FUSRAP Maywood Site Remediation of Redstone Park, Lodi, NJ-17534

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ABSTRACT

The Formerly Utilized Sites Remedial Action Program (FUSRAP) is the U.S. government program started in 1974 to identify, investigate and clean up or control sites that became contaminated as a result of the nation's early atomic programs. FUSRAP was administered by the U.S. Department of Energy (DOE) until 1997, when it was transferred to the U.S. Army Corps of Engineers (USACE) by congressional action.

Redstone Park is a 1.5-acre municipal park located in a residential neighborhood in Lodi, Bergen County, New Jersey, USA. The park is a designated vicinity property of the FUSRAP Maywood Superfund Site. This paper will summarize the FUSRAP history of the property spanning over 20 years and then focus on the construction and community relations challenges of recent FUSRAP actions at the site.

All of Redstone Park except for a portion bordering a residential property was remediated under FUSRAP in 1996. This remaining portion was remediated in 1998. The 1996 remediation included some hand-digging of surface contamination around the roots of several large mature trees in the park. As part of this action, the DOE proposed alternate cleanup standards whereby subsurface contaminated soil would remain in place around the root balls of the trees and in deeper areas (greater than 1.2 meters [m]) under a large storm drain pipe (or culvert) that runs through the park. This proposal was made to preserve the natural value of the trees and to protect the drainage pipe from damage. After careful review which included an assessment of potential health hazards, the U.S. Environmental Protection Agency (EPA) approved this proposal. The Borough of Lodi also supported the proposal as a way to preserve the trees for the enjoyment of park users.

In 2009, EPA conducted a mandatory Five-Year Review of the FUSRAP Maywood Site. The review identified data gaps which prevented a full assessment of remedy effectiveness at Redstone Park. The USACE reviewed all the historic soil data from the park [1] and developed a characterization plan to address those gaps. Field surveys and sampling confirmed that the material around the tree roots and under

the pipe did not comply with the current FUSRAP Maywood Site unrestricted use soil cleanup criteria (an average of 5 picoCuries per gram of radium-226 and thorium-232 combined above background) as established in the site's Soils and Buildings Record of Decision [2]. As noted earlier, USACE also considered the widespread uprooting of trees in the region during Hurricane Sandy in 2012 in its re-evaluation of the earlier decision to leave the trees in the park in place. That re-evaluation concluded it was in the best interest of all stakeholders to remove the residual contamination in Redstone Park. USACE subsequently excavated the soil under and around the drainage pipe as Phase 1 of a two-phased approach to address this residual contamination. 1,116 cubic yards of soil were removed for safe offsite disposal during this action in June-July 2016. Phase 2 (removal of contaminated soil around the tree roots) began in September 2016 with expected completion by December 2016. The work was staged in two phases so as not to impact the park during the summer school vacation months when park use is heaviest.

INTRODUCTION

FUSRAP is the U.S. government program to address waste generated by atomic research and production during the 1940s, 1950s and 1960s. The program was administered by the DOE from its inception in 1973 until 1997, when it was transferred to the USACE by congressional action.

The FUSRAP Maywood Superfund Site is located in a densely developed part of Bergen County, New Jersey (NJ), approximately 13 kilometers west of New York City (Figure 1). The primary contaminant of concern at the Site is thorium, a naturally occurring radioactive rare earth element that was extracted from monazite sand at a chemical plant in Maywood from about 1916 to 1959. This process generated a sludge-like byproduct material that was pumped into holding ponds or otherwise disposed onsite. Some of this material migrated offsite through surface water sediment deposition, by way of a surface stream known as the Lodi Brook that was routed to an underground storm drain pipe in the 1960s. Other material is known to have been taken from the plant site for use as fill on nearby properties. The Site consists of 92 designated properties known as vicinity properties, including residential, commercial and some government-owned properties. Figure 1 locates FUSRAP Maywood Site properties, including Redstone Park, Lodi that is examined in this paper. While the scale of Figure 1 lends itself to highlighting whole property parcels, contamination is known or suspected to exist in discrete areas of the individual parcels highlighted.

Maywood site properties are located in three communities: the Boroughs of Maywood and Lodi and the Township of Rochelle Park. The combined population of these communities is 39,441, with a population density of approximately 3,285 persons per square kilometer. This compares to New Jersey's statewide density of 459 per square kilometer (ranking the state first in the US) and a national figure of 33.7 per square kilometer [3]. All residential site properties have been remediated in compliance with applicable regulatory cleanup standards. In addition to Redstone Park, USACE is currently addressing three commercial properties and one government-owned property; all of the commercial locations currently house active businesses. FUSRAP activities at the Maywood Site are being conducted in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended [4].

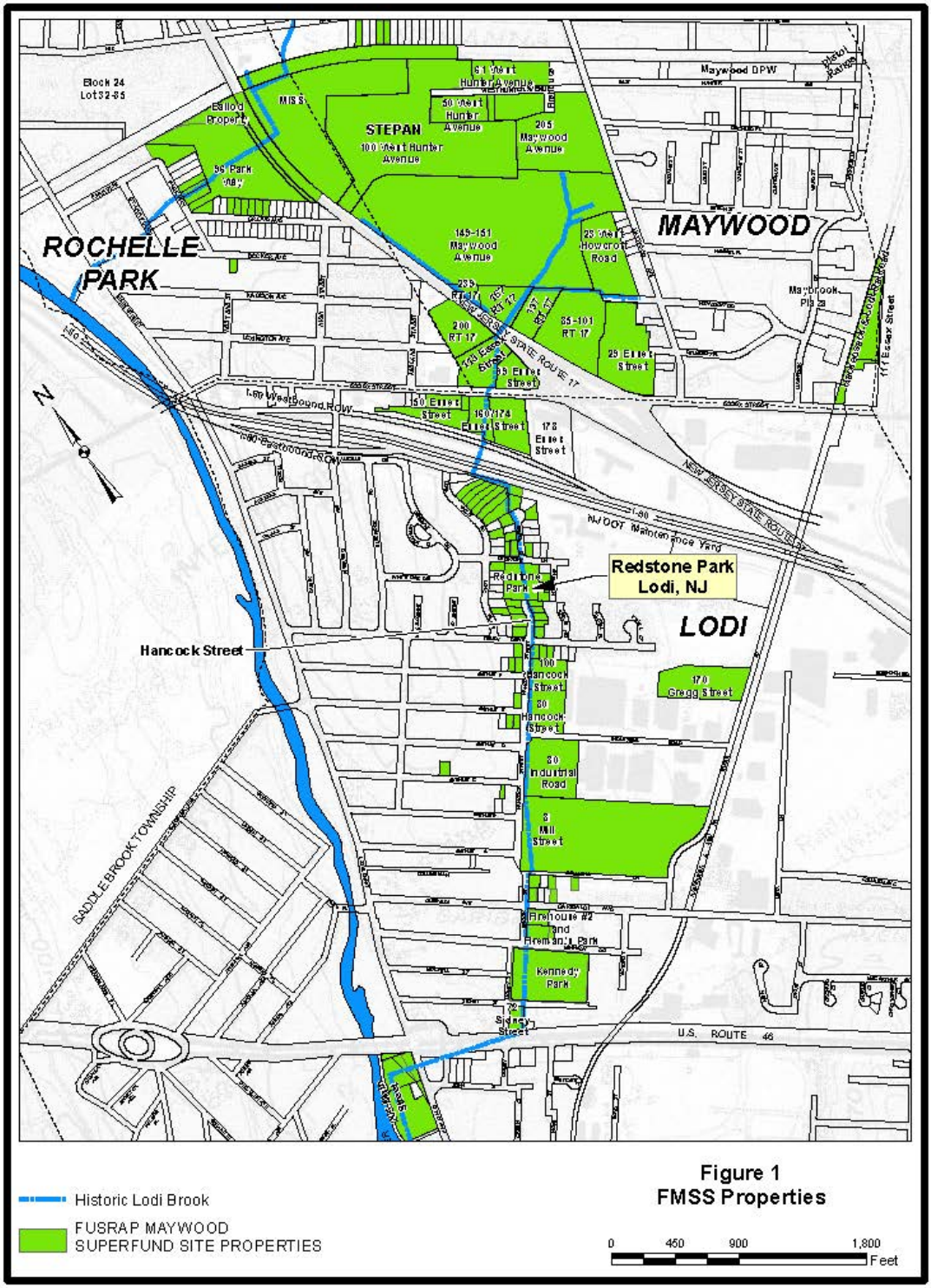

Fig. 1. FUSRAP Maywood Vicinity Properties including Redstone Park

Completed FUSRAP Actions at Redstone Park

DOE actions:

- All of Redstone Park except for a portion bordering the property at 10 Hancock Street was remediated in 1996. This included some hand-digging of surface contamination around the roots of several mature trees in the park.
- As part of this action, DOE proposed alternate cleanup standards whereby subsurface contaminated soil would remain in place around the root balls of the trees and in deeper areas (greater than 1.2 m) under a large storm drain pipe (formerly a surface stream known as Lodi Brook) that runs under the park. This proposal was made to preserve the natural value of the trees and to protect the pipe from damage.
- After careful review including a health hazard assessment, the U.S. Environmental Protection Agency (EPA) approved this proposal. The Borough of Lodi also supported the proposal as a way to preserve the trees for the enjoyment of park users.

USACE actions:

- The portion of the park next to 10 Hancock Street was remediated in 1998 along with the adjacent residential property itself.

A total of 7,635 in situ cubic yards of contaminated soil was excavated during the combined DOE and USACE actions.

Residual Contamination

The residual contamination described above did not pose a health risk to Redstone Park visitors. Surface contamination had been removed during the 1996 and 1998 actions. The contaminated soil left in place around the drainage pipe and the tree root balls was located where park users did not come in contact with it: at least 1 m below the surface and in places difficult to disturb without heavy equipment. A FUSRAP exposure assessment conducted in 1996 in support of the supplemental cleanup criteria evaluation process found that leaving the contaminated soil in the root balls of the trees was protective of human health and the environment.

Recent Actions at Redstone Park

Recent FUSRAP actions at Redstone Park were conducted in two phases. Phase I was from March 7 to June 15, 2016, during which USACE completed remedial excavation of contaminated soil under the drainage pipe. Phase 2, remedial excavation of contaminated soil associated with the tree root balls, began in September 2016 and is ongoing as of this writing. All excavated soil is transported

to a licensed and permitted offsite disposal facility. Figure 2 shows the locations of both work phases.

Basis for Recent Actions

Removing this contaminated soil now will protect workers who may have to dig around the trees or repair the pipe in the future, thereby reducing FUSRAP's future long-term stewardship responsibilities at the Maywood Site. Addressing the contaminated soil around the tree root balls at this time had another benefit besides ensuring worker safety. Experience from Hurricane Sandy at another site where high winds uprooted mature trees and brought root ball contamination to the surface led to a review of the practice of leaving contamination under mature trees in place. That review considered potential exposure to future residents under the following conditions: trees were uprooted by a storm, bringing contaminated soil to the surface; a slab-on-grade home was then built above that soil [5]. This condition is not likely given Redstone Park's current and expected future use as recreational. However, if these conditions did occur, potential future exposures to residents of the home would exceed current annual residential dose limits that are protective of human health, and cleanup action would be warranted. Removing the contaminated soil around the root balls now ensures that it cannot come to the surface in the future and better manages the FUSRAP program's long-term stewardship responsibilities.

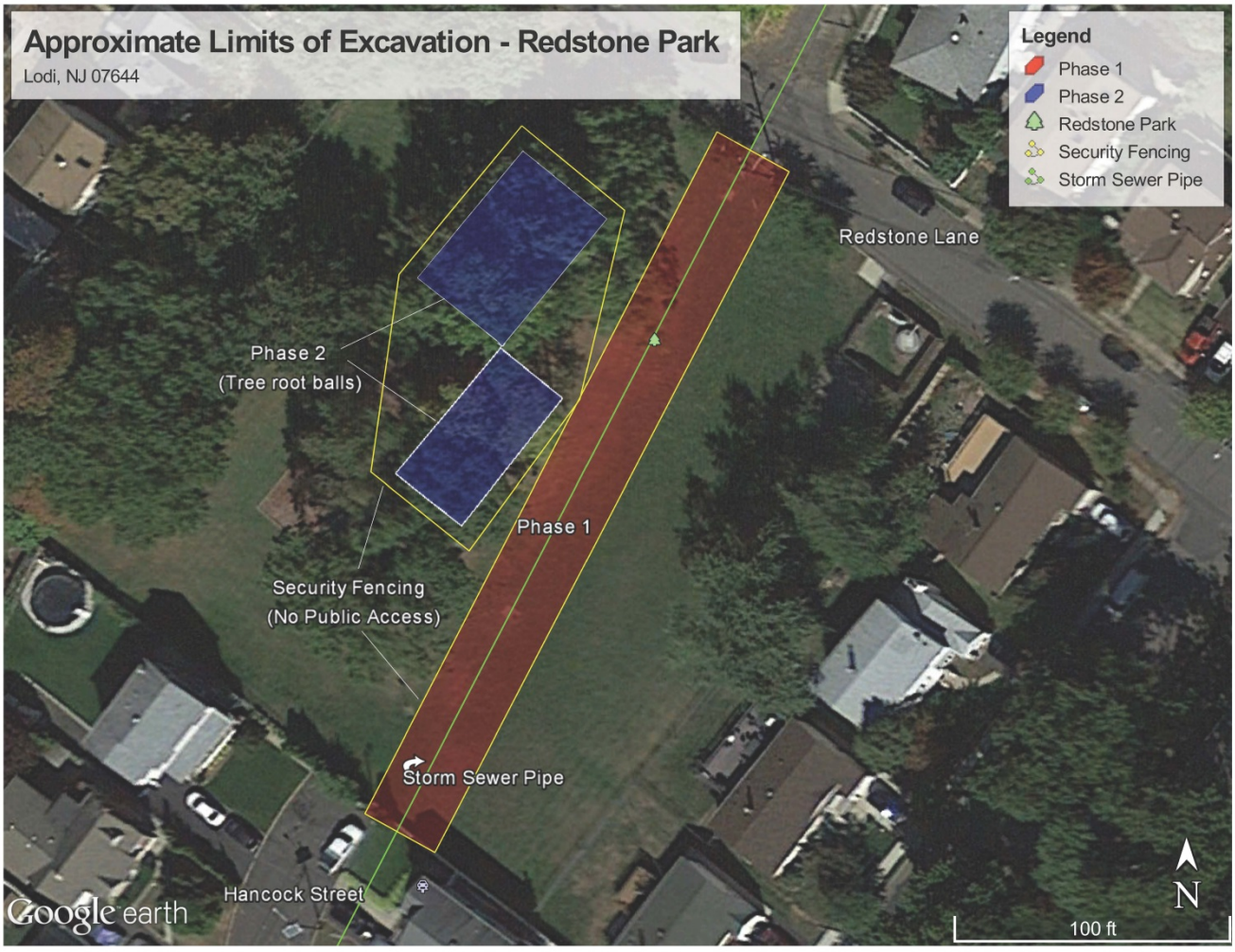

Fig. 2. Approximates limits of remedial excavations at Redstone Park.

Some additional points about the Redstone Park project:

- **Safety -** Portions of the park not affected by this work remained open, except during the tree removal work. Temporary fences were installed to separate work zones from the rest of the park. This allowed continued access to a valued community recreation resource during the action. Dust suppression measures such as hosing down excavations to keep soil moist was used. Perimeter air monitors also operated throughout the project to track dust emissions. Trucks and other equipment leaving the site were surveyed and decontaminated as needed prior to travelling on public roads.
- **Timing** - The work was staged in two phases so the park could be fully accessible during the peak use summer months. Work hours were from 7 a.m. to 5 p.m. Monday to Thursday, with Friday work as needed to meet

schedule expectations. These hours were consistent with local construction and noise codes.

- **Benefits** - This action brought Redstone Park into full compliance with the current unrestricted use cleanup criteria for the FUSRAP Maywood Site. Future workers will be protected, and future land use restrictions (for instance, deed notices) will not be required.
- **Coordination** - All work was coordinated with the EPA, New Jersey Department of Environmental Protection and the Borough of Lodi. Replacement of the trees that were removed will be done in consultation with local officials.

CONSTRUCTION CHALLENGES

PHASE 1: Lodi Brook Culvert Bypass, Remediation and Replacement

A storm water bypass pumping system was necessary so that the existing 1.96 x 1.32-m corrugated metal culvert pipe and the impacted soil around it could be removed (Figure 3). The bypass pumping operation employed three pumps: two 0.1-m and one 0.15-m. The pumps were operated for nine hours each workday for 21 days. With the bypass pumping in place, 6.1-m sections of the culvert pipe were exposed at a time. Contaminated soil around both sides was excavated down to the bottom of the pipe. The exposed pipe was then removed to allow access to the contaminated soils underneath. Final Status Survey (FSS) activities were performed to evaluate compliance with cleanup criteria; FSS data was then reviewed by project health physics staff. Upon USACE approval for immediate backfill, a new pipe section was installed, followed by backfill and grading to project specifications. This process was repeated for each pipe section; a total of 14 sections (approximately 73.15 linear m) were installed in this manner. This approach eliminated the need for 24-hour pumping and the associated cost of round-the-clock staffing by an operator, and also mitigated noise impacts to the surrounding neighborhood during off-work hours and over weekends. It should be noted that the bypass system did overload during heavy rain events, causing temporary shutdowns in the culvert remediation and replacement task.

Fig. 3. Redstone Park storm pipe bypass pumping operation during Phase 1 (**note**: trees on left were removed during Phase 2 to allow for excavation).

PHASE 2: Removal of Mature Trees and Restoration

FUSRAP personnel and equipment mobilized to Redstone Park for Phase 2 on September 14, 2016. The first order of business was the removal of 17 mature trees to allow access to the underlying contaminated soils (Figure 3). An in-field preparatory meeting was held prior to the start of tree removal and was attended by the Borough of Lodi Shade Tree Commissioner. Perimeter fencing, air monitoring units, and personnel access controls were then established and remedial excavations commenced. The design contaminated soil volume estimate for Phase 2 was 715 cubic yards. This was exceeded as remedial excavations progressed and additional surveys were performed to bound the contamination. This expansion also required relocation of playground equipment, with the approval of Borough of Lodi officials. As of this writing, 1,500 in situ cubic yards of contaminated soil has been removed during Phase 2 for transport and disposal at a licensed and/or permitted disposal facility. Tree replacement is scheduled for spring 2017 to take advantage of the spring planting season. The FUSRAP team will develop a planting plan for review by local authorities, including the Shade Tree Commissioner and the Recreation Department Superintendent.

COMMUNITY CHALLENGES

The remediation of Redstone Park presented some unique community relations challenges, given the park's location in the midst of a residential neighborhood and its importance as a community recreational resource. This required implementation of a proactive and carefully planned community relations program well in advance of any site work in the park, under the direction of a dedicated Community Relations Manager assigned to the Maywood project.

Initial contact with local officials was made in October 2013 during a meeting with the Lodi Borough Manager to present the findings of the FUSRAP Maywood Property Assessment [1] as they related to Redstone Park and another Lodi property. Eight such meetings took place over the course of the Redstone Park work, and included other local officials including public works and public safety management personnel as needed. It is noteworthy that a new Borough Manager took office in January 2016. The new manager had limited knowledge of the FUSRAP history or ongoing action at Redstone Park. This required an extensive background briefing by the FUSRAP Maywood Site Project and Community Relations Managers to the new Borough Manager.

Topics discussed at the meetings with local officials included:

- Technical issues (nature and extent of contamination, potential health effects)
- Property access (access agreements between the borough and USACE were executed with support from USACE Real Estate Division prior to initial site characterization and renewed as needed through site remediation)
- Construction logistics (traffic routing, use of onsite utilities, arrangements for worker sanitary facilities, property maintenance during FUSRAP action)
- Support for manager briefings to the local mayor and council
- Project status

FUSRAP staff and the Lodi Tree Commissioner also held two field meetings in the park regarding tree removal and replacement, one prior to the start of remediation and a second on the morning of the tree removal itself. Additional meetings are planned in spring 2017 to discuss tree restoration. Aside from personal meetings with local officials, regular telephone and email communications were established between FUSRAP and local staff to address in real time any issues that arose throughout the duration of the project.

Likewise, significant attention was given to public communication and involvement in support of the Redstone Park action. Fact sheets were hand-delivered by the Community Relations Manager to approximately 135 residences in the surrounding neighborhood before the work commenced and at various milestones thereafter. Door-to-door delivery of these materials provided an opportunity for many individual contacts with residents, during which the Community Relations Manager was able to personally address questions and concerns. It also allowed the specialist to establish himself as an onsite presence in the community, as opposed to an impersonal point of contact listed on a fact sheet. The fact sheets were also posted on the municipal web site (www.lodi-nj.org) and the project web site (www.fusrapmaywood.com) to keep residents and other interested stakeholders informed of project activities. Four fact sheets have been distributed in this way, and more are planned to address the Phase 2 completion and property restoration. The online fact sheets were especially helpful in responding to calls from residents outside the hand-delivery distribution, as the Community Relations Manager was able to direct those callers to the online postings. Signage was also posted on temporary fencing at the job site to provide park visitors with a point of contact for information on the project (Figure 4).

Fig. 4. Public information posting at Redstone Park Phase 1 job site.

One resident in particular became a regular contact during the course of the park remediation. The caller, whose home looked out directly on the northern end of the park, described herself as a kind of de facto representative of the park neighbors. She contacted the Community Relations Manager with various concerns about lawn maintenance, equipment staging, sanitary conditions, and noise impacts, as well as on general project status. The Community Relations met with the resident in person after her initial call, and they communicated by phone thereafter. The resident would relay the information gained from these contacts to her neighbors, and in this way became a valuable conduit for communicating public information.

Several local newspaper articles also appeared on the Redstone Park work. FUSRAP project management felt that the first such article warranted clarification regarding some basic facts about the project. The reporter was contacted with the specific clarifications and referred to the Community Relations Manager and project web site as sources for background information and status updates. The newspaper published a clarification, and in the view of FUSRAP management subsequent articles displayed a better understanding of the project.

Conclusions

The remedial action at Redstone Park detailed in this paper had several benefits:

- Workers accessing the Lodi Brook culvert in the future are protected
- Tree root ball contamination has been removed, eliminating potential risks from tree uprooting (i.e., the Hurricane Sandy experience)
- Long-term land use controls are not required
- Long-term FUSRAP environmental monitoring responsibilities are significantly reduced

The Maywood team encountered some challenging engineering considerations when designing the storm water bypass pumping system. The solution resulted in a system that operated during work hours and shut down during off hours, mitigating community quality of life impacts while providing substantial cost savings to the project.

Community relations and public involvement are team efforts that cross disciplines. Project management, technical staff, field engineers, and real estate and community relations specialists all worked cooperatively to support interactions with residents and local officials. This team-based approach resulted in the

successful, on-schedule execution of the Redstone Park project, with minimal impacts to the community and little negative public feedback.

REFERENCES

1. United States Army Corps of Engineers, *Technical Memorandum, FUSRAP Maywood Superfund Site Property Assessment* (August 2013)
2. United States Army Corps of Engineers, *Record of Decision for Soils and Buildings at the FUSRAP Maywood Superfund Site, Maywood, New Jersey*, prepared by Shaw Environmental, Inc. (August 2003).
3. United States Department of Commerce, US Census Bureau, Population Division, *Population Estimates* (2011).
4. United States Environmental Protection Agency, 42 U.S.C. 9601 et seq., *Comprehensive Environmental Response, Compensation and Liability Act* (1980) as amended.
5. United States Army Corps of Engineers, *Technical Memorandum, Redstone Park (formerly known as Lodi Municipal Park), Residual Contamination Dose Assessment, FUSRAP Maywood Superfund Site, Maywood, New Jersey* (July 2013).