K2C2 Intersection Impact Analysis
Update September 12, 2012
Transportation Analysis Overview

• Calculation of daily and peak hour trips resulting from proposed build-out by 2030 for K2C2 area

• Analysis of future traffic impacts at the intersection level at 12 intersections in/near study area

• Analysis of future capacity of transit system to absorb predicted transit trips

• Also: parking and infrastructure recommendations
2030 Net New PM Person Trips

“Person-Trips” for C2, K2 & Transition/South of Main St.

<table>
<thead>
<tr>
<th>Year</th>
<th>Employee</th>
<th>Residential</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2030 Under Existing Zoning</td>
<td>6,538</td>
<td></td>
<td>407</td>
</tr>
<tr>
<td>2030 K2C2 Proposal</td>
<td>7,005</td>
<td>1,496</td>
<td>1,492</td>
</tr>
</tbody>
</table>

2/14/2013
Central Square Mode Shares by Land Use

**Office and R&D**
- Current: 51% Auto, 38% Transit, 5% Bike, 6% Walk
- Enhanced TDM: 41% Auto, 42% Transit, 10% Bike, 7% Walk

**Residential**
- Current: 28% Auto, 8% Transit, 6% Bike, 17% Walk
- Enhanced TDM: 44% Auto, 17% Transit, 10% Bike, 20% Walk

**Retail**
- Current: 25% Auto, 31% Transit, 6% Bike, 36% Walk
- Enhanced TDM: 23% Auto, 31% Transit, 6% Bike, 38% Walk

Created by Nelson\Nygaard 2/14/2013
2030 Net New PM Trips by Car with Enhanced TDM

**Person-Trips**
- Residential: 1,496
- Employee: 7,005
- Retail: 1,492
- **TOTAL**: 9,993

**25-51% of Trips in Cars**
- Vehicle occupancy of 1.08-1.09

**10% Fewer Car Trips**
- **TOTAL**: 4,213
- (-736 cars)

**Car Trips**
- Residential: 474
- Employee: 3,280
- Retail: 459
- **TOTAL**: 4,213

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**Car Trips (enhanced TDM)**
- Residential: 430
- Employee: 2,636
- Retail: 411
- **TOTAL**: 3,477

2/14/2013
Overview of Critical Sums Analysis

• Critical Sums Analysis is a planning tool used to evaluate build-out scenarios
• Compares how different levels of build-out impacts specific intersections in general way
• Focuses on evening peak hour trips, rather than daily trips
• Not a traffic engineering tool
• Same methodology used in prior planning studies:
  – 2001 Citywide Rezoning
  – 2001 ECaPS
  – 2004 Concord-Alewife Plan
Intersections Analyzed

Intersections Added to Analysis
Critical movement volume at an intersection is the sum of all conflicting traffic movements (vehicles per hour).

Intersections with 1,500 or fewer vehicles per hour considered to operate adequately, i.e. motorists will wait no more than two light cycles to get through the intersection.

When thresholds are exceeded, intersection operation starts to deteriorate exponentially.
## Critical Sums by Intersection

<table>
<thead>
<tr>
<th>Intersection</th>
<th>2010</th>
<th>2030 Buildout</th>
<th>2030 Buildout</th>
<th>2030 Buildout</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Vol</td>
<td>Critical Sum</td>
<td>Total Vol</td>
<td>Critical Sum</td>
</tr>
<tr>
<td>Existing Conditions</td>
<td></td>
<td></td>
<td>Existing Zoning</td>
<td>K2C2</td>
</tr>
<tr>
<td>Total Vol</td>
<td>Critical Sum</td>
<td></td>
<td>Total Vol</td>
<td>Critical Sum</td>
</tr>
<tr>
<td>1. Broadway/Galilei</td>
<td>2292</td>
<td>768</td>
<td>2732</td>
<td>897</td>
</tr>
<tr>
<td>2. Broadway/Third</td>
<td>1964</td>
<td>1111</td>
<td>2437</td>
<td>1333</td>
</tr>
<tr>
<td>3. Main/Galilei/Vassar</td>
<td>1764</td>
<td>711</td>
<td>2183</td>
<td>986</td>
</tr>
<tr>
<td>4. Binney/Third</td>
<td>2007</td>
<td>742</td>
<td>2597</td>
<td>982</td>
</tr>
<tr>
<td>5. Binney/First</td>
<td>1311</td>
<td>590</td>
<td>1983</td>
<td>682</td>
</tr>
<tr>
<td>6. Binney/Land</td>
<td>2382</td>
<td>654</td>
<td>3019</td>
<td>917</td>
</tr>
<tr>
<td>7. Memorial Drive / Wadsworth</td>
<td>1361</td>
<td>680</td>
<td>1638</td>
<td>802</td>
</tr>
<tr>
<td>8. Mass. Ave/Albany</td>
<td>1850</td>
<td>807</td>
<td>2210</td>
<td>1026</td>
</tr>
<tr>
<td>9. Main/Mass./Columbia/Sidney(Lafayette Sq.)</td>
<td>1460</td>
<td>762</td>
<td>2053</td>
<td>1098</td>
</tr>
<tr>
<td>10. Mass/Prospect/River/Western(Central Sq.)</td>
<td>1912</td>
<td>825</td>
<td>2285</td>
<td>1017</td>
</tr>
<tr>
<td>11. Putnam/Western</td>
<td>1737</td>
<td>1004</td>
<td>1801</td>
<td>1068</td>
</tr>
<tr>
<td>12. Bishop Allen/Prospect</td>
<td>1488</td>
<td>1008</td>
<td>1594</td>
<td>1114</td>
</tr>
</tbody>
</table>

**Preferred Scenario**

2/14/2013
Average Daily Traffic Volumes/Cambridgeport

- Putnam Ave, west of Sidney Street
- Waverly Street, south of Erie Street
- Albany Street, south of Pacific Street
- Sidney Street north of Putnam Ave
- Granite Street west of Brookline Street
- Brookline street, south of Putnam Avenue

Source: City of Cambridge traffic counts
Development vs. Traffic Growth

Kendall Square Average Daily Traffic with Trend Lines

- Added almost 4 million square feet in Greater Kendall from 2000-2010
- 37.6% growth in built square footage
- Daily Traffic Volumes remained consistent or been reduced
Conclusion

• Critical sums is a planning tool used to compare future build-out scenarios (existing vs. K2C2), not an engineering tool

• K2C2 compared with existing zoning:
  – 6 intersections will experience more/the same number of conflicting movements
  – 6 intersections will experience fewer
  – Third/Broadway only intersection where conflicting movements are close to threshold
  – Additional analysis done for intersection of Mass/Prospect/River/Western due to unusually high number of pedestrians; needs careful review
  – Analysis assumes that existing travel patterns remain unchanged, even though traffic has been decreasing

• Development projects will be subject to:
  – Traffic study/traffic mitigation requirements in Zoning Ordinance
  – Parking and Transportation Demand Management (PTDM) Ordinance
  – Reduced parking ratios
MBTA Red Line Station Entries: 2007-2012

2012 Station Entries By Hour


2/14/2013
Transit Riders Getting On /Off at Central Square

These numbers indicate how many riders during a typical weekday get on and off at a stop in the heart of Central Square.

<table>
<thead>
<tr>
<th>Bus Route</th>
<th>Daily on/off</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>3,900</td>
</tr>
<tr>
<td>#70</td>
<td>3,600</td>
</tr>
<tr>
<td>#70A</td>
<td>1,600</td>
</tr>
<tr>
<td>#47</td>
<td>1,500</td>
</tr>
<tr>
<td>#83</td>
<td>1,100</td>
</tr>
<tr>
<td>#CT1</td>
<td>1,000</td>
</tr>
<tr>
<td>#91</td>
<td>900</td>
</tr>
<tr>
<td>#64</td>
<td>610</td>
</tr>
<tr>
<td>TOTAL BUS</td>
<td>14,000</td>
</tr>
<tr>
<td>RED LINE</td>
<td>32,000</td>
</tr>
</tbody>
</table>

2012 estimates

Source: MBTA Service Planning Passenger Count Reports; and Ridership and Service Statistics, 2010.
Additional Daily Trips From K2C2 Buildout (2030)

680 new transit riders coming and going in Central Square AM peak hour

228 new riders boarding Red Line at Central Square traveling inbound in AM peak hour (current boardings = 1,555/hr)

On average, 16 new riders boarding each inbound Red Line train at Central Square in peak AM hour (current boardings = 112/train)

Source: Trip generation model

Assume:
60% on & 40% off
70% Red Line & 30% Bus
80% inbound & 20% outbound

Assume:
14 trains per hour

2/14/2013
Average Train Load — AM peak toward Boston

Standing Capacity →

Seated Capacity →

Additional ridership from full K2C2 buildout

Transit Capacity Mitigation Strategies

#1 Shift riders to other modes
   – Shift to existing bus routes
   – Shift short-distance riders to bicycling including Hubway
   – Shift riders to new/improved subway/bus lines

#2 Ensure the Red Line runs at existing capacity
   – Maintain existing cars/Replace 1969 Red Line cars
   – Upgrade switching systems

#3 Increase the capacity of the Red Line
   – Upgrade power system and increase peak capacity by 15%
   – Big Red car could increase capacity by 10% (but opposition)

#4 Shift riders off of the peak hour
   – Workplace policy that allows flexible hours
   – Peak hour pricing on transit