

**STORM SEWER STUDY  
FOR PALISADES  
NEIGHBORHOOD**



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**2<sup>ND</sup> Public Meeting  
May 29, 2008**



# Agenda

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- **Questionnaire Results**
- **Planning for Personal Interviews**
- **Sewer Inspection**
- **Computer Modeling**

# Public Involvement

## ■ Questionnaire

✓ **Door-to-door distribution (04/14/08)**

✓ **Web Resources**

■ DDOE:

<http://ddoe.dc.gov/ddoe/cwp/view,a,1209,q,497997.asp>

■ DCWASA:

[http://www.dcwasa.com/news/listings/alert\\_detail332.cfm](http://www.dcwasa.com/news/listings/alert_detail332.cfm)

■ **In all, 303 + questionnaires distributed**

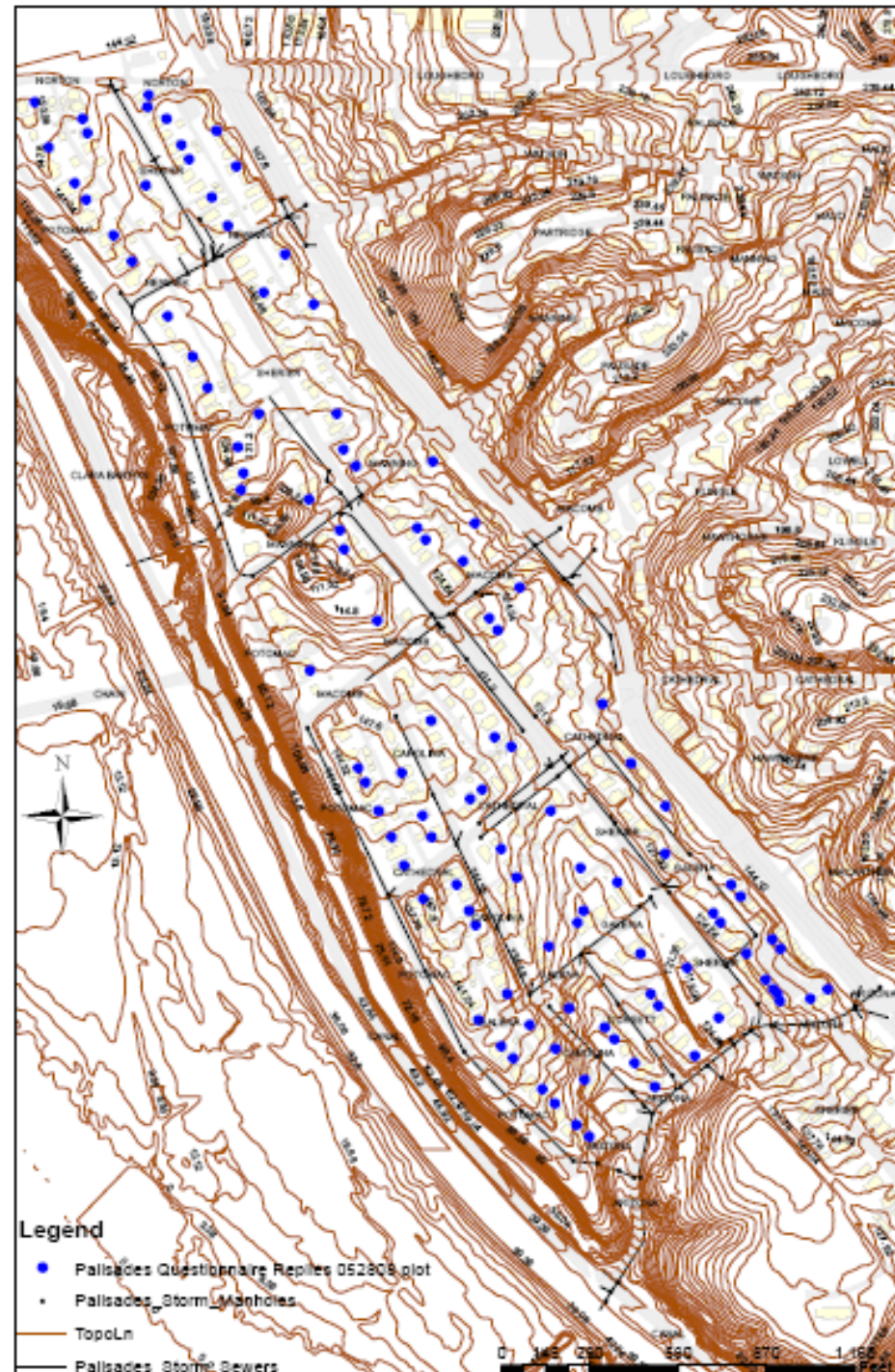
■ **108 residents responded, which is 36% of total distributed**

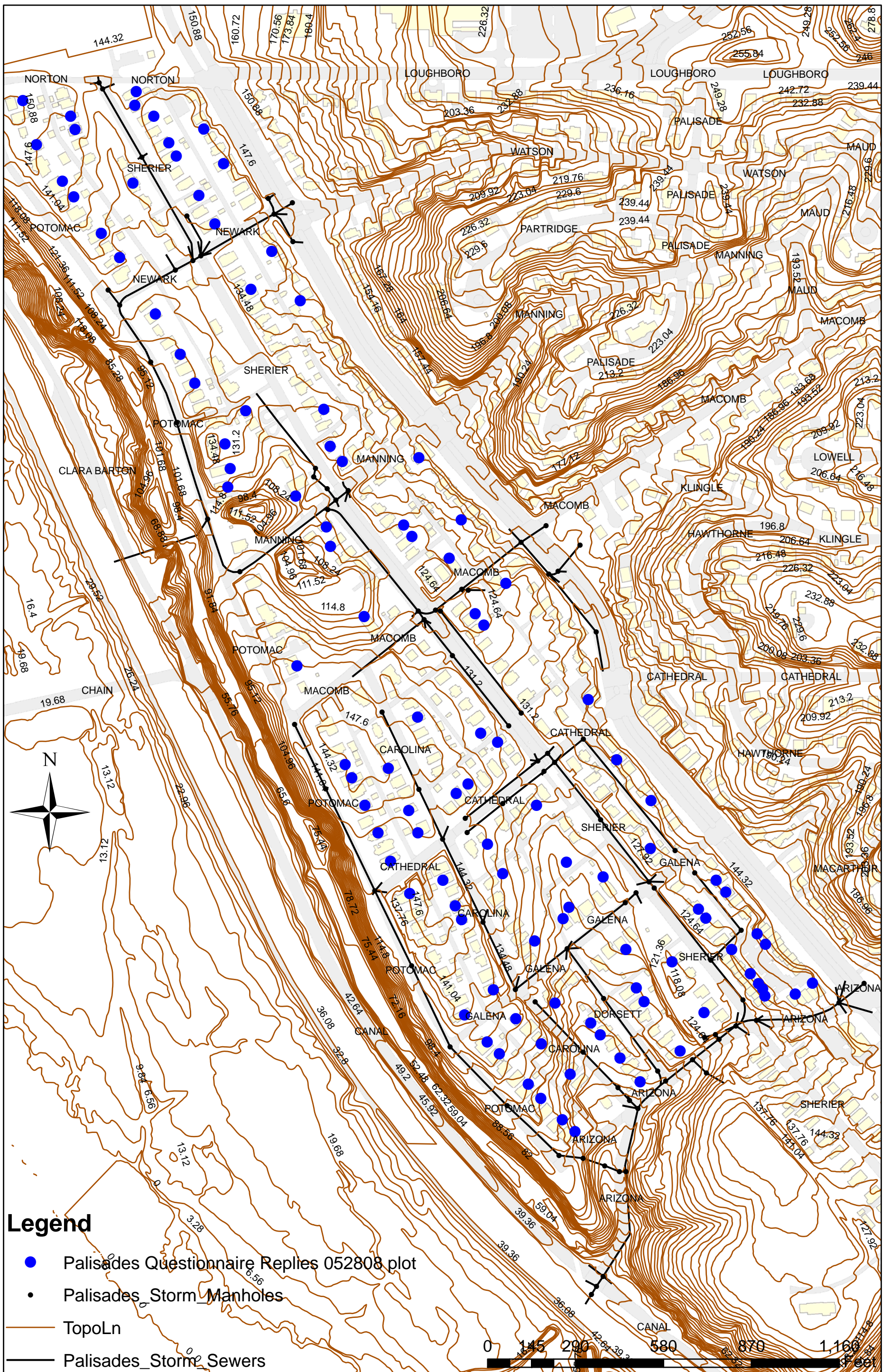
# Questionnaire Results

- **General Results [Question # 4 and 5]**

<b>Properties with Flood Problems</b>	<b>=</b>	<b>79 (73%)</b>
<b>Properties without Flood Problems</b>	<b>=</b>	<b>29 (27%)</b>
<b>Total</b>	<b>=</b>	<b>108 (100%)</b>

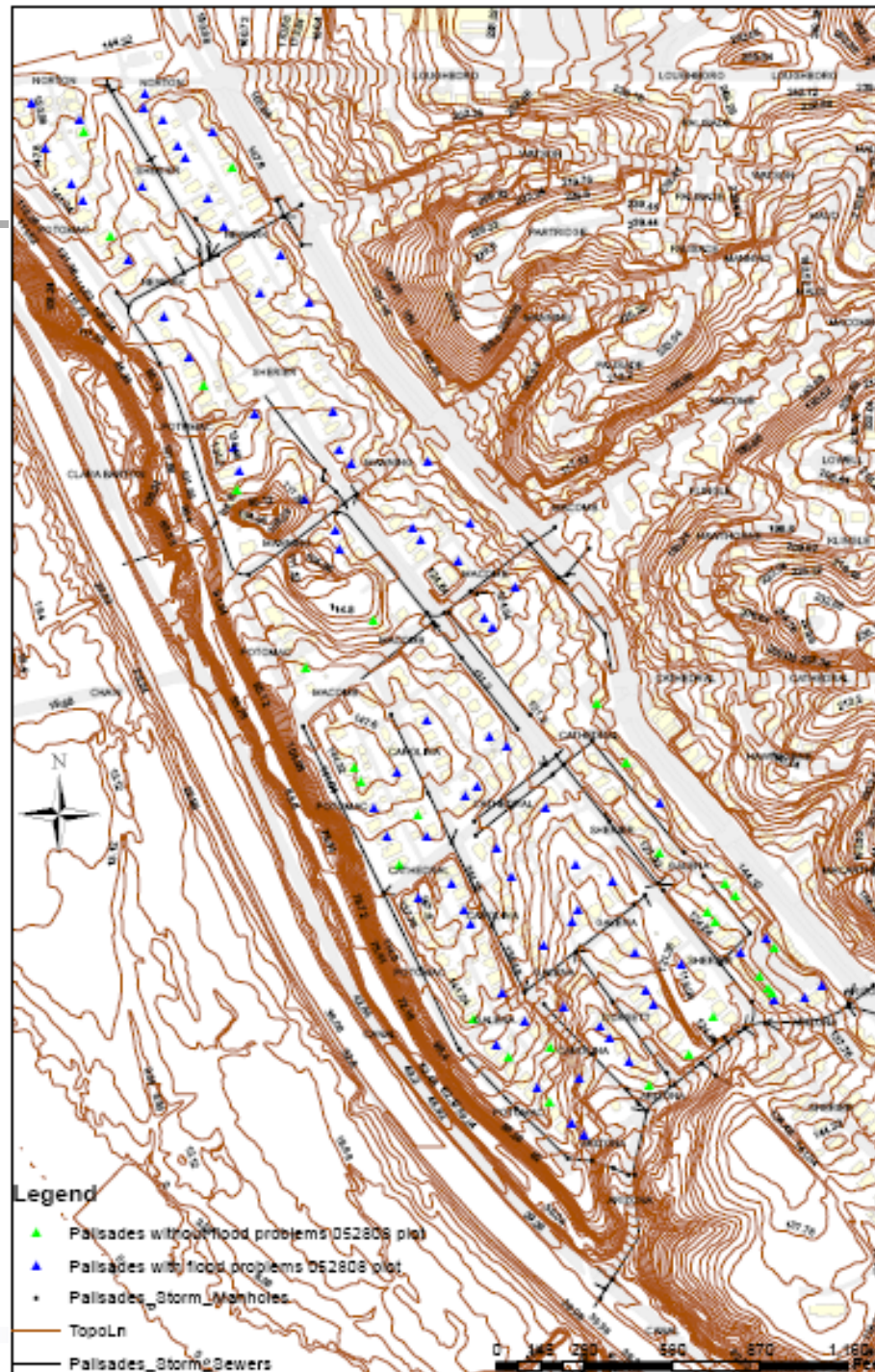
# Location of Properties who responded to questionnaire

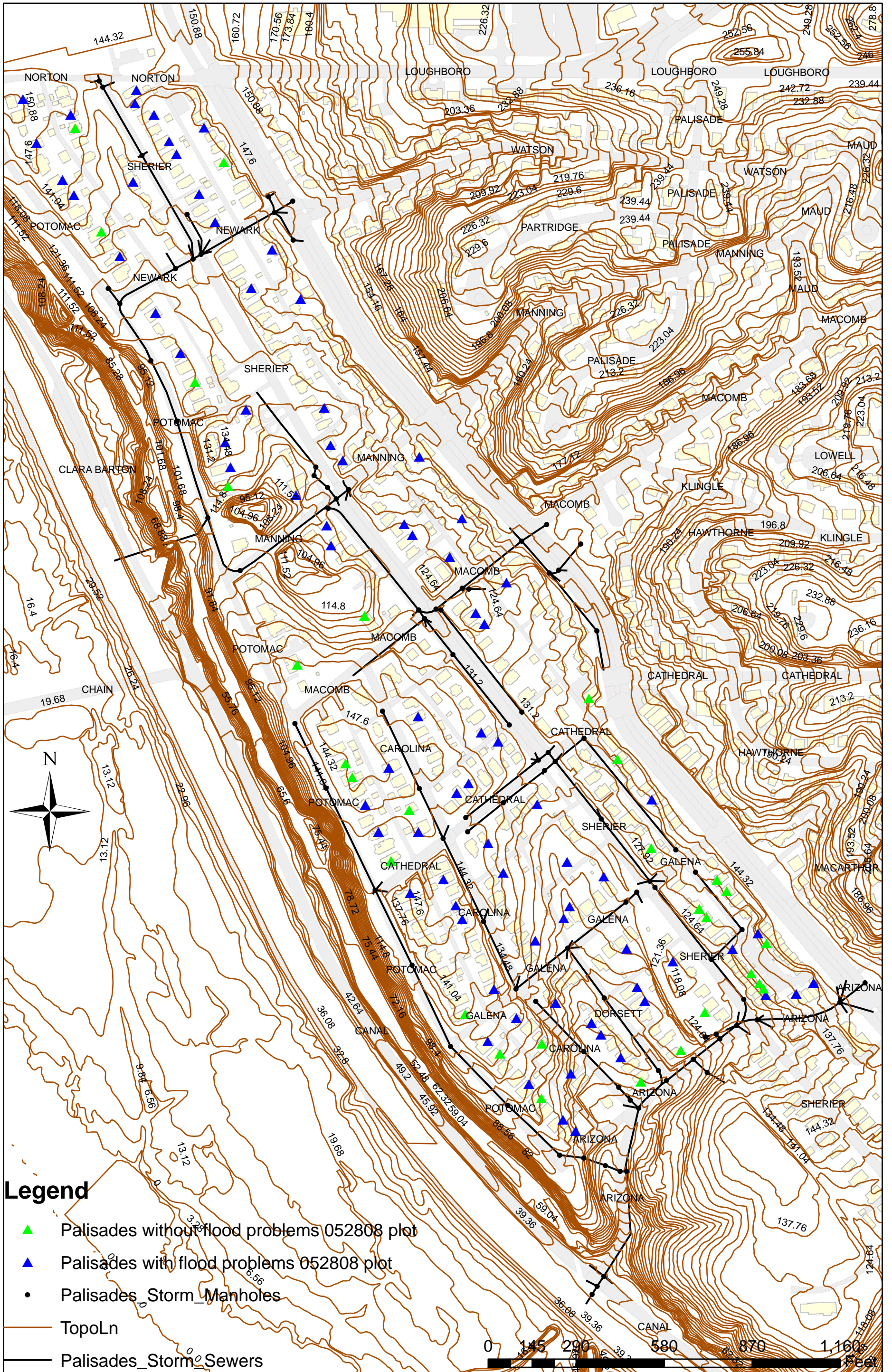




Palisades Questionnaire Replies 052808

# Location of Properties with & w/o flood problems



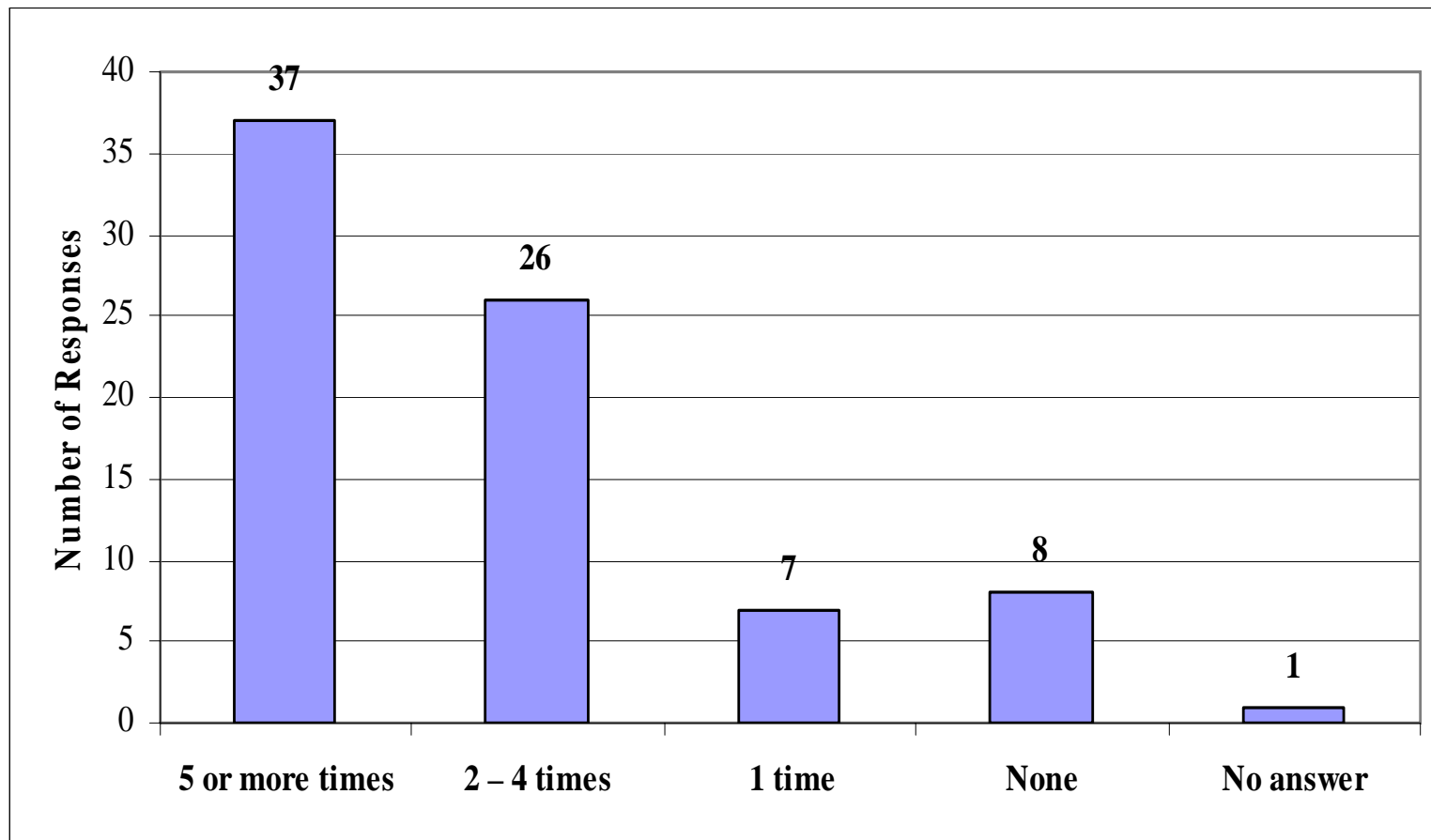


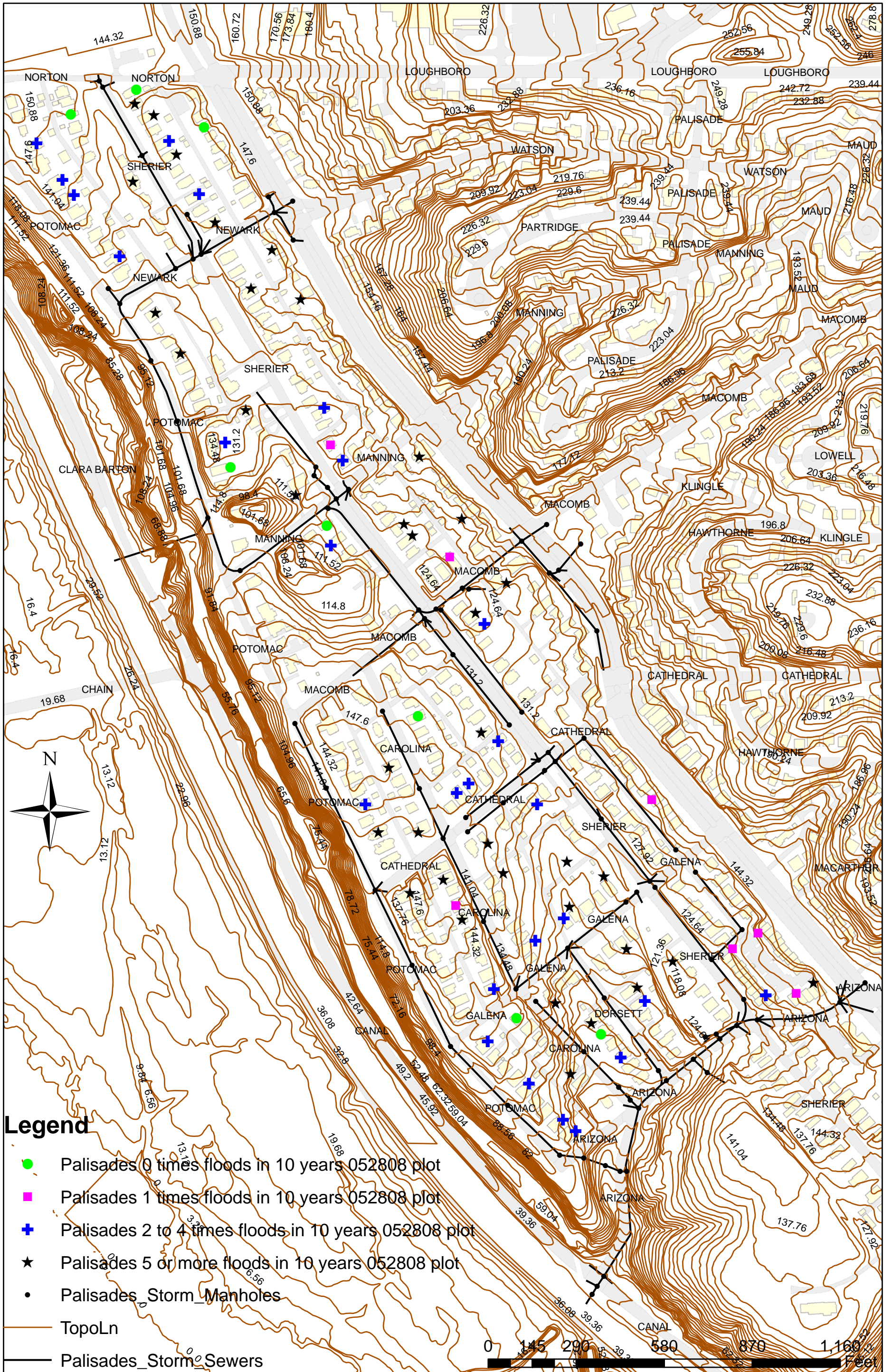
Palisades Properties with & without Flood Problems 052808



# Questionnaire Results

- **# of Floods in the Past 10 Years at 79 Properties with Flood Problems [Question # 2]**

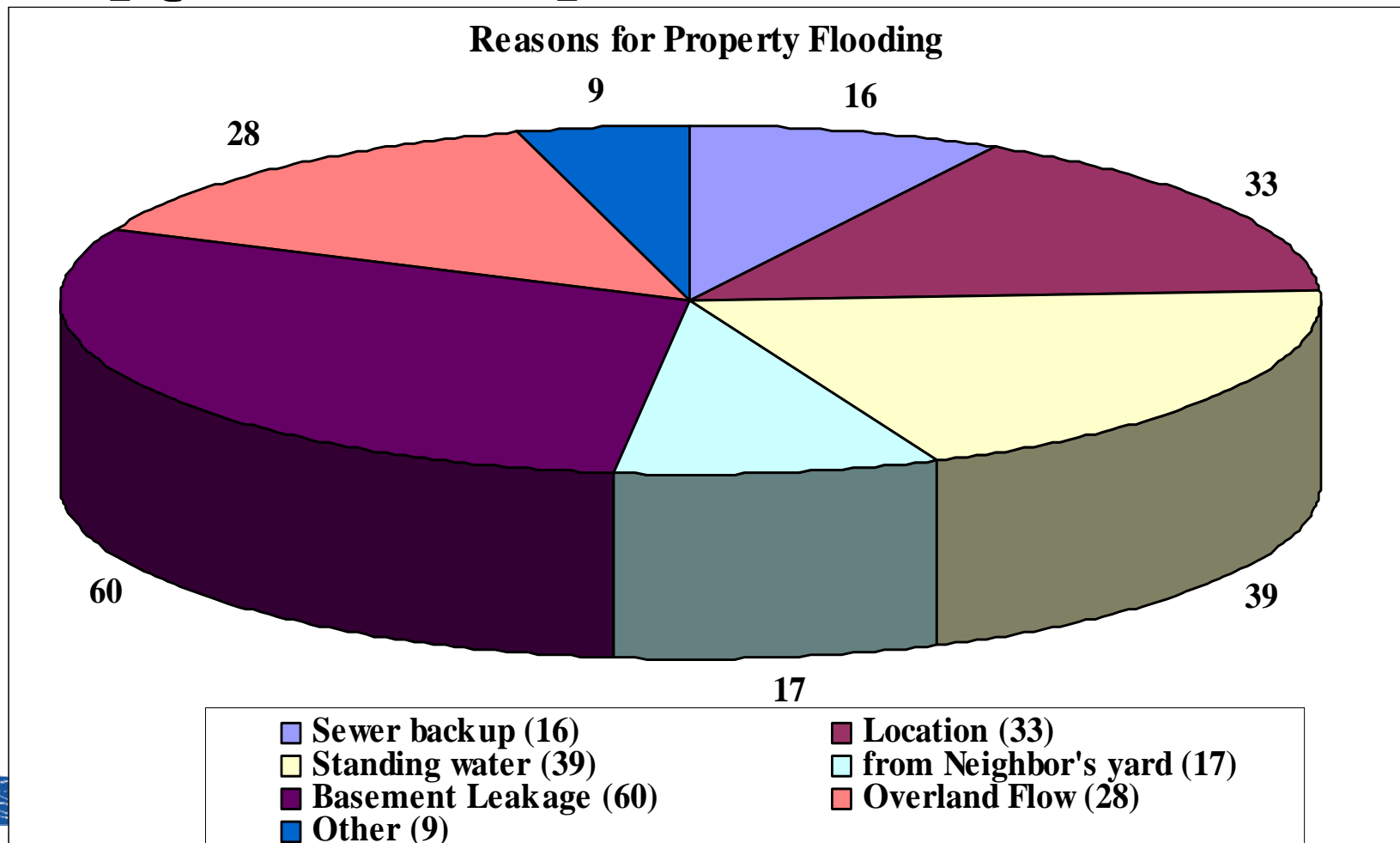


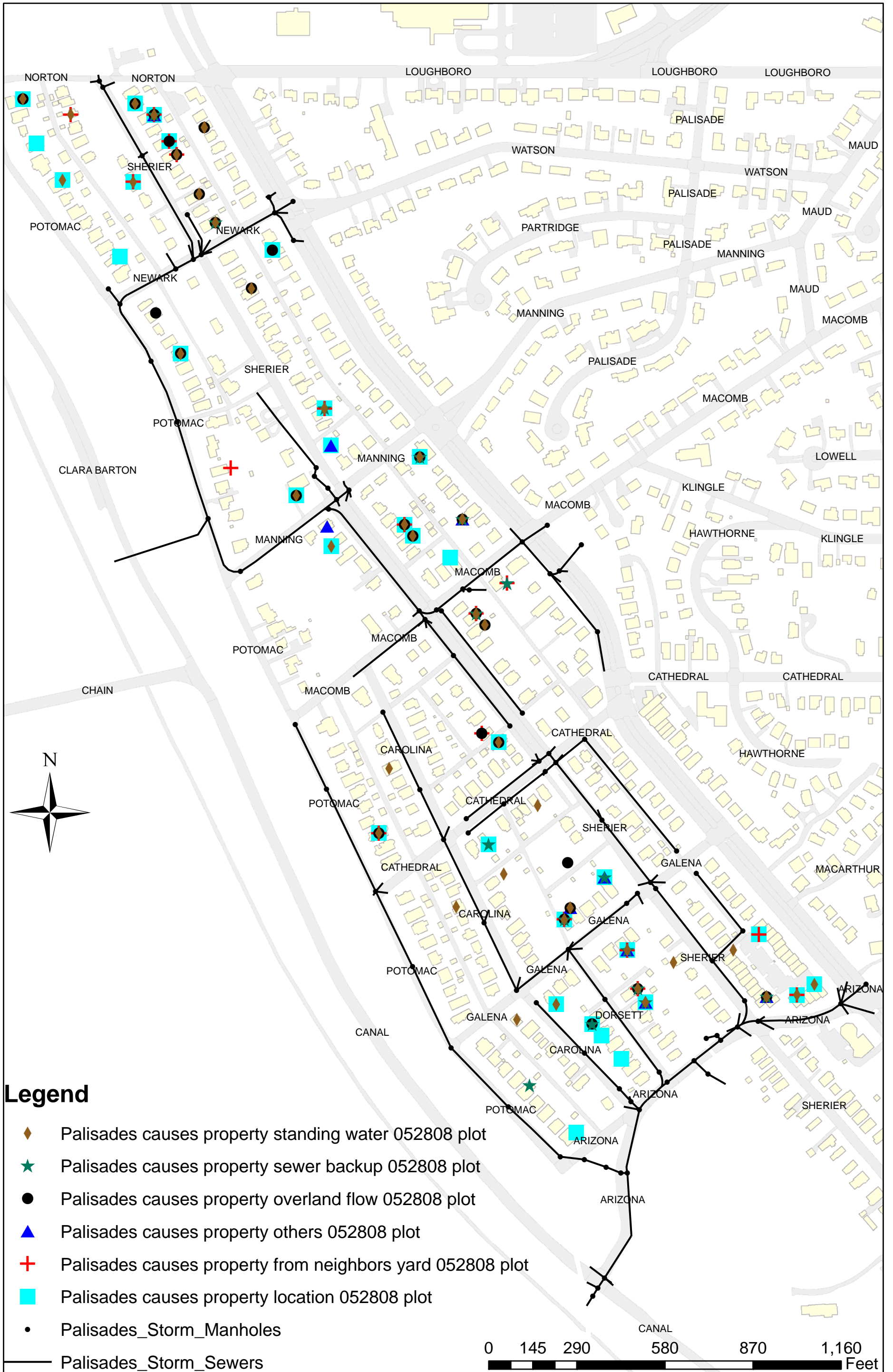


Palisades # of Floods in the Past 10 Years 052808

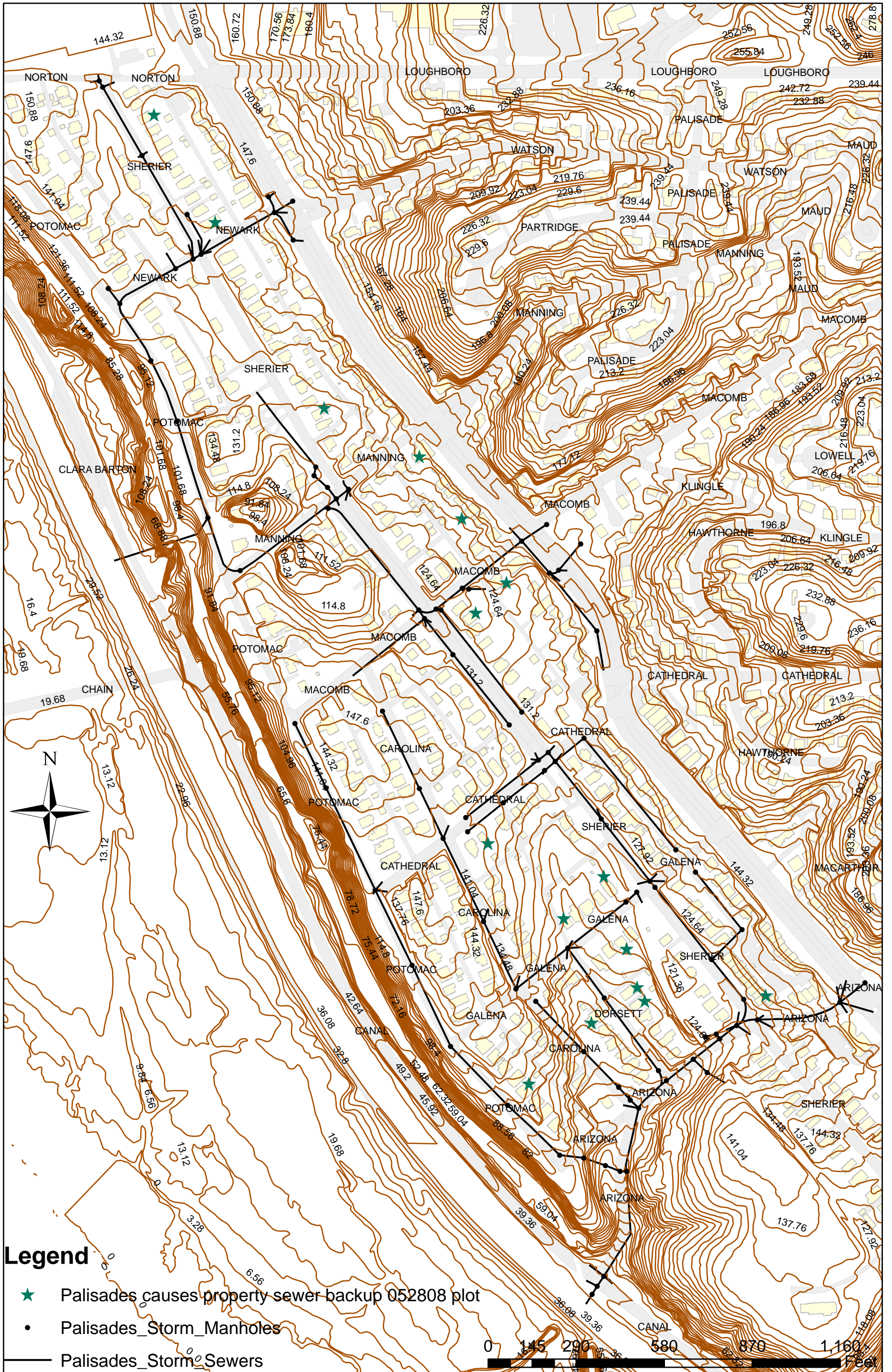
# Questionnaire Results

## Reasons Given for Property Flooding [Question # 6]

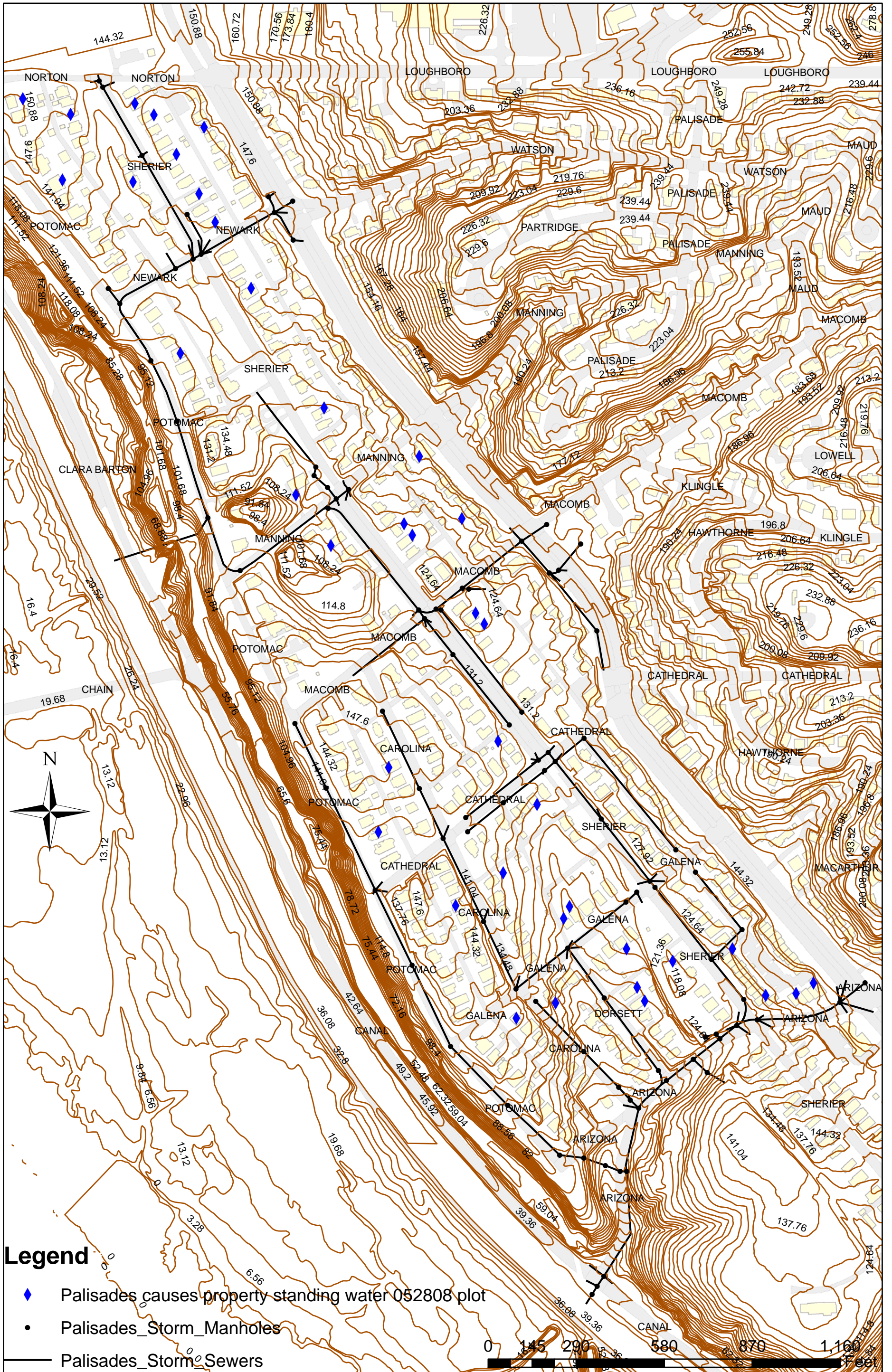




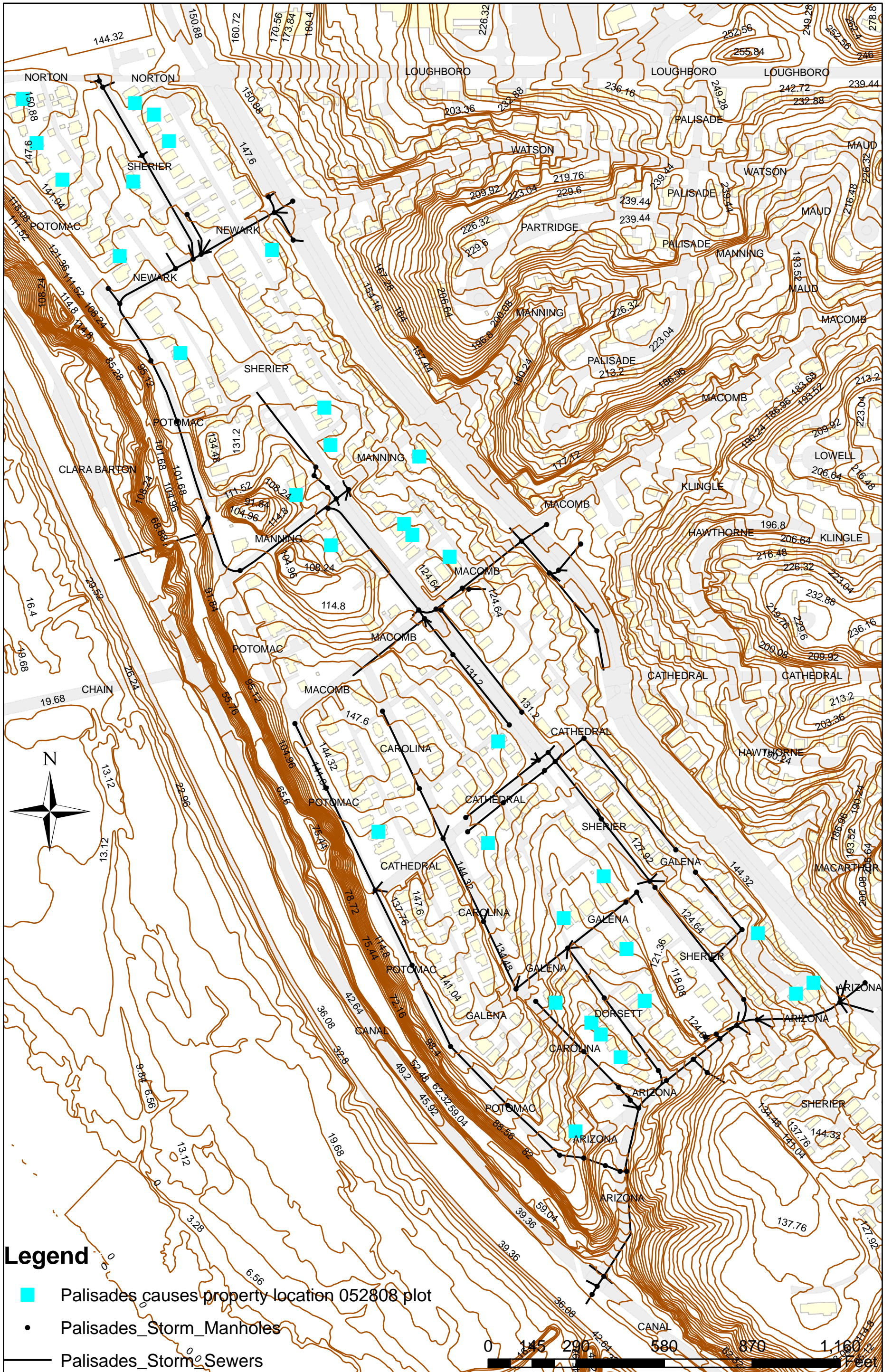
Palisades Flood Causes in Private Properties 052808



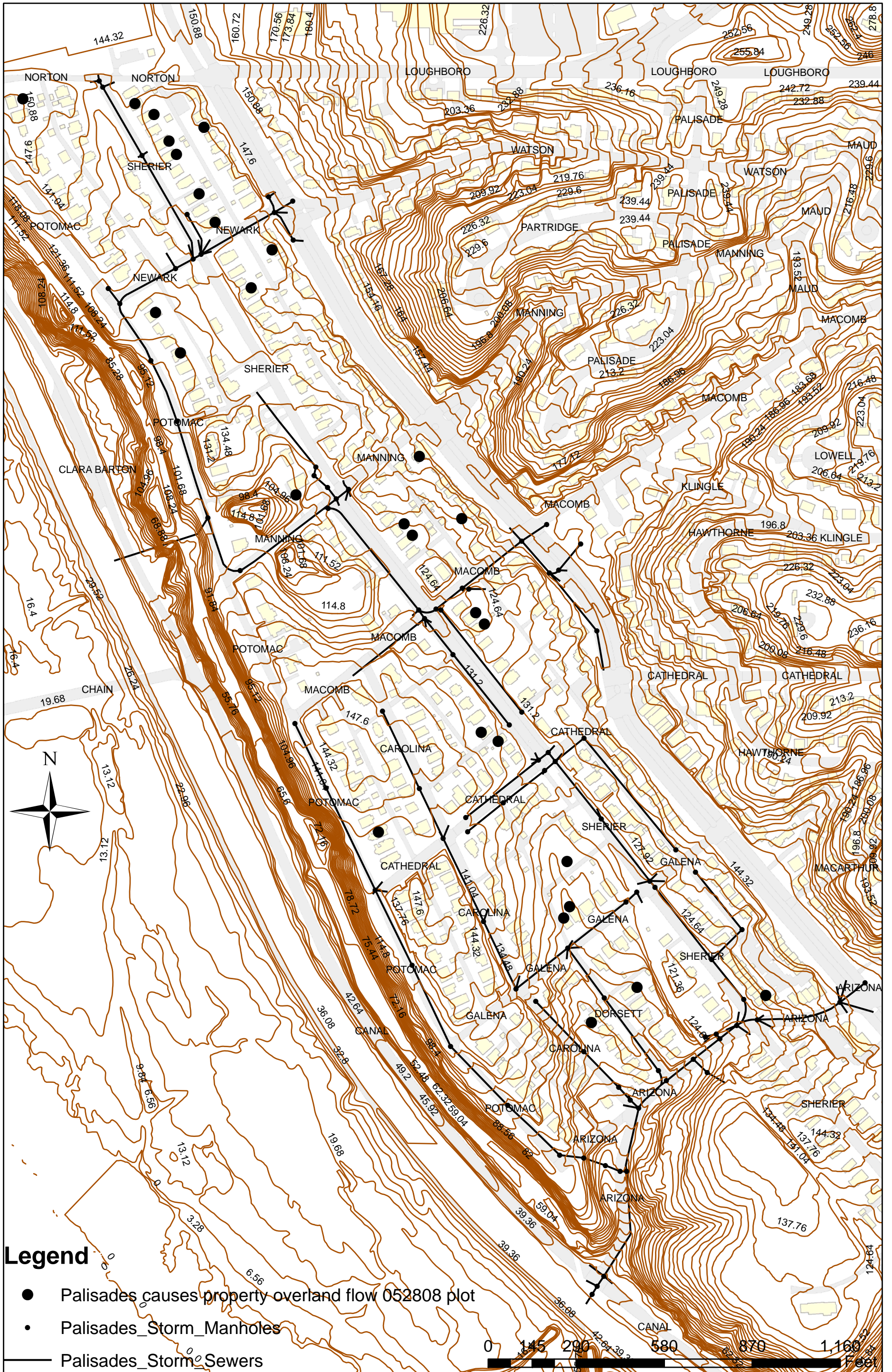
Palisades Flood Causes in Private Properties - Sewer Backup 052808



Palisades Flood Causes in Private Properties - Standing Water 052808

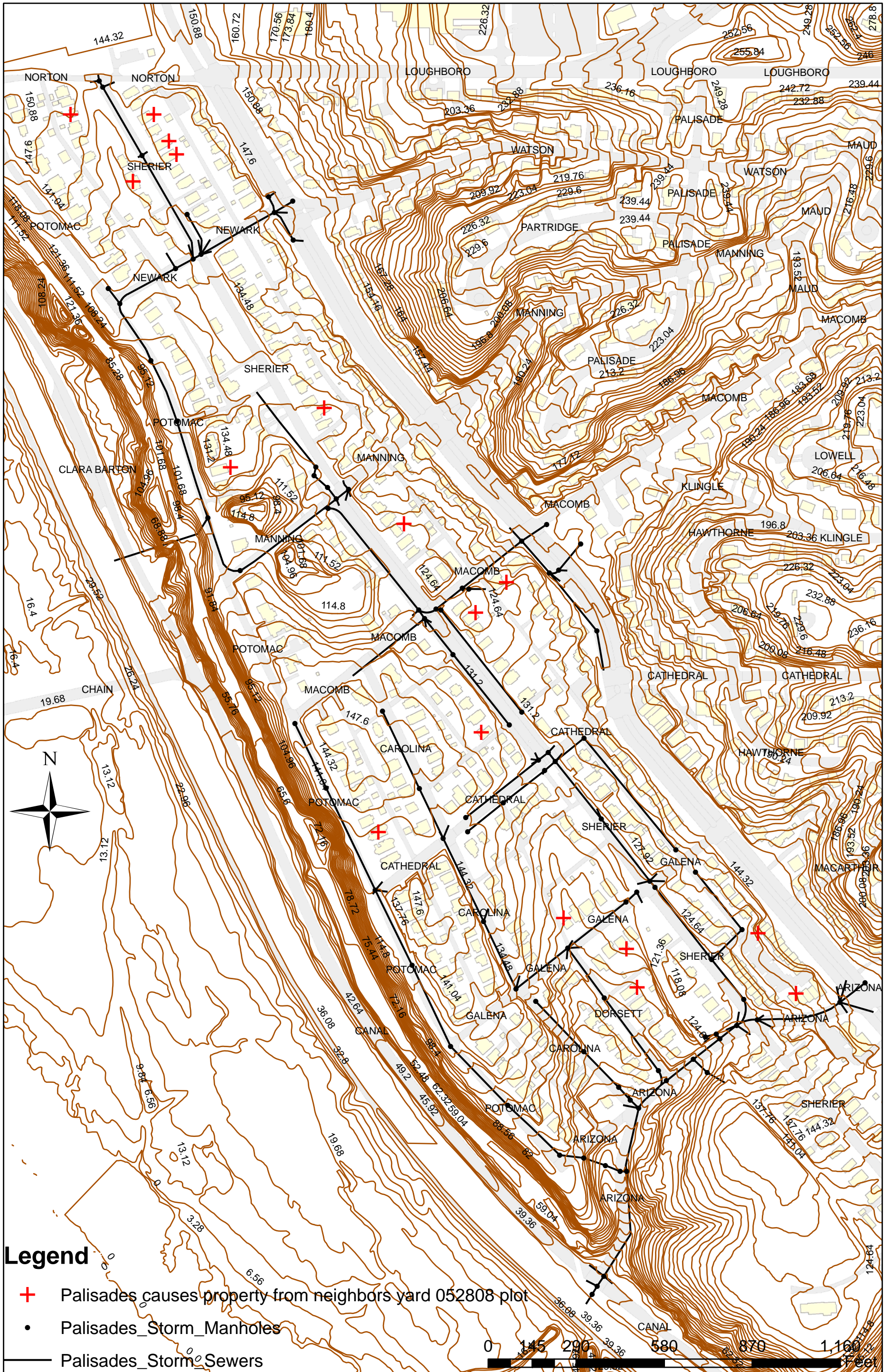


Palisades Flood Causes in Private Properties - Location 052808

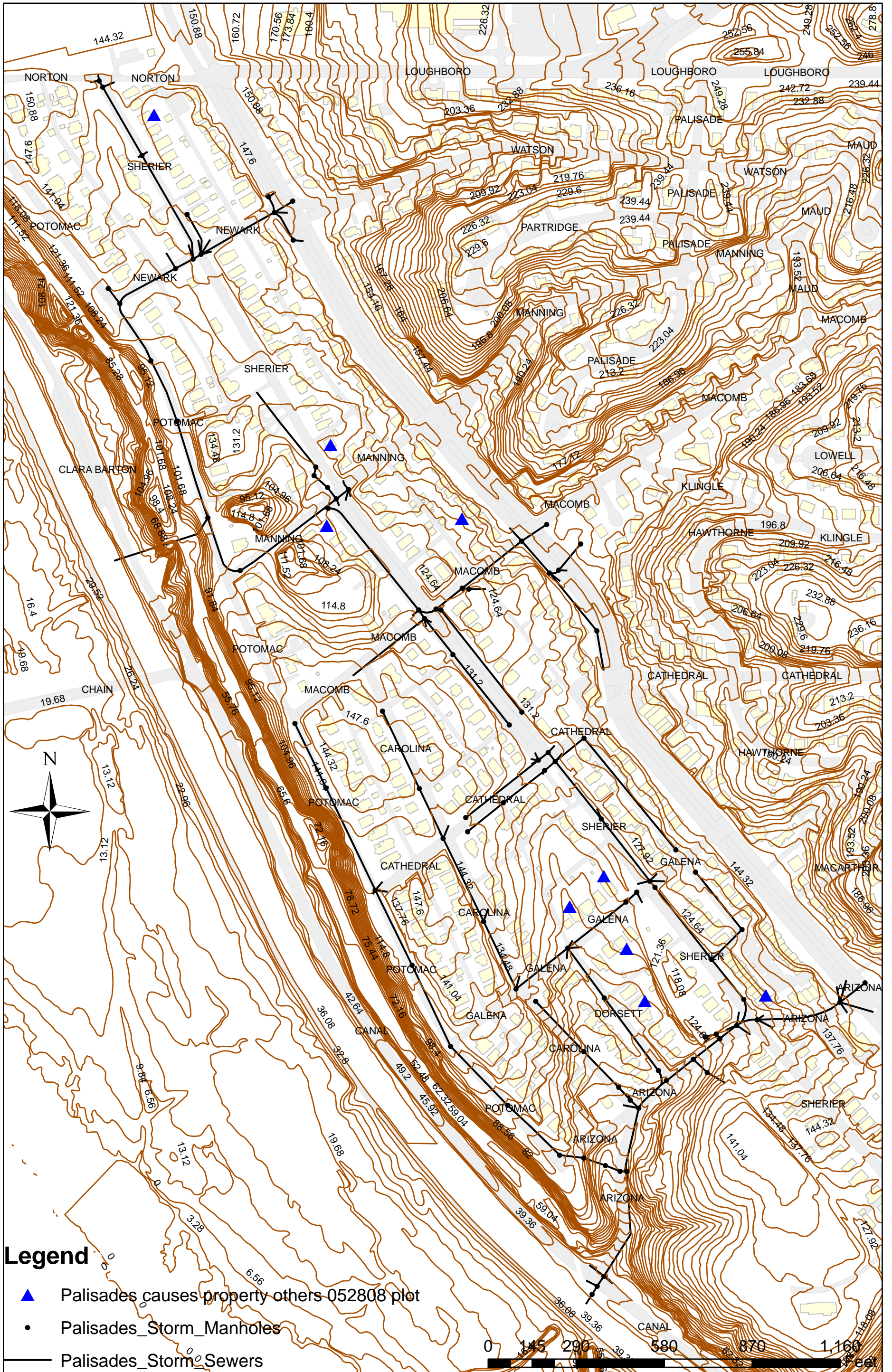


Palisades Flood Causes in Private Properties - Overland Flow 052808





Palisades Flood Causes in Private Properties - From Neighbors Yards 052808

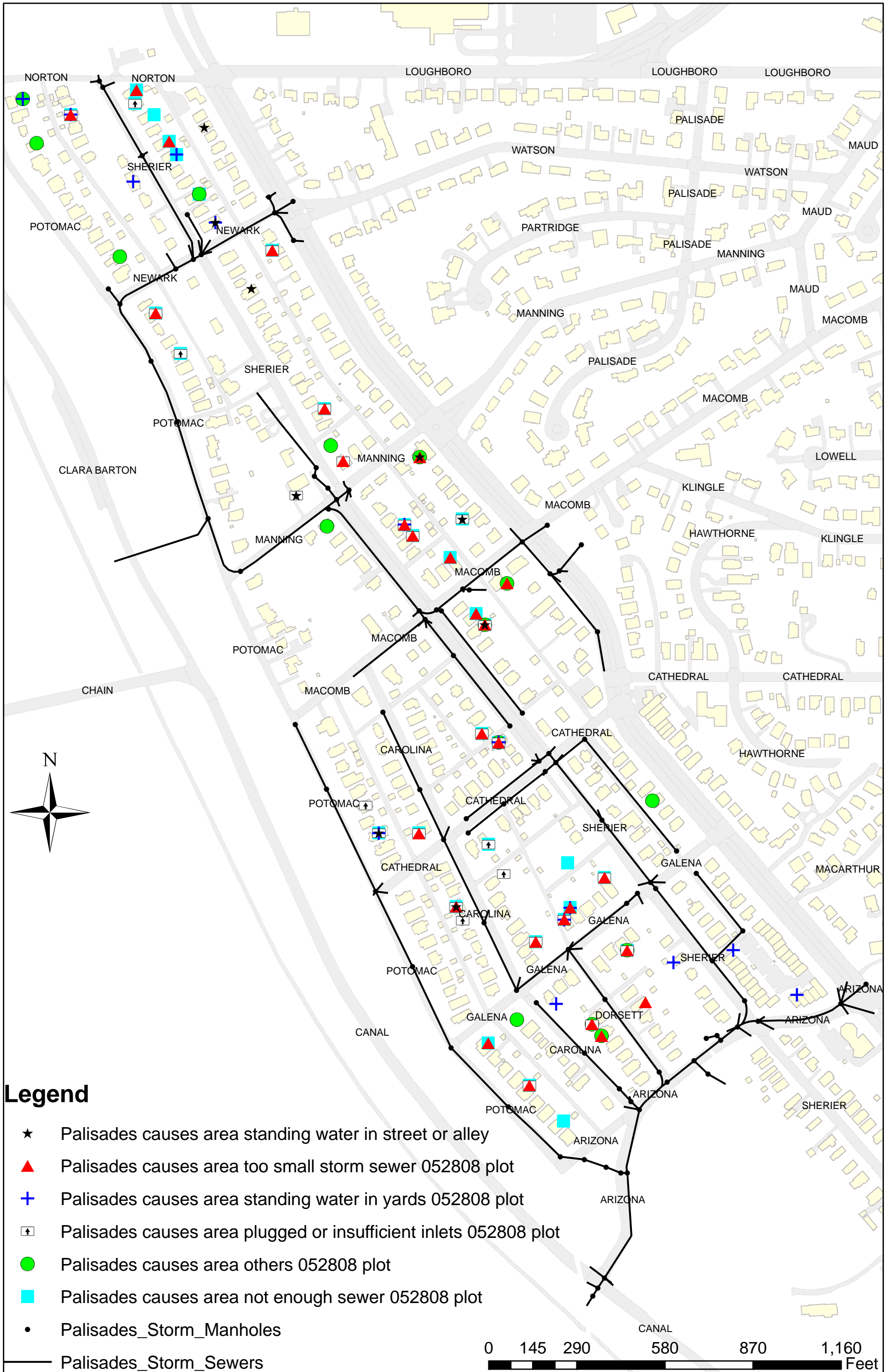


Palisades Flood Causes in Private Properties - Other Causes 052808

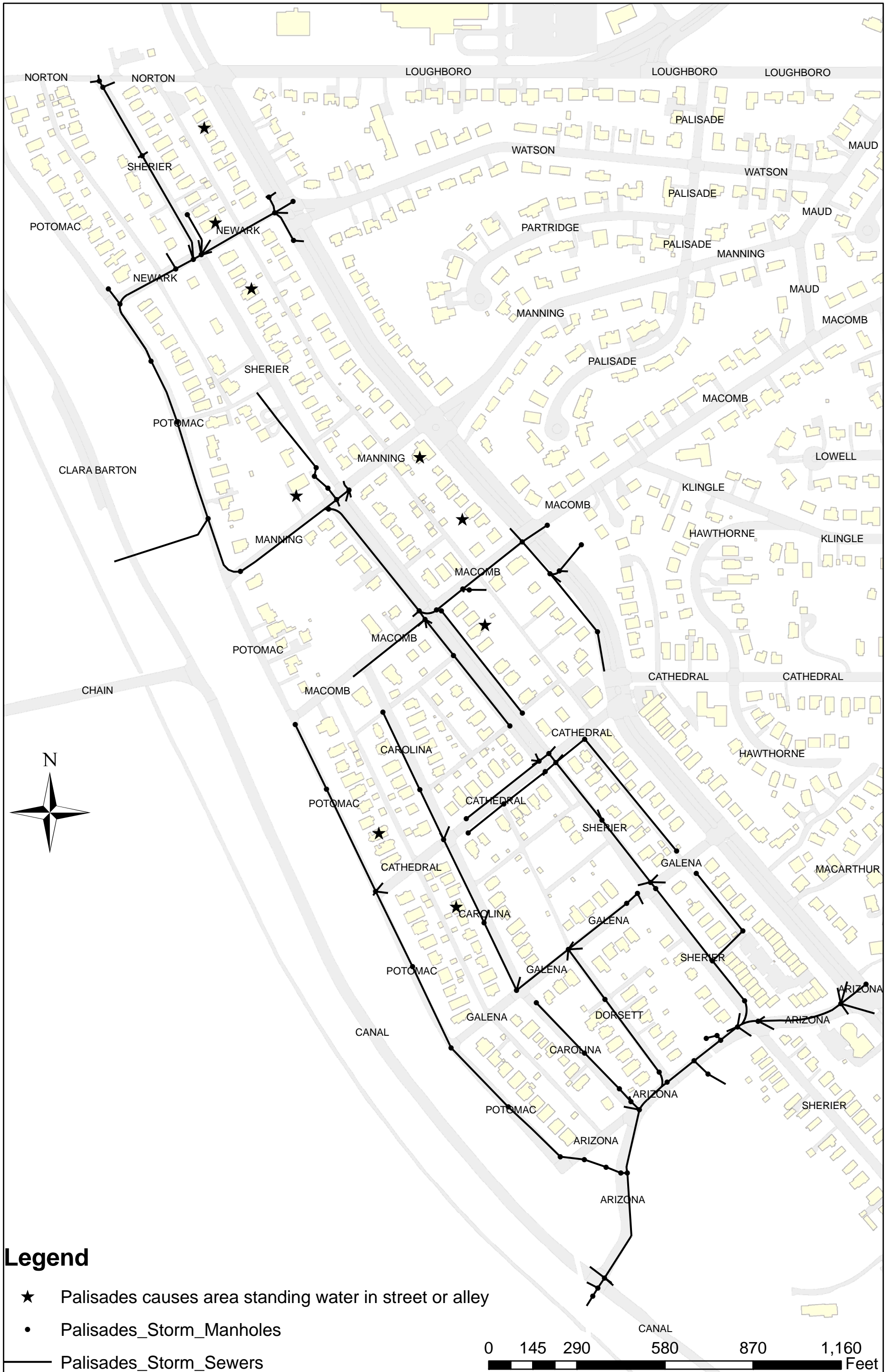
# Questionnaire Results

- Reasons Given for Area Flooding  
[Question # 8]

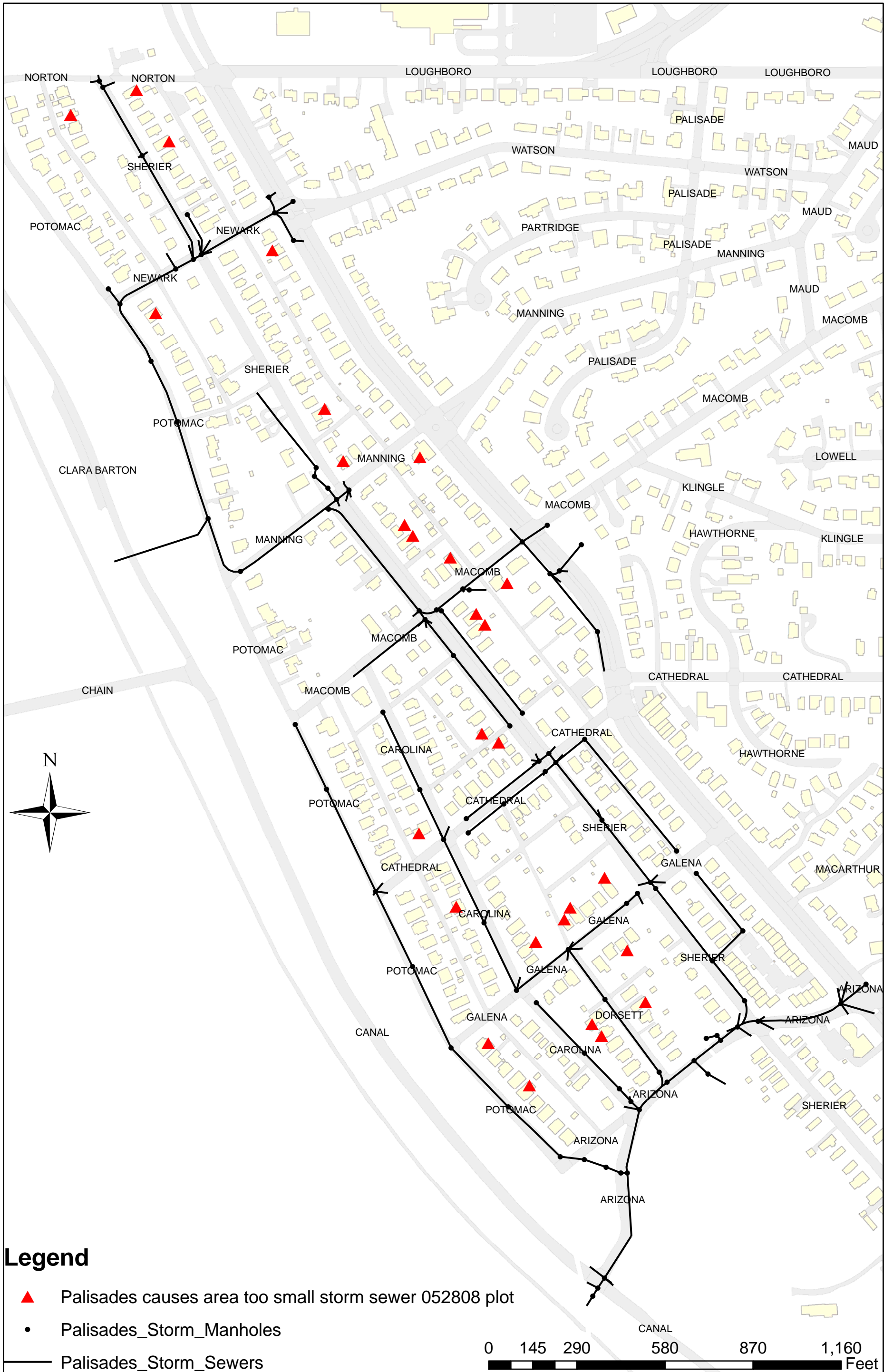
<b>Not enough storm sewers</b>	<b>=</b>	<b>32</b>
<b>Too small storm water</b>	<b>=</b>	<b>28</b>
<b>Plugged or insufficient inlet</b>	<b>=</b>	<b>27</b>
<b>Other</b>	<b>=</b>	<b>15</b>
<b>Standing water in yard</b>	<b>=</b>	<b>14</b>
<b>Standing water on street/alley</b>	<b>=</b>	<b>9</b>
<b>Total</b>	<b>=</b>	<b>125</b>



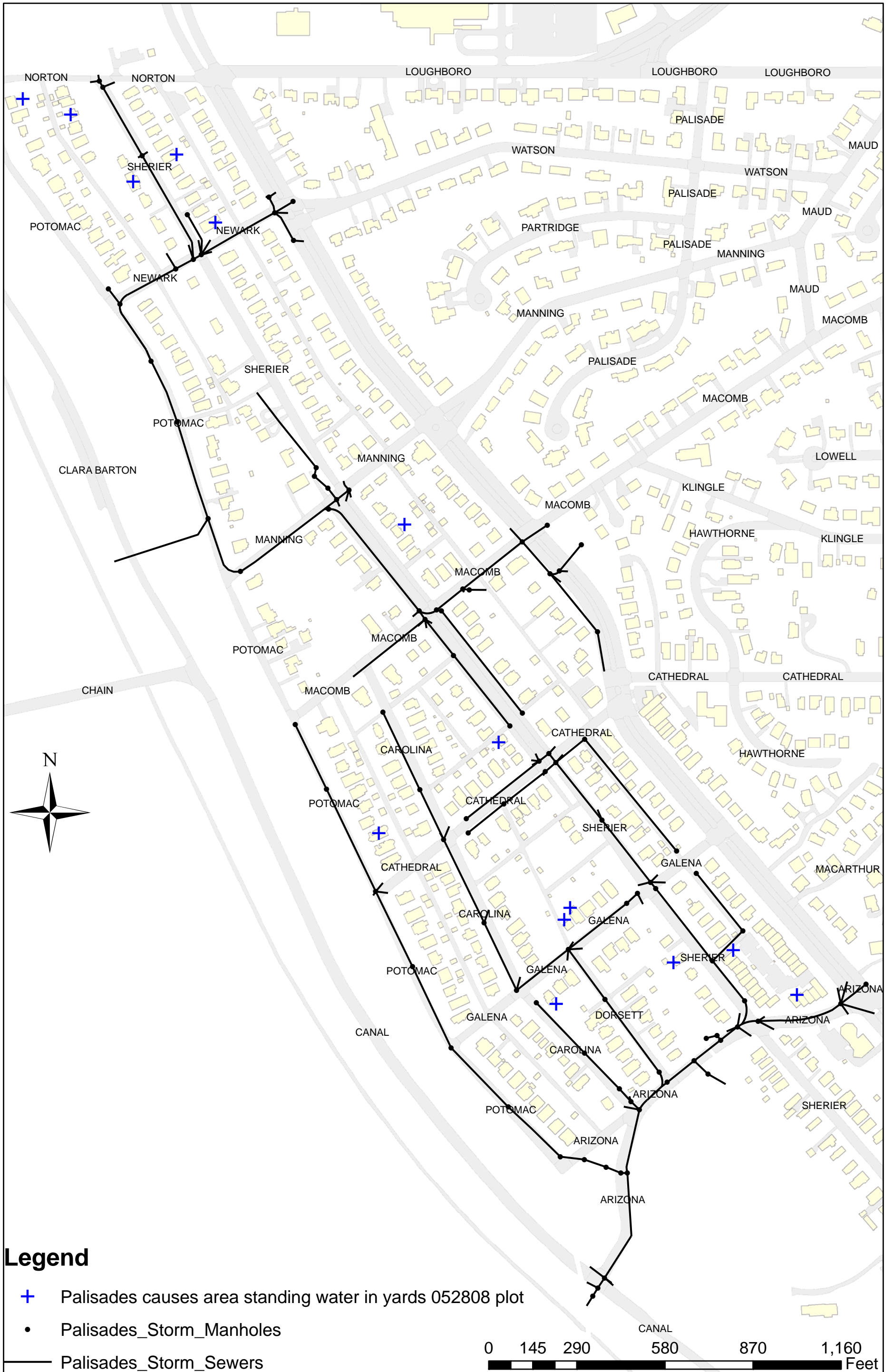
Palisades Flood Causes in Neighborhood 052808



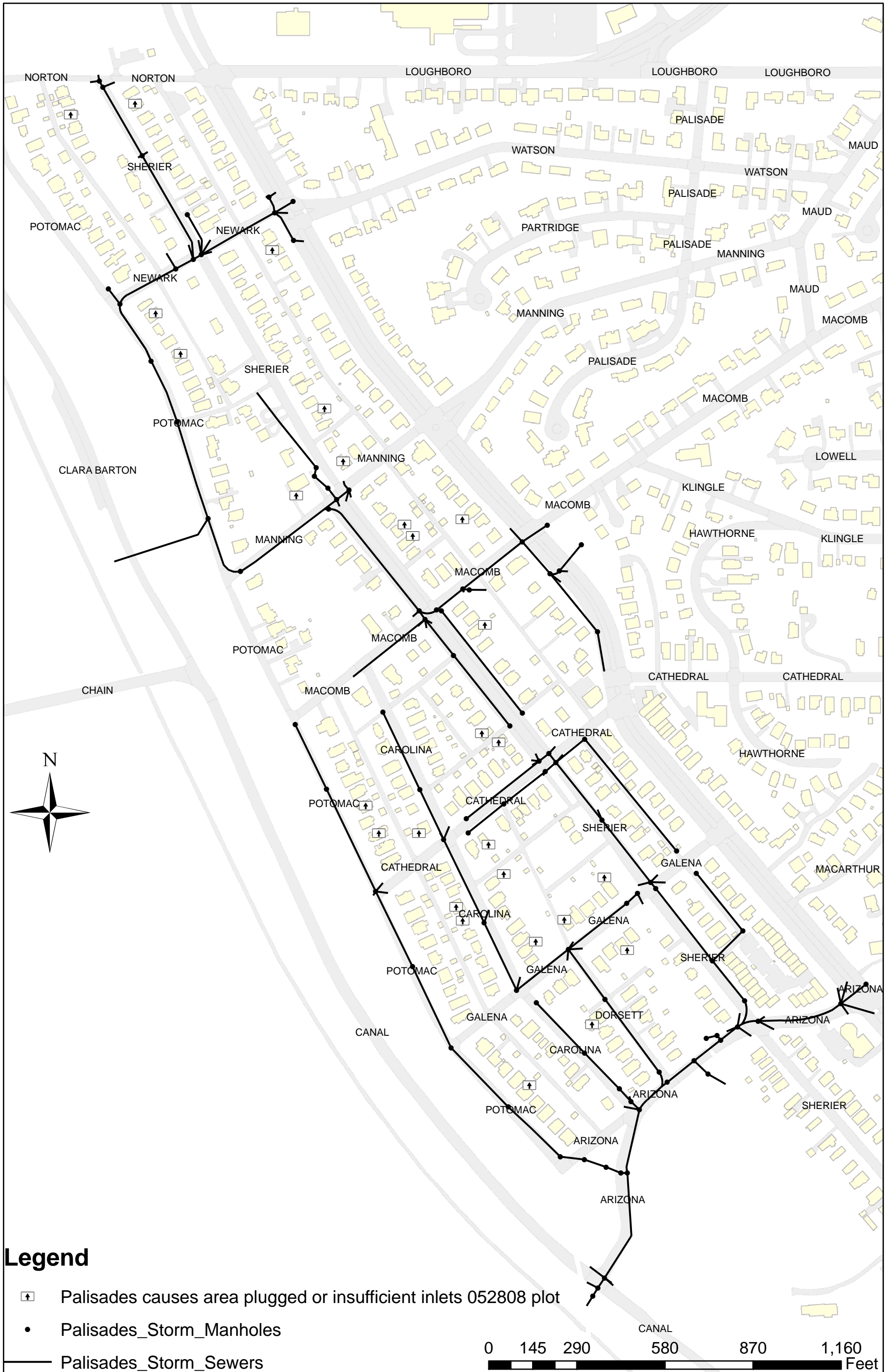
Palisades Flood Causes in Neighborhood - Standing Water in Street 052808



Palisades Flood Causes in Neighborhood - Too Small Storm Sewer 052808

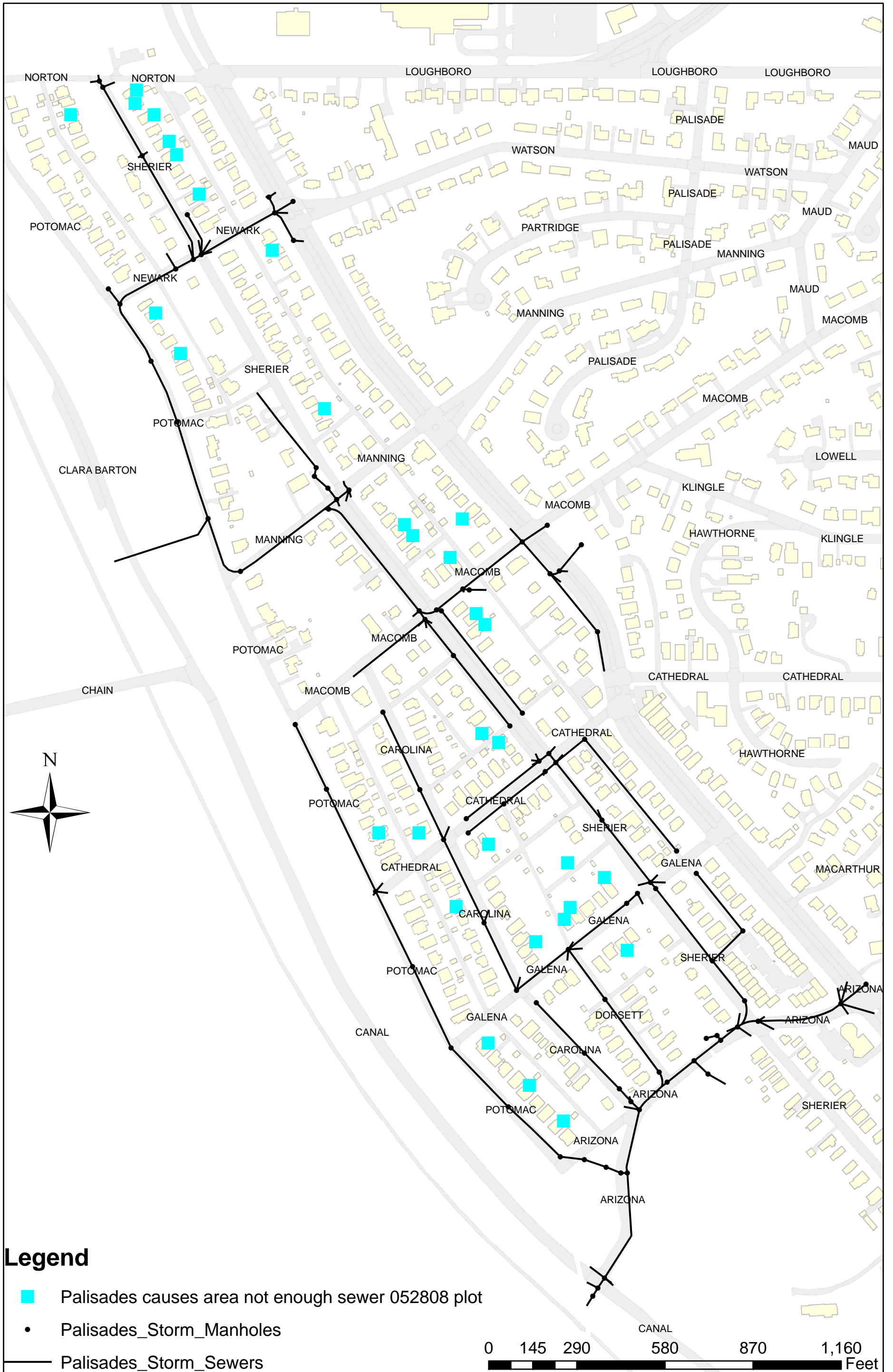


Palisades Flood Causes in Neighborhood - Standing Water in Yards 052808

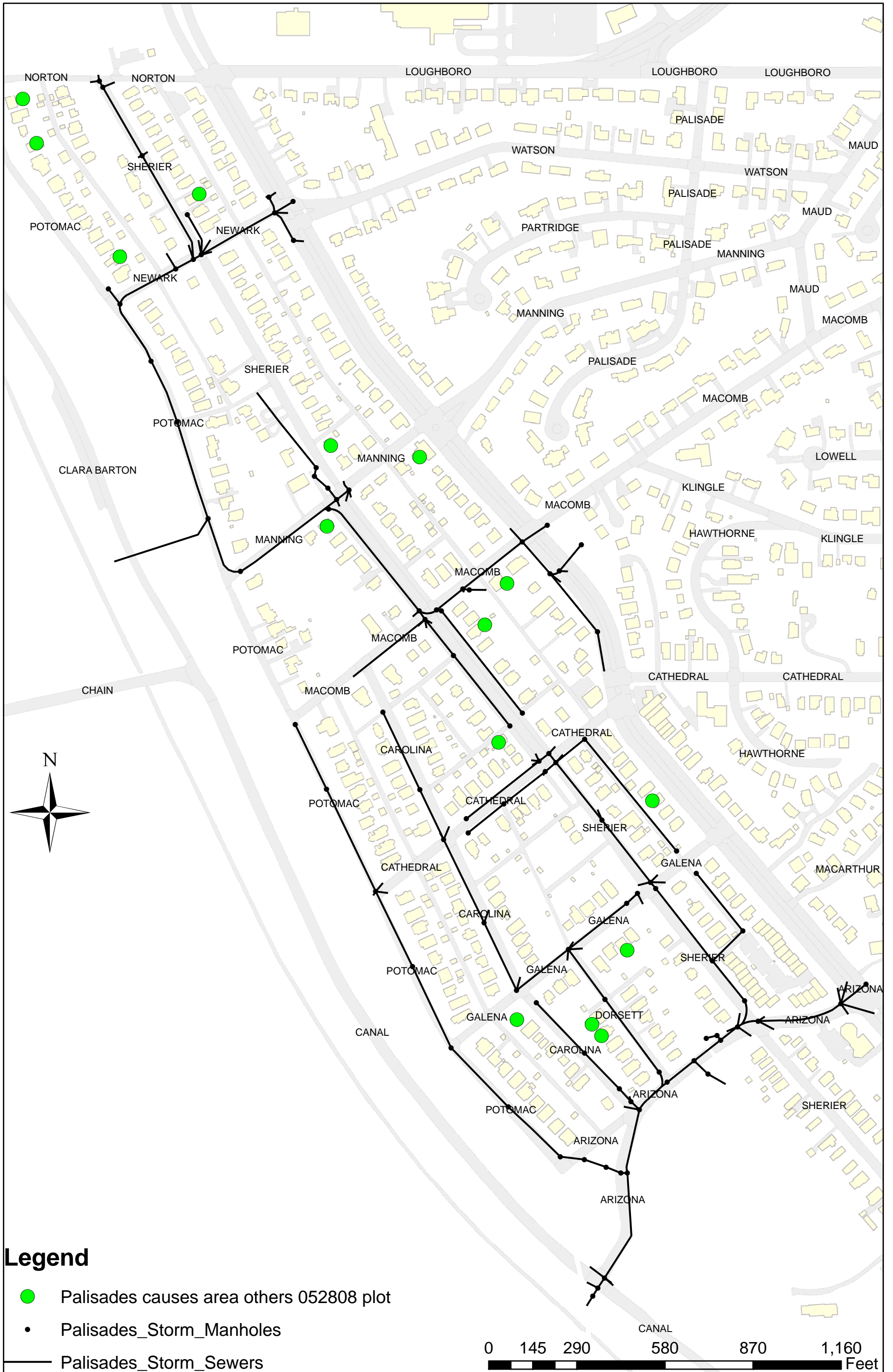


Palisades Flood Causes in Neighborhood - Plugged or Insufficient Inlets 052808





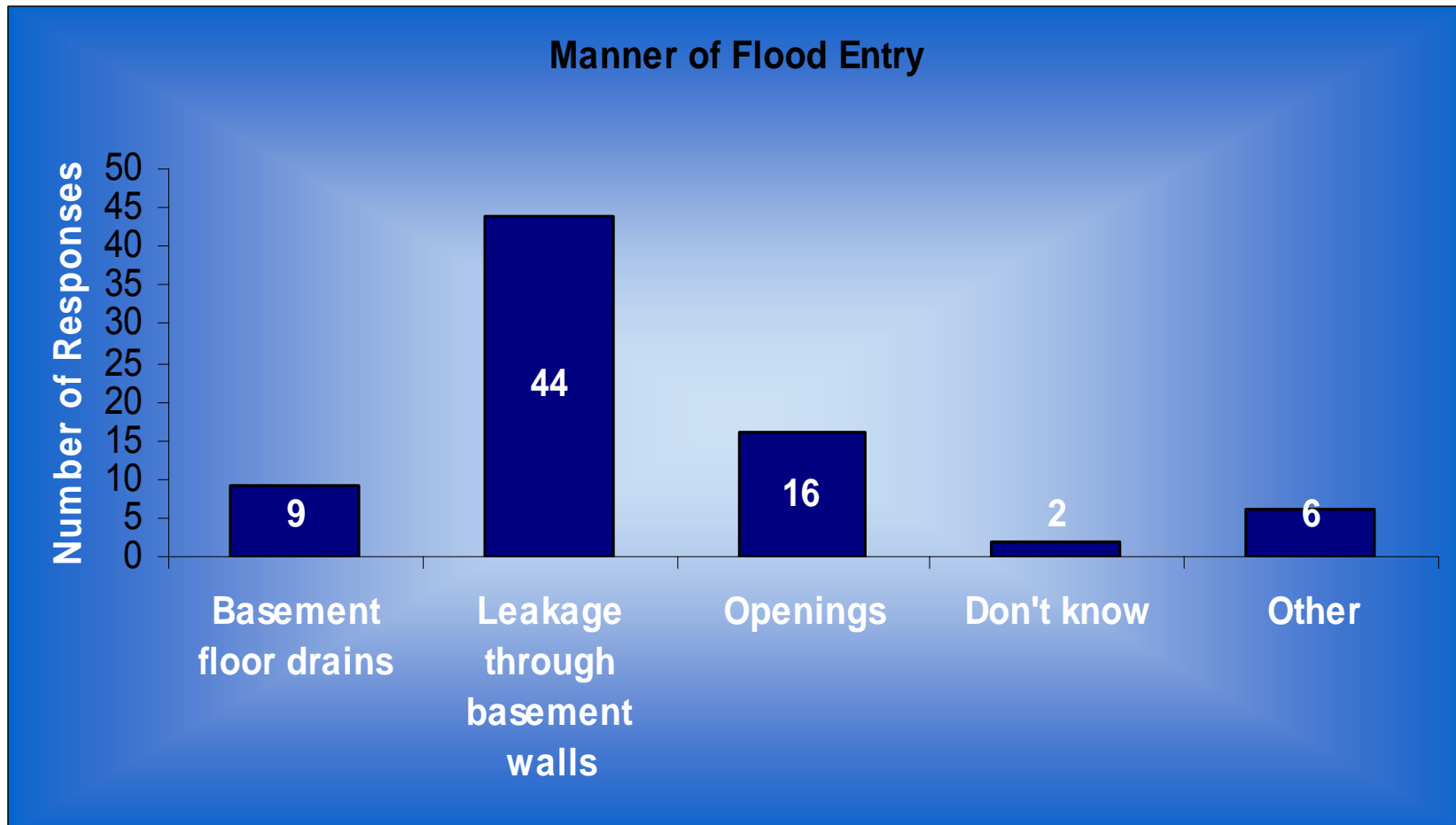
Palisades Flood Causes in Neighborhood - Not Enough Sewers 052808

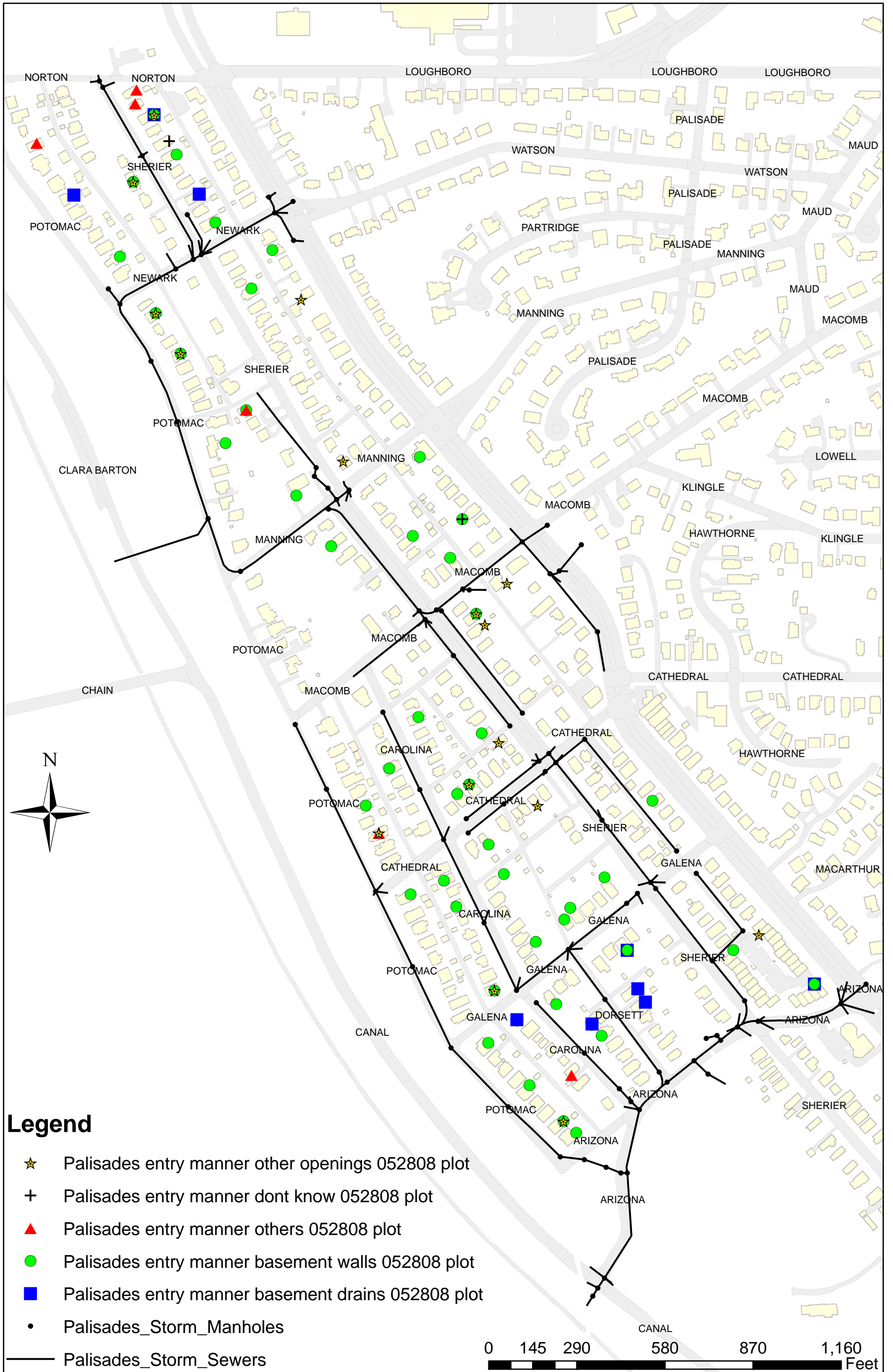


Palisades Flood Causes in Neighborhood - Others 052808

# Questionnaire Results

## ■ Manner of Flood Entry [Question # 5]





**Legend**

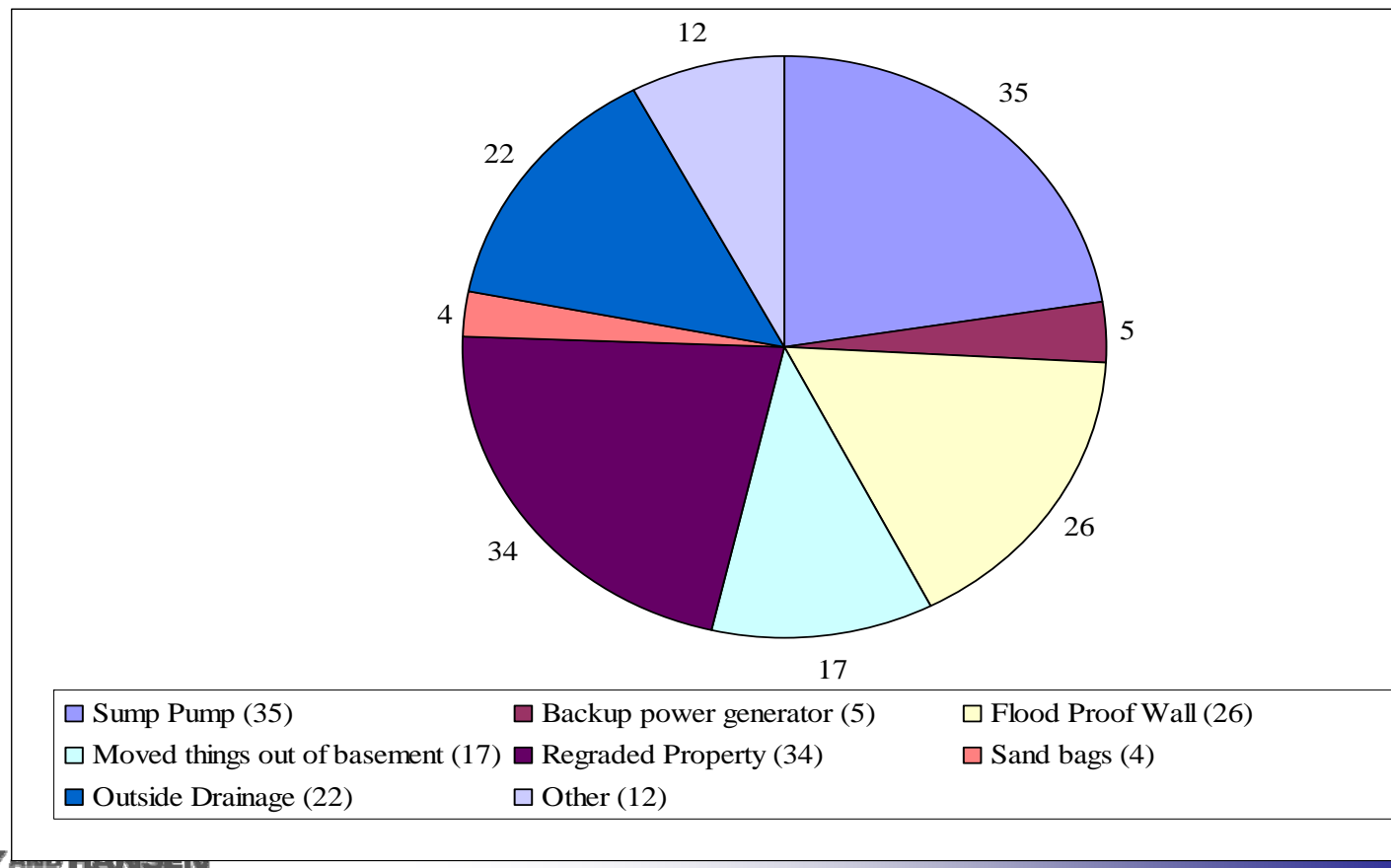
- ★ Palisades entry manner other openings 052808 plot
- + Palisades entry manner dont know 052808 plot
- ▲ Palisades entry manner others 052808 plot
- Palisades entry manner basement walls 052808 plot
- Palisades entry manner basement drains 052808 plot
- Palisades\_Storm\_Manholes
- Palisades\_Storm\_Sewers

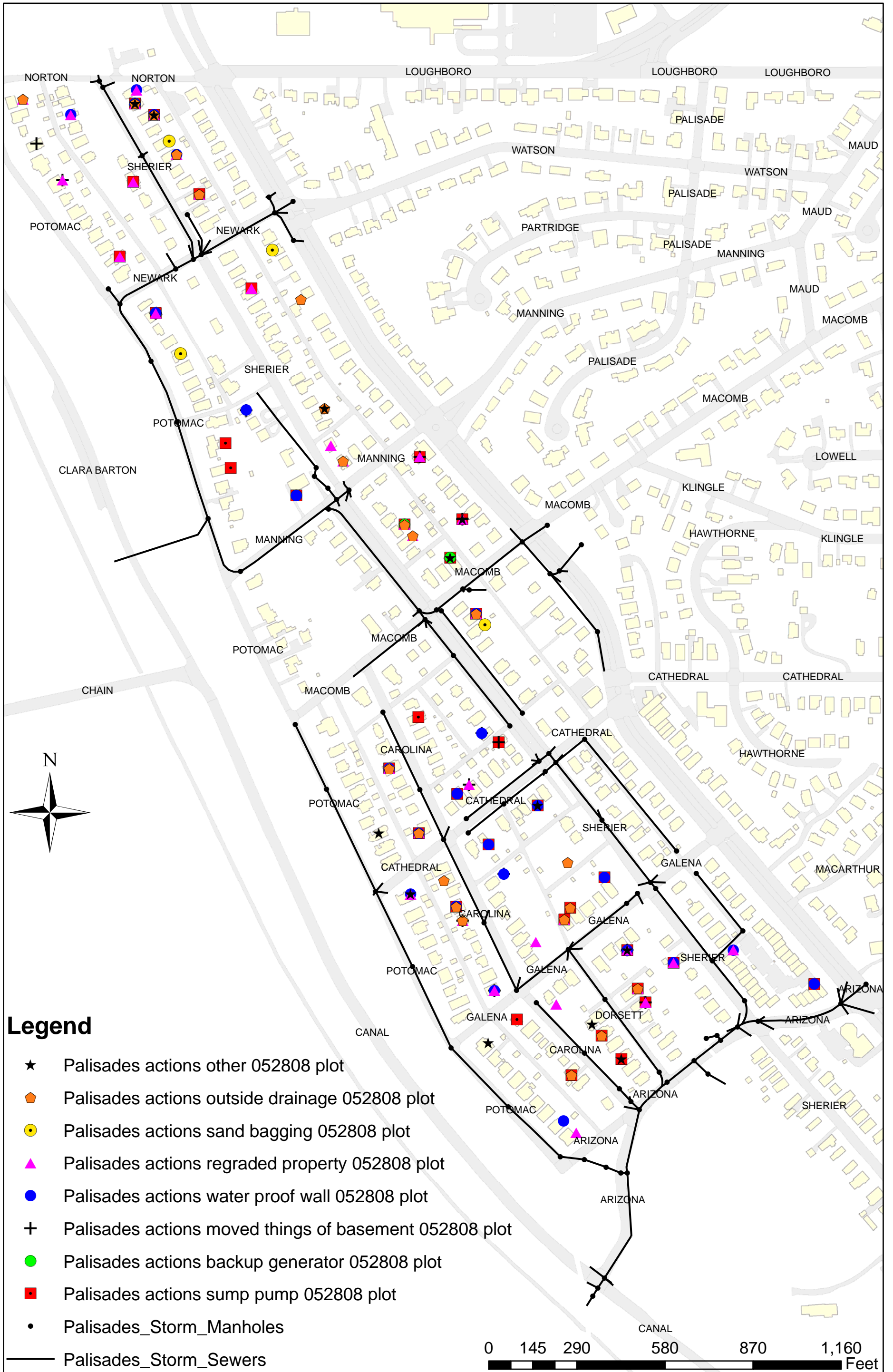
Palisades Flood Manner of Entry 052808

# Questionnaire Results

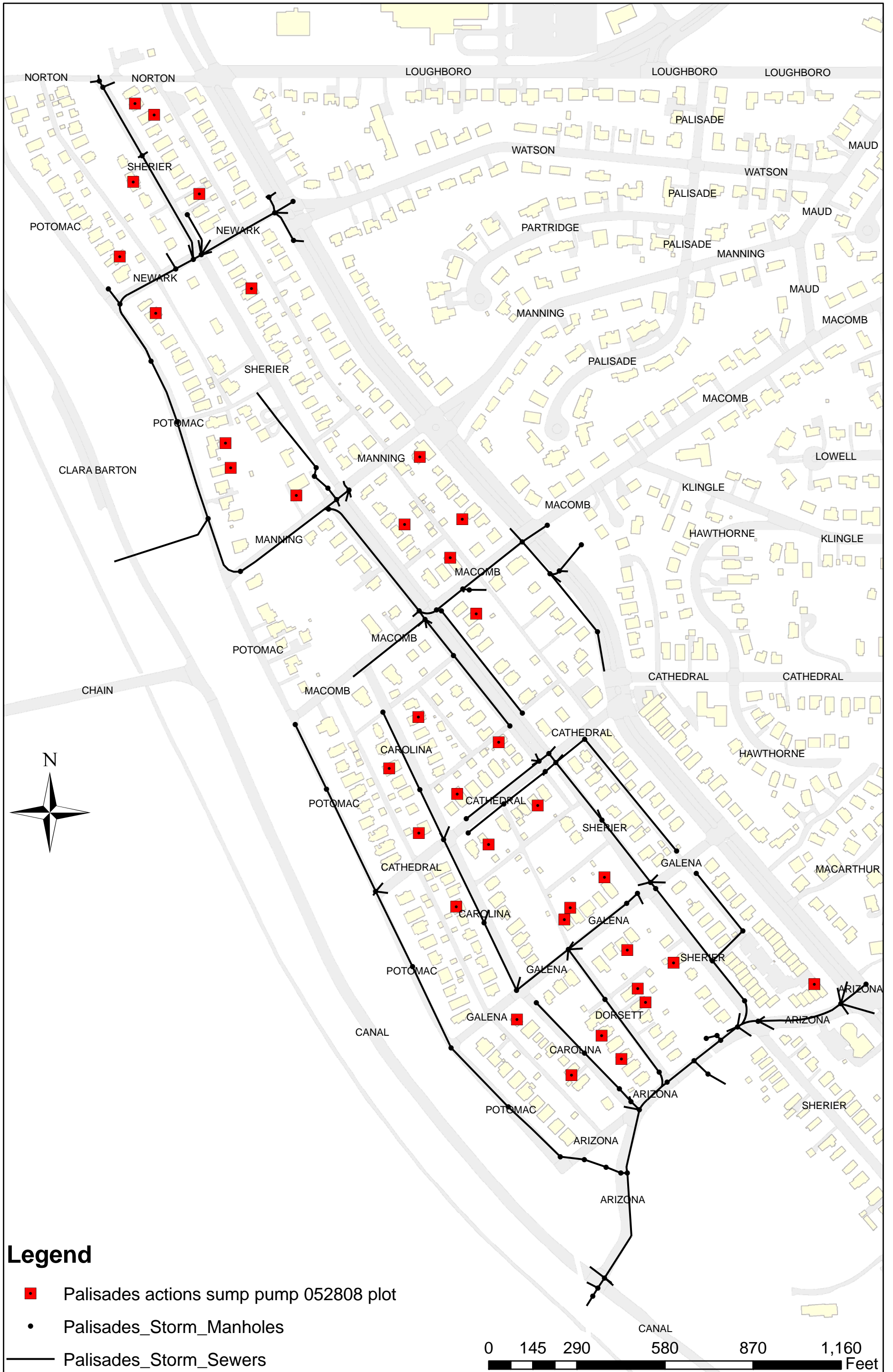
## ■ Measures Taken by Residents [Question # 11]

- ✓ 75 of the 108 respondents,  $\approx 70\%$
- ✓ 67 of the 79 respondents with flood problems,  $\approx 85\%$

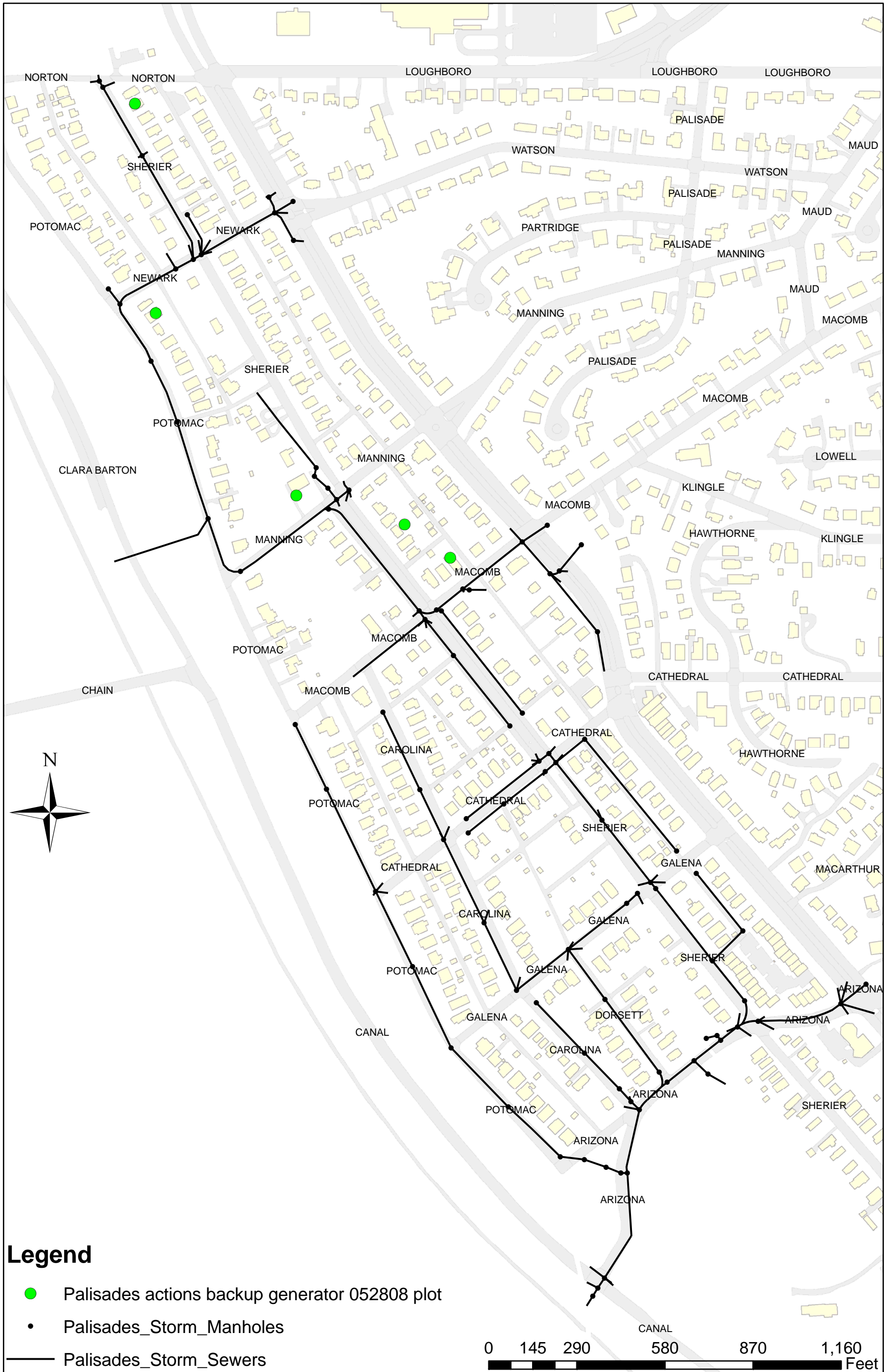




Palisades Action Taken by Residents 052808

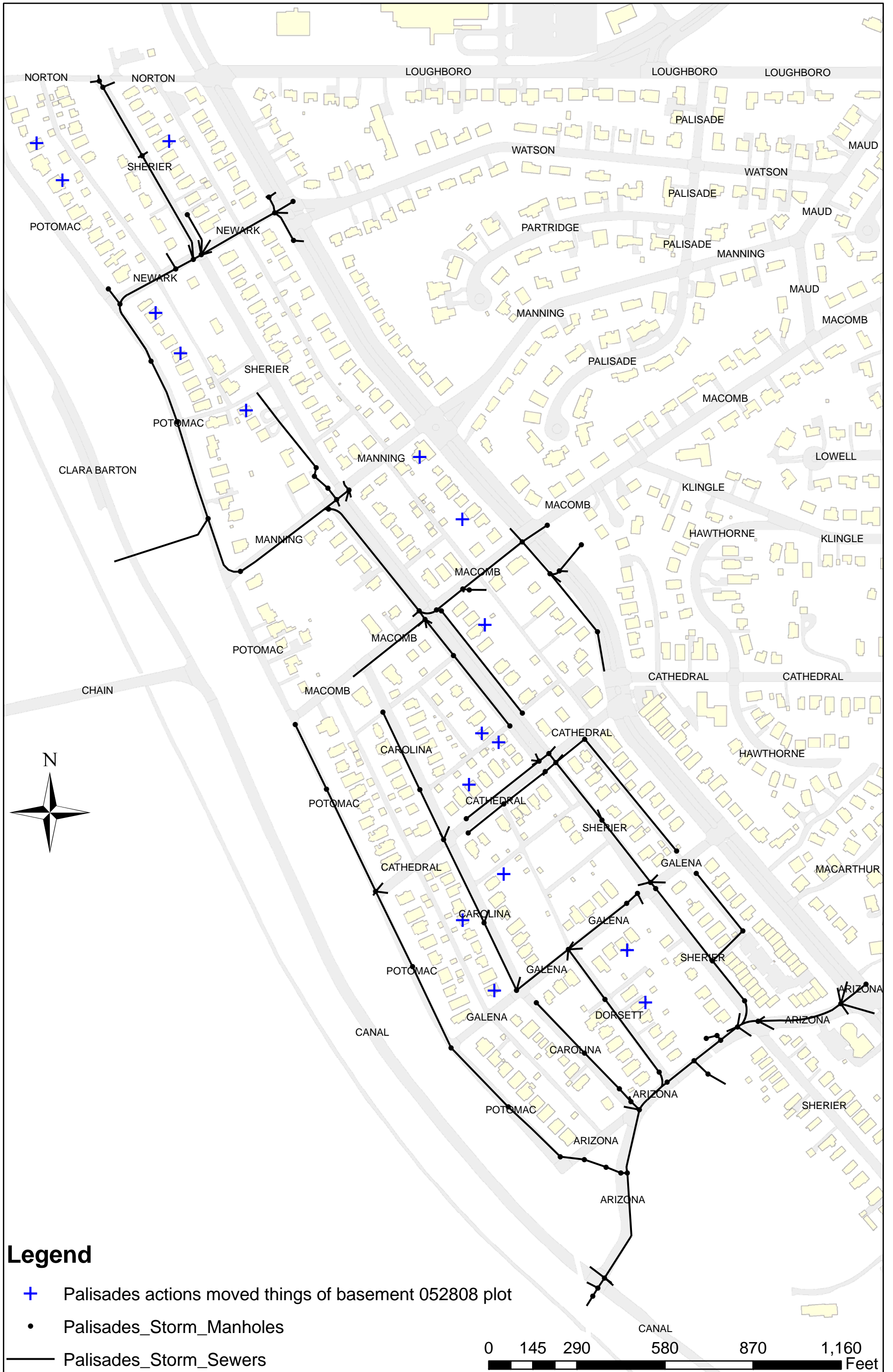


Palisades Action Taken by Residents - Sump Pumps 052808

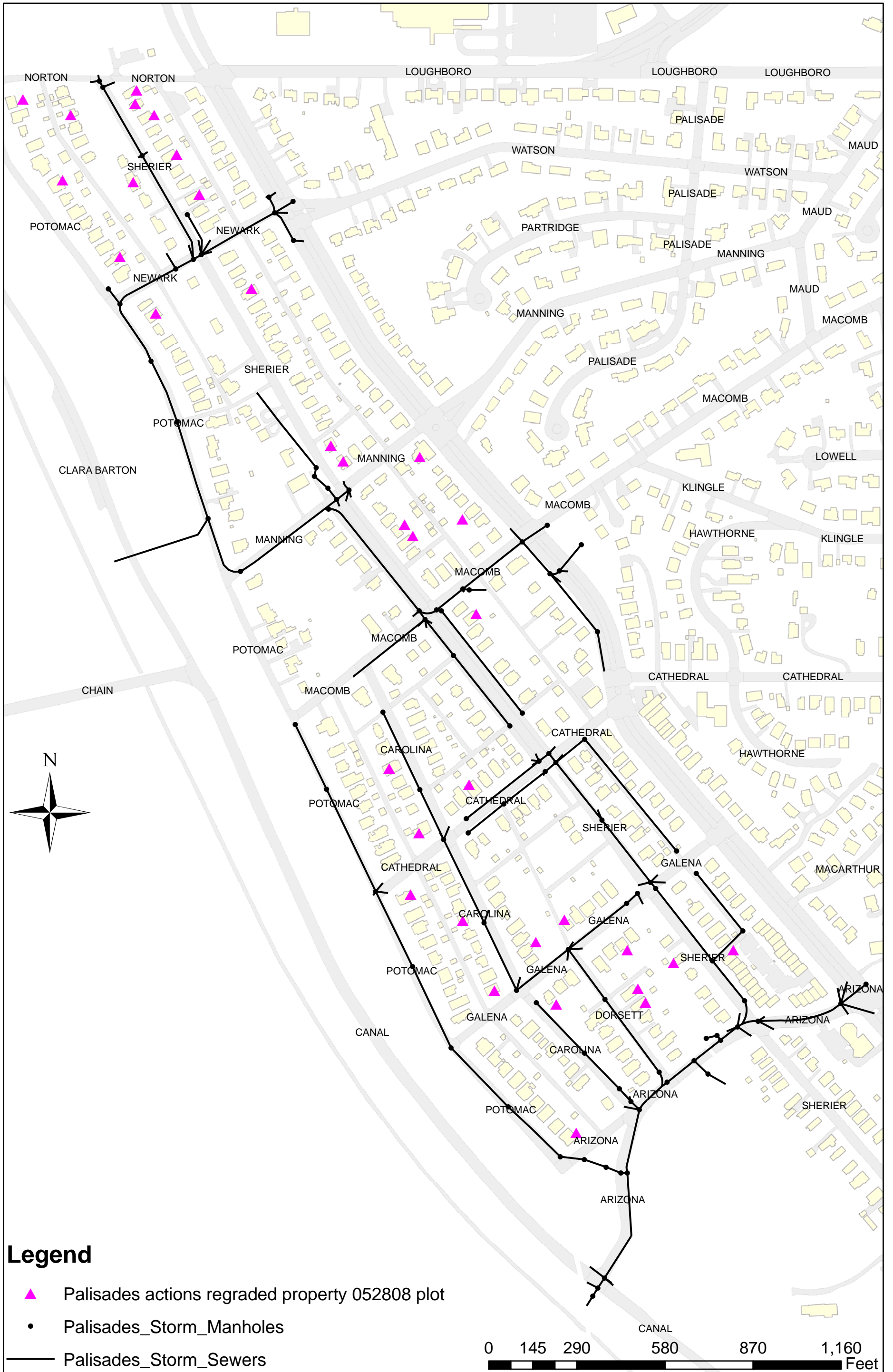


Palisades Action Taken by Residents - Backup Generator 052808

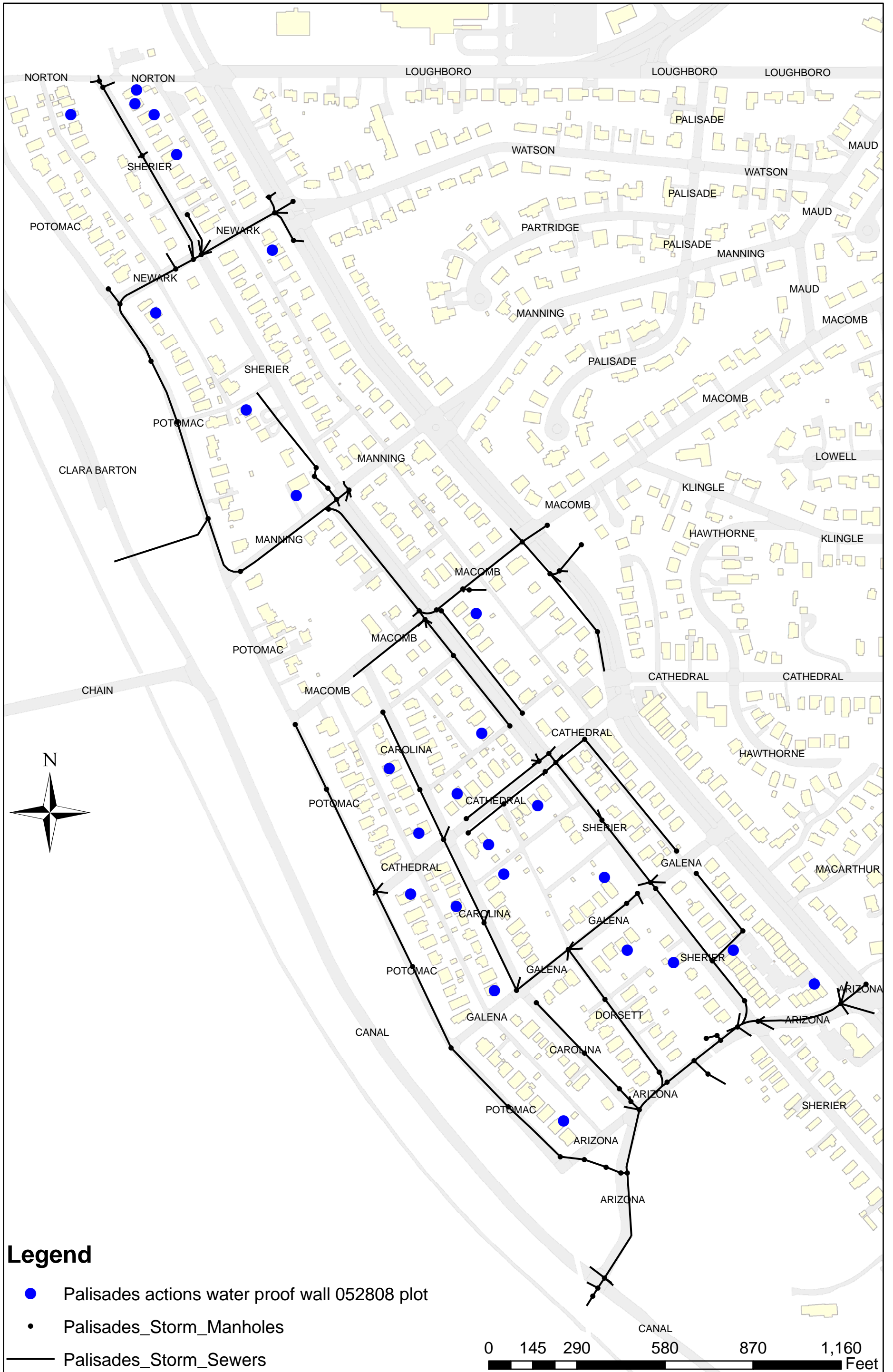




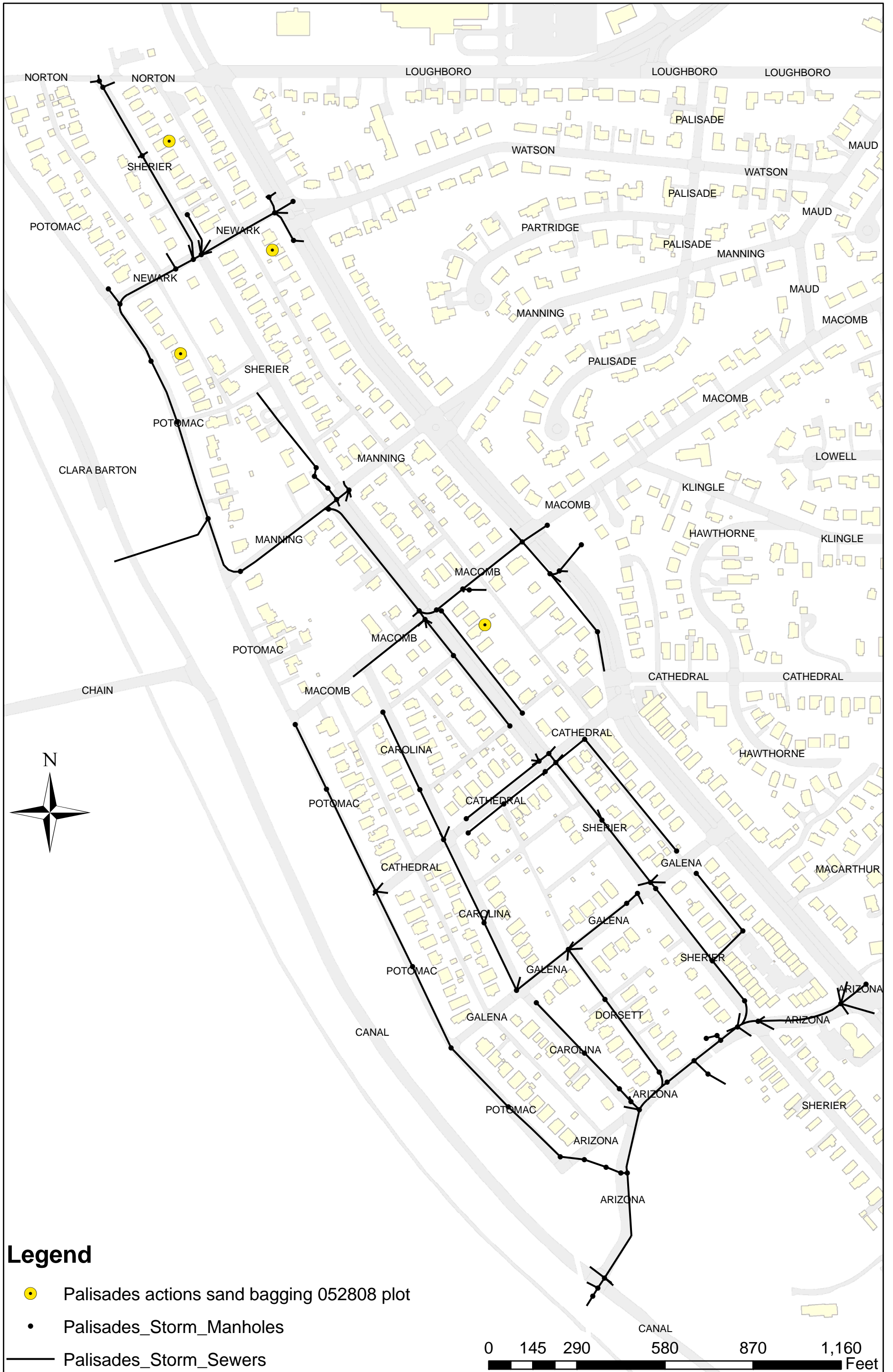
Palisades Action Taken by Residents - Moved Things Out Of Basement 052808



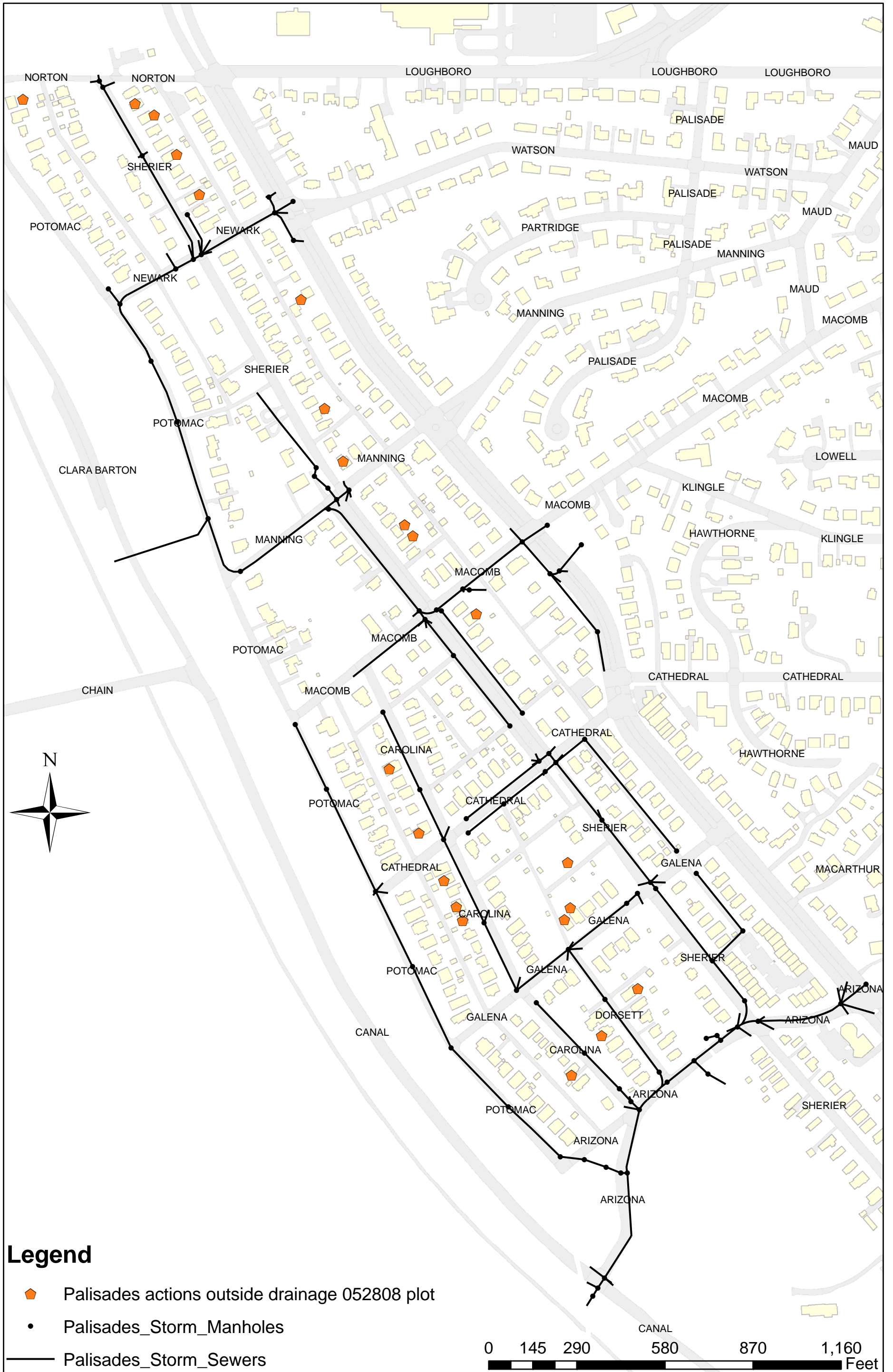
Palisades Action Taken by Residents - Regraded Property 052808



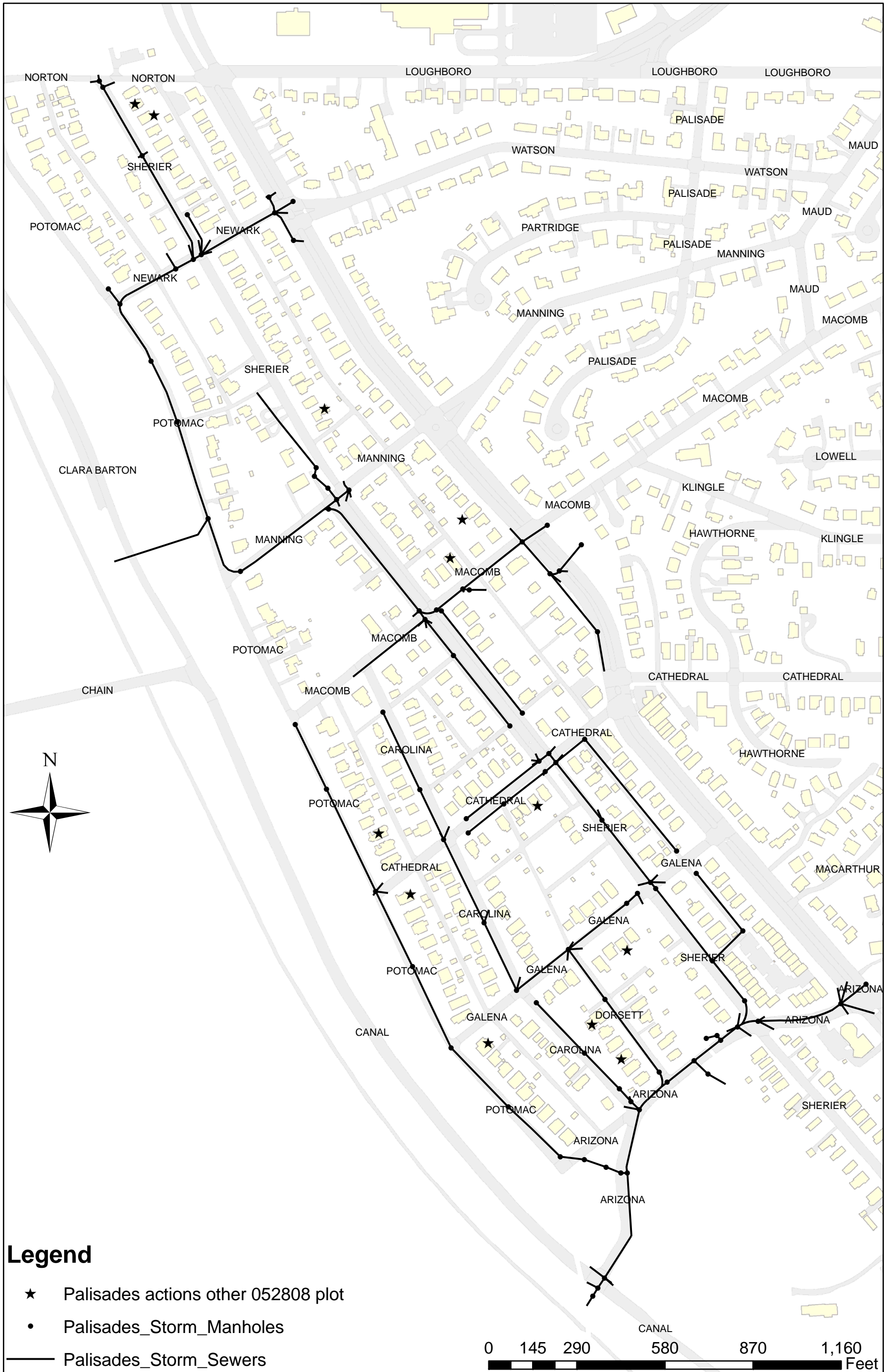
Palisades Action Taken by Residents - Flood Proof Wall 052808



Palisades Action Taken by Residents - Sand Bags 052808



Palisades Action Taken by Residents - Outside Drainage 052808



Palisades Action Taken by Residents - Other Actions 052808

# Questionnaire Results

## ■ Priorities for Sewer Improvement [Question # 12]

Minimize Drainage from adjacent properties	=	41
Maintain natural drainage system	=	37
Minimize damage from erosion	=	31
Limit damage to structures	=	25
Minimize street flooding	=	23
Minimize temporary ponding on properties	=	22



# Planning for Personal Interviews

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- **Purpose of Interview:**

- ✓ **Determine causes of flood problems**
- ✓ **Learn more about their experiences**
- ✓ **Collect personal records including visiting implemented measures**
- ✓ **Learn what preventive measures have worked best in this particular area**





# Planning for Personal Interviews

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- **Selection Criteria:**

- 1. Properties flooded 5 or more times in the past 10 years**
- 2. Residents who implemented at least 3 preventive measures to protect their property**
- 3. Residents who have documented their experiences and are willing to share with us**
- 4. Residents who, while living close to each other on the same block, reported flooding and non-flooding in an alternating pattern**
- 5. Other factors (geographic representation, interest, ...)**

# Sewer & Manhole Inspections

- **14,000 ft storm sewers inspected**
- Sewer pipes are generally in good condition
  - ✓ Observed problems include
    - **Operational: debris, grease deposits, ...**
    - **Structural: Not significant**
  - ✓ Data loading and processing in progress

# Pipe with Debris (M-4447 to M-4446)



# Pipe in good condition (M-4530 to M-4315)



# Sewer & Manhole Inspections

- 80 manholes inspected
  - In total, 111 manholes
  - 31 manholes not inspected b/c of access, paved over, high traffic reasons
  - Data loading and processing in progress
- Catch basin cleaning
  - ✓ 89 catch basins cleaned
    - Full of debris, leaves & other materials

M-4831



M-4831



M-4831







# Way forward

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- **Continue participating the public**
- **Process and compile data collected from questionnaire, personal interviews, CCTV & manhole inspections**
- **Integrate collected data with the hydraulic model**



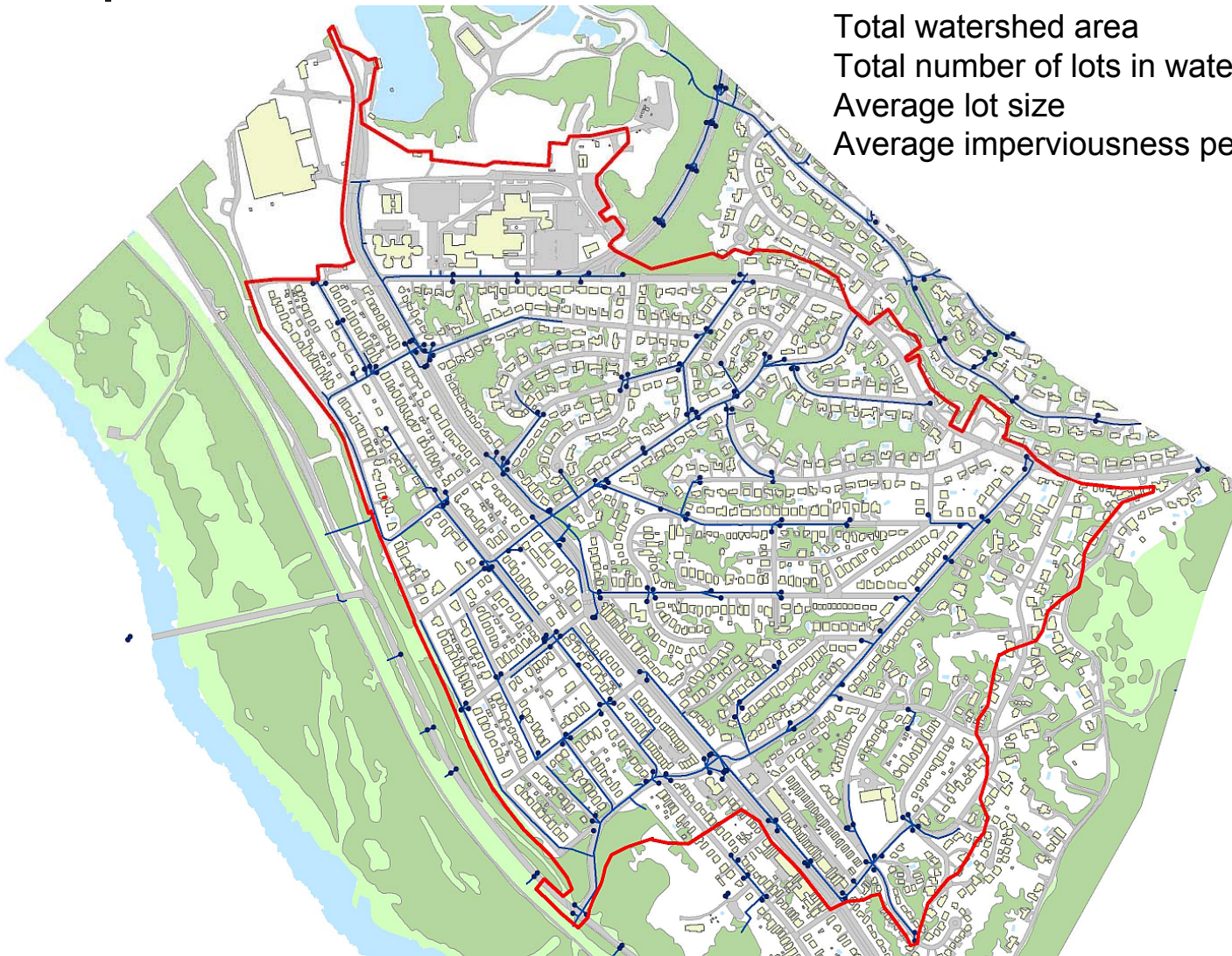
# Way forward

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- **Identify problems with the existing system**
- **Consider alternatives to mitigate flood problems in the area**
- **Provide recommendations**
- **Submit draft and final reports**

# Computer Modeling

Total watershed area = 358 acres  
Total number of lots in watershed area = 1701  
Average lot size = 6210 sq-ft  
Average imperviousness per lot = 42 %



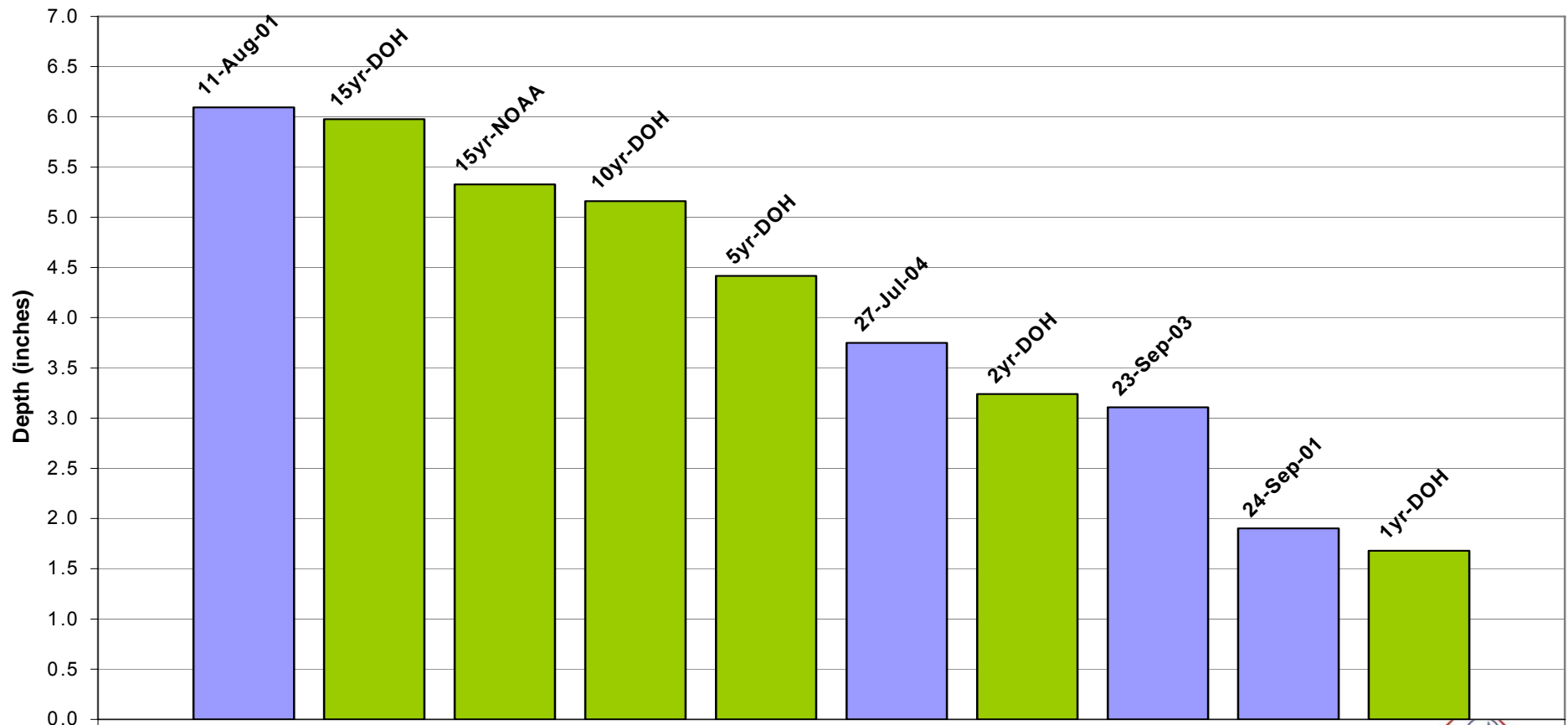
Legend:

-  Watershed area
-  Storm sewers
-  Catch basins
-  Project area

# Computer Modeling

## Rain Events and Design Storms

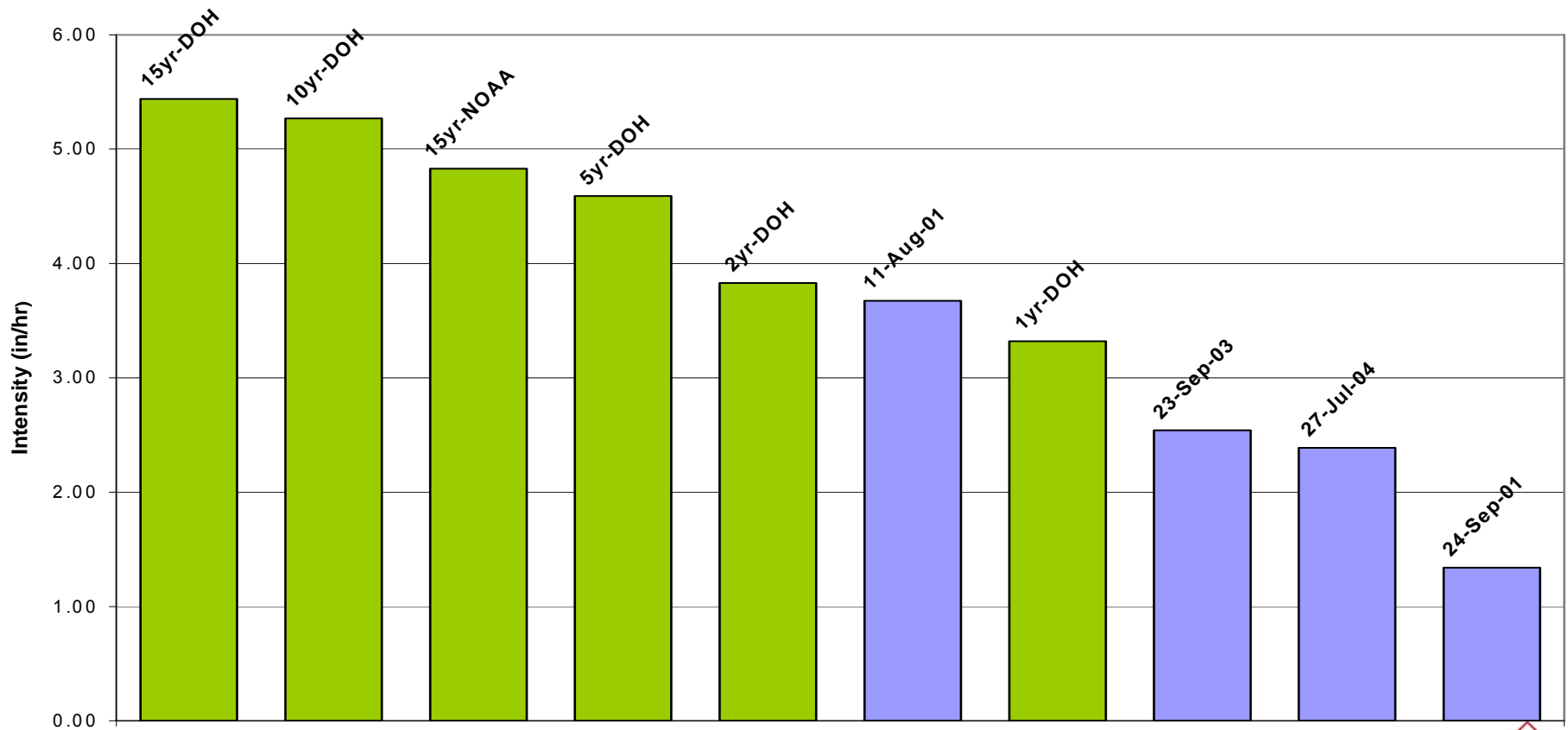
Total Precipitation Depths



# Computer Modeling

## Rain Events and Design Storms

Peak Precipitation Intensities





# Computer Modeling

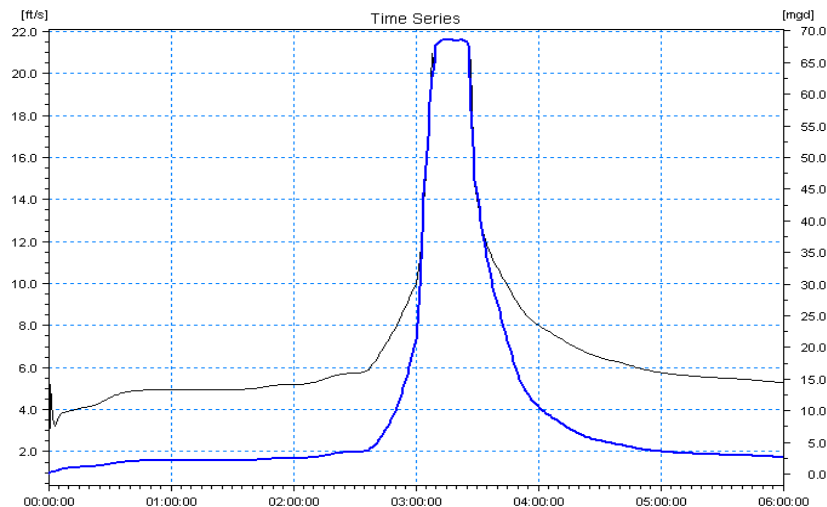
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- **Model components - hydrologic & hydrodynamic**
- **Model calibration**
- **Results can identify capacity problems**
  - ✓ **Theoretical capacity model**
  - ✓ **“Real world” model**
- **Use to test alternative improvements**

# Computer Modeling

## ■ Preliminary Findings

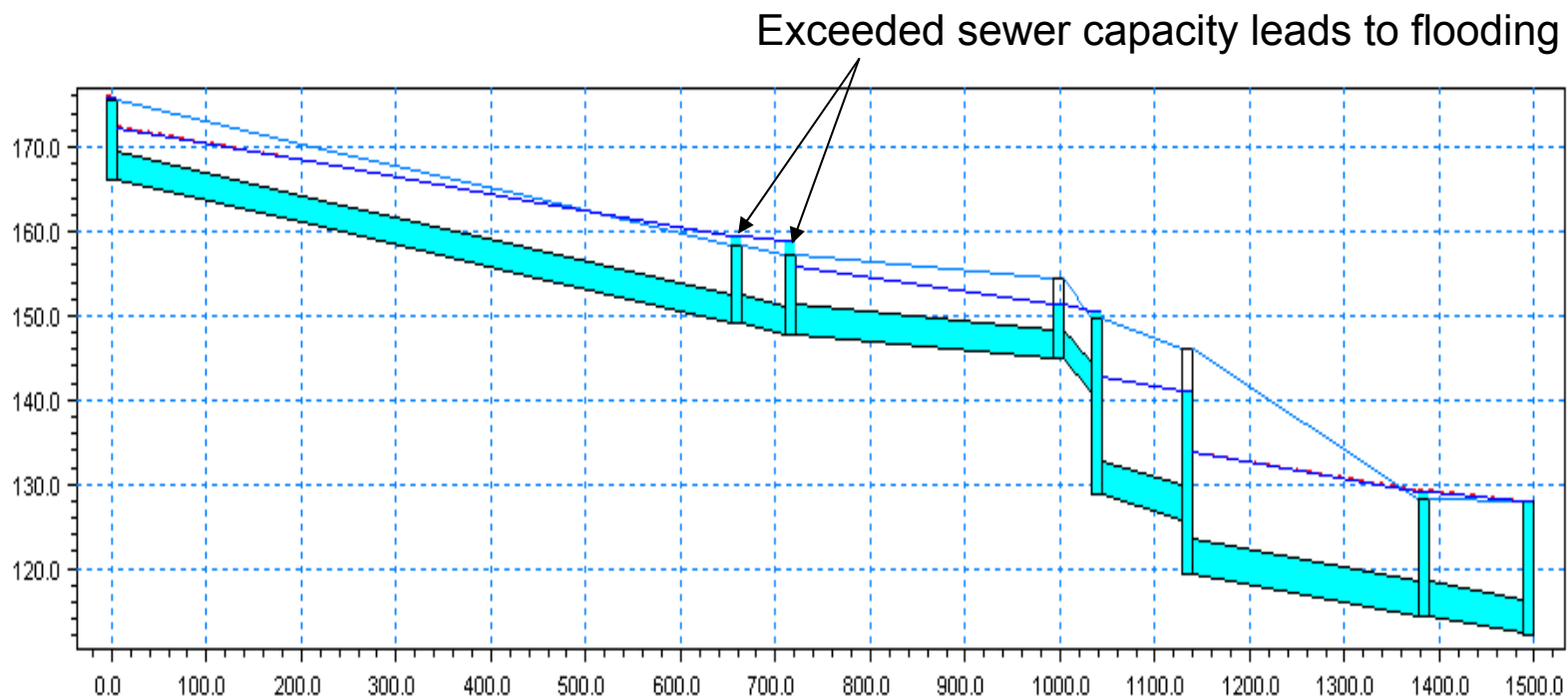
- ✓ Local sewer problems along AZ & Newark
- ✓ Trunk sewer problems along Maccomb, Sherier & Manning
- ✓ Steep slopes = high velocities = possible surcharge at manholes



# Computer Modeling

## ■ Preliminary Findings (cont.)

- ✓ Some inlets being bypassed





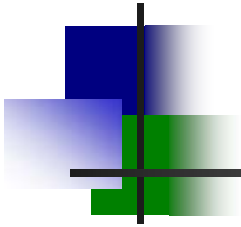


# Computer Modeling

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- **Next Steps**

- ✓ **Calibrate model**
- ✓ **Analyze impacts of changes in land use**
- ✓ **Calculate theoretical sewer capacity**
- ✓ **Calculate actual sewer capacity using inspection results**
- ✓ **Evaluate alternatives:**
  - Increase sewer capacities
  - Inlet locations
  - Reduce surface runoff



# Discussion