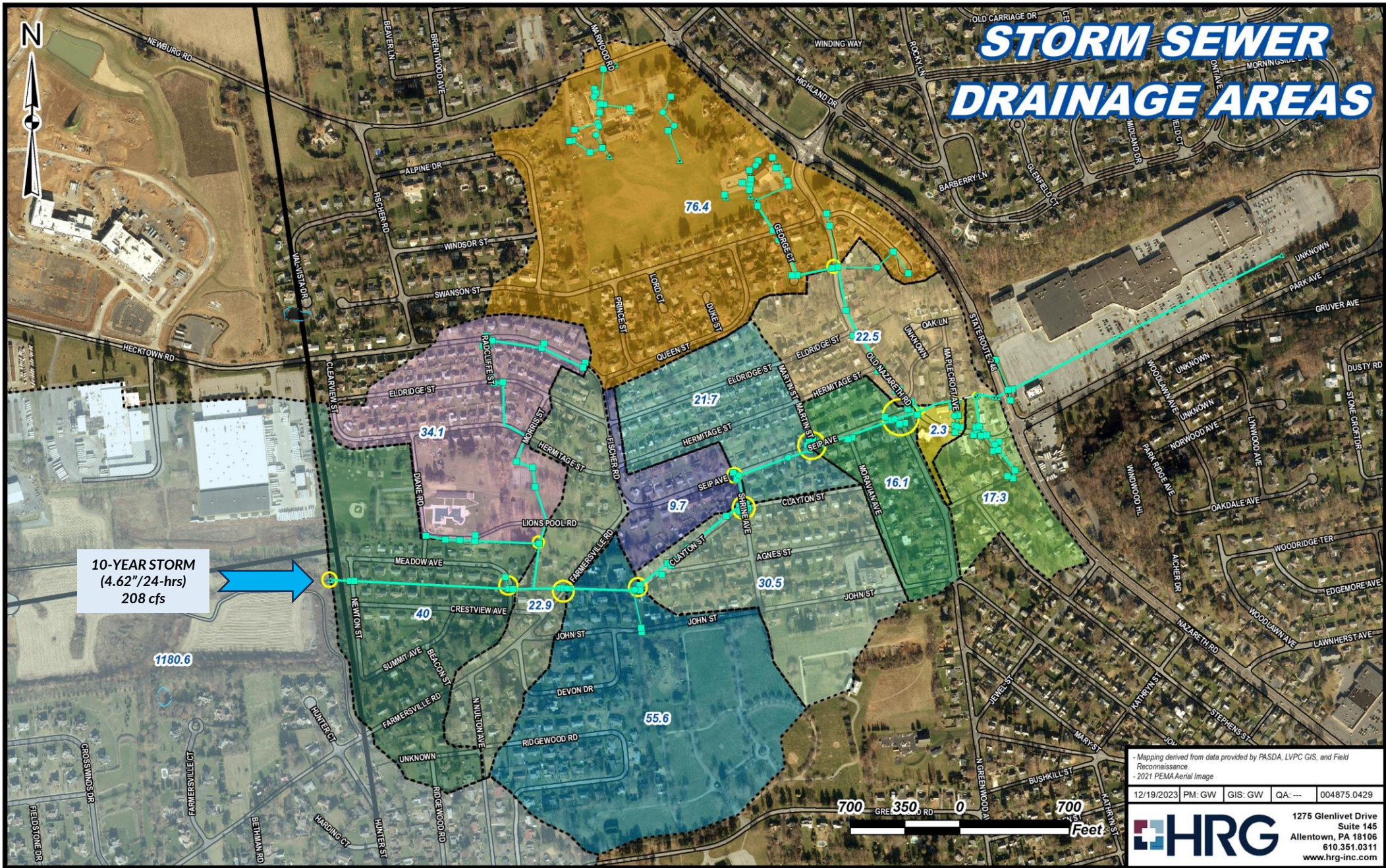
[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

2023-07-16 FLASH FLOOD
1 HR - 2.75" (50)
2 HRS - 3.44" (50)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.318 (0.285-0.354)	0.379 (0.340-0.423)	0.449 (0.402-0.499)	0.501 (0.448-0.557)	0.569 (0.505-0.631)	0.621 (0.547-0.689)	0.675 (0.592-0.750)	0.731 (0.634-0.814)	0.807 (0.691-0.902)	0.871 (0.737-0.978)
10-min	0.507 (0.455-0.565)	0.606 (0.544-0.675)	0.717 (0.642-0.797)	0.801 (0.716-0.889)	0.905 (0.804-1.00)	0.987 (0.870-1.10)	1.07 (0.939-1.19)	1.16 (1.00-1.29)	1.28 (1.09-1.42)	1.37 (1.16-1.54)
15-min	0.634 (0.568-0.706)	0.761 (0.683-0.849)	0.907 (0.812-1.01)	1.01 (0.905-1.12)	1.15 (1.02-1.27)	1.25 (1.10-1.39)	1.35 (1.19-1.50)	1.46 (1.26-1.62)	1.60 (1.37-1.79)	1.72 (1.45-1.93)
30-min	0.868 (0.778-0.966)	1.05 (0.942-1.17)	1.29 (1.15-1.43)	1.46 (1.31-1.63)	1.70 (1.51-1.88)	1.88 (1.66-2.08)	2.07 (1.82-2.30)	2.27 (1.97-2.53)	2.55 (2.18-2.85)	2.78 (2.35-3.12)
60-min	1.08 (0.970-1.20)	1.32 (1.18-1.47)	1.65 (1.48-1.83)	1.91 (1.70-2.12)	2.26 (2.00-2.50)	2.54 (2.24-2.82)	2.85 (2.50-3.16)	3.18 (2.76-3.54)	3.65 (3.13-4.08)	4.05 (3.43-4.55)
2-hr	1.30 (1.17-1.45)	1.58 (1.42-1.76)	1.98 (1.78-2.21)	2.31 (2.06-2.56)	2.77 (2.46-3.07)	3.16 (2.80-3.51)	3.60 (3.15-3.98)	4.07 (3.54-4.52)	4.78 (4.09-5.34)	5.40 (4.56-6.06)
3-hr	1.44 (1.30-1.60)	1.74 (1.57-1.94)	2.17 (1.95-2.42)	2.52 (2.26-2.79)	3.02 (2.68-3.34)	3.44 (3.04-3.80)	3.90 (3.42-4.32)	4.40 (3.82-4.88)	5.16 (4.42-5.75)	5.81 (4.91-6.51)
6-hr	1.83 (1.66-2.04)	2.20 (1.99-2.45)	2.72 (2.46-3.02)	3.16 (2.85-3.50)	3.80 (3.39-4.20)	4.36 (3.86-4.81)	4.97 (4.36-5.50)	5.67 (4.91-6.27)	6.72 (5.72-7.46)	7.64 (6.41-8.50)
12-hr	2.25 (2.04-2.51)	2.71 (2.46-3.02)	3.38 (3.05-3.75)	3.94 (3.54-4.37)	4.79 (4.27-5.30)	5.54 (4.88-6.11)	6.38 (5.57-7.04)	7.34 (6.33-8.10)	8.81 (7.44-9.75)	10.1 (8.39-11.2)
24-hr	2.64 (2.44-2.85)	3.17 (2.94-3.43)	3.96 (3.67-4.28)	4.62 (4.27-4.98)	5.60 (5.15-6.02)	6.43 (5.88-6.91)	7.34 (6.66-7.88)	8.35 (7.51-8.94)	9.84 (8.74-10.5)	11.1 (9.75-11.9)

STORM SEWER DRAINAGE AREAS



10-YEAR STORM
(4.62"/24-hrs)
208 cfs

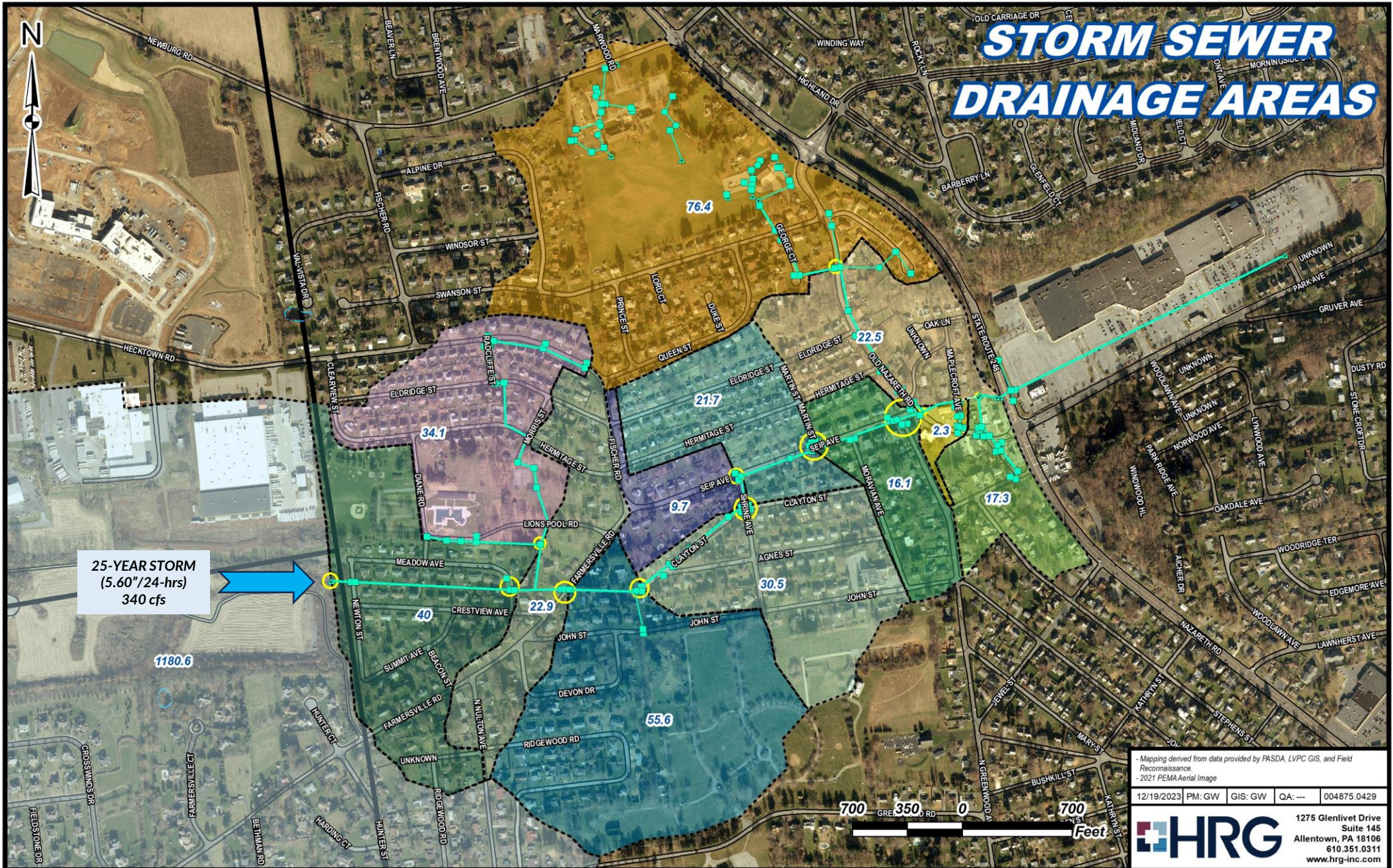
- Mapping derived from data provided by PASDA, LVPC GIS, and Field Reconnaissance
- 2021 PEMA Aerial Image

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STORM SEWER DRAINAGE AREAS



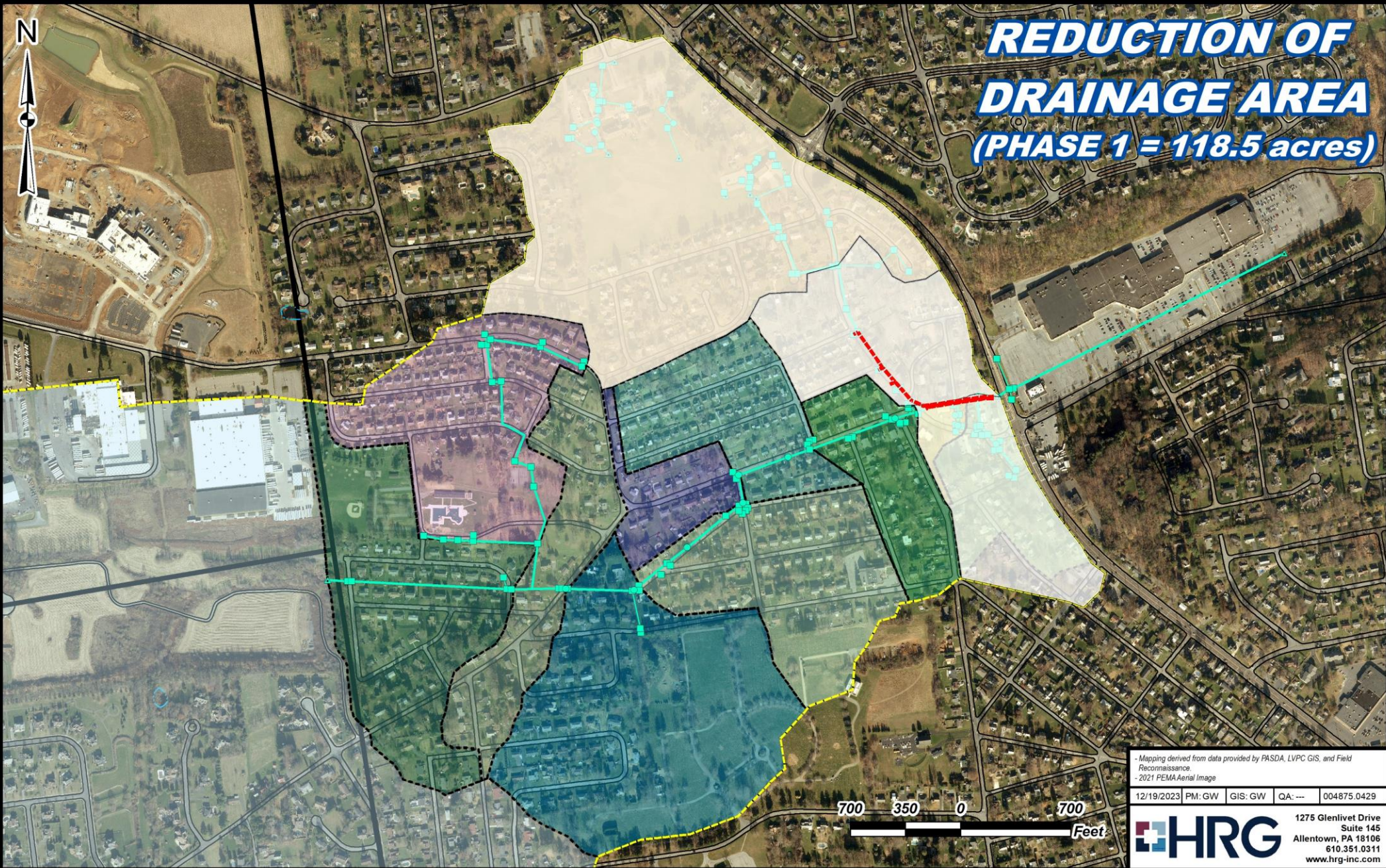
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REDUCTION OF DRAINAGE AREA (PHASE 1 = 118.5 acres)



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700 350 0 700
Feet

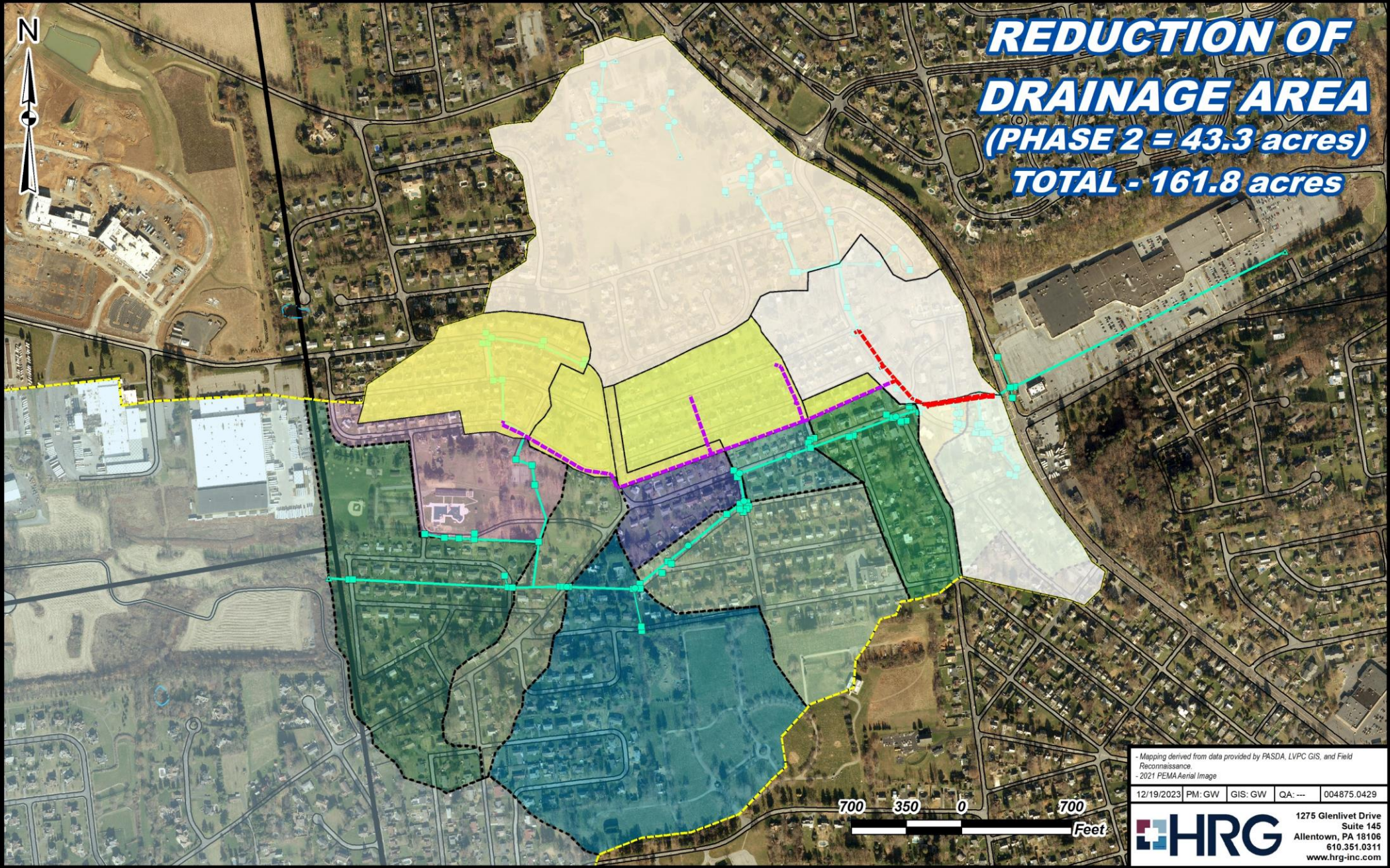


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**REDUCTION OF
DRAINAGE AREA
(PHASE 2 = 43.3 acres)
TOTAL - 161.8 acres**

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REGIONAL STORMWATER BASIN



5 ACRE REGIONAL
STORMWATER BASIN



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OLD NAZARETH ROAD DRAINAGE



MAP LEGEND:

EXISTING STORM SEWER SYSTEM

-  - Stormwater Pipe
-  - Drainage Swale
-  - Manhole
-  - Stormwater Inlet
-  - Headwall
-  - Flood Hazard Area

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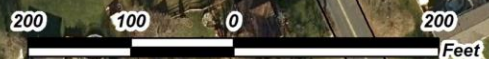
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OLD NAZARETH ROAD DRAINAGE PHASE 1 IMPROVEMENTS



MAP LEGEND:

- EXISTING STORM SEWER SYSTEM**
- Stormwater Pipe
 - Drainage Swale
 - Manhole
 - Stormwater Inlet
 - Headwall
 - Flood Hazard Area



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MAP LEGEND:

STORM SEWER SYSTEM

-  - Existing Stormwater Pipe
-  - Phase 1 Improvements
-  - Phase 2 Improvements
-  - Manhole
-  - Stormwater Inlet
-  - Headwall

PHASE 2 DRAINAGE IMPROVEMENTS



TIE INTO EXISTING FISCHER ROAD SYSTEM

EX. PAPER ALLEY

DRAINAGE EASEMENT REQUIRED

EXISTING PAPER STREET

REDUCE FLOW INTO TRUNKLINE



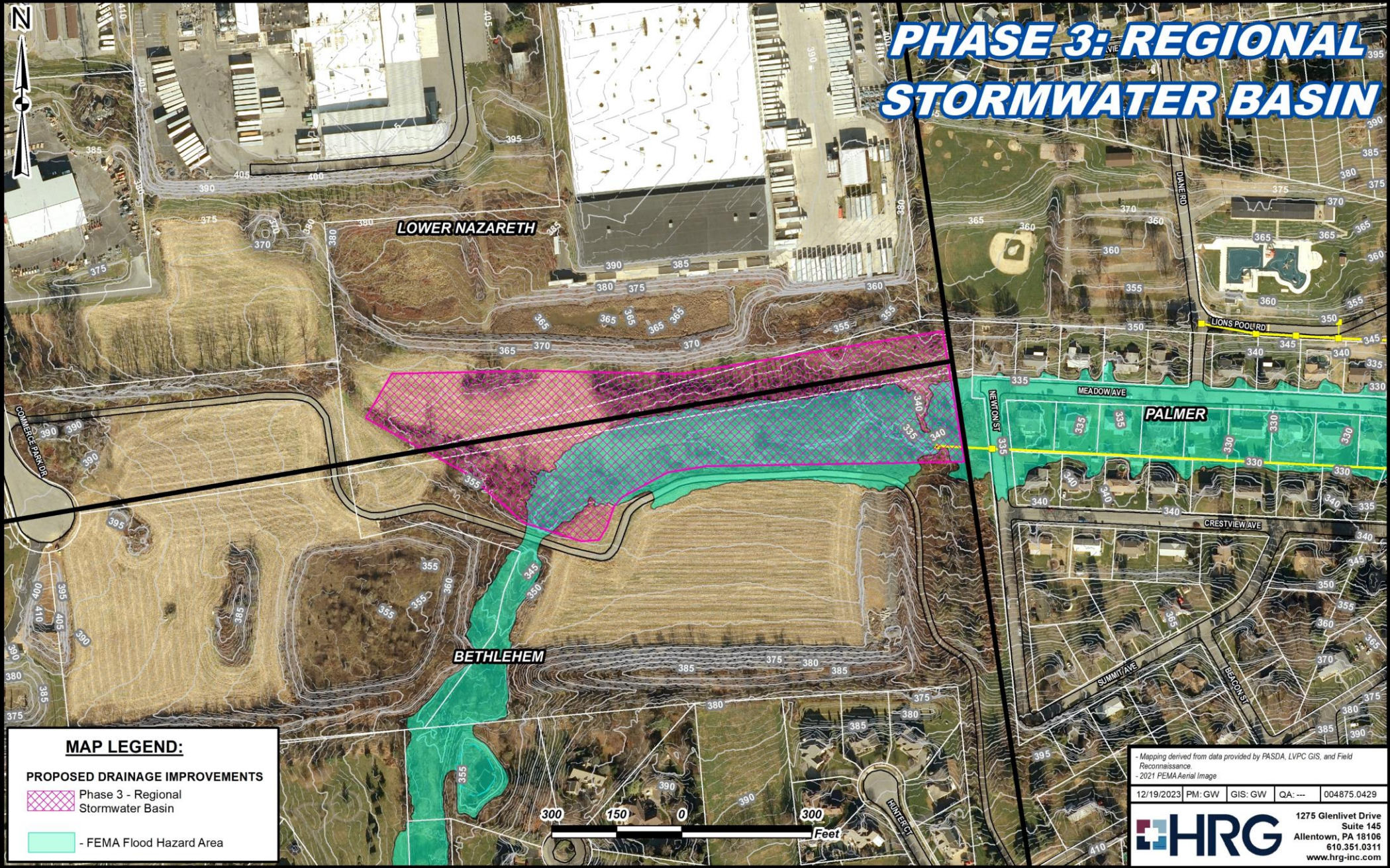
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PHASE 3: REGIONAL STORMWATER BASIN



MAP LEGEND:

PROPOSED DRAINAGE IMPROVEMENTS

-  Phase 3 - Regional Stormwater Basin
-  - FEMA Flood Hazard Area

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Current 10-Year Storm Conditions (4.62" / 24-hrs)

Estimated Flooding at Meadow Ave
25" Depth / 112 cfs

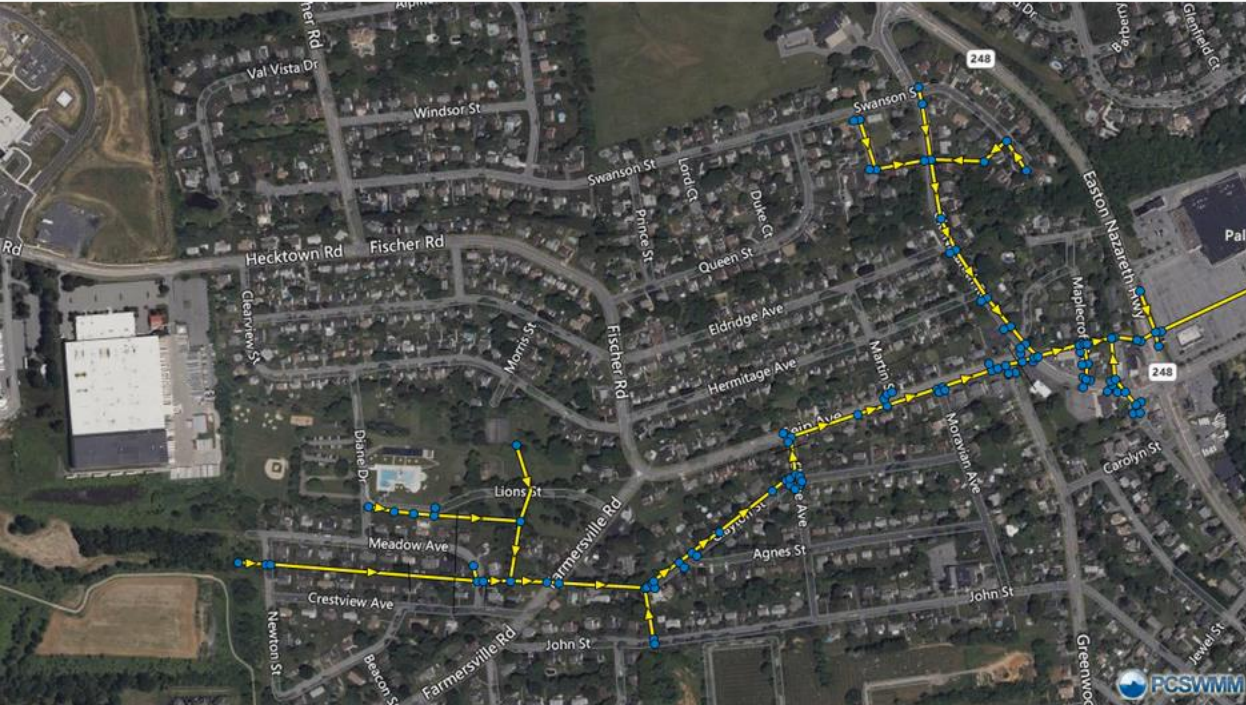


Proposed 10-Year Storm Conditions (4.62" / 24-hrs)

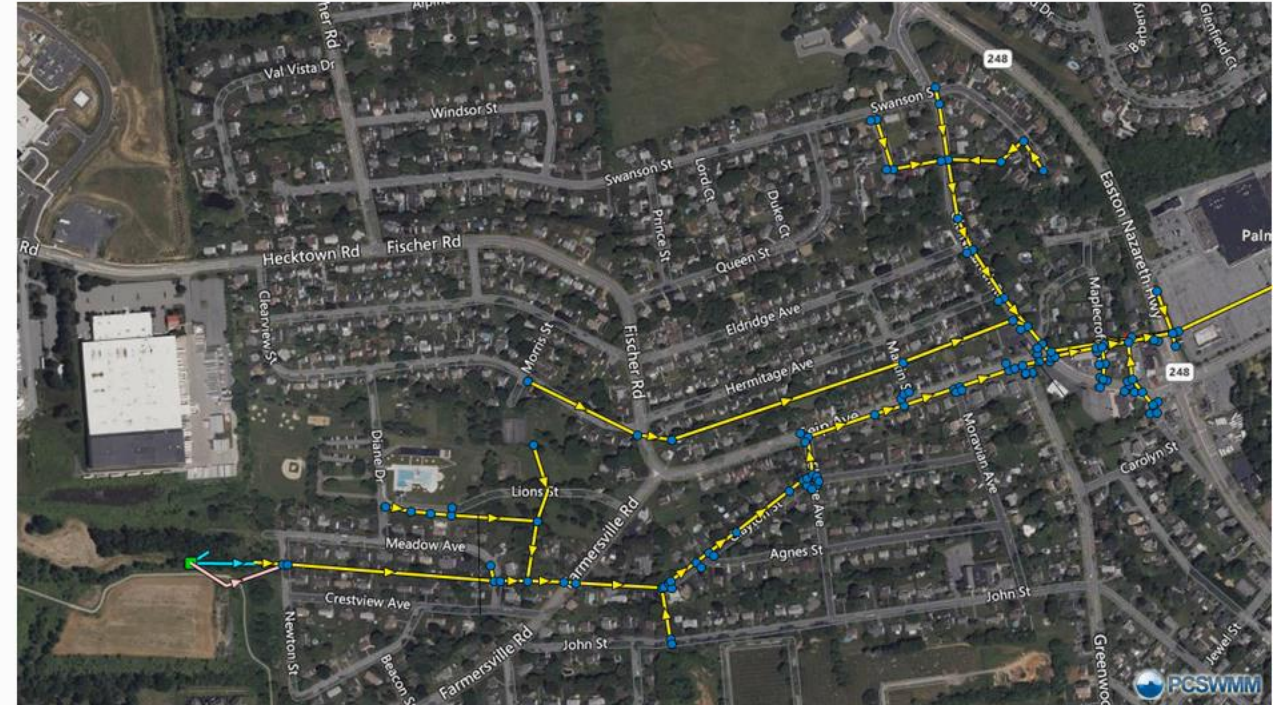
Estimated Flooding at Meadow Ave
NONE



10-Year Storm 4.62" / 24-hrs



2D Model Base EX,
10-Year Present



2D Model Base PR,
10-Year Present

Current 25-Year Storm Conditions (5.60" / 24-hrs)

Estimated Flooding at Meadow Ave
34" Depth / 250 cfs

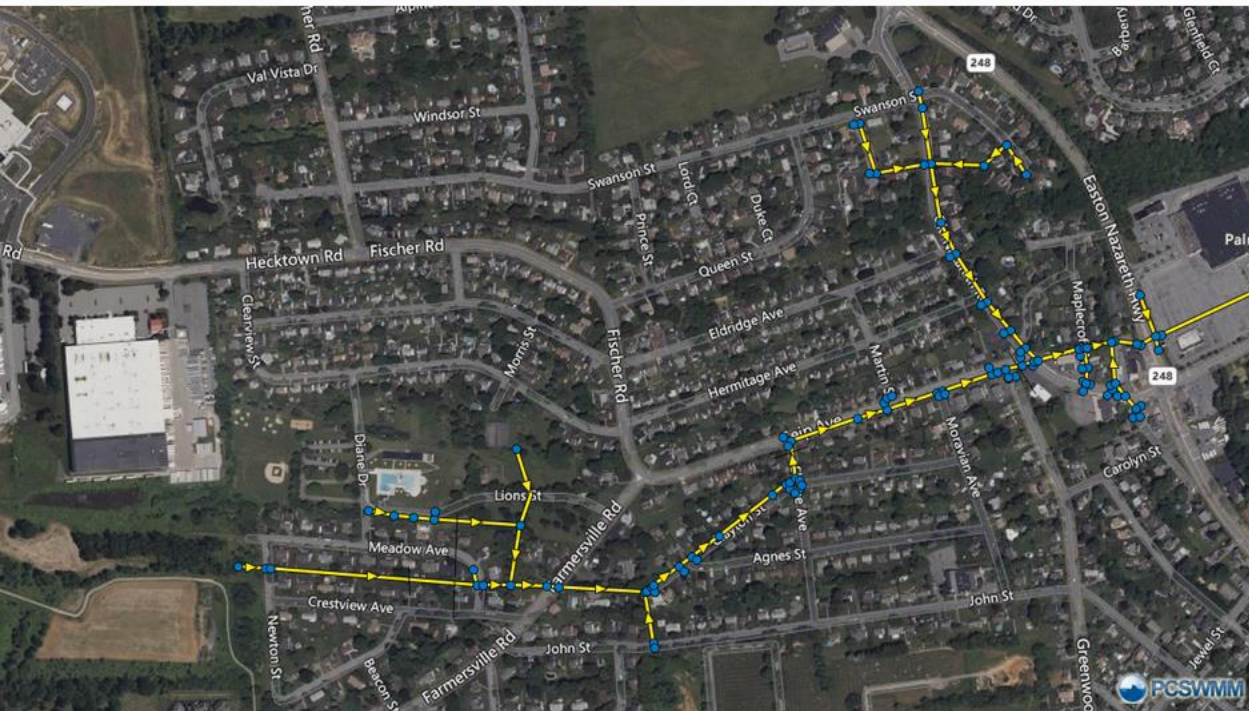


Proposed 25-Year Storm Conditions (5.60" / 24-hrs)

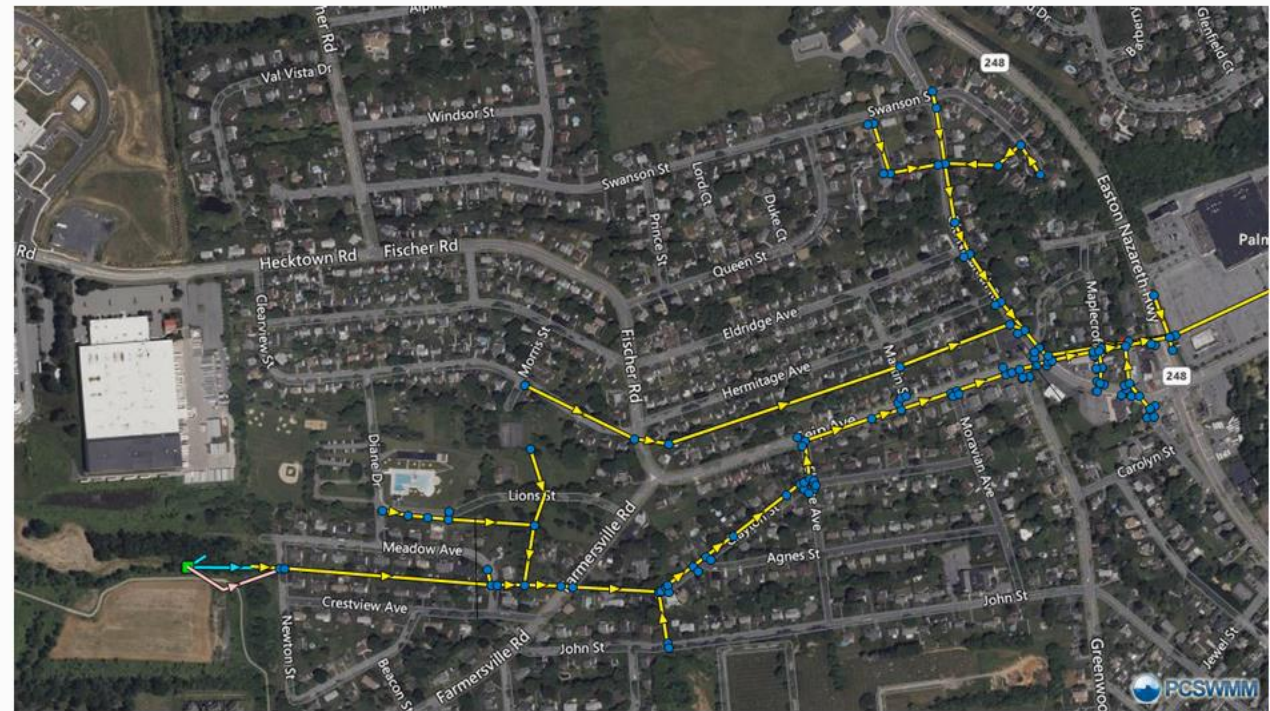
Estimated Flooding at Meadow Ave
20" Depth / 45 cfs



25-Year Storm 5.60" / 24-hrs

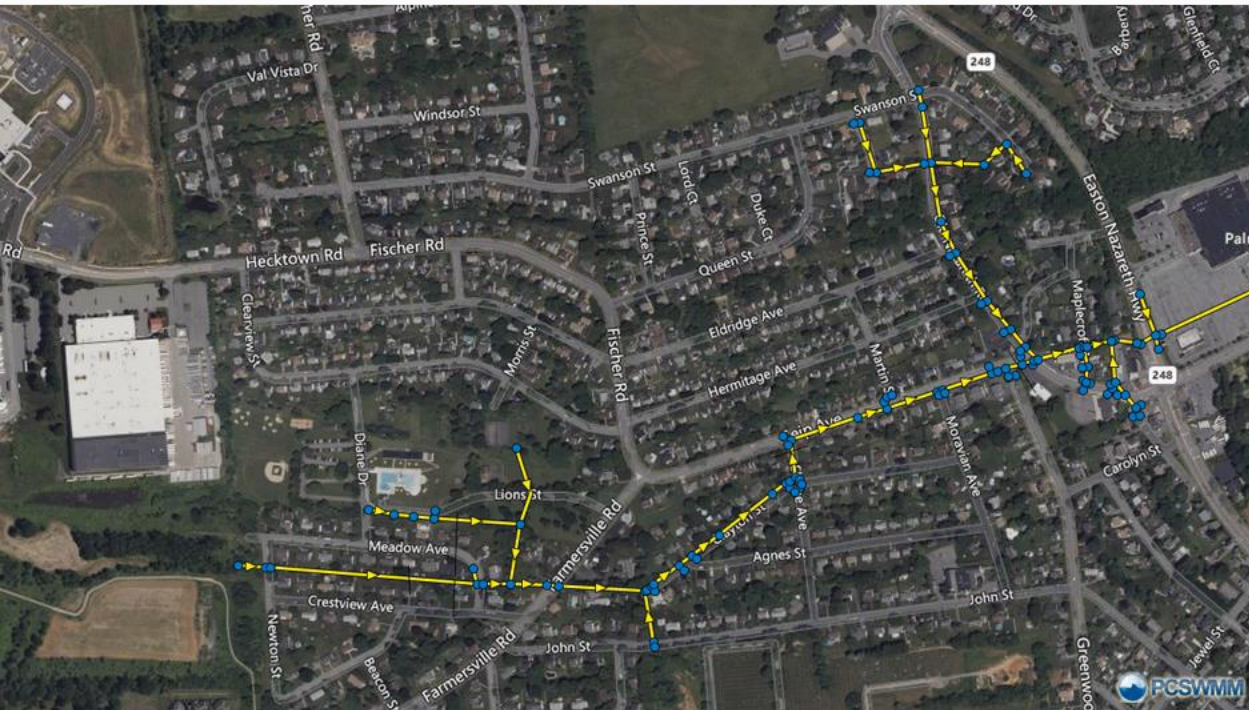


Existing 25-Year Storm

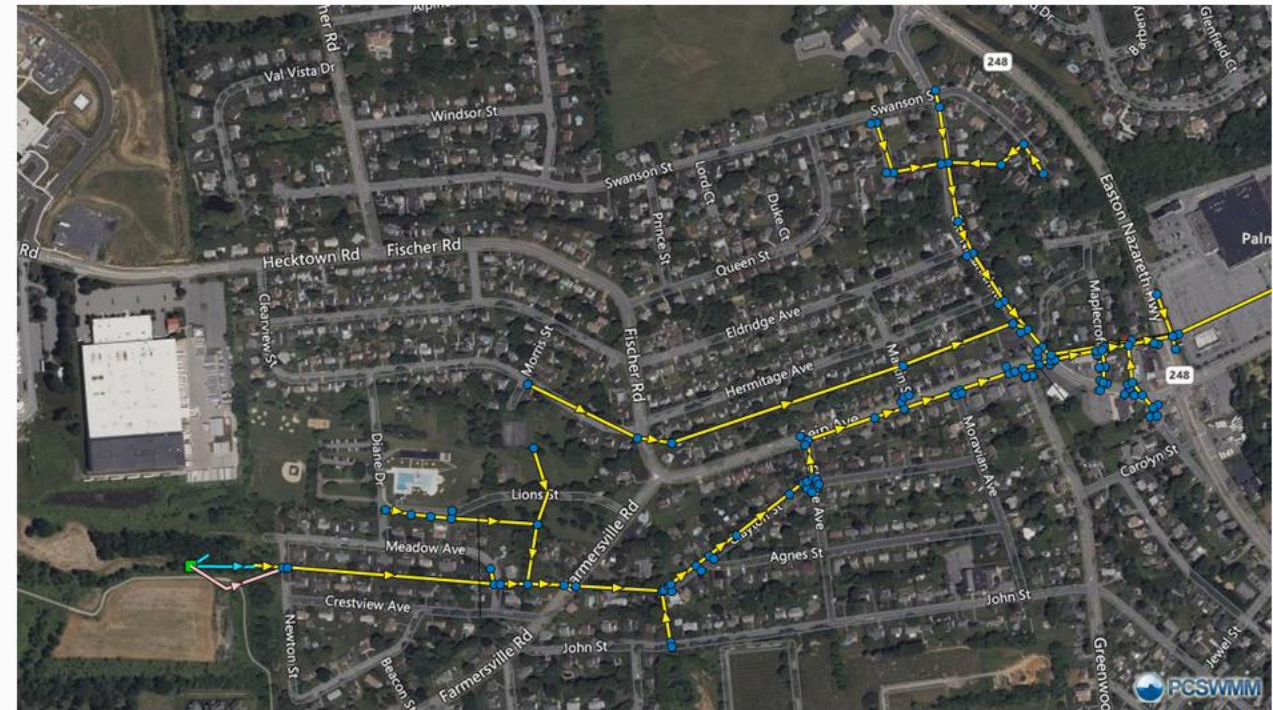


Proposed 25-Year Storm

100-Year Storm 7.34" / 24-hrs



Existing 100-Year Storm



Proposed 100-Year Storm

PALMER TOWNSHIP FLOOD MITIGATION STUDY



ANTICIPATED PROJECT COSTS:

- PHASE 1: Old Nazareth Road Improvements
– \$2,300,000
- PHASE 2: Eldridge and Hermitage Streets Drainage System
– \$1,600,000
- PHASE 3: Regional Stormwater Basin
– \$3,100,000
TOTAL = \$7,000,000



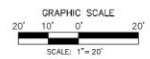
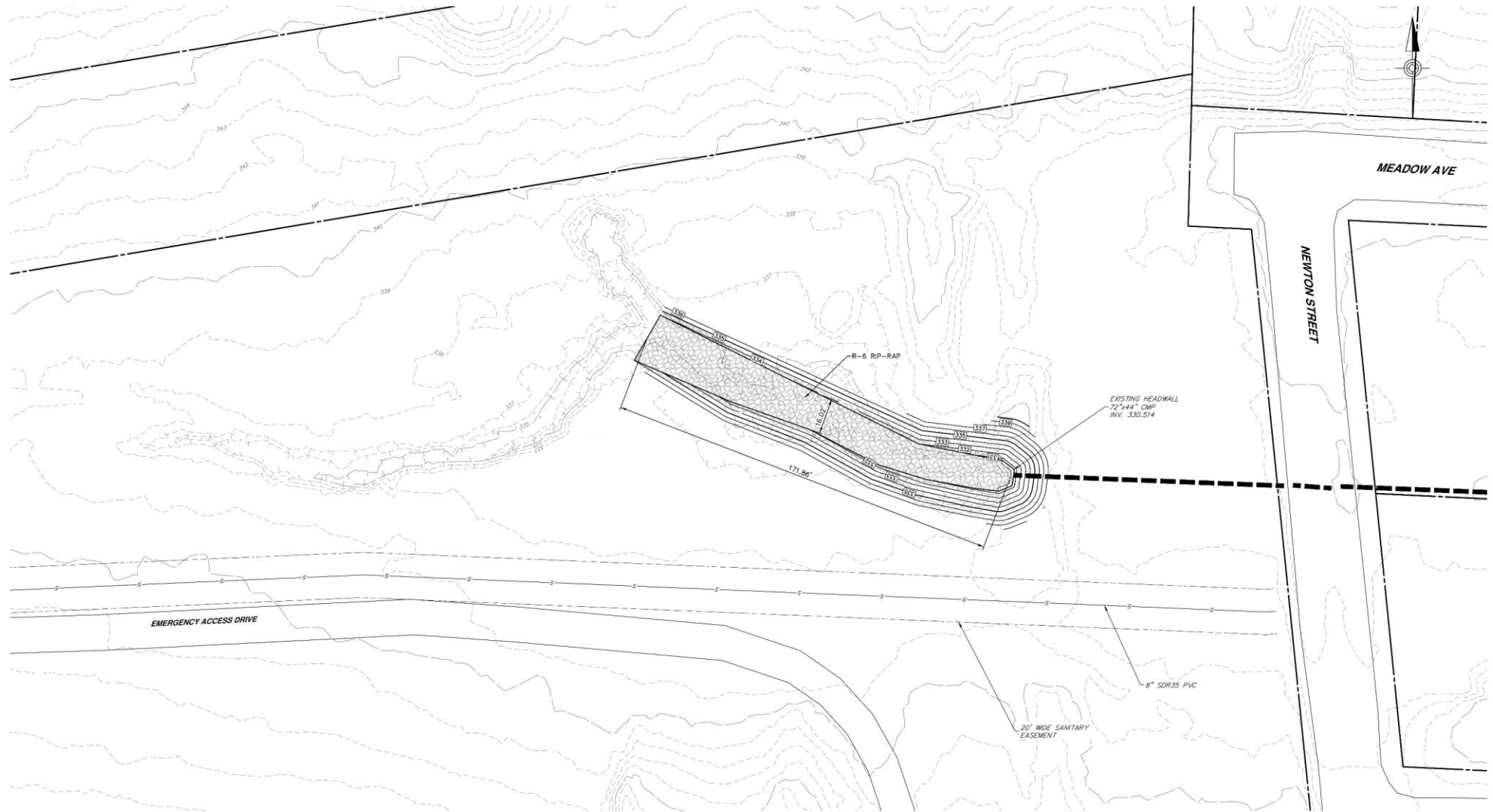
**EXISTING HEADWALL FOR 72" X 44" DRAINAGE
PIPE ABOVE MEADOW AVENUE**

**VIEW OF DRAINAGE SWALE UPHILL FROM THE
MEADOW AVENUE HEADWALL**

MEADOW AVENUE HEADWALL

COLLECTING RUNOFF FROM 1,180 ACRE DRAINAGE AREA.





DRAFT

SCALE: 1" = 20'
 JOB#: 4875.0429
 DATE: AUGUST 16, 2023

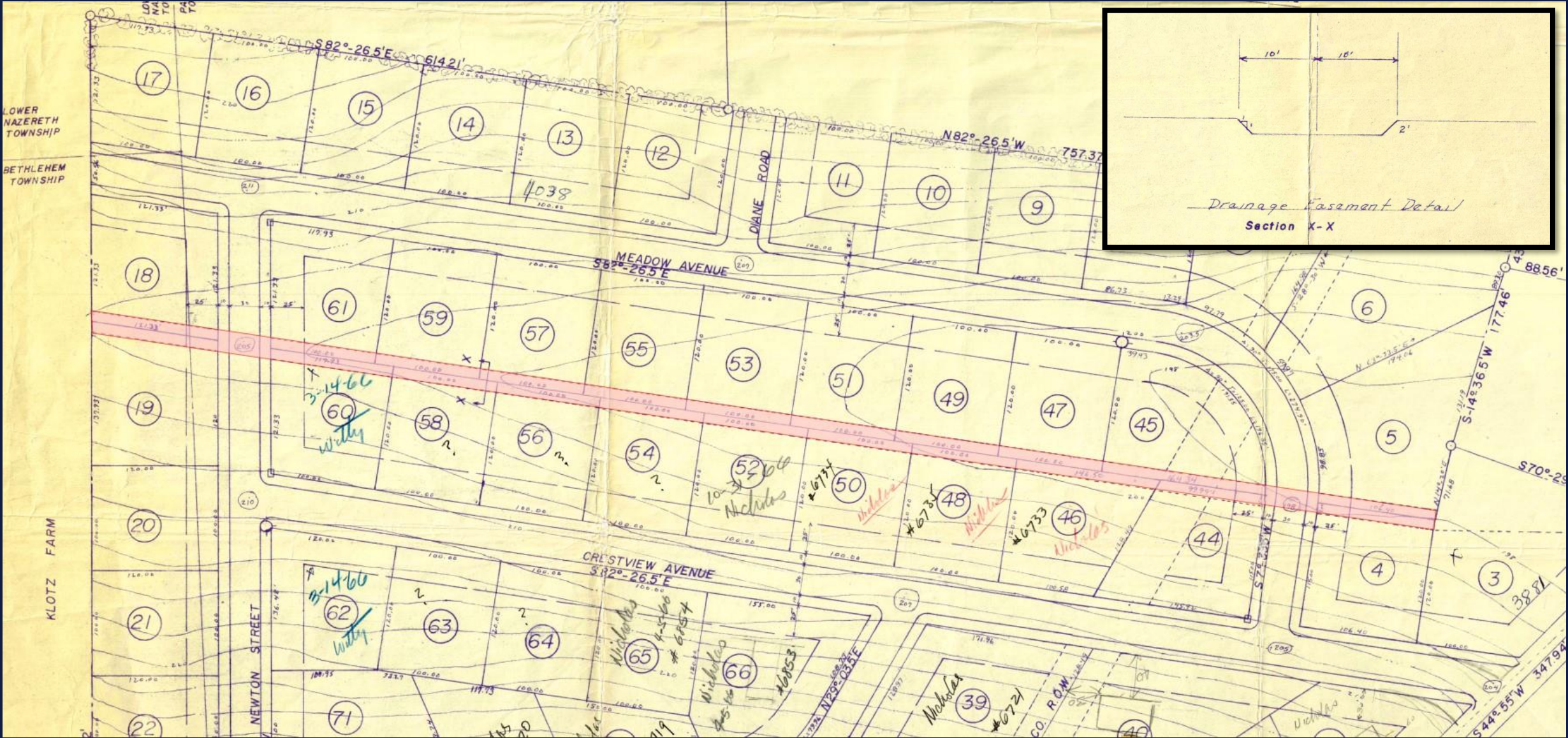
CONCEPT SKETCH
PROPOSED DRAINAGE SWALE MAINTENANCE

PALMER TOWNSHIP, NORTHAMPTON COUNTY, PENNSYLVANIA

HRG
 Herbert, Rowland & Grubic, Inc.
 Engineering & Related Services
 AN EMPLOYEE-OWNED COMPANY

369 East Park Drive
 Harrisburg, PA 17111
 (717) 564-1121
 Fax (717) 564-1158
 hrghrg-inc.com
 www.hrg-inc.com

File Name: C:\Users\jgarcia\OneDrive\Desktop\4875.0429\4875.0429-01-Proposed Swale Maintenance.dwg, User: jgarcia, Date: 8/16/2023, Time: 10:58:30 AM



1964 CRESTVIEW SUBDIVISION PLAN

Showing 20' Drainage Swale along Rear Property Lines





CRESTVIEW DRAINAGE EASEMENT



- Mapping derived from data provided by PASDA, LVPC GIS, and Field Reconnaissance
- 2021 PEMA Aerial Image

12/19/2023 PM:GW GIS:GW QA:--- 004875.0429



1275 Glenlivet Drive
Suite 145
Allentown, PA 18106
610.351.0311
www.hrg-inc.com





EASTERN END OF MEADOW AVE



WESTERN END OF MEADOW AVE.

CRESTVIEW DRAINAGE EASEMENT
20' WIDE BASED UPON 1964 SUBDIVISION PLANS



CLAYTON AVENUE DRAINAGE IMPROVEMENT



LIONS POOL RD
FARMERSVILLE RD

223
CLAYTON ST

AGNES ST

189

109

527

408

REPLACE EXISTING PIPES TO INCREASE CAPACITY TO 260 cfs

MAP LEGEND:

PIPE CAPACITY (cfs)

- 0 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- 200 - 250
- 250 - 300
- > 300



- Mapping derived from data provided by PASDA, LVPC GIS, and Field Reconnaissance
- 2021 PEMA Aerial Image

12/19/2023 PM:GW GIS:GW QA:--- 004875.0429

HRG 1275 Glenlivet Drive Suite 145 Allentown, PA 18106 610.351.0311 www.hrg-inc.com

C:\GIS\PROJECTS - GAWPALMER\001 - PRESENTATION MAPS\MISC IMPROVEMENTS.mxd

PALMER TOWNSHIP FLOOD MITIGATION STUDY



NEXT STEPS:

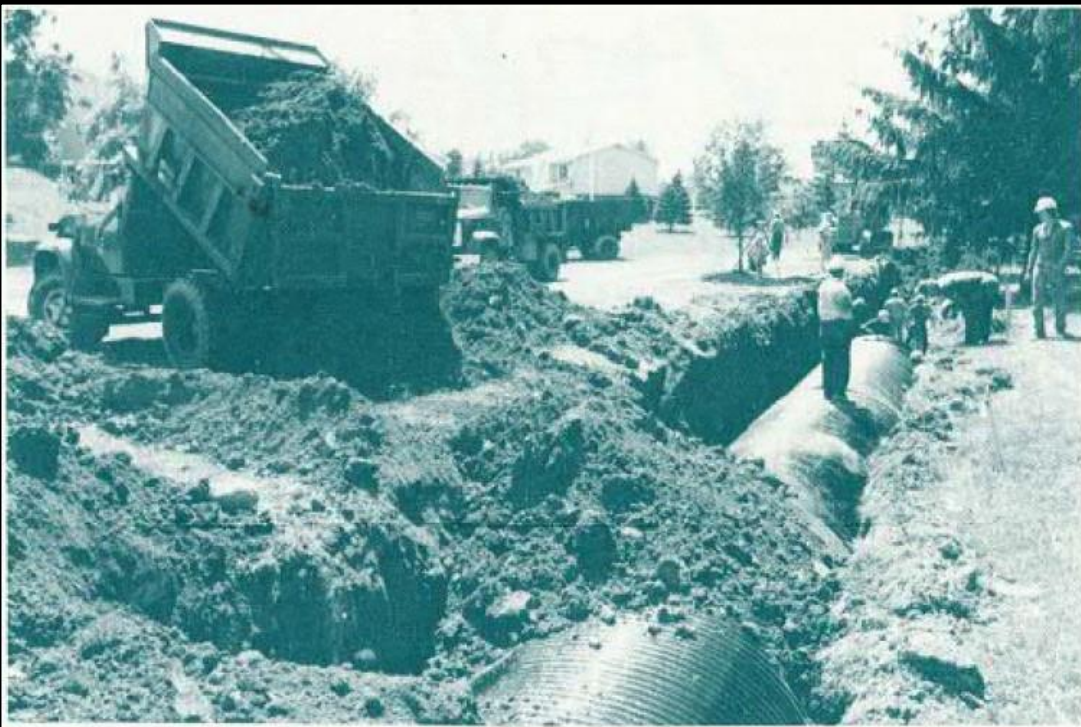
- FEMA BRIC Grant application has been submitted for funding of the Regional Stormwater Basin **(\$3.2 Million)**
- Landowner negotiations for Basin and Drainage Easements
- Final Design and Permitting for all three projects
- **May 2024** - PENNVEST Loan application for **Phase 1**
- **Summer / Fall 2024** – Meadow Ave Drainage Swale Maintenance

PALMER TOWNSHIP FLOOD MITIGATION STUDY



NEXT STEPS:

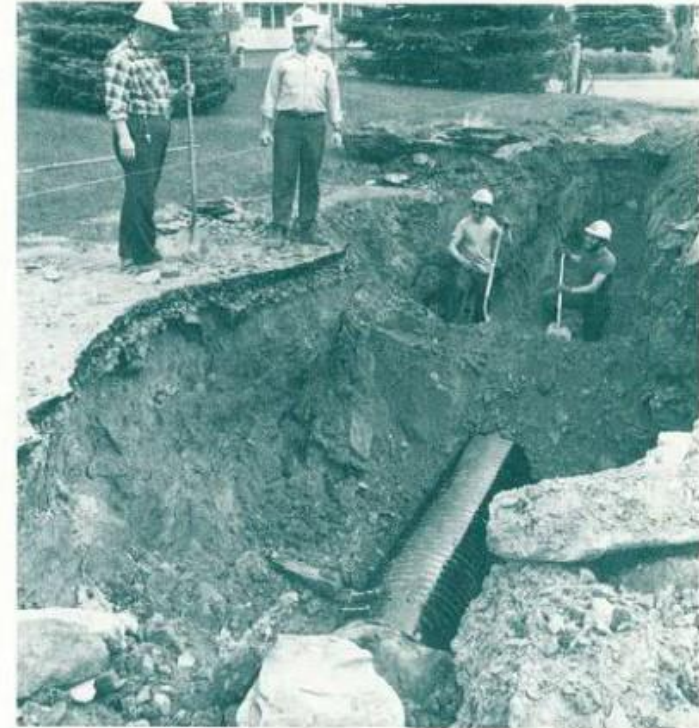
- Spring / Summer 2025 – Begin construction of **Phase 1**
- Fall, 2025 - PENNVEST Loan application for **Phase 2**
- Summer, 2026 – Begin construction of **Phase 2**
- Fall, 2026 – Replace Clayton Ave pipe
- Construction of **Phase 3 Basin** upon release by property owner and receipt of FEMA Grant money
- Debit service to be paid through Palmer Stormwater Utility Fees



STANDING ON PALMER'S PIPELINE is Township Supervisor and Superintendent of Public Works, Paul Kocher on a walking inspection of the 380 feet of storm-water pipe placed in the ground between Clayton Street and Farmersville Road. The $4\frac{1}{2}$ x 7 foot wide pipe was laid in place by the Township's Public Works crew.

AUTUMN, 1977

Making Room for Storm Waters



Time Out - after removing tons of rock to clear the way for a man-made water route seven feet below the road surface from Meadow Avenue to Fischer Road.

SUMMER, 1979

CLIPPINGS FROM THE PALMER TOWNSHIP NEWLETTER

Stormwater runoff has been a significant issue in Palmer for more than 50 years





PALMER TOWNSHIP FLOOD MITIGATION STUDY

PALMER TOWNSHIP, NORTHAMPTON COUNTY, PA