private

MITHŪN
public

MITHŪN
private + public
lloyd crossing
sustainable urban design

MITHUN
lloyd crossing
sustainable context

MITHŪN
Sustainable Urban Design Plan:

Identify “green” infrastructure opportunities and synergies that can be realized at the neighborhood scale

Lloyd Crossing Signature Project:

Develop a conceptual design for a sustainable, financially feasible, mixed-use development project that will catalyze future private development in the district
lloyd crossing
sustainable urban design

MITHŪN
sustainable urban design

lloyd

Mithūn
To Columbia Boulevard Wastewater Treatment Plant

0.6 cents/gallon

From Bull Run Watershed

0.3 cents/gallon
the big pipe
stormwater portland oregon

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coal power
sustainable urban design plan

implementation

placemaking

technology

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goals
2004 sustainable urban design plan

mobility

vision

activity

livability

identity

sustainability

dynamic mix of uses
high density
enhance identity
optimize shared systems
enhance linkages
achievable
predevelopment
metrics
goal
lloyd study area
Predevelopment
predevelopment metrics

- **A**: Sustainable Strategy "Predevelopment" Goal
- **B**: No Strategy "Status Quo"
- **C**: Reduction in Environmental Impact
pre development metrics

metrics

solar energy
water
carbon
habitat
materials

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water use

vision

a water neutral

lloyd study area

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energy carbon neutral
vision
a carbon neutral lloyd study area
2004 existing
2004 metrics

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2004 Existing

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Project Area Development Potentials

- Potential Build-Out
- Above Grade Parking
- Restaurant
- Lodging
- Office/Retail
- Residential

<table>
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<tr>
<th>Year</th>
<th>Potential Build-Out</th>
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<td>2003</td>
<td>2,350,850 sf</td>
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<tr>
<td>2015</td>
<td>3,835,608 sf</td>
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<tr>
<td>2050</td>
<td>10,925,000 sf</td>
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17,000,000 sf.
placemaking
street hierarchy
placemaking

distributed green water swale
Place Making
landscape & habitat

Typical Green Street Intersection

Concrete Crosswalk, Typical
Deciduous Street Tree In Conventional Planter, Typical
Energy Disipator, Typical
Stormwater Basin, Typical
Basin Tree and Wetland Planting, Typical
Deciduous Intersection Tree in Conventional Planter, Typical

North
placemaking
open space plan

Future Connection
Pocket Park
Proposed Neighborhood Park
Proposed Open Space Connection
Existing Private Open Space to Remain
Oregon Square Open Space
Pocket Park
Potential Habitat Connection to Sullivan’s Gulch
placemaking
landscape & habitat
<table>
<thead>
<tr>
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<td>Capital Costs</td>
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<td>$6,350,000</td>
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<td>Additional Plumbing - Buildings</td>
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<tr>
<td>Rainwater Treatment System (for potable use)</td>
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<td>Rainwater Treatment Storage</td>
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<td>Operations and Maintenance Costs (per year)</td>
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<td>$139,953</td>
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<td>Blackwater Treatment System</td>
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<td>Rainwater Treatment System (for potable use)</td>
<td>$425,762</td>
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<td>Savings (per year)</td>
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<td>$915,924</td>
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<td>$0</td>
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<td>Sanitary Sewer</td>
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<td>$583,948</td>
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<td>Stormwater</td>
<td>$0</td>
<td>$70,117</td>
<td>$85,146</td>
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<td>Payback Period</td>
<td>9</td>
<td>23</td>
<td>16</td>
<td>15</td>
<td>40</td>
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</tbody>
</table>
30% Water Conservation through Fixture Efficiency

100% Non-Potable thru Rainwater Harvesting (Private Property) & Blackwater Reuse

62% Potable Water Demand Reduction

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Precipitation

64,000,000 gallon/yr

Potable Water

160,378,998 gallon/yr

Stormwater Runoff

56,320,000 gallon/yr

Waste Water

144,341,098 gallon/yr

Evaporation

6,400,000 gallon/yr

Transpiration

1,280,000 gallon/yr

Building System/Occupant Consumptions (System Loss)

16,037,900 gallon/yr

Groundwater Recharge

negligible

2050

Water per code
Precipitation

64,000,000 gallon/yr

100%

Potable Water

57,736,439 gallon/yr

45% of precipitation

Stormwater Runoff

28,800,000 gallon/yr

90% of potable water

Waste Water

51,962,795 gallon/yr

10% of potable water

Building System/Occupant
Consumptions (System Loss)

5,773,644 gallon/yr

10% of precipitation

Evaporation

6,400,000 gallon/yr

10% of precipitation

Transpiration

6,400,000 gallon/yr

35% of precipitation

Groundwater Recharge

22,400,000 gallon/yr

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2050

Water per plan
energy

vision

carbon neutral

a carbon neutral

lloyd study area
Solar Energy Input
100% 161,000,000 kWh/yr

Solar Energy Reflected, Absorbed & Released
95% 152,936,000 kWh/yr

Solar Energy Used by Photosynthesis
4.5% 8,050,000 kWh/yr

O2 Released
495.4 tons/yr

CO2 Used
681.2 tons/yr

Carbon Fixed
185.8 tons/yr

Carbon Balance
Net removal from atmosphere: 681.2 tons/yr

Energy - predevelopment

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implementation
financial strategy

- implementation
- technology
- lloyd
- placemaking

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HEARTLAND
OVERALL SUMMARY

<table>
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<tr>
<td>WATER</td>
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<td>Building Improvements</td>
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<td>$2,100,099</td>
<td>$1,572,436</td>
<td>$529,374</td>
<td>$3,32,534</td>
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<td>$945,172</td>
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<td>ENERGY (inflated @ 2%)</td>
<td>$316,047,076</td>
<td>$4,071,312</td>
<td>$19,047,715</td>
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<tr>
<td>HABITAT / OPER SPACE</td>
<td>$32,125,750</td>
<td>$5,880,600</td>
<td>$5,472,215</td>
<td>$12,419,410</td>
<td>$1,406,210</td>
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<td>$6,941,215</td>
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<td>PLACEMAKING</td>
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<td>$14,653,750</td>
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Sources:

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<tr>
<th>Uses:</th>
<th>Water</th>
<th>Energy</th>
<th>HABITAT / OPER SPACE</th>
<th>OTHER POTENTIAL FUNDING SOURCES</th>
<th>Total Sources</th>
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<tbody>
<tr>
<td>WATER</td>
<td>$40,212,420</td>
<td>$1,002,022</td>
<td>$3,947,990</td>
<td>$84,739,389</td>
<td>$240,468,216</td>
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<tr>
<td>ENERGY</td>
<td>$8,279,399</td>
<td>$1,270,021</td>
<td>$7,115,612</td>
<td>$3,030,715</td>
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<td>HABITAT / OPER SPACE</td>
<td>$1,002,022</td>
<td>$3,947,990</td>
<td>$84,739,389</td>
<td>$240,468,216</td>
<td>$5,179,871</td>
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<tr>
<td>OTHER POTENTIAL FUNDING SOURCES</td>
<td>$1,002,022</td>
<td>$3,947,990</td>
<td>$84,739,389</td>
<td>$240,468,216</td>
<td>$5,179,871</td>
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Net Cash Flow:

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<th>Uses:</th>
<th>5-Year Cash Flow</th>
<th>Payback Year</th>
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<td>WATER</td>
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<td>2020</td>
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<td>ENERGY</td>
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<td>2020</td>
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<td>HABITAT / OPER SPACE</td>
<td>$32,125,750</td>
<td>2010</td>
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<td>2015</td>
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<td>2030</td>
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GRAND TOTAL DISTRICT CASH FLOW: $5,066,938

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catalyst project
project components

implementation

lloyd

placemaking

technology

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open space
streetcar stop
& park concept
catalyst project

high-rise alternate

catalyst residential tower

- solar sail – PV
  - single loaded cross ventilation
- wind ellipse
  - double loaded pressure differential natural ventilation

- streetcar stop
- interim retail along key street fronts
catalyst project
aerial view from east

high-rise alternate

café / living machine in park