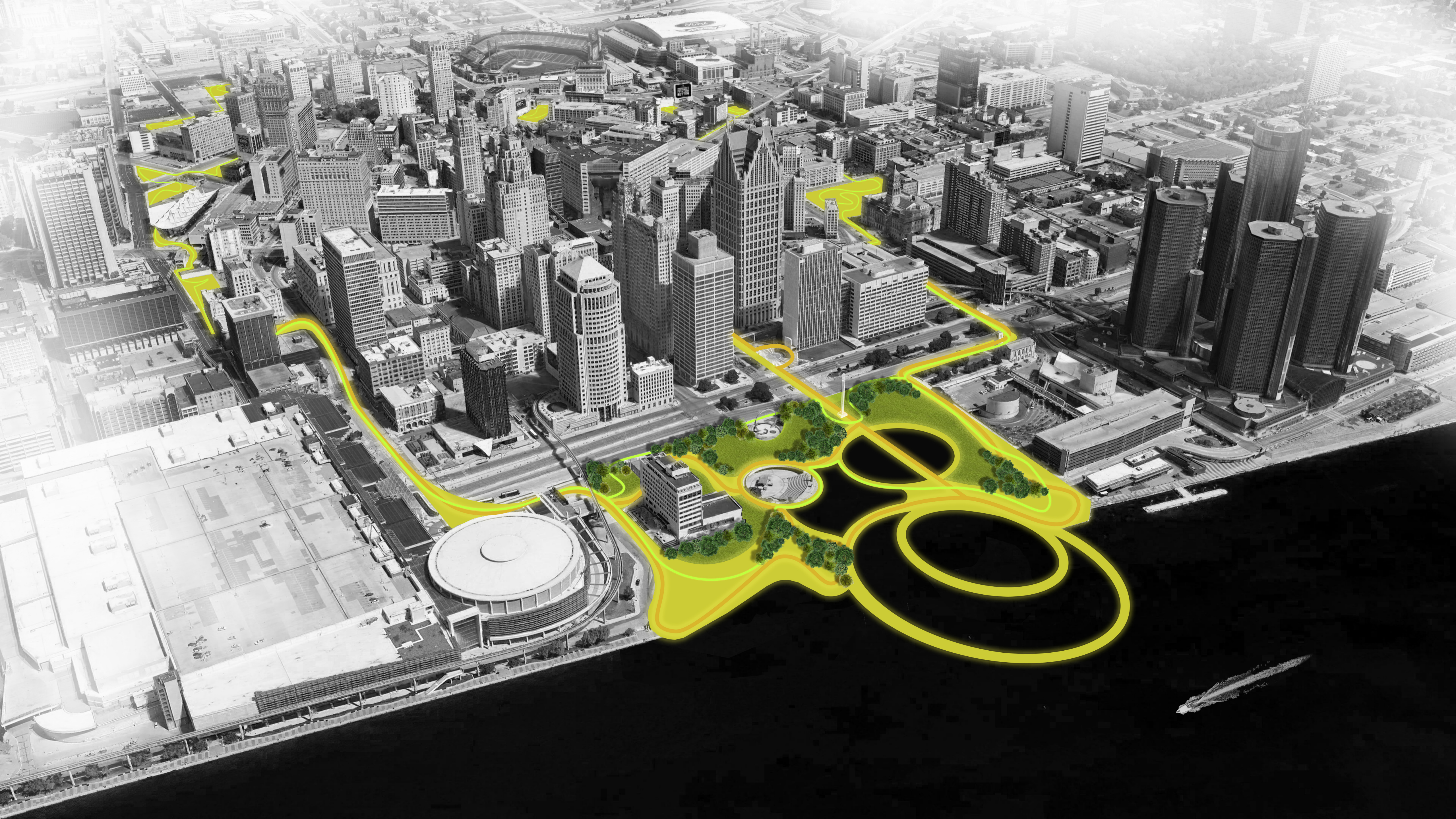




# URBAN AQUAPUNCTURES

DETROIT, MI

Kathryn Mallory



## Commercial Drainage Rates

Drainage charge = Total impervious surface area of the parcel x Impervious acre rate (dollars per acre per month)

\*Most areas under consideration are Class 5, which means there is a 75–100% Impervious Area, so at a base rate of 87.5% impervious surface, the impervious acre rate would be approximately \$771.91, which then needs to be multiplied by the impervious acreage.

## EPA Clean Water Act

The Clean Water Act prohibits anybody from discharging “pollutants” through a “point source” into a “water of the United States” unless they have an NPDES permit. Federal laws provide EPA and authorized state regulatory agencies with various methods of taking enforcement actions against violators of permit requirements. For example, EPA and state regulatory agencies may issue administrative orders which require facilities to correct violations and that assess monetary penalties.

## Potential Green Credits

The Detroit Water and Sewerage Department (DWSD) launched a drainage charge credit program in October 2016. Detroit non-residential customers who reduce the peak flow and volume of stormwater runoff on your property – by planting rain gardens or installing pervious pavement, for example – can earn credits to be applied to your bill.

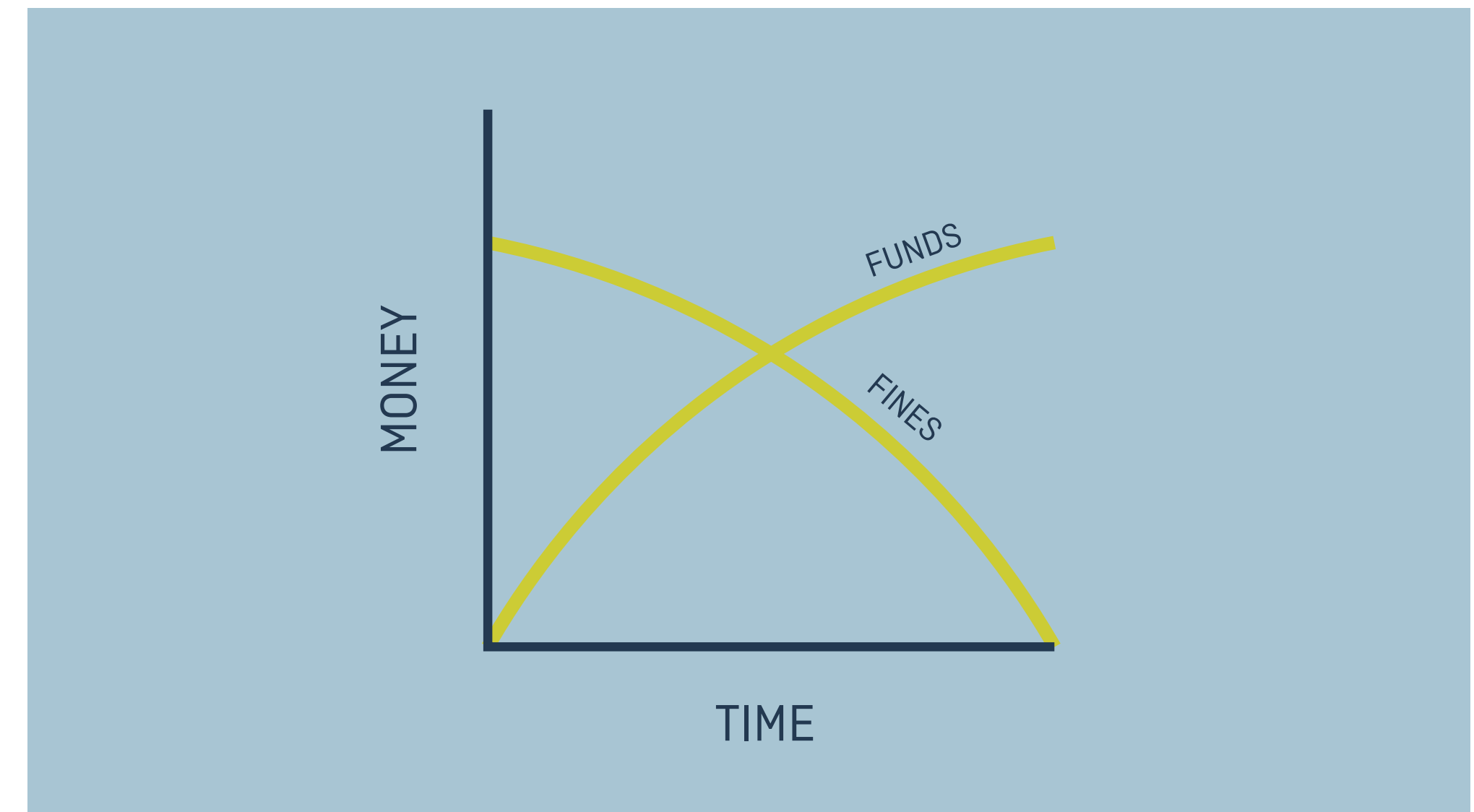
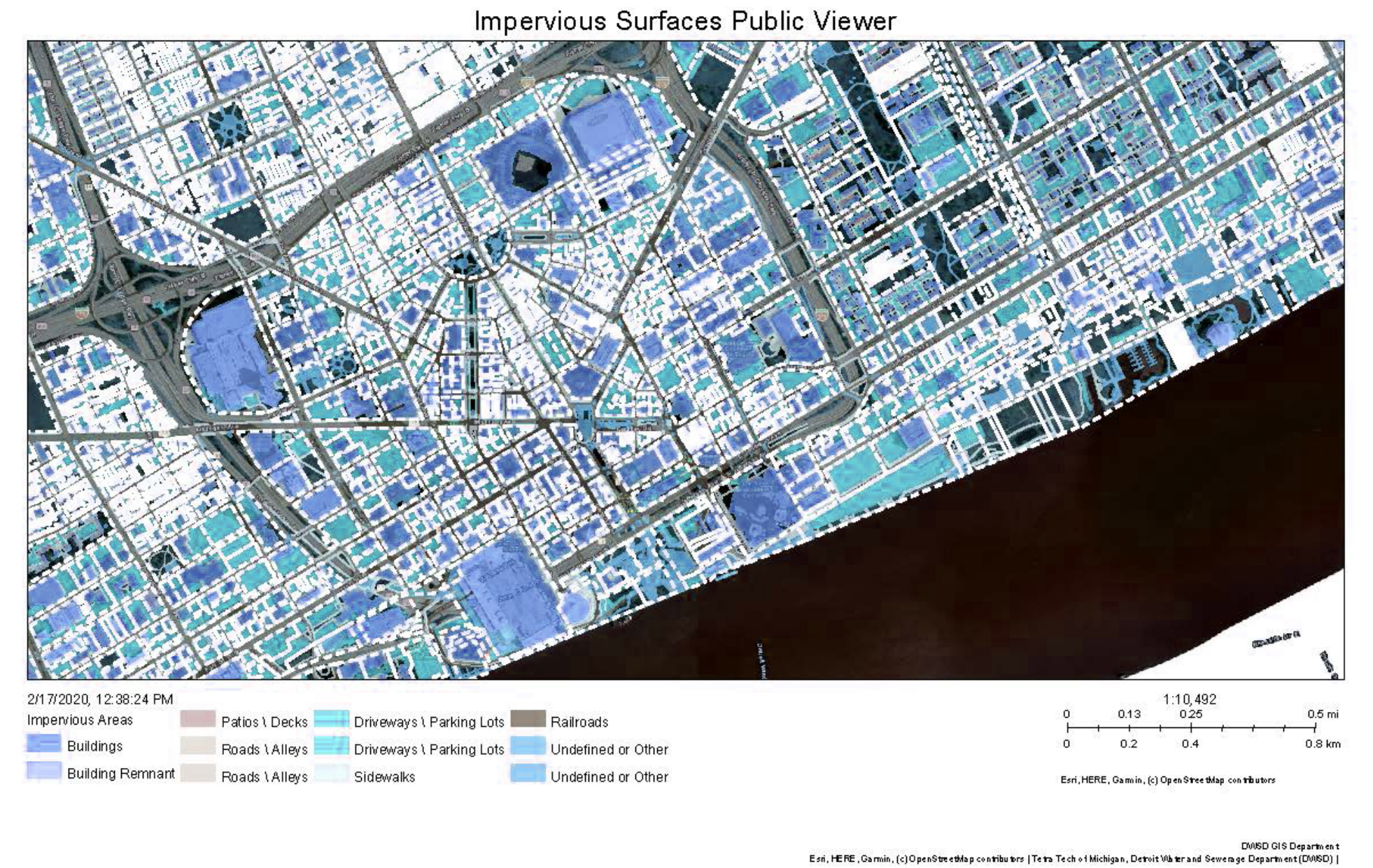
## Capital Partnership Program

The Capital Partnership Program allocates \$5 million per year to fund installation of approved Green Stormwater Infrastructure (GSI) projects for nonresidential property owners. Up to 50 percent of design, installation and capital costs will be reimbursed, up to a maximum \$50,000 (subject to DWSD discretion).

### Summary

Large infrastructure with not enough residents to pay taxes for the upkeep, high fines from the EPA, causes the city to be in a perpetual feedback loop. Commercial drainage rates are expensive for property owners.

The combination of potential green credits, capital partnership program will help fund Aquapunctures. The EPA fines will go down and therefore the city can reallocate money to invest back into the city.



**KEY**  
WATER LEVEL RISE ON  
THE DETROIT RIVER

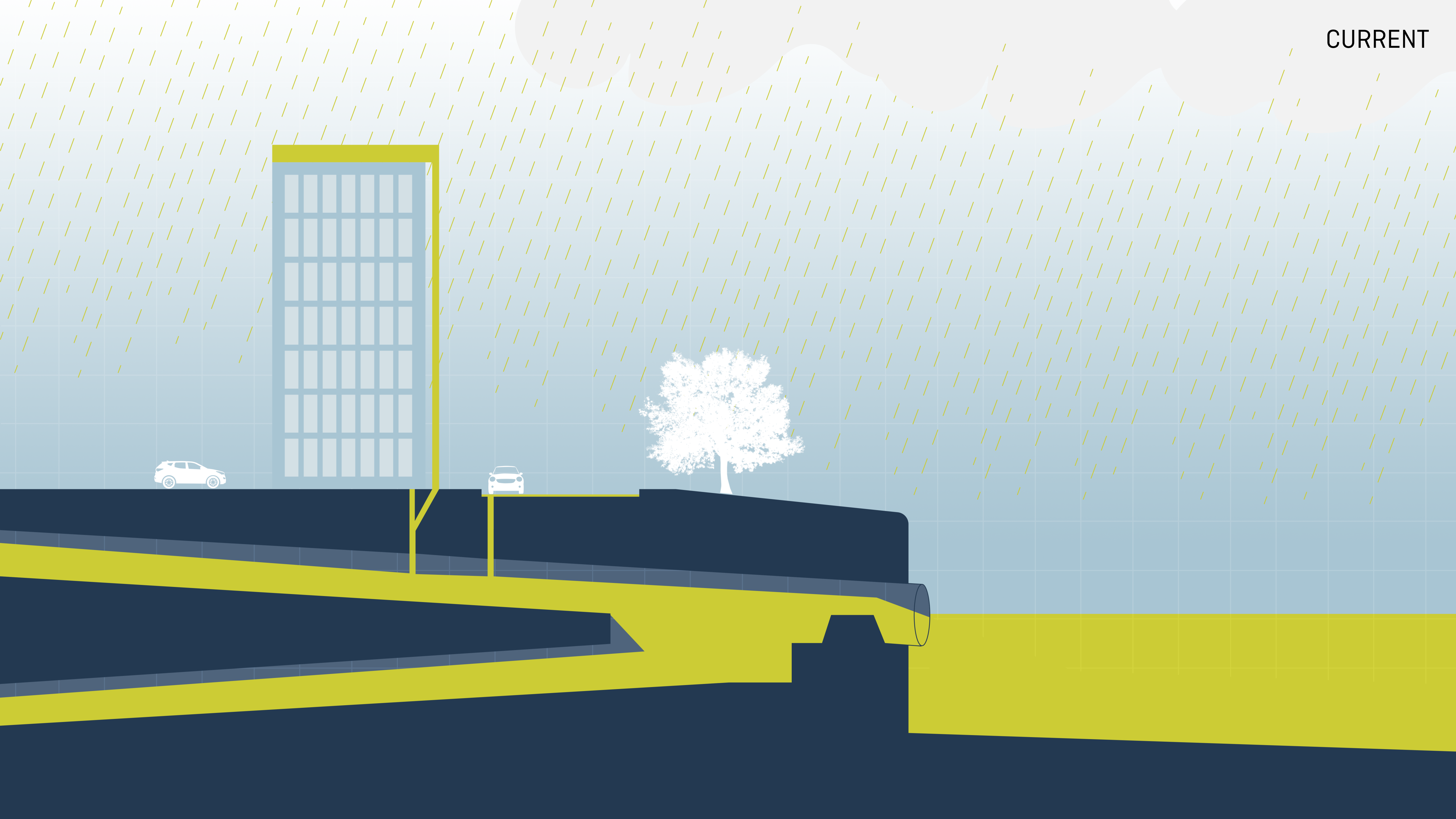
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2020 WATER LEVEL:  
577 FT

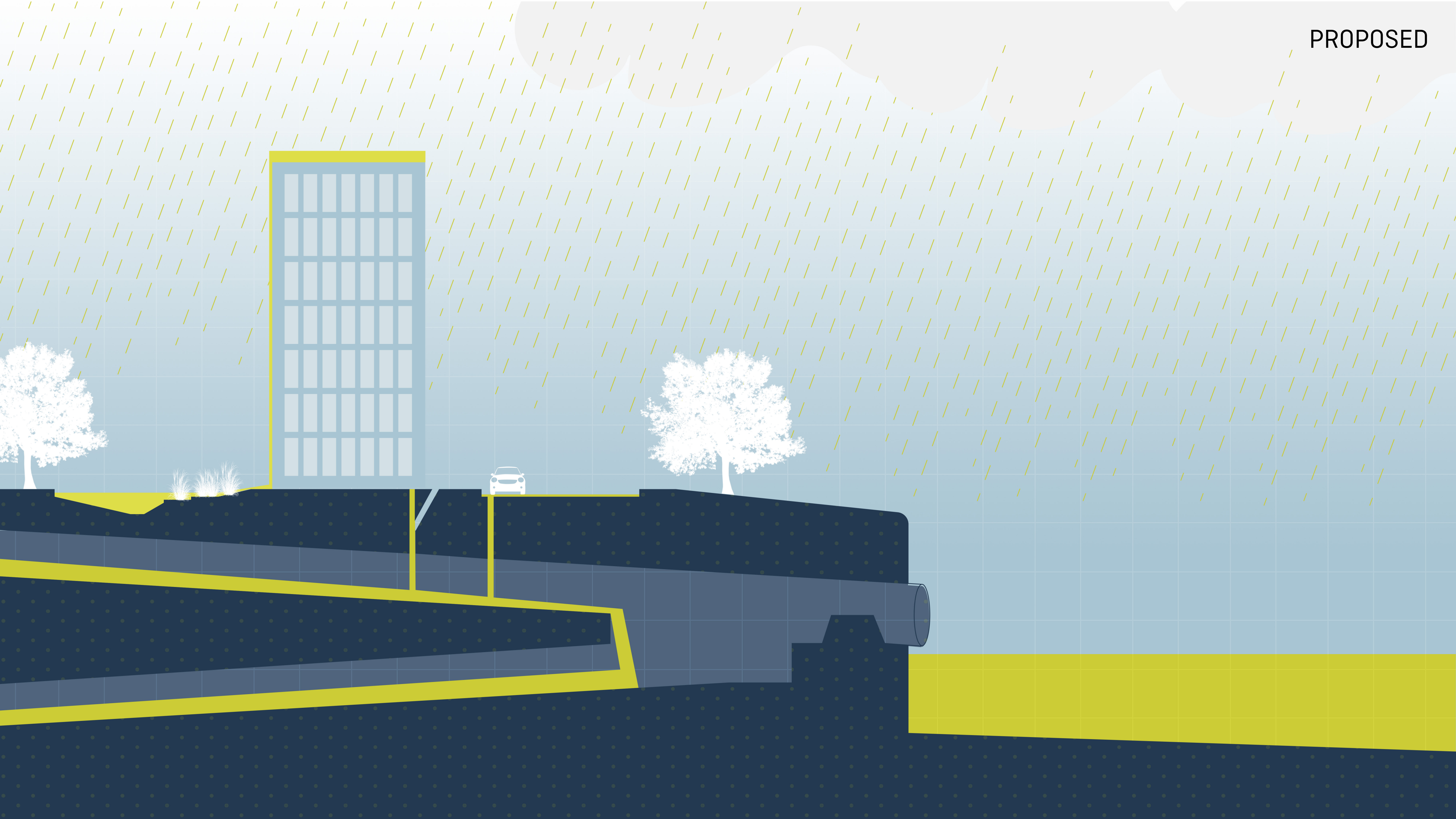
2019 WATER LEVEL:  
576 FT

1920 WATER LEVEL:  
575.75 FT





PROPOSED



**KEY**  
OUTFALL LOCATIONS &  
AMOUNT FROM 2008-2014

OUTFALL 

220.87 MILLION GAL

16.37 MILLION GAL

2741.19 MILLION GAL

150.93 MILLION GAL

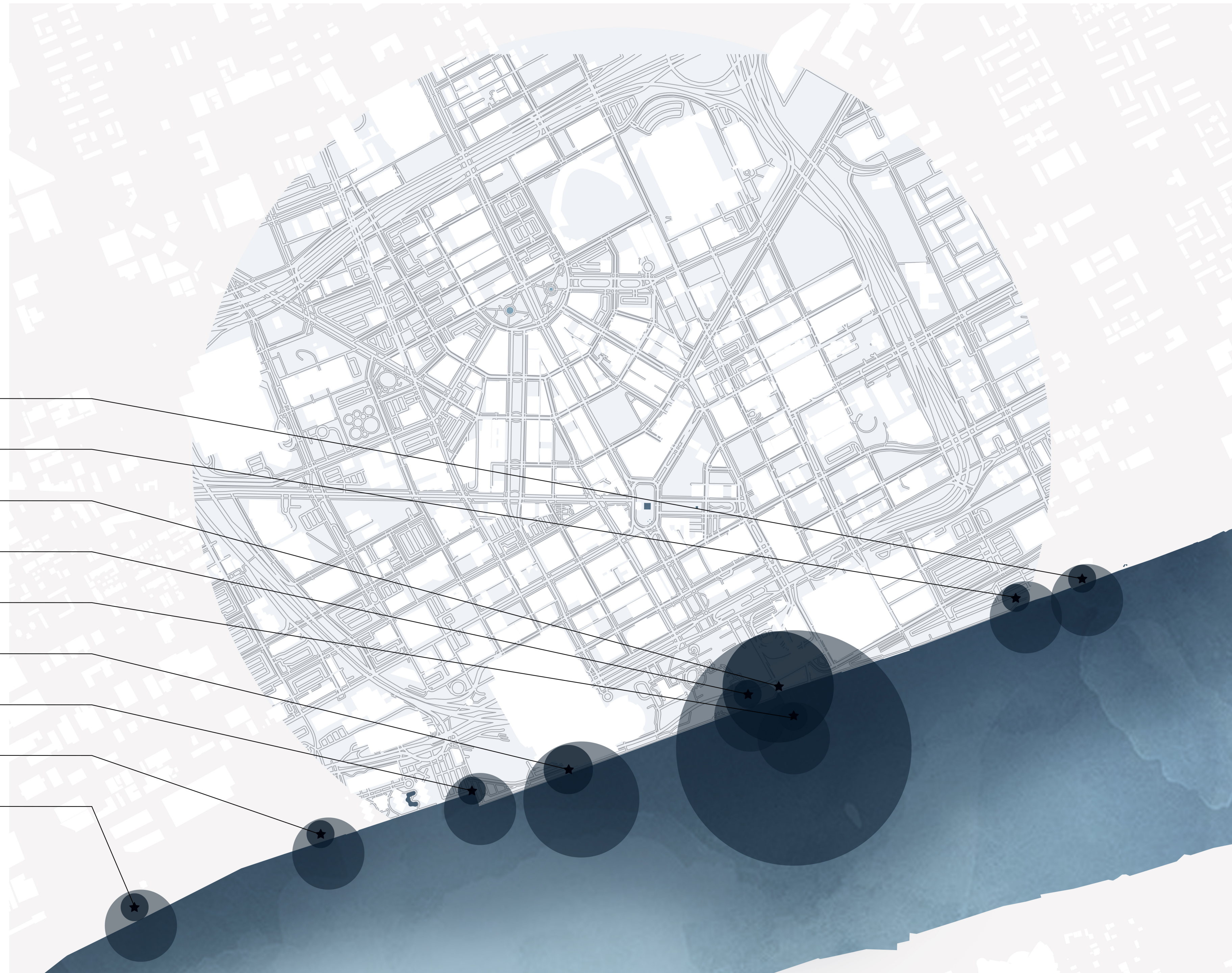
6.52 MILLION GAL

1025.86 MILLION GAL

244.9 MILLION GAL

16.075 MILLION GAL

17.93 MILLION GAL



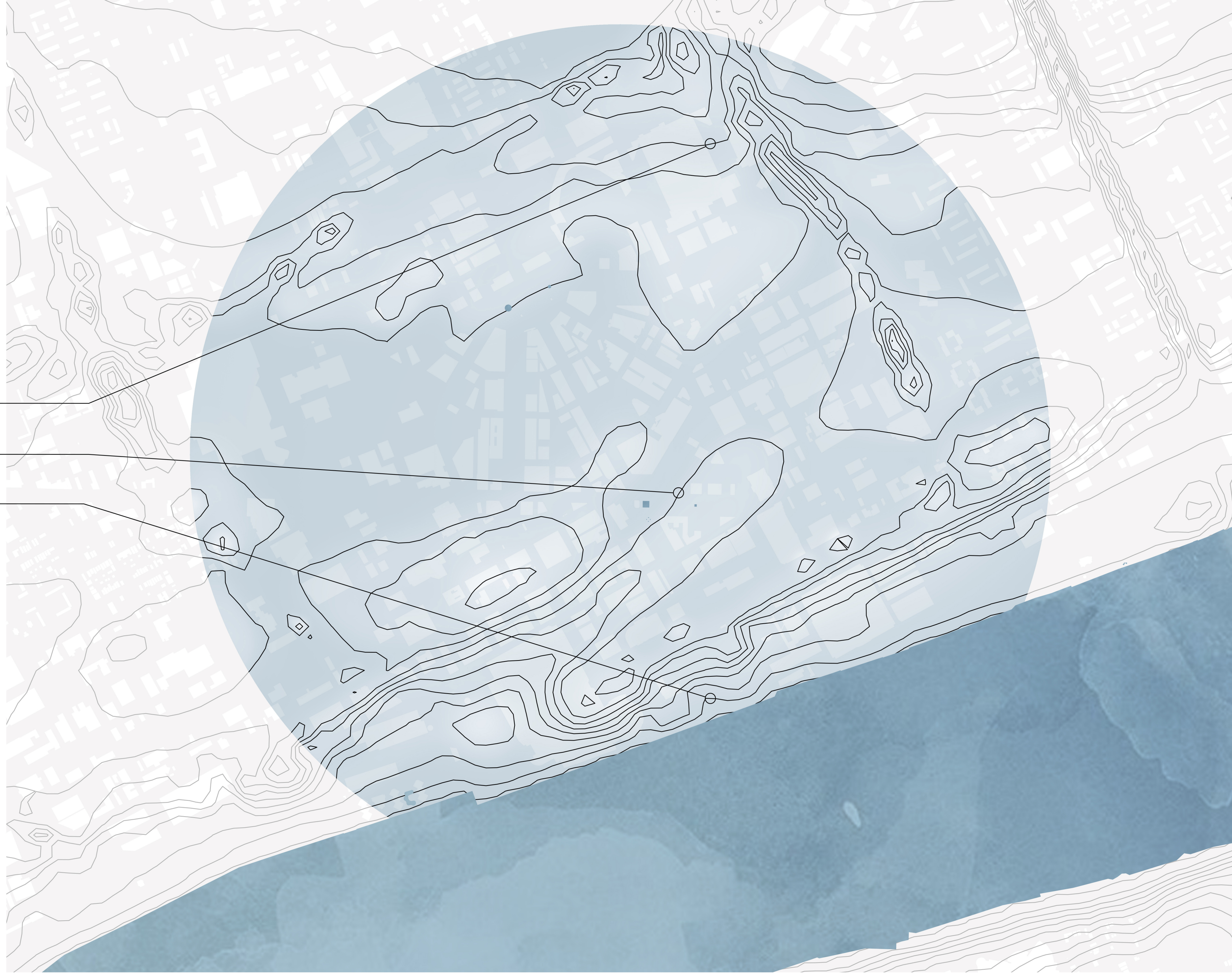
**KEY**  
TOPOGRAPGY

3 FT DIFFERENCE ||

609 FASL

600 FASL

580 FASL

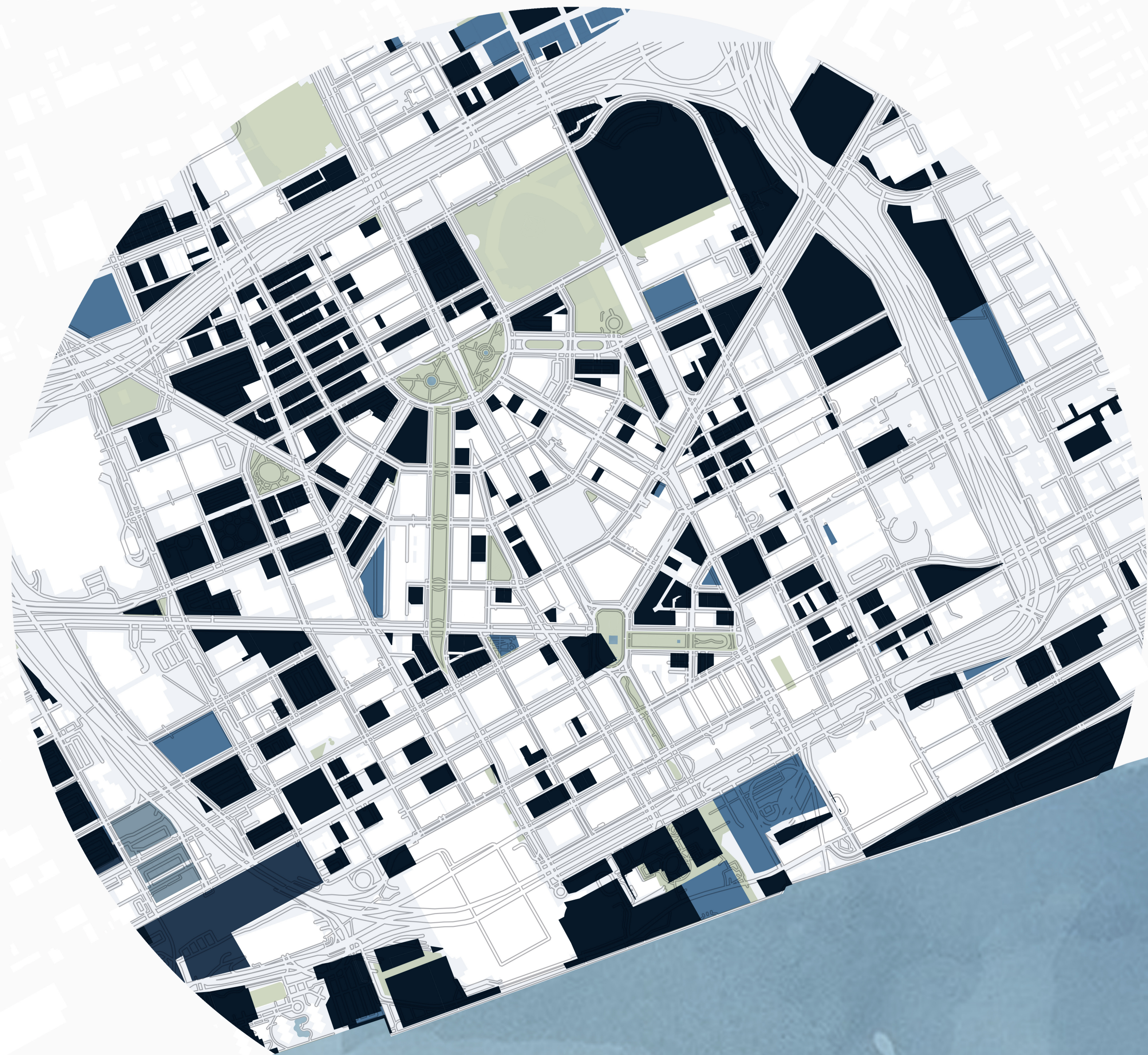




**KEY**  
2019 City of Detroit  
Land Ownership

---

- VACANT
- COUNTY OWNED
- CITY OWNED
- CITY OWNED PARKS
- STATE OWNED
- DETROIT LAND BANK



KEY  
PAVED &  
VACANT LOTS

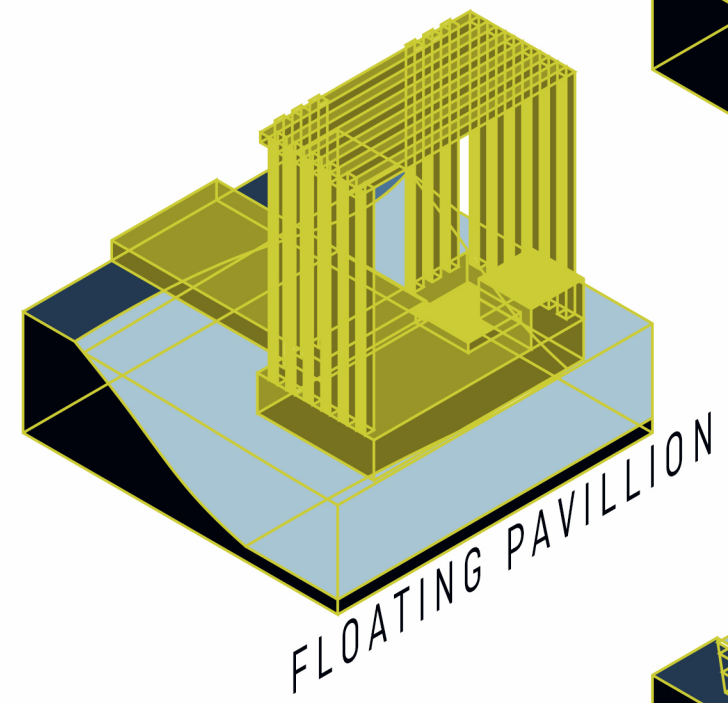
PAVED PARKING LOT

VACANT



- KEY**  
AQUACONNECTIONS
- 
- AQUAPUNCTURE ■
- OPPORTUNITY AREA ■
- WATER DISTRICT ■
- AQUACONNECTIONS ■

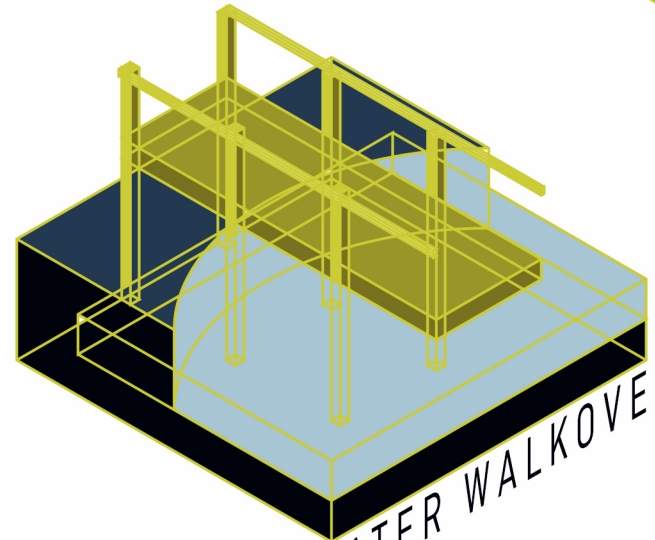




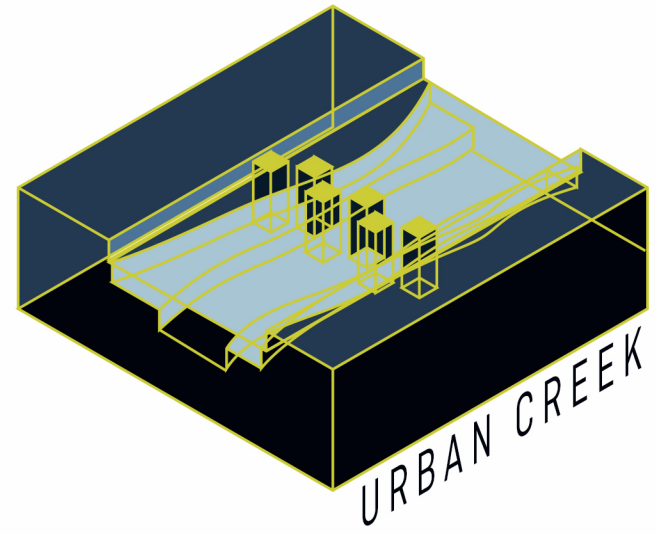
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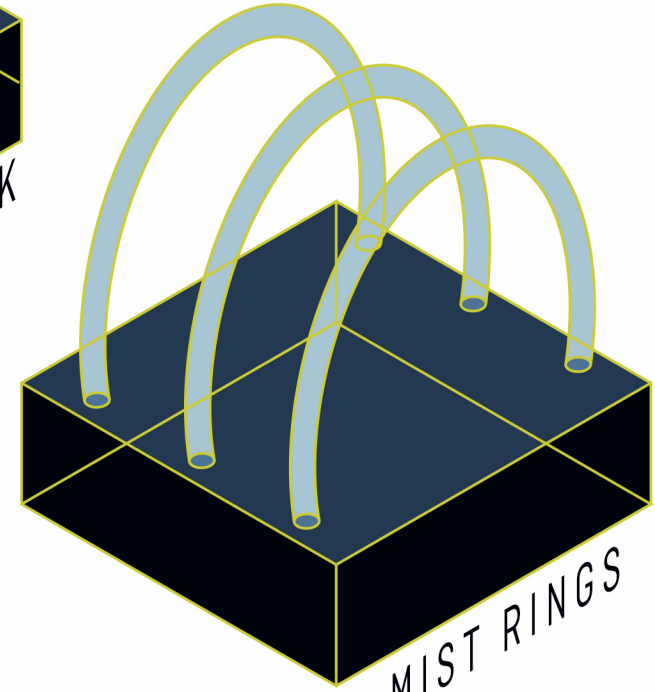
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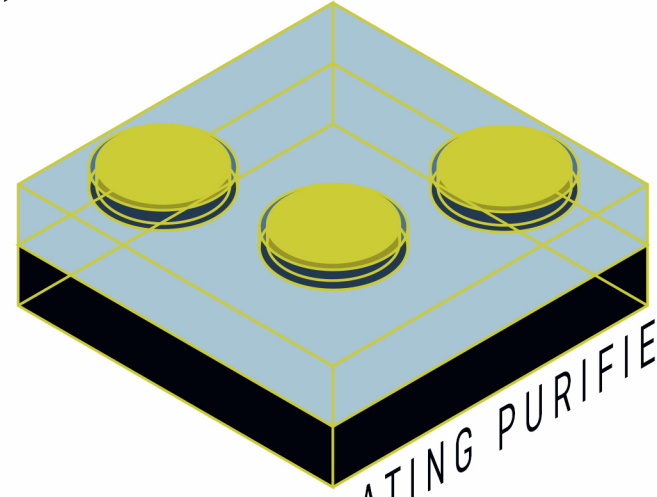
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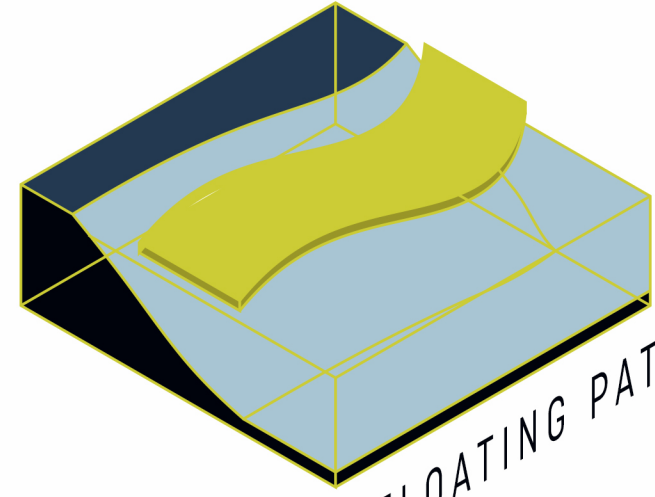
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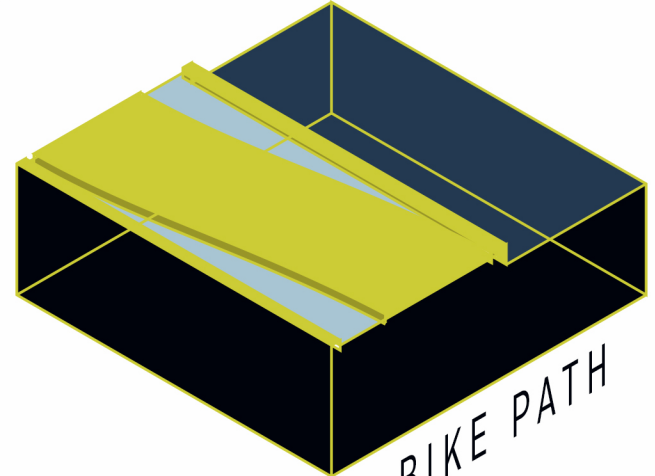
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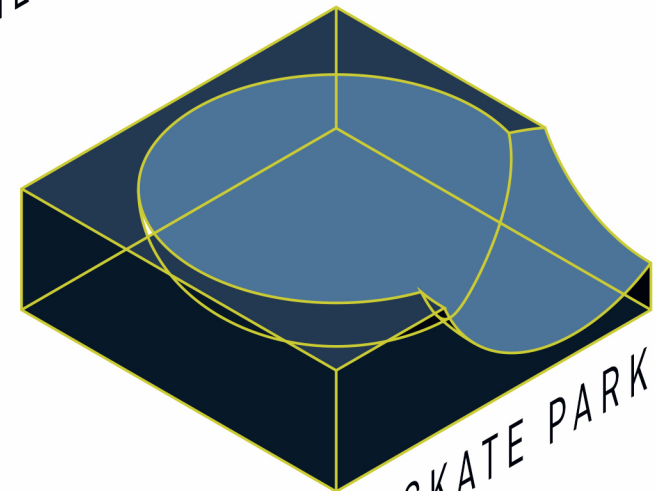
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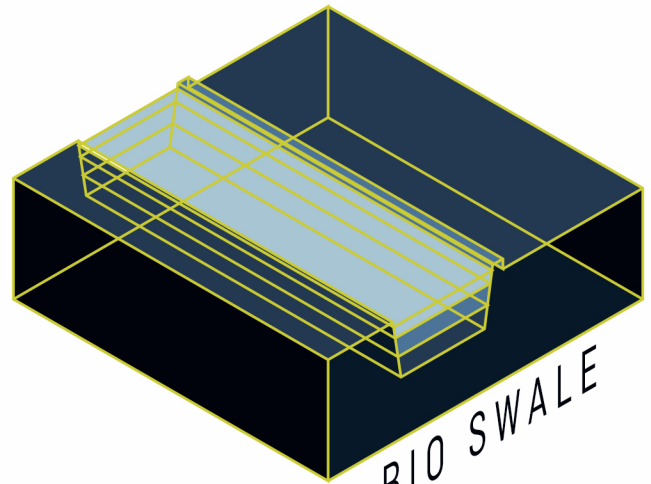
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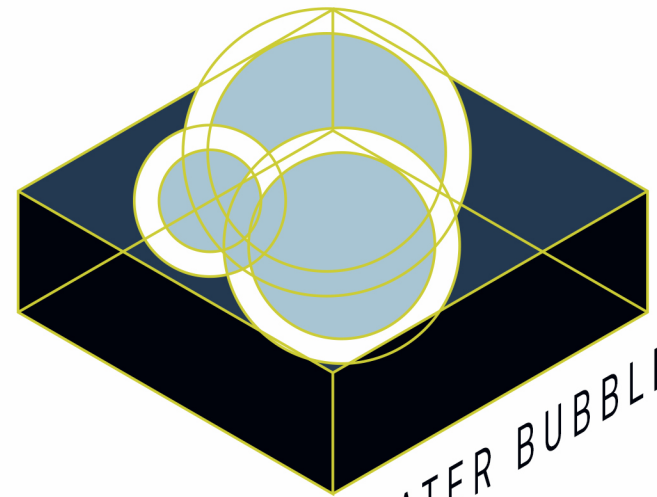
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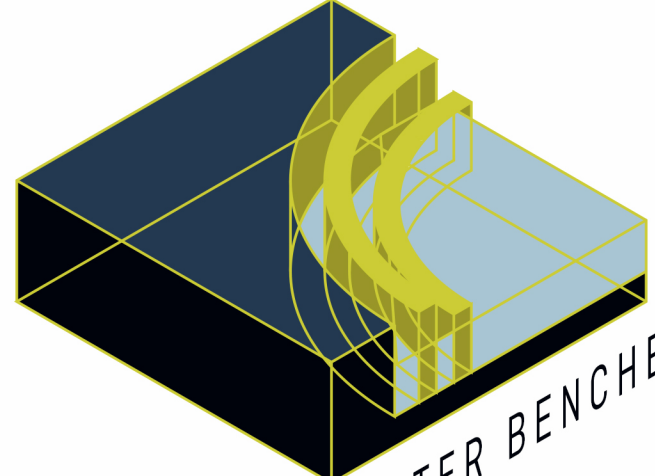
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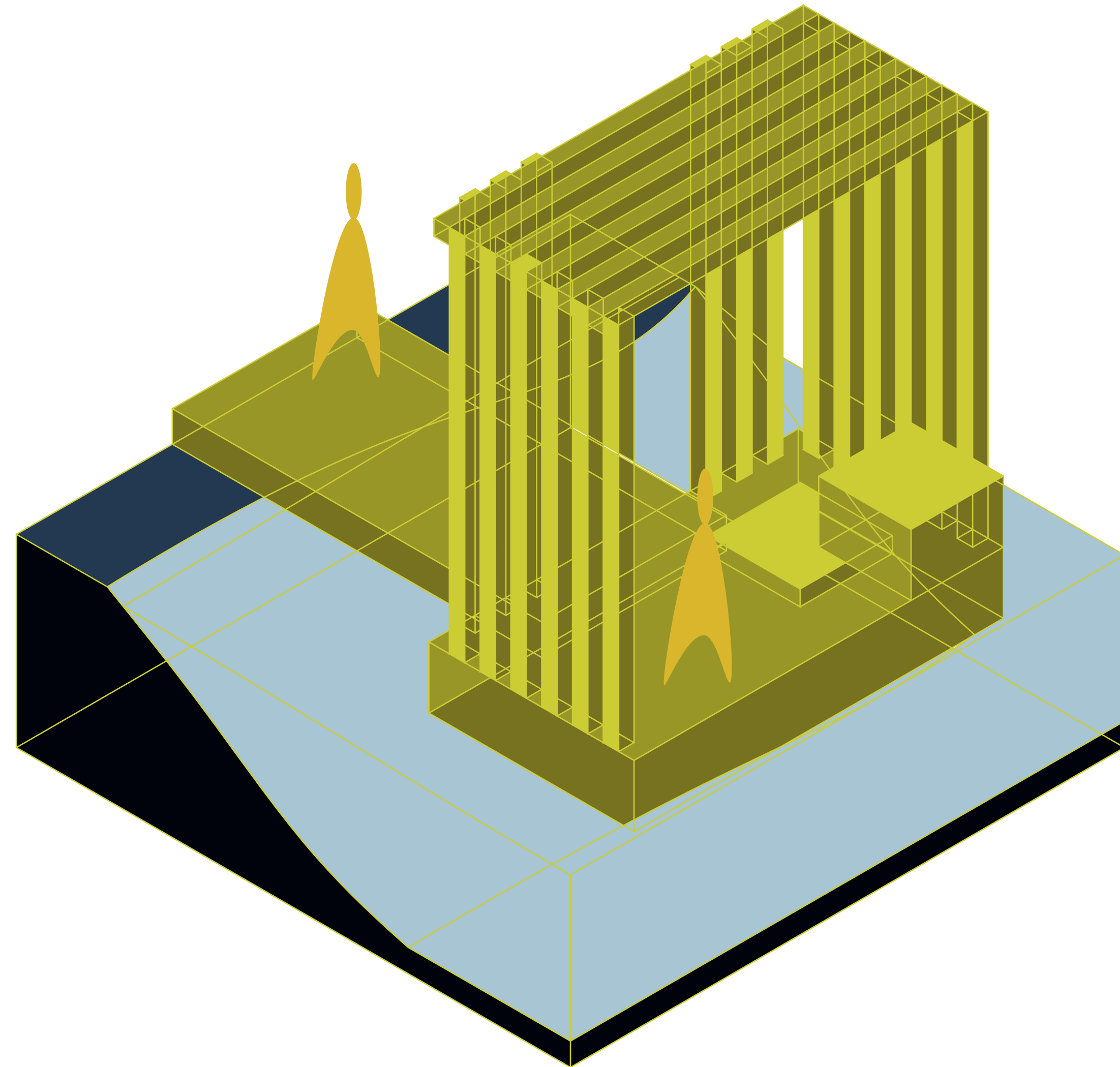
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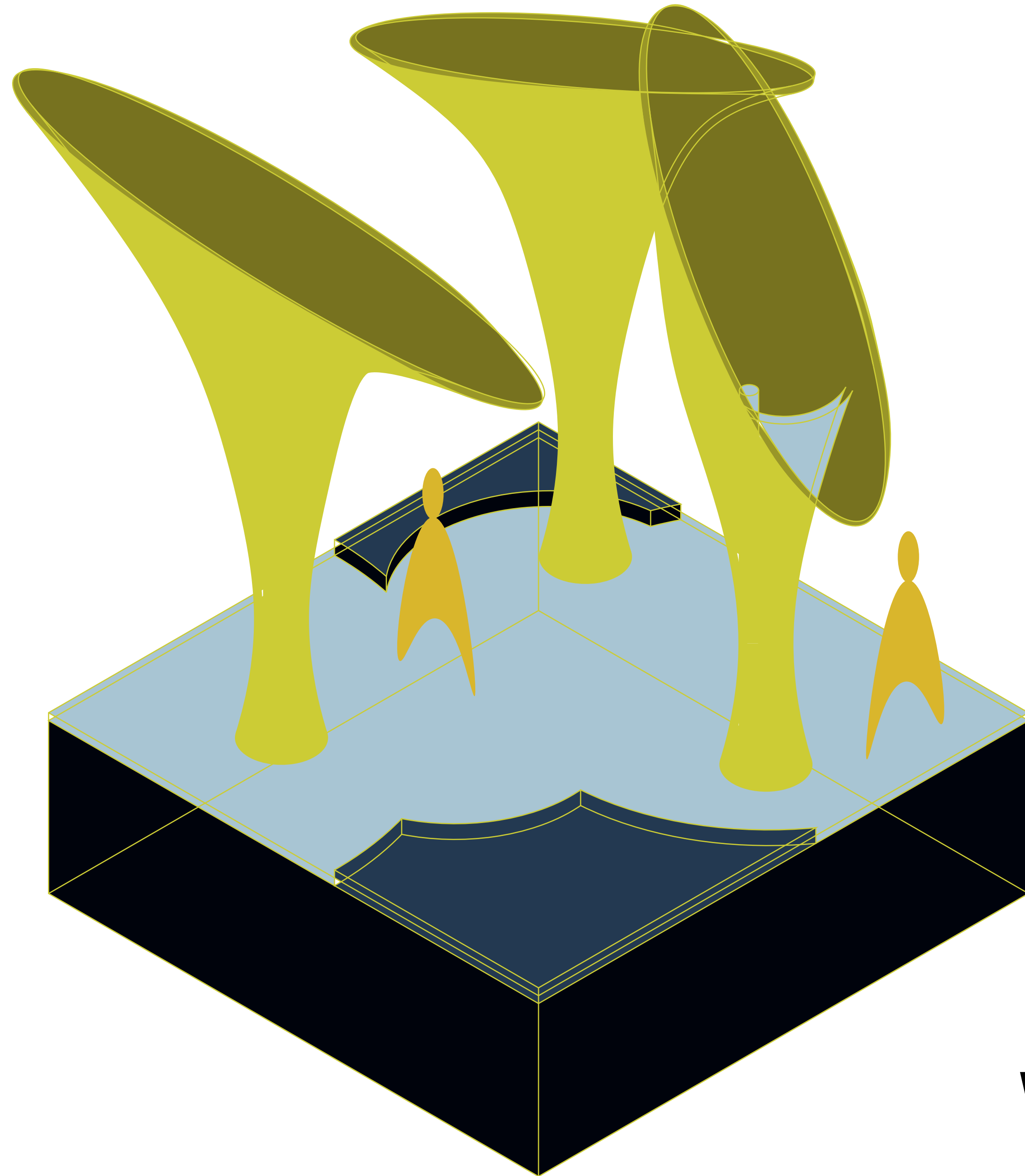
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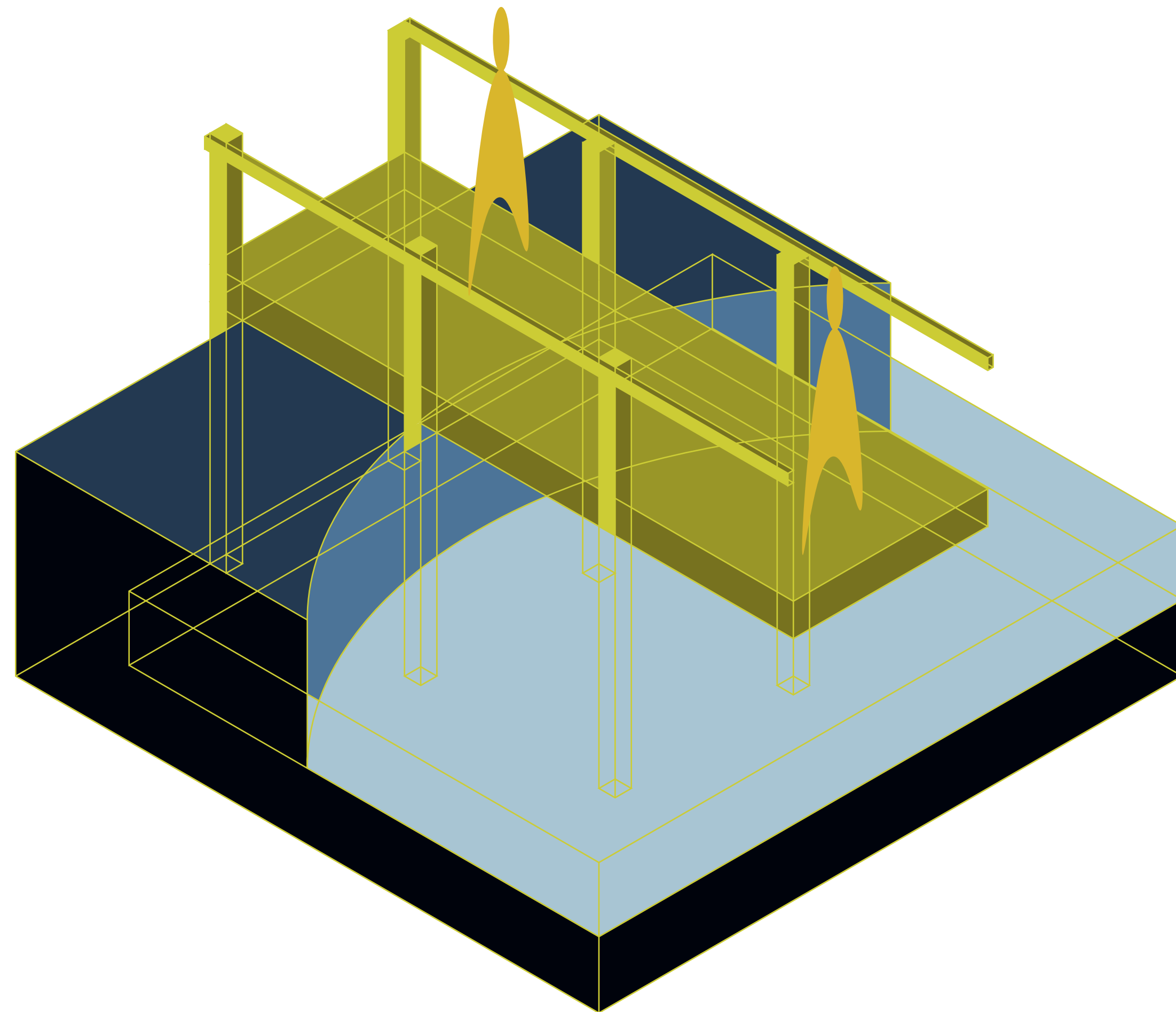
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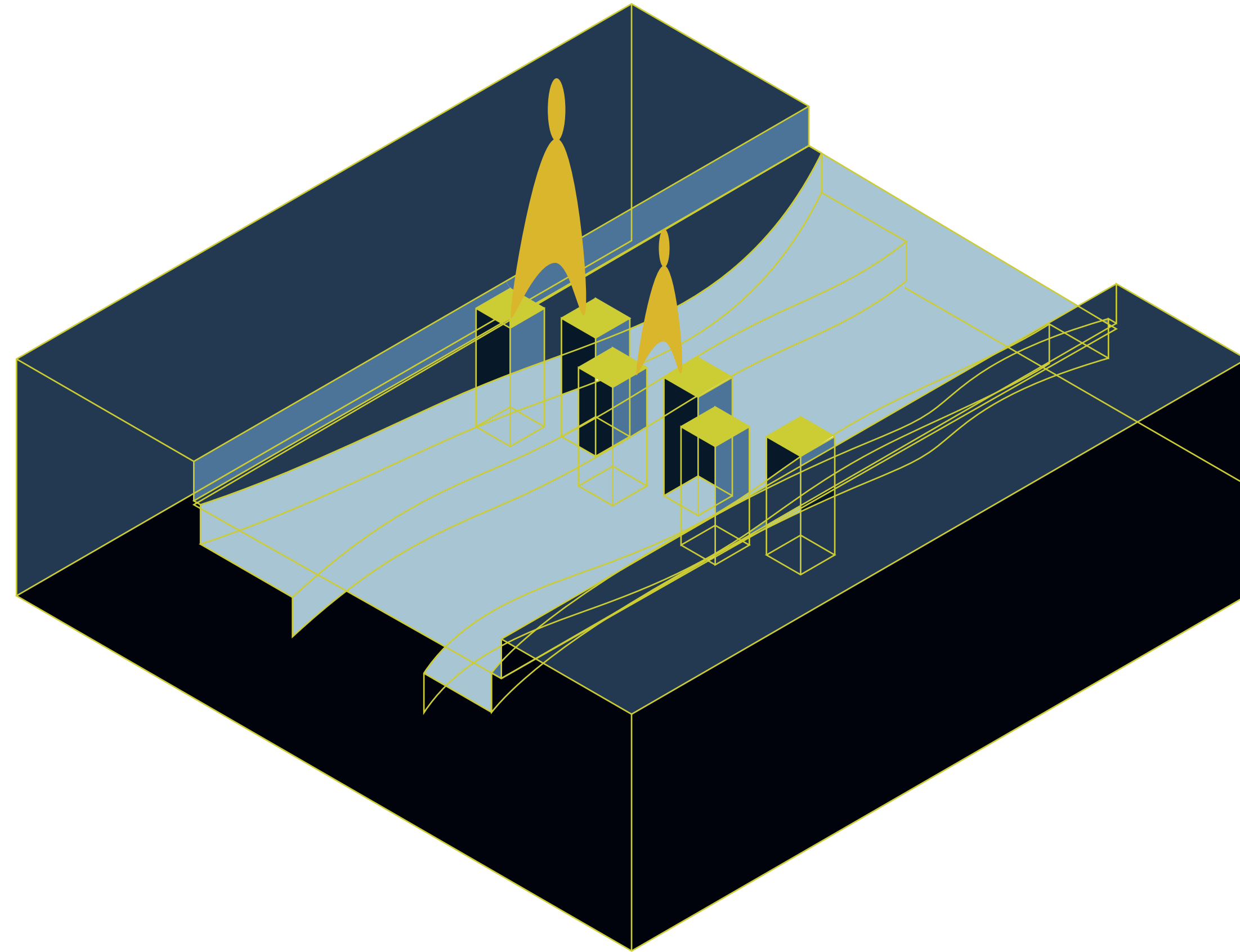
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WATER CATCHER

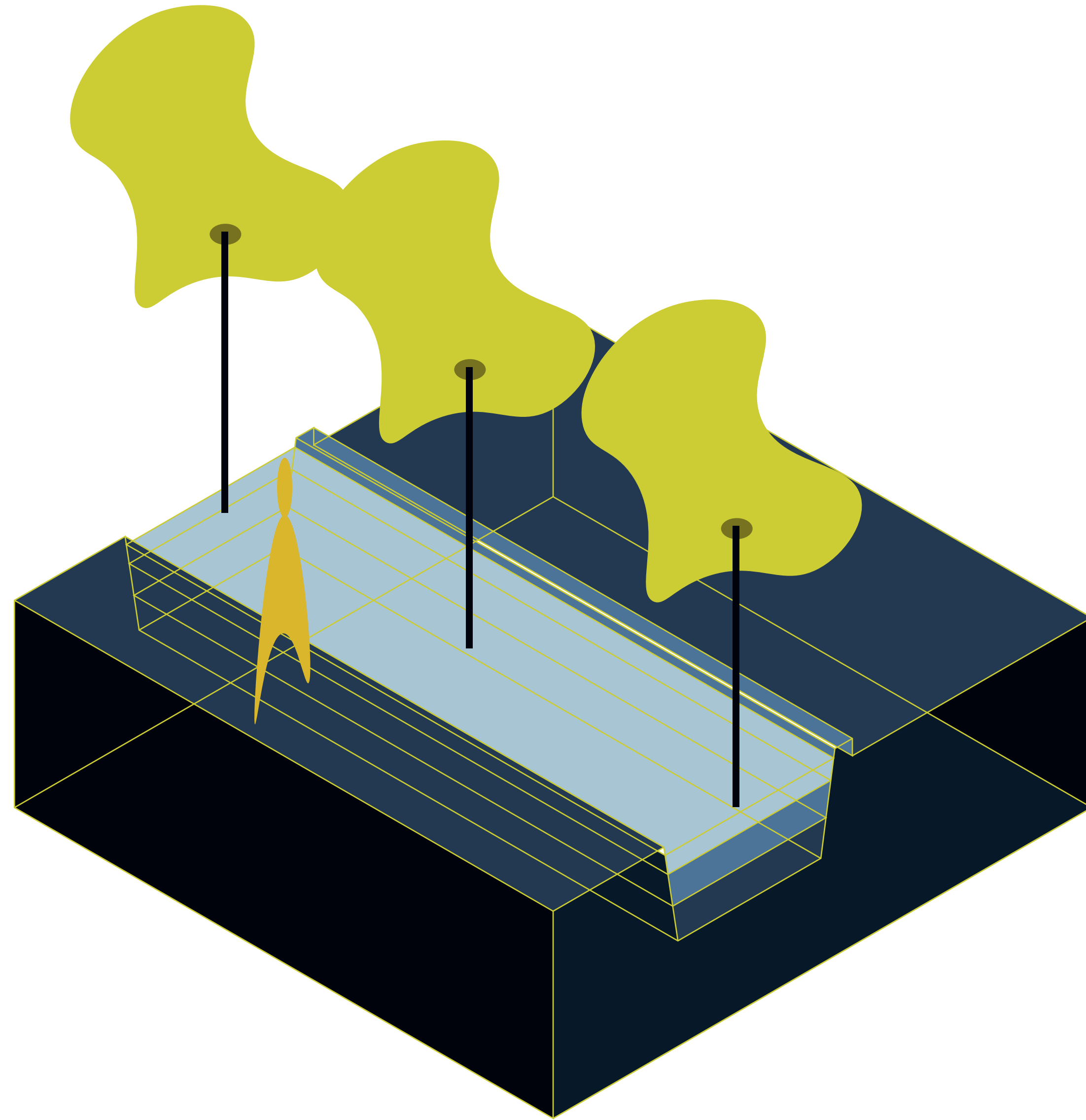


**WATER WALKOVER**

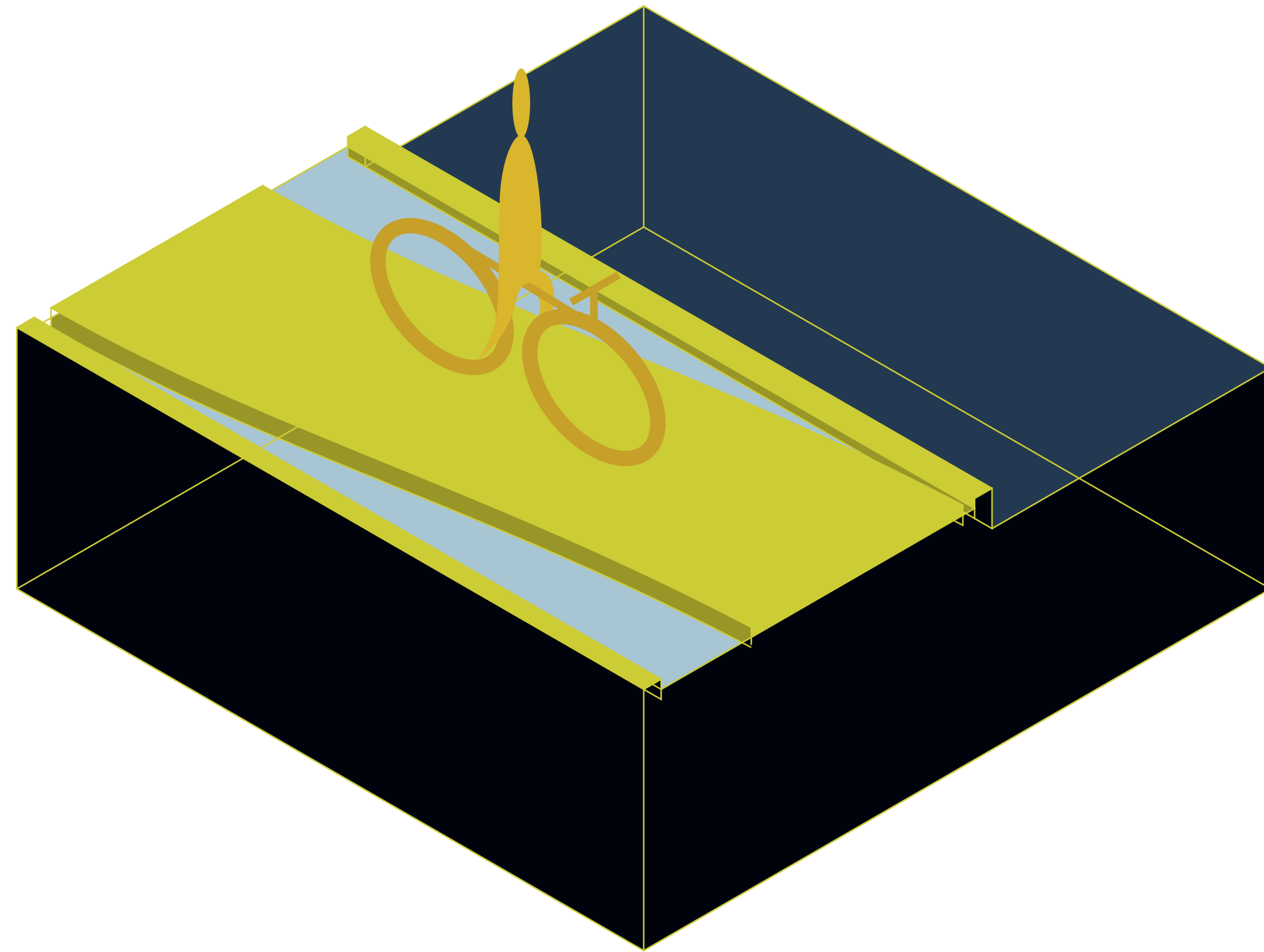


URBAN CREEK

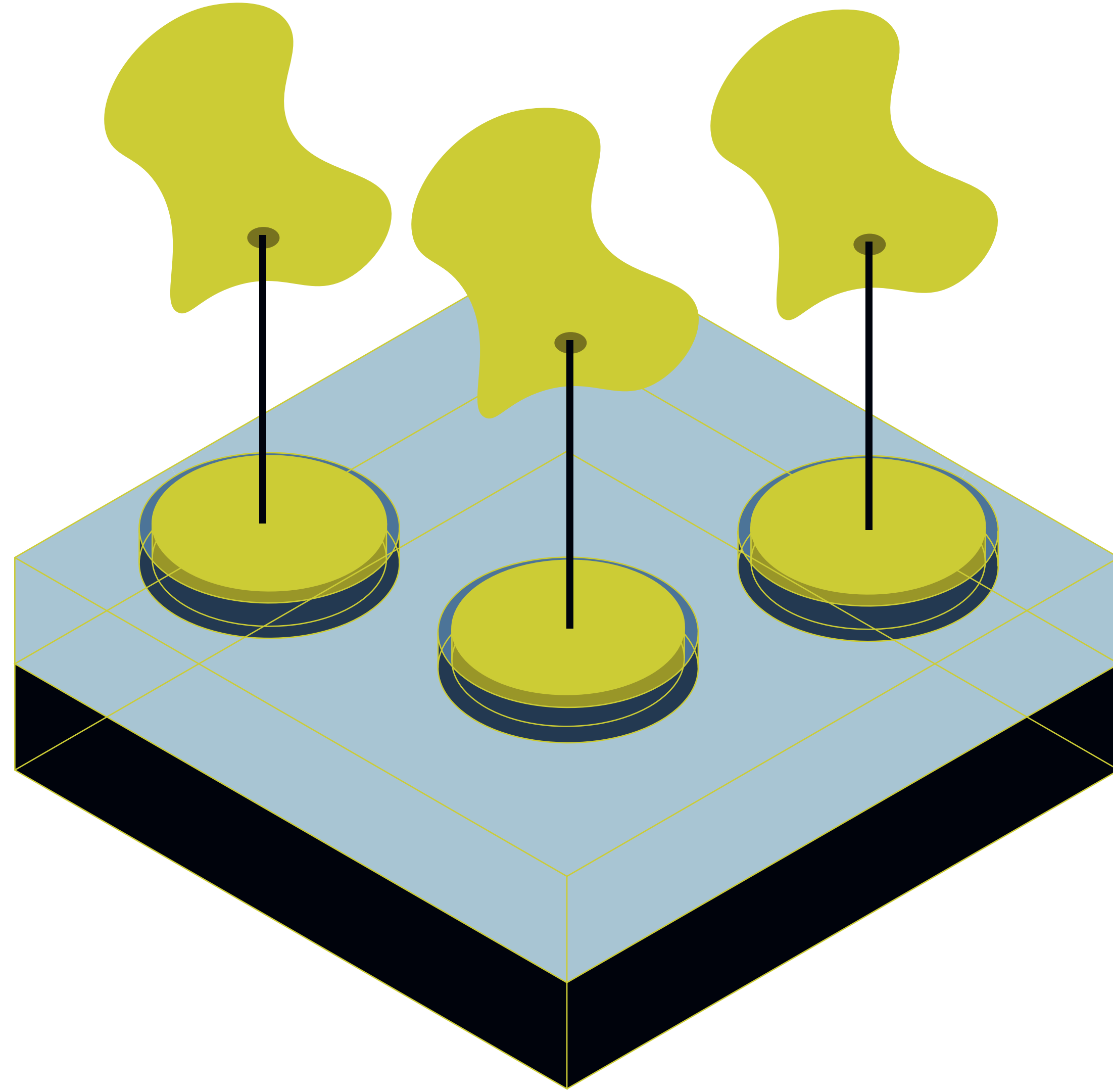




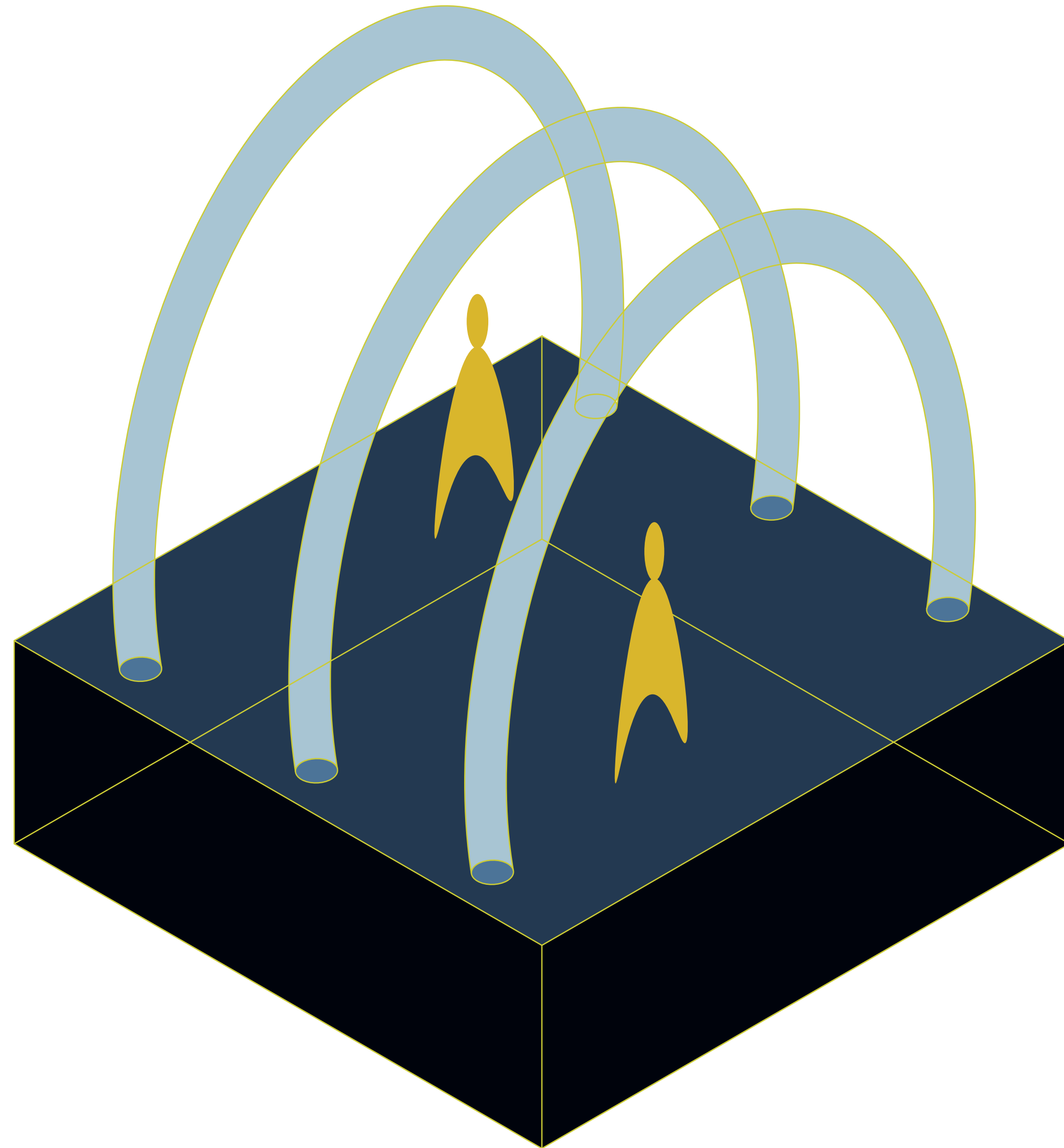
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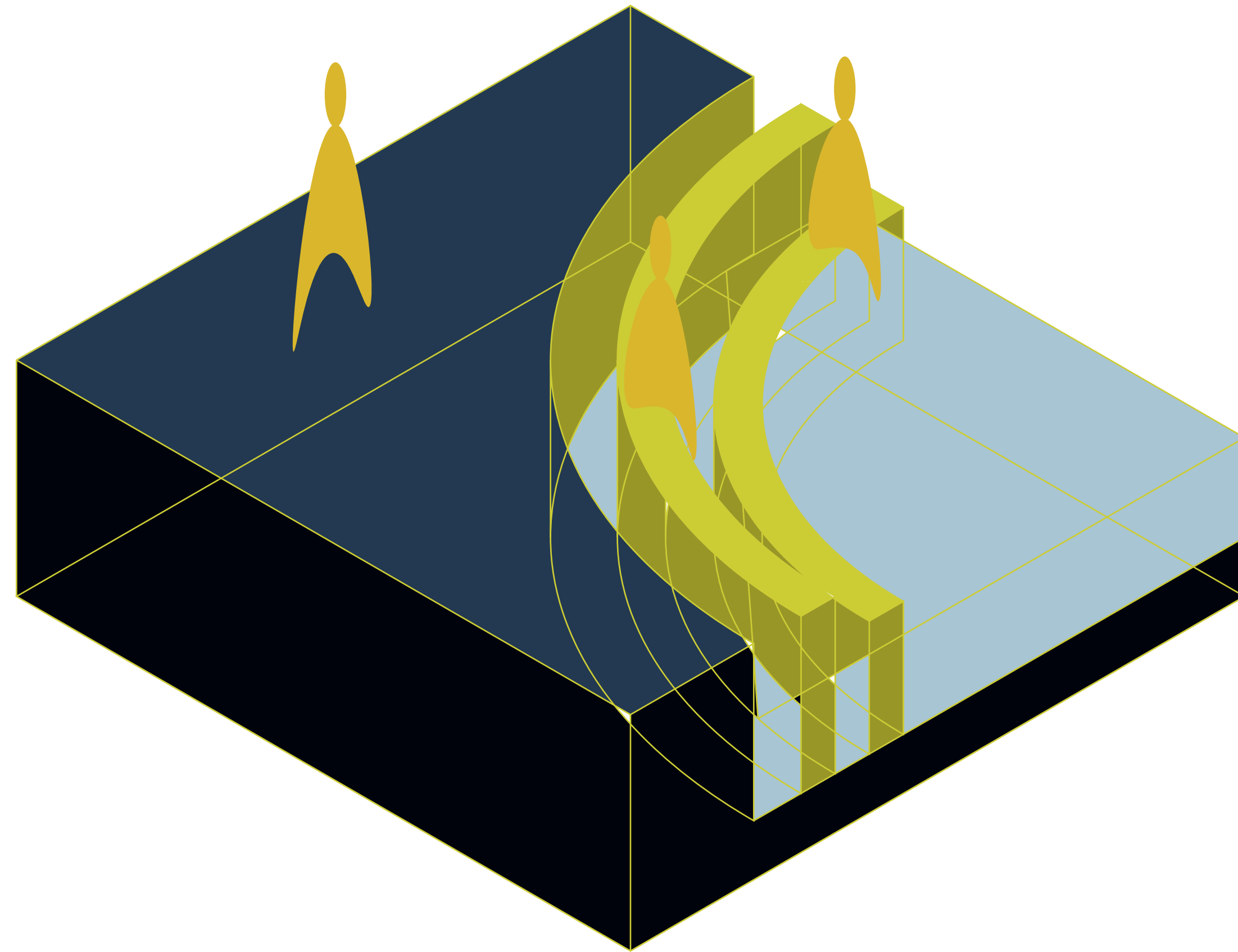
BIKE PATH



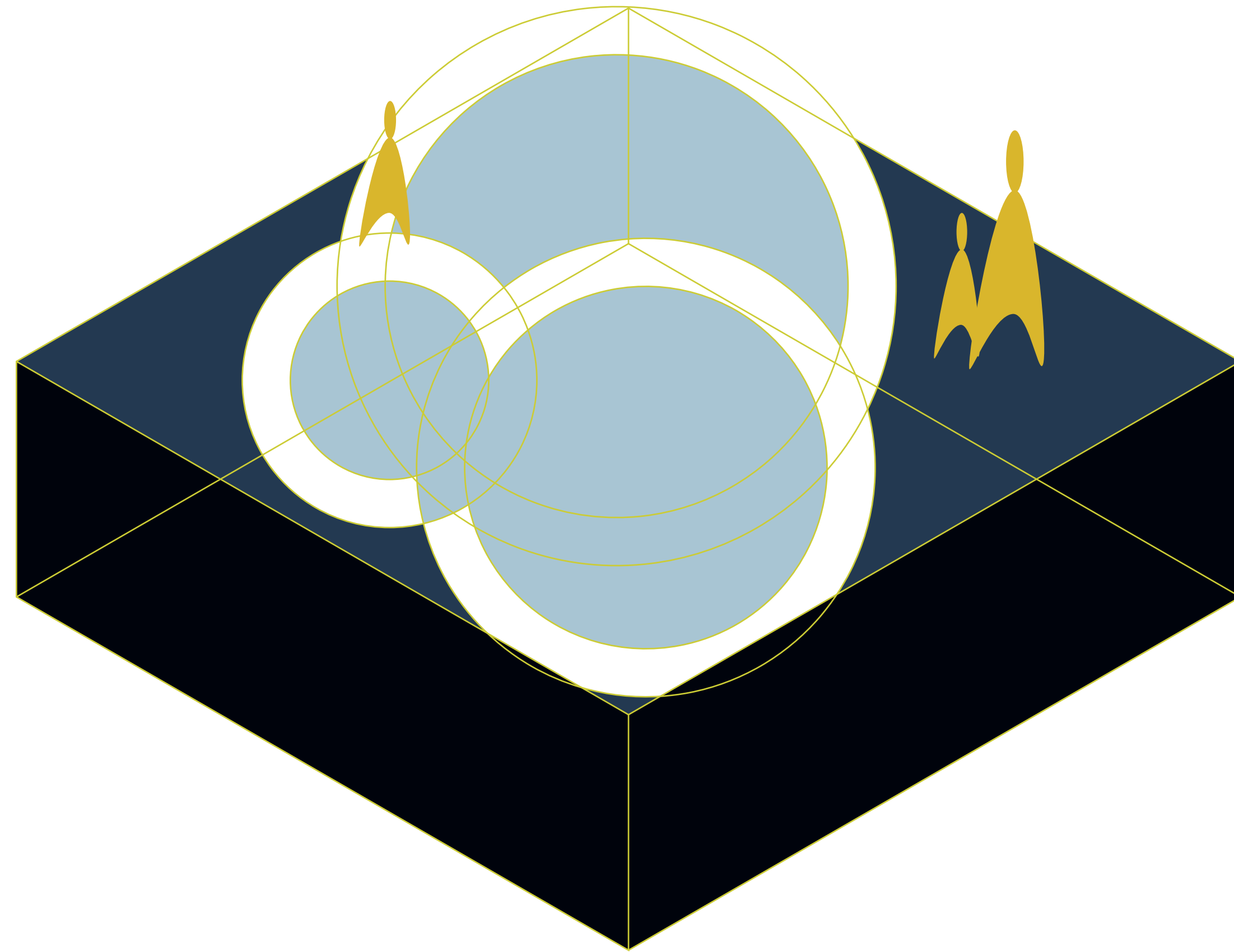
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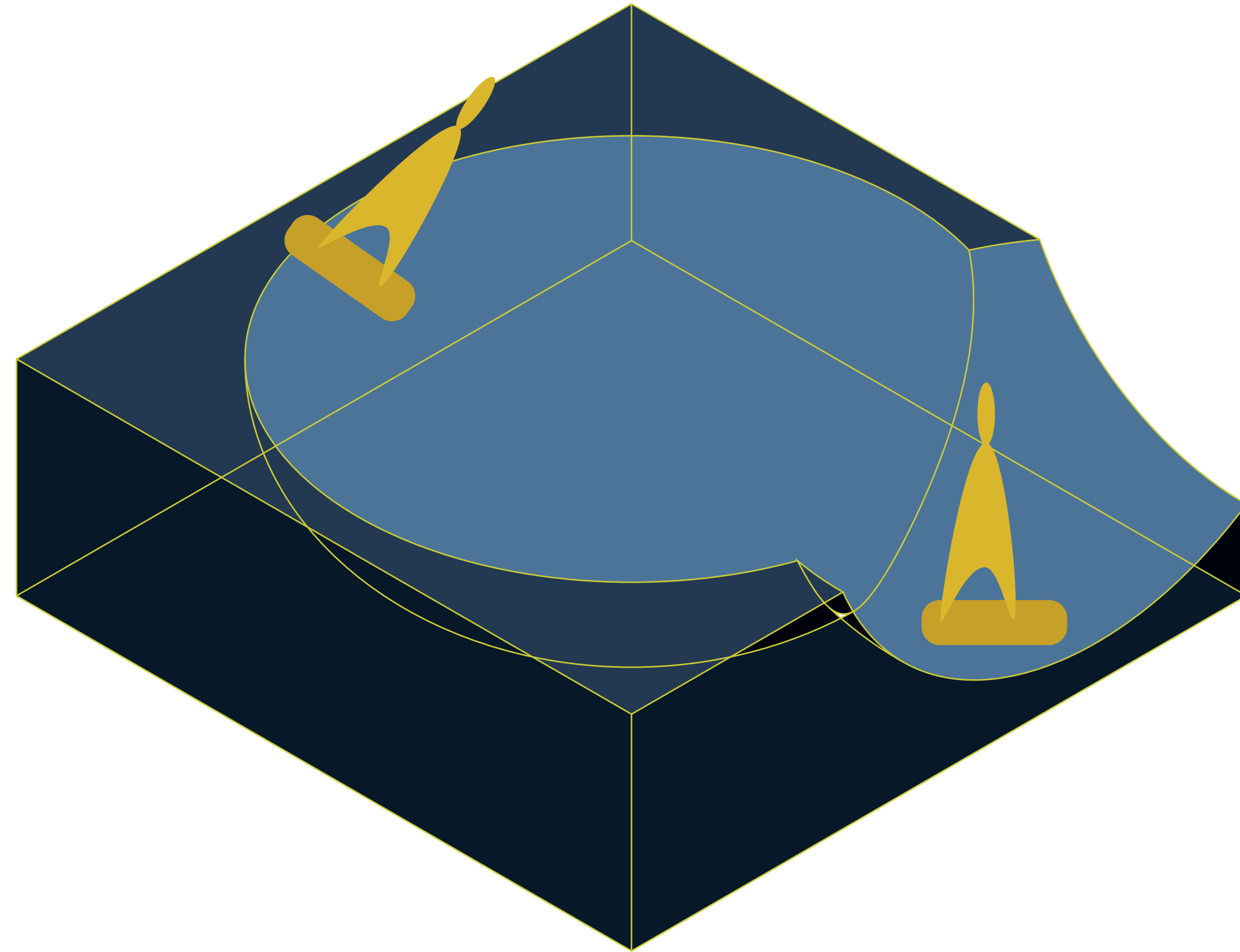
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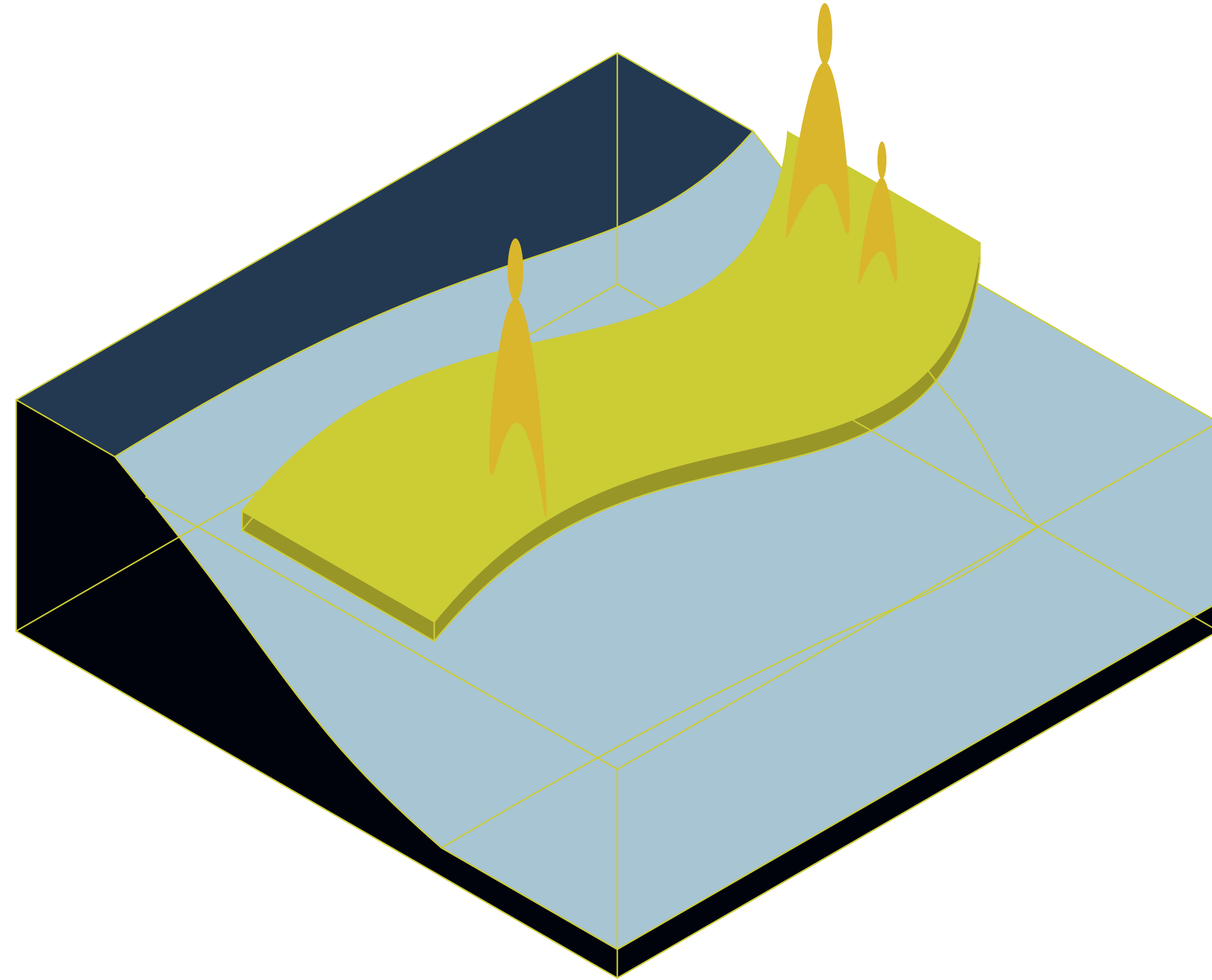
WATER BENCHES



WATER BUBBLES

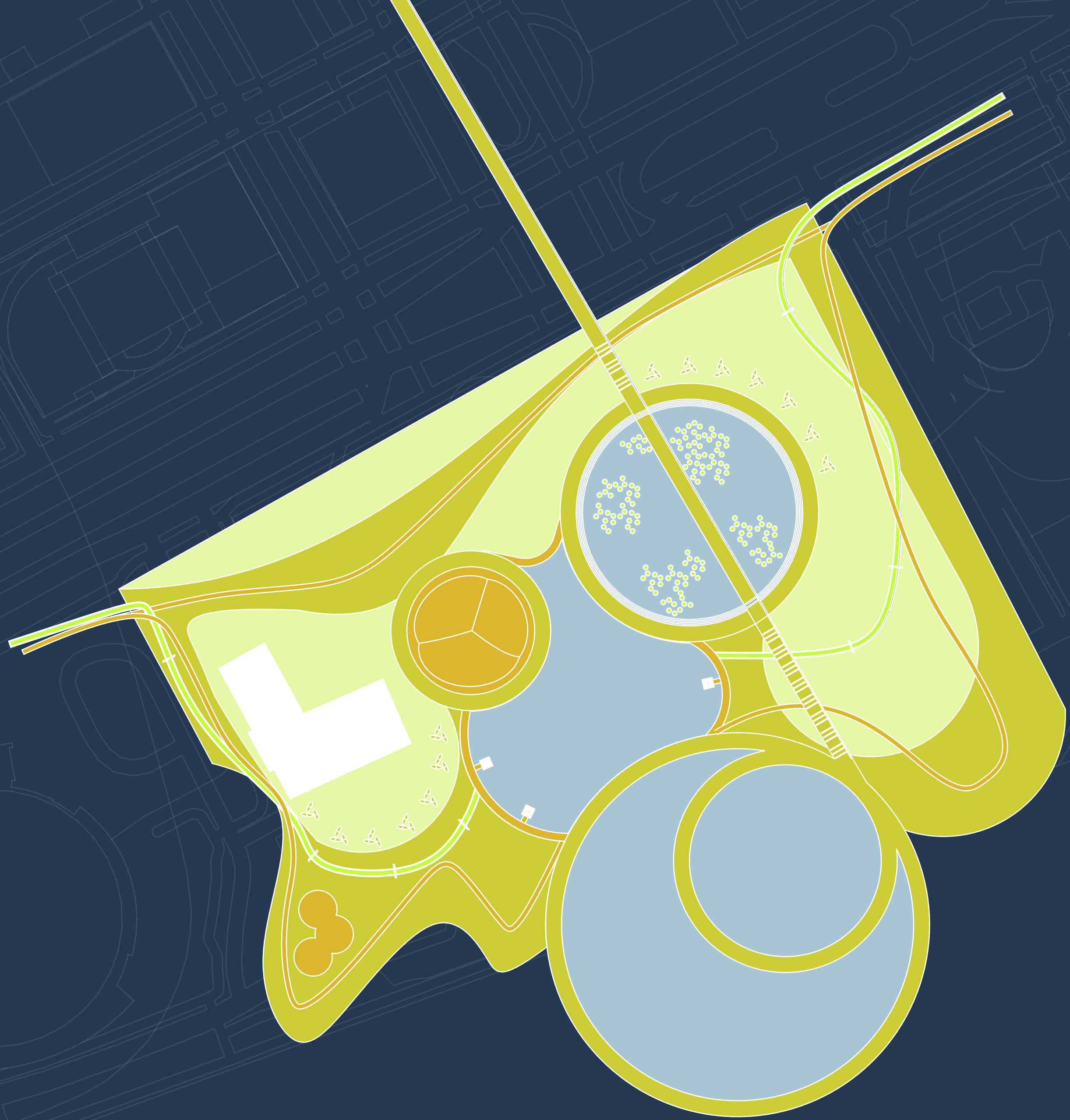


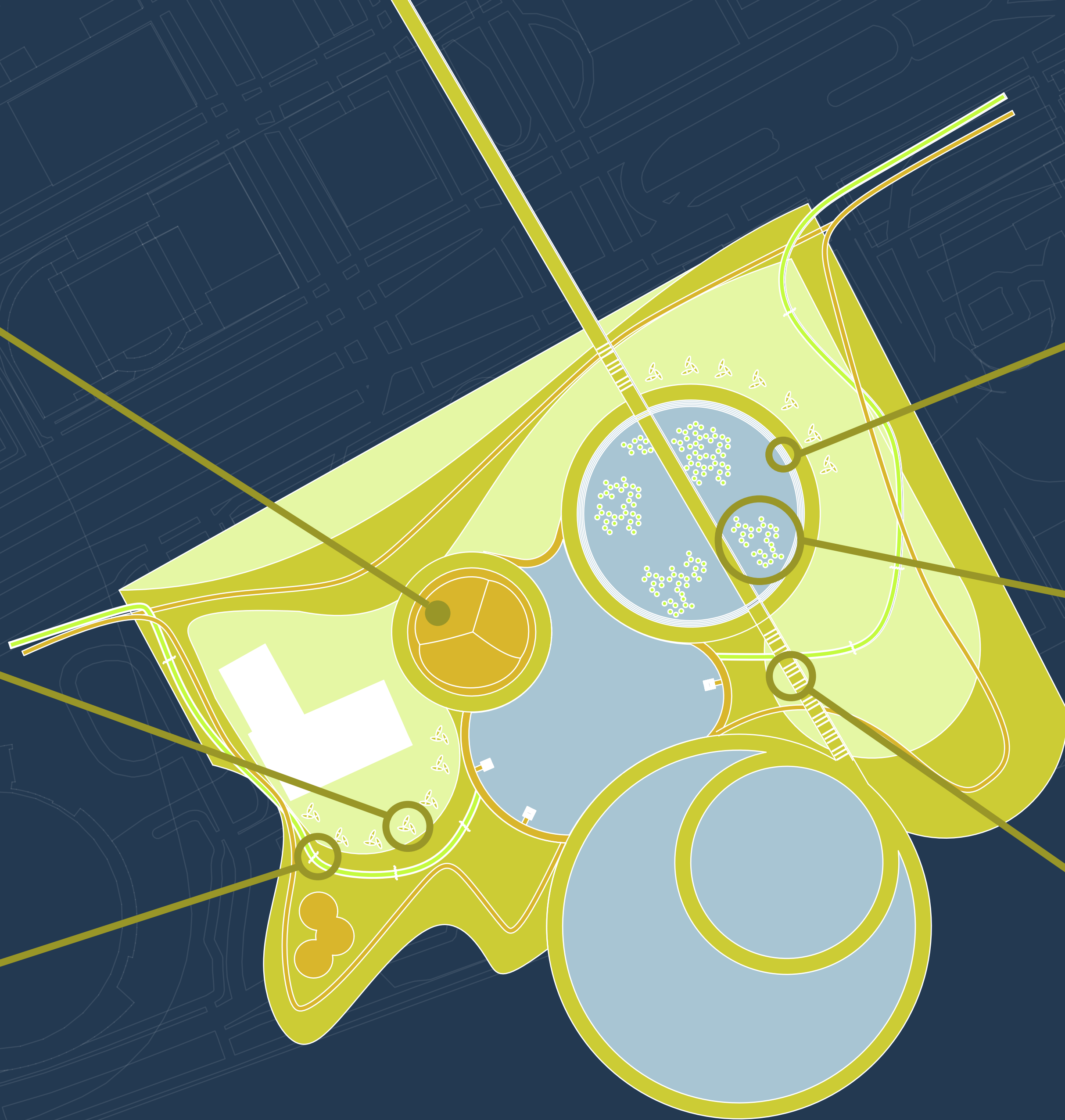
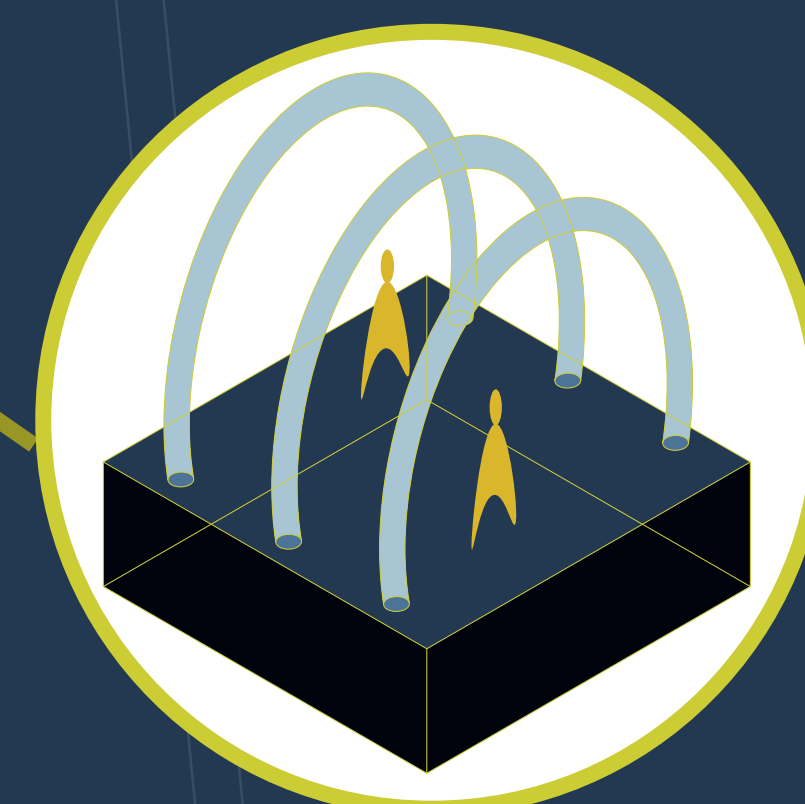
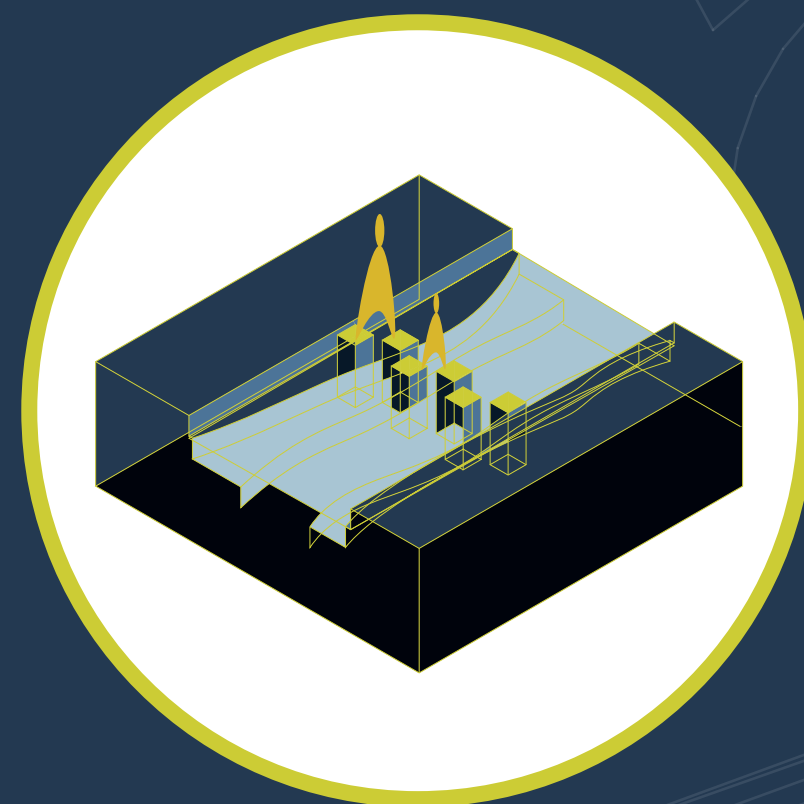
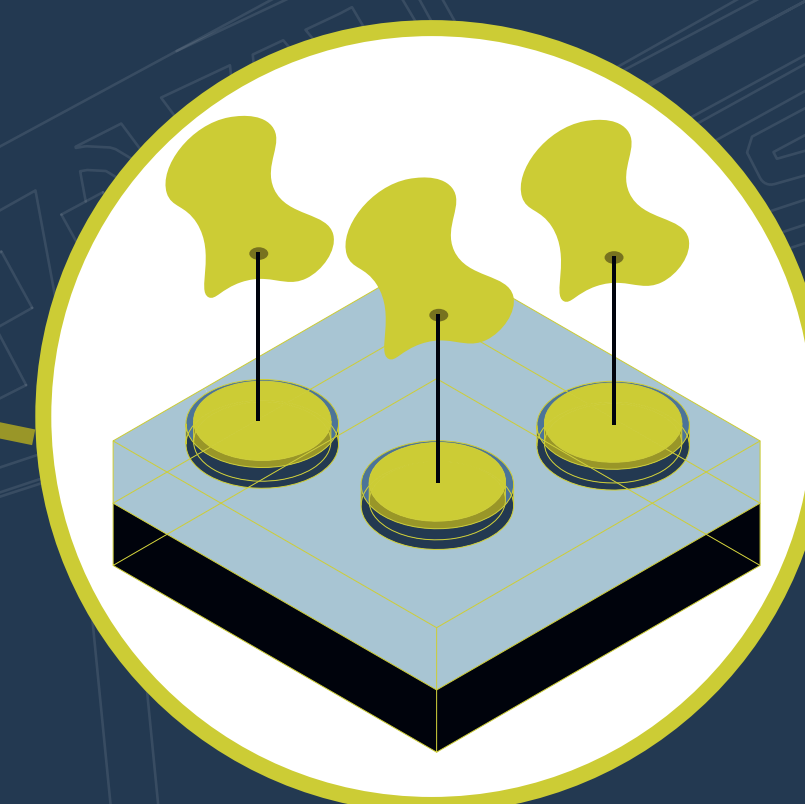
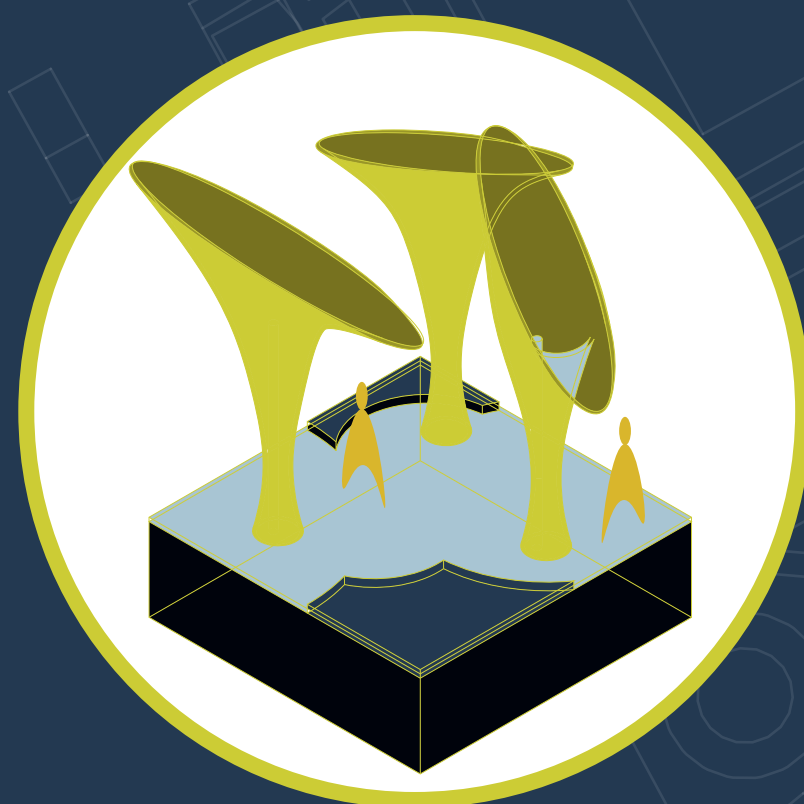
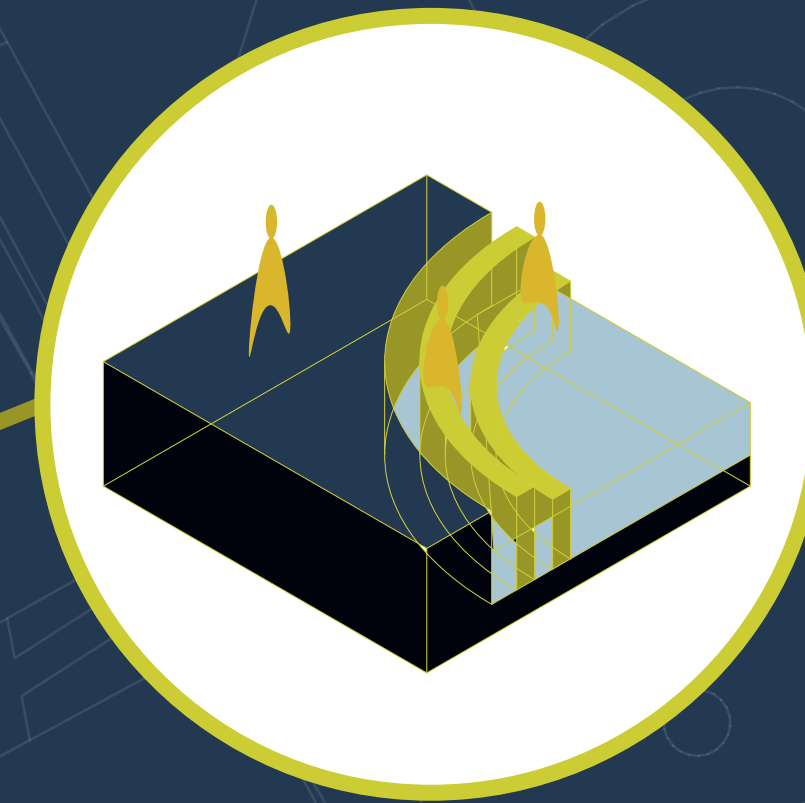
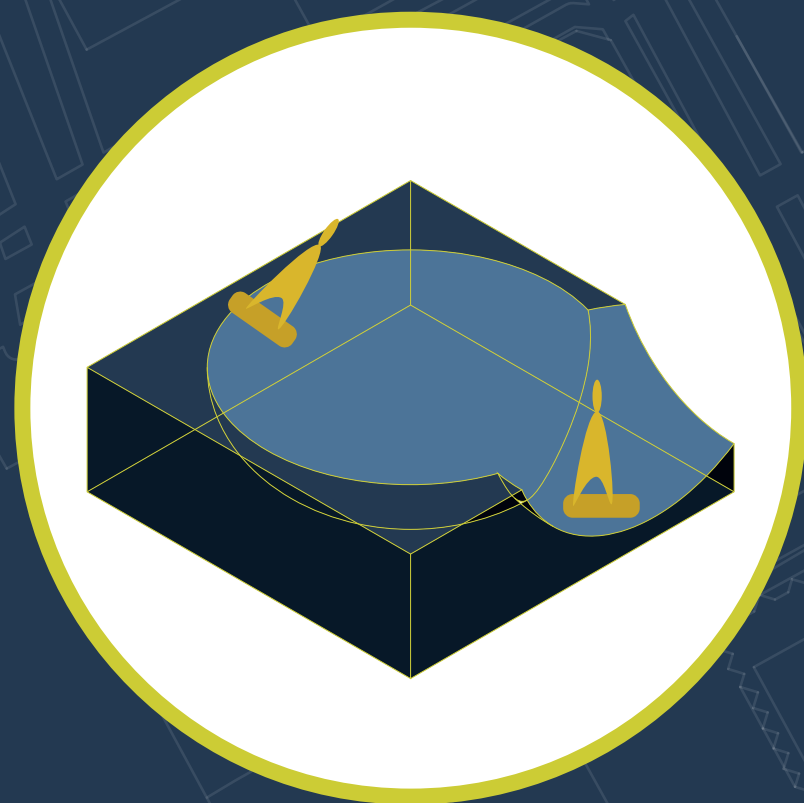
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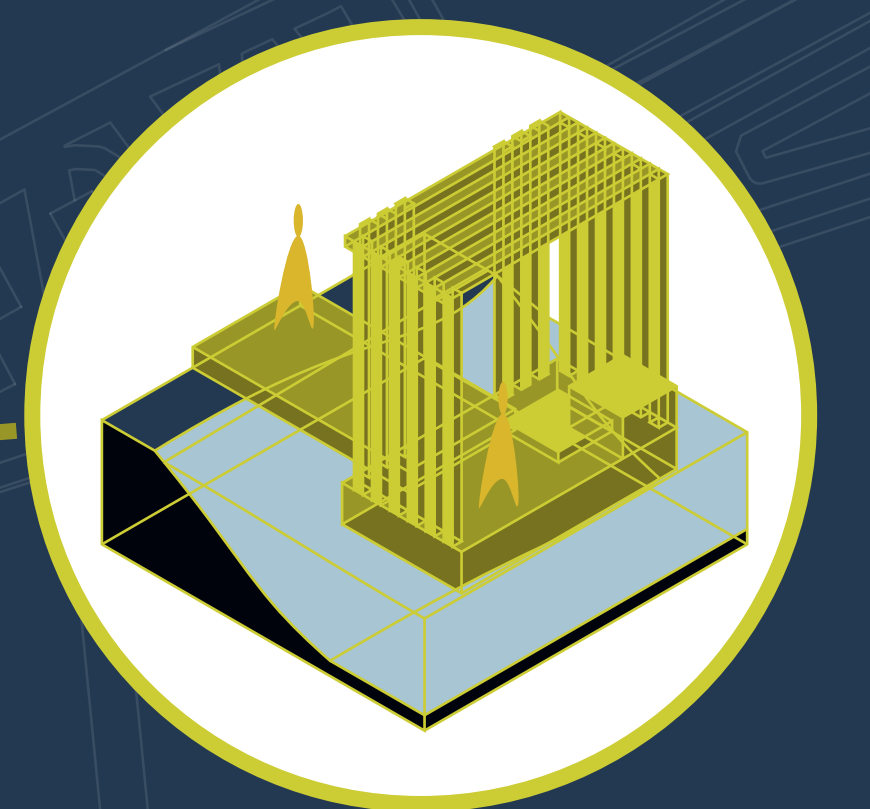
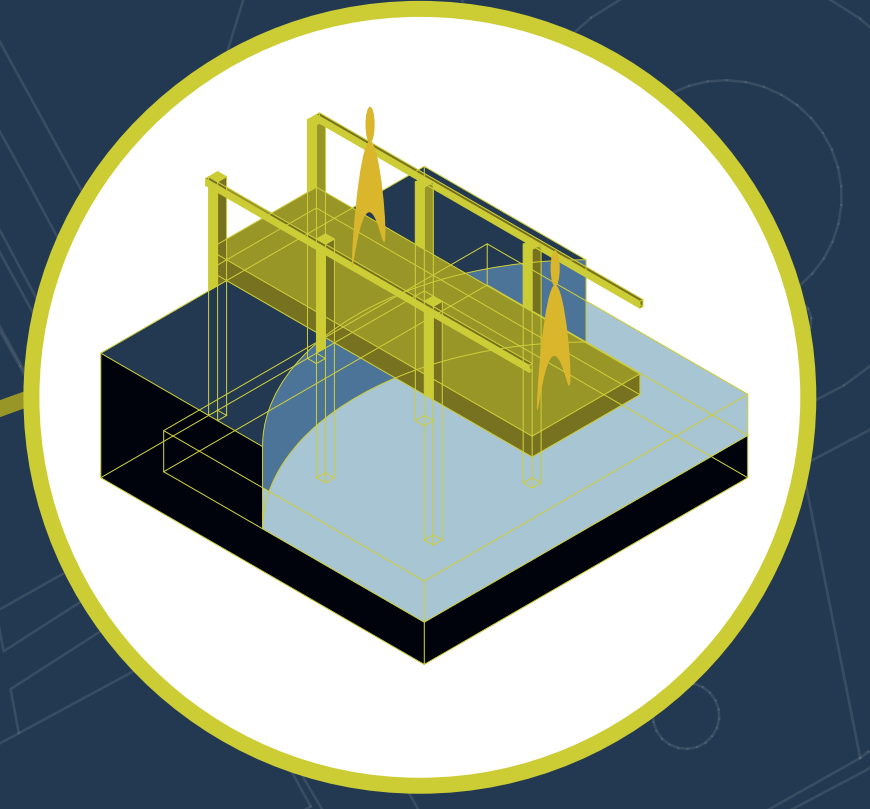
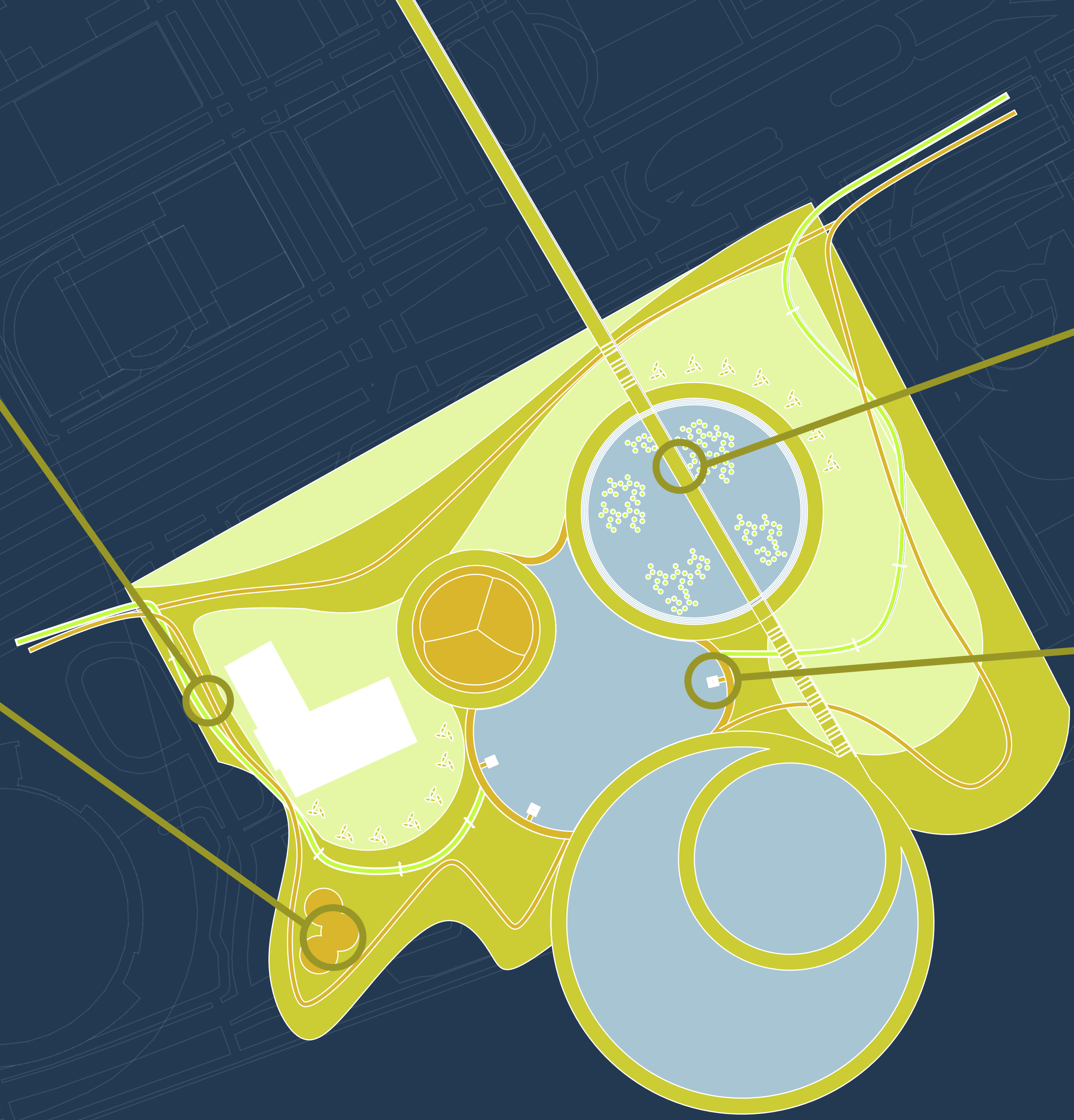
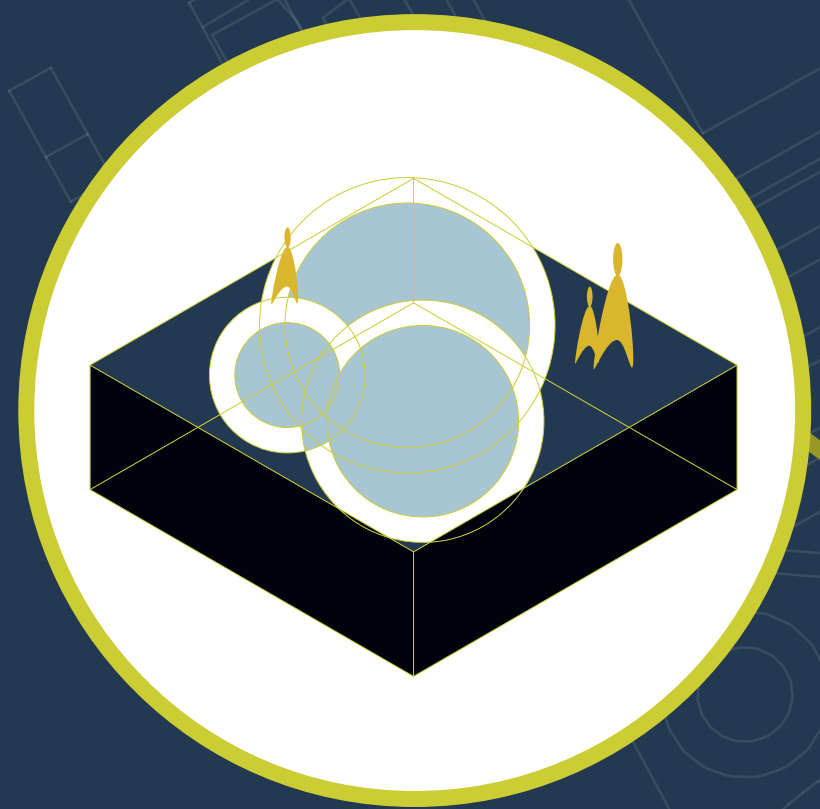
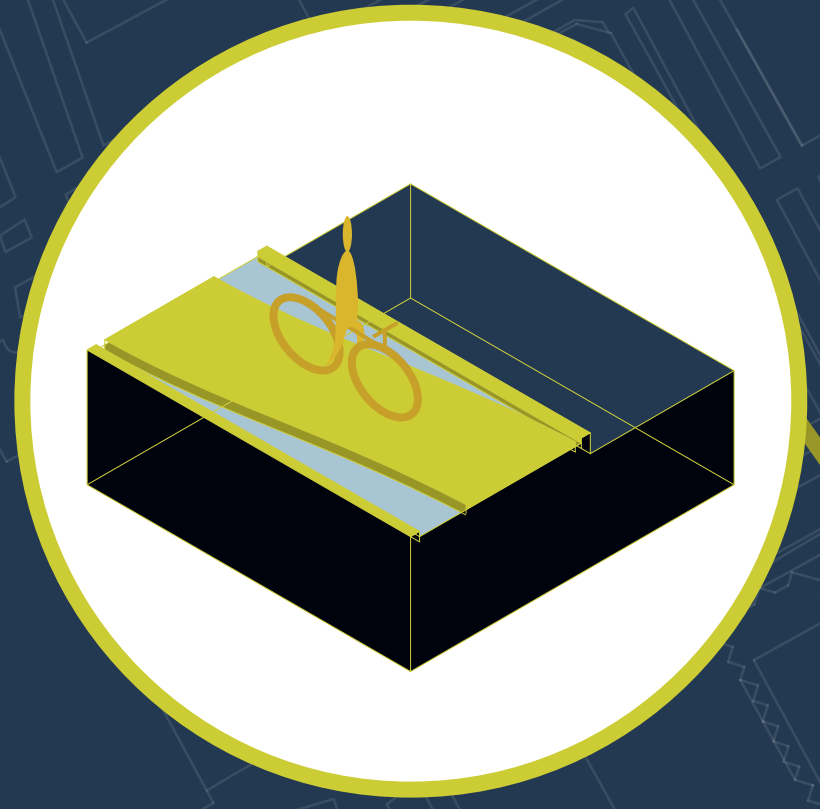


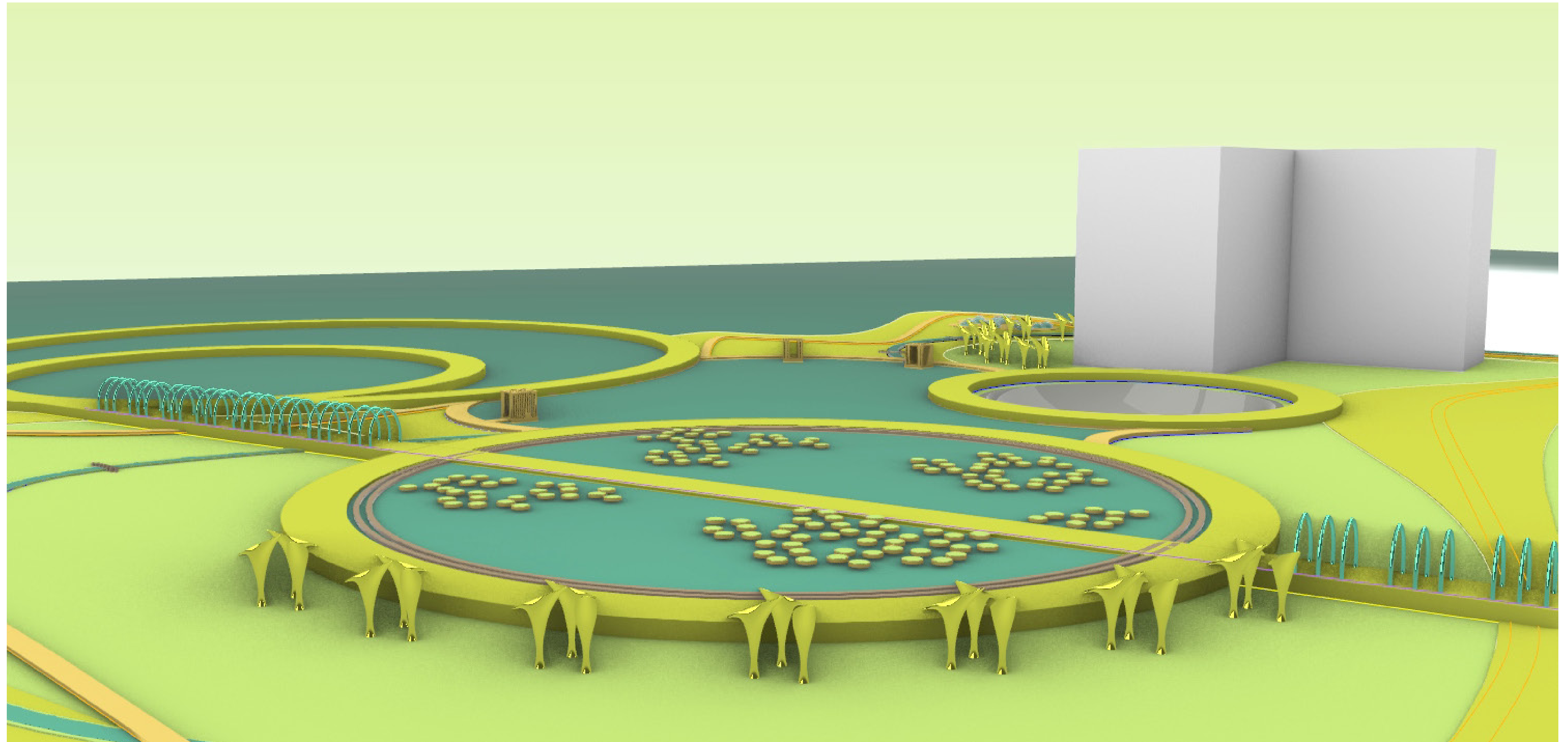
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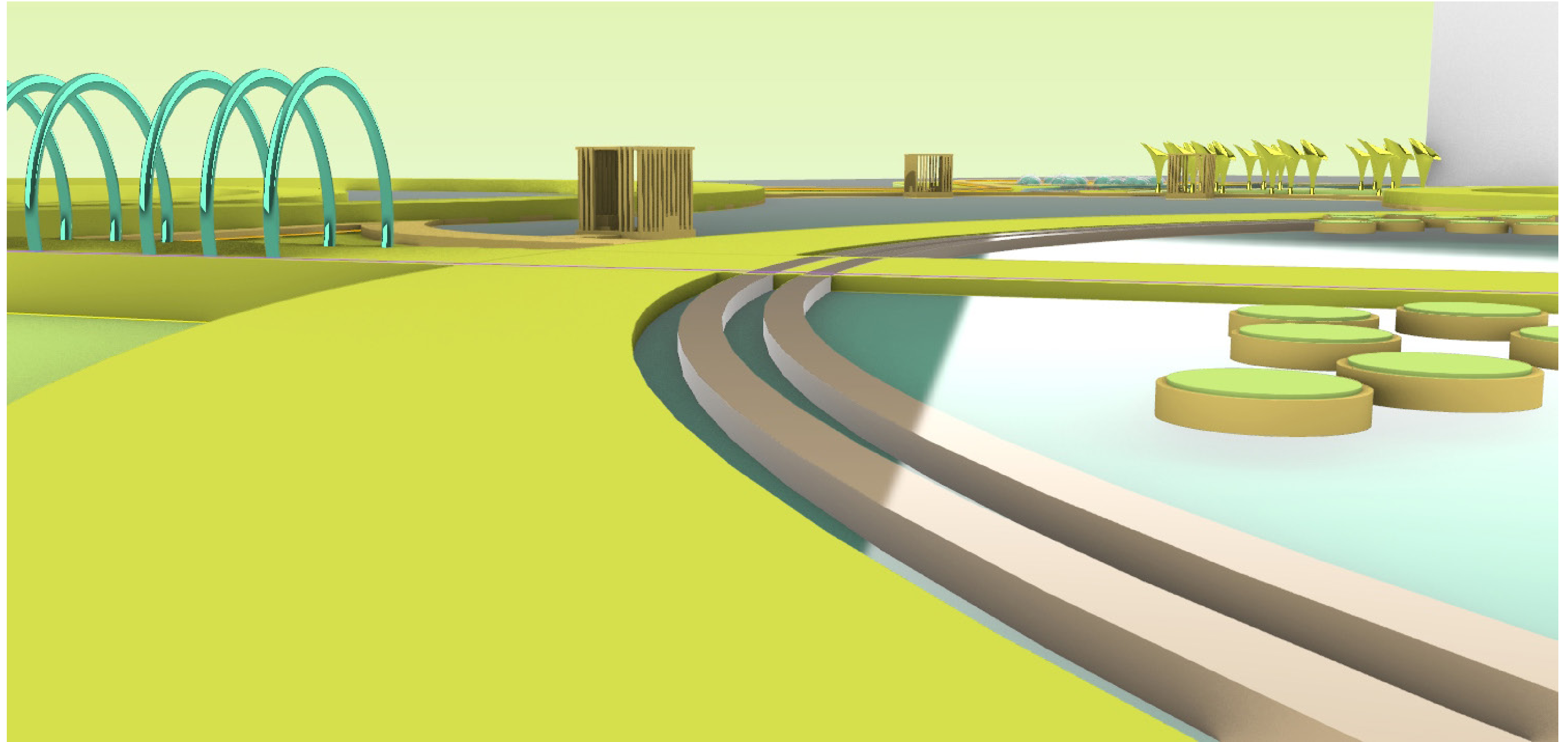


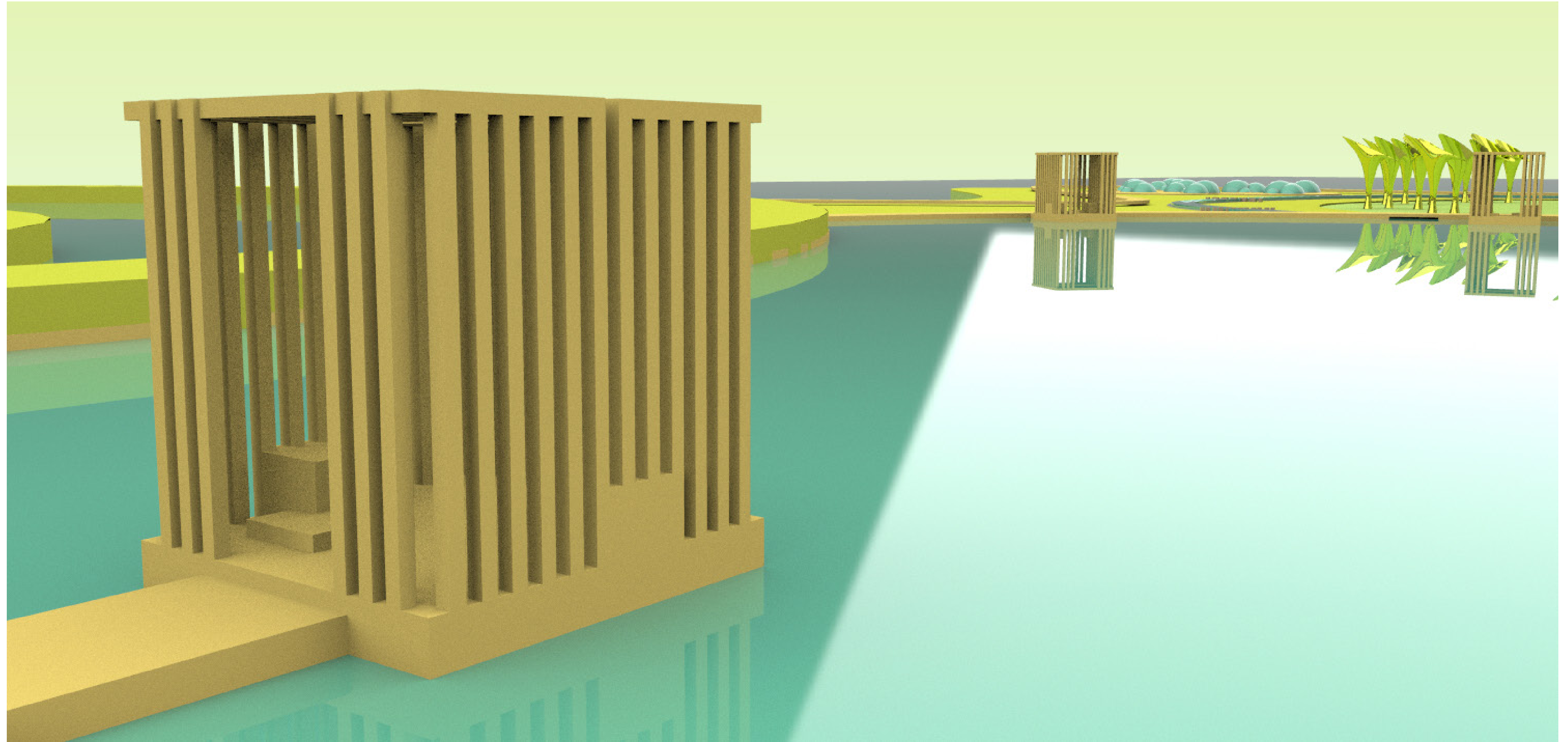


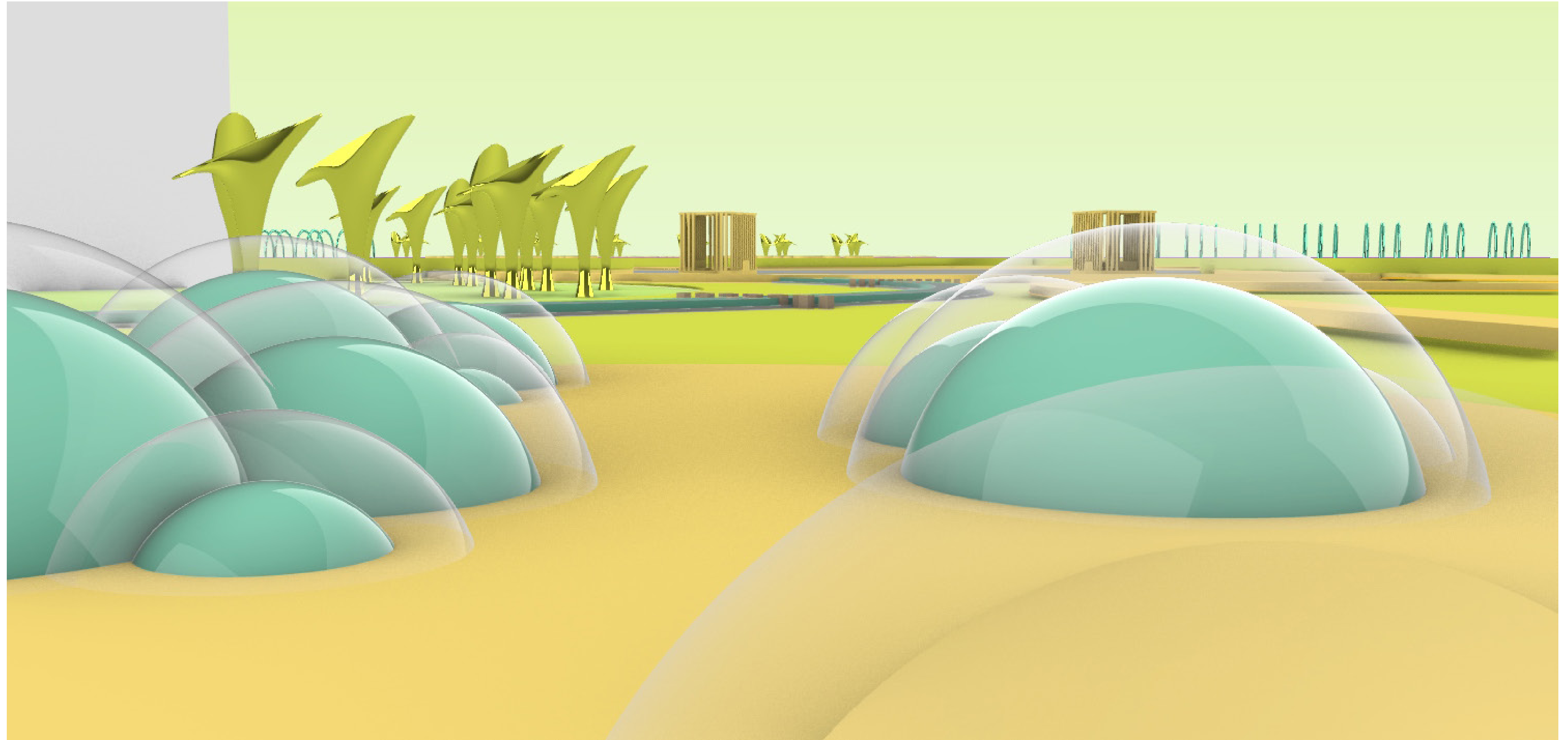


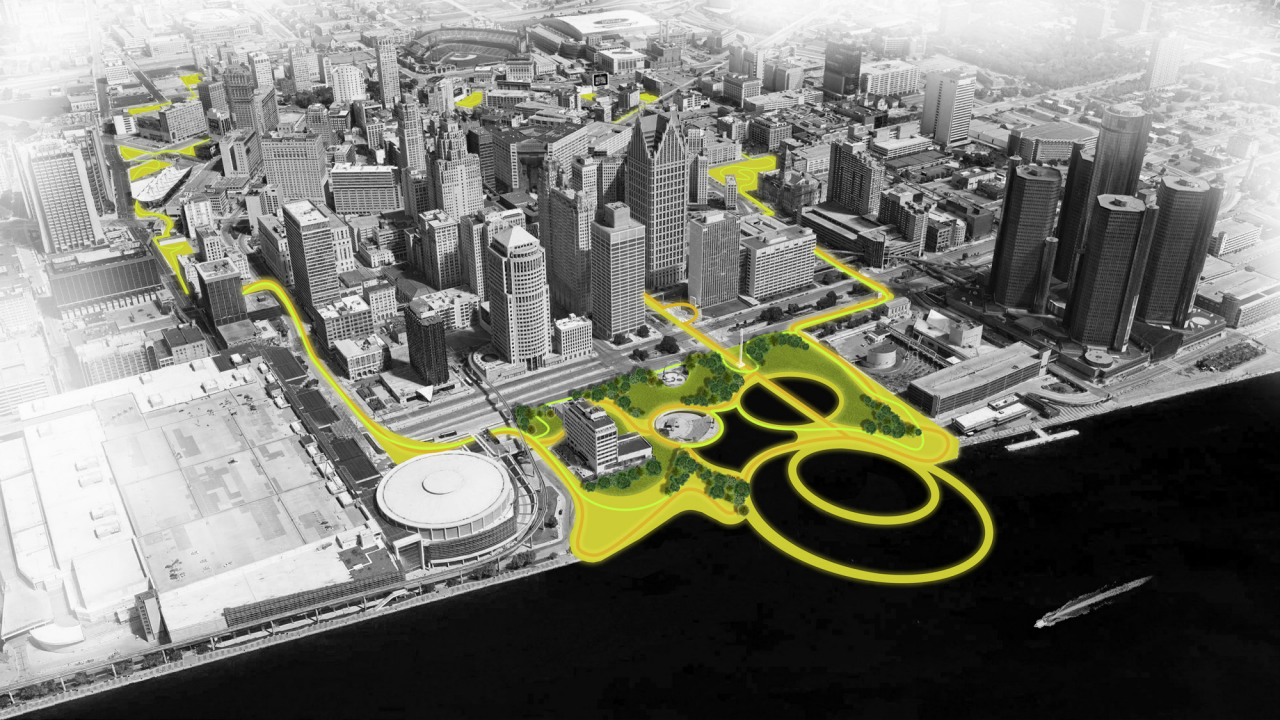




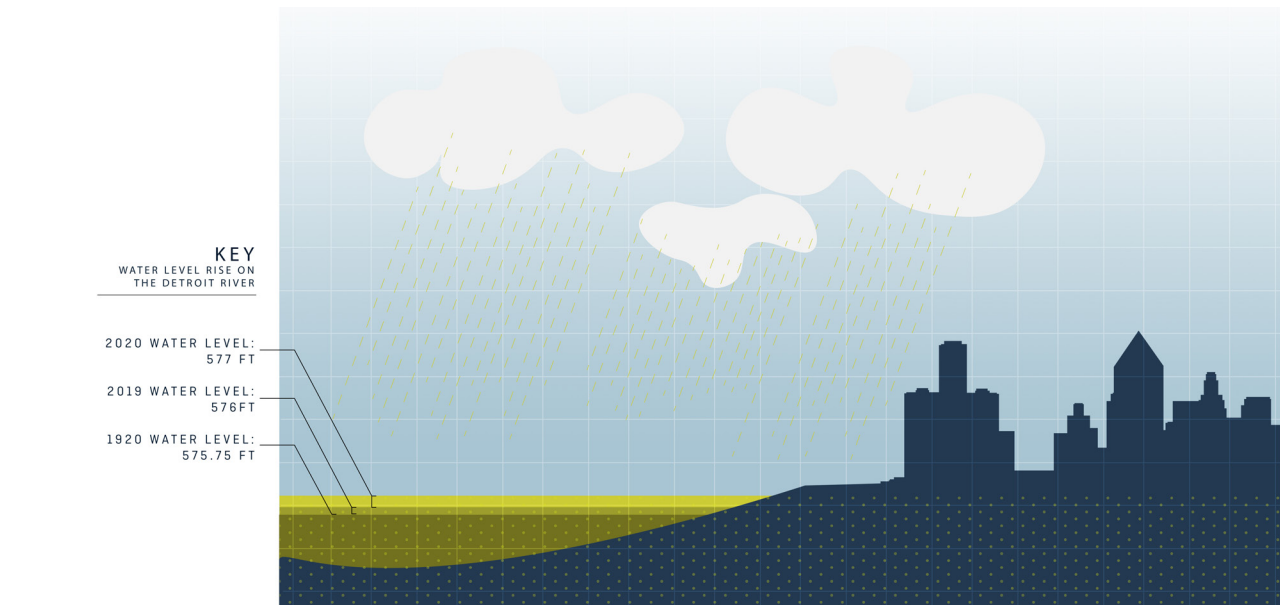
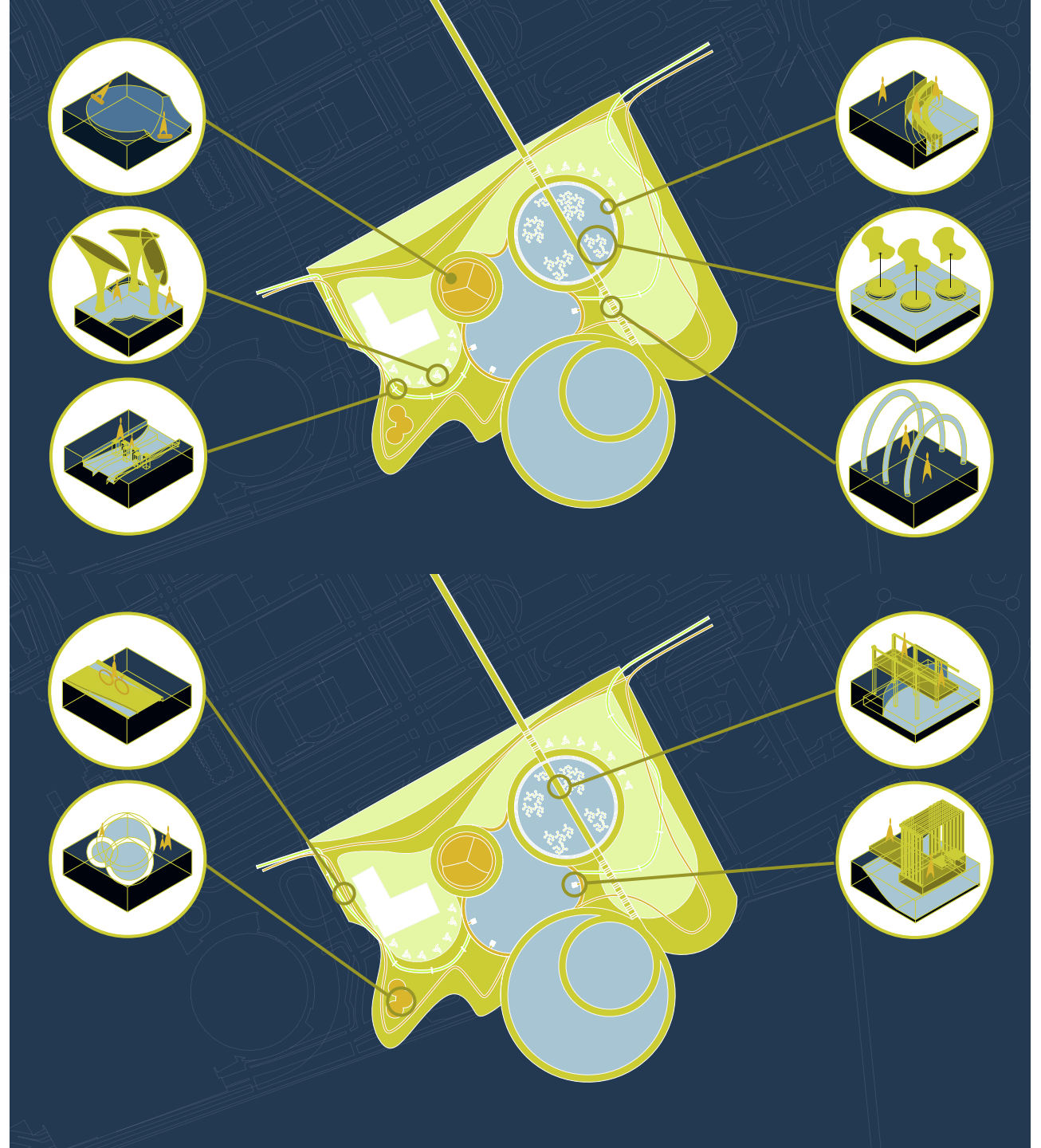
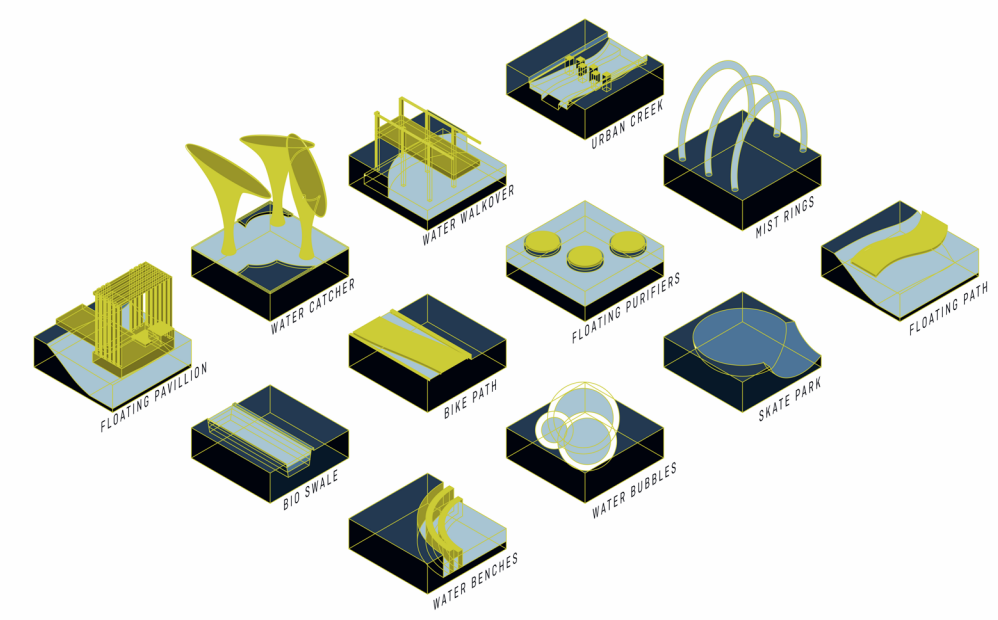
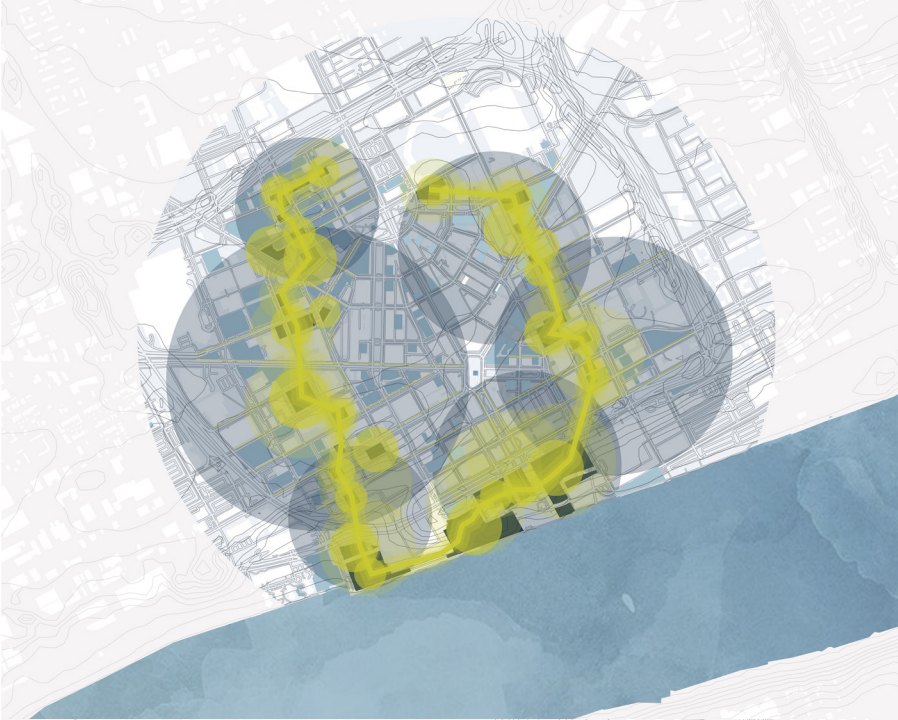




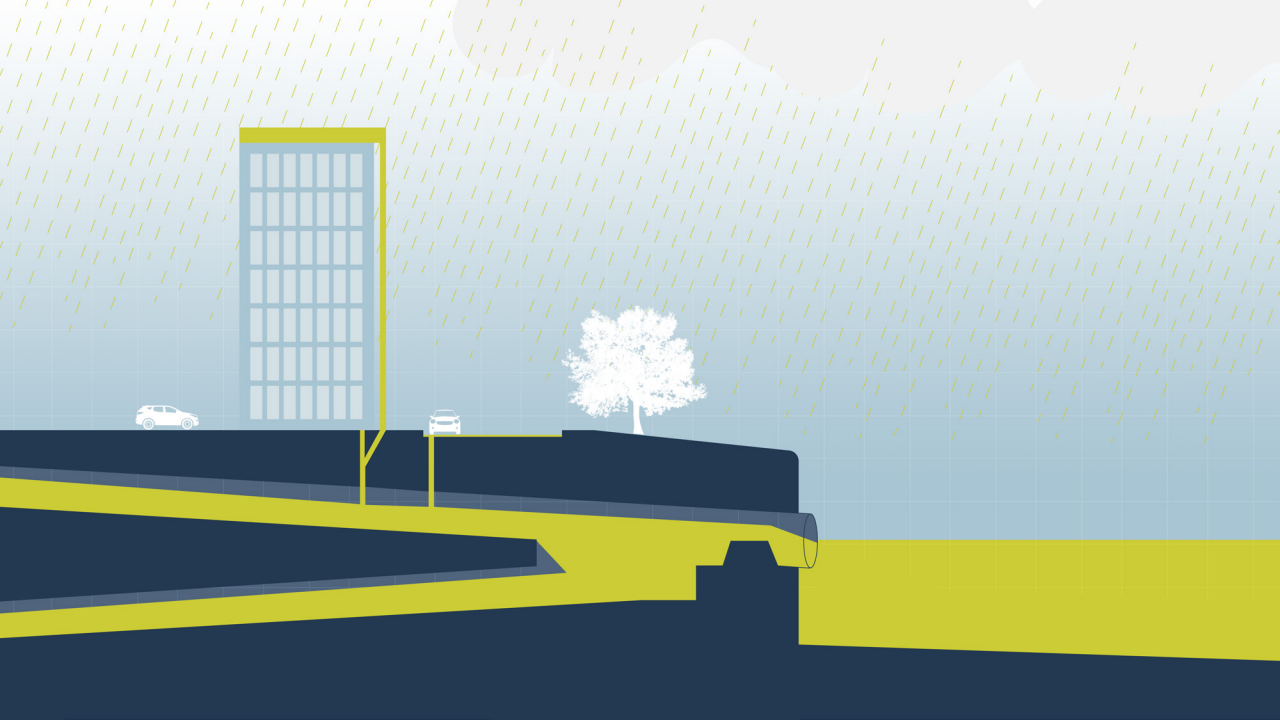
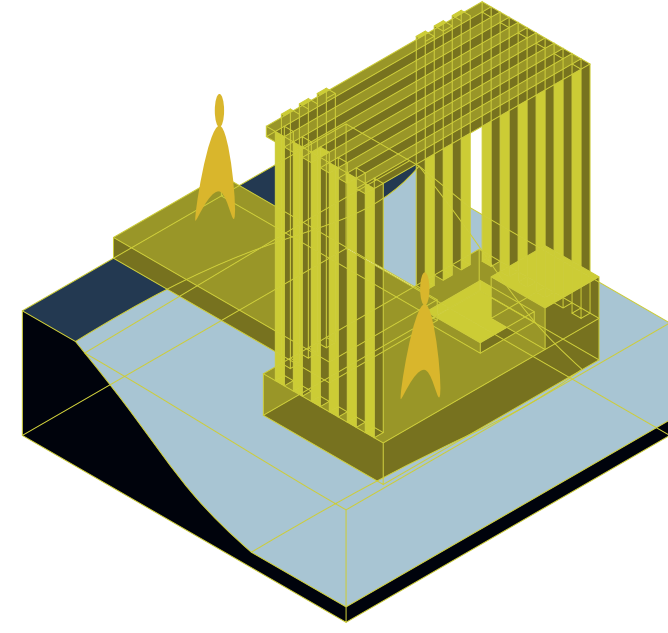




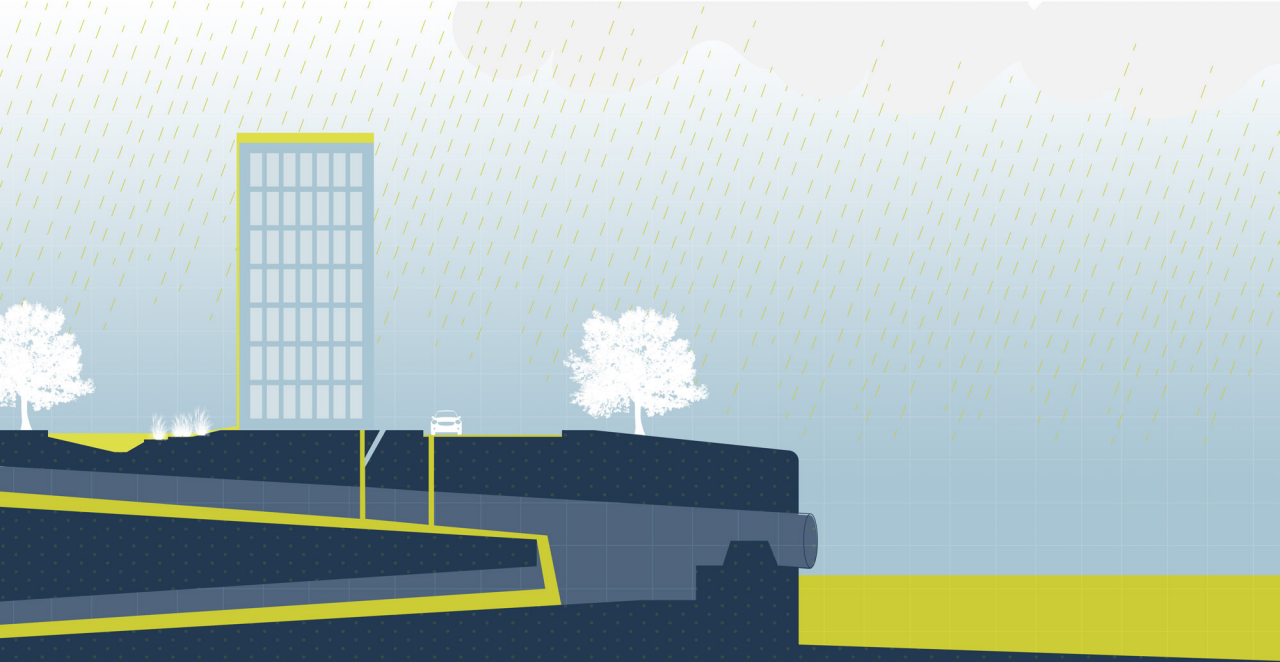
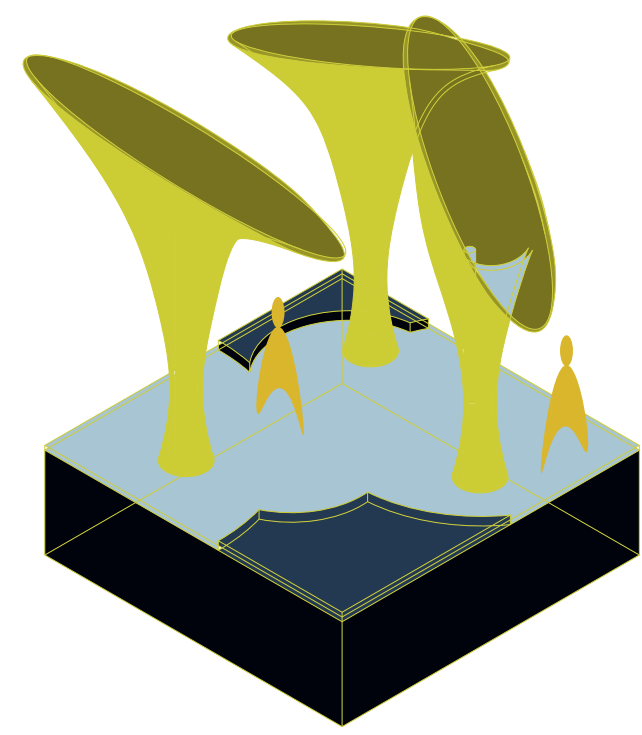
**KEY**  
 AQUACTIONS  
 AQUAPUNCTURE  
 OPPORTUNITY AREA  
 WATER DISTRICT  
 AQUACTIONS



**KEY**  
 TOPOGRAPHY  
 9 FT DIFFERENCE  
 609 FASL  
 600 FASL  
 590 FASL



**KEY**  
 PAVED PARKING LOSS  
 VACANT



**KEY**  
 OUTFALL LOCATIONS & AMOUNT FROM 2020-2024

220.87 MILLION GAL
16.37 MILLION GAL
2743.19 MILLION GAL
150.93 MILLION GAL
6.52 MILLION GAL
1025.88 MILLION GAL
244.9 MILLION GAL
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