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# *Programmatic Approach to Management of PFAS:*

*One State's Strategy to Protect Human  
Health and the Environment*

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## **1. Overview of PFAS in Minnesota**

## **2. Programmatic Approach**

- a. Overview of the process
- b. Outcome/Results of the Pilot Program
- c. Next Steps

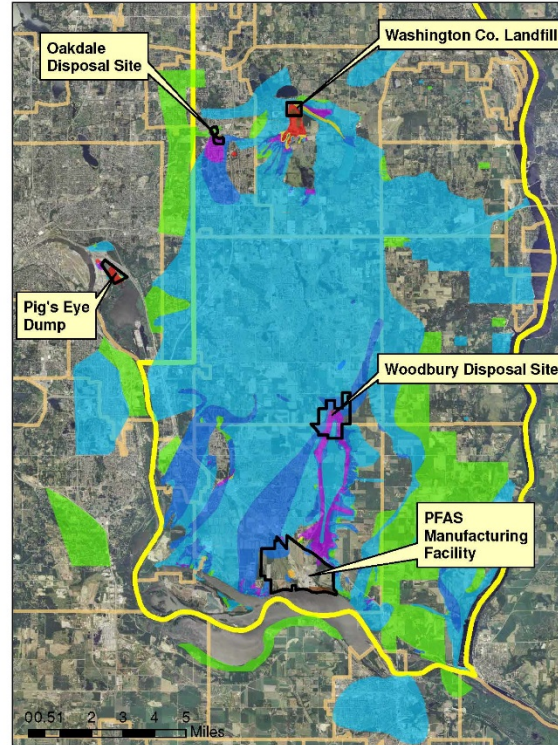
## **3. Applicability to other industries**

## **4. Questions?**

# Overview of PFAS in Minnesota

## PFAS manufactured since 1940s

- MDH/MPCA investigation of PFAS since 2002
- Criteria first developed in 2002
- Analytical method development started in 2003
- Water contamination in East metro- over 150 sq. miles and affecting 140,000 residents
- \$850M settlement (State vs 3M) in February 2018

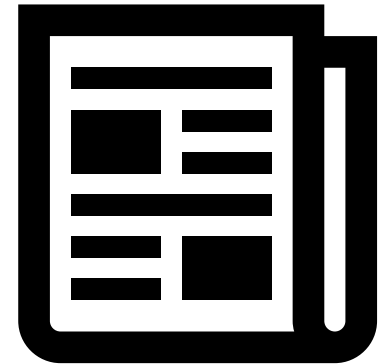


## Location of Legacy PFAS Sites in Washington Co., Minnesota



## Goals of the State

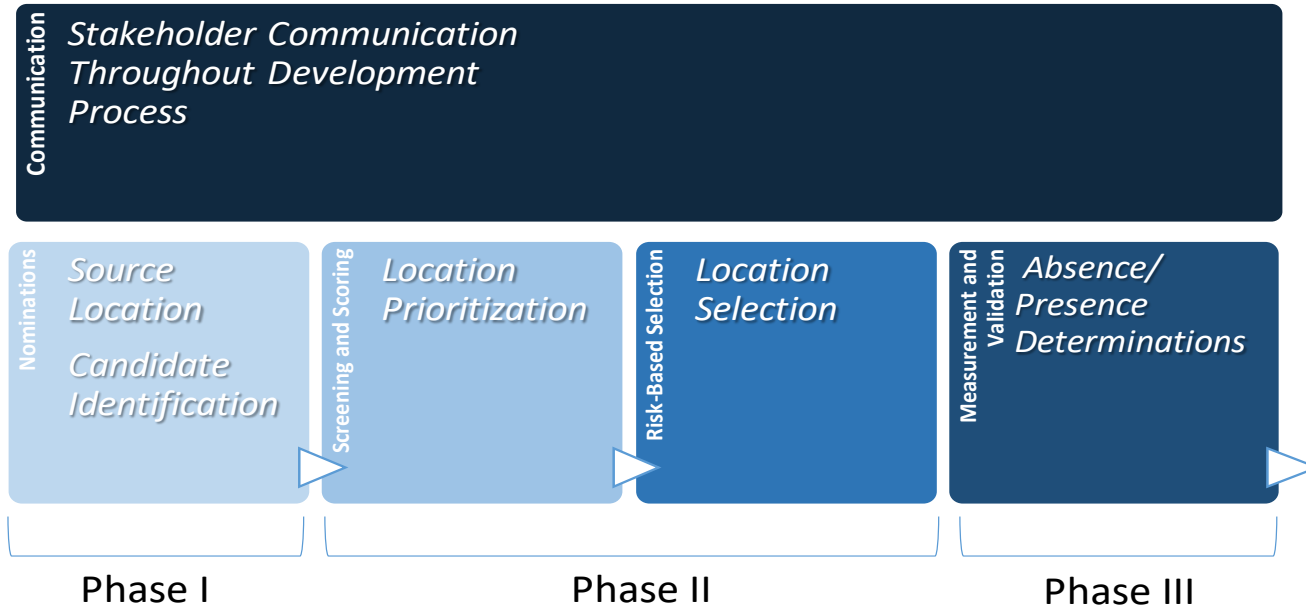
- ✓ Initiated in 2016
- ✓ Primary objective: Development of a protocol to evaluate and prioritize PFAS source locations across the State that is:
  - ✓ defensible,
  - ✓ well-documented,
  - ✓ reproducible,
  - ✓ financially feasible,
  - ✓ transparent.



# Programmatic PFAS Approach

## Overview of the Process- the theoretical model

Exhibit 1: PFAS Program Development Process



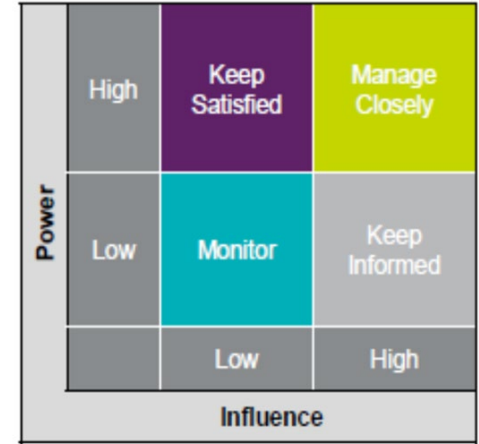
# Programmatic PFAS Approach



## Risk Communication Plan- WHO-Stakeholder Evaluation

For each type of stakeholders, the following was considered:

1. What should be communicated?
2. How should it be communicated?
3. When should it be communicated? At what frequency?
4. What will the opportunity be for feedback?



## WHAT- Development of Message Blocks

1. Bites- tidbits of information, easily digestible- a few sentences to a few paragraphs
2. Snacks- more information than bites, a half- to full-page of content
3. Meals- most information, 2-5 pages of informative content

## HOW- Development of Decision Framework for Execution

1. Roadmap for plan execution



# Programmatic PFAS Approach



## Phase I- Nominations

### Source Location/ Candidate Identification

The following location types are considered in development of the inventory:

- 1. Airports
- 2. Landfills
- 3. Military bases
- 4. Manufacturers
  - a. Chrome-plating
  - b. Textiles
  - c. Pulp and paper
  - d. Semiconductor
  - e. Treated papers
  - f. Leather tanneries
- 5. Municipal water suppliers

Primary NAICS	Primary NAICS Description
313210	Broadwoven Fabric Mills, Manmade Fiber and Silk
313310	Finishers of Broadwoven Fabrics of Manmade Fiber and Silk
314110	Carpets and Rugs
314999	Waterproof Outerwear
316110	Leather & Hide Tanning & Finishing
316998	All Other Leather Good & Allied Product Mfg
322121	Paper Mills
322219	Sanitary Food Containers, Except Folding
322220	Packaging Paper and Plastics Film, Coated and Laminated
323111	Commercial Printing, Lithographic
323120	Platemaking and Related Services
324110	Petroleum Refining
324110	Oil Refineries
324191	Lubricating Oils and Greases
325510	Paints, Varnishes, Lacquers, Enamels, and Allied Products
325611	Perfumes, Cosmetics, and other Toilet Preparations
325612	Specialty Cleaning, Polishing, and Sanitation Preparations
326113	Unsupported Plastics Film and Sheet
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring
332999	Metal Foil and Leaf
333249	Surgical and Medical Instruments and Apparatus
333318	Service Industry Machinery, Not Elsewhere Classified
334413	Semiconductor and Related Device Manufacturing
424690	Chemicals and Allied Products, Not Elsewhere Classified
488119	Airports
561740	Carpet and Upholstery Cleaning
562212	Landfills
928110	National Security (DoD sites)



# Programmatic PFAS Approach



## Phase II- Screening/Scoring Location Prioritization

1. Rank of 4 if direct application to environment (AFFF)
2. Rank of 3 if PFAS assumed in multiple parts of the process and used in higher frequency or volume
3. Rank of 2 if PFAS assumed in after-market application
4. Rank of 1 if PFAS assumed in smaller volumes or less known about process inputs

Primary NAICS	Primary NAICS Description
<b>HIGH (4)</b>	
488119	Airports
928110	National Security (DoD sites)
324110	Petroleum Refining
324110	Oil Refineries
<b>MEDIUM TO HIGH (3)</b>	
316110	Leather & Hide Tanning & Finishing
316998	All Other Leather Good & Allied Product Mfg
323120	Platemaking and Related Services
324191	Lubricating Oils and Greases
325510	Paints, Varnishes, Lacquers, Enamels, and Allied Products
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring
424690	Chemicals and Allied Products, Not Elsewhere Classified
562212	Landfills
<b>MEDIUM (2)</b>	
313310	Finishers of Broadwoven Fabrics of Manmade Fiber and Silk
314110	Carpets and Rugs
314999	Waterproof Outerwear
322219	Sanitary Food Containers, Except Folding
322220	Packaging Paper and Plastics Film, Coated and Laminated
326113	Unsupported Plastics Film and Sheet
334413	Semiconductor and Related Device Manufacturing
313210	Broadwoven Fabric Mills, Manmade Fiber and Silk
<b>LOW (1)</b>	
322121	Paper Mills
323111	Commercial Printing, Lithographic
325611	Perfumes, Cosmetics, and other Toilet Preparations
325612	Specialty Cleaning, Polishing, and Sanitation Preparations
332999	Metal Foil and Leaf
333249	Surgical and Medical Instruments and Apparatus
333318	Service Industry Machinery, Not Elsewhere Classified
561740	Carpet and Upholstery Cleaning





# Programmatic PFAS Approach



## Phase II- Risk-Based Selection

### Location Selection –using multiple inputs

1. Potential Pathway Evaluation
  - ✓ Supply and Private Wells
  - ✓ Municipal Wells
  - ✓ Wellhead Protection and Aquifer Sensitivity Areas
  - ✓ Surface Water
2. Receptor Evaluation
  - ✓ Educational Facilities
  - ✓ Daycare Facilities
  - ✓ Medical Facilities

\*Evaluation at 100, 200, 500 ft from potential locations



# Programmatic PFAS Approach



## Phase II- Risk-Based Selection

### Location Selection –using multiple inputs

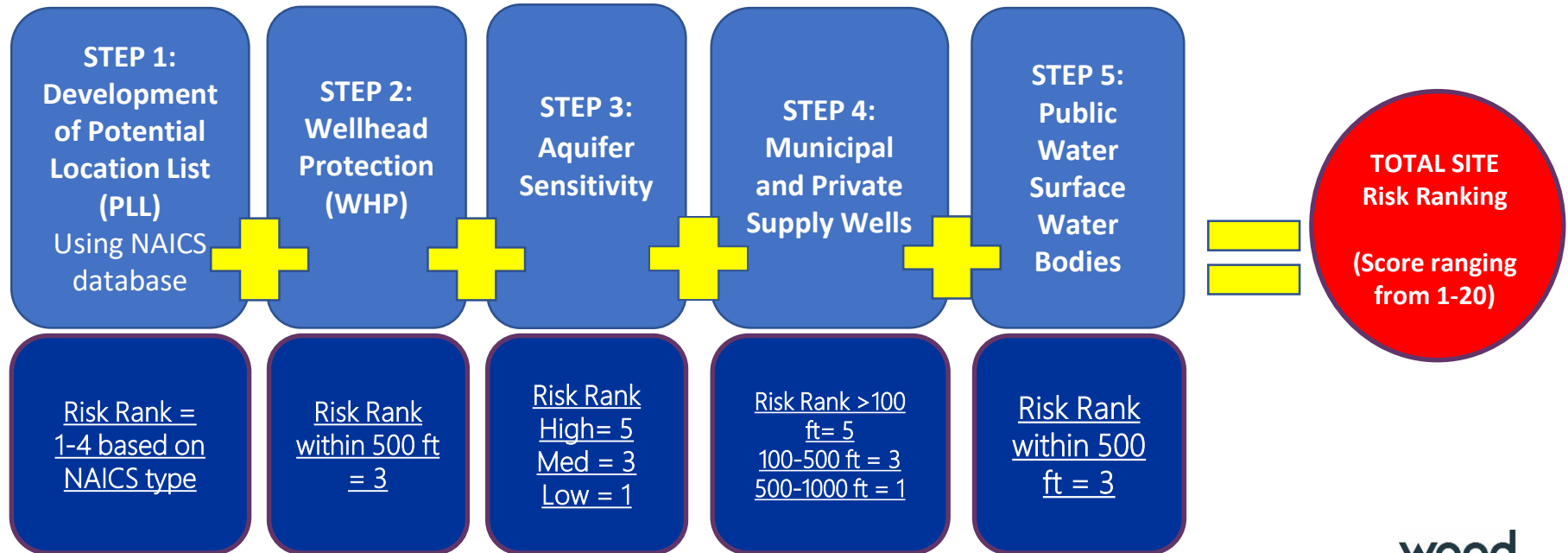
3. Evaluation of Other Sources
  - ✓ Landfills
  - ✓ Tank sites
  - ✓ Leak sites/remediation sites/Brownfield sites
  - ✓ Wastewater permits
4. Evaluation of Existing PFAS Data
  - ✓ Ambient monitoring well program
  - ✓ Closed landfill program
  - ✓ Surface water sampling
  - ✓ WWTP sampling

\*Evaluation within 500 ft from potential locations



# Programmatic PFAS Approach

## Quantitative Outcome/Results of the Pilot Program



# Programmatic PFAS Approach



## Quantitative Outcome/Results of the Pilot Program

**Airport**  
County, MN

**SUMMARY**

Site Name:	Airport	Level II Rank Score:	17/20
Current Address:	ST W	- NAICS Rank:	4
County:	Dakota	- Wellhead Protection Rank:	0
Parcel ID:		- Aquifer Sensitivity Rank:	5
		- Private/Supply Wells:	5
		- Surface Water:	3

NAICS Code: 488119 – Airports

**NAICS SITE DESCRIPTION AND OPERATIONS**

The Site property is approximately 310-acres in size, comprised of multiple parcels of land, located at a County. The property includes an administration office building, approximately 90 aircraft hangars, airfield equipment, and storage buildings with associated paved parking areas, drives, and aircraft pavement. The operates the facility which houses 133 aircraft based at the airport, and experiences more than 33,000 operations annually.

The Site is classified under NAICS code 488119 – Airports. Industries classified under that code are primarily engaged in operating international, national, or civil airports or public flying fields, or, supporting airport operations, such as rental of hangar space, and providing baggage handling and/or cargo handling services.

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**Airport**  
County, MN

**GROUNDWATER AND SURFACE WATER INFORMATION**

As shown on the Site Figure, the Site does not fall within a Wellhead Protection Area. The closest wellhead protection area (F ) is located 1.4 miles to the northeast.

One groundwater supply well is located within 500-feet of the Site. A commercial supply well (ID registered to ) is located on-Site. Based on regional topography, Site groundwater is anticipated to flow to the northeast.

An unnamed stream, a Public Waters Watercourse, appears to be channelized, flowing from west to east, across the northern portion of the Site. The unnamed stream empties to the River, located approximately 3-miles to the east of the Site

**COMMUNITY INFORMATION OF INTEREST**

Daycares, schools, and medical and long-term care facilities were evaluated to determine potential community populations that either live or spend time in the vicinity of the site. Findings from the community evaluation are presented in the table below. No communities of interest were located within 500-feet of the Site property.

Community Type	100 ft	200 ft	500 ft
Daycares	0	0	0
Schools	0	0	0
Medical & Long-term Care Facilities	0	0	0

**OTHER RELEVANT INFORMATION**

In addition to the information discussed above, various MPCA environmental databases were queried to determine the potential presence of various known contamination sources in the area of the Site. As shown in the table below, MPCA records indicate the presence of two registered storage tanks associated with the Site, and the presence of six remediation sites within 500-feet of the Site property.

Site	On-Site		Within 500-ft of Site			
	Registered Landfills	Registered Tanks	Closed Landfills	MPCA Remediation Sites	Brownfield Sites	Wastewater Permits
Total	No	2	0	6	0	0

Additionally, the majority of the Site falls within a high vulnerability aquifer as defined by the Minnesota Water Table Aquifer Vulnerability database. High vulnerability aquifers are defined as vertical water movement reaching the aquifer within several hours to years. A low vulnerability aquifer underlays portions of the southwest corner of the Site, with water anticipated to reach the aquifer within several decades to over a century in these areas.

**EXISTING PFAS INFORMATION**

The results of previous MPCA PFAS sampling events from across the State were queried to determine if environmental PFAS detections have been reported to date in proximity to the Site. As indicated in the following table, no PFAS detections from targeted sampling events have been reported within one-mile of the Site.

Site	Ambient Groundwater Sampling	Closed Landfill Program Sampling	Wastewater Treatment Plant Sampling	Surface Water Sampling
1-mile	No	No	No	No

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- ✓ Site profiles are developed for high-ranked sites.
- ✓ Profiles used to support Phase III – measurement and verification and rationale for evaluation
- ✓ Profiles intended to support PMs

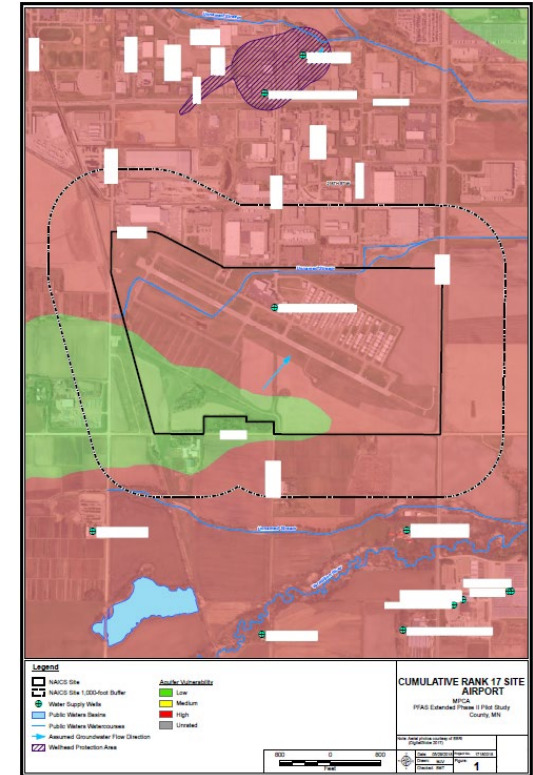


# Programmatic PFAS Approach



## Quantitative Outcome/Results of the Pilot Program

- ✓ Site profiles are accompanied by comprehensive cumulative risk-rank map
- ✓ Map provides visual representation of potential pathway, receptor, and source evaluation
- ✓ Profiles and accompanying map provide communication tool that illustrates consistent, reproducible, validated programmatic approach



# Programmatic PFAS Approach



## Next Steps

- Data Gap evaluation
- Protocol verification
- Phase II Expansion of geography to Statewide Superfund Permanent List of Priorities (PLP-92 sites total)
- Phase III-Measurement and verification



## Proactive Desktop Liability Management

- This protocol can be modified to support emerging contaminants liability management for any organization
  - Establishes a risk-based asset management tool that systematically considers the following for any asset:
    - Potential pathways
    - Potential receptors
    - Potential offsite sources

# Questions?

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