Appendix A: Anticipated Development Methodology

Several data sets were utilized to determine the most likely scenario for future development in the Iwilei Kapalama Infrastructure Needs Assessment study boundary. Data sets include GIS parcel data from the City and County of Honolulu, Tax Categories and Rates provided by the Department of Budget and Fiscal Services, a data set commissioned from CBRE to compare analysis, and, most importantly, the data set generated by planning firm Dyett & Bhatia for the Downtown and Kalihi Neighborhood Transit-Oriented Development Plans and associated studies. All data sources utilized TMK as a category, so when necessary this column was used to join datasets.

nticipated development was estimated based on the existing and proposed TOD land uses, average assumptions assumptions for intensity and use mix developed by Dyett & Bhatia and updated according to new considerations (see table B1), and the likelihood of redevelopment. Development opportunity sites were identified through the analysis of the data provided by Dyett & Bhatia according to their existing conditions analysis and the opportunity sites data was revised by the project team. These sites are shown Figure 5 of this report. The analysis centered on identifying potential opportunity sites based on categories in the data set, such as:

- Vacant sites or sites currently occupied by surface parking lots;
- Properties where assessed value is less than land value, suggesting that the site is "underutilized;"
- Low intensity sites, where FAR values are below 0.75 or 0.50 and more intensive redevelopment may be appropriate (sites with low FAR values);
- "Other Opportunity Sites" that have been identified as potential opportunities by stakeholders, landowners, City staff or consultants; but
- Excluding open space, schools, and residential uses (except those identified as "Other Opportunity Sites.")

Depiction of the site as an "opportunity" does not necessarily mean that the site will undergo change over the next 20-30 years. It is possible that a site with reuse potential may not undergo change while other sites that are not considered to have potential may undergo change; however, the purpose behind this exercise is to help evaluate <u>likely</u> future development potential and impacts.

The Key on Table B2 identifies the data used for this model and analysis, the source of the data set and is color-coded by source. Further, the Key identifies the column, heading (including source), an explanation of the heading when appropriate, and the range of value(s) or equations found in each column. This study adjusted the data set to account for the twelve determined sub-districts within the broader infrastructure needs assessment boundary.

Table B1: Assumptions for Buildout Calculations									
					ASSUMED BREAKDOWN OF USES				
Land Use Designation		**ROW Factor**	**Total Typical FAR**	**Max FAR**	**Mixed use Allocations**	**Residential**	**Retail**	**Office/ R&D/ Light Industrial**	**Open Space**
High Density Residential	High-density residential development in an urban setting that accommodates single- and multi-family units in mid- and high-rise buildings, with adequate public facilities and infrastructure	0.7	2.5	2.8		120%			20%
Medium Density Residential	Urban residential development in a low- to mid-rise setting with adequate public facilities and infrastructure; permits single-family, duplex, and multi-family dwelling units	0.7	1.5	1.9		120%			20%
Low Density Residential	Urban residential development in a low-rise setting, permitting single-family (attached and detached) and duplex dwelling units		0.6	0.9					20%
Downtown Mixed Use	Mixed-use development in the central business district allowing office, government, retail, and multi-family residential uses, as well as public/quasi-public facilities and open spaces	0.9	4.5	7.5	0.6 Residential 0.2 Retail 0.2 Office/R&D/Light Industrial	60%	20%	20%	30%
Urban Mixed Use-High	A mix of commercial, residential, and public uses serving a larger community outside the central business district; mix of uses may occur horizontally or vertically; single-use projects (i.e. 120% residential or 120% non-residential) are permitted	0.8	3.5	5.5	0.7 Residential 0.15 Retail 0.15 Office/R&D/Light Industrial	70%	15%	15%	25%
Urban Mixed Use-Medium	Medium-density housing in a neighborhood setting with a mix of commercial, residential, and public uses; mix of uses may occur horizontally or vertically; single-use projects (i.e. 120% residential or 120% non-residential) are permitted	0.65	2.5	4.5	0.7 Residential 0.15 Retail 0.15 Office/R&D/Light Industrial	70%	15%	15%	20%
Industrial Mixed Use	A mix of commercial and industrial uses allowing a range of business and employment opportunities; residential development is not permitted	0.25	1.5	2.5	0.25 Retail 0.75 Office/R&D/Light Industrial		25%	75%	20% 12%?
Office/R+D/Light Industrial	Light manufacturing, research and development, distribution, office, and commercial uses; heavy industry excluded	0.8	1.5	2.5				120%	20%
Commercial Office	Commercial office development, accommodating a range of business types and serving several neighborhoods.		2.5	3.5					12%
Industrial	Full-range of light and heavy industrial activities		1.5	2.5	n/a				12%
Open Space	Public open space, parks, recreation, and greenways for the general community	1	n/a	n/a					100%

Source: Downtown and Kalihi TOD Plans (Dyett & Bhatia 2012)

Table B2: Methodology Key			
Column	**Heading**	**Heading Explanation**	**Value or Equation**
A*	**Sub District**	Anticipated IKIMP Sub District Area	• 1, • 2, • 3, • 4, • 5, • 6, • 7, • 8, • 9, • 10, • 11, or • 12
F*	**TMK (D&B/Tax Records)**		*Various*
G*	**Facility (D&B)**	Existing Facility Category	• 0; • (Did not use because it's ROW on either side of Kapalama Canal); • (Subdistrict 2 or 3, chose 3 because drainage and Canal (HCC Side)); • Ancillary Dwelling; • Apartment; • Building w/ 2 Dwellings (Duplex); • Community; • Driveway entrance; • Educational/Cultural; • Exhibition; • Group Quarter; • Hotel; • Kapalama Canal- No Development; • Office; • Open Recreation; • Other Open Facility; • Production/Storage/Distribution/Repair; • Production/Storage/Distribution/Repair (Did not use because it's within Kapalama Canal); • Public Safety; • Retail; or • Services; • Single-Family Dwelling; • Transit Terminal; • Utilities; • Worship; • (Blanks)
S*	**FAR (Column N Divided by Column Y)**	*Existing Floor Area Ratio as Built*	*Various Numbers*
U*	**DENSITY (D&B)**		*Various Numbers*
V*	**Opt_Site (D&B)**	Site Opportunity	• Low FAR: 0.75 under; • Low FAR: Less than 0.5; • Other Opportunity Sites;

Table B2: Methodology Key			
Column	**Heading**	**Heading Explanation**	**Value or Equation**
			• ROW; • Vacant/Surface Parking; or • <Blank>
AR*	**Pref_Plan (D&B)**	Preferred TOD Plan Identified Use	• College; • Commercial Office; • Downtown Mixed Use; • Government; • High Density Residential; • Industrial; • Industrial Mixed Use; • Kakaako Community Development District; • Low Density Residential; • Medium Density Residential; • Open Space; • Public/Quasi-Public; School; • Urban Mixed Use-High; • Urban Mixed Use-Medium; • Waterfront Industrial Precinct; or < • Blank>
AW*	**PP_MAXFAR (D&B)**	Preferred TOD Plan Identified Max Floor Area Ratio	• 0; • 0.0; • 0.9; • 1.0; • 1.9; • 2.5; • 2.8; • 3.5; • 4.5; • 5.5; or • 7.5
BJ*	**OPPSITE (D&B)**	Opportunity Site (do they consider it one with great opportunity or not)	=IF(OR((AND(AI2="Low FAR: 0.5 - 0.75",BE2="Yes")),(AND(AI2="",BE2="Yes")),AI2="Low FAR: Less than 0.5",AI2="Vacant/Surface Parking",AI2="Other Opportunity Sites"),"Yes","") • Yes; or • <Blank>
CM*	**Preferred Plan Typical FAR**	Coded from D&B Assumptions	=IF(AR2="Downtown Mixed Use",4.5,IF(AR2="Urban Mixed Use-High",3.5,IF(AR2="Urban Mixed Use-Medium",2.5,IF(AR2="High Density Residential",2.5,IF(AR2="Commercial Office",2.5,IF(AR2="Medium Density Residential",1.5,IF(AR2="Industrial Mixed Use",1.5,IF(AR2="Office/R+D/Light Industrial",1.5,IF(AR2="Industrial",0,IF(AR2="",""))))))))))) • 4.5 • 3.5 • 2.5 • 1.5 • 0 • False; or • <Blank>
CN*	**Redevelopment**	Anticipated square footage	=BG2*43560

Table B2: Methodology Key			
Column	**Heading**	**Heading Explanation**	**Value or Equation**
	SF	available for redevelopment using D&B numbers	Various
CO*	**Residential**	Anticipated total residential SF for development	=(IF(AR2="Downtown Mixed Use",0.6,IF(AR2="Urban Mixed Use-High",0.7,IF(AR2="Urban Mixed Use-Medium",0.7,IF(AR2="High Density Residential",1.2,IF(AR2="Medium Density Residential",1.2)))))*BI2)
CP*	**@1000 sf/unit**	Residential units @ 1000 SF/unit (C0/1000)	=(IF(AR2="Downtown Mixed Use",0.6,IF(AR2="Urban Mixed Use-High",0.7,IF(AR2="Urban Mixed Use-Medium",0.7,IF(AR2="High Density Residential",1.2,IF(AR2="Medium Density Residential",1.2)))))*CN2)/1000
CQ*	**@850 sf/unit**	Residential units @ 850 SF/unit (C0/850)	=(IF(AR2="Downtown Mixed Use",0.6,IF(AR2="Urban Mixed Use-High",0.7,IF(AR2="Urban Mixed Use-Medium",0.7,IF(AR2="High Density Residential",1.2,IF(AR2="Medium Density Residential",1.2)))))*CN2)/850
CR*	**Retail**	Anticipated total retail SF for development	=IF(AR2="Downtown Mixed Use", 0.2,IF(AR2="Urban Mixed Use-High", 0.15,IF(AR2="Urban Mixed Use-Medium",0.15,IF(AR2="Industrial Mixed Use",0.25,IF(AR2="Medium Density Residential",FALSE))))))*CN2
CS*	**Office/R&D/Light Industrial**	Anticipated total office/R&D/light industrial SF for development	=IF(AR2="Downtown Mixed Use", 0.2,IF(AR2="Urban Mixed Use-High", 0.15,IF(AR2="Urban Mixed Use-Medium",0.15,IF(AR2="Industrial Mixed Use",0.75))))*CN2
CT*	**Difference from Existing Residential**	(Existing residential units minus the inverse of percent build out equals remaining existing units)	=K2*(1-BF2)
CU*	**Difference from Existing Commercial**	Existing commercial SF minus the inverse of percent build out equals remaining commercial SF)	=N2*(1-BF2)

Appendix B: Infrastructure Modeling and Cost Assumptions

Proposed New Roadways

New Roadways Assumptions

- When new roadways are being constructed, other infrastructure (water, sewer, etc.) will be put in place.
- Roadway Sections:
    - Will have a 66' right-of-way (ROW) with 36' wide asphalt paved travel way, 5' for landscaping and 10' wide concrete sidewalks with curb and gutter
    - Pavement section is based on 3" thick AC, 4" thick asphalt treated base over 12" thick base course
    - Additional pavement costs must be considered for roadways sections with heavy traffic loads
    - For roadways in poor soil condition, and additional 18" of base course wrapped with geogrid and geotextile is recommended
- Conceptual Construction Cost Estimates
    - Include:
        - Property acquisition
        - Irrigation and street tree
        - Catch basins for drainage
        - Streets lights
        - Landscaping
    - Do not include:
        - Demolition and removal of the existing buildings or hardened surfaces
        - Demolition or relocation of existing utilities
        - Subdivision and permits costs
        - Green infrastructure costs, but it is assumed that they could be incorporated into the 66' ROW[17]
        - Tree root cutting and pruning for utility installation
- The conceptual landscaping costs assume:
    - Sidewalk zone
    - Landscaping incorporates irrigation, grass strip, trees, and 90-day maintenance period
    - Trees spaced 40' apart
- Other Elements for Consideration
    - An 8' bike lane with barriers such as sign posts or bollards may require narrower street sweeping equipment since normal street sweeper width is 9'6"
- Existing Roadways: Improvements to existing roadways were not considered in this analysis.

[17] The costs of green infrastructure (Silva Cells) are included for comparison to landscaping costs in the Conceptual Roadway Cost Estimate (see Appendix B-1).

Water

New Facility Assumptions

- The Water System Standards (WSS) identify trench widths of 24-inches for mains up to 12" diameter and 30-inches for mains up to 16" diameter. Expect the contractor to bid and charge us for only that quantity of material removed.
- Conceptual Construction Cost Estimates
    - Include:
        - Fire hydrant, hydrant connection, and chlorination
        - Demolition and removal of the existing waterline is shown but can be excluded if BWS deems not necessary
    - Do not include:
        - Relocation of other utilities to place new waterline
        - Replacement of old/inadequate infrastructure has not been considered Construction requirements for high water table, flooding, or poor soil conditions
        - Alternative pipe materials or corrosion protection systems that may be necessary for conditions created with sea level rise
- Other Elements for Consideration
    - Water lines are preferred to be located on City roadways, because there can be challenges when running distribution pipelines through private property
    - The current WSS approve PVC up to 16" diameter (DR14) pipe; however, the BWS is currently re-evaluating the standards and may only allow PVC for 12" diameter and below
    - Other pipe material selections may be needed because fuel contaminated soils in the region may impact PVC material.
    - There may be difficulties in repairing main breaks with flooded conditions because dewatering operations will flood adjacent properties

Existing Facilities

- As much as possible, design pipe alignment to avoid relocation of utilities.
- BWS doesn't typically do demolition and removal of existing pipeline. Disruptions to existing water services and fire protection should be minimized.

Drainage

New Facility Assumptions

- Conceptual Construction Cost Estimates
    - Include: Rough order of magnitude costs for catch basins along new roadways only
    - Do not include: Improvements to regional drainage
- Other Elements for Consideration
    - Recommended that all new catch basin construction implement revised reinforcing as indicated in the current DPP Standard Details (blue book)
    - Drain inlets are being considered, instead of catch basins because catch basins are often damaged by vehicles. Also, new grated inlets can be considered if it is important to improve water quality in Kapalama Stream in terms of trash reduction
    - Grated inlet system will cost approximately 12% more than the catch basin system

Wastewater

New Facility Assumptions

- Construction work with local connectors under 16” should be same price.
- Conceptual Construction Cost Estimates
    - Do not include: Price increase percentage of costs due to high groundwater levels versus regular construction.

Electrical

New Facility Assumptions

- New electrical and telecommunication infrastructure improvements are assumed to be underground.
- If additional land or easements are required by the utility companies for the necessary facilities to serve the Districts, this will be addressed by the utility companies.

Appendix C: Engineering Analysis and Cost Estimates

Appendix C.1: Conceptual New Roadway Cost Estimates

(The cost for new underground electrical and telecommunications ducts and cabling, street lights, street light duct systems, wiring, and traffic signal interconnect conduits, are summarized in Appendix C.3.)

Appendix C.2: Conceptual Fire Protection Water System Improvement Cost Estimates

Appendix C.3: Electrical and Telecommunications Conceptual Analysis

Appendix C.1: Conceptual New Roadway Cost Estimates

Unit Price based year: 2017

			Cost Per Road Phase 1				
Item	**Unit**	**Unit Price**	**1**	**2**	**3**	**4**	**Sub-Total**
Land Acquisition	SF	*varies*	$0	$0	$0	$0	**$0**
Roadway							
3" A.C. Pavement	SY	$25.50	$111,996	$58,752	$44,523	$100,827	$316,098
4" Asphalt Treated Base	SY	$30.00	$131,760	$69,120	$52,380	$118,620	$371,880
12" Base Course	SY	$40.00	$175,680	$92,160	$69,840	$158,160	$495,840
C&C Std. 15" Curb and Gutter	LF	$60.00	$148,200	$77,760	$58,920	$133,440	$418,320
4" Conc. Sidewalk w/ WWF	SF	$15.00	$370,500	$194,400	$147,300	$333,600	$1,045,800
Select Borrow for Conc. Sidewalk	CY	$160.00	$73,185	$38,400	$29,096	$65,896	$206,578
							$2,900,000
Drainage							
Type "A" or "B" Catch Basins	EA	$18,300.00	$530,700	$274,500	$109,800	$475,800	$1,390,800
18" RC Pipe	LF	$207.00	$471,753	$245,916	$146,349	$423,936	$1,287,954
24" RC Pipe	LF	$247.00	$0	$0	$0	$0	$0
							$2,700,000
Sewer							
16" or less PVC Pipe	LF	$186.00	$229,710	$120,528	$91,326	$206,832	$648,396
Standard SMH	EA	$21,400.00	$85,600	$42,800	$42,800	$85,600	$256,800
							$900,000
Water							
12" PVC Pipe	LF	$170.00	$209,950	$110,160	$0	$0	$320,110
8" PVC Pipe	LF	$160.00	$0	$0	$78,560	$177,920	$256,480
							$600,000
Landscaping							
Trees (Tulipwood)	EA	$500.00	$31,000	$17,000	$13,000	$28,000	$89,000
Silva Cell 3 per Catch Basin	EA	$17,000.00	$493,000	$255,000	$102,000	$442,000	$1,292,000
Grassed Strip	LF	$2.00	$4,940	$2,592	$1,964	$4,448	$13,944
Irrigation	LF	$20.00	$49,400	$25,920	$19,640	$44,480	$139,440
WM and IPC	EA	$9,000.00	$18,000	$18,000	$18,000	$18,000	$72,000
90-Day Maintenance Period	LF	$4.00	$9,880	$5,184	$3,928	$8,896	$27,888
							$1,600,000
Sub-total			**$3,145,254**	**$1,648,192**	**$1,029,426**	**$2,826,455**	**$8,700,000**

Legend

A.C. = Asphalt Concrete
Std. = Standard
Conc. = Concrete
WWF = Welded Wire Fabric
RC = Reinforced Concrete
PVC = Polyvinyl Chloride
SMH = Sewer Manhole
WM = Water Meter
IPC = Irrigation Point of Connection

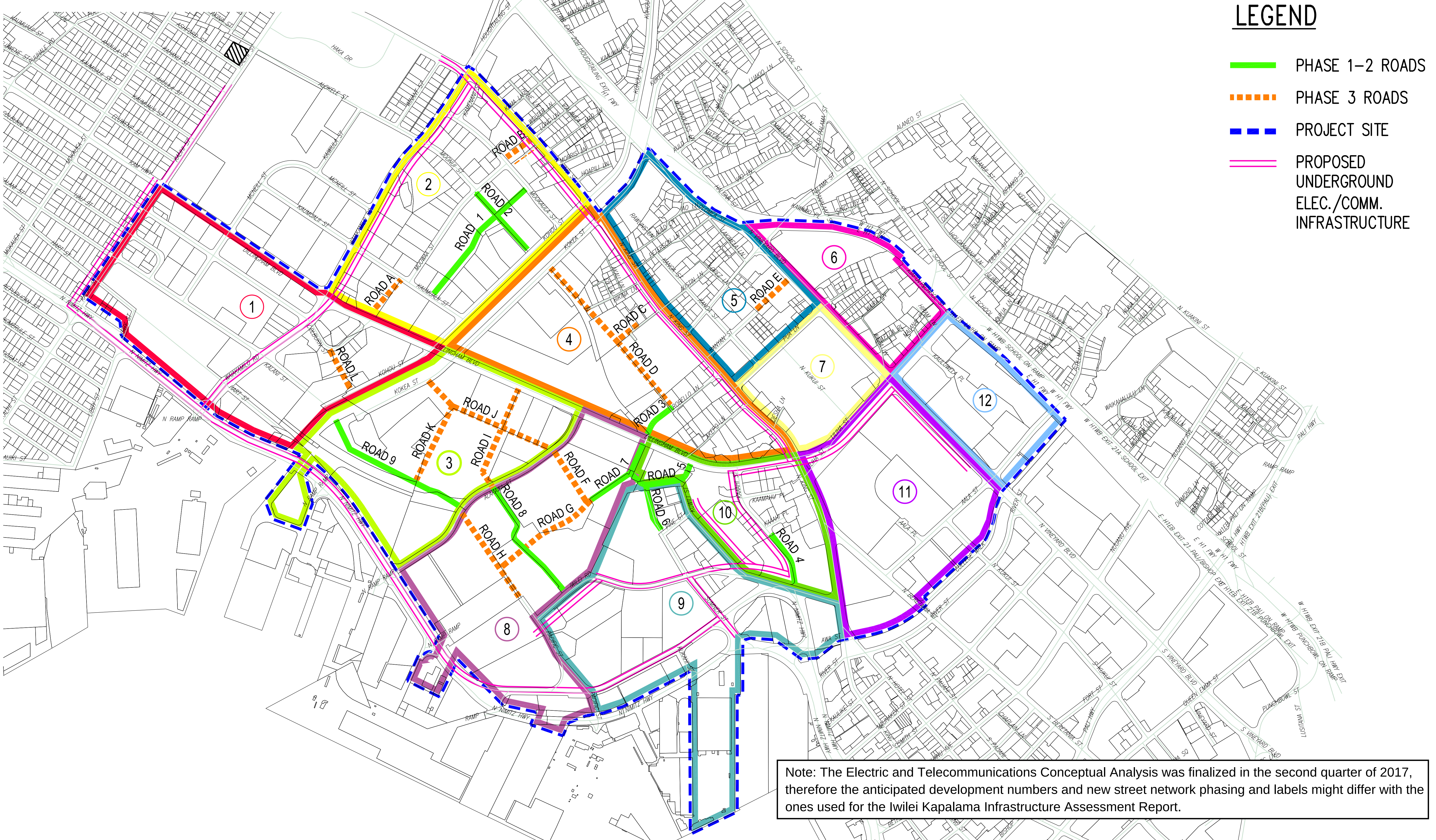
			Cost Per Road Phases 2 - 3								
Item	**Unit**	**Unit Price**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
Land Acquisition	SF	*varies*	$1,810,190	$1,747,316	$0	$0	$0	$2,805,733	$0	$3,368,796	$2,219,803
Roadway											
3" A.C. Pavement	SY	$25.50	$38,352	$24,225	$22,848	$146,523	$31,008	$35,828	$36,287	$48,527	$36,287
4" Asphalt Treated Base	SY	$30.00	$45,120	$28,500	$26,880	$172,380	$36,480	$42,150	$42,690	$57,090	$42,690
12" Base Course	SY	$40.00	$60,160	$38,000	$35,840	$229,840	$48,640	$56,200	$56,920	$76,120	$56,920
C&C Std. 15" Curb and Gutter	LF	$60.00	$50,760	$32,040	$30,240	$193,920	$41,040	$47,400	$48,000	$64,200	$48,000
4" Conc. Sidewalk w/ WWF	SF	$15.00	$126,900	$80,100	$75,600	$484,800	$102,600	$118,500	$120,000	$160,500	$120,000
Select Borrow for Conc. Sidewalk	CY	$160.00	$25,067	$15,822	$14,933	$95,763	$20,267	$23,407	$23,704	$31,704	$23,704
Drainage											
Type "A" or "B" Catch Basins	EA	$18,300.00	$128,100	$36,600	$36,600	$311,100	$36,600	$54,900	$128,100	$237,900	$128,100
18" RC Pipe	LF	$207.00	$139,725	$70,173	$67,068	$461,196	$85,698	$104,121	$134,964	$207,621	$134,964
24" RC Pipe	LF	$247.00	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sewer											
16" or less PVC Pipe	LF	$186.00	$78,678	$49,662	$46,872	$177,816	$63,612	$73,470	$18,600	$99,510	$18,600
Standard SMH	EA	$21,400.00	$42,800	$21,400	$21,400	$64,200	$21,400	$42,800	$21,400	$42,800	$21,400
Water											
12" PVC Pipe	LF	$170.00	$71,910	$45,390	$0	$0	$0	$0	$0	$0	$0
8" PVC Pipe	LF	$160.00	$0	$0	$40,320	$258,560	$54,720	$63,200	$64,000	$53,600	$64,000
Landscaping											
Trees (Tulipwood)	EA	$500.00	$11,000	$7,000	$7,000	$41,000	$9,000	$10,000	$10,000	$14,000	$10,000
Silva Cell 3 per Catch Basin	EA	$17,000.00	$119,000	$34,000	$34,000	$289,000	$34,000	$51,000	$119,000	$221,000	$119,000
Grassed Strip	LF	$2.00	$1,692	$1,068	$1,008	$6,464	$1,368	$1,580	$1,600	$2,140	$1,600
Irrigation	LF	$20.00	$16,920	$10,680	$10,080	$64,640	$13,680	$15,800	$16,000	$21,400	$16,000
WM and IPC	EA	$9,000.00	$18,000	$18,000	$18,000	$18,000	$18,000	$18,000	$18,000	$18,000	$18,000
90-Day Maintenance Period	LF	$4.00	$3,384	$2,136	$2,016	$12,928	$2,736	$3,160	$3,200	$4,280	$3,200
Sub-total			**$2,787,758**	**$2,262,112**	**$490,705**	**$3,028,130**	**$620,849**	**$3,567,249**	**$862,464**	**$4,729,187**	**$3,082,267**

Cost Per Road Phases 2 – 3 (continued)												Total Cost
Item	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**	**Sub-Total**	**All Phases**
Land Acquisition	$2,170,452	$2,475,685	$6,833,706	$4,288,109	$4,896,958	$6,666,872	$3,410,738	$4,944,324	$9,865,347	$4,580,381	**$62,100,000**	**$62,100,000**
Roadway												
3" A.C. Pavement	$61,838	$44,447	$90,678	$79,535	$82,340	$113,628	$64,668	$119,238	$35,369	$65,280	$1,176,902	
4" Asphalt Treated Base	$72,750	$52,290	$106,680	$93,570	$96,870	$133,680	$76,080	$140,280	$41,610	$76,800	$1,384,590	
12" Base Course	$97,000	$69,720	$142,240	$124,760	$129,160	$178,240	$101,440	$187,040	$55,480	$102,400	$1,846,120	
C&C Std. 15" Curb and Gutter	$81,840	$58,800	$120,000	$105,240	$108,960	$150,360	$85,560	$157,800	$46,800	$86,400	$1,557,360	
4" Conc. Sidewalk w/ WWF	$204,600	$147,000	$300,000	$263,100	$272,400	$375,900	$213,900	$394,500	$117,000	$216,000	$3,893,400	
Select Borrow for Conc. Sidewalk	$40,415	$29,037	$59,259	$51,970	$53,807	$74,252	$42,252	$77,926	$23,111	$42,667	$769,067	
											$10,600,000	**$13,500,000**
Drainage												
Type "A" or "B" Catch Basins	$292,800	$109,800	$420,900	$366,000	$384,300	$384,300	$219,600	$457,500	$54,900	$146,400	$3,788,100	
18" RC Pipe	$260,406	$146,142	$378,396	$330,579	$271,998	$308,223	$89,424	$458,505	$103,086	$0	$3,752,289	
24" RC Pipe	$0	$0	$0	$0	$86,450	$128,440	$176,111	$0	$0	$248,976	$391,001	
											$7,900,000	**$10,600,000**
Sewer												
16" or less PVC Pipe	$126,852	$91,140	$186,000	$81,282	$168,888	$233,058	$132,618	$244,590	$72,540	$133,920	$1,963,788	
Standard SMH	$42,800	$42,800	$64,200	$42,800	$64,200	$85,600	$64,200	$85,600	$42,800	$64,200	$834,600	
											$2,800,000	**$3,700,000**
Water												
12" PVC Pipe	$0	$0	$0	$0	$154,360	$213,010	$121,210	$223,550	$66,300	$122,400	$895,730	
8" PVC Pipe	$109,120	$78,400	$160,000	$101,920	$0	$0	$0	$0	$0	$0	$1,047,840	
											$1,900,000	**$2,500,000**
Landscaping												
Trees (Tulipwood)	$18,000	$13,000	$25,000	$22,000	$23,000	$32,000	$18,000	$33,000	$10,000	$18,000	$313,000	
Silva Cell 3 per Catch Basin	$272,000	$102,000	$391,000	$340,000	$357,000	$357,000	$204,000	$425,000	$51,000	$136,000	$3,519,000	
Grassed Strip	$2,728	$1,960	$4,000	$3,508	$3,632	$5,012	$2,852	$5,260	$1,560	$2,880	$49,032	
Irrigation	$27,280	$19,600	$40,000	$35,080	$36,320	$50,120	$28,520	$52,600	$15,600	$28,800	$490,320	
WM and IPC	$18,000	$18,000	$18,000	$18,000	$18,000	$18,000	$18,000	$18,000	$18,000	$18,000	$324,000	
90-Day Maintenance Period	$5,456	$3,920	$8,000	$7,016	$7,264	$10,024	$5,704	$10,520	$3,120	$5,760	$98,064	
											$4,800,000	**$6,400,000**
Sub-total	**$3,904,336**	**$3,503,741**	**$9,348,059**	**$6,354,469**	**$7,215,907**	**$9,517,719**	**$5,074,877**	**$8,035,233**	**$10,623,623**	**$6,095,264**	**$90,100,000**	**$98,800,000**

Potential additional cost		
Item	**Unit**	**Unit Price**
Roadway (Poor Soil) Additional 18" Base Course w/ Geotextile & Geogrid	SY	$68.00
Utilities - (Poor Soil) Jet Grouting for Bedding Stabilization	LF	$200.00
Dewatering Contingency	LF	$210.00
Roadway (Bad Soil) Additional 18" Base Course w/ Geotextile & Geogrid	SY	$128.00
Roadway (Bad Soil) Additional 18" Base Course w/ Geogrid and Geotextile	LF	$378.00
Dewatering Contingency	LF	$397.00
Note: Approximate locations can be determined during the design phase based on the geotechnical report but the exact locations can only be determined during construction.		

Appendix C.2: Conceptual Fire Protection Water System Improvement Cost Estimates

ITEM	LOCATION	Description	QUANTITY	UNIT	Year 2017 Unit Cost	Year 2030 Unit Cost	Year 2017 Total Cost	Year 2030 Total Cost
WATER SYSTEM								
1	Hart St.	16" C905 PVC class 150 water pipe including AC pavement removal, trenching, pipe cushion, connection to existing laterals, backfill, AC pavement restoration and other incidentals, in place complete.	1,600	Lin. Ft.	$1,200	$2,270	$1,920,000	$3,632,000
2	Kalani St.	12" C900 PVC class 150 water pipe, including AC pavement removal, trenching, pipe cushion, backfill, connection to existing laterals, AC pavement restoration, and other incidentals, in place complete.	1,700	Lin. Ft.	$800	$1,500	$1,360,000	$2,550,000
3	Dillingham Blvd		1,800				$1,440,000	$2,700,000
4	Waiakamilo Rd.		2,470				$1,976,000	$3,705,000
5	Colburn St. Ext.		460				$368,000	$690,000
6	McNeill St.		2,550				$2,040,000	$3,825,000
7	Kaumualii St. (East)		1,000				$800,000	$1,500,000
8	Moonui St.		750				$600,000	$1,125,000
9	Moowaa St.		1,450				$1,160,000	$2,175,000
10	Kokea St.		750				$600,000	$1,125,000
11	Kohou St.		200				$160,000	$300,000
SUBTOTAL FOR WATER SYSTEM							**$12,424,000**	**$23,327,000**
DEMOLITION AND REMOVAL								
1	Hart St.	Remove Existing 12" Water Line, including AC pavement removal, trenching, backfill, and replacement of AC pavement	1,600	Lin. Ft.	$290	$550	$464,000	$880,000
2	Kalani St.	Remove Existing 8" Water Line, including AC pavement removal, trenching, backfill, and replacement of AC pavement	1,700	Lin. Ft.	$250	$470	$425,000	$799,000
3	Dillingham Blvd		1,800				$450,000	$846,000
4	Waiakamilo Rd.		2,470				$617,500	$1,160,900
5	Colburn St. Ext.		460				$115,000	$216,200
6	McNeill St.		2,550				$637,500	$1,198,500
7	Kaumualii St. (East)		1,300				$325,000	$611,000
8	Moonui St.		750				$187,500	$352,500
9	Moowaa St.		1,450				$362,500	$681,500
10	Kokea St.		750				$187,500	$352,500
11	Kohou St.		200				$50,000	$94,000
SUBTOTAL DEMOLITION AND REMOVAL COST							**$3,821,500**	**$7,192,100**
TOTAL COST							**$16,245,500**	**$30,519,100**



Note: The Electric and Telecommunications Conceptual Analysis was finalized in the second quarter of 2017, therefore the anticipated development numbers and new street network phasing and labels might differ with the ones used for the Iwilei Kapalama Infrastructure Assessment Report.

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NORTH

800' 400' 0 800' 1600'

SCALE: 1" = 800'

TOD – KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS OVERALL MAP

Figure **E-1**

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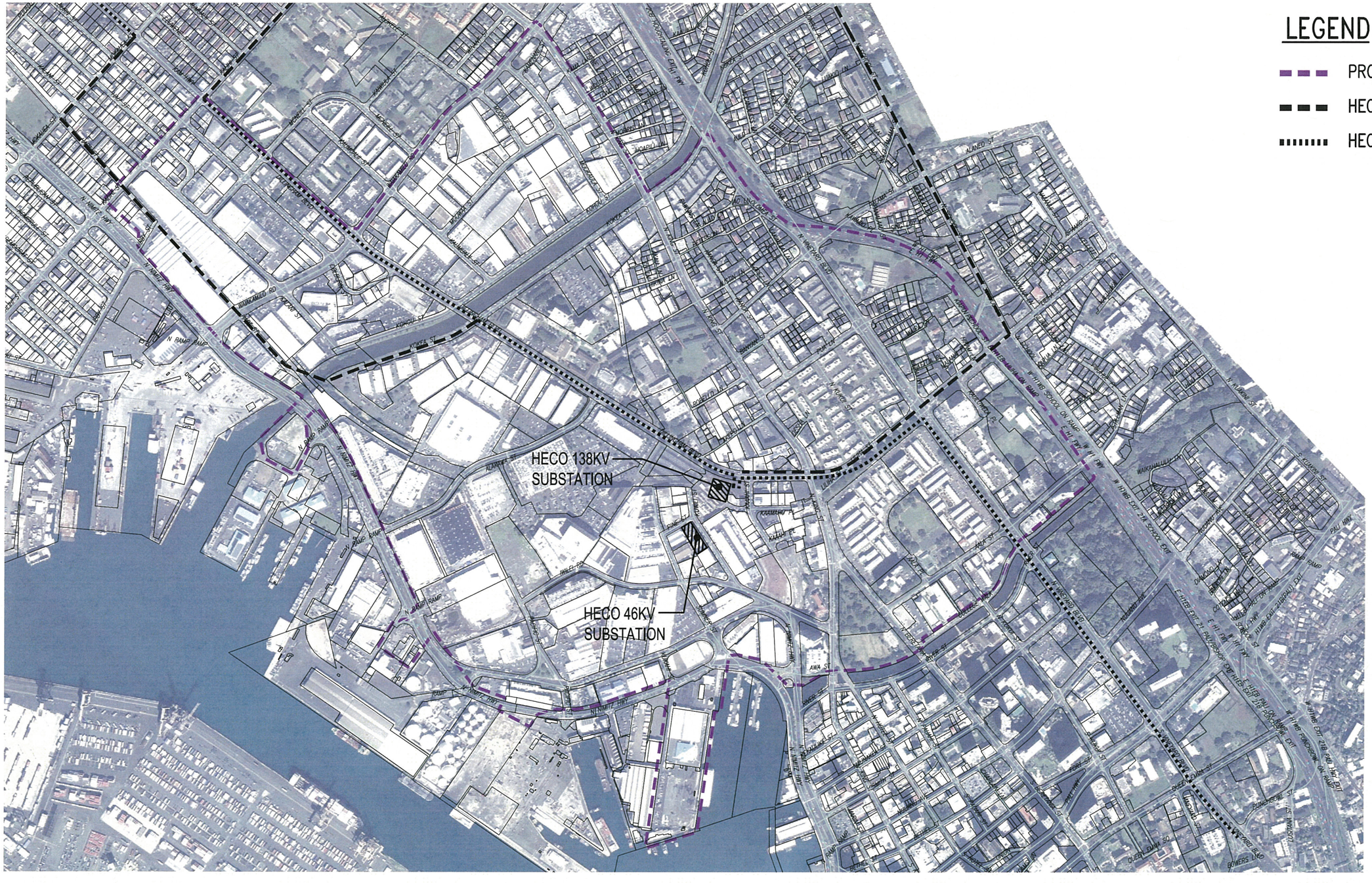

LEGEND

- PROJECT SITE
- HECO 138KV OH
- HECO 138KV UG

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NORTH

800' 400' 0 800' 1600'

SCALE: 1" = 800'

TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS OVERALL MAP - HECO 138KV

* SEGMENTS OF THE EXST 138KV LINES TO BE UNDERGROUND BY HART

Figure E-2

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LEGEND

- PROJECT SITE
- HECO 46KV OH
- HECO 46KV UG
- PROPOSED HECO 46KV UG

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NORTH

800' 400' 0 800' 1600'

SCALE: 1" = 800'

TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS OVERALL MAP - HECO 46KV

* SEGMENTS OF THE EXST 46KV LINES TO BE UNDERGROUND BY HART

Figure E-3

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ELECTRIC AND TELECOMMUNICATIONS UTILITY NOTES

- WITH THE PROPOSED CONSTRUCTION OF THE HRTP GUIDEWAY ALONG DILLINGHAM BOULEVARD AND THE CONSEQUENT UNDERGROUNDING OF ALL ELECTRICAL AND TELECOMMUNICATIONS UTILITIES WITHIN THE ROAD R/W, DILLINGHAM BOULEVARD BECOMES AN IMPRACTICAL ALIGNMENT FOR ADDITIONAL UTILITY DUCTLINES.
- ROUTING OF THE HECO 138 KILO-VOLT (KV) AND 46KV OVERHEAD LINES INDICATED ON THESE PLANS WERE IDENTIFIED BY VISUAL CHECKS AND INTERNET IMAGING.
- PER PROPOSED TOD RULES, NEW ELECTRIC AND TELECOMMUNICATION UTILITIES WILL BE CONSTRUCTED UNDERGROUND. EXISTING OVERHEAD UTILITIES WILL REMAIN OVERHEAD. NO COSTS ARE INCLUDED FOR ANY OVERHEAD-TO-UNDERGROUND SERVICE AND DISTRIBUTION SYSTEM CONVERSIONS.
- IT IS PROPOSED THAT ADDITIONAL SUBSTATION TRANSFORMERS BE INSTALLED BY HECO INTO THEIR WAIAKAMILO SUBSTATION, LOCATED AT THE CORNER OF KALIHI STREET AND ASHFORD STREET, TO PROVIDE ADDITIONAL POWER FOR TOD DEVELOPMENT ON AN INTERIM BASIS, SEE FIGURE E-6 FOR LOCATION
- TO SUPPORT THE LONG-TERM TOD DEVELOPMENT OF IWILEI-KAPALAMA TOD AREA AND TO SUPPORT REGIONAL DEVELOPMENT, IT IS SUGGESTED THAT A 2-ACRE PARCEL BE IDENTIFIED AND DEDICATED FOR DEVELOPMENT OF A HECO 138-25KV SUBSTATION PREFERABLY CLOSER TO THE MIDDLE STREET AREA AND ADJACENT TO THE HECO 138KV LINE. A POSSIBLE LOCATION FOR CONSIDERATION IS THE OAHU COMMUNITY CORRECTIONAL CENTER SITE IF IT IS PROPOSED FOR RE-DEVELOPMENT.
- IT IS PROPOSED THAT ALTHOUGH SOME OF THE PROPOSED UNDERGROUND ELECTRIC UTILITY LINES MAY BE ENERGIZED INITIALLY AT 12KV, THAT THE DUCTLINES AND HECO CABLING BE DESIGNED TO SUPPORT 25KV DISTRIBUTION. THE ROM COSTS ARE BASED ON THIS ASSUMPTION.
- AS-BUILT PLANS OF THE EXISTING OVERHEAD AND UNDERGROUND ELECTRIC UTILITY LINES WERE SOLICITED FROM HAWAIIAN ELECTRIC COMPANY (HECO), BUT ARE UNAVAILABLE AT PRESENT.
- EXCEPT FOR NEW ROADWAYS, ROM COSTS FOR ELECTRIC AND TELECOMMUNICATIONS UNDERGROUND INFRASTRUCTURE DO NOT INCLUDE COSTS FOR STREET LIGHT AND TRAFFIC SIGNAL UPGRADES OR REHABILITATION.
- WAIKAMILO SUBSTATION AND IWILEI TRANSMISSION SUBSTATION EXPANSION COSTS ARE ASSUMED TO BE HECO "SYSTEM" COSTS AND NO BUDGETS ARE INCLUDED HEREIN.
- INTERCEPT & CONNECT THE PROPOSED NIMITZ HIGHWAY 25KV INFRASTRUCTURE TO THE EXISTING ALAKAWA STREET INFRASTRUCTURE.
- NIMITZ HWY AND KALIHI STREET ARE STATE R/W'S. NEW UNDER UNDERGROUND DUCT SYSTEMS WITHIN THESE ROADWAYS WILL REQUIRE USE-AND-OCCUPANCY AGREEMENTS BETWEEN THE UTILITY COMPANIES AND THE STATE DEPT. OF TRANSPORTATION.

ROM COST SUMMARY

ROADWAY	UG NFRASTRUCTURE	HECO 46KV
NIMITZ HIGHWAY INFRASTRUCTURE TOTAL	$27,000,000	$33,000,000
KALIHI STREET INFRASTRUCTURE TOTAL	$4,500,000	$6,500,000
WAIKAMILO ROAD INFRASTRUCTURE TOTAL	$5,000,000	
N KING STREET INFRASTRUCTURE TOTAL	$6,000,000	
LILIHA STREET INFRASTRUCTURE TOTAL	$2,000,000	
VINEYARD BLVD INFRASTRUCTURE TOTAL	$1,750,000	
IWILEI ROAD INFRASTRUCTURE TOTAL	$1,500,000	
IWILEI ROAD (N SUMNER ST) INFRASTRUCTURE TOTAL	$1,400,000	$1,600,000
KAAAHI STREET INFRASTRUCTURE TOTAL	$1,100,000	
DILLINGHAM BLVD INFRASTRUCTURE TOTAL	$800,000	
KUWILI STREET INFRASTRUCTURE TOTAL	$3,500,000	$2,500,000
SUMNER STREET INFRASTRUCTURE TOTAL	$2,000,000	
PHASE 1 & 2 ROADS INFRASTRUCTURE TOTAL	$5,000,000	
PHASE 3 ROADS INFRASTRUCTURE TOTAL	$6,000,000	
IWILEI TOD ELEC & COMM TOTAL	$67,550,000	$45,600,000

ROM COSTS FOR EXISTING ROADS INCLUDE BUDGET ALLOWANCES FOR:
SAWCUT; PAVEMENT REPAIRS; PATCHING; SHORING; DEWATERING; AND TRAFFIC CONTROL.

ROM COST FOR ALL ROADS INCLUDE BUDGET COTS FOR ANTICIPATED HECO CABLING & EQUIPMENT CHARGES.

ROM COSTS FOR ELECTRIC AND TELECOMMUNICATIONS UNDERGROUND INFRASTRUCTURE ALONG EXISTING ROAD RIGHTS-OF-WAYS INCLUDE THE INSTALLATION OF CONDUITS FOR TELECOMMUNICATIONS TRUNKING (TRANSMISSION) LINES ONLY. IT IS ASSUMED THAT ADDITIONAL TELECOMMUNICATIONS DISTRIBUTION CABLES WILL BE INSTALLED ON EXISTING JOINT POLE LINES OR EXISTING UNDERGROUND FACILITIES.

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TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS - NOTES & ROM COST

Figure E-4

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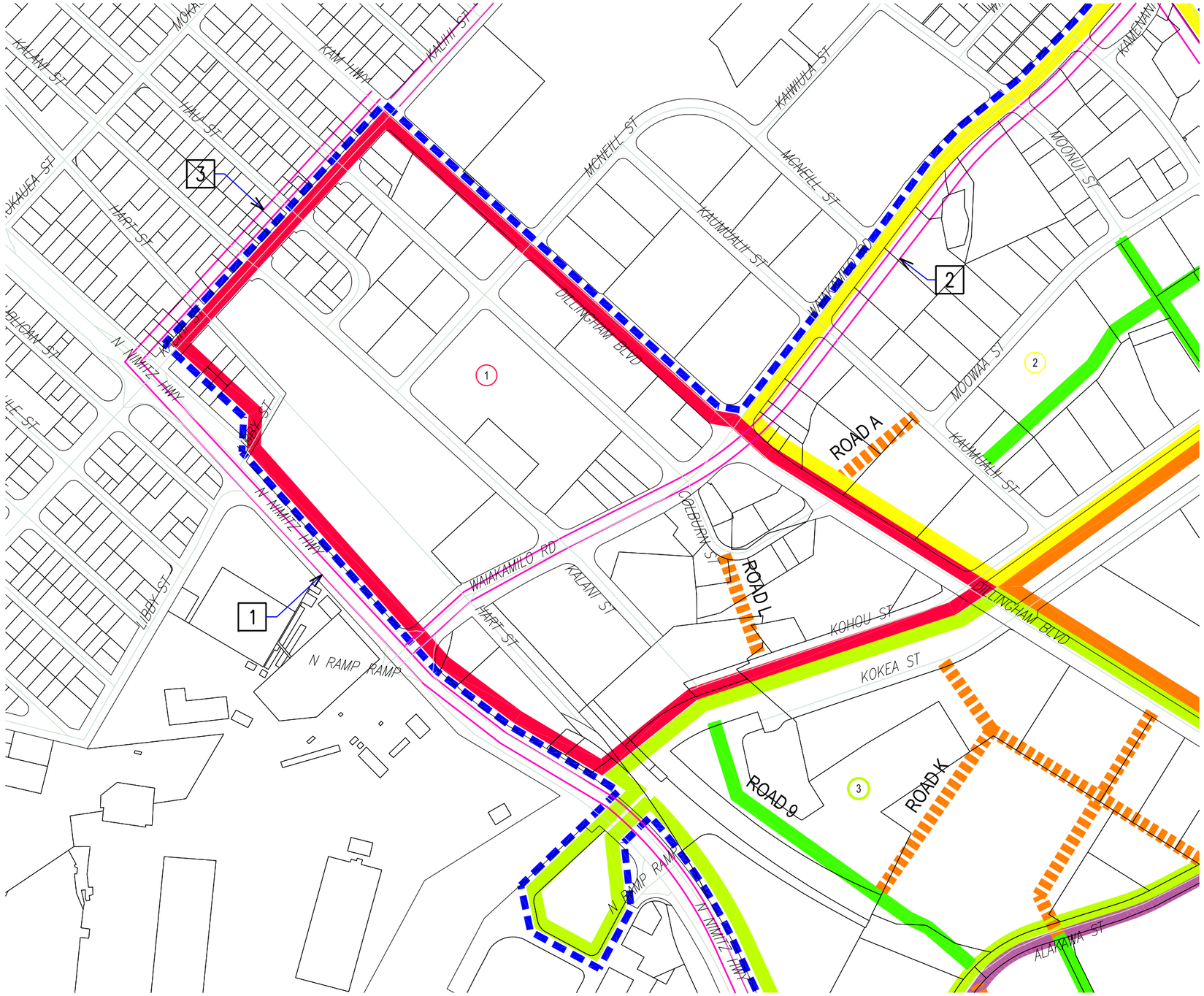

LEGEND

- PHASE 1–2 ROADS
- PHASE 3 ROADS
- PROJECT SITE
- PROPOSED UNDERGROUND ELEC./COMM. INFRASTRUCTURE

DISTRICT 1 NOTES:

1. NIMITZ HWY INFRASTRUCTURE
   HECO : 6–6"C (25KV)
   4–5"C (46KV)
   2–4"C (25KV)
   HTCO : 2–4"C
   CATV : 2–4"C

2. WAIAKAMILO RD INFRASTRUCTURE
   HECO : 4–6"C (25KV)
   2–4"C (25KV)
   HTCO : 2–4"C
   CATV : 2–4"C

3. KALIHI ST INFRASTRUCTURE
   HECO : 4–6"C (25KV)
   4–5"C (46KV)
   2–4"C (25KV)
   HTCO : 2–4"C
   CATV : 2–4"C

NEW ROADS : HECO 2–6"C, 2–4"C
HTCO 2–4"C, CATV 4"C

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NORTH

400' 200' 0 400' 800'
SCALE: 1" = 400'

TOD – KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS – DISTRICT 1

Figure
E-5

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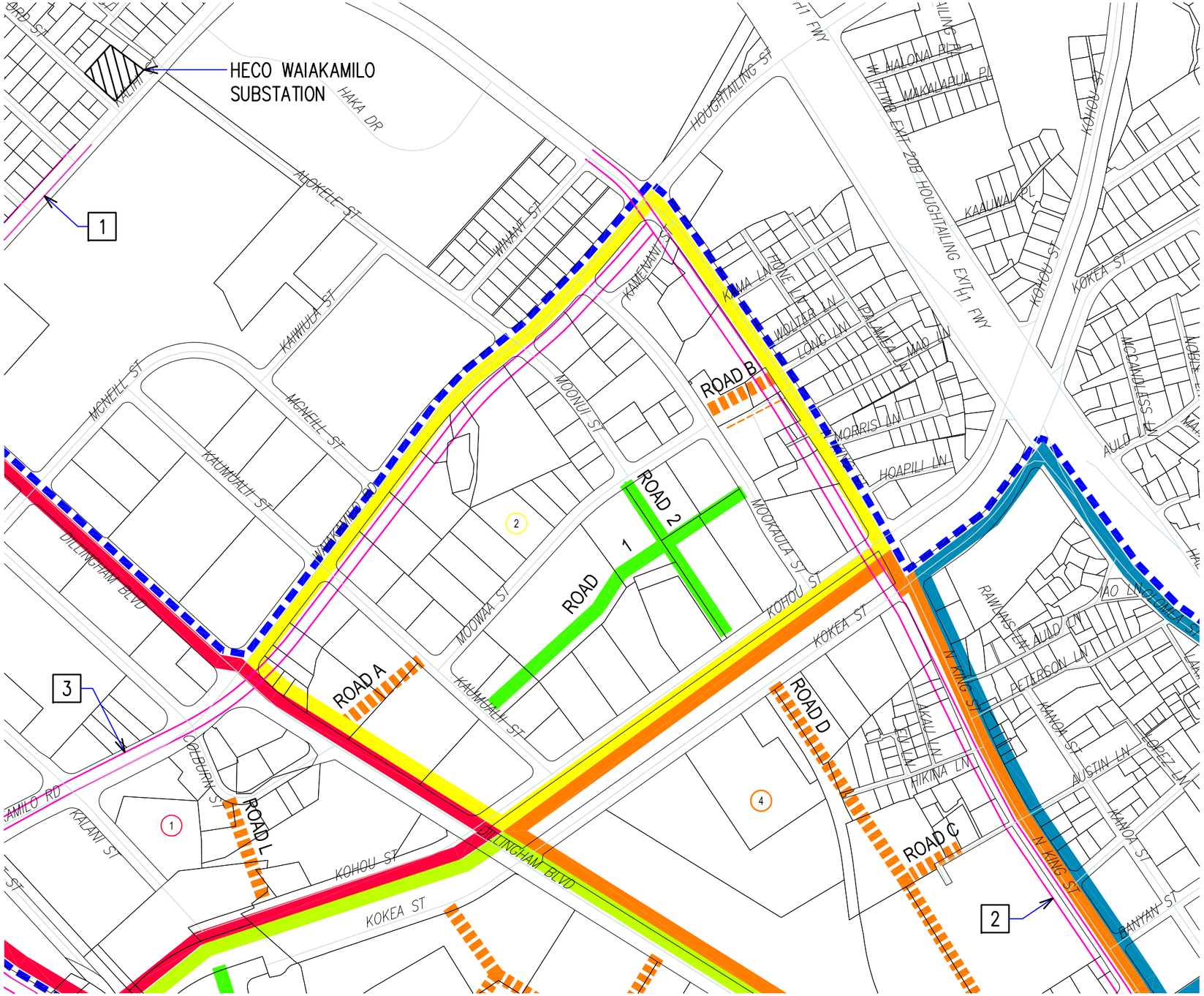

LEGEND

- PHASE 1–2 ROADS
- PHASE 3 ROADS
- PROJECT SITE
- PROPOSED UNDERGROUND ELEC./COMM. INFRASTRUCTURE

DISTRICT 2 NOTES:

1 KALIHI ST INFRASTRUCTURE
HECO : 4–6"C (25KV)
4–5"C (46KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

2 N KING ST INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

3 WAIAKAMILO RD INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

NEW ROADS : HECO 2–6"C, 2–4"C
HTCO 2–4"C, CATV 4"C

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NORTH

400' 200' 0 400' 800'
SCALE: 1" = 400'

TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS - DISTRICT 2

Figure
E-6

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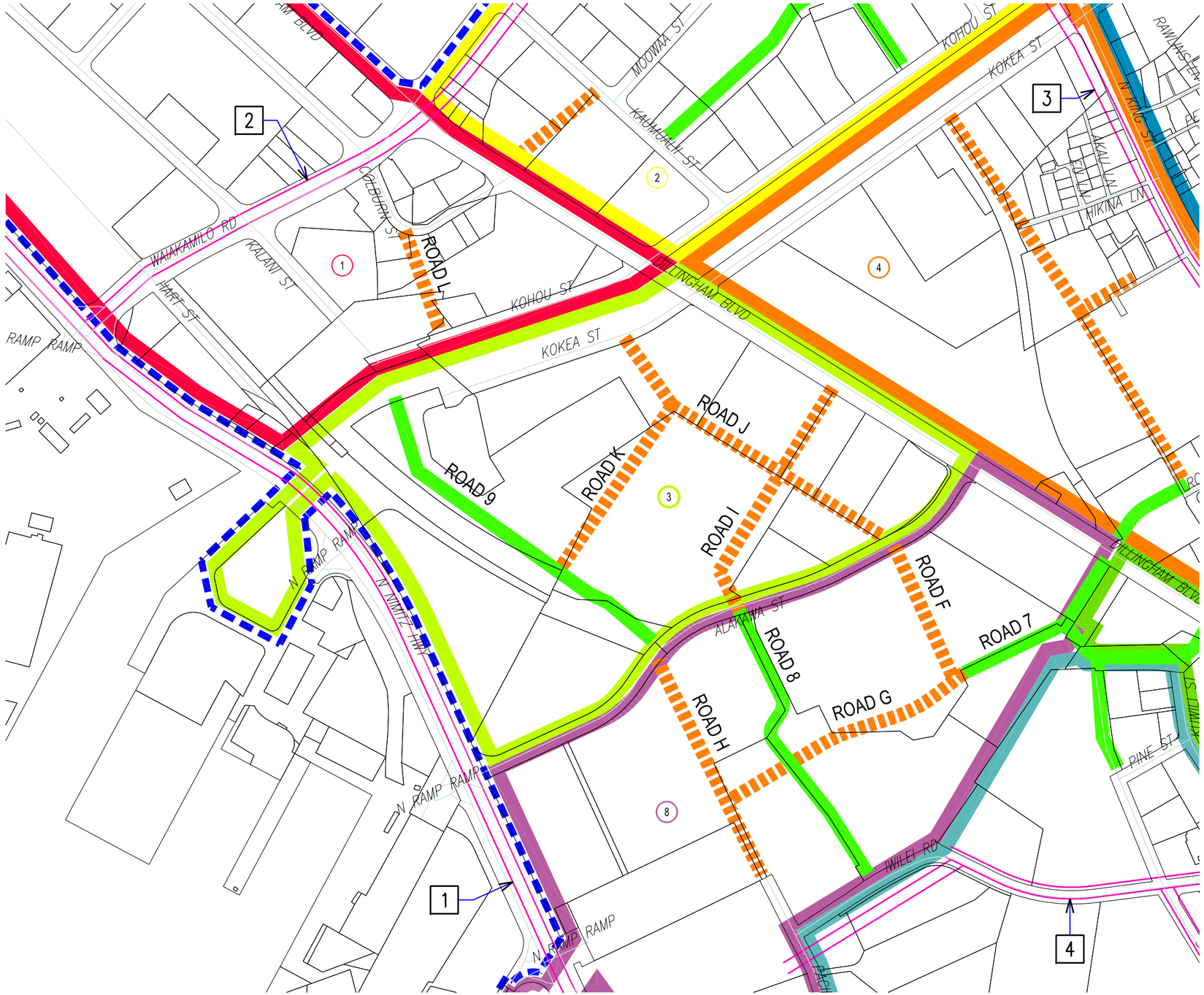

LEGEND

- PHASE 1–2 ROADS
- PHASE 3 ROADS
- PROJECT SITE
- PROPOSED UNDERGROUND ELEC./COMM. INFRASTRUCTURE

DISTRICT 3 NOTES:

1 NIMITZ HWY INFRASTRUCTURE
HECO : 6–6"C (25KV)
4–5"C (46KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

2 WAIAKAMILO RD INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

3 N KING ST INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

4 IWILEI RD INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

NEW ROADS : HECO 2–6"C, 2–4"C
HTCO 2–4"C, CATV 4"C

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NORTH

400' 200' 0 400' 800'
SCALE: 1" = 400'

TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS - DISTRICT 3

Figure
E-7

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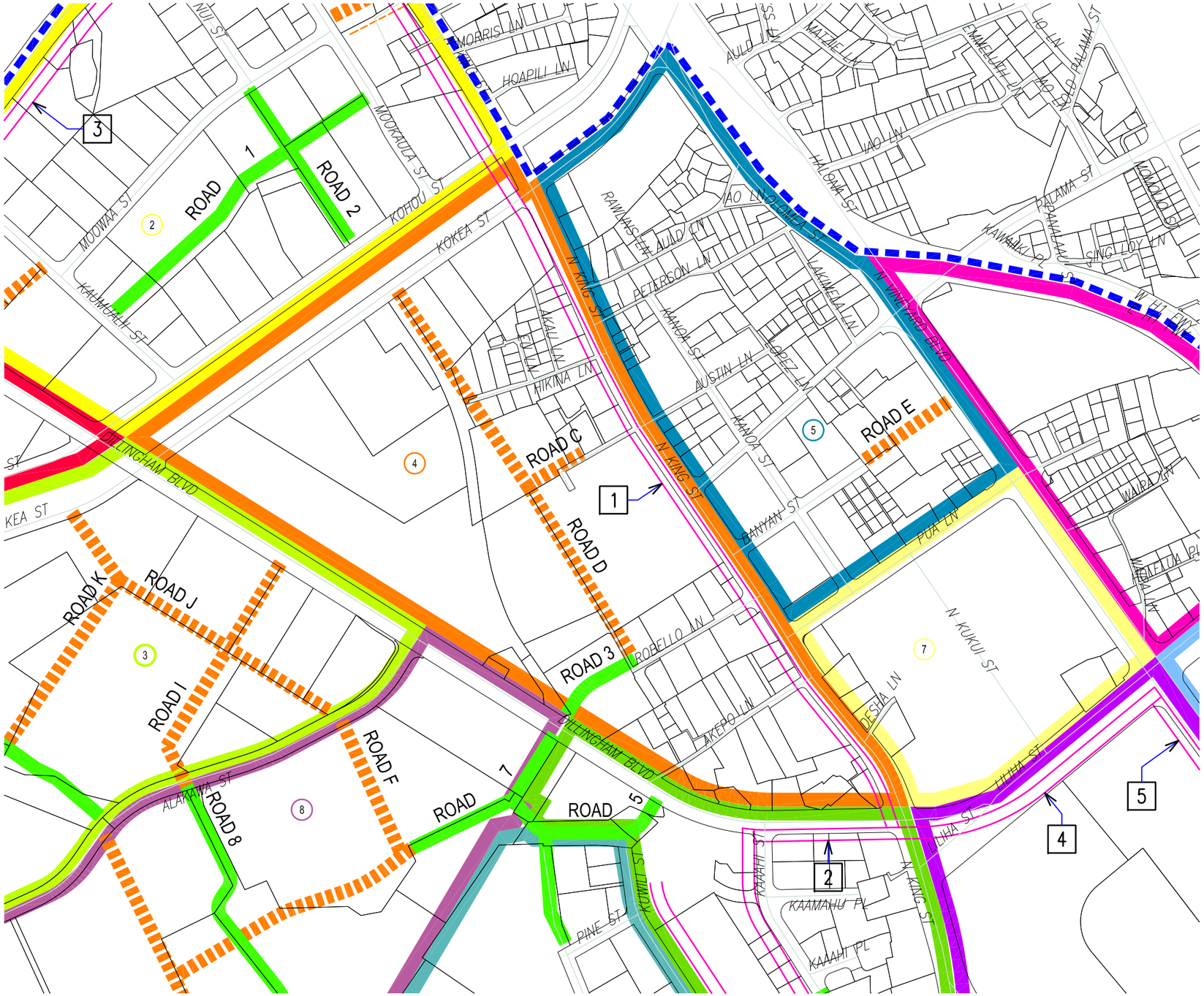

LEGEND

- PHASE 1–2 ROADS
- PHASE 3 ROADS
- PROJECT SITE
- PROPOSED UNDERGROUND ELEC./COMM. INFRASTRUCTURE

DISTRICT 4 AND DISTRICT 5 NOTES:

1 N KING ST INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

2 DILLINGHAM BLVD / KAAAHI ST INFRASTRUCTURE
HECO : 6–6"C (25KV)

3 WAIAKAMILO RD INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

4 LILIHA ST INFRASTRUCTURE
HECO : 6–6"C (25KV)
4–2"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

5 VINEYARD BLVD INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

NEW ROADS : HECO 2–6"C, 2–4"C
HTCO 2–4"C, CATV 4"C

Planning – Engineering – Environmental Services – Photogrammetry – Surveying – Construction Management
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NORTH

400' 200' 0 400' 800'
SCALE: 1" = 400'

TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS - DISTRICT 4 & 5

Figure
E-8

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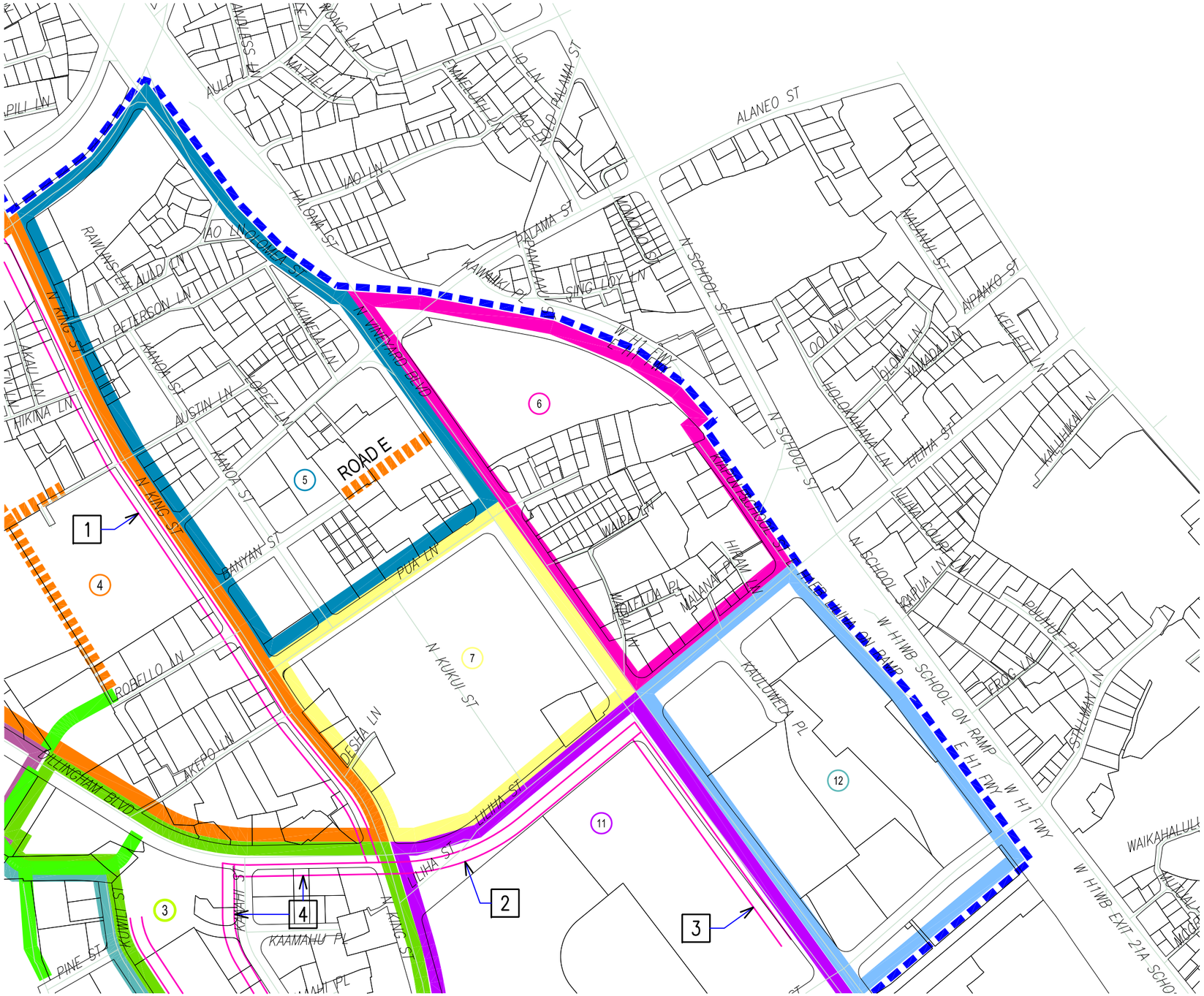

LEGEND

- PHASE 1–2 ROADS
- PHASE 3 ROADS
- PROJECT SITE
- PROPOSED UNDERGROUND ELEC./COMM. INFRASTRUCTURE

DISTRICT 6 NOTES:

1. N KING ST INFRASTRUCTURE
   HECO : 4–6"C (25KV)
   2–4"C (25KV)
   HTCO : 2–4"C
   CATV : 2–4"C

2. LILIHA ST INFRASTRUCTURE
   HECO : 6–6"C (25KV)
   4–2"C (25KV)
   HTCO : 2–4"C
   CATV : 2–4"C

3. VINEYARD BLVD INFRASTRUCTURE
   HECO : 4–6"C (25KV)
   2–4"C (25KV)
   HTCO : 2–4"C
   CATV : 2–4"C

4. DILLINGHAM BLVD / KAAAHI ST INFRASTRUCTURE
   HECO : 6–6"C (25KV)

NEW ROADS : HECO 2–6"C, 2–4"C
HTCO 2–4"C, CATV 4"C

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NORTH

400' 200' 0 400' 800'
SCALE: 1" = 400'

TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS - DISTRICT 6

Figure
E-9

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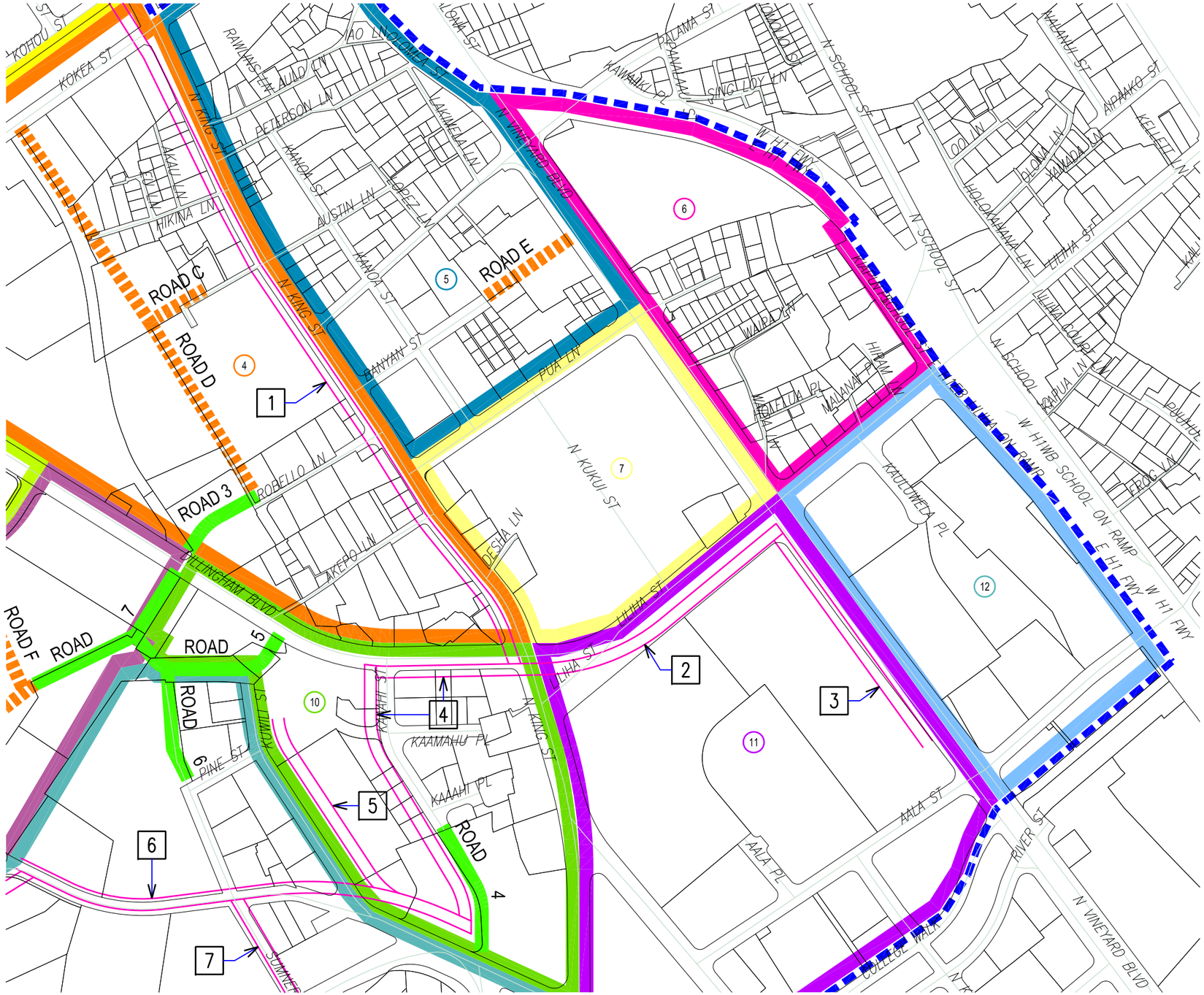

LEGEND

- PHASE 1–2 ROADS
- PHASE 3 ROADS
- PROJECT SITE
- PROPOSED UNDERGROUND ELEC./COMM. INFRASTRUCTURE

DISTRICT 7 AND DISTRICT 10 NOTES:

1 N KING ST INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

2 DILLINGHAM BLVD / KAAAHI ST INFRASTRUCTURE
HECO : 6–6"C (25KV)

3 WAIAKAMILO RD INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

4 LILIHA ST INFRASTRUCTURE
HECO : 6–6"C (25KV)
4–2"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

5 KUWILI ST INFRASTRUCTURE
HECO : 12–6"C (25KV)
4–5"C (46KV)

6 IWILEI RD INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–6"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

7 SUMNER ST INFRASTRUCTURE
HECO : 6–6"C (25KV)
4–5"C (46KV)

NEW ROADS :
HECO : 2–6"C, 2–4"C
HTCO : 2–4"C
CATV : 4"C

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NORTH

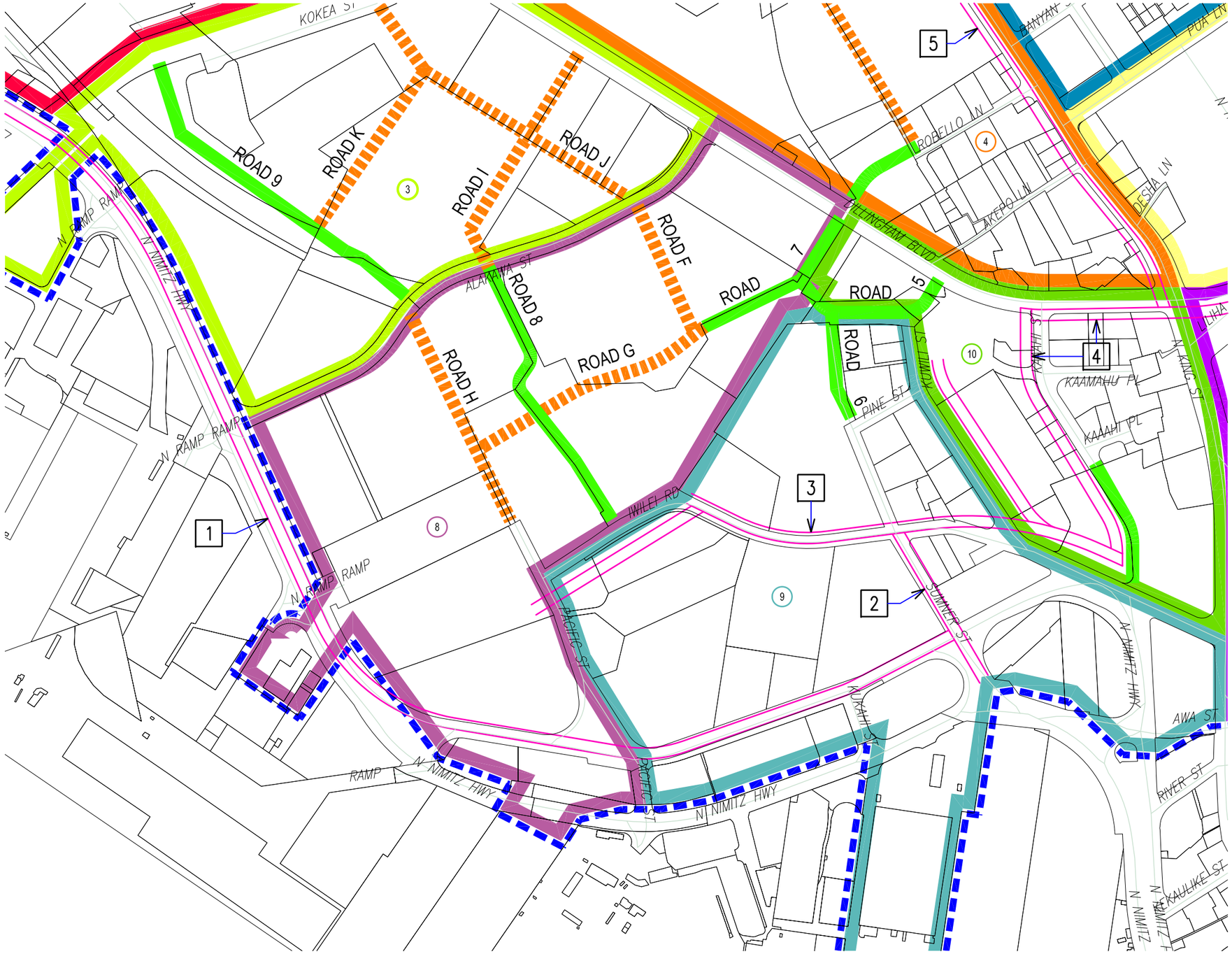
400' 200' 0 400' 800'
SCALE: 1" = 400'

TOD – KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS – DISTRICT 7 & 10

Figure
E-10

LAST SAVE: 04/26/17 @ 09:37:19 BY: RN PLOT SC 1=400.000000
Z:\ACAD\PROJECTS\215138\E010_215138_Elec District 7 and 10 XREFS: STREETS_FOR PLOTS R1=.\STREETS_FOR PLOTS R1 PARCEL TOD AREA=.\PARCEL TOD AREA STREETS_TOD AREA=.\STREETS_TOD AREA _XRH_215138_BACKGND ALL



LEGEND

- PHASE 1–2 ROADS
- PHASE 3 ROADS
- PROJECT SITE
- PROPOSED UNDERGROUND ELEC./COMM. INFRASTRUCTURE

DISTRICT 8 AND DISTRICT 9 NOTES:

1 NIMITZ HWY INFRASTRUCTURE
HECO : 6–6"C (25KV)
4–5"C (46KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

2 SUMNER ST INFRASTRUCTURE
HECO : 6–6"C (25KV)
4–5"C (46KV)

3 IWILEI RD INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–6"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

4 DILLINGHAM BLVD / KAAAHI ST INFRASTRUCTURE
HECO : 6–6"C (25KV)

5 N KING ST INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

NEW ROADS : HECO 2–6"C, 2–4"C
HTCO 2–4"C, CATV 4"C

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NORTH

400' 200' 0 400' 800'
SCALE: 1" = 400'

TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS - DISTRICT 8 & 9

Figure
E-11

LAST SAVE: 04/26/17 @ 09:37:49 BY: RN PLOT SC 1=400.000000

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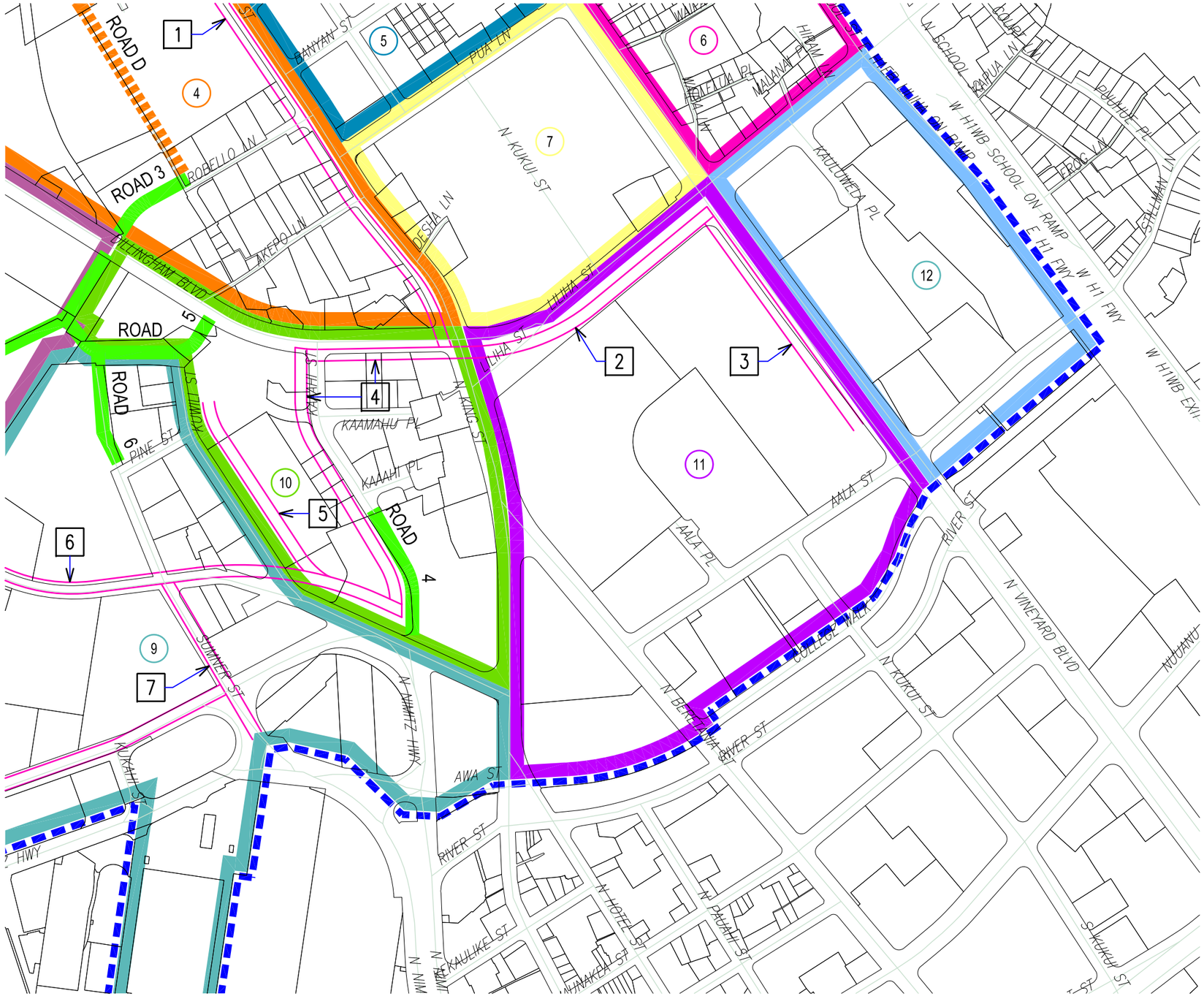

LEGEND

- PHASE 1–2 ROADS
- PHASE 3 ROADS
- PROJECT SITE
- PROPOSED UNDERGROUND ELEC./COMM. INFRASTRUCTURE

DISTRICT 11 AND DISTRICT 12 NOTES:

1 N KING ST INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

2 DILLINGHAM BLVD / KAAAHI ST INFRASTRUCTURE
HECO : 6–6"C (25KV)

3 WAIAKAMILO RD INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–4"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

4 LILIHA ST INFRASTRUCTURE
HECO : 6–6"C (25KV)
4–2"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

5 KUWILI ST INFRASTRUCTURE
HECO : 12–6"C (25KV)
4–5"C (46KV)

6 IWILEI RD INFRASTRUCTURE
HECO : 4–6"C (25KV)
2–6"C (25KV)
HTCO : 2–4"C
CATV : 2–4"C

7 SUMNER ST INFRASTRUCTURE
HECO : 6–6"C (25KV)
4–5"C (46KV)

NEW ROADS :
HECO : 2–6"C, 2–4"C
HTCO : 2–4"C
CATV : 4"C

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NORTH

400' 200' 0 400' 800'
SCALE: 1" = 400'

TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS - DISTRICT 11 & 12

Figure
E-12

LAST SAVE: 04/26/17 @ 09:38:19 BY: RN PLOT SC 1=400.000000
Z:\ACAD\PROJECTS\215138\E012_215138_Elec District 11 and 12 XREFS: STREETS_FOR PLOTS R1=.\STREETS_FOR PLOTS R1 PARCEL TOD AREA=.\PARCEL TOD AREA STREETS_TOD AREA=.\STREETS_TOD AREA _XRH_215138_BACKGND ALL

			UPDATED ANTICIPATED RESIDENTIAL DEVELOPMENT @850 SF/UNIT			ANTICIPATED COMMERCIAL DEVELOPMENT SF		
DISTRICT	GROSS RESIDENTIAL @850 SF/UNIT	GROSS COMMERCIAL	UPDATED PHASE 1	UPDATED PHASE 2	UPDATED PHASE 2	UPDATED PHASE 1	UPDATED PHASE 2	UPDATED PHASE 2
1	3,008	1,231,807	150	902	1,955	61,590	369,542	800,675
2	2,515	770,493	1,006	754	754	308,197	231,148	231,148
3	1,500	608,271	300	450	750	121,654	182,481	304,135
4	1,066	444,016	–	320	746	–	133,205	310,811
5	531	101,804	–	266	266	–	50,902	50,902
6	540	52,983	–	378	162	–	37,088	15,895
7	2,579	80,000	1,676	903	–	52,000	28,000	–
8	965	1,030,505	96	289	579	103,050	309,151	618,303
9	1,011	1,001,472	101	303	607	100,147	300,442	600,883
10	504	525,061	50	151	302	52,506	157,518	315,037
11	805	192,773	564	201	40	134,941	48,193	9,639
12	805	192,773	564	201	40	134,941	48,193	9,639
	NEW AND EXISTING	NEW AND EXISTING						
TOTAL	15,569	6,121,732	4,490	4,918	6,161	1,016,634	1,847,670	3,257,427

TOTAL NEW	13,732	TOTAL NEW	3,014,446
TOTAL GROSS	15,569	TOTAL GROSS	6,121,732

ASSUMPTIONS

PHASE 1 — PHASE 1 REPRESENTS BASICALLY DEVELOPERS INPUT SUB–DISTRICTS, 8, 9 AND 10 HAVE A 15% DEVELOPMENT IN PHASE 1, GIVEN THEIR PROXIMITY TO THE IWILEI STATION AND SHARE HOLDER DISCUSSIONS.

PHASE 2 — PHASE 2 ASSUMES 30% DEVELOPMENT, UNLESS INPUT WAS PROVIDED. SUB–DISTRICTS 5 IS EXPECTED TO HAVE LITTLE DEVELOPMENT (ONLY 60 UNITS) THEREFORE WE EXPECTED 50% OF ITS DEVELOPMENT TO HAPPEN IN PHASE2.

PHASE 3 — THE REST OF DEVELOPMENT IS EXPECTED TO HAPPEN IN PHASE 3 (THE DIFFERENCE OF PHASE 1 AND PHASE 2).

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TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

KAPALAMA & IWILEI TOD DEVELOPMENT OVERLAY

Figure E-13

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Z:\ACAD\PROJECTS\215138\E013_215138_Color Table

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NORTH

800' 400' 0 800' 1600'

SCALE: 1" = 800'

TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS OVERALL MAP - HECO 46KV - ALT 1

* SEGMENTS OF THE EXST 46KV LINES TO BE UNDERGROUND BY HART

Figure

E-15

LAST SAVE: 08/29/18 @ 14:21:13 BY: SSY PLOT SC 1=800.0000

Z:\ACAD\PROJECTS\215138\E015_215138_ALT01_HECO_46KV_Plan01 XREFS: STREETS_FOR PLOTS R1=.\STREETS_FOR PLOTS R1 _XRH_215138_BACKGND ALL=._XRH_215138_BACKGND ALL PARCEL TOD AREA=.\PARCEL TOD AREA STREETS_TOD AREA=.\STREETS_TOD AREA

ELECTRIC AND TELECOMMUNICATIONS UTILITY NOTES

- WITH THE PROPOSED CONSTRUCTION OF THE HRTP GUIDEWAY ALONG DILLINGHAM BOULEVARD AND THE CONSEQUENT UNDERGROUNDING OF ALL ELECTRICAL AND TELECOMMUNICATIONS UTILITIES WITHIN THE ROAD R/W, DILLINGHAM BOULEVARD BECOMES AN IMPRACTICAL ALIGNMENT FOR ADDITIONAL UTILITY DUCTLINES.
- ROUTING OF THE HECO 138 KILO-VOLT (KV) AND 46KV OVERHEAD LINES INDICATED ON THESE PLANS WERE IDENTIFIED BY VISUAL CHECKS AND INTERNET IMAGING.
- PER PROPOSED TOD RULES, NEW ELECTRIC AND TELECOMMUNICATION UTILITIES WILL BE CONSTRUCTED UNDERGROUND. EXISTING OVERHEAD UTILITIES WILL REMAIN OVERHEAD. NO COSTS ARE INCLUDED FOR ANY OVERHEAD-TO-UNDERGROUND SERVICE AND DISTRIBUTION SYSTEM CONVERSIONS.
- IT IS PROPOSED THAT ADDITIONAL SUBSTATION TRANSFORMERS BE INSTALLED BY HECO INTO THEIR WAIAKAMILO SUBSTATION, LOCATED AT THE CORNER OF KALIHI STREET AND ASHFORD STREET, TO PROVIDE ADDITIONAL POWER FOR TOD DEVELOPMENT ON AN INTERIM BASIS, SEE FIGURE E-6 FOR LOCATION
- TO SUPPORT THE LONG-TERM TOD DEVELOPMENT OF IWILEI-KAPALAMA TOD AREA AND TO SUPPORT REGIONAL DEVELOPMENT, IT IS SUGGESTED THAT A 2-ACRE PARCEL BE IDENTIFIED AND DEDICATED FOR DEVELOPMENT OF A HECO 138-25KV SUBSTATION PREFERABLY CLOSER TO THE MIDDLE STREET AREA AND ADJACENT TO THE HECO 138KV LINE. A POSSIBLE LOCATION FOR CONSIDERATION IS THE OAHU COMMUNITY CORRECTIONAL CENTER SITE IF IT IS PROPOSED FOR RE-DEVELOPMENT.
- IT IS PROPOSED THAT ALTHOUGH SOME OF THE PROPOSED UNDERGROUND ELECTRIC UTILITY LINES MAY BE ENERGIZED INITIALLY AT 12KV, THAT THE DUCTLINES AND HECO CABLING BE DESIGNED TO SUPPORT 25KV DISTRIBUTION. THE ROM COSTS ARE BASED ON THIS ASSUMPTION.
- AS-BUILT PLANS OF THE EXISTING OVERHEAD AND UNDERGROUND ELECTRIC UTILITY LINES WERE SOLICITED FROM HAWAIIAN ELECTRIC COMPANY (HECO), BUT ARE UNAVAILABLE AT PRESENT.
- EXCEPT FOR NEW ROADWAYS, ROM COSTS FOR ELECTRIC AND TELECOMMUNICATIONS UNDERGROUND INFRASTRUCTURE DO NOT INCLUDE COSTS FOR STREET LIGHT AND TRAFFIC SIGNAL UPGRADES OR REHABILITATION.
- WAIKAMILO SUBSTATION AND IWILEI TRANSMISSION SUBSTATION EXPANSION COSTS ARE ASSUMED TO BE HECO "SYSTEM" COSTS AND NO BUDGETS ARE INCLUDED HEREIN.
- INTERCEPT & CONNECT THE PROPOSED NIMITZ HIGHWAY 25KV INFRASTRUCTURE TO THE EXISTING ALAKAWA STREET INFRASTRUCTURE.
- NIMITZ HWY AND KALIHI STREET ARE STATE R/W'S. NEW UNDER UNDERGROUND DUCT SYSTEMS WITHIN THESE ROADWAYS WILL REQUIRE USE-AND-OCCUPANCY AGREEMENTS BETWEEN THE UTILITY COMPANIES AND THE STATE DEPT. OF TRANSPORTATION.

ROM COST SUMMARY

ROADWAY	UG NFRASTRUCTURE	HECO 46KV
NIMITZ HIGHWAY INFRASTRUCTURE TOTAL	$27,000,000	
KALIHI STREET INFRASTRUCTURE TOTAL	$5,000,000	$3,000,000
WAIKAMILO ROAD INFRASTRUCTURE TOTAL	$5,000,000	
N KING STREET INFRASTRUCTURE TOTAL	$10,000,000	$12,000,000
LILIHA STREET INFRASTRUCTURE TOTAL	$2,000,000	
VINEYARD BLVD INFRASTRUCTURE TOTAL	$1,750,000	
IWILEI ROAD INFRASTRUCTURE TOTAL	$1,500,000	
IWILEI ROAD (N SUMNER ST) INFRASTRUCTURE TOTAL	$1,600,000	$900,000
KAAAHI STREET INFRASTRUCTURE TOTAL	$1,400,000	$1,600,000
DILLINGHAM BLVD INFRASTRUCTURE TOTAL	$900,000	$1,100,000
KUWILI STREET INFRASTRUCTURE TOTAL	$3,600,000	$2,400,000
SUMNER STREET INFRASTRUCTURE TOTAL	$1,500,000	
PHASE 1 & 2 ROADS INFRASTRUCTURE TOTAL	$5,000,000	
PHASE 3 ROADS INFRASTRUCTURE TOTAL	$6,000,000	
IWILEI TOD ELEC & COMM TOTAL	$72,250,000	$21,000,000

ROM COSTS FOR EXISTING ROADS INCLUDE BUDGET ALLOWANCES FOR:
SAWCUT; PAVEMENT REPAIRS; PATCHING; SHORING; DEWATERING; AND TRAFFIC CONTROL.

ROM COST FOR ALL ROADS INCLUDE BUDGET COTS FOR ANTICIPATED HECO CABLING & EQUIPMENT CHARGES.

ROM COSTS FOR ELECTRIC AND TELECOMMUNICATIONS UNDERGROUND INFRASTRUCTURE ALONG EXISTING ROAD RIGHTS-OF-WAYS INCLUDE THE INSTALLATION OF CONDUITS FOR TELECOMMUNICATIONS TRUNKING (TRANSMISSION) LINES ONLY. IT IS ASSUMED THAT ADDITIONAL TELECOMMUNICATIONS DISTRIBUTION CABLES WILL BE INSTALLED ON EXISTING JOINT POLE LINES OR EXISTING UNDERGROUND FACILITIES.

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TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS - NOTES & ROM COST - ALT 1

Figure E-16

LAST SAVE: 04/26/17 @ 11:08:02 BY: RN PLOT SC 1"=0"=1'
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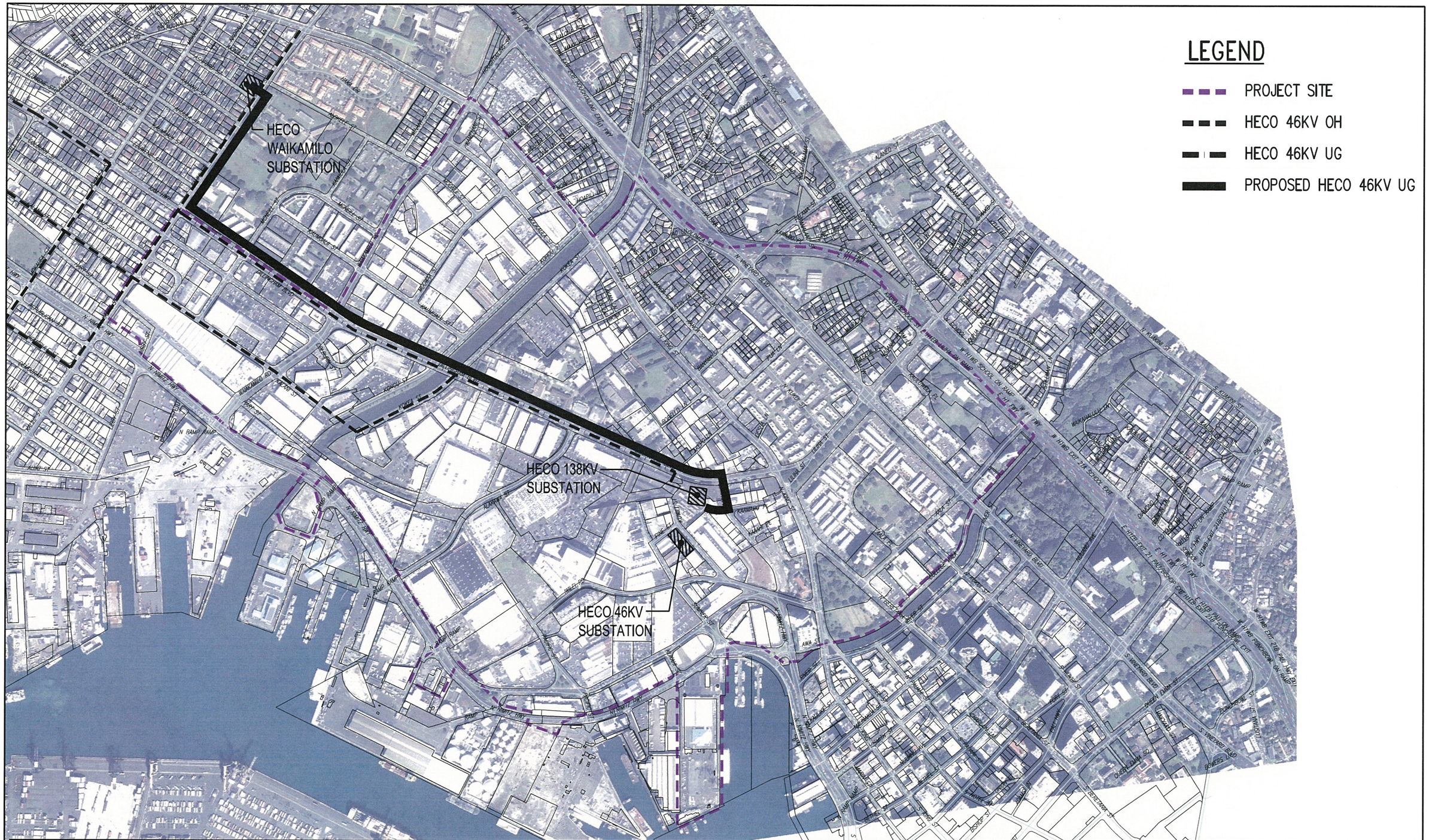

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NORTH

800' 400' 0 800' 1600'

SCALE: 1" = 800'

TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS OVERALL MAP - HECO 46KV - ALT 2

* SEGMENTS OF THE EXST 46KV LINES TO BE UNDERGROUND BY HART

Figure

E-26

LAST SAVE: 02/07/18 @ 13:24:29 BY: RN PLOT SC 1=800.0000

Z:\ACAD\PROJECTS\215138\E026_215138_ALT02_HECO_46KV_Plan01 XREFS: STREETS_FOR PLOTS R1=.\STREETS_FOR PLOTS R1 _XRH_215138_BACKGND ALL=._XRH_215138_BACKGND ALL PARCEL TOD AREA=.\PARCEL TOD AREA STREETS_TOD AREA=.\STREETS_TOD AREA

ELECTRIC AND TELECOMMUNICATIONS UTILITY NOTES

- WITH THE PROPOSED CONSTRUCTION OF THE HRTP GUIDEWAY ALONG DILLINGHAM BOULEVARD AND THE CONSEQUENT UNDERGROUNDING OF ALL ELECTRICAL AND TELECOMMUNICATIONS UTILITIES WITHIN THE ROAD R/W, DILLINGHAM BOULEVARD BECOMES AN IMPRACTICAL ALIGNMENT FOR ADDITIONAL UTILITY DUCTLINES.
- ROUTING OF THE HECO 138 KILO-VOLT (KV) AND 46KV OVERHEAD LINES INDICATED ON THESE PLANS WERE IDENTIFIED BY VISUAL CHECKS AND INTERNET IMAGING.
- PER PROPOSED TOD RULES, NEW ELECTRIC AND TELECOMMUNICATION UTILITIES WILL BE CONSTRUCTED UNDERGROUND. EXISTING OVERHEAD UTILITIES WILL REMAIN OVERHEAD. NO COSTS ARE INCLUDED FOR ANY OVERHEAD-TO-UNDERGROUND SERVICE AND DISTRIBUTION SYSTEM CONVERSIONS.
- IT IS PROPOSED THAT ADDITIONAL SUBSTATION TRANSFORMERS BE INSTALLED BY HECO INTO THEIR WAIAKAMILO SUBSTATION, LOCATED AT THE CORNER OF KALIHI STREET AND ASHFORD STREET, TO PROVIDE ADDITIONAL POWER FOR TOD DEVELOPMENT ON AN INTERIM BASIS, SEE FIGURE E-6 FOR LOCATION
- TO SUPPORT THE LONG-TERM TOD DEVELOPMENT OF IWILEI-KAPALAMA TOD AREA AND TO SUPPORT REGIONAL DEVELOPMENT, IT IS SUGGESTED THAT A 2-ACRE PARCEL BE IDENTIFIED AND DEDICATED FOR DEVELOPMENT OF A HECO 138-25KV SUBSTATION PREFERABLY CLOSER TO THE MIDDLE STREET AREA AND ADJACENT TO THE HECO 138KV LINE. A POSSIBLE LOCATION FOR CONSIDERATION IS THE OAHU COMMUNITY CORRECTIONAL CENTER SITE IF IT IS PROPOSED FOR RE-DEVELOPMENT.
- IT IS PROPOSED THAT ALTHOUGH SOME OF THE PROPOSED UNDERGROUND ELECTRIC UTILITY LINES MAY BE ENERGIZED INITIALLY AT 12KV, THAT THE DUCTLINES AND HECO CABLING BE DESIGNED TO SUPPORT 25KV DISTRIBUTION. THE ROM COSTS ARE BASED ON THIS ASSUMPTION.
- AS-BUILT PLANS OF THE EXISTING OVERHEAD AND UNDERGROUND ELECTRIC UTILITY LINES WERE SOLICITED FROM HAWAIIAN ELECTRIC COMPANY (HECO), BUT ARE UNAVAILABLE AT PRESENT.
- EXCEPT FOR NEW ROADWAYS, ROM COSTS FOR ELECTRIC AND TELECOMMUNICATIONS UNDERGROUND INFRASTRUCTURE DO NOT INCLUDE COSTS FOR STREET LIGHT AND TRAFFIC SIGNAL UPGRADES OR REHABILITATION.
- WAIKAMILO SUBSTATION AND IWILEI TRANSMISSION SUBSTATION EXPANSION COSTS ARE ASSUMED TO BE HECO "SYSTEM" COSTS AND NO BUDGETS ARE INCLUDED HEREIN.
- INTERCEPT & CONNECT THE PROPOSED NIMITZ HIGHWAY 25KV INFRASTRUCTURE TO THE EXISTING ALAKAWA STREET INFRASTRUCTURE.
- NIMITZ HWY AND KALIHI STREET ARE STATE R/W'S. NEW UNDER UNDERGROUND DUCT SYSTEMS WITHIN THESE ROADWAYS WILL REQUIRE USE-AND-OCCUPANCY AGREEMENTS BETWEEN THE UTILITY COMPANIES AND THE STATE DEPT. OF TRANSPORTATION.
- FOR ALTERNATE 2, IT IS ASSUMED THAT AN AGREEMENT CAN BE REACHED BETWEEN HART, THE CITY AND COUNTY AND HECO TO PLACE AND MAINTAIN THE 46KV CABLE AND INFRASTRUCTURE WITHIN THE GUIDEWAY.
- NO COSTS ARE INCLUDED TO ADJUST THE GUIDEWAY STRUCTURE TO ACCEPT THE 46KV INFRASTRUCTURE AND TO PROVIDE TRANSITIONING FROM THE STRUCTURE TO AN UNDERGROUND DUCT SYSTEM.

ROM COST SUMMARY

ROADWAY	UG NFRASTRUCTURE	HECO 46KV
NIMITZ HIGHWAY INFRASTRUCTURE TOTAL	$27,000,000	
KALIHI STREET INFRASTRUCTURE TOTAL	$5,000,000	$1,500,000
WAIKAMILO ROAD INFRASTRUCTURE TOTAL	$5,000,000	
N KING STREET INFRASTRUCTURE TOTAL	$5,000,000	
LILIHA STREET INFRASTRUCTURE TOTAL	$10,000,000	
VINEYARD BLVD INFRASTRUCTURE TOTAL	$2,000,000	
IWILEI ROAD INFRASTRUCTURE TOTAL	$1,750,000	
IWILEI ROAD (N SUMNER ST) INFRASTRUCTURE TOTAL	$1,500,000	
KAAAHI STREET INFRASTRUCTURE TOTAL	$1,100,000	$900,000
DILLINGHAM BLVD INFRASTRUCTURE TOTAL	$800,000	
KUWILI STREET INFRASTRUCTURE TOTAL	$3,500,000	$2,500,000
SUMNER STREET INFRASTRUCTURE TOTAL HECO 46KV IN HRTP GUIDEWAY	$1,500,000	$11,000,000
PHASE 1 & 2 ROADS INFRASTRUCTURE TOTAL	$5,000,000	
PHASE 3 ROADS INFRASTRUCTURE TOTAL	$6,000,000	
IWILEI TOD ELEC & COMM TOTAL	$71,380,000	$13,400,000

ROM COSTS FOR EXISTING ROADS INCLUDE BUDGET ALLOWANCES FOR:
SAWCUT; PAVEMENT REPAIRS; PATCHING; SHORING; DEWATERING; AND TRAFFIC CONTROL.

ROM COST FOR ALL ROADS INCLUDE BUDGET COTS FOR ANTICIPATED HECO CABLING & EQUIPMENT CHARGES.

ROM COSTS FOR ELECTRIC AND TELECOMMUNICATIONS UNDERGROUND INFRASTRUCTURE ALONG EXISTING ROAD RIGHTS-OF-WAYS INCLUDE THE INSTALLATION OF CONDUITS FOR TELECOMMUNICATIONS TRUNKING (TRANSMISSION) LINES ONLY. IT IS ASSUMED THAT ADDITIONAL TELECOMMUNICATIONS DISTRIBUTION CABLES WILL BE INSTALLED ON EXISTING JOINT POLE LINES OR EXISTING UNDERGROUND FACILITIES.

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TOD - KAPALAMA AND IWILEI CONCEPTUAL MASTER PLAN

ELECTRIC AND TELECOMMUNICATIONS - NOTES & ROM COST - ALT 2

Figure E-27

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