

Navigating the PFAS Puzzle: Strategic Assessment and Prioritization for Stormwater Management



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What are we finding?



- Getting the full picture on PFAS can be challenging, and stormwater has unique issues.
- Technical challenges
- Climate of regulatory uncertainty and inconsistency
- Is it better just not to look under the bed?



Technical Challenges



- Approach, process and outcomes
 - Data gathering and review
 - Hydrology and hydraulics analysis and approach
 - Prioritization of drainage areas
 - Conceptual alternatives development and recommendations
 - Implementation - full design, BMPs, remedial measures



Regulatory challenges



- When and how to initiate site investigation
- Federal and State regulatory frameworks vary
- Agency decision making – rule, policy, guidance, best professional judgement
- NPDES permitting
 - Permit coverage – yea or nay?
 - Effluent limits, benchmarks, BMPs
- Companies with facilities in multiple jurisdictions face consistency issues



NPDES Discharge Authorization & Permit Coverage



- Existing stormwater general permits may not authorize discharges of PFAS constituents
 - May authorize discharge of “treated” stormwater
 - Does “Treatment” = BMP?
- Site-specific individual permit may be needed
- Consent order can be an option





Federal Administration & PFAS News



Federal rules/actions that were in progress are largely paused; State actions/leadership role is key – many unknowns

Safe Drinking Water Act EPA moving forward with rules to rescind MCLs on PFHxS, PFNA, HFPO-DA, and Hazard Index mixtures; leave existing PFOA and PFOS MCLs intact; and extend the compliance deadlines by up to two years. [Comment period ended 7/20/2026]. Litigation over the rule is also proceeding.



Federal Administration & PFAS News



CERCLA

- EPA's Hazardous Substance designations for PFOA and PFOS remains in effect, but subject to challenge in court.
- The EPA Regional Screening Level tables include 37 PFAS entries (16 unique chemical structures).



Federal Administration & PFAS News



Clean Water Act

- PFAS Human Health Water Quality Criteria remain in draft form.
- EPA's draft 2026 Multi-sector General Permit (MSGP) contains conditions for monitoring PFAS.



Administrator Zeldin Announces Major EPA Actions to Combat PFAS Contamination

April 28, 2025



- Strengthen PFAS science: Agency lead, test strategy, air data collection, address data gaps
- Fulfill obligations: Develop ELGs for PFAS manufacturers and metal finishers; address compliance, RCRA, TRI, CWA and TSCA enforcement
- Build partnerships: Remediation, state assistance, risk assessment tools, support investigations



PFAS Stormwater Evaluations and Best Management Practices (BMPs)



- Approach to data collection and evaluation
- Prioritization is key
- Conceptual design, remedial actions, other BMPs
- Design and implement solutions

What problem are we working to solve?



Industrial sites with
PFAS impacted areas



Desire to be responsive
to agency actions,
permitting, new
requirements



Need a way to prioritize
areas of the site for
potential BMPs



Develop conceptual
alternatives for priority
drainage areas



Decision framework to
determine implementation of
recommendations

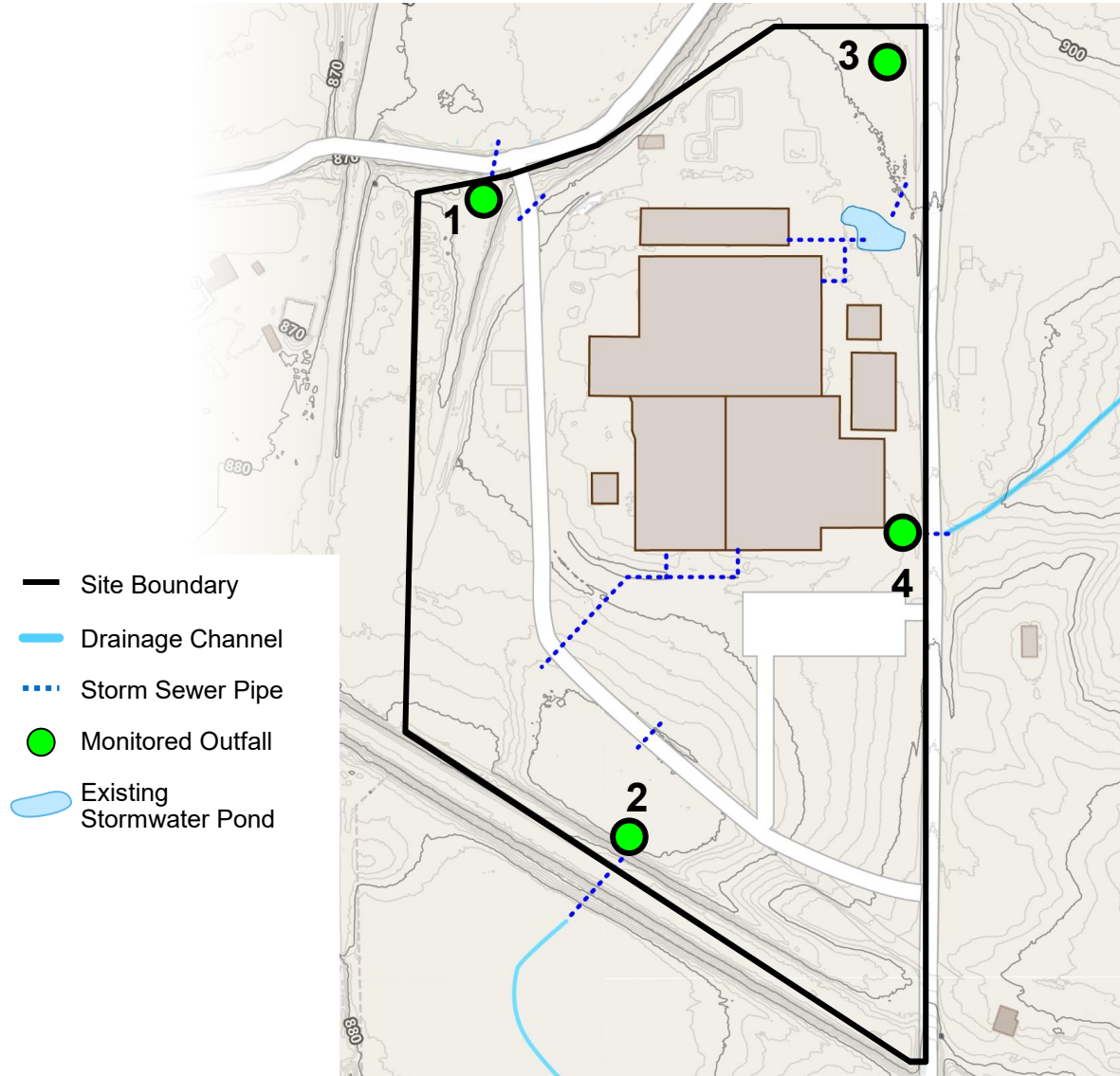


Stormwater Evaluation Approach



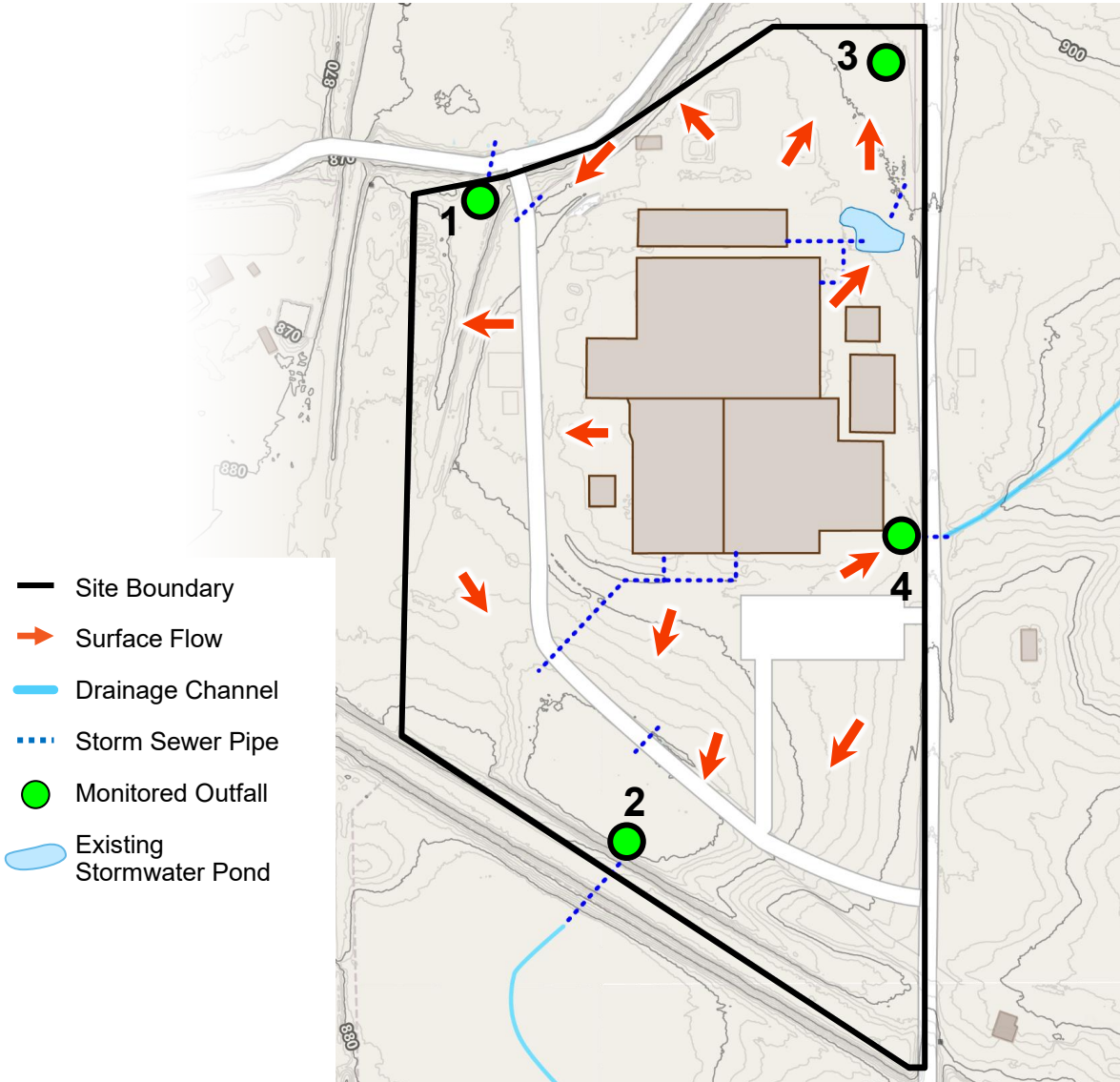
- Review and analyze site-specific data
 - PFAS stormwater sample results at outfalls and within sub drainage areas (if available)
 - Storm sewer, roof drains
 - Topographic data
- Delineate drainage areas to each monitored outfall and any additional offsite discharge locations
- Evaluate stormwater discharges using various hydrologic & hydraulic (H&H) routing models
- Use the site data and model outputs to assign relative priority to each of the site's drainage areas

Review and analyze site-specific data



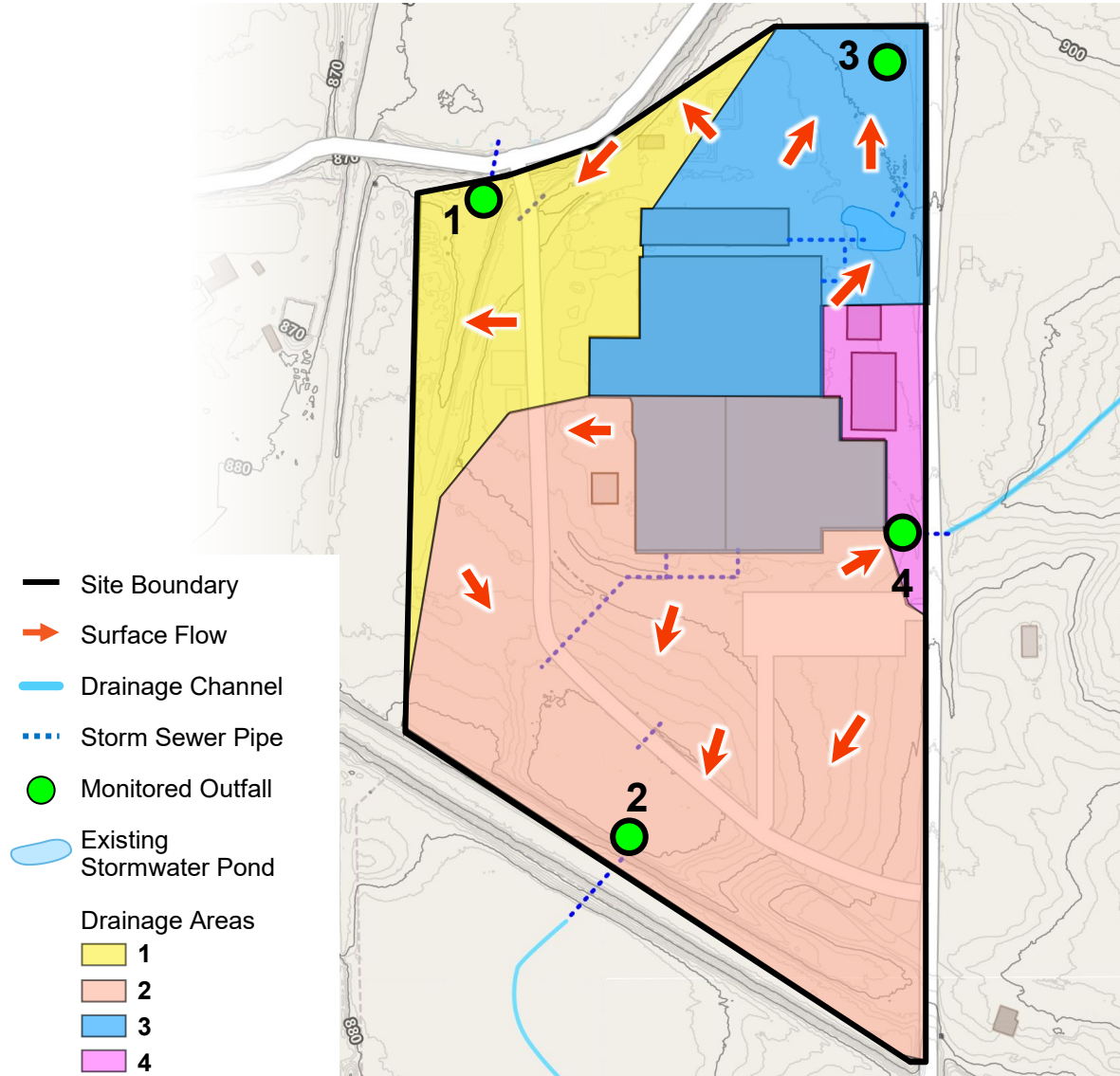
- Use drawings of interior roof drain piping to inform drainage areas
- Land cover, topography, and soils information based on publicly available datasets
- Hydraulics of main stormwater conveyance modeled in storm sewer pipes and channels
- Identifying outfalls – locations where stormwater has potential to discharge from facility property
- Site location and proximity to surface waters, drinking water wells, and other sensitive receptors

Data informs the understanding of stormwater flows on site

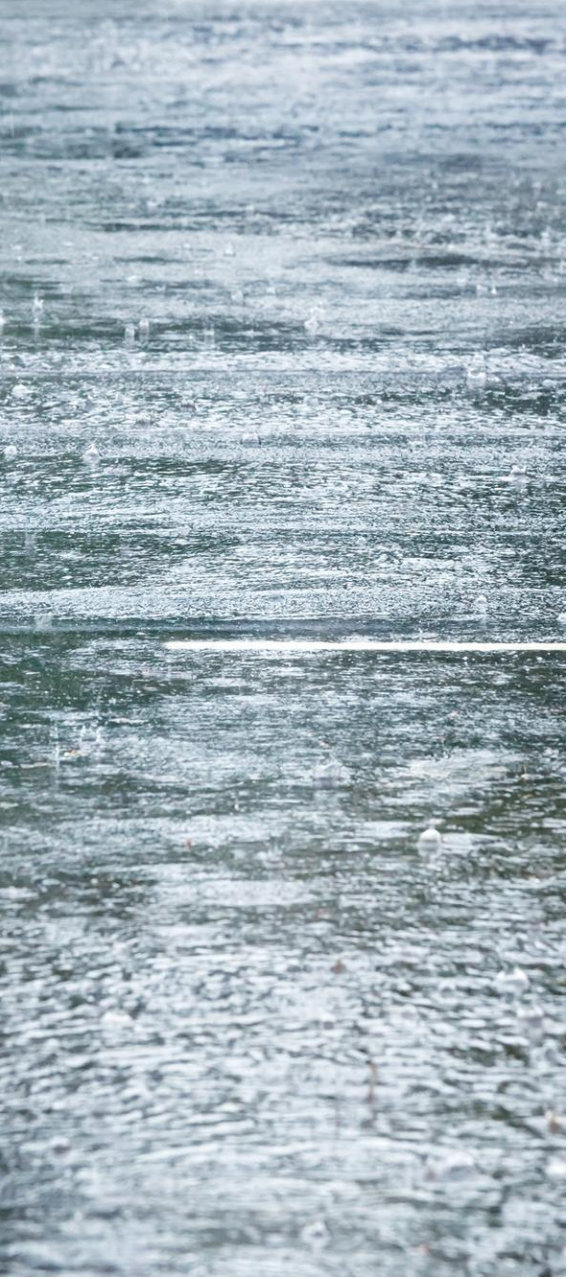


- Topography
- Surface – pervious vs impervious
- Soil types
- Roof drains – where do these flow?
- Existing stormwater features - storm sewers, catch basins, ponds

Delineate drainage area boundaries for each outfall



- Create a basemap using the site data in GIS
- Define drainage areas – tied to outfall locations
- Used to prioritize specific areas of the site for BMPs



Stormwater Existing Conditions Modeling



- PCSWMM – used in cases where full design is likely
- Simplified stormwater runoff analysis can be used - TR-55 (curve number) spreadsheet model, volumes only at outfalls
 - Estimated runoff from 24-hour design storm events
 - Determined total discharge volume at each outfall location

Stormwater Evaluation: design storm events



- Simulate 24-hour design storm events
 - ✓ Determine peak discharge
 - ✓ Determine total discharge volume at each drainage area outfall location

Design Storm Event	Precipitation (inches)
0.5 inch, 24-hour	0.50
1.0 inch, 24-hour	1.00
1-year, 24-hour	2.17
10-year, 24-hour	3.55
100-year, 24-hour	5.64

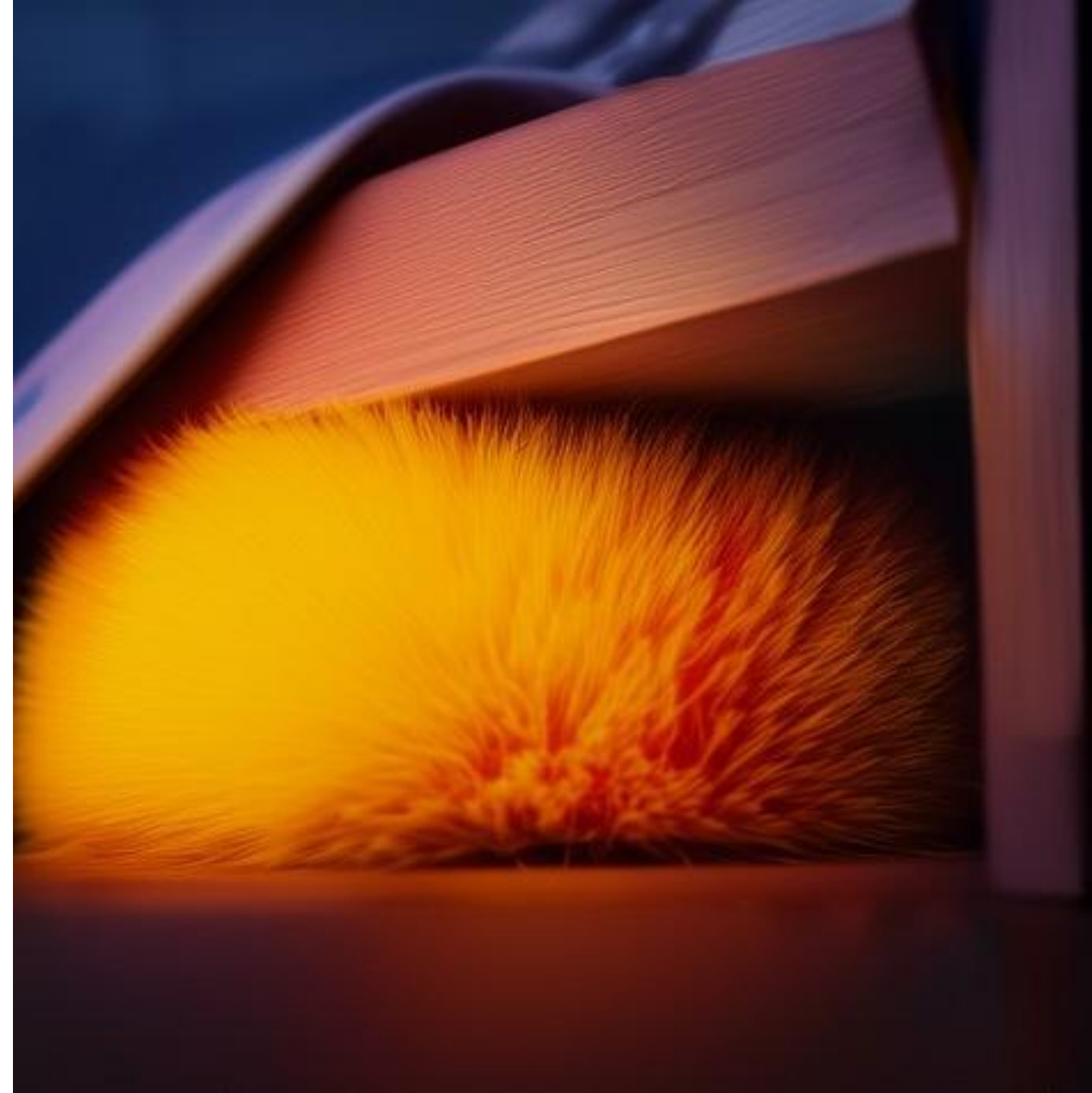
What we've learned is shaping the picture



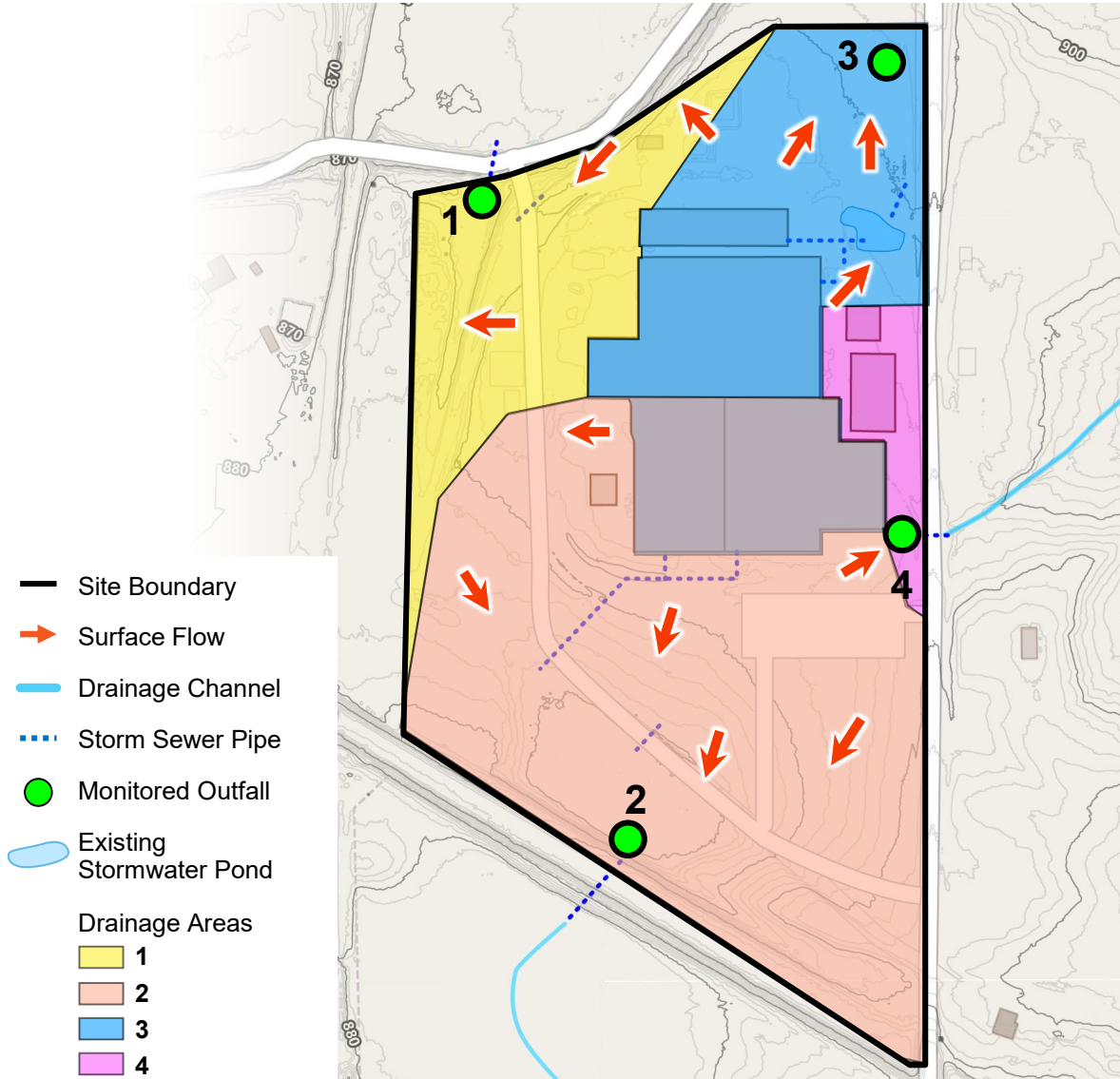
- Review of sample data
- Site infrastructure review
- Drainage areas delineated
- 24-hr storm events modeled
- Site location and sensitivity
- Site features – proximity to surface waters, wells, and other potential receptors

The picture is starting to come together...

...but, what's next?



Narrowing it down – Priority Criteria



- PFAS concentrations in stormwater – magnitude relative to reporting limits
- Proximity to surface water bodies and/or drinking water wells – consider a radius of impact (e.g. within 0.5 miles)
- Discharge volume (from model output) – relative to site total
- Potential receptors and sensitive areas – use of water bodies; exposure pathways

Criteria developed to prioritize drainage areas



	Risk Ranking Criteria				+ Weight factor (optional)
	High = 9	Moderate = 3	Low = 1	Assumed none to very low = 0	
PFAS Concentration	Sample result(s) two orders of magnitude above the analytical lab reporting limit	Sample result(s) one order of magnitude above the analytical laboratory reporting limit	Sample results above analytical lab laboratory reporting limit	No samples above analytical lab laboratory reporting limit	X 3?
Proximity to surface water body and groundwater supply wells	Direct discharge to surface water	Potential discharge to downgradient groundwater or surface water drinking water source within 0.5 mile of the site	Discharges to ditch and/or MS4/City infrastructure	All or nearly all stormwater is contained on site/no industrial discharge	X 2?
Discharge during design storm event	Discharge volume $\geq$ 50% of total site volume	Discharge volume < 50% and $\geq$ 20% of total site volume	Discharge volume < 20% and $\geq$ 1% of total site volume	Discharge volume < 1% of total site volume	X 3?
Potential receptors/receptor sensitivity	Known drinking water receptor/drinking water use for receiving water body	Aquatic life use only on receiving water body, no direct human receptors	Recreational use exposure only for receiving water body	Ephemeral drainage, no known downstream receptors or waterbodies within 1 mile of facility	X 1?

Prioritization results: weight of criteria & numeric rankings



Criteria	Weight factor	Outfall 1	Outfall 2	Outfall 3	Outfall 4
PFAS Concentration	3	3	9	3	1
Proximity to surface water body	2	1	9	9	9
Discharge during design storm event	3	3	3	9	1
Potential receptors/receptor sensitivity	1	1	3	3	1
Total of criteria assigned values		21	57	57	25

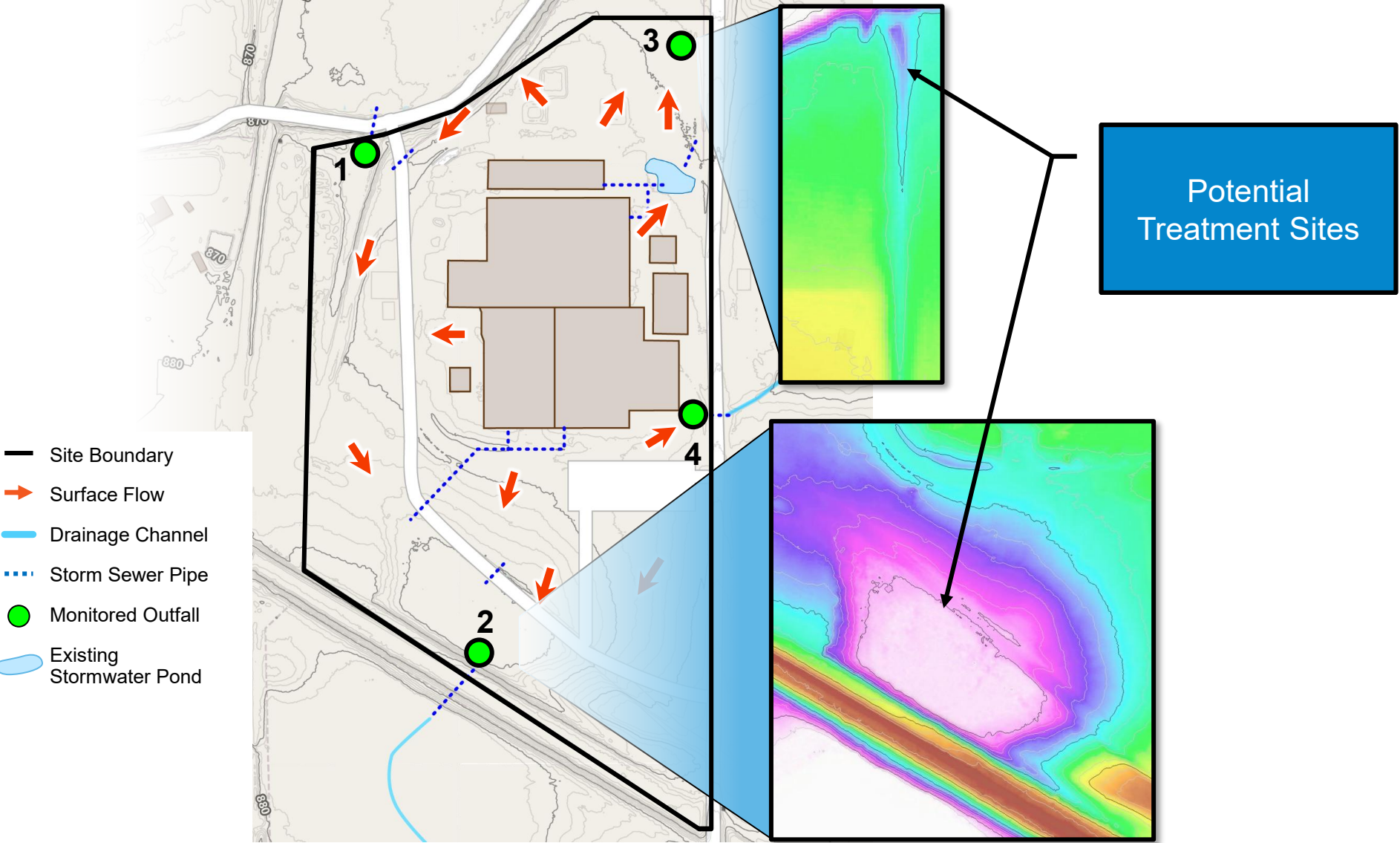


Conceptual Design & Modeling

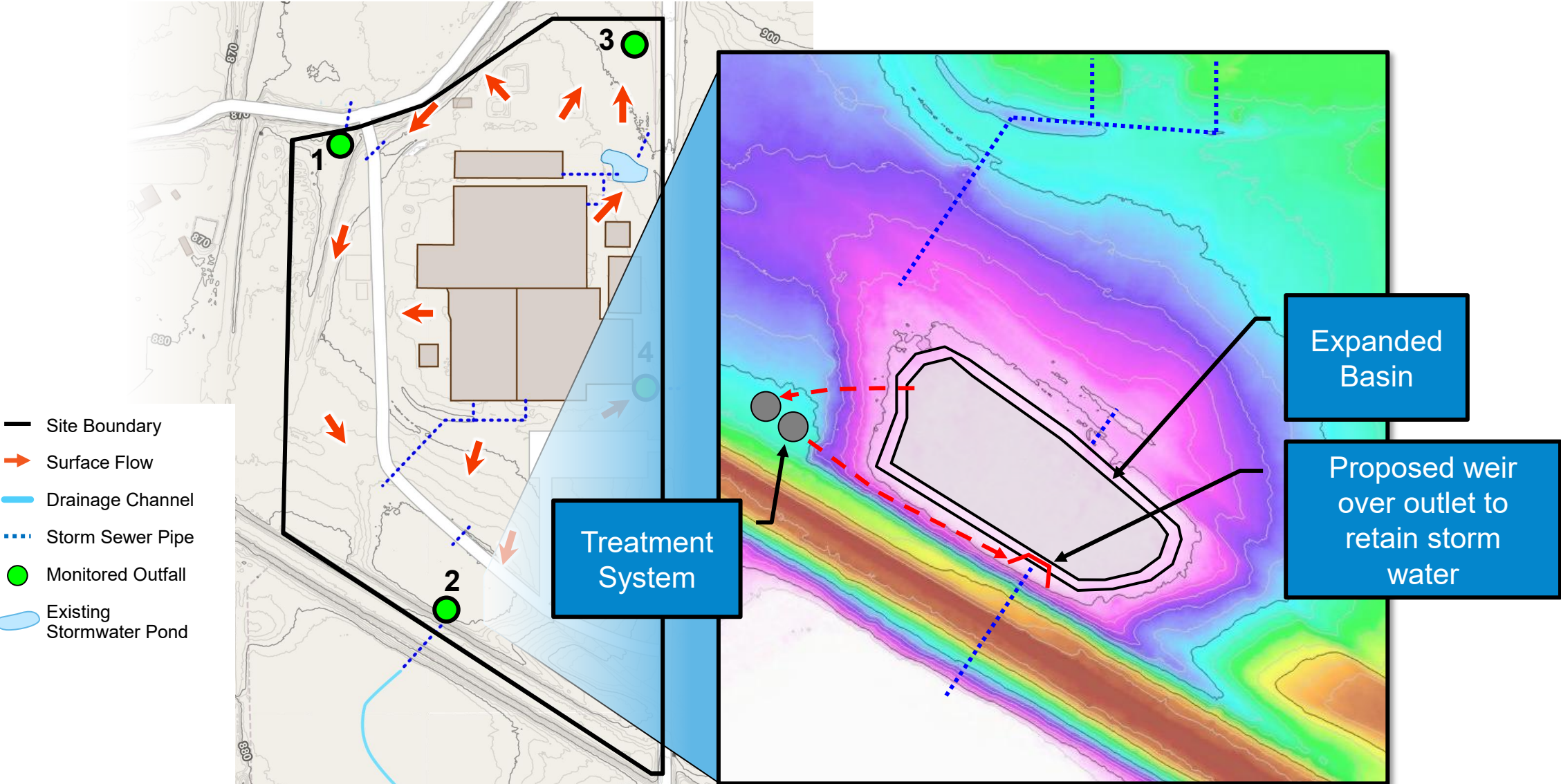


- Once priority locations are identified, determine if capture (new or retrofit of existing storage) is feasible
- Determine design target storm event
- Identify locations for storage and complete modeling for proposed conditions to confirm approximate storage volume needed

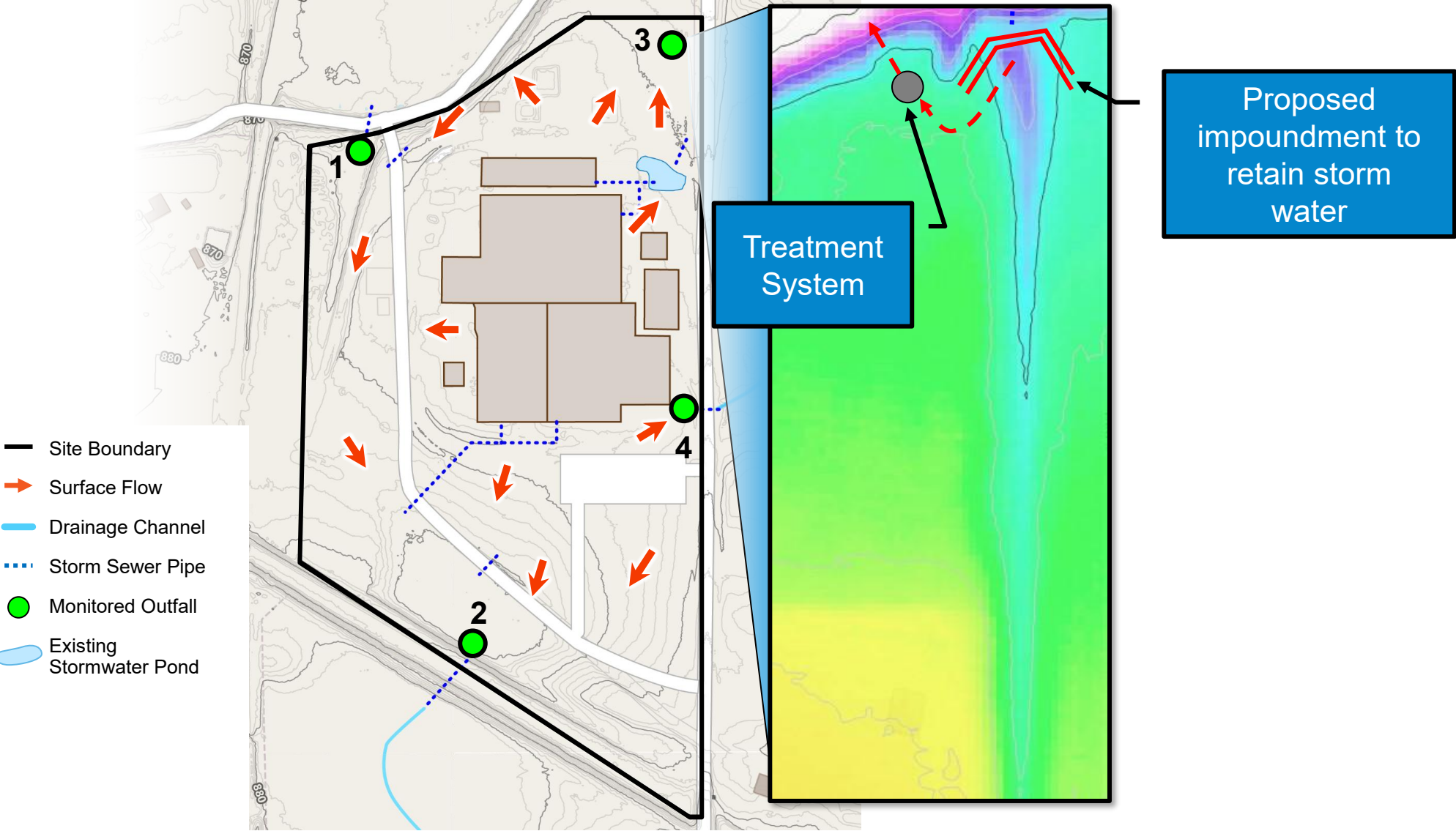
Conceptual Design & Modeling



Conceptual Design & Modeling



Conceptual Design & Modeling





BMP Alternatives and Recommendations



- Capture and treatment in highest priority drainage areas
- Soil removal and/or capping
- Berms, swales to limit or prevent discharge
- Lining existing storage structures
- Televising - lining and/or repair of storm sewers

Also...

- Consider if more data is needed
- Source investigation if unknown
- Consider potential off-site contributions



Questions?