

Change vs. Transformation, Hard Edges to Soft – The Role of Integrated Land Use Planning in the Adaptive Reuse of Contaminated Sites - 16431

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ABSTRACT

Between the bookends of World War II and the Cold War, numerous cycles of upsizing, downsizing, and right sizing resulted in changing needs for federal real property to support government missions. The end of the Cold War has yielded many opportunities for reuse of federal facilities as defense-related property needs have been lessened. These federal facilities have both a historic and an environmental legacy, from radionuclides to unexploded ordnance to landfills and everything in between. Private-sector manufacturing sites have been especially affected by changing market demands. Obsolescence and advancing technologies have made the “have to have it” product into the “what was that for?” The result has been thousands of hectares (acres) of contaminated land throughout the country. While site histories go back in time, it is the environmental cleanup contaminants that have the ability to go forward in time and influence the future use of a site. Demonstrating that property conditions are protective of human health and the environment facilitates reuse options for these properties. Site reuse creates land for communities to attract businesses, grow their tax bases, add open space, and implement sustainability efforts, such as renewables, or set the property aside for future possibilities.

A broad range of sites have been made available across the country as a result of federal mission changes and changed economic market conditions affecting private industry. This broad range of properties should have similarly broad recipes for reuse. Even with the constraints of zoning, topographic/natural conditions and use restrictions necessitated by past operations, the pathways to creative, adaptive, and sustainable reuse can be taken by integrating the planning with the remediation or, in a more community-sensitive approach, by integrating the remediation with the planning. Situations do exist where a like-kind use is an ideal reuse option, but a redevelopment of sameness need not be a foregone conclusion. Unlike the operational and imposed environments from which these sites came, with their engineered features often developed in a systematic manner with straight lines and hard edges, they can indeed be transformed into functional, relaxed, and engaging places *and* be productive again. A site’s transformation can begin with how the remediation incorporates sustainable techniques that consider the future use of a site, and how the sustainable remediation can dovetail with the community’s reuse plans.

Rather than building on Greenfields and extending infrastructure and services to more distant locations, many communities are looking within their already developed footprints for growth possibilities. For some communities this is their only source of growth. Stigmatized and challenged as they may be to reuse, the nation’s excess, underutilized, surplus, and abandoned industrial past presents opportunities well worth considering for improvement to local and regional

economies. Communities that are engaged in remediation and reuse planning efforts at these sites have the opportunity to shape their futures, transform their identities and incorporate sustainable practices throughout the process. Unlike the simple name change of a facility, transformative change takes time.

Transformative change relies on working partnerships, dedication to achieving something better, open communication, and cooperative planning. It is this type of change that tends to be lasting and tailored to a place.

INTRODUCTION

The term "sustainability" was introduced by the Brundtland Commission in 1987, and was defined as "equity between economic, social, and environmental concerns", and "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs," [1]. Since that time numerous tools have been developed to help understand, manage, and measure the sustainability "brand." A concise definition of sustainable remediation, also referred to as "Green Remediation," is from the U.S. Environmental Protection Agency (USEPA) and notes "the practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprint of cleanup actions." [2] This appears to go hand-in-hand with a maximized reuse footprint. [3] Another definition of green/sustainable remediation is that of the Interstate Technology and Regulatory Council, which provides both the project-specific focus that remedial projects require and the larger lens perspective. "The ultimate goal of remediation is to protect human health and the environment. To meet this goal, many remedies have been focused on site-specific risks and may not have been developed in consideration of external social and economic impacts beyond identified environmental impacts. By identifying approaches that address environmental, social, and economic impacts, projects can be improved while still meeting regulatory objectives." [4] For cleanup projects with an intended reuse, this definition is the most valuable and appropriate because it has the dual-level focus of the near term and the future.

Implementing sustainability methods and the ability to apply metrics to the methods have become more prevalent recently. The "Green and Sustainable Remediation" guidance developed by the Department of Defense [5] and, more recently, the standards developed by the American Society of Testing and Materials [6] do an outstanding job of defining, measuring, exemplifying, and testing sustainability. While the diversity of definitions of sustainability illustrates the subjectivity of the term, initiatives are in place to reduce the subjectivity and increase the implementation and measurement of sustainable cleanups.

Besides sustainability factors, other ingredients have come to flavor the cleanup recipe. Consider, for example, the concepts of restraint (don't spend too much), sprinkled with pragmatism (we want to do this, but not now, let's do this instead), perception management (let's front-load certain project aspects that can garner positive public or environmental benefits, then taper to the less tangible, but still important aspects), and cautiousness, perhaps choosing to study risk reduction approaches over a longer period in an effort to adjust them and maximize their

effectiveness at a future time. Can each of these concepts – restraint, pragmatism, perception management, and cautiousness - be components of sustainability? They may not be part of the planning and analysis but clearly play a role in implementation. What about budget sustainability? Doing more with less is clearly an economic sustainability concept and may also have the benefit of employment sustainability, if not for more people over time, but for fewer people over a longer period of time.

Following the presentation of instructive material in the methods discussion that follows, examples of transformative change are provided. The objective of the overall analysis was to find both public and private sites with contamination histories that had been or are being redeveloped and reused. The U.S. Department of Defense [DoD] Base Realignment and Closure (BRAC) database maintained by the DoD Office of Economic Adjustment (OEA) [7] was researched along with inquiries to the Association of Defense Communities [8] regarding good examples of planning for reuse. Department of Energy Environmental Management and Legacy Management program sites were researched and two of the more mature sites were selected. With regard to private sector sites, it was necessary to conduct more research to identify sites with robust project files to enable analysis.

METHODS

Ultimately, three DoD sites were studied, with Fort Ord in Monterey, California, used as the example site. Two DOE sites were studied and one site, the East Tennessee Technology Park, was chosen as the example site. A number of private sector sites were chosen for additional study, with Bingham Junction, the former Midvale UT Slag Site, chosen to exemplify the value of land use planning for site reuse. Each of the example sites approached their reuse effort differently. Planners were engaged to varying degrees at each site. The history of the planning that was conducted for each of the three sites is discussed to illustrate the differences. Each site is being successful in its own way when measured against the goals of its community.

Getting from Sustainable Remediation to Reuse – With a Plan

With the effective and detailed tools, definitions, and metrics of sustainability now broadly available to all, coupled with the experience of implementing sustainable projects broadly or narrowly, it is time to bring sustainable remediation together with reuse that is guided and enhanced by land-use planning.

The desire to reuse land – as opposed to leaving waste in place and limiting reuse options - that needed cleanup led to the circular logic traps of “how clean is clean,” “how clean is clean enough,” and “how clean does it need to be for what a community wants to use it for?” There is also the major decision faced by communities, “what do we want to use it for? It’s always been something else and now *we have a say* about its future use.” Chicken and egg discussions typically ensue. When a time element is applied to the scenarios being contemplated, it can overwhelm communities already overwhelmed by the loss of jobs. There is a great deal for communities to contemplate. Not only the contemplation, but the

involvement and the community acceptance of a remedy for a Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) cleanup are essential. (9) The remedy should be entirely integrated with the future use vision for the site, and that vision needs to incorporate community input to be effective. Getting from uncertainty to the future is best achieved with a plan that considers the present-day realities of contamination and the aspirations of community enhancement and economic development.

PLANNING TO PLAN 101

Provide Perspective and Encouragement

It may be hard for impacted parties to believe initially, but participating in the planning process is an enriching experience. After the news of a major change to the community by the loss of an employer who is often a public benefactor and a foundation upon which the community has depended, it is important to help the community take a step back, take a deep breath, remind them not to panic, and most importantly, help them to realize that they will ultimately have an asset. [10] This asset will be theirs to design and plan. *Planning? What's that?* Is it easier to react and be angry, frustrated, and even a bit frightened of the unknown? Well yes, it may be easier, and very normal, but it is not productive. You have work to do and you can do it.

A cornerstone planning manual for use by the public in working with BRAC sites presents two paragraphs that could not be better stated about planning. This text is from Patrick J. O'Brien, Director of the Department of Defense Office of Economic Adjustment (OEA). The text is from *Base Redevelopment Planning for BRAC Sites* [6] and is included here in full.

"A military base closure, while initially a source of significant local economic impacts, also represents the single most important opportunity for a community to make a dramatic, positive change in the local economy, especially in response to the loss of jobs. For some communities, former military property is ideally situated with strong prospects for redevelopment due to a location near, or in the midst of rapidly growing, prosperous communities. For other communities, the presence of a less robust local economy, an isolated location, or limited redevelopment opportunities and resources, makes the planning effort more challenging.

The redevelopment plan is the catalyst for a successful local response to base realignment and closure impacts. While no two communities are alike, and the redevelopment planning process is never routine, successful communities typically provide for a broad-based public planning effort to build consensus for redevelopment, and take actions to ensure the uses recommended in the redevelopment plan are formally incorporated into the local government's ongoing planning and economic development initiatives."

Communities can take the words of those two paragraphs, substitute the type of closure or need for use alternatives due to contamination that has affected their

community, and place themselves either in the growth area of their state or see themselves in the isolated location. Regardless of the specifics, they can see the need for the planning process and the value it can offer to a community in transition.

Identify the Reuse and Redevelopment Community

How can an agency or a Brownfield redeveloper find out what a community wants and needs? Identify the community in the broadest sense and ask them. An initial factor in communication is for a project proponent to know how to define their community. It is easy to define the specific place where a cleanup for reuse will occur, but it is more complex to define the community in which the *direct and indirect* effects of the cleanup for reuse will occur. It is not limited to the zip code of the cleanup. Emotions and shared interests, for example, can create communities. Far more functional associations, not paved or defined places with school districts, define communities; where the sense of a community is more of a verb than a noun. Introducing the unknown of land that will be available to a town/county/region can be a triggering event for the formation of a community with diverse interested parties and interests, from open space to economic development to affordable housing. This sense of community can be enhanced by the public or private body performing the cleanup or the reuse planning by actively seeking the input of the parties who represent the various aspects of the community.

Federal cleanups have advisory bodies that are chartered to assist the agencies with cleanup recommendations. Where DOE Environmental Management (EM) sites are located there are Community Reuse Organizations (CROs) in place to assist the communities that have hosted defense nuclear facilities with economic development of transferred property. Where DoD sites have been selected for BRAC, Local Reuse Authorities (LRAs) are identified. [11,12] For communities working with private sector cleanups of Brownfield sites, there can be chartered organizations to represent the public along with community planning boards, specially established organizations, and spontaneously generated organizations that can offer input to reuse. While it can be a somewhat unwieldy task and take far more time than a project sponsor anticipates, seeking the input of the public is an essential component of cleanup and reuse. Private sector developers engaged with cleanup projects should seriously consider the following question: *Has the affected community been involved in planning for brownfields remediation or has the developer controlled the process?* The latter narrows the ability to view the project as part of a community-wide plan and undermines its legitimacy. [13] If you want to find out what your affected community thinks about a remedial effort and future land use, sustainable or otherwise, ask them, listen, and keep that conversation going.

LAND USE PLANNING

Planners and What They Do

Land use planners are often invisible members of communities, but they exist and support various levels of local, regional, state, and national governments and a range of corporate and federal organizations. Ultimately their objective is to help communities offer better choices for where and how people live and work. Planners are trained in how to systematically solve problems that regard how man and land interact. They know how to engage with the public, how to listen, how to integrate information to solve problems, how to create interest in and about change, and how to facilitate disputes, seek compromises, and educate others on process, progress, sequencing of work, and the interrelationships between the parties involved in the implementation of a plan. It is to the benefit for the community to have a trained planner in a leadership role, in particular if the LRA or CRO is headed by a planner. They can help lead you through a process in a systematic way and perhaps even teach you principles that have lasting value and applicability to other situations.

Land use planners supporting site reuse have worked in the midst of technical, legal and/or regulatory issues related to contamination and its continuing cleanup and community uncertainty about the contamination and what it could portend to the future of their communities. Land use planners often bring unique and non-traditional ideas and conceptual, creative approaches to accommodate and facilitate change. They offer an approach of “why not” and the resilience to withstand the challenge of “we’ve never done that before,” which may be more of an individual’s response to uncertainty rather than resistance to change.

Planning Process Primer

The details of the planning process, beyond the broadest level, typically take place in a facilitated manner that transitions to a semi-facilitated manner after those broad-level factors are known. As noted above, it is important to know the interests of the community – what they value, what they would like to see happen to the land, and perhaps a preference on the order of when they would like to see it happen – as well as to at least identify a “theme” for how they want things to look. Working with that information, land use planners can create generalized master plans to share and seek community input. After the generalized planning phase is complete and input is gathered from the community and project sponsors, additional planning and design work is performed that emphasizes the theme and establishes the style of a place. This phase usually involves the planners, and often landscape architects, working together on a limited set of plan options. At the conclusion of this phase, choices are made by the project sponsors in recognition of the interests of the public, the limitations of the land, the realities of budgets, and the understanding that while the planning process is a process and a plan is not a decision, it is very important to reach a conclusion to enable a sense of accomplishment. A preferred land use plan is usually identified at this time, with one or two alternatives from which a plan can be adopted.

It is important to plan first and design later. The temptation is great to jump ahead in the planning process and try to name the streets and design the signage. Far more important at the outset, however, is to dedicate the effort to do the broad brush planning. When working with a remediation project, it is the risks posed by the contaminants that are present in the soil, sediment, air, surface water, and groundwater; how they will be remediated (or not); and to what cleanup (exposure) level that provide the basis of the conceptual future land use. [14] Stakeholder and public involvement is a key to this aspect of the planning process. Certain contaminants in particular media have tailored and proven remedies with predictable end-state results. While the remedies may be known for these contaminants, it is not known how long it will take to implement the remedies and that discussion and knowledge is needed for the planning process. Knowing the sequence of the cleanup is also very valuable to the planning process. For example, will it occur by media or by geographic area of the site? How long will each phase take and will areas be available for redevelopment in a reliable timeframe? This information also aids in the management of expectations for the reuse organizations, regulators, elected officials and others, most especially the community that is awaiting the improvements to occur. It is also necessary to know where dedicated uses will occur, such as landfills.

Knowing the end state information and the sequencing and timing of it shapes the land use planning. These factors also affect and inform how much "future" is involved in future land use planning. With DOE EM sites the mission is cleanup, not reuse, and the future use planning is the responsibility of a CRO or other similar body. [15] It is during this planning time that a site can attain its "branding," potentially helping to coalesce the remainder of the planning process and inform later design refinements. Use versus open space zones are delineated, and then further defined use "zones" based on use type (e.g., heavy industry, light manufacturing, office, and commercial) are delimited. In parallel, the planners work to incorporate open spaces that consider remediation end states, watershed protection, visual and aesthetic relief, passive recreation and/or conservation, etc. Overlays based on federal, state, or local requirements such as setbacks for utilities, drainage and water retention, infrastructure, and resource protection are also incorporated as are roads, sidewalks, paths, lighting, etc. The broadest level of information – development areas, open space, and restricted or limited use areas – establishes the bounds, and the details are built around these areas.

EXAMPLES

Fort Ord – Planning to Enable it All – A Center for Environmental Protection, Economic Development, and Education



The former Fort Ord is an approximately 11,330-hectare (28,000-acre) U.S. Army installation located in Monterey County, California, that was identified for closure in the BRAC of 1991 and was closed on September 30, 1994. [16] The troops located there were realigned to Fort Lewis, Washington, and only a small portion of the site, approximately

324 hectares (800 acres), was retained by the Army. Fort Ord is and was the largest U.S. Army site ever closed. The Fort, at peak operations, housed 36,000 military and civilians and employed approximately 14,000 military and 3,000 civilians. The Fort is a historically and ecologically significant site and both of these factors play a large role in the site's reuse.

Fort Ord was officially established in 1917 for training infantry troops, was expanded several times in its life span, had many of its barracks built by German prisoners of war who were freed at the end of the war in Europe, and was the Army's main training facility during the Vietnam War. It is estimated that over its history more than 1.5 million troops were trained at Fort Ord. Fort Ord not only had barracks, but a golf course, bowling alleys, movie theatres, tennis courts, schools, a hospital, 11 chapels, and extensive roads and infrastructure. [17] At the time of its closure, the Fort also had unexploded ordnance, a large unlined landfill, leaking underground storage tanks, solvents, and other contaminants that led to the contamination of the soil and groundwater. Groundwater contamination was discovered in 1990 and the Fort was subsequently designated as a Superfund site. The DoD/U.S. Army performed the remedial investigation/feasibility study phase of the Comprehensive Environmental Response, Compensation and Liability of 1980 (CERCLA) process and identified future land uses (as determined by the federal disposal process). The evaluation of the future land uses included the risk analysis process for each of the reuse scenarios and the risks to human health and the environment. [18]



Shortly after the DoD announcement of closure, the community – the county and each of the municipalities and communities in the Fort region – formed a task force and began the reuse planning process. By 1993, an interim reuse plan had been adopted. A LRA was formally identified by the DoD Office of Economic Adjustment. The Fort Ord Reuse Authority (FORA) was formed as a State of California

corporation and is the LRA responsible for redevelopment of the former Fort. The cornerstone document prepared by FORA was the Base Reuse Plan (BRP), which was issued in 1997 and was built upon the interim reuse plan that was finalized in 1993. The focus of the BRP is economic development, education, and environmental protection. The BRP is seen by FORA, DoD, and the community as the guiding approach for reuse of the Fort. Planning, including landscape planning, habitat planning, transportation planning, and historic preservation planning, is a key feature of the reuse of Fort Ord. [19] Neither the DoD, the community, or FORA see the plan as a static tome, it is actively used. The BRP was reviewed in 2012 and re-emphasized in 2013 to enable looking back at the initial plans and to look forward to the future, including making modifications to keep up with community interests.

FORA's dedication to the planning process and its unique coordination of the cleanup with planning has been an exemplary success. Two-thirds of the site is a National Monument and is in the process of being transferred to the Bureau of Land Management (BLM) for conservation purposes. Remediation of the land to be transferred to BLM began in 2008 and is projected to be completed between 2024 and 2026. [20] A patient public awaits its completion. There are other areas of the site, approximately 1,335 hectares (3,300 acres), where the cleanup was proposed to take 17-20 years, but the timeframe for completion was unacceptable to the community and its economic growth plans. To facilitate an expedited cleanup, FORA obtained the 1,335 hectares in an early transfer and is implementing the cleanup under an Administrative Order on Consent. The vehicle for this is an Environmental Services Cooperative Agreement (ESCA), a privatized cleanup that is being coordinated with DoD, the State, and USEPA. This ESCA approach has shaved 10-12 years off of the DoD cleanup schedule by taking advantage of full funding and avoiding heavy time and funding impacts of mobilization and demobilization. Integrated planning and working towards the attainment of the BRP has served FORA and its community well.

The results of the integration of cleanup and reuse planning at the former Fort Ord are exciting and inspirational. The site now hosts the University of California Monterey Bay, California State University – Monterey Bay, a youth hostel, rehabilitated housing (both for rent and purchase), new homes, apartments, townhouses, senior housing, DoD facilities and military housing, the planned California Central Coast Veterans Cemetery, a planned veterans medical clinic, an

airfield, a planned equestrian complex, Monterey Peninsula College, retail and commercial space, open space, trails, golf courses, hotels, restaurants, and numerous transportation projects. The economic impact/benefit to the region is estimated to be several billion dollars.

U.S. Department of Energy Oak Ridge K-25 Site East Tennessee Technology Park – Moving Forward While Reflecting on a Significant Past

The former Oak Ridge K-25 Site, now referred to as ETTP, is a DOE EM Program site, is the centerpiece of DOE's asset revitalization efforts, and is a well-known success. The ETTP program is referred to as "Reindustrialization" and it has its roots in a different type of planning process than that of DoD BRAC sites. The K-25 site was the government's original Manhattan Project facility dedicated to the enrichment of uranium. In 1985, all uranium enrichment operations ceased and in 1987 the operations were permanently shut down. ETTP was not closed, but it was not operating either. Preliminary steps towards the eventual decontamination and decommissioning (D&D) were underway. In 1989, ETTP and the two other DOE facilities in Oak Ridge were named to the National Priorities List (NPL) and are being cleaned up under the provisions of CERCLA. In addition to planning for D&D, DOE now also had to consider the implications of a much larger cleanup. It was the larger CERCLA cleanup and that planning effort that indirectly sowed the seeds for what was to become Reindustrialization.



The Oak Ridge SSAB (ORSSAB) was formed in 1995 under the Federal Advisory Committee Act. The ORSSAB is a federally appointed citizen's panel that provides advice and recommendations to the DOE EM program. [21] After a wide divergence in remedial alternatives that had been proposed for a project elsewhere on the Oak Ridge Reservation (ORR), DOE asked the ORSSAB to initiate a process to gain a better understanding of community values and desired future uses for contaminated areas on the ORR. The ORSSAB sponsored a public meeting in 1997 that resulted in the formation of the End Use Working Group (EUWG). By asking for the input of the community DOE learned that, in the case of ETTP, the community sought a combination of controlled and uncontrolled industrial use, and that they understood that a restricted waste disposal end use for particular classified burial ground was also needed. [22] Not only did this community input assist with the development of the remedial alternatives for ETTP, it enabled the establishment of remediation levels consistent with industrial use versus more stringent levels. A positive economic spillover effect of the industrial remediation levels allowed for a lower-cost cleanup over a shorter period of time.

The end of the Cold War in late 1991 had brought uncertainty, layoffs, and budget reductions to Oak Ridge. The "Peace Dividend" was a "return" to the community that no one particularly wanted to claim, as it would be a net loss in government investment in Oak Ridge and many similar communities. The desire for extra governmental job creation and economic development rose to the forefront. Of particular interest to the community was industrial development, and the K-25 site was a prime location for that development. In 1996, DOE signed its first lease with the Community Reuse Organization of East Tennessee (CROET) and the Oak Ridge community was very supportive of the reuse of the K-25 site and the opportunities it might bring. The question of 'cleanup for what purpose?' was being answered. Cleanup was the mission, but the measure of success of the mission was viewed by the community as the ability to reuse the site *after* cleanup.

Since the site's Reindustrialization Program began in 1996, over 280 hectares (700 acres) of land have been transferred to the local CRO, the CRO of East Tennessee (CROET), and the city of Oak Ridge, along with 10 buildings and a range of utilities and infrastructure including a short-line railroad. [23] CROET has also

constructed new speculative buildings. Land has not only been transferred from DOE, but transformed by CROET through a land use planning effort that involved innovative redesign of the landscape and hardscape. ETTP, through CROET, is now host to three solar fields that each employs a different solar technology as well as with a tourist railroad that has regularly scheduled train rides throughout the year, with plans for a railroad museum. ETTP is also now host to a unit of the Manhattan Project National Historical Park, which is a feature that looks both back to the Manhattan Project of the 1940s and into the future. The Historical Park will have a permanent role in the end state reuse of ETTP.



An even greater demonstration of a commitment to the future can be to modify and enhance the way people personally experience change. To gain entry into the K-25 site during operations and up until the mid-2000s it was necessary to go to the badge office. The badge office was housed in a low-rise building at the front of the plant along a major road. In 2008, the building that formerly housed the badge office was transferred from DOE to CROET. CROET has transformed that building from a utilitarian structure to the Heritage Center Conference Center, a showplace enhanced with a mid-century modern look that resonates with a welcoming message to all who see it. CROET subleased the building to a private firm that uses it for functions and meetings and offers rental use.

More exemplary than the building is the investment CROET made to change the way people experience the Conference Center building itself, its site, and its situation. Looking back over many decades, the K-25 site was a secret wartime facility built by the U.S. Army Corps of Engineers. Function was the driver for the

design and placement of all structures, roads, and other features. Urgency was the key word for all Manhattan Project efforts and cost savings on everything but the direct mission needs were paramount, there were no frills to be had. Roads were straight with 90 degree angles and few curves. The Heritage Center Conference Center sets a completely different tone from that of what the Army Corps designed. As the "front door" to the site, the transformation is immediately different. The building has extensive landscaping that includes a waterfall, new signage, new lighting with a period look, and a network of curved sidewalks in a logical configuration that takes you to a destination, not simply a place. This experience was achieved through the efforts of land use planning and planners and enhanced designs prepared by landscape architects. It was not engineered, but was designed. Changed angles do lead to changed minds.

Another significant visible change at ETPP came about as a cost-saving measure and is also a landscape feature. The "front yard" at ETPP is no longer planted in fescue that requires intensive maintenance, but has been replanted with perennial native warm-season grasses and self-sowing wildflowers. DOE has removed the majority of the fences at the site and replaced them with fences that surround buildings and work that warrants fencing. CROET has already created several greenways at the site and has installed walking trails. The greenways serve multiple purposes, as some areas were found to be technically unsuitable for development. These areas have been rezoned and have a reduced tax rate. Solar projects have also been established in some of the areas unsuitable for development. Other areas are suitable for development, but the development has not yet occurred. In these areas, planting the grass and wildflower mixture is an interim step. What is not an interim step is the change that has been planned, is visible, tangible, and immediately recognizable as an investment in a sustainably reused site.

Midvale Superfund Sites, Midvale City, Utah – Looking to Finish vs. Looking to the Future

The Midvale City Superfund Sites include a former tailings site and an adjacent former smelter site that were the descendants of a long history of milling and smelting operations that occupied several hundred hectares (acres) in Midvale City, Utah. The tailings site, also referred to as the Sharon Steel site or Midvale Tailings site, is approximately 107 hectares (264 acres) in size. It is the site of a former ore milling facility that operated from 1906 to 1971. The tailings were disposed of in ponds adjacent to and below the milling facility. Eventually the piles were expanded and a portion of the Jordan River was rerouted and filling the riparian zone and adjacent wetlands took place. Ultimately 10 million cubic yards of tailings up to 58 feet deep were disposed. The tailings had high concentrations of heavy metals, including lead, arsenic, iron, manganese, and zinc,



which resulted in the contamination of the upper sand and gravel aquifer. The remedy for the tailings site was to excavate and relocate the tailings on site in place, replace some excavated areas with clean fill, dredge the filled wetland areas, and install a cap over 77 hectares (190 acres). Tailings excavated from the yards, gardens, and sandboxes of residences and businesses in the area were also added to the tailings pile before being capped. The remedy was implemented between 1991 and 1999. Institutional controls are in place and the site was delisted from the NPL in 2004. [24] The site has been renamed Jordan Bluffs and is being marketed for development. [25] Development appears to be challenged, however, due to the cap, the nature of the capped materials, and the range of institutional controls in place.

The smelter site, also referred to as the Midvale Slag Site, is 180 hectares (446 acres) in size and is located to the north of the Sharon Steel/Midvale Tailings site. Smelting operations occurred at the site between 1871 and 1958. At one point, five smelters were located on the site along with baghouses, smokestacks, and blast furnaces. Site operations resulted in the contamination of the soil and groundwater with heavy metals. Bank stabilization work was also needed in a riparian area along the Jordan River. The remedy for the Midvale Slag Site was quite different from the remedy for the adjacent Sharon Steel site. Rather than burying waste on site, contaminated soil was excavated and the areas were backfilled, soil cover was added, barriers were installed over smelter waste and contaminated soils, and an extensive series of institutional controls were put in place. The remedy for the soil, groundwater, and riparian areas was implemented in phases between 1996 and 2011. [26, 27] The site has been renamed Bingham Junction and is being successfully redeveloped for mixed uses, including residential. In 2015, it was delisted from the NPL. [28] The tax assessment for the property has risen from \$3.9 million in 2004 to nearly \$309 million (projected) in 2015. [29]

Why does the future of Bingham Junction appear to be brighter than that of Jordan Bluffs? What is the difference between the two sites? Both sites involved USEPA Region 8, the Utah Department of Environmental Quality, and Midvale City. Both were listed on the NPL and have been delisted. Surely we can expect similar results, can't we? No. The major



difference between these two sites does not lie specifically in the contamination or the technologies available for remedy, but lies in putting the future use of the site into remediation planning and designing the remedy to attain the communities' future use objective. It also relies on the willingness of the involved parties to work together as partners. The Mayor of Midvale City attributed the success to a number of key aspects, namely a dedicated USEPA Project Manager, making the needs and expectations of the community understood, and the development, implementation, and enforcement of land use controls that were put in place to ensure the health protectiveness of the future users and occupants of the site. [30]

Table 1 on the following page presents a high-level summary of the key aspects of reuse planning for the three main sites (Fort Ord, K-25, and Midvale Slag) and several of the other researched sites.

RESULTS

Each of the three sites focused on has approached their cleanup and reuse differently. Ownership, regulatory engagement, stakeholder involvement, the type of cleanup needed, the type of reuse desired, the presence of natural or historical resources, each of these and other factors have created a type of unique fingerprint upon the properties. The element of time has also been a relevant factor. In one instance the visioning, remediation and planning activities began in excess of 40 years ago, whereas in others these activities have occurred only within the past 5 years. Site reuse was not the consideration of cleanup planning and strategizing that it is now. The majority of the sites studied are admittedly not through with their renaissance; they are still engaged in cleanup, planning, development, and working with their communities to shape their futures. While some organizations may cease to exist as their charters expire or other administrative changes occur, the commitment to continue to strive for community enhancement sought by their stakeholders does not appear to have a sunset date.

Planning for reuse should not be confused with a duplicated formula. Communities are literally living systems and should resist the urge to say "I want what they have!" No, you do not, you want what is right for your community. Part of knowing what is right, is to know what is feasible, reasonable, and executable within a fairly short window of time; economic opportunities can be extremely brief. Obtaining professional support to perform the necessary market and labor studies that are tailored to the community/region are an important early component of planning for reuse.

TABLE 1. Selected remediation and reuse variables at evaluated sites [31, 32, 33, 34, 35]

Variables		Department of Defense Sites			Department of Energy Sites		Commercial/Private Sites				
		Fort Ord, CA	Volunteer Army Ammunition Plant, TN	Fort Monroe, VA	East Tennessee Technology Park, TN	Fernald Site, OH	Midvale Slag, UT	Midvale Tailings, UT	The Steel Yard, RI	South Platte River Greenway, CO	Paint Shop Pond, Wellesley College, MA
Redevelopment Foci	Industrial/Commercial	•	•	•	•		•		•		
	Residential	•		•			•				
	Retail	•		•			•				
	Educational	•		•	•	•			•	•	
	Open Space/Recreation	•	•	•	•	•	•		•	•	•
	Preservation &/or Interpretation, including Historic	•		•	•				•	•	
Sustainability Factors	Remediation	•		•	•	•	•		•	•	•
	Reuse	•	•	•	•	•	•		•	•	•
	Economic	•	•	•	•	n/a	•		•	n/a	n/a
Reuse Planning	Early community planning initiatives	•	•	•			•			•	
	Joint leadership	•	•	•	•	•	•		•	•	•
	Continuing engagement	•	•	•	•	•	•		•	•	•
Miscellaneous	~ Years of effort involved to date	22	11	11	20	17	15	8	10	41	5
	complete (C) or ongoing (O)	O	O	O	O	C	C	TBD	C	O	C
	Perception issues	•	•	•	•	•	•	•			
	Positive community results	yes	yes	yes	yes	yes	yes	no	yes	yes	yes

The Face of Change – from a Land Use Plan to a Tangible Result

The length of time that it can take to get from the announcement of a military installation or a federal or private sector industrial/manufacturing facility closure to transfer for redevelopment can be very lengthy, in particular because cleanup is involved. [36] While some areas of a site may be able to use early transfer methods and be transferred for redevelopment before the entire site is restored, there can still be a sense of being in suspended animation with regard to progress. It is the time period between the closure announcement and the re-opening for business when the planning described above takes place. Attention to the management and structure of the entire transition phase from closure to reopening is crucial. The planning process should be an open, transparent, and well publicized effort so that when it concludes there can be an understood vision. Granted, not all parties will see each of their wishes incorporated into the plan, but all parties should understand how the plan was developed and why it looks the way it does. At the conclusion of the planning process there is often a major announcement, or series of announcements, to a wide audience that communicates the results of the planning effort and unveils the new plan that expresses the future image for the restored property.

The days are past when simply changing the name of a place is sufficient. Communities tend to be more sophisticated and have greater expectations of change, especially when change implies progress. The expectation of change is more pronounced when the change is part of an "owed" restoration. While it is accurate to say that manufacturing jobs are desirable and that government installations and facilities tend to bring long-term steady employment, it is also necessary to say that there are costs to communities from these operations. Add to this list the announcement of a closure and a forecast of decades of cleanup and communities will seek to be made whole from years or decades of environmental insult. Residents, businesses, and elected officials seek evidence that industry and/or developers on their behalf make an investment in change and are committed to following through. The planning process in and of itself is insufficient to demonstrate investment, there must be timely, tangible results.

The placement of a new sign is a demonstration of change, but alone it is not enough, rather it can be an insult. People can treat the new sign and new name with contempt if there are not steps taken to show measurable, visible change. Some of these sites may be vast or inaccessible to the public, so making changes that people cannot see or otherwise experience does not help broadcast the message of committed change. The sequencing of the redevelopment is a factor worthy of consideration. Well-used major public thoroughfares are a logical interface point to show change. New landscaping is a contributor to the message of change and can be accompanied by new lighting and the repainting of remaining facilities. While changing a sign will not change a mind, changing the way a site looks to those who see it regularly, even in the smallest ways, can send a positive message of commitment to the future.

Lessons Learned About Helping A Site Transition to its New Use

Plan to help people plan – When looking at the reuse of an industrial-type property that will be turned over to a community, it is important to understand that people generally do not know how to plan. People experience life in a “present” state where they react and respond to their environments (for example, the majority of people purchase existing homes rather than work with an architect to design and build a home that they must wait to occupy). Large tracts of land, “blank slates,” that produce an opportunity to design a future environment are a rare situation. If you are working with a community on the reuse of land, in particular large tracts of land where there has been a long-standing presence of a firm or a government mission, you will need to advise them on the planning process, show them where they have a role and how to participate in a meaningful way, explain the limitations of the reuse opportunities (and bring in technical professionals to do that if needed), manage their expectations and help them to understand the increments of progress that can be made under the site’s unique circumstances.

Flexibility is crucial – A plan is a guide, not a rule to be applied with rigidity. A land use/redevelopment plan has use areas defined and infrastructure corridors identified, and perhaps even an order in which land areas are to be remediated and readied for transfer, but plans can and do change as a result of economic or other factors. Being able to adapt to change is a hallmark of maturity, and not following the plan exactly is not failing. Plans capture the mood and direction of a community’s interests at the time they are developed, they are iterative in nature, both during development and after issuance. Sites are often cleaned up in phases or by areas or sectors. As cleanup occurs, interim transfers for reuse can also come about unexpectedly and may affect future transfers; the ability to pivot is the ability to say “yes” to growth. Parcel shapes may be altered or generalized uses may be adjusted. Flexibility in reuse, while working within the bounds of an overall plan, is important. Development will likely be incremental and the plan should be able to accommodate it. [37] The plan – in its timing expectations and success benchmarks – also needs to reflect the reality of overcoming perceptions in the reuse of certain sites that may have particularly contaminated pasts.

Group dynamics need to be understood and managed – In a group setting such as one that is encountered in a planning meeting, the diffusion of responsibility is a deterrent to needed participation. “Diffusion of responsibility” is a phenomenon that occurs in group settings where people tend to feel less personal accountability and may feel that their efforts have little impact on the outcome, so they withdraw. “Social loafing” is another phenomenon that can also occur in group settings such as open planning meetings. “Social loafing” is the tendency of individuals to put forth less effort when they are part of a group. Because all members of a group pool their efforts to achieve a common goal, each member of the group contributes less than if they were individually responsible. With these social behavior actions in mind, it is essential for the planning process and those in leadership roles in the process to define roles and responsibilities that provide structure and create opportunities for participation where people can speak

objectively and be treated fairly. Establishing smaller groups that can focus on certain aspects of the planning process can help the situations avoid apathy, frustration, and a lack of progress, precisely the experiences a planning process needs to avoid. [38]

Start planning yesterday – The time to start planning for the future reuse of a site is yesterday. These things take time and there is no such thing as a community starting too early to plan. In some instances, sites and installations prepare materials that can provide insights into potential change, what they might be, and when they might occur. Keep informed about the use, mission, and utilization of the site in and engage with the leadership there through the SSAB or similarly recognized body so that you can start to work on components of a use succession plan.

About branding – “Branding” is a component of the planning process that will need attention. For some locations, the new use will be very clear and the name will come easily. For other sites, branding will need to wait until the planning has taken some shape and the economic development and market studies have been completed so the brand can be targeted to the intended future use. Professionals can be brought in to help with the branding and associated logo, mission and vision statements, etc. Creativity is important. It is important to be unique but be wary of names that are so creative that they do not offer any clues of where you are and what you do.

All land in a community should be planned for, even if it already has a use or isn't anticipated to have a future use – The value of visioning and planning to the end result cannot be understated. The possibility that something will always be there is somewhat naïve in the present business environment and the global economy. Change does come and it is best to know ahead of time what the community leadership has in mind for the overall community, and how it considers and integrates with the federal or private sector occupant of the vast site at the end of town. This is the type of information that can help a community define its vision in the present state and in the potential future state when change does come and a facility shuts down. How will the addition of hundreds of hectares (acres) of land affect the vision for the community? How will the hundreds of hectares (acres) of land be integrated into the community, over what timeframe, and what use or uses will it have? What present-day needs can it serve? What limitations will the community like to place on its use? Are there studies that can be undertaken ahead of time, for a limited investment, to help prepare for those types of eventualities?

The best plan still needs to be executed – The best plans still need to get from the drawing board or the newspaper announcements to the field. As noted by O'Brien in the DOD BRAC manual [11], it is important to have the results of the planning process formally incorporated into the local government's plans and the plans of the economic development offices. The cleanup is separate from the reuse. Cleanups are driven by the need to reduce risks to human health and the environment and take place as risk-prioritized federal funding is committed to it or,

in the case of a private industry, direct funding to the cleanup pursuant to orders of consent or other requirements. Reuse, however, is not risk-based and can be seen as optional. Communities need to remain engaged with the organizations involved in the redevelopment, insist on implementation schedules, regularly- scheduled public meetings where status will be provided, and demand accountability. The relationship of all involved should not turn into an adversarial one, but be an ongoing, diligent and diligently- managed one where expectations are understood all around. The involvement of elected representatives at the local, state and national level should also be a part of the equation. Keeping elected officials informed and aware of progress and issues can provide a consistent level of information that assists them in drawing focused attention to community needs at appropriate times.

CONCLUSION

Positive change requires definition of the desired change and its cooperative pursuit. This approach applies to individuals on a personal level and communities on a larger scale. One of the best assets a community can bring to the process of defining and designing change is a land use planner.

Land use planners are an invaluable asset to reuse planning. Site reuse, aided by the involvement and leadership of trained land use planners, can yield exceptional results because of the visionary and creative nature of planners. Planners are listeners, navigators, and liaisons between the parties engaged in cleanup for reuse. Planners and landscape architects, working together, can bring about unexpected changes to the environment because they see the world differently from engineers and, therefore, design different solutions.

Smart development, which is a planned development that integrates desired reuse and visioning information from an engaged community and that provides a designed environment that cooperates with the landscape, is a win-win-win. The winners are the communities, their new assets, and the opportunities they provide; the parties performing the cleanup and the realized effort to shrink their footprints; and the environment wherein a Brownfield is reused rather than a Greenfield disturbed; that's sustainability.

When it comes to sustainable and resilient communities that maximize the management and smart use of their resources, land reuse is at the top of the list. The reuse of previously developed sites, which can include brownfields, is an ultimately sustainable activity for a community.

REFERENCES

1. *Sustainability and the US EPA*, National Academies Press, <http://www.nap.edu/read/13152>, Washington, D.C. (2011).
2. U.S. Environmental Protection Agency, *Superfund Green Remediation Strategy*, Office of Superfund Remediation and Technology (2010).
3. U.S. Environmental Protection Agency, *Methodology for Understanding and Reducing a Project's Environmental Footprint*, EPA 542-R-12-002 (2012).
4. Interstate Technology & Regulatory Council, *Green and Sustainable Remediation: A Practical Framework*, GSR-2, Washington, D.C., Interstate Technology & Regulatory Council, Green and Sustainable Remediation Team, <http://www.itrcweb.org/guidance/getdocument?documentid=34>.
5. U.S. Army Corps of Engineers, *Evaluation of Consideration and Incorporation of Green and Sustainable (GSR) Remediation Practices in Army Environmental Remediation*, Office of the Assistant Chief of Staff for Installation Management, Installation Services Directorate – Environmental Division (August 27, 2012).
6. *Standard Guide for Greener Cleanups*, ASTM E-2893-13, 2013, ASTM International, West Conshohocken, PA, 2013, ASTM E2893-13e1, www.astm.org.
7. Department of Defense, Office of Economic Adjustment, Base Reuse websites, <http://www.oea.gov/links/base-reuse-websites>.
8. Association of Defense Communities, <http://defensecommunities.org/>.
9. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601 et. seq.
10. Watson. R. J., and Buss, T.F., "Back to BRAC," *Economic Development Journal*, Volume 3, Issue 3 (2004).
11. Department of Defense, Office of Economic Adjustment, *Base Redevelopment Planning for BRAC Sites* (May 2006).
12. Sorenson, David S., *Military Base Closure: A Reference Handbook*, Greenwood Publishing Group (2007).
13. Eisen, Joel B., *Finality in Remediation and Reuse*, 41 Sw. L. J. (773), 2012
14. U.S. Environmental Protection Agency, *Handbook on the Benefits, Costs and Impacts of Land Cleanup and Reuse*, EPA-240-R-11-001, Office of Policy and Solid Waste and Emergency Response (October 2011).
15. U.S. Department of Energy, Office of Environmental Management, *Asset Revitalization Guide for Asset Management and Reuse*, DOE G 430.1-8 (July 2015).
16. U.S. Department of Defense, Office of Economic Adjustment, www.oea.gov.
17. Foundling, Steven and Andy Warner, *Fort Ord: A Chapbook Adventure into the Ruins of the American Military-Industrial Complex*, Indrind Press (2008).
18. *Pacific Southwest, Region 9: Superfund, Fort Ord*. U.S. Environmental Protection Agency, <http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/vwsoalphabetic/Fort+Ord?OpenDocument> (February 2015).
19. *Fort Ord Reuse Plan, Volume I: Context and Framework*, Fort Ord Reuse Authority, http://ecoviz.csUMB.edu/wiki/images/b/b6/FORA_Base_Reuse_Plan_Vol_1.pdf (August 2001).

20. Fact Sheet: Fort Ord Track 3 Impact Area Munitions Response Area, Fort Ord Community Relations Office,
http://docs.fortordcleanup.com/ar_pdfs/factsheets/04-02/FINAL%20FS-04-02%20Track%203%20%20Fact%20Sheetv29DEC15.pdf (January 2016)
21. *History of the Oak Ridge EM Program*. DOE Oak Ridge Environmental Management Program,
<http://energy.gov/sites/prod/files/2015/05/f22/OREM%20accomplishments%20timeline.pdf> (May 2015).
22. *Final Report of the Oak Ridge Reservation End Use Working Group*, U.S. Department of Energy (July 1998)
23. Website, *East Tennessee Technology Park*, U.S. Department of Energy,
www.ettpreuse.com (February 2014).
24. Website. Superfund. *Site Information for Sharon Steel, Inc. (Midvale Tailings Site)*, U.S. EPA, http://cumulis.epa.gov/supercpad/cursites/dsp_ssppSiteData1.cfm?id=0800694#Why (January 2016).
25. *Jordan Bluffs*, CBRE,
2013, <http://www.loopnet.com/ATTACHMENTS/8/8/3/883FB0DB-E364-4BE8-A6A9-818FD9EAB731.PDF>
26. U.S. EPA Superfund Redevelopment Initiative, "Cleanup and Mixed-Use Revitalization on the Wasatch Front: The Midvale Slag Superfund Site and Midvale City, Utah," National Service Center for Environmental Publications,
<http://nepis.epa.gov>, 908R11002.
27. U.S. EPA Superfund Site Program, Site Information for Midvale Slag,
http://cumulis.epa.gov/supercpad/cursites/dsp_ssppSiteData2.cfm?id=0800641.
28. U.S. EPA Office of Enforcement and Compliance Assurance, *From Midvale Slag to Bingham Junction: A Superfund Success Story*, EPA-330S – 12001,
<http://www.epa.gov/sites/production/files/documents/midvale-sf-success.pdf> (July 2012).
29. *Redevelopment Agency of Midvale, 2014 Annual Report*, JoAnn B. Seghini, Mayor, Chief Administrative Officer, Midvale, UT.
30. Interview with the Honorable JoAnn Seghini, Mayor of Midvale City, UT (December 2015).
31. Fort Monroe Reuse Plan, Hampton, VA,
<http://www.virginiaplaces.org/military/fortmonroebrac.html>
32. *The Steel Yard, Rudy Bruner Foundation Award Case Study*, 2013 Silver Medal Award, Bruner Foundation, Inc.,
<http://www.brunerfoundation.org/rba/pdfs/2013/CH4.pdf>.
33. *South Platte River, Rudy Bruner Foundation Award Case Study*, 2001 Silver Medal Award, Bruner Foundation, Inc.,
http://www.brunerfoundation.org/rba/pdfs/2001/04_SouthPlatte.pdf.
34. Alumnae Valley Restoration, Wellesley, MA, Michael Van Valkenburgh Associates Inc., <http://www.mvvainc.com/project.php?id=29>.
35. Holden, T., presenter, Gevalt, D. and Haley, M., co-authors, *Transforming A Paint Factory to a Playing Field - Case Study*; Haley & Aldrich, Inc., San Diego, CA, Slide Presentation, 2008.

36. Mason, R. Chuck, *Base Realignment and Closure (BRAC): Transfer and Disposal of Military Property*, Congressional Research Service, 7-5700, R40476, <https://www.fas.org/sgp/crs/natsec/R40476.pdf> (February 28, 2013).
37. Bacon, K. Jr., Dagenhart, R. Leigh, N. and Skach, J., *The Economic Development-Urban Design Link in Brownfield Redevelopment*, Economic Development Journal, Volume 5, Issue 3, (2008).
38. Latane, B., Williams, K., Harkins, S. *Many Hands Make Light the Work: The Causes and Consequences of Social Loafing*, Journal of Personality and Social Psychology, 37(6), 822-832 (1979).

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