



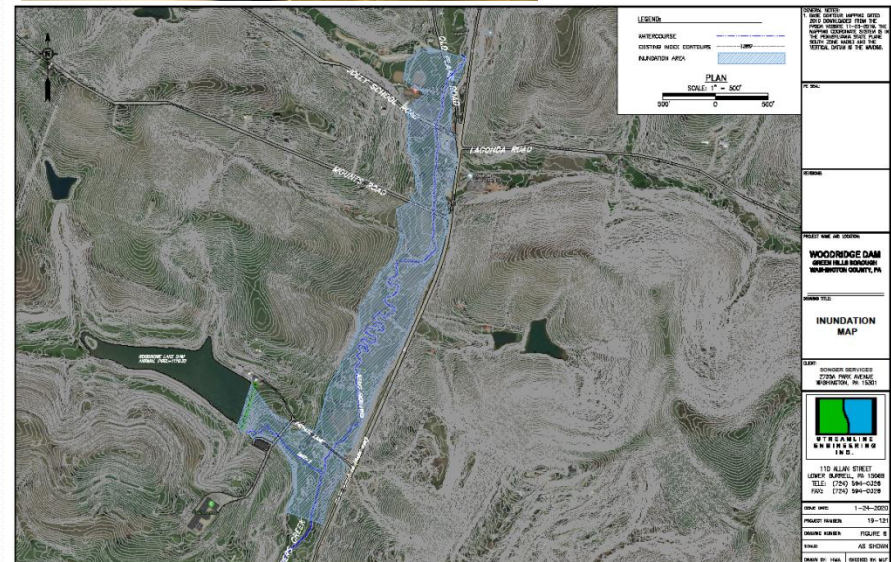
# **Penn Lake Dam and Spillway Improvements**

**Penn Lake Park Borough**

October 10, 2021

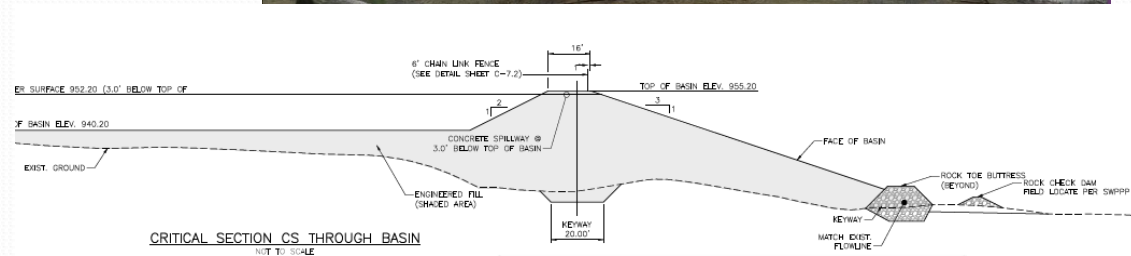
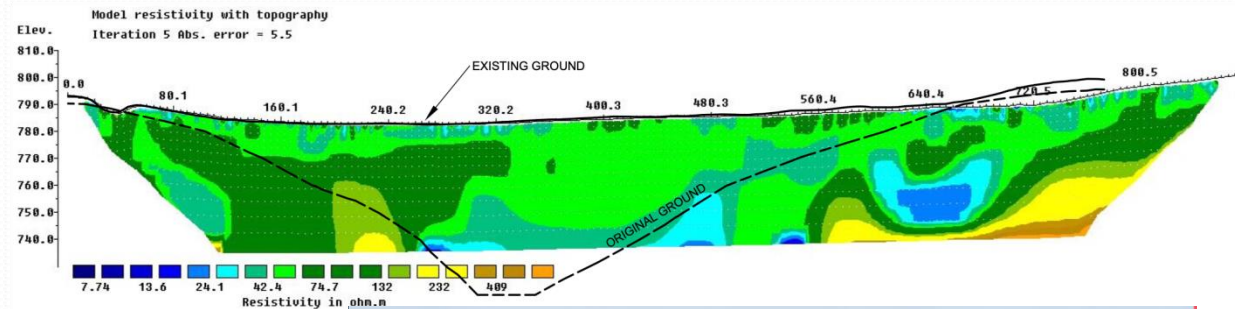
# Streamline Engineering, Inc.

- Founded in 2004
- Certified Small Business
- DBE/WBE
- PennDOT Business Partner
- Located in Lower Burrell, PA
- Engineering staff has +40 years of experience
  - Water resource design
  - Permitting



# Thoroughbred Engineering

- Founded in 1986
- Three offices
  - Lexington, KY
  - Shelbyville, KY
  - Morgantown, WV
- Full Service Engineering Firm
- 40+ employees
- Licensed in 11 states



# SLE/TBred Team Offers

- Efficiency
- Personal Attention
- Timely Performance
- Technical Competency
- Project Streamlining
- Cost Effective Solutions
- Earthen and Concrete Dam & Spillway Rehabilitation Design  
**AND** Construction Experience



# Penn Lake Plan View



# Identified Concerns

- Hydraulic capacity of the spillway
- Impacts to downstream residents
- Uncontrolled seepage along downstream face
- Recent changes in rates of seepage (anecdotal)
- Structural & Functional integrity of the drawdown conduit & valves
- Functional integrity of the toe drain
- Undocumented construction of the original dam
- Owner desires a long-term solution **NOT** another band-aid

# Project Understanding

## What is Known?

- Dam inspection reports
- Piezometric levels
- First-level analysis for the Spillway Design Flood
- Earthen Buttress & Toe Drain As-built (1980s)
- Anecdotal information:
  - Dam construction
  - Lake bathymetry
  - Changes in seepage

## What is Unknown?

- As-Built for Original dam construction (1900s)
- Existence of State Dam Permit
- Dam Breach & Downstream Impact Analyses
- Embankment Condition & Stability
- Integrity of the dewatering system
- Seepage rates around conduit and through toe drain system

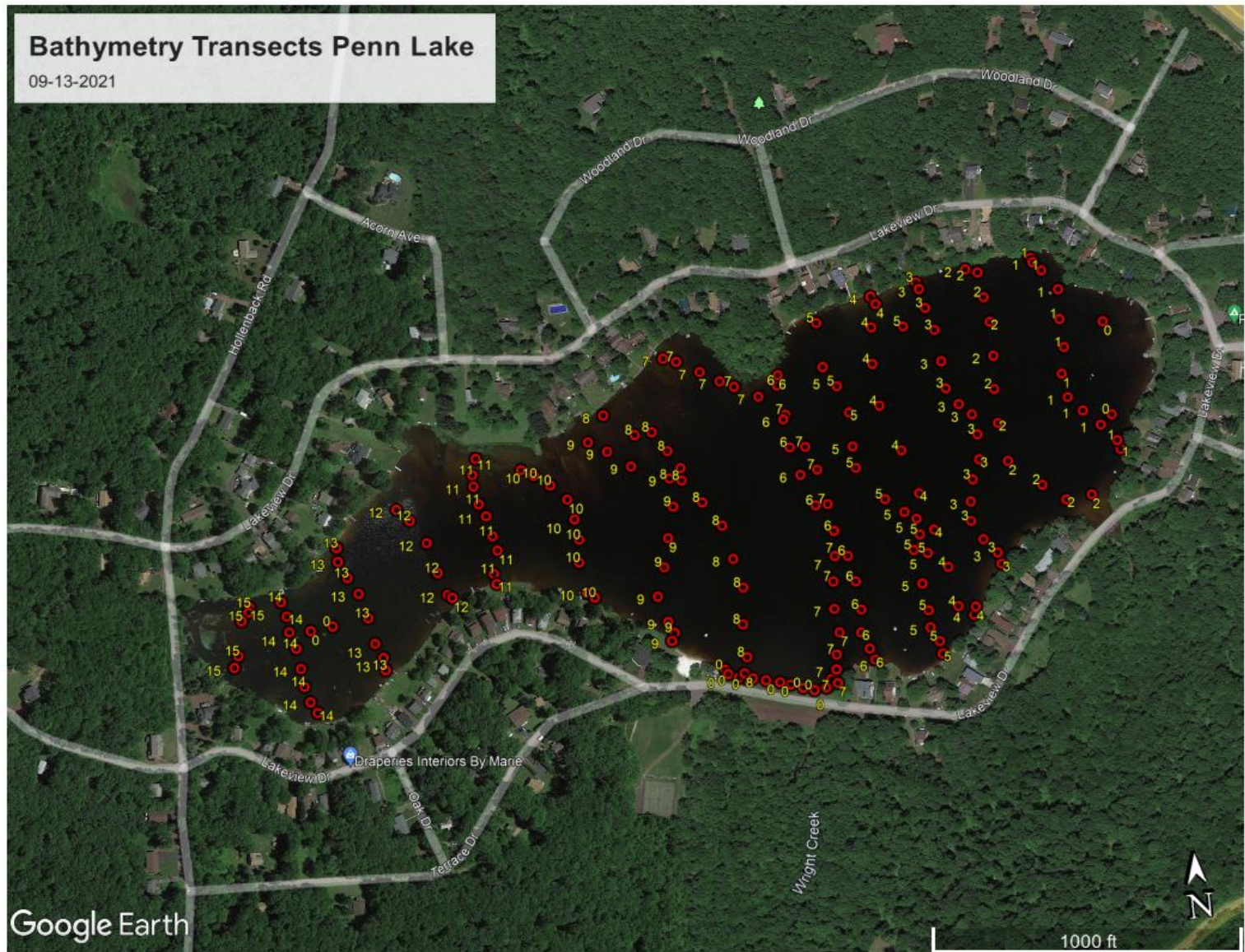
# Penn Lake Dam Phase 1 Task Outline

- Initial Study, Evaluation & Recommendations
  1. **Data Collection and Review:** Evaluation of existing data, field surveys, and engineering reports
  2. **Mapping:** aerial photography (drones), lake bathymetry, downstream flood sensitive areas
  3. **Geotechnical Investigations:** geophysics, geotechnical borings, test pits, borrow areas
  4. **Hydrologic & Hydraulic Analyses:** Non-breach and breach analyses identifying inundation area and SDF
  5. **Preliminary Design:** earthen dam cutoff wall, spillways, conduit rehabilitation and/or replacement, drainage, spillway structures, mechanical piping & valves, construction means and methods, utilities
  6. **Quantity and Cost Estimating:** construction means & methods, past projects, contacts with contractors
  7. **Coordination & Follow-Through:** Regular progress (Zoom and face-to-face) meetings with the Penn Lake Park Borough Committee, Penn Lake Park community, PaDEP
  8. **Deliverables:** Comprehensive reports and drawings formatted to meet federal and state requirements for permitting process



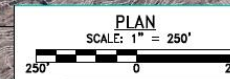
## Bathymetry Transects Penn Lake

09-13-2021





ELEVATION	SURFACE AREA (SF)	SURFACE AREA (AC)	VOLUME (AC-FT)
1308	160	0.0	0.2
1310	6564	0.2	1.8
1312	65225	1.5	6.7
1314	146432	3.4	22.0
1316	523644	12.0	50.8
1318	728901	16.7	88.2
1320	899100	20.6	133.2
1322	1060615	24.3	186.3
1324	1255176	28.8	248.6
1326	1456579	33.4	323.1
1328	1789999	41.1	413.7
1330	2157882	49.5	465.9
1331	2385345	54.8	521.1
1332	2426121	55.7	577.6
1333	2494694	57.3	637.7
1334	2739271	62.9	702.0
1335	2863298	65.7	769.9
1336	3055445	70.1	841.6
1337	3185258	73.1	916.9
1338	3381666	77.6	995.9
1339	3495889	80.3	1078.4
1340	3690789	84.7	1120.7



**GENERAL NOTES:**  
 1. BASE TOPOGRAPHY MAPPING DOWNLOADED FROM THE PASDA WEBSITE.  
 2. AERIAL IMAGE FROM PASDA

**FE. SCALE:**

**REVISIONS:**

**PROJECT NAME AND LOCATION:**  
**PENN LAKE**  
 PENN LAKE BOROUGH  
 LUZERNE COUNTY  
 PENNSYLVANIA

**DRAWING TITLE:**  
**BATHYMETRIC MAP**

**CLIENT:**  
 PENN LAKE PARK  
 BOROUGH COUNCIL  
 P.O. BOX 14  
 WHITE HAVEN, PA 18661

**STREAMLINE ENGINEERING INC.**

110 ALLAN STREET  
 LOWER BURRELL, PA 15068  
 TELE: (724) 594-0326  
 FAX: (724) 594-0328

**ISSUE DATE:** 10-7-2021

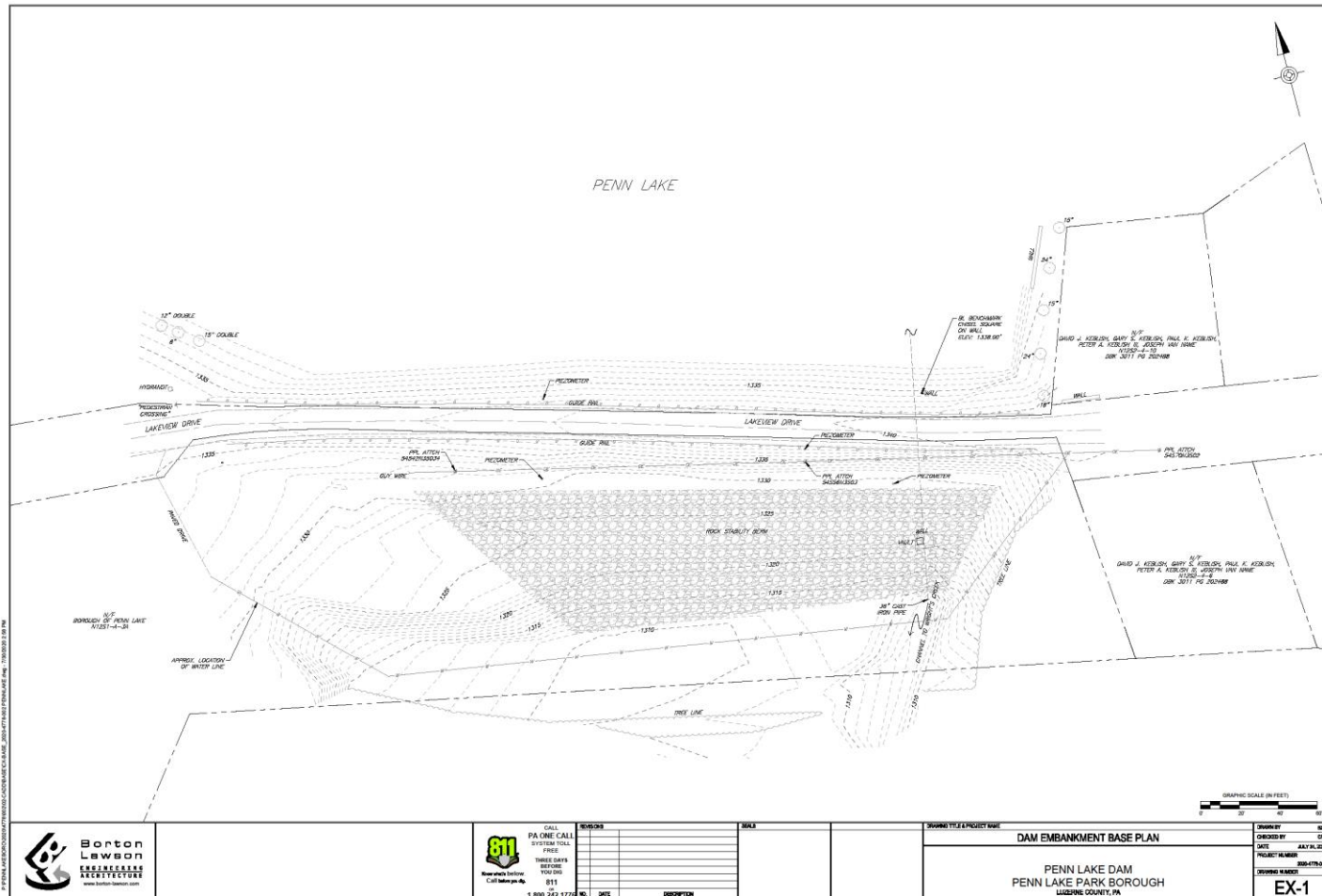
**PROJECT NUMBER:** 21-107

**DRAWING NUMBER:** FIGURE3

**SCALE:** AS SHOWN

**DRAWN BY:** AJL **CHECKED BY:** MUF

# Preliminary Boring Plan





# Downstream Face of Dam





# Upstream Face of Dam



# Longitudinal & Transverse Pavement Cracking





# Slope Movement near Left Abutment



# Leaning Piezometer #2





# Seepage around & above the Outlet Pipe





# Channel Downstream of the Dam





# Seepage with Orange Staining





# Seepage Ponding below the Dam





# Upstream Face of Spillway





# Downstream Face of Spillway





# Channel Downstream of Spillway



# Questions?

- Mailing Address

21 Sunrise Drive  
Leechburg, PA 15656-1524

- Office Address

110 Allan Street  
Lower Burrell, PA 15068

724-594-0326 Office

724-991-4541 Cell

724-594-0328 Fax

[mfrech@streamlineengineering.net](mailto:mfrech@streamlineengineering.net)

[www.streamlineengineering.net](http://www.streamlineengineering.net)

