

Update on Emerging Contaminants of Concern

Per- and Polyfluoroalkyl Substances (PFAS) and 1,4-Dioxane

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Groundwater Characterization (2017-2019)

Phased characterization effort to determine the impacts from PFAS and 1,4-Dioxane

PFAS (chemicals used in firefighting foam)

- Phase 1- Sample groundwater in source water contributing areas for the drinking water supply wells
- Phase 2- Characterize groundwater in the eight identified foam release areas
- Phase 3- Sample groundwater treatment wells/systems, landfill areas, Sewage Treatment Plant effluent and groundwater, select southern boundary monitoring wells. Some wells/treatment systems were also tested for 1,4-Dioxane

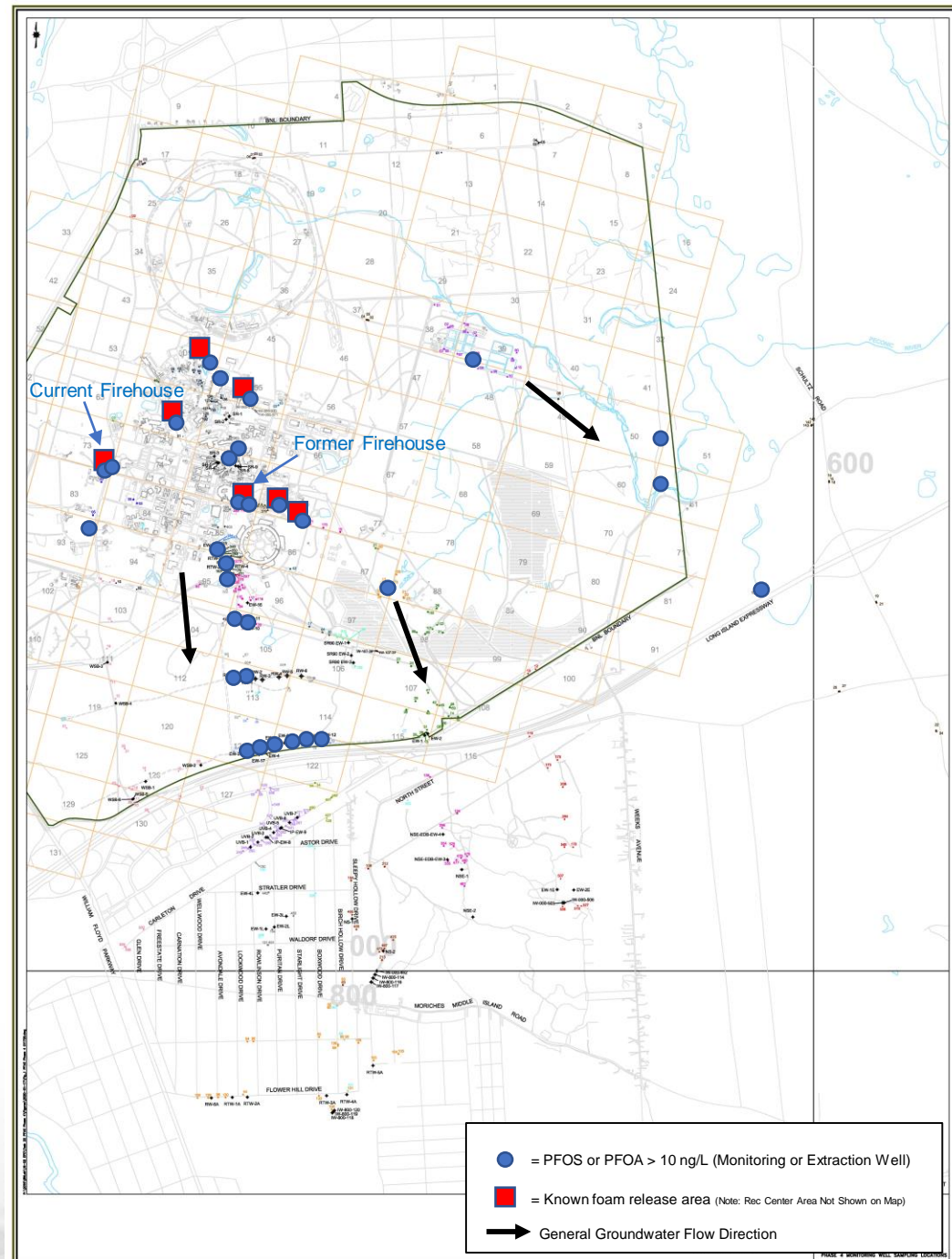
1,4-Dioxane (was used as a chemical stabilizer for the solvent TCA)

- Sampled limited number of on-site and off-site monitoring wells and groundwater treatment systems that have or had detectable levels of TCA

PFAS Results Phases 1, 2 and 3

Results Compared to Proposed 10 ng/L
Drinking Water Standards for PFOS and PFOA

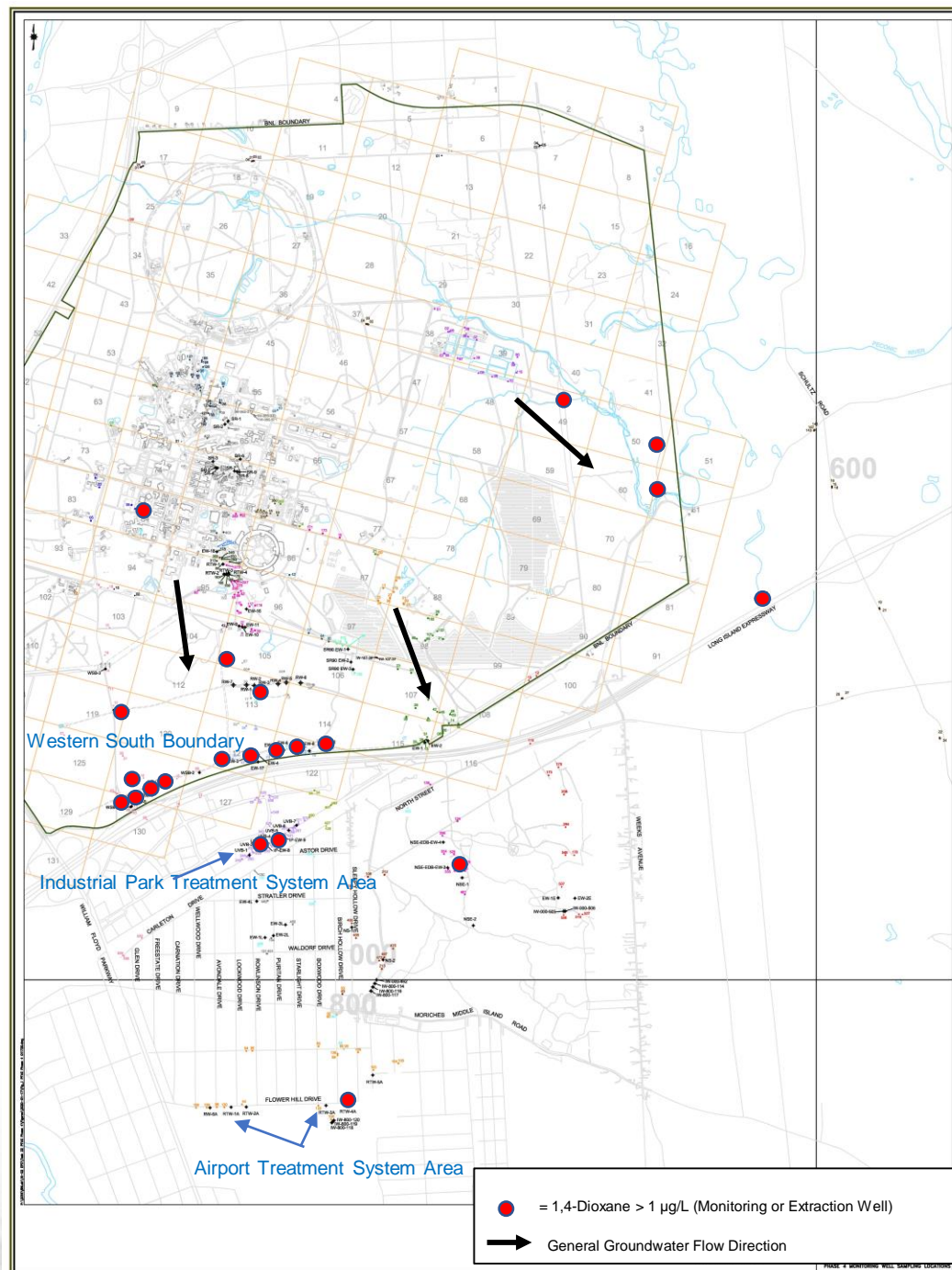
- Focus was on-site
 - Foam release areas
 - Southern site boundary
- Highest PFOS and PFOA concentrations were detected at foam training areas
 - Current Firehouse
 - PFOS up to 12,200 ng/L
 - PFOA up to 240 ng/L
 - Former Firehouse
 - PFOS up to 5,210 ng/L
 - PFOA up to 736 ng/L
- Southern Boundary
 - PFOS up to 66 ng/L
 - PFOA up to 24 ng/L



1,4-Dioxane Results

Results Compared to Proposed 1 µg/L Drinking Water Standard

- 1,4-Dioxane was detected in on-site and off-site areas. Examples:
 - Western South Boundary area up to ~15 µg/L
 - Industrial Park Treatment System area up to ~19 µg/L
 - Airport Treatment System area up to ~2 µg/L



Continued Characterization

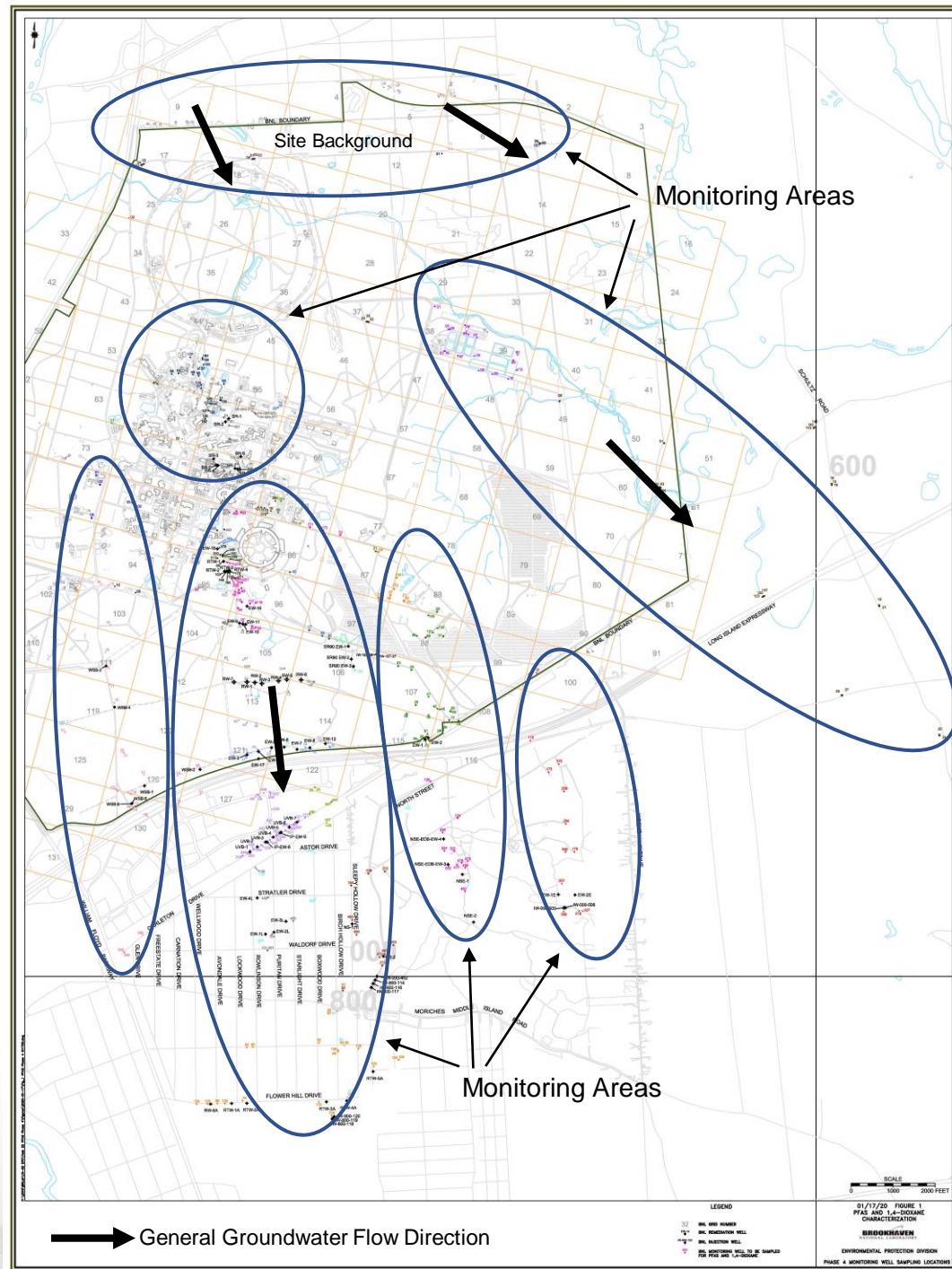
Phase 4: Extensive sampling of existing on-site and off-site monitoring wells and off-site treatment systems for PFAS and 1,4-dioxane

Phase 5: Detailed characterization of the two BNL firehouse PFAS plumes using temporary wells. Goal is to characterize the plume segments with the highest PFAS concentrations



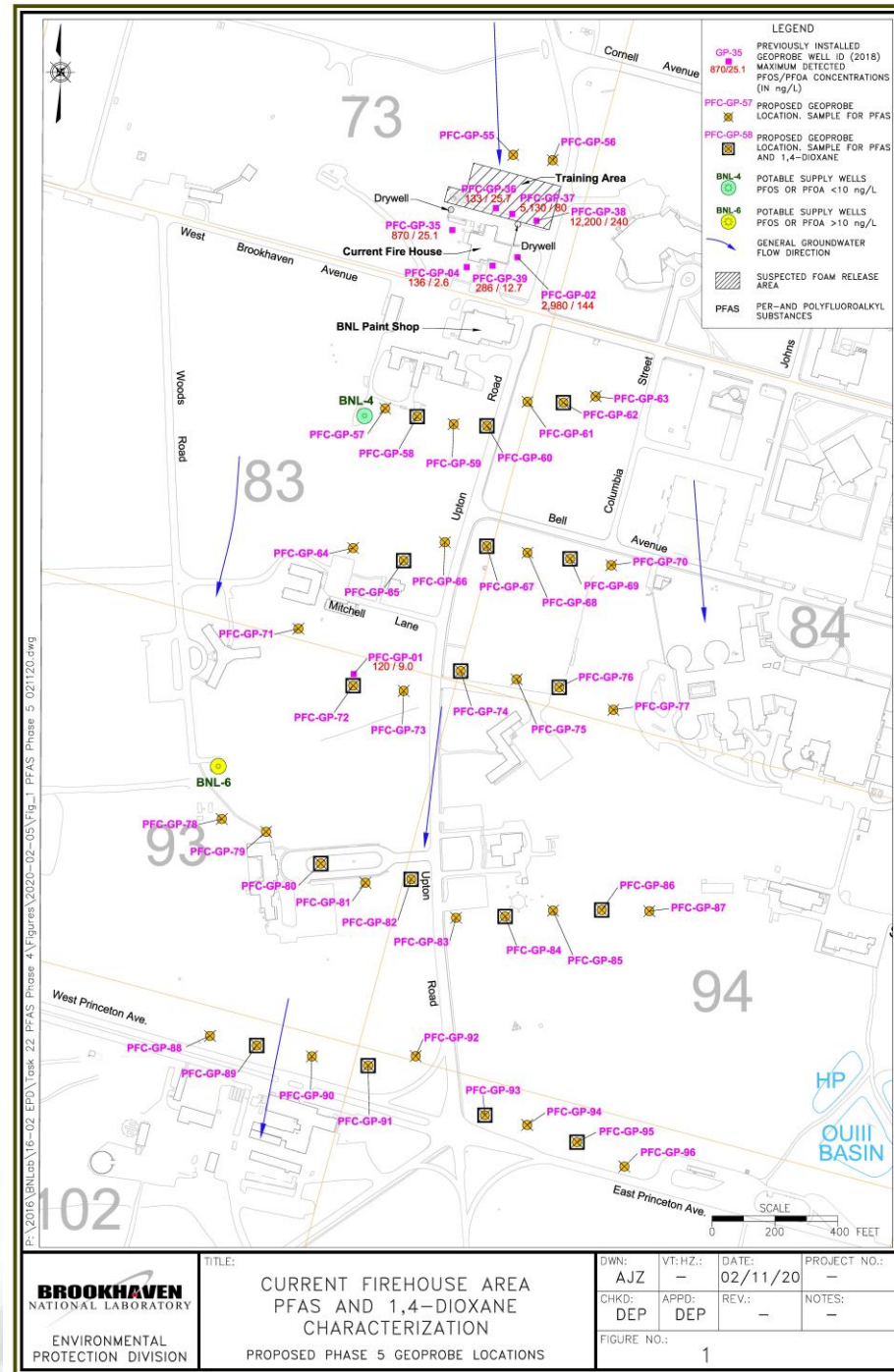
Phase 4 Characterization

- Started in late January
 - Plan to complete by late July
- Collect samples for PFAS and 1,4-Dioxane at each location:
 - 350 on-site and off-site monitoring wells
 - 275 wells sampled to date
 - 27 off-site extraction/treatment wells
 - 21 extraction wells sampled to date
 - Influent and effluent from 5 off-site groundwater treatment systems
 - 3 systems sampled to date



Phase 5: Current Firehouse Area

- Expected start in early July 2020
- Install up to 42 temporary wells
 - Depths to ~150 feet
 - 10 foot sample intervals
 - Also sample for 1,4-dioxane at select locations



Phase 5 Results Will Be Used To

- Prepare maps and cross section views of the PFAS plumes
- Hold discussions with the regulatory agencies on best approach to control/remediate the PFAS plumes
- Design groundwater treatment systems
 - Groundwater modeling and engineering
 - Number, locations, depths, and pumping rates for the groundwater extraction wells
 - Filter system design
 - Where to recharge the treated water
- Determine where permanent wells are needed for long-term surveillance of the source areas and plumes