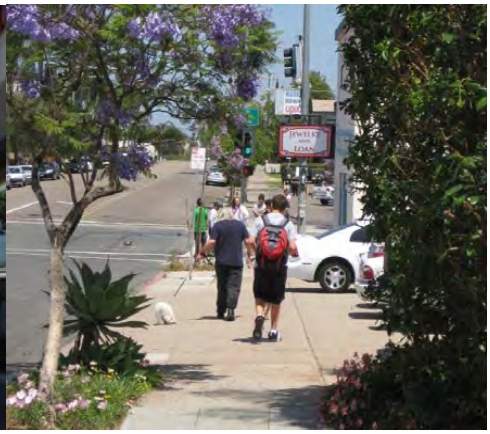
Appendix B: Pedestrian Priority Model Update, Pedestrian Study Areas and Routes

CITY OF SAN DIEGO

Pedestrian Master Plan
Phases 2 & 3

Technical Memorandum for Pedestrian Priority Model Update, Study Areas and Route Types

April 23, 2010



alta
PLANNING + DESIGN

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I. Introduction

This report summarizes methodologies and outcomes associated with the following three key San Diego Pedestrian Master Plan Phases 2 & 3 (PMP 2&3) tasks:

- Task 2.7 – Update the City of San Diego's Pedestrian Priority Model (PPM),
- Task 3.2 – Pedestrian Study Areas, and
- Task 3.3 – Pedestrian Routes

II. Task 2.7 Update to the Pedestrian Priority Model

The PPM was updated as part of the PMP 2&3 project due to the fact that several of the data inputs were out of date since the PMP Phase I project. In particular, the location of transit stops and ridership levels, land uses, traffic counts, and pedestrian crashes have more recent data available than was used during the PMP Phase 1 effort. **Table 1** displays the source and date for all inputs used in the attractor, generator and detractor submodels for the purposes of updating the PPM. **Figures 1** through **4** display the output from each of the updated submodels as well as the final composite priority model. **Table 2** shows the updated ranking of Community Plan Areas based upon the updated PPM, while **Figure 5** displays the updated Community Plan Area rankings across the jurisdiction.

III. Task 3.2 Community Study Areas

The PMP 2&3 study areas are defined in part by high PPM locations and in part by pedestrian route designations within the community. This section presents an overview of high PPM locations for each community and summarizes these areas in terms of study area acreage and percentage of the community represented in the study area.

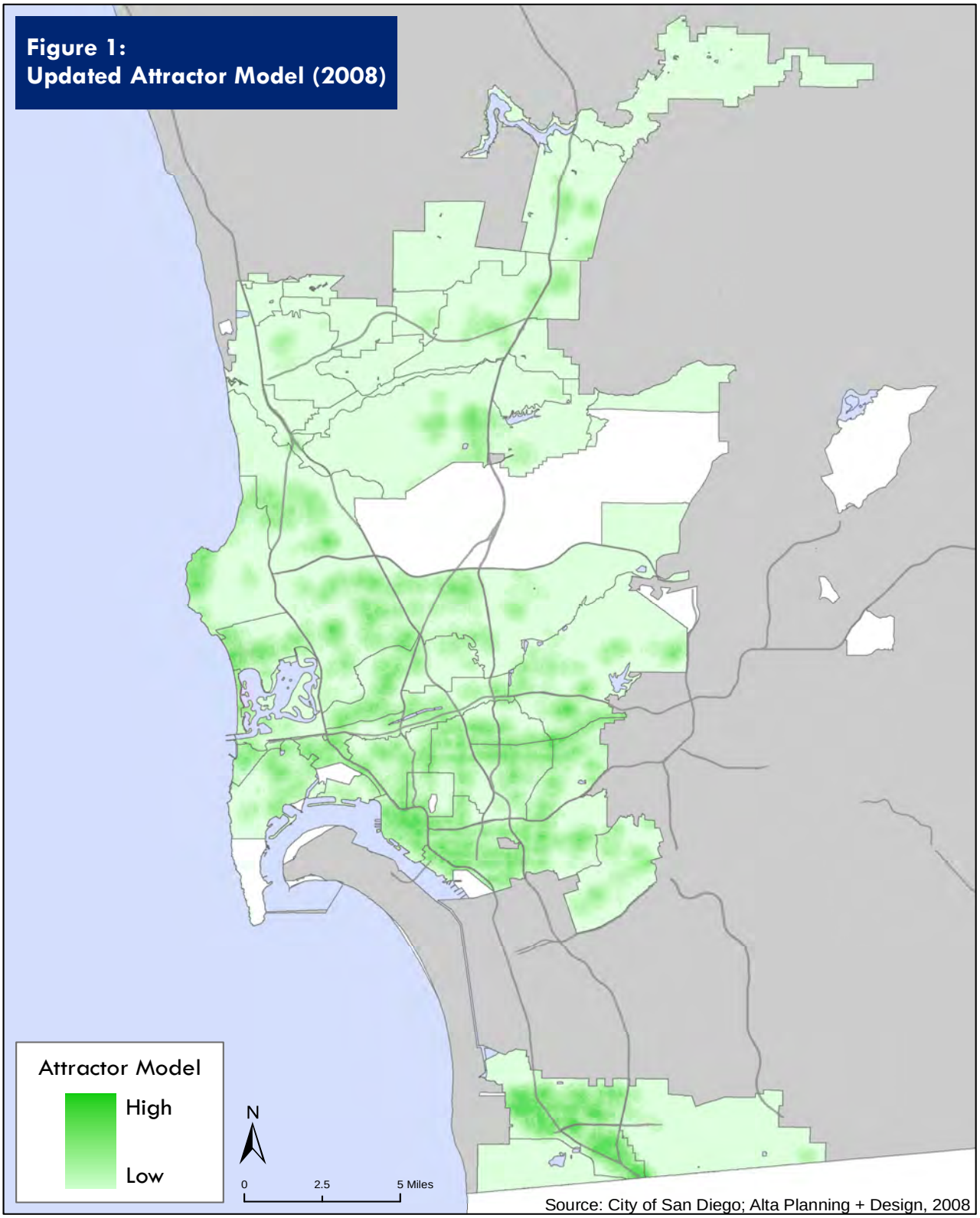
Using the updated model, high PPM locations are defined as those areas of the community that intersect PPM raster grids whose values fall within the top 50 percent of the range of PPM values.

Table 1: Pedestrian Priority Model Inputs – Updated Model (2008)

Model Input	Filenames	Fieldnames/Codes	Source	Date
Attractor Inputs				
Pedestrian Intensive Border Crossings	Ports_of_Entry_Mex.shp	-	SanGIS	2007
Elementary Schools	lu.shp	lu = 6806	SANDAG	2007
Middle Schools	lu.shp	lu = 6805	SANDAG	2007
High Schools	lu.shp	lu = 6805	SANDAG	2007
Universities and Colleges	lu.shp	lu = 6801, 6802, 6803	SANDAG	2007
Civic Facilities	lu.shp	lu = 6003, 6103, 6102,6104	SANDAG	2007
Retail	lu.shp	lu = 5002, 5003, 5004, 5005, 5007, 5009	SANDAG	2007
Beaches	lu.shp	lu = 7604	SANDAG	2007
Parks and Recreation	lu.shp	lu = 7201, 7211, 7601	SANDAG	2007
Generator Inputs				
Census Mobility: People Who Walk to Work	Census_BlockGroups_Income_Edu.shp	COMMUTE_WA	SanGIS	2000
Population Density	Census_BlockGroups_Pop_Housing.shp	POP_AGE_AL	SanGIS	2000
Employment Density	TAZ_Demographics.shp	EMP2004	SANDAG	2004
Age Density: Senior Citizens per Acre	Census_BlockGroups_Pop_Housing.shp	-	SanGIS	2000
Household Income	Census_BlockGroups_Income_Edu.shp	-	SanGIS	2000
Age Density: Children per Acre	Census_BlockGroups_Pop_Housing.shp	-	SanGIS	2000
Disability Density: People with Disabilities per Acre	Census_BlockGroups_Income_Edu.shp	POP_DISABL	SanGIS	2000
Housing Near Employment	lu.shp	lu = 1000, 1100, 1110, 1120, 1190, 1200, 1280, 1290, 1300, 1400	SANDAG	2007
Housing Near Commercial	lu.shp	lu = 1000, 1100, 1110, 1120, 1190, 1200, 1280, 1290, 1300, 1400	SANDAG	2007
Proposed Mixed Use	Mixed_use_polygon.shp	-	City of San Diego	2008
Detractor Inputs				
Collisions per Year	Pedestrian_Collisions_CITYWIDE_1998_2007.mdb	-	City of San Diego	2008
Average Daily Trips	Hwycov2008.shp	ADTVL	SANDAG	2008
Speed	Roads_All	SPEED	SanGIS	2008
Lack of Street Lighting	Street_Light.shp	-	SanGIS	2008
Railroad Tracks	rr.shp	-	SANDAG	2008
Freeways	Roads_All	IFC = 1, 8, 9	SanGIS	2008
Slopes	Elevgrd30	-	SANDAG	1970s

Source: Alta Planning + Design, February 18, 2010

Figure 1:
Updated Attractor Model (2008)



Source: City of San Diego; Alta Planning + Design, 2008

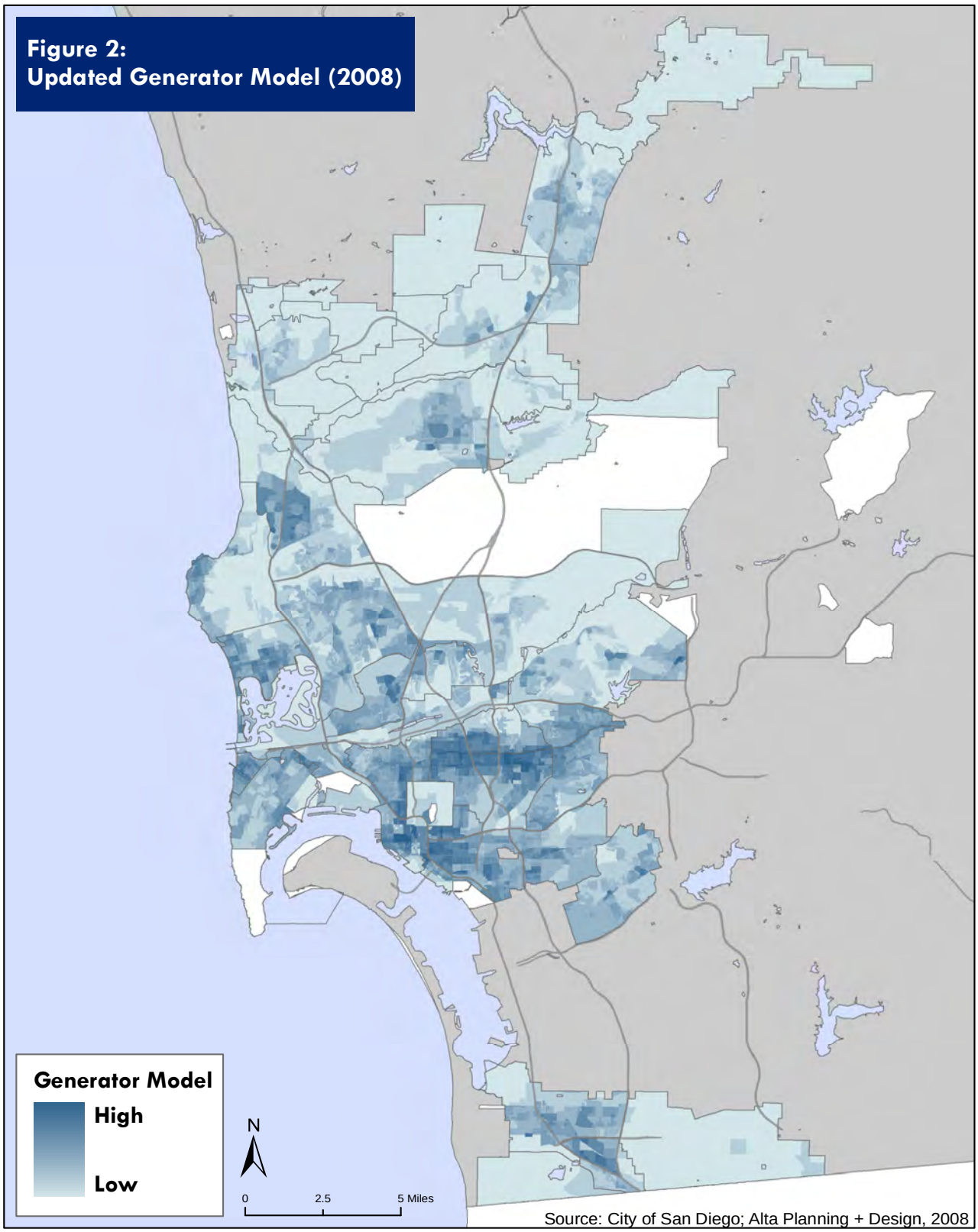
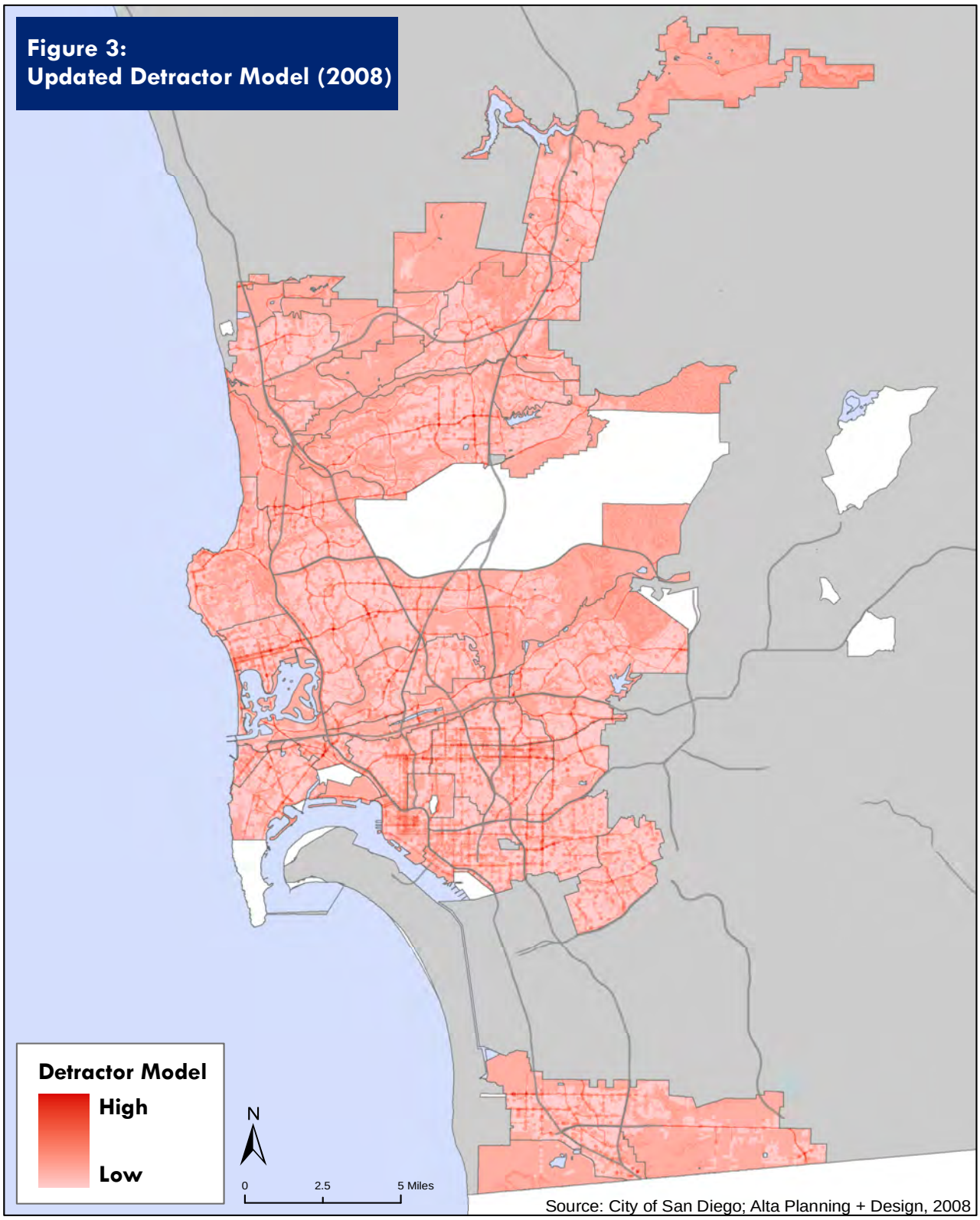


Figure 2:
Updated Generator Model (2008)
Generator Model
High
Low
N
0
2.5
5 Miles
Source: City of San Diego; Alta Planning + Design, 2008

Figure 3:
Updated Detractor Model (2008)



Source: City of San Diego; Alta Planning + Design, 2008

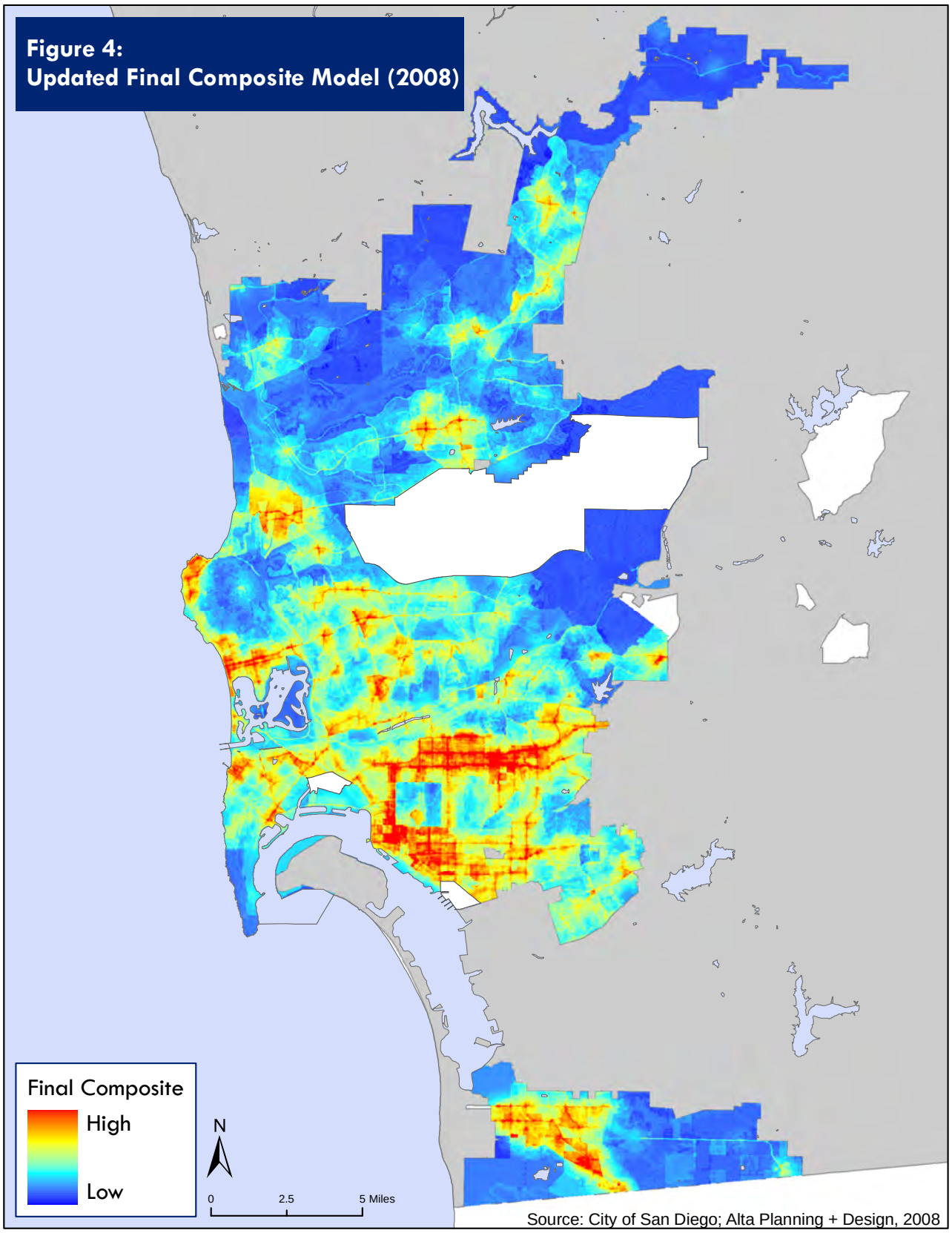
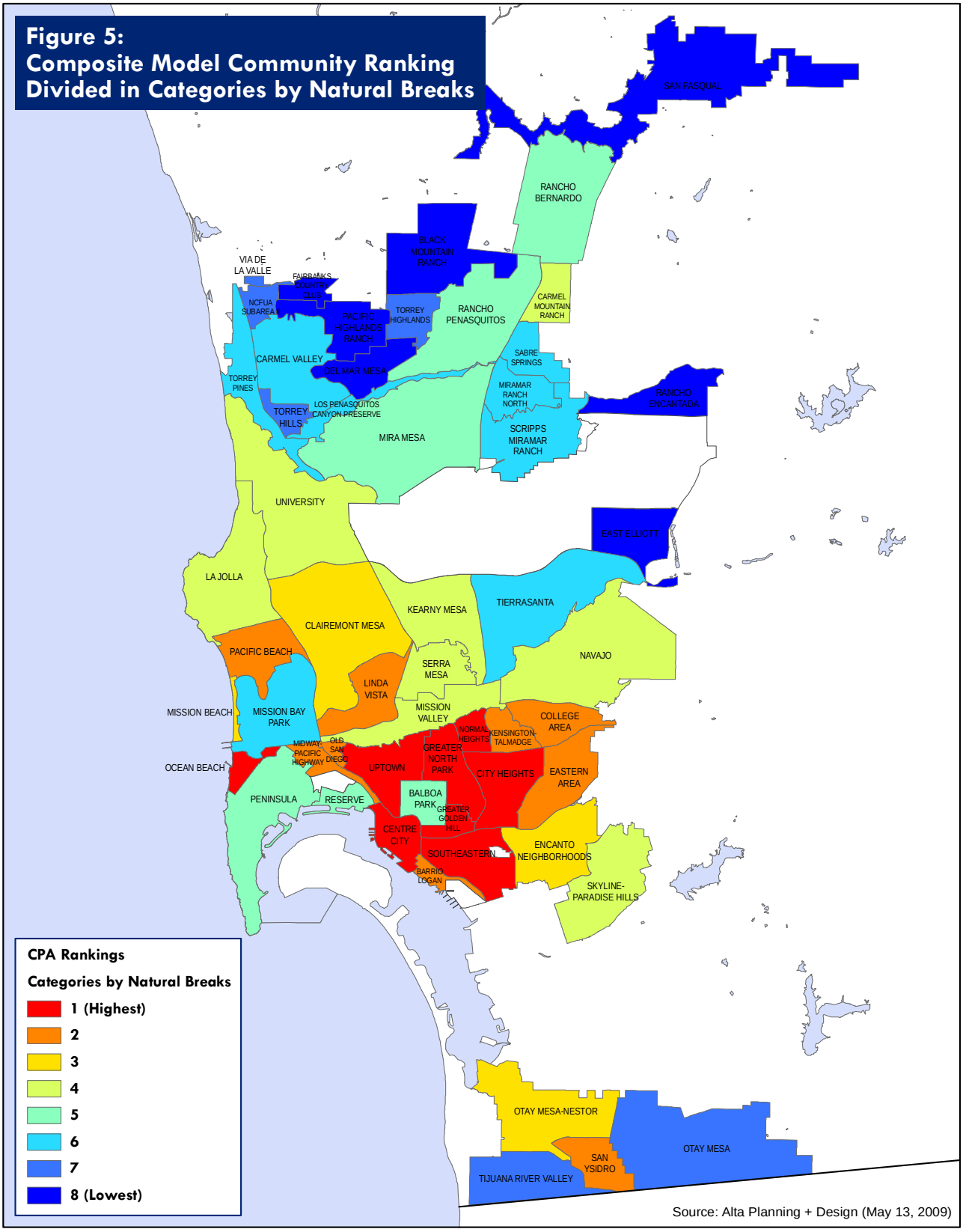


Figure 4:
Updated Final Composite Model (2008)
Final Composite
High
Low
N
0
2.5
5 Miles
Source: City of San Diego; Alta Planning + Design, 2008

Figure 5:
Composite Model Community Ranking Divided in Categories by Natural Breaks



Source: Alta Planning + Design (May 13, 2009)

Table 2
Updated Community PPM Points and Ranking

Updated Ranking	Community Planning Area	Average PPM Points	Previous PMP Phase I Rank	Change in Ranking	Updated CPA Grouping according to Natural Breaks
1	Centre City	230.0	1	0	
2	**Greater North Park**	229.4	2	0	
3	**Mid-City: Normal Heights**	226.6	6	+3	
4	**Mid-City: City Heights**	222.1	8	+4	1
5	**Southeastern San Diego**	220.3	3	-2	(210-230 points)
6	**Uptown**	218.1	5	-1	
7	**Greater Golden Hill**	212.3	4	-3	
8	Ocean Beach	209.7	12	+4	
9	San Ysidro	205.9	9	0	
10	Pacific Beach	202.0	14	+4	
11	College Area	199.1	13	+2	
12	Midway-Pacific Highway	196.9	10	-2	
13	**Barrio Logan**	193.5	7	**-6**	2
14	Mid-City: Kensington-Talmadge	191.4	15	+1	(186-206 points)
15	Old San Diego	188.7	11	-4	
16	Linda Vista	187.9	19	+3	
17	Mid-City: Eastern Area	185.7	18	+1	
18	Mission Beach	179.8	17	-1	
19	Southeastern: Encanto Neighborhooods	171.2	16	-3	3
20	Otay Mesa-Nestor	164.4	25	+5	(160-180 points)
21	Clairemont Mesa	160.4	21	0	
22	Serra Mesa	144.4	20	-2	
23	Mission Valley	140.6	22	-1	
24	Skyline-Paradise Hills	138.9	24	0	
25	University	135.9	28	+3	4
26	Carmel Mountain Ranch	132.8	31	+5	(125-145 points)
27	La Jolla	132.2	27	0	
28	Navajo	131.2	30	+2	
29	Kearny Mesa	127.7	29	0	
30	Peninsula	122.6	23	**-7**	
31	Rancho Bernardo	114.6	41	**+10**	
32	Mira Mesa	113.6	32	0	5
33	Balboa Park	113.5	26	**-7**	(110-123)
34	Reserve	112.7	36	+2	
35	Rancho Penasquitos	111.9	34	-1	
36	Tierrasanta	98.6	35	-1	
37	Scripps Miramar Ranch	94.3	33	-4	6
38	Mission Bay Park	94.2	38	0	(80-100 points)

Updated Ranking	Community Planning Area	Average PPM Points	Previous PMP Phase I Rank	Change in Ranking	Updated CPA Grouping according to Natural Breaks
39	Carmel Valley	93.9	43	+4	6 (80-100 points)
40	Torrey Pines	91.5	39	-1	
41	Sabre Springs	83.4	44	+3	
42	Miramar Ranch North	82.8	37	-5	
43	Los Penasquitos Canyon Preserve	82.3	42	-1	
44	Torrey Highlands	73.4	49	+5	7 (55-75 points)
45	Tijuana River Valley	73.1	46	+1	
46	Via de la Valle	71.1	40	**-6**	
47	Torrey Hills (Sorrento Hills)	67.5	50	+3	
48	Otay Mesa	60.3	45	-3	
49	NCFUA Subarea II	57.8	48	-1	
50	Pacific Highlands Ranch	44.9	47	-3	8 (35-45 points)
51	San Pasqual	39.0	57	**+6**	
52	Black Mountain Ranch	38.9	51	-1	
53	Fairbanks Country Club	38.9	56	+3	
54	East Elliott	38.9	54	0	
55	Del Mar Mesa	37.6	53	-2	
56	Rancho Encantada	37.6	55	-1	

Source: Alta Planning + Design, February 18, 2010

Figures 6 through **12** display each communities' study area. **Table 3** displays the percentage of each community's total acreage included within the study area.

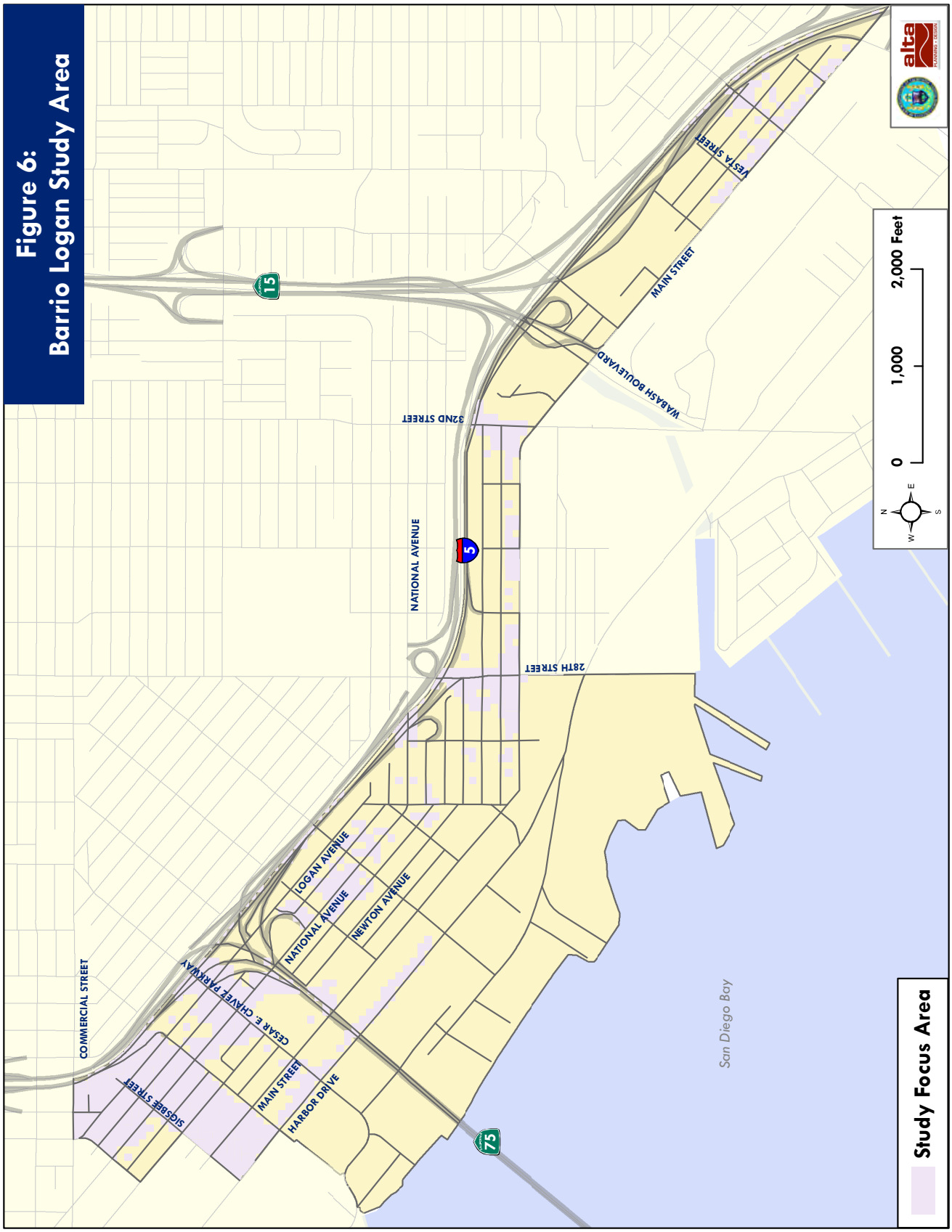
Table 3: PMP 2&3 Community Study Area Acreage

Community	Total Acreage	Study Area Acreage	Percent of Total
Barrio Logan	4,554	1,080	23.7%
City Heights	24,234	8,281	34.2%
Greater Golden Hill	6,141	1,681	27.4%
Normal Heights	6,911	2,402	34.7%
Greater North Park	18,623	6,114	32.8%
Southeastern San Diego	24,178	7,487	30.9%
Uptown	22,168	4,675	21.1%

Source: Alta Planning + Design, February 18, 2010

The ultimate definition of each community's study area however is also dependent on the pedestrian route types that traverse the community. Pedestrian route type definitions and assignments to community roadways are discussed in the next section.

Figure 6: Barrio Logan Study Area



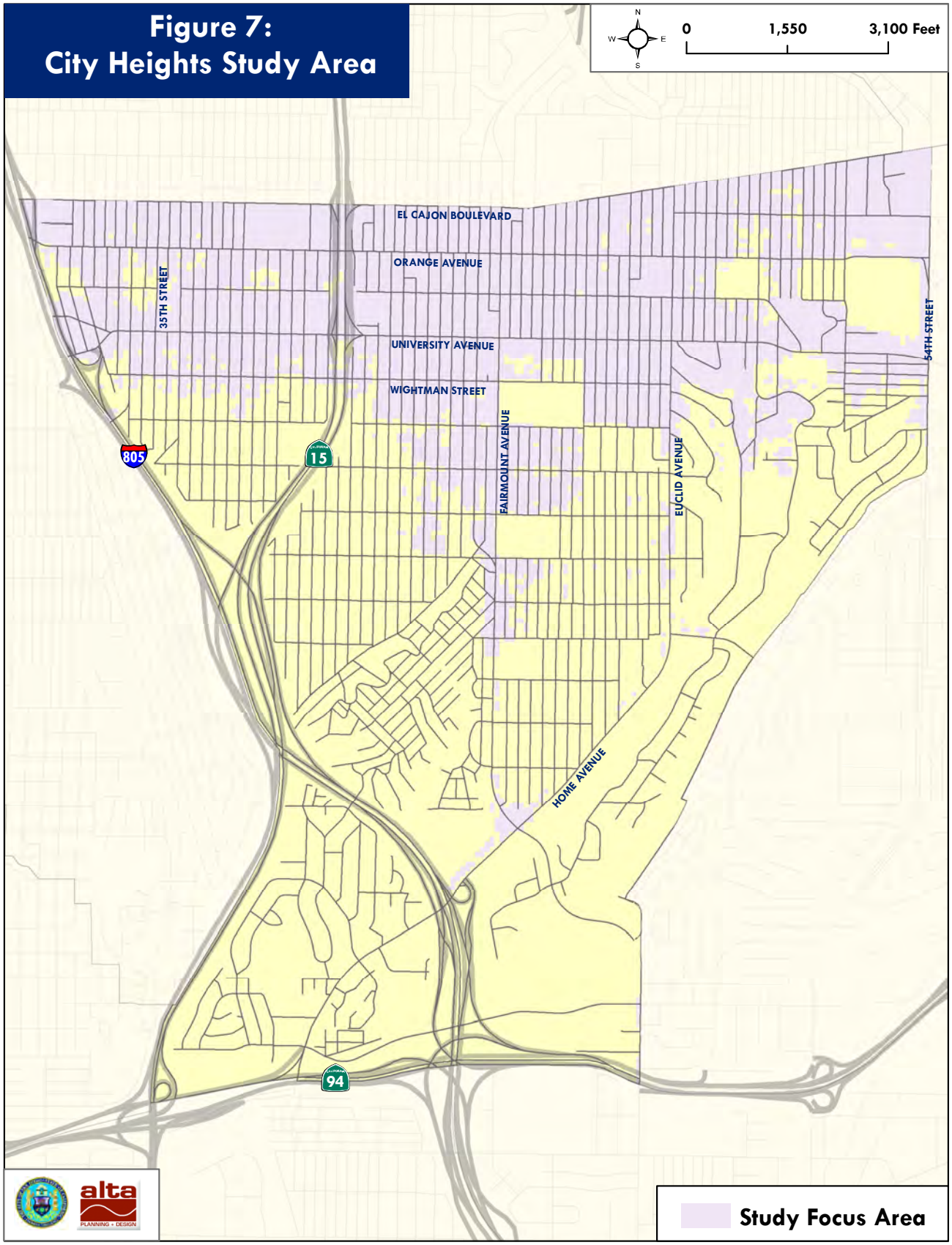


Figure 7:
City Heights Study Area
N
W
E
S
0
1,550
3,100 Feet
EL CAJON BOULEVARD
ORANGE AVENUE
UNIVERSITY AVENUE
WIGHTMAN STREET
35TH STREET
54TH STREET
FAIRMOUNT AVENUE
EUCLID AVENUE
HOME AVENUE
805
15
94
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Study Focus Area

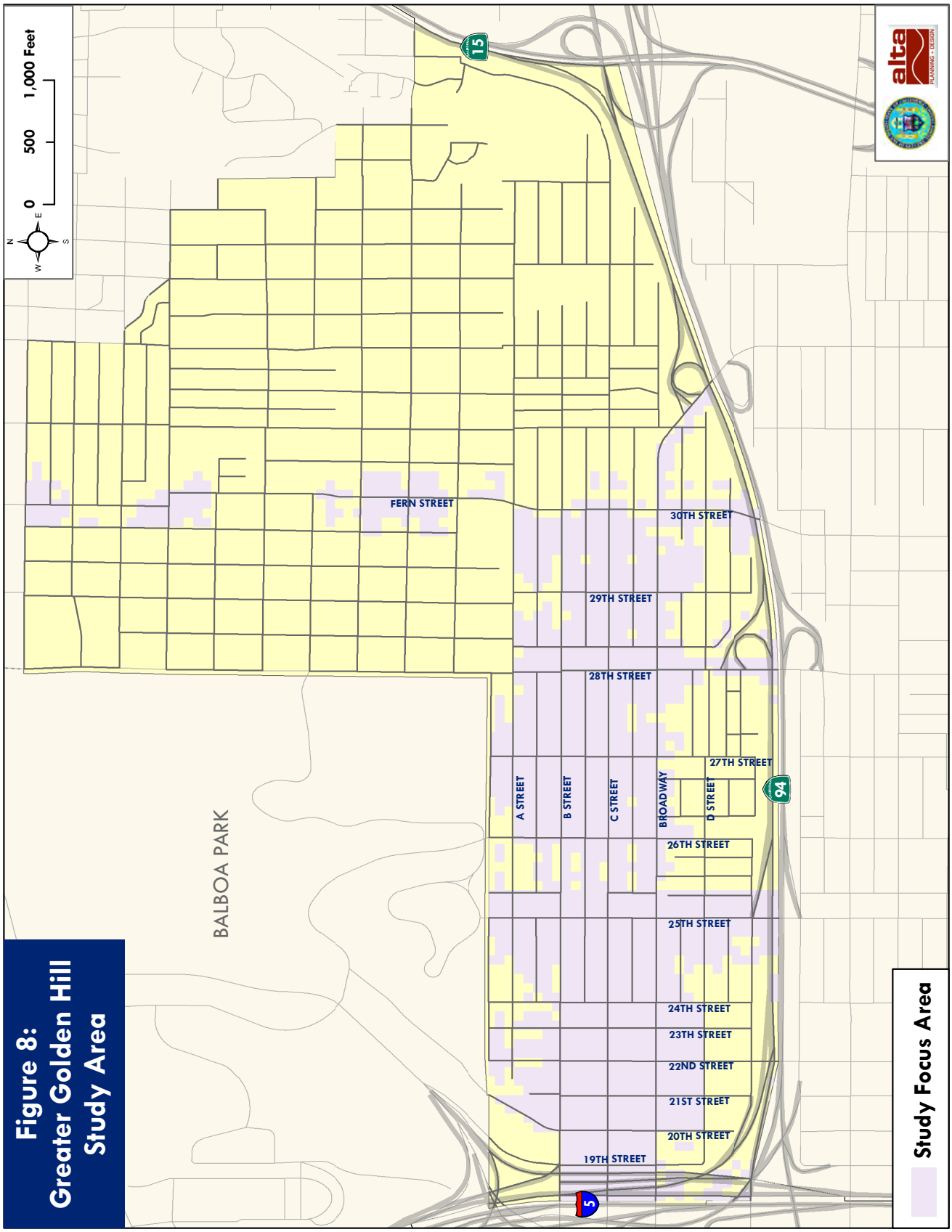

Figure 8: Greater Golden Hill Study Area

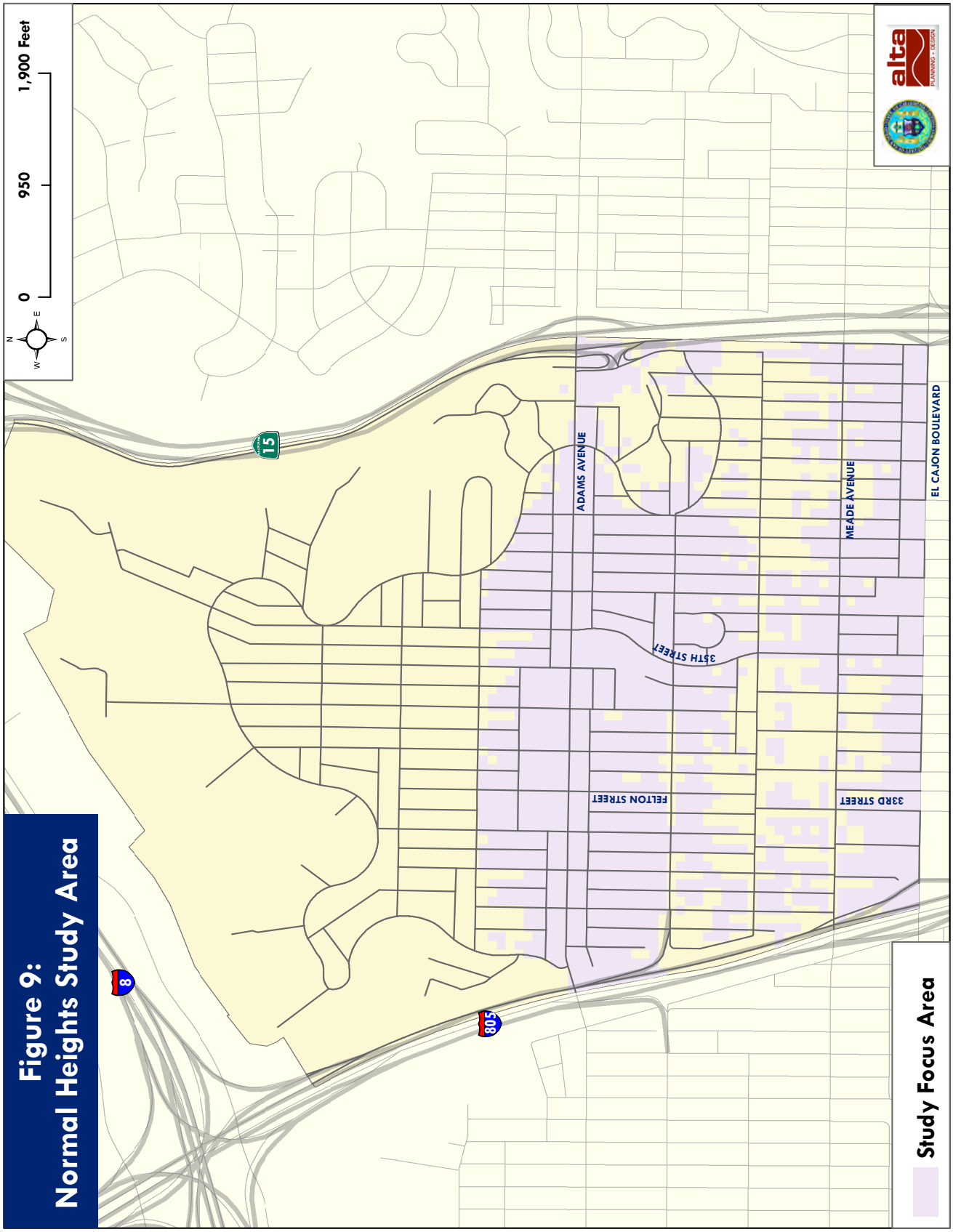
Figure 9:
Normal Heights Study Area
Study Focus Area
0
950
1,900 Feet
N
E
S
W
15
8
805
ADAMS AVENUE
MEADE AVENUE
EL CAJON BOULEVARD
35TH STREET
FELTON STREET
33RD STREET
alta
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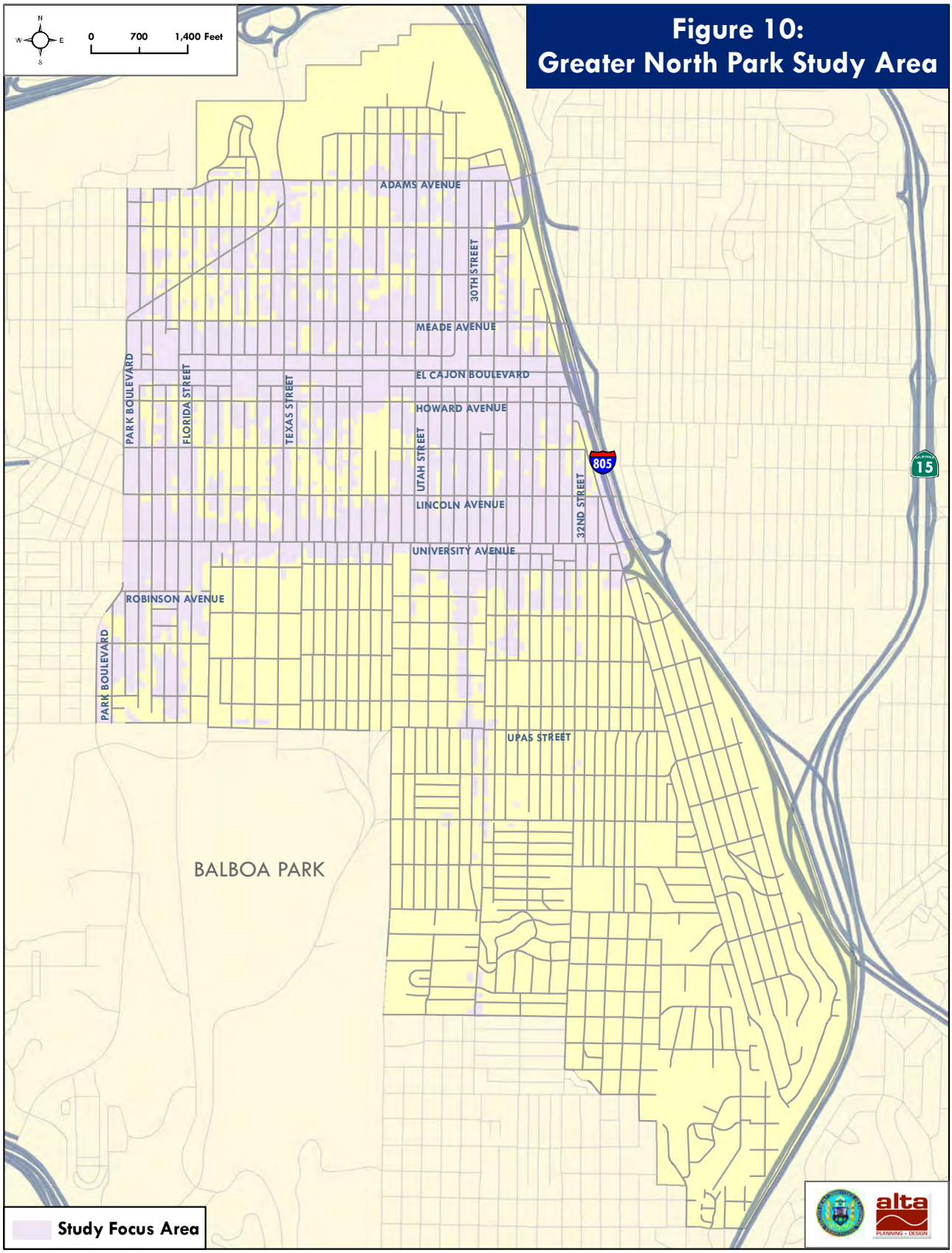


Figure 10:
Greater North Park Study Area
N
W
E
S
0
700
1,400 Feet
ADAMS AVENUE
30TH STREET
MEADE AVENUE
EL CAJON BOULEVARD
HOWARD AVENUE
PARK BOULEVARD
FLORIDA STREET
TEXAS STREET
UTAH STREET
32ND STREET
LINCOLN AVENUE
UNIVERSITY AVENUE
ROBINSON AVENUE
PARK BOULEVARD
UPAS STREET
BALBOA PARK
805
15
Study Focus Area
alta
PLANNING + DESIGN

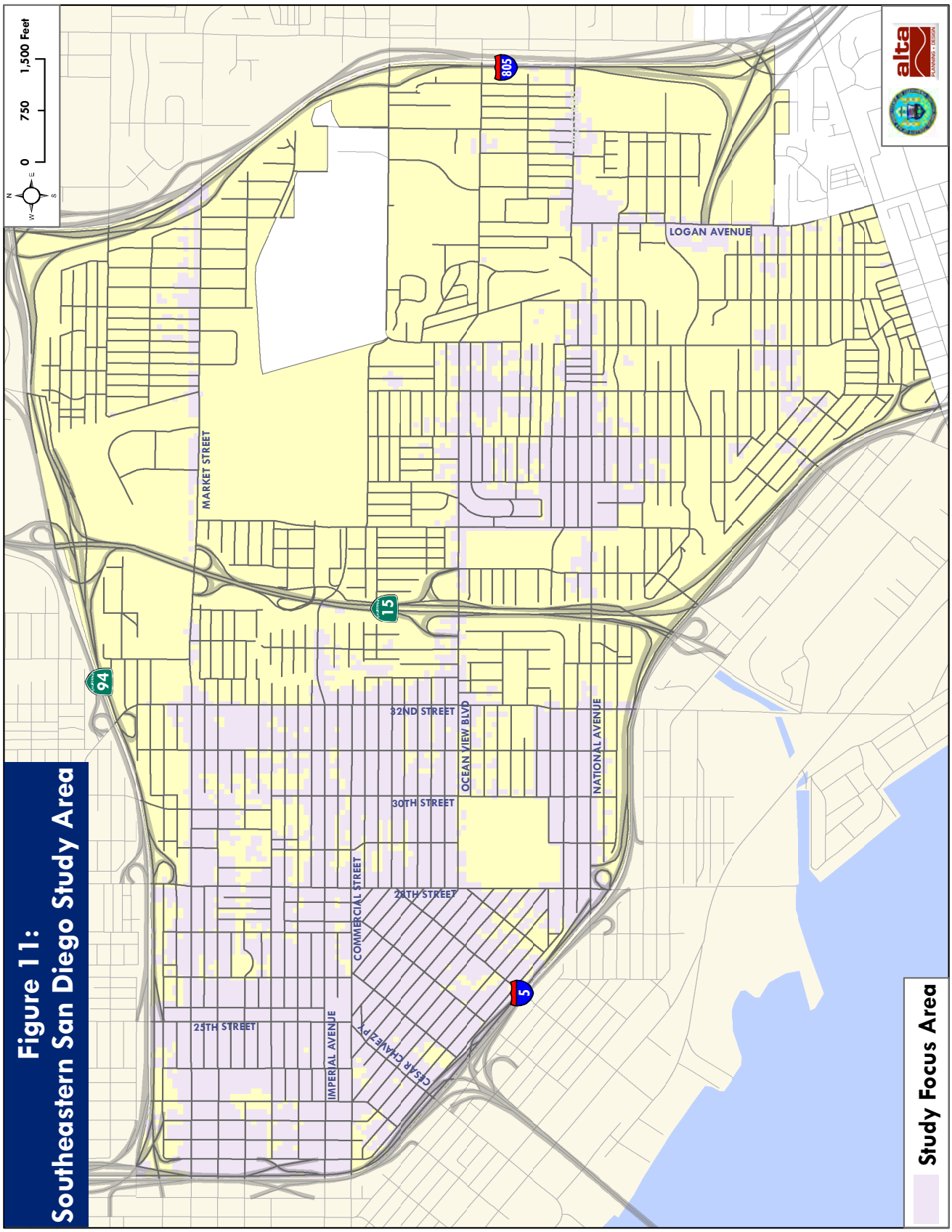


Figure 11:
Southeastern San Diego Study Area
0
750
1,500 Feet
LOGAN AVENUE
MARKET STREET
32ND STREET
30TH STREET
28TH STREET
25TH STREET
OCEAN VIEW BLVD
NATIONAL AVENUE
COMMERCIAL STREET
IMPERIAL AVENUE
CESAR CHAVEZ PKY
805
15
94
5
Study Focus Area

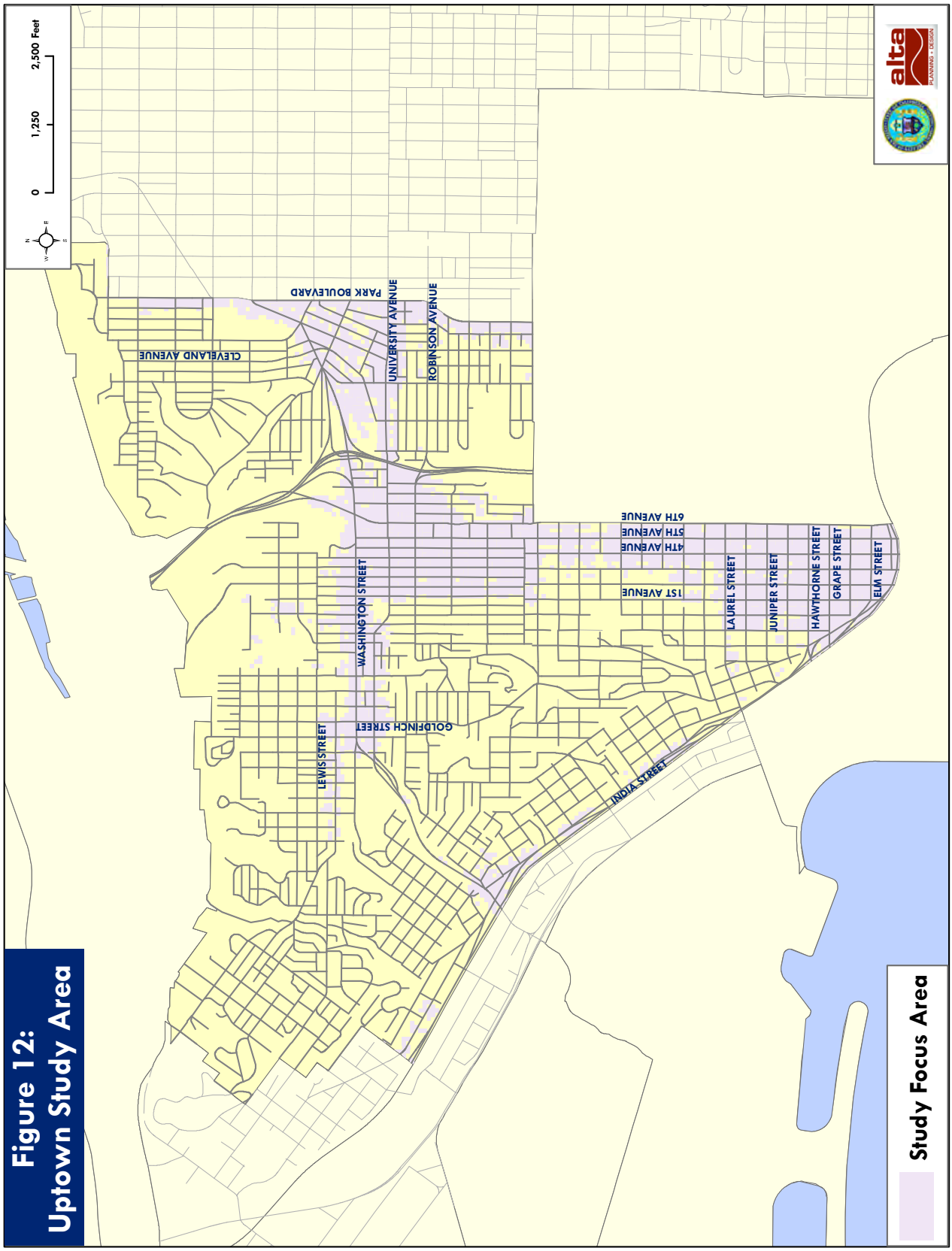


Figure 12:
Uptown Study Area

IV. Task 3.3 Pedestrian Route Types

Pedestrian route typologies were defined in the PMP Phase 1 effort and are employed here to define those roadways within a particular community that will be inventoried and assessed for the development of priority pedestrian improvements. **Table 4** displays the route type definitions and their relationship to the City's *Street Design Manual* and the *Strategic Framework Element*. The PMP 2&3 effort will only assess Districts, Corridors and Connectors for the purposes of developing pedestrian improvement concepts.

Table 4: Pedestrian Route Type Definitions

	Route Type		
	District Sidewalks	Corridor Sidewalks	Connector Sidewalks
Purpose	Sidewalks along roads that support heavy pedestrian levels in mixed-use concentrated areas	Sidewalks along roads that support moderate density business and shopping districts with moderate pedestrian levels	Sidewalks along roads that support institutional, industrial or business complexes with limited lateral access and low pedestrian levels
Typical Adjacent *"Street Design Manual"* Classifications	All types of adjacent streets are possible	Commercial, Urban Collector, Urban Major and Arterial	Commercial, Industrial, Urban Major, Rural Collector and Arterial
Cross Reference to Related *"Strategic Framework Plan"* Definitions	Existing: Regional Centers, Urban Villages and Neighborhood Villages	Existing: Sub-regional Districts and Transit Corridors	Existing: Sub-regional Districts, Transit Corridors and Suburban Residential along Major Arterials
Typical Adjacent Land Uses	Mixed-use housing, commercial, office and entertainment with urban densities	Multiple land uses but may be separated. Often strip commercial or office complex	Open space, industrial uses, institutional uses or other pedestrian restricted uses

Source: City of San Diego Pedestrian Master Plan City-Wide Implementation Framework, Page 4-1 (2006)

Table 5 summarizes the three basic criteria proposed by the PMP Phase 1 *Final Pedestrian Master Plan Report* for use in defining pedestrian route types. These criteria include the City of San Diego *Street Design Manual* roadway classifications, the *Strategic Framework Element* Village Types, and existing land uses. Table 5 also shows how these criteria are operationalized for the purposes of classifying pedestrian route types across the City of San Diego under the current PMP 2&3 planning effort.

Table 5: Pedestrian Route Type Criteria

Phase I Pedestrian Route Type Criteria	Phase 2 & 3 Operationalization of Route Type Criteria	Data Sources
Street Design Manual Classification	Circulation Element Roadway Classification	General_Plan_Road_Network.shp (City of San Diego, 2008)
Strategic Framework Element Village Type	Village Propensity Model	Villagepropensity_vpMay30.img (City of San Diego, 2008)
Land Uses	Pedestrian Priority Attractor Model and existing adjacent land uses and intensities	Updated PPM 2008 (City of San Diego 2008) and 2007 lu.shp (SANDAG)

Source: Alta Planning + Design, February 18, 2010

Each of the factors used to define pedestrian route types is available in a GIS format, allowing for automated analyses to be utilized for classifying pedestrian route types.

There are three major steps in this Route Type identification process: 1) Defining Corridor, Connector and District Routes Types, 2) Defining Neighborhood Route Types, and 3) Manual Refinement to the Route Types. Each of these steps is described in following sections, along with key justifications for the methods employed.

1. Defining Corridor, Connector and District Route Types

1a. Create a raster-based Route Type Model combining the highest 25% scoring Village Propensity Model raster cells and the highest 40% scoring Pedestrian Priority Attractor Model raster cells.

Step 1a justification: Combining these two raster models incorporates several important aspects of the route type definitions: mixed land uses, multi-modal and pedestrian suitability, and locations and intensities of pedestrian trip attracting land uses. **Figure 13** shows the outcome of this analysis for the seven PMP 2&3 study communities.

1b. Identify linear clusterings of the Route Type Model output through visual inspection.

1c. Overlay the circulation element roadways on the Route Type Model output and assess the relationship between the linear clusterings of the Route Type Model output and the locations of the circulation element roadways. Corridors and Connectors are primarily distinguished by the fact that Corridors are very directly related to the linear clusterings of the Route Type Model, while Connectors are not. Corridors are defined along circulation element roadways that run continuous along linear clusterings of the Route Type Model output, ensuring adjacency to the types of land uses and expected pedestrian activity associated with Corridor routes. Connectors are defined along circulation element roadways that may touch or traverse the Route Type Model output, but are not primarily correlated with the linear clusterings.

1d. Preliminary District route type locations will be considered at locations where two Corridor routes intersect, indicating high levels of land use types and pedestrian activity associated with Districts. District locations will be finalized in the last step of this process when manual refinements take place.

Steps 1b-1d justification: Output from the Route Type Model clearly shows linear clusterings of pedestrian attracting land uses, mixed land uses and locations with high levels of pedestrian suitability. The ability of the Route Type Model output for distinguishing between Corridors and Connectors was confirmed by comparing existing land uses located adjacent to the routes – especially open space, industrial, and institutional land uses – which are a key distinguishing characteristic between Corridors and Connectors. Connectors are mostly adjacent to open space, residential, industrial or institutional land uses, while Corridors would typically be adjacent to commercial land uses. Local knowledge about areas with moderate to high levels of pedestrian activity was also used to confirm the Route Type Model output capability to distinguish Corridors from Connectors. These assessments supported the conclusion that the Route Type Model does successfully distinguish between Corridors and Connectors.

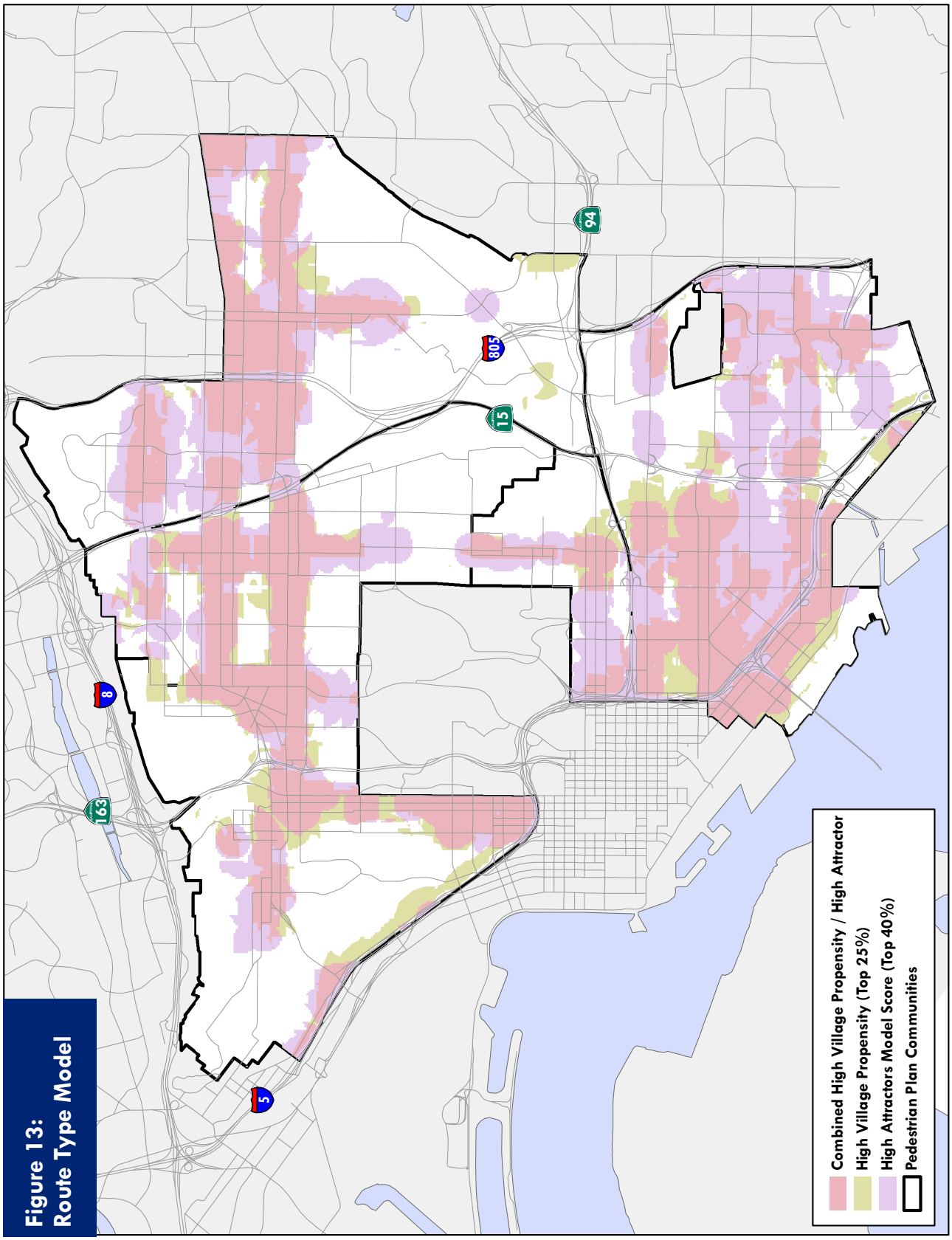


Figure 13:
Route Type Model

Figure 14 shows the results of a preliminary assessment of the relationship between the Route Type Model output and the location of circulation element roadways. As shown, Corridors are strongly associated with continuous linear clusterings of the Route Type Model output. While Connectors sometimes coincide with the Route Type Model output, they are not primarily correlated with the output.

2. Defining Neighborhood Route Types

2a. Sidewalks along non-circulation element roadways can be defined as Neighborhood Route Types.

Step 2a justification: Circulation Element roadways represent transportation segments vital to through-movement travel across the city. Roadways with low through-movement potential tend to be in largely residential areas, which is a distinguishing characteristics of the Neighborhood pedestrian route type.

3. Manual Adjustments to the Route Types

3a. Manual adjustments to the route type designations were made, as needed, to ensure the correct relationship between the proposed route type and the adjacent land uses and levels of pedestrian activity. A visual inspection was performed to check the adjacent land uses and existing and potential mixed-use areas along every route.

Step 3a justification: Manual adjustments are necessary to fine-tune the outcomes of the Route Type Model. Manual adjustments were used to finalize the locations of District route types and to change a few of the route types from Corridor to Connector or visa versa. **Figure 15** shows the proposed pedestrian route types for the seven study communities utilizing the techniques in the three steps described above. **Figures 16** through **22** display the designated pedestrian route types and land uses by PMP 2&3 Community Planning Areas.

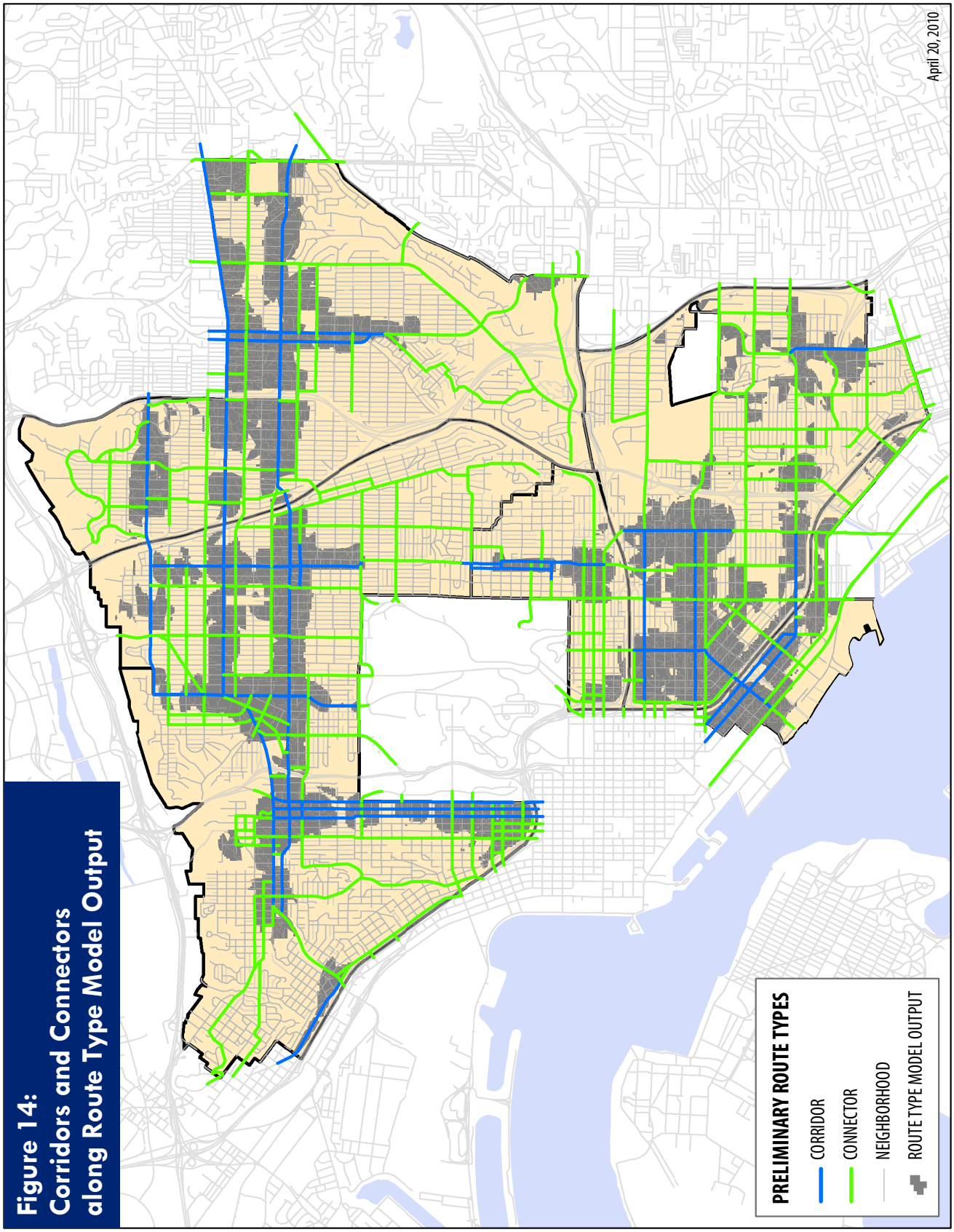


Figure 14: Corridors and Connectors along Route Type Model Output

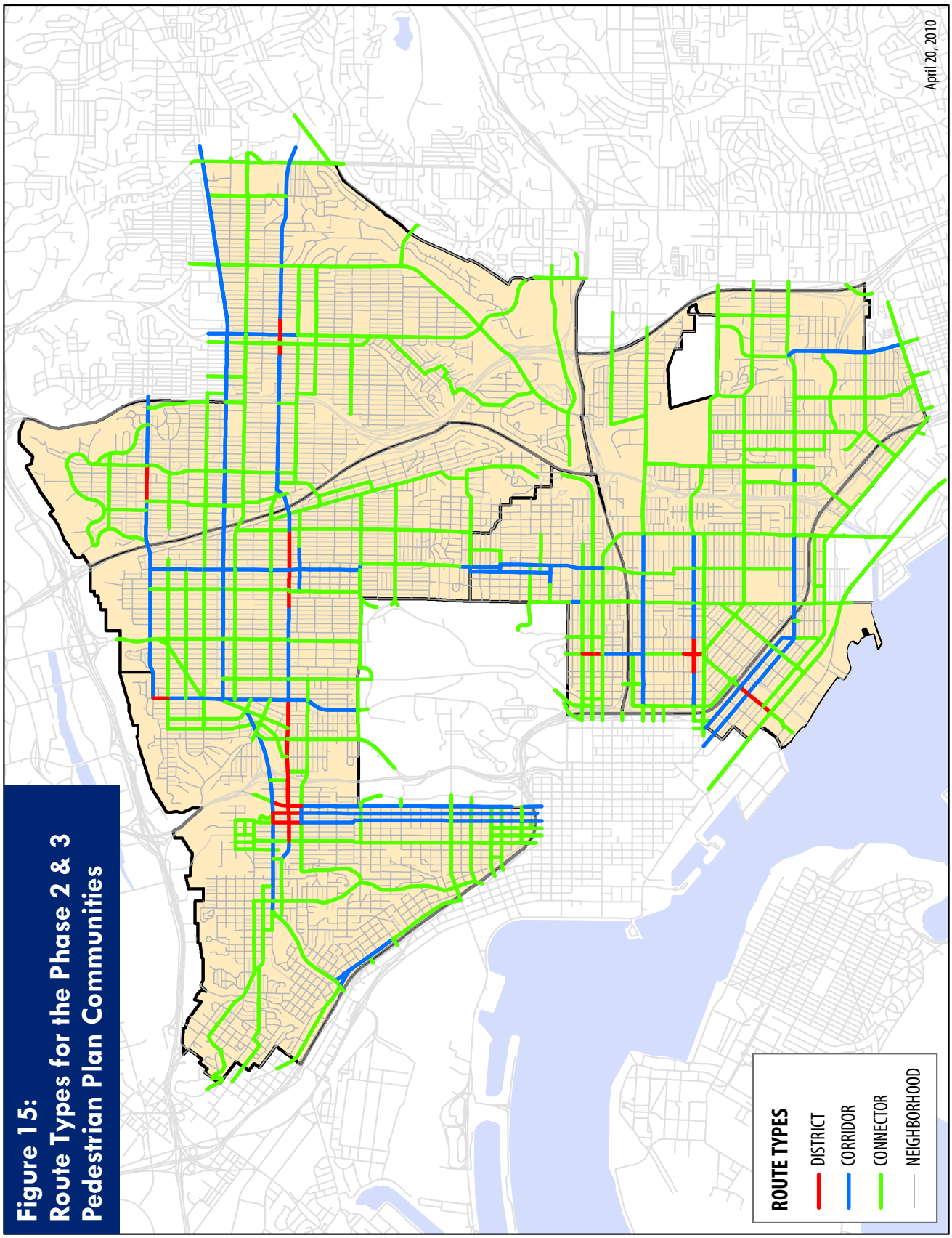


Figure 15: Route Types for the Phase 2 & 3 Pedestrian Plan Communities

Figure 16: Barrio Logan Route Types and Land Uses

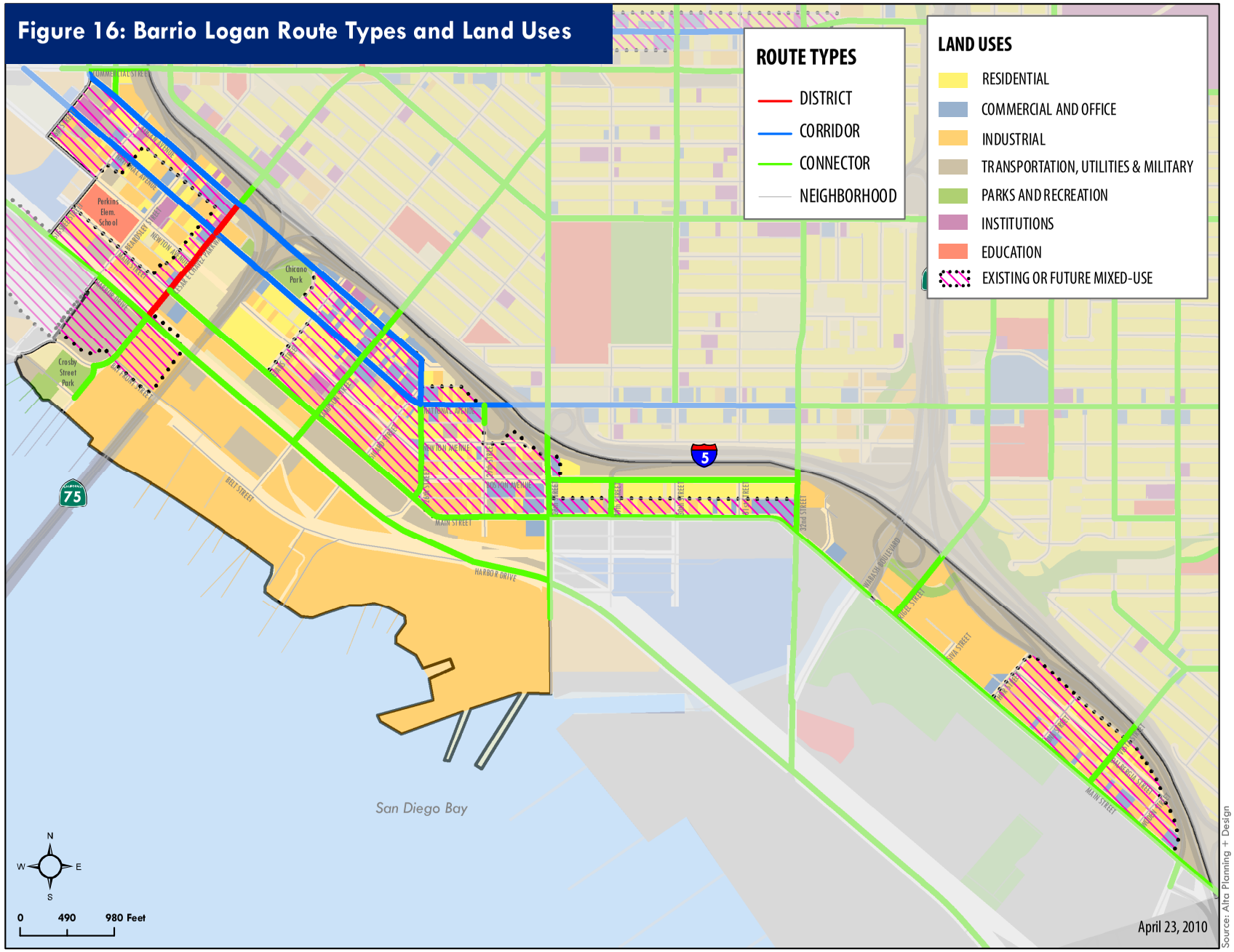
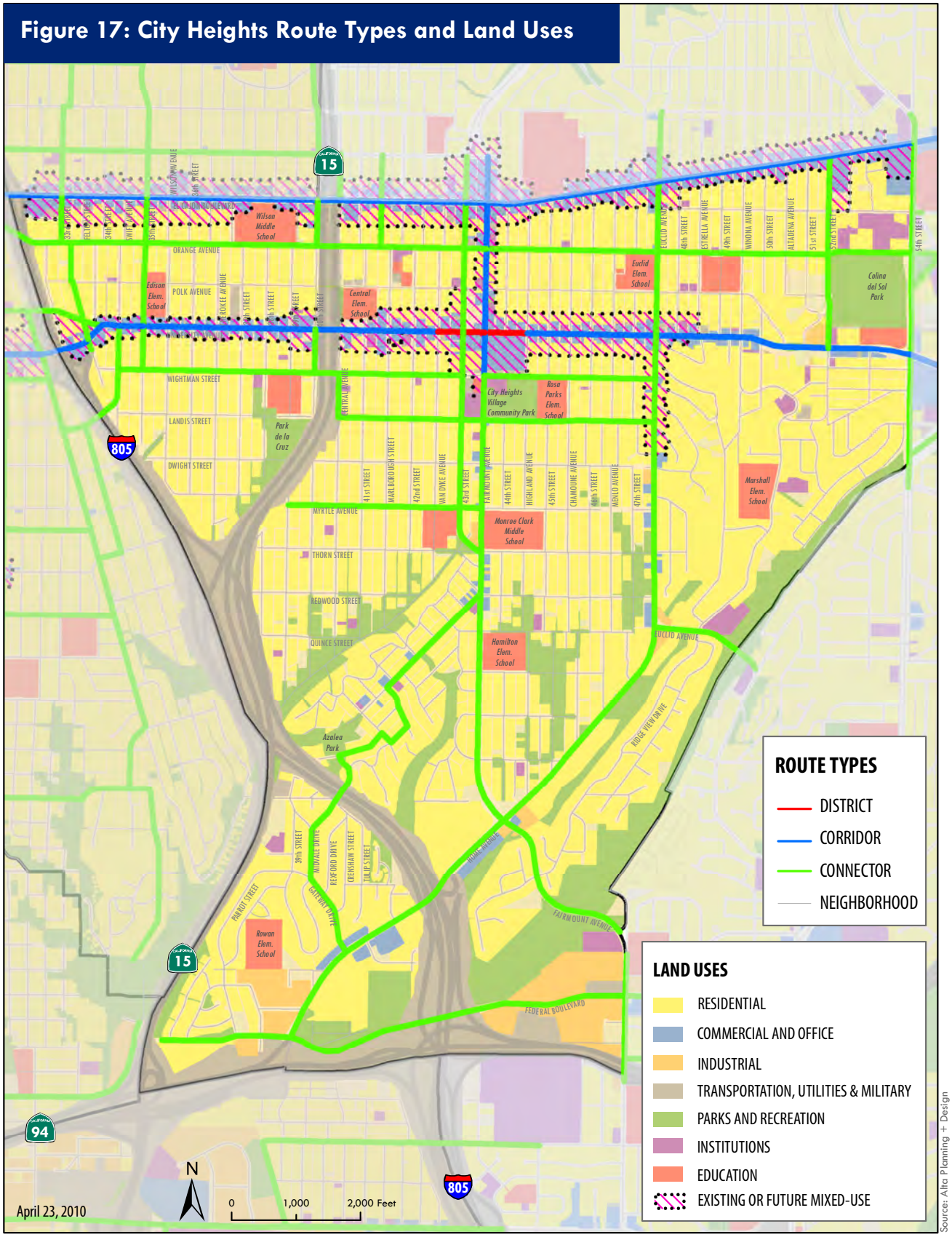


Figure 17: City Heights Route Types and Land Uses



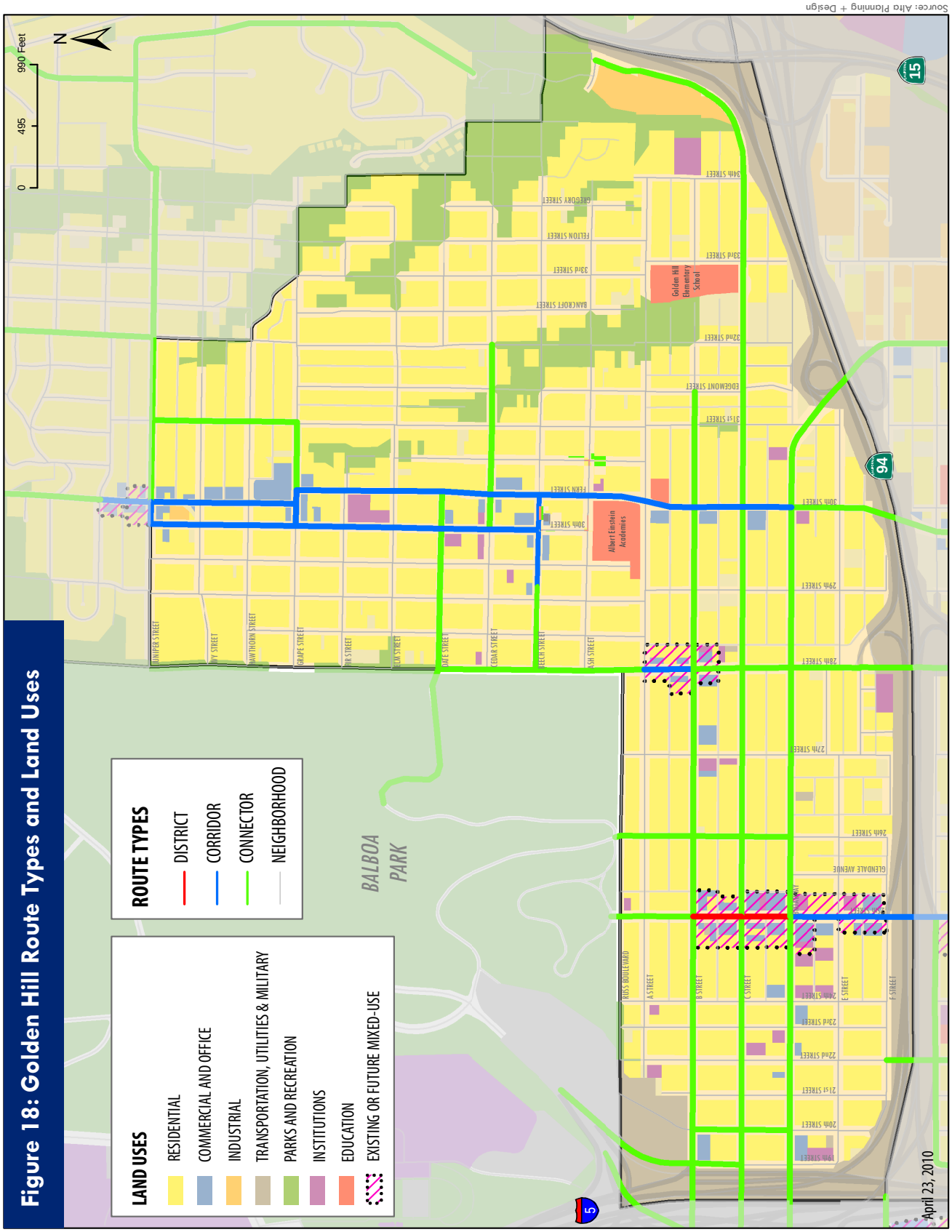
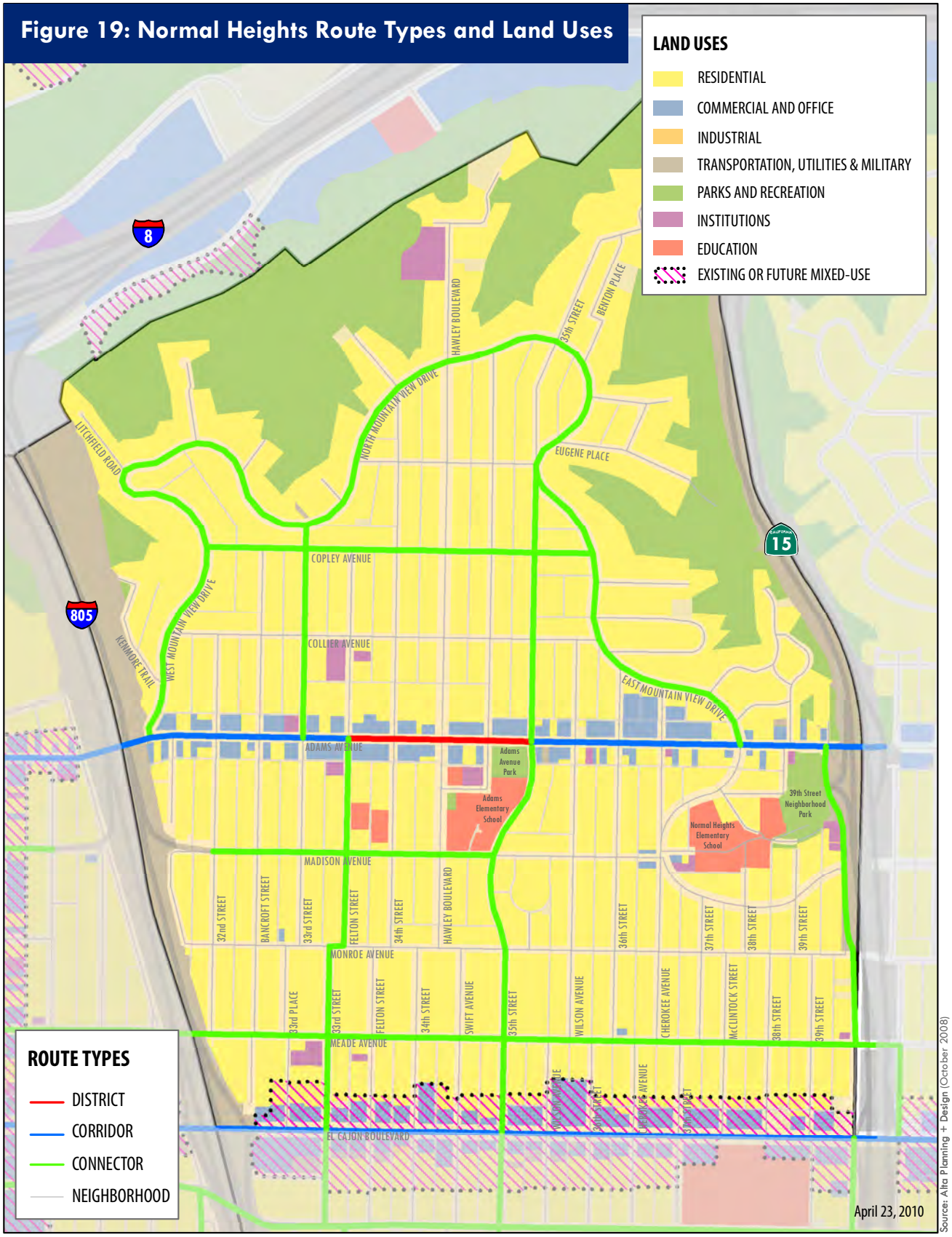


Figure 18: Golden Hill Route Types and Land Uses
LAND USES
RESIDENTIAL
COMMERCIAL AND OFFICE
INDUSTRIAL
TRANSPORTATION, UTILITIES & MILITARY
PARKS AND RECREATION
INSTITUTIONS
EDUCATION
EXISTING OR FUTURE MIXED-USE
ROUTE TYPES
DISTRICT
CORRIDOR
CONNECTOR
NEIGHBORHOOD
BALBOA PARK
Golden Hill Elementary School
Albert Einstein Academies
0
495
990 Feet
N
April 23, 2010
Source: Alta Planning + Design

Figure 19: Normal Heights Route Types and Land Uses



Source: Alta Planning + Design (October 2008)

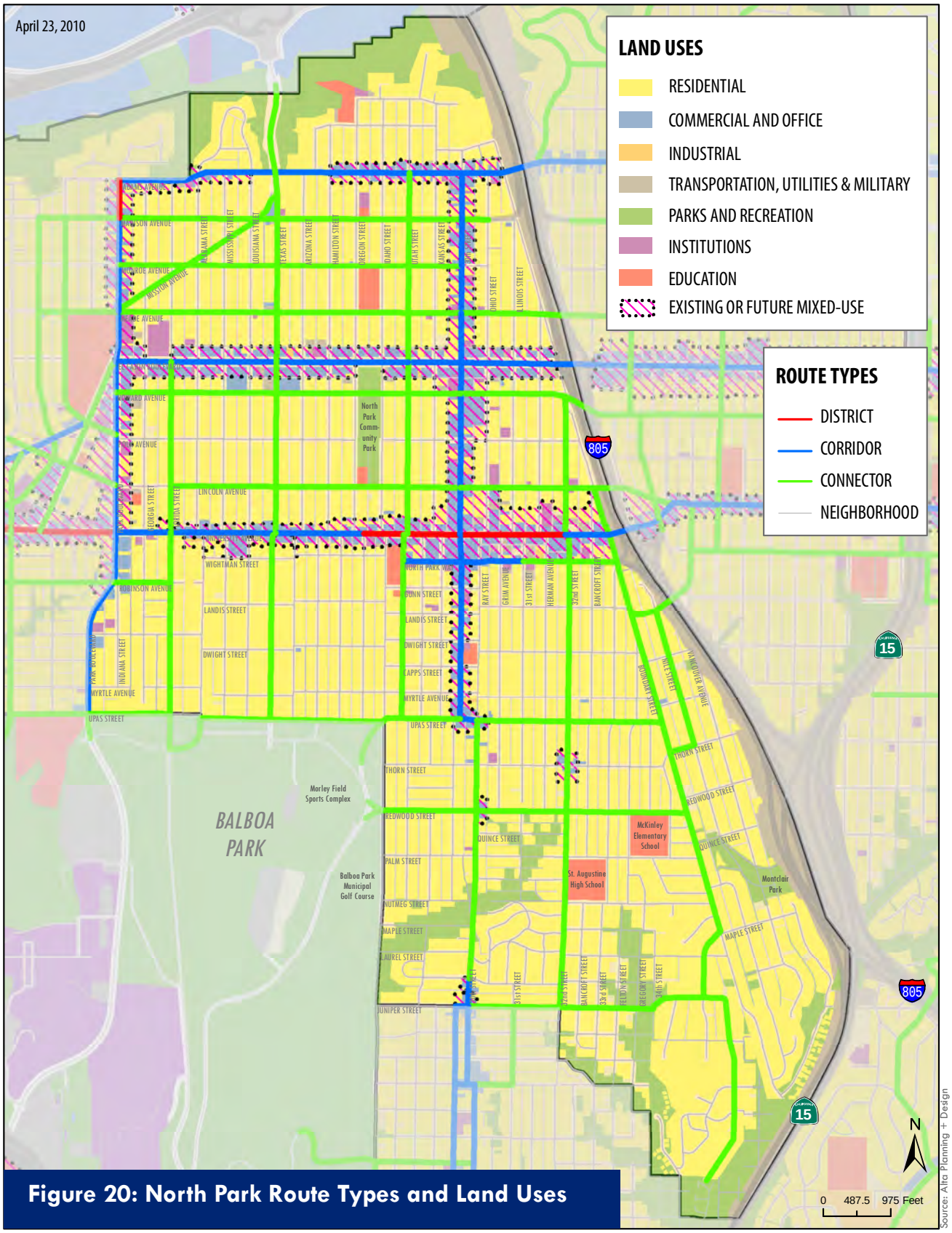


Figure 20: North Park Route Types and Land Uses

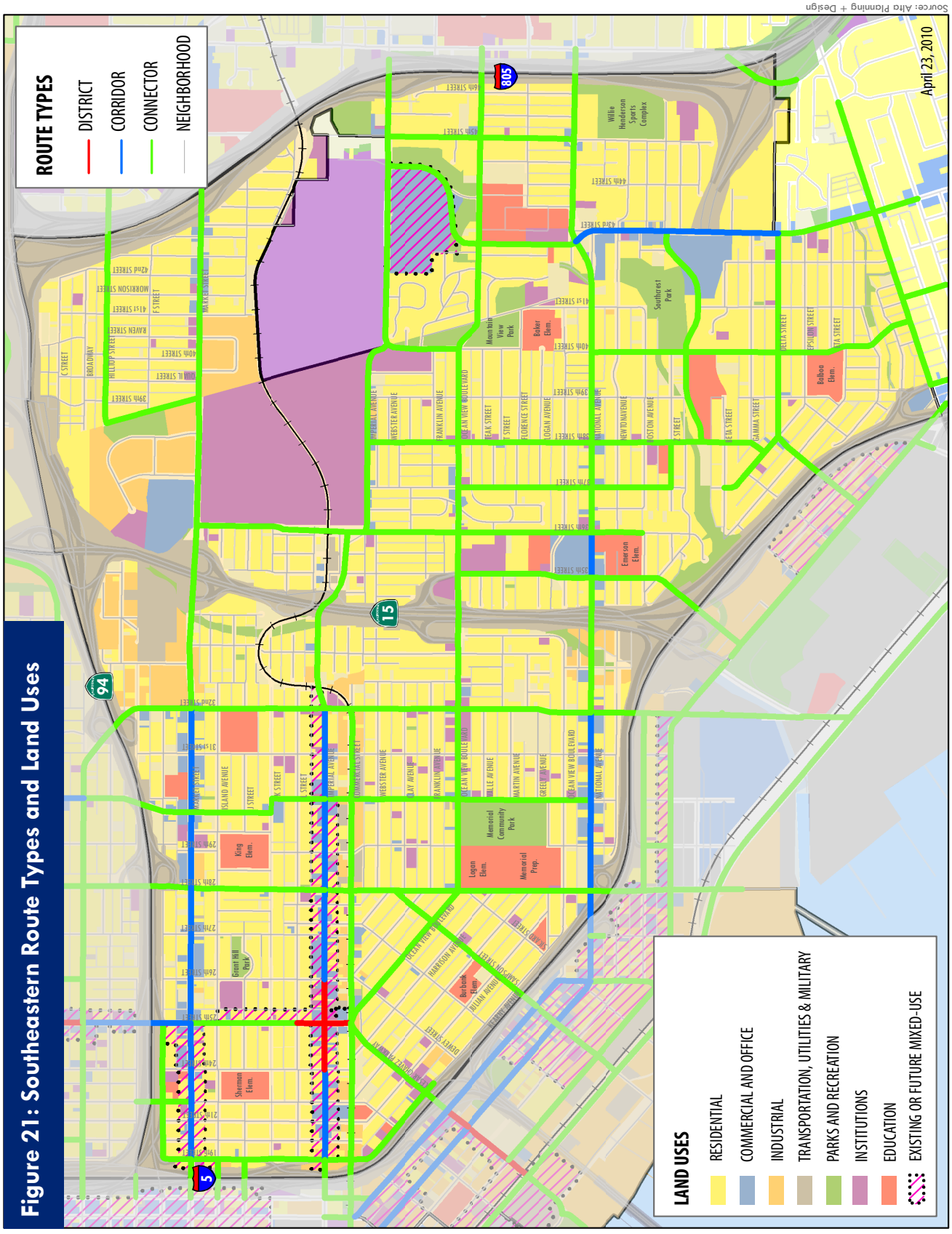


Figure 21: Southeastern Route Types and Land Uses
ROUTE TYPES
DISTRICT
CORRIDOR
CONNECTOR
NEIGHBORHOOD
LAND USES
RESIDENTIAL
COMMERCIAL AND OFFICE
INDUSTRIAL
TRANSPORTATION, UTILITIES & MILITARY
PARKS AND RECREATION
INSTITUTIONS
EDUCATION
EXISTING OR FUTURE MIXED-USE
April 23, 2010
Source: Alta Planning + Design

Figure 22: Uptown Route Types and Land Uses