



# **K2C2 Intersection Impact Analysis**

## **Update September 12, 2012**

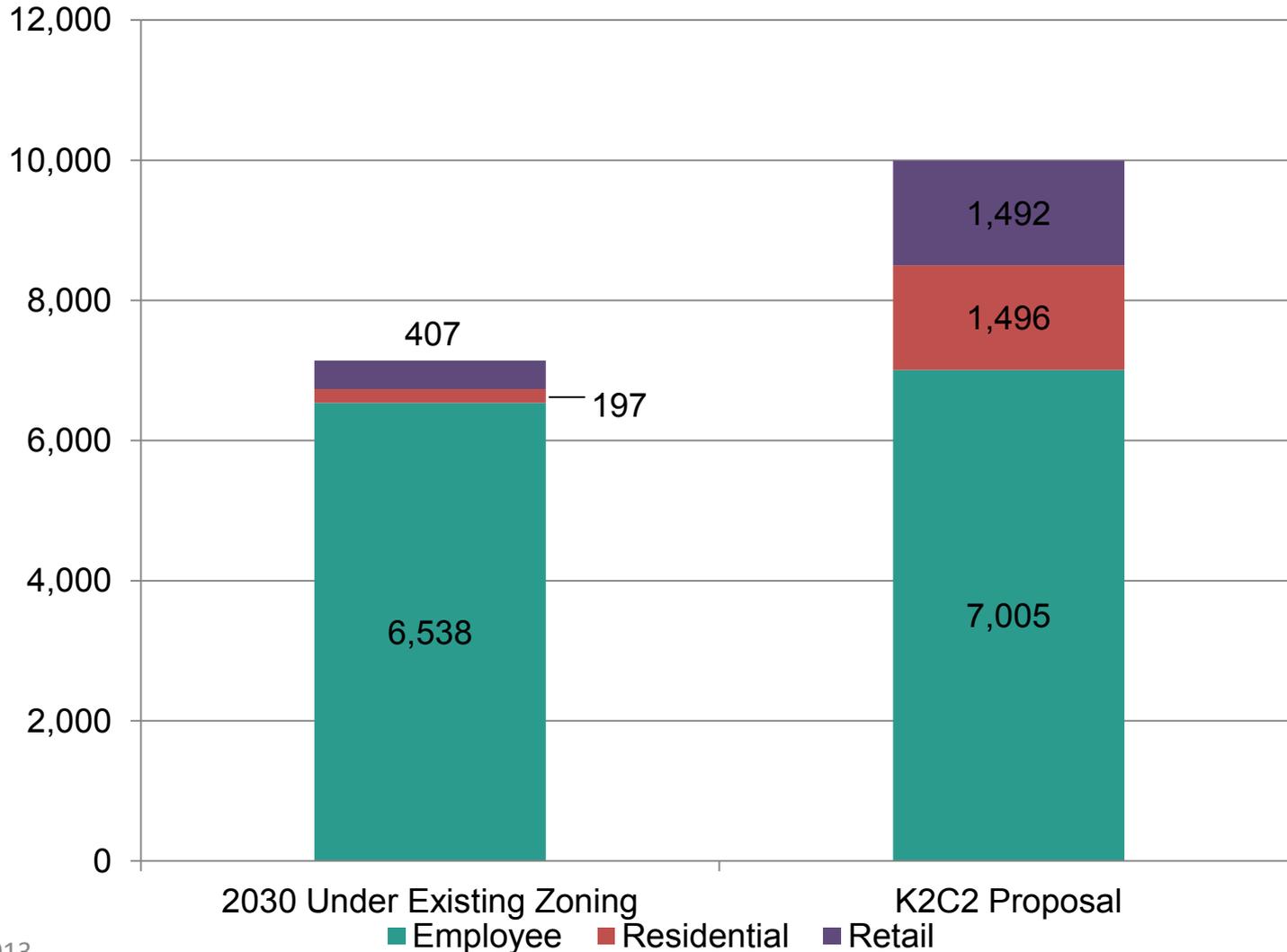
2/14/2013

# Transportation Analysis Overview

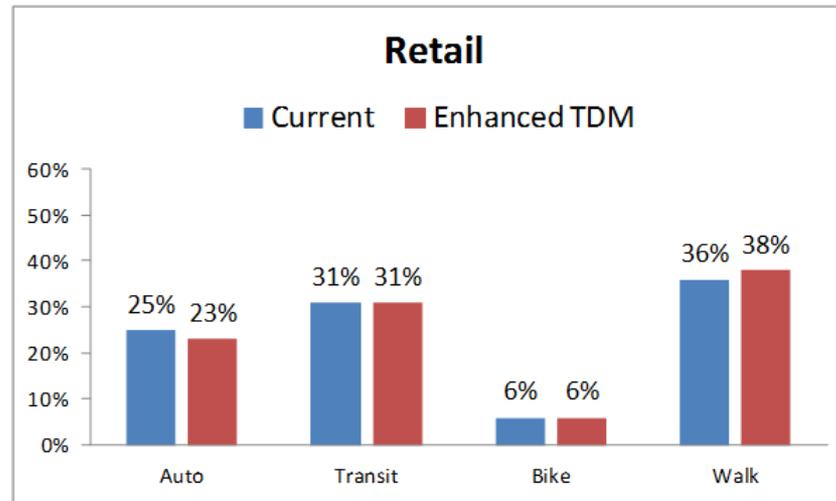
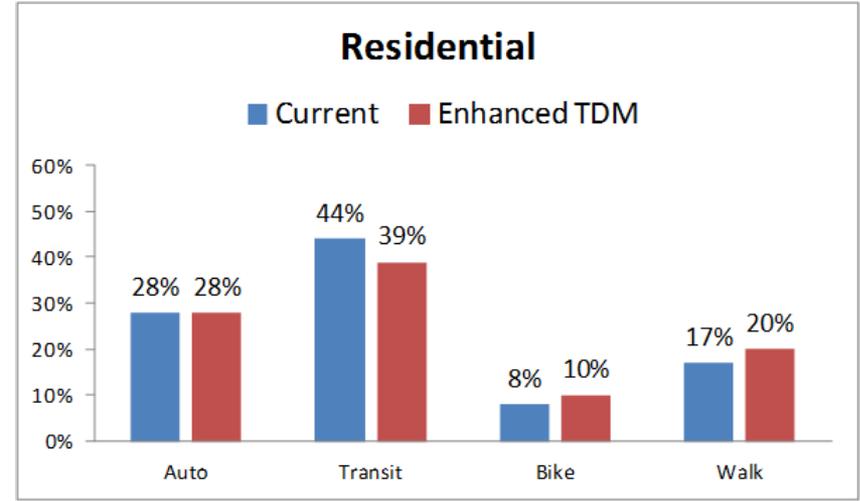
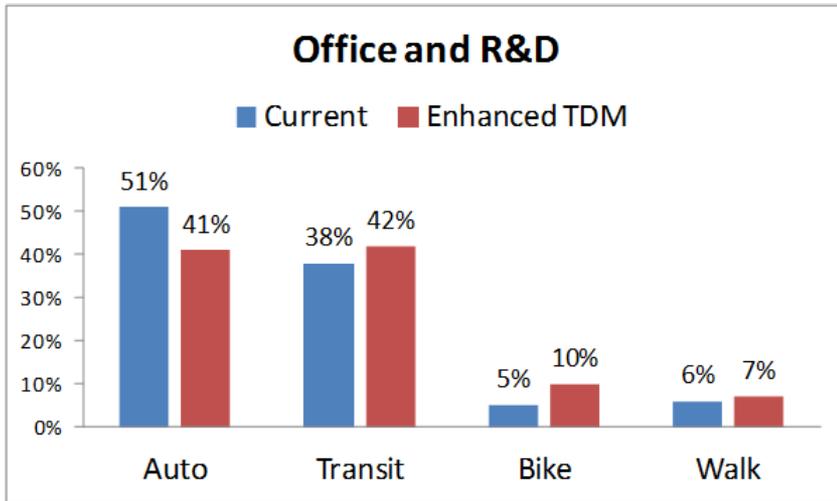
- Calculation of daily and peak hour trips resulting from proposed build-out by 2030 for K2C2 area
- Analysis of future traffic impacts at the intersection level at 12 intersections in/near study area
- Analysis of future capacity of transit system to absorb predicted transit trips
- Also: parking and infrastructure recommendations

# 2030 Net New PM Person Trips

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



# Central Square Mode Shares by Land Use



# 2030 Net New PM Trips by Car with Enhanced TDM

Person-Trips	
Residential	1,496
Employee	7,005
Retail	1,492
<b>TOTAL</b>	<b>9,993</b>

**25-51% of Trips in Cars**

Vehicle occupancy of 1.08-1.09

Car Trips	
Residential	474
Employee	3,280
Retail	459
<b>TOTAL</b>	<b>4,213</b>

**10% Fewer Car Trips**

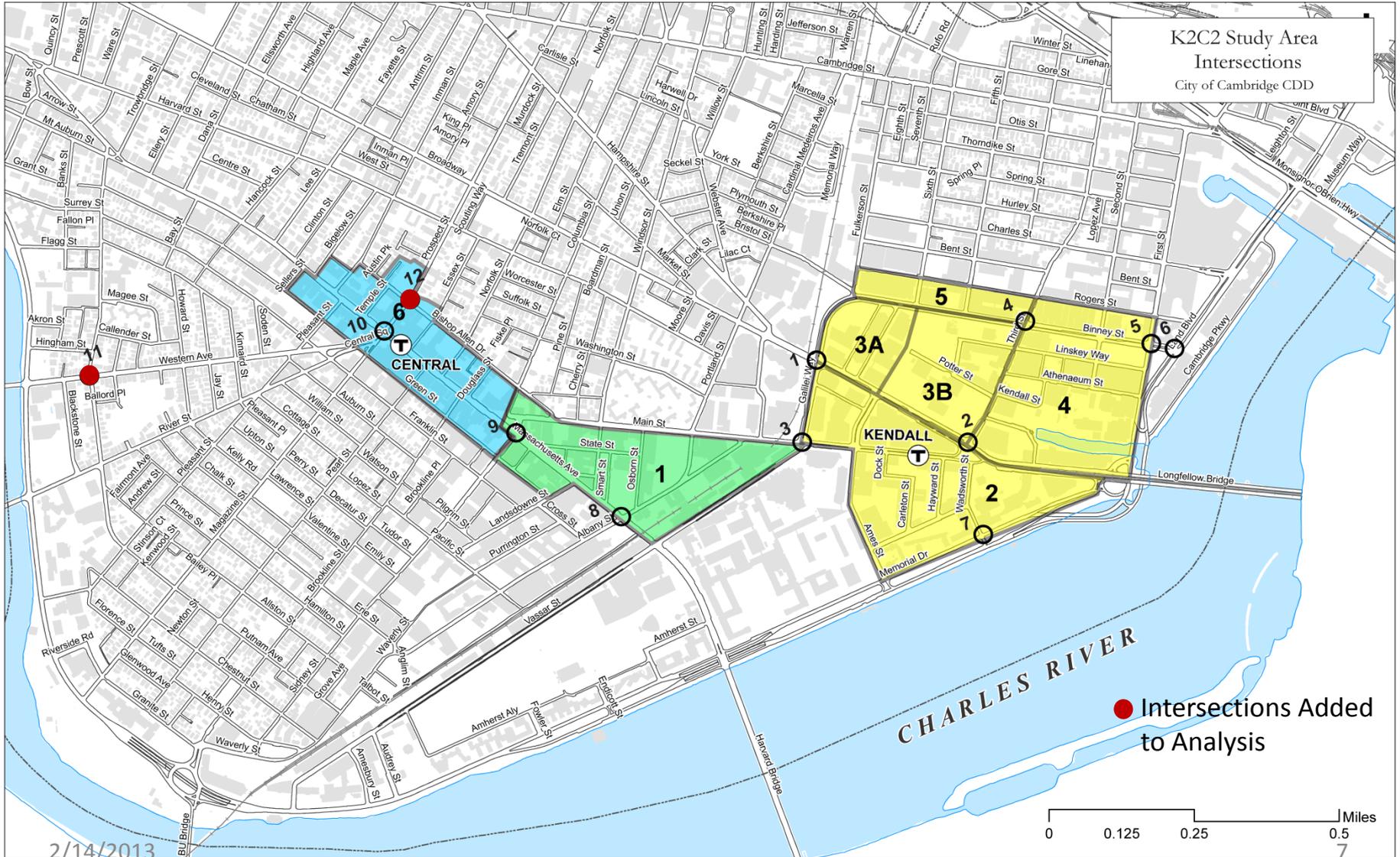
(-736 cars)

Car Trips (enhanced TDM)	
Residential	430
Employee	2,636
Retail	411
<b>TOTAL</b>	<b>3,477</b>

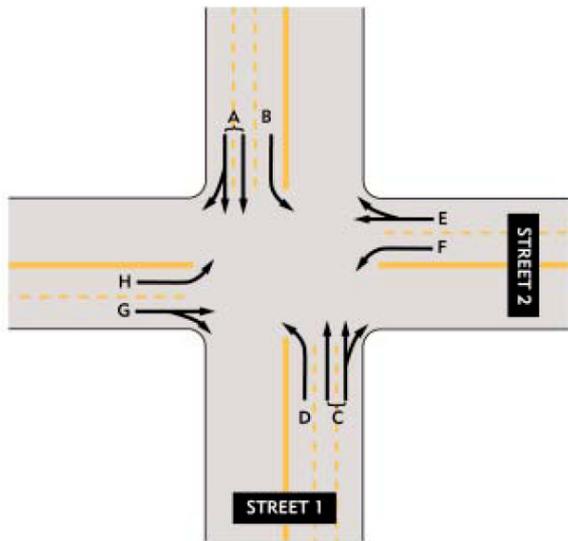
# Overview of Critical Sums Analysis

- 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



# Critical Sums Methodology



Street 1:  $(A+2) + D$  or  $(C+2) + B$ , whichever is more

Street 2:  $E + H$  or  $G + F$ , whichever is more

Critical Sum = Result of Street 1 + Street 2

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.

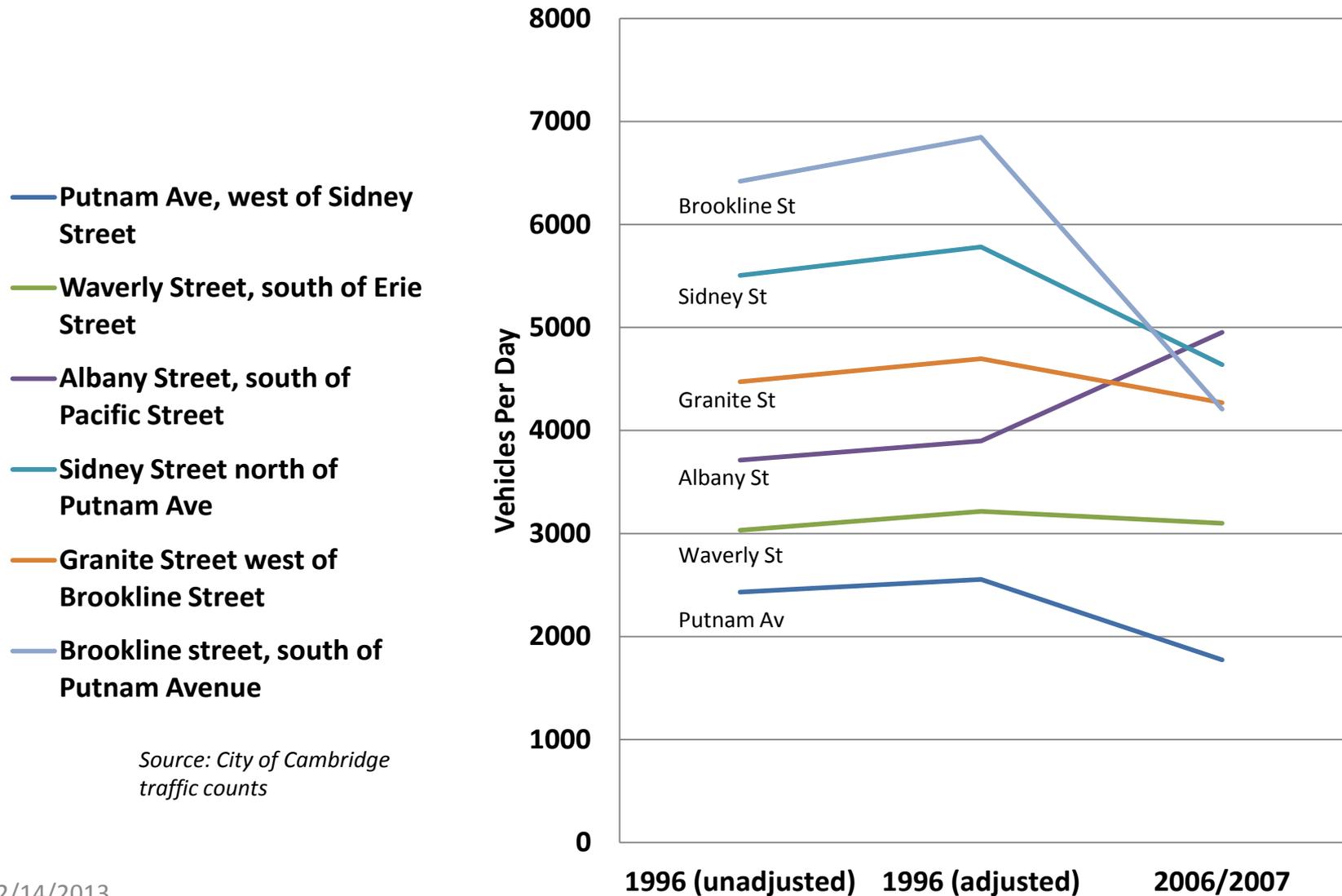
When thresholds are exceeded, intersection operation starts to deteriorate exponentially.

# Critical Sums by Intersection

	2010		2030 Buildout		2030 Buildout		2030 Buildout	
	Existing Conditions		Existing Zoning		K2C2		K2C2 w/TDM	
	Total Volume	Critical Sum	Total Volume	Critical Sum	Total Volume	Critical Sum	Total Volume	Critical Sum
1. Broadway/Galilei	2292	768	2732	897	3022	1045	2906	999
2. Broadway/Third	1964	1111	2437	1333	2787	1510	2641	1440
3. Main/Galilei/Vassar	1764	711	2183	986	2389	1069	2285	1007
4. Binney/Third	2007	742	2597	982	2929	1112	2768	1044
5. Binney/First	1311	590	1983	682	2182	749	2024	722
6. Binney/Land	2382	654	3019	917	3162	967	3018	903
7. Memorial Drive / Wadsworth	1361	680	1638	802	1677	812	1615	785
8. Mass. Ave/Albany	1850	807	2210	1026	2159	1013	2110	978
9. Main/Mass./Columbia/Sidney(Lafayette Sq.)	1460	762	2053	1098	2180	1145	2063	1082
10. Mass/Prospect/River/Western(Central Sq.)	1912	825	2285	1017	2385	1069	2309	1027
11. Putnam/Western	1737	1004	1801	1068	1812	1079	1800	1067
12. Bishop Allen/Prospect	1488	1008	1594	1114	1571	1091	1558	1078

**Preferred Scenario**

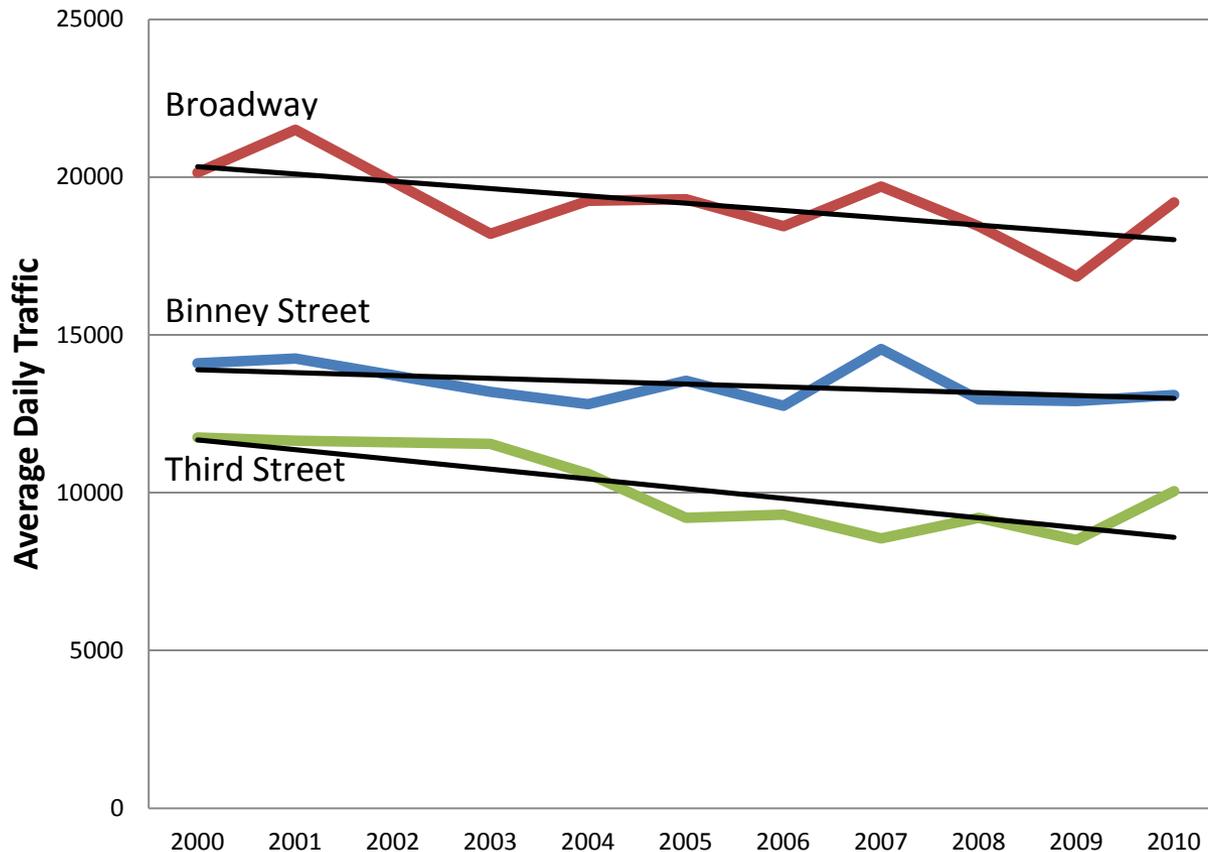
# Average Daily Traffic Volumes/Cambridgeport



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

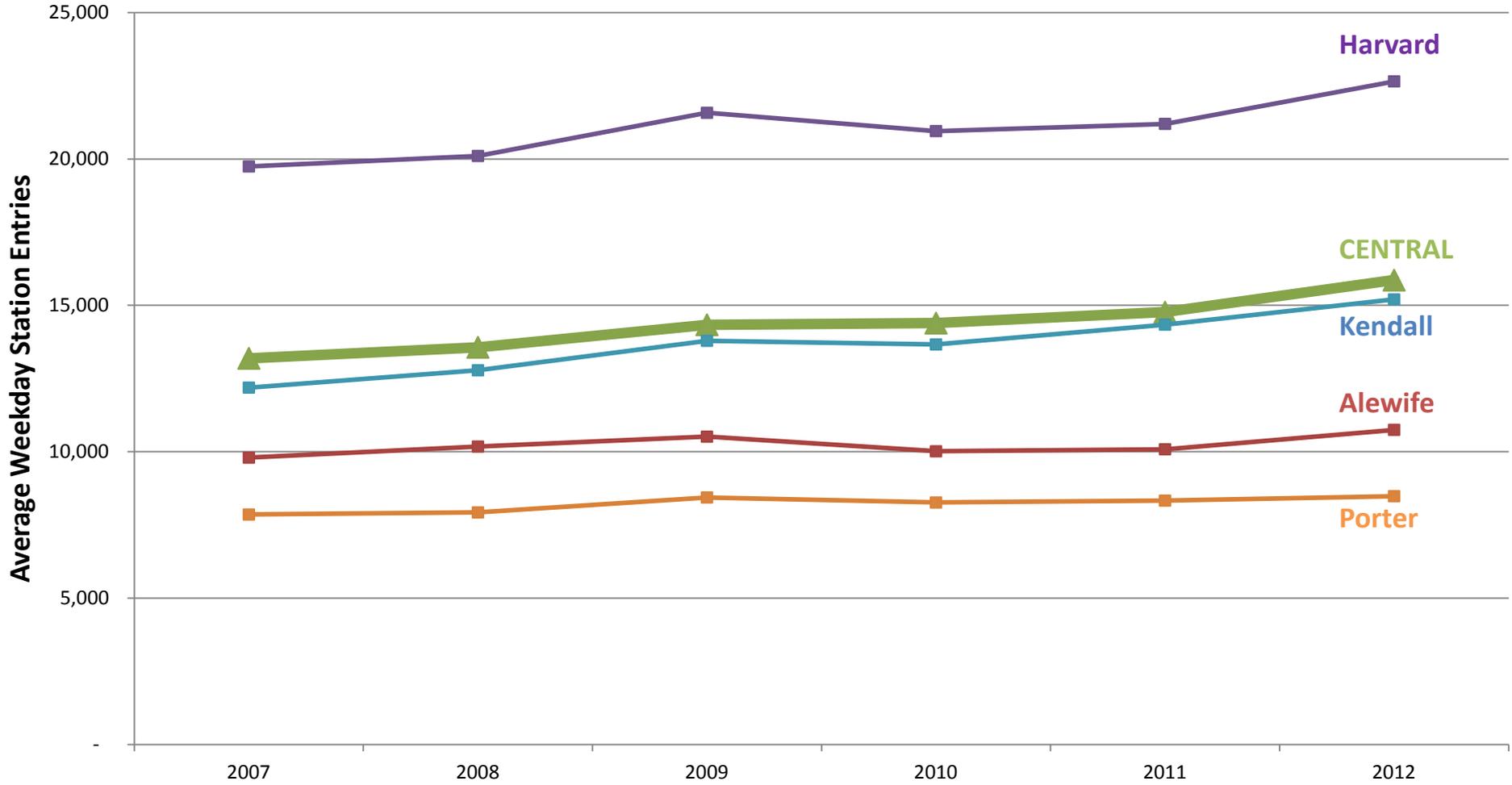


# Red Line Transit Capacity Analysis

## Update September 12, 2012

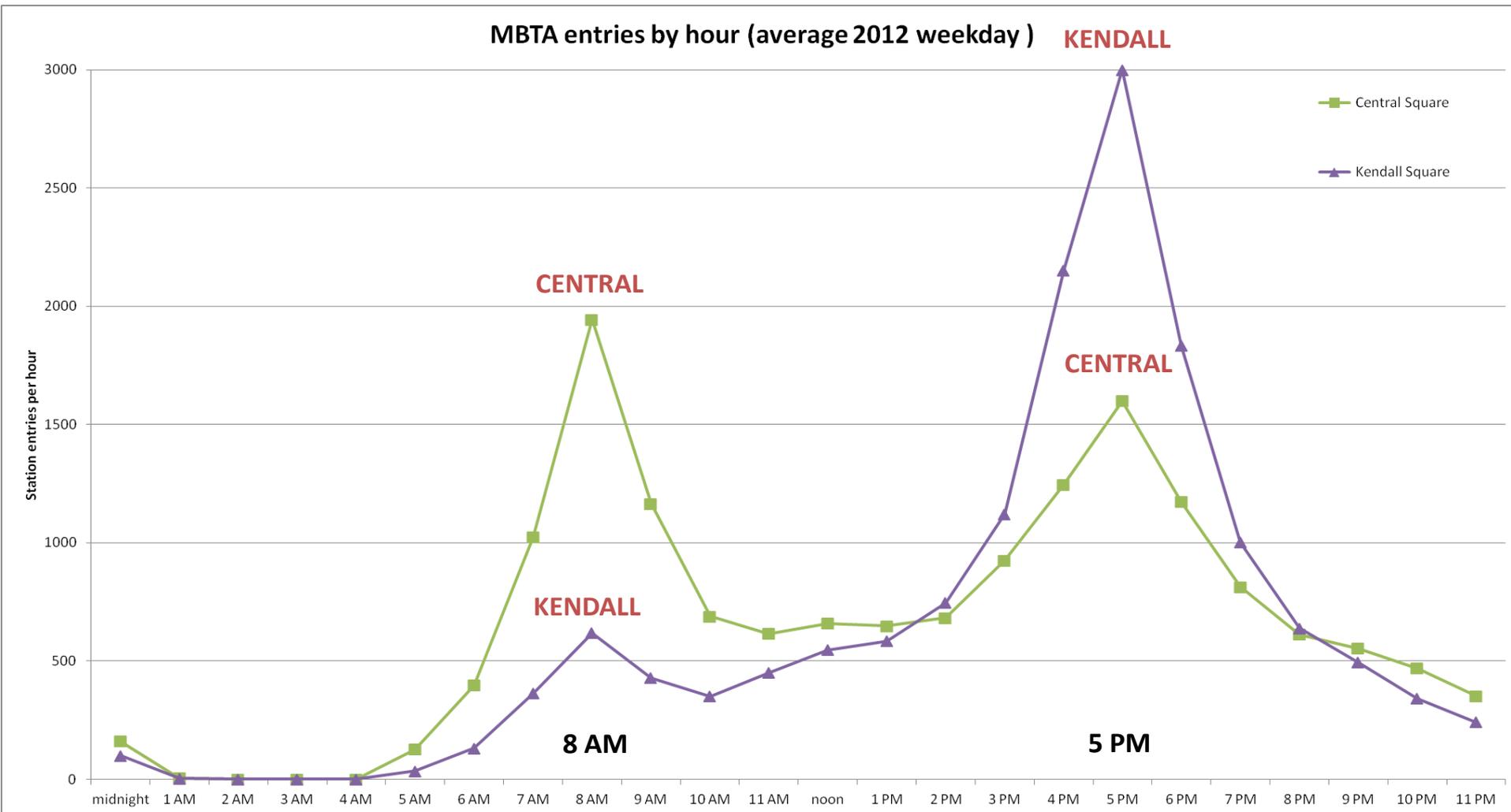
# MBTA Red Line Station Entries: 2007-2012

## MBTA Red Line Station Entries (weekday)



Source: MBTA AFC Database reports, 2007 - 2012.

# 2012 Station Entries By Hour



Source: MBTA AFC Database reports, 2007 - 2012.

2/14/2013

# Transit Riders Getting On /Off at Central Square <sup>16</sup>

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

Bus Route	Daily on/off
#1	3,900
#70	3,600
#70A	1,600
#47	1,500
#83	1,100
#CT1	1,000
#91	900
#64	610
<b>TOTAL BUS</b>	<b>14,000</b> <b>30%</b>
<b>RED LINE</b>	<b>32,000</b> <b>70%</b>

**2012 estimates**

# Additional Daily Trips From K2C2 Buildout<sup>17</sup> (2030)

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

**Source:**  
Trip generation model



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

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



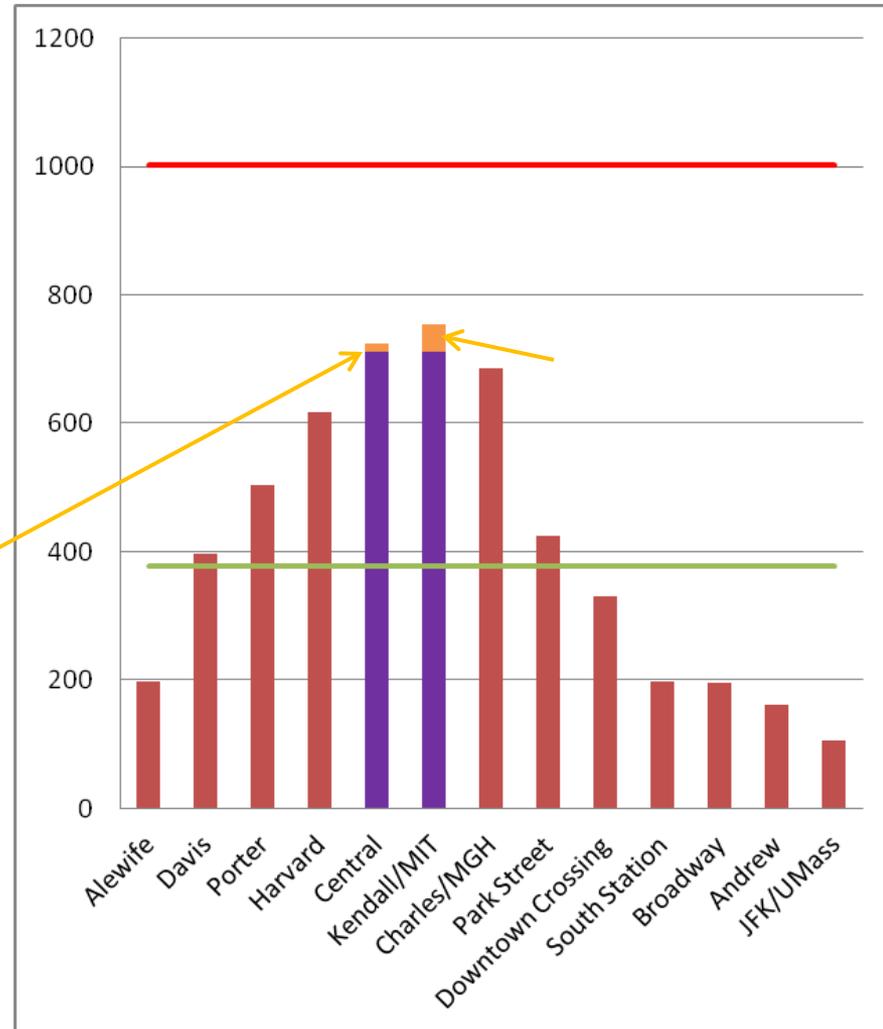
**On average, 16 new riders boarding each inbound  
Red Line train at Central Square in peak AM hour  
(current boardings = 112/train)**

**Assume:**  
14 trains per hour

# Average Train Load – AM peak toward Boston



**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