

REIMAGINING Chevy in the Hole



FLINT, MICHIGAN

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Partners: Genesee County Land Bank & Genesee Institute



Introduction

The City of Flint faces serious challenges related to its high number of abandoned properties and vacant lots. These empty patches in the landscape pose safety risks, decrease the city's visual quality, and often contribute to environmental contamination. One of the most problematic vacant lots, a 130-acre property known in Flint as "Chevy in the Hole," was a key center of manufacturing for General Motors for most of the past century. Adjacent to downtown and surrounded by residential neighborhoods, redevelopment of this riverfront property will play a key role in Flint's recovery. In this planning document, the Flint Futures group from the School of Natural Resources and Environment, University of Michigan presents two scenarios for redevelopment of Chevy in the Hole, each responding to a different series of plausible assumptions about residual contamination and Flint's future growth. Both scenarios are based on the stated preferences of Flint's residents and business owners.

In 2005, Sasaki Associates worked with a client group composed of the Genesee County Land Bank, Kettering University, and the C.S. Mott Foundation to create the Flint River District Strategy. The Flint River District Strategy report outlines a broad vision for redevelopment along the river, stretching from UM Flint to the Mott Park Golf Course. It has helped bring stakeholders together and several parts of the plan are already underway, but it does not address the economic and environmental complexities of Chevy in the Hole.



Chevy in the Hole is a brownfield site, that is, a site where real or perceived contamination complicates redevelopment. Brownfields present special problems, and redeveloping these sites requires particularly careful planning. In the interest of helping Flint move forward with this key piece of the puzzle, we offer a more detailed consideration of this particular site.



Community Input ■ After conducting background research and studying relevant precedents, we met with community members in Flint to discuss their priorities for Chevy in the Hole. These priorities fell into four categories: new housing in a variety of price ranges and markets; a stronger job base; increased safety, both in terms of crime prevention and cleanup of hazardous contaminants; and improvements to Flint’s livability.

Considering the community’s priorities, we identified four central questions relating to redevelopment of the site:

- 1) What economic drivers will spur redevelopment and stimulate new growth at Chevy in the Hole?**
- 2) Given the economic context and environmental risks of this brownfield site, what kinds of remediation are advisable?**
- 3) After remediation, what kinds of redevelopment and ecological restoration are feasible?**
- 4) How could redevelopment phases respond to both community needs and brownfield constraints?**

Redevelopment Scenarios ■ These key questions helped us develop two alternate stories, or scenarios, that describe possible redevelopment trajectories for Chevy in the Hole. Outlined in detail in the following chapters, these are the “Flint’s Urban Riverfront” scenario and the “Flint River

State Park” scenario. The two scenarios differ from one another in their assumptions about development pressures, contamination, remediation, ecological enhancements, and circulation patterns. In the Urban Riverfront scenario, we assume that Flint begins to attract new businesses and residents in the near future. Redevelopment focuses on cleaning up the site quickly to accommodate growing development pressures. The State Park scenario assumes that population decline and job losses level off, allowing Flint to stabilize. Remediation occurs over a longer period of time and requires less capital investment, and much more of the site is dedicated to public open space. Each scenario occurs in two phases, beginning in 2010 and ending 2040.

Rather than proposing a definitive plan of what should happen at the site, these scenarios cover multiple possibilities for the site’s future, giving interested parties more flexibility to respond to new information as redevelopment moves forward. We believe that in order for Flint to reclaim Chevy in the Hole, stakeholders need to have a strong, realistic understanding of the range of possibilities.

While the visions of Chevy in the Hole’s future illustrated here differ in form and function, both strive to realistically imagine how the site could contribute to Flint’s rebirth as a vibrant and healthy city. Both focus on the Flint River as a vital asset for the community, and both place a high priority on public health and the creation of public amenities to improve quality of life.



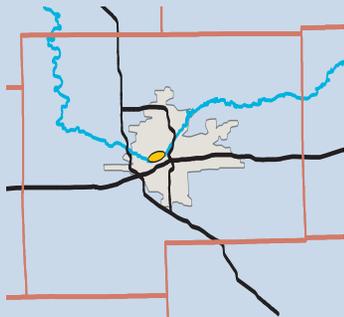
Flint River running through Chevy in the Hole

LOCATION & CIRCULATION

■ Genesee County, Michigan



■ Flint, Michigan
— Interstate highways



— Flint River
— Major roads
● Chevy in the hole



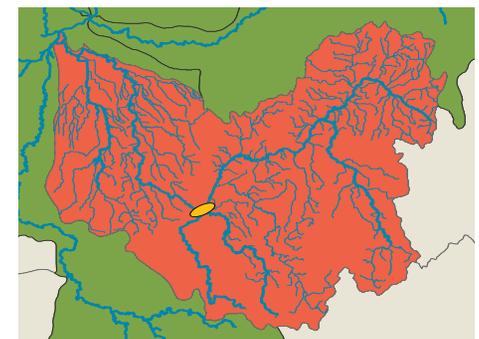
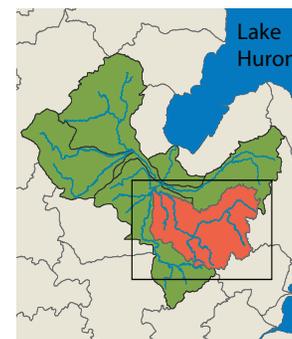
Site Context and History

Information as to how redevelopment should occur in order to best contribute to Flint's rejuvenation is provided by Chevy in the Hole's history and context within the City of Flint and the State of Michigan. Circulation, ecological context, site history and surrounding land use patterns give insight into how people perceive and relate to the site and the ways in which Chevy in the Hole could be better integrated into the city's framework.

Location & Circulation ■ Chevy in the Hole is located at the heart of downtown Flint in Genesee County, Michigan. Downtown and Chevy in the Hole can be accessed from interstate exits from the south, east and west, and the site is framed by four major neighborhood streets.

Flint River ■ The Flint River flows through downtown Flint and directly through Chevy in the Hole. After several floods during the first half of the 20th century caused damage at Chevy in the Hole and downtown, a concrete channel about one mile long was installed on the site in 1963 by the Army Corps of Engineers. Chevy in the Hole sits in the center of the Flint River watershed, part of the larger Saginaw Bay watershed which ultimately drains into Lake Huron. The stretch of river running through Flint is the most degraded area in the Flint River watershed, so any strategies to reduce contaminants entering the river or to increase habitat along the river's edge in Flint will substantially improve water quality and the river ecosystem.

WATERSHED CONTEXT



■ Watershed Boundary
■ Saginaw Bay Watershed
■ Flint River Watershed

■ Great Lakes
— River/Stream
● Chevy in the Hole



The site is known as Chevy in the Hole because it is literally located in a depression along the Flint River. The topography allows clear views onto the site from surrounding streets, and the site offers good views of downtown.



General Motors started to close plants at Chevy in the Hole during the mid-1990s and the last building was demolished in 2004.



Flint's main downtown district is along Saginaw Street, seven blocks east of Chevy in the Hole.

Chevy in the Hole contained about twenty buildings, of which eight were production and assembly plants.

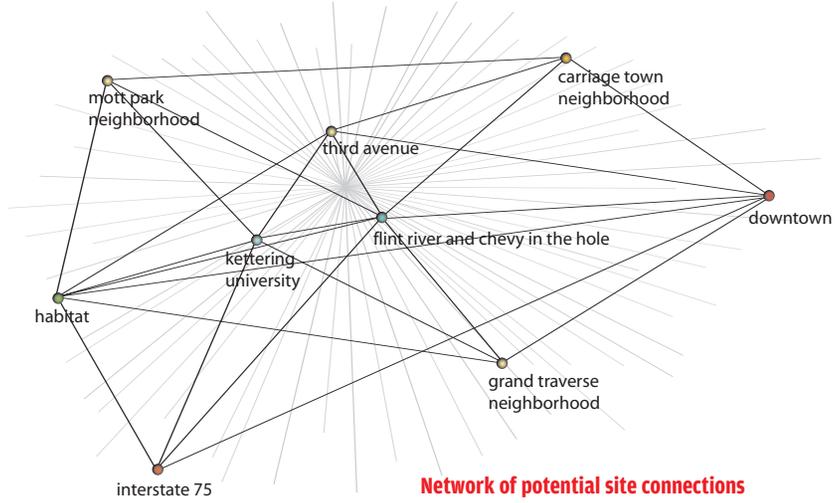
Photo: Genesee County Historical Society

olet G. M. Divs., Flint, Mich.
Photo (c) by Ball & Wanck, Flint, Mich.

History ■ Flint first became known as the nation's Vehicle City in the late 1800s for its wagon and carriage industry, and later for the automobile industry. Chevy in the Hole was the manufacturing center of Chevrolet Motors, part of General Motors, in the early 1900s. When General Motors was at its peak in the 1950s, the company employed 89,000 in Flint and around 8,000 at Chevy in the Hole. Chevy in the Hole and its workers also made national history in the labor movement when the United Auto Workers' Sit-Down Strike occurred in 1936-1937.

Neighborhood Context ■ Generally, the neighborhoods around downtown have experienced decline along with the auto industry. There are several abandoned, rundown properties and vacant lots, however some of the older homes have been restored. Although Flint is diverse as a whole, neighborhoods have tended to be segregated and the river historically has acted as a dividing line between African-American and Caucasian communities. Today, many neighborhood groups are strong and active in the community and in downtown planning issues.

University of Michigan-Flint and Kettering University are anchors of stability on either side of downtown. Located along the river, both bring a strong institutional presence to downtown. Flint's public open spaces are concentrated along the Flint River, Swartz Creek, and other tributaries, but there is not a continuous habitat corridor along the river and much of the open space is fragmented.



Industrial Land Use Legacy

In planning the redevelopment of Chevy in the Hole, it is important to carefully consider the implications of soil and groundwater contamination left by the site's industrial history. A comprehensive and innovative development plan should utilize a holistic approach to remediation, acknowledging both short-term and long-term risks and opportunities for the site. Brownfield redevelopment not only presents the opportunity to bring new investment to the city, but also to improve the health and safety of its residents and their environment.

Potential Contamination ■ After the buildings were demolished, the site was paved over with asphalt to minimize movement of residual contamination, the contaminants remaining in the site's soil and groundwater from earlier times. A barbwire fence was also installed around the property's perimeter to restrict access. These two actions prevent people from being directly exposed to residual contamination, reflecting the concerns of GM and Delphi about liability issues surrounding this brownfield. Depending on the types of contamination present and their concentration, people still may be exposed indirectly through air and water pollution.

Two of the basic first steps in brownfield redevelopment are Phase I and II assessments. These assessments determine the extent of contamination and characterize specific problems on the site. Phase I and II assessments are both

initiated by the transfer of property or plans for new development. Under federal and state brownfield laws, as soon as the Phase II assessments identify the extent of contamination at Chevy in the Hole, GM and Delphi are likely to be held liable for a large portion of the cleanup costs. The transfer of land ownership is a legal barrier to moving this brownfield site toward redevelopment.

Since no Phase I or II assessments are on file at the Michigan Department of Environmental Quality (MDEQ), we had to develop our own understanding of the contamination likely to be on the site. Under the Freedom of Information Act, we were able to obtain GM and Delphi records including maps and spill reports from MDEQ.

The information we gathered allowed us to make plausible assumptions about residual contamination on the site. These assumptions about contamination types and spatial distribution helped guide our design futures.

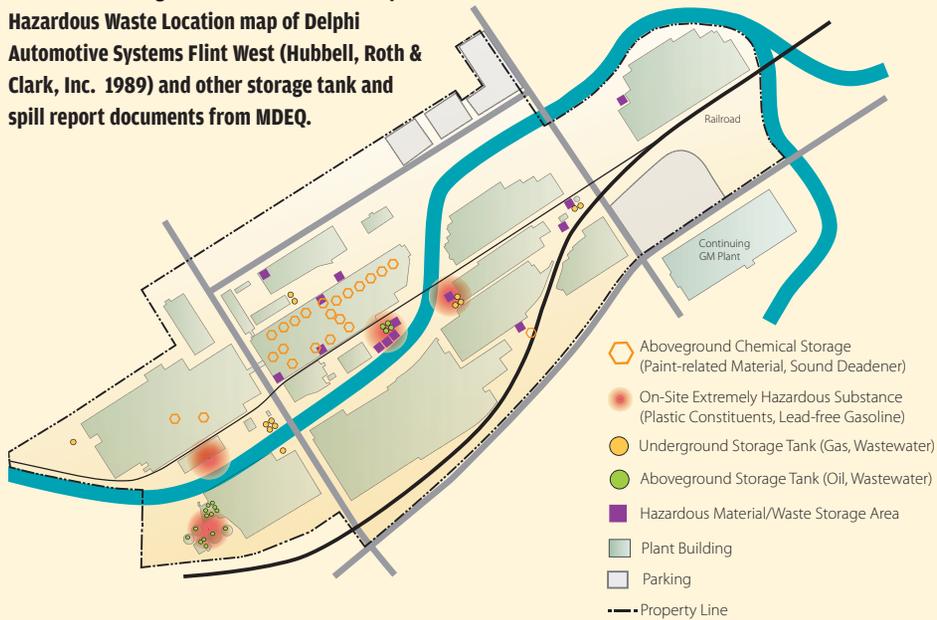


Brownfield redevelopment process

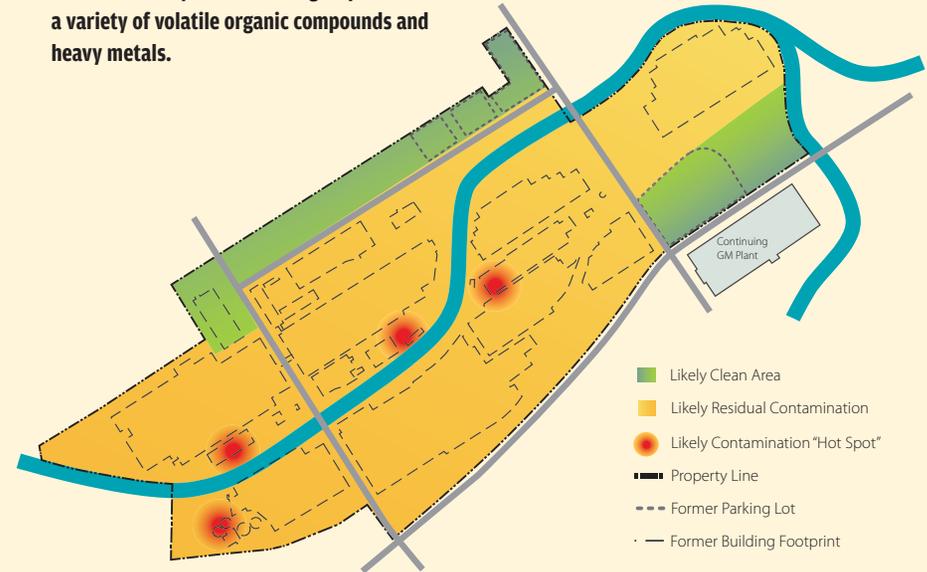
We classified the site into three general zones (see far right diagram opposite):

- The **green** areas are likely to be the cleanest of the site, containing minimal contamination. These parcels were used for employee parking and executive offices.
- Residual contamination is likely to persist throughout the **yellow** area.
- **Red** hot spots occur where known plumes of contaminated groundwater exist, where leaking underground storage tanks have been reported, or where highly hazardous materials were stored.

Summary of historic contamination. Information was gathered from an Extremely Hazardous Waste Location map of Delphi Automotive Systems Flint West (Hubbell, Roth & Clark, Inc. 1989) and other storage tank and spill report documents from MDEQ.



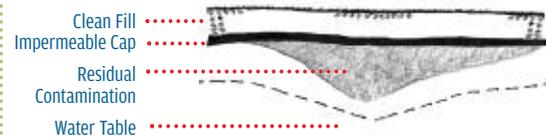
Zones of potential contamination at Chevy in the Hole. Likely contaminant groups include a variety of volatile organic compounds and heavy metals.



Remediation ■ After a thorough site investigation, the next step in the brownfield redevelopment process is remediation. While hundreds of remediation techniques are in use at brownfield sites around the world, our design futures focus on two different remediation approaches: a cut and cap strategy and a phytoremediation strategy.

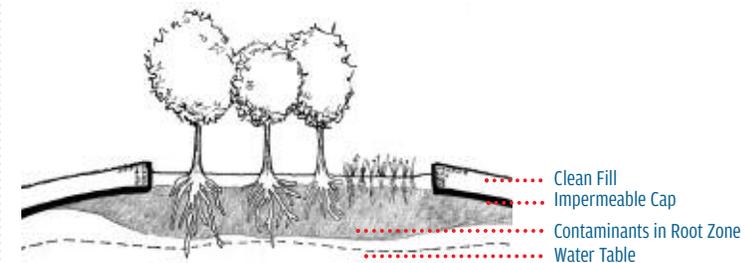
Cut and Cap - The first scenario consolidates contaminated materials, then uses capping to stabilize them under an impermeable protective layer. These caps are typically made of concrete, asphalt, clay, or synthetic materials. Specific cap composition depends on the contaminants present, climate, and soil type.

- Caps are a relatively fast and low cost way to minimize exposure.
- Caps contain contaminated substances rather than eliminating them, so maintenance and monitoring is essential.



Phytoremediation - The second scenario uses plants and soil microbes to extract metals and accelerate the breakdown of complex contaminants.

- Phytoremediation can be a relatively low cost process, and can actually eliminate contaminants in some cases.
- It is time intensive, since biological processes can take decades to extract and break down hazardous substances.
- Phytoremediation sites must be carefully managed, as they open potential exposure pathways.



Imagining New Futures for Chevy in the Hole

This project presents two new visions for the future of this pivotal site in Flint. The first is Flint's Urban Riverfront, in which future growth pressures drive new local investment and institutional expansion, restoring the urban fabric in Flint and stimulating new development. The second is the Flint River State Park scenario, in which the population stabilizes, modest economic growth begins, and park development is driven by broader state and regional investment. These alternative visions generate plausible new landscape patterns based on historical information and community input, and can be used by policymakers and community members to understand and evaluate the consequences of different policy decisions and anticipate realistic timeframes for future development.

From the two scenarios we developed four future design solutions: two phases of growth and development for the Urban Riverfront scenario and two for the State Park scenario. Certain assumptions are shared by both scenarios, while others differentiate the scenarios. The design solutions proposed in each of the four futures experiment with landscape pattern, parcel organization, location, land uses and landscape management.

Shared Assumptions

Development Opportunities

- A demand exists for new housing in a variety of markets.
- No development should occur in the 100-year floodplain.

Contamination

- Soil and groundwater contamination from manufacturing remain on the site.
- Thorough testing and ongoing monitoring are crucial for public and environmental safety.

Remediation

- Public health risks are to be minimized.
- Contaminated groundwater is to be prevented from flowing into the river.

Ecological Enhancements

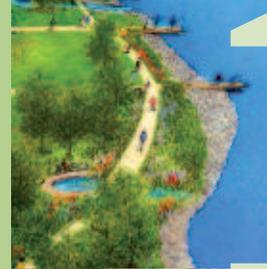
- The concrete channel is removed in appropriate areas.
- Low impact development (LID) stormwater management is to be implemented wherever feasible.

Circulation

- One-way roads should become two-way to simplify navigation, decrease car speeds, and improve the pedestrian experience.
- New paths to facilitate walking and biking will encourage safety, livability, and commerce while decreasing dependence on cars.

Flint's Urban Riverfront

Flint's economy sees steady growth, driving new mixed-use development as well as an increased institutional and light industrial presence, particularly through partnerships between Kettering University and private businesses. Population growth creates a need for increases in housing and space for recreation. Contamination is assumed to be concentrated or localized in certain hot spots around the site. Remediation uses a combination of excavating and consolidating contaminated soils onsite along with impermeable caps, focusing on expedience in order to accommodate more rapid redevelopment. Ecological enhancements are assumed to have a more urban form, providing open space for recreation and community connectivity as well as improved habitat for urban and aquatic wildlife.



1

2

1

2

Flint's Urban Riverfront Phase 1 : 2010 - 2020

Rapid Remediation, river rehabilitation, & city park

- Holistic remediation strategy
- Riverfront park amenities
- Public and private development investment

Flint's Urban Riverfront Phase 2 : 2020 - 2040

Developing an Urban Corridor

- Kettering University expands
- Kearsley Business Park created
- New, diverse types of housing developed

Flint River State Park

Flint's economy stabilizes but does not see immediate growth, and the development pressures are greatest for improved residential options. Outdoor recreation opportunities draw visitors to the site and improve livability for the existing residential community. Contamination levels are lower than in the first scenario but contaminants are spread throughout the site. Remediation emphasizes innovative bioremediation techniques, using longer periods of time and biological processes to break down contaminants while creating a green visual amenity at the heart of Flint. The site becomes more of a natural area over time, eventually hosting extensive native riparian habitat.

Flint River State Park Phase 1 : 2010 - 2035

Phytoremediation, Biofuels, and Recreation

- Large-scale phytoremediation of residual contaminants
- Production of ethanol crops
- Controlled public access and recreation

Flint River State Park Phase 2 : 2035 - 2040

Ecological Restoration, Residential Growth and Amenity

- Floodplain restoration with braided channel
- Naturalize the river and creek corridor
- Increased natural amenity access
- Expanded recreation amenities

Flint's Urban Riverfront Scenario Phase 1

Rapid Remediation, River Rehabilitation and Recreation

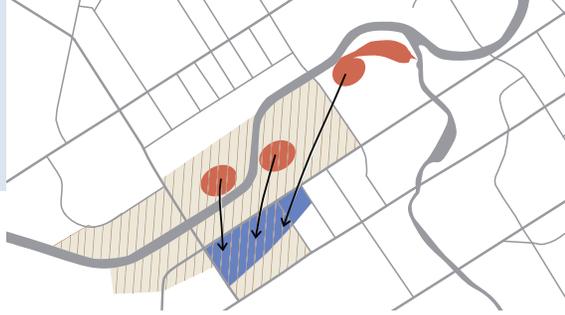
2010-2020



In the Flint's Urban Riverfront scenario, economic growth in Flint is reinforced by opening up the Chevy in the Hole property for development, providing public access to the river, and creating a public park for neighborhood residents. Within 10 years, a green spine with an urban character networks the surrounding neighborhoods to the downtown and universities.

This phase is made up of three main elements: a holistic remediation approach that creates a new circulation pattern and areas for new investment, renovation of the Flint River's concrete channel, and development of a new city park.





Remediation Strategy

- = cut
- = fill
- ▨ = impermeable remediation cap

Remediation, Circulation, and Investment

A rapid remediation strategy allows for improvements in public infrastructure, which in turn provide incentives for new investment and jobs for the City of Flint. Kearsley Boulevard is restored to create an east-west corridor that mirrors Third Avenue and parcels for private development offer the opportunity for new jobs.

Remediation - Highly contaminated soils will be cut from areas near the river and consolidated upslope on the south side of the site. Contaminated materials are then sealed under a protective cap. This new fill is used to support circulation changes.

Circulation - Restoring Kearsley to its pre-industrial route establishes a circular connection to downtown, creating stronger ties between downtown and surrounding neighborhoods. The Grand Traverse neighborhood extends further north toward the river, allowing connections across the river and improving access to the park from the south. The new road alignment also clarifies the intersection at Court Street and establishes a gateway to Kettering.

New Development - The newly capped area is designated for light industrial use in the future. A new mixed-use development, located at the corner of Kearsley Boulevard and Stevenson Street, expands the city's tax base and helps to offset the cost of remediation.

River Rehabilitation ■ The degraded segment of the Flint River that runs through Chevy in the Hole provides an opportunity for collaboration with the U.S. Army Corps of Engineers (USACE). In 2004, the USACE conducted a restoration feasibility study for this river corridor. They proposed two alternatives for restoration. We propose a terraced channel design similar to one of the USACE concepts.

Vegetated Terraces - New terraces allow channel walls to preserve flood control measures and continue to act as a vertical barrier preventing the migration of contamination into the river, while greatly improving aesthetics. They also detain and clean stormwater from upland areas before it enters the river, improving water quality.

Public Access - Access points are built into the terraces, allowing park users down to the river.

Ecological Restoration - On the east side of the property, the concrete channel is removed to create a naturalized river edge opposite Atwood Stadium. From our analysis, this stretch is less likely to have persistent residual contamination than elsewhere on the property. A new wetland marsh and oxbow lake in this area provide flood storage capacity and habitat for waterfowl and other wildlife.

Terraced river banks draw park visitors down to the river's edge. Native vegetation within the terraces will improve the ecological health of the river.



City Park ■ A variety of new recreation resources are created, improving livability for surrounding neighborhoods and making the site more desirable for new businesses.

Confluence Park - Confluence Park complements the activities associated with Atwood Stadium, providing a community park space. The upland park area has an open but shady feel, offering picnic facilities and a playground area. A canoe livery on the oxbow lake will allow access to the river, while a fishing pier and ice skating allow for additional use of the new lake.

Confluence Park will have park space for residents to recreate along the new Oxbow Lake.



Play Fields - Large, open playfields provide safe, flexible public open space that can be used for a range of activities, from rotating sculpture displays to festivals. These fields present a low maintenance design approach which would create low-cost public open space for the City of Flint. Trees are selectively planted within the river terrace structures to prevent puncturing or damaging the remediation cap.

Greenway - The park serves as a node along a regional greenway system. Two greenway trails run along the river terraces and connect to the existing Flint River Trail.

Community Gardens and Urban Tree Nursery - The linear area along Bluff Street, where contamination is likely to be low due to historical use as parking lots, becomes a large community garden space. A tree nursery reflects the site's early connection to the logging industry, and serves as a place to cultivate trees for use around the city, contributing to both new and pre-existing urban renewal projects. These uses serve as a connection between past and present while further extending the green redevelopment of Chevy in the Hole.

Case Study:

Gasworks Park, Seattle, Washington

Gasworks Park, a popular public park just north of downtown Seattle, was built in 1975 at the former site of a coal gasification plant. This is a notable project because a close collaboration between the landscape architect and a remediation scientist allowed for an innovative remediation strategy. Contaminated soil and rubble were extracted and consolidated to form huge conical mounds, adding a bold geometric design to the park and eliminating the cost required to remove heavy debris. Soil-cleansing enzymes were introduced to encourage bioremediation and clean the site over time.

Redevelopment of this site as a park has been one step in the transformation of the neighboring Fremont and Wallingford neighborhoods into two of the most desirable areas to live in Seattle. Adjacent to the park are multiple restaurants, shops, and apartment complexes that have appeared since the park's creation. Property values in the neighborhoods have skyrocketed in the past two decades, partially because of their proximity to public open space.



Although cherished by Seattleites for its superb views of the city skyline, Gasworks Park has experienced closures due to residual contamination. Residual contaminants have occasionally surfaced and caused alarm among residents and officials. Gasworks Park illustrates the potential popularity and economic importance of brownfields redeveloped into parks, but also serves as a warning that remediation should be thorough and aggressive in areas that will be open for public recreation.

Gas Works Park utilized a similar remediation strategy proposed in this scenario and preserved the site's industrial history by including relics from a former coal plant.

Flint's Urban Riverfront Scenario Phase 2

Developing an Urban Corridor

2020-2040



Phase 2 of Flint's Urban Riverfront assumes that site remediation is complete and the area is clean or capped, so that new development can accommodate rapid growth. The plan builds on and strengthens circulation patterns, river improvements, and open space amenities established in Phase 1, bringing new growth that compliments and diversifies the downtown business district. Phase 2 consists of three main elements: Kettering University expands, Kearsley Business Park is created, and new, diverse types of housing are developed.



Kettering University ■ In Phase 2 Kettering University becomes a steward of a larger part of the site, developing a unique campus that focuses on the riverfront and adding around 400,000 square feet of building space. This scenario assumes that Kettering builds on its nationally-ranked engineering programs and expands programs to be a leading research and education institution in alternative energy and technologies. New buildings in the campus plan could include a student union facing the river, academic buildings, research centers, incubator space for new research businesses, continuing education center, and new student housing.

Gateway Entrance - The new entrance established in Phase 1 from the I-69 exit to the west is enhanced with signage and buildings along Kearsley Boulevard. When driving on Kearsley Boulevard through campus, there are open views onto the site and across the river.

Gear Plaza - The plaza is a gathering place for students and visitors that capitalizes on the riverfront, making it an integral element of the campus. The plaza also provides a space to highlight the history of the site and University.

Riverfront Access - The new channel design, including river access, a pedestrian bridge, and gathering nooks, brings student life down to and across the river. An entrance to the Flint River Trail is also located near the new bridge, providing regional recreation opportunities.



The Memorial Union terraces along Lake Mendota at the University of Wisconsin-Madison (above) are an integral element of their waterfront campus. Photo: Jeff Miller



Gear Plaza becomes a student gathering space near the river.

Kearsley Business Park ■ Kearsley Business Park supports a range of uses, including light industrial, research and development, and commercial or office space near downtown. The business park contributes to Flint's assumed economic growth by diversifying Flint's economy, and offers larger building spaces totaling around 300,000 square feet. Tenants are attracted to the site by research partnerships between Kettering University, University of Michigan-Flint, and outside businesses, similar to other university-affiliated research parks. This development along the south side of the river further strengthens the new Kearsley Boulevard corridor.

Kettering Connection - Kettering's Cooperative Program, in which students rotate between taking classes and working as interns with partnering businesses, presents a unique way to attract new businesses. Kearsley Business Park also offers more opportunities for college students to stay and work in Flint, creating a more sustainable workforce.

Interior Park - A shared park space is designed in the middle of the buildings to provide spaces where workers can hold meetings, eat lunch, or take a break. This space also serves as a pedestrian corridor from Kettering and the park spaces to the east.

Institutional Controls - Through careful placement of surface parking, buildings, and other impervious surfaces, the business park provides further controls against residual contamination in areas where contaminated soil has been condensed and capped.



New Residential ■ Increased regional growth, together with the site's improved riverfront, park spaces and mixed-use amenities, leads to the construction of new housing. This housing becomes part of the revitalized urban fabric extending from downtown to Kettering University. It also fosters stronger residential connections across the river, as people use the parks and access new stores, work opportunities or downtown.

Visteon Corporation's campus in Dearborn, Michigan is an example of an urban business park. Photo: JJR





Upper Landing housing development, St. Paul, Minnesota. This redevelopment project along the Mississippi River is an example of dense, urban housing near downtown amenities.
Photo: Karen Melvin, David Bernard Builders & Developers

Types of Housing - New single-family homes and around 200,000 square feet of multi-family buildings meet the need for improved housing in the downtown area. There are several types of housing, including townhouses, condominiums, riverfront housing, affordable housing, senior housing, and live/work space, all designed with an urban character and density.

Chevy Crossing - The open space crossing the river in Phase 1 becomes a formalized park in Phase 2. The park's design is a continuation of open spaces within the business park and Kettering, connecting these areas visually and physically. Large raised planting beds with native plants define the space and are used to prevent plant roots from penetrating the cap.

Neighborhood Raingardens - Rainwater gardens are installed in the surrounding single-family neighborhoods to help slow down, minimize and clean stormwater runoff in areas where there is a low risk of residual contamination (Seattle photo). Underdrains connecting to storm sewer pipes are to be used where groundwater contamination is a concern.

Case Study:

Goose Island Eco-industrial Area, Chicago, Illinois

Once dubbed “Little Hell” and “Smokey Hollow” from years of industrial pollution, Goose Island is experiencing a slow but steady rebirth from heavy industry to research and development and other new industry. The site is being redeveloped with \$15 million in tax increment financing (TIF) and a property tax incentive worth \$1 million, along with investment from Wrigley, the chewing gum and confectionary company.

Goose Island is currently home to facilities for Federal Express, Republic Windows and Doors, Goose Island Brewery, Kendall College and the Wrigley Global Innovation Center. Kendall College opened a new Riverworks Campus on the island in 2004, and in 2005 Wrigley built a 193,000 square foot office and lab building for research, design, and collaboration on a waterfront portion of the site. This project shows the strength that one or two large site stewards, like Kettering University, can have on Chevy in the Hole.

Goose Island before redevelopment



Goose Island after redevelopment.
Wm. Wrigley Jr. Company's Global Innovation Center



Flint State Park Scenario Phase 1

Phytoremediation, Biofuels, and Recreation

2010 - 2035

The first phase of the State Park scenario focuses on cleaning the site through phytoremediation and establishing it as a state park. This phase transforms a barren, fenced-off landscape into a green and productive one, offering new recreational opportunities for residents and visitors while significantly improving views from surrounding areas. Phase 1 consists of three main elements: remediation using plants and microorganisms, production of biofuel crops, and controlled public access.

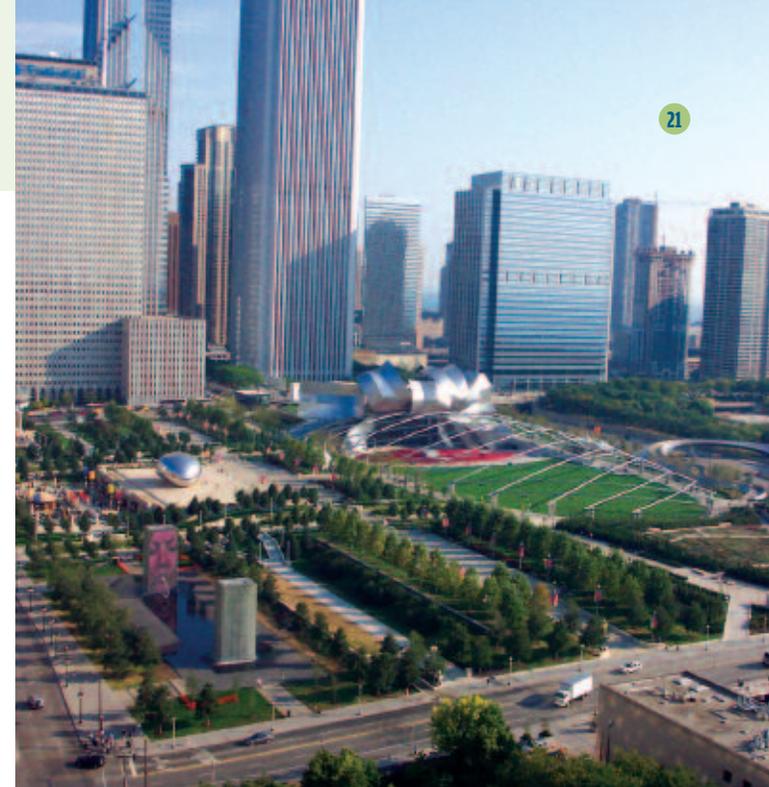


Remediation ■ The remediation proposed here is based on the assumption that contamination is less severe but more widely spread than in the Urban Riverfront scenario. Any concentrated pockets of contamination are excavated and enclosed, while residual contamination in soil and groundwater is cleaned using plants. This process takes longer than the cut-and-cap approach described in the first scenario, but reduces contamination rather than containing it.

Remediation Greenhouse - Areas with concentrated contamination are excavated and enclosed in a large greenhouse designed to support phytoremediation by controlling temperature and moisture. Moving the most contaminated materials to an enclosed area allows greater public access to the rest of the site. The greenhouse could be an aesthetically appealing feature, acting as a visual focal point of the site.

Large Scale Phytoremediation - This scenario assumes that enclosing the most contaminated soil cleans the rest of the site to a level sufficient for industrial redevelopment, but that residual contamination remains. Extensive plantings eliminate this residual contamination over time. It is important that plants used for phytoremediation are carefully selected to minimize the possibilities that humans or wildlife are exposed to contaminants. Seed crops like corn or sunflowers increase risks by concentrating contaminants in edible parts, and plantings resembling the structure of native ecosystems may encourage foraging and nesting, increasing the potential spread of contaminants.

Aesthetics and Safety Cues - The colors and textures of the plants create a dynamic visual quality, quickly improving views in surrounding communities and attracting visitors. It is important that healthy plants growing on the site are not mistaken by the public as signs that the site is cleaner than it truly is. As discussed below, a clear organization of paths and careful use of barriers need to communicate to park visitors where they can and cannot go.



The criss-cross speaker supports at the Pritzker Pavilion in Chicago's Millennium Park demonstrate how industrial building materials can be used to create an attractive, voluminous space. Photo: City of Chicago

Views into the Chevy in the Hole site improve dramatically as remediation proceeds, and a new greenway extension connects the downtown area to Kettering and surrounding neighborhoods.



Biofuel Crop Production ■ Phase 1 of the State Park scenario combines phytoremediation practices with the production of biofuel crops. While the site isn't large enough to reap large profits through agriculture, the sale of biofuel crops may offset some cleanup costs. Additionally, the use of vacant urban land to produce fuel crops is an innovative strategy that could draw attention to Flint as a leader in the alternative energy and green cities movements.

Willow and Switchgrass - Willow and switchgrass are both promising candidates for this strategy. Both are good species for breaking down the types of contaminants likely to be found at Chevy in the Hole, and both are excellent crops for the production of cellulosic ethanol. Commercial production of this renewable fuel is just starting, but many experts predict that a cellulose-based form of ethanol will become an important part of the U.S. fuel supply in the coming decade.

Environmental Safety - An added benefit of these crops is that when grown in thick, uniform stands, they offer relatively poor habitat, thereby discouraging contact between wildlife and contaminants. Also, their dense growth forms serve as a physical barrier to help keep people out of unsafe areas. Adding a simple rail between paths and plantings reinforces the message. Finally, when processing crops from this site into ethanol, engineering controls may be necessary to filter out contaminants.



Public Access ■ This phase allows controlled public access, drawing people to the area with new recreational opportunities while preventing exposure to contaminated areas.

Greenway - During our community meetings, extending the Flint River Trail was repeatedly identified as a top priority. The existing greenway is a fun and interesting way to experience the Flint River and its surroundings, and extending this trail allows important connections between residential areas and downtown. The changing spacing of the willow hedges trail creates visual interest, while a mowed buffer on either side of the greenway prevents an excessive feeling of enclosure, and frequently spaced entrance/exit side paths increase security.

Recreation Nodes - A variety of facilities offer new opportunities for play, socializing, and learning. At the eastern end of the site, a canoe launch on Swartz Creek allows small boat access to the river. Next to the canoe launch, a new Michigan Museum of Industry documents the state's manufacturing history, with emphases on GM and the labor movement. Moving clockwise around the park, a new indoor recreation center offers a range of classes and sports facilities. Outdoor basketball and tennis courts are built, and Kettering's sports fields become managed as part of the park to increase public use.

A field of switchgrass being grown for biofuel production.

The Round River Playground - Overlooking the park on its north side, this play area thematically alludes to the site's history of logging and manufacturing. Its namesake water feature, a circular stream, refers to a Paul Bunyan story used by pioneering ecologist Aldo Leopold as a metaphor for ecological cycles and rebirth. Play equipment in the shapes of wagon wheels and interlocking gears will offer a unique, place-based play experience.



Extension of the Flint River Trail will allow controlled access through the site.

Case Study:

Tri-Centennial State Park, Detroit, Michigan

In 2004, Tri-Centennial State Park became Michigan's first urban state park. Located along the Detroit River, the park demonstrates how state and local governments can collaborate to provide urban residents with recreational opportunities. The vision for the eventual 31-acre state park has four distinct areas reflecting Michigan's natural history: a wetland, an upland hardwood forest, a meadow, and a recreational harbor. One of the goals of Tri-Centennial Park is to provide visitors a sample of what Michigan's other state parks have to offer.

Located in the East Riverfront District, the park is part of a citywide redevelopment strategy. Detroit retains ownership of the parkland and leases it under a long-term agreement, while the state funds the park's development. Management is carried out by Michigan Department of Natural Resources staff. Development of the park has been divided into 5 phases. The first, completed in 2004, renovated St. Aubin Marina and Park, adding a 52-slip harbor, 12 acres of walking paths, picnic areas, and shoreline fishing,



as well as a historic lighthouse replica. Vacant properties surrounding the current Tri-Centennial Park will allow for the park's expansion in future phases. These properties, former industrial sites, will have to be cleared and remediated before further development of the parkland can occur.

Tri-Centennial State Park is a successful example of how a state/city partnership can effectively build and maintain public space in a city with limited resources. Currently, Genesee County has no state park, which makes Flint a stronger candidate for the type of park proposed here.

A rendering shows how Tri-Centennial State Park will help make the Detroit River a center of recreational activity for Detroit's residents and visitors. Photo: JJR

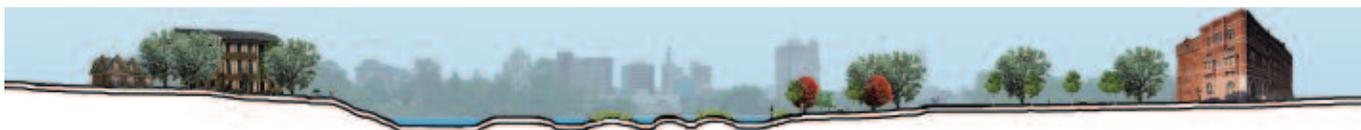
Flint State Park Scenario Phase 2

Ecological Restoration; Residential Growth and Amenity

2035 - 2040



The second phase of the Flint River State Park scenario steers the park in a new direction. After completion of phytoremediation, the site experiences dramatic changes to topography and circulation. The character of the park changes, offering greater access and recreation throughout the site, as well as more substantial ecological enhancements. Three main elements help the Michigan Department of Natural Resources continue to fulfill its mission of “conservation, protection, and management of the State’s natural resources”. These elements are restoration of the natural river channel, the creation of public open space connections, and residential growth coupled with additional amenities.



Single and multi-family residential Bluff Street Flint River Braided Channel Floodplain Flint River Parkway Playing fields Kearsley Street High end residential

Ecological Restoration and Enhancements

■ Dramatic landform changes characterize the restoration of the naturalized channel of the Flint River, broadening the river in some places, forming a braided channel with gravel bars planted with lowland wetland species, and recreating the historic Moon Island near Atwood Stadium.

Braided Channel Floodplain Restoration - Most of the phyto-remediation plantings are removed as braided channels are created. When high flows occur, water spreads throughout these channels slowing down and dropping sediments, and over time the channels evolve with the movement of water. Seasonal variations in water level and flows create a sense of mystery for visitors as the landscape changes. Views of the braided river will be most dramatic from the new botanic garden on the northwestern bank and from the widened Stevenson Street pedestrian and automobile bridge that spans the broadened floodplain.

Riparian Restoration and Historic Recreation - The restored island becomes a focal point for visitors to Atwood Stadium, as well as a place of respite for park users. The recreated island provides a node to connect the stadium to the state park on the southern side of the river. Pedestrian bridges connect the stadium and the neighboring Third Avenue and Carriage Town communities to Moon Island.

Swartz Creek Nature Reserve - As the eastern gateway to the Flint River State Park, the new Swartz Creek Nature Reserve and adjacent museum serve as a combined outdoor laboratory and educational resource for Flint residents, also creating a neighborhood amenity for the Grand Traverse community. Access to the river and the creek is improved through the expansion of the canoe launch and southern trail system through the Nature Reserve, connecting the state park with city parks to the south of the site.



A naturalized edge along the Flint River and Swartz Creek will provide renewed habitat for wildlife and added amenity for residents.

From the Flint River Parkway visitors will have extensive views of the new braided channel floodplain and the Flint River Botanic Garden on the northern shore.



Creating Public Open Space

Connections ■ New open space connections offer expansive views of the state park and continue to reveal the landscape legacy of the site, while serving the surrounding community.

Flint River Parkway - The parkway serves as a wooded avenue with broad views of the expansive park space, connecting the park with downtown.

Sit-down Strike Memorial Grove - On the southwestern edge of the park, at the former site of the Factory #2, made famous by the historic UAW Sit-Down Strike, small stands of oak offer an area for repose as a memorial wall rises out of the ground. The memorial is a quiet space for reflection and observation honoring those who participated in the 1936 strike.

Residential Growth through Amenity ■

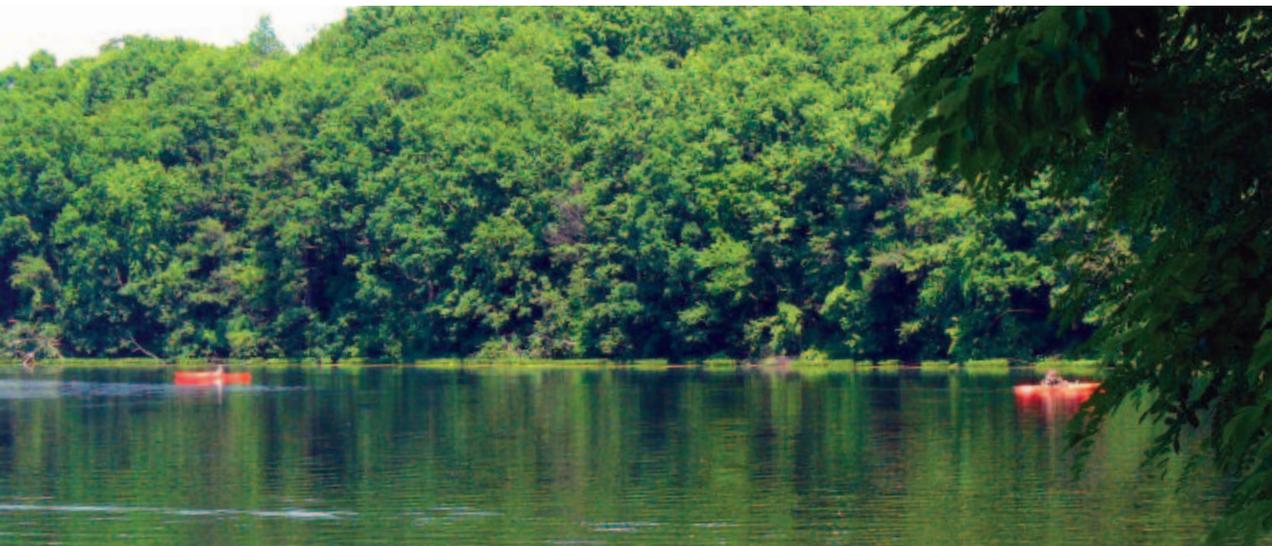
Modest residential growth and further infill throughout the site are supported by various new amenities. Three new buildings with lofts and apartments overlooking the nature reserve and the state park are built at the western corner of Stevenson and Kearsley, offering 97,200 square feet of new high-end to medium-range residential development. Within this steadily growing residential area, which also includes the creation of almost 100,000 square feet of single family housing, a community garden area and new playing fields allow for further connectivity and recreation.



The remediation structure from the first phase evolves into an exhibit space for the new Botanic Garden in the later phase of development. Photo: Ilkka Halso, <http://ilkka.halso.net>

Flint River Botanic Garden - With the completion of remediation in the greenhouse, the building is renovated as a conservatory to house interior exhibits for a new Flint River Botanic Garden. The conservatory overlooks the braided river channels and provides outdoor areas for picnicking and repose along the riverbank.

Fishing Pier and Riverside Beach - Just west of the botanic gardens is the Kettering University campus. As the western entry to the park, this area retains many of the plantings from the remediation phase, directing views into the site. At the crossing of the historic Chevrolet Avenue bridge, a beach and fishing pier on the southern shore provide river recreation access for residents.



Kayaking on the restored Swartz Creek would have a similar feel to the experiences had along the Huron River in southeastern Michigan.

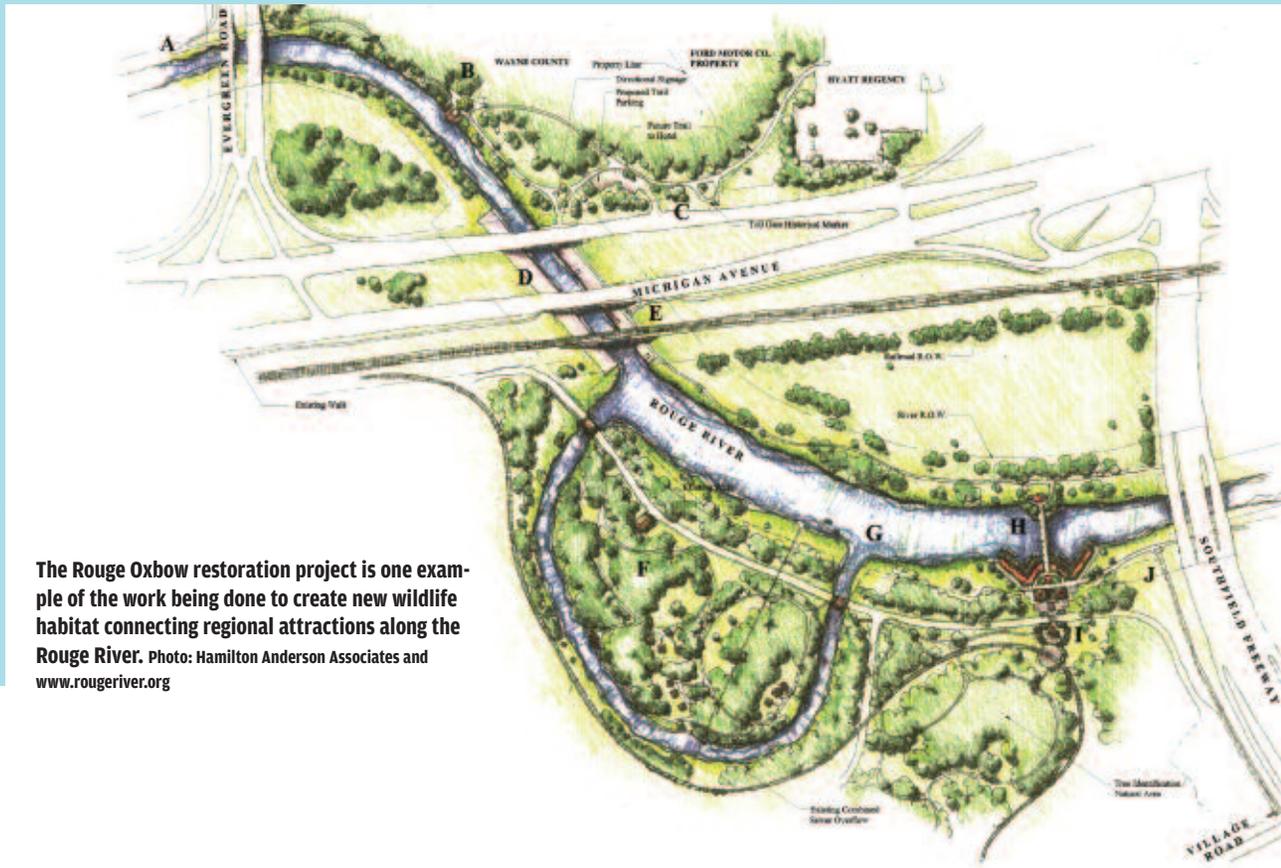
Case Study:

Rouge River Restoration, Southeast Michigan

Reported to be the largest industrial complex in the world, the Ford Rouge Complex is built along the banks of the Rouge River, one of Michigan's most densely populated watersheds and considered one of the most polluted and degraded rivers in the state in the late 1980s.

The Rouge Oxbow restoration project is one example of the work being done to create new wildlife habitat connecting regional attractions along the Rouge River. It is located at the Henry Ford Museum, along the lower branch of the Rouge River. Goals include restoration of fish and wildlife habitat through native riparian wetlands, improved water quality, increased floodplain storage, new educational opportunities, use of bioengineering in bank stabilization, and improved aesthetics.

During the boom of the automotive industry, the Rouge River experienced impacts similar to those at the Flint River. The Flint River Corridor Alliance and the Flint River Watershed Coalition are two groups that could help to initiate and implement restoration of the Flint River to spur revitalization in the region. Improvements in the river ecology and aquatic habitat could be made within the stretch of the Flint River that runs through the Chevy in the Hole property.



The Rouge Oxbow restoration project is one example of the work being done to create new wildlife habitat connecting regional attractions along the Rouge River. Photo: Hamilton Anderson Associates and www.rougeriver.org

Analysis of New Futures

The two proposed scenarios result in very different futures in the year 2040, one more focused on immediate economic gains and the other aiming for long term ecological restoration and health.



Flint's Urban Riverfront Scenario

Economy

- Flint has grown since the early 21st century and the site has been a major catalyst for that growth
- Higher short-term investments are accompanied by higher long-term economic benefits with diversification and development of the economy.
- Site contamination is concentrated and capped, focusing on practical and quick options for remediation.
- Development commences sooner.
- There is a stronger connection to the central business district through new access roads that continue the street grid.



Ecology

- An improved concrete channel has been built through the majority of the site to minimize residual contamination from reaching the river.
- New community parks and a recreational lake connect neighborhoods across and down to the river and the urban forest has expanded along a new tree-lined boulevard.
- Large open park areas with shallow-rooted turf grass are used to minimize breaks in the clay cap on the site.

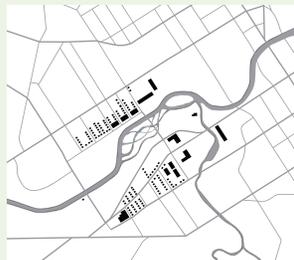




Flint State Park Scenario

Economy

- Flint has stabilized but growth has been limited over the last 40 years.
- Lower short-term development costs accompany long-term restoration costs; ecological benefits and limited development occurs much later due to longer onsite remediation.
- Site contamination is widespread and at lower levels; remediation strategies take longer but eventually leave the site with less residual contamination.



Ecology

- There is controlled access on the site while phytoremediation occurs, followed by long-term monitoring.
- Ecological enhancements include the full restoration of the river channel and increased wildlife habitat along the riparian edge.
- Recreation opportunities include increased access to the river's edge for fishing and boating, and active areas for play and sport.
- Nature reserves and public parks are created for recreation and education and include low impact development strategies for stormwater management.
- The state park is connected to downtown by a new parkway.





Conclusion

In summary, Flint's Urban Riverfront focuses on relatively rapid cleanup at a higher initial cost to accommodate increased growth. It also keeps the Flint River in its concrete channel, both as a means to protect the river from contaminated groundwater and to allow development closer to the river. The Flint River State Park uses time and biological processes to remediate the site more economically. By breaking down residual contaminants and restoring a natural river channel, this scenario allows for greater ecological restoration and habitat creation.

The two scenarios described in this book respond to Flint's needs in different ways, but they both address the community's priorities: Flint's Urban Riverfront creates many new jobs on site, while the park scenario bolsters local businesses by making downtown Flint more of a destination. Both include a variety of new, high-amenity housing options. Both respond to safety concerns by remediating the site, reducing blight and social fragmentation, and increasing activity. Finally, both respond strongly to livability concerns, dramatically improving the visual character of the river district and providing opportunities for fun and engaging experiences.

By providing a range of realistic options for the site, these proposals are intended to encourage discussion about what could happen and what should happen at Chevy in the Hole. It is unlikely that either of these scenarios will be carried out exactly as illustrated here, but elements of each may contribute to the site's redevelopment. Building a clear vision within the community about what is possible and desirable is the best tool that Flint has to move into a better future.

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Genesee County Land Bank

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Funded in part by an EPA Site Assessment Grant to the
Genesee County Land Bank.



Project Award International Federation of Landscape
Architecture Jury Award, Student Design Competition, 2007

Downloads of this report are available at
www.thelandbank.org.

For further information on background,
methods, designs, technical recommendations,
and citations, please see the complete academic
publication, which can be accessed online at
<http://hdl.handle.net/2027.42/50481>



