

# Base Map for Cultural and Ecological Restoration in the Urban Setting

*A whole systems-based design approach for the Colfax Clover Connection for the Colfax Avenue and Federal Boulevard Interchange in Denver, Colorado.*

*Water flow is People Flow*

## Introduction

The role that urban green space plays in ecological, social and economic sustainability cannot be underestimated for life quality and sustainable city development. It is argued, that urban parks and other open green spaces are important for the quality of life of an increasingly urbanized society. With the proposed development around the Colfax-Federal interchange – West Colfax BID, Sun Valley [in-progress], Empower Stadium District development [approved] – an ecological design is more needed than ever.

This document outlines the purpose and need for a cultural- and ecology- based design instead of the current extractive, vehicle-centric design that the city has proposed. These ideas are not new, but they are not prominent and forth front in modern city planning. With the ever-increasing need to address climate change, an ecology-based design moves us closer to resiliency instead of dependency on the current infrastructure designs. Additionally, this plan explains the design process and produces a conceptual idea that the city can use to move forward on an eco-centric design.

In this conceptual regenerative design for Colfax-Federal interchange, named here as the *Colfax Clover Connection*, several factors should be forefront when thinking about the long-term, far-reaching impacts this development has the potential to accomplish. This is a unique opportunity for the city to address creative stormwater management (**Attachment A, Figure 1**), ecosystem vitality, climate resiliency, education, community connection, and food equity.

In Denver’s 2014 Climate Adaptation Plan

(<https://www.denvergov.org/content/dam/denvergov/Portals/771/documents/EQ/Climate1/Adaptation%20Update%20%20-%20final.pdf>),

three top vulnerabilities were identified:

1. An increase in temperature and urban heat island effect.
2. An increase in frequency and severity of extreme weather events, such as hail, wind, rain, snow or drought.
3. Reduced snowpack and earlier snowmelt, affecting water availability and water quality.

Communities in north and west Denver are more impacted by climate change and air pollution than other metro areas. According to Denver’s Climate Protection Fund Five-Year Plan ([https://denvergov.org/files/assets/public/climate-action/cpf\\_fiveyearplan\\_final.pdf](https://denvergov.org/files/assets/public/climate-action/cpf_fiveyearplan_final.pdf)), the area of the Colfax-Federal interchange is categorized as *High Vulnerability* on Denver’s Heat Vulnerability Map. Additionally, the area is rated as *High* on Denver’s Climate Equity Score. Due to these undesirable scores, it’s very important for development in this area of Denver be addressing these inequities.

## Process and Design

Through public meetings, design charettes, and other community engagement, the community has voiced their opinion for the proposed Colfax and Federal interchange development. The community identified three major opportunities to be addressed by the proposed development include:

- Safer and more accessible routes connecting residents to amenities, shifting away from single-passenger vehicle-centered development.
- Utilizing community assets including arts, culture, downtown views, trail system connectivity with health and environmental issues as a forefront.
- Opportunities for attracting investment, public-private partnerships, and innovative design.

The West Colfax Business Improvement District (BID) published a study, *Over the Clover* (<https://westcolfaxbid.org/wp-content/uploads/2018/01/Cloverleaf-Final-Report-DRAFT-072320sm.pdf>), which highlighted the major opportunities bulleted above and developed several “options” including Split One-Way, At-Grade, and Federal West which are development- and vehicle-centric design options (**Attachment A, Figure 2**).

Following the West Colfax BID grassroots effort to address a large, challenging, and public-facing community issue, the City and County of Denver (CCD), in cooperation with Colorado Department of Transportation (CDOT) and the High Performance Transportation Enterprise (HPTE) evaluated and developed site scenarios, called *Working Concepts*, for the Federal Boulevard and Colfax Avenue interchange.

Denver’s Colfax and Federal Interchange Transformation Final Report (2021) developed five Working Concepts to address future interchange configuration to support greater land use efficiency and maximize network opportunities for surrounding communities (CCD 2021).

The Project’s scenarios aimed to:

- Re-envision the 29 acres, known as the ‘Cloverleaf’;
- Significantly improve pedestrian, bicycle, and transit mobility options;
- Respond to needed stormwater and water quality infrastructure improvements; and

- Support potential future land use and development, connected neighborhoods and enhanced experience, aesthetics, and safety of the public realm.

Instead of the same urban interface designs, why not shift the paradigm and design for the land, the earth and the water? Utilizing ecological design and restoration techniques, the Colfax-Federal interchange should be reimagined as a multi-functional green space that addresses community needs and climate change resiliency.

Shifting the *Pipe It Pave It Pollute It* mentality with a *Slow It Spread It Sink It* design would be forefront in a regenerative design fusing the synergy of water flow with people flow through ecological connections. This ecology-based design utilized the 100-year FEMA floodplain map as a base map, the ultimate informer of the design (**Attachment A, Figure 3**).

A core principle of regenerative design is a system designed where the future outputs exceed the inputs. Utilizing diversity, reducing waste streams, using regenerative resources, integration of elements and functions, and utilizing the edges are other regenerative design principles informing the design.

**The “Connections,” linking the Colfax Clover to:**

- The Sloan’s Lake Trail System
- The bike/ped path on 17<sup>th</sup> Avenue
- The Empower Stadium development and public-private parking partnership
- The Colfax Viaduct in Sun Valley
- The Platte River Trail
- The RTD Rides and passenger vehicle public-private parking partnership with CDOT and RTD
- The West Colfax Business Improvement District

The proposed design (**Attachment A, Figure 4**) would address sustainability principles for land use and development including:

- Utilize ecological services provided by the environment. Green infrastructure can include energy solutions such as co-generation or renewable energy and water solutions such as stormwater retention and recharge. This will reduce community and environmental impacts as well as private, public and taxpayer costs of development and infrastructure.
- Maintain and restore ecosystem functions. Respect the natural functions of the landscape, particularly watersheds and aquatic habitats.
- Create pedestrian-friendly environments with an interconnected street network to ensure walkable access to services and amenities.
- Couple a multi-modal approach to transportation with supportive development patterns to create a variety of transportation options.

- Connectivity of all modes of transportation ensuring a more effective and efficient, safe, barrier-free access to transportation system for people, goods and services. Transportation services and infrastructure should be delivered in a cost-effective and energy-efficient manner.
- Lastly, the proposed design would allow room for discussion of a mix of housing types and ownerships to allow residents to live affordably. Additionally, if the ecology-based design informs, there’s room for discussion of green building. Green buildings include but aren’t limited to externally certified standards such as LEED (Leading in Energy and Environmental Design), BOMA Go Green for commercial buildings and Built Green™ for residential applications.

Additionally, utilizing the same strengths-weaknesses analyses outlined in the Colfax and Federal Interchange Transformation, the ecological design charted the following:

**Table 1. Strengths and Weaknesses of an Ecological Design Scenario for the Colfax Clover Connection**

Strengths	Weaknesses
Repurposes the Federal Bridge, increasing pedestrian/bicycle value and saving on demolition costs	Single-passenger vehicles are not allowed within the development only circumventing via DDI
Addresses the 100-year flood events with a stacked function of a “green” trail system	Using existing infrastructure of bridges and roads would limit business and development potential
Addresses stormwater volume and conveyance issues by reducing piped, underground, and expensive facilities and utilizing ecological functions	
Creates “green” connections and direct access to RTD, CDOT, Stadium District, Sun Valley/Viaduct, West Colfax BID, Platte River Trail, Sloan’s Lake Trail, and West 17 <sup>th</sup> Avenue	
Enhanced bicycle and pedestrian safety and connections throughout development to both Federal and Colfax	
BRT Transit opportunities through the Clover for both Federal and Colfax	
One-way traffic circumventing design operates better/safer than two-way	

Addresses food insecurity and equity issues through the implementation of food forests	
Reduces air quality issues by reducing single-passenger vehicular traffic and increasing trees and other vegetation	
Addresses future climate change impacts associated with heat island effects by increased plantings of trees and other vegetation	

### Yeoman's Scale of Permanence

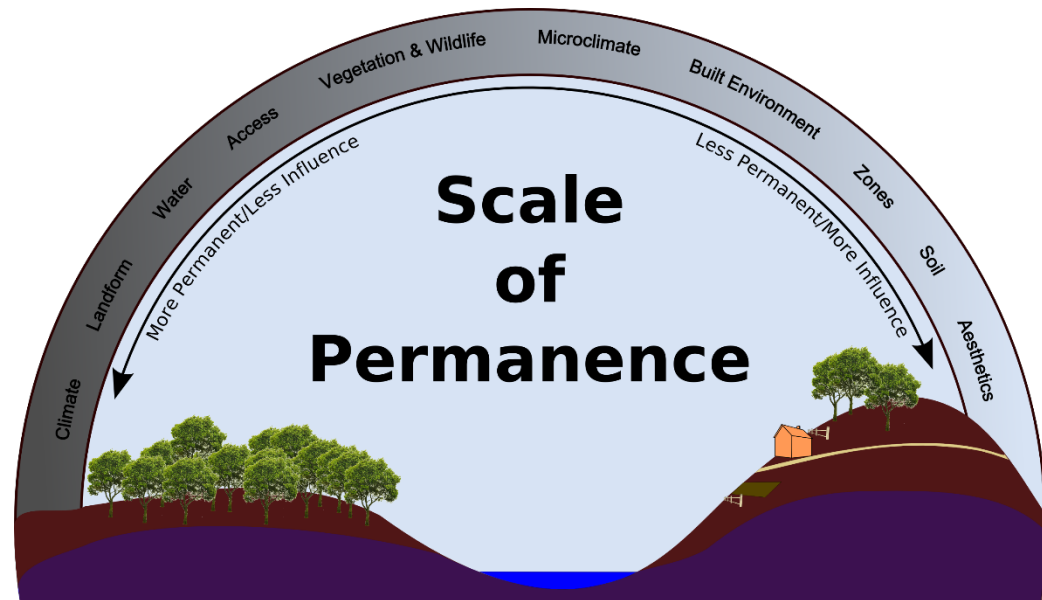
For resilient, regenerative design outcomes, the design process utilizes P.A. Yeoman's Scale of Permanence which outlines the relative permanence of factors for the planning, development and management of land as it relates to whole systems planning and design. P.A. Yeoman, an Australian farmer, developed the scale of permanence in the 1950s as a strategic tool for farm use that he called keyline design.

The scale of landscape permanence is also known as a sensible order to design elements. It ranks several characteristics of a site in decreasing order of how long they persist over time and the effort needed to modify them. When successfully applied to the design of urban landscapes, it can ultimately avoid big mistakes.

**Climate** and **Landform** are difficult things to change and require lots of energy as well as time. In geologic-years, the climate has changed rather quickly over the last 200 years of the industrial age as compared to the previous millions of years; however, the effort to shift the climate has been ecologically expensive and took billions of humans to accomplish.

### Water

Water is high on the permanence scale, as it should be as a powerful, pervasive force of nature. Proposed development of the Clover within a 100-year floodplain does not appear to harmonize with what the land wants or will do during a 100-year precipitation event.



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- The proposed Clover River Trail will stack functions of conveying high-volume storm events but most of the year, it will serve as a connecting trail to the South Platte River Trail and RTD Decatur Station. The Clover River Trail will serve as a dry riverbed and contain riparian vegetation. Tree plantings along the trail will utilize the swale of rainwater and relieve the City’s stormwater system during these times.
- Several Extended Detention Basins (EDBs) can be built to mitigate stormwater events even further. The EDBs should be designed as functional wetlands. They will not only become valuable wildlife habitat but also education for the public.
- If the design eventually opens for informed sustainable development, developers will be grateful for built-in drainage and flood control. Or sustainable development will appreciate creativity to address these types of environmental constraints.

### **Access and Transportation**

The Transportation Plan for the Colfax Clover Connection highlights the safety for pedestrians and cyclists while allowing for vehicular traffic to circumvent the ecological development. The lack of stop lights and increased speed of traffic in the current interchange has been very dangerous for those traveling outside of a passenger vehicle.

Single-passenger vehicles are not the main focus of the design and will be considered last. An ecological development design uses the natural environment as the informant and most vehicles do not meet the criteria for inclusion.

Double-diamond interchanges (DDI) combined with a giant round-about will convey one-way traffic counterclockwise. Four stoplights at each corner of the Colfax Clover Connection will move vehicular traffic through the DDIs via two 12-foot lanes.

Bus-Rapid-Transit (BRT) including pedestrian, bicycle, moped, and scooters will be the only types of transportation allowed within the proposed Colfax Clover Connection besides emergency or maintenance vehicles on a limited basis. A dedicated, centered, BRT lane will move people throughout the proposed ecological development and provide a Safe pedestrian connection to RTD Decatur Station bus center and train station (**Attachment A, Figure 5**). Solar panels covering bus stops would stack functions by simultaneously creating shelter and energy.

A great example of a repurposed roadway is the 1.45-mile-long elevated linear park, greenway and rail trail called High Line in New York City (**Attachment A, Photos 1 through 4**). The High Line was a former Railroad spur. It was purposefully redesigned as a “living system” which is multifunctional for people and the environment (<https://www.thehighline.org/>). Community feedback indicated a strong desire for the Structure on the Federal bridge that supports mobility and ecology (**Attachment A, Figure 6**).

Plenty of personal vehicle parking is already present the areas surrounding the Colfax Clover Connection, much of which is largely unused for the majority of the year. Subjecting the land with more impervious surfaces for parking is unneeded with alternative modes of transportation and the use of public-private parking partnerships:

- Colfax Clover Parking Partnership with Empower Stadium
- Colfax Clover Parking Partnership with RTD and CDOT

### **Vegetation and Wildlife**

The Front Range of Colorado is a unique confluence of several ecoregions – Great Plains, Foothills, and Mountains, with wetlands and riparian habitats throughout. The creation of native habitats is multi-functional providing habitat connectivity for the urban wildlife, educational opportunities, as well as providing functions of water and air purification and overall green space for community vitality.

Using native species will not only increase survival but allow plants to thrive even in times of drought. Native species plaques will educate the public including education of indigenous land practices and foods as well as providing food for the over 800 native pollinators that occur in the state of Colorado.

Themes for plantings will be analogous to native habitats in Colorado as well as progressive polycultures that feed the community:

- Sagebrush – hot, dry, southern exposure
- Short- and mid-grass prairie
- Pinyon-Juniper foothills, northwestern portion of the Clover to function as windbreak, and cooler microclimate
- Riparian
- Wetland
- Community Food Forest
- Open space, open field to throw a ball, xeric, native grasses

### **Structures**

After water, access, flora and fauna are designed and accounted for, is there room for structures?

Proposed structures within the Colfax Clover Connection could include pavilions for the people. Art installations, outdoor concert, pop-up vendors, and markets could occur in the open spaces. Natural play structures for children could be located in the southwestern portion of the Clover.

The intention of an ecology-based design is not the complete exclusion of development but instead, that the ecology will inform the built environment and not be the funding driver of it.

## **Fences/boundaries**

Fences are low on the permanence scale and not all that relevant in the Colfax Clover Connection concept.

## **Soil**

Granite bedrock parent material and low precipitation rates give way to alkaline soils and desert-like environments. Soils can be easily manipulated and shifted to be more organic-rich with increased water-holding capacity which functions to filter water, retain floodwaters, and increase overall nutritional value of plants for people and wildlife.

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## **Conclusion**

In summary, an alternate, ecology-informed design could be explored for the Colfax-Federal Interchange. The Colfax Clover Connection design would be a unique opportunity for the city to address climate change impacts by creative stormwater management, ecosystem vitality, education, community connection, and food equity.

As requested by the community and outlined as important in Denver’s Climate Adaptation Plan and Climate Protection Fund Five-Year Plan, the proposed ecologically-centered design showcases and addresses important factors when planning shared space. These include:

- Native habitats of Colorado (education, resiliency)
- Soil carbon sinking /carbon sequestration (climate change mitigation, resiliency)
- Pedestrian/cyclist safety from West Colfax to Downtown (public safety, mobility)
- Stormwater mitigation (climate change, resiliency)
- Food access (equity, health and wellness, quality of life)
- Affordable housing (equity, quality of life)
- Community shared spaces including art, parks, open fields, and fitness (vitality, health and wellness, quality of life)
- Sustainable development (economic development, suitability)

If we can flip the approach to an ecology-based regenerative design, we can ensure that we are meeting the needs of people thru resistance and equity and ensure the elements are the drivers of the design and not development or funding.

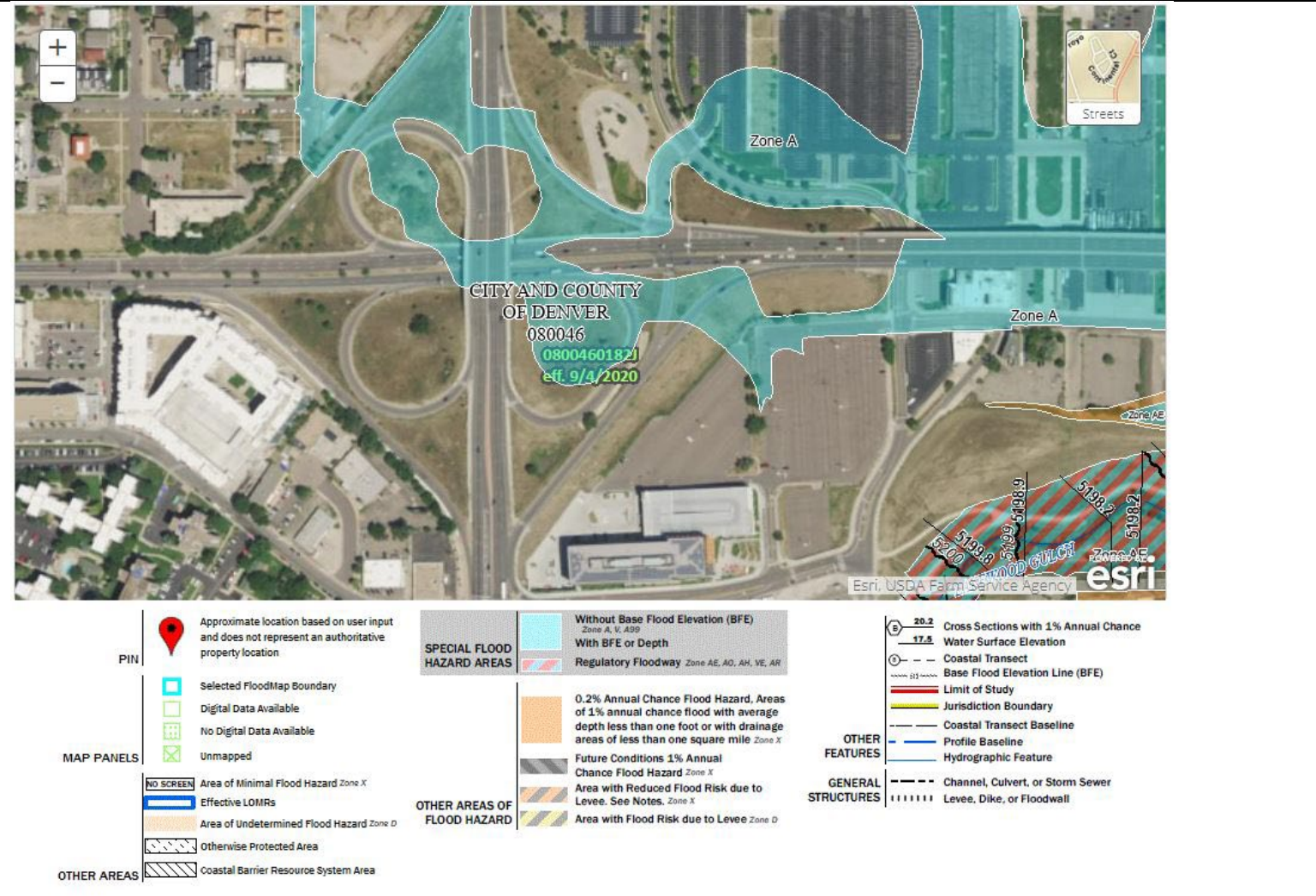


*Someday you'll find us, at the Colfax Connection, the lovers, the dreamers in me."*

# ***Attachment A.***

*Figures and Photos*

Figure 1. FEMA's 100-year Floodplain Map for the Clover Neighborhood



Source: Federal Emergency Management Agency (FEMA). 2020. Flood Map Service Center, Map 0800460182J, Effective 09/04/2020.

**Figure 2. Proposed Federal West Long-Term Design Option**



Source: West Colfax Business Improvement District (BID). Undated. Over the Clover Final Summary Report. Available online: <https://westcolfaxbid.org/wp-content/uploads/2018/01/Cloverleaf-Final-Report-DRAFT-072320sm.pdf>

Figure 3. Ecological Design Base map based on FEMA's 100-year floodplain map

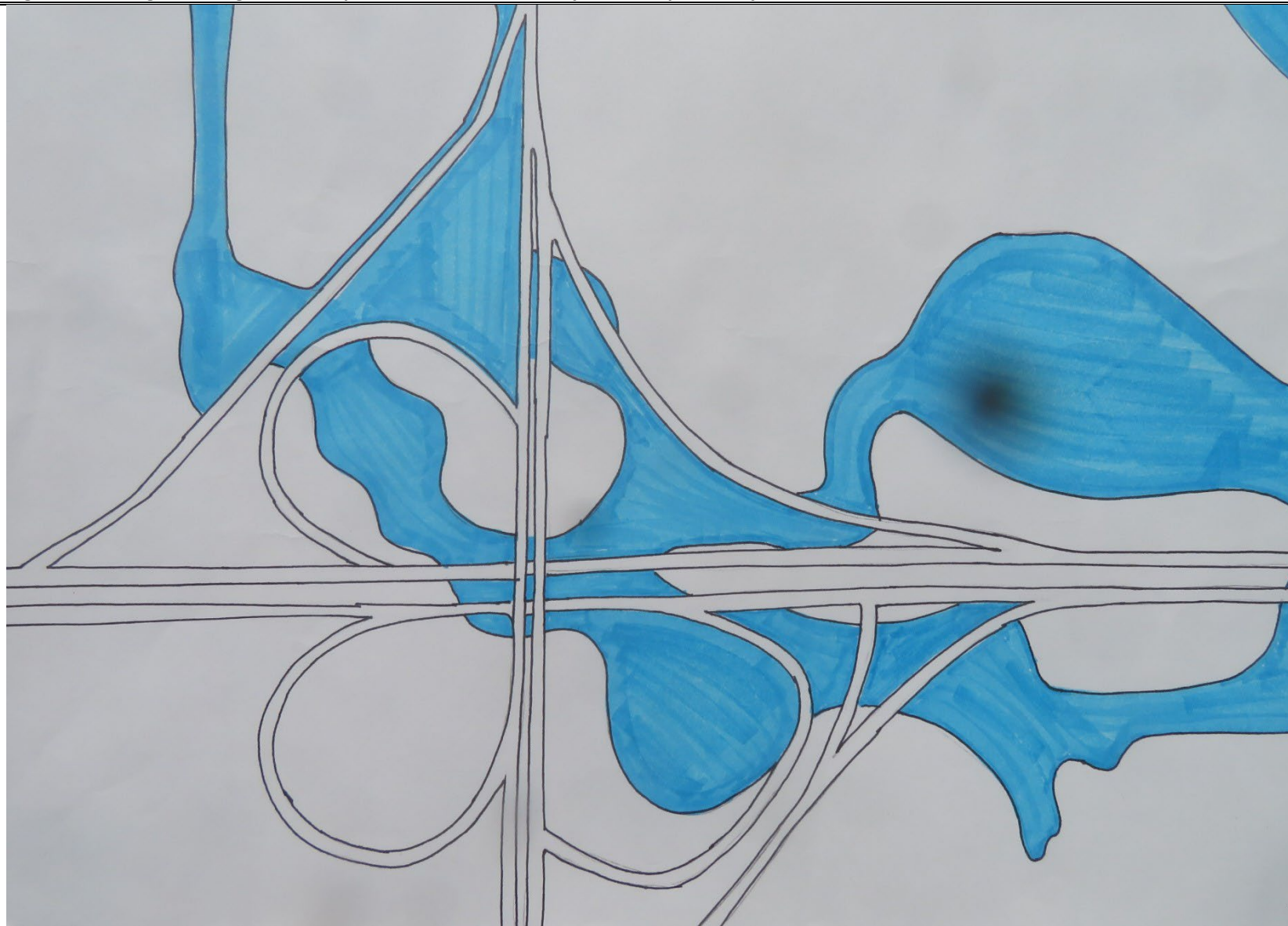
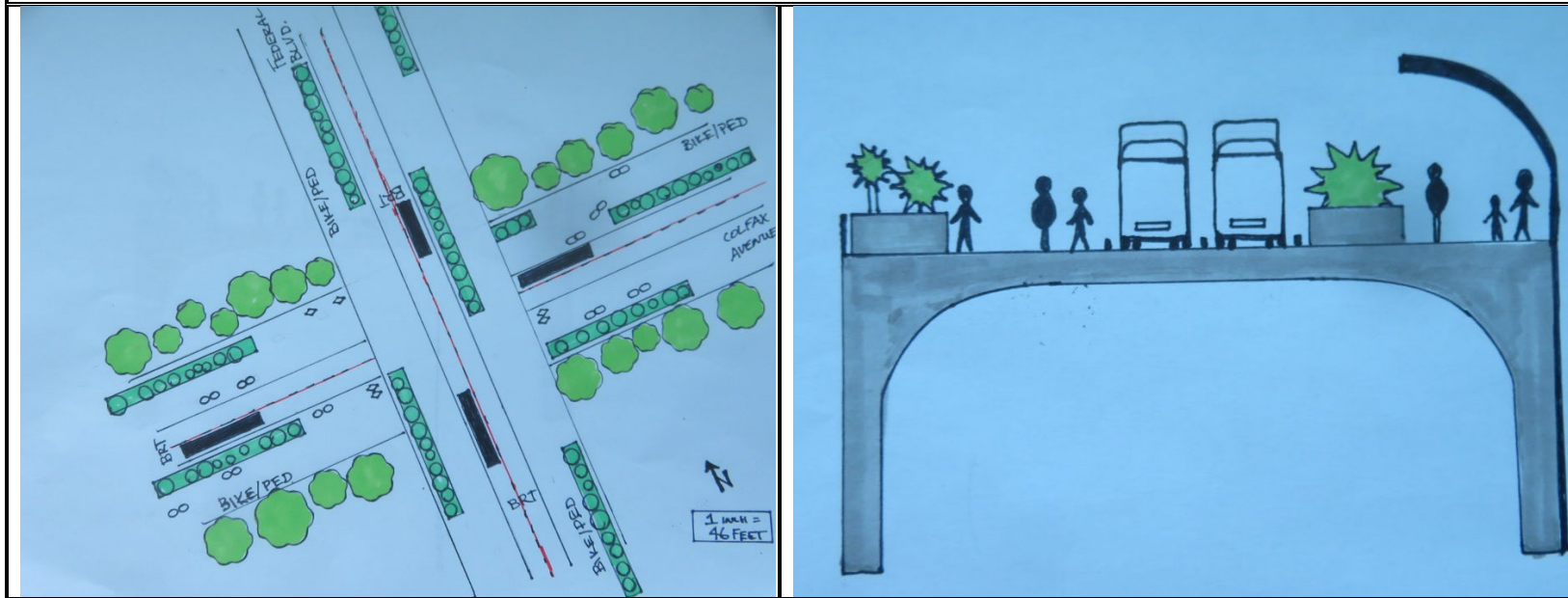


Figure 4. Proposed Ecological Design Scenario for the Colfax Clover



Figure 5. Bird's Eye View of Proposed Ecological Design Scenario for the Federal Boulevard Overpass with a NYC High Line Trail "feel"



Photos 1-4. New York City's "The High Line" – reimagining and repurposing old infrastructure into green solutions



Source: <https://traveldigg.com/the-high-line-a-park-over-the-city-of-new-york/>

*This conceptual plan was drafted by a local ecologist who specializes in permaculture design with input and funding by local West Colfax residents.*

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