Central Square Retrofit
Transforming the Mass Ave. corridor into a pedestrian centered live-work environment

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Commercial vs Residential Square Footage

- Residential: 81,126 sq ft
- Commercial: 110,121 sq ft

Commercial Energy Use and Square Footage

Residential Energy Use and Square Footage

Total Site Energy Use (kWh/Year)

- Residential: 1,709,964 kWh/year
- Commercial: 6,316,561 kWh/year
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**Constraints**

- Lack of open space and public parks.
- Lack of mixed use buildings and a live/work environment.
- Deep floor plate buildings along the Mass Ave corridor lack natural daylight.
- Unpleasant wind conditions along Mass Ave, and a lack of trees or other wind blocking system.
- Abundant parking lots generate minimal revenue, and cause a division between the residential and commercial districts.
- Excessive impermeable areas cause urban heat island effect, and hamper water drainage.
- No permanent community gathering space like a farmers market or outdoor venue.
- Lack of pedestrian throughway connections between Mass Ave corridor and residential neighborhoods.
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Sections

Key Plan

Bishop Allen Dr _Existing

2.5m 7.7m 2.0m 1.5m

Retail  Sidewalk  Vehicle lane  Parking  Sidewalk  Residential
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Continuous Daylight Autonomy

29% Daylit

Existing

33% Daylit

K2C2 Proposal

Best-Daylight Areas
Well-Daylight Areas
Non-Daylight Areas
Below 300 lux
Less than 50% of occupied hours
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Solar Fan | Mass Ave

Existing

K2C2 Proposal
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Solar Fan: Parking Lot

Existing

K2C2 Proposal
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Outdoor Comfort _Winter

Uncomfortable (Cold) Below 5 C and no direct sunlight January - February - March
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Outdoor Comfort | Summer

Uncomfortable (Hot)
Above 28°C and direct sunlight
June - July - August

Existing

K2C2 Proposal
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UMI_Existing

Urban EUI : 158 kWh/m²
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**UMI_K2C2 Proposal**

Urban EUI: 133 kWh/m²
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Transit:

• Integrate defined and separated bikepaths for safer cycling. This would alleviate the current conflict between cyclists and buses.

• Improve the pedestrian experience by allowing cafes to add outdoor seating to sidewalk areas at their facades. Encourage mobile food vendors for increased activity along Mass Ave. corridor.

• Build additional bus stops outside of bikelanes with improved rain and wind protection. Integrate timers and other technology to display bus schedules and arrival times.

Streetscapes/Greenspace:

• Plan for more deciduous street trees along sidewalks to improve shading for homes and sidewalks in summer.

• Compare options of replacing parking lots with open space VS mixed use development. Pocket parks and pedestrian only streets can reactivate underutilized spaces.

• Integrate green roofs into commercial and residential buildings to counteract the urban heat island effect, lower the urban EUI, and provide additional open spaces for added density.
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Massing:

• Tactfully add density to the Mass Ave corridor without causing excessive shading to facades or sidewalks.

• Divide deep floor plate commercial buildings to open up the blocks for optimized daylighting. Improve the quality of the office environment.

• Utilize micro-units and other residential types to add diversity to housing options in the Central Square area. Compact footprint residential towers allow for better access to daylight and natural ventilation.

Facades:

• Measure the impact of proposed high window to wall ratios and transparency for the commercial facades. Utilize urban daylighting tool to compare massing and WWR options.

• Measure the impact of sidewalk awnings and shading devices on commercial/residential facades.

• Cater facade design and transparency Measure the impact of sidewalk awnings and shading devices on commercial/residential facades.
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Land Use Map_Final Proposal

- Site Context
- Residential
- Commercial
- Mixed Use

Residential zone
Transition zone
Commercial zone
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Section
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Section

Bishop Allen Drive _Final Proposal
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Birds Eye View Final Proposal

- Proposed Massing
- Context
- Existing Protoblock
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Continuous Daylight Autonomy

Proposal 1

Proposal 2

- Best-Daylight Areas
- Well-Daylight Areas
- Non-Daylight Areas
  - Below 300 lux
  - Less than 50% of occupied hours

39 % Daylit

Final Proposal
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Solar Fan Final Proposal Mass Ave
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**Solar Fan** Final Proposal Pedestrian street
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Outdoor Comfort Proposals 1, 2, & Final

Proposals 1, 2, and Final

Uncomfortable (Cold)
Below 5 C and no direct sunlight
January - February - March
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Outdoor Comfort Proposals 1, 2, & Final

Uncomfortable (Hot)
Above 28 C and direct sunlight
June - July - August
Urban EUI: 101.1 kWh/m²
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Floor Area Breakdown

**EXISTING**

- **Residential**: 14%
- **Commercial**: 40%

**K2C2**

- **Residential**: 40%
- **Commercial**: 60%

**PROPOSAL**

- **Residential**: 40%
- **Commercial**: 60%
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**Summary of Metrics**

<table>
<thead>
<tr>
<th>EXISTING</th>
<th>K2C2</th>
<th>PROPOSAL</th>
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</thead>
<tbody>
<tr>
<td>Density [FAR]</td>
<td><strong>1.5</strong></td>
<td><strong>5.2</strong></td>
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<tr>
<td>Finance IRR [%]</td>
<td><strong>3.5</strong></td>
<td><strong>6.4</strong></td>
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<tr>
<td>Energy [kWh/m² a]</td>
<td><strong>158</strong></td>
<td><strong>133</strong></td>
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<tr>
<td>Daylit Area [%]</td>
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<tr>
<td>Accessibility [%]</td>
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<td><strong>98</strong></td>
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<tr>
<td>Carbon Emissions [t/m²]</td>
<td><strong>0.11</strong></td>
<td><strong>0.09</strong></td>
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