

Naval Air Station South Weymouth Site Redevelopment Plan
Hannah Axtell
2nd Year
Environmental Science Major
001307437

Historically the Naval Air Station (NAS) South Weymouth Site that intersects the town limits of Rockland, Abington, and Weymouth in southeastern Massachusetts has served as grounds for military aircraft patrolling in the 1940s during WWII and aviation training in the 1950s. But modernly, the site functions as partly Operable Units like that of the West Gate Landfill (WGL), has been placed on the National Priorities List (NPL), and is now a government “superfund site.” As defined by the U.S. Environmental Protection Agency (EPA), a superfund site is a one of “thousands of contaminated sites exist[ing] nationally due to hazardous waste being dumped, left out in the open, or otherwise improperly managed. These sites include manufacturing facilities, processing plants, landfills and mining sites. In response, Congress established the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), informally called ‘Superfund’ in 1980 ” (EPA, 2018). The creation of CERCLA has allowed the EPA to clean up these contaminated sites, like that of the NAS South Weymouth Site, and hold polluting parties accountable for their actions by either reimbursing the government for the EPA-led cleanup work or by having the perpetrators perform the cleanup, redevelopment projects themselves. This U.S. Department of Defense funded South Weymouth redevelopment project will outline plans to turn the former NAS into a community center with recreational activities and affordable housing that will conquer issues with soil/water contamination, invasive species, as well as water, sewage, stormwater, climate change, transportation, and energy on the site. This plan will provide insight into the potential social, political, environmental, and economic hurdles that are expected of redevelopment along with propositions for solutions that will help mitigate these foreseen obstacles.

To best understand the societal pressures affecting the effective balance of the NAS, it is helpful to think of the site as analogous to a sitting stool. A stool requires three legs to support

itself, but in the case of the NAS South Weymouth Site, these three legs are social, environmental, and economic factors that influence its ability to stand upright. If any one of the three legs goes unattended to, the stool becomes tilted to the side and is no longer providing the service of comfortable sitting to its user. This can be easily applied to the Massachusetts naval station as if the social, environmental, economic requirements--the subsistence of jobs, service to the military, preservation of the air, water, and land in the ecosystem, contentedness of the wildlife and citizens depending on the health of the ecosystem, or the financial productivity of the site's are not upheld, it will no longer serve its purpose, and once again, fall to one side and be shut down.

While the site has long historically been affiliated with the U.S. military, I am of the opinion that a change of ownership is in the best of the interests of the residents of Abington, Rockland, and Weymouth along with any other people and species that depend on it. With this redevelopment plan, I propose the 1,450 acres of land be handed back over to the local governments and be used as grounds to provide their communities with needed services that have otherwise been neglected in the past. While the respective demographics of the three towns comprise of majorly upper-middle class families with the median incomes of the three ranging from \$78,000-\$99,000, I think the towns could substantially benefit from some land dedicated to the uplifting of lower-income families and their grandparents and children. And according to the Draft of the Environmental Impact Report (DEIR, 2006), the younger populations in the towns are decreasing which allows for the assumption that a community recreation center could influence families with younger children to stay in the area. Accompanying a center with access to after-school programs, plenty of indoor (basketball court, gym, track, classrooms, tutoring services, pool and foosball tables, etc.) and outdoor amenities (tennis courts, pool, track,

playground, etc.), there will also be options for older, retired populations to participate in group classes and events catered to them (yoga, water aerobics, knitting, music, dancing, bingo, etc.). Redeveloping the site allows for better consideration for the needs of its citizens and I would propose that a veteran care facility and housing that employs working both physical and mental health professions to address and appeal to its large veteran population. That being said, the community center is only to encompass roughly 25 of the 1,450 acres, the veteran care facility only 10 acres, the construction of at least affordable three-story apartment style buildings (about 25 units per acre, a total of 16,625 housing units) that will confront the minority of ~15% residents living below the poverty line comprising of about 665 of the acres, and the remaining 750 acres consisting of the wetland buffer zones, solar panel and wind turbine fields, parking and road construction projects, and other infrastructure essential to the site function and maintenance through the extreme weather events that accompany climate change (DEIR, 2006). The new housing project will also serve to account for any increase in internal migration to the greater site area as a result of the development. The plan will also feature buffer zones like small parks and walking trails that preserve the isolation and protections of the wetland habitats and provide for the residents to decompress and socialize after a long day of work.

A number of portions of the South Weymouth site have been designated as areas of concern (Operable Units (OUs)), in which Remedial Investigations (RI) have ensued. These RIs have unfortunately discovered soil and groundwater contamination in many of these OUs. Considering these site OUs--the "WGL" and "Small" landfills, the "Rubble Disposal," "Firefighting Training," "Industrial Operations," and "Solvent Release" areas, buildings 81 and 82, hangar 1, the Coast Guard Buoy Depot and the Sewage Treatment Plant were active from the 1940s through 1972, multiple contaminants like that of PCBs, PAHs, pesticides, dieldrin,

dioxins, indeno(1,2,3-cd)pyrene, metals, perfluorochemicals, jet fuel, and likely PFAS were uncovered in soil and groundwater extending into the wetlands at the former landfills (EPA, 2019). Soil and groundwater contamination affects not only the people who seek to live and work on the land, but the connected ecosystem as a whole prohibiting plants and animal species from being able to survive in what remains of the wetland environment. Following Massachusetts State Guidelines, it is fundamental to the social and environmental “legs of the stool” that the debris be removed from the landfills and that the wetlands be restored. For many of these chemicals and PFAs in particular, mitigation requires testing for the chemical concentrations to determine the course of action. In the case of the sewage treatment plant, remediation requires soil excavation, removal, and disposal in order to deconstruct and depollute the area. But for the case of the Hangar 1 site for plume and waste oil cleanup, treatment barriers that utilize permeable reactive material to absorb, precipitate, or degrade the contaminants and bioremediation which uses either naturally occurring or deliberately introduced microorganisms to consume and break down environmental pollutants are more suitable options to rehabilitate the habitat (Liyanage, 2020). However, because often the clean up projects of offsite contaminants in particular demand topsoil excavation, these restoration projects are best monitored for the time following remediation to keep track of returning contaminating threats to the wetlands.

Invasive species have been known to devastate ecosystems around the globe and are most definitely a threat to the health of the site wetlands. On the former NAS specifically, the presence of glossy buckthorn, the common reed, purple loosestrife, oriental bittersweet, and swallow wort pose a threat to the health of the wetlands. The most effective ways to manage this threat is by using burning, herbicides, mowing, and biological control and adjusting the method on a

case-by-case basis. Burning and biological control would be the most effective prevention and removal techniques for the invasives on the former NAS due to how concentrated the amounts and sheer resilience of the five non-indigenous species. The method of burning would be advantageous to eradicate the influences of the five impending species threats through reducing the woody plant density and competition, stimulating the growth of native plants, returning nutrients to the soil, and promoting germination of dormant seeds (National Parks Service, n.d.). On the other hand, biological control would help to eliminate the ability for the unwanted species to subsist by sheer resilience as classical biological control intentionally introduced natural enemies of the pest populations in order to limit their growth and survival. That being said, because these introduced enemies to the invasive species are typically not natural to this wetland environment in themselves, it is vital that this experimental elimination be very closely controlled and monitored as to prevent the introduced species from subsisting in the wetlands as well (U.S. Forest Service, 2014).

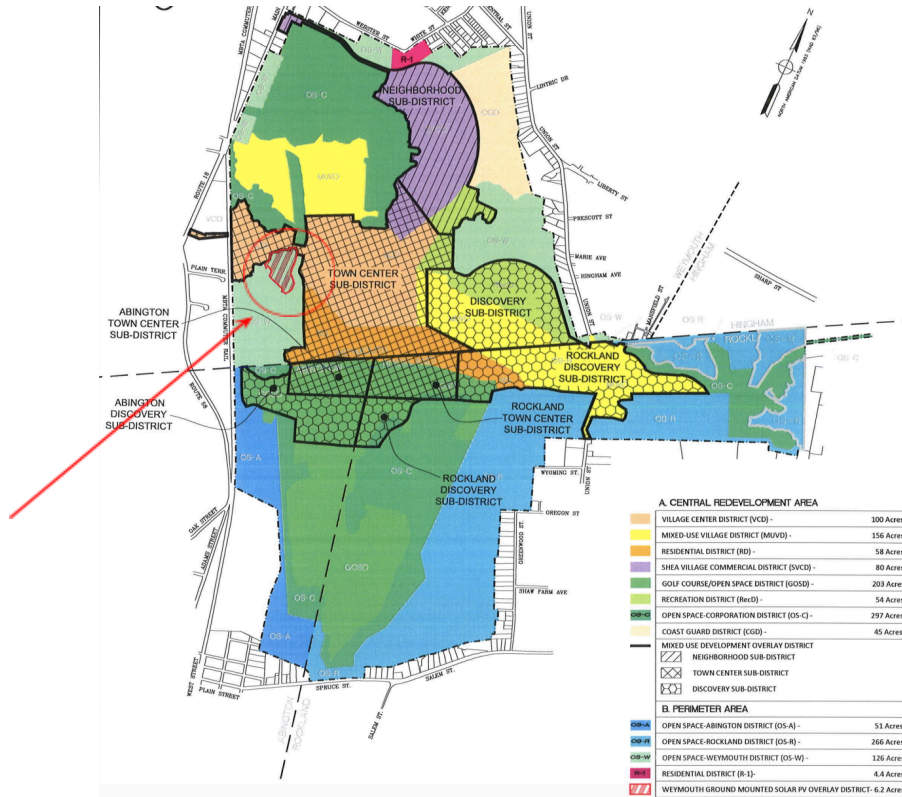
In order for the former NAS to provide for the new building and housing construction, proper water, sewage, solid waste, and stormwater infrastructure is vital to the redevelopment efforts. The site sources its water supply from the many aquifers on the station. However, because this water source has previously seen various chemical groundwater contamination, the assurance of clean drinking water as well as Massachusetts regulation, requires the construction of a new water treatment plant (Mass.gov, 2013). This new water treatment plant would work in tandem with a two stage sewage/wastewater treatment system that would reuse and conserve the site's water and natural resources. Additionally, mitigation of stormwater runoff can be involved with this new treatment plant plan as it is a very useful source of new water when it can be properly filtered. Stormwater runoff, when unmonitored, can get contaminated very easily,

proving hazards for the residents and wetland species. However, stormwater management can be built into the multi-dimensional treatment plant by setting up pipes and drainage that capture and collect the groundwater in low-lying areas which is then filtered and recycled in the plant. In addition to sustainable water management infrastructure, the EPA encourages renewable energy development on current and formerly termed OUs and superfund sites.

This redevelopment plan depends on a successful switch to renewable energies on the site in order to fulfill the environmental leg of the stool. This site transition to an option of one or more energy alternatives to an otherwise fossil fuel dependent energy economy will reduce the possibility for the station's restoration to worsen greenhouse gas emissions, species endangerment, and the overall air, water, and habitat quality in the greater Weymouth area. Due to South Weymouth not being located on top of a high enough concentration of thermal energy and the French Stream and the Old Swamp River having inadequate flow rates of 4 and 12 cfs respectively (Call, 2007 and SnoFlo, 2021), both geothermal energy and hydropower are not viable sources of renewable energy for this redevelopment plan. Solar power and wind power are the two prospective energy alternatives I will be evaluating for their feasibility in the South Weymouth site as far as cost, both monetary and environmental, and the land coverage and other resource limitations on the 1,450 acre air station.

Solar power is one of the two more practical energy sources for the site due to the site being almost entirely flat, not existing on a floodplain, having a good amount of sun coverage throughout the year, maintaining a sufficient pre-existing connection to electrical transmission lines, and that the local power grids can handle the additional energy. However, there are precautions that must be considered when installing the necessary amount of solar panels to serve as the primary site source of power. While the site is not completely covered in wetlands, it

is important that the solar panels be mapped around these wetland habitats as to protect the wildlife from the potential disturbances detailed in the Wetland Conservation Act (Robertson, 2020). Zoning and land-use bylaws in Weymouth have identified a particular area of the site, within the designated Open Space - Weymouth District located on the WGL OU, to be zoned for solar.



The cost to install a 1 MW solar farm would range from \$820,000 to upwards of \$1.36 million (Hyder, 2020). But as far as the complete conversion of site energy to renewables, solar power requires a supplementary provider to fully produce for the entirety of a NAS. A wind turbine project would be viable on the Weymouth site due to its available acreage to operate the necessary turbines. Developers would be able to safely install at least 225 200-foot turbines facing westward along the length of the site as well as about 115 along the width of the site just

above the Weymouth town border in under just 1.5 acre proving to be a considerably space effective power source (ElementalGreen, 2020). Additionally, it is notable that wind power can be a more reliable, powerful form of renewable energy: “wind is a naturally more efficient power source than solar. From an emissions standpoint, wind releases less carbon dioxide into the atmosphere, consuming less energy as well. What wind turbines lack in compactness, they make up for in efficiency, being able to generate the same amount of electricity ‘per kWh as about 48,704 solar panels’” (ElementalGreen, 2020). While there are many advantages to wind power, the main drawbacks of the turbines are their disturbance to migratory bird patterns, weather-dependence, and their obtrusiveness/lack of visual aesthetic. The upfront cost, depending on the size, can range from \$1.2 to about \$4 million (Windustry, n.d.). But, despite the large upfront cost, the wind turbines will be able to pay for themselves within 10 to 15 years making them a great long-term investment for this redevelopment project.

Through a transition to a primarily solar and partially wind renewable energy model, greenhouse gas emissions would decrease, benefiting the environment and human health-the social leg of the stool, and energy costs would be reduced in the long term thus enriching the economic leg of the stool in the process. And as far as the feasibility of a transition to renewable energy at the NAS, this site formerly sourced its energy from an on-site coal power plant, so there is a strong possibility that residual transmission line infrastructure could be used in implementing renewable energy. Benefits of developing renewable energy on contaminated sites might include reduced land costs, tax incentives, and streamlined permitting processes (EPA, 2020).

Although site residents would likely have to rely on cars to travel through the former NAS, there is far more travel infrastructure to-and-from the site than lies within it. Existing

transportation infrastructure consists of the commuter rail Old Colony Line, bus Route 225, Route 18, and Shea Memorial Drive. But because the current infrastructure already infringes on the bounds of the wetland ecosystems, revamping the existing transportation base rather than constructing new road systems would be far superior both environmentally and economically. Given Massachusetts Environmental Policy Act Office (MEPA) thresholds, it is important to consider that widening of an existing roadway by one or two more miles in length, construction of 1,000 or more new parking spaces at a single location, construction of a new rail or transit line along a new, unused, or abandoned path for transportation of passengers or freight all require both an Environmental Notification Form and an Environmental Impact Report when blueprinting revamp plans (Mass.gov, 2013). In order to mitigate the environmental impacts of a roads construction project, choosing to use E-busses rather than diesel-fueled busses, incentivizing mobile rather than paper ticketing, and designing bike lanes to promote sustainable travel are all economically and environmentally advantageous alternatives to the existing structure. Additionally, the redevelopment should place limitations on the construction processes in efforts to prevent increases in traffic for nearby residents (although upon completion, the roads project should provide new routes and do much to ease traffic in the area); construction vehicles are only to enter and exit during specific hours of the day where roads are bare/non-rush hour times, the project is to include plans to expand on current parking to account for foreseen new visitors and residents, the development leads are also to consult the EPA's "Diesel Emission Reduction Policy" at every step of the way to confirm that everything that can be done to limit exhaust emissions and general pollution is being done. Nonetheless, transportation infrastructure has a substantial effect on the stability of the site "stool." Economically, the transportation redevelopment plan incentivizes nearby residents to use public transportation thus limiting travel

emissions proving advantageous for the environment as well. The plan similarly brings stability to an otherwise dysfunctional transport system and will likely increase property values, a seeming pull factor for new town residents to come. Environmentally, as aforementioned the redevelopment has potential to reduce pollution and the town's carbon footprint as more people abandon isolated travel and save money traveling in groups. And socially, public transportation is likely to strengthen communal ties allowing members of the intersected cities to socialize and meet people they would have otherwise never met. The new plan for Weymouth transportation will also create many new jobs in the process of its construction which will provide some stability for those working citizens and stimulate the town financially.

To address the social leg of the stool, I must investigate the potential for political and social backlash from any number of these proposed solutions to this superfund problem. The town of Weymouth is the primary land benefactor of the site while the adjacent towns of Abington and Rockland comprise the remaining borders of the former NAS. The three towns are predominantly white with large veteran and family populations, which may be hesitant to the proposal due to its budget demands. Despite the plan's ability to pay for itself in money saved over time, it would be crucial to inform those voting on the plan that a majority of the redevelopment is not to be funded out of their pockets, but out of a combination of the responsible polluting parties and the government's Department of Defense and EPA. But because the proposed community development project is in the best interest of all of the town's residents, the plan should pass very successfully through a democratic vote. Along with the site's redevelopment plans for a community recreation center, veteran care facility and housing, affordable apartment complexes, transportation and renewable energy infrastructure, etc., it would be of benefit to the social leg of the stool to set aside an acre for a community garden or

two as well as an investment into the restoration of key historical features and monuments of the former NAS that will both serve to foster a community feel for a collective history and unity.

That is to say, the proposed former NAS South Weymouth Redevelopment Project is equipped to tackle the downfalls of the prior planning cooperation. The project outlines courses of action for any and every foreseen obstacle including; soil/water contamination, invasive species, water, sewage, stormwater, climate change, transportation, and energy issues on the site. And along with crisis mitigation, the redevelopment plan composes new infrastructure that will foster a supportive and happy communal reality through the creation of new jobs, more efficient and sustainable transportation and energy systems, cleaner air, water, and wetland ecosystems, and the construction of a community amenities that will see to the needs and demands of the residents of the three towns. Therefore, this site redevelopment plan proves advantageous to reintroduce the three-legged balance back into the Abington, Rockland, and Weymouth towns as the development strategies benefit the town and its residents socially, environmentally, and economically.

References

- Call, Phoebe. (September 2007). *Record of Decision: Operable Unit 1 West Gate Landfill*. Sems Publishing. <https://semspub.epa.gov/work/01/278802.pdf>
- DEIR. (October 16, 2006). *Volume I Text Naval Air Station Development Project*.
- ElementalGreen. (2020). *WIND VS. SOLAR — WHICH POWER SOURCE IS BETTER?* <https://elemental.green/wind-vs-solar-which-power-source-is-better/>
- EPA. (November 30, 2018). *What Is Superfund?*- Environmental Protection Agency, www.epa.gov/superfund/what-superfund
- EPA. (2019). *SOUTH WEYMOUTH NAVAL AIR STATION WEYMOUTH, MA*. <https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0101826#bkground>
- EPA. (2020). *Learn More About RE-Powering*. United States Environmental Protection Agency. <https://www.epa.gov/re-powering/learn-more-about-re-powering>
- Hyder, Zeeshan. (December 8, 2020). *What is a solar farm? Costs, land needs & more*. SolarReviews. <https://www.solarreviews.com/blog/what-is-a-solar-farm-do-i-need-one#cost>
- (Liyanage, Don). (2020). “Permeable Reactive Barrier.” *Permeable Reactive Barrier - an Overview* | ScienceDirect Topics, 2020, www.sciencedirect.com/topics/earth-and-planetary-sciences/permeable-reactive-barrier
- Mass.gov. (May 10, 2013). *301 CMR 11.00: MEPA Regulations*. www.mass.gov/regulations/301-CMR-1100-mepa-regulations
- National Parks Service. (n.d.). *Prescribed Fire Used to Remove Invasive Species and Reduce Hazardous Fuels-U.S. National Park Service: U.S. Department of the Interior*, www.nps.gov/articles/agfo-rxfire.htm
- SnoFlo. (March 21, 2021). *Old Swamp River Near South Weymouth Flow Report*. SnoFlo. <https://snoflo.org/report/flow/massachusetts/old-swamp-river-near-south-weymouth/>
- U.S. Forest Service. (April 24, 2014). *Biological Control - US Forest Service Research & Development*, 2014, www.fs.fed.us/research/invasive-species/control/biological.php
- Robertson, Roxy. (May 28, 2020). *Effects of Solar Gardens on Vegetation*, WSB, www.wsbeng.com/effects-of-solar-gardens-on-vegetation/
- Windustry. (n.d.). *How much do wind turbines cost?* https://www.windustry.org/how_much_do_wind_turbines_cost#:~:text=The%20costs%20for%20a%20utility,%243%2D%244%20million%20installed